

electroair
ELECTRONIC IGNITION SYSTEMS

***EA-26000 Series
EIS Back-up Battery System Panel
Installation Manual***

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Revision Log

Revision	Pages Affected	Date of Revision	Description of Revision	Approved by	Date of FAA Approval
00	1-11	10/17/2022	Initial Release	JMS	-
01	3	12/14/2022	Limitations Section Added	MAK	
02	2-16	05/05/2023	ECO 1019-0121: Tachometer Relay Circuit Addition	JMS	

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Electroair EIS Back-up Battery System Panel

The EIS Back-up Battery System (EBBS) Panel has been created for operation with dual electronic ignition systems (EIS) using a back-up battery. The panel is to give the pilot indication of EIS status and back-up battery status during operation of an aircraft.

The EIS Back-up Battery System Panel is designed for use with Electroair Electronic Ignition Systems (EIS), STC# SA02987CH or SA03286CH, and TCW Technologies Integrated Back-up Battery System (IBBS), STC# SA04400NY. The panel has three LEDs, a voltmeter, and a switch. Two LEDs (green) will indicate whether or not the connected EIS is receiving power. The remaining LED (amber) indicates if the back-up battery is supplying power to one of the EISs. The voltmeter indicates the voltage of the back-up battery system. The rocker switch enables the back-up battery to supply power in the event of main power failure.



Figure 1: EIS Back-up Battery System Panel

Tachometer Relay Controller

The Tachometer Relay Controller (TRC) is used to output a correct signal for tachometers to use with Dual EIS installations. The TRC uses inputs of power status of two EISs and each of their Tachometer signal outputs. The TRC outputs a single RPM signal that can be used on an electronic tachometer. The TRC controls the two green LEDs on the EBBS panel based on the power status of the EISs. The TRC is contained in a box to be mounted behind the instrument panel. A wire harness (part # EA-26110) with a 15-pin connector will be used to connect the TRC box to the EBBS panel and other connections.

Limitations:

Electroair Electronic Ignition Systems STC# SA02987CH or SA03286CH must be installed prior to installation of EIS Backup Battery Panel System.

An approved Back-up Battery must be installed in accordance with the TCW Technologies Installation Instructions prior to installation of the EIS Back-up Battery System Panel. See table below for list of approved batteries.

Battery P/N	Battery Mfg	STC#	Installation Document	Voltage
IBBS-12v3ah-CRT	TCW Technologies	SA04400NY	TCW doc # 725.0047	12V
IBBS-12v6ah-CRT	TCW Technologies	SA04400NY	TCW doc # 725.0047	12V
IBBS-24v3ah-CRT	TCW Technologies	SA04400NY	TCW doc # 725.0047	24V

Kit Requirements and Contents

EA-26000-12 Kit Requirements:

1. 12-volt electrical system
2. Installed Electroair EIS STC# SA02987CH or SA03286CH.
3. Installed TCW Technologies IBBS STC# SA04400NY.

EA-26000-24 Kit Requirements:

1. 24-volt electrical system
2. Installed Electroair EIS STC# SA02987CH or SA03286CH.
3. Installed TCW Technologies IBBS STC# SA04400NY.

Other items needed:

1. Basic tools and standard aircraft hardware required for mounting the panel
2. Electrical tools for cutting, stripping, and terminating various wiring. Also recommended is a good selection of cable ties for harness routing and tie-off.

EA-26000-12 Kit Contents:

1. ___ EA-26000-12: EBBS 12 Volt Control Panel
2. ___ EA-26100: Tachometer Relay Controller
3. ___ EA-26110: Tachometer Relay Wire Harness
4. ___ USB Drive Containing Kit Documents (Installation Manual, STC, ICA, AFMS, etc)
5. ___ Warranty Registration

EA-26000-24 Kit Contents:

1. ___ EA-26000-24: EBBS 24 Volt Control Panel
2. ___ EA-26100: Tachometer Relay Controller
3. ___ EA-26110: Tachometer Relay Wire Harness
4. ___ USB Drive Containing Kit Documents (Installation Manual, STC, ICA, AFMS, etc)
5. ___ Warranty Registration

