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FCI extends Power.S³* range of production-ready EV connectors

FCI has announced a new addition to its Power.S³ family of high power connectors for the EV (Electric Vehicle) market. The 2 way 230A/750V RCS890 is a 90° version of the proven RCS800, and offers greater design flexibility to meet the challenge of ensuring reliable connection with bulky, large diameter power cables.

With volume production scheduled for mid-2012, the RCS890 builds on the success of the RCS800, which is already being deployed in the first generation of mass production Renault/Nissan EV's, including the Nissan Leaf and Renault Z.E. range. Designed to complement the RCS800, the new connector will help alleviate the high mechanical stresses placed on connectors by the 35-50mm² power cables required in EV engine bays. Significantly, the RCS890 can be used in both 'up' and 'down' positions. It can also be used in conjunction with the RCS800, maximising the number of orientations possible.

Incorporating large Li-ion batteries, EV applications are characterised by operating voltages up to 800V and average continuous currents up to 300A. Connectors must therefore deliver outstanding protection against risks such as electrocution, interference and arcing. Furthermore, the need to maximise vehicle range while keeping budgets under control means that weight, size and total cost of ownership must be minimised.

Retaining all the successful and innovative features of the RCS800, the latest member of FCI's Power.S³ family achieves exceptional levels of safety, sealing, shielding, durability and reliability. In common with the RCS800, the RCS890 incorporates terminals with an 8mm round pin design. These make more efficient use of space than equivalent square designs and boast higher like-for-like current carrying capacity. The RCS890 also incorporate the same innovative features developed for the RCS800:

- Unique 2-step unmating process, incorporating a time delay between power disconnection and the interlock opening. Disconnection is impossible when the connector is live, eliminating the risk of accidental electrocution or arcing.
- Unique integrated electric interlock and Connector Position Assurance (CPA), ensuring 100% safe mating.

Furthermore, the RCS890 connector slider system provides a 1-move easy and fast connection process featuring an extremely compact and robust design.

New enhancements for the RCS890, which will also be implemented on the RCS800, include further improvements to the best-in-class sealing performance. Uniquely in this market sector, FCI applies two levels of sealing: individual cable line sealing and global sealing when mated. Consequently during maintenance operations, RCS800 & RCS890 connectors are sealed even when disconnected. These connector solutions provide a combination of IP2xB finger touch protection and IPx9K, IP67



external sealing performance. Furthermore, the RCS800 and RCS890 are sealed both when mated and when unmated, further minimising the risk of arcing, short circuits and water ingress.

High power levels also necessitate rigorous control of EMI. Significantly, the RCS890 employs peripheral rather than individual cable shielding. A braid shield, secured with clamps and a metal collar, encompasses the entire connector/wire interface. Furthermore, the ease of installation provided by this approach ensures that the total applied cost is extremely competitive compared to individual shielding.

Developed in partnership with Renault/Nissan, the creation of the RCS890 and RCS800 reflects the fact that the EV sector is maturing. Crucially, OEMs and their suppliers are now benefiting from first hand experience of EV's on the production line and on the road. But whilst the market is developing fast, its future shape, size and direction remain unclear. Studies suggest that global EV sales could reach anything between 500,000 and 1,000,000 units by 2015. However, a range of factors will have a significant impact on the actual outcome. These include the price of oil, implementation of fast charging infrastructures, the availability of government support and financial incentives, and consumer acceptance of vehicles which currently offer relatively limited autonomy compared to conventionally-powered alternatives.

Another notable characteristic of the EV sector remains the widespread absence of commonly accepted standards for connector design. At present, different regions and OEM technical 'clusters' have opted to pursue their own development paths. One exception is charge plugs, where moves toward greater harmonisation are evident. FCI has already commenced full production of a 'Type-1' charge plug design (the EV-PLUG-16/32A) that complies with both IEC-62196-2-1 and SAE-J1772 standards. This is a single phase 16-32A 7.4kW solution that supports slow charging and is currently the preferred option in Japan and North America. FCI has also developed a 'Type-2' charge plug (the EV-PLUG-16/63A). This 3 phase, 16-63A 43.5kW solution complies with IEC-62916-2-2. Supporting both fast and slow charging, it is the preferred route for European markets.

Given such a fluid, dynamic and fast-moving market, FCI remains committed to working in partnership with customers across the globe to create product solutions that are tailored to individual requirements. In this respect, FCI is also working on AK connector developments compliant with AK interface meeting the requirements of EV and HEV applications.

FCI brings to bear not only specialist experience in EV applications, but also a long standing and deep rooted understanding of the wider automotive market. Notably, the company's commitment to a collaborative approach is backed by efficient programme management, and predictive design tools that can indicate the real-life performance of new products at the earliest stages of the development cycle.

The EV sector is evolving. In a relatively short period of time, ground-breaking vehicles have moved from the drawing board to the showroom and out onto the road. Numerous technical challenges have already been met, including the development of connectors that can meet exceptional safety and performance challenges. As the market enters a new phase, it remains to be seen how quickly consumer markets will adopt EV technology. One key factor in driving forward the attractiveness of EV's will be the willingness of all suppliers to respond to the lessons now being learnt from real life experience of manufacturing, maintaining and owning the first generation of mass

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produced, zero emission vehicles. The RCS890 is certainly a reflection of this philosophy, and underlines FCI's determination to continually improve the performance and flexibility offered by its EV connector range. With the design now qualified and sampling underway, when volume production commences in mid-2012, the RCS890 will become the latest addition to a family of off-the-shelf connectors that is already helping to underpin a revolution in automotive technology.

**Power.S³ is a trademark of FCI*

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About FCI

With operations in 30 countries and sales of 1.28 billion Euros in 2010, FCI is a leading manufacturer of connectors. Our 14,000 employees are committed to providing customers with high-quality, innovative products for a wide range of consumer and industrial applications.

FCI Motorized Vehicles is one of the world's first connector manufacturers to offer a comprehensive range of production-ready connectors and charge plugs for the Electric and Hybrid Electric Vehicle markets, optimized for reliability, safety, light weight and compactness.

For more information: www.fci.com/powerS3