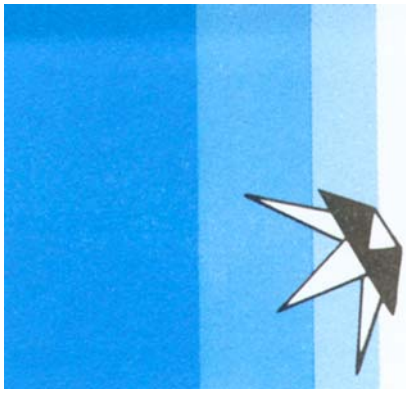


Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L

816 333-3400
800 437-6556

www.phoenixaerospace.com

Phoenix Aerospace, Inc., is a world class leader in AIRBORNE POWER CONVERSION, DISTRIBUTION and REGULATION EQUIPMENT. Our vast family of silicon solid state equipment has been accepted and used worldwide by leading airframe manufacturers for over a quarter of a century.

Our entire product line represents state-of-the-art expertise utilizing **electronic components** and **circuitry** proven reliable by millions of flight hours in a wide variety of high production commercial and military **fixed-wing** and **rotary wing** aircraft.

We manufacture 43 models of **SINGLE PHASE & 4-WIRE THREE PHASE TRANSVERTERS (Airborne DC to AC Solid State Static Electrical Power Inverters) in 105 separate configurations;** and 20 models of **DC VOLTAGE REGULATORS & GENERATOR CONTROL UNITS** in 40 configurations.

Successful hybrid systems using our **REGULATION EQUIPMENT** with **DC GENERATORS AND STARTER GENERATORS** manufactured by **APC, Auxilec, Bendix, General Electric, Lear Siegler, Lucas-Rotax, Plessey, Sal Moiraghi, Shinko, Westinghouse** and other well known manufacturers, literally cover the globe and are the standard of the world by which all others are judged.

All Phoenix Aerospace Equipment has a Two-Year Unconditional Warranty.

SUPPLEMENTAL TYPE CERTIFICATES

** Indicates an STC issued to Phoenix Aerospace, Inc. The following units can be purchased from Phoenix Aerospace, Inc. The STC may be used for installation FREE of charge.

Phoenix Aerospace holds an FAA Parts Manufacturer Approval on all items listed in the Type Certificates and the Supplemental Type Certificates.

All Phoenix Aerospace, Inc., equipment has a two-year warranty.

PAI PART #	STC #	APPLICATION
VR-1010-24-1A SOLID STATE DC VOLTAGE REGULATOR	SA2511CE**	**BELL 206A & 206B**
	SA2853CE**	**AIRTRACTOR AT-400, AT400A**
	SA2854CE**	**AIRTRACTOR AT-402, AT-402A, AT502, AT502A, AT-503**
	DESSIGN APPROVAL	**AYRES THRUSH S2R-T11, S2R-T15, S2R-T34, SR-T45, AND S2R-565**
	DHC TC	**deHAVILLAND DHC-6**
VR-1010-24-2A SOLID STATE DC VOLTAGE REGULATOR	SA2705CE**	**GULFSTREAM AEROSPACE (AERO-COMMANDER) MODEL 680T, 681, 690, 690A, S/N 11100 THRU 11226**
	DHC TC	**deHAVILLAND DHC-6**
	SA00487WI**	**BEECH-60 S/N P-4 THRU 126 EXCEPT S/N 123: -A60 S/N P123 AND P-127 THRU P-246; B60 S/N P-247 THRU P-465**
	SA 1014GL (TURBIN CONV.)	**NYTWORNIA SPRZETUPZL M18, M18A**
	SA2511CE**	**BELL 206A & 206B**
	SA00575WI**	**BEECH 65 A90, B90, C90 S/N LJ114 THRU LJ539 AND LJ571 THRU LJ677 E90 S/N LW 14 THRU LW 156**
VR-10101-24-2AA SOLID STATE DC VOLTAGE REGULATOR	**AYERS TC**	**AYRES S2R, S2R-R1340, S2R-R3S, S2R-R1820, S2R-T11, T15, T34, T45, T65, (EXCEPT FOR THE HGT65), S2R-G1, G5, G10**

VR-1010-24-2BE SOLID STATE DC VOLTAGE REGULATOR	**SH7005SW-D** (AEROSPATIALE)	**AEROSPATIALE AS355E, AS355F, AS355F-1**
	SERVICE RECOMMENDATION	**MITSUBISHI MU-2-25/-26/-26A/-40 S/N 313SA, 321SA, 348SA AND SUBSEQUENT**
VR-1010-24-GA SOLID STATE DC VOLTAGE REGULATOR	**SA5489NM****	**GULFSTREAM G-1159 S/N'S 1 THRU 300 EXCEPT THOSE WITH AIRCRAFT SERVICE CHANGE 285 INCORPORATED**
VR-1010-24-2AD SOLID STATE DC VOLTAGE REGULATOR	**SA1466CE** COLT INDUSTRIES	**HAWKERSIDDELEY DH-125-1A, -1A522, 1A/R-522, -3A, -3A/R, -1A/S-522, -3A/RA, -400A AND HS-125-600A**
VR-1010-24-2AW SOLID STATE DC VOLTAGE REGULATOR	**SA3777NM** A.W. LUTTON	**DHC-3 (TURBINE MOD)**
VR-1010-24-2E SOLID STATE DC VOLTAGE REGULATOR	**SHORTS TC**	**SHORTS SKYVAN SC-7**
VR-1010-24-2F SOLID STATE DC VOLTGAE REGULATOR AND **GC-1010-24-6AM** SOLID STATE DC GENERATOR CONTROL UNIT	**SR00470WI****	**BELL HELICOPTER 206B3 (H2SW)**
GC-1010-24-3B SOLID STATE DC GENERATOR CONTROL UNIT	**SA2570CE****	**CASA C-212 SERIES**
GC-1010-24-3B I SOLID STATE DC GENERATOR CONTROL UNIT	**SR2704CE****	**GULFSTREAM AEROSPACE (AEROCOMMANDER) 690A, 690B, 690C, 690D, 695, 695A**

GC-1010-24-5D SOLID STATE DC GENERATOR CONTROL UNIT	**DHC TC**	**DHC-8 SERIES 100, 200, 300**
GC-1010-24-6A AND **GC-1010-24-6D** SOLID STATE GENERATOR CONTROL UNITS	**SR00061WI****	**BELL 206L, 206L-1, 206L-3 & 296L-4 WITH IFR**
GC-1010-24-6D SOLID STATE DC GENERATOR CONTROL UNIT	**SR00887WI****	**BELL 206A, 206B**
GC-1010-24-6AM SOLID STATE DC GENERATOR CONTROL UNIT AND **VR-1010-24-2F** SOLID STATE DC VOLTAGE REGULATOR	**SR00470WI****	**BELL HELICOPTER 206B3** **(H2SW) WITH IFR**
GC-1010-24-6D SOLID STATE DC GENERATOR CONTROL UNIT	**SR00083WI**** **SR00887WI****	**BELL 206L, 206L-1, 206L-3 & 206L-4 WITHOUT IFR**
VR-1010-24-6E SOLID STATE DC VOLTAGE REGULATOR	**SA2353NM** (SOLOY CONVERSION)	**CESSNA U206G; TU206G; S/N U20603522 THRU U20604074 (1977) SEE PMA FOR REGULATOR ADDITIONAL SERIAL NUMBERS**
	SA3523NM TURBINE POWER COMPANY (ONLY)	**BEECH A36, A36TC**

GC-1010-24-6L SOLID STATE DC GENERATOR CONTROL UNIT	**SR00799WI****	**BELL 407**
BG-1010-24-7A SOLID STATE BRUSHLESS DC GENERATOR VOLTAGE REGULATOR	**ST00173WI****	**LEARJET 35, 35A, 36, 36A**
	ST00537WI**	**LEARJET 55, 55B & 55C**
BG-1010-24-8A SOLID STATE BRUSHLESS DC GENERATOR VOLTAGE REGULATOR	**ST00955WI****	**LEARJET 35, 35A, 36, 36A**
BP-1010-24-8D BUS BAR PROTECTION UNIT	**DHC TC**	**DHC-8 SERIES 100, 200, 300 (SUPERCEDED BY 8E)**
GC-1010-24-9A SOLID STATE DC GENERATOR CONTROL UNIT	**AEROSPATIALE STC**	**AEROSPATIALE SA366G SERIES**
DH-1020-115-3-CS I AC POWER CONTROL UNIT	**DHC TC**	**DHC-8 SERIES 100, 200, 300**
DH-1020-115-3-CS II AC POWER CONTROL UNIT	**DHC TC**	**DHC-8 SERIES 100, 200, 300**
1025-24-15-CS SOLID STATE INVERTER	**DHC TC**	**DHC-2**
DH-1030-24-2-CS DC CURRENT FAULT SENSOR	**AEROSPATIALE TC**	**AEROSPATIALE SA366G SERIES**

DH-1030-24-2-CS I DC CURRENT FAULT SENSOR	**DHC TC**	**DHC-8 SERIES 100, 200, 300**
DH-1030-24-3-CS I INVERTER WARNING LIGHT CONTROL BOX	**CASA TC**	**CASA C-212 CB, CC, CD, CE**
DH-1030-24-3-CS INVERTER WARNING LIGHT CONTROL BOX	**SA740CE** COLT INDUSTRIES (ONLY)	**HS-125-1A, -1A/522, -1A/R-522, -3A, -3NR, 1A/S-522, -3A/RA AND -400A**
	DHC TC	**DHC-7**
DH-1030-24-3-CS II INVERTER WARNING LIGHT CONTROL BOX	**DHC TC**	**DHC-5**
DH-1030-24-3-CS IID INVERTER WARNING LIGHT CONTROL BOX	**DHC TC**	**DHC 8 SERIES 100, 200, 300**
DH-1030-24-65-CS SOLID STATE INVERTER	**DHC TC**	**DHC-6**
BH-1030-24-100-CS SOLID STATE INVERTER	**SR09190RC** ORLANDO AVIATION	**SIKORSKY 555**
DH-1030-24-100-CS SOLID STATE INVERTER	**DHC TC**	**DHC-5**
DH-1030-24-600-CS SOLID STATE INVERTER	**SA740CE** COLT INDUSTRIES	**HS-125-1A, -1A/255, -1A/R522, -3A, -3A/R, -1A/S-522, 3A/RA & -400A**

DH-1030-24-600-CS I SOLID STATE INVERTER	**CASA TC**	**CASA C-212 CB, CC, CD, CE**
DH-1030-24-600-CS II SOLID STATE INVERTER	**DHC TC**	**DHC-5**
DH-1030-24-600-CS IIB SOLID STATE INVERTER	**DHC TC**	**DHC-8 SERIES 100, 200, 300**
DH-1030-24-1200-CS SOLID STATE INVERTER	**SA740CE** COLT INDUSTRIES	**HS DH-125-1A, -1A/522, -1A/R-522, -3A, -3A/R, -1A/S-522, -3A/4A 7-400A**
DH-1030-1200-CS IIB SOLID STATE INVERTER	**DHC TC**	**DHC-7 SERIES 100, 150**
DH-1030-115/3-600-CS I SOLID STATE PARALLELING CONTROL BOX	**CASA TC**	**CASA C212 CB, CC, CD, CE**
DH-1030-115/3-1200-SS SOLID STATE PARALLELING CONTROL BOX	**DHC TC**	**DHC-5**
DH-1030-115/3-1200-SS-IID SOLID STATE PARALLELING CONTROL BOX	**DHC TC**	**DHC-8 SERIES 100, 200, 300** **DHC-7 SERIES 100, 150**
DH-1030-115/26-150-CS I AUTOFORMER	**CASA TC**	**CASA C212 CB, CC, CD, CE**

DH-1080-24-1A II SOLID STATE BLEED VALVE CONTROL UNIT	**DHC TC**	**DHC SERIES 100, 200, 300**

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA2511CE

This certificate, issued to Phoenix Aerospace, Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 6 *of the* Civil Air *Regulations.*

Original Product — Type Certificate Number: H2SW

Make: Bell

Model: 206A and 206B

Description of Type Design Change: Installation of Phoenix Aerospace, Inc. (PAI) Model VR-1010-24-1A, Drawing No. 095001, Rev. O dated December 16, 1988, or Model VR-1010-24-2A, Drawing No. 095027, Rev. P, dated April 12, 1991, Silicon, Solid-State, DC Voltage Regulator Units Data required: (1) PAI Installation Instructions for Installing PAI Mode VR-1010-24-1A Solid-State DC Voltage Regulator in Bell Helicopter Model 206B, dated June 6, 1989, or Rev. A, dated March 12, 1991, which added Model 206A, or (2) PAI Installation Instructions for Installing PAI Mode VR-1010-24-2A Solid-State DC Voltage Regulator in Bell Helicopters Model 206A and 206B, dated September 9, 1991, or later "FAA Approved" revision of (1) or (2).

Limitations and Conditions:

This approval should not be extended to other specific helicopters of these models on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that helicopter.

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

Date of application: June 16, 1989

Date of issuance: July 24, 1989

Date reissued:

Date amended: 3/18/91, 10/11/91, 11/8/91

By direction of the Administrator

Ronald K. Rathgeber
(Signature)

for Lawrence A. Herron, Manager
Wichita Aircraft Certification Office
(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

DEPARTMENT OF TRANSPORT

Supplemental Type Approval

Number: SH89-40

This approval is issued to:

Phoenix Aerospace, Inc.
220 W. 80th Terrace
Kansas City, MO 64114
U.S.A.

Issue No.: 2

Approval Date: November 10, 1989

Issue Date: December 3, 1991

Responsible Region: Headquarters

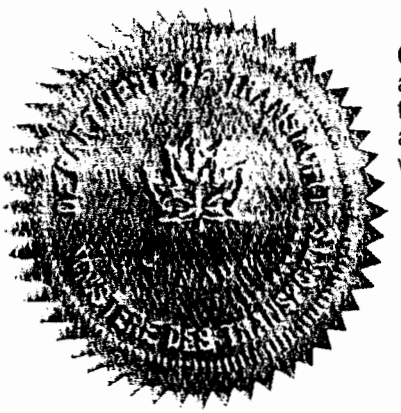
Aircraft/Engine Type or Model: Bell 206A, 206B

Canadian Type Approval or Equivalent: H-92

Description of Type Design Change: Installation of Phoenix Aerospace Inc. solid state DC voltage regulators in accordance with FAA STC SA2511CE

Installation/Operating Data, Required Equipment and Limitations: Installation is to be carried out in accordance with FAA approved Phoenix Aerospace Inc. Installation Instruction for Installing Phoenix Aerospace Model VR-1010-24-1A Solid State DC Voltage Regulator in Bell Helicopter Model 206B (no rev.), dated June 16, 1989,* or Rev. A, dated March 12, 1991* which adds Model 206A; or Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Inc. Model VR-1010-24-2A Solid State DC Voltage Regulator in Bell Helicopters Model 206A and 206B dated September 9, 1991.*

* or later approved revision.



Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, it shall be established that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

F.R. Davies
Chief, Programs
Airworthiness Branch Ottawa
For Minister of Transport

Canada

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

16 JUNE 1989
REV. A
12 MARCH 1991

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL VR-1010-24-1A SOLID STATE DC VOLTAGE REGULATOR IN BELL HELICOPTER MODEL 206A & 206B

1. This installation is to be performed by qualified personnel only.

2. Gain access to the voltage regulator by removing the Hat Rack.

3. Prior to removal of the existing requlator, place all switches or circuit breakers in their "OFF" position. Press downward on the voltage regulator firmly and unsnap spring hold-down clips. Lift regulator up and away from slotted brackets and engaging tabs to remove.

4. Install the VR-1010-24-1A Regulator in mounting base and secure as follows:

   (a) Insert the two small tabs on the DC voltage regulator into the slotted brackets on the mounting base. The tabs should fit snug, but without forcing. Check to see the brackets are not bent out from the mounting base, which would permit the tabs to slip up and out.

   (b) Press the voltage regulator downward to the base, forcing the spring hold-down clips out far enough to admit the two vertical tabs on the voltage regulator. DO NOT bend these spring clips outward with pliers or a screwdriver, as they must exert pressure both downward and across the base toward the slotted brackets.

   (c) Holding the voltage regulator firmly against the regulator base, snap the spring clips into position by pressing them against the vertical tabs on the regulator. In the event spring clips will not pass over the vertical tabs on regulator, remove regulator and examine both regulator and base for foreign objects causing interference.

5. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position.

6. Voltage check:

   (a) Connect a voltmeter with a range 0 to 30 volts to the regulator base test jacks. (Terminal B+ and G-)

   (b) Accelerate the engine until the generator is operating at or above the minimum rated speed as given in the applicable generator manufacturer's handbook.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

(c) Close the generator switch.

(d) No-load or minimum-load voltage should be between 27.7 and 29.1 volts.

(e) The DC voltage regulator is preset at the factory for 28.5 volts on the regulated bus terminal B of generator to terminal E. In the event adjustment is required at flight line level, perform steps (f) through (h).

(f) Remove 1/2 inch plug button at access hole using a 5/16 inch hexnut driver with hollow shaft, loosen the regulation adjustment control locking nut.

(g) Using a small screwdrive, approximately 1/8 inch blade, rotate slotted control shaft to obtain desired voltage on regulated bus.

(h) Using the 5/16 hexnut driver, tighten control locking nut. DO NOT overtighten. Replace 1/2 inch plug button in access hole.

(i) Operate the generator at least ten minutes at flight idle with minimum load and battery switch off. Recheck voltage to assure temperature rise does not affect the regulation.

NOTE: The model VR-1010-24-1A DC Voltage Regulator does not exhibit the characteristic droop of carbon pile regulators when cold. The regulation will be flat over the specified temperature altitude operating range.

(j) At flight idle, close master battery switch and switch on max aircraft DC load. Recheck the DC voltage.

(k) Verify the generator load meter is indicating the load supplied.

(l) Switch off DC load, master battery switch, generator switch and engine.

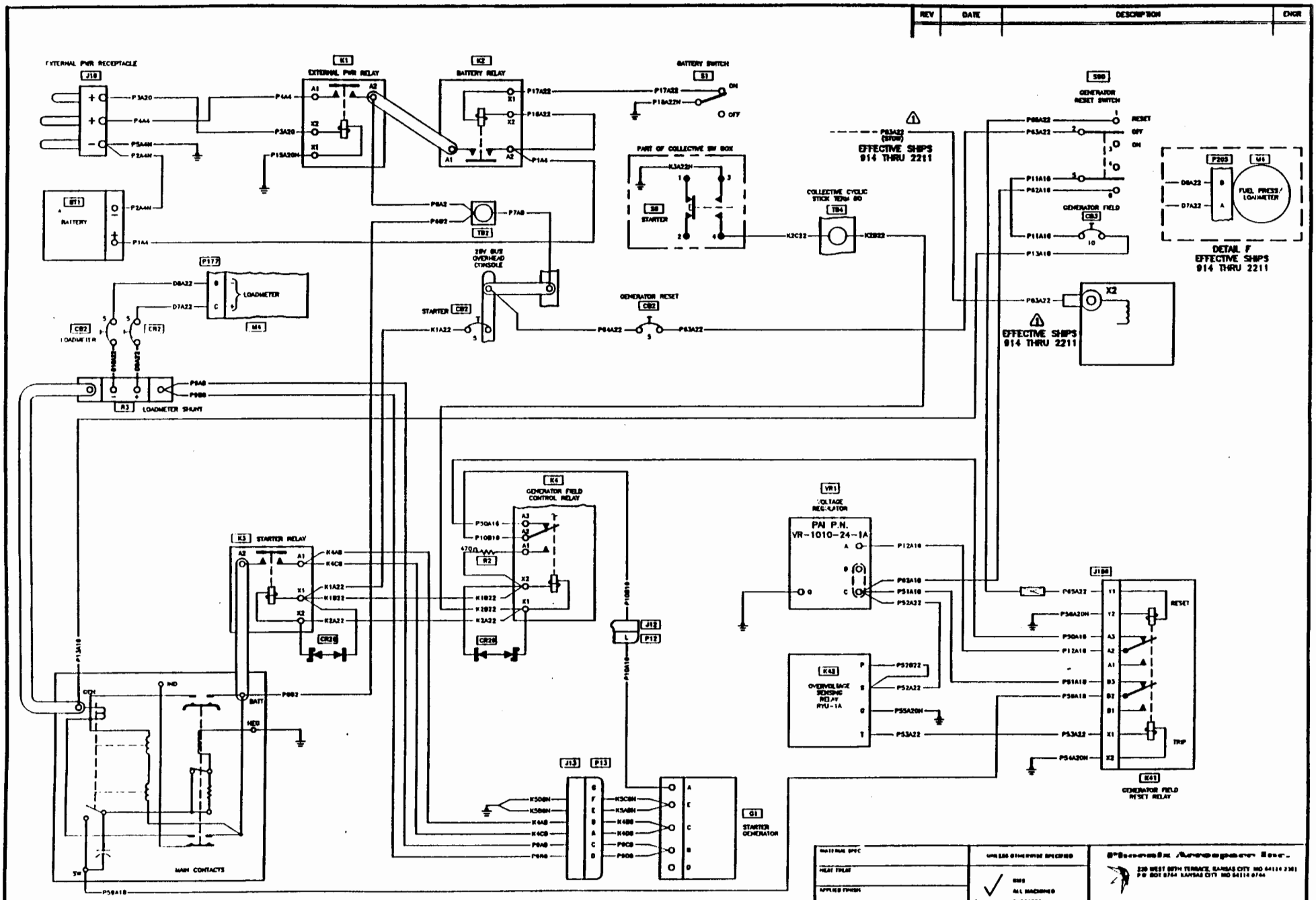
CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATORS FROM THE BASE UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN. FAILURE TO OBSERVE THIS CAUTION WILL RESULT IN PITTED OR BURNED CONTACT SURFACES OR OTHER DAMAGE.