Receiving and Acceptance Checking of the EBBS Panel

1. Review the packaging before acceptance from the freight carrier. If damaged, refuse the package.
2. Open and check the contents of the package match the content listing on the package.
3. Are all of the materials there?
 - a. Yes, proceed to step 4.
 - b. No, contact the factory. Have the serial number of the kit available when contacting. (factory 248-674-3433 or sales@electroair.net)
4. Inspect the EBBS Panel, TRC box, and wire harness for damage. If damaged contact Electroair 248-674-3433 or sales@electroair.net.
5. Inspect the wires for nicks and cracks.
6. Are all materials acceptable?
 - a. Yes, proceed with installation.
 - b. No, contact the factory. Have the serial number of the kit available when contacting. (factory 248-674-3433 or sales@electroair.net)

If possible, store parts in original packaging when not in use. If not possible, wrap parts in cushioning material and place in one location. Review above prior to reinstallation.

For latest copies of documentation, refer to www.electroair.net.

- AML
- AFMS
- ICA
- Installation Manual
- STC

Product Details and General Information:

Back-up Power Master Switch:

The EIS Back-up Battery System Panel has one switch connection as identified in the wiring diagram: Back-up Power Master Switch, located on the right side of the panel. The back-up power master switch gives the pilot the ability to turn the back-up battery system off and it must be utilized to turn the back-up battery system off when not in use. In some installations this may be the only means to shut down the connected equipment.

The switch enables back-up power from the back-up battery system to be available on the output wires from the TCW Technologies IBBS when power on the normal aircraft bus falls below 11 volts (22 volts for a 24-volt system).

If the normal aircraft power bus is above 11 volts (22 volts for 24-volt system), then the outputs are energized with normal aircraft power (if the pass thru-power connections are utilized) and the back-up battery remains off-line. This operation occurs regardless of the state (READY or OFF) of the Back-up Power Master switch. This allows for automatic pass through of power during normal operation.

Back-up Battery Voltage Monitor

The EIS Back-up Battery System Panel has a voltmeter that will indicate the voltage of the back-up battery. The voltmeter will only report voltage when the back-up switch is in the "READY" position. A fully charged TCW battery will indicate about 13-14.7 volts (26-29.5 volts for 24-volt system). The working current of the voltmeter is less than 20mA.

Back-up Battery Status Indicator

The amber LED labeled "BATTERY IN USE" located on the EIS Back-up Battery System Panel will indicate when the back-up battery is providing power which will occur when power on the normal aircraft bus falls below 11 volts (22 volts for a 24-volt system).

EIS Status LEDs

The EIS Back-up Battery System Panel includes two green LEDs labeled EIS #1 and EIS #2. These LEDs will turn on when the EISs are receiving power and turn off when the EIS is not receiving power. The POH should be updated to state which EIS is connected to the back-up battery and which is connected to main battery power.

Tachometer Relay Controller and Wire Harness

The Tachometer Relay Controller (TRC) will be used to output a single RPM signal for use with an electronic tachometer. The TRC will be connected with TRC Wire Harness to the TCW Technologies IBBS, the Electroair Back-up Battery System panel, and the EISs. The TRC Wire Harness is connected to the TRC using a 15-pin connector.

Component Current Loads

Component	Maximum Current Load
Voltmeter	20mA
EA-26000 LEDs	15mA each
EA-26100 Tachometer Relay Controller	140mA (12v), 70mA (24v)

Installation of EA-26000 EBBS Series

1. Mounting the EIS Back-up Battery System Panel

Determine the proper location for the panel and the most appropriate mounting method. The panel is 3.375 inches wide by 2.125 inches tall as shown in Figure 2. Suggested Cutout Dimensions are shown in Figure 3. Figures are not to scale.

