

400W Series

Instructions for Continued Airworthiness

Document Number 190-00356-65 Rev. D

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Olathe, Kansas 66062 USA**

Record of Revision

Rev.	Date	Description of Change
1	10-19-06	Initial Release
A	11-03-06	Revision for STC Issuance
B	07-30-09	Add the "-D" to STC number when reissued under ODA
C	02-28-13	Revise to support software version 5.02. Clarify inspections. Add electrical bonding check.
D	11-20-14	Revise to support software version 5.20 with Flight Stream 210.

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1. INTRODUCTION

1.1 PURPOSE

This document is designed for use by the installing agency of the Garmin Model 400W Series GPS/WAAS Nav/Com as Instructions for Continued Airworthiness in response to Federal Aviation regulation (FAR) Part 23.1529, and Part 23 Appendix G. The ICA includes information required by the operator to adequately maintain the Garmin Models 400W series installed under Approved Model List (AML) STC SA01933LA-D.

1.2 Scope

This document identifies the Instruction for Continued Airworthiness for the modification of the aircraft for installation of the Garmin Models 400W series GPS/WAAS Nav/Com installed under Approved Model List (AML) STC SA01933LA-D. This includes the optional accessory to the GNS 400W, the Flight Stream 210.

1.3 Document Control

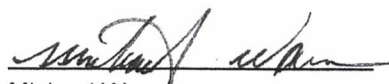
This document shall be released, archived, and controlled in accordance with the Garmin document control system. When this document is revised, refer to Section 2.15 for information on how to gain FAA acceptance or approval and how to notify customers of changes.

1.4 Airworthiness Limitations Section

There are no additional Airworthiness Limitations as defined in 14 CFR § 23, Appendix G. G23.4 that result from this modification.

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

FAA APPROVED


Michael Warren
ODA STC Unit Administrator
ODA-240087-CE

Date

20-NOV-2014

1.5 Permission to Use Certain Documents

Permission is granted to any corporation or person applying for approval of a Garmin Model 400W Series to use and reference appropriate STC documents to accomplish the Instructions for Continued Airworthiness and show compliance with STC engineering data. This permission does not construe suitability of the documents. It is the responsibility of the applicant to determine the suitability of the documents for the ICA.

1.6 Definitions

The following terminology is used within this document:

- 1) **AC:** Advisory Circular
- 2) **ACO:** Aircraft Certification Office
- 3) **AEG:** Aircraft Evaluation Group
- 4) **BIT:** Built in Test
- 5) **CFR:** Code of Federal Regulations
- 6) **DER:** Designated Engineering Representative
- 7) **FAA:** Federal Aviation Administration
- 8) **IAW:** In Accordance With
- 9) **ICA:** Instructions for Continued Airworthiness
- 10) **MFD:** Multi-Function Display unit
- 11) **ODA:** Organization Designation Authorization
- 12) **PED:** Portable Electronic Device
- 13) **PMI:** Primary Manufacturing Inspector
- 14) **POI:** Primary Operations Inspector
- 15) **STC:** Supplemental Type Certificate
- 16) **TC:** Type Certification or Type Certificate
- 17) **TSO:** Technical Standard Order

2. INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 Introduction

Content, Scope, Purpose and Arrangement:	This document identifies the Instructions for Continued Airworthiness for the modification of the aircraft by installation of the Garmin Models 400W Series GPS/WAAS Nav/Com.
Applicability:	Applies to aircraft altered by installation of the Garmin Model 400W Series GPS/WAAS Nav/Com.
Definition of Abbreviations:	See Section 1.6
Precautions:	None
Units of measurement:	None
Referenced publications:	190-00356-02 Rev. K <i>400W Series Installation Manual</i> or later revision 005-C0221-00 Rev. J <i>400W Series STC Master Data List</i> or later revision
Retention:	This document, or the information contained within, will be included in the aircraft's permanent records.

2.2 Description of Alteration

The Garmin Model 400W Series GPS/WAAS Nav/Com unit is a 6 ¼ inch wide panel mounted unit with all the interface connections behind the instrument panel. Installation of the Garmin Model 400W Series GPS/WAAS Nav/Com system interfaces, specific for the aircraft installation, is documented in the GNS 400W Series Post-Installation Checkout Log that is retained as part of the aircraft's permanent records. The 400W Series units combine a large number of easily acceptable controls to use the color multi-function display, Nav and Com transceiver, GPS/WAAS navigator in a single unit.

