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Standard Specification
EPIC Series Battery Cabinet

A battery cabinet shall be furnished in accordance with the following specification.

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1. General

- 1.1. This specification applies to the construction, materials, and performance of the EPIC Series Battery Cabinet. The cabinet provides a means for batteries and electrical equipment to be stored in an enclosure with the option for environmental controls and allowing operator(s) to monitor the system remotely.

2. Applicable Codes

The cabinet shall meet requirements of latest versions of the following industry and agency standards:

- 2.1. NEMA Type 1, IP 10
- 2.2. NEMA Type 3R, IP14
- 2.3. ASCE 7-10 (2010): Minimum Design Loads for Buildings and Other Structures, as applicable for wind and snow loading
- 2.4. IEEE 693 (2018): IEEE Recommended Practice for Seismic Design of Substations; High, Seismic certified, essential equipment (up to 1000lbs/door or width of section)
- 2.5. IEEE693 (2018): IEEE Recommended Practice for Seismic Design of Substations; Moderate, Seismic certified, essential equipment (up to 2000lbs/door or width of section)
- 2.6. IEEE 1635 (2018): Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications
- 2.7. CSA C22.2 No. 286-17 (2017), Industrial Control panels (Special Request)
- 2.8. UL 508A (2018), Standard for Safety Control Equipment (Special Request)



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3. Performance Conditions

- 3.1. The EPIC Battery Cabinet will be an indoor or outdoor enclosure meeting either NEMA 1 or NEMA Type 3R rating requirements.
- 3.2. For NEMA 3R, and when environmental options are provided, the battery cabinet will maintain a steady internal temperature of 77° F (+/- 3°F) through an external ambient temperature of -30°F to 120°F (+/- 5°F).
- 3.3. For NEMA 3R, battery cabinet will safely mitigate hydrogen to a level of 2% per IEEE 1635 (2018).
 - 3.3.1. Each battery section will include exhaust fans in the eave of each roof section.
 - 3.3.2. A make up air vent will be on far left front door of the battery section.
 - 3.3.3. Each electrical section will include exhaust fans in the eave of each roof section.
 - 3.3.4. A make up air vent will be on the far right front door of the electrical section.
- 3.4. The battery cabinet roof will withstand loads from falling snow up to 40 psf.
- 3.5. The battery cabinet will withstand loads from wind up to 151 mph.

4. Mechanical & Base Cabinet Design

- 4.1. General Cabinet Structure
 - 4.1.1. The battery cabinet will be scalable, allowing the addition of sections for greater length.
 - 4.1.2. All exterior battery cabinet hardware will be 18-8 stainless steel or better.
- 4.2. Base Design
 - 4.2.1. The battery cabinet base frame will be not less than 12-gauge.
 - 4.2.2. The battery cabinet base frame will be coated, before final powder coating, with a cationic epoxy primer.
 - 4.2.2.1. Tested per ASTM B117 for salt spray resistance at 500 hours and 1000 hours.
 - 4.2.2.2. Tested per GMW14872 for cyclic corrosion at 28 cycles.
 - 4.2.2.3. Tested per ASTM D1735 for humidity resistance at 500 hours, 5B rating.
 - 4.2.2.4. Tested per ASTM D870 for water resistance at 500 hours, 5B rating
- 4.3. Frame Design
 - 4.3.1. The battery cabinet interior frame will be constructed from painted 1-5/8" P1000H3 Unistrut® or equivalent.



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4.4. Door/Panel Design

- 4.4.1. For NEMA 1, the battery cabinet wall and door panels will consist of steel skins.
- 4.4.2. For NEMA 3R, the battery cabinet wall and door panels will consist of injected foam insulated panels.
 - 4.4.2.1. Panels will incorporate skins fabricated from 20-gauge powder-coated aluminum sheet.
 - 4.4.2.2. Panels will incorporate a 2-inch core of injected polyurethane foam utilizing HFO 1233zd(E) and water blowing agent, designed for commercial and industrial insulation applications meeting the requirements of UL94HF-1.
 - 4.4.2.3. Panels will incorporate a perimeter of polymeric material with a UV inhibitor package and include an integrated provision for gasketing material.
 - 4.4.2.4. Panel gasketing will be EPDM rubber foam or equivalent for sealing to the console frame.
- 4.4.3. The battery wall and door panels provide a heat resistance capacity of not less than R-12.
- 4.4.4. The battery cabinet's external hinges, hinge pins, and hinge brackets will be 316 stainless steel or better.
- 4.4.5. The battery cabinet doors will have a pad-lockable, three-point latching system.
- 4.4.6. Doors will incorporate handles made from polyamide thermoplastic.