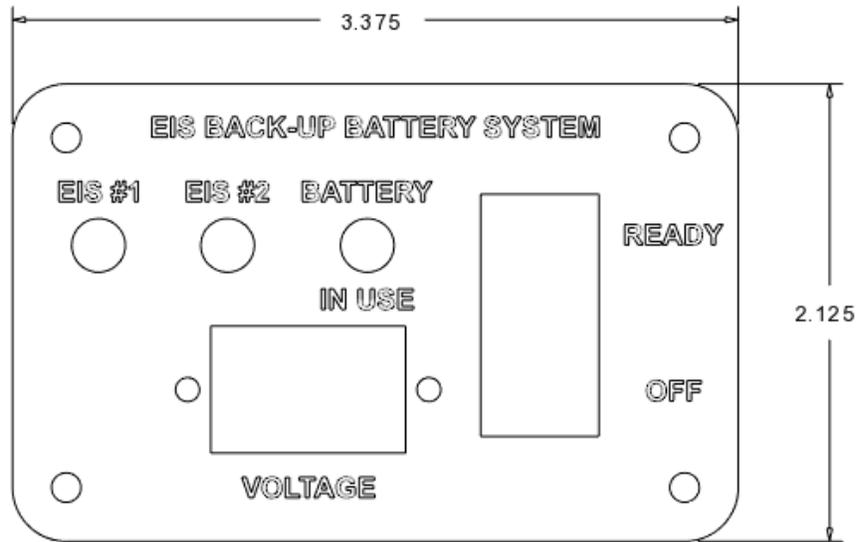


Figure 2: EIS Back-up Battery System Panel Overall Dimensions (inches)

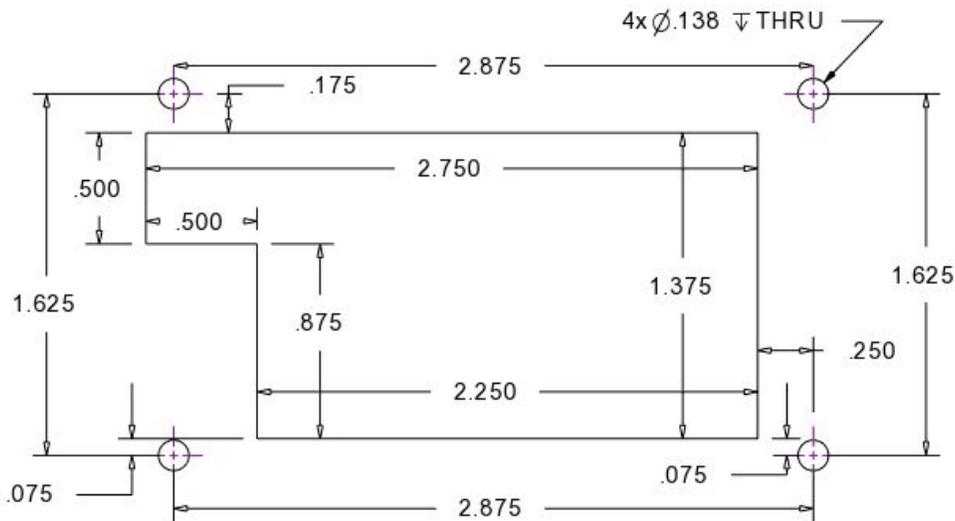


Figure 3: Suggested Cutout Dimensions (inches)

CAUTION: Before cutting or drilling, verify space is clear behind the instrument panel.

CAUTION: Use extreme care as to not damage any wiring, instruments, structural, and fuel lines.

CAUTION: Ensure electrical connectors are tight on switch connections. Ensure wires will not pull out of any electrical connections.

2. Insert EIS Back-up Battery System Panel into instrument panel and screw down using standard hardware.

3. Mounting the Tachometer Relay Controller (TRC) (p/n: EA-26100)

Determine the proper location for the circuit box and the most appropriate mounting method. The circuit box 80mm by 74mm by 23mm (3.15 in by 2.92in by 0.91 in) as shown in Figure 4.

