

CAPACITORS FOR ELECTRIC VEHICLE BATTERY CHARGER APPLICATIONS



An Introduction to EV Chargers for Autos and Light Trucks

There are three basic types of Electric Vehicle Charging Stations:

- **Level 1**, Residential Charging: 120-Vac - Charging Speed (range): 3 to 5 miles per charging hour*
- **Level 2**, Residential, Public Charging: 208-Vac to 240-Vac - Charging Speed: 12 to 80 miles per charging hour*
- **Level 3**, Commercial, Public Charging: 400-Vdc to 900-Vdc (DC Fast Charge & Supercharging) - Charging Speed: 3 to 20 miles per charging minute.



* When powered from the grid.

High Performance Capacitors are Essential for EV Chargers

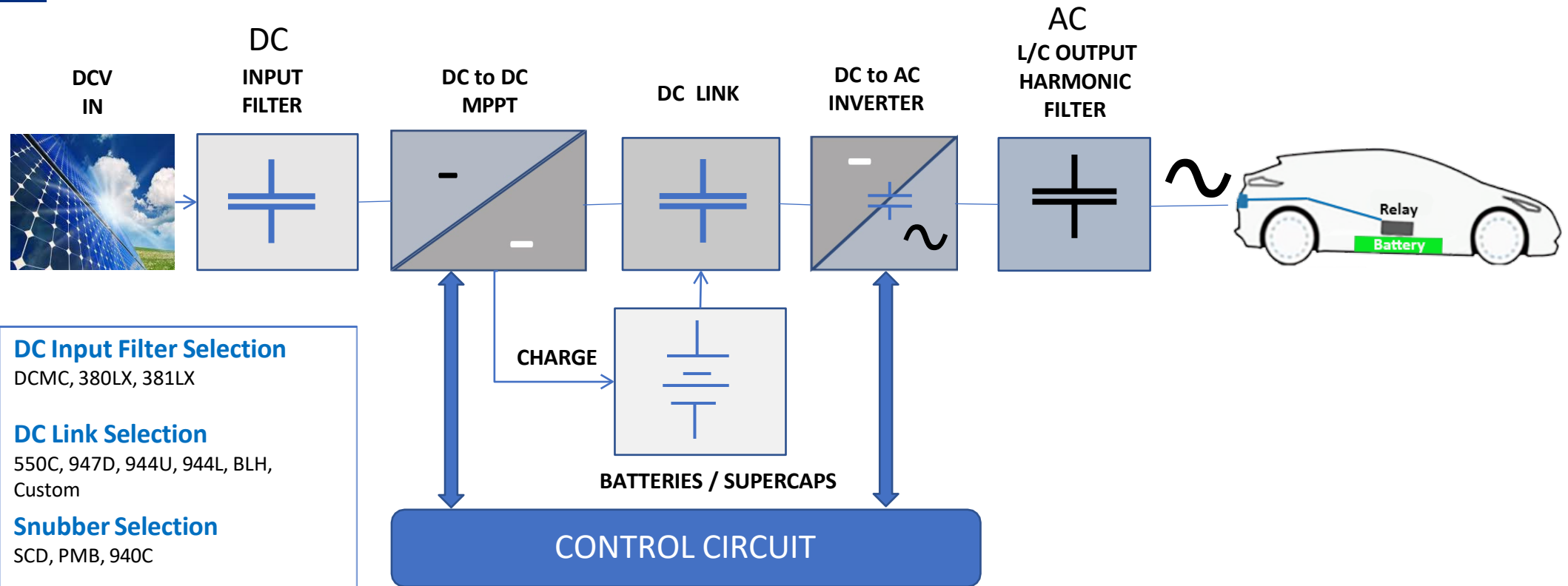
Capacitors are critical components used in inverters and converters for all types of Electric Vehicle Charging Stations:

- Grid-powered Level 1 and Level 2 chargers do not require AC to DC conversion; however, solar-powered Level 1 and 2 chargers use an inverter and require a variety of capacitors, including:
 - DC Input Filter Capacitors
 - DC Link Capacitors
 - AC Output Filter Capacitors
- Level 3: DC fast chargers use AC to DC conversion requiring power capacitors:
 - AC input filter capacitors
 - DC link capacitors
 - DC output filter capacitors





