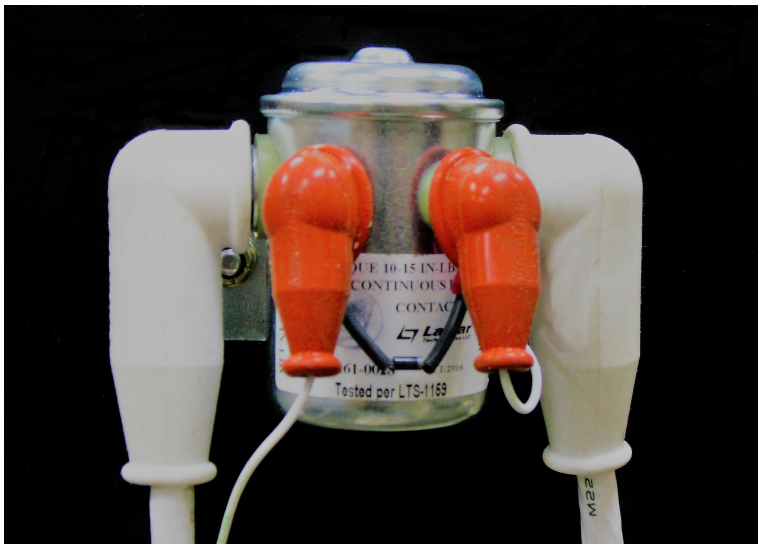
STC SA02601CH

INSTALLATION, MAINTENANCE MANUAL

Installation of a Battery Master Relay

Univair (ERCO) 415-C, 415-CD,
415-D, E, G, F-1, F-1A Aircraft

Manual Number: 415- Master Relay



Alpha Aviation Inc.
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Revision	Date	Change	Approved
A	5/10/2008	Initial Issuance	
B	6/20/2008	Add Circuit Detail	
C	3/16/2011	Minor Instruction Changes	
D	12/1/2016	Change Relay – Update Manual	

FAA APPROVED

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1.0 Model Designations

TCDS	Model Designation	Category
A-718, Part 4a	415-C	Normal
	415-CD	Normal
A-787, CAR 03	415-D	Normal
	Model - E	Normal
	Model - G	Normal
	Model F1	Normal
	Model F1-A	Normal

2.0 Product Description

This STC authorizes the modification of Univair (ERCO) 415-C, -CD, -D, - E, -G, F-1, F-1A aircraft to incorporate the installation of a high current battery master relay and low current control circuit.

This installation is accomplished through the addition of a high current master relay attached to the battery box, which reuses the existing factory installed wiring.

There are two methods developed to accomplish this modification.

Method 1 –
Provide a battery box mounted master relay controlled by the contacts of the existing AN3023 - 2 battery master switch.

Method 2- –
Provide a battery box mounted master relay controlled by the contacts of a new AN3027-2 or MS35059-22 battery master switch, instrument panel mounted.

3.0 Airframe Qualification

The following criteria must be met prior to the application of this STC:

The aircraft is a Univair (ERCO) Model 415-C, 415-CD, 415-D, - E, -G, F-1, F-1A.

The aircraft has a standard airworthiness certificate.

The airworthiness certificate is in the Normal Category.

The authorized aircraft serial number range is: All TCDS authorized serial Numbers.

Previous modifications or applied STC's do not preclude the installation of this STC.

4.0 Weight and Balance

A minor weight and balance change is anticipated and may vary by installation.

It is suggested that the actual weight of items removed and installed be used to develop the weight and balance calculation.

5.0 FAA Documentation

When the installation is completed, per the approved data, the installer should:

Update the aircraft equipment list.

Install the "Instructions for Continued Airworthiness" (ICA)) in the aircraft maintenance records.

Make the appropriate maintenance entries in the aircraft log book.

Prepare and submit FAA Form 337.

Note –

CAR 4a Aircraft - No change is required to be made to the "Operating Limitations" form.

CAR 3 Aircraft – No Airplane Flight Manual (AFM) supplements are required; as the pilot operation of the battery control remains unchanged.

Instructions For Continued Airworthiness (ICA)

Installation of a Battery Master Relay

Univair (ERCO) 415-C, 415-CD
415-D, E, G, F-1, F-1A Aircraft

1. Introduction;
   This ICA is issued to provide information pertinent to the inspection and ongoing maintenance of the Battery Master Relay installation on this aircraft.

2. Description;
   This aircraft has been modified, by FAA approval, to incorporate the installation of a battery box mounted master relay, The installation includes the provision of a remotely located low current control circuit and switch.

3. Operation;
   The control of the airframe battery output voltage is accomplish through the use of the battery Master Switch, to energize the battery box mounted high current master relay.

4. Servicing information; None required.

5. Maintenance instructions;
   Inspection of the aircraft records to assure continuing conformance with this STC shall be made on an Annual / 100 Hour Inspection basis.

