



**BAT**

**BAT-0400-H-1U**

**MILITARY GRADE UPS BATTERY PACK**

<b>-20°C to 55°C Operating Temperature</b>	<b>Lithium Ion Battery Technology</b>	<b>400 W-hr - 1U Battery Energy Capacity</b>	<b>LED Status Display</b>	<b>1250 W Continuous Output Power</b>	<b>&gt;13.5 Min. - 1U Battery Run Time</b>
--	---	--	-----------------------------------	---	--



DESIGNED & MANUFACTURED IN USA

SynQor’s Military-Grade Uninterruptible Power Supply Battery Pack units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor’s battery pack incorporates field proven rugged packaging technologies. The use of lithium ion batteries permits the lowest profile and lowest weight solution in its power class. It is designed and manufactured in SynQor’s USA facilities to comply with a wide range of military standards.

The UPS Battery Pack is only intended for use within the SynQor UPS-1250, UPS-1500 and UPS-3000 products as the primary battery pack for the UPS. The pack cannot be used as a standalone battery. Multiple layers of circuit protection are implemented internal to the battery pack. Features include heater resistors for operating down to -20°C ambient, and internal hardware protection and status monitoring.

**Hot Swappable Internal Battery Pack**

**Features**

- Sealed, weather-proof, shock-proof construction when installed in a UPS-1250/1500/3000
- Hot swappable battery pack (lithium ion)
- >13.5 minute run-time at full power
- Contains 400 W-hr of energy
- 1250W continuous output power
- Full power discharge: -20°C to +55°C
- Automatic cell-to-cell balancing software and circuitry
- Over and under-temperature protection features
- Internal heaters for low-temp operation down to -20°C
- Internal hardware protection and status monitoring
- LED status display of system parameters
- <1U high unit (15.00" x 10.89" x 1.46")
- Low weight: 11.8 lbs.

**Specification Compliance**

When installed inside a UPS-1250/1500/3000, the system is designed to meet:

- MIL-STD-1399-300B - Interface Std for Shipboard Systems
- MIL-STD-810G - Environmental Engineering Considerations
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-704F - Aircraft Electrical Power Characteristics
- MIL-STD-1275D - Vehicle Electrical Power Characteristics

**In-Line Manufacturing Process**

- AS9100 and ISO 9001 certified facility
- Full component traceability

**Contents**

Technical Specification..... 2  
 Product Description ..... 3  
 Mechanical Diagrams..... 4  
 Ordering Information ..... 5

### Technical Specification

BAT-0400-H-1U is compatible with the following SynQor UPS products:

UPS-1250-[S,M,H]-1U
UPS-1250-[S,M,H]-2S
UPS-1500-[S,M,H]-1U
UPS-1500-[S,M,H]-2S
UPS-3000-[S,M,H]-2U - 2 BAT-0400-H-1U Battery Packs Required

#### LITHIUM-ION BATTERY ELECTRICAL CHARACTERISTICS

Parameter	BAT-0400-H-1U	Notes & Conditions
<b>Energy Capacity</b>	400 Watt-Hours	
<b>Run Time</b>		Given the UPS output power shown
625 W	27 min.	
1000 W	18 min.	
1250 W	13.5 min.	
<b>Recharge Time (to 90%)</b>	2 hrs.	Total system output power < 1000W
<b>Temperature Range for Recharge</b>	0°C to 45°C	See Notes 1, 2, and 3
<b>Temperature Range for Discharge</b>	-20°C to 55°C	Discharging only enabled below +55°C
<b>Temperature Range for Storage</b>	-20°C to 65°C	See Note 4

Note 1: Internal heaters, which receive power from the UPS system, maintain battery temperature above 0°C when UPS input power is present.

Note 2: Battery charging, internal to and facilitated by the UPS, is only enabled below +45°C.

Note 3: Charging current may be limited depending on UPS input and output conditions.

Note 4: Long-term battery capacity is substantially improved when stored at ambient temperatures below 35°C.

