



# Charging analysis

EV Charging Analyzer | Generation 5 / FLEX

**comemso**

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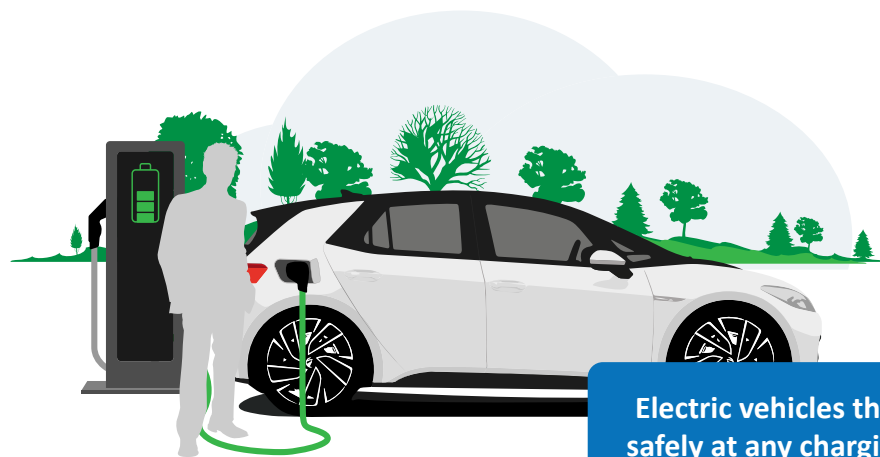
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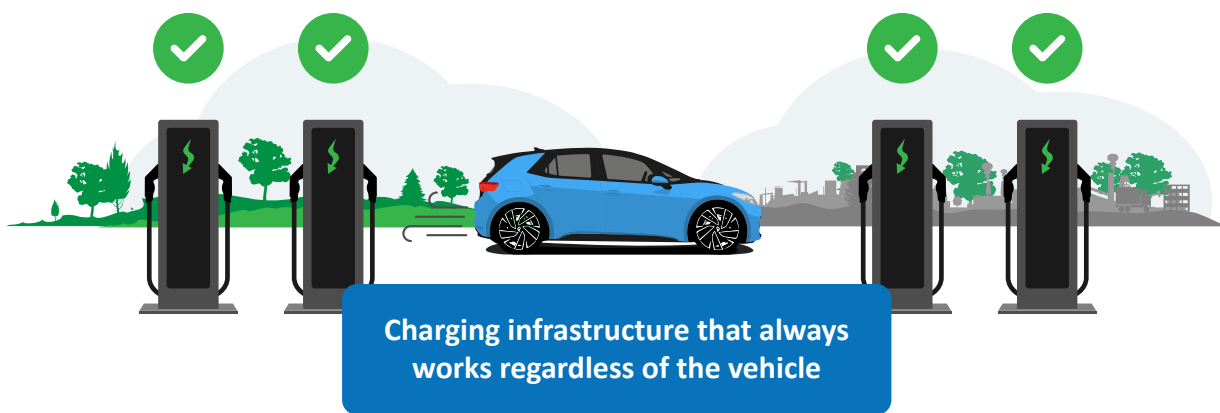
# A perfect synergy between charging station and electric vehicle

Whether you're testing electric vehicles, components or charging equipment - from suppliers to manufacturers: with analysis systems from comemso, you can increase the efficiency of your development and make your products ready for the market without a hitch.

You not only receive measuring devices, but also systems that analyze your products for standard conformity and robustness that also conveniently displays deviations. Thanks to fault simulation you can also check the reaction to non-compliant behavior. And that both at both protocol and electrical level.