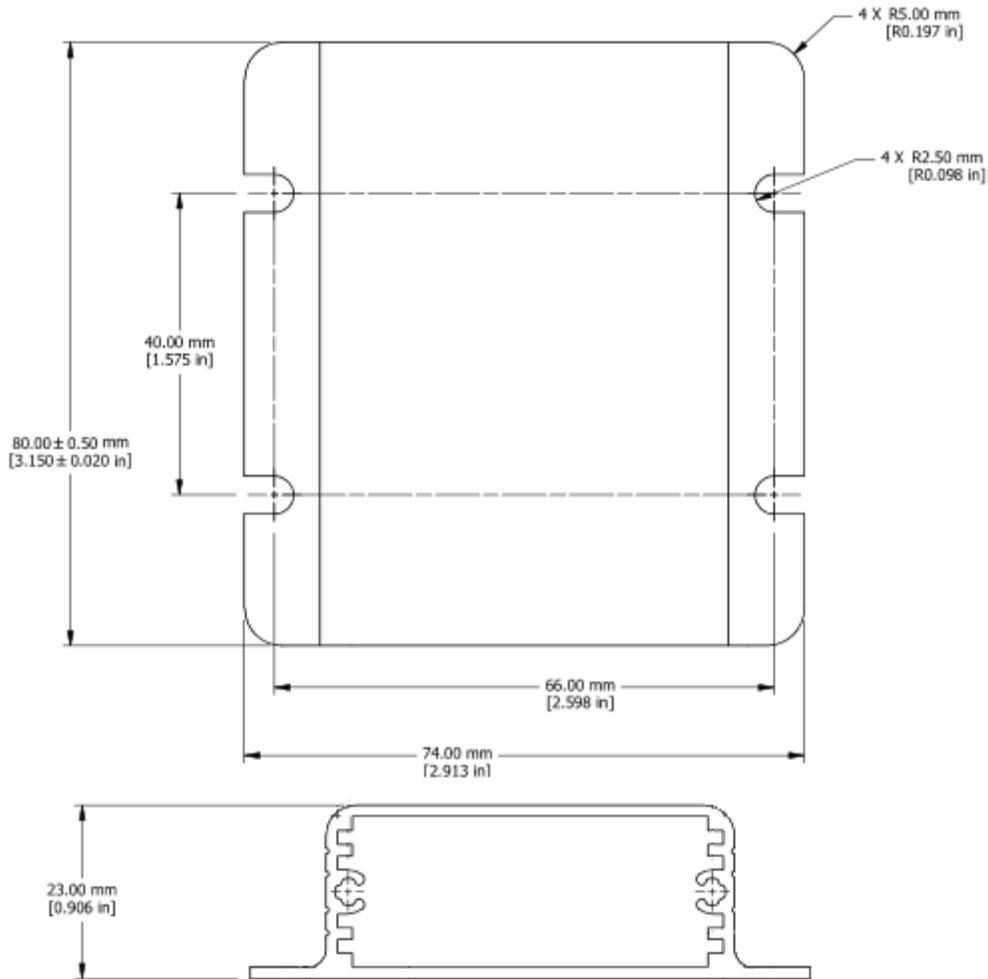


Figure 4: Tachometer Relay Controller Dimensions

4. Wiring for the components on the panel are explained in further steps 5-9. The panel components and TRC will have connections with the Electroair Electronic Ignition Systems and the TCW Technologies IBBS. Insulate any exposed electrical connections in accordance with 43.13-1B Change 1 section 11-159.

5. Back-up Power Master Switch

The Back-up Power Master Switch is the rocker switch located on right side of the EIS Back-up Battery System Panel. Connect one terminal of the rocker switch on the panel to the WHITE/BLACK wire (Pin 1) from the TCW Technologies IBBS Wire Harness. Connect to the other terminal of the rocker switch to ground.

6. Back-up Battery Voltage Monitor

Locate the wires from the voltmeter on the panel. Connect the RED/GREEN wire (Pin 2) from the back-up battery harness to the WHITE wire of the voltmeter. Connect the BLACK wire of the voltmeter to ground. Connect the RED wire of the voltmeter to a WHITE wire (Pin 12, 13, 14, or 15) from the TCW Technologies IBBS Wire Harness.

