THRUSH AIRCRAFT

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CUSTOM KIT

CK-AG-43

LAMAR GENERATOR CONTROL UNIT MODIFICATION FOR S2R-T34 AIRCRAFT SINGLE AND DUAL COCKPIT AIRCRAFT EQUIPPED WTH MVP-50T ENGINE MONITOR.

VICE PRESIDENT ENGINEERING

Revision B 08/28/2020

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AIRPLANES AFFECTED:

MODEL	SERIAL NUMBERS
S2R-T34	T34-273 THRU -340 (for Airplanes Equipped With MVP-50T Engine Monitor System as Option) T34-341 THRU -421, EXCEPT -409 (for Airplanes Equipped With MVP-50T Engine Monitor System as Standard)

LOG OF REVISIONS

NOTE: Re-formatting and correction of typographical errors is not considered revision. True revisions are indicated by a dark vertical line at the right margin of the lines revised.

Rev.	Page	Description of Revision	By:	Approved:
IR	All	New Document Initial Release.	G. Moreland	
A	PG. 2	Typographical error on callout of part quantities.	K. Sheppard 08/15/2018	
B	PG. ii	WAS: T34-273 THRU -340 for Airplanes Equipped With MVP-50T Engine Monitor System IS NOW: T34-273 THRU -340 (for Airplanes Equipped With MVP-50T Engine Monitor System as Option) T34-341 THRU -421, EXCEPT -409 (for Airplanes Equipped With MVP-50T Engine Monitor System as Standard) (REF ECN 19870 C7B)	W. Griffin 08/28/2020	

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TOPIC PAGE

1. PURPOSE AND REASON FOR PUBLICATION

This document provides the instructions and parts for installing the GCU, Generator Control Unit, Battery Plate Assembly on Single and Dual Cockpit S2R-T34 aircraft equipped with a MVP-50T Engine Monitoring System.

2. SCOPE/COMPLIANCE

The GCU and associated 300 amp Relays provides a solution to the service difficulties associated with previous electrical system utilized on the S2R-T34 aircraft which included inability to maintain a consistent output voltage and sticking of the reverse current Relay. The previous system consisted of a voltage regulator, reverse current Relay, and 200 amp Relays.

Compliance with this custom kit is optional and at the Owner's discretion.

It is recommended to reference AC 43.13-1 or -2 (per 14 CFR 21.91).

3. BY WHOM WORK WILL BE ACCOMPLISHED

The work is to be accomplished by an FAA licensed A&P mechanic, or foreign equivalent. The action must be recorded in the airplane log book and signed off by the mechanic.

4. APPROVAL

4.1 THRUSH AIRCRAFT, LLC. APPROVAL

This Custom Kit document is approved by Thrush Aircraft, LLC. Proper execution of these instructions will ensure proper field conversion.

5. MAN HOURS

5.1 REMOVAL AND MODIFICATION

The total estimated time required to accomplish this task is 22 Hours.

6. SPECIAL TOOLS

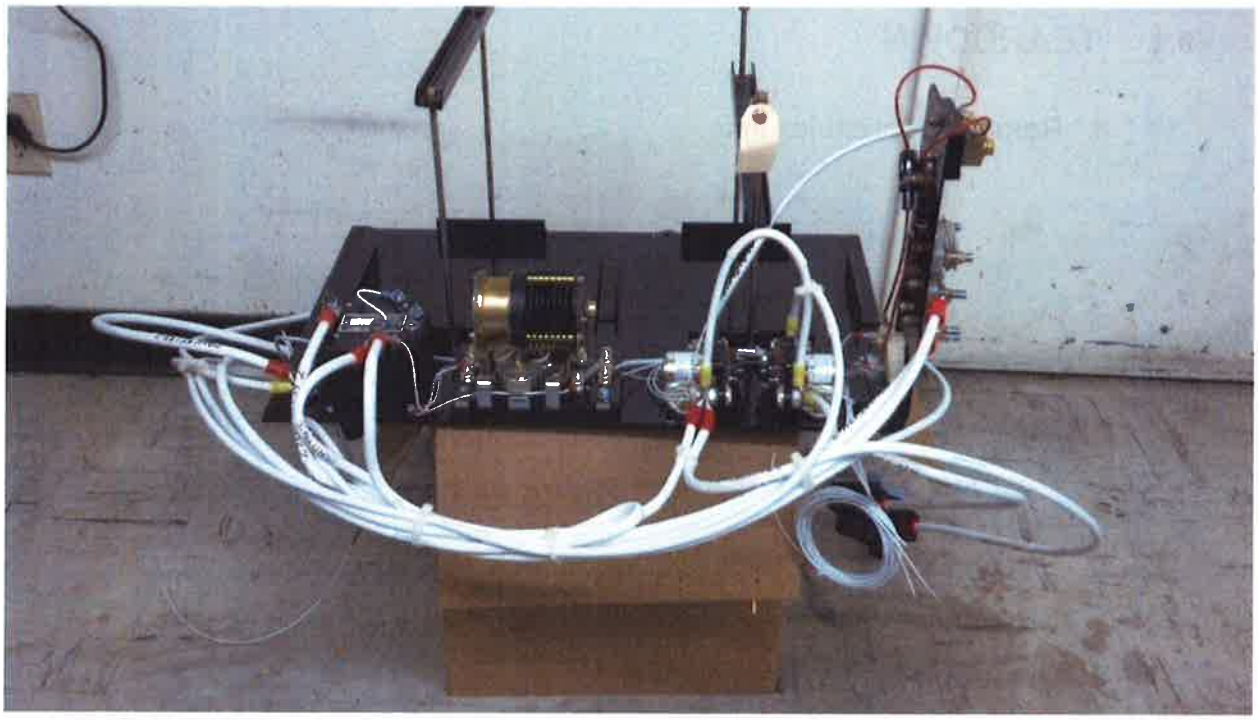
6.1 ESK 742-1 DRILL TEMPLATE.

7. NEW PARTS AND MATERIAL

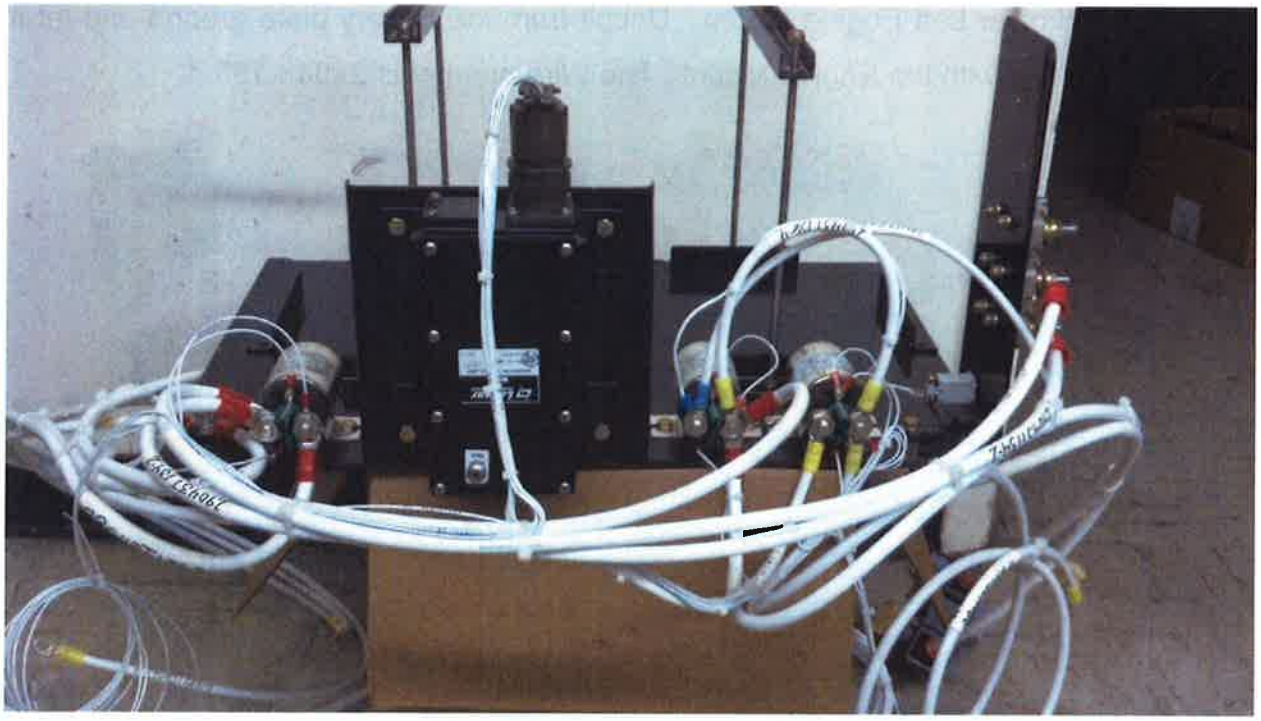
7.1 PARTS REQUIRED FURNISHED WITH KIT.

Part Number	Nomenclature	Quantity
29-314-12-903	LCR, Master, Start Relays	3
246010003-001	GCU Bracket Assembly	1
GC08	Solid State GCU	1
AN4-6A	Bolt	10
AN4-5A	Bolt	4
AN960-416 (ALT: NAS1149FO463P)	Washer	14
MS21044N3	Nut	10
MS21044N4	Nut	4
AN960-416L (ALT: NAS1149FO432P)	Washer	6
MIL SPEC 22759	18 AWG Electrical Wire	38 Feet
MIL SPEC 22759	16 AWG Electrical Wire	4 Feet
MS25036-102	Crimp Style Terminal Lug	5
MS25036-150	Crimp Style Terminal Lug	3
MS25036-103	Crimp Style Terminal Lug	2
MS25036-105	Crimp Style Terminal Lug	4
S2R-T34-MMS S2R02 Rev IR	Maintenance Manual Supplement	1
AFMS S2R-T3402 GCU Rev. IR	Airplane Flight Manual Supplement	1

8. OLD CONFIGURATION VS NEW CONFIGURATON



Battery Plate Assembly with Voltage Regulator



Battery Plate Assembly with GCU and Relays

Figure 43-1

9. MODIFICATION INSTRUCTIONS

9.1 TEARDOWN

a. Remove applicable skins.

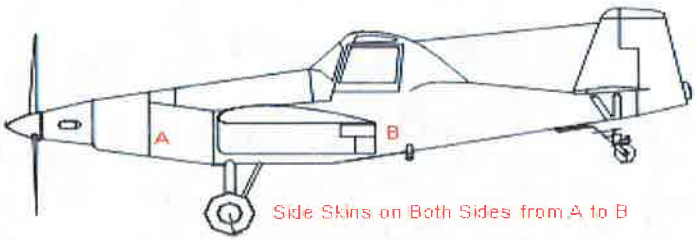


Figure 43-2

b. Disconnect Battery (2 Quick Disconnects P/N 8003-1)
c. Disconnect Vent tubes from Batteries and store for hook up later.
d. Remove Batteries from aircraft.
e. Disconnect one wire from the Battery Plate Ground. This wire bolts to the Lower Left Engine Mount. Unbolt from the battery plate ground and let it stay with the Engine Mount. The Wire number is 29043-153-4.

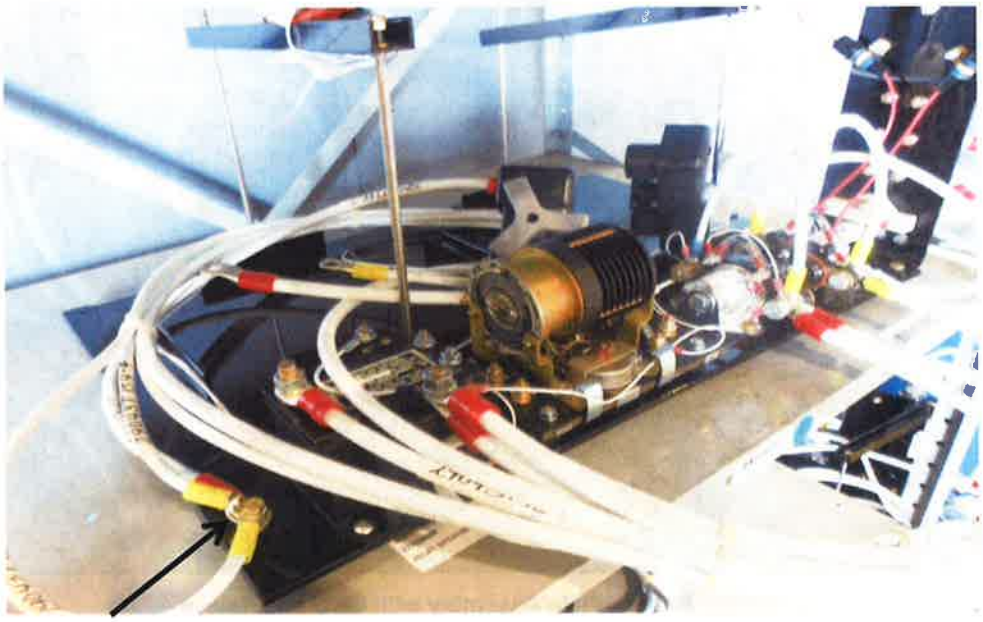


Figure 43-3: Battery Plate Ground

NOTE: It is imperative that all wires that are removed get labeled/tagged because they will get reconnected later. Don't label if wire number can be easily seen.

f. Disconnect one more wire from the Battery Plate Ground. This wire bolts to the Engine Driven Fuel Pump attach bolt. Unbolt from the battery plate. The Wire number is 29043-154-4. Let this wire stay with the Fuel Pump.

g. Disconnect All Wires Attached to the Starter Generator. Label each wire with the Terminal Letter Character that it was removed from, e.g.

SG-A 29043-130-18	This wire will not be re-used.
SG-A 29043-127A-18	This wire will not be re-used.
SG-B 29043-131-2	This wire will be re-used.
SG-C 29043-129-4	This wire will be re-used.
SG-D No Connection	
SG-E 29043-132-4	This wire will be re-used.

