



Electrical Vehicle Supply Equipment (EVSE) Manufacturing

A full turnkey solution for EVSE manufacturing

EVSE Manufacturing

Electric Vehicle (EV) are rapidly transforming the automotive landscape, offering cleaner and sustainable transportation solutions. As EV adoption increases, the need for reliable, efficient, and accessible charging infrastructure becomes critical. This brings about a huge opportunity for Electric Vehicle Supply Equipment (EVSE) manufacturers to scale up. However, this poses a challenge as EVSE manufacturing increases in complexity due to the need for faster charging, safety, and efficiency.

A full assembly for a DC charger, as seen in Figure 1, requires the use of various equipment, subassemblies, and Printed Circuit Assembly (PCA) to get a fully finished product. Due to the nature of the EVSE on high power, strict testing is required to ensure the product is safe for the consumer.

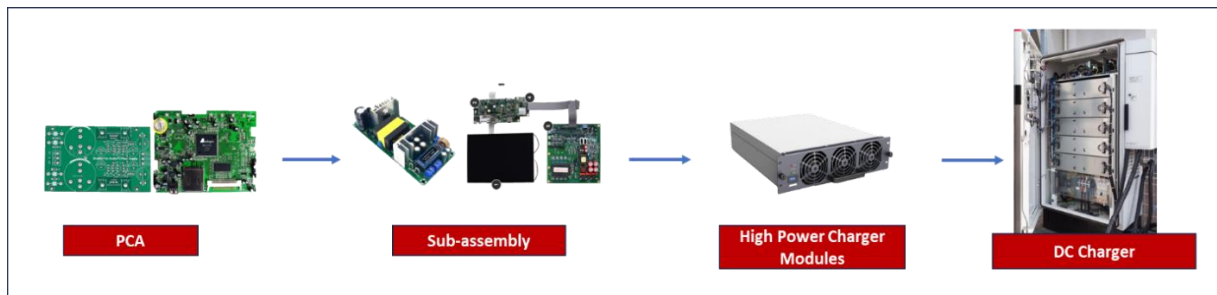


Figure 1. Overview of components required for a 120-480kW DC Charger

Unlocking manufacturing excellence with Keysight's full turnkey solution

At Keysight, we are committed to delivering comprehensive solutions that drive manufacturing excellence from start to finish. Our full turnkey solution starts with the board level and ends with the final Device Under Test (DUT), ensuring quality and efficiency throughout the entire process.

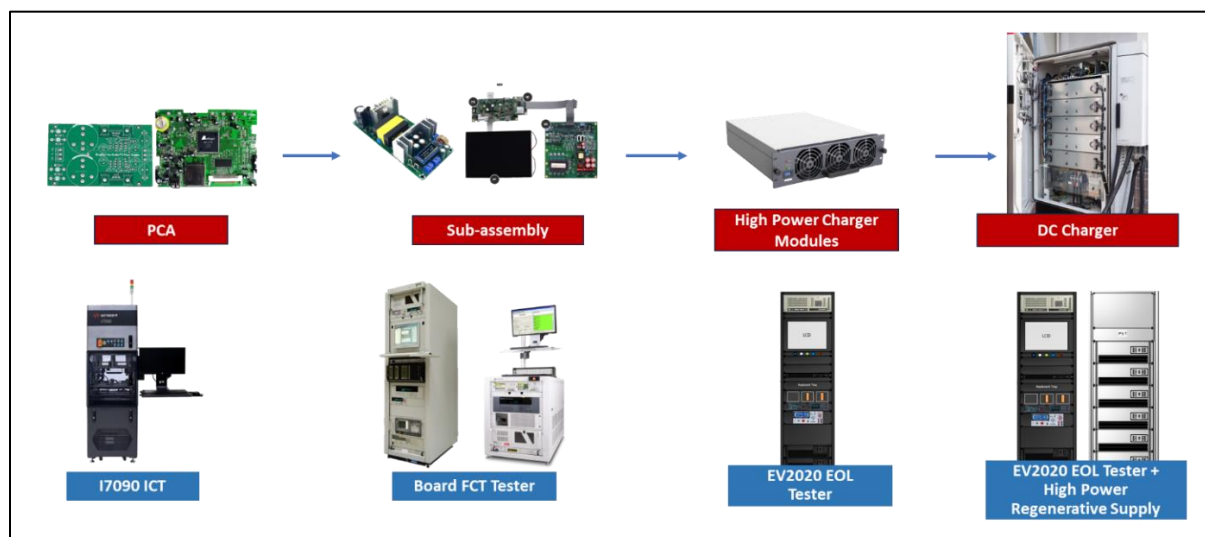


Figure 2. Keysight solution within the end-to-end assembly line

Starting strong: i7090 for In-Circuit Testing (ICT)

