



United States of America  
Department of Transportation  
Federal Aviation Administration

# Supplemental Type Certificate

Number SA11137SC

This certificate issued to: Hartzell Engine Technologies LLC  
2900 Selma Highway  
Montgomery, AL 36108

certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 23 of the Federal Aviation Regulations.

Original Product – Type Certificate Number: See Approved Model List

Make: See Approved Model List  
Model: See Approved Model List

**Description of Type Design Change:**

Installation of Plane-Power ALT-FLX alternator in accordance with Installation Instructions, Drawing No. 17-1001, dated November 24, 2011, or later FAA Approved revision. Alternator type design data is contained in Aircraft Engine Alternator Parts List, Drawing No. 17-0000, dated November 24, 2011, or later FAA Approved revision. Instructions for Continued Airworthiness are contained in Drawing No. 17-1001.

**Limitations and Conditions:**

The installer must determine whether this design change is compatible with previously approved modifications. If the holder agrees to permit another person to use this certificate to alter a product, the holder must give the other person written evidence of that permission.

**Certification Basis:**


(See continuation Sheet 3 of 3)

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, and revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

Date of application: May 18, 2012  
Date of issuance: March 14, 2013

Date reissued: 03/26/13; 05/10/13; 07/17/14  
Date amended:

By direction of the Administrator

Signature   
Scott A. Horn

Title \_\_\_\_\_  
Manager, Aircraft Certification Office,  
Southwest Region

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).



United States of America  
Department of Transportation  
Federal Aviation Administration

# Supplemental Type Certificate

(Continuation Sheet)

Number: SA11137SC  
Date of Issuance: March 14, 2013  
Reissuance Date: July 17, 2014

**Certification Basis (Continued):**

14 CFR Part 23.901(a)(b){23-62}, 23.1041{23-51}, 23.1163{23-42}, 23.1301(a)(b)(c){23-62}, 23.1309(a)(b)(c)(d){23-62}, 23.1351 (a){23-49}, 23.1359(c){23-49}, 23.1365(d){23-49}, 23.1431(b){23-62}, 23.1529{23-26}

-END-

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Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).

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FAA APPROVED MODEL LIST (AML)

SA11137SC

Hartzell Engine Technologies LLC  
2900 Selma Highway  
Montgomery, AL 36108

Date of issuance: March 14, 2013

Date reissued: March 26, 2013; May 10, 2013; July 17, 2014

| Aircraft Make                                    | Aircraft Model   | Original Type Certificate Number | Regulation/Part |
|--|--|----------------------------------|-----------------|
| Aerostar Aircraft Corporation                    | 360, 400   | A11WE                            | FAR 23          |
| Aerostar Aircraft Corporation                    | PA-60-600 (Aerostar 600),<br>PA-60-601 (Aerostar 601),<br>PA-60-601P (Aerostar 601P),<br>PA-60-602P (Aerostar 602P),<br>PA-60-700P (Aerostar 700P) | A17WE                            | FAR 23          |
| AERMACCHI S.p.A.                                 | S.205 – 18/R, S.205 – 20/F,<br>S.205 – 20/R, S.205 – 22/R,<br>S.208, S.208A  | A9EU                             | FAR 23          |
| AERMACCHI S.p.A.                                 | F.260, F.260B, F.260C, F.260D,<br>F.260E, F.260F   | A10EU                            | CAR 3           |
| American Champion Aircraft Corporation           | 7ECA 7GC, 7CGA, 7GCAA,<br>7GCB, 7GCBA, 7GCBC, 7HC,<br>7KC, 7KCAB   | A-759                            | CAR 4a          |
| American Champion Aircraft Corporation           | 8GCBC, 8KCAB   | A21CE                            | FAR 23          |
| Aviat Aircraft Incorporated                      | A-1, A-1A, A-1B, A1C-180,<br>A1C-200   | A22NM                            | FAR 23          |
| Aviat Aircraft Incorporated                      | S-1S, S-1T, S-2, S-2A, S-2B, S-2C  | A8SO                             | FAR 23          |
| Brantley Helicopters Industries U.S.A. Co., Ltd. | 305  | H3SW                             | CAR 6           |
| Brantley Helicopters Industries U.S.A. Co., Ltd. | B-2 (YHO 3BR), B-2A, B-2B  | 2H2                              | CAR 6           |
| Cessna Aircraft Company                          | 172I, 172K, 172L, 172M, 172N,<br>172P, 172Q  | 3A12                             | CAR 3           |
| Cessna Aircraft Company                          | 172R, 172S   | 3A12                             | FAR 23          |
| Cessna Aircraft Company                          | F172L, F172M, F172, F172P  | A4EU                             | CAR 3           |
| Cessna Aircraft Company                          | 177, 177A, 177B  | A13CE                            | FAR 23          |
| Cessna Aircraft Company                          | 177RG  | A20CE                            | FAR 23          |
| Cessna Aircraft Company                          | F177RG   | A26EU                            | FAR 23          |
| Cessna Aircraft Company                          | 180, 180A, 180B, 180C, 180D,<br>180E, 180F, 180G, 180H, 180J,<br>180K  | 5A6                              | CAR 3           |
| Cessna Aircraft Company                          | 182, 182A, 182B, 182C, 182D,<br>182E, 182F, 182G, 182H, 182J,<br>182K, 182L, 182M, 182N, 182P,<br>F182P, 182Q, 182R, T182,<br>TR182, T182T         | 3A13                             | CAR 3           |
| Cessna Aircraft Company                          | 185, 185A, 185B, 185C, 185D,<br>185E, A185E, A185F   | 3A24                             | CAR 3           |
| Cessna Aircraft Company                          | 188, A188, 188A, A188A,<br>188B, A188B, T188C  | A9CE                             | FAR 23          |
| Cessna Aircraft Company                          | 210-5 (205), 210-5A (205A),<br>210, 210A, 210B, 210C, 210D,  | 3A21                             | CAR 3           |