7. Make appropriate entry in the aircraft Log Book.

STC SA2511CE

F.A.A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date MAR 18 1991


REV
DATE
DESCRIPTION
ENGR
EXTERNAL PWR RECEPTACLE
J10
K1
EXTERNAL PWR RELAY
K2
BATTERY RELAY
BATTERY SWITCH
S1
ON
OFF
PART OF COLLECTIVE SW BOX
S8
STARTER
COLLECTIVE CYCLIC STICK TERM 80
TB4
EFFECTIVE SHIPS 914 THRU 2211
S90
GENERATOR RESET SWITCH
RESET
OFF
ON
GENERATOR FIELD
CB3
P205
M4
FUEL PRESS/ LOADMETER
DETAIL F
EFFECTIVE SHIPS 914 THRU 2211
BT1
BATTERY
P177
LOADMETER
M4
CB2
LOADMETER
CR2
A3
LOADMETER SHUNT
TB2
28V BUS OVERHEAD CONSOLE
STARTER CB2
GENERATOR RESET CB2
X2
EFFECTIVE SHIPS 914 THRU 2211
K4
GENERATOR FIELD CONTROL RELAY
K3
STARTER RELAY
CR26
R2
470Ω
VR1
VOLTAGE REGULATOR
PAI P.N. VR-1010-24-1A
K43
OVERVOLTAGE SENSING RELAY RYU-1A
J106
RESET
TRIP
K41
GENERATOR FIELD RESET RELAY
J13
P13
G1
STARTER GENERATOR
CON
IND
BATT
MAIN CONTACTS
EFFECTIVE SHIPS 584 THRU 2211
NOTES:
PROVISION FOR BATTERY KIT (STOW WIRE)
206-078-810E
206-078-337F
206-078-341A
MATERIAL SPEC
HEAT TREAT
APPLIED FINISH
DRAWN BY M.B.H. DATE 16 JAN 1989
CHECKED BY B.L.K. DATE 16 JUN 1989
UNLESS OTHERWISE SPECIFIED
ALL MACHINED SURFACES
FRAC TOL ± 1/64
DEC TOL ± .005
ANGULAR TOL ±
FEATURE CONTROL SYMBOLS PER ANSI Y14.5 CURRENT REV
BREAK ALL SHARP EDGES & CORNERS, REMOVE BURRS
UNDERLINED DIMS NOT TO SCALE
BELL HELICOPTER TEXTRON
220 WEST 80TH TERRACE, KANSAS CITY MO 64114 2301
P O BOX 8764 KANSAS CITY MO 64114 0764
TITLE
WIRING DIAGRAM-DC POWER DISTRIBUTION SYSTEM FOR BELL HELICOPTER 206B USING PHOENIX AEROSPACE INC. MODEL VR-1010-24-1A DC VOLTAGE REGULATOR
SCALE
SIZE C
CODE IDENT NO 29632
DWG NO 110114

Phoenix Aerospace Inc.

www.phoenixaerospace.com

VR-1010-24-1A

28 VOLT DC VOLTAGE REGULATOR

STC SA2511CE, FOR RETROFITTING THE ANTIQUATED CARBON PILE VOLTAGE REGULATORS IN BELL 206A & 206B HELICOPTERS WITH PAI *Silicon Solid State* REGULATORS, PROVIDES DRAMATIC IMPROVEMENT IN DC ELECTRICAL SYSTEM PERFORMANCE AND RELIABILITY.

INSTALL IT AND FORGET IT!

- ♣ PRECISION DC VOLTAGE REGULATION
- ♣ NO CHARGE FOR THE STC
- ♦ AUTOMATIC PARALLELING
- ♦ FIELD PROVEN UNIT RELIABILITY
- ♥ UNSURPASSED PRODUCT SUPPORT
- ♥ ULTRALIGHT: 1.5 LBS.

♠ 24 MONTH UNCONDITIONAL WARRANTY

FOR INFORMATION, CALL: 800-437-6556 or FAX: 816-444-4133

VR-1010-24-1A

28 VOLT DC VOLTAGE REGULATOR

Silicon Solid State

Regulation Technology for the 21st Century

PAI P/N VR-1010-24-1A DC VOLTAGE REGULATORS ARE A DIRECT RETROFIT FOR ALL CARBON PILE REGULATORS IN BELL 206A & 206B HELICOPTERS WITH NO CIRCUITRY, MECHANICAL, OR WIRING CHANGES OF ANY KIND IN THE AIRCRAFT.

ELECTRICAL CHARACTERISTICS

*REGULATED DC VOLTAGE RANGE:	27.5 to 29.5 VDC
*REGULATION (LIMITS ALL CONDITIONS):	±0.2 VOLT
FIELD CURRENT (CONTINUOUS):	14 AMPERES
TIME OF RECOVERY (0 - FULL LOAD):	0.05 SECOND
AMBIENT TEMPERATURE RANGE:	-85ºC TO +85ºC
MAXIMUM OPERATING ALTITUDE:	100,000 FEET & BEYOND
MTBF:	10,000 FLIGHT HOURS (MIN.)
WEIGHT:	1.5 LBS.

*0 to full load, over rated generator speed & temperature-altitude operating range (No other manufacturer maintains such tight, stable regulation).

ORDER TODAY! - 800 437-6556

Installation of PAI P/N VR-1010-24-1A DC VOLTAGE REGULATORS in DC Electrical Systems that now utilize a Carbon Pile Voltage Regulator on a flexible mounting base is the easiest and the simplest choice – merely unsnap the carbon pile regulator from the base and snap in the –1A solid state regulator. The regulator is preset at the factory at 28.5 Volts DC and normally does not require any readjustment for either Ni-Cad or lead acid batteries. It's that simple! There's nothing else to do!

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA2853CE

This certificate, issued to Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114

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

Original Product — Type Certificate Number: A9SW

Make: Air Tractor

Model: AT-400, AT-400A

Description of Type Design Change: Installation of Phoenix Aerospace DC Voltage regulator, P/N VR-1010-24-1A or P/N VR-1010-24-2A in accordance with (1) "Phoenix Aerospace Inc., Installation Instructions for Installing Phoenix Aerospace Model VR-1010-24-1A Solid State DC Voltage Regulator" dated August 5, 1992, or "Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Model VR-1010-24-2A Solid State DC Voltage Regulator" dated October 9, 1992, and (2) Phoenix Aerospace Drawing No. 095001, Revision P, dated September 20, 1991, or Drawing No. 095027, Revision Q, dated September 20, 1991, or later FAA approved revisions to (1) or (2).

Limitations and Conditions: This approval should not be extended to other specific airplanes of these models on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

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

Date of application: August 5, 1992 *Date reissued:*

Date of issuance: October 7, 1992 *Date amended:* December 14, 1992

By direction of the Administrator

Lawrence A. Herron
(Signature)

Lawrence A. Herron, Manager
Wichita Aircraft Certification Office
(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

29 October 1992

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL VR-1010-24-2A
SOLID STATE DC VOLTAGE REGULATOR IN
AIR TRACTOR MODELS AT-400, AT-400A, AT-402, AT-402A, AT-502, AT-502A, AND AT-503A

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

1. Assure battery is disconnected and switches or circuit breakers are in their "OFF" position.

2. Gain access to the voltage regulator by removing the Hat Rack.

3. Press downward on the voltage regulator firmly and unsnap the spring hold-down clips. Lift regulator up and away from the slotted brackets and engaging tabs to remove.

4. Disconnect and label the base assembly wires. Remove base and shock mount assembly.

5. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

6. Phoenix Aerospace Inc. P/N 116563 Mounting Kit

   *1 each P/N 088087 Adapter Plate
   1 each P/N MS3106F-16S-1S (028012) Solder Connector
   4 each P/N 100070 Nut, Hex, S.Stl Nylon Insert, Locking, 8-32
   4 each P/N 076026 Washer, Flat, S.Stl #8 x 3/8 In. O.D.

   Contains all the hardware necessary to complete the installation.

   *Voltage regulator has been secured to the adapter plate at the factory.

7. Install the Phoenix Aerospace Inc. P/N VR-1010-24-2A DC Voltage Regulator complete with adapter plate assembly into the existing 4 holes and secure with the 4 flat washers and the 4 locking nuts supplied.

8. The supplied MS3106F-16S-1S solder connector is to be wired to the following pin call-out:

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PIN NO.	CONNECTION
PIN A	GENERATOR FIELD
PIN B	VOLTAGE SENSE (REG. POINT ON BUS)
PIN C	GENERATOR POSITIVE

PLEASE NOTE: PINS B & C MUST BE JUMPERED

PIN G GROUND (GENERATOR NEGATIVE)

9. Install the connector on the voltage regulator.

10. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position.

11. Voltage check:

    (a) Connect a voltmeter with a range 0 to 30 volts; positive to the generator side of the DC Bus Contactor and negative to DC Ground.

    (b) Accelerate the engine until the generator is operating at or above the minimum rated speed as given in the pilot's handbook.

    (c) Close the generator switch.

    (d) No-load or minimum-load voltage should be between 27.7 and 29.1 volts.

    (e) The DC voltage regulator is preset at the factory for 28.5 volts on the regulated bus terminal B of generator to terminal E. In the event adjustment is required at flight line level, perform steps (f) through (h).

    (f) Using a 5/16-inch hexnut driver with hollow shaft, loosen the regulation adjustment control locking nut located on the front of the voltage regulator.

    (g) Using a small screwdriver, approximately 1/8-inch blade, rotate slotted control shaft to obtain desired voltage on regulated bus.

    (h) Using the 5/16 hexnut driver, tighten control locking nut. DO NOT overtighten.

    (i) Operate the generator at least ten minutes at flight idle with minimum load and battery switch off. Recheck voltage to assure temperature rise does not affect the regulation.

    NOTE: The model VR-1010-24-2A DC Voltage Regulator does not exhibit the characteristic droop of carbon pile regulators when cold. The regulation will be flat over the specified temperature altitude operating range.

(j) At flight idle, close master battery switch and switch on max aircraft DC load. Recheck the DC voltage.

(k) Verify the generator load meter is indicating the load supplied.

(l) Switch off the engine, DC load, master battery switch, and generator switch.

CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATOR CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

12. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number SA2854CE

This certificate, issued to Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114

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

Original Product—Type Certificate Number: A17SW.

Make: Air Tractor

Model: AT-402, AT-402A, AT-502, AT-502A, AT503

Description of Type Design Change: Installation of Phoenix Aerospace DC Voltage regulator, P/N VR-1010-24-1A or P/N VR-1010-24-2A in accordance with (1) "Phoenix Aerospace Inc., Installation Instructions for Installing Phoenix Aerospace Model VR-1010-24-1A Solid State DC Voltage Regulator" dated August 5, 1992, or "Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Model VR-1010-24-2A Solid State DC Voltage Regulator" dated October 9, 1992, and (2) Phoenix Aerospace Drawing No. 095001, Revision P, dated September 20, 1991, or Drawing No. 095027, Revision Q, dated September 20, 1991, or later FAA approved revisions to (1) or (2).

Limitations and Conditions: This approval should not be extended to other specific airplanes of these models on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

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

Date of application: August 5, 1992

Date reissued:

Date of issuance: October 7, 1992

Date amended: December 14, 1992

By direction of the Administrator

Lawrence A. Herron
(Signature)

Lawrence A. Herron, Manager
Wichita Aircraft Certification Office
(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

29 October 1992

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL VR-1010-24-2A
SOLID STATE DC VOLTAGE REGULATOR IN
AIR TRACTOR MODELS AT-400, AT-400A, AT-402, AT-402A, AT-502, AT-502A, AND AT-503A

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

1. Assure battery is disconnected and switches or circuit breakers are in their "OFF" position.

2. Gain access to the voltage regulator by removing the Hat Rack.

3. Press downward on the voltage regulator firmly and unsnap the spring hold-down clips. Lift regulator up and away from the slotted brackets and engaging tabs to remove.

4. Disconnect and label the base assembly wires. Remove base and shock mount assembly.

5. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

6. Phoenix Aerospace Inc. P/N 116563 Mounting Kit

   *1 each P/N 088087 Adapter Plate
   1 each P/N MS3106F-16S-1S (028012) Solder Connector
   4 each P/N 100070 Nut, Hex, S.Stl Nylon Insert, Locking, 8-32
   4 each P/N 076026 Washer, Flat, S.Stl #8 x 3/8 In. O.D.

   Contains all the hardware necessary to complete the installation.

   *Voltage regulator has been secured to the adapter plate at the factory.

7. Install the Phoenix Aerospace Inc. P/N VR-1010-24-2A DC Voltage Regulator complete with adapter plate assembly into the existing 4 holes and secure with the 4 flat washers and the 4 locking nuts supplied.

8. The supplied MS3106F-16S-1S solder connector is to be wired to the following pin call-out:

PIN NO.	CONNECTION
PIN A	GENERATOR FIELD
PIN B	VOLTAGE SENSE (REG. POINT ON BUS)
PIN C	GENERATOR POSITIVE

PLEASE NOTE: PINS B & C MUST BE JUMPERED

PIN G GROUND (GENERATOR NEGATIVE)

9. Install the connector on the voltage regulator.

10. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position.

11. Voltage check:

    (a) Connect a voltmeter with a range 0 to 30 volts; positive to the generator side of the DC Bus Contactor and negative to DC Ground.

    (b) Accelerate the engine until the generator is operating at or above the minimum rated speed as given in the pilot's handbook.

    (c) Close the generator switch.

    (d) No-load or minimum-load voltage should be between 27.7 and 29.1 volts.

    (e) The DC voltage regulator is preset at the factory for 28.5 volts on the regulated bus terminal B of generator to terminal E. In the event adjustment is required at flight line level, perform steps (f) through (h).

    (f) Using a 5/16-inch hexnut driver with hollow shaft, loosen the regulation adjustment control locking nut located on the front of the voltage regulator.

    (g) Using a small screwdriver, approximately 1/8-inch blade, rotate slotted control shaft to obtain desired voltage on regulated bus.

    (h) Using the 5/16 hexnut driver, tighten control locking nut. DO NOT overtighten.

    (i) Operate the generator at least ten minutes at flight idle with minimum load and battery switch off. Recheck voltage to assure temperature rise does not affect the regulation.

    NOTE: The model VR-1010-24-2A DC Voltage Regulator does not exhibit the characteristic droop of carbon pile regulators when cold. The regulation will be flat over the specified temperature altitude operating range.

(j) At flight idle, close master battery switch and switch on max aircraft DC load. Recheck the DC voltage.

(k) Verify the generator load meter is indicating the load supplied.

(l) Switch off the engine, DC load, master battery switch, and generator switch.

CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATOR CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

12. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number SA2705CE

This certificate, issued to Phoenix Aerospace, Inc.
220 W. 80th Terrace
P.O. Box 8744
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 *of the* Civil Air Regulations.

Original Product—Type Certificate Number: 2A4

Make: Gulfstream Aerospace (Aero Commander)

Model: 680T, 680V, 680W, 681, 690, 690A S/N 11100 through 11226

Description of Type Design Change: Installation of Phoenix Aerospace, P/N VR-1010-24-2A DC Voltage Regulator (2 ea). Data required: (1) Phoenix Aerospace Inc., Installation Instructions for Solid State DC Voltage Regulator VR-1010-24-2A; and (2) Model VR-1010-24-2A DC Voltage Regulator Unit, Silicon Solid-State, Assembly Drawing No. 095027, Revision P, dated April 12, 1991, or later "FAA approved" revision.

Limitations and Conditions: This approval should not be extended to other specific airplanes of this model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

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

Date of application: March 26, 1990

Date of issuance: April 16, 1991

Date reissued:

Date amended: October 10, 1991

By direction of the Administrator

Lawrence A. Herron
(Signature)

Lawrence A. Herron, Manager
Wichita Aircraft Certification Office
(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

SOLID STATE DC VOLTAGE REGULATOR VR-1010-24-2A IN AERO COMMANDER MODEL'S 680T, V, AND W; 681, 690, AND 690A AIRCRAFT (SERIAL NO'S. 11100 THRU 11226)

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

1. Assure battery is disconnected and switches or circuit breakers are in their "OFF" position.

2. Locate the existing voltage regulators and their shock mount base assemblies.

   Aircraft Models: 680T, V, W, 681, & 690
   Located in fuselage station 245 on right side of aircraft, behind the baggage compartment aft panel.

   Aircraft Model: 690A, Serial No's. 11100 thru 11226
   Located in fuselage station 272 on left side of aircraft, behind the DC contactor box on the shelf.

3. Press downward on the voltage regulator firmly and unsnap spring hold-down clips. Lift regulator up and away from slotted brackets and engaging tabs to remove.

4. Disconnect and label the base assembly wires. Remove base and shock mount assembly.

5. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

6. Phoenix Aerospace Inc. P/N 116565 Mounting Kit

   *1 each P/N 088090 Adapter Plate
   1 each P/N MS3106F-16S-1S (028012) Solder Connector
   4 each P/N 100048 Nut, Hex, S.Stl Nylon Insert, Locking, 10-32
   4 each P/N 076021 Washer, Flat, S.Stl #10 x 3/8 In. O.D.

   Contains all the hardware necessary to complete the installation. STC SA2705CE

   *Voltage regulator has been secured to the adapter plate at the factory.

F.A.A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region
Date APR 16 1991

7. Install the voltage regulator adapter plate assembly into the existing 4 holes and secure with the 4 flat washers and the 4 locking nuts supplied.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

8. The supplied MS3106F-16S-1S solder connector is to be wired to the following pin call-out:

PIN NO.	CONNECTION	TERMINAL
PIN A	GENERATOR FIELD	F+
PIN B	VOLTAGE SENSE (REG. POINT ON BUS)	L+
PIN C	GENERATOR POSITIVE	G+
PIN D	EQUALIZER SENSE	EG
PIN E	NOT USED	--
PIN F	EQUALIZER BUS	EB
PIN G	GROUND (GENERATOR NEGATIVE)	L-

9. Install the MS connectors on the voltage regulators (VR#1 is the forward/right regulator/VR#2 is the aft/left regulator).

10. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position. Hook up the batteries.

11. Perform the ground run and the operational checks:

(a) VOLTAGE CHECK

STC SA2704CE(1)

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date APR 16 1991

With aircraft running, right generator "OFF," and all possible electrical aircraft load off, operate left engine at 96 percent of engine RPM, connect digital voltmeter negative lead to a good aircraft DC ground (common to terminal "E" of DC generator). Connect positive voltmeter lead to any convenient post on the main bus in DC contactor box. Voltmeter should read 28.5 VDC (±0.2VDC) - the regulator voltage preset at the factory. Retard the engines to flight idle. Voltmeter should again read the factory preset value of 28.5 VDC (±0.2 VDC).

N/A, V

To check other voltage regulators, turn "ON" right generator switch and turn "OFF" left generator and repeat above test.

NOTE: The Model VR-1010-24-2A DC Voltage Regulator does not exhibit the characteristic "droop" of carbon pile regulators when cold. The regulation will be flat over the specified temperature/altitude operation range.

(b) LOAD SHARING CHECK

(1) With engine speeds synchronized at 96 percent engine RPM, place both generator switches in "ON" position and turn on all maximum possible load to aircraft electrical system.

(2) Read and record amperage of generators, as indicated on the ammeters installed in the right overhead switch panel, with various electrical loads applied to the electrical buses.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

NOTE: PAI's VR-1010-24-2A DC Voltage Regulators have automatic paralleling circuitry. No parallel adjustment is necessary. If the generators do not load share within ±10% equal division of load, recheck voltage settings and then check equalizer bus for continuity and resistance.

(3) Retard engines from 96% RPM to flight idle. Read and record amperage of generators, as indicated on the ammeters.

(c) BATTERY OFF, SELF EXCITATION CHECK

(1) With both the left and right generator switches "ON," turn the battery switch "OFF." Individually turn "OFF" the generators and then turn them "ON" again - they should come back on line.

CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATOR CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

12. Close up the baggage panels.

13. Make appropriate entry in the aircraft Log Book.

STC SA2705CE

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date APR 16 1991

Phoenix Aerospace Inc.

www.phoenixaerospace.com

VR-1010-24-2A

28 VOLT DC VOLTAGE REGULATOR

QUIET, WITH PRECISE VOLTAGE CONTROL FOR ALL GENERATORS AND STARTER/GENERATORS THAT CONFORM TO MIL-G-6162, AS WELL AS STATE-OF-THE-ART REPLACEMENT FOR THE ANTIQUATED CARBON PILE VOLTAGE REGULATORS AND MOUNTING BASES.

INSTALL IT AND FORGET IT!

- ♣ PRECISION DC VOLTAGE REGULATION
- ♣ OVERVOLTAGE SENSING
- ♦ AUTOMATIC PARALLELING
- ♦ FIELD PROVEN UNIT RELIABILITY
- ♥ UNSURPASSED PRODUCT SUPPORT
- ♥ NO CHARGE FOR THE STCs
- ♠ 24 MONTH UNCONDITIONAL WARRANTY

FOR INFORMATION, CALL: 800-437-6556 or FAX: 816-444-4133

VR-1010-24-2A

28 VOLT DC VOLTAGE REGULATOR
Silicon Solid State

Regulation Technology for the 21st Century

VR-1010-24-2A DC VOLTAGE REGULATORS PROVIDE DRAMATIC IMPROVEMENT OVER COMPETITOR'S UNITS IN ELECTRICAL SYSTEM PERFORMANCE, DEPENDABILTY AND RELIABILITY.

ELECTRICAL CHARACTERISTICS

*REGULATED DC VOLTAGE RANGE:	27.5 to 29.5 VDC
FIELD CURRENT (CONTINUOUS):	14 AMPERES
*REGULATION (LIMITS ALL CONDITIONS):	±0.2 VOLT
OVERVOLTAGE SENSING (PIN E):	32.0 ±1VOLTS
TIME OF RECOVERY (0 - FULL LOAD):	0.05 SECOND
AMBIENT TEMPERATURE RANGE:	-85ºC TO +85ºC
MAXIMUM OPERATING ALTITUDE:	100,000 FEET & BEYOND
MTBF:	10,000 FLIGHT HOURS (MIN.)
WEIGHT:	1.6 LBS.