4.5. Roof/Ceiling Design

- 4.5.1. For NEMA 1, the battery cabinet roof will incorporate a perforated steel sheet.
- 4.5.2. For NEMA 3R, the battery cabinet roof will have a pitch of 1.7 degrees.
- 4.5.3. For NEMA 3R, the ceiling will provide a heat resistance capacity of not less than R-6.

4.6. Cable Entry

- 4.6.1. The battery cabinet will allow for conduit entry by the following means:
 - 4.6.1.1. Stub-ups through the floor
 - 4.6.1.2. Gland plate on cabinet side.

4.7. Finish

- 4.7.1. The console exterior finish will be ANSI 61 gray epoxy coat per HindlePower standard CB5046-00 or equivalent when carbon steel is selected for:
 - 4.7.1.1. Exterior wall and door panel skins.
 - 4.7.1.2. Exterior base and upper frame assemblies.
 - 4.7.1.3. Roof assembly
- 4.7.2. For NEMA 3R, the cabinet interior wall and door skins will be smooth matte white per RAL 9010 per HindlePower standard CB5046-01 49/10103 or equivalent.
- 4.7.3. The cabinet exterior door/wall panel skins, base and upper frame assemblies will be unfinished when optional 316 stainless steel is selected.



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4.7.4. The cabinet wall and door panel perimeter extrusions will be color-coordinated to ANSI 61 gray.

4.7.5. The cabinet will accommodate custom colors per customer specification (at increased cost and lead-time) for:

4.7.5.1. Exterior wall and door panel skins.

4.7.5.2. Exterior base and upper frame assemblies.

4.7.5.3. Roof assembly

5. Battery Racking System

- 5.1. The console will incorporate a battery racking system comprising a standard P1000H3 Unistrut® (or equivalent) system to accommodate a variety of battery sizes and arrangements per application requirements.
- 5.2. The battery racking system has seismic certifications per applicable standards and capacities included in section 2.
- 5.3. Battery supports will be rated to handle the battery weight per standards included in Section 2.
- 5.4. Battery rack rails will incorporate an electrolyte-resistant nonconductive rail cover.
- 5.5. Battery rack rails will be supported by re-positionable brackets bolted into Unistrut® to allow for field modification if required.

6. Electrical Bay and Equipment

- 6.1. The cabinet can accommodate the following factory-installed electrical equipment in the electrical section:
 - 6.1.1. ATevo, AT10, and AT30 battery charger(s).
 - 6.1.2. Optional DC distribution panel.
 - 6.1.3. Optional DC disconnect.
 - 6.1.4. Optional AC distribution panel.
 - 6.1.5. Optional AC disconnect.
 - 6.1.6. Optional AC main breaker.
 - 6.1.7. Optional best battery selector.
 - 6.1.8. Optional equipment racking per EIA 19in or 23in standards. Rack to be removable for equipment installation and wiring.
 - 6.1.9. Customer specified equipment.

7. Electrical Design

- 7.1. The cabinet will accept 120/240 Vac split phase as its standard input.
 - 7.1.1. Standard terminal block for customer input terminals



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- 7.1.2. Cabinet operation will be powered from 120 Vac (line, neutral)
- 7.1.3. Battery chargers will operate from 240 Vac (line, line)
- 7.1.4. Nonstandard inputs are available via isolation transformer.
- 7.2. The cabinet internal power and control wiring will utilize XLPE wire per HindlePower standard CB0002-00.
 - 7.2.1. The cabinet internal wiring will include wire identification labels.
 - 7.2.2. The cabinet internal wiring will be in accordance with standards listed in section 2.

8. Standard Features

- 8.1. Integrated NEMA, two-hole ground pads for each section.
- 8.2. For NEMA 3R, dc ventilation fans in each section.
- 8.3. Wire labels.
- 8.4. Seismic rated pad mounting clips.
- 8.5. Padlockable handles on each door.
- 8.6. HindleHealth status lights.
 - 8.6.1. Under the following conditions, the system will indicate steady green:
 - 8.6.1.1. Normal operation (no faults or alarms within the system or subsystem)
 - 8.6.2. Under the following conditions, the system will indicate steady red:
 - 8.6.2.1. Cabinet alarms
 - 8.6.2.1.1. Fan failure
 - 8.6.2.1.2. Battery bay over-temperature (if equipped)
 - 8.6.2.1.3. Battery bay low temperature (if equipped)
 - 8.6.2.1.4. Electronic bay over-temperature (if equipped)
 - 8.6.2.1.5. Electronic bay low temperature (if equipped)
 - 8.6.2.1.6. Smoke alarm (if equipped)
 - 8.6.2.1.7. Hydrogen 2% (if equipped)
 - 8.6.2.1.8. Hydrogen 1% (if equipped)
- 8.7. Common alarm relay, 1 form-C contact.
- 8.8. Fan failure alarm relay, 1 form-C contact.