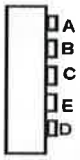


Figure 43-4: Starter Generator Pin Out

Let the wires travel with the Battery Plate when it is taken out of the airplane.

h. Remove wire ❶ and Label as 29043-245-4 to APU +.

Figure 43.4 A

Remove wire ❷ and Label as 29043-135-2 to 100 AMP Buss Limiter Fuse.

Remove wire ❸ and Label as 29043-640-2 to Heat & Cool Current Limiter 100 AMPS.

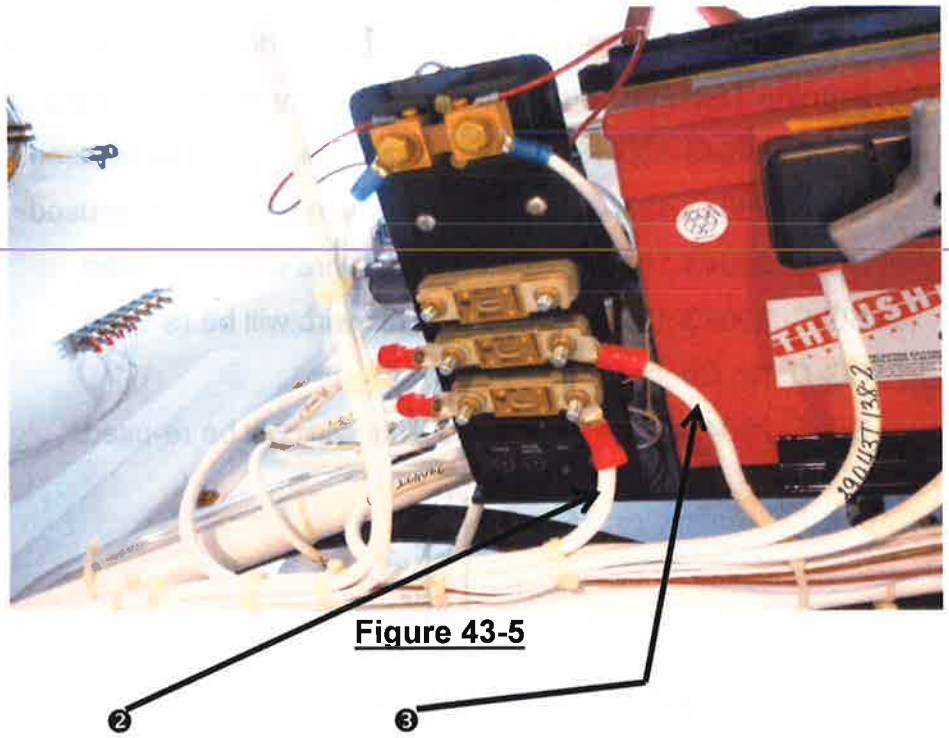


Figure 43-5

i. Remove Wire ❺ and Label as 29043-846-6 to Shunt Negative.
Disconnect the fuse holder connecting Wire ❻ and label as 29043-908-22 Shunt Negative.
Disconnect the fuse holder connecting Wire ❼ and label as 29043-909-22 Shunt Positive.

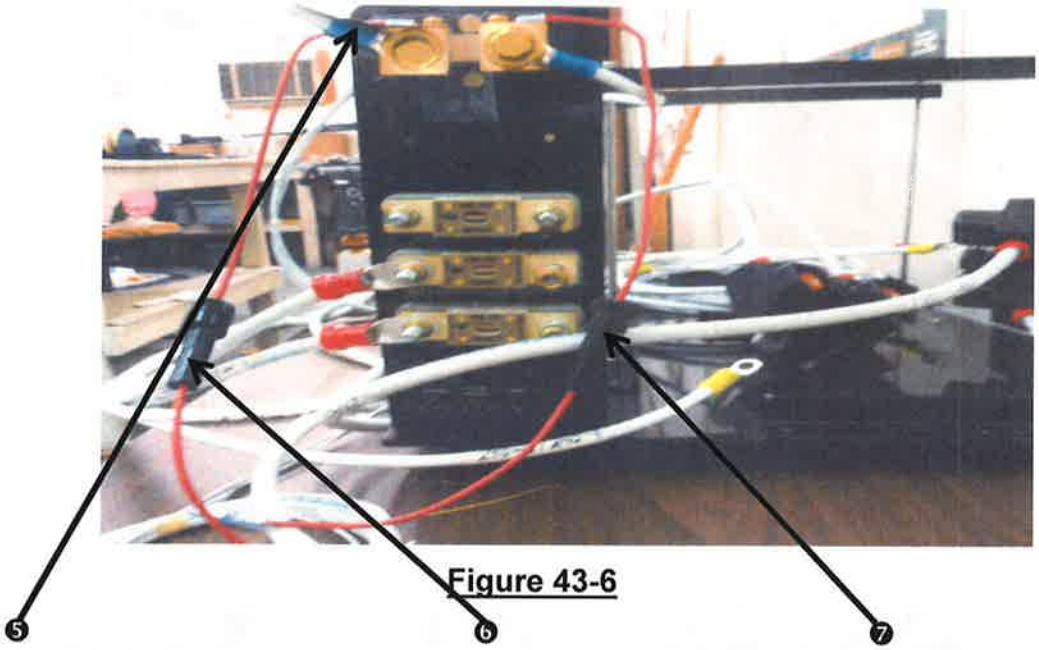


Figure 43-6

j. Disconnect Wire ❽ from Master Relay and label as 29043-144-18-X1.
Note: A1 is the large Terminal on Relay. X1 is small terminal on same side. Battery Plate might have to be unbolted and slide out to do this.

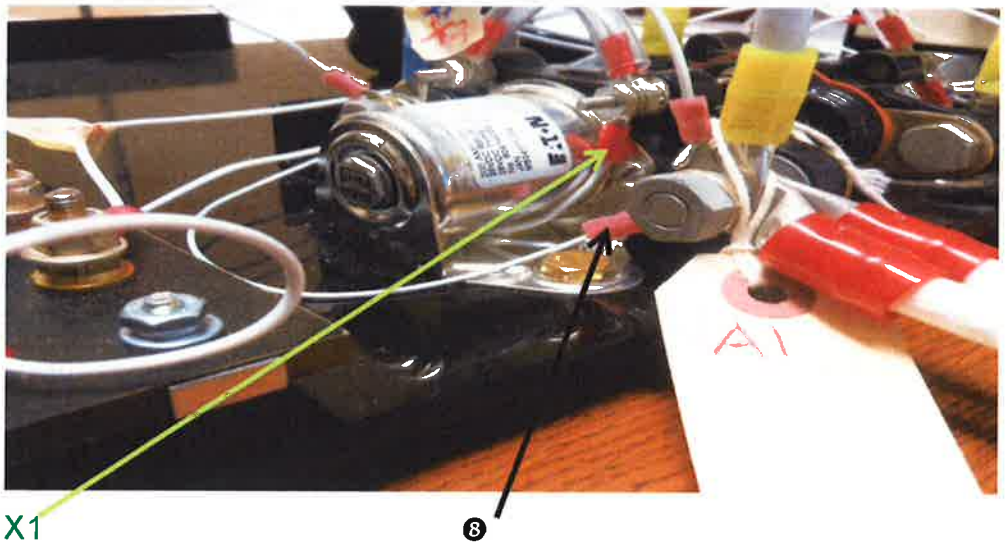


Figure 43-7

k. Disconnect Wire ❾ from Start Relay and Label as 29043-171A-18-X2.

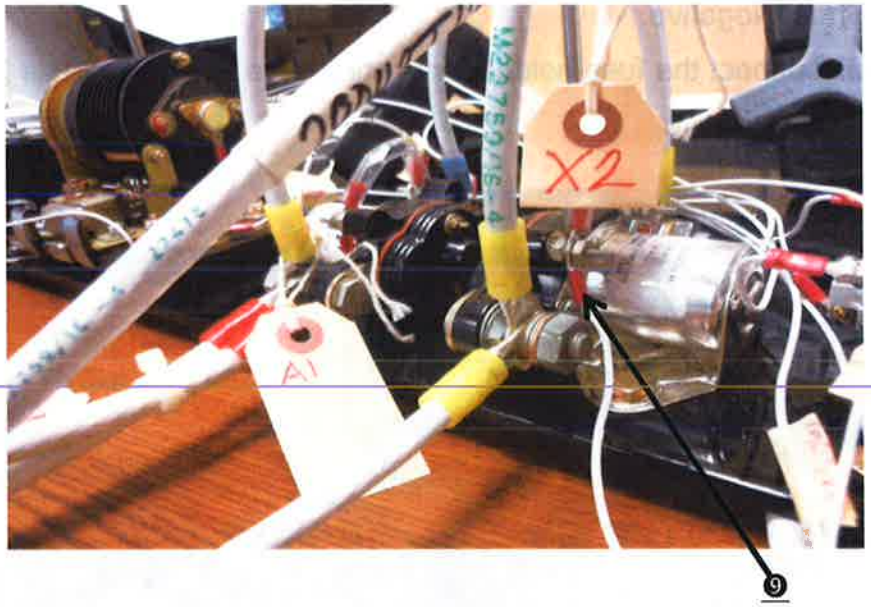


Figure 43-8

Note that X2 is on this side as the Relays are back to back.

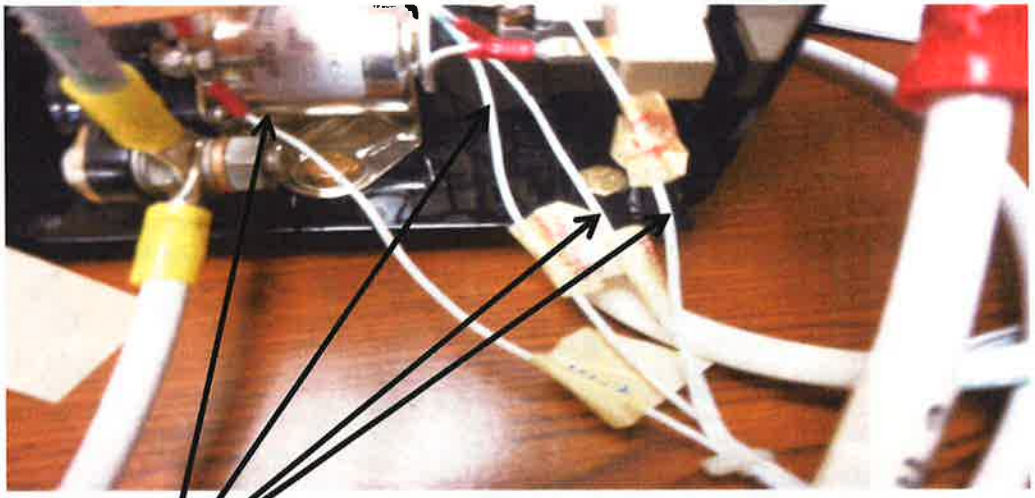


Figure 43-9

l. Pull wires ⑩ away from the assembly and store for later use.

m. Unbolt the battery plate and slide out of airplane and place on workbench.

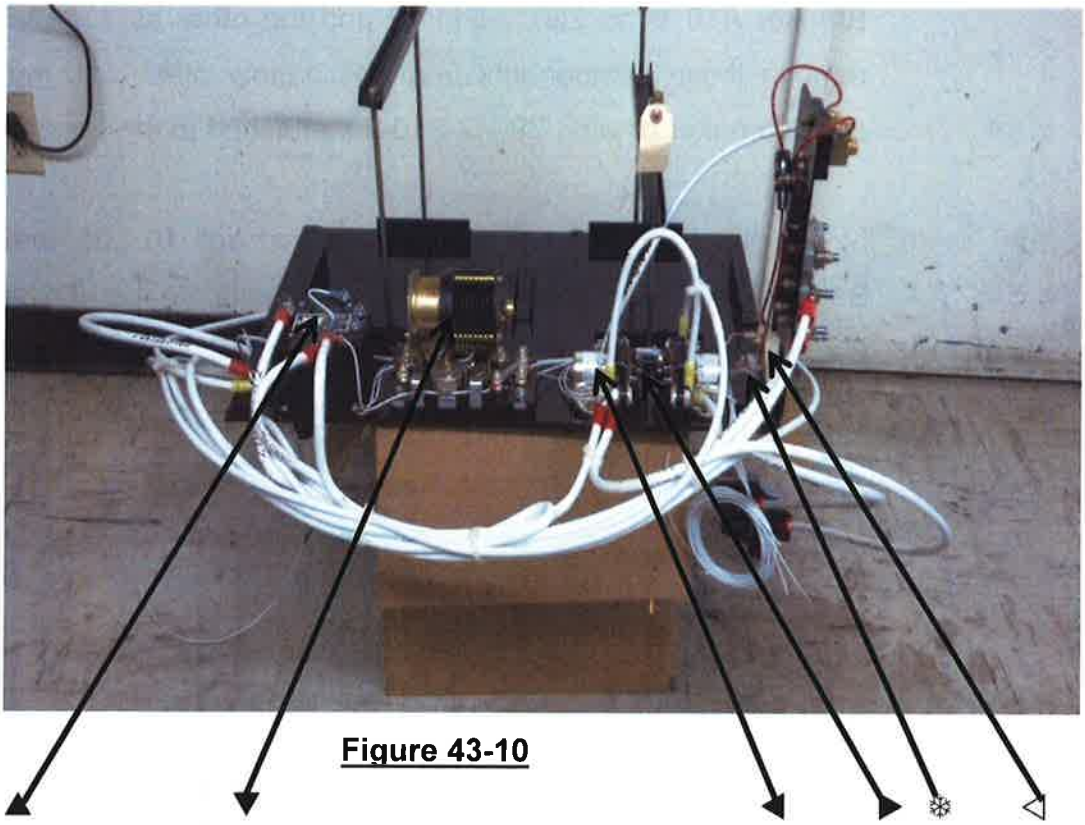


Figure 43-10

n. Remove the wires attached to the following Components:

- Reverse Current Relay ▲
- Voltage Regulator ▼
- Master Relay ◀
- Start Relay ▶
- EDC Breaker ❄
- Resistor ◁
-

NOTE: Wires attached to resistor to be discarded. Keep the rest for later use.