*0 to full load, over rated generator speed & temperature-altitude operating range (No other manufacturer maintains such tight, stable regulation).

ORDER TODAY! - 800 437-6556

PAI P/N VR-1010-24-2A DC VOLTAGE REGULATOR IS SUPPLIED FROM THE FACTORY, INCLUSIVE WITH PAI P/N 116562 MOUNTING KIT: CONSISTING OF ADAPTER PLATE (FACTORY MOUNTED) - ATTACHING HARDWARE - P/N CA3106F-16S-1S CRIMP, OR MS3106F-16S-1S SOLDER MATING CONNECTOR & PMA TAGS.

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA00487WI

This certificate issued to Phoenix Aerospace Inc.
220 W. 80th Terrace
Kansas City, MO 64114

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

Original Product - Type Certificate Number : A12CE

Make : Beech

Model : 60 ; A60 ; B60

Description of Type Design Change: Installation of Phoenix Aerospace Inc. (PAI) Solid State DC Voltage Regulator Assembly P/N VR-1010-24-2A, in accordance with (1) PAI Installation Instructions for Installing Phoenix Aerospace Model VR-1010-24-2A Solid State DC Voltage Regulator in Beechcraft Duke Model 60, S/N P-4 thru 126 except S/N 123; A60, S/N P-123 and P127 thru P-246; B60, S/N P-247 thru P-465, dated November 6, 1996, and (2) Phoenix Aerospace Top Assembly Drawing No. 095027, Rev. Q, dated September 20, 1991, or later FAA Approved revisions to (1) or (2).

Limitations and Conditions: Compatibility of this design change with previously approved modifications must be determined by the installer

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

Date of application : November 07, 1996

Date of issuance : December 12, 1996

Date reissued :

Date amended :

By direction of the Administrator

(*Signature*)

James M. Peterson
Associate ACO Mgr., Systems & Propulsion
Wichita Aircraft Certification Office

(*Title*)

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 in accordance with FAR 21.47.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL VR-1010-24-2A SOLID STATE DC VOLTAGE REGULATOR IN BEECHCRAFT DUKE MODEL 60, S/N P-4 THRU 126 EXCEPT S/N 123; A60, S/N P-123 AND P-127 THRU P-246; B60, S/N P-247 THRU P-465

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

NOTE: **Prior to the installation of the Phoenix Aerospace Inc. Solid State Voltage Regulators, Beechcraft Class II Service Instructions No. 1040, REV I, must be complied with. These PAI Voltage Regulators (VR) MUST be installed in pairs on initial installation and MUST NOT be combined with existing Beechcraft Voltage Regulators at any time.**

1. Disconnect both aircraft batteries for safety.

2. From the applicable aircraft maintenance manual, locate the existing VR's, 2 each, their shock mount base assemblies, and the regulator paralleling pots.

3. Press downward on the voltage regulator firmly and unsnap the spring hold-down clips. Lift regulator up and away from the slotted brackets and engaging tabs to remove.

4. Disconnect and label the base assembly wires. Remove base and shock mount assembly and regulator paralleling pots.

5. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

6. Phoenix Aerospace Inc. P/N 116562 Mounting Kit
   *1 each P/N 088087 Adapter Plate
   1 each P/N 028012 (MS3106F-16S-1S) Solder Connector
   4 each P/N 100070 Nut, Hex, S.Stl Nylon Insert, Locking, 8-32
   4 each P/N 076026 Washer, Flat, S.Stl #8 x 3/8 In. O.D.

   Contains all the hardware necessary to complete the installation.

   *Voltage regulator has been secured to the adapter plate at the factory.

F. A. A.
APPROVED
Wichita Aircraft Certificatic
Office, ACE-115W
Central Region
Date DEC 12 1996
STC # SA00987W

7. Install the Phoenix Aerospace Inc. P/N VR-1010-24-2A DC Voltage Regulator complete with adapter plate assembly into the existing 4 holes and secure with the 4 flat washers and the 4 locking nuts supplied.

8. The supplied 028012 (MS3106F-16S-1S) solder connector is to be wired to the following pin call-out:

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PIN NO.	CONNECTION	TERMINAL
PIN A	GENERATOR FIELD	F+
PIN B	VOLTAGE SENSE (REG. POINT ON BUS)	L+
PIN C	GENERATOR POSITIVE	G+
PIN D	EQUALIZER SENSE	EG
PIN E	NOT USED	--
PIN F	EQUALIZER BUS	EB
PIN G	GROUND (GENERATOR NEGATIVE)	L-

9. Install the connector on the voltage regulator.

10. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position. Hook up the batteries.

11. Perform the ground run and the operational checks:

    (a) VOLTAGE CHECK

        (1) With aircraft running, right generator "OFF," and all possible electrical aircraft load off, operate left engine at 1900 RPM, connect digital voltmeter negative lead to a good aircraft DC ground (common to terminal "E" of DC generator). Connect positive voltmeter lead to any convenient post on the main bus in DC contactor box. Voltmeter should read 28.5 VDC (±0.2 VDC) - the regulator voltage preset at the factory. Retard the engines to flight idle. Voltmeter should again read the factory preset value of 28.5 VDC (±0.2 VDC).

        (2) To check other voltage regulator, turn "ON" right generator switch and turn "OFF" left generator and repeat above test.

            NOTE: The Model VR-1010-24-2A DC Voltage Regulator does not exhibit the characteristic "droop" of carbon pile regulators when cold. The regulation will be flat over the specified temperature/altitude operation range.

    (b) LOAD SHARING CHECK

        (1) With engine speeds synchronized at 2000 RPM, place both generator switches in "ON" position and turn on all maximum possible load to aircraft electrical system.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

(2) Read and record amperage of generators, as indicated on the ammeters, with various electrical loads applied to the electrical buses.

NOTE: PAI's VR-1010-24-2A DC Voltage Regulators have automatic paralleling circuitry. No parallel adjustment is necessary. If the generators do not load share within ±10% equal division of load, recheck voltage settings and then check equalizer bus for continuity and resistance.

(3) Retard engines from 2000 RPM to 1600 RPM. Read and record amperage of generators, as indicated on the ammeters.

(c) BATTERY OFF, SELF EXCITATION CHECK

(1) With both the left and right generator switches "ON," turn the battery switch "OFF." Individually turn "OFF" the generators and then turn them "ON" again - they should come back on line.

(2) Switch off the engine, DC load, master battery switch, and generator switch.

CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATOR CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

12. Make appropriate entry in the aircraft Log Book.

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region
Date DEC 12 1996

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA00575WI

This certificate issued to Phoenix Aerospace Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 3 *of the* Civil Air *Regulations.*

Original Product - Type Certificate Number : 3A20

Make : Beech

Model : 65-A90, B90, C90, E90

Description of Type Design Change: Installation of Phoenix Aerospace Inc. (PAI) Solid State DC Voltage Regulator, Model VR-1010-24-2A, PAI Drawing Number 095027, Revision Q, dated September 20, 1991, or later FAA approved revisions. Data Required: PAI Installation Instructions for Phoenix Aerospace Model VR-1010-24-2A Solid State DC Voltage Regulator in Beechcraft King Air Model 65-A90; B90; C90; S/N LJ-114 thru LJ-539 and LJ-571 thru LJ-677; E90, S/N LW-14 thru LW-156, Revision N/C, dated September 26, 1997, or later FAA approved revisions.

Limitations and Conditions:
Compatibility of this design change with previously approved modifications must be determined by the installer

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

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

Date of application : August 05, 1997

Date of issuance : September 26, 1997

Date reissued : April 09, 1998

Date amended :

By direction of the Administrator

(*Signature*)

Jose R. Flores
Senior Electrical/Avionics Engineer
Wichita Aircraft Certification Office

(*Title*)

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 in accordance with FAR 21.47.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS FOR INSTALLING PHOENIX AEROSPACE MODEL VR-1010-24-2A SOLID STATE DC VOLTAGE REGULATOR IN BEECHCRAFT KING AIR MODEL 65-A90, B90, C90, S/N LJ-114 THRU LJ-539 AND LJ-571 THRU LJ-677; E90, S/N LW-14 THRU LW-156

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

NOTE: Prior to the installation of the Phoenix Aerospace Inc. Solid State Voltage Regulators, those portions of Beechcraft Class II Service Instructions No. 07766-354 REV II that address the paralleling relay(s) must be complied with. These PAI Voltage Regulators MUST be installed in pairs on initial installation and MUST NOT be combined with existing Beechcraft Voltage Regulators at any time.

1. Disconnect both aircraft batteries for safety.

2. From the applicable aircraft maintenance manual, locate the existing voltage regulators, 2 each, their shock mount base assemblies, and the regulator paralleling pots.

3. Press downward on the voltage regulator firmly and unsnap the spring hold-down clips. Lift regulator up and away from the slotted brackets and engaging tabs to remove.

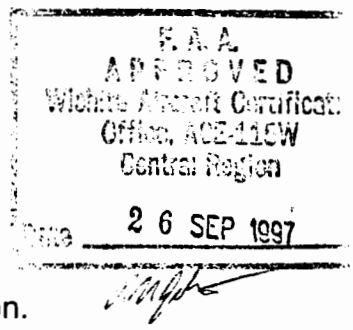
4. Disconnect and label the base assembly wires. Remove base and shock mount assembly and regulator paralleling pots.

5. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

6. Phoenix Aerospace Inc. P/N 116713 Mounting Kit
   *1 each P/N 088087 Adapter Plate
   1 each P/N MS3106F-16S-1S (028012) Solder Connector
   4 each P/N 100070 Nut, Hex, S.Stl Nylon Insert, Locking, 8-32
   4 each P/N 076026 Washer, Flat, S.Stl #8 x 3/8 In. O.D.

   Contains all the hardware necessary to complete the installation.

   *Voltage regulator has been secured to the adapter plate at the factory.



Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

7. Install the Phoenix Aerospace Inc. P/N VR-1010-24-2A DC Voltage Regulator complete with adapter plate assembly into the existing 4 holes and secure with the 4 flat washers and the 4 locking nuts supplied.

8. The supplied MS3106F-16S-1S (028012) solder connector is to be wired to the following pin call-out:

PIN NO.	CONNECTION	TERMINAL
PIN A	GENERATOR FIELD	F+
PIN B	VOLTAGE SENSE (REG. POINT ON BUS)	L+
PIN C	GENERATOR POSITIVE	G+
PIN D	EQUALIZER SENSE	EG
PIN E	NOT USED	--
PIN F	EQUALIZER BUS	EB
PIN G	GROUND (GENERAOR NEGATIVE)	L-

NOTE: IF TERMINAL L+ AND TERMINAL G+ WERE TIED TOGETHER, PIN B AND PIN C ON THE CONNECTOR MUST ALSO BE TIED TOGETHER. IF NECESSARY, EXTEND AIRCRAFT WIRING TO THE CONNECTOR USING APPROVED WIRE AND SPLICING METHODS.

9. Install the connector on the voltage regulator.

10. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position. Hook up the batteries.

11. Perform the ground run and the operational checks:

    (a) VOLTAGE CHECK

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region
Date 2 0 [illegible]

(1) With aircraft running, right generator "OFF," and all possible electrical aircraft load off, operate left engine at 70 percent of engine RPM, connect digital voltmeter negative lead to a good aircraft DC ground (common to terminal "E" of DC generator). Connect positive voltmeter lead to any convenient post on the main bus in DC contactor box. Voltmeter should read 28.5 VDC (±0.2 VDC) - the regulator voltage preset at the factory. Retard the engines to flight idle. Voltmeter should again read the factory preset value of 28.5 VDC (±0.2 VDC).

(2) To check other voltage regulator, turn "ON" right generator switch and turn "OFF" left generator and repeat above test.

NOTE: The Model VR-1010-24-2A DC Voltage Regulator does not exhibit the characteristic "droop" of carbon pile regulators when cold. The regulation will be flat over the specified temperature/altitude operation range.

(b) LOAD SHARING CHECK

(1) With engine speed synchronized at 70% engine RPM, place both generator switches in "ON" position and turn on all possible load to aircraft electrical system.

(2) Read and record amperage of generators, as indicated on the ammeters, with various electrical loads applied to the electrical buses.

F.A.A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region
Date 26 SEP 1997

NOTE: Phoenix Aerospace Inc.'s VR-1010-24-2A Voltage Regulators have automatic paralleling circuitry. No parallel adjustment is necessary. If the generators do not load share within ±10% equal division of load, recheck voltage settings and then check equalizer bus for continuity and resistance.

(3) Retard engines from 70% RPM to flight idle. Read and record amperage of generators, as indicated on the ammeters.

(c) BATTERY OFF, SELF EXCITATION CHECK

(1) With both the left and right generator switches "ON," turn the battery switch "OFF." Individually turn "OFF" the generators and then turn them "ON" again - they should come back on line.

(2) Switch off the engine, DC load, master battery switch, and generator switch.

CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATOR CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

12. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA5489NM

This certificate, issued to Phoenix Aerospace, Inc.

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part CAR 4b* *of the* Federal Aviation *Regulations.* *(For Certification basis see T.C. Data Sheet A12EA)

Original Product — Type Certificate Number: A12EA

Make: Gulfstream Aerospace

Model: G-1159

Description of Type Design Change: Installation of a Phoenix Aerospace, Inc. P/N VR-1010-24-2GA Voltage Regulator in Gulfstream Aerospace Model G-1159 aircraft serial numbers 1 through 300, except those aircraft with Aircraft Service Change 285 incorporated, in accordance with FAA approved Western Commander Engineering Report Number 9103-2, Revision "NEW", dated March 5, 1991, or later FAA approved revisions.

Limitations and Conditions: This installation should not be incorporated in any aircraft unless it is determined that the interrelationship between this change and any previously approved configuration will not introduce any adverse effect upon the airworthiness of the aircraft.

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

Date of application: September 4, 1991 *Date issued:* January 24, 1992

Date of issuance: October 30, 1991 *Date amended:*

By direction of the Administrator

for (Signature)

Manager, Los Angeles Aircraft Certification Office

(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

The Jet Center

WESTERN COMMANDER, INC., AERO INTERIORS

ENGINEERING REPORT #9103-2

INSTALLATION INSTRUCTIONS

FOR INSTALLING PHOENIX AEROSPACE
P/N VR1010-24-2GA SOLID STATE
VOLTAGE REGULATORS, AS DEFINED BY
PAI TOP DRAWING #095132 FOR

GULFSTREAM AEROSPACE (G-II) AIRCRAFT WITHOUT ASC 285

REVISION STATUS B

FAA APPROVED

JAN 28 1992

LOS ANGELES
AIRCRAFT CERTIFICATION OFFICE
INITIALS: .....RSL.....

THE JET CENTER/WESTERN COMMANDER, INC.

APPROVED BY: Robert E. Mays
MR. ROBERT MAYS
PRESIDENT/GENERAL MANAGER

PREPARED BY: Norman A. Hill
MR. NORMAN A. HILL
AIRCRAFT MAINTENANCE/SHOP FOREMAN

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS
FOR

INSTALLING PHOENIX AEROSPACE MODEL VR-1010-24-2GA
SOLID STATE DC VOLTAGE REGULATOR, AS DEFINED BY
PAI TOP DRAWING #095132 FOR
GULFSTREAM AMERICAN CORPORATION
GULFSTREAM II AIRCRAFT
W/O ASC 285

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

1. Assure both batteries are disconnected and all switches or circuit breakers are in their "off" position.

2. Locate and remove the existing voltage regulators and base assemblies at station #133 below the radio racks (floor level).

3. For grounding purposes, use a bonding brush to remove all paint and alodine near the mounting holes.

4. Phoenix Aerospace Inc. P/N 116566 mounting Kit.

   *1 each P/N 088049 Adapter Plate
   *Voltage regulator has been secured to the adapter plate at the factory.

5. Install the PAI P/N VR-1010-24-2GA, complete with adapter plate assembled and with connectors, facing INBOARD into the existing 4 holes and secure with 4 each P/N AN3-6A bolt and 4 each P/N AN960-10 washer. The upper regulator is for the LEFT GENERATOR and lower regulator is for the RIGHT GENERATOR.

6. OVERVOLTAGE PROTECTION

   Two (2) 6-foot lengths AWG #20 wire required. Using approved aircraft wiring methods and accepted aircraft procedures, complete the following:

   UPPER REGULATOR -- LEFT GENERATOR:
   Add #20 AWG wire from pin "E" of the upper voltage regulator to pin "I" of connector P461. Route the wire from pin "E" with existing wire bundle below floorboard (FL/18) to pin "I" (wire 1P42L20) of connector P461 at relay K153.

FAA APPROVED

JAN 28 1992

LOS ANGELES
AIRCRAFT CERTIFICATION OFFICE
INITIALS: .....

LOWER REGULATOR -- RIGHT GENERATOR:
Add #20 AWG wire from pin "E" of the lower voltage regulator to pin "I" of connector P462. Route the wire from pin "E" with existing wire bundle below floor board (FL/18) to pin "I" (wire 2P42L20) of connector P462 at relay K152.

7. Connect the cable connectors to the VR-1010-24-2GA Voltage Regulators.

8. After installation has been completed, check to insure that all switches or circuit breakers are in their "OFF" position. Reconnect the batteries.

Perform the ground run and the operational checks:

9. VOLTAGE CHECK -- RIGHT GENERATOR

(a) Place battery switch to "NORMAL".

(B) Place both the RIGHT GENERATOR and the LEFT GENERATOR control switches to "TRIP" then to "OFF". (This resets the filed power relays).

(c) Connect digital voltmeter, with a range of 0 - 30 volts, to the RIGHT MAIN DC VOLT TEST jacks on the pilot window faring panel.

(d) Start BOTH engines, keeping RPM near idle.

NOTE: If APU engine alternator and the transformer rectifier (T/R) is used, the T/R must be turned "OFF" when either the LEFT and/or RIGHT DC GENERATORS are selected "ON". If external DC power is used, it must be turned "OFF" when either the LEFT and/or RIGHT DC GENERATORS are selected "ON".

(e) Advance RIGHT engine to 70% hp RPM.

(f) Place RIGHT GENERATOR switch "ON".

NOTE: The DC voltage regulator has a preset factory level of 28.5 VDC on the regulated bus terminal B of the generator to terminal E. In the event adjustment is required at flight line level, perform the following steps -- (1) thru (3).

(1) Locate the RIGHT GENERATOR voltage regulator (the lower mounted regulator). Using a 5/16" inch hexnut driver, with a hollow shaft, loosen the regulation adjustment control lock-nut that is labeled "INCREASE" on the front of the voltage regulator.

FAA APPROVED

JAN 28 1992

LOS ANGELES
AIRCRAFT CERTIFICATION OFFICE
INITIALS: .....

(2) Using a small screwdriver with an approximate 1/8" blade, rotate the slotted control shaft to obtain the desired voltage on regulated bus.

(3) Using the 5/16" hexnut driver, retighten the control locking nut. "DO NOT OVERTIGHTEN".

10. Operate the generator for at least 5 minutes and recheck voltage that temperature rise does not affect the regulation.

NOTE: The PAI P/N VR-1010-24-2GA DC Voltage Regulator does not exhibit the characteristic droop of carbon-pile regulators when cold. The regulation will be flat over the specified temperature/ altitude operation range.

11. Place the following load on the DC Bus System:

Four Fuel Boost Pumps	Anticollision Lights
Emergency Inverter	Taxi Lights

If voltage does not remain at 28.5 ± 0.2 VDC, readjust until tolerance is obtained.

12. Remove loads on DC Bus System (step 11). Place RIGHT GENERATOR switch "OFF" and retard RIGHT engine to idle.

13. VOLTAGE CHECK -- LEFT GENERATOR

(a) Connect digital voltmeter, with a range of 0 - 30 volts, to the LEFT MAIN DC VOLT TEST jacks on the pilot window faring panel.

(b) Advance LEFT engine to 70% hp RPM.

(c) Place LEFT GENERATOR switch "ON".

NOTE: The DC voltage regulator has a preset factory level of 28.5 VDC on the regulated bus terminal B of the generator to terminal E. In the event adjustment is required at flight line level, perform the following steps -- (1) thru (3).

(1) Locate the LEFT GENERATOR voltage regulator (the upper mounted regulator). Using a 5/16" inch hexnut drive, with a hollow shaft, loosen the regulation adjustment control lock-nut that is labeled "INCREASE" on the front of the voltage regulator.

(2) Using a small screwdriver with an approximate 1/8" blade, rotate the slotted control shaft to obtain the desired voltage on regulated bus.

(3) Using the 5/16" hexnut driver, retighten the control locking nut. "DO NOT OVERTIGHTEN".

14. Operate the generator for at least 5 minutes and recheck voltage that temperature rise does not affect the regulation.

NOTE: The PAI P/N VR-1010-24-2GA DC Voltage Regulator does not exhibit the characteristic droop of carbon-pile regulators when cold. The regulation will be flat over the specified temperature/ altitude operation range.

15. Place the following load on the DC Bus System:

Four Fuel Boost Pumps	Anticollision Lights
Emergency Inverter	Taxi Lights

If voltage does not remain at 28.5 $\pm$0.2 VDC, readjust until tolerance is obtained.

16. PARALLELING CHECK

With LEFT engine still operating at 70% hp RPM and LEFT GENERATOR switch "ON", place RIGHT GENERATOR switch "ON" and advance RIGHT engine to 70% hp RPM (leave load on DC Bus). LEFT and RIGHT GENERATOR should share load within 10%, as indicated on cockpit DC ammeters.

NOTE: PAI's VR-1010-24-2GA DC Voltage Regulators have automatic paralleling circuitry. No parallel adjustment is necessary. If the generators do not load share within $\pm$10% equal division of load. voltage on LEFT and RIGHT MAIN DC VOLT TEST jack must be rechecked.