   Additionally, a visual and operational check of the battery master relay and its control circuit shall be made on an Annual / 100 Hour Inspection basis.

6. Trouble shooting procedures; None
7 Removal and replacement; Per STC Manual; 415-Master Relay
8 Diagrams; Contained in STC Manual; 415-Master Relay
9 Special inspections; None.
10 Special treatments; None.
11 Data; Aircraft records and STC installation check list.
12 Special tools; None.
13 Does not apply.
14 Overhaul periods; N/A
15 Airworthiness limitations; None.
16. Revisions; All revisions to this document must be prepared and presented to an FAA inspector, for field approval in the form of an FAA Form 337.

End

8.0

INSTALLATION INSTRUCTIONS

Step-by-Step Instructions;

1. Remove the airframe battery.
2. Inspect the battery box, mount and ground strap. Repair as necessary.
3. Remove the baggage compartment and gain access to the existing master switch and wiring harness.
4. Determine which installation method is to be used -

Method 1 –
Install a battery box mounted battery Master Relay, controlled by the contacts of the existing AN3023- 2 battery Master Switch. Thus, utilizing the Master Switches high current contacts to control the low current control circuit of the Master Relay.

Instructions

1. Install the new MR-12NOCD Battery Master Relay, centered vertically and horizontally on the outboard wall of the battery box. Use two AN526-1032R10 Screws, AN970-3 and AN960-10 Washers and AN365-1032 Nuts.

   Install the screws with the threads out and a AN970-3 surface washer under the screw head. Refer to cover photo.

2. Locate and trace the positive battery cable, as it runs to the existing Master Switch.
3. Disconnect both legs of the positive battery cable from the master switch and remove both cables (#4 wire) from the harness, down to the location of the new Battery Master Relay.
4. Remove what was the positive battery cable from the battery to the Master Switch and set it aside.
5. By reference to Diagram 3, take the positive cable, which runs forward to the starter terminal, and lay it out for connection to the **Left** high current terminal of the new Battery Master Relay.

   Note – Examine the newly installed Master Relay; the battery Input terminal is the Right hand high current stud. The Output, load terminal, is the Left hand high current stud. You may want to mark them.

6. Determine the required length of the **output** cable – Cut the cable – Trim back the shielding 2” – Tape the shield to the inner sheath with friction tape – Strip the core and install a #4 AMP connector.

Note – The #4 AMP terminal can be installed using an approved AMP lever action crimper or by staking the connection with a drift, followed by soldering the connection.

7. Complete the **output** connection by installing a large insulating boot and attaching the cable to the battery Master Relay **output** lug.

8. Using the #4 cable set aside in step 4; fabricate a new positive battery cable to run between the battery positive terminal and the Master Relay **input** terminal

   Re-terminate one end with a **new** #4 AMP connector. Cut the cable – Trim back the shielding 2" – Tape the shield to the inner sheath with friction tape – Strip the core and install a #4 AMP connector.

   Determine the finished cable length needed, cut the cable. Re-terminate the end as above.

   Note – The material list includes 2 additional #4 AMP connectors for use if the installer desires to fabricate a replacement battery ground cable from the remaining #4 cable.

9. Fabricate a control circuit jumper lead from the #20 wire supplied. Cut a 3" length and terminate one end with a #10 ring terminal and the other with the large 5/16" ring terminal.

10. Complete the **input** connection by installing a large insulating boot and attaching the battery cable and control circuit jumper wire to the battery Master Relay **input** lug.

11, Fabricate a contact protection circuit (Diode Jumper) by insulating each leg of the diode with heat shrink and installing a #10 ring terminal on each end.

12. Carefully install the Diode Jumper onto the coil circuit terminals with the Ring marked side of the Diode on the **RIGHT** control circuit terminal.

    Add the loose end of the jumper from the positive battery terminal and a small insulating boot to the **RIGHT** control circuit terminal, Complete the connection.

13. Establish a control circuit for the Master Relay by running a single #20 wire from the **LEFT** control circuit terminal of the Master relay to the Master Switch location. Install a small insulating boot on the control circuit terminal.

    Follow the path of the existing Generator Field Circuit and complete the harness installation by grouping the wires and tying up the bundle.

14. Complete the Master Switch wiring by terminating the control wire to an open lug and connecting a local ground to the other open lug.

15. Reinstall the battery and perform an operational test – verifying that the switch is functioning correctly. **Verify that Down is OFF.**

16. Perform a final inspection, operational check and reinstall the baggage compartment.

17. Complete the paperwork and sign off.

Method 2-
Install a battery box mounted Master Relay controlled by the contacts of a new AN3027-2 or MS35059-22 battery master switch, instrument panel mounted.