Solar-Powered Inverter EV Charging System (Levels 1 and 2)



DC Input Filter Selection

DCMC, 380LX, 381LX

DC Link Selection

550C, 947D, 944U, 944L, BLH, Custom

Snubber Selection

SCD, PMB, 940C

AC Harmonic Filter Selection

ALH, PC, PFCH

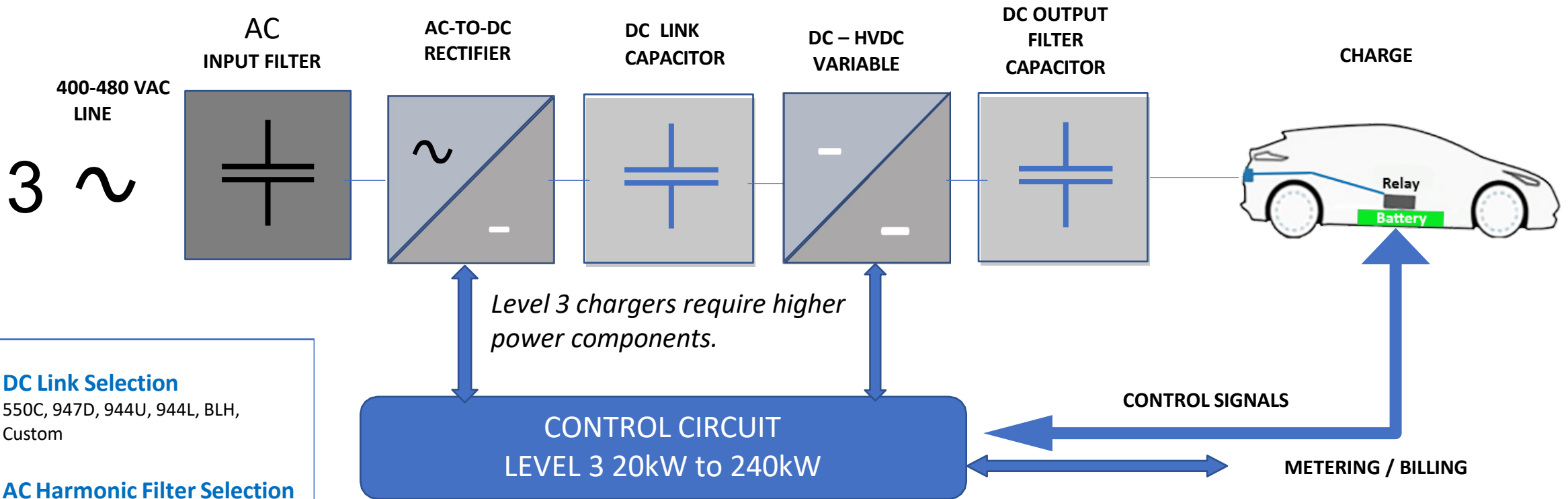
Supercapacitor Selection

DGH, DSF

Supercapacitors are used in combination with batteries for energy storage from solar inverters.