|  |  |          |             |
|--|--|----------|-------------|
|  | 210E, 210F, 210G, 210H, 210J, 210K, 210L, 210M, 210N, 210R, T210F, T210G, T210H, T210J, T210K, T210L, T210M, T210N, T210R, P210N, P210R  |          |             |
| Cessna Aircraft Company                  | 206, 206H, P206, P206A, P206B, P206C, P206D, P206E, U206, U206A, U206B, U206C, U206D, U206E, U206F, U296G, T206H, TP206A, TP206B, TP206C, TP206D, TP206E, TU206A, TU206B, TU206C, TU206D, TU206E, TU206F, TU206G | A4CE     | CAR 3       |
| Cessna Aircraft Company                  | 207, 207A, T207, T207A   | A16CE    | FAR 23      |
| Cessna Aircraft Company                  | 152, A152  | 3A19     | CAR 3       |
| Cessna Aircraft Company                  | F152, FA152  | A13EU    | CAR 3       |
| Cessna Aircraft Company                  | 172RG  | 3A17     | CAR 3       |
| Cessna Aircraft Company                  | 310, 310A, 310B, 310C, 310D, 310E, 310F, 310G, 310H, 310I, 310J, 310K, 310L, 310M, 310N, 310P, 310Q, E310H, E310K  | 3A10     | CAR 3       |
| Cessna Aircraft Company                  | 320, 320-1, 320A, 320B, 320C   | 3A25     | CAR 3       |
| Cirrus Design Corporation                | SR20   | A00009CH | FAR 23      |
| CPAC, Incorporated                       | 112, 114, 112TC, 112B, 112TCA, 114A, 114B, 114TC   | A12SO    | FAR 23      |
| Cub Crafters                             | CC18-180, CC18-180A  | A00006SE | FAR 23      |
| Diamond Aircraft Industries GmbH         | DA 40, DA 40 F   | A47CE    | JAR 23      |
| The Enstrom Helicopter Corporation       | F28, F-28A, F-28C, F-28C-2, F-28C, F-28C-2R, F-28F, F-28F-R, 280, 280C, 280F, 280FX  | H1CE     | CAR 6       |
| Extra Flugzeugproduktions                | EA-300, EA-300/S, EA-300/L, EA-300/200   | A67EU    | FAR 23      |
| Hawker Beechcraft Corporation            | 19A, B19, M19A, 23, A23-19, A23-24, B23, C23, A24, A24R, B24R, C24R  | A1CE     | CAR 3       |
| Fred Garcia                              | 480  | 2A2      | CAR 3       |
| Hawker Beechcraft Corporation            | 35-33, 35-A33, 35-B33, 35-C33, E33, F33, G33, H35, J35, K35, M35, N35, P35, S35, V35, V35A   | 3A15     | CAR 3       |
| Hawker Beechcraft Corporation            | 60, A60, B60   | A12CE    | FAR 23      |
| Hawker Beechcraft Corporation            | 76   | A29CE    | FAR 23      |
| Hawker Beechcraft Corporation            | 77   | A30CE    | FAR 23      |
| Hawker Beechcraft Corporation            | 95, B95, 95-55, 95-A55, B95A, D95A, E95, 95-B55, 95-B55A, 95-B55B, 56TC, A56TC   | 3A16     | CAR 3       |
| Lavia Argentina S.A.                     | PA-25, PA-25-235, PA-25-260  | 2A10     | CAR 8.10(b) |
| Maule Aerospace Technology, Incorporated | M-4-180V, M-5-180C, M-5-200, M-5-210TC, M-5-235C, M-6-180, M-7-235, M-7-235A, M-7-235B, M-7-235C, M-7-260, M-7-260C, M-8-235, M-9-235, MT-7-235, MT-7-260, MX-7-160, MX-7-160C, MX-7-180, MX-7-180A, MX-7-180AC, | 3A23     | CAR 3       |

|                                       |   |       |                 |
|---------------------------------------|---|-------|-----------------|
|                                       | MX-7-180B, MX-7-180C, MX-7-235, MXT-7-160, MXT-7-180, MXT-7-180A  |       |                 |
| Mooney Airplane Company, Incorporated | M20, M20A, M20B, M20C, M20D, M20E, M20F, M20G, M20J, M20M   | 2A3   | CAR 3           |
| Piper Aircraft, Incorporated          | PA-23, PA-23-160, PA-23-235, PA-23-250, PA-E23-250  | 1A10  | CAR 3           |
| Piper Aircraft, Incorporated          | PA-24-180, PA-24-250, PA-24-260, PA-24-300  | 1A15  | CAR 3           |
| Piper Aircraft, Incorporated          | PA-28-140, PA-28-150, PA-28-151, PA-28-160, PA-28-161, PA-28-180, PA-28-201T, PA-28-235, PA-28-236, PA-28R-180, PA-28R-200, PA-28RT-201, PA-28S-160, PA-28S-180       | 2A13  | CAR 3           |
| Piper Aircraft, Incorporated          | PA-31, PA-31-300, PA-31-325, PA-31-350  | A8EA  | CAR 3           |
| Piper Aircraft, Incorporated          | PA-32-260 PA-32R-301 (SP), PA-32-300 PA-32R-301 (HP), PA-32S-300, PA-32R-301T, PA-32R-300, PA-32-301, PA-32RT-300, PA-32-301T, PA-32RT-300T, PA-32-301FT, PA-32-301XT | A3SO  | CAR 3           |
| Piper Aircraft, Incorporated          | PA-34-200   | A7SO  | FAR 23          |
| Piper Aircraft, Incorporated          | PA-44-180   | A19SO | FAR 23          |
| Piper Aircraft, Incorporated          | PA-46-310P, PA-46-350P, PA-46-500TP, PA-46R-350   | A25SO | FAR 23          |
| Revo, Incorporated                    | LAKE LA-4-200, LAKE MODEL 250   | 1A13  | CAR 3           |
| Robinson Helicopter Company           | R22, R22 Alpha, R22 Beta, R22 Mariner   | H10WE | FAR 27          |
| Robinson Helicopter Company           | R44, R44 II   | H11NM | FAR 27          |
| SOCATA                                | Rallye 150T, Rallye 150ST, Rallye 235C, Rallye 235E, MS 892A-150, MS 892E-150, MS 893A, MS 893E, MS 894A, MS 894E   | 7A14  | CAR 10<br>CAR 3 |
| SOCATA                                | TB9, TB10, TB20, TB21, TB200  | A51EU | FAR 23          |
| SOCATA                                | GA-7  | A17SO | FAR 23          |
| Sierra Hotel Aero, Incorporated       | Navion D, E, F, G, H  | A-782 | CAR 3           |
| Sikorsky Aircraft Corporation         | 269A, 269A-1, 269B, 269C, 269C-1  | 4H12  | CAR 6           |
| True Flight Holdings LLC              | AA-1, AA-1A, AA-1B, AA-1C   | A11EA | FAR 23          |
| True Flight Holdings LLC              | AA-5, AA-5A, AA-5B, AG-5B   | A16EA | FAR 23          |
| Twin Commander Aircraft LLC           | 500, 500B, 500-S  | 6A1   | CAR 3           |
| Twin Commander Aircraft LLC           | 700   | A12SW | FAR 23          |
| Vulcanair, S.p.A                      | P68, P 68B, P 68C, P 68C-TC, P68 "Observer", P68TC "Observer", P68 "Observer 2"   | A31EU | FAR 23          |

