CharM or Charging in Minutes is a system for fast charging electric vehicles (EVs) that are using the Lithium-ion battery storage technology. CharM provides an alternative charging strategy that eliminates the need for several hours in order to fully charge an EV. The conventional 4-6 hours in slow charging is reduced to less than an hour or even a matter of minutes for smaller vehicles.

Fast charging is done without compromising the safety and integrity of the users and the vehicles respectively. CharM addresses the range anxiety of EV users especially those operating as mass transport vehicles like E-Trikes and E-Jeepneys.

**KEY FEATURES**

- Smart and robust charger to vehicle link
- Expandable power
- Versatile voltage range
- Cashless payment system
- Safe and reliable

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**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power</td>
<td>5kW power, expandable</td>
</tr>
<tr>
<td>Voltage range</td>
<td>48-60 VDC, reconfigurable for &gt;60V</td>
</tr>
<tr>
<td>Rated current</td>
<td>80ADC @ 5kW, upgradable</td>
</tr>
<tr>
<td>Input requirements</td>
<td>220VAC, single phasem L-N-E</td>
</tr>
<tr>
<td>Power factor</td>
<td>0.99 PF at rated load</td>
</tr>
<tr>
<td>Payment system</td>
<td>NFC tap-card cashless payment</td>
</tr>
<tr>
<td>User interface</td>
<td>Touchscreen user interface</td>
</tr>
<tr>
<td>Communication</td>
<td>Controller Area Network (CAN)</td>
</tr>
<tr>
<td>Charge connector</td>
<td>High-power charge coupler with communications and electric lock</td>
</tr>
<tr>
<td>Safety</td>
<td>Emergency stop button; power connector auto-lock; RCD fault protection; Junction box secure access; automatic battery charge detection</td>
</tr>
</tbody>
</table>

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**Cauayan City Pilot Project**

Greener & Smarter Transport for a More Progressive City

The establishment of the first commercial CharM charging station in Cauayan City, Isabela is a joint commercialization and research venture by the Department of Science and Technology, University of the Philippines, Isabela State University, Electronics Industries Association of the Philippines, Inc. (EIAPI), and Cauayan City LGU.

The charging station currently services local e-trikes in the city. Future plans include introducing e-jeeps into the electric vehicle (EV) ecosystem and establishing a network of charging stations in the region to support the budding EV sector.

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Eee/upd.edu.ph/news/charm

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**For technology licensing, please visit:**

UP OVCRD, Intellectual Property & Technology Transfer Section
Lower Ground Floor, PHILVOLCS Bldg., CP Garcia Ave., Diliman, Quezon City 1101

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**Specialized Charging Connector**

- High-power rating
- Electronic locking mechanism with auto-engage during charging
- IP54 rating for weatherability
- Robust insulation against electric shock

**User Interface & Payment System**

- Touchscreen & user-friendly interface
- NFC tap-card reliable payment system
- Charging options: (1) by amount or (2) by battery charge percentage
- Easy to setup reloading facility

**Charge Inlet & Charge Controller**

- IP65 Rated weatherproof charge inlet
- Automatic charger-vehicle communications system
- Charger-vehicle handshake for charging integrity and process safety

**Batter Management System (BMS)**

- State-of-charge (SOC) Monitoring System
- Real-time SOC dashboard display
- Built-in protection (OVP, UVP, OCP, OTP)
- Battery charge cell balancing
- CAN digital communications