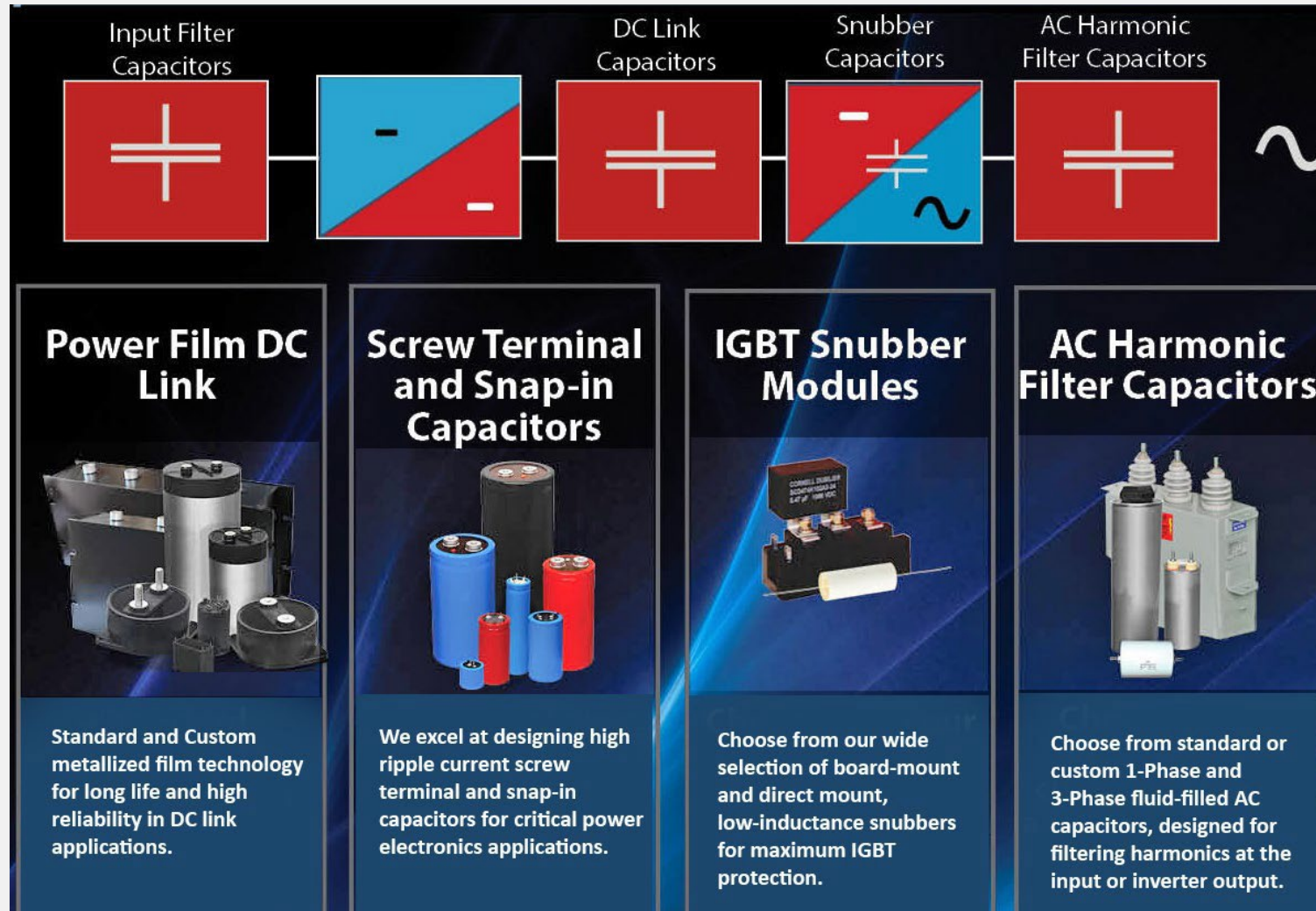
Grid-Powered EV Charging System (Level 3)



DC Link Selection
 550C, 947D, 944U, 944L, BLH,
 Custom

AC Harmonic Filter Selection
 ALH, PC, PFCH

CDE Capacitors at a Glance for Inverters and Converters



CDE is recognized as a global leader in the design and manufacture of capacitors for all stages of power conversion for standard and custom solutions.

