

**Nidec**

All for dreams

NIDEC INDUSTRIAL SOLUTIONS

## Nuovi “CBX” per stazioni di carica ultra rapida per veicoli elettrici

### Charge Box (CBX) for fast charge of Electric Vehicles

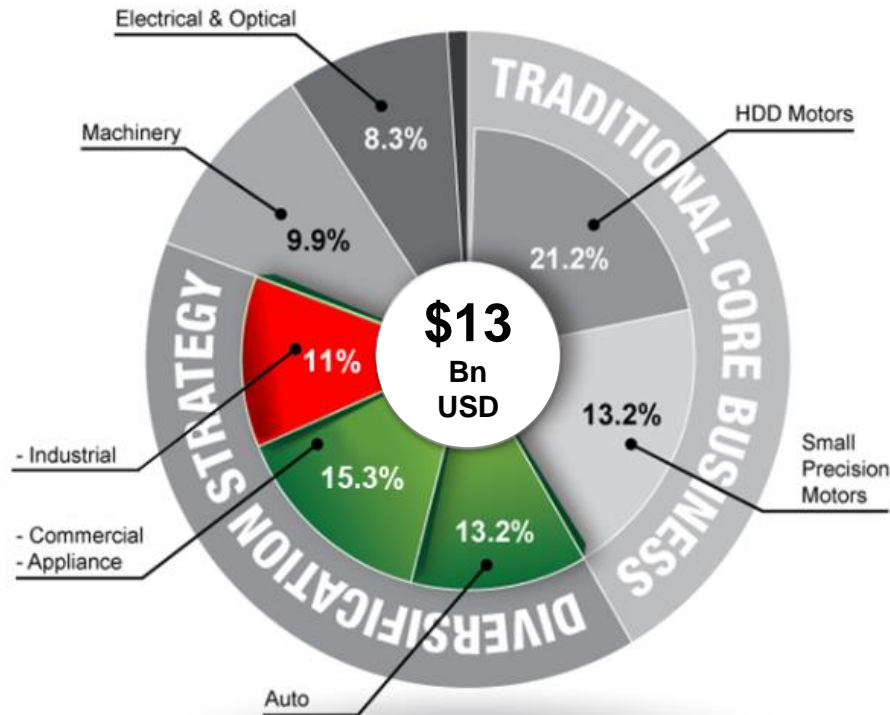


Fast Charge EV Battery

05/10/2017 (versione divulgabile)

# About Nidec Corporation

## FY16 sales by Product Group



- Nidec Corp (NJ, Kyoto, Japan) is one of the world's leading manufacturers of electric motors and drive solutions.

- Founded in 1973, today Nidec has a workforce of over 160,000, and achieved 13B USD in net sales in FY 2016

- More than 135 factories in over 33 nations.

- Over the last 10 years Nidec has acquired more than 40 companies.

- In 2012 Nidec acquired Ansaldo Sistemi Industriali now renamed Nidec Asi.

- In Feb 2017 Nidec acquired Leroy Somer (France) and Control Techniques (UK).

- Nidec Asi designs & manufacture motors, generators, drives and power quality products and solutions for industrial applications. Today the industrial sector represents the 20% of entire turnover

## Electric vehicles in Europe: gearing up for a new phase

Europe is entering the initial phase adoption phase of electric mobility.

Although EU-wide sales numbers of EVs are not yet impressive (about 1%) there is reason to believe that we are entering a phase of early EV adoption.

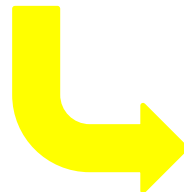
The European Commission has shown its support for the further adoption of electric mobility by proposing a directive on the deployment of alternative fuels infrastructure which explicitly supports clean fuel transport and proposes specific targets on enabling infrastructure deployment.



**A critical enabler of the scale-up of EV adoption is the improvement of the charging infrastructure.**

## Key motives for early EV adoption

- **Carbon footprint reduction.** The desire to reduce their carbon footprint is a motivator for environmentally conscious consumers to buy EVs. Some are even willing to pay a premium for the zero- or low-emission alternatives to ICE.
- **Driving and usage benefits.** Additional benefits are afforded to drivers of EVs by many governments and cities in an effort to stimulate EV sales. These benefits may include preferential parking permits in dense urban areas.
- **Cost savings.** Without subsidies, EVs are significantly more expensive than ICE cars. But in some specific cases, as a result of government subsidies: (for example purchase tax, VAT, toll road charges, registration tax, and annual circulation tax) EV models are cheaper than their ICE counterparts...