NOTE: Label the long 20 gauge wire connected to the Reverse Current Relay GEN terminal ▲ as 29043-918-20.

NOTE: Label the 20 gauge wire connected to the Master Relay terminal X1 ◀ as 29043-910-20. The other end of the wire is connected to the bottom connector on the EDC Breaker.

NOTE: Label the (2) long 22 gauge wires connected to top terminal of the EDC Breaker A19 ❄ as 29043-911-22 and the other as 29043-859-22. Now remove those components from the battery plate. Do not remove the circuit breaker or wire, 29043-910-20, attached to the bottom Terminal.

o. Locate the ESK 742-1 Drill Template and drill 10 (.25 Dia) holes in the Battery Plate. See Figure 43-11 for how to locate the drill template on the Battery Plate. Use an engraving to engrave "MODIFIED BY CK-AG-43 REV-IR" into the battery plate. Locate Here:

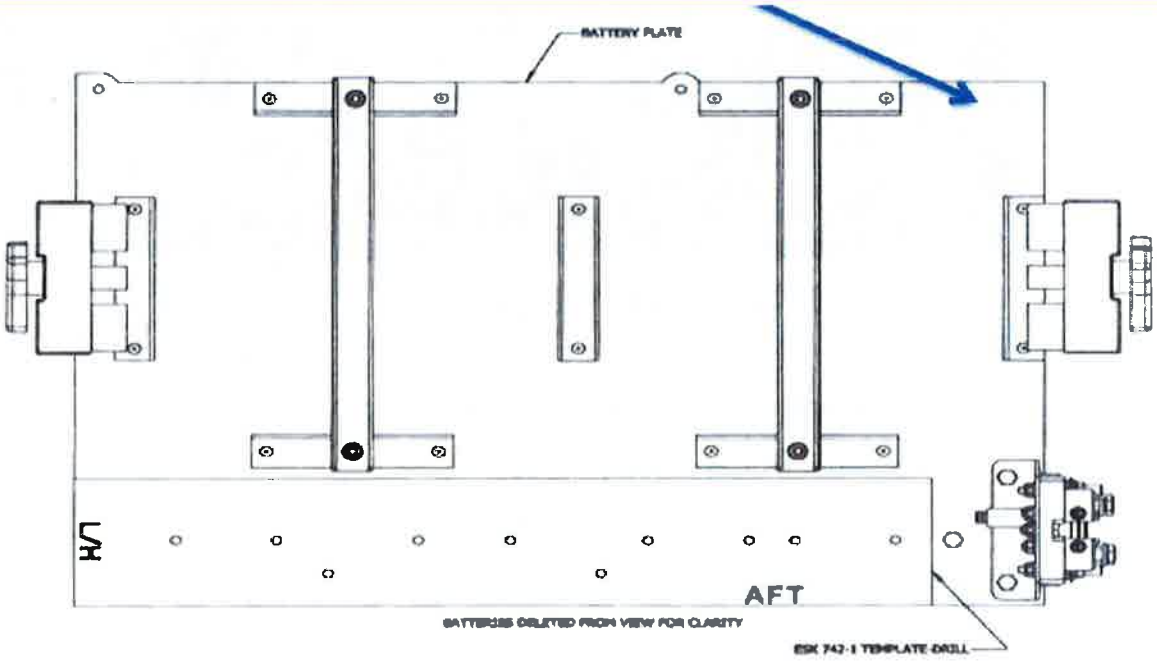


Figure 43-11

9.2 INSTALL NEW COMPONENTS

9.2.1 FINISH PRODUCT

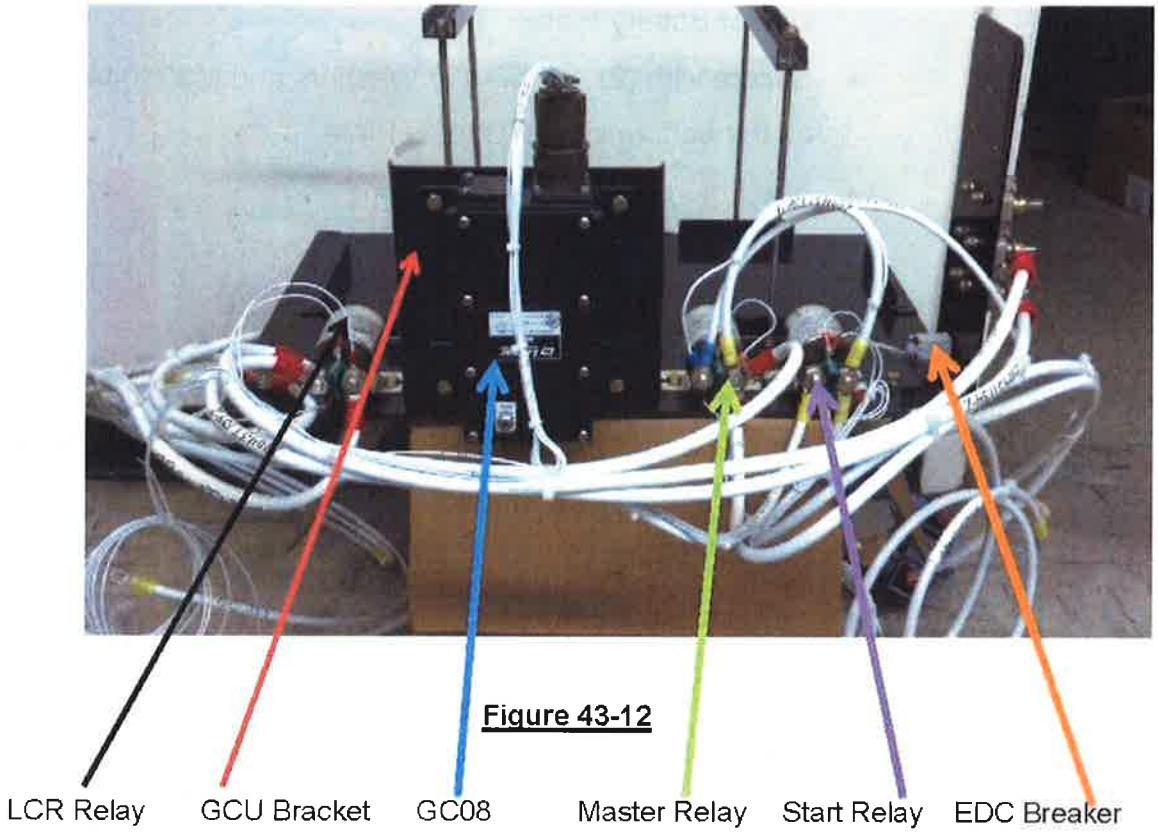


Figure 43-12

9.2.2 INSTALLATION SEQUENCE AND HARDWARE

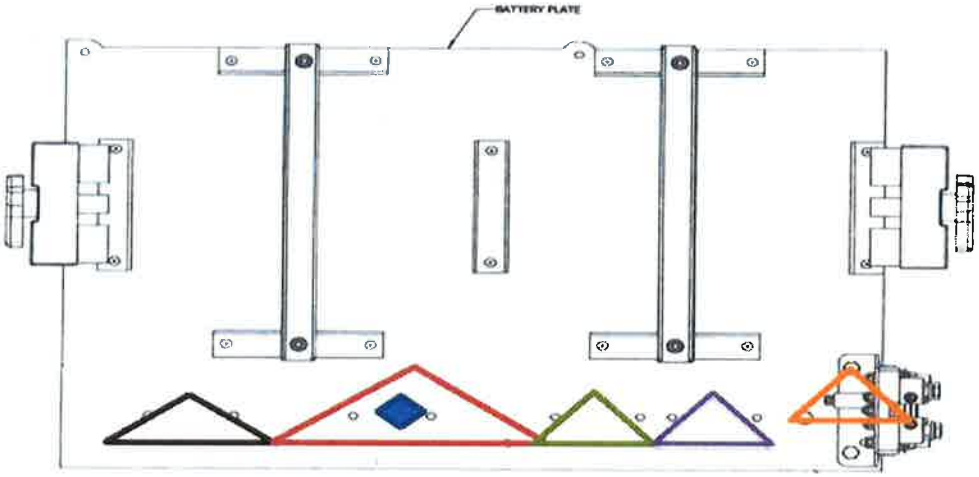


Figure 43-13

1. LCR Relay  29-314-12-903
    - Use (2) AN4-6A Bolts and AN960-416L Washers on the top side of Battery Plate
    - Secure with (2) AN960-416 Washers and MS21044N3 Nuts on the bottom side of Battery Plate.
    - See Figure 43-13 for orientation

2. GCU Bracket Assy  246010003-001
    - Use (4) AN4-6A Bolts on the top side of Battery Plate
    - Secure with (4) AN960-416 Washers and MS21044N3 Nuts on the bottom side of Battery Plate.
    - See Figure 43-13 for orientation
    -

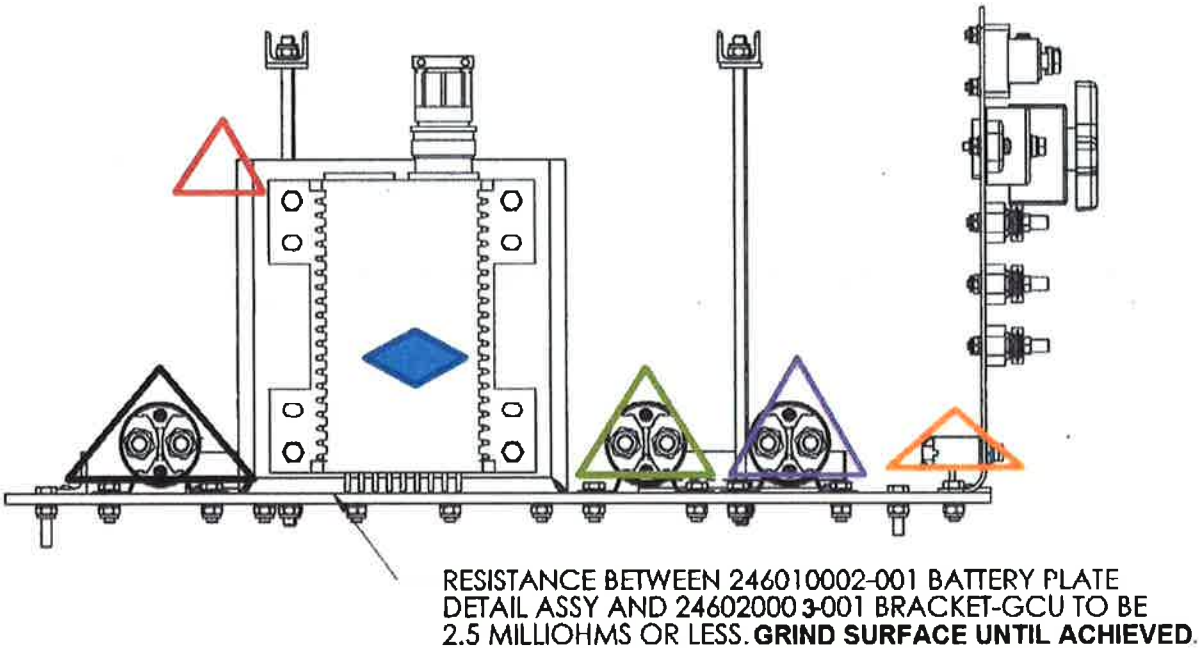


Figure 43-14

3. GC08  GC08 Solid State GCU
   - Use (4) AN4-5A Bolts and insert through the GC08 and GCU Bracket Assy towards the Battery.
   - Secure from the other side of the GCU Bracket Assy with (4) AN960-416 Washers and MS21044N4 Nuts.
   - See Figure 43-13 for orientation
   -

4. Master Relay  29-314-12-903
   - Use (2) AN4-6A Bolts and AN960-416L Washers on the top side of Battery Plate
   - Secure with (2) AN960-416 Washers and MS21044N3 Nuts on the bottom side of Battery Plate.
   - See Figure 43-13 for orientation

5. Start Relay  29-314-12-903
   - Use (2) AN4-6A Bolts and AN960-416L Washers on the top side of Battery Plate
   - Secure with (2) AN960-416 Washers and MS21044N3 Nuts on the bottom side of Battery Plate.
   - See Figure 43-13 for orientation

6. EDC Circuit Breaker  7277-2-5
   - Circuit breaker already installed.

10. SCHEMATIC PER APPENDIX A

11. WIRES PER APPENDIX A AND B.

12. BATTERY PLATE HARDWARE PER APPENDIX B.

13. CONNECT EXISTING WIRES TO COMPONENTS

13.1 Use existing wire labeled 29043-129-4 and connect to terminal AI. Note: 29043-129-4 is a 4 gauge wire.

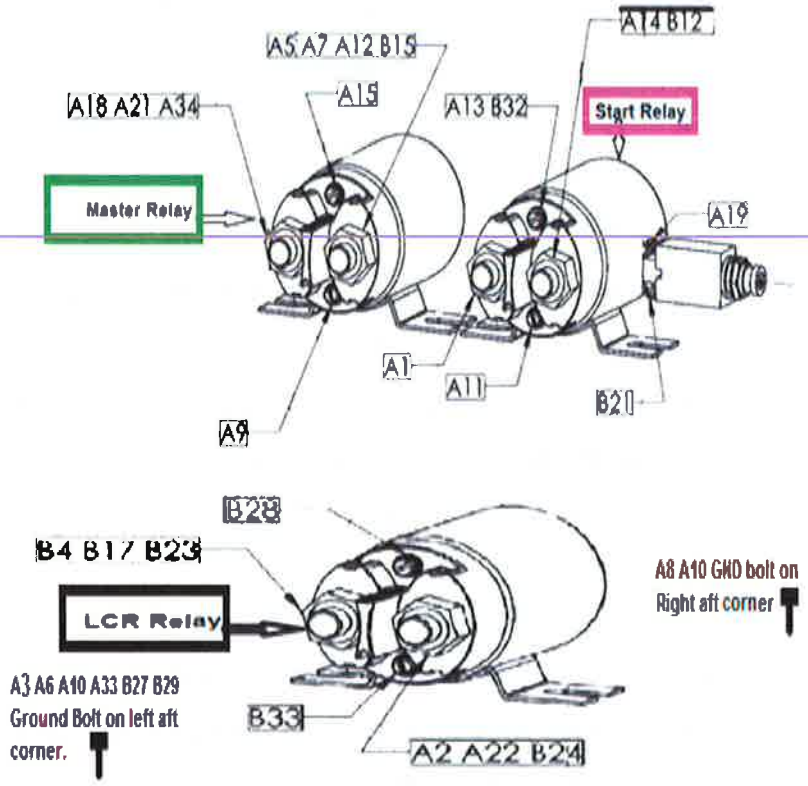


Figure 43-15:
_Relay Terminal Identification for Wiring Purposes

13.2 Use existing wire labeled 29043-131-2 and connect to terminal A2 A2 is on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification.

