

Anderson Power Plug - Official Commercial BESS Technical Overview & Datasheet

ANDERSON POWER PLUG FOR COMMERCIAL ENERGY STORAGE SYSTEMS

EXECUTIVE SUMMARY

As global energy storage deployments scale toward multi-MWh capacities, the reliability of low-voltage auxiliary and high-current DC interconnection components becomes critical to system uptime. The Anderson Power Plug series represents a field-proven, touch-safe, high-cycle connector solution purpose-engineered for Commercial & Industrial (C&I) Energy Storage Systems (ESS). Designed for rapid field service, blind-mating rack integration, and vibration-resistant DC bus connections, this connector family bridges the gap between generic industrial plugs and utility-grade power distribution requirements.



SYSTEM ARCHITECTURE & SAFETY

The Anderson Power Plug employs a genderless housing design with integrated arc-suppression chambers and finger-proof contacts (IP2X). Within a typical 215 kWh to 372 kWh outdoor cabinet, these plugs serve three critical functions:

- Battery rack disconnects (up to 350A continuous per pole)
- PCS DC input/output auxiliary interfaces
- Field-swappable service break points without de-energizing entire strings

All variants integrate a secondary locking latch with audible engagement feedback, preventing partial mating under load. The housing material is UL94 V-0 rated polycarbonate, providing -40°C to +105°C operational tolerance.

KEY FEATURES

- Touch-Safe Design: Spring-loaded self-closing dust covers and recessed contacts eliminate accidental contact during maintenance (IEC 60947-3).
- High-Cycle Durability: Rated for 10,000+ mating cycles without performance degradation, critical for mobile storage units or frequent commissioning.
- Low Millivolt Drop: Silver-plated copper contacts achieve $<0.2\text{ m}\Omega$ resistance per pole, reducing parasitic losses in high-ampacity strings.
- Color-Coded Housings: Standardized gray (auxiliary, $\leq 150\text{A}$), red (positive DC bus), black (negative DC bus), blue (PV input) for error-proof field installation.
- Chemical Resistance: Seals resist diesel, glycol coolant mist, and UV exposure per UL 50E.

COMPLIANCE & STANDARDS

- UL 1977 (Component connectors for data, signal, and power).
- UL 4128 (Energy storage system connectors – new standard compliance).
- RoHS 3 (2015/863/EU).
- REACH SVHC compliant.
- IP54 (mated) / IP20 (unmated) with optional environmental boot.
- Vibration rating: 5G RMS, 10–500 Hz per IEC 61373 (rolling stock extended to stationary ESS).

TECHNICAL SPECIFICATIONS

Parameter	Specification
Rated Current (Single Pole)	120A / 180A / 350A models
Rated Voltage (DC)	600V DC (UL) / 1000V DC (IEC optional)
Contact Material	Silver-plated copper (standard) or tin-plated (cost)
Dielectric Withstanding Voltage	2200V DC, 60 sec
Insulation Resistance	>100 M Ω @ 500V DC
Operating Temperature	-40°C to +105°C
Flammability Rating	UL94 V-0
Mating Cycles	10,000 (minimum)

Current ratings are derated linearly at ambient >50 ° C. Parallel pole configurations (double studs) support up to 700A per connector body for high-power DC bus splicing. Wire termination options include crimp (10 AWG to 4/0 AWG), PCB mount, and busbar lug adapters. All plugs include a pull-grip strain relief interface rated for 150N pull-out force.

INDUSTRIAL DEPLOYMENT

For C&I behind-the-meter peak shaving and EV fleet charging depots, Anderson Power Plugs are deployed at the following touch points:

- Rack-to-rack jumpers in 10-foot containerized ESS.
- Service disconnect points for liquid cooling pump power feeds.
- Temporary paralleling ports for mobile generator hookup during grid outages.

Field data from 150+ operating sites (1 MW – 20 MWh range) indicates a mean-time-between-failure (MTBF) exceeding 500,000 hours, with failures limited to physical abuse (cable over-tension) rather than contact degradation. Routine thermal imaging during quarterly PM confirms <15°C temperature rise above ambient at rated load.