# Hartzell Engine Technologies LLC

## Aircraft Engine Alternator Parts List

DRAWING NO. 17-0000 Rev. C

Created: 11/24/2011

Last Revised: 9/12/14

| Rev. | Date          | By  | Revisions  |
|------|---------------|-----|--|
| A    | Nov. 12, 2012 | JH  |  |
| B    | 10/16/2013    | BRJ | UPDATED 17-1001 REV B  |
| C    | 9/12/2014     | BRJ | 1) FIRST RELEASE TO HET DESIGN DATA. 2) HEADING WAS "PLANE POWER LDT." 3) DRAWING 17-1001 UPDATED TO REV C |

| Part No. | Date | Rev | Description | Qty | ALT-FLX |
|----------|------|-----|-------------|-----|---------|
|----------|------|-----|-------------|-----|---------|

### INSTALLATION INSTRUCTIONS

|          |            |   |                           |   |   |
|----------|------------|---|---------------------------|---|---|
| 17-1001  | 9/12/2014  | C | INSTALLATION INSTRUCTIONS | 1 | X |
| 17-0005  | 9/12/2012  | - | DRIVE BELT                |   |   |
| 17-1005  | 11/24/2011 | - | PULLEY                    |   |   |
| 17-1005A | 11/24/2011 | - | PULLEY                    |   |   |
| 17-1005B | 9/12/2012  | - | PULLEY                    |   |   |
| 17-1005C | 9/12/2012  | - | PULLEY                    |   |   |
| 17-9003  | 9/12/2012  | A | MOUNTING BRACKET          |   |   |
| 17-9006  | 9/12/2012  | - | SUPPORT BRACKET           |   |   |

### ASSEMBLY

|          |            |     |                       |   |   |
|----------|------------|-----|-----------------------|---|---|
| 17-2000  | 9/12/2012  | A   | ALERNATOR ASSEMBLY    | 1 | X |
| 17-3000  | 9/12/2012  | A   | FRONT HOUSING         | 1 |   |
| 17-3000C | 11/24/2011 | -   | FRONT HOUSING CASTING | 1 |   |
| 17-1006  | 9/12/2014  | NEW | M14 NUT               | 1 |   |
| 17-1007  | 9/12/2014  | NEW | M14 LOCKWASHER        | 1 |   |
| 17-4000  | 11/24/2011 | -   | ROTOR ASSEMBLY        | 1 |   |
| 17-4030  | 9/12/2012  | A   | SHAFT                 | 1 |   |
| 17-3020  | 9/12/2012  | -   | REAR HOUSING          | 1 |   |
| 15-3020  | 10/13/2011 | F*  | REAR HOUSING          | 1 |   |
| 15-3020C | 10/5/2010  | A*  | REAR HOUSING CASTING  | 1 |   |
| 15-5000  | 10/5/2010  | A*  | BRUSH ASSEMBLY        | 1 |   |
| 10-9000  | 9/9/2005   | B*  | BRUSH                 | 2 |   |
| 15-5050  | 9/30/2010  | B*  | WIRE HARNESS          | 1 |   |
| 15-5070  | 9/30/2010  | -*  | AUX TERMINAL          | 1 |   |
| 15-5080  | 9/30/2010  | -*  | AUX TAB               | 1 |   |
| 15-5090  | 9/30/2010  | -*  | GROUND TERMINAL       | 1 |   |
| 15-6000  | 10/5/2010  | C*  | REAR COVER ASSEMBLY   | 1 |   |

|         |           |   |       |   |   |
|---------|-----------|---|-------|---|---|
| 10-1031 | 8/22/2014 | - | LABEL | 1 | X |
|---------|-----------|---|-------|---|---|

### REGULATOR

|  |  |  |                               |  |  |
|--|--|--|-------------------------------|--|--|
|  |  |  | R1224 PMA APPROVED REGULATOR  |  |  |
|  |  |  | R1224B PMA APPROVED REGULATOR |  |  |

