CAPACITORS FOR ELECTRIC VEHICLE BATTERY CHARGER APPLICATIONS

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ENERGIZING IDEAS

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.*

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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

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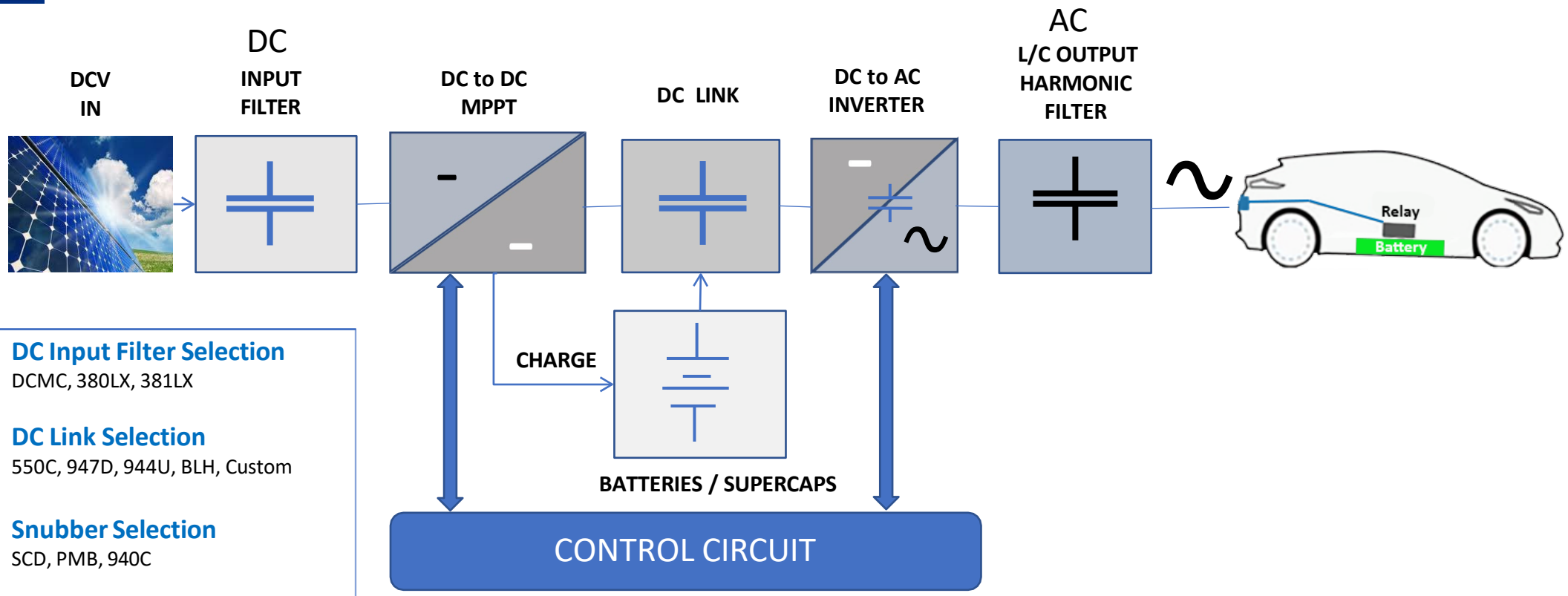
Solar-Powered Inverter EV Charging System (Levels 1 and 2)



DC Input Filter Selection
DCMC, 380LX, 381LX

DC Link Selection
550C, 947D, 944U, 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.