7. Back-up Battery Status/ Low Voltage Indicator

Find the amber LED labeled "BATTERY IN USE" located on the EIS Back-up Battery System Panel. Connect the black wire of the amber LED to the purple wire (Pin 3) of the back-up battery wire harness. Connect the red wire of the amber LED to the +5v wire (Pin 5) of the TRC wire harness. **Note:** The +5v wire (Pin 5) of the TRC wire harness should also connect to the red wires of both EIS #1 and EIS #2 Status LEDs.

8. EIS Status LEDs

The EIS Back-up Battery System Panel includes two green LEDs labeled EIS #1 and EIS #2. These LEDs will turn on when the EISs are receiving power and turn off when the EIS is not receiving power. The black wire of EIS #1 LED should be connected Pin 3 of the TRC wire harness. The black wire of EIS #2 LED should be connected to Pin 4 of the TRC wire harness. The red wires of both EIS LEDs should connect to the +5v wire (Pin 5) of the TRC wire harness. **Note:** The +5v wire (Pin 5) of the TRC wire harness should also connect to the red wire of the Low Voltage Indicator LED.

The POH should be updated to state which EIS is connected to the back-up battery and which is connected to main battery power.

9. Tachometer Relay Wire Harness Connections

The TRC Wire Harness (p/n: EA-26110) uses a 15-pin connector (**C4**), with 11 wires for connections within the aircraft. The connections listed are also visualized on the Wiring Diagram in this document.

i. Pin 1 of connector C4 should be connected to a WHITE wire (Pin 12, 13, 14, or 15) from the TCW Technologies IBBS Wire Harness.

ii. Pin 5 of connector C4 should be connected to the three red wires of the EA-26000 panel LEDs.

iii. Pin 3 of connector C4 should be connected to the black wire of the EIS #1 LED.

iv. Pin 4 of connector C4 should be connected to the black wire of the EIS #2 LED.

v. Pin 11 of connector C4 should be connected to the EIS #1 B+ Wire, C1 Pin 6 (red wire). **Note:** The EIS #1 C1 Pin 6 will also be connected to the EIS #1 Switch.

vi. Pin 7 of connector C4 should be connected to EIS #1 Tachometer Signal Output, C1 Pin 8 (black wire).

vii. Pin 13 of connector C4 should be connected to the EIS #2 B+ Wire, C1 Pin 6 (red wire). **Note:** The EIS #2 C1 Pin 6 will also be connected to the EIS #2 Switch.

viii. Pin 8 of connector C4 should be connected to EIS #2 Tachometer Signal Output, C1 Pin 8 (black wire).

ix. Pins 14 and 15 of the C4 connector should be connected to ground.

x. Pin 6 of connector C4 is the Tachometer Output Signal, which can be used with an electronic tachometer. Verify that the tachometer or engine monitor system that you are using can receive the EIS Tach output signal before connecting or operating. Incorrect signal types can cause incorrect readings or potentially damage monitoring systems. Mechanical tachometers will not be able to receive the signal.

TACH Relay Wire Harness C4 Connector	Function	Connection
Pin 1	B+ Supply	TCW Backup Battery Output White Wire (Pin 12, 13, 14, or 15)
Pin 2	Not used	None
Pin 3	EIS#1 LED Out	EIS #1 LED Black Wire
Pin 4	EIS#2 LED Out	EIS #2 LED Black Wire
Pin 5	5V	1. EIS #1 LED Red Wire 2. EIS #2 LED Red Wire 3. Low Voltage Warning LED Red wire
Pin 6	TACH OUTPUT	TACHOMETER
Pin 7	EIS #1 TACH	EIS #1 C1 Pin 8
Pin 8	EIS #2 TACH	EIS #2 C1 Pin 8
Pin 9	Not used	None
Pin 10	Not used	None
Pin 11	B+ EIS #1	EIS #1 C1 Pin 6
Pin 12	Not used	None
Pin 13	B+ EIS #2	EIS #2 C1 Pin 6
Pin 14	Ground	Ground
Pin 15	Ground	Ground