\* OR LATER APPROVED REVISION



4

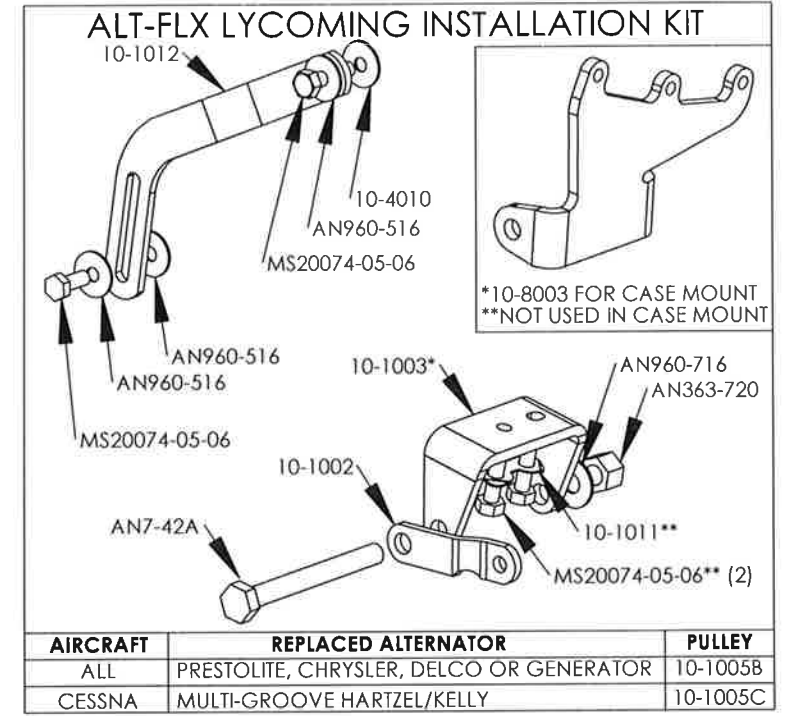
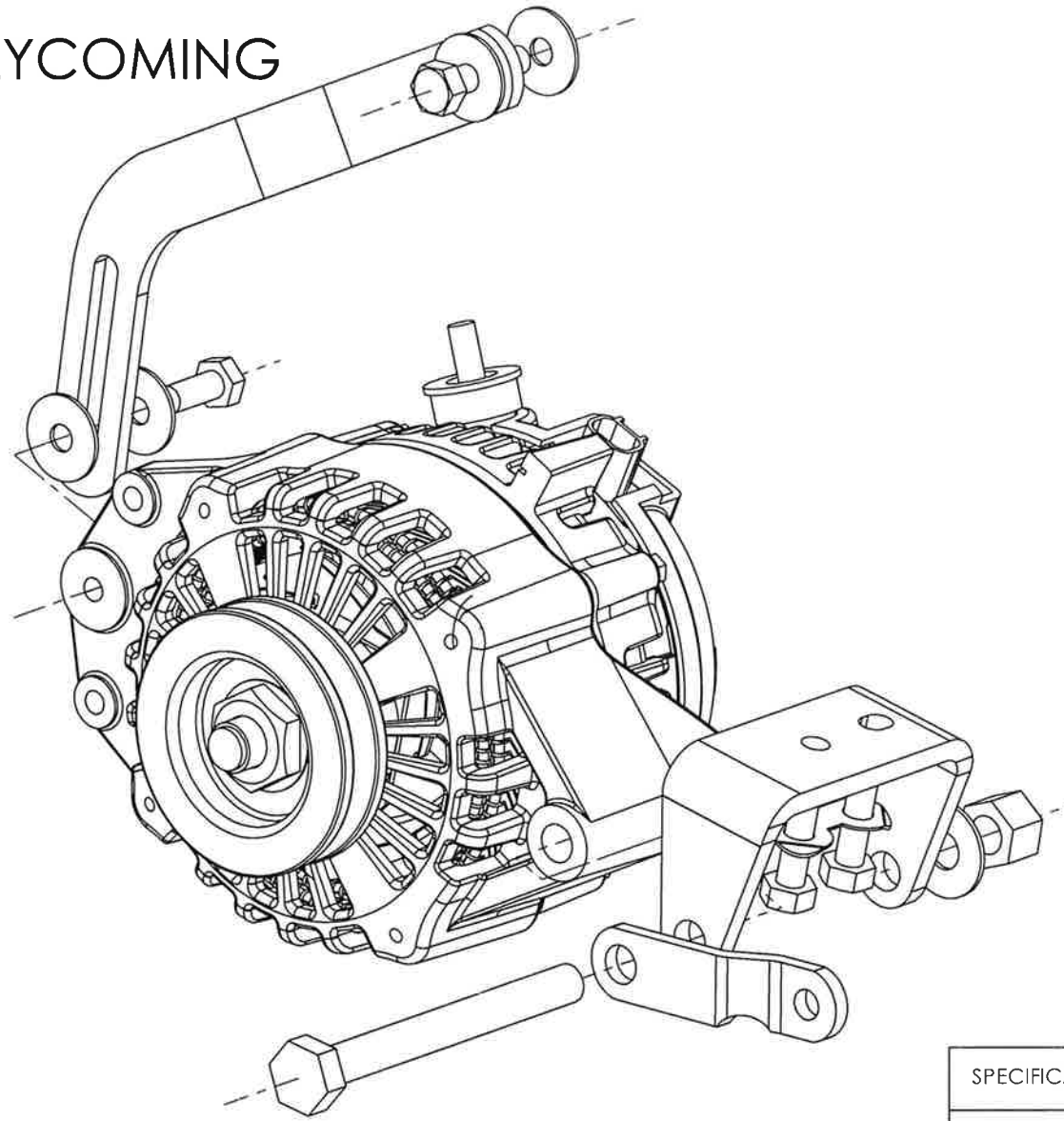
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| REVISIONS |      |   |    |         |
|-----------|------|---|----|---------|
| EN        | REV. | DESCRIPTION   | BY | DATE    |
| 1409070   | B    | FIRST RELEASE INTO HET DESIGN DATA  | BJ | 9/12/14 |
| 1409071   | C    | 1) TITLE BLOCK WAS PLANE-POWER, LTD. 2) "HARTZELL ENGINE TECHNOLOGIES LLC" WAS "PLANE-POWER, LTD" 3) ADDED 10-1031 CALLOUT TO DATA TAG 4) MODEL NO. 17-2000 WAS ALT-FLX 5) CHANGED M14 NUT AND LOCK WASHER TO 17-1006 & 17-1007 6) REMOVED "PLANE POWER, LTD" OR REPLACED WITH "HET" FROM INSTRUCTIONS WHERE APPLICABLE 7) ADDED DATA TAG LOCATION NOTE | BJ | 9/12/14 |

# LYCOMING



10-1031

**FAA PMA**  
HARTZELL ENGINE TECHNOLOGIES, LLC  
For eligibility see  
[www.plane-power.com/catalog](http://www.plane-power.com/catalog)

**MODEL NO. 17-2000**  
**SERIAL NO. FLX-YWWSN**  
**VOLTAGE VV**

NOTE 1: INSTALL 10-1005, 10-1005A, 10-1005B, 10-1005C, 17-1005 OR 17-1005A USING 17-1006 & 17-1007 WITH LOCTITE#272 ON NUT. TORQUE NUT TO 55FT LBS.

| SPECIFICATION CLASSIFICATION |                      |                     |
|------------------------------|----------------------|---------------------|
| CLASSIFICATION               | DIMENSION CONVENTION | NOTE NO. CONVENTION |
| CRITICAL                     | <XX.XX>              | <#>                 |
| MAJOR                        | [XX.XX]              | [#]                 |
| MINOR                        | XX.XX                | #                   |
| REFERENCE                    | (XX.XX)              | (#)                 |

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES AND APPLY AFTER HEAT TREAT AND PLATING  
.X = ±.015  
.XX = ±.010 ANGLES ±1°  
.XXX = ±.005  
BREAK ALL EDGES AND MACHINE ALL INSIDE CORNER FILLETS .015 MAX.  
SURFACE FINISH

THIS DRAWING CONTAINS INFORMATION THAT IS CONFIDENTIAL AND PROPRIETARY TO HARTZELL ENGINE TECHNOLOGIES. THIS DRAWING IS FURNISHED ON THE UNDERSTANDING THAT THE DRAWING AND THE INFORMATION IT CONTAINS WILL NOT BE COPIED OR DISCLOSED TO OTHERS EXCEPT WITH THE WRITTEN CONSENT OF HARTZELL ENGINE TECHNOLOGIES. WILL NOT BE USED TO THE DETRIMENT OF HARTZELL ENGINE TECHNOLOGIES, AND WILL BE RETURNED UPON REQUEST BY HARTZELL ENGINE TECHNOLOGIES.

| GEOMETRIC SYMBOLS PER ANSI Y14.5 |                  |
|----------------------------------|------------------|
| □                                | FLATNESS         |
| — —                              | STRAIGHTNESS     |
| ○                                | ROUNDNESS        |
| ⊘                                | CYLINDRICITY     |
| ⊖                                | PROFILE          |
| ⊥                                | PERPENDICULARITY |
| ⊕                                | POSITION         |
| ◎                                | CONCENTRICITY    |
| ≡                                | SYMMETRY         |
| ∠                                | ANGULARITY       |
| ∥                                | PARALLELISM      |
| ↺                                | CIRCULAR RUNOUT  |
| ↻                                | TOTAL RUNOUT     |

|          |                      |               |
|----------|----------------------|---------------|
| DRAWN    | BJ                   | 11/24/11      |
| CHECKED  | RFO                  | 9/16/14       |
| ENG.     | CMB                  | 9/22/14       |
| FINISH   | N/A                  |               |
| WEIGHT   | N/A                  |               |
| MATERIAL | SEE INDIVIDUAL PARTS |               |
| SIZE     | SH 1 OF 8            | CODE ID 65PY1 |