The Flight Stream 210 brings Bluetooth connectivity to the cockpit, allowing portable electronics to stream data to and from the installed avionics.

The Flight Stream 210 interfaces to the GNS 400W via RS-232. The Flight Stream 210 may also interface to the GDL 88 through RS-422 and the GDL 69 through RS-232. The Flight Stream unit is a remote mount LRU that may be located in a variety of places around the aircraft. The suggested locations are in the cabin/cockpit area, or in the forward or aft avionics bay. See Section 3.10 in the 400W Series Installation Manual, 190-00356-02 for suggested locations and mounting information.

2.3 Control, Operating Information

See the *400W Series Installation Manual*, listed under the reference documentation in paragraph 2.1 of this document, for system operation and self-test information.

2.4 Servicing Information

None. In the event of system failure, return the unit to the manufacturer or an approved Garmin repair station.

2.5 Periodic Maintenance Instructions

The 400W Series units are designed to detect internal failure. A thorough self-test is executed automatically upon application of power to the units, and built-in test is continuously executed. Detected errors are indicated on the equipment via failure annunciations and maintenance is on-condition.

Operation of the 400W Series unit is not permitted unless an inspection as described in this section has been completed within the preceding 12 calendar months. Conduct a visual inspection on the 400W series unit, its wire harness, and the Flight Stream 210 (if installed) to insure installation integrity:

1. Inspect the 400W and Flight Stream units for security of attachment. If the Flight Stream 210 is installed and screws are not securely attached, tighten any loose Flight Stream 210 mounting screws as necessary to snug plus ¼ turn. If required, re-torque bonding strap hardware to 12-15 in-lbs.



CAUTION

Care should be taken when tightening the mounting screws of the Flight Stream 210. Excessive tightening may damage the mounting flange.

2. Inspect for signs of corrosion.
3. Inspect all knobs and buttons for legibility.
4. Inspect condition of wiring, shield terminations, routing and attachment/clamping.

5. Inspect electrical bonding components. Perform bonding check, if due (see Section 2.5.4).

2.5.1 Cleaning the Front Panel

The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water. DO NOT use any chemical-cleaning agents. Care should be taken to avoid scratching the surface of the display.

2.5.2 Display Backlight

The display backlight lamp is rated by the manufacturer as having a usable life of 20,000 hours. This life may be more or less than the rated time depending on the operating conditions of the 400W series unit. Over time, the backlight lamp may dim and the display may not perform as well in direct sunlight conditions. The user must determine by observation when the display brightness is not suitable for its intended use. Contact the Garmin factory repair station when the backlight lamp requires service.

2.5.3 Battery Replacement

The 400W series has an internal keep-alive battery that will last about 10 years. The battery is used for GPS system information. Regular planned replacement is not necessary. The 400W series will display a 'low battery' message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months.

If the battery is not replaced and becomes totally discharged, the 400W series unit will remain fully operational, but the GPS signal acquisition time may be increased. This acquisition time can be reduced by entering a new seed position each time the unit is powered on. There is no loss of function or accuracy of the 400W series unit with a dead battery.

The battery must be replaced by the Garmin factory repair station or factory authorized repair station.

2.5.4 Bonding Check (IFR-certified aircraft only)

Every 2000 flight hours or ten (10) years, whichever is first, perform an electrical bonding check on the GNS 400W Series Unit and if installed, the Flight Stream 210. If a bonding check was not done during the initial installation, it must be done to support electromagnetic interference and lightning compliance.

2.5.4.1 GNS 400W Series Unit in Metallic or Tube/Fabric Aircraft

Perform an electrical bonding check as follows:

1. Remove the 400W unit from the mounting rack.
2. Remove the backplate assembly from the rack.
3. Measure the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure and verify it is less than 10 milliohms.

In the event of bonding test failure, remove the 400W rack and clean the attachment points with a bonding brush at both the 400W rack and the aircraft and reattach the rack to the rails in the panel. Verify the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure is less than 2.5 milliohms.

4. Reinstall the backplate assembly and reinstall the 400W in the mounting rack.

2.5.4.2 GNS 400W Series Unit in Composite Aircraft

Perform an electrical bonding check as follows:

1. Remove the 400W unit from the mounting rack.
2. Remove the backplate assembly from the rack.
3. Measure the resistance between the mounting rack and the instrument panel, verify it is less than 10 milliohms.

In the event of bonding test failure, remove the 400W rack and clean the attachment points with a bonding brush at both the 400W rack and the aircraft and reattach the rack to the rails in the panel. Verify the resistance between the mounting rack and the instrument panel is less than 5 milliohms.

