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## Evolving Requirements | KST EV Charging Connectors

For the past 50 years, KST has literally stamped its reputation as a leading global manufacturer of electrical terminals and automotive connectors. In 2012, leveraging decades of stamping and injection mold technology, KST expanded its portfolio, setting a new innovative course by researching & developing an evolving range of AC/DC charging solutions for residential, industrial and commercial charging station (EVSE) scenarios and EV applications.

Today, KST's EV Charging Connector product line includes products offerings for three specific geographical regions built to current regulatory specifications set by each regions respective regulatory body.

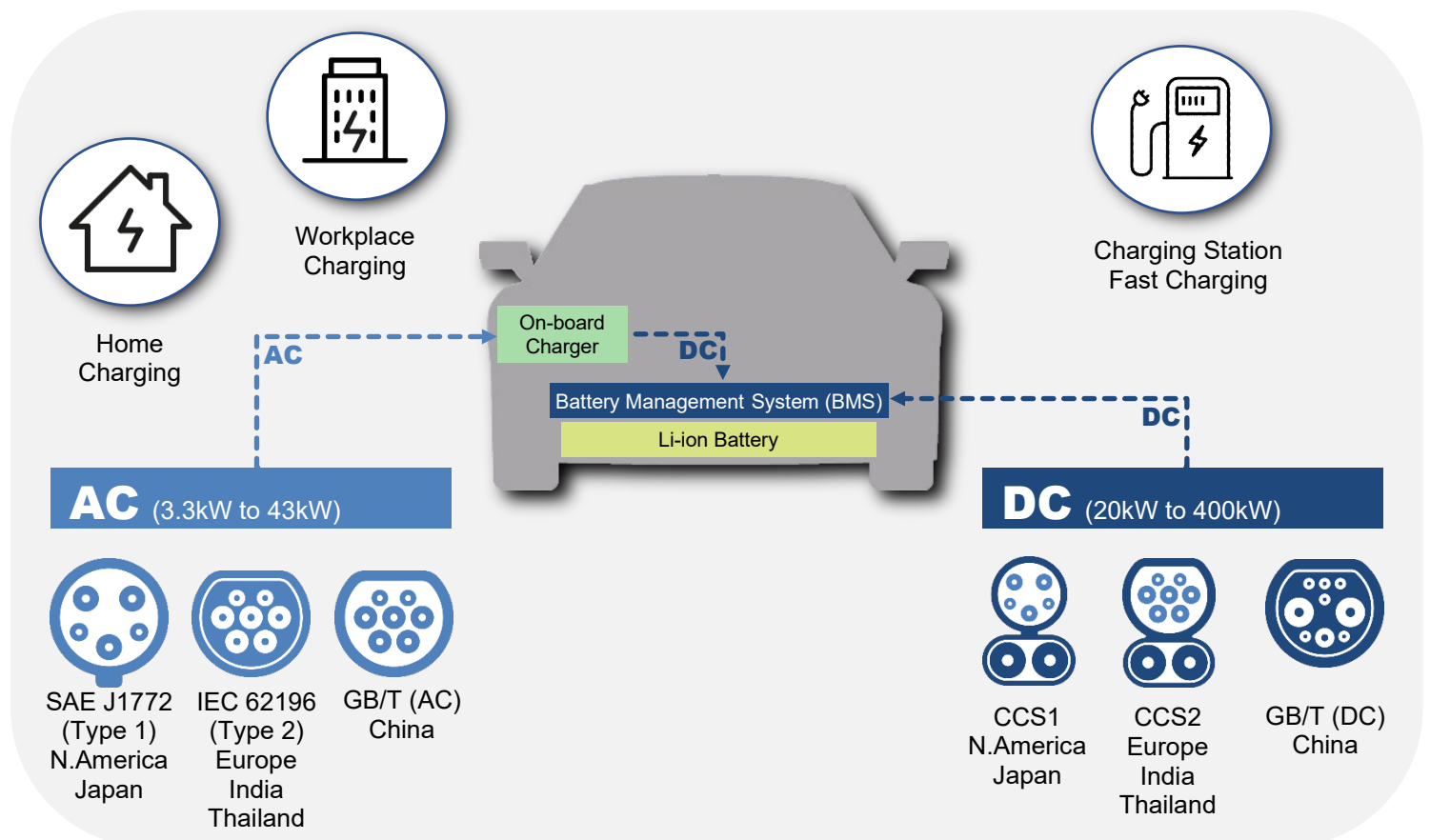


Figure 1 KST EV charging connector types by region and AC/DC capabilities of EV charging inlets in residential, workplace and charging station scenarios.