Instructions

1. Install the new MR-12NOCD Battery Master Relay, centered vertically and horizontally on the outboard wall of the battery box. Use two AN526-1032R10 Screws, AN970-3 and AN960-10 Washers and AN365-1032 Nuts.

   Install the screws with the threads out and a AN970-3 surface washer under the screw head. Refer to cover photo.

2. Locate and trace the positive battery cable, as it runs to the existing Master Switch.

3. Disconnect both legs of the positive battery cable from the master switch and remove both cables (#4 wire) from the harness, down to the location of the new Battery Master Relay.

4. Remove what was the positive battery cable from the battery to the Master Switch and set it aside.

5. By reference to Diagram 3, take the positive cable, which runs forward to the starter terminal, and lay it out for connection to the **Left** high current terminal of the new Battery Master Relay.

   Note – Examine the newly installed Master Relay; the battery Input terminal is the Right hand high current stud. The Output, load terminal, is the Left hand high current stud. You may want to mark them.

6. Determine the required length of the **output** cable – Cut the cable – Trim back the shielding 2" – Tape the shield to the inner sheath with friction tape – Strip the core and install a #4 AMP connector.

   Note – The #4 AMP terminal can be installed using an approved AMP lever action crimper or by staking the connection with a drift, followed by soldering the connection.

7. Complete the **output** connection by installing a large insulating boot and attaching the cable to the battery Master Relay **output** lug.

8. Using the #4 cable set aside in step 4; fabricate a new positive battery cable to run between the battery positive terminal and the Master Relay **input** terminal.

   Re-terminate one end with a **new** #4 AMP connector. Cut the cable – Trim back the shielding 2" – Tape the shield to the inner sheath with friction tape – Strip the core and install a #4 AMP connector.

   Determine the finished cable length needed, cut the cable. Re-terminate the end as above.

   Note – The material list includes 2 additional #4 AMP connectors for use if the installer desires to fabricate a replacement battery ground cable from the remaining #4 cable.

9. Fabricate a control circuit jumper lead from the #20 wire supplied. Cut a 3" length and terminate one end with a #10 ring terminal and the other with the large 5/16" ring terminal.

10. Complete the **input** connection by installing a large insulating boot and attaching the battery cable and control circuit jumper wire to the battery Master Relay **input** lug.

11. Fabricate a contact protection circuit (Diode Jumper) by insulating each leg of the diode with heat shrink and installing a #10 ring terminal on each end.

    Carefully install the Diode Jumper onto the coil circuit terminals with the Ring marked side of the Diode on the **RIGHT** control circuit terminal.

    Add the loose end of the jumper from the positive battery terminal and a small insulating boot to the **RIGHT** control circuit terminal, Complete the connection.

12. Remove the front floorboard and open the access panel beneath the seat cushion.

13. Establish a control circuit for the battery Master Relay by running a single #20 wire from the battery Master Relay location to the new master switch location on the instrument panel. Follow the existing wire bundle and secure as necessary.

14. Connect the battery Master Relay control wire to the **LEFT** control lug on the relay using #10 ring terminal and small insulating boot; Complete the wire bundle and inspect the aft installation.

15, Complete the battery master switch wiring by installing the new master switch and placard on the instrument panel; terminate the control wire on either left terminal on the switch. Connect a local ground to the other left side terminal.

16. The remaining two wires on the old master switch are the Generator Field Circuit and can be removed from the switch and the switch can be removed.

17. Remove the field circuit wire which ran from the regulator "F" terminal to the old master switch and discard.

18. Using a #10 ring terminal; Re-terminate the Generator Field Circuit wire which ran from the old master switch location forward to the "F" terminal of the generator. Terminate it on the "F" terminal of the regulator.

19. Re-install the floorboard and seat cushion.

20. Complete the Generator Field Circuit by locating the Field wire in the bundle along the right wall.

21. Cut the Field wire and splice enough #20 wire to each lead, in order to terminate the wires on the right side lugs of the new Master Switch.

22. Complete the Field wire connections using 2ea, #8 ring terminals and secure all of the new Master Relay wires in the instrument panel harness.

23. Reinstall the battery and perform an operational test – verifying that the switch is functioning correctly. **Verify that DOWN is OFF.**

