CharIN e.V.
Perspective on standardization developments
CharIN association

Organisational Structure

Executive Board
Managing Director & Coordination Office
Steering Committee

Focus Groups

- Charging Connection
- Charging Communication
- Charging Infrastructure
- Conformance Test | Interoperability
- Grid Integration

Claas Bracklo
Michael Keller
André Kaufung
Summary

CCS Scope

Performance up to
450 kW

450 kW

DC
AC

Megawatt

Added Value
Extended Functionality
Vehicle to grid &
Vehicle to home

Worldwide
Asia
Europe
North America

Scope of application
Motorbike
Car
Bus | Truck
CharIN e.V.
Accessible at any time right round the world
CharIN association

Our members – currently **188 (total)** 1/2
CharIN association

Our members – currently 188 (total) 2/2

Regular Members

Associated Members

Cooperations of CharIN

Regular members: 82

Supporters of CharIN

Supporters of CharIN: 16

Coordination Office CharIN
c/o inno - Sperlich GmbH
Membership Share

Top 20 passenger car brands 2018 by volume

18 of the top 20 car brands are represented in CharIN
A CharIN task force was formed in March 2018 with the following purpose statement:

“Define a new commercial vehicle high power charging standard to maximize customer flexibility.” It was named the High Power Charging for Commercial Vehicle Task Force (HPCCV for short).

CharIN Appointed Task Force Lead:

Rustam Kocher
DTNA - EMG
The team

HPCCV

OEMs
- DAIMLER
- FCA
- MAN
- Ford
- General Motors
- HYUNDAI
- Linde
- PACCAR
- Navistar
- CILIG
- PORSCHE
- TESLA
- NEW FLYER
- Proterra
- VOLVO

Customers
- Penske
- NFI
- RUAN
- ATA
- Shell
- bp
- Loves
- TA
- Petro

Travel Centers
- bp
- Loves
- Shell
- TA
- Petro

Suppliers and Equipment Manufacturers
- ABB
- APTIV
- Thomas&Betts
- ChargePoint
- heliox
- Delta
- Huber+Suhner
- TE Connectivity

Design & Construction
- Burns & McDonnell
- PROLOGIS
- Black & Veatch

Utilities
- APS
- Duke Energy
- EPRI
- Electric Power Research Institute

Government Labs
- Argonne National Laboratory
- Sandia National Laboratories
- NREL

Standards
- ITT
- Stäubli
- Trans tech Industries

Network Providers
- Electrify America
- Greenlots
- Allego
- EVgo
- FASTNED

Coordination Office CharIn
C/O Innos - Sperlich GmbH

20/02/2020
Process

- The HPCCV held a requirements-gathering process including all stakeholders.
- Subgroups were formed and created their requirements, which were then aggregated.
- An in-person meeting was held in September 2018 to gain group agreement on the requirements. They were later finalized during online meetings.
- Those requirements were then approved by the CharIN Board of Management on Nov 28, 2018
- For complete list please visit: https://www.charinev.org/hpccv/?no_cache=1

Requirements (not a complete list)

- single conductive plug
- max 1500 DCV
- max 3000 DCA
- PLC + ISO/IEC15118
- touch-safe (UL2251)
- on-handle software interpreted override switch
- adheres to OSHA and ADA requirements
- FCC Class A EMI
- located on the driver side of the vehicle, hip-height
- capable of being automated
- UL (NRTL) certified
- cyber-secure
- V2X (bi-directional)
There are many public DC charging standards...but none are sufficient for commercial trucks

<table>
<thead>
<tr>
<th>USA-Japan</th>
<th>Europe</th>
<th>USA-Japan-Europe</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combo 1: Combined AC &amp; DC</td>
<td>Combo 2: Combined AC &amp; DC</td>
<td>Chademo</td>
<td>GB/T</td>
</tr>
</tbody>
</table>

They were all designed to quickly charge passenger cars, not commercial trucks. Existing and future passenger car charging limits are 500-600A.

In order to charge a truck carrying 200-600 kWh batteries in 20-30 minutes, the charge time requested by customers, trucks will require power levels of over 2 MW and current over 2000A.

None of the existing public standards are capable of providing the power needed to quickly charge commercial trucks, which will require 4 to 10 times higher charging power than existing passenger car charging systems!
HPCCV

The charging systems

- **Fast Charging (FC)**
  - CCS
  - ISO 15118 PLC

- **High Power Charging (HPC)**
  - CCS
  - ISO 15118 PLC

- **HPC > 1MW**
  - CCS
  - ISO 15118 PLC

**Communication**:
- CHAdeMO
  - 11 bit CAN
- ChaoJi
  - 11 bit CAN

**DC-Connector**:
- Global
- Japan
- China

**Interoperable**
- ✓
**Not interoperable**
- X

**Communication**

- Japan
- China

**Global**

- In Progress

**One system for all**

- In Progress
Selection has been made, iterative development is underway: After a call for submission to solve the requirements, 5 propositions have been presented. The HPCCV task force voted in May 2019, and there was overwhelming consensus to pursue a hand-held conductive charging plug and socket capable of 3000 A.

The Task Force is now focused on iterative testing and validation of this selection: Ongoing weekly technical meetings discussing details of the future standard, including voltage range, current capability and associated thermal performance, plug/socket geometry fit and function, etc.

Multiple stakeholders have agreed to build prototypes by Q1 2020.

The goal of the task force is compile a complete requirements document, including plug geometry, which can be submitted to a standards defining organization in 2020 to become the worldwide standard for charging commercial vehicles.
HPCCV
The way of standardization

• Full commitment of German truck CTO’s to bring HPCCV to international standardization

• Task to German Norms and Standards Authority (NA AA37) and DKE to start the process

• Standardization Kick Off workshop at December 13th 2019 to define scope, organization and process
  - Agreement on HPCCV requirements set
  - New DC coupling device will be based on already standardized definitions for System C (CCS), with DC only
  - Input of the HPCCV TF will be respected in the further steps of standardization
  - A new work item proposal to start the connector standardization will be applied in IEC TC69 as a new part of IEC62196 → end of 02/20
  - Preparation of a system description proposal to be inserted into the CCS related international standards where necessary (e.g. IEC61851-series, ISO15118, ISO17409, ISO 21498-1) → end of 2020

• Project Kick Off workshop at February 6th 2020 for creating a HPCCV corridor project
  • Four european OEMs with grid companies, technology providers, logistics and CPOs
Thank you for your kind attention!

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