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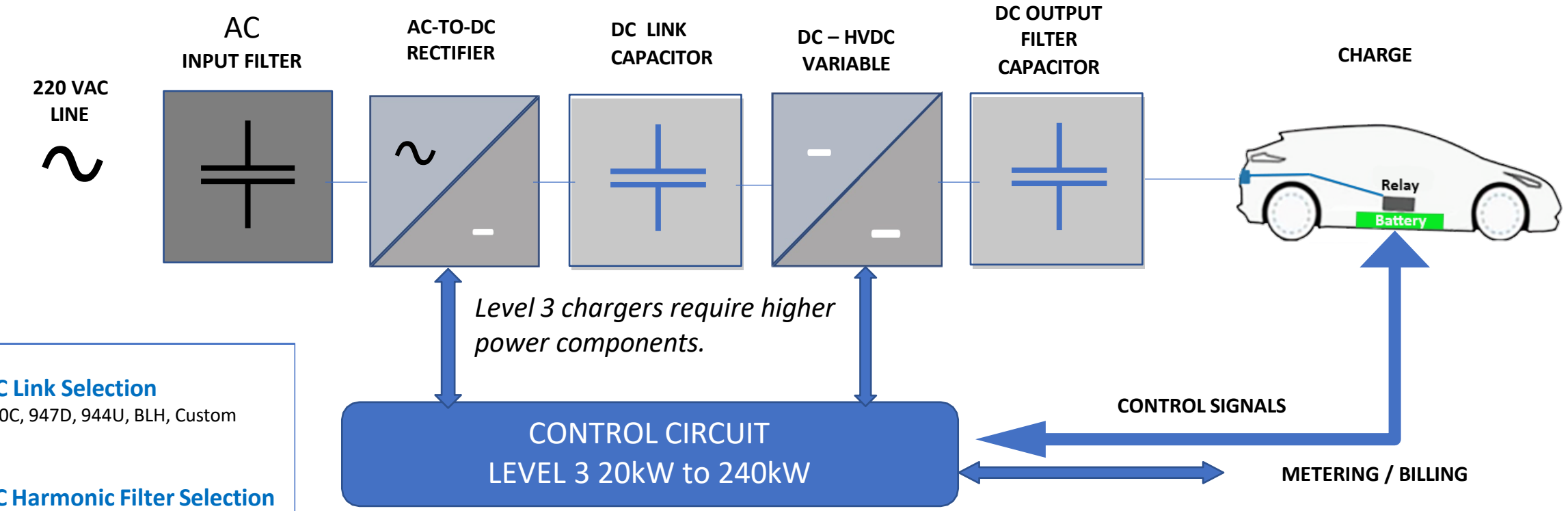
Grid-Powered EV Charging System (Level 3)



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

AC Harmonic Filter Selection
ALH, PC, PFCH

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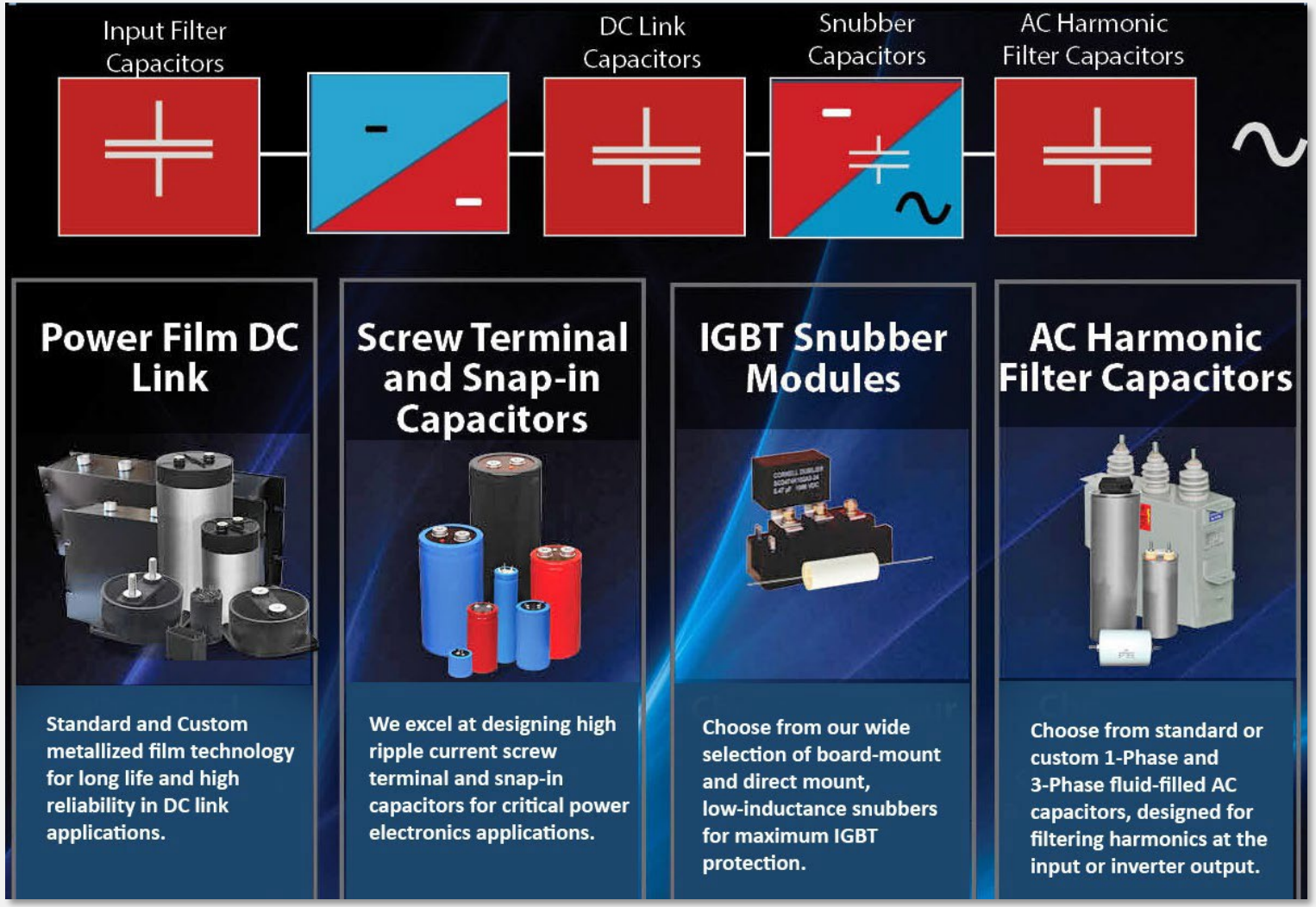
CDE Capacitors at a Glance for Inverters and Converters