2900 Selma Highway  
Montgomery, AL 36108

**ALT-FLX INSTALLATION INSTRUCTIONS**

|             |      |
|-------------|------|
| DRAWING NO. | REV. |
| 17-1001     | C    |

4

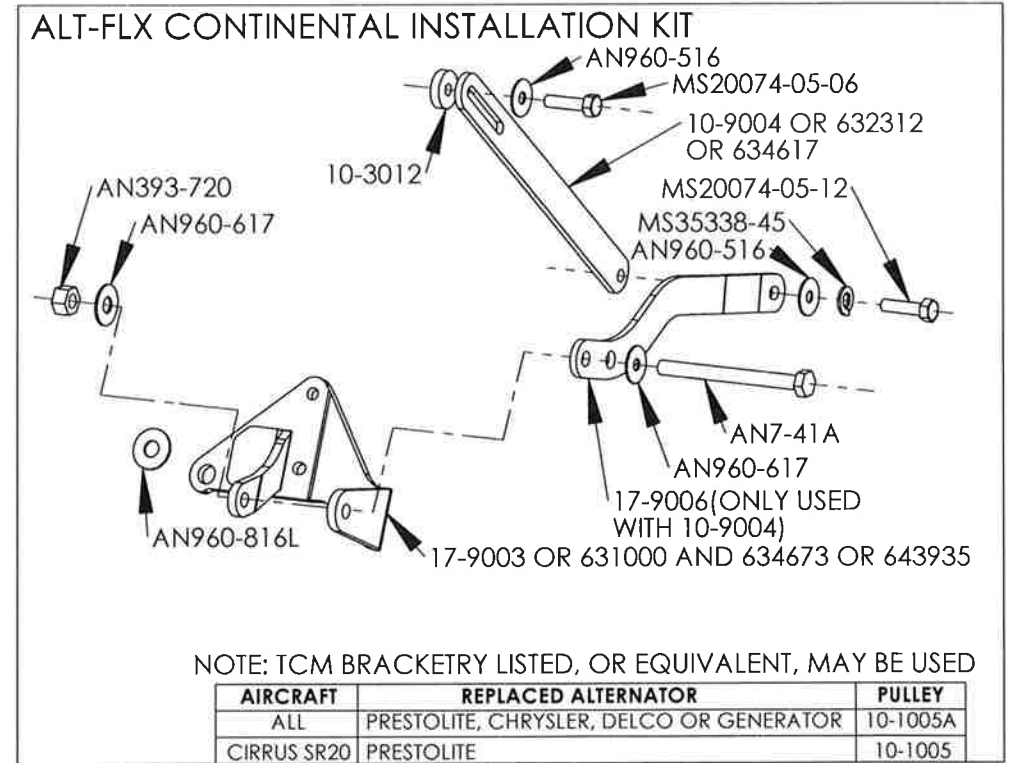
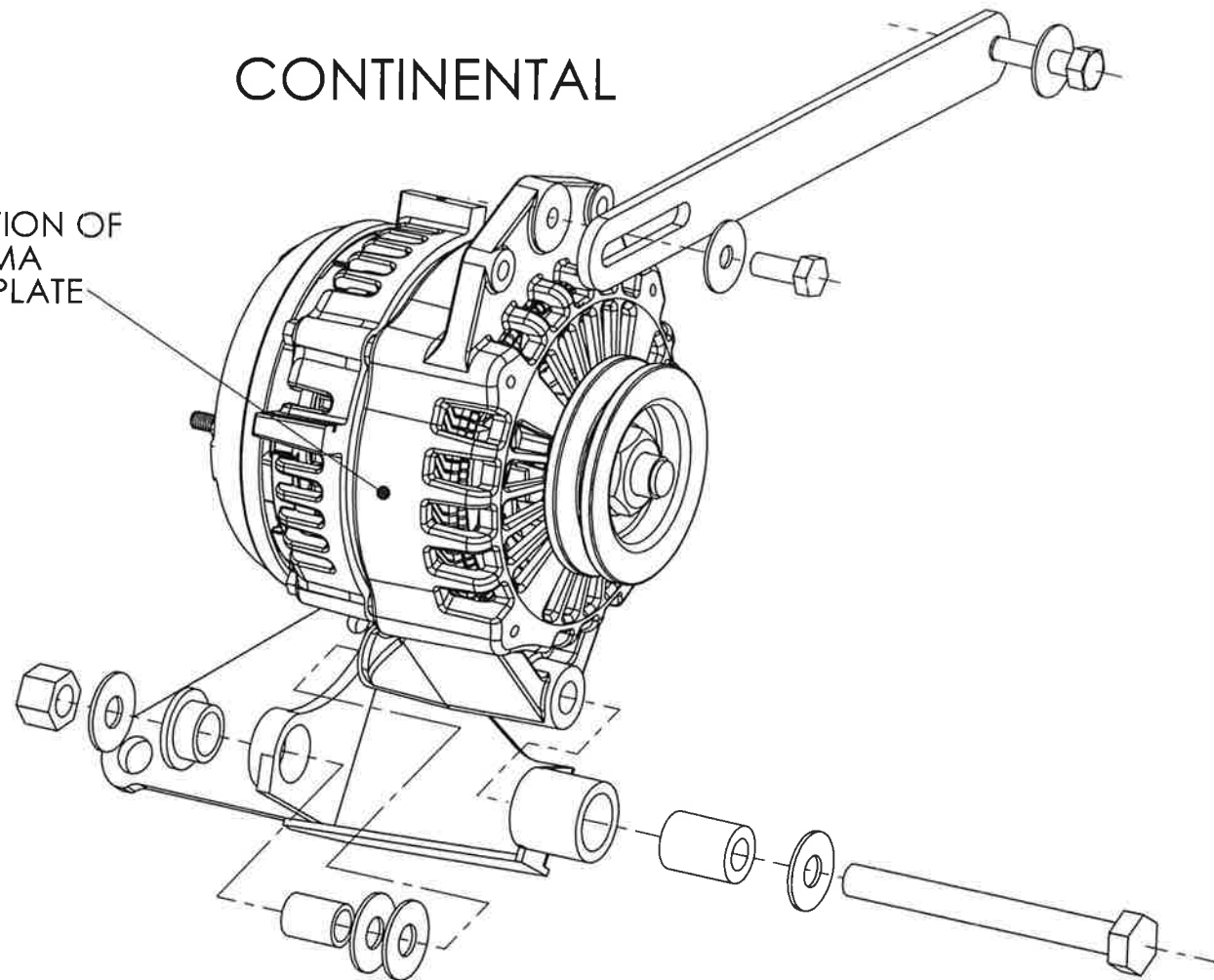
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# CONTINENTAL