Electric vehicles that charge safely at any charging station



Charging infrastructure that always works regardless of the vehicle



## Standard/Norm compliance

- Analyze your products with the help of our proven test libraries (e.g. CharIN CCTS) for all globally relevant charging standards and norms

## Safety & durability

- Take advantage of our extensive test and analysis solutions for a guaranteed safety of charging processes

## Interoperability

- Test, analyze and manipulate complete charging cycles
- Ensure smooth on-site communication between vehicle and charging station
- Use recordings to compare and evaluate a series of charging processes with each other

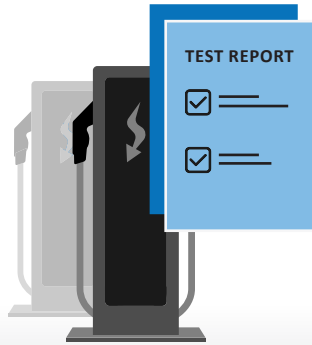
# Inefficient analysis technology costs you a lot of time and money

Customers are putting pressure on you. At the same time, your development is facing major challenges and you are wondering how you can reconcile everything?

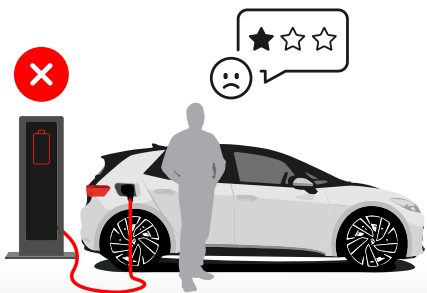
We know the requirements and special features that the electromobility market places on manufacturers and end customers. That’s why we have a technical solution for virtually all of your problems, helping you to overcome them and keep your customers and employees happy and satisfied.



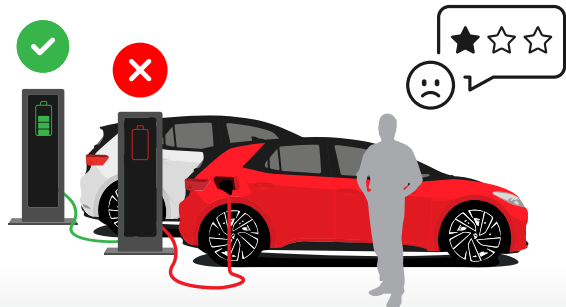
EVSE manufacturer  
*„I have to support all vehicles at my charging station as long as I can guarantee electrical safety“*



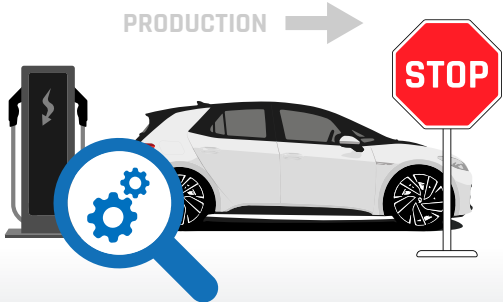
EVSE manufacturer  
*„I have to prove that my charging station complies with standards in order to win the contract“*



EV manufacturer  
*„My vehicle does not charge at a specific charging station“*



EV- & EVSE charging operator  
*„Some vehicle customers cannot charge at my charging station“*



EV-, EVSE- and component manufacturer  
*„I have to recognize errors as early as possible in order to reduce development and follow-up costs“*



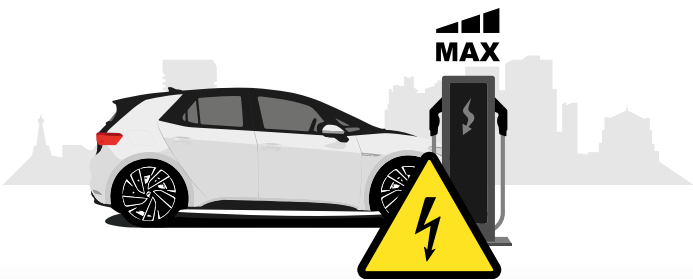
EV- and EVSE manufacturer  
*„I need a test system manufacturer with an outstanding reputation“*



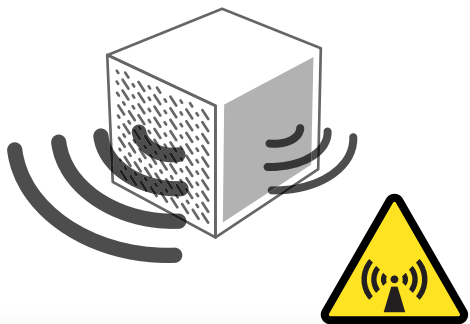
Component manufacturer  
*„I have to meet the vehicle manufacturer’s standards to win this contract“*



