

# EV ComboCS4M - CCS simulation



Accelerate and make CCS developments more reliable

Date: 2020-08-19  
Version: 6



*TRIALOG* is working on EV charge since more than 10 years and had several opportunities to develop a strong expertise on EV charge protocols like IEC 61851, DIN 70121, ISO 15118 and OCPP1.6/2.0.

In this context, *TRIALOG* has developed several testing and validation tools.

**ComboCS4M, the EV CCS simulator** is one of these tools. It could be used in any setup in needs of a CCS EV implementation. For example to simplify CCS end of line validation and maintenance by providing quick test means for DIN 70121 and ISO 15118 protocols without any power transfer.

## ***Technical Details***

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- Size: 160 x 125 x 52 mm
- Connectors:
  - Power supply: barrel jack
  - Control Pilot and Protective Earth: BNC
- Interface
  - WiFi hotspot
  - Ethernet

## ***Supported Features***

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ComboCS4M could be used in any setup in needs of a CCS EV implementation. For example, to validate the correct behaviour of a CCS EVSE or of an SECC for AC or DC, ISO 15118 or DIN 70121 communications, including the HPGP PLC and IEC 61851-1 communications. The goal of ComboCS4M is not to entirely check the EVSE CCS implementation<sup>1</sup>, but to verify that the building process, installation operation or maintenance operation leads to a properly working device.

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<sup>1</sup> Do you know ComboCS? It is done for that purpose! If you are interested, please contact us at [contact@trialog.com](mailto:contact@trialog.com).



Figure 1: ComboCS4M - Face 1

## Auto Mode - Verify expected behaviour

In auto mode, once plugged to an EVSE or an SECC, the ComboCS4M is starting a DIN 70121 and an ISO 15118 (optional) test suite.

The test suite can be quickly described as below:

- Do the SLAC mechanism
- Select the DIN 70121 version: the EV ComboCS4M is supporting only DIN 70121, and DIN 70121 is expected to start
- Once charging loop is reached, wait 15s before to request to stop
- At the end of the charge, simulate an unplugged wire and wait 7s
- Simulate a plugged wire and do the SLAC mechanism
- Select DIN 70121 or ISO 15118: the EV ComboCS4M is supporting ISO 15118 and DIN 70121, ISO 15118 is expected to start, but DIN 70121 is also accepted
- Once charging loop is reached, wait 15s before to request to stop
- At the end of the charge, simulate an unplugged wire

## Manual Mode – Simulate an EV

In manual mode, once plugged to an EVSE or an SECC, the ComboCS4M is simply starting a DIN 70121 or ISO 15118 communication session as an EV will do.

## Simple Configuration

The ComboCS4M is provided with a Wifi hotspot and an Ethernet plug allowing to access a configuration UI. Select the functioning mode of the ComboCS4M (AC, DC, EIM or PnC) and its SmartCharging behaviour: Departure time, Energy request and Battery State of Charge (DC only).

