

Ring Terminal - Official Commercial BESS Technical Overview & Datasheet

RING TERMINAL: HIGH-RELIABILITY DC POWER INTERCONNECT FOR ENERGY STORAGE SYSTEMS

EXECUTIVE SUMMARY

As the foundational interconnect component for high-current DC power distribution within Battery Energy Storage Systems (BESS), the Ring Terminal (lug) ensures irreversible, low-impedance electrical joints between battery racks, busbars, PCS DC inputs, and protective grounding networks. Designed for Tier-1 utility-scale and C&I storage platforms, this terminal family delivers long-term mechanical stability under thermal cycling, vibration, and fault current conditions. All units comply with UL 486A-486B, IEC 61238-1, and RoHS directives, supporting copper and aluminum conductors from 6 AWG to 750 kcmil.



SYSTEM ARCHITECTURE & SAFETY

Within containerized and modular cabinet BESS topologies, ring terminals serve as the primary junction points for series/parallel battery string connections, DC circuit breaker interfaces, and EMS current sensing loops. The closed-ring design prevents accidental dislodging, while the tin-plated or bare copper barrel ensures galvanic compatibility with aluminum or copper busbars. High-pressure crimping or compression tooling creates a gas-tight, cold-welded interface that minimizes contact resistance ($< 50 \mu\Omega$ for a 95 mm^2 terminal). Fire safety is enhanced by eliminating loose stranded wires that could cause arcing or resistive overheating.

KEY FEATURES

- Feature 1: Sealed Barrel with Funnel Entry – Accepts fine-stranded or Class K/M flexible cables, preventing strand breakage during crimping.
- Feature 2: Electro-Tin Plated Finish – Provides corrosion resistance (Salt Spray > 500 hrs, ASTM B117) and stable contact interface for lithium-ion battery environments.
- Feature 3: Color-Coded Nylon or PVC Insulated Options – Rapid field identification for cross-sectional area (e.g., 35 mm² blue, 95 mm² black/yellow).
- Feature 4: Double-Hole or Single-Hole Pad Configurations – Fixed-center spacing (e.g., 25.4 mm or 32 mm) compatible with standard M8, M10, or M12 studs on battery modules and BMS contactors.
- Feature 5: High Short-Circuit Withstand – Rated for 65 kA for 1 sec without deformation per IEC 61439-1 annex testing.

COMPLIANCE & STANDARDS

- UL 486A-486B (File E122402) – Wire connectors and soldering lugs for copper conductors.
- CSA C22.2 No. 65 – Wire connectors.
- IEC 61238-1 – Compression and mechanical connectors for power cables.
- RoHS 2011/65/EU – Restriction of hazardous substances.
- REACH (EC 1907/2006) – Chemical registration compliance.

- Flammability rating: V-2 or V-0 (insulated types per UL 94).

TECHNICAL SPECIFICATIONS

Parameter	Specification
Conductor cross-section	6 AWG to 750 kcmil (Cu) / 10 AWG to 600 kcmil (Al)
Stud hole diameter	6.4 mm (M6) / 8.4 mm (M8) / 10.5 mm (M10) / 13.0 mm (M12)
Barrel type	Seamless copper tube, tin-plated (8-12 μ m)
Temperature range	-40 ° C to +125 ° C (continuous operation)
Max DC current (95 mm ²)	340 A (90°C rated conductor, ambient 40°C)
Crimp tool class	IEC 61238-1 Class A (electrical) & Class B (mechanical)
Insulation voltage rating	600V / 1000V DC (insulated type up to 1500V DC)
Pull-out strength (95 mm ²)	≥ 4.5 kN (IEC 61238-1)
Salt spray resistance	≥ 500 hrs ASTM B117 (no white rust)

INDUSTRIAL DEPLOYMENT

Ring terminals are field-installed using hydraulic crimping tools with matched die indices (e.g., Burndy, Klauke, Greenlee). Torque requirements for stud mounting: M8 (12-15 N · m), M10 (20-25 N · m), M12 (35-40 N · m). Annual re-torque inspection is recommended for high-vibration environments (marine, mobile BESS). For aluminum conductors, an antioxidant compound (e.g., No-Ox-ID) must be applied. All terminals are 100% factory-tested for electrical continuity and plating thickness (8-12 μm tin over copper).



For procurement, specify conductor type (Cu/Al), insulation color (if required), hole count, and stud size. Custom barrel lengths and metric hole patterns available for OEM BESS integrators.