4. Reinstall the backplate assembly and reinstall the 400W in the mounting rack.

2.5.4.3 Flight Stream 210 in Metallic or Tube/Fabric Aircraft

1. Disconnect the shield terminations from the Flight Stream 210 connector backshell.
2. Measure the resistance between the connector and nearby exposed portion of aircraft metallic structure and verify that it is less than or equal to 20 milliohms.

In the event of bonding test failure, remove the Flight Stream 210 connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Verify the resistance between the Flight Stream 210 connector and aircraft structure is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and re-attach the Flight Stream 210 side.

3. Connect the shield terminations to the Flight Stream 210 connector backshell.

2.5.4.4 Flight Stream 210 in Composite Aircraft

1. Disconnect the shield terminations from the Flight Stream 210 connector backshell.
2. Measure the resistance between the connector and instrument panel (or other aircraft ground) and verify that it is less than or equal to 20 milliohms.

In the event of a bonding test failure, remove the Flight Stream 210 connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Verify the resistance between the Flight Stream 210 connector and aircraft ground is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and re-attach on the Flight Stream 210 side.

3. Connect the shield terminations to the Flight Stream 210 connector backshell.

2.6 Troubleshooting Information

If error indications are displayed on the 400W series unit, consult the Troubleshooting section contained in the 400W Series Installation Manual, listed under reference documentation in paragraph 2.1 of this document. The same troubleshooting section also contains troubleshooting information for the Flight Stream 210. The 400W Series Post-Installation Checkout Log' in the aircraft permanent records includes the configuration information for the installation. (See Section 5 in the *400W Series Installation Manual* for a sample Log).

2.7 Removal and Replacement Information

2.7.1 GNS 400W

If the 400W series unit is removed and reinstalled, verify that the 400W series unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

If the 400W series unit is removed for repair and reinstalled, or if the 400W unit is removed and replaced with a different 400W series unit, then follow 'Post Installation Configuration & Checkout Procedures' contained in the *400W Series Installation Manual* listed in Section 2.1 of this document, and verify the 400W unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

If any work has been done on the aircraft that could affect the system wiring, antenna cable, or any interconnected equipment, verify the 400W series unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

To remove the 400W series unit from the mounting rack, insert a 3/32-inch hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool counterclockwise until the unit is forced out about 3/8 inches and can be freely pulled from the rack.

The 400W unit is installed in the rack by sliding it straight in until it stops, about 1 inch short of the final position. Insert the hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool clockwise while pressing on the left side of the bezel until the unit is firmly seated in the rack.

Note: There are no special handling requirements for the 400W series units.

2.7.2 Flight Stream 210 (If Installed)

See Figure 1 when performing the following steps:

Removal

1. Locate and open the BT Link circuit breaker.
2. Unscrew the two jackscrews on the Flight Stream 210 connector. Remove connector.
3. Remove the four #6 mounting screws to remove the Flight Stream 210.

Reinstallation

1. Check that the BT Link circuit breaker is open.
2. Reinstall the Flight Stream 210 using the four previously removed #6 mounting screws.
3. Tighten fasteners until snug, plus an additional 1/4 turn.

Note: *Ensure that the Flight Stream 210 is mounted with the arrow pointing in the direction of flight.*

4. Attach the connector, tightening the two jackscrews.
5. Close the B/T Link circuit breaker.
6. Complete the interface checkout procedures contained in Section 5.5.7 of the 400W Series Installation Manual.

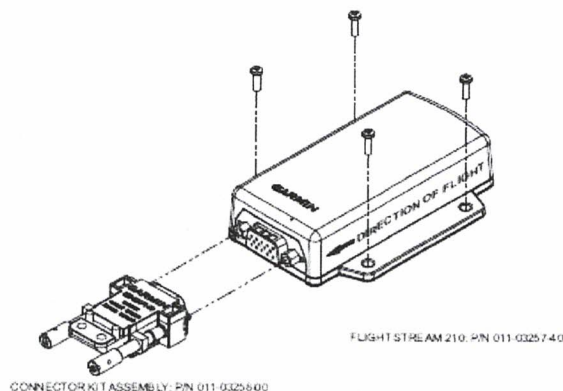


Figure 1. Flight Stream 210 Assembly Overview (Bonding Strap Not Shown)

2.7.3 Flight Stream 210 Bonding Strap

The following removal and replacement steps are provided as guidance for replacing the Flight Stream 210 bonding strap. The bonding strap assembly drawing is shown in Figure 2.