Function Check

- a. Master Switch – OFF
- b. Back-up Battery Panel Switch – READY (Verify amber “BATTERY IN USE” LED illuminated)
- c. Voltage – CHECK 12V system acceptable range: 12-15V
 24V system acceptable range: 24-29V

NOTE

If voltage is less than the acceptable range, then charge the back-up battery before continuing. Refer to back-up battery manufacturer instructions on how to properly charge the battery.

- d. EIS Switches – ON (Verify that either EIS #1 or EIS #2 green LED illuminated)
- e. Master Switch – ON
- f. Verify EIS #1 and EIS #2 green LEDs, are both illuminated.
- g. Amber “BATTERY IN USE” LED – EXTINGUISHED (Verify)

NOTE

This step confirms the main aircraft power is sufficient to Energize the EIS. If the amber “BATTERY IN USE” LED Remains illuminated, then the main aircraft voltage is Insufficient (low). Resolved the issue before continuing.

- h. EIS Switches – OFF
- i. Verify EIS #1 and EIS #2 green LEDs, are both extinguished.
- j. Battery Backup Panel Switch – OFF Position
- k. Master Switch – OFF
- l. If verification passes, then return to service. If any verification fails, reverify and correct all connections and repeat Function Check. If the aircraft fails a second time, contact the factory for support. (248-674-3433 or sales@electroair.net)

Weights of Parts

Part	Weight
EBBS Panel	2 oz
Tachometer Relay Controller	4 oz
TRC Wire Harness	4 oz

Product Mounting Footprint

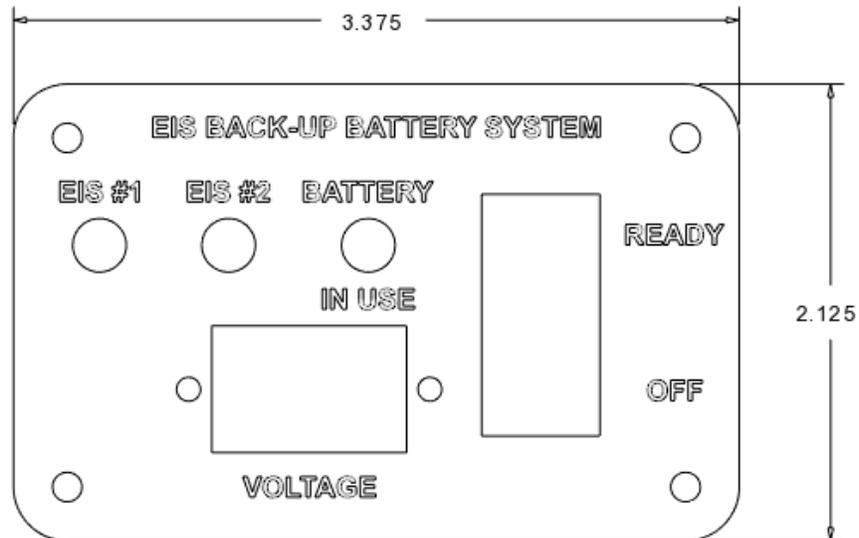


Figure 5: EIS Back-up Battery System Panel Overall Dimensions (inches)