EV-, EVSE- and component manufacturer  
*„Time-consuming and cumbersome root cause analysis increases costs, orders are lost“*



Energy corporation  
*„I need automatic tests across the entire power range - including communication between vehicle and charging station“*



Testing laboratories, EV- and EVSE manufacturer  
*„I need a system that is suitable for EMC tests“*





**Dr.-Ing. Kiriakos Athanasas**  
CEO, Founder

# Understanding charging processes and presenting them in a conclusive manner is part of our DNA

We have been developing analysis systems for optimizing charging processes with passion and dedication since 2011. In order to always find the best solution possible, we always carry out field tests ourselves. The resulting pool of experience flows directly into our development and is thus available to each of our customers in the form of innovative products. Thanks to our exclusive in-house production, they can also be tailored to your specific requirements.

Today - as the market leader in the field of charging analysis - we are now more determined than ever to continue to enrich and advance the electromobility market with our innovations.

**Manuel Athanasas**  
Junior - the next generation



**Dipl.-Ing. (FH) Anita Athanasas**  
COO, Co-Founder



Connect the  
Co-Founder on  
LinkedIn



## Quick and easy root-cause analysis for every measurement

Analysis: Graphical translation in relation to the standard

## Tried and tested

Numerous renowned commercial and state testing laboratories. Among them: TÜV Austria, KTL, KTC, PTEC, VL, VDE, CSA, PPLAN

## Durability tests

Wide power range (1500 V, 500 A or more)

IEC 61851-23 (EVSE robustness tests)

Detailed fault simulations

## Verified test libraries

CharIN CCTS: validated

## Extensive interoperability tests

Man-in-the-Middle on many levels of detail to support all types of encryption or even manipulate load communication.

Including quick and easy analysis and conclusive presentation



# Testing without limits

In our product portfolio, you will find solutions for every conceivable test and analysis requirement:

- Test electric vehicles and charging quipment in the laboratory or end-of-line with up to 900 kW (600 A and 1500 V)
- Perform interoperability analyses using „man-in-the-middle“ in the field or in the laboratory and also use charging recordings for later analysis under changed conditions
- Check your charging infrastructure in the field with our easy to use portable devices for outdoor operations

|                   | Measuring | Analyzing | Testing |
|-------------------|-----------|-----------|---------|
| Man-in-the-Middle | ✓         | ✓         | ✓       |
| EV Test           | ✓         | ✓         | ✓       |
| EVSE Test         | ✓         | ✓         | ✓       |

## Testing and analyzing complex charging processes made easy

Our aim is to simplify the work of our customers and thus accelerate the development of electromobility. That’s why you can not only test, measure and simulate with our systems, but also have charging processes checked for compliance with standards at the same time. Automatic, user-friendly and easy to understand.

# Perfectly integrated

- Existing hardware, such as sources and loads, can be easily integrated into our test systems
- With our software interfaces, we ensure seamless integration into your development and testing environment



## Man-in-the-Middle

- Interoperability



## EV Test

- Standard conformity
- Durability
- Safety



## EVSE Test

- Standard conformity
- Durability
- Safety



## Supported standards and norms

### Plug-Types



Typ 1



Typ 2



GB/T AC



CCS Typ 1



CCS Typ 2



GB/T DC



CHAdeMO



NACS (AC/DC)

### Standards

- **For AC**  
IEC 61851-1, SAE J1772 and GB/T 18487.1-2015 Annex A (AC)
- **For DC-CCS Combo 1 + 2 & NACS**  
IEC 61851-1, DIN 70121, ISO 15118 and SAE J1772; IEC 61851-23 measurement and IEC 61851-24
- **For CHAdeMO**  
0.9.1, 1.0, 1.0.1, 1.1, 1.2 and 2.0
- **For GB/T DC (China)**  
GB/T 27930-2011; GB/T 27930-2015 and GB/T 18487.1-2015.



