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AEROSPACE

BECA-045AH

**AERONAUTICAL
BATTERY**



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System summary

The BECA project is a sealed lead-acid battery, to be used as a backup battery for aircraft avionics system. The battery is made to fit into a ARINC 404 ¼ ATR tray, and uses DPXB-13-34B connector. The connector is customizable according to customer needs.

On the front part, the battery has a DB-25 connector used for maintenance and storage purposes. The front also has a test button to run functional checks during on wing maintenance, and a circuit breaker to protect the battery output.

The battery is made according to Technical Standard Order (TSO) number C173-a. This TSO lists, among other requirements, DO-293A for functional and environmental qualification and DO-254 for electronic hardware qualification.

The MTBF of the battery electronics is above 50.000 hours, making cell replacement cost-effective.

Functional summary

The backup battery main function is to provide emergency energy for any electrical subsystem. To achieve this function properly and safely, the battery is developed with an internal heater and a power bypass to allow energy to freely flow from the input to the output if needed. Protections are built to increase battery reliability and Built-In-Tests are also developed to help during maintenance.

The battery functional envelope, with estimated values for total useful discharge time at 120 W is shown in the graph from 100% and 72% SoC to the end point voltage (19.5 V). The cold degradation starts at -20 °C. The battery heater can create a 25 °C difference to the environment. The overtemperature protection triggers at 55 °C.

The battery ON BIT considers that the battery turns on when more than 350 mA is passing through the output. The maximum current is 15 A, protected by an output circuit breaker.





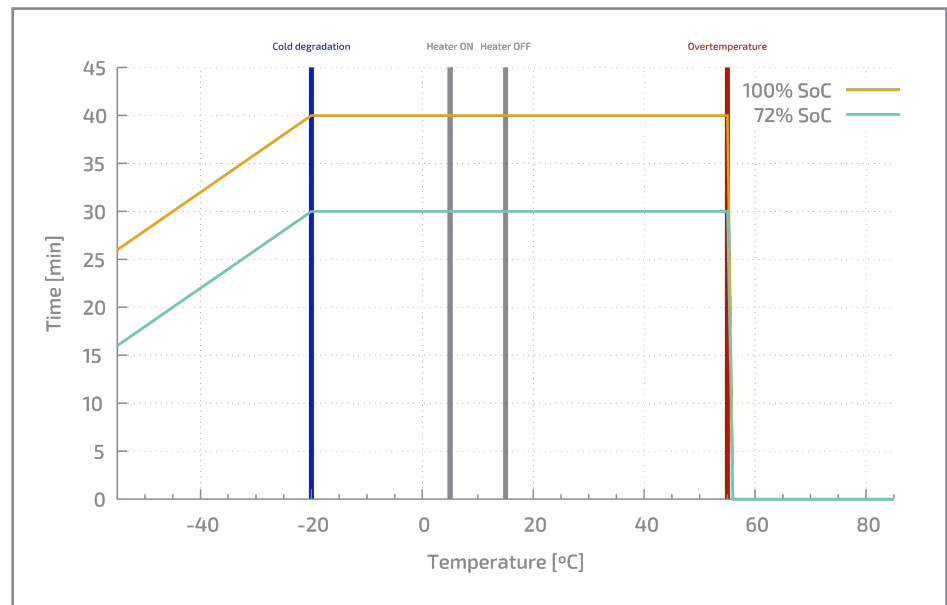
SPECIFICATIONS

BECA-045AH

TECHNICAL SPECIFICATIONS

Weight	4.9 kg
Dimensions	193 mm × 57.8 mm × 371 mm
Chemistry	Lead-acid
Input voltage	18 Vcc to 32 Vcc
Nominal voltage	24 Vcc
Nominal capacity	4.5 Ah
Operating temperature	-55 °C to 65 °C
Storage temperature	25 °C ± 10 °C
Internal heaters	Yes

DISCHARGING TIME PER TEMPERATURE AT 120 W

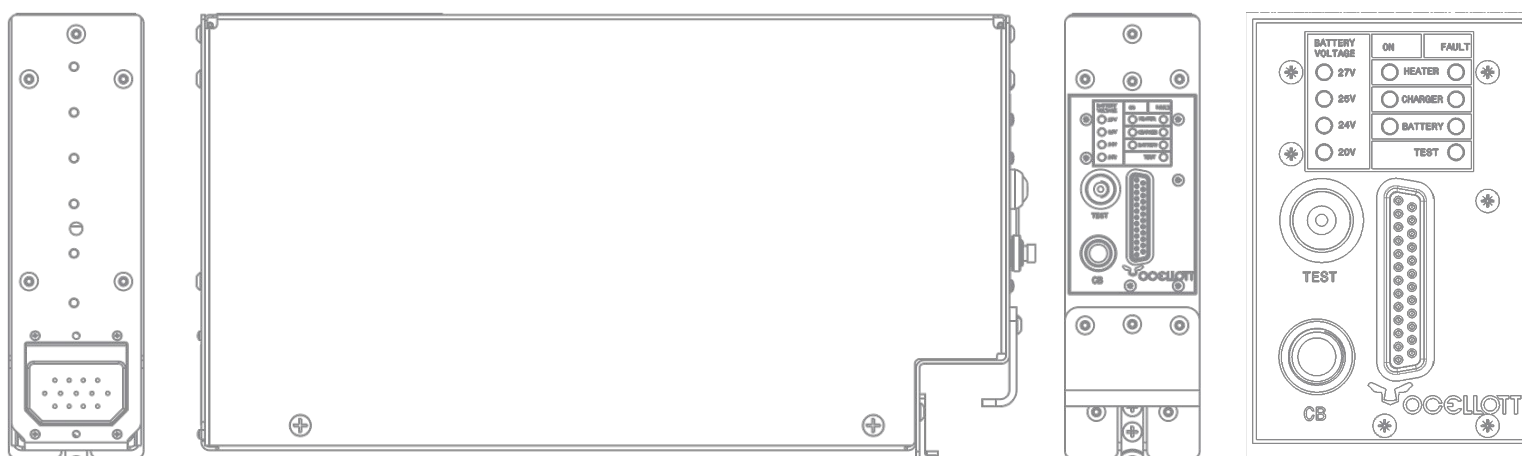


BATTERY PROTECTION

Overvoltage	Hysteresis behavior Triggers when $V_{in} > 32$ VDC; turns off when $V_{in} < 31$ VDC
Overtemperature	Hysteresis behavior Triggers when $T_{cell} > 55$ °C; turns off when $T_{cell} < 53$ °C
Deep discharge	Hysteresis behavior Triggers when $V_{bat} < 19.5$ VDC; turns off when $V_{in} > 22$ V
Reverse polarity	Prevents reverse polarity to be applied to the battery and from the battery
Transient	Prevents high currents and electrical surges in the system
Short circuit	Prevents system overload when the output is short circuited

BUILT-IN-TESTS AND INDICATIONS

Cell imbalance	Detects voltage imbalance between the battery cells
Charger fault	Detects if the battery charger circuit is failed
Heater fault	Detects if the heater is failed
Battery level	Detects the battery level and displays with multiple LEDs
Charger ON	Indicates that the battery charger is on
Heater ON	Indicates if the battery heater is on



The battery front panel is used to run the functional checks and to indicate various battery statuses. This figure shows the battery panel, with LEDs indicating status and fault for Heater, Charger, and Battery, a Test Status LED, the Battery voltage level, the TEST button, circuit breaker and the DB-25 connector.



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