17. Remove power from all switches and controls utilized in above test.

18. Shut down engines.

CAUTION: DO NOT ATTEMPT TO REMOVE VOLTAGE REGULATOR CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

19. Make appropriate entry in the Aircraft Log.

FAA APPROVED

JAN 28 1992

LOS ANGELES
AIRCRAFT CERTIFICATION OFFICE
INITIALS: .....PAL.....

Phoenix Aerospace Inc.

www.phoenixaerospace.com

VR-1010-24-2GA

28 VOLT DC VOLTAGE REGULATOR

PAI STC SA489MN WAS ISSUED JANUARY 24, 1992 FOR GULFSTREAM AEROSPACE AIRCRAFT MODEL G-1159 (GII). INSTALLATION OF THE STC "KIT" PRODUCES DRAMATIC IMPROVEMENT IN THE DC ELECTRICAL SYSTEM PERFORMANCE, DEPENDABILITY AND RELIABILITY, WHILE REPLACING ANTIQUATED CARBON PILE VOLTAGE REGULATORS AND MOUNTING BASES.

INSTALL IT AND FORGET IT!

- ♣ AUTOMATIC PARALLELING
- ♣ PRECISION DC VOLTAGE REGULATION
- ♦ OVERVOLTAGE SENSING
- ♦ IMPROVED UNIT TO AIRCRAFT INTEGRITY
- ♥ NO CHARGE FOR THE STC
- ♥ UNSURPASSED PRODUCT SUPPORT
- ♠ PROVEN UNIT RELIABILITY
- ♠ 24 MONTH UNCONDITIONAL WARRANTY

FOR INFORMATION, CALL: 800-437-6556 or FAX: 816-444-4133

VR-1010-24-2GA

28 VOLT DC VOLTAGE REGULATOR

Silicon Solid State

Regulation Technology for the 21st Century

VR-1010-24-2GA DC VOLTAGE REGULATORS PROVIDE DRAMATIC IMPROVEMENT OVER COMPETITOR'S UNITS IN ELECTRICAL SYSTEM PERFORMANCE, DEPENDABILITY AND RELIABILITY.

ELECTRICAL CHARACTERISTICS

*REGULATED DC VOLTAGE RANGE:	27.5 to 29.5 VDC
FIELD CURRENT (CONTINUOUS):	14 AMPERES
*REGULATION (LIMITS ALL CONDITIONS):	±0.2 VOLT
OVERVOLTAGE SENSING (PIN E):	32.0 ±1VOLTS
TIME OF RECOVERY (0 - FULL LOAD):	0.05 SECOND
AMBIENT TEMPERATURE RANGE:	-85°C TO +85°C
MAXIMUM OPERATING ALTITUDE:	100,000 FEET & BEYOND
MTBF:	10,000 FLIGHT HOURS (MIN.)
WEIGHT:	1.6 LBS.

*0 to full load, over rated generator speed & temperature-altitude operating range (No other manufacturer maintains such tight, stable regulation).

ORDER TODAY! - 800 437-6556

PAI P/N VR-1010-24-2GA DC VOLTAGE REGULATOR IS SUPPLIED FROM THE FACTORY, INCLUSIVE WITH PAI P/N 116566 OR P/N 116567 MOUNTING KIT: CONSISTING OF PAI P/N 088049 ADAPTER PLATE (FACTORY MOUNTED) - ATTACHING HARDWARE - PMA TAGS. KIT 116567 ALSO INCLUDES MS3106F-16S-1S SOLDER MATING CONNECTOR.

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SR00470WI

This certificate issued to Phoenix Aerospace, Inc.
220 West 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 6 *of the* Civil Air *Regulations.*

Original Product - Type Certificate Number : H2SW

Make : Bell Helicopter

Model : 206B3

Description of Type Design Change:
Installation of Phoenix Aerospace, Inc. (PAI) Solid State DC Generator Control Unit (GCU) P/N GC-1010-24-6AM, and Solid State DC Voltage Regulator Assembly P/N VR-1010-24-2F in accordance with (1) "Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Model GC-1010-24-6AM Solid State DC Generator Control Unit & Model VR-1010-24-2F Solid State DC Voltage Regulator in Bell Helicopter Model 206B3, for those models with IFR Capability" dated February 29, 1996, and (2) Phoenix Aerospace Drawing No. 095304, No Revision, dated February 1, 1991, and Drawing No. 095291, No Revision, dated January 22, 1996, or later FAA Approved revisions to (1) or (2).

Limitations and Conditions: Compatibility of this design change with previously approved modifications must be determined by the installer

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

Date of application : February 29, 1996

Date of issuance : September 25, 1996

Date reissued :

Date amended :

By direction of the Administrator

James M. Peterson
(Signature)

James M. Peterson
Associate ACO Mgr., Systems & Propulsion
Wichita Aircraft Certification Office

(Title)

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 in accordance with FAR 21.47.

DEPARTMENT OF TRANSPORT

Supplemental Type Approval

Number: SH93-58

This approval is issued to:

Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114-0744
USA

Issue No.: 1

Approval Date: September 15, 1993

Issue Date: September 15, 1993

Responsible Region: Headquarters

Aircraft/Engine Type or Model: Bell 206L, 206L-1, 206L-3 and 206L-4 without IFR

Canadian Type Approval or Equivalent: H-92

Description of Type Design Change: Installation of Phoenix Aerospace DC Generator Control Unit in accordance with FAA STC SR00083WI.

Installation/Operating Data, Required Equipment and Limitations:

Installation of Phoenix Aerospace DC Generator Control Unit, P/N GC-1010-24-6D, Drawing No. 095214, no revision, dated July 27, 1990. Installation is to be carried out in accordance with Phoenix Aerospace Inc., Installation Instructions "Installing Phoenix Aerospace Model GC-1010-24-6D Solid State DC Generator Control Unit in Bell Helicopter Models 206L, 206L-1, 206L-3 and 206L-4, except for those Models with IFR Capability", dated September 4, 1992 or later FAA approved revision.

Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

M.J. Eley

Airworthiness Branch Ottawa
For Minister of Transport

Canada

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS
FOR
INSTALLING PHOENIX AEROSPACE MODEL GC-1010-24-6AM
SOLID STATE DC GENERATOR CONTROL UNIT &
MODEL VR-1010-24-2F SOLID STATE DC VOLTAGE REGULATOR IN
BELL HELICOPTER MODEL 206B3
FOR THOSE MODELS WITH IFR CAPABILITY
THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

REMOVAL MAIN GENERATOR CONTROL UNIT

1. Set BAT and GEN switches to OFF position.

2. Disconnect electrical connector.

3. Remove 4 mounting screws and washers.

4. Lift Generator Control Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. MAIN GENERATOR CONTROL UNIT P/N GC-1010-24-6AM

1. Position Main Generator Control Unit and install 4 mounting screws and washers.

2. Connect electrical connector to Generator Control Unit P/N GC-1010-24-6AM.

REMOVAL STANDBY VOLTAGE REGULATOR

1. Set BAT and GEN switches to OFF position.

2. Disconnect electrical connector.

3. Remove 4 mounting screws and washers.

4. Lift Voltage Regulator Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. STANDBY VOLTAGE REGULATOR P/N VR-1010-24-2F

1. Position Standby Voltage Regulator and install 4 mounting screws and washers.

2. Connect electrical connector to Voltage Regulator P/N VR-1010-24-2F.

STC #SR00470WI

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date 9/25/96

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

NOTE: AFTER INSTALLATION HAS BEEN COMPLETED, CHECK TO INSURE THAT ALL SWITCHES OR CIRCUIT BREAKERS ARE IN THEIR "OFF" POSITION.

VOLTAGE CHECK - MAIN GENERATOR CONTROL UNIT P/N GC-1010-24-6AM

1. With GEN switch CLOSED, and all possible electrical load off, accelerate engine until the generator is operating at or above the minimum rated speed as given in pilot's handbook.

2. Connect precision digital voltmeter, negative lead to the black test jack on the front of the Generator Control Unit. Connect positive voltmeter lead to the red test jack on the front of the Generator Control Unit. The voltmeter should read the factory preset value of 28.5 VDC (±0.2 VDC).

VOLTAGE ADJUST

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Recheck voltage on voltmeter.

5. At flight idles with MASTER BATTERY switch in OFF position, switch on maximum aircraft DC load.

6. Recheck DC voltage.

VOLTAGE CHECK - STANDBY VOLTAGE REGULATOR P/N VR-1010-24-2F

1. Connect a voltmeter with a range of O to 30 volts: positive to the generator side of the DC Bus Contactor and negative to DC ground.

2. Accelerate the engine until the generator is operating at or above the minimum rated speed as given in the pilot's handbook.

3. Close the standby generator switch.

No-load or minimum-load voltage should be between 27.5 and 28.5 volts.

CAUTION: STANDBY VOLTAGE REGULATOR SHOULD BE SET 1/2 VOLT LOWER THAN MAIN GENERATOR CONTROL UNIT.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

The DC Voltage Regulator is preset at the factory for 28.5 volts on the regulated bus terminal B of generator to terminal E. In the event adjustment is required at flight line level, perform the following steps:

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Voltage Regulator.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Operate the generator at least ten minutes at flight idle with minimum load and BATTERY switch OFF.

5. Recheck voltage to assure temperature rise does not affect the regulation.

DC GENERATION SYSTEM - FUNCTIONAL TEST

1. MAIN GEN - To OFF position; check caution light indication.

2. STARTER Generator - To STBY-GEN position. Main generator loadmeter should indicate zero and standby generator loadmeter should indicate a load.

3. NON-ESS BUS switch - Check voltmeter indication of zero with non-essential bus switch in NORMAL ON position; NON-ESS BUS switch to MANUAL ON; recheck voltmeter; verify volt reading is 1/2 volt lower than main generator control.

4. MAIN GENERATOR - ON and guard closed. Ensure main generator returns on line.

5. Switch off DC load, MASTER BATTERY switch, and GENERATOR switch.

CAUTION: DO NOT ATTEMPT TO REMOVE THE GENERATOR CONTROL UNIT CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

6. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA2570CE

This certificate, issued to Phoenix Aerospace, Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 25 *of the* Federal Aviatic Regulations.

Original Product — Type Certificate Number: A43EU

Make: Construcctiones Aeronauticas S. A.

Model: C-212 series

Description of Type Design Change:

Replace the original generator control units with Phoenix Aerospace, Inc., Model GC-1010-24-3B solid state generator control units. Data Required: Phoenix Aerospace, Inc., Installation Instructions for Installing Phoenix Aerospace Model GC-1010-24-3B Solid State DC Generator Control in CASA C-212,-100,-200,-300 Aircraft (No Revision), dated October 31, 1989, or later FAA approved revision.

Limitations and Conditions:

This approval should not be extended to other specific aircraft of this model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that aircraft.

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

Date of application: September 5, 1989

Date of issuance: January 18, 1990

Date reissued:

Date amended:

By direction of the Administrator

Ronald K. Rathgeber
(Signature)

for Lawrence A. Herron, Manager
Wichita Aircraft Certification Office

(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

October 31, 1989

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS for INSTALLING PHOENIX AEROSPACE MODEL GC-1010-24-3B SOLID STATE DC GENERATOR CONTROL IN CASA C-212 -100-200-300 AIRCRAFT

WARNING: BEFORE SUPPLYING ELECTRICAL POWER TO THE AIRCRAFT, MAKE CERTAIN THAT ALL OTHER CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING: PERSONNEL WORKING ON ELECTRICAL CIRCUITS MUST NOT WEAR METALLIC JEWELRY SUCH AS RINGS, BRACELETS, WATCHES OR NECKLACES.

WARNING: ONLY AUTHORIZED PERSONNEL FULLY FAMILIAR WITH ALL NECESSARY SAFETY PRECAUTIONS AND PROCEDURES ARE PERMITTED TO START THE AIRCRAFT ENGINES.

WARNING: WHEN WORKING ON ELECTRICAL CABINET, ISOLATE ALL ELECTRICAL POWER TO AIRCRAFT BUS-BARS AND PUT APPROPRIATE WARNING NOTICES IN POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Protection Caps (Electrical)
C.	Ground Power Unit (GPU)
D.	Precision DC Voltmeter

F.A.A. APPROVED
Wichita Aircraft Certification Office, ACE-115W
Central Region
Date 1-18-90

2. Procedure

A. Job Set-Up

R (1) Open, safety and tag the following circuit breakers:

R	PANEL	SERVICE	FIN
R	OVERHEAD	GENERATOR L	PA9
R	OVERHEAD	GENERATOR R	PA10
R	OVERHEAD	GENERATOR L	PA11
R	OVERHEAD	GENERATOR R	PA12

(2) Put appropriate warning notices in and around aircraft.

(3) Gain access to electrical cabinet.

B. Removal (fig. 1)

(1) Disconnect electrical connector (1) from control unit (3) receptacle (2). Install protective caps to electrical connector (1) and receptacle (2).

R ** On A/C: All except CC46, CC60, CD63, S43

(2) Remove four screws (6), washers (5), and nuts (4), Remove control unit (3) from panel (7).

R ** On A/C: CC46, CC60, CD63, S43

(2) Remove four screws (6) and washers (5). Remove control unit (3) from panel (7).

** On A/C: All

C. Preparation for installation (fig. 1)

(1) Inspect replacement control unit for signs of damage, corrosion, or damage to electrical receptacle (2).

D. Intallation (fig. 1)

R ** On A/C: All except CC46, CC60, CD63, S43

(1) Put control unit (3) on panel (7). Fasten with four screws (6), washers (5), and nuts (4).

R ** On A/C: CC46, CC60, CD63, S43

(1) Put control unit (3) on panel (7). Fasten with four screws (6) and washers (5).

** On A/C: All

(2) Remove protective caps from connector (1) and receptacle (2). Connect connector (1) to receptacle (2).

E. Test

(1) Remove safety clips and tags and close circuit breakers PA9, PA10, PA11, PA12.

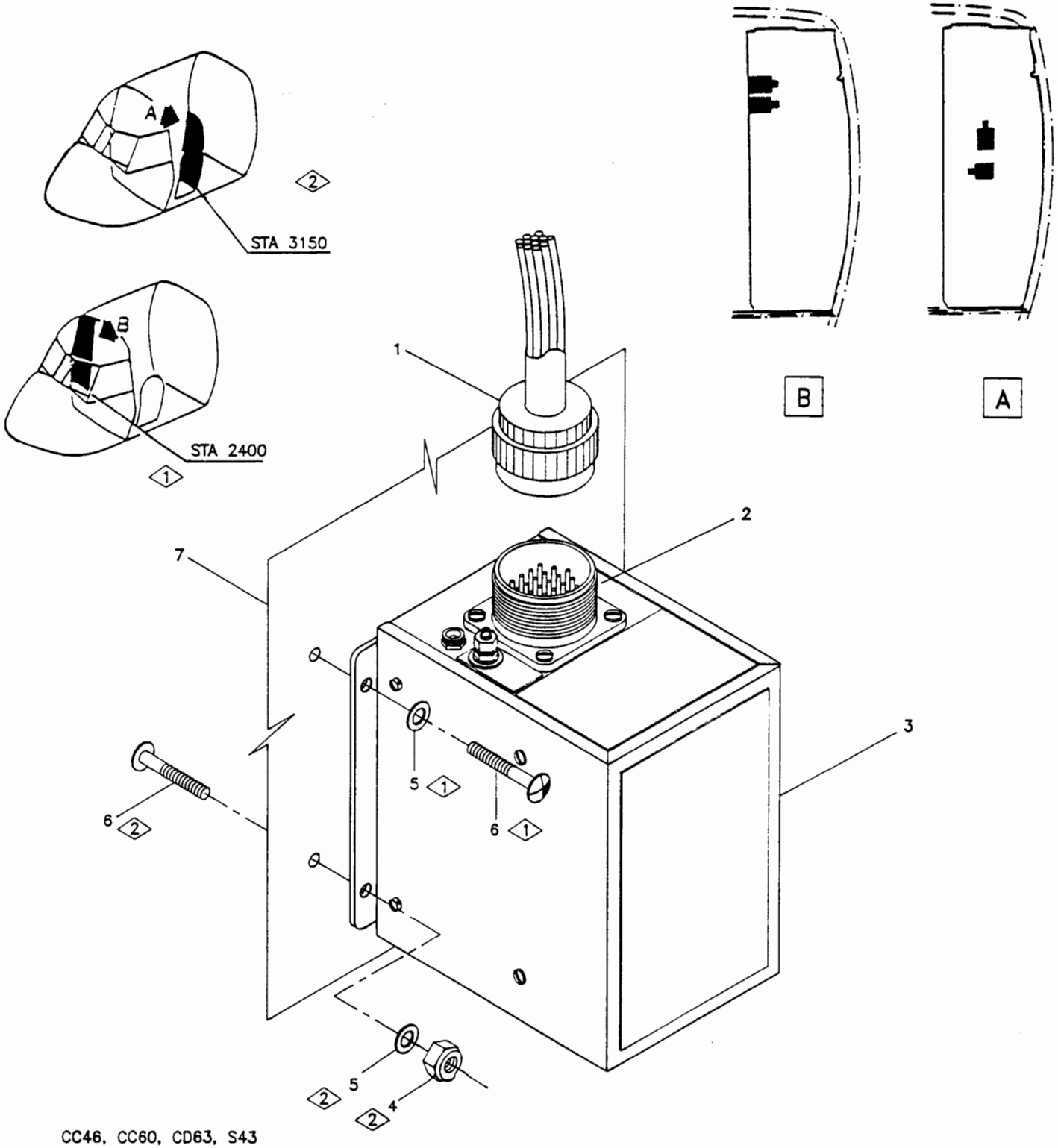
(2) Do adjustment/test of d.c. generation system.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD



CC46, CC60, CD63, S43

EXCEPT: CC46, CC60, CD63, S43

R Effectivity: All

FIG. 1 GENERATOR CONTROL UNIT

F. DC Generation System - Functional Test

(1) Job Set-Up

(a) Connect the precision voltmeter between aircraft ground and terminal L1 on overload sensors PA39 and PA40 (Ref. 24-31-10, P. Block 1*).

(b) Connect GP and switch on aircraft electrical system (Ref. 24-40-00, P. Block 501).

(c) Observing all safety precautions, start both aircraft engines and stabilize their rate at 90% of maximum RPM using throttle control (Ref. 71-00-00, P. Block 501).

(2) Test of generators with engines at 90% maximum RPM.

ACTION	RESULT
(a)	- GENERATOR LH and RH captions on failure warning panel (FWP) are on.
(b) Set GEN LH control switch to RESET, then to ON.	- GENERATOR LH caption on FWP goes off. LH generator ammeter shows current flowing.
(c) Push circuit breaker VOLT and set selector switch VOLT SELECT to GEN LEFT.	- Aircraft voltmeter shows between 27 and 30 volts and agrees with precision voltmeter to within +0,2 volts and -0,2 volts.
(d) Set GEN LH control switch to OFF.	- GENERATOR LH caption on FWP comes on.
(e) Repeat steps (b) to (c) for RH engine generator.	- same result
(f) Set GEN RH control switch to OFF.	- GENERATOR RH caption on FWP comes on.

*Reference and Block Numbers in parenthesis refer to CASA C-212 - 200 Maintenance Manual

(3) Test of generators with engines at 65% maximum RPM.

ACTION	RESULT
(a) Using aircraft throttles, reduce both engine rates and stabilize at 65% maximum RPM.	
(b) Set GEN LH control switch to RESET, then to ON.	- GENERATOR LH caption on FWP goes off. LH generator ammeter shows current flowing.
(c) Set selector switch VOLT SELECT to GEN LEFT.	- Voltmeter shows between 27 and 30 volts and agrees with precision voltmeter to within +0,2 volts and -0,2 volts.
(d) Set GEN LH control switch to OFF.	- GENERATOR LH caption on FWP comes on.
(e) Repeat steps (b) to (c) for RH engine generator.	- Same result.
(f) Set GEN RH control switch to OFF.	- GENERATOR RH caption on FWP comes on.

(4) Test of Load-sharing with both generators on-line at 65%, 75%, and 100% maximum engine RPM.

ACTION	RESULT
(a) Make certain that both engine rates are stabilized at 65% maximum RPM.	- N/A
(b) Set GEN LH and GEN RH control switches to RESET, then to ON.	- GENERATOR LH and GENERATOR RH captions on FWP go off. Both ammeters show current flowing.
(c) Record indications of both ammeters and d.c. voltmeter with VOLT SELECT switch set to GEN LEFT and GEN RIGHT in turn.	- N/A

	In each case multiply ammeter indication by the respective generator voltmeter indication.	- Resultant loads are equal +5% -5%.
(d)	Stabilize engine rates at 75% maximum RPM.	- N/A
(e)	Repeat steps (b) and (c).	- Same result as step (c).
(f)	Stabilize engine rates at 100% maximum RPM.	- N/A
(g)	Repeat steps (b) and (c).	- Same result as step (c).
(h)	Reduce engine rates to idling.	- GENERATOR LH and GENERATOR RH captions on FWP remain off and both ammeters show current flowing.
(j)	Set GEN LH and GEN RH control switches to OFF.	- GENERATOR LH and GENERATOR RH captions on FWP come on and both ammeters read zero.

(5) Test of Load-sharing under load conditions for various percentage engine RPM.

ACTION		RESULT
(a)	Stabilize engine rates at 90% maximum RPM.	- N/A
(b)	Set GEN LH and GEN RH control switches to RESET, then to ON.	- GENERATOR LH and GENERATOR RH captions on FWP go off. Both ammeters show current flowing.
	Switch on all electrical and electronic equipment which is normally operational with the aircraft in flight.	- As step (b).
	CAUTION: MAKE CERTAIN THERE ARE NOT LIMITATIONS FOR USING THE ACTIVATED CIRCUITS WHILE THE AIRCRAFT IS ON THE GROUND.	
	Switch on aircraft hydraulic pump (Ref. 29-10-00, P. Block 1) and aircraft landing and taxi lights (Ref. 33-40-00).	- As step (b).

