3 Ways Aptiv Helps OEMs Build Safety into Electric Vehicles

BLOG
February 20, 2020

There are more than 8,000 connection points inside a typical electric vehicle (EV). If any one of them malfunctions, the results can range from a minor inconvenience to a major, life-threatening problem. That's why, when it comes to building electric vehicles, there is simply no room for error.

What are OEMs to do? For starters, they can partner with an automotive technology partner that takes safety as seriously as they do. Let's take a closer look at three ways Aptiv is helping lower the risk in EVs, even as the voltage inside them increases.

Safety for everyone who touches the car

When it comes to electrical wiring and high-voltage connections, Aptiv builds safety into every design. Every Aptiv connector must pass the "finger-proof" test, meaning the design makes it impossible for someone to touch any internal

portion of the metal electrical contacts. This is an important design feature that protects a consumer or a service technician who might accidentally or intentionally gain exposure to an open connection.

Aptiv also is a proven leader in fuse-in connectors and other innovative technology that ensure that if a spike in current reaches a potentially dangerous level, the battery will disconnect from the rest of the car and the charger, thus eliminating any potential for a catastrophic event.

Similarly, in scenarios where a connector may be accidentally disconnected while the power is still on, Aptiv's embedded High Voltage Interlock Loop (HVIL) technology serves as a kind of circuit breaker embedded directly in the connector, effectively putting the car into "safe mode."

Industry-leading reliability and safety

Another way Aptiv lowers risk even when voltages grow higher is by exceeding the highest safety specs set by OEMs. Most specs cover vehicles in the 600V to 750V range, but Aptiv designs its products for 1000V, making them not just safer for today's EVs but also ready for adjacent markets right around the corner, such as electric buses. Additionally, Aptiv exceeds by double the OEM requirements for reinforced isolation of high-voltage connectors to minimize unwanted transient currents.

Truth in testing

The final and most crucial step in ensuring EV safety is the certification process, and these certifications differ widely by region. When it comes to testing and validating electric vehicles on a global scale, Aptiv has no peer.

We validate components through our nine test labs strategically located around the world. Of particular significance is the testing of our line of portable EV chargers. EV owners may use these chargers every single day. Safety is of the utmost importance, and the chargers must be certified for regional safety compliance. Aptiv chargers utilize independent third-party labs such as Underwriters Laboratories (UL) to perform these certified tests, and as a result we offer chargers with certifications in 117 countries. Our in-house, region-specific testing, along with these outside capabilities, covers everything from electrical

and mechanical components to environmental and vibration factors, ensuring we deliver components that are far above customer requirements.

At Aptiv, safety never happens by accident. It happens because we have a systematic approach to ensuring the critical functions in an EV will do their job, and we test them under the most extreme-use conditions. Electric vehicles need to be safe even if they are wrongly used (in either the assembly or driving of the car), and Aptiv tests across a wide range of worst-case scenarios.

Our Failure Mode & Effect Analysis (FMEA) methodology allows us to design and control parameters that can anticipate a broad range of safety issues. Functional analysis, from design and prototyping through manufacturing and production, is how we find the answers we need to guarantee that every EV component we deliver to an OEM meets or exceeds its established safety requirements.

Easing safety concerns, one EV innovation at a time

Consumers have historically been wary of any disruptive technology, and EVs are no exception. The same general public that was once nervous about driving around with a tank full of flammable gas is now understandably nervous about electrification.

Time and a proven track record of safety dissipated the concerns about gas-powered vehicles, and the same thing will happen with electric vehicles. For OEMs, that proven track record of safety starts with an automotive partner with a proven record of safety, too. And for dozens of OEMs around the world, that partner is Aptiv.