LOCATION OF  
FAA PMA  
NAMEPLATE



NOTE 1: INSTALL 10-1005, 10-1005A, 10-1005B, 10-1005C, 17-1005 OR 17-1005A USING 17-1006 & 17-1007 WITH LOCTITE#272 ON NUT. TORQUE NUT TO 55FT LBS.

| SPECIFICATION CLASSIFICATION |                      |                     |
|------------------------------|----------------------|---------------------|
| CLASSIFICATION               | DIMENSION CONVENTION | NOTE NO. CONVENTION |
| CRITICAL                     | <XX.XX>              | <#>                 |
| MAJOR                        | [XX.XX]              | [#]                 |
| MINOR                        | XX.XX                | #                   |
| REFERENCE                    | (XX.XX)              | (#)                 |

#### UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES AND APPLY AFTER HEAT TREAT AND PLATING  
 .X = ±.015  
 .XX = ±.010      ANGLES ±1°  
 .XXX = ±.005  
 BREAK ALL EDGES AND MACHINE ALL INSIDE CORNER FILLETS .015 MAX. SURFACE FINISH

THIS DRAWING CONTAINS INFORMATION THAT IS CONFIDENTIAL AND PROPRIETARY TO HARTZELL ENGINE TECHNOLOGIES. THIS DRAWING IS FURNISHED ON THE UNDERSTANDING THAT THE DRAWING AND THE INFORMATION IT CONTAINS WILL NOT BE COPIED OR DISCLOSED TO OTHERS EXCEPT WITH THE WRITTEN CONSENT OF HARTZELL ENGINE TECHNOLOGIES. WILL NOT BE USED TO THE DETRIMENT OF HARTZELL ENGINE TECHNOLOGIES, AND WILL BE RETURNED UPON REQUEST BY HARTZELL ENGINE TECHNOLOGIES.

#### GEOMETRIC SYMBOLS PER ANSI Y14.5

- FLATNESS
- STRAIGHTNESS
- ROUNDNESS
- ⊘ CYLINDRICITY
- PROFILE
- ⊥ PERPENDICULARITY
- ⊕ POSITION
- ◎ CONCENTRICITY
- SYMMETRY
- ∠ ANGULARITY
- ∥ PARALLELISM
- ⊘ CIRCULAR RUNOUT
- TOTAL RUNOUT

SCALE NTS

|          |                      |          |
|----------|----------------------|----------|
| DRAWN    | BJ                   | 11/24/11 |
| CHECKED  | PFO                  | 9/19/14  |
| ENG.     | CMB                  | 9/22/14  |
| FINISH   | N/A                  |          |
| WEIGHT   | N/A                  |          |
| MATERIAL | SEE INDIVIDUAL PARTS |          |
| SIZE     | SH 2                 | CODE ID  |
| B        | OF 8                 | 65PY1    |

**HARTZELL ENGINE TECHNOLOGIES**  
 2900 Selma Highway  
 Montgomery, AL 36108

| ALT-FLX INSTALLATION INSTRUCTIONS |      |
|-----------------------------------|------|
| DRAWING NO.                       | REV. |
| 17-1001                           | C    |



4

3

2

1

D

D

C

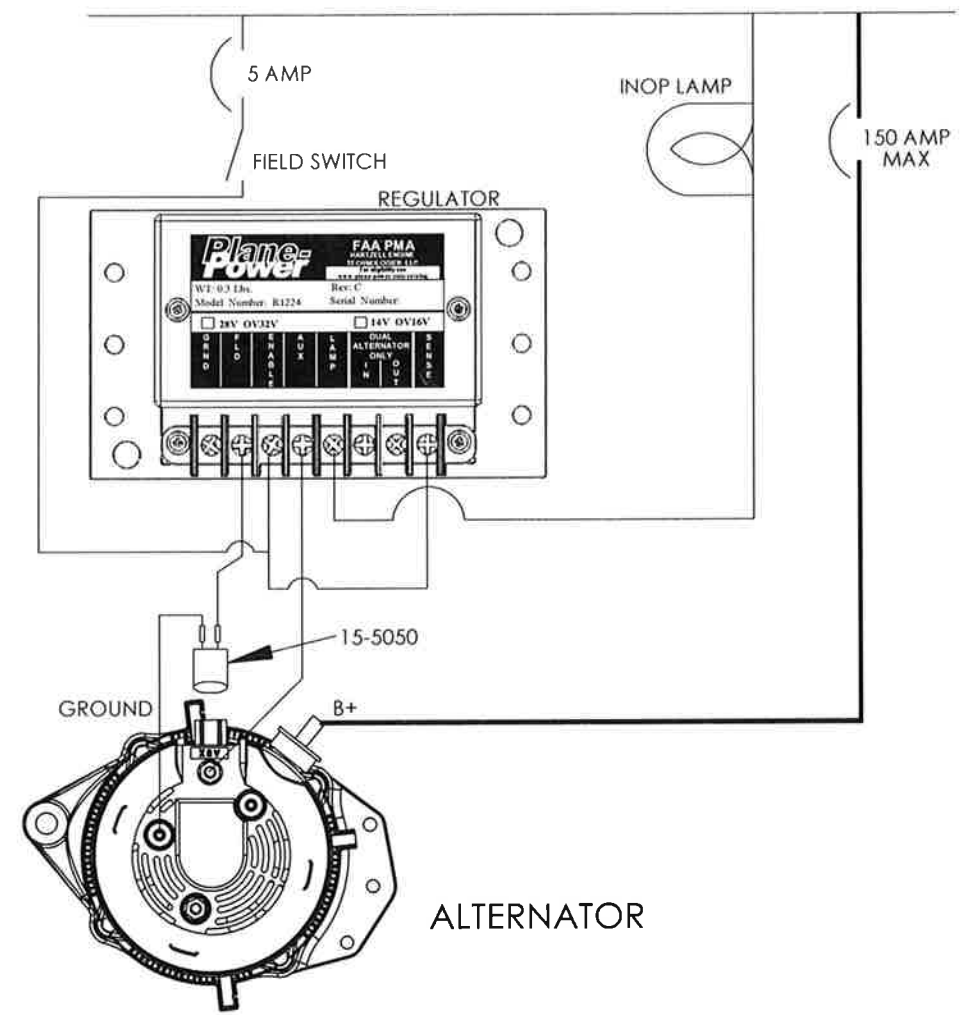
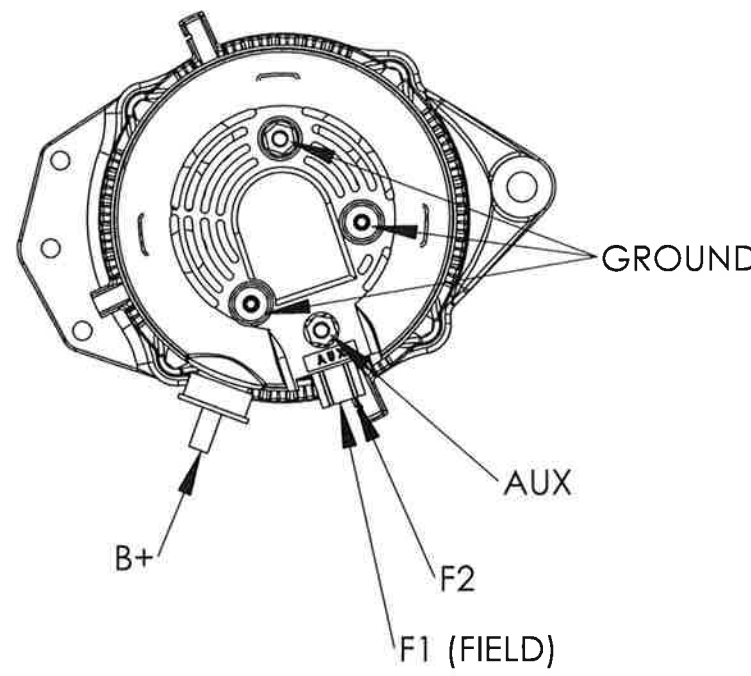
C

