50KW EV Quick Charger

HKPC TechDive: Smart City – EV Technology

27 May 2020

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At present, 118 EV models have been type-approved by the Transport Department. These are include 87 models for private cars and motorcycles, 31 models for public transport and commercial vehicles.
Electric Vehicle Basics

- Inverter
- Motor
- Reduction drive

- Power Inverter and Transformer
- Battery Charger
- Connector Box
- Electric Motor and Reducer
- Lithium-Ion Battery
Electric Vehicle Basics

Discharging

Charging
# Electric Vehicle Basics

Higher battery capacity for **longer driving range**

<table>
<thead>
<tr>
<th>Year (Model)</th>
<th>Old Model</th>
<th>2019/2020 Model</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017 (Model S)</td>
<td></td>
<td></td>
<td>5.7 km/kWh</td>
</tr>
<tr>
<td>2020 (Model S)</td>
<td></td>
<td></td>
<td>6.2 km/kWh</td>
</tr>
<tr>
<td>2017 (ZE 40 R90)</td>
<td></td>
<td></td>
<td>9.6 km/kWh</td>
</tr>
<tr>
<td>2020 (ZE 50 R135)</td>
<td></td>
<td></td>
<td>9.1 km/kWh</td>
</tr>
<tr>
<td>2017 (Leaf)</td>
<td></td>
<td></td>
<td>8.3 km/kWh</td>
</tr>
<tr>
<td>2019 (Leaf e+)</td>
<td></td>
<td></td>
<td>9.2 km/kWh</td>
</tr>
<tr>
<td>2016 (i3 94Ah)</td>
<td></td>
<td></td>
<td>6.1 km/kWh</td>
</tr>
<tr>
<td>2019 (i3 120Ah)</td>
<td></td>
<td></td>
<td>6.2 km/kWh</td>
</tr>
</tbody>
</table>
Communicating with EV for battery recharge

Provision of safety protection, e.g. overload, short-circuit, current leakage

- **Standard**: Domestic plug and socket
  - Low cost, but not practical for long term development

- **Medium**: Most EV models in HK support IEC standard via suitable cable
  - Suitable for large scale installation

- **Quick**: Standards not yet harmonised
  - Required high power supply, suitable for Opportunity Charging
AC Medium Chargers

- Charging power: 3.3kW – 21kW
- Typically 7kW (1-phase 32A) or 21kW (3-phase 32A) in HK
- Compliance of IEC 62196 or SAE J1772
- Deployed >500 charging points in 70 sites since 2012
Quick Charging

Not compatible with each other

Europe & U.S.
CCS Combo

SAE DC Combo (Combo 1)
IEC DC Combo (Combo 2)

China GB

GB 20234-3 DC Vehicle Connector and Vehicle Inlet

Japan
CHAdeMO

CHAdeMO Vehicle Connector
CHAdeMO Vehicle Inlet

Tesla
Supercharger

Techno Dive
27-5-2020
50kW EV Quick Charger

Emergency stop
Stop charging immediately

Fast charging (Combo)
Output: DC 500V/125A max

Fast charging (CHAdeMO)
Output: DC 500V/125A max

Medium speed charging (IEC 62196)
Output: AC 220V/32A

Touch screen control panel and operation status display
50kW EV Quick Charger – Power Converter

Main Power Converter
Dimension: 100 x 80 x 180cm

Fast charge (Combo) connector

IEC62196 (medium fast) connector

Fast charge (CHAdeMO) connector
## Product Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHAdeMO DC smart fast charging</strong></td>
<td>• Output voltage range: 50~500V</td>
</tr>
<tr>
<td></td>
<td>• Maximum output current: 125A</td>
</tr>
<tr>
<td><strong>Combo DC smart fast charging</strong></td>
<td>• Output voltage range: 50~500V</td>
</tr>
<tr>
<td></td>
<td>• Maximum output current: 125A</td>
</tr>
<tr>
<td><strong>IEC Medium speed AC charging</strong></td>
<td>• Output Voltage: 220V@50Hz</td>
</tr>
<tr>
<td></td>
<td>• Output current: 32A</td>
</tr>
<tr>
<td><strong>Three AC power inputs</strong></td>
<td>• Three-phase 380V@63A</td>
</tr>
<tr>
<td><strong>Touch-screen</strong></td>
<td>• Easy-to-use user interface</td>
</tr>
</tbody>
</table>
Fast charge by using Tesla’s CHAdeMO adapter – 60 to 80 mins charge to full
Impact and Advantages

- This quick charger provides great convenience and efficient EV usage for drivers.
- Offer a complete quick charge solution for both Japanese and European electric vehicles in market.

Market Potentials and Business Opportunities

- Public charging stations (e.g. shopping centers, public car parks, highways)
- Private car parks
- Public transportation and commercial fleets

Benefits of Technology Transfer/Licensing

- APAS can customize the specifications and functionalities of the quick charger to fulfill customers’ requirements.
- The project expenditure could be subsidised by HKSAR Government.
Deployment and Trial

- Deployed in various government departments
- Cover all market available EVs in Hong Kong
- Total charged > 9,000kwh（度電）
Mobilized EV Charger

- Flexible in any EV standards, models, fast or medium charging
- Fast charge 6 to 8 mins to get 20km
- Roadside emergency charging services
- No more range anxiety
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