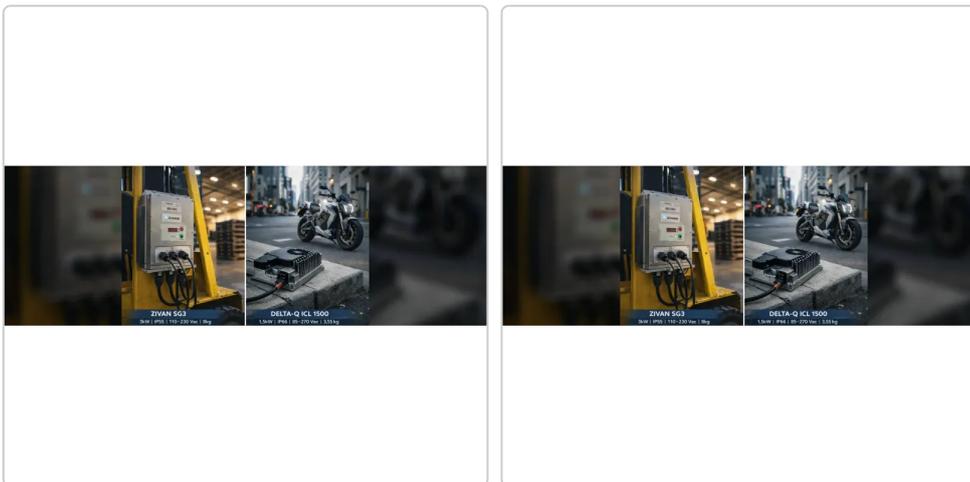# FAQ: Choosing a 96V onboard charger for lead/lithium (CAN, IP65) – criteria + SG3/ICL/CT3.3

Reference : LND-004-96V-CHARGEUR-CAN-IP65

Brand : ZIVAN

Options :

No variants

3D Model : Not available

EAN-13 :

On a traction architecture built around a **96V nominal** DC bus (48–120V depending on platforms), the onboard charger is not just an AC/DC converter. It directly drives the **charging strategy** (lead-acid / lithium), the **environmental robustness** (IP rating, temperature, vibration), and the **supervision layer** (BMS, vehicle controller, telematics). This page compares three commonly used references for retrofit and industrial machines: **ZIVAN SG3 96V 25A**, **Delta-Q ICL1500**, and **ZIVAN CT3.3**.

96V constraints

In embedded applications, charging must remain stable despite variable mains quality (workshop outlets, extension leads, generator sets) and thermal constraints. On a 96V bus, DC currents become significant: cable cross-sections, ohmic losses, and thermal derating directly impact machine availability. Integration must also account for real-world sealing (housing + connectors + harness), as well as EMC constraints when traction power and communications (CAN) share the same wiring harness.

Lead vs lithium

Lead: multi-stage

Lead-acid batteries (AGM, GEL, etc.) rely on multi-stage charging (bulk/absorption/float) with maintenance control and, depending on the use case, equalization phases. Field performance depends on voltage/current regulation accuracy and on phase durations that match the battery technology and real duty cycles.

Lithium: BMS control

For lithium, the charger must execute a clean CC/CV profile while remaining subordinate to the BMS: charge enable, current/voltage limits, safe shutdown on cell/temperature faults, and state reporting for diagnostics and maintenance. A usable CAN interface reduces commissioning ambiguity and supports robust fault handling.

Type 2 charging

In electric mobility, the **Type 2** interface is not only about the connector: it drives the charging user experience, integration compliance, and the complexity level on the vehicle side. Depending on the charger architecture, Type 2 handling can be **native** (integrated control and interlocking) or require an **external module** acting as the interface/EVSE.

- In a mobility-oriented integration, the **CT3.3** can be deployed with a **"natural" Type 2** approach, using an architecture aligned with modern onboard charging use cases.
- By contrast, more "classic" chargers such as **SG3** and **ICL1500** are typically integrated via an **external Type 2 module** (pilot control, charge enable, interlocks).
- In retrofit and multi-platform projects, the goal is to **standardize the charging interface** independently of the selected charger, in order to reduce harness/control variants.
- EVEA has developed an **adaptation system** that makes any onboard charger **Type 2 ready**: the conversion is implemented at the interface and control-logic level, without changing the charger power sizing.
- At integration level, it remains essential to address: **AC protection**, connector/harness sealing, water paths, vibration robustness, and EMC compatibility between power stages and pilot signals.

Comparison

The rating below (★ to ★★★★★) is intended for "design office integration": environmental robustness, input range, system functions, and CAN usability. It does not replace proper sizing (charge time), but it accelerates selection against project constraints.