13.3 Use existing wire labeled 29043-132-4 and connect to terminal A3 GND. See Figure 43-15 for ground bolt designation.

13.4 Use existing wire labeled 29043-134-2 and connect to terminals A4 and B4. A4 is located Current Limiter Plate. See Figure 43-15b for location of A4. B4 is located and on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification.

13.5 Use existing wire labeled 29043-137-2 and connect to terminals A5 and B5. Wire should already be assembled to Quick Disconnect B5. See Figure 43-15 for ground bolt designation. See Figure 43-15a for B5 designation.

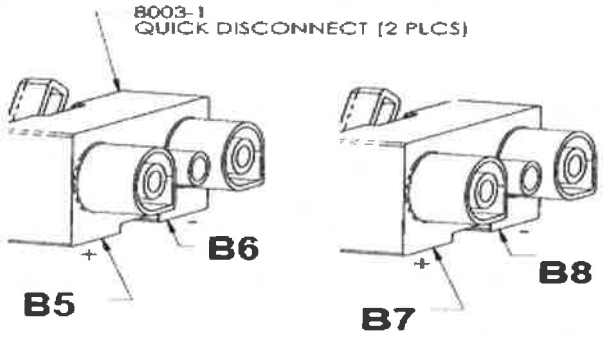


Figure 43- 15a
Quick Disconnect Diagram for Wiring Purposes

13.6 Use existing wire labeled 29043-138-2 and connect to terminals A6 GND and B6. Wire should already be assembled to Quick Disconnect B6. See Figure 43-15 for ground bolt designation. See Figure 43-15a for B6 designation.

13.7 Use existing wire labeled 29043-140-2 and connect to terminals A8 GND and B . Wire should already be assembled to Quick Disconnect B8. See Figure 43-15 for ground bolt designation. See Figure 43-15a for B8 designation.

13.8 Use existing wire labeled 29043-139-2 and connect to terminals A7 GND and B7. Wire should already be assembled to Quick Disconnect B7. See Figure 43-15 for A7 ground bolt designation. See Figure 43-15a for B7 designation.

13.9 Create an 18 AWG wire to connect Terminal A11 on the Start Relay using a MS25036-102 Lug and A8 Gnd using a MS25036-150 Lug. See Figure 4-12 and 14 for component location and Figure 4-15 for terminal identification and ground bolt designation. Ref 29043-155-18 per MIL SPEC 22759. Wire length to be determined on installation.

29043	155	18	26"	START RELAY	MS25036-102	GND	MS25036-150
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.10 Use existing wire labeled 29043-156-4 and connect to terminals A12 and B12. A12 is on the Master Relay. B12 is on the Start Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification.

13.11 Create an 18 AWG wire to connect Terminals A15 to B15. Use a MS25036-102 Lug on one end and a MS25036-105 on the other. Ref 29043-471-18 per MIL SPEC 22759. A15 and B15 are on the Master Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification.

29043	471	18	4"	MASTER RELAY 3/8 STUD	MS25036-105	MASTER RELAY COIL STUD	MS25036-102
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.12 Use existing wire labeled 29043-796-2 and connect to terminals A17 and B17. A17 is on the Current Limiter Plate. See Figure 4-15b terminal location. B17 is on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification.

13.13 Use existing wire labeled 29045-845-6 and connect to terminals A18 and B18. A18 is on the Master Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification. B18 is on the Current Limiter Plate. See Figure 43-15b for location and terminal identification.

13.14 Locate the MS3106F22-19S Connector. See Figure 43-15b for picture of the connector.

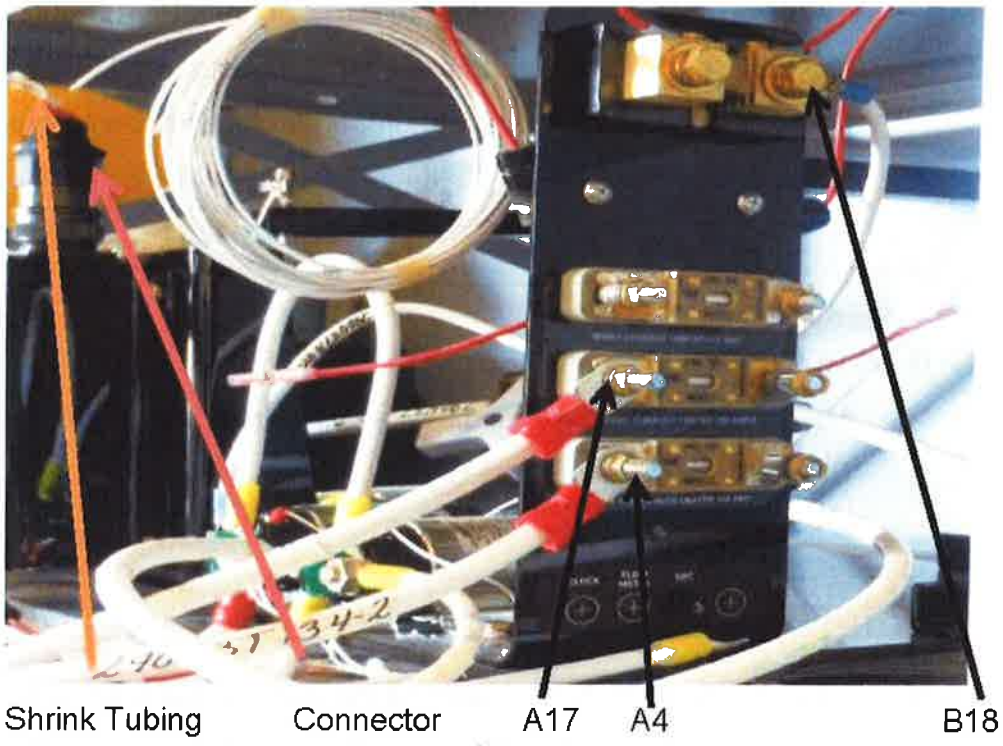


Figure 43-15b
Depiction of MS3106F22-19S Connector and MIL123053 13/4 Heat Shrink Tubing

13.15 Pull and cut and solder the following wires into the connector. Route each wire through an adequate length of MIL123053 13/4 Heat Shrink tubing before soldering into the MS3106F22-19S Connector. See Figure 43-15b for a picture of the tubing. Wiring is in accordance with drawing 29043-K4 and drawing 246010001-IR.

13.16 18 AWG @ 36 inches. Solder to Pin A of the MS3106F22-19S Connector. MS25036-105 on other end and then connected to B23 on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification. Ref 29043-937-18 per MIL SPEC 22759.

29043	937	18	36"	GCU PIN A	SOLDER	LCR RELAY	MS25036-105
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.17 18 AWG @ 36 inches. Solder to Pin B of the MS3106F22-19S Connector. MS25036-105 on other end and then connected to B24 on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification. Ref 29043-938-18 per MIL SPEC 22759.

29043	938	18	36"	LCR RELAY	SOLDER	GCU PIN B	MS25036-102
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.18 18 AWG @ 84 inches. Solder to Pin D of the MS3106F22-19S Connector. MS25036-103 on other end. Wire will be terminated at Terminal D on the Starter Generator after the Battery Plate is re-installed. Ref 29043-940-18 per MIL SPEC 22759.

29043	940	18	84"	GCU PIN D	SOLDER	START GEN PIN D	MS25036-103
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.19 16 AWG @ 36 inches. Solder to Pin G of the MS3106F22-19S Connector. MS25036-105 terminal lug on other end and then connect to B27. See Figure 43-15 for ground bolt designation. Ref 29043-941-16 per MIL SPEC 22759.

29043	941	16	36"	GCU PIN G	SOLDER	GND	MS25036-150
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.20 18 AWG @ 36 inches. Solder to Pin H of the MS3106F22-19S Connector. MS25036-102 on other end and then connect to B28 on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification. Ref 29043-942-18 per MIL SPEC 22759.

29043	942	18	36"	LCR RELAY	SOLDER	GCU PIN H	MS25036-102
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.21 18 AWG @ 36 inches. Solder to Pin J of the MS3106F22-19S Connector. MS25036-150 on other end and then connect to B29. See Figure 43-15 for ground bolt designation. Ref 29043-943-18 per MIL SPEC 22759.

29043	943	18	36"	GCU PIN J	SOLDER	GND	MS25036-150
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.22 18 AWG @ 72 inches per MIL SPEC 22759. Solder to Pin L of the MS3106F22-19S connector and label as 29043-944-18. Crimp 66101-2 female pin on other end. Wire will be terminated in QDJ 10 Female connector after the Battery Plate is re-installed.

29043	944	18	72"	GCU PIN L	SOLDER	PIN 10 QDJ	66101-2
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.23 18 AWG @ 84 inches per MIL SPEC 22759. Solder to Pin M of the MS3106F22-19S connector and label as 29043-945-18. Wire cut to 84 inches. MS25036-103 on other end. Wire will be terminated at Terminal A of the Starter Generator after the Battery Plate is re-installed.

29043	945	18	84"	START GEN PIN A	SOLDER	GCU PIN M	MS25036-103
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.24 18 AWG @ 36 inches. Solder to Pin N of the MS3106F22-19S connector. MS25036-102 on other end and then connected to B32 on the Start Relay. Ref 29043-946-18 per MIL SPEC 22759.

29043	946	18	36"	START RELAY A1	SOLDER	GCU PIN N	MS25036-102
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

13.25 18 AWG @ 6 inches. MS25036-102 connected to B33 on the LCR Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification. MS25036-150 on the other end connected to A33 Gnd. See Figure 43-15 for ground bolt designation. Ref 29043-947-18 per MIL SPEC 22759.

29043	947	18	6"	LCR RELAY	MS25036-102	GROUND	MS25036-150
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

14. RING OUT WIRING TO ENSURE COMPLIANCE WITH SCHEMATIC APPENDIX A AND ASSEMBLY DRAWING APPENDIX B.

14.1 RECORD COMPLIANCE.

Record successful completion of wiring ring out in the aircraft logbook. See section 21 for requirements.

15. INSTALL MODIFIED BATTERY PLATE IN AIRPLANE

15.1. Install Battery Plate back in the airplane. See Figure 43-1 for orientation. View looking forward. See Figure 43-18 for hardware.

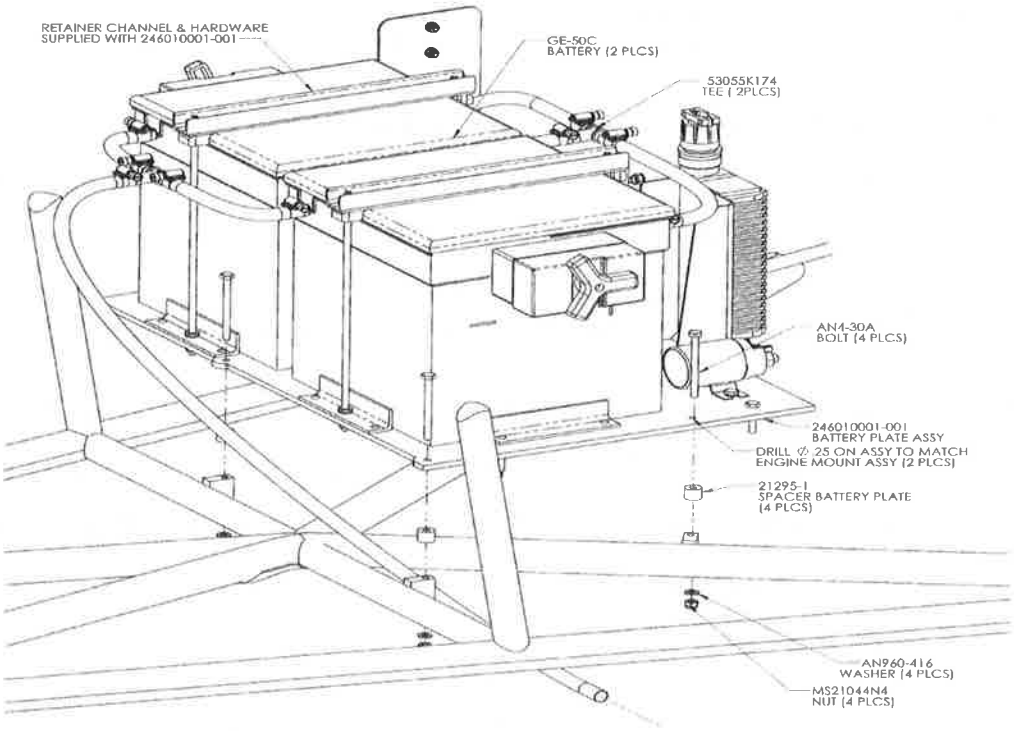


Figure 43-17

15.2. Use existing wire labeled 29043-918-20 and connect to another MIL SPEC 22759, 20 gauge, wire with a 320555 Knife Splice and solder the other end to terminal A20. A20 is Pin F of the MS3106F22-19S connector. The new wire in the circuit is 29043-918A-20 and will be 72" long.