**In the long-term EV adoption remains uncertain, driven by regulation**

## E-mobility charging infrastructure trends

Together with the growing adoption of EVs, the technology and infrastructure to charge them is developing as well.

**Market of Charging stations**

Charger type	Typical output power	Typical charging time	Availability
Quick	22 ÷ 40 kW	4 ÷ 8 hours	>20000
Fast	Around 50 kW	< 4 hours	20000
Ultra Fast	100 ÷ 320 kW	1h ÷ 15 min	Few stations (prototypes)



**Nidec is developing an ultra fast charging station for EV:**  
**Innovative product: Need of Storage battery only, few samples available**

The increase of ultra-fast charging stations will contribute to the spread of EV as it will allow long-distance travel (between cities or even countries)



Home and semi public Solutions mainly for early adopter



**320 kW**

**120 kW**

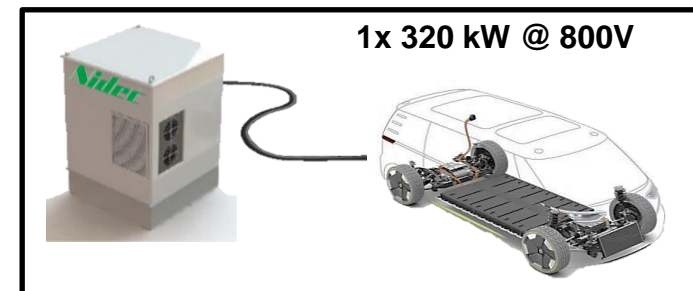
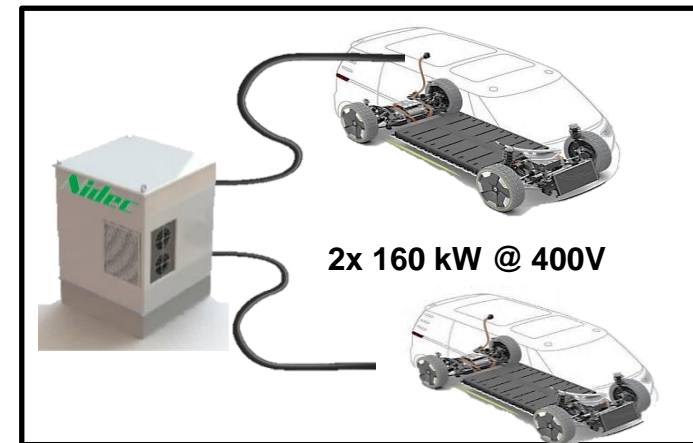
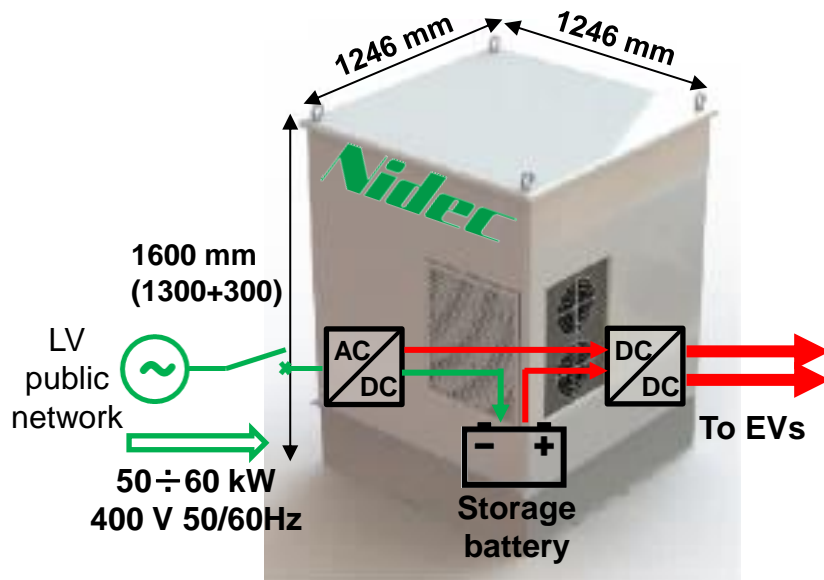


# NIDEC CBX: Technical features and functionalities

The DC-Charge Box (CBX) is a Power Supply designed for the fast charge of electric vehicles, with high charging capacity.

