



INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

AIRCRAFT MANUAL SUPPLEMENT

**INSTRUCTIONS FOR CONTINUED
AIRWORTHINESS**

FOR

PLANE POWER, Ltd.

CONVERSION KIT ER14-50

for

**ALTERNATOR and R1224B
ALTERNATOR REGULATOR**



INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

NOTE:

Insert these Instructions for Continued Airworthiness into the Instruction for Continued Airworthiness section of the aircraft’s maintenance manual.

Contact Plane Power for revision status of these Instructions for Continued airworthiness.

Toll Free --877.934.5700

Web Page—www.plane-power.com

Revision Status	Effective Date	Approval
Initial Release	8/10/2007	SK
A	9/2/2008	SK

Future revisions will be denoted by revision bars at the side of the page.

LIST OF EFFECTIVE PAGES

Page	Effective Date
1	<u>August 10, 2007</u>
2	<u>September 2, 2008</u>
3	<u>August 10, 2007</u>
4	<u>September 2, 2008</u>
5	<u>August 10, 2007</u>
6	<u>September 2, 2008</u>
7	<u>September 2, 2008</u>
8	<u>August 10, 2007</u>
9	<u>September 2, 2008</u>

Plane Power, Ltd.

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

MODEL ER14-50

ALTERNATOR CONVERSION KIT FOR 12 VOLT AIRCRAFT WITH GEAR DRIVEN CONTINENTAL ENGINES

Aircraft/Engine Make	Aircraft/Engine Model
AD Aerospace Inc	T-211
Aircraft Parts & Development Corp	A-3
Aerodifusion	D-1190S
American Champion Aircraft Corp.	7EC, 7ECA, 7FC, 7JC, S7EC,
American Champion Aircraft Corp.	402
Burl A. Rogers	15AC, S15AC
Hawker Beechcraft Corp.	45 (YT-34)
Hawker Beechcraft Corp.	35, A35, B35, 35R, G35, (C35, D35, E35, F35, Equipped with E225-8 Engine.)
All American Aircraft, Inc.	10A
Cessna Aircraft Co.	150, 150A, 150B, 150C, 150D, 150E, 150F,
Cessna Aircraft Co.	140A
Cessna Aircraft Co.	120, 140
Cessna Aircraft Co.	170, 170A, 170B
Cessna Aircraft Co.	172, 172A, 172B, 172C, 172D, 172E, 172F, 172G, 172H
Commonwealth Aircraft, Inc.	185
Edward Scott Kearns	Trojan A-2
FS 2001 Corp.	J5A (Army L-4F), Equipped with C75-12 Engine.
Swift Museum Foundation, Inc.	GC-1A, GC-1B
Goodyear Aircraft Corp.	GA-22A
Helio Aircraft Corp.	15A, Equipped with C145-2 Engine.
Avion Jodel	D-1190
Avion Jodel	150
Avion Jodel	DR-1050
The Don Luscombe Aviation History Foundation, Inc.	8E, 8F, T-8F
Maule Aerospace Technology, Inc.	Bee Dee M-4, M-4, M-4C, M-4S, M-4T
MICCO Aircraft Company Inc.	MAC-125C, MAC-145
Navion Sierra Hotel Aero, Inc.	Navion (Army L-17A), Navion A (Army L-17B & L-17C).
Piper Aircraft, Inc.	(J3C-65 (Army L-4, L-4A, L-4B (Navy NE-1), L-4H, L-4J (Navy NE-2)), J3C-65S, Equipped with C75-12, or C85-12 Engine.), (PA-11, PA-11S, Equipped with C85-12 Engine.)
Piper Aircraft, Inc.	J4A, Equipped with C85-12 Engine.
Piper Aircraft, Inc.	J4E (Army L-4E), Equipped with C75-12 Engine.
Piper Aircraft, Inc.	PA-18, PA-19, (PA-18S, PA-19S Equipped with C90-12F Engine)
Quartz Mountain Aerospace, Inc.	11A
S.O.C.A.T.A. - Groupe Aerospatiale	Rallye MS880B, MS885, 100S
Stits Aircraft Inc.	SA-9A
Superior Aircraft Co.	Culver V, V2
Taylorcraft Aviation, LLC	19
Taylorcraft Aviation, LLC	BC12-D-4-85, BCS12D-4-85
Thomas H. McClish	B85C
Univair Aircraft Corp.	Ercoupe 415-C, 415-CD, Equipped with C75-12, C75-12F, C85-12, or C85-12F Engine.
Univair Aircraft Corp.	Ercoupe 415-D, E, G, F-1, F-1A, A-2, A2-A, M10



INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

INTRODUCTION:

This manual supplement is prepared to provide instructions on the maintenance and adjustment of the Plane Power, Ltd., MODEL ER14-50 with R1224B Voltage regulator kit: GEAR DRIVEN ALTERNATOR CONVERSION FOR AIRCRAFT WITH GEAR DRIVEN CONTINENTAL ENGINES.

DESCRIPTION:

The Plane-Power, Ltd alternator part number 11-1008 is a light weight alternator with improved power output at lower RPM.

The Plane Power, Ltd., R1224B Voltage Regulator is a solid state electronic alternator voltage regulator with built in over-voltage protection.

MAINTENANCE INSTRUCTIONS:

Maintenance operations will commence when there is a Pilot report that the voltage level on the aircraft does not meet the aircraft manufacturer's requirement. The alternator should be inspected to be certain that the alternator shaft moves freely with no unusual noise. If the alternator output is not satisfactory, the voltage setting should be adjusted by following the instructions given on Plane Power Ltd., document 12-1001B. This document is in the voltage regulator Instructions for Continued Airworthiness (37003-06).

If the regulator cannot be adjusted to the aircraft manufacturers specification, the regulator must be returned to Plane Power, Ltd. (Phone Number: 1-877-934-5700).

PERIODIC MAINTENANCE:

It is recommended that the operation of the Plane Power, Ltd., 11-1008 alternator be checked every 100 hour inspection or every annual inspection whichever ever comes first.

Annual / 100 Hour Inspections:

1. Check regulated voltage is within limits per aircraft maintenance manual.

5 Year or 500-Hour Intervals:

1. Repeat: Annual / 100 Hour Inspection
2. Remove Field Brush assembly and inspect brushes for excess wear. Replace Brush assembly if brushes extend less than .250" from edge of brush holder.
3. Replace 2 Drive Coupling Bushings, TCM Part Number 626543 or SA# 632050.
4. Inspect Gear Assembly and Drive Key for wear.

Each annual/100 hour inspection, the alternator and its associated wiring should be checked for secure electrical connections and physical connection to the airframe.

For re-assembly convenience, the installation instructions are listed on pages 6, 7, 8, and 9.

The voltage regulator maintenance instructions are in Plane Power Ltd. document 37003-06, and those inspections should be concurrent with those of the alternator. No special tools are required.



INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

AIRWORTHINESS LIMITATIONS

There are no mandatory replacement limits. There are no mandatory structural inspection intervals.

THE AIRWORTHINESS LIMITATIONS SECTION IS FAA APPROVED AND SPECIFIES MAINTENANCE REQUIRED UNDER SEC. 43.16 AND 91.403 OF THE FEDERAL AVIATION REGULATIONS UNLESS AN ALTERNATIVE PROGRAM HAS BEEN FAA APPROVED.

Plane Power, Ltd.

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS READ AND THOROUGHLY UNDERSTAND ALL OF THE INSTALLATION INSTRUCTIONS BEFORE BEGINNING INSTALLATION OF THIS KIT.

NOTE: IF AIRCRAFT DOES NOT HAVE A CIRCUIT BREAKER OR CURRENT LIMITING DEVICE IN THE GENERATOR OUTPUT WIRE AND REGULATOR INPUT TERMINAL PER AC43.13-1B SECTION 4, DO NOT INSTALL THIS KIT. ANY NEW OR REPLACEMENT WIRE MUST CONFORM TO MIL-W-22759/16.