# AC EV Charging Connectors

## SAE J1772 (Type 1) | AC EV Charging Connectors

The Society of Automotive Engineering (SAE) defines the general physical, electrical, communication, and performance requirements for EV charging systems used in North America, as part of the SAE J1772 standard. Below are the current charging levels that are practiced in the North American market.

SAE J1772 (Type 1) is a single-phase connector and is a standard for EVs in North America and Japan. It allows you to charge your car at a rate of up to 19.2 kW, depending on the capacity of your car's on-board charger, voltage and amperage grid capability.

- Charging "levels" are specific to SAE J1772 and are used to categorize the rated power, voltage, and current of the charging system. The evolving standard currently has 2 different EV charging levels for AC Charging.
  - AC Level 1: Residential charging from a standard 120V outlet with a maximum current of 12 or 16A, delivering maximum power of 1.44kW or 1.92kW. The EV's on-board charger converts AC to DC.
  - AC Level 2: Residential, Workplace charging from a standard 240V outlet or from a dedicated EV charge point (EVSE); AC voltage at 240V with a maximum current of 80A and a maximum power of 19.2KW. The EV's on-board charger converts AC to DC.

## IEC 62196 (Type 2) | AC EV Charging Connectors

IEC 62196 Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles is a series of international standards that define requirements and tests for plugs, socket-outlets, vehicle connectors and vehicle inlets for conductive charging of electric vehicles.

IEC 62196 (Type 2) connectors have three additional wires allowing for triple-phase power and current providing for higher charging rates when compared to single-phase SAE J1772 Type 1 connectors. For residential charging, the highest charging rate is 19.2 kW, while charging stations can achieve charging rates of up to 43 kW. Again, this is dependant on the capacity of your car's on-board charger, as well as the your scenarios voltage and amperage grid capability / configuration.

# DC EV Charging Connectors

The Combined Charging System (CCS) is a standard for charging electric vehicles, which uses Combo 1 and Combo 2 AC/DC inlets which can be used with both AC and DC connectors to provide power at up to 400kW. These connectors, both inlets and plugs are an extension of the SAE J1772 (Type 1) and IEC 62196 (Type 2) connectors, with two additional direct current (DC) contacts to support high-power DC fast charging. CCS plugs support DC charging only.

## CCS1 | AC/DC EV Charging Connectors

The CCS1 connector is an enhanced version of the Type 1 connector, with two additional DC power contacts for the purpose of fast charging. CCS1 EV Charging Inlets support AC and DC charging.

## CCS2 | AC/DC EV Charging Connectors

The CCS connector is an enhanced version of the Type 2 connector, with two additional power contacts for the purpose of fast charging. CCS2 EV Charging Inlets support AC and DC charging.

- Charging "levels" are used to categorize the rated power, voltage, and current of the charging system. The evolving standard currently has 2 different EV charging levels for DC charging.
  - DC Level 1: EVSE DC charging ranging from 50 to 1000V, with a maximum current of 80A and a maximum power of 80kW.
  - DC Level 2: EVSE DC charging ranging from 50 to 1000V, with a maximum current of 400A and a maximum power of 400kW.

### Company Resources

- An integrated ISO and IATF 16949 certified electrical terminal and connector manufacturer.
- ISO certified Quality Assurance and authorized independent UL Testing Laboratory.
- Core stamping and injection mold technologies have been honed developing over 30,000 products.
- EV Charging Connector OEM for the leading EV brands (Toyota, Volvo, Mercedes-Benz).
- Three factories: two including HQ in Taiwan, one in Suzhou, China.
- Modularized automated manufacturing & assembly machines are extremely customizable yielding a high-order low-volume mix.

### Products Highlights

- CCS1 & CCS2 Combined EV Charging Connectors & Inlets | IEC 62196-3
- SAE J1772 Type 1 and IEC 62196 Type 2 connectors provide the convenience of AC Charging at home or work.
- Additional two direct current (DC) contacts provide the convenience of high-power DC fast Charging at commercial charging stations
- Product portfolio includes electrical terminals, connectors, wires, and cables for automotive industrial, agriculture and renewable energy industry segments

### International Partnerships

- Automotive / Motorcycle Manufacturers – Tesla, Yamaha, Gogoro
- Systems Mfg / Integrator – ABB, Eaton, Schneider Electric, Mahle
- Wire Harness Mfg – BizLink, Dräxlmaier

Corporate Video – [Click here](#)