## Main features:

- 50 ÷ 100 kW absorbed from the low voltage public network
- Integrated storage battery (150kWh ÷ 170kWh), to deliver large power to the Electric Vehicles: up to 400 kW
- Output current to Electric Vehicles up to 400 A
- Equipped with two charging strings for high flexibility:
  - ✓ Two cars independently charged: 2x160 kW @ 400 V, 400 A
  - ✓ One car charged with combined operation of the strings: 320 kW @ 800 V, 400 A

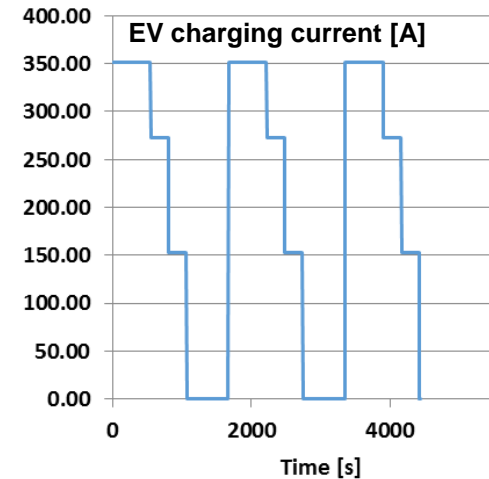
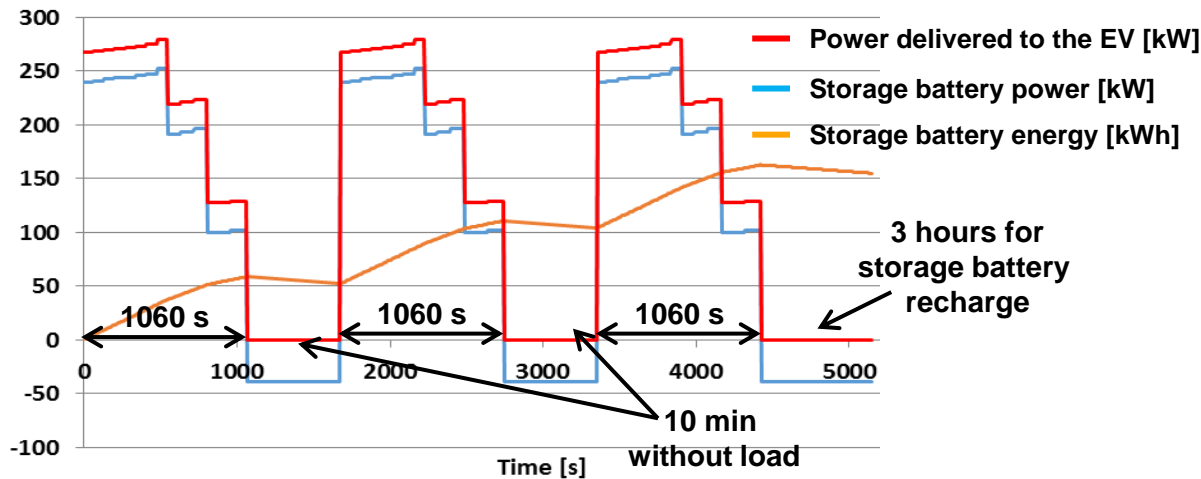


- Ambient temperature: -20 °C / +45 °C
- Low acoustic noise
- Easy access for high maintainability

# NIDEC CBX: Performances & Cooling

Typical charging profile: full charge of 3 cars in series (800 V vehicle). One vehicle's charge lasts 1060s. There is a pause of 10 minutes between two full charges. So the CBX will work 73 min and then it will not be available for around 3 hours, during which the internal storage battery of CBX will be charged.