Our journey begins with the i7090, a cutting-edge solution for In-Circuit Testing (ICT). With its advanced capabilities, the i7090 ensures the integrity and functionality of your Printed Circuit Board Assembly (PCBA), laying a solid foundation for the manufacturing process. The i7090 comes equipped with up to 20 parallel cores, allowing for simultaneous testing with multiple Units Under Test (UUTs). It also is configurable to include functional testing.



Figure 3. i7090 Board Test System

Building confidence: Functional Test Systems (E2240A and E2230C)

Each subassembly undergoes rigorous testing using our Functional Test Systems, including the E2240A and E2230C. These systems are designed to verify the performance of individual components and subassembly, guaranteeing reliability and consistency at every stage of production. Additionally, the functional test systems come with a large base of instrumentation, allowing them to be customized to your manufacturing needs!



Figure 4. TS-5020 (left) and TS-5040 Functional Test

Reaching new heights: EV2020A for end product testing

As we near the final stage of production, our EV2020A takes center stage for end-of-line product testing. With its scalable power ranging from 30kW to an impressive 540kW and bidirectional testing capabilities, the EV2020A meets the demands of high-power manufacturing environments with ease. Whether testing electric vehicles or power electronics, this versatile solution delivers unmatched performance and accuracy.



Figure 5. EV2020A High Power End of line tester

Compliance with current and future charging standards

Our EV2020A also comes integrated with Keysight's SL1040A Scienlab Charging Discovery System (CDS), enabling a realistic emulation of all AC and DC charging interfaces of EVs and EVSE. CDS supports the following standards and directives:

- AC charging mode according to IEC 61851-1 (PWM)
- AC charging mode according to SAE J1772 (PWM)
- AC charging mode according to GB/T 18487.1 (PWM)
- AC charging mode according to ISO 15118
- AC charging mode according to Bharat AC fast IS17017 Part 1 (PWM)
- DC fast charging mode according to DIN SPEC 70121
- DC fast charging mode according to ISO 15118
- DC fast charging mode according to GB/T 27930
- DC fast charging mode according to CHAdeMO
- DC fast charging mode according to Bharat DC (CAN)

Why Keysight?

Safety

At Keysight, safety is not just a priority – it's our commitment. We understand the critical importance of ensuring the safety of both users and equipment in the electric vehicle charging infrastructure. Our high voltage stations come equipped with emergency stop switches, allowing for easy shutdown of operations when needed to minimize the risk of accidents or electrical hazards. We understand that even with advanced safety features, users may still have concerns about potential electrical hazards. That's why our interfaces are designed to be touch-safe, providing an extra layer of assurance and peace of mind.

Software

PathWave Test Automation (TAP) with PathWave Test Executive (PTem) provides powerful, flexible, and extensible test sequencing and test plan creation with additional capabilities that optimize your test software development and overall performance.

- Minimize programming and coding effort and promote code reusability.
- Create high-level steps, share them, and gain the benefit of test standardization for repeatable use cases.
- Graphical switch manager visualizes instrument and switch connects.

