Amphenol®

Application Note

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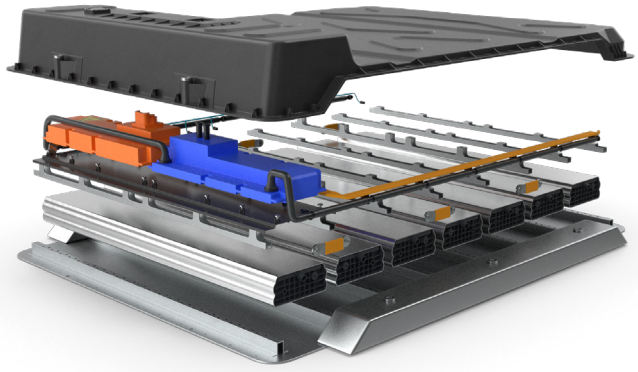

UPC Series 12mm

BACKGROUND

As part of our dedication to innovating within the electric vehicle industry, we are enhancing our suite of high-current HV connectors to expedite the charging process. The expansion of our Universal Power Connector (UPC) Series is a testament to this commitment. We are focused on expanding a groundbreaking product that will streamline the electrical connection from the battery to the Power Distribution Unit (PDU) pack, and from the PDU to the motor controller, reinforcing our role in the advancement of electric vehicle technologies.

PROBLEM

In environments where connectors are exposed to significant mechanical stress and intense vibrations, the integrity and resilience of the interconnect system are critical. These conditions demand connectors that can maintain a stable and secure connection despite the physical forces at play. In the realm of Electric Mobility (E-Mobility), there is an ever-increasing demand for electrical efficiency, which places a high value on the amperage and voltage capacities of connectors. However, conventional connector designs often fall short, as they tend to be large and bulky. This presents a challenge in E-Mobility applications, where space is at a premium and the efficiency of power transfer is paramount. Therefore, there is a pressing need for innovative connector solutions that are not only compact and space-efficient but also capable of handling high power loads without compromising on performance in the face of rigorous mechanical demands.

AIO SOLUTION

Optimal for integration within Power Distributor Units (PDUs) and Motor Controller Units for hybrid and electric vehicles, the UPC 12mm is a sophisticated two-pole connector that boasts EMI shielding, a High Voltage Interlock Loop (HVIL), and an additional safeguard in the form of a secondary locking mechanism, ensuring secure high voltage and current connections.

The UPC 12mm, crafted from metal, embodies a rapid lock-and-release mechanism alongside a Controlled Passive Alignment (CPA) and Terminal Position Assurance (TPA) design, effectively mitigating the risk of erroneous mating. When engaged, it achieves an impressive IP6K9K rating and demonstrates resilience through a guaranteed minimum of 100 mating cycles.

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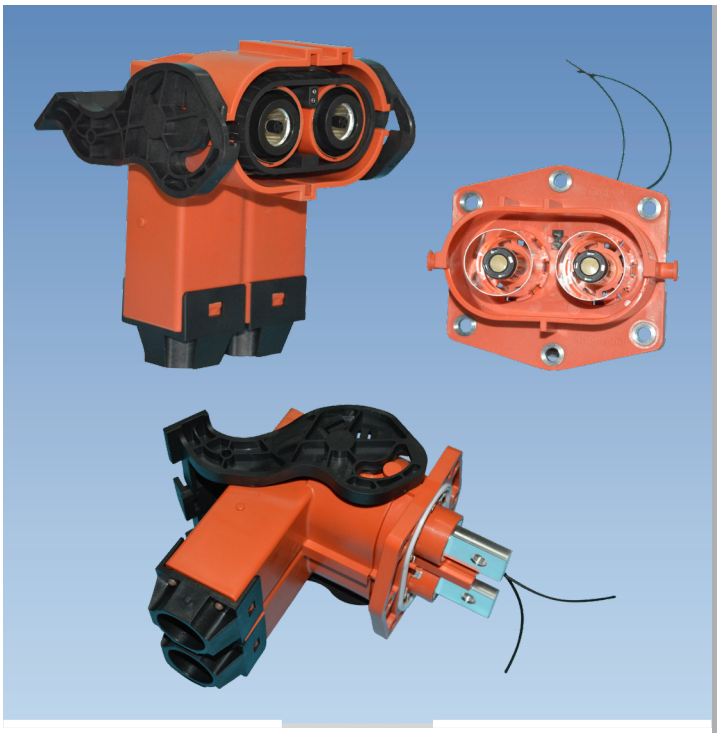

UPC Series 14mm

BACKGROUND

Amphenol Industrial Operations' (AIO) endeavor to further high current HV connector solutions in the Heavy Equipment and Electric Vehicle markets has led to an expansion of the UPC product family. AIO has developed the next generation UPC with a focus on implementation of the connection between the OBC and Battery packs in electric vehicles.

PROBLEM

Within the existing EV, HEV, E-bus and E-truck Markets, most connectors utilize metal housings and have a high cost for connecting battery pack output. Any innovative solution will need to have a lightweight plastic shell and high amperage capabilities that will provide customers with a reduction in production costs on their end product.

AIO SOLUTION

The UPC 14mm is ideal for use in power converters, hybrid vehicles, battery management systems, as well as in heavy equipment electrification and starter generators. This two-pole plastic connector includes EMI shielding, HVIL (high voltage interlock loop) and a second lock function for high voltage and high current connections.

The UPC 14mm also offers a quick lock and release function and a keyway design to prevent incorrect mating. It meets an IP67 rating when mated and can withstand a minimum of 100 mating cycles.

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Application Note

UPC for Hybrid and EV

BACKGROUND

Electrical systems on conventional automobiles, buses and trucks are typically powered by a 12 volt battery with a 30A current rating. The switch to “electrification” in hybrid and electric vehicles requires much higher voltage and amperage levels for operation. These demanding electrical requirements of 1,000VDC with up to a 400A current rating require special contacts and connectors. Unique packaging solutions for the power distribution system, AC/DC converters, multi-phase motors, battery packs and starter generators needed to be developed. Amphenol Industrial Operations is leading the industry with our new Universal Power Connector series, UPC.

PROBLEM

OEM’s are looking for robust plastic connectors to be lightweight, compact, and economical while being reliable and durable to deal with the automotive and heavy equipment environments. These requirements include shielding, HVIL (high voltage interlock loop), touch-proof and waterproof features all in one connection system, while handling mating cycles into the thousands.

Furthermore, OEM’s are looking for reliable suppliers that can design and manufacture HEV systems globally. They need value added suppliers who can support them in all regions with proven technology and manufacturing to provide them solutions in “one stop shopping”.

AIO SOLUTION

AIO introduces the UPC connector series which incorporates our patented RADSOK® technology used globally around the world for many years. The product features higher amperage, lower T-rise, less resistance, lower mating force and higher mating cycles. Because RADSOK® allows 50% more amperage through the same size pin, the UPC is compact; and because it is plastic, it is also lightweight. This solution has shielding, HVIL, touch-proof and waterproof features. For your HEV systems, it can be used along with our SurLok Plus®, ePower, and other Amphe-Power solutions as connectors or cable assemblies.s