29043	918A	20	72"	GCU PIN F	SOLDER	29043-918-20	320555
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

15.3. Locate existing wire labeled 29043-910-20 and which is already connected to terminal B21 on the EDC Breaker., Bottom Terminal on the on the Master Relay. See Figures 43-12 and 14 for component location and Figure 43-15 for terminal identification. All wires are MIL SPEC 22759.

15.4. Connect one end of a 153R Fuse holder to one end of an 18 AWG Wire with a MS25181-1 Splice. MIL SPEC 22759 is the type wire to use.

Connect the other end of the Fuse holder to terminal A22 with a MS25036-105 Terminal lug. Install a MDL-150 Slow Blow Fuse in the Fuse holder. See Figure 43-18 for details. REF 29043-952A-18 PER MIL SPEC 22759.

Figure 43-18

A22
MS25036-105
Terminal Lug

153R Fuse holder
MDL-10-R Slow Blow Fuse

MS25181-1 Splice
29043-952A-18 Wire

Label the wire as 29043-952A-18. Cut the wire to a length of 72 inches. Crimp a 66101-2 Female Socket on the end and terminate in QDJ-32 Female connector. See Figure 43-19 and 43-20 for location of Quick Disconnect Connector QDJ and pin count.

29043	952A	18	72"	PIN 32 QDJ 206150-1	66101-2	15 AMP SLO-BLO FUSE	MS25181-1
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

15.5. Use existing wires labeled 29043-911-22 and 29043-859-22 and connect to the top terminal A19 on the EDC Breaker. See Figures 43-10 for component location. All wires are MIL SPEC 22759.

29043	911	22	72"	PIN 37 EDC TOP CONNECTOR	SOLDER	EDC C.B. BATTERY PLATE	MS25036-102
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

29043	859	22	50"	PIN 35 EDC TOP CONN		28VDC BUSS UPER PNL	MS25036-103
PART #	DASH #	AWG	LTH	CONNECTION DESCRIPTION	TERMINAL A	PIN # QUICK DISC # QD P/N	TERMINAL B

Figure 43-19

✈ QDJ location shown in the top picture. Looking AFT at the Firewall on the right hand side of the airplane.

✈✈QDH location shown in the bottom picture. Looking at the left hand side of the airplane.

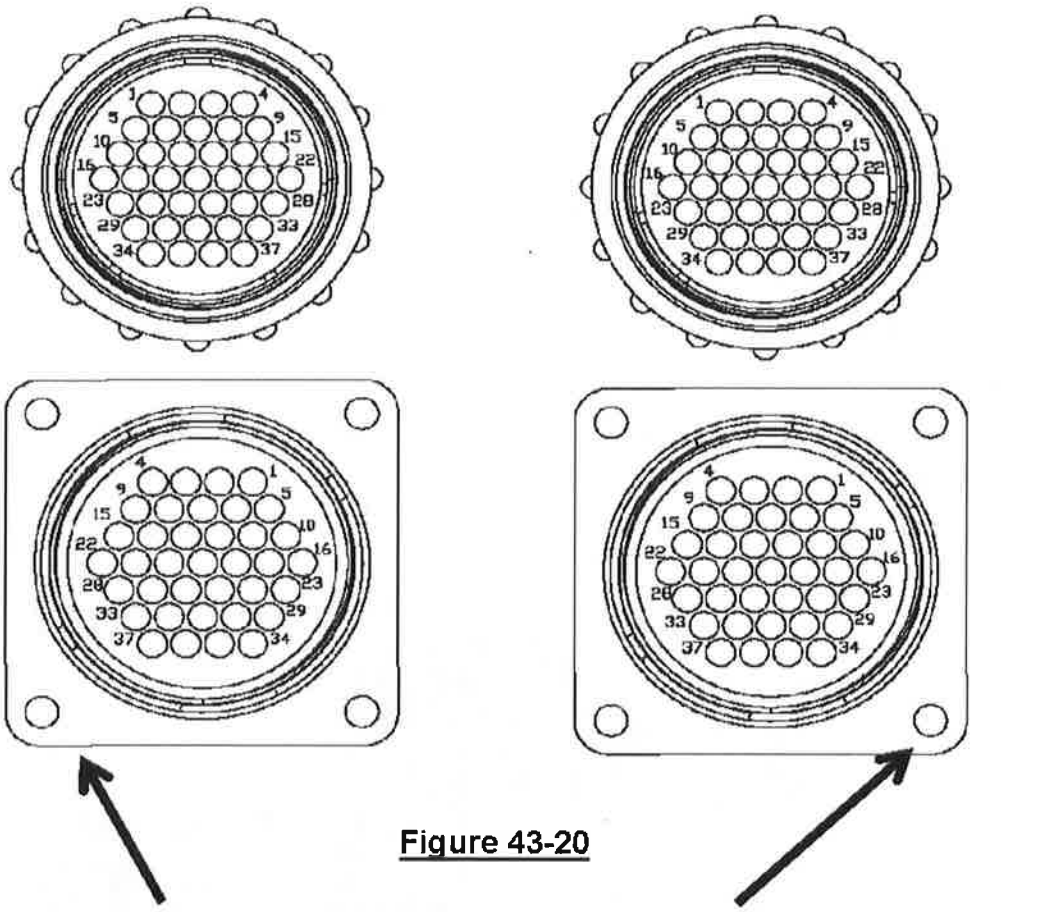


Figure 43-20

QDH Male Pins in this Connector

QDJ Male Pin in This Connector

15.6. Remove the male pin from QDJ position 11.

15.7. Relocate this male pin to QDJ position 32.

15.8. Remove the female socket from QDJ position 10. This wire is 29043-127A-18 removed from the starter terminal A. Discard this wire.

15.9. Locate the wire created in section 14-22 and terminate the female socket in QDJ position 10. Referenced 29043-944-18.

15.10. Connect the wire labeled 29043-129-4 to the Starter Generator terminal C

15.11. Connect the wire labeled 29043-131-2 to the Starter Generator terminal B.

15.12. Connect the wire labeled 29043-132-4 to the Starter Generator terminal E.

15.13. Connect the wire labeled 29043-154-4 to the Starter to Gnd Bolt A3. The wire is connected to Engine Driven Fuel Pump.

15.14. Connect the wire labeled 29043-153-4 to Gnd Bolt A3. The wire is connected to the lower left engine mount.

15.15. Connect the wire labeled 29043-135-2 to the100 AMP BUSS Limiter Fuse. See Figure 43-5.

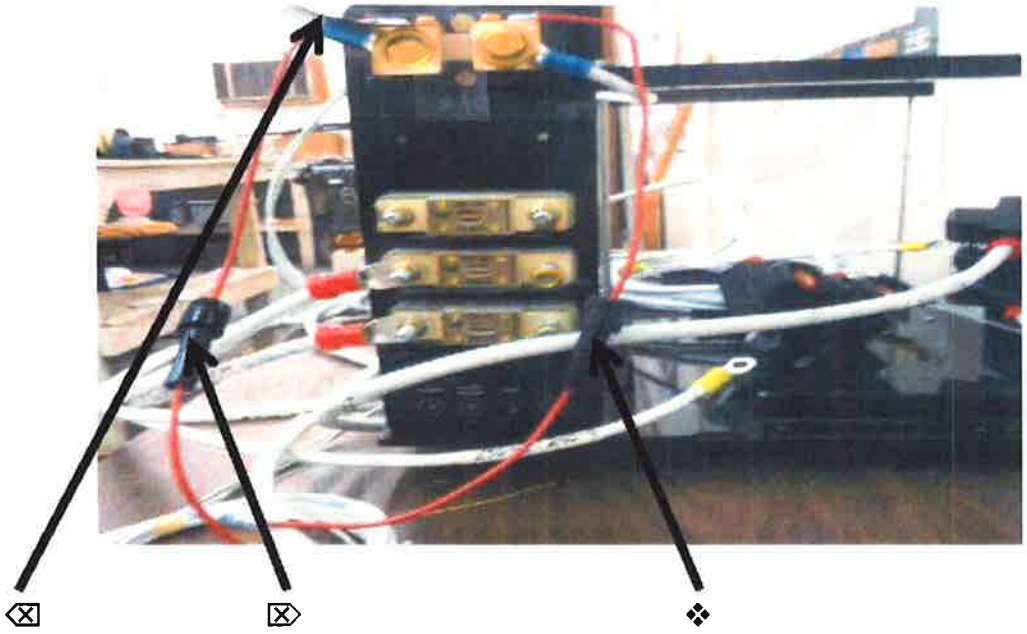
15.16. Connect the wire labeled 29043-640-2 to the Heat & Cool Current Limiter 100 Amps. See Figure 43-5.

15.17. Connect existing wire 29043-245-4 to APU +. See Figure 43-4.

15.18. Reconnect Wire ⌫ Labeled as 29043-846-6 to Shunt Negative.

Reconnect the fuse holder connecting Wire ⌦ and label as 29043-908-22 Shunt Negative.

Reconnect the fuse holder connecting Wire ❖ and label as 29043-909-22 Shunt Positive.



15.19. Connect Existing wire labeled 29043-144-18-X1 to A9. See Figure 43-15. This wire was disconnected earlier. See Figure 43-7.

15.20. Connect Existing wire labeled 29043-171A-18-X2 to A13. See Figure 43-15. This wire was disconnected earlier. See Figure 43-8.

15.21. Connect the wire labeled 29043- -18 to the Starter Generator Terminal D. Wire is soldered to Pin D on the GCU connector on the other end.

15.22. Connect the wire labeled 29043-944-18 to the QDJ-10 Female. Wire is soldered to Pin L on the GCU connector on the other end.

15.23. Connect the wire labeled 29043-945-18 to the Starter Generator Terminal A. Wire is soldered to Pin M on the GCU connector on the other end.

15.24. Slide the shrink tubing up on the MS3106F22-19S connector. See Figure 43-15b.

15.25. Apply RTV 106 (MIL-A46106B) Red Sealant between Wires that were soldered into the connector and Heat Shrink Tubing. See Figure 43-15b.

15.26. Use a heat gun and shrink the tubing. See Figure 43-15.

15.27. Mate the MS3106F22-19S connector with the GCU to complete the installation process.

15.28. Mate the 2 battery quick disconnect to the battery.

16. REPROGRAM MVP-50T FOR GEN FAIL ANNUNCIATOR TO BE YELLOW VERSES RED.

16.1. Retrieve unit ID

1. Turn battery switch on.
2. Verify MVP 50T power up.
3. Obtain the "Unit ID" as follows:
   a. Start at the Main Screen.
   b. Hit the Menu button.
   c. On the Blue Menu, scroll to the top of the menu and select HELP.
   d. Once on the HELP screen, press the MENU button again and a small black menu will appear.
   e. Select "EI Info" from the Black menu.
   f. The "Unit ID" is located on the "EI Info Screen". The "Unit ID" usually begins with "1711…".

16.2. Contact Electronics International to request level 2 password.

1. Call Electronics International, 541-318-6060, and give your "Unit ID" and request a level 2 password to reprogram the generator fail color from red to yellow.
2. Request the representative walk you through the change process.

16.3. Record compliance.

1. Record successful reprogramming in the aircraft logbook. See section 21 for requirements.

17. CONDUCT FUNCTIONAL TEST PER APPENDIX C.

17.1 RECORD COMPLIANCE.

1. Record successful completion and passing of functional test in the aircraft logbook. See section 21 for requirements.

18. CONDUCT EMI TEST PER APPENDIX D.

18.1 RECORD COMPLIANCE.

1. Record successful completion and passing of EMI test in the aircraft logbook. See section 21 for requirements.

19. SUPPORT DOCUMENTATION

a. An Airplane Flight Manual Supplement, created to address the modifications herein, has been supplied with this Custom Kit. This supplement should be inserted into your existing FAA Approved Airplane Flight Manual. The title and revision for the supplement is as follows: AFMS S2R-T34 GCU Revision IR.

b. An Airplane Maintenance Manual Supplement, created to address the modifications herein, has been supplied with this Custom Kit. This supplement should be inserted into your existing Airplane Flight Manual. The title and revision for the supplement is as follows: MMS S2R-T3402 GCU Revision IR.

20. RECORD OF COMPLIANCE

Make appropriate entry in airplane maintenance records as follows:

"Thrush Custom Kit CK-AG-43 Rev. A complied with at _____

total hours on aircraft.

Modification includes the following:

1. New GCU, Relays, and Wiring Installation:

Modification accomplished by:

_____.

(Mechanic Name & Certificate #) (Date)

2. Successful ring out of wiring per instruction in section 15 herein.

_____.

(Mechanic Name & Certificate #) (Date)

3. Successful reprogramming MVP-50T per instructions in section 17 herein.

_____.

(Mechanic Name & Certificate #) (Date)

4. Successful Completion and passing of Functional Test per the requirements of Appendix C.

_____.

(Mechanic Name & Certificate #) (Date)

_____.

(IA Name & Certificate #) (Date)

5. Successful Completion and passing of EMI Test per the requirements of Appendix D.

_____.

(Mechanic Name & Certificate #) (Date)

_____.

(IA Name & Certificate #) (Date)

21. CUSTOM KIT COMPLETION CRITERIA

This Custom Kit is only complete when all required entries have been made in the airplane log book and all signatures applied. This signifies that all test were passed and the installation successful.

22. RESPONSE CARD

The final step in compliance with this Custom Kit is to complete and return the compliance card on the next page. It may be mailed, Faxed, or scanned and e-mailed.