CAUTION: TAXI AND LANDING LIGHTS MUST NOT BE SWITCHED ON CONTINUOUSLY FOR MORE THAN 2 MINUTES. TOTAL TIME OF CONNECTION MUST NOT BE FOR MORE THAN 5 MINUTES UNLESS THE LIGHTS HAVE BEEN ALLOWED TO COOL DOWN COMPLETELY.

(c) Record indications of both ammeters and d.c. voltmeter with VOLT SELECT switch set to GEN LEFT and GEN RIGHT in turn.	- N/A
In each case multiply ammeter indication by the respective generator voltmeter indication.	- Resultant loads are equal +5% -5%.
(d) Stabilize engine rates at 65% maximum RPM and repeat step (c).	- Same result as step (c).
(e) Stabilize engine rates at 75% maximum RPM and repeat step (c).	- Same result as step (c).
(f) Stabilize engine rates at 100% maximum RPM and repeat step (c).	- Same result as step (c).
(g) Switch off electrical and electronic equipment previously switched on in step (b). Reduce engine rates to idling RPM.	- GENERATOR LH and GENERATOR RH captions on FWP remain off and both ammeters show current flowing.
(h) Set GEN LH and GEN RH control switches to OFF.	- GENERATOR LH and GENERATOR RH captions on FWP come on and both ammeters read zero.

(6) Test of emergency power supply with one starter generator switched off.

ACTION	RESULT
(a) Stabilize engine rates at 90% maximum RPM.	- N/A
(b) Set GEN LH and GEN RH control switches to RESET then to ON.	- GENERATOR LH and GENERATOR RH captions on FWP go off. Both ammeters show current flowing.

(c)	Switch on all electrical and electronic circuits previously mentioned in (5) step (b) and observe safety precautions.	- Same result as in step (b).
(d)	Set GEN RH control switch to OFF.	- GENERATOR RH caption on FWP comes on.
(e)	Record indications of LH ammeter and voltmeter when stabilized.	- Voltmeter shows between 27 volts and 30 volts +0,2 -0,2 volts.
(f)	Set LH engine RPM to 60%, 70%, 80%, and 100% and in each case note LH ammeter and voltmeter indications.	- Voltmeter shows between 27 volts and 30 volts +0,2 -0,2 volts in each case. - The ammeter indications must not vary by more than 5% of original indications recorded in step (d).
(g)	Stabilize both engines at 90% maximum RPM.	- N/A
(h)	Set GEN RH control switch to ON and GEN LH control switch to OFF.	- GENERATOR RH caption on FWP goes off. - GENERATOR LH caption on FWP comes on.
(j)	Repeat steps (e) to (f) while varying RH engine RPM.	- Same result as in steps (e) to (f).
(k)	Set GEN RH control switch to OFF.	- GENERATOR RH caption on FWP comes on.

(7) Test of maximum load balance.

ACTION		RESULT
(a)	Stabilize engine rates at 100% maximum RPM.	- N/A
(b)	Set GEN LH and GEN RH control switches to ON.	- GENERATOR LH and GENERATOR RH captions on FWP go off. Both ammeters show current flowing.

(c)	Switch on all electrical and electronic circuits previously mentioned in (5) step (b) and observe safety precautions.	- Same result as in step (b).
(d)	Test load sharing between LH and RH starter generator circuits by measuring voltage and current levels in the LH generator circuit, multiplying them together and comparing the result with the RH generator circuit.	- The resultant sums agree within +5% - 5%.
(e)	Set BUS TIED switch to EMERG and repeat step (d).	- Same result as in step (d).
(f)	Return BUS TIED switch to NORMAL and repeat step (d).	- Same result as in step (d).
(g)	Switch off all electrical and electronic circuits previously mentioned in step (c) and statilize engine rates at idling RPM.	- GENERATOR LH and GENERATOR RH captions on FWP remain off and both ammeters show current flowing.
(h)	Set GEN LH and GEN RH control switches to OFF.	- GENERATOR LH and GENERATOR RH captions on FWP come on and both ammeters read zero.

(8) Close-Up

(a) Stop both aircraft engines (Ref. 71-00-00, P. Block 501).

(b) Switch off aircraft electrical system and disconnect GPU (Ref. 24-40-00, P. Block 501).

(c) Disconnect and remove precision voltmeters between aircraft ground and terminal L1 on overload sensors, PA39 and PA40, (Ref. 24-31-10, P. Block 1).

(d) Make certain that work area is clean and clear of tools and miscellaneous items.

(e) Remove warning notices.

(9) Make appropriate entry in Aircraft Log Book

United States of America

Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number SA2704CE

This certificate, issued to Phoenix Aerospace, Inc.
220 W. 80th Terrace
P.O. Box 8744
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 *of the* Civil Air Regulations.

Original Product—Type Certificate Number: 2A4

Make: Gulfstream Aerospace (Aero Commander)

Model: 690A, 690B, 690C, 690D, 695, 695A

Description of Type Design Change: Installation of Phoenix Aerospace, Inc. DC Generator Control (2 ea), Drawing No. 095234, Assembly DC Generator Control Unit, Silicon, Solid State, P/N GC-1010-24-3B I, dated September 7, 1990. Data required: (1) Phoenix Aerospace Inc., Installation Instructions for Solid State DC Generator Control GC-1010-24-3B I in Aero Commander Models 690A, 690B, 690C, 690D, 695, and 695A airplanes, dated March 8, 1991, or later "FAA approved" revision.

Limitations and Conditions: This approval should not be extended to other specific airplanes of this model on which other previously approved modifications are incorporated, unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

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

Date of application: March 26, 1990

Date of issuance: April 16, 1991

Date reissued:

Date amended: March 26, 1992

By direction of the Administrator

Lawrence A. Herron
(Signature)

Lawrence A. Herron, Manager
Wichita Aircraft Certification Office
(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

SOLID STATE DC GENERATOR CONTROL GC-1010-24-3B I
IN AERO COMMANDER MODEL'S 690A, 690B, 690C,
690D, 695, AND 695A AIRCRAFT

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

1. Assure that all switches or circuit breakers are in their "OFF" position.

2. Locate the existing generator controls per aircraft model:

   Aircraft Models: 690A - All S/N's -
   with solid state generator controls installed
   690B - All S/N's

   Located in fuselage station #275 on left side of aircraft.

   Aircraft Models: 690C - S/N's 11600 thru 11729
   690D - S/N's 15000 thru 15024
   695 - S/N's 95000 thru 96055
   695A - S/N's 96000 thru 96055

   Located at aft electrical equipment panel directly below DC contactor box on left side - station #270.

   Aircraft Models: 690C - S/N's 11730 thru 11999
   690D - S/N's 15025 thru 15999
   695 - S/N's 95084 thru 95999
   695A - S/N's 96056 thru 96200

   Located at aft electrical equipment panel located between the aircraft batteries at fuselage station #270.

STC SA2704CE
F.A.A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region
Date APR 16 1991

3. Remove the existing generator controls from the aft electrical panel.

4. In the aft electrical panel, drill two sets of 4 each #10 holes centered in the original pattern and location of the existing generator control units.

5. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

6. To install the Phoenix Aerospace Inc. Generator Control Units in the new hole pattern, 4 each AN3-7 bolts, 4 each AN960-10 washers, and 4 each AN364-1032 nuts are required for each unit.

7. Reconnect MS connectors to both generator controls.

8. After installation has been completed, check to insure that all switches and circuit breakers are in their "OFF" position.

9. Perform the ground run and the operational checks:

   (a) VOLTAGE CHECK

      (1) With aircraft running, right generator "OFF," and all possible electrical aircraft load off, operate left engine at 96 percent of engine RPM, connect precision digital voltmeter negative lead to the black test jack on the front of GCU. Connect positive voltmeter lead to red test jack on front of GCU. Generator control should read the factory preset value of 28.5 VDC (±0.2 VDC).

      (2) To test other generator controls, turn "ON" right generator switch and turn "OFF" left generator, connect precision digital voltmeter leads, as indicated above, and repeat test.

   (b) LOAD SHARING CHECK

      (1) With engine speeds synchronized at 96 percent engine RPM, place both generator switches in "ON" position and turn on all maximum possible load to aircraft electrical system.

      (2) Read and record amperage of generators, as indicated on the ammeters installed in the right overhead switch panel, with various electrical loads applied to the electrical buses.

STC SA2704CE

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date APR 16 19

NOTE: PAI's GC-1010-24-3B I DC Generator Controls have automatic paralleling circuitry. No parallel adjustment is necessary. If the generators do not load share within ±10% equal division of load, recheck voltage settings and then check equalizer bus for continuity and resistance.

      (3) Retard engines from 96% RPM to flight idle. Read and record amperage of generators, as indicated on the ammeters.

   (c) BATTERY OFF, SELF EXCITATION CHECK

      (1) With both the left and right generator switches "ON," turn the battery switch "OFF." Individually turn "OFF" the generators and then turn them "ON" again - they should come back on line.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

(d) REVERSE CURRENT CHECK

(1) With battery switch "ON" and both generator switches "ON," turn "OFF" the engines and observe warning light annunciators for warning light indication.

CAUTION: DO NOT ATTEMPT TO REMOVE GENERATOR CONTROL CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

10. Close up the baggage panels.

11. Make appropriate entry in the aircraft Log Book.

STC SA2704CE

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date APR 16 1991

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SR00061WI

This certificate, issued to Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 6 of the Civil Air Regulations.

Original Product — Type Certificate Number: H2SW

Make: Bell Helicopter

Model: 206L, 206L-1, 206L-3 and 206L-4 with IFR

Description of Type Design Change: Installation of Phoenix Aerospace DC Generator Control unit, P/N GC-1010-24-6A, Drawing No. 095204, no revision, dated July 3, 1990, and/or P/N GC-1010-24-6D, Drawing No. 095214, no revision, dated July 27, 1990, in accordance with (1) "Phoenix Aerospace Inc., Installation Instructions for Installing Phoenix Aerospace Model GC-1010-24-6A Solid State DC Generator Control Unit in Bell Helicopter Models 206L, 206L-1, 206L-3, and 206L-4, for those Models with IFR Capability" dated October 9, 1992, or later FAA approved revision.

Limitations and Conditions:

This approval should not be extended to other specific helicopters of these models on which other previously approved modifications are incorporated, unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that helicopter.

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

Date of application: October 9, 1992

Date issued:

Date of issuance: May 10, 1993

Date amended: July 2, 1993

By direction of the Administrator

Everett W. Pittman
(Signature)

Everett W. Pittman, Manager
Wichita Aircraft Certification Office

(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

DEPARTMENT OF TRANSPORT

Supplemental Type Approval

Number: SH93-57

This approval is issued to:

Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114-0744
USA

Issue No.: 1

Approval Date: September 15, 1993

Issue Date: September 15, 1993

Responsible Region: Headquarters

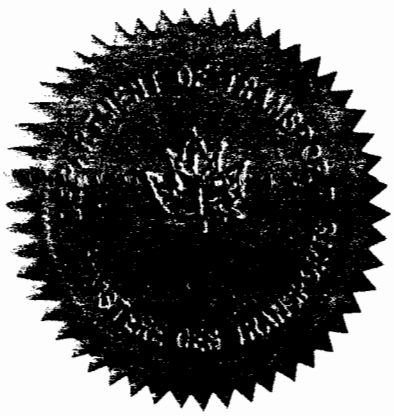
Aircraft/Engine Type or Model: Bell 206L, 206L-1, 206L-3 and 206L-4 with IFR

Canadian Type Approval or Equivalent: H-92

Description of Type Design Change: Installation of Phoenix Aerospace DC Generator Control Unit in accordance with FAA STC SR00061WI.

Installation/Operating Data, Required Equipment and Limitations:

Installation of Phoenix Aerospace DC Generator Control Unit, P/N GC-1010-24-6A, Drawing No. 095204, no revision, dated July 3, 1990, and/or P/N GC-1010-24-6D, Drawing No 095214, no revision, dated July 27, 1990. Installation is to be carried out in accordance with Phoenix Aerospace Inc., Installation Instructions "Installing Phoenix Aerospace Model GC-1010-24-6A Solid State DC Generator Control Unit in Bell Helicopter Models 206L, 206L-1, 206L-3 and 206L-4, for those Models with IFR Capability", dated October 9, 1992 or later FAA approved revision.



Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

M.J. Eley

Airworthiness Branch Ottawa
For Minister of Transport

Canada

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

MAY 10 1993

Date _____

Jon A Flom

9 October 1992

STC # SR00061WI PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL GC-1010-24-6A
SOLID STATE DC GENERATOR CONTROL UNIT IN
BELL HELICOPTER MODELS 206L, 206L1, 206L3, AND 206L4,
FOR THOSE MODELS WITH IFR CAPABILITY

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

REMOVAL MAIN GENERATOR CONTROL UNIT

1. Set BAT and GEN switches to OFF position.
2. Disconnect electrical connector.
3. Remove 4 mounting screws and washers.
4. Lift Generator Control Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. MAIN GENERATOR CONTROL UNIT P/N GC-1010-24-6A

1. Position Main Generator Control Unit and install 4 mounting screws and washers.
2. Connect electrical connector to Generator Control Unit.

REMOVAL STANDBY GENERATOR CONTROL UNIT

1. Set BAT and GEN switches to OFF position.
2. Disconnect electrical connector.
3. Remove 4 mounting screws and washers.
4. Lift Generator Control Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. STANDBY GENERATOR CONTROL UNIT P/N GC-1010-24-6D

1. Position Standby Generator Control Unit and install 4 mounting screws and washers.
2. Connect electrical connector to Generator Control Unit.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

NOTE: AFTER INSTALLATION HAS BEEN COMPLETED, CHECK TO INSURE THAT ALL SWITCHES OR CIRCUIT BREAKERS ARE IN THEIR "OFF" POSITION.

VOLTAGE CHECK - MAIN GENERATOR CONTROL UNIT P/N GC-1010-24-6A

1. With GEN switch CLOSED, and all possible electrical load off, accelerate engine until the generator is operating at or above the minimum rated speed as given in pilot's handbook.

2. Connect precision digital voltmeter, negative lead to the black test jack on the front of the Generator Control Unit. Connect positive voltmeter lead to the red test jack on the front of the Generator Control Unit. The voltmeter should read the factory preset value of 28.5 VDC (±0.2 VDC).

VOLTAGE ADJUST

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Recheck voltage on voltmeter.

5. At flight idle, with MASTER BATTERY switch in OFF position, switch on maximum aircraft DC load.

6. Recheck DC voltage.

VOLTAGE CHECK - STANDBY GENERATOR CONTROL UNIT P/N GC-1010-24-6D

1. With GEN switch CLOSED, and all possible electrical load off, accelerate engine until the generator is operating at or above the minimum rated speed as given in pilot's handbook.

2. Connect precision digital voltmeter, negative lead to the black test jack on the front of the Generator Control Unit. Connect positive voltmeter lead to the red test jack on the front of the Generator Control Unit. The voltmeter should read the factory preset value of 28.5 VDC (±0.2 VDC).

CAUTION: STANDBY GENERATOR CONTROL UNIT SHOULD BE SET 1/2 VOLT LOWER THAN MAIN GENERATOR CONTROL UNIT

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

VOLTAGE ADJUST

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Recheck voltage on voltmeter.

5. At flight idle, with MASTER BATTERY switch in OFF position, switch on maximum aircraft DC load.

6. Recheck DC voltage.

DC GENERATION SYSTEM - FUNCTIONAL TEST

1. MAIN GEN - To OFF position; check caution light indication.

2. STARTER Generator - To STBY-GEN position. Main generator loadmeter should indicate zero and standby generator loadmeter should indicate a load.

3. NON-ESS BUS switch - Check voltmeter indication of zero with non-essential bus switch in NORMAL ON position; NON-ESS BUS switch to MANUAL ON; recheck voltmeter; verify volt reading is 1/2 volt lower than main generator control; switch to NORMAL ON position.

4. MAIN GENERATOR - ON and guard closed. Ensure main generator returns on line.

BATTERY OFF-SELF EXCITATION CHECK

1. With GEN switch "ON," turn BATTERY switch "OFF." Turn GEN switch "OFF" (verify no regulated generator output voltage). Turn GEN switch "ON," generator should come back on line.

   NOTE: PHOENIX AEROSPACE GENERATOR CONTROL UNIT DOES NOT REQUIRE BATTERY VOLTAGE FOR GENERATOR BUILDUP.

REVERSE CURRENT CHECK

1. With BAT switch "ON" and GEN switch "ON," turn engine "OFF." Observe warning light annunciator for warning light indication.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

2. Switch off DC load, MASTER BATTERY switch, and GENERATOR switch.

   CAUTION: DO NOT ATTEMPT TO REMOVE THE GENERATOR CONTROL UNIT CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

3. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SR00887WI

This certificate issued to Phoenix Aerospace Inc.
220 West 80th Terrace
P.O. Box 8744
Kansas City, MO 64114-0744

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 6 *of the* Civil Air *Regulations.*

Original Product - Type Certificate Number: H2SW

Make: Bell Helicopter

Model: 206A; 206B

Description of Type Design Change:
Installation of the Phoenix Aerospace Generator Control Unit P/N GC-1010-24-6D. Data Required: Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Modification Kit #116723 in Bell Helicopter Model 206 A & B, Serial Numbers 4310 and Prior, Revision A, dated June 19, 2000, or later FAA approved revision.

Limitations and Conditions:
Compatibility of this design change with previously approved modifications must be determined by the installer.

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

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

Date of application: November 03, 1999

Date of issuance: July 03, 2000

Date reissued:

Date amended:

By direction of the Administrator

Joel M. Ligon
(*Signature*)

Joel M. Ligon
FAA Program Manager
Wichita Aircraft Certification Office

(*Title*)

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 in accordance with FAR 21.47.

Transport Canada Transports Canada

Department of Transport

Supplemental Type Certificate

This approval is issued to:

Phoenix Aerospace Inc.
220 West 80th Terrace, P. O .Box 8744
Kansas City MO 64114-0744

Number: SH00-38
Issue No.: 1
Approval Date: September 14, 2000
Issue Date: September 14, 2000

Responsible Office: Ontario

Aircraft/Engine Type or Model: BELL 206A, 206B

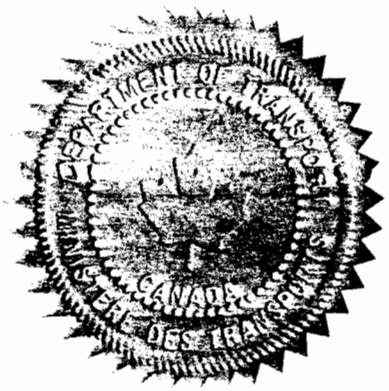
Canadian Type Certificate or Equivalent: H-92

Description of Type Design Change: Installation of generator control unit

Installation/Operating Data,
Required Equipment and Limitations:

Installation must be performed in accordance with Phoenix Aerospace Inc. Installation Instruction, Revision A for installing Phoenix Aerospace Modification Kit #116723, FAA approved June 19, 2000, or later FAA approved revision.

-- End --



Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

Vladan Vujosevic
For Minister of Transport

Canada

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS FOR INSTALLING PHOENIX AEROSPACE MODIFICATION KIT #116723 IN BELL HELICOPTER MODEL 206 A & B, SERIAL NUMBERS 4310 AND PRIOR.

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

1. Assure battery is disconnected and switches and circuit breakers are in their "OFF" positions.
2. Gain access to the voltage regulator by removing the Hat Rack.
3. a. For Aircraft installations utilizing the Carbon Pile or Phoenix Aerospace Inc. VR-1010-24-1A voltage regulator, press downward on the voltage regulator firmly and unsnap the spring hold-down clips. Lift the regulator up and away from the slotted brackets and engaging tabs to remove.
   b. For Aircraft installations utilizing the Phoenix Aerospace Inc. VR-1010-24-2A voltage regulator, disconnect the voltage regulator connector.
4. Disconnect and label the base assembly wires for the carbon pile and VR-1010-24-1A voltage regulators. Remove the base and shock mount assembly.
5. For Aircraft with the VR-1010-24-2A voltage regulator installed, remove the aircraft voltage regulator connector and label the connector wires. Remove the voltage regulator including the adaptor plate.

