

EV CHARGING SOLUTIONS



DIFFERENT TYPES OF EV CONNECTORS

Electric vehicle (EV) charging infrastructure encompasses the network of public and private charging stations needed to support the growing number of EVs on the road. This infrastructure is crucial for the widespread adoption of EVs, offering convenient and reliable charging options for drivers. The global market for EV charging infrastructure is experiencing rapid growth, with projections indicating a significant increase in both the number of charging stations and the overall market size.

CHARGING INFRASTRUCTURE TERMINOLOGY

The charging infrastructure industry has aligned with a common standard called the **Open Charge Point Interface (OCPI)** protocol with this hierarchy for charging stations: location, electric vehicle supply equipment (EVSE) port, and connector. The Alternative Fuels Data Center and the **Station Locator** use the following charging infrastructure definitions:

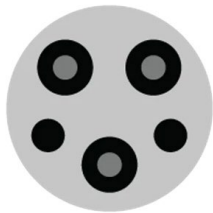
- **EVSE Port:** An EVSE port provides power to charge only one vehicle at a time even though it may have multiple connectors. The unit that houses EVSE ports is sometimes called a charging post, which can have one or more EVSE ports.
- **Connector:** A connector is what is plugged into a vehicle to charge it. Multiple connectors and connector types (such as CHAdeMO and CCS) can be available on one EVSE port, but only one vehicle will charge at a time. Connectors are sometimes called plugs.

DIFFERENT TYPES OF EV CONNECTORS

CHARGING EQUIPMENT

EV charging is classified by speed, which depends on battery size, depletion, and charger type. Charging can range from under 20 minutes to 20+ hours. Equipment choice also involves networking, payment, and maintenance considerations.

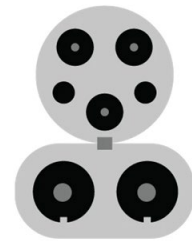
J1772 Connector



NACS Connector



CCS Connector



LEVEL 1 (AC, 120V)

Provides ~5 miles of range per hour using a standard household outlet and a J1772 connector. It is slow but convenient, requiring no special installation. Most useful for overnight or low-demand home charging. As of 2021, it accounted for less than 2% of public charging ports in the U.S.







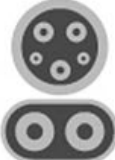
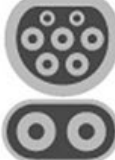

LEVEL 2 (AC, 240/208V)

Provides ~25 miles of range per hour through 240V residential or 208V commercial service. Common in homes, workplaces, and public locations, typically operating around 7.2 kW but can reach up to 19.2 kW. It uses the J1772 connector or NACS with an adapter. Over 80% of U.S. public charging ports are Level 2.

DC FAST CHARGING

Provides ~100-200+ miles of range in about 30 minutes, making it ideal for highways, fleet depots, and charging hubs. Three main connector types exist: CCS (the most widely adopted), CHAdeMO, and Tesla. CCS is versatile, allowing both AC and DC charging through the same port.

SUMMARY OF EV CHARGING CONNECTORS

| | Japan | N. America | Europe | China | All Markets (except EU) |
|-----------|---|---|--|---|---|
| AC |  J1772 (Type 1) |  J1772 (Type 1) |  Mennekes (Type 2) |  GB/T |  NACS |
| DC |  CHAdeMO |  CCS1 |  CCS2 |  GB/T | |

Amphenol Energy Technologies is the leading provider of Electric Vehicle Charging Connectors, Cable Assemblies and Customized Cable Solutions for the EV infrastructure industry in North America. They can customize and manufacture domestically a cable assembly that ideally meets any Electric Vehicle Charging Station OEM/MRO requirement. Such products include the NACS Charging Cables [HVCON1MA50ANL7620](#) and [HVCON1MA80ANL7620](#) as well as the [CCS1 SAE Combo](#).



MORE ABOUT NACS CHARGING CABLES:

- 50A or 80A Options
- 7.62m Length
- Without UHF
- Compliant with SAE J1772, SAE J3400, UL2251

CCS1 SAE EV/BATTERY STORAGE



The [CCS1 SAE Combo](#) charging connectors deliver reliable DC fast charging across 65A, 125A, 200A, and 500A (Cooled High Powered Charging) ratings at 1000V DC. Engineered for durability and flexibility, each assembly features a rugged industrial conduit jacket and high-performance cable design built to withstand demanding operating environments and extreme temperatures.

MORE ABOUT CCS1 SAE COMBO:

- Cooled - High powered charging
- High flexible cable assembly
- Rugged/industrial conduit jacket assembly
- Amphenol 500A charging system

NACS TO CCS1 ADAPTER

The **HVCONT1001** is Amphenol's UL/CSA-approved NACS-to-CCS1 DC fast-charging adapter designed for non-Tesla EVs accessing NACS sites (e.g., many Supercharger V3/V4 locations).

MORE ABOUT HVCONT1001

- Rated to 1000 VDC
- Air cooling 380A rated, Liquid cooling 500A@25min, 600A@10min boosted mode
- Switch off when the temperature exceeds 90°C



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CHD SERIES HEAVY DUTY CONNECTORS



Amphenol Industrial **CHD Series Heavy Duty Connectors** provides an interconnect solution that is designed for high power applications in harsh environment conditions.

These heavy duty power connectors offer waterproof IP grade and salt spray performance over 500 hours that allows the CHD series to challenge tough application environments. The CHD range is completed by shunt plug and receptacle, ideal for safety applications for vehicles with Manual Service Disconnect functionality. These heavy duty connectors with the minimum durability of 50 cycles are useful in EV chargers, power distribution unit, on-board chargers and inverters.



HIGH VOLTAGE SAFETY LOCK CONNECTORS

Amphenol PCD Shenzhen **High Voltage Safety Lock (HVSL) Connectors** are ideal for all electrical vehicle (EV) batteries, chargers, and related applications.

The HVSL series can offer up to 1000V voltage, 330A operating current, and a -40°C to +125°C operating temperature range. These circular connectors feature a 2.8mm to 10mm RADSOK contact and IP67/IP67K sealing. These HVSL Connectors include secondary locking and external or internal HVIL. Applications are vast for EV charging solutions including EV batteries, chargers, inverters, junction boxes, and power distribution boxes.



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MANUAL SERVICE DISCONNECTS

The **Excel | Mate Manual Service Disconnect (MSD)** is a safe and reliable solution for HEV servicing. Equipped with a two-stage lever to open the HVIL circuit prior to the separation of HV contacts, it is a tool-free solution for disconnecting the internal high voltage battery pack and protecting it from short circuit.



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The **Mini MSD** has been developed from the standard MSD. Smaller in size and lower in cost, it offers a more compact solution. It features a two-stage lever with delayed HVIL, integrated internal HVIL, dual-channel cooling to reduce temperature rise, tool-free un-mating, flexible fuse ratings, and front or rear receptacle mounting.

Both **Excel | Mate MSD** and **Mini MSD's** are available in a scalable design with a variety of fuse ratings.