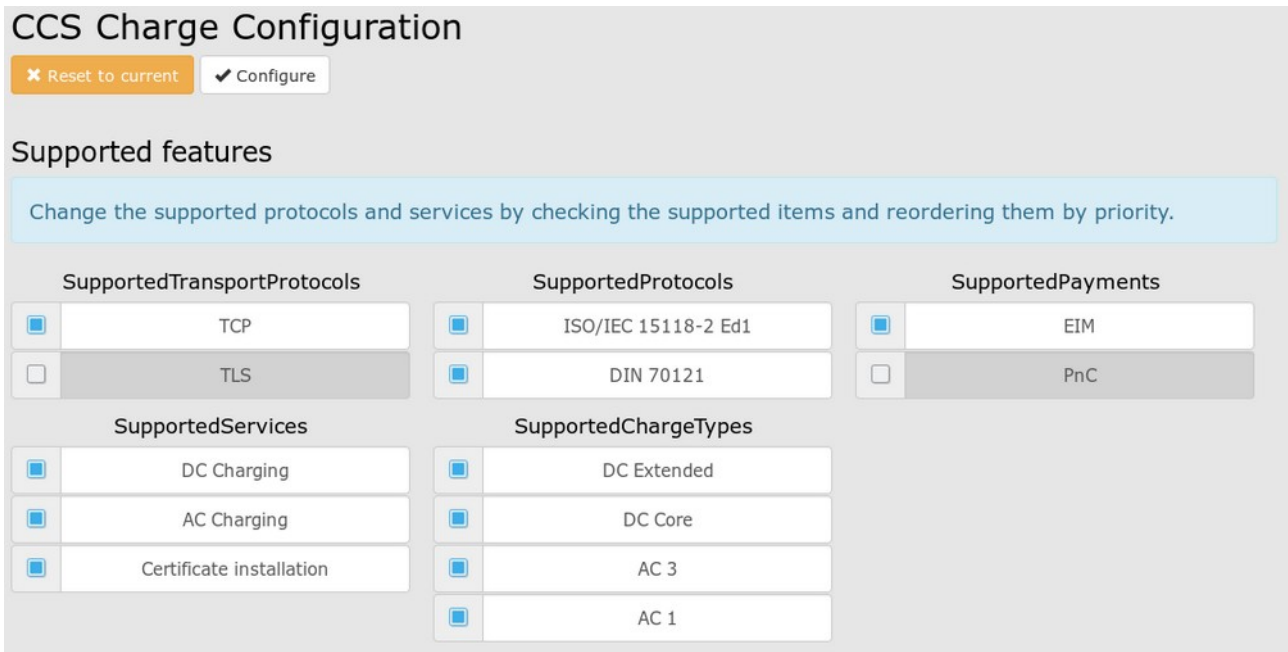


Figure 2: ComboCS4M configuration UI

## Quick access to test result

On the ComboCS4M box, LEDs are indicating the progress of the charging session and the test suite result. It allows to visualize where it fails in case of failure.



Figure 3: ComboCS4M showing session progress with LEDs

## Quick access to test results history

The ComboCS4M is provided with a Wifi hotspot and an Ethernet plug allowing to access a result UI and to download a CSV file listing all test suites passed by the tool. The listing contains: Date, EV @MAC, SessionId, Test Result OK/NOK, Error Code.

## Test Results - EV ComboCS4M

[Download results \[CSV\]](#)
[Purge results](#)
[Download logs](#)

#	Time	EV MAC	EVCCID	RunId	SessionId	Result	Last message	Last stage	LED	Error code
1	1587650114	0001870564de	0001870564df	1341917951	DIN c6dcd8d69b37f680	Success	SessionStopRes	Finished	*●●●●●	No error
2	1587650158	0001870564de	0001870564df	2103066586	DIN 307318b2dc503402	Success	SessionStopRes	Finished	*●●●●●	No error
3	1587650941	000000000000		2116314582		Failure	None	Waiting PLC	○*○○○*	Cable unplug during session
4	1587650987	000000000000		1550997892		Failure	None	Waiting PLC	○*○○○*	Cable unplug during session
5	1587651038	0001870564de	0001870564df	2111408007	DIN dcc7a1fc7e6542fa	Success	SessionStopRes	Finished	*●●●●●	No error
6	1587651088	0001870564de	0001870564df	1532606698	DIN b44871f8d9fd9478	Success	SessionStopRes	Finished	*●●●●●	No error

Figure 4: ComboCS4M test result UI

## Annual Subscription

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The ComboCS4M tool described in this document is ready to use. It has been tested and validated by the *TRIALOG* team, tested with several EVSEs in the field and during 3 Testing Symposiums and 1 CharIN Festival and is currently used by several companies around the world.

The ComboCS is also still actively maintained by *TRIALOG* to fix eventual remaining bugs, test with new EVSEs, facilitate the usage of the stacks, and ensure the correct behaviour of the Simulation mode regarding the current consensus of the normative groups and ISO 15118 user group.

In order to provide such corrective and evolutive updates of the ComboCS4M, *TRIALOG* is proposing an annual subscription including:

- Access to corrective releases of the ComboCS4M
- Access to evolutive releases of the ComboCS4M

*TRIALOG* will deliver at least one release per year to fix minor bugs that might have been detected and to deploy enhancement of existing features (same feature basis).

In addition to the access of these releases, the subscription also offers access to:

- Blocking bug detected by the Purchaser: answer with 2 working days, fix or patch under 5 working days
- Non-blocking bug detected by the Purchaser: fix under 10 working days
- Minor bug detected by the Purchaser: fix during the next annual release of the ComboCS4M

After investigations, if the encountered issues were not related to the ComboCS4M but to the Purchaser setup or CCS implementation, the time spent for the investigation will be imputed to the Purchaser at the price agreed when buying the tool.

The subscription is done on a yearly basis. The first year of the ComboCS4M subscription is already included when buying the tool. Subscription for upcoming years is done on the conditions defined when buying the tool if done continuously. In case of interruption, paying for the not covered period is necessary to get the update.

The definitions below are required to fully understand the scope of the subscription:

<b>Blocking bug</b>	Bug that “prevents starting a charging session”, “prevents finishing a charging session” or “prevents unlocking charge plug on EV” without any possible workaround.
<b>Non-blocking bug</b>	Bug that “prevents to charge at the desired timing or level” or bug with workaround but that fits “Blocking bug” characteristics (“prevents starting a charging session”, “prevents finishing a charging session” or “prevents unlocking charge plug on EV side”).

<b>Minor bug</b>	Any other bug not fitting in the 2 cases described above.
<b>Fix</b>	A fix is completely eradicating a bug.
<b>Patch</b>	A patch provides quick-fix or workaround to a “Blocking bug” in order to make it “Non-blocking bug” or “Minor bug”.

## Contact us

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For more information about **ComboCS4M**, please contact us: [contact@trialog.com](mailto:contact@trialog.com).