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

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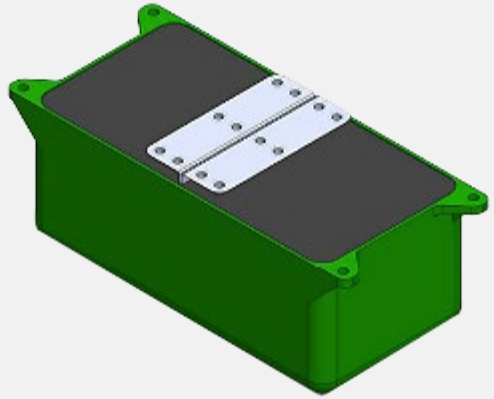
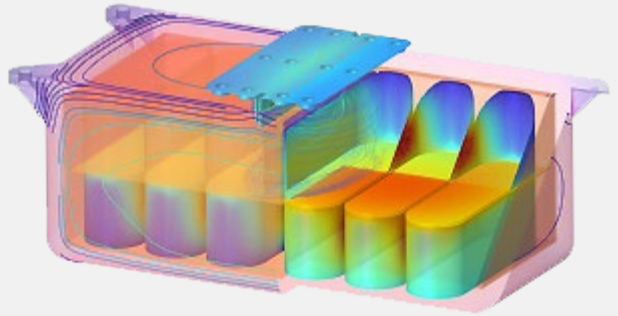
Custom DC Link Capacitors for Level 3 EV Charging Stations

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

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Useful Links and Contacts

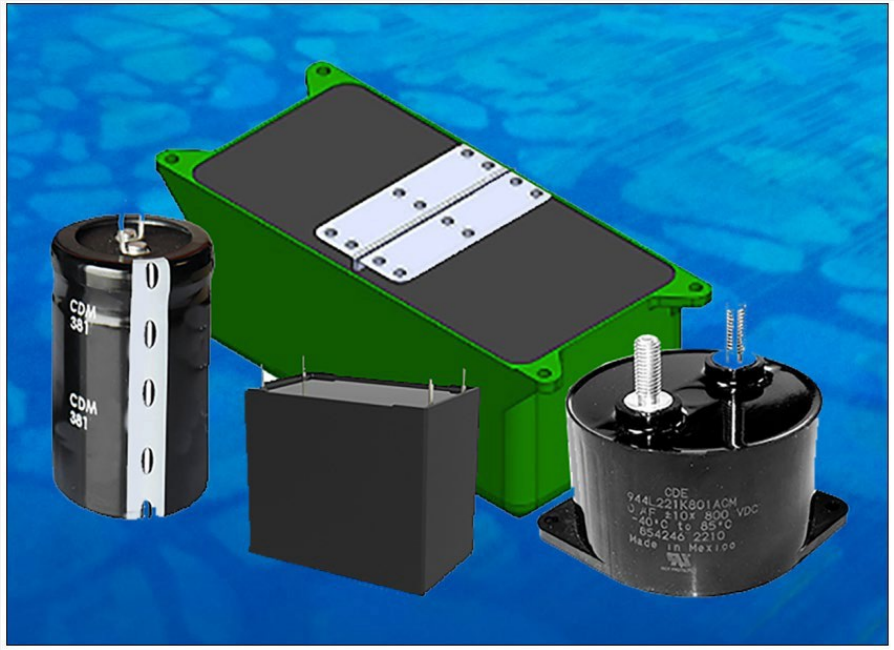
Cornell Dubilier Website Homepage
https://www.cde.com/

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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