Note: Aircraft structure side of bonding strap may be mounted using a nut in lieu of a nut plate. If a nut was used in lieu of a nut plate, further disassembly of the aircraft may be required to gain access to the nut.

Removal

1. Disconnect one end of the bonding strap from the aircraft ground location.
2. Disconnect the other end of the bonding strap from the shield block on the Flight Stream 210 connector backshell.
3. Remove the bonding strap.

Replacement

Note: The Flight Stream 210 bonding strap should be as short as practical. When installed, the bonding strap must not loop back on itself.

1. Construct a bonding strap no longer than 20" by attaching clean terminal lugs to both ends of clean braid (See Table 1 for parts required).
2. Clean the attachment locations with a bonding brush.
3. Secure each end of the bonding strap to the previously installed locations. Ensure that the strap does not loop back on itself and that the hardware is as shown in Figure 2. The washers must seat fully against the aircraft metallic structure without overhang or interference with other hardware.
4. Using a milliohm meter, verify that the resistance between the connected structure is less than 10 milliohms.

In the event of a bonding test failure, remove the bonding strap from the aircraft ground point and clean the attachment points with a bonding brush. Re-install the bonding strap and perform the electrical bonding test in accordance with Section 2.5.4.

5. Replace any damaged hardware, otherwise hardware may be reused.

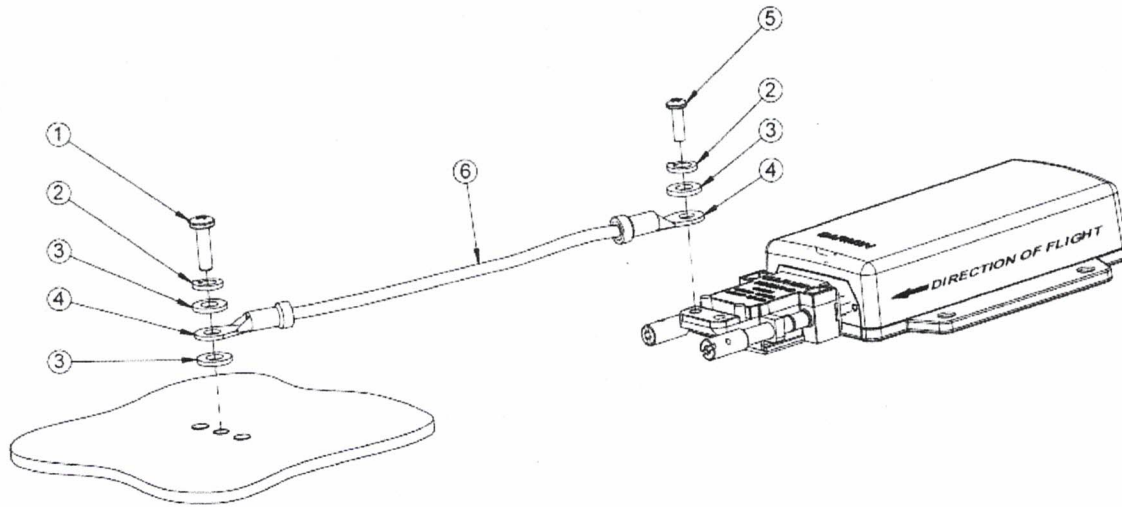


Figure 2. Flight Stream 210 Bonding

Table 1. Flight Stream 210 Bonding Hardware

See Figure 2	Hardware	P/N
1	Screw	MS35206 (AN515) #8 Pan Head Screw
2	Lock Washer	MS35338-42 #8 Lock Washer
3	Flat Washer	NAS1149FN832P (AN960-8) #8 Washer
4	#8 Ring Terminal	MS25036 #8 Ring Terminal
5	Screw	MS51957-42 #6 Screw
6	Braid	QQB575R36T0250 or larger

2.8 Diagrams

Refer to the *400W Series Installation Manual* (listed under reference documentation in section 2.1 of this document) for drawings applicable to this installation. Point to point wiring diagrams are in Appendix H of the *400W Series Installation Manual*. Refer to the GNS 400W Series Post-Installation Checkout Log retained in the aircraft permanent records for a list of the interfaced equipment. The antenna cables are routed between the 400W series unit and the antenna with disconnects at each unit. The antenna cable typically is routed behind interior panels in the fuselage.

2.9 Special Inspection Requirements

None, N/A.