<https://www.cde.com/solutions/inverters>

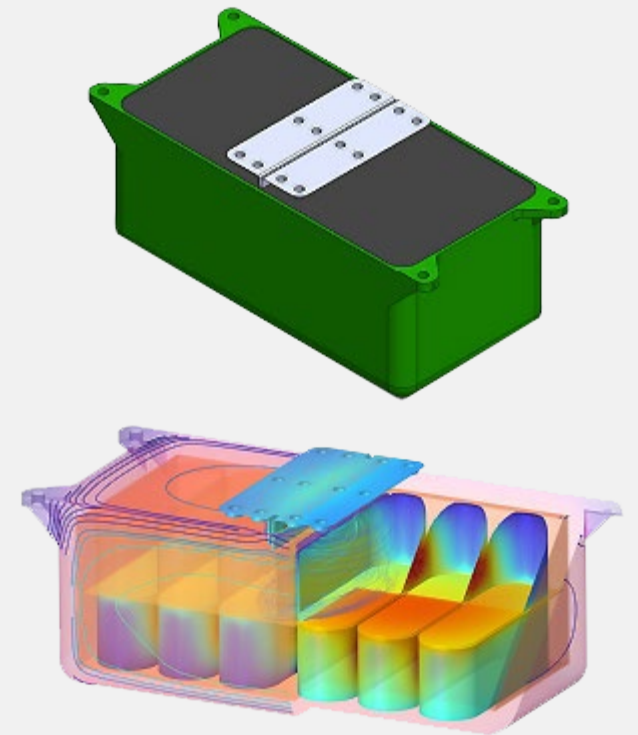
Custom DC Link Capacitors for Level 3 EV Charging Stations

CDE has the capability to produce custom DC link capacitors, optimized for power inverter/converter EV charging systems.

- Module designs, engineered to meet mechanical and electrical requirements of the application, including high energy and high-current density
- High capacitance values available
- Low inductance: <5 nH achievable
- Very high ripple current: 100's of amperes (rms)
- Self-healing and low-loss dielectric system
- Metal or insulated plastic cases available
- Advanced capacitor performance modeling based on customer's application

Specifications

Capacitance Range:	Designed for specific application
Voltage Range:	450 Vdc to 3800 Vdc
Operating Temperature:	-40 °C to +135 °C Life
Expectancy:	200,000 hours typical



Useful Links and Contacts

Cornell Dubilier Website Homepage

<https://www.cde.com/>

CDE Inverter Solutions

<https://www.cde.com/solutions/inverters>

CDE Custom DC Link Product Brief

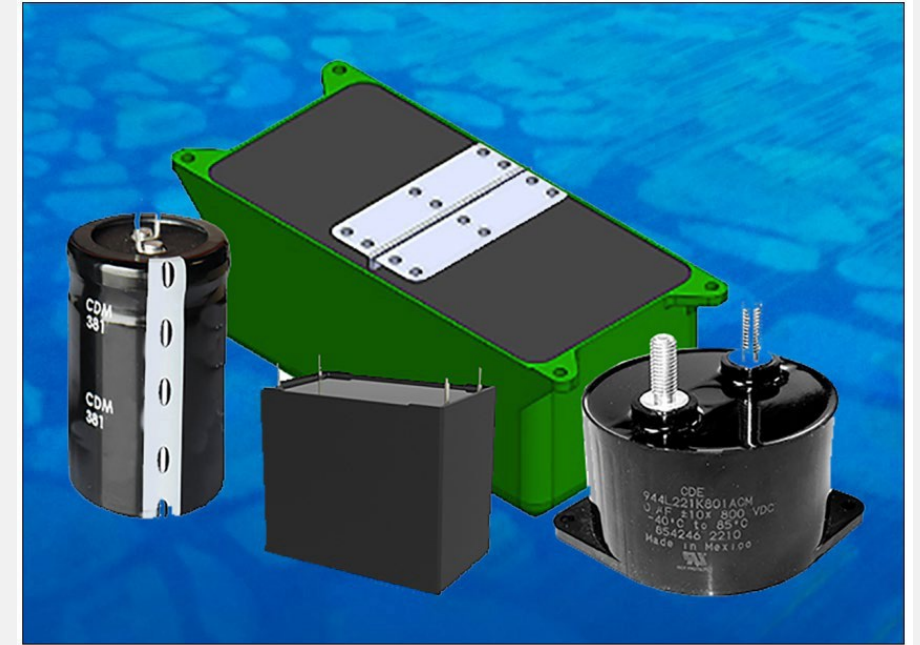
<https://www.cde.com/resources/downloads/Briefs/Custom-DC-Link-Brief.pdf>

CDE Custom DC Link Solutions

<https://www.cde.com/custom-solutions/dc-link-dc-filtering>

CDE Sales Rep Contacts

<https://www.cde.com/sales-rep-search>



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