

EV2020B EV Manufacturing Functional Test Platform



Achieve more with less

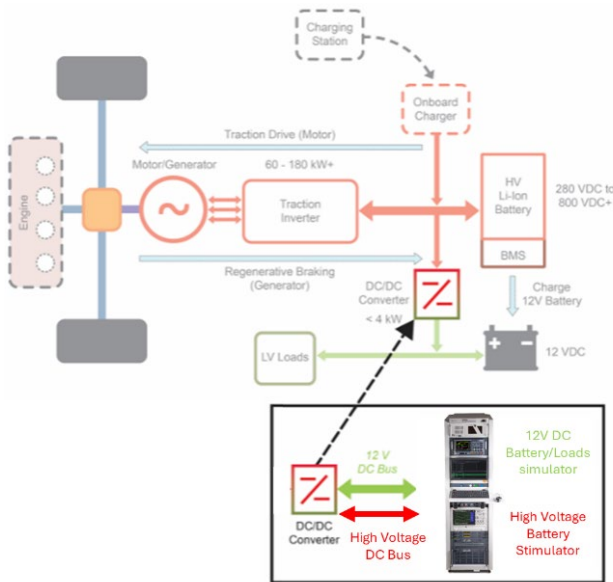
In today's Electric Vehicle (EV) market, components such as the DC-DC converter and on-board charging plays an impact in the mass adoption of EV. The DC-DC converter holds paramount importance as it serves the link between high voltage battery and various low-voltage systems. Meanwhile, the On-Board Charger (OBC) enables EVs to charge from diverse sources providing flexibility and convenience to drivers. With advancements in technology, including higher power ratings and faster charging capabilities, these components are pivotal in enhancing practicality and attractiveness of electric vehicles.

The EV2020B EV Manufacturing Functional Test System from Keysight is a scalable and configurable solution for testing DC-DC and OBC applications for EV. The solution is scalable up 120 kW while maintaining a compact footprint, seamlessly integrated within a single rack. Moreover, dealing with high voltage safety is always the top priority, the EV2020B comes equipped with several safety mechanism to protect the user and equipment such as high-power output inhibit, emergency power off and user configurable touch-safe high-power connectors. With its robust safety features and unparalleled scalability, the EV2020B system empowers manufacturers to conduct comprehensive and reliable testing of EV components, driving forward the advancement and adoption of electric mobility.

Key features

- Wide Input AC voltage range
 - 3 Phase: 380-480Vac @ 120A max
 - 1 Phase: 100-240Vac @ 16A max
- Scalable DC power output up to 120kW max
- Safe to use: Safety interlock, Emergency Power Off (EPO), output inhibit, protective contactor, touch-safe high-power connectors.
- Keysight PathWave platform with DC-DC and OBC test case library feature and DC-DC and OBC application test suite libraries

Application Use Case

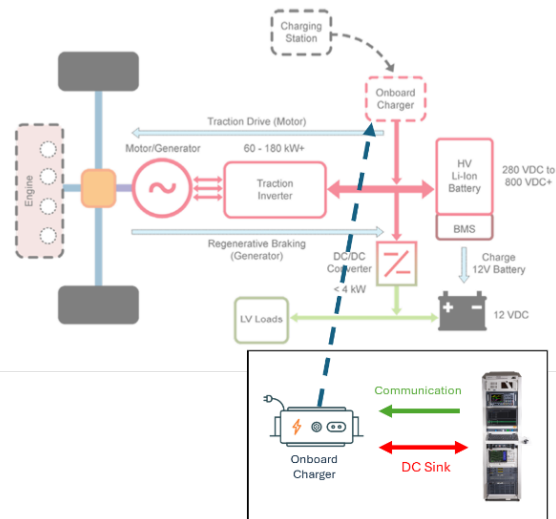


DC-DC converter use case

When testing power converters, it is crucial to use a power source/sink unit that accurately emulates your EV's battery. The EV2020B meets this need with Keysight's RP7900 Regenerative DC Power System, capable of both sourcing and sinking DC power, simultaneously measuring the power at both input and output of the converter. This bidirectional capability will simplify the overall test setup, especially to bi-directional DC-DC converters.