## comemso eMobility Services GmbH has an accredited calibration laboratory

The aim of calibration laboratories is to determine display errors in instruments and measuring systems as well as the values of the measurement samples. The objective is to guarantee accurate and reliable measurement results. The accreditation of testing and calibration laboratories is carried out in accordance with DIN EN ISO/IEC 17025.



# Quick, cost-effective and safe to your destination in just three steps

Ready to switch to world-class and future-proof analysis and testing methods?

1

Call our employees or contact us:



+49 711 982 98 - 200



[sales@comemso.com](mailto:sales@comemso.com)

2

We will go through all further steps personally with you

3

In the future your vehicles or charging infrastructure will operate standardized, safe and interoperable

## Here's what will happen next

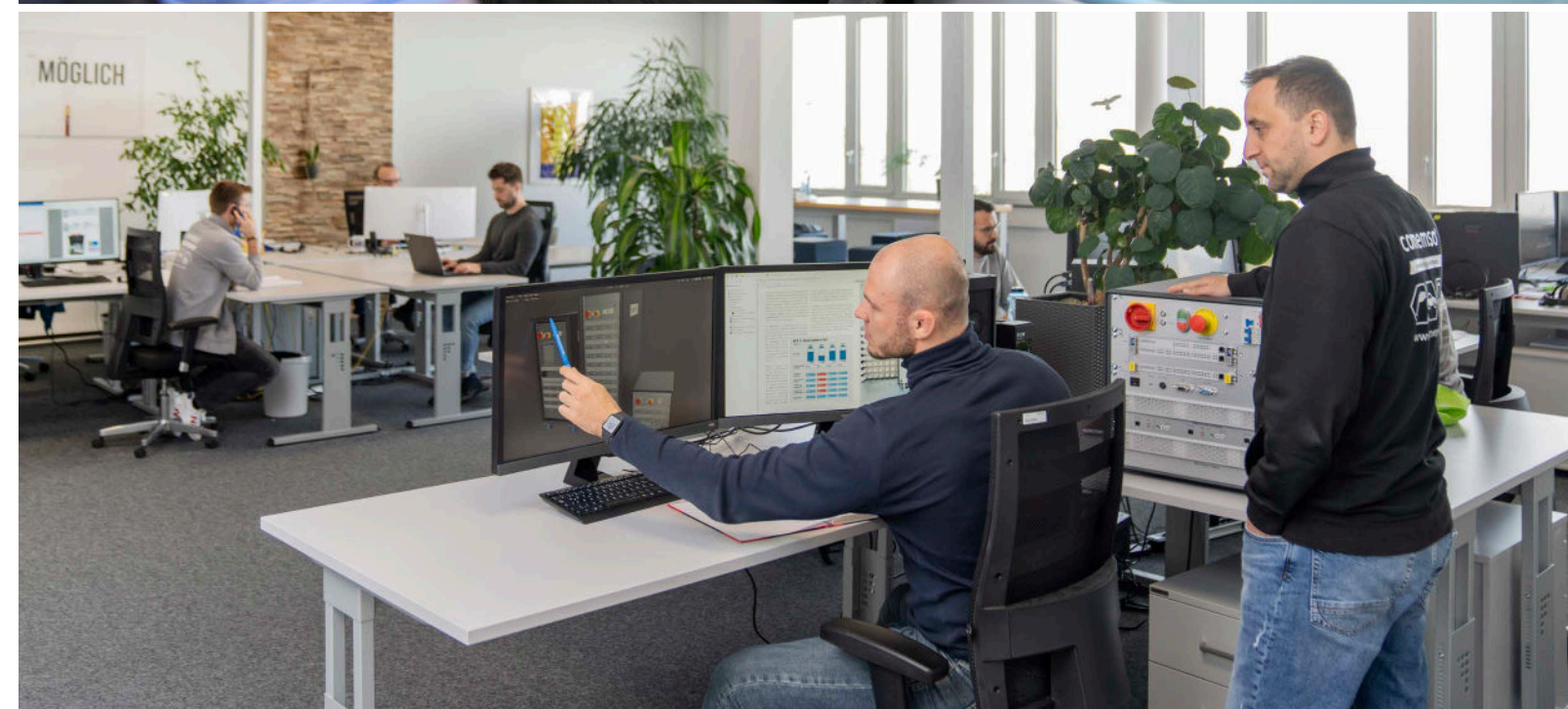
We will work with you to determine your specific requirements.