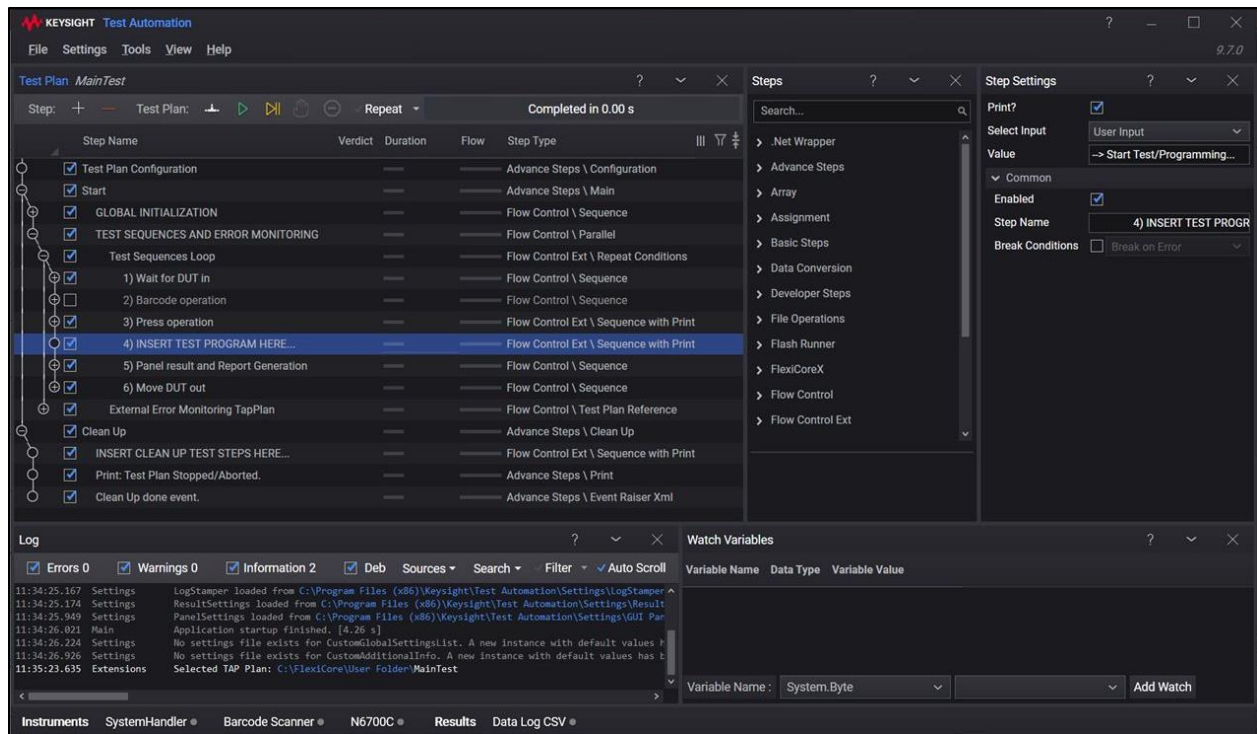


Figure 6. PathWave Test Automation (TAP) with PathWave Test Executive (PTEM) GUI

Full turnkey

We understand the importance of efficiency and speed in manufacturing. That is why we work with partners to offer a fully automated end-to-end solution for your manufacturing line. By automating repetitive tasks and processes, we help you improve efficiency, reduce labor costs, and minimize errors, ensuring consistent quality and reliability in every product.

To expedite the development process and shorten the time to market, Keysight offers a custom EV Manufacturing test library. This extensive library provides a wide range of pre-built test applications tailored for EV manufacturing, covering various testing scenarios and requirements.

Your Partner in Automotive Manufacturing

Having the right measurement solution is only the beginning. Design engineers count on repeatable results across work groups to avoid discrepancies that can impact development cycle time, time to market, and budgets. Manufacturing strives to meet production goals, but inaccurate measurements can affect yield and product quality. Keysight calibration and repair services keep instruments operating to warranted specifications over their lifetime, ensuring accurate, repeatable measurements across R&D and manufacturing.

Our partnership with you

Keysight offers a broad portfolio of services and support to address all your test equipment needs:

- Startup assistance and training help you quickly and effectively use your new equipment.
- Calibration and warranty assurance plans provide coverage for five, seven, or ten years.
- Flexible service delivery includes on-site mobile labs that reduce your calibration turnaround time from days to hours.
- Premium used equipment includes the same high performance and three-year standard warranty as new units.
- Global presence providing support and services for your success.
- Trade-in programs (available on both Keysight and non-Keysight models) offer you significant credits to upgrade to the latest Keysight technology.

Conclusion

We at Keysight are committed to driving the EV revolution forward by providing manufacturers with the tools and support they need to succeed. Through our testing solutions, we enable manufacturers to focus on innovation and optimization while ensuring the production of high-quality EVSE and safety in the manufacturing line. Join us in shaping the future of transportation and accelerating the transition to electric mobility. Stay in contact with Keysight for upcoming solutions.



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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Published in USA, March 20, 2024, 3124-1197.EN