B

B

A

A



| SPECIFICATION CLASSIFICATION |                      |                     |
|------------------------------|----------------------|---------------------|
| CLASSIFICATION               | DIMENSION CONVENTION | NOTE NO. CONVENTION |
| CRITICAL                     | <XX.XX>              | <#>                 |
| MAJOR                        | [XX.XX]              | [#]                 |
| MINOR                        | XX.XX                | #                   |
| REFERENCE                    | (XX.XX)              | (#)                 |

UNLESS OTHERWISE SPECIFIED  
 DIMENSIONS ARE IN INCHES AND APPLY AFTER HEAT TREAT AND PLATING  
 .X = ±.015  
 .XX = ±.010      ANGLES ±1°  
 .XXX = ±.005  
 BREAK ALL EDGES AND MACHINE ALL INSIDE CORNER FILLETS .015 MAX. SURFACE FINISH

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| GEOMETRIC SYMBOLS PER ANSI Y14.5 |                  |
|----------------------------------|------------------|
| —                                | FLATNESS         |
| —                                | STRAIGHTNESS     |
| —                                | ROUNDNESS        |
| —                                | CYLINDRICITY     |
| —                                | PROFILE          |
| —                                | PERPENDICULARITY |
| —                                | POSITION         |
| —                                | CONCENTRICITY    |
| —                                | SYMMETRY         |
| —                                | ANGULARITY       |
| —                                | PARALLELISM      |
| —                                | CIRCULAR RUNOUT  |
| —                                | TOTAL RUNOUT     |
| SCALE                            | NTS              |

|                                  |            |               |
|----------------------------------|------------|---------------|
| DRAWN                            | BJ         | 11/24/11      |
| CHECKED                          | <i>BJ</i>  | 9/11/14       |
| ENG.                             | <i>CMB</i> | 9/22/14       |
| FINISH                           | N/A        |               |
| WEIGHT                           | N/A        |               |
| MATERIAL<br>SEE INDIVIDUAL PARTS |            |               |
| SIZE                             | SH 3 OF 8  | CODE ID 65PY1 |



2900 Selma Highway  
Montgomery, AL 36108

**ALT-FLX INSTALLATION INSTRUCTIONS**

|                        |           |
|------------------------|-----------|
| DRAWING NO.<br>17-1001 | REV.<br>C |
|------------------------|-----------|

4

3

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## Drawing No.: 17-1001 ALT-FLX INSTALLATION INSTRUCTIONS

**READ AND THOROUGHLY UNDERSTAND ALL OF THE INSTRUCTIONS BEFORE BEGINNING INSTALLATION.**

If a FORD DOFF-series (Cessna 611501, 611502, etc. Grumman American DOFF-10300, etc.) alternator is being replaced; the ALT-FLX will fit using all existing brackets, belt and hardware. Use ALT-FLX with 17-1005A pulley. See Installation Instructions 17-1001 SH1 and SH2.

If a Prestolite, Chrysler, Delco or other alternator or a generator is being replaced; new brackets, tension arm and mounting hardware are required. Use the table below to identify proper pulley and mounting kit. Use the ALT-FLX Lycoming Installation Kit for Lycoming engines and the ALT-FLX Continental Installation Kit for Continental engines. See Installation Instructions 17-1001 SH1 and SH2.

| Aircraft    | Engine | Alternator being replaced              | Mount Kit    | Pulley part # |
|-------------|--------|--|--------------|---------------|
| All         | Cont.  | Ford DOFF series                       | existing     | 17-1005A      |
| All         | Cont.  | Prestolite,Chrysler,Delco,or Generator | PP Cont. Kit | 10-1005A      |
| Cirrus SR20 | Cont.  | Prestolite                             | existing     | 10-1005       |
| All         | Lyc.   | Ford DOFF series                       | existing     | 17-1005A      |
| All         | Lyc.   | Prestolite,Chrysler,Delco,or Generator | PP Lyc. Kit  | 10-1005B      |
| Cessna      | Lyc.   | Multi-groove Hartzell/Kelly            | PP Lyc. Kit  | 10-1005C      |

If the increased current capacity of the ALT-FLX is to be used, replace the existing output circuit breaker with one rated for the desired current (up to 100A for 14V installations and up to 150A for 28V installations). Ensure the 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 per AC43.13-1B. Note: If aircraft has been equipped with an Ammeter, ensure that it is of adequate size to handle the increased output capability before increasing the output wire and breaker.

If desired, the original alternator regulator may be replaced with a R1224 or R1224B regulator. If a generator is being replaced, the generator regulator must be replaced with a R1224 or R1224B regulator (the R1224B mounts using the same holes as most generator regulators). Remove the original regulator and install the R1224 or R1224B in the same location using the R1224 installation and wiring instructions. For Generator Conversions, wire the R1224 per the GENERATOR CONVERSION section of this document. Ensure that the R1224 or R1224B is set for the voltage matching that of the aircraft's electrical system.

**MULTI-ENGINE INSTALLATIONS:** For proper load-balancing operation, R1224 or R1224B regulators must be installed for each alternator and wired per the R1224 Installation Instructions.