UNIT PIN-OUT REFERENCED TO GENERATOR TERMINALS

CARBON PILE	VR-1A	VR-2A	GC-6D	GENERATOR TERMINAL
F+	A	A	M	GEN. "A" TML. (FIELD)
L+*	B*	B*		
G+*	C*	C*	J	GEN. "B" TML. (POSITIVE)
O - EG	D	D	G	GEN. "D" TML. (INTERPOLE)
L-	G	G	L	GEN. "E" TML. (GROUND)

*connected by respective jumper

6. For grounding purposes, use a bonding brush to remove all of the paint and aledine near the mounting holes.

STC # SR00887WI

7. Phoenix Aerospace Inc. P/N 116723 Modification Kit
   *1 ea 095214 GC-1010-24-6D Generator Control Unit

F. A. A.
APPROVED
Wichita Aircraft Certification Office, ACE-115W
Central Region

Date 7-3-00

ACE-116W

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

1 ea 088111 Generator Control Unit Mounting Plate
4 ea 101752 Stud 10-32x1/2"
4 ea 101753 Stud 8-32x5/8"
4 ea 100048 Hex Stop Nut 10-32
4 ea 100070 Hex Stop Nut 8-32
4 ea 076021 Flatwasher #10
4 ea 076026 Flatwasher #8
*1 ea 011524 DC Bus Contactor, p/n SM20 ACD 200 A21
1 ea 116725 Diode Subassembly
1 ea 088112 DC Bus Contactor Mounting Plate
2 ea 070087 Spacer, Round Alum.., 3-5/8 in. lg., tapped 10-32, threaded 3/8-24, 15/16 in. lg.
6 ea 101144 SCREW, FHM, 100 CSK, STL, PASSIVATED, 10-32 X ½ IN LG, MS24694-S49
4 ea 100076 NUT, HEX, STL, NYLON LOCKING, PASSIVATED, 10-32, 3/8 WAF, ¼ IN. HIGH, MS21044-N3
2 ea 100069 3/8-24 Hex Nuts, S. Stl.
2 ea 076018 ¼ in. Int. Tooth Lock, S. Stl.
1 ea 026100 LEAD, ELECTRICAL, #16, WHT, M22759/41-16-9, Marked P10C16
1 ea 026101 LEAD, ELECTRICAL, #16, WHT, M22759/41-16-9 Marked P19A16N
1 ea 026102 LEAD, ELECTRICAL, #18 WHT, M22759/41-18-9 Marked P56A18N
1 ea 026103 LEAD, ELECTRICAL, #20WHT, M22759/41-20-9 Marked P74B20
1 ea 026104 LEAD, ELECTRICAL, #22, WHT, M22759/41-22-9 Marked P74A22
1 ea 026105 LEAD, ELECTRICAL, #22, WHT, M22759/41-22-9 Marked P50A22
1 ea 026106 LEAD, ELECTRICAL, #22, WHT, M22759/41-22-9 Marked P65B22
1 ea 026107 LEAD, ELECTRICAL, #22, WHT, M22759/41-22-9 Marked K1C22

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

1 ea 025047 SPLICE, RAYCHEM, BLUE, M81824/1-2
1 ea 025048 SPLICE, RAYCHEM, RED, M81824/1-1
5 ea 025043 TERMINAL, CRIMP, MS25036-102
3 ea 025044 TERMINAL, CRIMP, MS25036-103
1 ea 025046 TERMINAL, CRIMP, MS25036-154
1 ea 028021 CONNECTOR, MS3126F-14-12S (crimp)
1 ea 033006 BUS BAR, marked A1
1 ea 033005 BUS BAR, marked A2

The Kit contains all hardware necessary to complete the installation.

* Generator Control Unit and DC Bus Contactor have been secured to their respective mounting plates at the factory.

8. Install the Phoenix Aerospace Inc. P/N GC-1010-24-6D Generator Control Unit complete with adapter plate assembly into the existing 4 holes and secure with 4 each, # 8 flat washers and 4 each 8-32 hex stop nuts.
9. The supplied MS3126F-14-12S crimp type connector is to be wired to the following pin call out:

PIN	IDENTIFICATION
A	SPARE
B	SPARE
C	START CIRCUIT
D	RESET
E	SPARE
F	SPARE
G	REV CURRENT SENSE
H	LINE RELAY CONT
J	FIELD POWER IN
K	SPARE
L	SYSTEMS GROUND
M	FIELD

10. Remove bus bar from between the starter relay K3 and reverse current relay K5. Relocate wire P6B2 from K5-BATT terminal to K3-A2 terminal. Remove bus bar between K5 and the loadmeter shunt. Remove and mark wire P13A16 from K5. Remove and stow wire P59A18 from K5. Remove K5.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

11. Install DC bus contactor p/n SM20 ACD 200 A21, (PAI p/n 011524) on the adapter plate, (PAI p/n 101752) using 4 ea. MS24694S49 screws, (PAI p/n 101144), and 4 ea. MS21044-N3 nuts, (PAI p/n 100076). Install adapter plate in location where reverse current relay K5 was removed.
12. Install bus bar, (PAI p/n 033006) between DC bus contactor A1 terminal and the starter relay A2 terminal. Install bus bar, (PAI p/n 033005) between DC bus contactor A2 terminal and the loadmeter shunt.
13. Remove terminal from wire P13A16 and crimp on new terminal p/n MS25036-154 (PAI p/n 025046) Connect wire to DC bus contactor A2 terminal.
14. Remove wire P10B16 from A2 of generator field control relay K4. Splice new wire P10C16 , (PAI p/n 026100), to P10B16 using p/n D436-37 splice, (PAI p/n 025047). Route to GCU connector pin M. At relay K4, remove and discard Resistor R2 from A1 and X2 and remove or stow wire P50A16 from A3. Install terminal MS25036-102 (PAI p/n 025043) on new wire P50A22 (PAI p/n 026105), connect to K4-A2 and route to GCU connector pin C. Install new wire K1C22 (PAI p/n (026107) between K4-A1 and X2 using 2 ea. terminals MS25036-102 (PAI p/n 025043).
15. Install wire P62A16 (removed from voltage regulator base) in GCU connector pin J.
16. Install wire P51A18 (removed from voltage regulator base) in GCU connector pin H. Remove wire P51A18 from B3 of generator field reset relay K41and route to DC bus contactor and connect to the X1 terminal using crimp terminal MS25036-102, (PAI p/n 025043).
17. Install new wire P56A18N, (PAI p/n 026102), on the DC bus contactor X2 terminal using crimp terminal p/n MS25036-102, (PAI p/n 025043), and route to local ground point. Install crimp terminal p/n MS25036-103, (PAI p/n 025044), on ground end of wire.
18. Install diode CR-K5 , (PAI subassy p/n 116725) between K4-X1 and X2 of the DC Bus Contactor. Connect the cathode, (striped end) of CR-K5 to X1 of the DC Bus Contactor.
19. Install new wire P74B20 , (PAI p/n 026103), on starter generator D terminal using crimp terminal p/n MS25036-103, (PAI p/n 025044). Route to P12 and install in pin I. Install new wire P74A22, (PAI p/n 026104), in pin I of J12 and route to GCU connector pin G.
20. Remove wire P65A22 from Y1 of generator field reset relay K41. Splice new wire P65B22, (PAI p/n 026106), to wire P65A22 using splice p/n D436-36, (PAI p/n 025048). Route to GCU pin D.
21. Install new wire P19A16N, (PAI p/n 026101), in GCU connector pin L, route to a local ground point. Install crimp terminal p/n MS25036 –103, (PAI p/n 025044) on ground end of wire.
22. Remove generator field reset relay K41. Remove or stow remaining wires.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

23 Remove overvoltage sensing relay K42. Remove or stow remaining wires

24. Reinstall DC panel cover assembly. Trim panel as required to adapt to relocation of wire P6B2.

25. VOLTAGE CHECK
   (a) Connect a voltmeter with a range of 0 to 30 volts: Positive to the Red test jack on the front of the unit and Negative to the Black test jack on the front of the unit.
   (b) Accelerate the engine until the generator is operating at or above the minimum rated speed as given in the pilot's handbook..
   (c) Close the generator switch.
   (d) No-load or minimum-load voltage should be between 27.7 and 29.1 volts.
   (e) The DC Generator Control Unit is preset at the factory for 28.5 volts on the regulated bus, terminal "B" of generator to terminal "E". In the event adjustment is required at flight line level, perform steps (f) through (h).
   (f) Using a 5/16 – inch hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.
   (g) Using a small screwdriver, approximately 1/8 - inch blade, rotate slotted control shaft to obtain desired voltage on the regulated bus.
   (h) Using a 5/16 – inch hexnut driver, tighten the regulation adjustment control locking nut. DO NOT overtighten.
   (i) Operate the generator at least ten minutes at flight idle with minimum load and battery switch OFF. Recheck voltage to assure temperature rise does not affect the regulation.

NOTE: The model GC-1010-24-6D Generator Control Unit does not exhibit the characteristic voltage droop of carbon pile regulators, when cold. The regulation will be flat over the specified temperature/altitude operating range.

   (j) At flight idle, close the master battery switch and switch on maximum aircraft DC load. Recheck the DC voltage.
   (k) Verify the generator load meter is indicating the load supplied.
   (l) Switch to minimum aircraft load.

26. BATTERY OFF - SELF EXCITATION CHECK
   (a) With the generator switch "ON", turn the battery switch "OFF."
   (b) Turn the generator switch "OFF", (verify no regulated output voltage).
   (c) Turn the generator switch "ON", generator should come back on line.

NOTE: PHOENIX AEROSPACE GENERATOR CONTROL UNITS DO NOT REQUIRE BATTERY VOLTAGE FOR GENERATOR BUILDUP.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

27. REVERSE CURRENT CHECK:
    (a) With battery switch "ON" and generator switch "ON", turn engine "OFF".
    (b) Observe Voltmeter/Loadmeter for loss of generator output..
    (c) Switch OFF DC load, master battery switch, and generator switch.

    CAUTION: DO NOT ATTEMPT TO REMOVE THE GENERATOR CONTROL UNIT CONNECTOR UNLESS THE GENERATOR IS STOPPED OR THE FIELD IS OPEN.

28. WEIGHT AND BALANCE CORRECTIONS
    Minus 1.3 Pounds @ Longitudinal Sta. 133 Lateral Sta. +3

29. Make appropriate entry in the Aircraft Log Book

Phoenix Aerospace Inc.

www.phoenixaerospace.com

GC-1010-24-6D

GENERATOR CONTROL UNIT

PAI STC SR00887W1, AUTHORIZES THE REPLACEMENT OF CARBON PILE VOLTAGE REGULATORS IN BELL 206A & 206B HELICOPTERS WITH PAI P/N GC-1010-24-6D GCUs, EFFECTING A DRAMATIC IMPROVEMENT IN ELECTRICAL SYSTEM PERFORMANCE, DEPENDABILITY AND RELIABILITY.

INSTALL IT AND FORGET IT!

- ♣ PRECISION DC VOLTAGE REGULATION
- ♣ OVERVOLTAGE SENSING
- ♦ AUTOMATIC PARALLELING
- ♦ FIELD PROVEN UNIT RELIABILITY
- ♥ UNSURPASSED PRODUCT SUPPORT
- ♥ SIGNIFICANT WEIGHT SAVINGS
- ♠ 24 MONTH UNCONDITIONAL WARRANTY
- ♠ NO CHARGE FOR THE STCs

FOR INFORMATION, CALL: 800-437-6556 or FAX: 816-444-4133

GC-1010-24-6D

GENERATOR CONTROL UNIT

Regulation Technology for the 21st Century

Direct Replacement for Carbon Pile Voltage Regulators in BELL 206A & 206B Helicopters – Eliminates Carbon Pile Voltage Regulator & Flexible Shock Mounting Base, AN3025-1 Reverse Current Relay, Generator Field Reset Relay and Overvoltage Sensing Relay - with dramatic Improvement in Electrical System Performance, Dependability and Reliability.

ELECTRICAL CHARACTERISTICS

*REGULATED DC VOLTAGE RANGE:	27.5 to 29.5 VDC
*REGULATION (LIMITS ALL CONDITIONS):	±0.2 VOLT
FIELD CURRENT (CONTINUOUS):	14 AMPERES (MIN.)
PARALLEL OPERATION:	±10% EQUAL DIV. OF LOAD
TIME OF RECOVERY (0 - FULL LOAD):	0.05 SECOND
OVERVOLTAGE PROTECTION:	32.5 ±0.5 VOLTS
AMBIENT TEMPERATURE RANGE:	-85°C TO +85°C
MAXIMUM OPERATING ALTITUDE:	100,000 FEET & BEYOND
MTBF:	10,000 FLIGHT HOURS (MIN.)
WEIGHT:	2.1 LBS.

*0 to full load, over rated generator speed & temperature-altitude operating range (No other manufacturer maintains such tight, stable regulation).

ORDER TODAY! - 800 437-6556

PAI P/N GC-1010-24-6D GCU incorporates all essential functions of Voltage Regulation, Overvoltage Protection and DC Bus Control with phenomenal improvement in electrical system performance. The Model GC-1010-24-6D Generator Control Unit does not exhibit the characteristic voltage droop of carbon pile regulators, when cold. Regulation is flat over the load, speed and temperature/altitude operating range, greatly reducing installation time and saving a two-man team an hour or more of tedious tweaking.

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SR00470WI

This certificate issued to Phoenix Aerospace, Inc.
220 West 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 6 *of the* Civil Air *Regulations.*

Original Product - Type Certificate Number : H2SW

Make : Bell Helicopter

Model : 206B3

Description of Type Design Change:
Installation of Phoenix Aerospace, Inc. (PAI) Solid State DC Generator Control Unit (GCU) P/N GC-1010-24-6AM, and Solid State DC Voltage Regulator Assembly P/N VR-1010-24-2F in accordance with (1) "Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Model GC-1010-24-6AM Solid State DC Generator Control Unit & Model VR-1010-24-2F Solid State DC Voltage Regulator in Bell Helicopter Model 206B3, for those models with IFR Capability" dated February 29, 1996, and (2) Phoenix Aerospace Drawing No. 095304, No Revision, dated February 1, 1991, and Drawing No. 095291, No Revision, dated January 22, 1996, or later FAA Approved revisions to (1) or (2).

Limitations and Conditions: Compatibility of this design change with previously approved modifications must be determined by the installer

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

Date of application : February 29, 1996

Date of issuance : September 25, 1996

Date reissued :

Date amended :

By direction of the Administrator

James M. Peterson
(Signature)

James M. Peterson
Associate ACO Mgr., Systems & Propulsion
Wichita Aircraft Certification Office

(Title)

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 in accordance with FAR 21.47.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS
FOR
INSTALLING PHOENIX AEROSPACE MODEL GC-1010-24-6AM
SOLID STATE DC GENERATOR CONTROL UNIT &
MODEL VR-1010-24-2F SOLID STATE DC VOLTAGE REGULATOR IN
BELL HELICOPTER MODEL 206B3
FOR THOSE MODELS WITH IFR CAPABILITY
THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

REMOVAL MAIN GENERATOR CONTROL UNIT

1. Set BAT and GEN switches to OFF position.

2. Disconnect electrical connector.

3. Remove 4 mounting screws and washers.

4. Lift Generator Control Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. MAIN GENERATOR CONTROL UNIT P/N GC-1010-24-6AM

1. Position Main Generator Control Unit and install 4 mounting screws and washers.

2. Connect electrical connector to Generator Control Unit P/N GC-1010-24-6AM.

REMOVAL STANDBY VOLTAGE REGULATOR

1. Set BAT and GEN switches to OFF position.

2. Disconnect electrical connector.

3. Remove 4 mounting screws and washers.

4. Lift Voltage Regulator Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. STANDBY VOLTAGE REGULATOR P/N VR-1010-24-2F

1. Position Standby Voltage Regulator and install 4 mounting screws and washers.

2. Connect electrical connector to Voltage Regulator P/N VR-1010-24-2F.

STC #SR00470WI

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date 9/25/96

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

NOTE: AFTER INSTALLATION HAS BEEN COMPLETED, CHECK TO INSURE THAT ALL SWITCHES OR CIRCUIT BREAKERS ARE IN THEIR "OFF" POSITION.

VOLTAGE CHECK - MAIN GENERATOR CONTROL UNIT P/N GC-1010-24-6AM

1. With GEN switch CLOSED, and all possible electrical load off, accelerate engine until the generator is operating at or above the minimum rated speed as given in pilot's handbook.

2. Connect precision digital voltmeter, negative lead to the black test jack on the front of the Generator Control Unit. Connect positive voltmeter lead to the red test jack on the front of the Generator Control Unit. The voltmeter should read the factory preset value of 28.5 VDC (±0.2 VDC).

VOLTAGE ADJUST

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Recheck voltage on voltmeter.

5. At flight idles with MASTER BATTERY switch in OFF position, switch on maximum aircraft DC load.

6. Recheck DC voltage.

VOLTAGE CHECK - STANDBY VOLTAGE REGULATOR P/N VR-1010-24-2F

1. Connect a voltmeter with a range of O to 30 volts: positive to the generator side of the DC Bus Contactor and negative to DC ground.

2. Accelerate the engine until the generator is operating at or above the minimum rated speed as given in the pilot's handbook.

3. Close the standby generator switch.

No-load or minimum-load voltage should be between 27.5 and 28.5 volts.

CAUTION: STANDBY VOLTAGE REGULATOR SHOULD BE SET 1/2 VOLT LOWER THAN MAIN GENERATOR CONTROL UNIT.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

The DC Voltage Regulator is preset at the factory for 28.5 volts on the regulated bus terminal B of generator to terminal E. In the event adjustment is required at flight line level, perform the following steps:

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Voltage Regulator.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Operate the generator at least ten minutes at flight idle with minimum load and BATTERY switch OFF.

5. Recheck voltage to assure temperature rise does not affect the regulation.

DC GENERATION SYSTEM - FUNCTIONAL TEST

1. MAIN GEN - To OFF position; check caution light indication.

2. STARTER Generator - To STBY-GEN position. Main generator loadmeter should indicate zero and standby generator loadmeter should indicate a load.

3. NON-ESS BUS switch - Check voltmeter indication of zero with non-essential bus switch in NORMAL ON position; NON-ESS BUS switch to MANUAL ON; recheck voltmeter; verify volt reading is 1/2 volt lower than main generator control.

4. MAIN GENERATOR - ON and guard closed. Ensure main generator returns on line.

5. Switch off DC load, MASTER BATTERY switch, and GENERATOR switch.

CAUTION: DO NOT ATTEMPT TO REMOVE THE GENERATOR CONTROL UNIT CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

6. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number SR00083WI

This certificate, issued to Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 6 *of the* Civil Air Regulations.

Original Product—Type Certificate Number: H2SW

Make: Bell Helicopter

Model: 206L, 206L-1, 206L-3 and 206L-4 without IFR

Description of Type Design Change: Installation of Phoenix Aerospace DC Generator Control unit, P/N GC-1010-24-6D, Drawing No. 095214, no revision, dated July 27, 1990, in accordance with (1) "Phoenix Aerospace Inc., Installation Instructions for Installing Phoenix Aerospace Model GC-1010-24-6D Solid State DC Generator Control Unit in Bell Helicopter Models 206L, 206L1, 206L3, and 206L4, Except Those Models with IFR Capability" dated September 4, 1992, or later FAA approved revision.

Limitations and Conditions: This approval should not be extended to other specific helicopters of these models on which other previously approved modifications are incorporated, unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that helicopter.

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

Date of application: September 14, 1992 *Date reissued:*

Date of issuance: July 20, 1993 *Date amended:*

By direction of the Administrator

Everett W. Pittman
(Signature)

Everett W. Pittman, Manager
Wichita Aircraft Certification Office
(Title)

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 in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

DEPARTMENT OF TRANSPORT

Supplemental Type Approval

Number: SH93-58

This approval is issued to:

Phoenix Aerospace Inc.
P.O. Box 8744
Kansas City, MO 64114-0744
USA

Issue No.: 1

Approval Date: September 15, 1993

Issue Date: September 15, 1993

Responsible Region: Headquarters

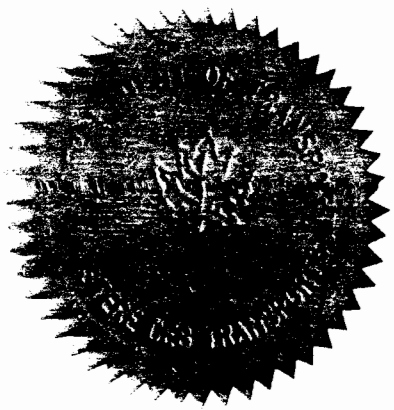
Aircraft/Engine Type or Model: Bell 206L, 206L-1, 206L-3 and 206L-4 without IFR

Canadian Type Approval or Equivalent: H-92

Description of Type Design Change: Installation of Phoenix Aerospace DC Generator Control Unit in accordance with FAA STC SR00083WI.

Installation/Operating Data, Required Equipment and Limitations:

Installation of Phoenix Aerospace DC Generator Control Unit, P/N GC-1010-24-6D, Drawing No. 095214, no revision, dated July 27, 1990. Installation is to be carried out in accordance with Phoenix Aerospace Inc., Installation Instructions "Installing Phoenix Aerospace Model GC-1010-24-6D Solid State DC Generator Control Unit in Bell Helicopter Models 206L, 206L-1, 206L-3 and 206L-4, except for those Models with IFR Capability", dated September 4, 1992 or later FAA approved revision.



Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

M.J. Eley

Airworthiness Branch Ottawa
For Minister of Transport

Canada

Transport Canada / Transports Canada
Aviation / Aviation

Ottawa, Ontario
K1A 0N8

Your file / Votre référence

Our file / Notre référence
5010-A168 (AARDE)

September 15, 1993

Lawrence A. Herron
Manager, ACE 115W
Department of Transportation
Federal Aviation Administration
Central Region
1801 Airport Road, Room 100
Mid-Continent Airport
Wichita, Kansas, 67209
U. S. A.

Subject: **Supplemental Type Approval Number SH 93-57**
Issue Number 1
Approval Date: September 15, 1993
Issue Date: September 15, 1993

Dear Mr Herron:

This Supplemental Type Approval (STA) document is issued to Phoenix Aerospace Inc in response to their application submitted through your office. It is requested that you transmit both this covering letter and the STA document to the company on our behalf.

The transfer of these documents in the name of another person requires a prior approval from the Minister. For further details, refer to Airworthiness Manual Advisory 513/5 which sets out the privileges, responsibilities and obligations of an STA holder, and specifies STA transfer procedures.

In accordance with the Bilateral Airworthiness Agreement, it is requested that any defect, malfunction or failure associated with these STA installations, which may affect the airworthiness of the modified aeronautical product, be communicated to Transport Canada.

Yours truly,

M.J. Eley
for Director
Airworthiness Branch

Enclosures:

RECEIVED
OCT 04 1993
Wichita Aircraft Certification Office
ACE-115W

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL GC-1010-24-6D SOLID STATE DC GENERATOR CONTROL UNIT IN BELL HELICOPTER MODELS 206L, 206L1, 206L3, AND 206L4, EXCEPT THOSE MODELS WITH IFR CAPABILITY

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY.

REMOVAL GENERATOR CONTROL UNIT

1. Set BAT and GEN switches to OFF position.
2. Disconnect electrical connector.
3. Remove 4 mounting screws and washers.
4. Lift Generator Control Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. GENERATOR CONTROL UNIT

1. Position Generator Control Unit and install 4 mounting screws and washers.
2. Connect electrical connector to Generator Control Unit.