#### LITHIUM-ION BATTERY PACK MONITORING FEATURES

Total Pack Output Voltage	Total Pack Output Current
Internal Pack Voltage	Internal Pack Current
Total Voltage of Series-Connected Cells	Cell Temperatures
Individual Cell Voltages	PCB Temperatures
Status of Charge and Discharge Protection Switches	

#### LITHIUM-ION BATTERY PACK PROTECTION FEATURES

Discharge Protection	Charge Protection	String Heater Overrides
Cell Under-Voltage Lockout, Software	Cell Over-Voltage Lockout, Software	Timeout
Cell Under-Voltage Lockout, Hardware	Cell Over-Voltage Lockout, Hardware	PCB Temperature
Cell Under-Voltage Lockout Timer	Cell Over-Voltage Lockout Timer	Measured Pack Voltage
Excessive String Current	Excessive Charging Current	Any Cell Temperature
String Short-Circuit Current	Total String Voltage Too Low	
Excessive Pack Current	Detection of UPS Chassis Installation	
Detection of UPS Chassis Installation	Cell Temperature Too Hot for Charging	
Cell Temperature Too Hot for Discharge	Cell Temperature Too Cold for Charging	
Cell Temperature Too Cold for Discharge	PCB Temperature Too High	
PCB Temperature Too High		



**BAT**  
**BAT-0400-H-1U**

## Product Description

The SynQor BAT-0400 battery pack is an alternative pack that can be used in place of the BAT-0200 pack. It is offered in two different versions with the different features: BAT-0400-H and BAT-0400-M. The BAT-0400 pack offers significantly longer runtime with the same power handling capability and rugged design of the original. The BAT-0400-M option also offers enhanced operational capabilities at cold temperatures down to -40°C. The BAT-0400 pack has the same protection features and status monitoring of the original BAT-0200 design, with additional protection features internal to the battery cells enhance safety in abusive conditions. The BAT-0400 packs can be used in existing UPS-1250, UPS-1500 and UPS-3000 products originally sold with the BAT-0200 pack.

	BAT-0200	BAT-0400-H	BAT-0400-M
Storage to -40°C	✓	✓	✓
Internal Heaters for operation to -40°C when input power is available	✓	✓	✓
Multiple levels of cell-by-cell protection and monitoring	✓	✓	✓
Coldstart from -20°C	✓	✓	✓
Operation -20°C to +55°C	✓	✓	✓
Coldstart from -40°C (self-heat)			✓
Safety features internal to cell design			✓
Heater operation during discharge		✓	✓
Runtime at 1250 W load	10 min	13.5 min	16.5 min
Pack Weight	10 lbs	11.8 lbs	11.8 lbs