2.10 Application of Protective Treatments

None, N/A.

2.11 Data Relative to Structural Fasteners

None, N/A.

2.12 Special Tools

A milliohm meter with an accuracy of +/- 0.1 milliohms ohms (or better) is required to measure the electrical bonding between the 400W system components and aircraft ground.

No special tools are required for system checkout. See *400W Series Installation Manual* listed in reference documentation in section 2.1 of this document.

2.13 Additional Instructions

None.

2.14 Overhaul Period

The system does not require overhaul at a specific time period. Power on self-test and continuous BIT will monitor the health of the 400W series unit. If the unit indicates an internal failure, the unit may be removed and replaced. See troubleshooting section contained in the *400W Series Installation Manual*, listed under reference documentation in paragraph 2.1 of this document.

2.15 ICA Revision and Distribution

To revise this ICA, Garmin will follow the Garmin ODA Procedures Manual SOP-0055/ACP-0016 for Instructions for Continued Airworthiness. The latest revision of this ICA document is available on the Garmin website (www.garmin.com). A Garmin Service Bulletin describing ICA revision will be sent to Garmin dealers if a revision is determined to be significant.

2.16 Assistance

Flight Standards Inspectors or the certificate holder's PMI have the required resources to respond to questions regarding this ICA. In addition, the customer may refer questions regarding this equipment and its installation to the manufacturer, Garmin. Garmin customer assistance may be contacted during normal business hours via telephone 913-397-8200 or email from the Garmin web site at www.garmin.com.

2.17 Implementation and Record Keeping

Modification of an aircraft by this Supplemental Type Certificate obligates the aircraft operator to include the maintenance information provided by this document in the operator's aircraft maintenance manual and/or the operator's aircraft scheduled maintenance program.

CHALLENGER INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

DOCUMENT# 1125 REVISION C DATED 10/31/2009

CLEANABLE OIL FILTER

AIRWORTHINESS LIMITATIONS

Airworthiness limitations section is FAA approved and specifies maintenance required under sections 43.16 and 91.403 of the Federal Aviation Regulations unless alternative program has been approved.

MAINTENANCE INSTRUCTIONS

INSPECTION

Challenger cleanable oil filter with a stainless steel element, must be cleaned and visually inspected at minimum with every oil change or sooner if operating in dusty conditions. The oil filter's cleanable element must be replaced at 1250 hours or 5 years of engine operation, whichever should occur first.

NOTE: Replace any damaged part of the oil filter assembly prior to cleaning.

CLEANING

1. Remove the oil filter assembly from the aircraft engine by twisting the assembly counter-clockwise.
2. Disassemble by gently pushing the filter element straight down out of the locked position, twist filter element 1/3 turn counter clockwise and release. You should now be able to remove the stainless steel filter element from the oil filter housing.
3. Visually inspect and wash the stainless steel filter element, spring and housing and clean all metal surfaces with biodegradable cleaner, non-toxic shop solvent or soap and water. If inspection of trapped debris is desired, flush particles into a clean light colored container. Use low pressure shop air to blow dry the filter element from the inside out to remove remaining particles or cleaning agent from the screen. **NOTE: THE ELEMENT MUST BE REPLACED IF ANY METAL REMAINS TRAPPED IN THE ELEMENT.**
4. Replace all parts that have been damaged, cracked, nicked, stripped threads, corroded, or elements that can not be cleaned.

ASSEMBLY

5. When all components are clean and dry, place the spring into the filter housing, large end down. Now place the filter element into the housing making sure the three "ears" on the element fall into their slots in the housing. Gently push the filter element straight down into the housing and twist the element 1/3 turn clockwise, locking the element up into the locked position. Make sure the three filter element ears are fully engaged in the housing notches (as the filter is tightened on the engine the filter will mate against the housing which will eliminate any play).
6. Install the quad-ring, part number CP-623, (either side up) fully into the groove in the housing. Lube the quad ring surface with a thin film of clean engine oil and install filter on the engine per Challenger Instructions #1124 latest revision. Note: **"DO NOT OVER TIGHTEN."**
7. Run engine and check for oil leaks and engine oil pressure. If visual oil leak is noticed repeat steps 5 thru 7. Check oil filter and pressure every pre-flight inspection.

Call Challenger Aviation for product support at 937-387-6500 or email premfilter@aol.com.