**The internal battery is sized to guarantee 3500 cycles of the described charging profile.**

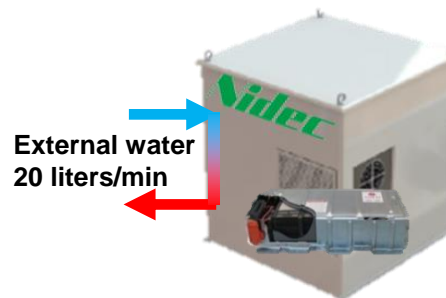


Cooling system fully integrated



Air-cooled batteries  
No need of external cooling devices

External water available



Air-cooled batteries  
Smaller cooling unit

External water available

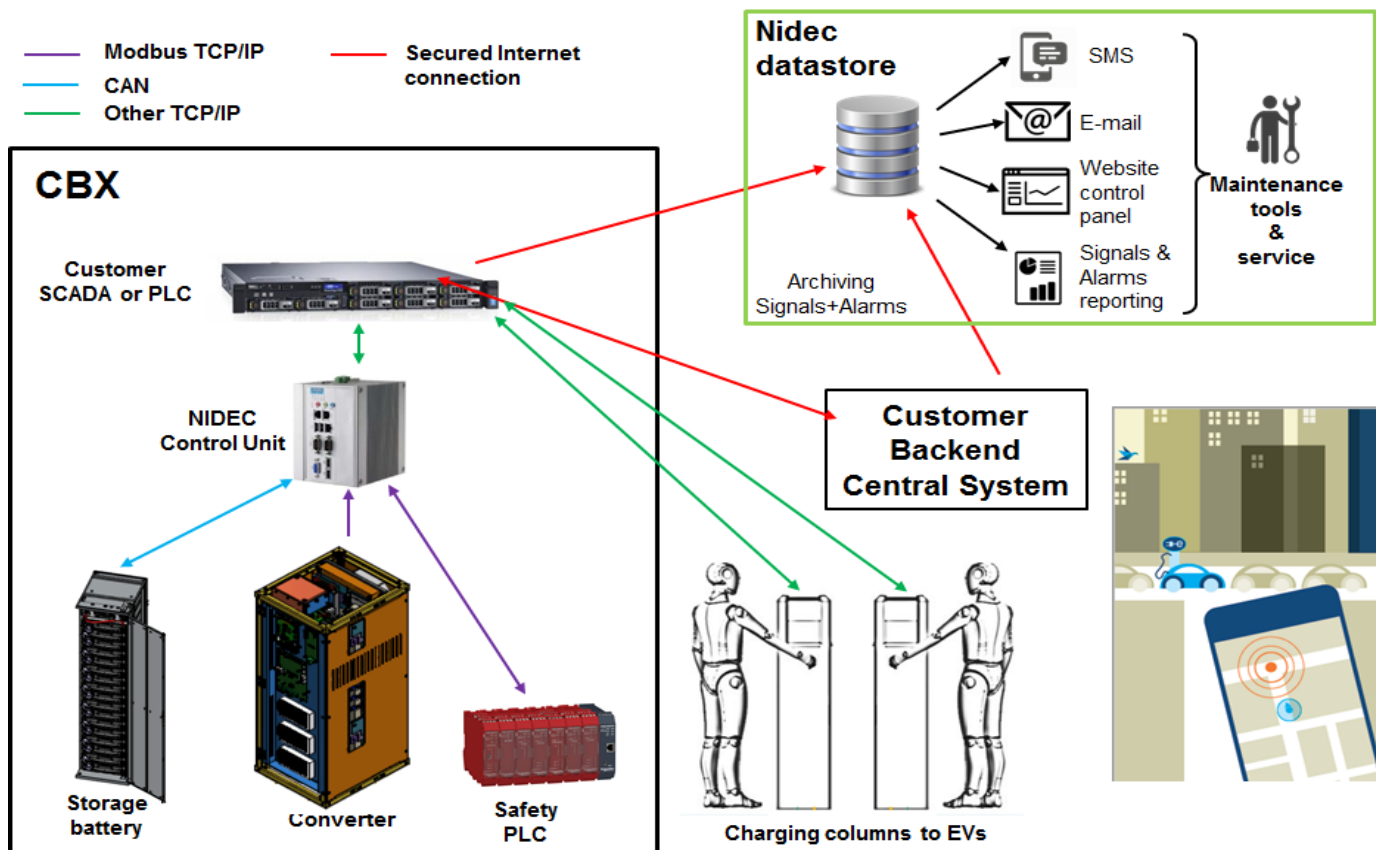


Water-cooled batteries  
Higher compactness  
Higher efficiency

# NIDEC CBX: Control features

As fast-charging standardization is not yet achieved, industry is providing an interim solution. The Clean Fuel Directive proposes CCS (Combo) as the standard for fast-charging, following the adoption of this standard by German and US car makers.

Another compatibility challenge is caused by multiple networks of charging stations and the related services systems they operate, namely the billing, identification, and communication systems. There are efforts to promote interoperability and to allow EV drivers to freely use all charging stations available



EU regulation would promote “free choice of provider” at any charge point, which would make “roaming” for EV charging points possible – in a similar way as for mobile phone providers and local telecom networks



**Thank you for your attention**