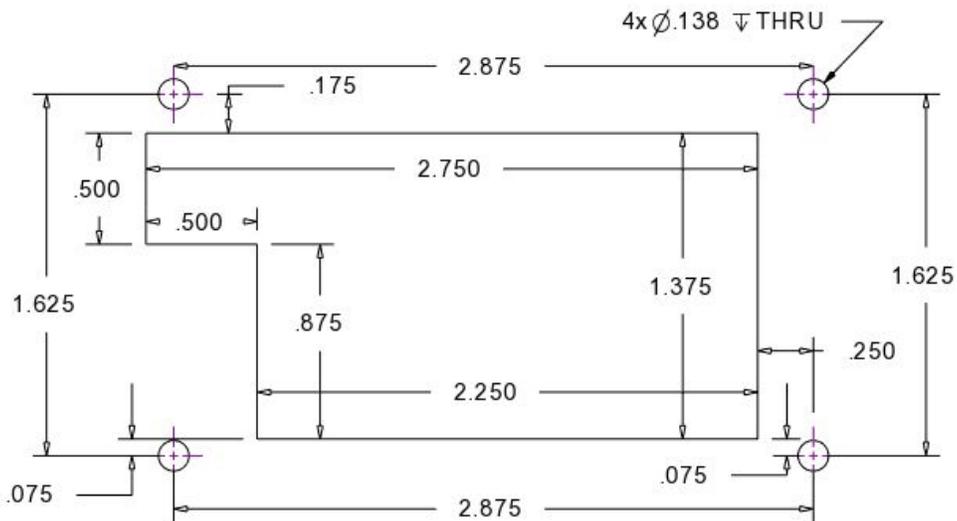


Figure 6: Suggested Cutout Dimensions (inches)