FAA APPROVED

12 JUL 2010

CHALLENGER AVIATION
CENTRAL REGION

Challenger Air Filter Instructions for Continued Airworthiness
Issue Date: May 5, 2010 Revision E, Document No. 4003

AIRWORTHINESS LIMITATIONS

Airworthiness limitations section is FAA approved and specifies maintenance required under sections 43.16 and 91.403 of the Federal Aviation Regulations unless alternative program has been approved.

MAINTENANCE INSTRUCTIONS

Challenger's air filter elements are enclosed in a frame or without a frame depending the aircraft model. Challenger's re-charging instructions must be followed carefully for maximum air filter life. Air filter must be recharged every 100 hours or 12 months or sooner if operated in extreme dusty conditions. Air filter assembly must be replaced after 25 cleanings or sooner if any deterioration or damage is found during pre-flight, post flight or any other aircraft inspections.

Note: Air Filter exposed to in flight rain encounter must be inspected before next flight. If red oil color is missing, clean and re-oil per these instructions.

Step 1: Remove the air filter assembly from the aircraft air box per the Aircraft Manufacturer's Instructions. **DO NOT REMOVE filter element from inside its frame. Remove the old sealing gasket from filter assembly with frame.**

Step 2: Begin re-charging Challenger Air Filters by "Gently" tapping the filter assembly on a hard surface to remove any loose dust that will easily fall off the filter. Visually inspect the filter for any damage, cracks, broken wires or missing fibers. If any of those conditions are visible, the filter assembly must be scrapped and replaced with a new filter assembly.

Step 3: Begin cleaning with Challenger Re-charger Kit P/N CP-99-5050, the only FAA approved re-charge kit. Inside are two squeeze bottles, one for cleaning and one red in color for re-oiling the filter element. Remove the bottle containing cleaning fluid and thoroughly saturate the filter. Allow the filter to soak for approximately 15 minutes. **DO NOT USE ANY OTHER CLEANING FLUID.**

Step 4: Flush the filter with low non-pressurized warm water starting from inside out for round filters and front to back for flat filters. After flush, gently shake the water out of the filter and allow to air dry only. **DO NOT USE ANY OTHER DRYING METHOD.**

Step 5: Remove the bottle from the Re-charger Kit P/N CP-99-5050 containing oil red in color. Begin re-oiling the dry filter by applying a bead or line of red oil along the top only of each pleat of the filter. The oil will soak into the length of each pleat. It may be necessary to apply oil on filter material that has not received oil from the wicking action. The entire filter medium must be covered with red oil. **DO NOT OVER OIL.** If oil drips from the filter, it has been over oiled. Allow the filter to drain the excess oil onto a clean rag or paper towel until the red oil stops dripping. Replace gasket with a new one on the frame surface to be mounted to the air box assembly.

Step 6: Re-install air filter per the Aircraft Maintenance Instructions and Challenger Installation Instruction # 0402. Make sure the air filter assembly is properly seated and is mounted securely to the filter air box assembly in accordance with the Aircraft Manufacturer's Specifications. **NOTE: Piper air box lids may need a cover gasket CP-2702(round) or CP-2102(oval) to seat the lid securely per Challenger's Installation Instructions #0402.**

NOTE: Do not use gasoline, jet fuel, or caustic cleaning solutions or shop solvents. Use only FAA approved Challenger cleaning solution in Challenger Re-charger Kit P/N CP-99-5050. Do not use steam cleaning equipment or any other cleaning devices: When drying the filter after cleaning, let the filter dry naturally. Pressurized equipment will strip the cotton of critical microfilaments. Do not use compressed air, open flames or heating devices of any kind. When recharging the filter with oil, use only FAA approved Challenger Re-charger Oil in Re-charger Kit P/N CP-99-5050. The oil is the same oil applied at the factory during the manufacturing process. Do not use transmission fluid, motor oil, or any other lightweight oil of any kind or any products containing petroleum products.