24. Perform a final inspection, operational check and reinstall the baggage compartment.

25. Complete the paper work and sign off.

9.0 Diagrams

9.1 Contact Protection Circuit

9.2 Wiring Schematic

9.3 Circuit Detail

Diagram 1 Contact Protection Circuit

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2016	12/6/2016	9.1

RETRACED 5.4.2021
FOR CLARITY ONLY

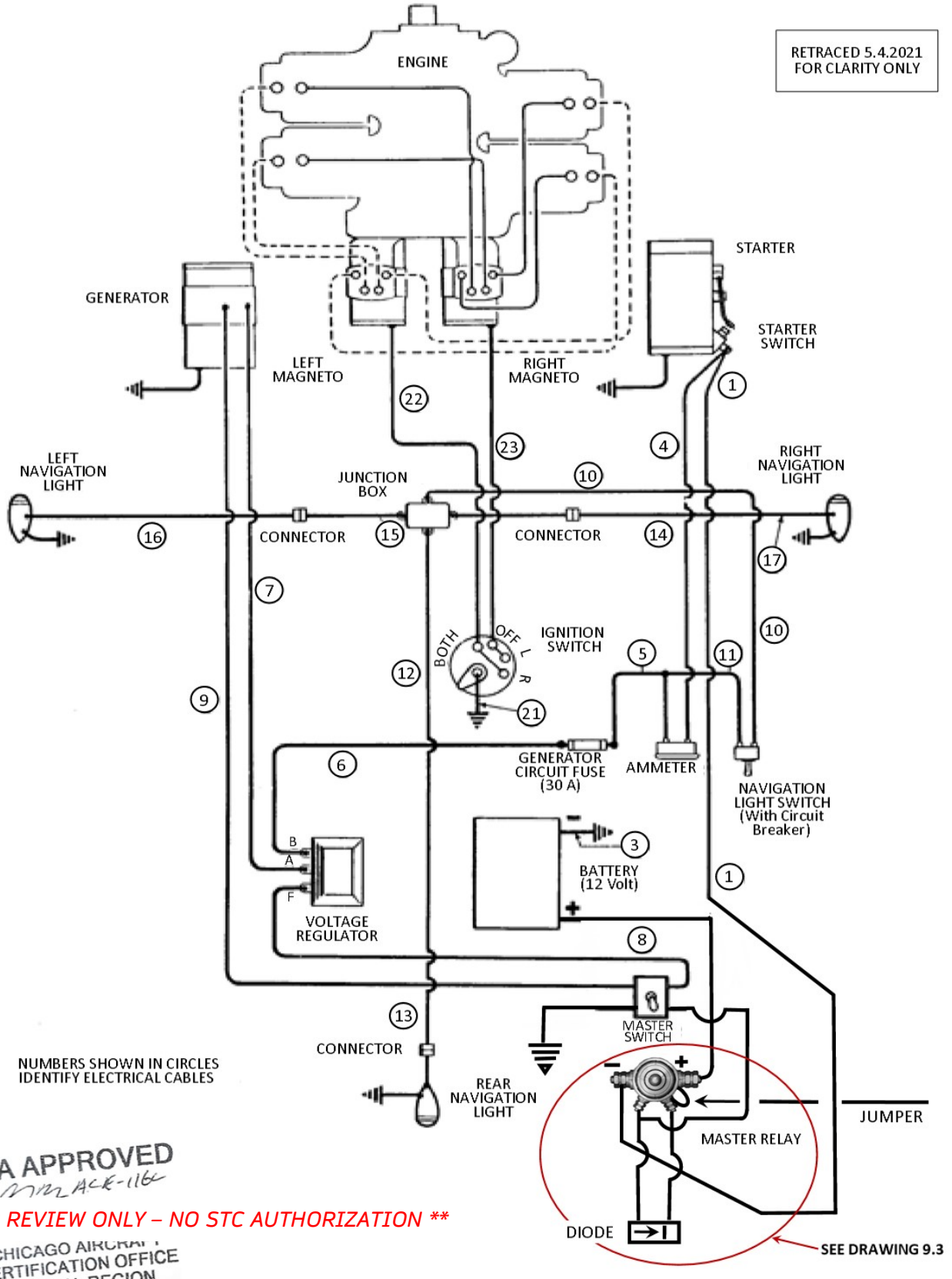

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Diagram 2 Wiring Schematic

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Diagram 3 Circuit Detail

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12/1/2016	Checked 12/6/2016	9.3

RETRACED 5.4.2021
FOR CLARITY ONLY

FAA APPROVED MODEL LIST (AML) NO. SA02601CH
ALPHA AVIATION INC.
FOR
INSTALLING BATTERY MASTER RELAY

ISSUE DATE: 7/23/08

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NUMBER/DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. & DATE		
1	Univair Aircraft Corporation	415-C, 415-CD	A-718	CAR 4a	Installation and Maintenance Manual No. 415-Master Relay	Revision B, dated 6/20/08*	N/A	--
2	Univair Aircraft Corporation	415-D, E, G, F-1, F-1A	A-787	CAR 3	Installation and Maintenance Manual No. 415-Master Relay	Revision B, dated 6/20/08*	N/A	--

* or latter FAA Approved Revisions.

FAA APPROVED: *Original signed by: Gregory J. Michalik*

Karol Mordasiewicz
Manager, Airframe & Administrative Branch
Chicago Aircraft Certification Office

Reissued: 12/20/16