1. Disconnect aircraft battery “-“ terminal (ground). Consult AC43.13-1B Chapter 11 Section 2, 11-22, E for additional information.
2. Remove existing voltage regulator by removing wiring and three mounting bolts. Remove existing generator by removing wiring and three nuts and washers. Remove mounting gasket and inspect mounting surface and mounting studs for any abnormalities. Correct all issues before installing ER14-50 Alternator Kit. Consult engine or airframe maintenance manual for further instructions if required.
3. Remove drive gear assembly from old generator. If assembly is in airworthy condition and all part numbers match the TCM part numbers on Figure A page 8 of this manual the drive gear assembly may be re-used. Otherwise purchase a new Plane-Power gear assembly P/N ER14-GR or a TCM gear assembly. (See Fig. A, Page 8)
4. If original gear assembly is to be re-used inspect gear, sleeve, retainer and hub for airworthy condition. Replace any worn/damaged parts or assemblies. **Old bushings, TCM Part Number 626543 or SA # 632050, must be replaced with new.**

NOTE: IT IS THE RESPONSIBILITY OF THE INSTALLER TO THOROUGHLY INSPECT AND PROPERLY INSTALL THE GEAR ASSEMBLY. DAMAGE TO THE ALTERNATOR FROM THE INSTALLATION OF WORN, DEFECTIVE OR IMPROPERLY INSTALLED PARTS WILL VOID ER14-50 WARRANTY AND MAY CAUSE ENGINE DAMAGE.

------(Refer to Pages 8 and 9)-----

5. **ASSEMBLE DRIVE GEAR ASSEMBLY WITH 2 NEW BUSHINGS TCM P/N 626543 OR SA# 632050** on alternator shaft. Ensure Bushings and Drive Key are properly installed in shaft.
6. Torque Shaft Nut Plane-Power # 11-1002 or TCM P/N 530412 to Minimum torque of 180 inch Lbs. and install cotter pin #MS24665-132. If cotter pin will not pass through drilled hole in shaft slowly increase torque to align hole. **DO NOT EXCEED 220 INCH LBS.**
7. Install alternator on engine with new gasket TCM P/N 35019 (SA35019) or TCM P/N 649984 (SA352066) depending on engine model. Ensure that alternator drive gear meshes to engine gear without forcing or binding.
8. Reinstall 3 flat washers, and lock nuts that were removed in step 2.
9. Hand tighten nuts evenly and check that the alternator fits evenly to the engine case without any force or binding.
10. Slowly increase the torque on the 3 mounting nuts using a crosswise pattern until a torque of 200 Inch Lbs. is achieved. **Check drive gear lash by carefully moving the ER14-50 cooling fan on rotor back and forth (Typical lash .075” on outer diameter of fan blade). If no lash is detected remove ER14-50 and correct the cause before proceeding.**
11. **Ensure that internal jumper #1 and internal jumper #2 of the R1224B regulator are set for 14V operation** (See data sheet 12-1001B for location of jumpers). Install the R1224B regulator in a convenient location for wiring, preferably in the location of the removed regulator.

Plane Power, Ltd.

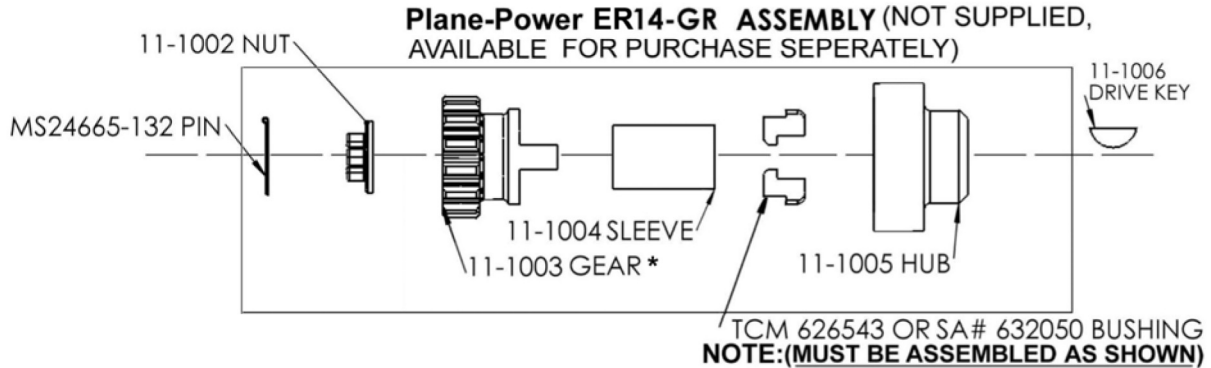
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