9. Optional Features

- 9.1. Battery section forced air heating (for NEMA 3R).
- 9.2. Battery section air conditioning (for NEMA 3R).



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- 9.3. Battery spill containment (lead acid or NiCd).
 - 9.3.1. Stainless steel spill trays under each battery bay.
 - 9.3.2. Spill absorbant pillows.
- 9.4. Smoke detector
- 9.5. Fire extinguisher
- 9.6. Hydrogen detector
- 9.7. Portable two bottle eyewash, door mounted in battery bay.
- 9.8. Interior LED lighting with manual switch
- 9.9. Interior electrical outlet
- 9.10. Crane lifting straps
- 9.11. Elevated base kit
- 9.12. Individual alarm relays
 - 9.12.1. Battery bay high temperature
 - 9.12.2. Battery bay low temperature
 - 9.12.3. Electronic bay high temperature
 - 9.12.4. Electronic bay low temperature.
- 9.13. 3rd party equipment alarm integration.
- 9.14. Rear doors.
- 9.15. Custom colors.
- 9.16. Stainless steel.
- 9.17. Custom nameplate data (markings, model number, etc.)
- 9.18. Customized parts data package
 - 9.18.1. Manufacturer's replacement part number.
 - 9.18.2. Recommended spares.

10. Advanced Capability with ATevo Battery Charger

- 10.1. The EPIC Series Battery Cabinet can have certain advanced capabilities when equipped with an ATevo battery charger.
 - 10.1.1. Binary inputs for customer-supplied equipment alarms. (requires optional auxiliary alarm relay board)
 - 10.1.2. Modbus over Ethernet I/O. (requires optional communication board)



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- 10.2. Each input acknowledged by the ATevo auxiliary relay board will have remote monitoring capabilities.
 - 10.2.1. Charger alarms.
 - 10.2.3. Any third-party device that can communicate a digital or analog signal for alarm or value will be integrated into the alarm schedule, event log, and able to illuminate the green or red LED.

11. Drawing and Instruction Manuals

- 11.1. Each EPIC Battery Cabinet will be furnished with the following standard documentation:
 - 11.1.1. Drawing list.
 - 11.1.2. Outline drawing.
 - 11.1.3. Internal component layout.
 - 11.1.4. Foundation drawing.
 - 11.1.5. Lifting diagram.
 - 11.1.6. Cabinet electrical schematic.
 - 11.1.7. Connection diagram.
 - 11.1.8. Circuit breaker coordination study.
 - 11.1.9. Hydrogen mitigation calculations.

12. Nameplate Information

- 12.1. Each nameplate will include:
 - 12.1.1. Model number.
 - 12.1.2. Serial number.
 - 12.1.3. AC input voltage and configuration.
 - 12.1.4. AC input frequency.
 - 12.1.5. Maximum AC input amperes.
 - 12.1.6. Cooling capacity BTU/h (if installed).
 - 12.1.7. Heating capacity BTU/h (if installed).
 - 12.1.8. Interrupting capacity.
 - 12.1.9. Short circuit rating.



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Job-Specific Details

Job Name _____

(Please refer to the specification for "Fill-In" details)

Feature	Spec Section	Detail	Specifier Fill-In Details
Application	3.1	Indoor or Outdoor	
		Nema 1 or NEMA 3R	
DC System Voltage		DC System Voltage	
Battery Information	5.1	Battery Model	
		Number of Cells	
		Number of Jars	
		Jar Dimensions	
Battery Charger Detail		Battery Charger Model	
		Battery Charger Dimensions	
DC Distribution Panel		DC Panel Model	
		Main breaker amp rating	
		Number of branch breakers	
		Branch breaker amp rating	
DC Disconnect		Disconnect Model	
		Disconnect Rating	
		Fused or Unfused	
Optional Features	9	Heater System	
		Air Conditioner	
		Spill Containment	
		Interior LED Lighting	
		Interior Electrical Outlet	
		Portable Eyewash	
		Hydrogen Detector	
		Fire Extinguisher	
		Smoke Detector	
		Rear Doors	
		DC Terminal Block	
		Lifting Straps	
Additional Comments			