B.A.S., INC. INERTIA REEL SHOULDER HARNESS SYSTEM

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

1. **Introduction:**
These ICA pertain to the inertia reel shoulder harness system installed in the 2 forward seating positions.
2. **Description:**
The shoulder harness system consists of an inertia reel mounted to the aircraft cabin roof above and behind each seat a "Y" shaped shoulder harness, a lap belt with mating buckle and associated bracketry and hardware to attach the system to the aircraft.
3. **Special control or operation information:**
See Owner's Manual Supplement. Report 1302, for proper placement of harness.
4. **Servicing information:**
There is no regular servicing required for the shoulder harness system beyond normal cleaning. Refer to AmSafe website for cleaning instructions. [www.amsafeaviation.com]
There is no regular servicing of the attachment hardware required.
5. **Maintenance instructions:**
Maintenance of the inertia reel and harness is limited to cleaning. The attachment hardware and bracketry should be inspected as part of the annual inspection of the aircraft for deformation or cracking of the bracketry and that the hardware is secure (see AC 43.13-1B, 9-8-98, Paragraph 5-15). Check the attachment bracketry and hardware for corrosion per AC 43.13-1B, 9-8-98, Chapter 6. Any bent, broken, damaged or corroded parts must be replaced.
6. **Troubleshooting:** N/A
7. **Removal and replacement information:**
Refer to BAS Installation Instructions, used during original installation, for removal and replacement information on the inertia reel. These should be included as part of the maintenance records of the aircraft, but may also be obtained from BAS, Inc. If the reel is removed, ensure that all of the components Such as the tension strap (when installed) are properly reattached upon reinstallation of the reel.
8. **Diagrams:** N/A
9. **Special inspection requirements:**
The inertia reel and attachment hardware and bracketry should be inspected for proper operation during annual inspection of the aircraft. The reel should allow for extension of the harness during a slow pull, but should lock up during a quick pull of the harness. Failure of the reel to function properly in either of these conditions is cause for removal and return to AmSafe for repair or replacement.
10. **Application of protective treatments:** N/A

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B.A.S., INC. INERTIA REEL SHOULDER HARNESS SYSTEM
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS (cont)

11. Data: N/A

12. List special tools: None

13. For commuter category aircraft: N/A

14. Recommended overhaul periods:

The shoulder harness does not have a fixed overhaul period, but should be inspected and replaced on condition. Refer to AmSafe website for removal and replacement information on the shoulder harness system.

15. Airworthiness Limitation Section:

There are no limitations on the operation of the aircraft due to the installation of the shoulder harness system.

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

16. Revisions:

These Instructions for Continued Airworthiness have been reviewed and accepted by the FAA. In the event a revision is required, BAS, Inc. will submit the revision to the FAA for review and approval. The revised ICA will then be posted on the BAS website or contact BAS, Inc. and the revision will be mailed. The revised ICA must become a part of the aircraft records and a logbook entry made noting the revision.

For harness & lap belt maintenance refer to AmSafe Aviation information at

www.amsafeaviation.com

If the AmSafe website is unavailable,
please contact BAS, Inc.

888-255-6566

360-832-6566

360-832-6466 Fax

For the latest revision of ICA refer to BAS information at

www.basinc-aeromod.com

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INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

FOR

LORD SE-1508-1 SHIMMY DAMPER

INSTALLED ON

**PIPER PA-28 140, 140B, 140C, 140E, 140 Cruiser,
150, 150B, 150C, 160, 160B, 160C, 180, 180B,
180C, 180D, 180E, 180F, 180G, 180 Challenger,
180 Archer, 181, 181 Archer II, 181 Archer III, and
181 Archer LX**

AIRCRAFT MODELS



LORD

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32-20-09
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Rev. --
June 16, 2014

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

APPROVED MODEL LIST

**LORD Shimmy Damper P/N SE-1508-1
replaces Piper Part number 456-015.**

Type Certificate 2A13

Models

**PIPER PA-28 140, 140B, 140C, 140E, 140 Cruiser, 150,
150B, 150C, 151, 151 Warrior, 160, 160B, 160C, 180, 180B,
180C, 180D, 180E, 180F, 180G, 180 Challenger, 180 Archer,
181, 181 Archer II, 181 Archer III, and 181 Archer LX**

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1.0 INTRODUCTION

1.1 Description

This manual presents the Instructions for Continued Airworthiness (ICA) for the installation of LORD nose wheel shimmy damper P/N SE-1508-1 to be installed on various Piper aircraft models as replacement for Piper shimmy damper part number 456-015. To determine aircraft model effectivity, refer to the list of approved models provided on page "EFFECTIVITY-1" of this manual.

The shimmy damper is a device that is used to lessen the effects of nose wheel shimmy by reducing the amplitude and/or by preventing the onset of the shimmy limit cycle. The LORD shimmy damper is a non-hydraulic damper that has the same mounting configuration as the hydraulic damper it replaces so that no yoke modifications are necessary. Figure 1 shows a picture of the damper and Figure 2 shows the overall dimensions.