FAX to: Ed Rusk 229-439-9790

E-mail to: Ed Rusk **erusk@thrushaircraft.com**

-Custom Kit No. CK-AG-43 Rev. A Compliance Report

Aircraft S/N:		Aircraft Owner:	
Aircraft Registration #		Address of Owner:	
Airframe total time:		City & State:	
Engine total time:		Physical location:	
Date of Compliance			
Complied with by:		Certificate #:	
Signature:			

PLEASE RETURN THIS REPORT ONLY AFTER REPAIR IS MADE

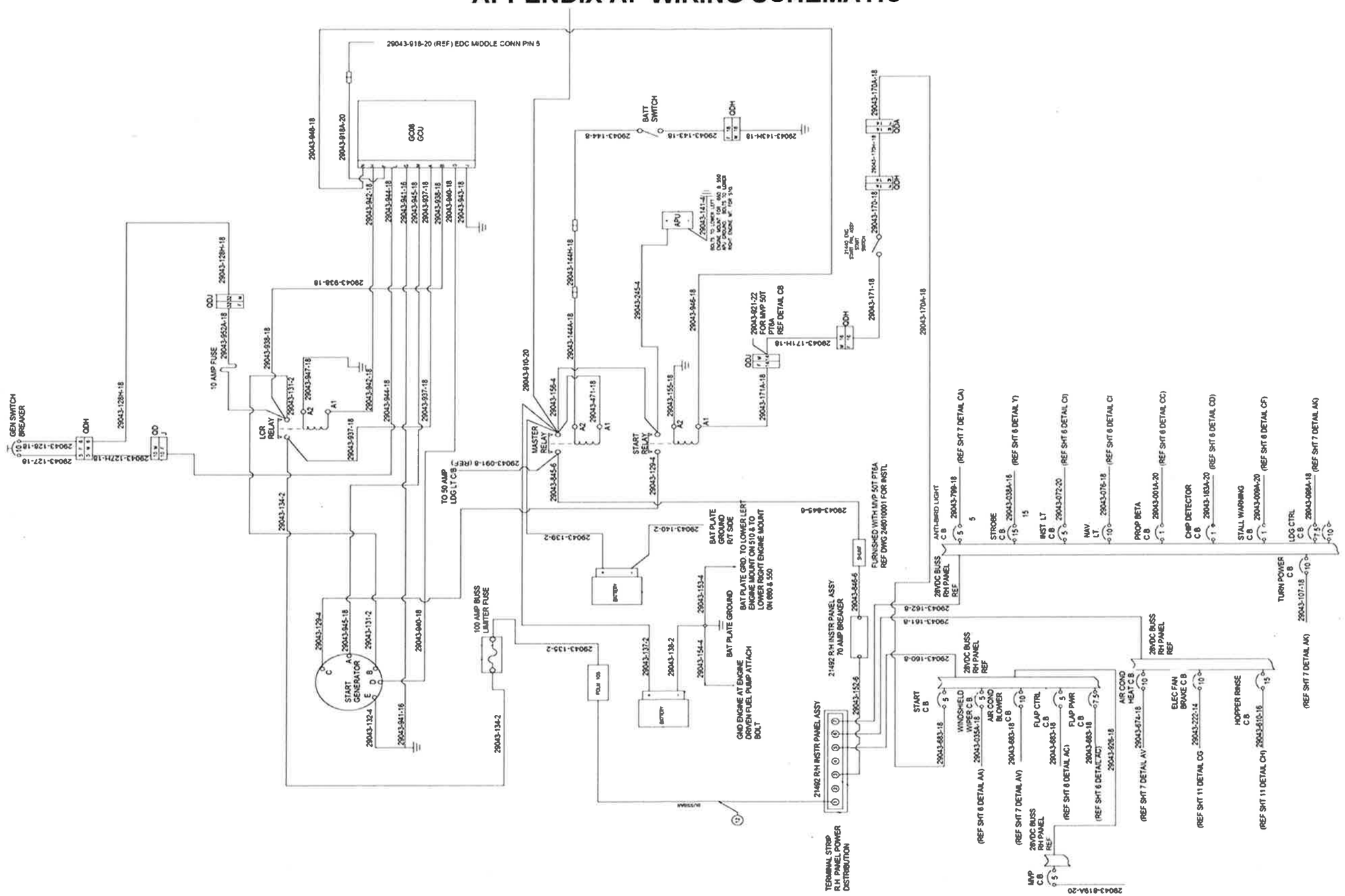
This response card may be mailed, Faxed to (229) 439-9790, or e-mailed to erusk@thrushaircraft.com.

fold, tape & mail (Do Not Staple) **Don't forget postage**

Return Address

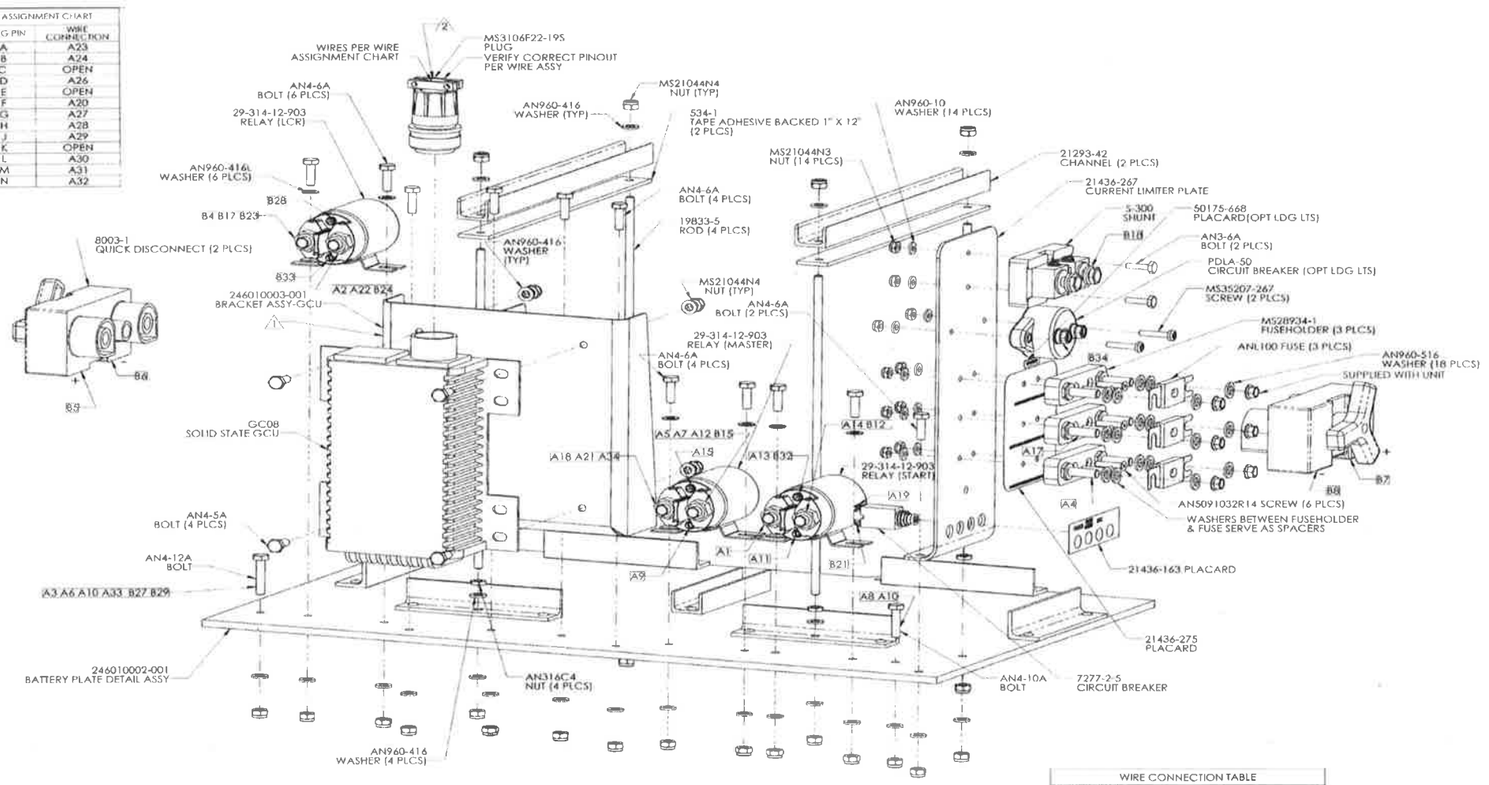
THRUSH AIRCRAFT LLC.
Attn: Ed Rusk
300 Old Pretoria Road
Albany, GA 31706-3149

APPENDIX A: WIRING SCHEMATIC



APPENDIX B: BATTERY PLATE ASSY MECHANICAL/ELECTRICAL

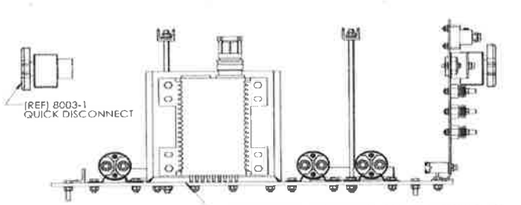
WIRE ASSIGNMENT CHART	
GCU PLUG PIN	WIRE CONNECTION
PIN A	A23
PIN B	A24
PINC	OPEN
PIN D	A26
PIN E	OPEN
PIN F	A20
PIN G	A27
PIN H	A28
PIN J	A29
PIN K	OPEN
PIN L	A30
PIN M	A31
PIN N	A32



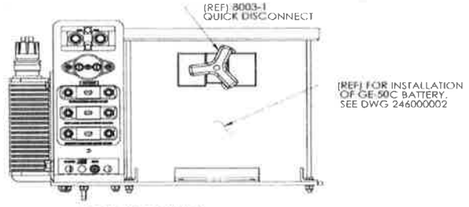
-001 BATTERY PLATE ASSY

NOTES

1. RESISTANCE BETWEEN 246010002-001 BATTERY PLATE DETAIL ASSY AND 246020002-001 BRACKET-GCU TO BE 2.5 MILLIOHMS OR LESS.
2. APPLY MIL123053 13/4 HEAT SHRINK TUBING OVER WIRE CONNECTION INTO MS3106F22-19S PLUG.
3. CONNECT 153R FUSEHOLDER TO 29043-952A-18 WIRE ASSY WITH MS25181-1 SPLICE. INSTALL TO CONNECTION A22 WITH MS25036-105 TERMINAL. INSTALL MDL-15 SLOW BLOW FUSE IN 153R FUSEHOLDER.



VIEW LOOKING FWD



R/H SIDE VIEW

WIRE CONNECTION TABLE		
CONNECTION A	WIRE PART #	CONNECTION B
A1	29043-129-4	PIN C START GEN
A2	29043-131-2	PIN B START GEN
A3	29043-132-4	PIN E START GEN
A4	29043-134-2	B4
A5	29043-137-2	B5
A6	29043-138-2	B6
A7	29043-139-2	B7
A8	29043-140-2	B8
A9	29043-144A-18	
A10	29043-154-4	
A11	29043-155-18	
A12	29043-156-4	B12
A13	29043-171A-18	
A14	29043-245-4	APU POS POST
A15	29043-471-18	B15
A17	29043-796-2	B17
A18	29043-846-6	B18
A19	29043-911-22	
A20	29043-918A-20	EDC
A21	29043-910-20	B21
A22 3	29043-952A-18	
A23	29043-937-18	B23
A24	29043-938-18	B24
A25		
A26	29043-940-18	PIN D START GEN
A27	29043-941-18	B27
A28	29043-942-18	B28
A29	29043-943-18	B29
A30	29043-944-18	GDJ PIN 10
A31	29043-945-18	PINA START GEN
A32	29043-946-18	B32
A33	29043-947-18	B33
A34	29043-091-18	B34

QTY	PART NUMBER	DESCRIPTION	OTHER	VENDOR
1	MS25036-105	TERMINAL		
1	MS25181-1	SPLICE		
1	MDL-15	SLOW BLOW FUSE		
1	153R	FUSEHOLDER		
A/R	MIL123053 1 3/4	HEAT SHRINK TUBING		
1	7277-2-5	CIRCUIT BREAKER		
3	ANL100	FUSE		
1	21436-275	PLACARD		
OPT	50175-668	PLACARD		
1	MS3106F22-19S	PLUG		ELECTRO ENTERPRISES
1	AN4-12A	BOLT		
4	AN4-5A	BOLT		
1	AN4-10A	BOLT		
2	AN3-6A	BOLT		
14	AN4-6A	BOLT		
10	MS21044N3	NUT		
6	MS21043-5	NUT, HEX, SELF LOCKING, CRES		
18	AN960-516	WASHER		
6	AN960-416L	WASHER		
10	AN960-10	WASHER		
30	AN960-416	WASHER		
26	MS21044N4	NUT		
4	AN316C4	NUT		
6	AN5091032R14	SCREW		
4	19833-5	ROD		
3	MS28934-1	FUSE HOLDER		
3	29-314-12-903	RELAY		KISSLING
2	MS35207-267	SCREW		
2	8003-1	CONNECTOR		
2	534-1	TAPE ADHESIVE BACKED 1" X 12"		
2	21293-42	RETAINER CHANNEL		
1	5-300	SHUNT		
OPT	PDLA-50	CIRCUIT BREAKER		
1	GC08	SOLID STATE GCU		LAMAR TECHNOLOGIES
1	29043-952A-18 3	WIRE ASSY		
1	29043-947-18	WIRE ASSY		
1	29043-946-18	WIRE ASSY		
1	29043-944-18	WIRE ASSY		
1	29043-943-18	WIRE ASSY		
1	29043-942-18	WIRE ASSY		
1	29043-941-18	WIRE ASSY		
1	29043-940-18	WIRE ASSY		
1	29043-938-18	WIRE ASSY		
1	29043-937-18	WIRE ASSY		
1	29043-936-18	WIRE ASSY		
1	29043-918A-20	WIRE ASSY		
1	29043-910-20	WIRE ASSY		
1	29043-846-6	WIRE ASSY		
1	29043-796-2	WIRE ASSY		
1	29043-471-18	WIRE ASSY		
1	29043-245-4	WIRE ASSY		
1	29043-171A-18	WIRE ASSY		
1	29043-156-4	WIRE ASSY		
1	29043-155-18	WIRE ASSY		
1	29043-154-4	WIRE ASSY		
1	29043-144A-18	WIRE ASSY		
1	29043-140-2	WIRE ASSY		
1	29043-139-2	WIRE ASSY		
1	29043-138-2	WIRE ASSY		
1	29043-137-2	WIRE ASSY		
1	29043-134-2	WIRE ASSY		
1	29043-132-4	WIRE ASSY		
1	29043-131-2	WIRE ASSY		
1	29043-129-4	WIRE ASSY		
OPT	29043-091-8	WIRE ASSY		
1	246010003-001	BRACKET ASSY-GCU		
1	246010002-001	BATTERY PLATE DETAIL ASSY		
1	21436-267	CURRENT LIMITER PLATE		
1	21436-163	PLACARD		
/	246010001-001	BATTERY PLATE ASSY		

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ± 5 BEND ±2
TWO PLACE DECIMAL ±.03
THREE PLACE DECIMAL ±.010
MFG PROCESS: N/A
INTERPRET GEOMETRIC TOLERANCING PER: ASME Y14.5-2009
MODEL: S2R
EFF A/C: S2R-134
DO NOT SCALE DRAWING

THRUSH AIRCRAFT
AIRCRAFT
300 OLD PELTORIA RD. ALBANY, GA
NAME | DATE

TITLE: BATTERY PLATE ASSY

SIZE	DWG. NO	REV
D	CK-AG 43	IR
SCALE: 1/2	WEIGHT:	SHEET 1 OF 1

APPENDIX C:

FUNCTIONAL TEST PLAN FIELD INSTALLATION OF GENERATOR CONTROL UNIT AND RELAYS MODEL S2R-T34

REFERENCES

1. 14 CFR, Part 23, Airworthiness Standards: Normal, Utility, Acrobatic and Commuter Category Airplanes.
2. Thrush Custom Kit, "CK-AG-43", Rev. IR Date 8/18/2014.