12. If original output circuit breaker is rated at less than 50-amperes and you wish to be able to utilize the increased capacity of the alternator, remove the breaker and replace with suitable breaker up to 50-amp maximum size (Refer to AC43.13-1B, Chapter 11, Section 4, Paragraphs 11-47 through 11-52 for additional information). **Ensure wire size from alternator output terminal to output circuit breaker and from output circuit breaker to bus is rated for more than the size of breaker installed** (Refer to AC43.13-1B, Chapter 11, Section 5, Table 11-9 for additional information). **Note: If aircraft has been equipped with an Amp Meter, ensure that it is of adequate size to handle the increased output capability before increasing the output wire and breaker.**
13. Wire the system as follows (refer to page 9 of this document):
 - a. Connect the GRND terminal of the regulator to the common aircraft ground.
 - b. Install output (B+) wire and torque to 50 inch Lbs. **If the output breaker is to be increased to 50-amperes ensure that the output wire is of sufficient size to carry more than 50-Amperes.** (Refer to AC43.13-1B, Chapter 11, Section 5, Table 11-9 for additional information)
 - c. Run the Red Field wire of the Enable Plug (P/N 11-1010) to the FLD terminal of the regulator.
 - d. **ENSURE THAT A 5AMP CIRCUIT PROTECTION DEVICE IS INSTALLED IN SERIES WITH, OR IS PART OF, THE FIELD SWITCH FOR THE ALTERNATOR.** (This is commonly the original generator Field switch & breaker.) Use the existing wire from the switch/breaker or install a new wire, minimum 20AWG, to the ENABLE terminal of the regulator. Install, in view of the pilot, placard ALP-1001 (ALT FIELD part of 14-1012) adjacent to the field switch for the alternator.
 - e. Ensure that the other end of the FIELD switch/breaker is connected to the aircraft positive bus.
 - f. If the aircraft has a "Generator Inoperative" indicator lamp, it may be used in this step. If lamp is not currently installed use the supplied lamp P/n 14-1010 Alternator Inoperative Lamp (14 Volt) and install it in pilots clear field of view.
 - g. Connect one wire of the lamp P/n 14-1010 to a 1amp fuse or circuit breaker and connect the other wire of the lamp to the LAMP terminal of the regulator using minimum #24AWG wire. Install, in view of the pilot, placard ALP-1006 (ALT INOP part of 14-1012) adjacent to the alternator inop lamp. Also run the White Aux wire of the Enable Plug (P/N 11-1010) to the AUX terminal of the regulator. (See wiring schematic on page 9).
14. Reconnect aircraft battery "-" terminal (ground). Consult AC43.13-1B Chapter 11 Section 2, 11-22, E for additional information.
15. Adjust and Test the system:
 - a. Set FIELD switch to OFF.
 - b. Turn on MASTER switch and start the engine and check for any oil leaks or abnormal sounds. Stop the engine immediately if any are noticed and correct the condition before proceeding.
 - c. With FIELD switch in OFF position ensure that ALT INOP indicator is illuminated.
 - d. Turn on the FIELD switch. Check proper charging indication. Check ALT INOP indicator is off. Check aircraft maintenance manual for proper bus voltage (typically 14.0V ± 0.3V). Adjust the regulator to the desired bus voltage at 1200 engine RPM.
 - e. Recheck and inspect the entire installation, and make a log book entry.
 - f. For additional troubleshooting information, see the regulator data sheet 12-1001B or visit our troubleshooting page online at www.plane-power.com/troubleshooting.

Plane Power, Ltd.