**INSTALLING THE ALT-FLX:**

1. Label then remove wiring from the existing alternator or generator. Remove the alternator.
2. Cut the ring lug off of the wire removed from the F or F1 terminal (Field) of the original alternator or generator. Connect the wire to EITHER white wire from the supplied 15-5050 Wire Harness/Plug using an appropriate butt connector.
3. If a second field wire (F2) was removed, connect it to the other white wire from the supplied 15-5050 Wire Harness/Plug using an appropriate butt connector. If no separate field wire (F2) was removed, connect the remaining white wire from the supplied 15-5050 Wire Harness/Plug to the elevated post (ground) on the rear of the ALT-FLX using an appropriate ring lug.
4. If an Aux wire was removed from the original alternator (generators will not have one) connect it to Aux terminal of the ALT-FLX with an appropriate ring lug. Hold the AUX post with a wrench and torque the AUX post nut to 20-22 in/lbs. If an R1224 regulator is being installed and there was not an AUX wire, connect a new wire (minimum 20AWG) to the ALT-FLX Aux terminal using an appropriate ring lug. Route this wire to the location that the R1224 is being installed.
5. If a separate ground wire (- or GND) was removed from the original alternator or generator, reconnect it to the elevated post (ground) on the rear of the ALT-FLX. Hold the ground post with a wrench and torque the ground post nut to 20-22 in/lbs.
6. Place the ring lug of the "+" wire (large output wire), and any other wires removed from the output (+) terminal of the original alternator or generator on the M8 output bolt of the ALT-FLX. Torque the M8 nut to 50 in/lb.
7. Tension the belt and torque the adjusting bolt to 200 in/lb and safety with 0.032" diameter safety wire. Refer to appropriate engine and airframe service manuals for belt tension and other torque values. Safety wire other drilled mounting bolts.
8. Start the aircraft and check the alternator output for proper operation.
10. Recheck and inspect the entire installation. Complete FAA form 337, make the appropriate log book entry, update the aircraft equipment list and revise the weight and balance if necessary.

## Generator Conversion

**NOTE: IF AIRCRAFT DOES NOT HAVE A CIRCUIT BREAKER OR CURRENT LIMITING DEVICE IN THE OUTPUT AND REGULATOR INPUT CIRCUIT THEY MUST BE INSTALLED.**

### WIRING THE R1224

- 1) If not already in place, install and label an alternator Field switch and a 5 amp fuse or circuit breaker in the panel. Connect the input of the circuit breaker to the positive bus and the output to the ENABLE terminal of the R1224.
- 2) Wire the system as follows, following the R1224 Installation Instructions for additional information:
  - a. Install a R1224 or R1224B alternator voltage regulator in the same location from which the generator regulator is removed. Ensure regulator voltage matches airframe electrical system.
  - b. Connect the field terminal on the voltage regulator to EITHER white wire from the supplied 15-5050 Wire Harness/Plug using an appropriate connector.
  - c. Connect the other white wire from the supplied 15-5050 Wire Harness/Plug to the elevated post (ground) on the rear of the ALT-FLX using an appropriate ring lug.
  - d. Hold the ground post with a wrench and torque the ground post nut to 20-22 in/lbs.
  - e. If the aircraft has a "Generator Inoperative" indicator lamp rated at 100mA or less, it may be used. If a lamp is not currently installed or is not compatible, install an alternator Inoperative Lamp (12v p/n 14-1010) (24v p/n 14-1011) in the panel in view of the pilot. Wire one lead of the lamp to the positive bus and the other to the R1224 LAMP terminal. Use minimum 20AWG wire.
  - f. Connect the AUX terminal of the ALT-FLX to the R1224 AUX terminal. Use minimum 20AWG wire.
  - g. Connect the GND terminal of the R1224 to aircraft ground. Use minimum 18AWG wire.
  - h. Jumper the R1224 SENSE and ENABLE terminals.
  - i. For Multi-engine installations, refer to the R1224 Installation Instructions for additional wiring.
  - g. Place the ring lug of the "+" wire (large output wire) on the M8 output bolt of the alternator. Torque the M8 nut to 50 in/lb.
  - h. Start the aircraft and check the alternator output for proper operation.
  - i. Recheck and inspect the entire installation. Complete FAA form 337, make a log book entry, update aircraft equipment list, and revise the weight and balance as necessary.

**For either installation the rear housing and stator may be clocked and the ground/aux offset studs may be removed as necessary to facilitate installation**

**INSTRUCTIONS FOR CONTINUED AIRWORTHINESS**

**Annual / 100 hour inspections:**

1. Remove drive belt and turn alternator rotor to check condition of bearings for abnormal noise or roughness.
2. Return to HET if problem is detected.

**5 year or 1,000 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 case.

## Alternate Parts Table

Note: parts below may be used in place of original equipment as applicable

| <b>Item</b>                             | <b>HET P/N</b>  |
|---|-----------------|
| <b>Bracket, LYC</b>                     | <b>10-8003</b>  |
| <b>Bracket, TCM</b>                     | <b>17-9003</b>  |
| <b>Continental Tension Arm</b>          | <b>10-9004</b>  |
| <b>3/8" V-Belt Pulley</b>               | <b>10-1005</b>  |
| <b>3/8" V-Belt Pulley</b>               | <b>10-1005A</b> |
| <b>3/8" V-Belt Pulley</b>               | <b>10-1005B</b> |
| <b>3.50" Diameter 4K Pulley</b>         | <b>10-1005C</b> |
| <b>3/8" V-Belt Pulley</b>               | <b>17-1005A</b> |
| <b>1/2" V-Belt Pulley</b>               | <b>10-2005</b>  |
| <b>3/8" V-Belt Pulley</b>               | <b>17-1005C</b> |
| <b>Pulley 4K Pulley</b>                 | <b>17-1005</b>  |
| <b>4k Engine Drive Pulley</b>           | <b>17-1005B</b> |
| <b>Engine Drive Belt</b>                | <b>17-0005</b>  |
| <b>Starter Strap</b>                    | <b>10-1002</b>  |
| <b>Support Bracket</b>                  | <b>17-9006</b>  |
| <b>Tension Arm</b>                      | <b>10-1012</b>  |
| <b>Tension Arm</b>                      | <b>10-1012A</b> |
| <b>Tension Arm at Alternator</b>        | <b>10-2007</b>  |
| <b>Tension Arm Spacer at Case</b>       | <b>10-3011</b>  |
| <b>Tension Arm Spacer at Case</b>       | <b>10-4010</b>  |
| <b>Tension Arm Spacer at Alternator</b> | <b>10-3012</b>  |
| <b>U Bracket</b>                        | <b>10-1003</b>  |
| <b>Regulator</b>                        | <b>R1224</b>    |
| <b>Regulator</b>                        | <b>R1224B</b>   |