- Fill out the questionnaire
- Online meeting with our sales representative

You will then receive an offer with a detailed description of your solution both in text and graphic form.

- Including an online demo of the desired functions

After order confirmation we will stay in contact with you so that we can provide you with your perfect system.





## Don't waste time and money with vague, complicated and inconclusive tests

Do not suffer the consequences of inadequate analysis technology:

- **Overly long & cost-intensive development times**
- **Fewer orders**
- **Dissatisfied end customers**
- **Poor or nonexistent press**



### CharIN Certification

As the leading association for European and American charging, CharIN has defined a system and test case validation with about 180 test cases for CCS. The test cases were specifically defined by the focus group experts to significantly improve the EV charging experience for consumers. After an extensive process, the comemso test system has proven that it is capable of performing reliable tests and measurements for the CharIN conformance tests under the DC CCS Basic EVSE profile.

*„We are proud to be now able to supply CharIN approved conformance test systems (CCTS) to our customers for CharIN CCS conformance testing and for individual product development testing,“*

said Anita Athanasas, Head of Sales & Product Management at comemso.

## Satisfaction at every charging station thanks to manufacturer compatibility

Use our analysis technology to ensure satisfied customers not only on the road but also in the charging park.

“Outstanding technical knowledge of Comemso and customer application. High product quality and support suitable for research.”



**Prof. Dr. Remus Teodorescu**  
Aalborg University Denmark

“Comemso is a leading provider of technical solutions for the electric vehicle industry. Their comprehensive knowledge and well support were key factors in our purchase decision.”



**Thomas Zitzelsberger**  
Head of EMC Team, TQ PCC Augsburg

“Comemso offers innovative solutions to the industry, offering support and a quality product. Highly recommended!!”



**Antonio Puerta Vicente**  
GRUPO SGS ESPAÑA



## New in Flex

With the EV Charging Analyser Flex - the latest development from our company - our systems have a completely new configuration, making our systems even more compact and flexible. Many functions that were previously packed into 19" plug-in units now find space in practical card modules that can be easily replaced for maintenance or upgrades and shipped individually. For example, if you send in a module, you will immediately receive a replacement module from us in return. This saves a lot of time and prevents extended standstills/outages.

The base of the EV Charging Analyzer Flex fits into a single switch cabinet. You decide which additional functions you require and receive the corresponding card modules from us. This of course also works if you want to add additional functions.

- High modularity
- Faster, simpler upgrades
- Even with changes to charging standards on a hardware basis and expansion to include new charging standards
- More efficient and straightforward change-outs worldwide with no need to return the whole product merely the modules

As a result: minimization of the risk of downtimes even for the production line

- More compact and therefore space-saving thanks to new configuration
- The hardware for all tests (excluding IEC 61851-23 electrical tests) can be accommodated in a cabinet
- Now up to 1500 volts, 600 amps

- Control-Unit**  
The heart of the new FLEX generation
- Power-Safety-Chassis**  
Increased safety thanks to switch box
- RCD FIUnit Chassis**  
AC fault simulation
- AC-Chassis**  
AC charging connections
- Extender-Chassis**  
Open for extensions
- Inlet-Chassis**  
DC charging connections
- HV-Connect-Chassis**  
The base with high-voltage connections including cooling unit



EV-Charging-Analyzer Flex



# EV Charging Analyzer Multi Mobile - the all-rounder

With our Allrounder you can test in the field, in the laboratory and in production. The integrated charging connections simulate a vehicle with up to four different charging standards.