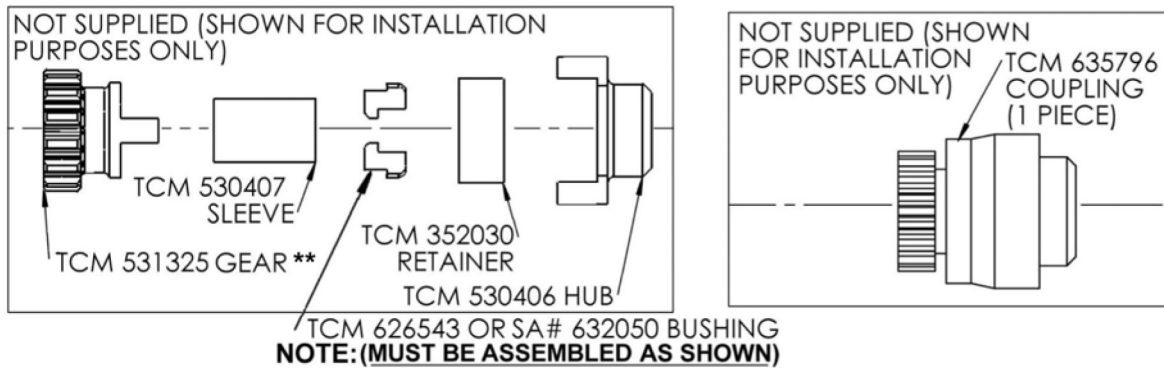
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

FIGURE A: ANY OF THE FOLLOWING GEAR ASSEMBLIES MAY BE USED WITH THE ER14-50



***Note: 11-1003 gear for use only on C75, C85, C90, C125, C145, O-200, and O-300 engines**

AVAILABLE FROM TCM



****Note: Use TCM 531325 gear on C75, C85, C90, C125, C145, O-200, and O-300 engines. Use TCM 530997 gear on E165, E185, and E225 engines.**

Plane Power, Ltd.

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

Installation & Wiring Diagram

14 VOLT 50 AMP GEAR DRIVEN ALTERNATOR

NOTE: BOTH GASKETS SUPPLIED USE APPROPRIATE GASKET FOR YOUR ENGINE

GASKET TCM P/N 35019 or SUPERIOR AIRPARTS SA35019

GASKET TCM P/N 649984 or SUPERIOR AIRPARTS SA352066

NOTE: PARTS MARKED WITH * ARE SHOWN FOR INSTALLATION PURPOSES ONLY AND ARE NOT SUPPLIED WITH KIT, AVAILABLE SEPERATELY - GEAR ASSEMBLY ER14-GR

WIRING DIAGRAM
NOTE: ANY NEW OR REPLACEMENT WIRE MUST CONFORM TO MIL-W-22759/16

REVISIONS

LTR.	DESCRIPTION	DATE	APR.
A	UPDATED INSTRUCTIONS	9/2/08	SJK

PRE-WIRED FIELD PLUG WIRING DIAGRAM AS VIEWED FROM REAR OF CONNECTOR

1.87"

PLANE POWER, LTD.
GRANBURY, TEXAS

ER14-50 INSTALLATION INSTRUCTIONS

DRAWN BY: B. JOWERS DATE: 8/10/07

MATERIALS: DWG. NO. 11-1001A REV. A

Parts List:

QTY	DESCRIPTION	P/N
1	Alternator Assembly	11-1008
1	Voltage Regulator	R1224B
1	Enable Plug Assembly	11-1010
1	14v Alternator Inoperative Lamp	14-1010
1	Placards(ALP-1001 & ALP-1006)	14-1012
1	TCM Gasket or Superior Airparts Gasket	TCM: 35019 SA: SA35019
1	TCM Gasket or Superior Airparts Gasket	TCM: 649984 SA: SA352066

Optional Parts:

QTY	DESCRIPTION	P/N
1	Gear Assembly	ER14-GR
ER14-GR Gear Assembly includes the following parts		
1	Nut	11-1002
1	Gear	11-1003
1	Sleeve	11-1004
1	Coupling	11-1005
1	Woodruff Key	11-1006
1	Bushing	11-1007

Documentation:

QTY	DESCRIPTION	P/N
1	Installation Instructions	11-1001A
1	Installation Instructions	12-1001
1	Instructions for Continued Airworthiness	11-0001
1	Instructions for Continued Airworthiness	37003-06