Wiring Diagram

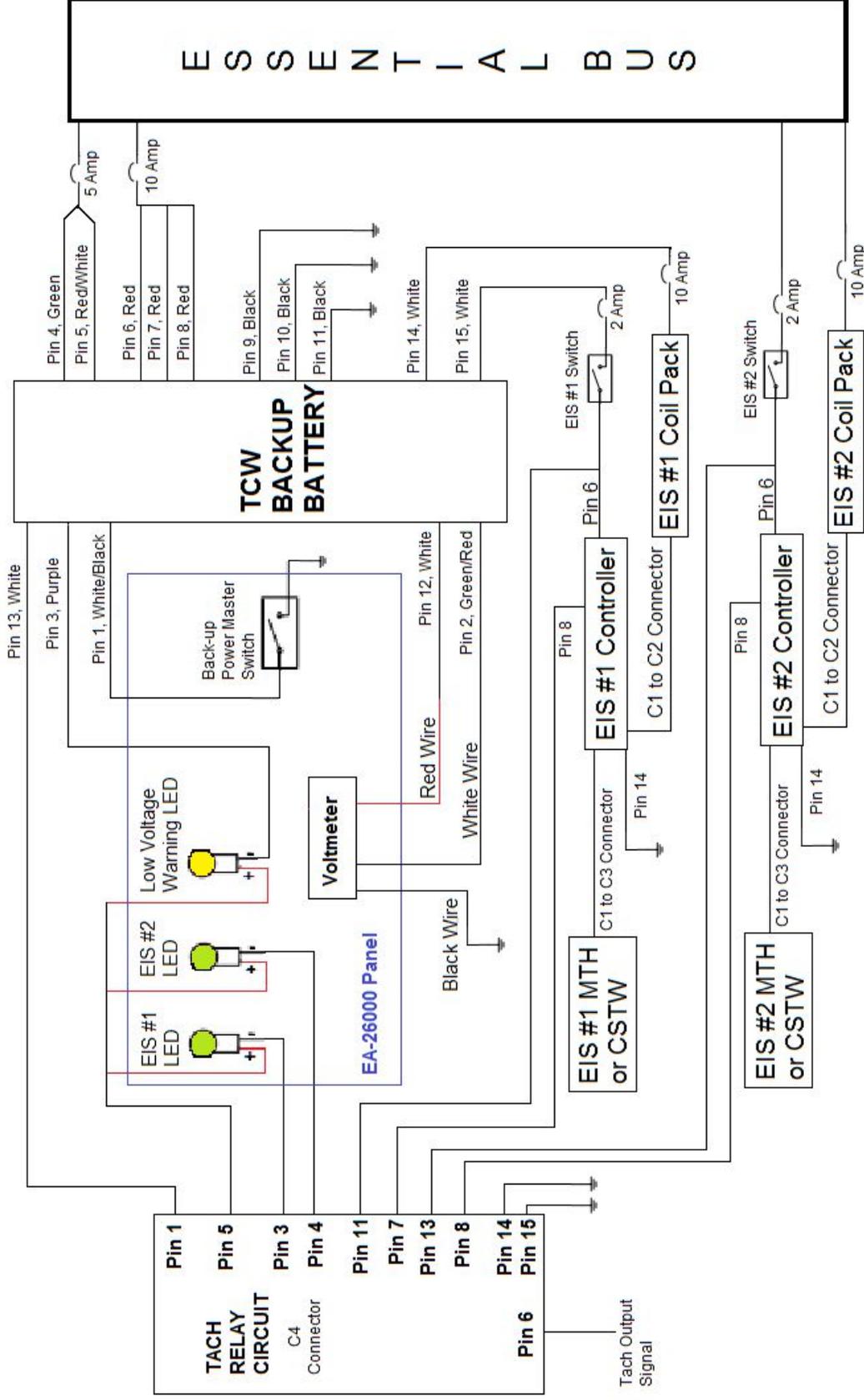


Figure 7: Wiring Connections for EIS Back-up Battery System Panel

Note: EIS #2 can be connected to the TCW Backup Battery instead of EIS#1. The POH should be updated to state which EIS is connected to the back-up battery and which is connected to main battery power.

Glossary and Abbreviations:

AC – Advisory Circular
ACO – Aircraft Certification Office
ACT – Action Identifiers
AD(s) – Airworthiness Directive(s)
AED – Aircraft Evaluation Division
AFM – Aircraft Flight Manual
AFMS – Aircraft Flight Manual Supplement
Amdt - Amendment
ALS – Aircraft Limitations Section
AML – Approved Model List
Amp – Ampere
APP - Approval
APU – Auxiliary Power Unit
ASO – Applicant Showing Only
BTDC – Before Top Dead Center
CDL – Certification Data List
CEA – Component Environmental Analysis
CFR – Code of Federal Regulations
CG – Center of Gravity
COM – Communications Radio
COTS – Commercial off the Shelf
CSD – Compliance Summary Document
CSTW – Crank Shaft Trigger Wheel
DC – Direct Current
DER – Designated Engineering Representative
DOC – Document Identifiers
EBBS – EIS Backup Battery System
EIS – Electronic Ignition System
ELA – Electrical Load Analysis
FAA – Federal Aviation Administration
FHA – Functional Hazard Assessment
FLM – Flammability Assessment
GA – General Aviation
HIRF – High-intensity Radiated Fields
IAW – In-Accordance With
ICA – Instructions for Continued Airworthiness
Ignition Timing – is the process of setting the angle relative to piston position and crankshaft angular velocity that a spark will occur in the combustion chamber near the end of the compression stroke.
LED – Light-Emitting Diode
LH – Left Handed, used to indicated counter rotating
Li-Fe-PO4 – Lithium-Iron-Phosphate
LOPC – Loss of Power Control
MAG – magneto
MAP – Manifold Absolute Pressure
MDL – Master Data List
MEL – Minimum Equipment List
MMEL – Master Minimum Equipment List
MOD – Modification
MQP – Model Qualification Process
MQR – Model Qualification Report
MTH – Mag Timing Housing
NAV – Navigation System
OEM – Original Equipment Manufacturer
PSCP – Project Specific Certification Plan
P/N – Part Number
QTY – Quantity
POH – Pilot's Operating Handbook
REC – Recommend Approval
RPM – Revolutions per Minute
RTCA – Radio-Technical Commission for Aeronautics
SAN – Structural Analysis
SSA – System Safety Assessment
STC – Supplemental Type Certificate
TCDS – Type Certificate Data Sheet
TDC – Top Dead Center
TIA – Type Inspection Authorization
TRC – Tachometer Relay Controller
TSO – Technical Standard Order
TSOA – Technical Standard Order Authorization
USC – United States Code
VDC – Voltage Direct Current