OBC + DC-DC converter use case

For an OBC testing, the EV2020B can be paired with the Keysight SL1200 series AC emulation to provide an AC power to simulate the characteristics of an AC EVSE output. We can measure the power conversion efficiency accurately with the power analyzer (available in the EV2020B as an option). Finally, with Keysight SL1550A integrated, it is able to emulate the behavior of a Supply Equipment Communication Controllers (SECC) for testing an OBC with built-in Electric Vehicle Communication Controllers (EVCC)



DC power bank use case

When there is a need for more power, the EV2020B can scale its DC power output up to 120 kW. This is done by utilizing the same RP7900 Series model stacking in parallel. Making it fairly compact with a single 2.0 m rack space and thanks to its bi-directional capabilities, it will be able to source or sink depending on requirements.

Simulate Bidirectional Power Components

Testing bidirectional power flow demands source and sink equipment at both input and output of a converter or vice versa. Conventional bidirectional test methods requires both power supply and electronic load at converter terminals, a multi-channel power meter is connected at both terminals to measure the power. Such setup requires more instruments and complicates the instrument configuration during testing.



RP7900 Series Regenerative Power System

The RP7900 Series Regenerative Power System is the core of the solution. It is a two-quadrant power system, capable of performing source/sink operation. The test setup can be significantly simplified with only two RP7900 at both converter terminals, performing the bidirectional source/sink testing and measuring the power at both ends concurrently. Thanks to its regenerative behavior, it reduces heat generation and return more than 85% of sink power back to the grid.

Safety and Reliability

Electrified vehicle components require extra validation and reliability testing to ensure DC-DC converter and OBC will last under harsh operating conditions. As hazardous voltage is involved during testing, manufacturing personnel need to be protected from the hazard. This requires special safety mechanisms implemented in manufacturing environment. EV2020 built-in fixture interlock feature offers to inhibit high voltage output from test system when unexpected interruption to test setup occurs.



Robust Software

PathWave Test Executive for Manufacturing (PTEM) is a plug-in that enhances the user experience in developing automated test programs using PathWave Test Automation Platform (TAP). With powerful PathWave Test Executive software, we eliminate the need to maintain or develop a test platform by users, especially in a manufacturing environment where a high mix of products exist, the maintenance, enhancement, and control of it could become challenging. Development of a test execution platform should not be a priority for valuable resources, instead optimizing and improving test coverage should be the key area of focus.

Additionally, PTEM can be paired with the EV2010 test case libraries further reduces development time with its application base libraries such as the DC-DC Converters, On Board Charging (OBC), EV battery, and electric vehicle supply (EVSE). This will help teams leverage on Keysight experience and further reduce development times allowing for faster entry to market!



General Characteristics

Line power	
Input AC supply	Single phase: 100 to 240 V _{AC} , 2.2kVA max Three phase: 380 to 480 V _{AC} , 68kVA max
Power line frequency	50/60 Hz
Environment	
Maximum altitude	2000 meters
Temperature (Operation)	5 °C to 40 °C
Maximum relative humidity	The test system is designed to operate in the range from 50% to 80% relative humidity. (non-condensing).
Pollution degree	2
Installation category	2
Regulatory	
Safety and EMC regulatory	Refer to Declaration of Conformity for the latest revisions of regulatory compliance at: http://www.keysight.com/go/conformity
Mechanical specification	
Dimensions (H x W x D)	2020 x 600 x 905 mm (79.5 x 23.6 x 35.6 in.)
Weight	Maximum weight 430.0 kg

Global Deployment

Keysight's global footprint ensures we deliver solutions where you need them. We have established automotive customer centers globally. These centers underscore our commitment to work with and serve customers in local proximity to support innovative technology projects that drive the automotive and energy industries.



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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