C.1. SCOPE

This document provides the procedures used for conducting the functional test following the field installation of a generator control unit and relays conducted on the Thrush model S2R-T34 Aircraft. This test plan is to evaluate Custom CK-AG-43 changes on the S2R-T34 aircraft.

The functional test is limited to power distribution system changes. Items tested for this modification are a Lamar Technologies GC08 Generator Control Unit (GCU) and three 300 AMP Kissling relays, P/N 29.314.12.903.

Each of these design changes will be tested per this test plan to ensure it performs its intended function and has proper interface with the rest of the electrical system.

These tests will demonstrate partial compliance with, and 14 CFR 23.1301(a)(1)(2)(b), 23.1322(b), & 23.1351(a)(1)(b)(2)(4)(c)(2).

C.2. TEST ARTICLE DESCRIPTION

The purpose of the GCU is to regulate the aircraft voltage that is produced by the aircraft starter/generator over a wide range of electrical loads and engine speeds. Other new aspects to this installation include an installation of a new line contactor relay, master relay and start relay. The line contactor relay will prevent potentially damaging reverse current at the starter generator in the event of a power distribution system failure or malfunction.

Table 1 Required And Optional Installations

Description	New/Legacy Installation	Standard=S Option=O
Power Distribution- GCU	NEW	S
Power Distribution- MVP & GCU	NEW	S
Battery	LEGACY	S
Starter Generator	LEGACY	S
MVP-50T Display	LEGACY	S
MVP-50T Kit	LEGACY	S
MVP-50T AV-17CP	LEGACY	S
Right Landing Light	LEGACY	O
Left Landing Light	LEGACY	O
Air Conditioning System	LEGACY	O
Heater System	LEGACY	O
Landing & Taxi Lights	LEGACY	O

C.3. MODIFIED AIRCRAFT AND TEST SETUP CONFIGURATION

C.3.1. MODIFIED AIRCRAFT

The modified S2R-T34 aircraft per Custom Kit CK-AG-43 will be used for the functional test. The aircraft being used for testing must be configured to match at least the standard requirements in Table 1-1.

C.3.2. TEST SETUP CONFIGURATION

No test setup or test setup conformity is required for this testing.

C.4. GROUND TEST

The test procedures contained in this plan, when performed and pass/fail criteria has been met as pass, will show that the changes to the electrical system result in the system performing as intended for operations on the ground. Flight testing is not required in that the engine will be running and the operation of this equipment on the ground will function in flight in the same manner as tested on the ground.

Testing for aircraft modified per Thrush Custom Kit CK-AG-43 will show that the Line Contactor Relay, Master Relay, Start Relay and that Generator Control Unit (GCU) all perform their intended function. The Master Relay will pass the test as long as power is available for the electrical equipment throughout the test. The Start Relay will pass the test as long as the aircraft can be started as designed. The Line Contactor Relay will pass the test as long as it allows generator power to be provided to the aircraft electrical system when the engine is operating and the Generator Switch is in the ON position. The GCU will pass the test when it is shown that normal operation of the Generator Control Unit (GCU) will regulate the output voltage at 27.5VDC +/-1VDC and control the Line Contactor Relay. The GCU functions tested include Voltage Regulation, Line Contactor Relay control, and "GEN FAIL" warning output. GCU functions not tested are Overvoltage Protection and Load Meter Drive. These features will be evaluated by design. No external loads will be required.

C.4.1. TEST PERSONNEL

For the functional test, a person capable of starting the aircraft and operating the aircraft electrical systems is required.

C.4.2. TEST EQUIPMENT

No specific equipment is required.

C.4.3. PASS / FAIL CRITERIA

For each condition tested the pass/fail criteria are contained in the test procedure.

C.4.4. PRE TEST PROCEDURE

The S2R-T34 GCU, new relays, and electrical components or systems carried over from the original design will be considered during this test.

Results of the Functional Test will be recorded in the Test Procedure section of this test plan. The original copy of the results will be filed in the aircraft log books.

Pretest Checklist		
Item	**Action**	**Mechanic I/A Witness Signature**
Test Plan	Confirm that test witness understands the test plan.	
Test Aircraft	Confirm Custom Kit modification is completed	
Test Aircraft Acceptability	Confirm the aircraft and the installation is in conformity with the Custom Kit drawings and description and unsatisfactory conditions if any have been acceptably dispositioned.	

TABLE 4-1: PRE TEST CHECKLIST

Test Conditions

- All

Data Acquisition

- Manual Recording on Functional Test Checklist. If a Step Fails, stop the test and determine what repairs are required before resuming test.

Safety

- Risk Assessment: Low risk
- Risk alleviation: Conduct test in day conditions.
- Aircraft operation must be performed by a qualified pilot/engine run mechanic

C.4.5. TEST PROCEDURE

C.4.5.1. GCU and Power Distribution

a. Position Aircraft in a location suitable for ground operation of the engine.
b. Ensure that the Aircraft Batteries are fully charged.
c. Ensure that the Master Switch and the Generator Control Switch are in the Off Position.
d. Ensure that the Master Switch and the Generator Control Switch are in the Off Position.
e. Place Master Switch in ON position.

   Verify aircraft electronics power up and system voltage is displayed on MVP-50T. Pass/Fail____ Record System Voltage_____

   Verify that GEN FAIL Indicator (Amber) is illuminated on the MVP-50T. Pass/Fail____.

f. Perform a Normal Engine Start per AFM.

Verify System voltage as displayed on MVP-50T remains at or above 18.0V throughout entire start sequence. Pass/Fail____

Verify no relay chattering, hot or hung starts, or other starting anomalies are observed. Pass/Fail____

Verify no abnormal EICAS messages are displayed during start sequence. Pass/Fail____

g. Set engine power to ground idle. Ensure N1 reads at a minimum 53%.

h. Place Generator Switch in ON position.

Verify GEN FAIL Indicator extinguishes. Pass/Fail____

Verify generator ammeter begins to indicate output current. Pass/Fail____

Verify System voltage as displayed on MVP-50T is 27.5VDC +/- 1.0VDC Pass/Fail____

i. Turn on all Electrical and Avionics systems including the Air conditioning System (if installed).

Verify GEN FAIL Indicator remains extinguished. Pass/Fail____

Verify generator ammeter begins to indicate output current. Pass/Fail____

Verify System voltage as displayed on MVP-50T remains at 27.5VDC +/- 1.0VDC Pass/Fail____

j. Advance Engine Power to 100% N1 while observing MVP-50T voltage.

Note: Ensure aircraft brakes are set and aircraft is properly secured during run-up.

Verify GEN FAIL Indicator remains extinguished. Pass/Fail____

Verify generator ammeter continues to indicate output current. Pass/Fail____

Verify System voltage as displayed on MVP-50T remains at 27.5VDC +/- 1.0VDC Pass/Fail____

k. Retard Engine Power back to 53% N1 while observing MVP-50T voltage.

Verify GEN FAIL Indicator remains extinguished. Pass/Fail____

Verify generator ammeter continues to indicate output current. Pass/Fail____

Verify System voltage as displayed on MVP-50T remains at 27.5VDC +/- 1.0VDC. Pass/Fail____

l. Turn off all Electrical and Avionics Systems including Air conditioning System (if installed).

Verify GEN FAIL Indicator remains extinguished. Pass/Fail____

Verify generator ammeter continues to indicate output current. Pass/Fail____

Verify System voltage as displayed on MVP-50T remains at 27.5VDC +/ 1.0VDC Pass/Fail____

m. Place Generator Switch in OFF position.

Verify GEN FAIL Indicator illuminates. Pass/Fail____

Verify generator ammeter begins to indicate output current. Pass/Fail____

n. Perform engine Shut Down per AFM.

Verify GEN FAIL Indicator remains illuminated. Pass/Fail____

Record System Voltage as displayed on MVP- 50T. _____

o. Place Master Switch in OFF position.

Verify all aircraft electronics power down. Pass/Fail____

p. Note any unsatisfactory conditions and acceptable disposition.

Unsatisfactory Condition 1 _____

Disposition 1 _____

Unsatisfactory Condition 2 _____

Disposition 2 _____

q. Mechanic and I/A Sign and date below to document completion of this testing.

Mechanic Signature and Number_____ Date _____

I/A Signature and Number _____ Date _____

APPENDIX D:

EMI TEST PLAN
POWER DISTRIBUTION MODIFICATION
MODEL S2R-T34

REFERENCES

1. 14 CFR Part 23, Airworthiness Standards: Normal, Utility, Acrobatic and Commuter Category Airplanes.
2. AC 43.13-2B Acceptable Methods, Techniques, and Practices – Aircraft Alterations
3. ER-609: Certification Plan, Power Generation System Control Modification, S2R-T34
4. ER-613: S2R-T34 Electrical Modification EMI/EMC Test Report

D.1. SCOPE

This document provides the procedures to evaluate the EMI effects of the power distribution changes to the single and dual cockpit S2R-T34 aircraft with the MVP-50T installed.

Items installed for this Custom Kit are a Lamar Technologies GC08 Generator Control Unit (GCU) and three 300 AMP Kissling relays, P/N 29.314.12.903.

D.2. AIRCRAFT CONFIGURATION

This power distribution change to the single cockpit S2R-T34 successfully passed EMI/EMC testing in the configuration as defined in Table 1. Additionally, Table 1 categorizes the tested equipment as standard, critical optional, and optional. The successfully completed test results are documented in document number ER-613, "S2R-T34 Electrical Modification EMI/EMC Test Report".

Table 1: ELECTRICAL COMPONENTS OF S2R-T34			
Item No.	**Description**	**Equipment**	**Standard = S, Option= O, Critical Option=CO**
1	Power Distribution- MVP & GCUI	Generator Control Unit	S
		Battery	S
		Starter Generator	S
2	Hopper Rinse	Hopper Rinse System	O
3	Electric Fan Brake	Electric Fan Brake	O
4	Stall Warning	Stall Warning	S
5	Aux Fuel Pump	Aux Fuel Pump	S
6	Igniters	Igniters	S
7	Prop Test	Prop Test	S
8	Prop Beta	Prop Beta Switch	S
9	Chip Detector	Chip Detector	S
10	MVP ENG Monitor	MVP-50T Display (Upper Instr Panel Assy)	S
		MVP-50T Kit (MVP - 50T Instl)	S
		MVP-50T AV-17CP	S
11	Aux Power Port	Aux Power Port	S
12	HI-Cap W/ Shield Washer	Windshield Washer	S
13	Right Landing Light	Landing Lights	O
14	Left Landing Light	Landing Lights	O
15	Artificial Horizon	Artificial Horizon	CO
16	Directional Gyro	Directional Gyro	CO
17	Map Lights	Map Lights	O
18	Turn & Bank	Turn & Bank	CO
19	Zee Air Conditioner	Air Conditioner System	O
20	Heater	Heater System	O
21	Smoker	Smoker System	O
22	Heated Pitot Tube	Heated Pitot System	CO

Table 1: ELECTRICAL COMPONENTS OF S2R-T34 (continued)			
Item No.	**Description**	**Equipment**	**Standard = S Option= O Critical Option=CO**
23	Fuel Flow	MVP Review	CO
24	Taxi Lights	Landing & Taxi Lights	O
25	NAV & Instrument	Nav & Instrument Lighting	S
26	Fuel QTY	MVP	S
27	Aux Buss	Aux Buss	S
28	Flap Control	Flap Control	S
29	Low Oil Pressure	MVP	CO
30	Windshield Wiper	Windshield Wiper	S
31	Windshield Washer	Windshield Washer	S
32	Strobe Lights	Strobe Lights	S
33	ITT	MVP	CO
34	Gas % Prop RPM	MVP	CO
35	Prop RPM	MVP	CO
36	Oil Temp	MVP	CO
37	P-3 Heater	P-3 Heater	S
38	Hour Meter	MVP	CO
39	Anti Bird Lights	Anti Bird Lights (Wing Extension Assy)	O
40	Flap Power	Flap Control	S
41	Comm	Garmin SL40	CO
42	Comm Antenna	AV-10	CO
43	Transponder	Garmin GTX 327	CO
44	Transponder Antenna	AV-74	CO
45	Blind Encoder	Ameri-King AK-350	O
46	Start Warning	MVP	CO
47	Turn Lights	Turn Lights	O
48	Dimmer- Upper Panels	Dimmer- Upper Panels	S
49	Dimmer- Lower Sub Panels	Dimmer- Lower sub panels	S
50	PT6A - Engine Installation	Engine	S
51	Airplane Complete S2R	Test ECN	O

D.3. VERIFICATION PROCEDURE

For the purpose of this Custom Kit the unaltered, factory installed systems and equipment do not require additional EMI testing once the power distribution change is completed.

