

Standards Defining Reliable Automotive



Automobiles are essential to our daily lives, relying on thousands of small components that must function perfectly for the vehicle to operate smoothly. A small failure of a single part can not only lead to a breakdown, but often may lead to mishaps that affect the passengers within the vehicle. Hence it is quintessential for these components to operate reliably, across a wide range of temperatures, vibrations, and other harsh environmental conditions.

Considering the criticality of these factors for the overall performance and safety of the vehicle, there is no doubt each component including the connectors and cables must undergo extensive testing and standardization. Adhering to the practice other industries follow to confirm the quality and reliability of each component used, well-defined standards are adopted in the [automotive industry](#) as well.

These standards define guidelines for manufacturers in measuring the quality of the component. When it comes to electrical connectors there are several automotive standards that not only define the safety of the products but also their ability to withstand vibrations and wide temperature ranges.



UL and VDE (Verband der Elektrotechnik) are pioneers in the industry for providing quality and safety certifications for various technologies. These organizations certify electronics and other application components within an automobile through rigorous testing protocols. The VDE mark is one of the most reliable forms of safety standards in consumer protection for around a hundred years. With EVs, autonomous driving, and other advanced features developed within the vehicles, challenges associated with cybersecurity and interoperability are also rising. UL has put forth an innovative globally recognized testing process to meet the complexities associated with the modern automobile

Both these certifications denote that the products meet a strict set of guidelines for safety, reliability, and environmental sustainability.

USCAR, LV214, and LVDS are other predominant standards associated with the automotive industry.

Founded in 1992, USCAR is a legal collaboration of prominent car manufacturing companies to address challenges and opportunities in major automotive technology areas like advanced propulsion, electrical & electronics, energy storage, hydrogen fuel cells, manufacturing, materials, and safety.

USCAR 2 is the latest standard released by the Society of Automotive Engineers (SAE). It includes performance testing at various phases like development, production, and field analysis of terminals, connectors, and other electrical components for 60~600V connections in high-voltage vehicles.



Our latest high-performance automotive grade products like [Ve-NET™ Automotive Multigigabit Differential Connector System](#), 0.50mm Power Pin [Floating Board-to-Board Connectors](#), 0.50mm [FFC/FPC Connectors with Autolock Mechanism](#) - F308/F332 Series, FlexLock® [FPC-to-Board Connector](#), and [HSBridge+ connector](#) complies with USCAR2.

LVDS stands for Low-Voltage Differential Signaling and is a global standard for high-speed data transmission. This standard is generally considered for automotive displays and digital cameras. Our [HSD \(High-Speed Data\) Connector](#) is designed to address this standard.

One of the other major automotive standards, especially prevalent in the European region is LV214. This was developed by an association of German car manufacturers Audi, BMW, Daimler, Porsche, and Volkswagen. LV214 addresses the ability to monitor the quality of crimped contacts with crimp force monitors. In an automotive wire harness, the terminal must have a certain crimping force. The crimp force monitors measure the adequacy of the pressure applied to the crimp, and thus the quality of a crimped terminal can be identified.

Amphenol's [Minitek MicroSpace™ Crimp-to-Wire connector](#) platform offered in 1.8, 1.5, and 1.27mm pitch comes with a unique design that enables LV214 Severity-2 levels. [Click here to learn more about our extensive portfolio of automotive connectors adhering to these industry standards.](#)