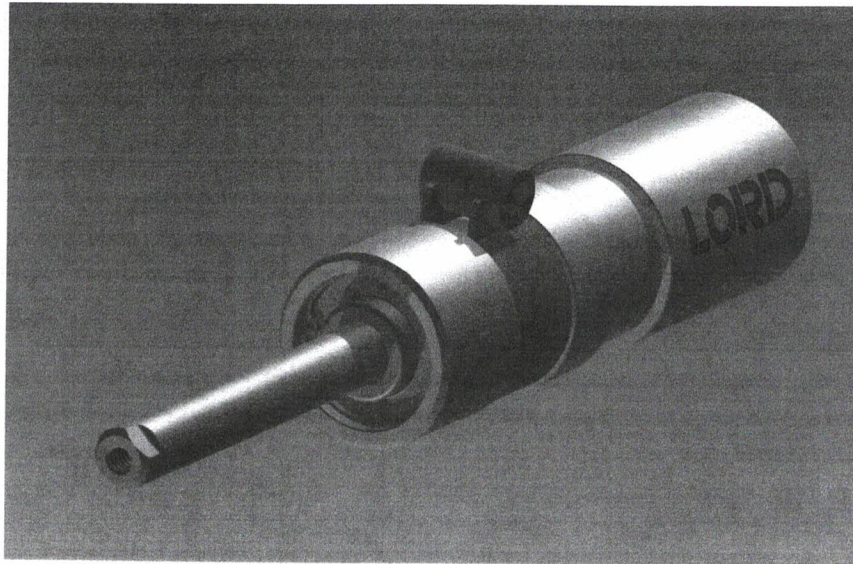


Figure 1: LORD Shimmy Damper

1.5 Document Change Control

This document is to be furnished as part of LORD Customer Copy Drawing SE-1508-1 and is to become part of the permanent aircraft records upon installation. Changes to this document will be indicated by a revision number and a date in the page footer. Vertical bars in the left hand margin indicate revisions.

Revision to this document shall be coordinated through the Chicago Aircraft Certification Office. Inquiries relating to this document should be made to LORD Corporation at the following contact address.

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2.0 AIRWORTHINESS LIMITATIONS

This Airworthiness Limitations section is FAA approved and specifies maintenance required under 14 CFR 43.16 and 14 CFR 91.403 unless an alternative program has been FAA approved. There are no additional airworthiness limitations as a result of LORD Shimmy Damper SE-1508-1.

3.0 INSTALLATION

3.1 Removal of Existing Shimmy Damper

Remove existing shimmy damper per the applicable Piper Aircraft Maintenance Manual.

3.2 Preparation

The following are the items that must be considered when preparing for installing the LORD Corporation Shimmy Damper.

1. Inspect the tire for wear, tears, and foreign objects, either repair the tire or replace it.
2. Balance the tire using a dynamic balancer where possible or static bubble as required.
3. Inspect the lower torque link for wear in the bolt, spacer, and washer. Replace these items as required.

and holes tend to elongate over time. Parts showing wear should be replaced to ensure that no free-play exists between the wheel and the damper. Any looseness in the linkage between the wheel and the damper will compromise the performance of the damper.

Install the damper as follows:

1. Ensure that LORD shimmy damper P/N SE-1508-1 is approved for your aircraft. Reference page EFFECTIVITY-1 for applicable airplane models.
2. Remove the old shimmy damper per paragraph 3.1 of this ICA.
3. Prepare the aircraft for the new damper installation per paragraph 3.2.
4. Ensure that you have the correct LORD shimmy damper part number applicable to your airplane. Reference page EFFECTIVITY-1 for LORD damper approved for your aircraft.
5. A damper that has sat for a long period of time can become "frozen". This is not a cause to reject the damper. A stuck unit may need to be excised before installation. Be careful to not push on to a fully compressed, bottomed-out shaft as this may damage the unit.
6. Test fit the shimmy damper to the steering collar and strut tube fittings. If there is any free play, replace or rework the discrepant parts per the applicable Piper Aircraft Maintenance Manual. A shimmy damper cannot fix a shimmy problem if free play exists between the wheel and the damper.
7. Install LORD damper per the applicable Piper AMM. Replace the nuts and bolts connecting the shimmy damper to the steering collar and the shimmy damper arm with hardware supplied.

3.3.3 Removal

Prepare the aircraft for shimmy damper removal per Beech Aircraft Maintenance Manual. Remove the nut, washers, bushing, and bolt which attach the shimmy damper to the brace.

Remove the nut, washers, bushing, and bolt and remove the shimmy damper from the shimmy damper from the nose gear strut.