VOLTAGE CHECK

1. With GEN switch CLOSED, and all possible electrical load off, accelerate engine until the generator is operating at or above the minimum rated speed as given in pilot's handbook.
2. Connect precision digital voltmeter, negative lead to the black test jack on the front of the Generator Control Unit. Connect positive voltmeter lead to the red test jack on the front of the Generator Control Unit. The voltmeter should read the factory preset value of 28.5 VDC (±0.2 VDC).

VOLTAGE ADJUST

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.
2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Recheck voltage on voltmeter.

5. At flight idle, with MASTER BATTERY switch in OFF position, switch on maximum aircraft DC load.

6. Recheck DC voltage.

BATTERY OFF-SELF EXCITATION CHECK

1. With GEN switch "ON," turn BATTERY switch "OFF." Turn GEN switch "OFF" (verify no regulated generator output voltage). Turn GEN switch "ON," generator should come back on line.

   NOTE: PHOENIX AEROSPACE GENERATOR CONTROL UNIT DOES NOT REQUIRE BATTERY VOLTAGE FOR GENERATOR BUILDUP.

REVERSE CURRENT CHECK

1. With BAT switch "ON" and GEN switch "ON," turn engine "OFF." Observe warning light annunciator for warning light indication.

2. Switch off DC load, MASTER BATTERY switch, and GENERATOR switch.

   CAUTION: DO NOT ATTEMPT TO REMOVE THE GENERATOR CONTROL UNIT CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

7. Make appropriate entry in the aircraft Log Book.

United States of America
Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SR00799WI

This certificate issued to Phoenix Aerospace Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereto for as specified hereon meets the airworthiness requirements of Part 27 *of the* Federal Aviation *Regulations.*

Original Product - Type Certificate Number : H2SW

Make : Bell Helicopter

Model : 407

Description of Type Design Change:
Installation of the Pheonix Aerospace Generator Control Unit P/N GC-1010-24-6L, in accordance with Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace Model GC-1010-24-6L Solid State DC Generator Control Unit in Bell Helicopter Model 407, dated June 12, 1998, or later FAA approved revision.

Limitations and Conditions:
Compatibility of this design change with previously approved modifications must be determined by the installer

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

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

Date of application : June 17, 1998

Date reissued :

Date of issuance : June 29, 1999

Date amended :

By direction of the Administrator

C. D. Riddle

(*Signature*)

Charles D. Riddle
Program Manager
Wichita Aircraft Certification Office

(*Title*)

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 in accordance with FAR 21.47.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS FOR INSTALLING PHOENIX AEROSPACE MODEL GC-1010-24-6L SOLID STATE DC GENERTOR CONTROL UNIT IN BELL HELICOPTER MODEL 407

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

STC # SR00799WI

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date 6-29-99

Jon A Hora
ACE-116W

REMOVAL GENERATOR CONTROL UNIT

1. Set BAT and GEN switches to OFF position.
2. Disconnect electrical connector.
3. Remove 4 mounting screws and washers.
4. Lift Generator Control Unit from shelf.

INSTALLATION PHOENIX AEROSPACE INC. GENERATOR CONTROL UNIT

1. Position Generator Control Unit and install 4 mounting screws and washers.
2. Connect electrical connector to Generator Control Unit.

VOLTAGE CHECK

1. With GEN switch CLOSED, and all possible electrical load off, accelerate engine until the generator is operating at or above the minimum rated speed as given in pilot's handbook.
2. Connect precision digital voltmeter, negative lead to the black test jack on the front of the Generator Control Unit. Connect positive voltmeter lead to the red test jack on the front of the Generator Control Unit. The voltmeter should read the factory preset value of 28.5 VDC (±0.2 VDC).

VOLTGE ADJUST

1. Using the 5/16 hexnut driver with a hollow shaft, loosen the regulation adjustment control locking nut located on the front of the Generator Control Unit.

2. Using a small screwdriver, approximately 1/8-inch blade, rotate the slotted control shaft to obtain desired voltage on regulated bus.

3. Using the 5/16 hexnut driver, tighten control locking nut. DO NOT OVERTIGHTEN.

4. Recheck voltage on voltmeter.

5. At flight idle, with MASTER BATTERY switch in OFF position, switch on maximum aircraft DC load.

6. Recheck DC voltage.

BATTERY OFF-SELF EXCITATION CHECK

1. With GEN switch "ON," turn BATTERY switch "OFF." Turn GEN switch "OFF" (verify no regulated generator output voltage). Turn GEN switch "ON." Generator should come back on line.

NOTE:

PHOENIX AEROSPACE GENERATOR CONTROL UNIT DOES NOT REQUIRE BATTERY VOLTAGE FOR GENERATOR BUILDUP.

REVERSE CURRENT CHECK

1. With BAT switch "ON" and GEN switch "ON," turn engine "OFF." Observe warning light annunciator for warning light indication.

2. Switch off DC load, MASTER BATTERY switch, and GENERTOR switch.

CAUTION:

DO NOT ATTEMPT TO REMOVE THE GENERATOR CONTROL UNIT CONNECTOR UNLESS GENERATOR IS STOPPED OR THE FIELD IS OPEN.

3. Make appropriate entry in the aircraft Log Book.

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number ST00173WI

This certificate issued to Phoenix Aerospace Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part 25 *of the* Federal Aviation *Regulations.*

Original Product - Type Certificate Number : A10CE

Make : Learjet

Model : 35, 35A, 36, 36A

Description of Type Design Change:
Installation of Phoenix Aerospace Inc., (PAI) Solid State Voltage Regulator, Model BG-1010-24-7A, PAI Drawing Number 095198, Revision A, dated January 18, 1994, or later "FAA Approved Revisions". Data Required: PAI Installation Instructions, Revision 1, for installing PAI Model BG-1010-24-7A in all Learjet Models 35, 35A, 36, 36A, dated July 11, 1994, or later "FAA Approved Revisions".

Limitations and Conditions:
Compatibility of this design change with previously approved modifications must be determined by the installer

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

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

Date of application : October 27, 1993

Date of issuance : July 20, 1994

Date reissued :

Date amended : March 27, 1998

By direction of the Administrator

James M. Peterson
(*Signature*)

James M. Peterson
Associate ACO Mgr., Systems and Propulsion
Wichita Aircraft Certification Office

(*Title*)

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 in accordance with FAR 21.47.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL BG-1010-24-7A SOLID STATE DC VOLTAGE REGULATOR IN ALL LEARJET MODELS 35, 35A, 36, AND 36A

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

NOTE: These PAI Voltage Regulators MUST be installed in pairs on initial installation and MUST NOT be combined with existing Learjet Voltage Regulators at any time.

STEP 1. Disconnect both aircraft batteries.

2. From your applicable aircraft maintenance and wiring manuals, locate the existing Voltage Regulators, associated wiring, and circuit terminal boards.

3. Remove connectors P381 & P382 from both Voltage Regulators, all mounting screws, and both Voltage Regulators.

CAUTION: On some aircraft, a small Terminal Board is installed between the Voltage Regulators and utilizes the same mounting screws. BE CAREFUL NOT TO DAMAGE THIS UNIT OR ITS CONNECTIONS.

4. Rewire the existing connectors, (P381 & P382), as follows:

   a. For left Voltage Regulator P381, remove pin G with wire #P40A20, (P43A20 on Learjets 35-202 and sub, or 36-42 and sub), cap this wire, coil and stow in loom.

   b. For right Voltage Regulator P382, remove pin G with wire #P25A20, cap this wire, coil and stow in loom.

   c. Install a new AWG #20 SHIELDED WIRE with new pins from P381, pin G, to P382, pin G, and ground the shielding ON ONE END ONLY to either Voltage Regulator mount screw with a suitable ring terminal.

F.A.A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date JUL 02 1995

JTC ST00173WI

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

5. The following two steps are for Learjet S/N's 35-148 and sub, and 36-036 and sub ONLY!!

   a. For left Voltage Regulator Terminal Board 521, (small board between VR's), disconnect wire #P40B20 from the end of Fuse FL47 and connect to Left Voltage Regulator P381, pin E, with a new suitable pin.

   b. For right Voltage Regulator Terminal Board 520, (same board as above), disconnect wire #P25B20 from the end of Fuse FL48 and connect to right Voltage Regulator P382, pin E, with a new suitable pin.

   c. Make sure the wiring disconnected at both fuses is capped or insulated from shorting to ground.

6. Using the same hardware removed, install both Phoenix Aerospace Inc. P/N BG-1010-24-7A Voltage Regulators and both connectors to their respective Voltage Regulators.

7. Reconnect both aircraft batteries.

8. Perform Voltage Regulator Adjustment, Operational Test, and Parallel Test as follows:

   a. Connect external power source to aircraft.

   b. Verify Left and Right Generator power annunciators on Master Warning Panel are ON.

   c. Start Right engine using Approved Aircraft Flight Manual.

   d. Start Left engine as above step.

   e. Disconnect external power.

   f. Set Right START/GEN switch to GEN. Verify right GEN annunicator is extinguished. Verify voltage at Red Test Point on right voltage regulator is 28.5 VDC (±.3). At the adjustment provided on the VR face, adjust, as necessary (clockwise to increase), until within tolerance.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

g. Set Left START/GEN switch to GEN. Verify left GEN annunciator is extinguished. Set the Right START/GEN to OFF. Verify voltage at Red Test Point on left voltage regulator is 28.5 VDC (±.3). At the adjustment provided on the VR face, adjust, as necessary (clockwise to increase), until within tolerance.

h. With both Voltage Regulators set within tolerance, set Right START/GEN switch to GEN and add aircraft electrical load to 200 Amps. Check for load sharing to within 40 Amps between Gen's. Repeat steps f. and g., as necessary, for amperage tolerance.

i. If steps f., g., and h. are within tolerance, turn each Gen. OFF and on one at a time to insure load sharing and voltages remain within tolerances.

j. Advance both power levers to 70% N2 speed and repeat steps h. and i. If not within tolerances, repeat steps f., g., h., i., and j. until within tolerances.

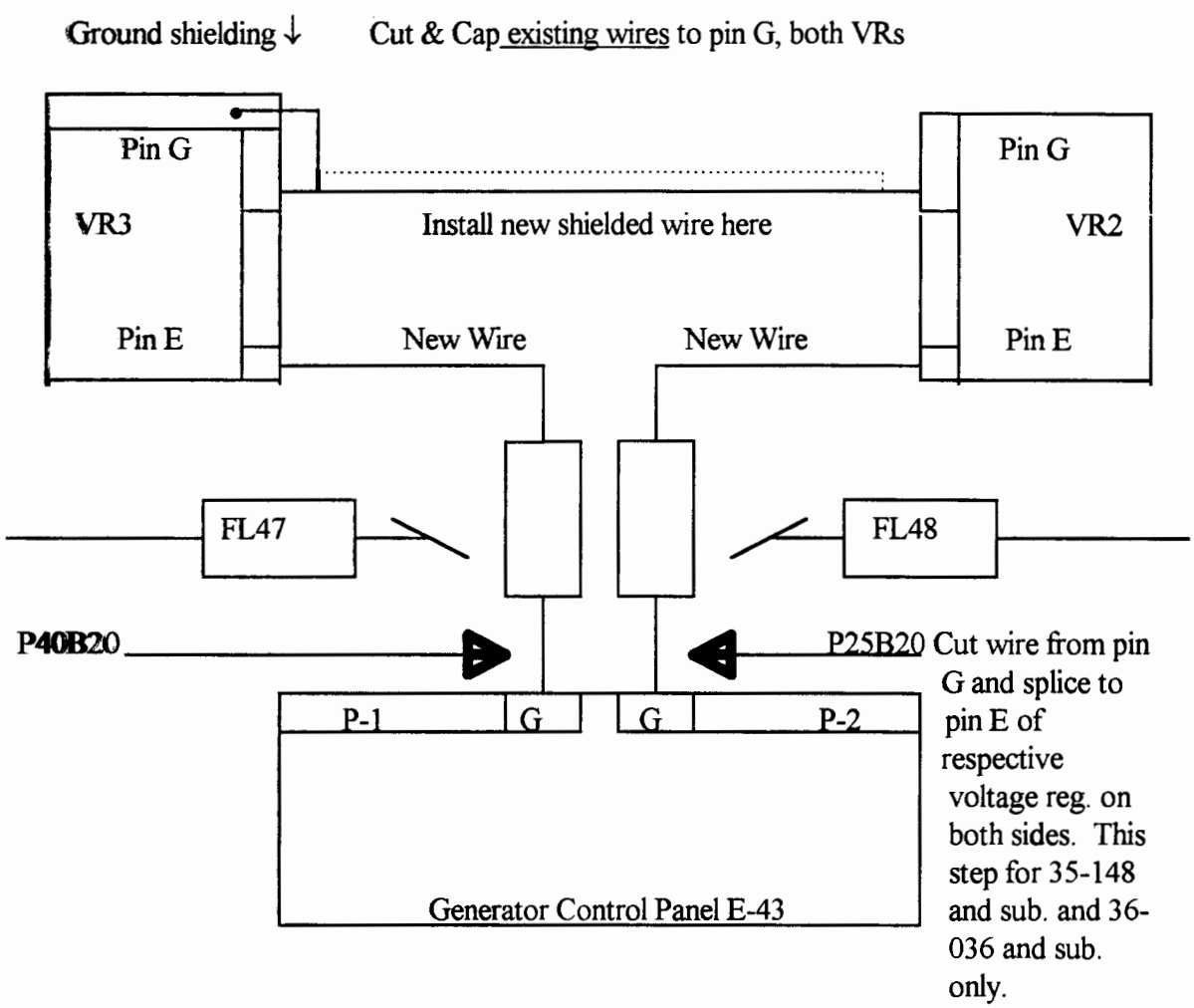
k. If all tolerances are within limits, remove voltmeter, close access doors, return aircraft to service, and make appropriate log entries.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD



Simplified installation wiring diagram

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

APR 27 1998

Date

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number ST00537WI

This Certificate issued to: Phoenix Aerospace Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 25 *of the* Federal Aviation *Regulations.*

Original Product - Type Certificate Number: A10CE

Make: Learjet Corporation

Model: 55, 55B and 55C

Description of Type Design Change: Installation of a Phoenix Aerospace Inc. (PAI) Solid State DC Voltage Regulator, Model BG-1010-24-7A, PAI Drawing No. 095198, Revision F, dated July 19, 1996, or later "FAA Approved Revisions". Data Required: "PAI Installation Instructions for Installing Phoenix Aerospace Model BG-1010-24-7A Solid State DC Voltage Regulator in All Learjet Model 55, 55B, and 55C Aircraft" dated April 23, 1997 or later "FAA Approved Revisions".

Limitations and Conditions: Compatibility of this design change with previously approved modifications must be determined by the installer.

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

Date of application: April 3, 1997 *Date reissued:*

Date of issuance: May 13, 1997 *Date amended:*

By direction of the Administrator

(Signature)

James M. Peterson
Associate ACO Mgr., Systems & Propulsion
Wichita Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2-1(10-68) *This certificate may be transfered in accordance with FAR 21.47.*

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS

FOR

INSTALLING PHOENIX AEROSPACE MODEL BG-1010-24-7A SOLID STATE DC VOLTAGE REGULATOR IN ALL LEARJET MODEL 55, 55B, AND 55C AIRCRAFT

THIS INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

NOTE: These PAI Voltage Regulators MUST be installed in pairs on initial installation and MUST NOT be combined with existing Learjet Voltage Regulators at any time.

STEP 1. Disconnect both aircraft batteries.

2. From your applicable aircraft maintenance and wiring manuals, locate the existing Voltage Regulators, Generator Control Panel, and associated wiring.

3. Remove connector P292 from VR2, (Right Voltage Regulator), & connector P293 from VR3, (Left Voltage Regulator). Remove mounting hardware from both existing Voltage Regulators and retain for later installation.

NOTE: Refer to the simplified installation wiring diagram on page 4 for Step 4 and Step 5 wiring changes.

4. Rewire the existing connectors, (P292 & P293), as follows:

   a. For the Left Voltage Regulator(VR3), at P293, remove pin G with wire P100A20, cap this wire, coil and stow in the loom.

   b. For the Right Voltage Regulator(VR2), at P292, remove pin G with wire P59A20, cap this wire, coil and stow as necessary in the loom.

   c. Install a new AWG #20 SHIELDED WIRE with new pins from P292, pin G, to connector P293, pin G, (where the above wires were removed from), and using approved methods, GROUND THE SHIELDING AT ONE END ONLY to a Left Voltage Regulator mounting base screw with a ring terminal.

STC ST00537WI

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date MAY 13 1997

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

5. Locate the Generator Control Panel and rewire as follows:

   a. For the Left Voltage Regulator(VR3), cut wire P108A20 approximately six inches from connector P183, pin G, at the Generator Control Panel(E6). Cap the long portion of this wire now. Connect a suitable length of AWG #20 wire using a butt splice to the short piece of P108A20 and route to the Left Voltage Regulator(VR3). Connect this new routed wire to a new pin and insert in P293 at pin E.

   b. For the Right Voltage Regulator(VR2), cut wire P66A20 approximately six inches from connector P182, pin G, at the Generator Control Panel(E6). Cap the long portion of this wire now. Connect a suitable length of AWG #20 wire using a butt splice to the short piece of P66A20 and route to the Right Voltage Regulator(VR2). Connect this new routed wire to a new pin and insert in P292 at pin E.

6. Using the same hardware removed, install both Phoenix Aerospace Inc. P/N BG-1010-24-7A Voltage Regulators and both connectors to their respective Voltage Regulators.

7. Reconnect both aircraft batteries.

8. Perform Voltage Regulator Adjustment, Operational Test, and Parallel Test as follows:

   a. Connect external power source to aircraft.

   b. Verify Left and Right Generator power annunciators on Master Warning Panel are ON.

   c. Start Right engine using Approved Aircraft Flight Manual.

   d. Start Left engine as above step.

   e. Disconnect external power.

STC STO0537W

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region
MAY 13 1997
Date _____

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632
816 333-3400 TELEX 424183 PHXAEROINC UD

f. Set Right START/GEN switch to GEN. Verify right GEN annunicator is extinguished. Verify voltage at Red Test Point on right Voltage Regulator is 28.5 VDC (±.3). At the adjustment provided on the VR face, adjust, as necessary (clockwise to increase), until within tolerance.

g. Set Left START/GEN switch to GEN. Verify left GEN annunciator is extinguished. Set the Right START/GEN to OFF. Verify voltage at Red Test Point on left Voltage Regulator is 28.5 VDC (±.3). At the adjustment provided on the VR face, adjust, as necessary (clockwise to increase), until within tolerance.

h. With both Voltage Regulators set within tolerance, set Right START/GEN switch to GEN and add aircraft electrical load to 200 Amps. Check for load sharing to within 40 Amps between Gen's. Repeat steps f. and g., as necessary, for amperage tolerance.

i. If steps f., g., and h. are within tolerance, turn each Gen. OFF and ON one at a time to insure load sharing and voltages remain within tolerances.

j. Advance both power levers to 70% N2 speed and repeat steps h. and i. If not within tolerances, repeat steps f., g., h., i., and j. until within tolerances.

k. If all tolerances are within limits, remove voltmeter, close access doors, return aircraft to service, and make appropriate log entries.

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date MAY 13 1997

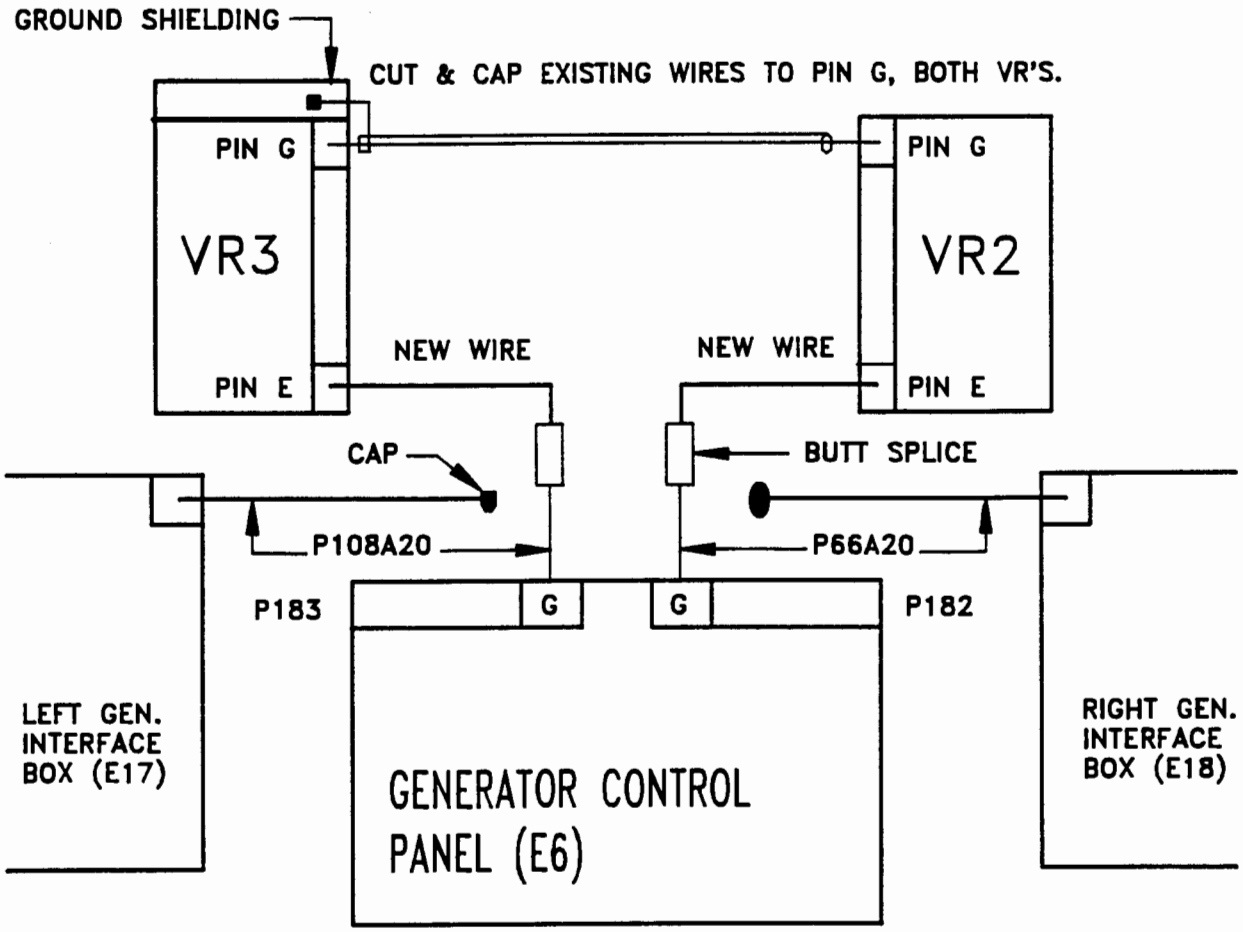
STC ST00537WI

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION NO. 363-1
VENDOR CODE IDENT NO. 29632

816 333-3400 TELEX 424183 PHXAEROINC UD



SIMPLIFIED INSTALLATION WIRING DIAGRAM

STC ST00537WI

F. A. A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

MAY 13 1997
Date

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number ST00955WI

This certificate issued to Phoenix Aerospace Inc.
220 W. 80th Terrace
Kansas City, MO 64114

certifies that the change in the type design for the following product with the limitations and conditions thereto as specified hereon meets the airworthiness requirements of Part 25 *of the* Federal Aviation *Regulations.*

Original Product - Type Certificate Number: A10CE

Make: Learjet

Model: 35, 35A, 36, 36A, C-21A

Description of Type Design Change:
Installation of Phoenix Aerospace Inc. Solid State Voltage Regulator Model No. BG-1010-24-8A, in place of existing voltage regulator in accordance with: "Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace BG-1010-24-8A, DC Voltage Regulators in all Learjet Models 35, 35A, 36, 36A", dated 2 February 2001; or "Phoenix Aerospace Inc. Installation Instructions for Installing Phoenix Aerospace BG-1010-24-8A, DC Voltage Regulators in all Learjet Models 35, 35A, 36, 36A, and C21A", dated 10 October 2001; or later FAA Approved Revision.