The EV-Charging-Analyzer Multi Mobile measures and checks both the communication circuit and the load circuit for standard compliance over the entire charging time and records all deviations. It detects and visualizes the causes of charging interruptions and displays them so that you can recognize them within seconds. Saves you a tedious search and therefore a lot of time and money.

## Expand your possibilities

The EV charging analyzer Multi Mobile allows you to implement a wide variety of test scenarios. Its most outstanding strengths are the extended man-in-the-middle functions, which give you significant and reproducible interoperability tests. Manipulate the communication of the charging station or electric vehicle to gather significant information about the corresponding behaviour of your products.



## Safe and simple

Thanks to the user-friendly design with patented sliding mechanism, there is no need to change charging sockets. Thanks to simple plug-and-play, no additional adapters are required.



- Monitoring of the protocol between vehicle and charging equipment
- Payment process in plain language despite encryption read out
- Targeted manipulation or disabling of messages

## AC/DC-CCS Combo 1 & 2, NACS

- IEC 61851-1
- DIN 70121
- ISO 15118
- SAE J1772
- IEC 61851-23
- IEC 61851-24

## CHAdeMO

- 0.9.1
- 1.0
- 1.0.1
- 1.1
- 1.2
- 2.0

## GB/T AC/DC (China)

- GB/T 27930-2011
- GB/T 27930-2015
- GB/T 18487.1-2015



## EMC testing

Test systems must always function reliably. This also includes electromagnetic immunity and the requirement that they do not negatively affect other systems. The EV charging analyzers from comemso meet the high requirements of the electromagnetic compatibility guidelines. This is confirmed by periodic tests in the in-house EMC test chamber.

## Our company headquarters has a lot to offer

We have extensive test equipment and a 630 kW mains connection available in our test laboratory for our development and end-of-line tests. Our devices are also tested for electromagnetic compatibility in our in-house EMC test chamber. On request, you can also book this for your own tests - we look forward to hearing from you:



**+49 711 982 98 - 200**



**[sales@comemso.com](mailto:sales@comemso.com)**

Benefit from our extensive capabilities and rely on our intensive and efficient tests for the dynamic electromobility market.



