7kW AC EV Charger - Official Commercial BESS Technical Overview & Datasheet

## PRODUCT OVERVIEW: 7kW AC EV CHARGER

Next-generation alternating current charging solution for residential and light commercial electric vehicle infrastructure. Designed for seamless integration with photovoltaic systems, energy storage, and grid-tied micro-grids. The 7kW AC charger delivers intelligent, safe, and future-proofed charging for mode 3 AC applications worldwide.

## SYSTEM ARCHITECTURE & SAFETY

Built around a fully galvanically isolated AC power stage with integrated Type A + 6mA DC leakage protection. The unit operates with a single-phase 230V AC nominal input and delivers continuous 7kW output through a standard IEC

62196-2 Type 2 or Type 1 vehicle connector. An embedded power metering IC (accuracy Class 1 or better) provides real-time voltage, current, active power, and energy registration. The architecture supports both scheduled charging and dynamic load balancing via external energy management system (EMS) signals using OCPP 1.6J or 2.0.1 over Ethernet, Wi-Fi, or 4G.

KEY FEATURES

- Feature 1: Dynamic Load Balancing – Automatically adjusts charging current from 6A to 32A (single-phase) based on real-time site load or available PV/storage power. Prevents grid overload and maximizes self-consumption.
- Feature 2: OCPP 1.6J & 2.0.1 Compliance – Full remote management, smart charging profiles, reservation, and transaction data via any certified central system. Local offline mode retains schedule and authentication.
- Feature 3: Integrated RFID & App Authentication – Supports ISO/IEC 14443 A/MIFARE classic or desfire EV1. User management via white/black lists stored locally (up to 1,000 users) or cloud.
- Feature 4: Rugged Outdoor Housing – IP54/NEMA 3R rated, IK08 impact resistance. UV-stabilized polycarbonate or aluminum chassis. Operating ambient -30°C to +50°C with automatic current derating above +45°C.
- Feature 5: Residual Current Monitoring – Type A (30mA AC) + 6mA DC detection internally. No external Type B RCD required for most single-phase residential installations – reduces BOM and panel space.

- Feature 6: MID-certifiable energy metering – Built-in bidirectional meter (optional) permits sub-billing, feed-in tracking, and precise energy accounting for fiscal applications.

COMPLIANCE & STANDARDS

- EN IEC 61851-1 (2019): Electric vehicle conductive charging system – General requirements.
- EN 61000-6-1/2/3/4: Electromagnetic compatibility – Immunity and emissions for residential and light industrial environments.
- OCPP 1.6J (JSON over WebSockets) – Core, Smart Charging, Reservation, Remote Trigger, and Firmware Management profiles.
- IEC 62955: Residual direct current detecting device (RCD-DD) for mode 3 AC charging.
- CE, UKCA, RCM (pending final country-specific certification).
- RoHS 3 (2015/863/EU) and REACH compliant.

TECHNICAL SPECIFICATIONS

AC INPUT

- Nominal voltage: 230V AC ±10% (single-phase)
- Nominal frequency: 50/60 Hz (auto-detecting)
- Rated current: 32A continuous (max)

- Recommended upstream protection: 40A Type A MCB / 40mA Type A RCD or RCBO

- Short-circuit withstand: 6kA (with proper upstream MCB)

AC OUTPUT (VEHICLE SIDE)

- Nominal power: 7kW (7.2kW peak for 10 minutes)

- Adjustable current range: 6A – 32A (1A steps)

- Output voltage range: follows grid ±10%

- Output connector: IEC 62196-2 Type 2 socket (female) or fixed cable with Type 1/Type 2 plug – specify at order

- Cable length (fixed cable variant): 5m or 7.5m (option)

PROTECTIONS

- Overvoltage/undervoltage: trip >264V AC or <184V AC

- Overcurrent: hardware + firmware limit at 33A

- Short-circuit: instantaneous electronic disconnect (<50µs) + upstream MCB backup

- Overtemperature: derating starts at +45°C, shutdown at +65°C

- Residual current: Type A (30mA AC) + 6mA DC detection per IEC 62955

- Surge protection: Type 3 MOV (20kA/phase, 8/20µs) optional external Type 2 recommended for lightning-prone areas

COMMUNICATIONS & SMART FUNCTIONS

- Wired: Ethernet 10/100Base-T (RJ45), RS485 Modbus RTU (for EMS or solar inverter coordination)

- Wireless: Dual-band Wi-Fi (802.11 b/g/n, 2.4/5 GHz), 4G LTE Cat 1 (optional SIM slot)

- Protocols: OCPP 1.6J (JSON), Modbus TCP/RTU, MQTT (custom)

- Local UI: 2.4″ color LCD (charging status, energy, RFID feedback) + LED bar (4-LED)

- Firmware update: OTA via OCPP or direct web interface (HTTP/HTTPS).

ENVIRONMENTAL & MECHANICAL

- Operating temperature: -30°C to +50°C (full power up to +45°C, then linear derating to 0A at +65°C)

- Storage temperature: -40°C to +85°C

- Humidity: 5% to 95% (non-condensing)

- Altitude: ≤2000m (derate 1% per 100m above 2000m up to 3000m)

- Enclosure rating: IP54 (installation: wall or pedestal), IK08 (impact resistance)

- Dimensions (W x H x D): 250mm x 350mm x 142mm (wallbox without cable)

- Weight: 4.2kg (socket version), 5.1kg (5m fixed cable version)

- Cable management: Integrated holster for Type 2 plug (socket variant) or cable hanger (fixed cable)

INSTALLATION & MAINTENANCE

- Connection type: Screw terminals for 6mm² – 10mm² copper conductors (L, N, PE)

- Recommended external circuit breaker: 2-pole 40A Curve C MCB

- Grounding: TT/TN systems with neutral reference; IT system (isolated) not supported without external isolation transformer

- Maintenance interval: Visual inspection every 12 months; functional RCD self-test monthly (automatic via software)

| **Parameter** | **Specification** |
|---|---|
| Rated Power (continuous) | 7 kW (32A @ 230V AC, single-phase) |
| Adjustable Current Range | 6A – 32A (1A steps) |
| Output Connector Type | IEC 62196-2 Type 2 socket or fixed cable Type 2/Type 1 |
| Communication Protocols | OCPP 1.6J, Modbus RTU/TCP, MQTT |
| Enclosure Protection | IP54 / IK08 (wall or pedestal mount) |
| Operating Temperature | -30°C to +50°C (derating above +45°C) |
| Residual Current Protection | Type A (30 mA AC) + 6 mA DC (IEC 62955) |
| Authentication | RFID (ISO/IEC 14443 A) and mobile app |

INDUSTRIAL DEPLOYMENT NOTE

For commercial and industrial (C&I) installations with EV fleets, the 7kW AC charger can be deployed in clusters of up to 20 units sharing a single 3-phase 400V AC feeder via a dynamic load balancing controller. When integrated with an energy storage system (ESS) and PV, the charger may be configured to prioritize 100% renewable charging during high solar hours and switch to time-of-use (TOU) arbitrage during peak tariff windows. The OCPP interface also supports ISO 15118 Plug & Charge (with optional software upgrade) for automated authentication and billing in depot or public workplace charging scenarios.

WARRANTY & SUPPORT

- Standard warranty: 3 years (extendable to 5 years)

- Mean Time Between Failures (MTBF): >50,000 hours at 25°C ambient

- Spare parts availability: Minimum 7 years from end-of-sale date

- Technical support: 24/7 remote diagnostics via OCPP; field replacement of power module or mainboard under 30 minutes.