

CHAdeMO Analyzer / Simulator

For DC charging of Electric-Vehicles – Analysis according to CHAdeMO



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CHAdEMO Analyzer / Simulator

For DC charging of Electric-Vehicles – Analysis according to CHAdEMO



New challenges...

Developments for e-mobility presents new challenges for vehicle- and charging-system manufacturers. The quiet young standard CHAdEMO describes the requirements on DC-charging-systems, electrical waveforms and the communication to control the charging process. By combining electric vehicles and charging systems of various manufacturer, different system-tolerances and disturbing influences may occur. The causes of charge interruptions are very difficult to locate due to the long charging.

...meet new solutions

The comemso CHAdEMO Analyzer / Simulator measures and verifies both the communication and the load circuit on standard-conformity over the complete duration of charging and records all deviations. Thus causes of charge interruptions can not only be identified but also causalities of events can be represented and visualized.

Features

Monitoring:

- communication analysis according to CHAdEMO Rev. 1.x
- synchronous DC Voltage and Current measurement, measurement data over CAN available
- quality Analysis of CAN physical layer
- quality Analysis of communication circuit (12V signals)
- protocol analysis:
 - timings of communication, signals and charging
 - communication and signal order

Gateway with Manipulation:

- manipulation of CAN data
- manipulation voltage of 12V signals (communication circuit) to 5V...15V

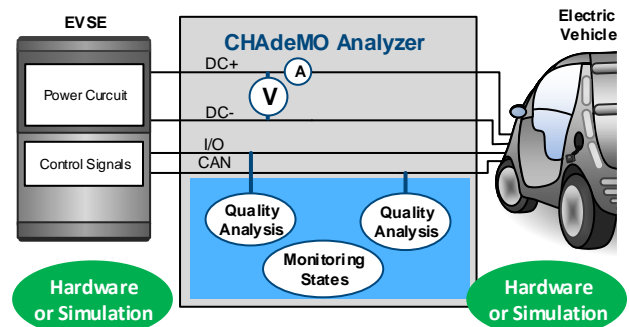
EV test:

- full configurable EV tests

Charger test:

- full configurable Charger tests

Verification Charging



Graphical User Interface (GUI):

- ready project with comfortable panels for Vector CANalyzer

DC Load Circuit:

- connectors for 500V/120A
- measurement up to 800V/200A

Other:

- robust casing for mobile outdoor use - IP67
- supply Power 100..230V

Please contact for more information:

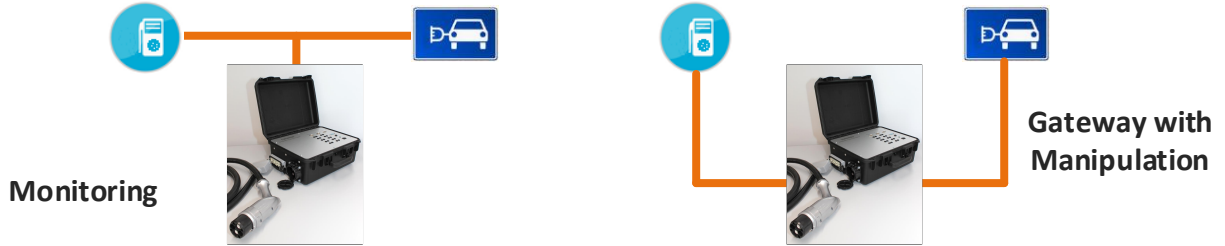
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Use Cases

Verification Charging (Man-in-the-Middle)



EV Test



DC Power Supply:

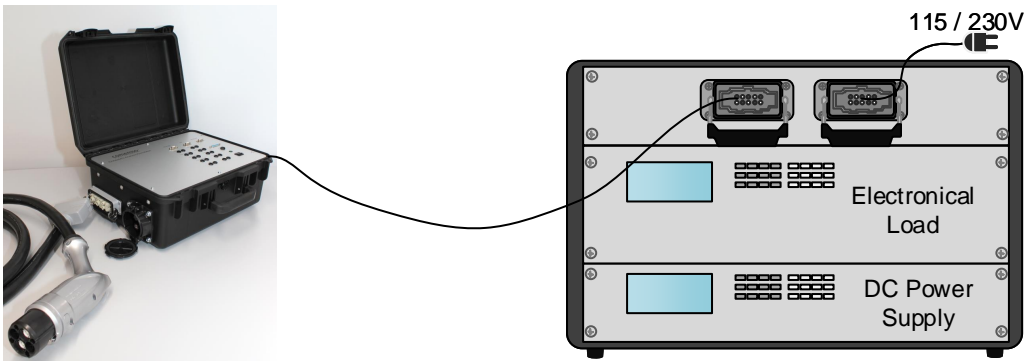
- Controllable over CAN
- Integrated interface by comemso

Charger Test



DC Load:

- Controllable over CAN
- Integrated interface by comemso



Monitoring Charging States, Signal Quality, etc. over CAN interface

success at the states, but timing problems

Error / abort detection

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CHAdEMO Analyzer / Simulator

Monitoring / Signal measurement / Summary

Verification Charging (Man-in-the-Middle / Monitoring)



State Monitoring

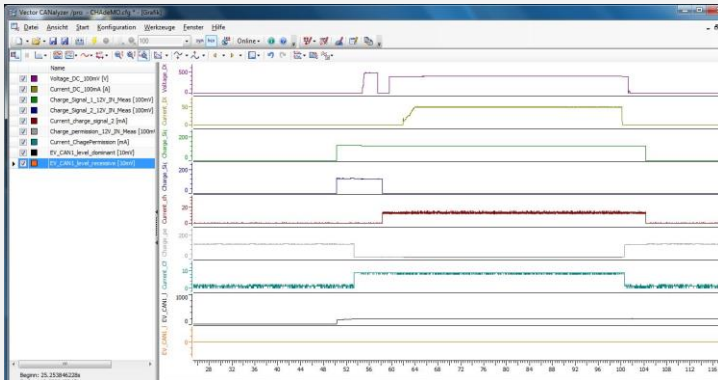
Example, *doesn't correspond to the behaviour of the participants shown above:*

If charger is acting like a Version 0.9, but communicated to be Version 1.x

à Detection of unexpected stop event (marked red).

	B	C-1	C-2	C-3	C-4	D-1	D-1A	D-1B	D-2	D-3	E-1	E-2	F-1A	F-1B	F-2	F-3	G	H-1	H-2	H-3	L-1	L-2	Abort string (100ms)	
Current time(100ms)	0	1	6	0	38	5	0	45	13	17	5	0	0	2	4	0	11	24	0	3	2	7		
Compliance time(100ms)	0	40	5	0	60	200	0	200	20	20	5	0	0	15	20	0	40	5	0	20	5	5		
Charge signal 1																								
Charge state																								
Charge signal 2																								
CAN EV running																								
CAN charger running																								
102.5.0 = 1																								
102.3.0 = 0																								
102.5.0 = 1																								
102.5.2 = 1																								
102.5.0 = 0																								
StopEvent timeout EV																								
StopEvent timeout Char																								
StopEvent 102.4.x = 1																								
StopEvent 102.5.1																								
StopEvent 102.5.4																								
StopEvent 102 Charging																								
StopEvent 109.5.1																								
StopEvent 109.5.3																								
Charge Signal1 lost																								
Charge State lost																								
Charge Signal2 lost																								

Signal Measurement



- ✓ Verify state changes
- ✓ Detect disturbances
- ✓ Check DC voltage / DC current values
- ✓ Compare signals and states with charging process

Summary

- ✓ Detect charge states
- ✓ Detect Stop Events
- ✓ Measure and check timings
- ✓ Measure signal voltage and current
- ✓ Measure DC Voltage and DC Current
- ✓ Check of DC Power with communication
- ✓ Measure CAN cycle time
à Statistics of good and bad cycle times
- ✓ Measure CAN message order
à Statistics of good and bad order counts
- ✓ Measure CAN signal quality
à Voltage of dominant and recessive level
- ✓ Detect causes of charging problems

Also available:

- ✓ Fully simulation of electric vehicle
- ✓ Fully simulation of charger

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