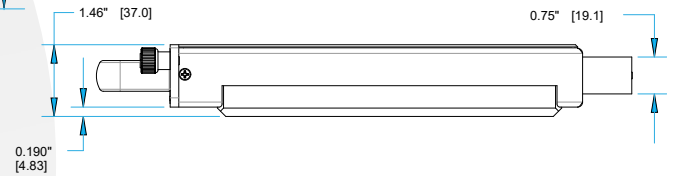
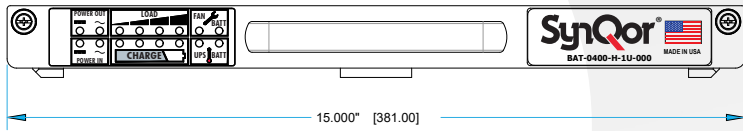
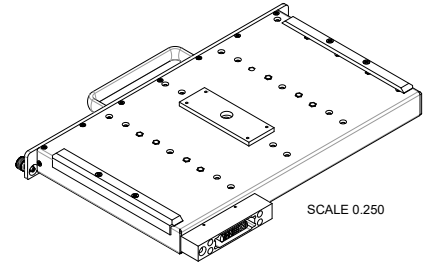
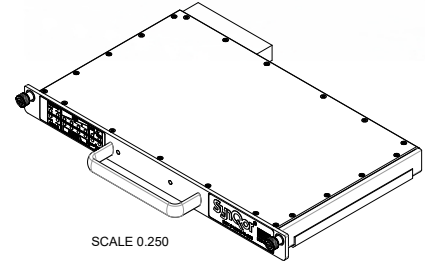
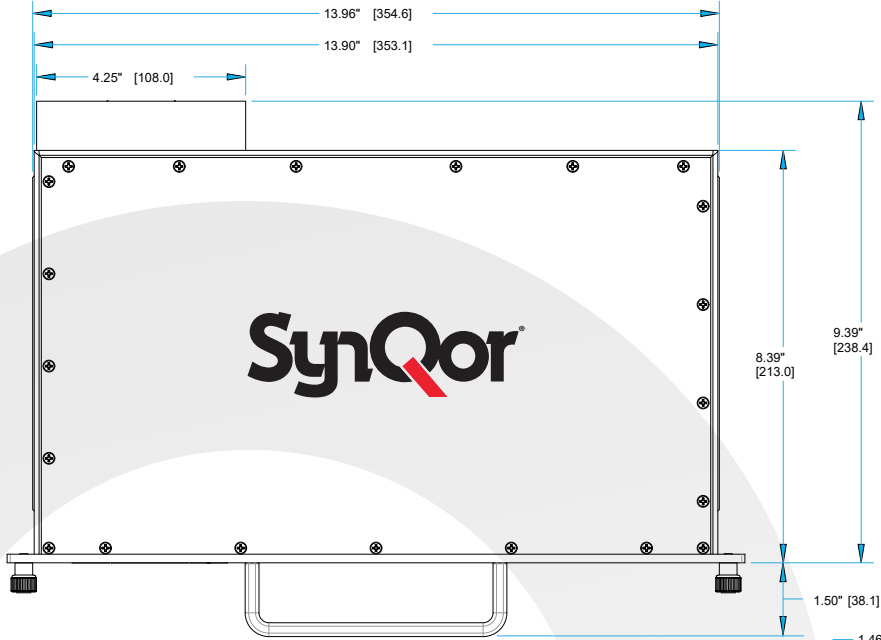
The BAT-0400-M pack provides cold-start operation down to -40°C. A cold-start is an enable of the UPS using only battery power, with no input power available. Below -20°C, following a cold-start enable command from the user, the BAT-0400 will pre-heat itself to operational temperature, then enable the UPS output.

From a start with the battery pack soaked at -40°C, the cold-start pre-heat takes 3.5 minutes. The pre-heat terminates based on internal cell temperatures, so a cold-start from a temperature warmer than -40°C will take less than 3.5 minutes. Although operation at full output load requires a full pre-heat sequence, the user can optionally set the pre-heat to terminate early if the output load is known to be less than full load.

At light load conditions and temperatures below -20°C, if the battery internal heat generation is not enough to keep the battery above the -20°C temperature limit, the BAT-0400 pack will enable the internal heaters as necessary to keep the battery in the operational range. Use of heaters in this regime increases the available runtime by keeping the cells warm.



# Mechanical Diagrams





## Ordering Information

BAT	Battery Pack Capacity (Watt-Hours)	Battery Pack Size	Height	Options
BAT	0400	H:	1U	000
BAT	0400: 400 W-hr	H: Standard (-20°C to 55°C)	1U: 1.46" (11.8 lbs.)	000 (Standard)

Not all combinations make valid part numbers, please contact SynQor for availability. See the Product Summary web page for more options.

Note: Battery packs are shipped at a charge level of 30%.

**Examples:**                    **Standard: BAT-0400-H-1U-000**

Safety & Qualifications	
IEC 62133	Safety requirements for portable secondary sealed cells.
ST/SG/AC.10/11	UN Recommendations on the Transport of Dangerous Goods
UL 1642	Lithium Batteries
EN 62040-1	General and safety requirements for UPS (Does not apply to 400Hz operation)
EN 62040-2	UPS Electromagnetic compatibility (Category C4)

**Contact SynQor for further information and to order:**

Phone: 978-849-0600 Toll Free: 888-567-9596 Fax: 978-849-0602

E-mail: [power@synqor.com](mailto:power@synqor.com) Web: [www.synqor.com](http://www.synqor.com)

Address: 155 Swanson Road, Boxborough, MA 01719 USA

**WARRANTY**

SynQor offers a 1 year limited warranty. Complete warranty information is listed on our website or is available upon request from SynQor.