Utilize Table 2 to verify which of the systems are in the factory configuration. If the system is in the factory configuration sign and date the column labeled 'Factory Installation'. If the system is not in the factory configuration check the 'test' column. If there are systems installed on the aircraft that were not included

in the certification EMI/EMC test as described in section 2, add those systems in the blank lines at the bottom of Table 2 and identify these systems as 'test'.

Table 2: SYSTEM VERIFICATION

Item No.	Equipment Description		Factory Installation	Test	Test Procedure
1	MVP-50T	MVP-50T-PT6-34 Display GS-1 G Meter RSLM-4-24 Fuel Signal Converter EDC-33T Signal Converter Oil Pressure Oil Temperature Low Oil Pressure Fuel Pressure Fuel Flow Fuel Quantity - Left Fuel Quantity - Right NP NG Torque ITT Prop Beta Prop Test Chip Detector Stall Warning AV-17CP Voice Alarm Hour Meter	The single or dual cockpit S2R-T34 aircraft must have the MVP-50T installed to incorporate the power distribution changed.	NA	NA
2	Lights	Strobes			4.5.2.1
3		Navigation			4.5.2.1 and 4.5.3
4		Compass			4.5.2.1 and 4.5.3
5		Map			4.5.2.1
6		Taxi			4.5.2.1
7		Left Landing			4.5.2.1
8		Right Landing			4.5.2.1
9		Left Turn			4.5.2.1
10		Right Turn			4.5.2.1
11		Instrument - Dim			4.5.2.1 and 4.5.3
12		Instrument - Bright			4.5.2.1 and 4.5.3
13		Anti Bird			4.5.2.1
14	Instruments	DG			4.5.2.2 and 4.5.3
15		Artificial Horizon			4.5.2.2 and 4.5.3
16		Turn & Bank			4.5.2.2 and 4.5.3
17		Whiskey Compass			4.5.2.2
18	Engine	Prop Test Switch			4.5.2.3 and 4.5.3
19		Igniters			4.5.2.3 and 4.5.3
20		P-3 Heater			4.5.2.3 and 4.5.3
21		Generator			4.5.2.3 and 4.5.3
22	Avionics	VHF COMM			4.5.2.4 and 4.5.3
23		Transponder			4.5.2.4 and 4.5.3
24	Misc Equipment	Smoker			4.5.2.5
25		Electric Fan Brake			4.5.2.5
26		Air Conditioner			4.5.2.5
27		Heater			4.5.2.5
28		AC & Heater Blower			4.5.2.5
29		Heated Pitot			4.5.2.5 and 4.5.3
30		Hopper Rinse			4.5.2.5
31		Flaps			4.5.2.5 and 4.5.3
32		Windshield Wiper			4.5.2.5 and 4.5.3
33		Windshield Washer			4.5.2.5 and 4.5.3

Item No.	Equipment Description		Factory Installation	Test	Test Procedure
34		Aux Fuel Pump			4.5.2.5 and 4.5.3
35		Aux Power Port			4.5.2.5
36	Misc. Equip 1		No	X	4.5.2.5
37	Misc. Equip 2		No	X	4.5.2.5
38	Misc. Equip 3		No	X	4.5.2.5
39	Misc. Equip 4		No	X	4.5.2.5
40	Misc. Equip 5		No	X	4.5.2.5

D.4. EMI TEST

The following procedures are required to be performed for each of the items identified as "test" in Table 2.

Performing the test procedures contained in this plan will determine whether normal operation of the SOURCE equipment creates interference with the operation of the VICTIM equipment. This testing is performed to ensure none of the new or added electrical systems cause interference or adverse effects on existing aircraft systems.

One ground test minimum is planned.

D.4.1. TEST PERSONNEL

For the ground test, a person capable of starting the aircraft and operating the aircraft electrical systems is required.

D.4.2. TEST EQUIPMENT

For the ground EMI test, an IFR 6000 or similar avionics test unit is required to test the aircraft transponder. This unit must have a valid and current calibration. A radio capable of communicating with the Air Traffic Control Tower must be available in the cockpit enabling communication with the tower if needed.

D.4.3. PASS / FAIL CRITERIA

In the following test procedures, operate and monitor all VICTIM equipment for an interval of approximately 20 seconds. This period of operation is adequate for any interference to manifest itself in the monitored displays/annunciations/audible outputs used to detect the condition.

D.4.4. PRE TEST PROCEDURE

Per AC 43.13-2B section 209(4) systems determined critical for operation need to be tested for EMI effects.

The power distribution changes to the S2R-T34 has been found to be free of mutual EMI as documented in document number ER-613, "S2R-T34 Electrical Modification EMI/EMC Test Report".

Therefore, the EMI effects of the power distribution changes as installed on fielded aircraft will be considered. The equipment marked "test" in Table 2 will be considered as an EMI SOURCE. The GCU and relays will be considered as an EMI VICTIM in relation to the aircraft electrical equipment marked "test" in Table 2.

Test Conditions

- Any

Safety

- Risk Assessment: Low risk
- Risk alleviation: Conduct test in day conditions.

D.4.5. **TEST PROCEDURE**

D.4.5.1. ENGINE START TEST

a. Position Aircraft in a location suitable for ground operation of the engine.

b. Place Master Switch in ON position.

c. Perform a Normal Engine Start per AFM.

Verify System voltage as displayed on MVP-50T remains at or above 18.0V throughout entire start sequence. Pass/Fail____

Verify no relay chattering, hot or hung starts, or other starting anomalies or indications of EMI are observed. Pass/Fail____

Verify no abnormal EICAS messages are displayed during start sequence. Pass/Fail____

d. Set engine power to ground idle. Ensure N1 reads at a minimum 53%.

e. Establish initial equipment states as shown in.

3 if installed.

Table 3: INITIAL EQUIPMENT STATES

Initial	
Equipment	**State**
MVP-50T	ON
Strobe Lights	OFF
Navigation Lights	OFF
Compass Lights	OFF
Map Lights	OFF
Taxi Lights	OFF
Left Landing Light	OFF
Right Landing Light	OFF
Left Turn Light	OFF
Right Turn Light	OFF
Instrument Lights	OFF
Anti Bird Lights	OFF
Smoker	OFF
Electric Fan Brake	ON
Air Conditioner	OFF
Heater	OFF
AC & Heater Blower	OFF
Heated Pitot	OFF
Hopper Rinse	OFF
Flaps	UP
Windshield Wiper	OFF
Windshield Washer	OFF
Aux Fuel Pump	OFF
Igniters	OFF
P-3 Heater	OFF
Generator	ON
VHF COMM	ON-NO TX
Transponder	STBY
Whiskey Compass	NA
All Other Equipment	OFF

D.4.5.2. GENERATOR CONTROL UNIT AS VICTIM

Record results for each source equipment in the Pass/Fail column of Table 4. Record details of any observed interference in Notes column.

a. Lights As Source

Toggle individual light switch ON. Verify victim equipment meets Pass Criteria as shown in Table 4. Toggle light switch OFF. Repeat for each light.

b. Instruments as Source

Pull all instrument circuit breakers. Toggle individual instrument circuit breaker ON. Verify victim equipment meets Pass Criteria as shown in Table 4. Toggle individual instrument circuit breaker OFF. Repeat for each instrument.

c. **Engine Equipment as Source**

Note: Ensure aircraft brakes are set and aircraft is properly secured during run-up.

Ensure generator switch is ON and MVP-50T ammeter indicates battery charge. Vary engine power throughout its entire range a minimum of 3 times while observing victim equipment. Verify victim equipment meets Pass Criteria as shown in Table 4.

After engine run-up, toggle remainder of engine equipment switches ON. Verify victim equipment meets Pass Criteria as shown in Table 4. Toggle equipment switches OFF. Repeat for each item of equipment.

d. **Avionics as Source**

Place the aircraft transponder in ALT mode. Using an IFR 6000 or similar test box, interrogate the aircraft's transponder and verify it reports current pressure altitude. During interrogation, verify victim equipment meets Pass Criteria as shown in Table 4.

Communicate TO/FROM a handheld COMM unit on the following frequencies: 118.00, 122.775, 135.00. During transmission, verify victim equipment meets Pass Criteria as shown in Table 4.

e. Misc. Equipment as Source

Toggle source individual equipment switch ON. Operate source equipment. Verify victim equipment meets Pass Criteria as shown in Table 4. Toggle equipment switch OFF. Repeat for each item of equipment.

Table 4: GENERATOR CONTROL UNIT AS VICTIM

Source		Victim	Pass/ Fail	Test Method	Pass Criteria	Notes
Lights 4.5.2.1	Strobes	GCU		Toggle individual light switch ON. Verify victim equipment meets Pass Criteria. Toggle light switch OFF. Repeat for each light.	1. System Voltage remains at 27.5VDC +/- 1.0 VDC as displayed on MVP-50T. 2. Generator Fail EICAS is not displayed. 3. MVP-50T ammeter displays positive battery charge.	
	Navigation					
	Compass					
	Map					
	Taxi					
	Left Landing					
	Right Landing					
	Left Turn					
	Right Turn					
	Instrument - Dim					
	Instrument - Bright					
	Anti Bird					
Instruments 4.5.2.2	DG			Pull all instrument circuit breakers. Toggle individual instrument circuit breaker ON. Verify victim equipment meets Pass Criteria. Toggle individual instrument circuit breaker OFF. Repeat for each instrument.		
	Artificial Horizon					
	Turn & Bank					
Engine 4.5.2.3	Prop Test Switch			Press Prop Test Switch and hold. Verify victim equipment meets Pass Criteria. Release Prop Test Switch.		
	P-3 Heater			Toggle P-3 heater switch ON. Verify victim equipment meets Pass Criteria. Toggle equipment switch OFF.		
	Igniters			Toggle igniter switch ON. Verify victim equipment meets Pass Criteria. Toggle equipment switch OFF.		
	Generator			Vary engine power throughout its entire range a minimum of 3 times while observing victim equipment. Verify victim equipment meets Pass Criteria.		
Avionics 4.5.2.4	VHF COMM			Communicate to/from a handheld COMM unit on the following frequencies: 118.00, 122.775, 135.00.		
	Transponder			With the transponder in ALT mode, wirelessly interrogate the transponder using an IFR 6000 or similar test box and verify it reports current pressure altitude.		
Misc. Equipment 4.5.2.5	Aux Power Port			Connect electrical equipment to Aux Power Port (GPS, Mobile device, or similar). Verify power is being drawn through port.		
	Smoker			Toggle individual equipment switch or circuit breaker ON. Operate equipment. Verify victim equipment meets Pass Criteria. Toggle equipment OFF. Repeat for each item of equipment.		
	Electric Fan Brake					
	Air Conditioner					
	Heater					
	AC & Heater Blower					
	Heated Pitot					
	Hopper Rinse					
	Flaps					
	Windshield Wiper					
	Windshield Washer					
	Aux Fuel Pump					
Misc. Equip 1						
Misc. Equip 2						
Misc. Equip 3						
Misc. Equip 4						
Misc. Equip 5						

f. Generator Control Unit as Source

Record results for each Victim equipment in the Pass/Fail column of Table 5. Record details of any observed interference in Notes column.

With the engine running and initial equipment states as defined in Step 5, toggle Generator circuit breaker OFF and then ON. Operate Victim equipment and verify it meets Pass Criteria as shown in Table 5. Repeat as required until all Victim equipment has been evaluated.

Table 5: GENERATOR CONTROL UNIT AS SOURCE

Source	Victim		Pass /Fail	Pass Criteria	Test Method	Notes
GCU 4.5.3	Lights	Navigation		No steady-state flicker, dropout, or other lighting anomaly	Toggle Generator circuit breaker OFF and then ON. Operate Victim equipment and verify it meets Pass Criteria. Repeat as required until all Victim equipment has been evaluated.	
		Compass		No steady-state flicker, dropout, or other lighting anomaly		
		Instrument – Bright and Dim		No steady-state flicker, dropout, or other lighting anomaly		
	Instruments	DG		Stable heading indication, no flag		
		Artificial Horizon		Stable Horizon, no flag		
		Turn & Bank		Stable indication, no flag		
		Magnetic Direction Indicator (Whiskey Compass)		A deviation not to exceed 10 degrees on any heading		
	Misc Equipment	Heated Pitot		Heats pitot probe		
		Flaps		Flaps transition smoothly throughout full range		
		Windshield Wiper		Wiper runs continuously		
		Windshield Washer		Fluid sprays properly		
		Aux Fuel Pump		Stable rise in fuel pressure		
	Misc. Equip 1					
	Misc. Equip 2					
	Misc. Equip 3					
	Misc. Equip 4					
	Misc. Equip 5					
	Engine	Prop Test Switch		Prop RPM limited to 2200		
		Igniters		Steady fire rate		
		P-3 Heater		No change in engine performance when P-3 Heater switch toggled.		
		Generator		1. System Voltage remains at 27.5VDC +/- 1.0 VDC as displayed on MVP-50T. 2. Generator Fail EICAS is not displayed. 3. MVP-50T ammeter displays positive battery charge.		
	Avionics	VHF COMM		No squelch breaks or other evidence of EMI while communicating with a handheld COMM on frequencies 118.00, 122.775, and 135.00.		
		Transponder		Reports correct pressure altitude in ALT mode when interrogated using an IFR 6000 or similar test box.		