Limitations and Conditions:
Compatibility of this design change with previously approved modifications must be determined by the installer.

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

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

Date of application: February 13, 2001

Date of issuance: March 27, 2001

Date reissued:

Date amended: November 02, 2001

By direction of the Administrator

(Signature)

Harvey E. Nero
FAA Program Manager
Wichita Aircraft Certification Office

(Title)

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 in accordance with FAR 21.47.

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

STC # ST00955WI

F.A.A.
APPROVED
Wichita Aircraft Certification
Office, ACE-115W
Central Region

Date 11-2-01

ACE-116W

PHOENIX AEROSPACE INC. INSTALLATION INSTRUCTIONS FOR INSTALLING PHOENIX AEROSPACE BG-1010-24-8A, DC VOLTAGE REGULATORS IN ALL LEARJET MODELS 35, 35A, 36, 36A, AND C21A

INSTALLATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

NOTE: The PAI, BG-1010-24-8A Voltage Regulators, MUST be installed in pairs and MUST NOT be combined with existing Learjet Voltage Regulators at any time. Refer to attached Simplified Wiring Diagram.

STEP 1. Disconnect both aircraft batteries.

2. From your applicable aircraft maintenance and wiring manuals, locate the existing Voltage Regulators, associated wiring, and circuit terminal boards.

3. Remove connectors P381 and P382 from both Voltage Regulators, all mounting screws, and both Voltage Regulators.

4. Rewire the existing connectors, (P381 & P382), as follows:

   a. For Left Voltage Regulator connector P381, remove pin "G" with wire P40A20.

NOTE: **Step b. for Learjet S/N 35-202 and sub, and 36-042 and sub ONLY.**

   b. For Left Voltage Regulator connector P381, remove pin "G" with wire P43A20

   c. For Right Voltage Regulator connector P382, remove pin "G" with wire P25A20.

   d. Install a new awg 20 SHIELDED WIRE with new pins from connector P381, pin "G" to connector P382, pin "G" and ground the shielding ON ONE END ONLY, to either Voltage Regulator mounting screw, with a suitable ring terminal.

5. To remove terminal boards TB520, TB521, perform the following:

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

a. Identify wire P135A20N connected from TB521 to pin M of connector 37B. Remove wire P135A20N from TB521, cap and stow this wire.

b. Identify wire P134A20N connected from TB520 to pin M of connector 38B. Remove wire P134A20N from TB520, cap and stow this wire.

c. Remove TB520 with attached wire P25A20 and TB521 with attached wire P40A20

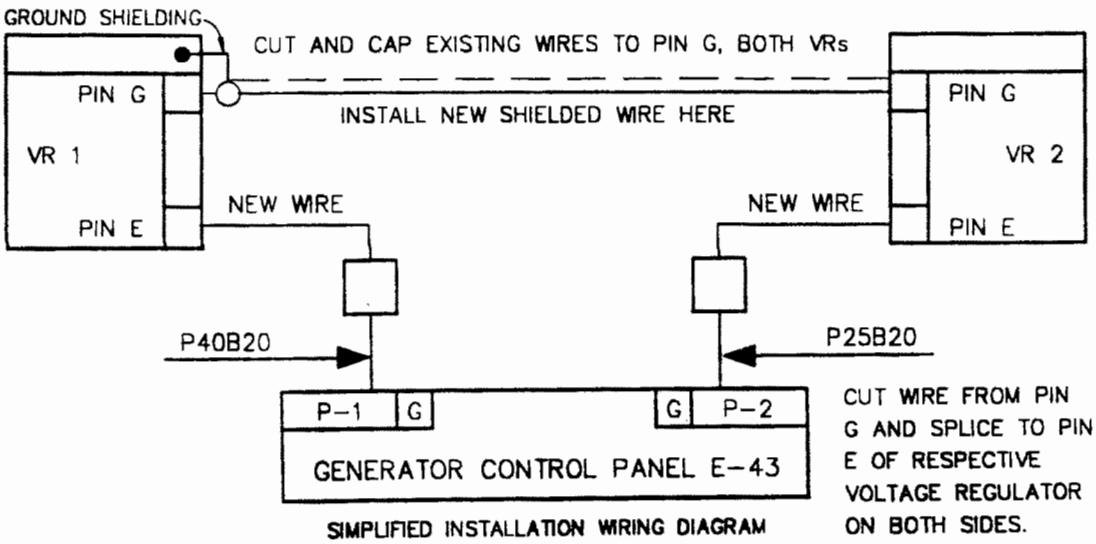
NOTE: Step d. for Learjet S/N 35-202 and sub, and 36-042 and sub <u>ONLY.</u>

d. For Left Voltage Regulator circuit, remove Inductor, L19.

6. On some aircraft, a small terminal board, (TB520, TB521) is installed between the Voltage Regulators and utilizes the same mounting screws. TB520 and TB521 are not required and are removed from the aircraft.

a. For Left Voltage Regulator, terminal board TB521,disconnect wire P40B20 from the end of Fuse FL47 and connect to Left Voltage Regulator connector P381, pin "E", with a new suitable pin.

b. For Right Voltage regulator terminal board TB520, disconnect wire P25B20 from the end of Fuse FL48 and connect to Right Voltage Regulator P382, pin "E", with a new suitable pin.



SIMPLIFIED INSTALLATION WIRING DIAGRAM

c. Remove terminal boards TB520 and TB521, fuses FL47 and FL48, and attached wiring, from the aircraft.

7. Using the same hardware removed, install both Phoenix Aerospace Inc. P/N BG-1010-24-8A Voltage Regulators and both connectors to their respective Voltage Regulators.

8. From your applicable aircraft maintenance and wiring manuals, locate aircraft Relays K628 (for the Right Generator) and K629 (for the Left Generator). Both Relays will be removed by the following steps.

NOTE: EFFECTIVITY: 35-002 thru -027, -029 and -030; 36-002 thru -013, -015 and -016. These aircraft do not have the GENERATOR WARNING CONTROL, E566.

9. The **Left** Generator's "S+" and "B" terminal voltages will not use Relay K629 after the following circuit changes:

a. Left Generator "S+" voltage is applied to connector P99, pin "W" via wire P86B20T. Identify wire P86A20 which runs from pin W of connector J99 to wire 8-20 which connects to Relay K629. Remove wire 8-20 from Relay K629.

b. Identify wire 9-20 which connects from connector P1, pin "J" of Generator Control Panel E43 to Relay 629. Remove wire 9-20 from Relay K629. Splice wire 8-20, which was removed from Relay K629, to wire 9-20.

c. At relay K629, cut, cap and stow wire 11-16 which connects to wire P38A16. Wires 11-16 and P38A16 connect Relay K629 to P1, pin "C" of the Generator Control Panel E43.

d. At relay K629, cut, cap and stow wire 12-20 which connects to wire P90A20N. Wires 12-20 and P90A20N connect Relay K629 to Ground through connector 37B, pin "C".

e. Left Generator "B" terminal voltage is applied to P101, pin M via wire P112A16T. Identify wire P112B16 connected from pin M of J101 through wire 10-16 to Relay K629. Remove wire

10-16 from Relay K629. Connector P381 pin "B", of Voltage Regulator VR 1, connects to Relay K629 via wires 20T to wire P88A16, through wire 14-16 to Relay K629. Wire 14-16 is removed from Relay K629 and spliced to wire 10-16 to eliminate Relay K629 from the circuit. Remove Diode CR163 from wire 13-16. Cap, and stow wire 13-16 after removing Diode CR163.

f. At P1, pin "J "of the Generator Control Panel E43, remove wires 9-20 and P86C20 from pin "J". Splice wires 9-20 and P86C20 together.

g. Connect an awg 20 wire from connector P1, pin "J" of Generator Control Panel E43, to pin "H" of DC Voltage Regulator, VR1, connector P381.

10. The **Right** Generator's "S+" and "B" terminal voltages will not use Relay K628 after the following circuit changes:

a. Right Generator "S+" voltage is applied to connector P100, pin "W" via wire P87B20T. Identify wire P87A20 which runs from pin W of J100 to wire 1-20 which connects to Relay K628. Remove wire 1-20 from Relay K628.

b. Identify wire 2-20 which connects from connector P2, pin "J" of Generator Control Panel E43 to Relay 628. Remove wire 2-20 from Relay K628. Splice wire 1-20, which was removed from Relay K628, to wire 2-20.

c. At Relay K628, cut, cap and stow wire 4-16 which connects to wire P27A16. Wires 4-16 and P27A16 connect Relay K629 to connector P2, pin "C" of the Generator Control Panel.

d. At Relay K628, cut, cap and stow wire 5-20 which connects to wire P93A20N. Wires 5-20 and P93A20N connect Relay K628 to Ground through connector 38B, pin "C".

e. Right Generator "B" terminal voltage is applied to P102, pin M via wire P113A16T. Identify wire P113B16 connected from pin M of J102 through wire 3-16 to Relay K628. Remove wire

3-16 from Relay K628. Connector P382 pin "B", of Voltage Regulator VR 2, connects to Relay K628 via wires 20T to wire P91A16, through wire 7-16 to Relay K628. Wire 7-16 is removed from Relay K628 and spliced to wire 3-16 to eliminate Relay K628 from the circuit. Remove Diode CR164 from wire 6-16. Cap, and stow wire 6-16 after removing Diode CR164.

f. At P2, pin "J "of the Generator Control Panel E43, remove wires 2-20 and P87C20 from pin "J". Splice wires 2-20 and P87C20 together.

g. Connect an awg 20 wire from connector P2, pin "J" of the Generator Control Panel to pin "H" of connector P382, for the DC Voltage Regulator, VR2.

11. Reconnect both aircraft batteries.

12. Perform Voltage Regulator Adjustment, Operational test, and Parallel Test as follows.

    a. Connect external power source to aircraft.

    b. Verify Left and Right Generator power annunciators on Master Warning Panel are ON.

    c. Start Right engine using Approved Aircraft Flight Manual.

    d. Start Left engine as above step.

    e. Disconnect external power.

    f. Set Right START/GEN switch to GEN. Verify Right GEN annunciator is extinguished. Verify voltage at Red Test Point on right Voltage Regulator is 28.5 VDC ($\pm$ 0.3). At the adjustment provided on the VR face, adjust the voltage as necessary, (clockwise to increase), until within tolerance. Set Left START/GEN switch to GEN. Verify Left GEN annunciator is extinguished. Set the Right START/GEN to OFF. Verify voltage at Red Test Point on the Left Voltage

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

Regulator is 28.5 VDC (± 0.3 VDC). At the adjustment provided on the VR face, adjust, as necessary (clockwise to increase), until within tolerance.

h. With both Voltage Regulators set within tolerance, set Right START/GEN switch to GEN and add aircraft electrical load to 200 amps. Check for load sharing to within 40 amps between Generators. Repeat steps f. and g. as necessary for amperage tolerance.

i. If steps f., g., and h. are within tolerance, turn each Generator OFF and ON, one at a time to insure load sharing and voltages remain within tolerances.

j. Advance both power levers to 70% N2 speed and repeat steps h. and i.. If not within tolerance, repeat steps f., g., h., I., and j. until within tolerances.

k. If all tolerances are within limits, remove voltmeter close access doors, return aircraft to service. Make appropriate log entries.

NOTE:

This information pertains to aircraft which have the GENERATOR WARNING CONTROL, E566 on the aircraft. EFFECTIVE ON AIRCRAFT 35-028, 35-031 THRU -082; 36-014, 36-017 THRU -020. NOTE WIRE CODE CHANGES TO CONNECTORS P862 AND P863 FOR NEW INSTALLATIONS OF GENERATOR WARNING CONTROL BOX E566.

THIS OPERATION IS TO BE PERFORMED BY QUALIFIED PERSONNEL ONLY

Step 1. Disconnect both aircraft batteries.

2. From your applicable aircraft maintenance and wiring manuals, locate aircraft relays K628 (for the Right Generator) and K629 (for the Left Generator) and aircraft Generator Warning Control, E566. K628, K629, and E566 will be removed by the following steps.

3. The **Left** generator's "S+" and "B" terminal voltages will not use Relay K629 after the following circuit changes:

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

a. Left Generator "S+" voltage is applied to connector J101, pin "12" via wire P86B20T. Identify wire P86A20T which runs from pin "12" of connector P101 to Relay K629. Remove wire P86A20T from Relay K629

b. Remove wire P94A20 from Relay K629. Wire P94A20 connects to an awg 20 wire which continues through connector P863 to pin "A" of E566, Generator Warning Control. Remove this awg 20 wire from pin "A" of connector P863. Cap and stow this wire. Splice wires P94A20 and P86A20T which were removed from Relay K629.

c. Identify wire P13A20 which connects P1, pin "J" of the Generator Control Panel E43 to connector P863, pin "H" of E566, Generator Warning Control. Remove wire P13A20 from connector P863, pin "H" of E566 and connect to VR1 connector P381, pin "H".

d. At relay K629, cut, cap and stow wire P38A16 which connects Relay K629 to P1, pin "C" of Generator Control Panel E43.

e. At relay K629, cut, cap and stow wire P90A20N which connects Relay K629 to Ground through connector 37B, pin "C".

f. Wire P139A20N, connected from connector P863, pin "C" of E566 to Ground through connector 37A, pin "R", is not required and is removed from connector P863, pin "C" of E566. Cap and stow wire P139A20N.

g. Generator Warning Control E566, connector P863, is now free for removal.

h. Left Generator "B" terminal voltage is applied to connector J965, pin 3, via wire P112A16T. Identify wire P112B16T connected from pin 3 of connector P965 to Relay K629. Remove wire P112B16T from Relay K629.

i. Connector P381, pin "B", of Voltage Regulator VR 1, connects to Relay K629 via wires 20T to wire P88A16, through an awg

16 wire. The awg 16 wire is removed from Relay K629 and spliced to wire P112B16T to eliminate Relay K629 from the circuit.

j. Wire P153A16, from P1, pin "B" of Generator Control Panel E43, connects to the anode of Diode CR163. An awg 16 wire connects from the cathode of Diode CR163 to the junction of wire P88A16 and another awg 16 wire which connected to relay K629. Remove Diode CR163. Cap and stow the awg 16 wire and wire P153A16 after removing Diode CR163.

4. The **Right** generator's "S+" and "B" terminal voltages will not use Relay K628 after the following circuit changes:

a. Right Generator "S+" voltage is applied to connector J102, pin "12" via wire P87B20T. Identify wire P87A20T which runs from pin "12" of P102 to Relay K628. Remove wire P87A20T from Relay K628

b. Remove wire P95A20 from Relay K628. Wire P95A20 connects to an awg 20 wire which continues through connector P862 to pin "A" of E566, Generator Warning Control. Remove this awg 20 wire from pin "A" of connector P862. Cap and stow this wire. Splice wires P95A20 and P87A20T which were removed from Relay K628.

c. Identify wire P136A20 which connects P2, pin "J" of the Generator Control Panel E43 to connector P862, pin "H" of E566, Generator Warning Control. Remove wire P136A20 from connector P862, pin "H" of E566 and connect to VR2 connector P382, pin "H".

d. At relay K628, cut, cap and stow wire P27A16 which connects Relay K628 to P2, pin "C" of Generator Control Panel E43.

e. At relay K628, cut, cap and stow wire P93A20N which connects Relay K628 to Ground through connector 38B, pin "C".

Phoenix Aerospace Inc.

220 WEST 80TH TERRACE
P.O. BOX 8744
KANSAS CITY, MISSOURI 64114-0744

FAA APPROVED REPAIR STATION SL2R165L
CAGE 29632
816 333-3400
FAX 816 444-4133
www.phoenixaerospace.com

f. Wire P138A20N, connected from connector P862, pin "C" of E566 to Ground through connector 38A, pin "P", is not required and is removed from connector P862, pin "C" of E566. Cap and stow wire P138A20N.

g. Generator Warning Control E566, connector P862, is now free for removal.

h. Remove E566 and all associated mounting hardware.

i. Right Generator "B" terminal voltage is applied to connector J964, pin 3, via wire P113A16T. Identify wire P113B16T connected from pin 3 of connector P964 to Relay K628. Remove wire P113B16T from Relay K628.

j. Connector P382 pin "B", of Voltage Regulator VR 2, connects to Relay K628 via wires 20T to wire P91A16, through an awg 16 wire. The awg 16 wire is removed from Relay K628 and spliced to wire P113B16T to eliminate Relay K628 from the circuit.

k. Wire P154A16, from P2, pin "B" of Generator Control Panel E43, connects to the anode of Diode CR164. An awg 16 wire connects from the cathode of Diode CR164 to the junction of wire P91A16 and another awg 16 wire which connected to Relay K628. Remove Diode CR164, Cap and stow the awg 16 wire and wire P154A16 after removing Diode CR164.

NOTE:

SOME AIRCRAFT DC POWER SYSTEMS MAY DEVIATE SLIGHTLY FROM THE INSTALLATION INFORMATION. TO ACCOMPLISH THE INTENT OF THE STC, ADHERE TO THE PERTINENT AIRCRAFT DC POWER SYSTEM WIRING DIAGRAM(S).

Phoenix Aerospace Inc.

www.phoenixaerospace.com

BG-1010-24-8A

28 VOLT DC VOLTAGE REGULATOR FOR BRUSHLESS GENERATORS

PAI STC ST00955WI, ISSUED FEBRUARY 2, 2001 FOR RETROFITTING LEARJET MODELS 35, 35A, 36, 36A AND C-21A (MILITARY).

INSTALL IT AND FORGET IT!

- ♣ PRECISION DC VOLTAGE REGULATION
- ♣ OVERVOLTAGE SENSING
- ♦ GENERATOR CURRENT LIMITING
- ♦ AUTOMATIC PARALLELING
- ♥ UNSURPASSED PRODUCT SUPPORT
- ♥ PROVEN UNIT RELIABILITY
- ♠ 36 MONTH UNCONDITIONAL WARRANTY
- ♠ NO CHARGE FOR THE STC

FOR INFORMATION, CALL: 800-437-6556 or FAX: 816-444-4133

BG-1010-24-8A

28 VOLT DC VOLTAGE REGULATOR
Silicon Solid State

Regulation Technology for the 21st Century

BG-1010-24-8A DC VOLTAGE REGULATORS PROVIDE DRAMATIC IMPROVEMENT OVER COMPETITOR'S UNITS IN ELECTRICAL SYSTEM PERFORMANCE, DEPENDABILITY AND RELIABILITY!

ELECTRICAL CHARACTERISTICS

*REGULATED DC VOLTAGE RANGE:	27.5 to 29.5 VDC
FIELD CURRENT (CONTINUOUS):	14 AMPERES
*REGULATION (LIMITS ALL CONDITIONS):	±0.4 VOLT
OVERVOLTAGE SENSING (PIN E):	32.0 ±1VOLTS
TIME OF RECOVERY (0 - FULL LOAD):	0.05 SECOND
AMBIENT TEMPERATURE RANGE:	-85ºC TO +85ºC
MAXIMUM OPERATING ALTITUDE:	100,000 FEET & BEYOND
MTBF:	10,000 FLIGHT HOURS (MIN.)
WEIGHT:	1.6 LBS.

*0 to full load, over rated generator speed & temperature-altitude operating range (No other manufacturer maintains such tight, stable regulation).

ORDER TODAY! - 800 437-6556

PAI P/N BG-1010-24-8A DC VOLTAGE REGULATOR IS A DIRECT RETROFIT FOR BENDIX P/N 25B18-4E DC VOLTAGE REGULATOR, APPL. BENDIX P/N 30B107-19A 28 VDC, 400 AMP BRUSHLESS GENERATOR AND IS SUPPLIED FROM THE FACTORY ADJUSTED & READY FOR INSTALLATION.