BackUp Battery System

Specification and Installation Instructions

Rev1.0

Models

- BB-01

Note: BB-01 is non-TSO certified as a backup battery.

Credits

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Revision History

Below is the document's revision hi story.

Revision #	Revision Date	Comments
Rev 1.0	January 12, 2025	Initial Release of this document

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1. Introduction

The 360 Avionics Backup Battery Module is a compact, self-contained emergency power source designed for 12-volt experimental and homebuilt aircraft. It provides clean, regulated 13.8 V backup power to your EFIS and other essential avionics in the event of engine start issues, alternator failure, or any unexpected loss of ship's power. Inside the unit is a high-quality $LiFePO_4$ battery pack with an intelligent charger that automatically charges whenever main power is available and instantly takes over when it's not. The module supports up to 6 A peak and 4 A continuous output, ensuring critical instruments stay powered without interruption. It integrates seamlessly with 360 Avionics EFIS systems and is also compatible with many third-party avionics requiring regulated backup power. This design combines aviation-grade components and advanced protection circuitry to give builders a reliable, maintenance-free backup solution.

2. General Description

The 360 Avionics Backup Battery Module is a lightweight, integrated emergency power unit for experimental aircraft. It automatically charges from the aircraft electrical system and provides instant, uninterrupted backup power when main power is lost. The module delivers a regulated 13.8 V output suitable for EFIS and other critical avionics. Built-in protection and monitoring circuitry ensure safe, reliable, and maintenance-free operation.

3. Technical Specifications

Description	VICS Module
Input voltage	+10 to +17 Volts
Power consumption	48W Max
Current	Up to 4.0A at 13.8V
Unit size	180mm x 110mm x 60mm (with mounting ears)
Weight (MiniUni2)	2.1lb
Operation humidity	25% to 90%

4. General functionality and Installation description

The backup battery module is connected to the aircraft electrical bus and controlled through a dedicated backup battery switch. Avionics requiring uninterrupted power are supplied from the **V BACKUP** output, while the aircraft bus is connected to the **PWR IN** input through a 7.5 A circuit breaker. When the voltage at **PWR IN** is above 12 V, the module operates in normal mode, using the aircraft bus to power the **V BACKUP** output and charge the internal battery. If the voltage at **PWR IN** falls below 12 V and the backup switch is enabled, the module automatically transitions to battery power and continues supplying **V BACKUP** without interruption. If the backup switch is OFF, the module will not engage the internal battery and will instead pass through the available voltage from **PWR IN**. In normal operation, a typical voltage drop of approximately 0.7 V can be expected between **PWR IN** and **V BACKUP**.

The module also provides three optional low-current status outputs intended for external LEDs to indicate battery state (such as charging or active). Each LED should be connected through an appropriate series resistor to **V BACKUP**, and the current on each status output must not exceed 30 mA.

For installation, the backup battery module must be mounted inside the cockpit in a location where ambient temperatures do not exceed 70 °C. The unit is compact and may be installed behind the instrument panel if desired, provided adequate clearance, ventilation, and secure mounting are ensured.

4.1 Connections

All electrical connections to the backup battery module are made through a single 15-pin D-SUB connector located on the side of the unit. This connector carries all required power, control, and status signal connections. To interface the module with the aircraft wiring, a **female 15-pin D-SUB connector** must be used on the aircraft side. Ensure the connector is properly assembled, strain-relieved, and securely fastened to provide reliable electrical contact in the aircraft environment.

4.2 15-pin Main connector pinout:

1 – PWR IN + (Input)
2 - PWR IN + (Input)
4 – V BACKUP + (Output)
5 – V BACKUP + (Output)
7 – BackUp Switch (Active when on GND)
9 – LED1 Output (Charging battery is in progress)
10 – LED2 Output (Charge completed)
11 – LED3 Output (Valid power present from aircraft)
12 – Ground (Output)
13 – Ground (Output)
14 – GND Input
15 – GND Input

It is recommended to use **18–20 AWG wire** for all power and ground connections (**pins 1, 2, 4, 5, 12, 13, 14, and 15**). For all other low-current and control connections, **22–24 AWG wire** is acceptable. Use **MIL-spec aircraft wire** for all connections to ensure high reliability, mechanical strength, and long-term durability.

The kit includes a **female 15-pin D-SUB connector** with optional solder or crimp-type pins. A plastic backshell (connector enclosure) is also provided. If soldering wires, ensure all joints are clean, properly wetted, and free of cold solder joints. Provide adequate strain relief to prevent stress on the connector pins.

Wiring Connections

- Connect **pins 1 and 2** to the aircraft avionics or main electrical bus through a **7.5 A circuit breaker**.
- Connect **pins 14 and 15** to the aircraft ground.
- Connect **pins 4 and 5** to the avionics loads that require backup power. Do not exceed the maximum current rating specified for the backup battery. The avionics load ground may be connected either to the aircraft ground or, optionally, to **pins 12 and 13** on the battery module.
- Connect **pin 7** to an **ON/OFF switch** labeled *Backup Battery*. The other terminal of the switch must be connected to aircraft ground.
- Optionally, connect **pins 9, 10, and 11** to external status LEDs. The other side of each LED must be connected through an appropriate resistor to the **V BACKUP** output (**pins 4 and 5**).

Ensure all wiring is properly secured, protected, and installed in accordance with standard aircraft wiring practices.

Normal Operation

Before Flight

- Turn the aircraft **Master Switch** ON.
- Turn the **Avionics Master Switch** ON (if installed).
- Turn the **Backup Battery Switch** ON.
- Complete all remaining items in accordance with the aircraft checklist.

After Flight

- Turn the **Backup Battery Switch** OFF.
- Turn the **Avionics Master Switch** OFF (if installed).
- Turn the aircraft **Master Switch** OFF.

5. Operation Limitations

- Information from airplane's POH is always supersedes information provided in this manual
- This unit is non-TSO certified and cannot be installed on the certified airplane unless special permission is obtained from regulatory agency/airplane manufacturer.

6. Warranty coverage and limitations

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12. TSO approval and Liability limitations

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