Criteria	ZIVAN SG3 96V 25A	Delta-Q ICL1500	ZIVAN CT3.3
Charging power	★★★★★ (3.0 kW)	★★★☆☆ (1.5 kW)	★★★★★ (3.3 kW)
AC input range	★★★☆☆ (110–230 Vac)	★★★★★ (85–270 Vac)	★★★★★ (85–270 Vac)
IP rating	★★★☆☆ (IP55)	★★★★☆ (IP66)	★★★★★ (IP67)
Operating temperature	★★★☆☆ (−20…+50ºC)	★★★★★ (−40…+65ºC)	★★★★★ (−40…+70ºC)
CAN monitoring	★★★★☆ (CANopen + alarms + I/O)	★★★★★ (CANopen / J1939 + logs)	★★★★☆ (BMS wake-up + integration)
Battery chemistries	★★★★★ (lead/gel + lithium via profiles)	★★☆☆☆ (lithium-focused)	★★★★☆ (lithium-focused)
System features	★★★☆☆ (AUX, sensors, LEDs)	★★★☆☆ (interlock, OEM protections)	★★★★★ (500 W DC/DC, EVSE option, stacking)
Compactness	★★☆☆☆ (≈8 kg)	★★★★★ (≈3.55 kg)	★★★★☆ (≈6 kg, air / liquid cooling)

ZIVAN SG3

The **SG3** positions itself as a versatile onboard charger in the **3.3 kW** class, with **PFC** (power factor stated at 0.98) and a stated efficiency ≥90%. From an integration standpoint, it fits classic motive environments: charge-profile management, auxiliary I/O, and fault handling via a detailed alarm table.

- **AC input** 110–230 Vac ±10%, 50/60 Hz; stated max input current 15 Arms.
- **Power** 3.3 kW absorbed (Pmax), 3000 W delivered to the battery (Pmax).
- **Environment** IP55, −20 to +50ºC; installation with clearance around fan/heatsink for full power.
- **Charging** configurable profiles (lead stages, dedicated modes), adjustable cable voltage-drop compensation.
- **Interface** CAN (Superseal connector) and auxiliaries (AUX1/AUX2, PT100/NPT100-type sensor, remote LED).

Delta-Q ICL

The **Delta-Q ICL1500** is designed for OEM lithium integration: a usable CAN interface, **CANopen** and **J1939** protocol support, and a structured diagnostic approach (states, faults, history) useful for industrialization and maintenance. **IP66 (NEMA4)** and the −40…+65ºC temperature range make it a robust option for harsh environments.

- **AC input** 85–270 Vac, 50/60 Hz; power factor >0.99 (120 Vac) and >0.98 (230 Vac).
- **Power** 1500 W max; lithium final charge voltage variants 36–58V / 55–85V / 80–120V depending on model.
- **Max current** up to 33.3 A (~58 V variant), 25 A (85 V), 18.7 A (120 V) at Vin > 200 Vac.
- **Protection** reverse polarity (Poka-Yoke terminals + auto-reset protection), electronic current limiting on short circuit.
- **Interface** CAN, dry-contact interlock (0.3 A), DC connection via ring lugs (Neg M6 / Pos M8).

ZIVAN CT3.3

The **CT3.3** targets "platform" architectures where the objective is to reduce the number of enclosures: **3.3 kW** traction charger, integrated **500 W DC-DC** for low-voltage supply, and an **EVSE** interface option depending on version. IP67, extended temperature capability, and liquid-cooling availability are decisive advantages when packaging is constrained or exposed.

- **AC input** 85–270 Vac; stacking possible 3.3 / 6.6 / 9.9 kW and beyond for scalable power.
- **HV variants** 58.8 V / 65 A; 65 V / 65 A; 120 V / 40 A (depending on version).
- **AUX DC** 13.7 V nominal configurable 12–14.5 V; 500 W in drive mode and 70 W in charging mode.
- **Environment** IP67; -40 to +70°C (full power up to 50°C); fan-cooled or liquid-cooled versions.
- **Integration** BMS wake-up, multi-pin signal connector, cybersecurity-oriented approach (AES128 stated).

Wiring & EMC

On 96V systems, charger integration is often decided by harness quality and EMC performance more than by nominal power. Design office and workshop best practices:

- Physically separate **HV power** (AC/DC) and **signals** (CAN, interlock, sensors); avoid long parallel runs.

- Size DC cable cross-sections based on charge current, allowable heating, and voltage drop; leverage cable-drop compensation where available.

- Engineer the CAN topology: lengths, termination, shield continuity, and a chassis/shield grounding strategy consistent with the vehicle.

- Reduce ground loops, stabilize 0V/control ground references, and document the grounding policy (star point, chassis, islands).

- Manage vibration: strain relief, bend radii, clamps, anti-abrasion zones, and locking connectors.

Quick choice

- **Need 3.3 kW and multi-chemistry flexibility**: ZIVAN SG3, suited to mixed fleets and legacy lead strategies with CAN and I/O integration.
- **Lithium only + IP66 + structured OEM integration**: Delta-Q ICL1500, relevant when the BMS drives charging and diagnostics/logs are central.
- **Modern platform + IP67 + integrated DC/DC + scalable power**: ZIVAN CT3.3, coherent for an integrated and industrializable architecture.