Our in-house EMC test chamber



## All vehicle components under control

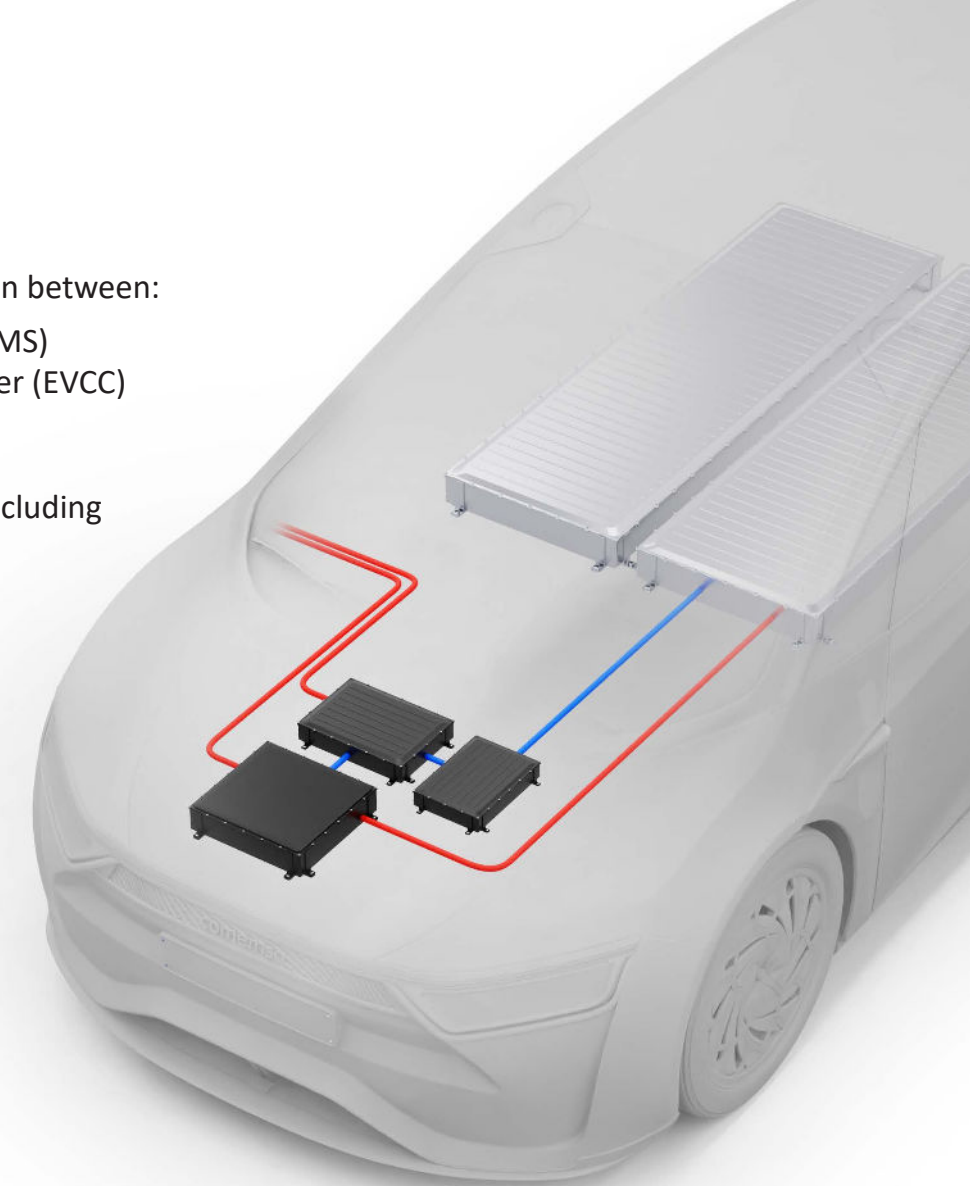
The control unit composite test bench allows you to test and analyze the communication between all relevant control units of an electric vehicle with high precision. It covers all testing requirements of both vehicle and component manufacturers on the interaction of the components.

- Are faults communicated correctly between the control units?
- Do the control units behave correctly in the event of faults?
- Are all security mechanisms implemented?
- What happens during communication of contradictory information?

By emulating both battery cells and a charging station, safety-relevant functions can also be tested, charging standards can be checked and fully automated conformity tests can be carried out. Test every possible scenario to ensure there are no risks of serious misconduct that could lead to damage and expensive recalls.

### Main functions

- Test and analysis of communication between:
  - » Battery Management System (BMS)
  - » Electric Vehicle Charge Controller (EVCC)
  - » On Board Charger (OBC)
- With the help of safe emulation including fault simulation of:
  - » Battery cell
  - » Battery pack
  - » charging station



## Accelerate the development of your battery management systems

Test and optimize your battery management system with the help of our battery cell simulators. Increase the EV range and at the same time optimize the condition and durability of the battery cells.

By the way:  
Battery cell simulators can be combined with our EV Charging Analyzer!

[www.comemso.com/bcs](http://www.comemso.com/bcs)





Easy Chester now with the benefits  
of the new Flex technology

## Easy Chester - Charging station tests made easy

No more time-consuming testing with different electric vehicles at your charging station. With the new Easy Chester you can simulate vehicle signals, communication protocols and load circuits directly on site. Simple, flexible and compact.

With the Easy Chester, you can ensure that your charging infrastructure works properly and safely and enables fast charging.

- Simulation of electric vehicles according to CCS (DIN 70121, ISO 15118) and CHAdeMO or NACS
- AC measurement optional including IEC 61851-1, DIN 70121 and ISO 15118-2/3
- Fully automatic EV simulation on communication and load circuits
- No computer required for on-site testing
- Safety test by EVSE (DC-CCS only) to verify the insulation fault detection
- Special fault injection on DC-CCS signal lines (PE cut, CP short circuit)
- Informative reports as PDF
- Also available as an end-of-line version for the production of charging equipment
- Also available as a calibration tester for laboratory and field use





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SUPPORTED AND TESTABLE STANDARDS



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