



Charging Station for ISO / IEC 15118 Protocol

*Building working smart networked charging station with support for both ISO 15118 and*

*IEC 61851*

Bachelors Project

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**Abstract**

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1. Introduction

In this chapter a short summary of this work is described. In addition, the task description as well as to overview Of the following chapters and Their contents are given.

* 1. **Short Version**

The present project work serves to set up a working model for the current standardization of the vehicle-column communication gemäß to ISO / IEC 15118 along with the HMI display.

The built-up working model besteht of two interconnected boards and a Raspberry Pi for teh display. Each communication user is Represented by a circuit board.

The software used is derived from at existing stack and angepasst for a defined application of ISO / IEC 115118th

.According To the ISO variable parameters are listed as macros and Documented, so did a change is possible at any time. If parameters are selected so dass die Resulting requirements can no longer be met by the respectivement other subscriber, a fault message is output.

* 1. **Task**

The main task is to implement a basic working model of the car charging station with the HMI interfaced into the system. It involves the study of the basic working of the ISO 15118 protocol and defining the possible working structure of the Charging station.

The task involves the design of the communication mechanisms and processes between the main processor of an electric vehicle supply equipment (EVSE) – or called charging station - and an computer that runs the HMI on that EVSE (HMI), and the electric vehicle to be charged (EV)

The targets achieved :

- Analysed the requirements of ISO 15118 and IEC 61851 based on the work of the references.

- Designed, discussed and finalized the state machine and the communication process between EVSE and HMI together with a German student (Raphael Scholz)

- Learned about UML as a description language for state machines and communication sequences

- Experienced TCP/IP communication with practical training on a linux system

- Started coding for the implementation of the above

* 1. Chapter Overview

1. Literature Survey
   1. Scholastic Survey

The following were considered for the initial study of the Car Charging Process

* + 1. **Automotive Ethernet: in-vehicle networking and smart mobility**

**Authors:**

* Peter Hank NXP Semiconductors, Hamburg, Germany
* Steffen Müller NXP Semiconductors, Hamburg, Germany
* Ovidiu Vermesan SINTEF, Oslo, Norway
* Jeroen Van Den Keybus Triphase NV, Leuven, Belgium

**Proceedings**

DATE '13 Proceedings of the Conference on Design, Automation and Test in Europe

Pages 1735-1739

Grenoble, France — March 18 - 22, 2011

* + 1. **Towards standardized Vehicle Grid Integration: Current status, challenges, and next steps**

**Authors:**

* BO chen Argonne National Laboratory, USA
* Keith S. Hardy Argonne National Laboratory, USA
* Jason D. Harper Argonne National Laboratory, USA
* Daniel S. Dobrzynski Argonne National Laboratory, USA

**Published in:** Transportation Electrification Conference and Expo (ITEC), 2015 IEEE

* + 1. **ISO 15118 – charging communication between plug-in electric vehicles and charging infrastructure**

**Authors:**

* Dr. Andreas Heinrich Dailmer AG, Holzgerlinen, Germany
* Michael Schwaiger BMW Group, Munich, Germany

**Book Title:** Grid Integration of Electric Mobility

**Book Subtitle:** 1st international ATZ Conference 2016

**Pages:** pp 213-227

* + 1. **Assuring Interoperability between Conductive EV and EVSE Charging SystemsAuthors:**
* M. Sc. Michael Tybel Scienlab electronic systems, Bochum
* Dr.-Ing Andrey Popov Scienlab electronic systems, Bochum
* Dr.-Ing Michael Schugt Scienlab electronic systems, Bochum

**Link to document:**

<http://www.p0p0v.com/science/downloads/TybelPopovSchugt15.pdf>

* + 1. **Vehicle-to-Grid AC Charging Station: AN approach for Smart Charging Development**

**Authors:**

* D. Wellisch Deggendorf Institute of Technology, Freyung
* J. Lenz Deggendorf Institute of Technology, Freyung
* A. Faschingbauer Deggendorf Institute of Technology, Freyung
* R. Pöschl Deggendorf Institute of Technology, Freyung
* S. Kunze Deggendorf Institute of Technology, Freyung

**Link to the document:**

<https://www.researchgate.net/profile/Rainer_Poeschl/publication/282846691_Vehicle-to-Grid_AC_Charging_Station_An_Approach_for_Smart_Charging_Development/links/561e15f808aec7945a253e1c.pdf>

* 1. Reference

1. Problem statement /Objective