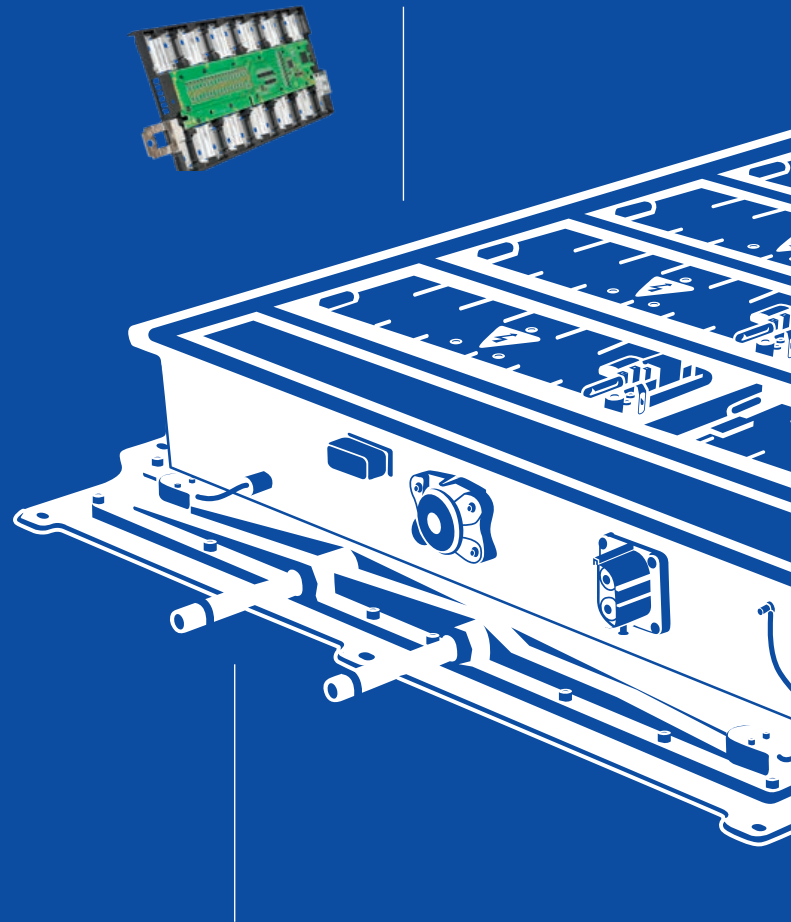


GOOD TO GO

The new era of mobility has begun and ElringKlinger is without a doubt good to go, quite simply because the company has already been mass-producing individual components for lithium-ion batteries since 2011. By establishing its first series production facility for battery systems, the Group is now taking a crucial step forward and is no longer merely a pure component supplier but also a supplier of complete battery units.

CELL CONTACT SYSTEMS

ensure the electrical connection of the cells within a battery module. They consist of a plastic carrier frame that holds the individual cell connectors together. The integrated sensor system monitors the voltage and temperature.



MODULE CONNECTORS

form the interface between the individual modules and the cell contact systems. They connect the modules both to each other and to the power electronics.





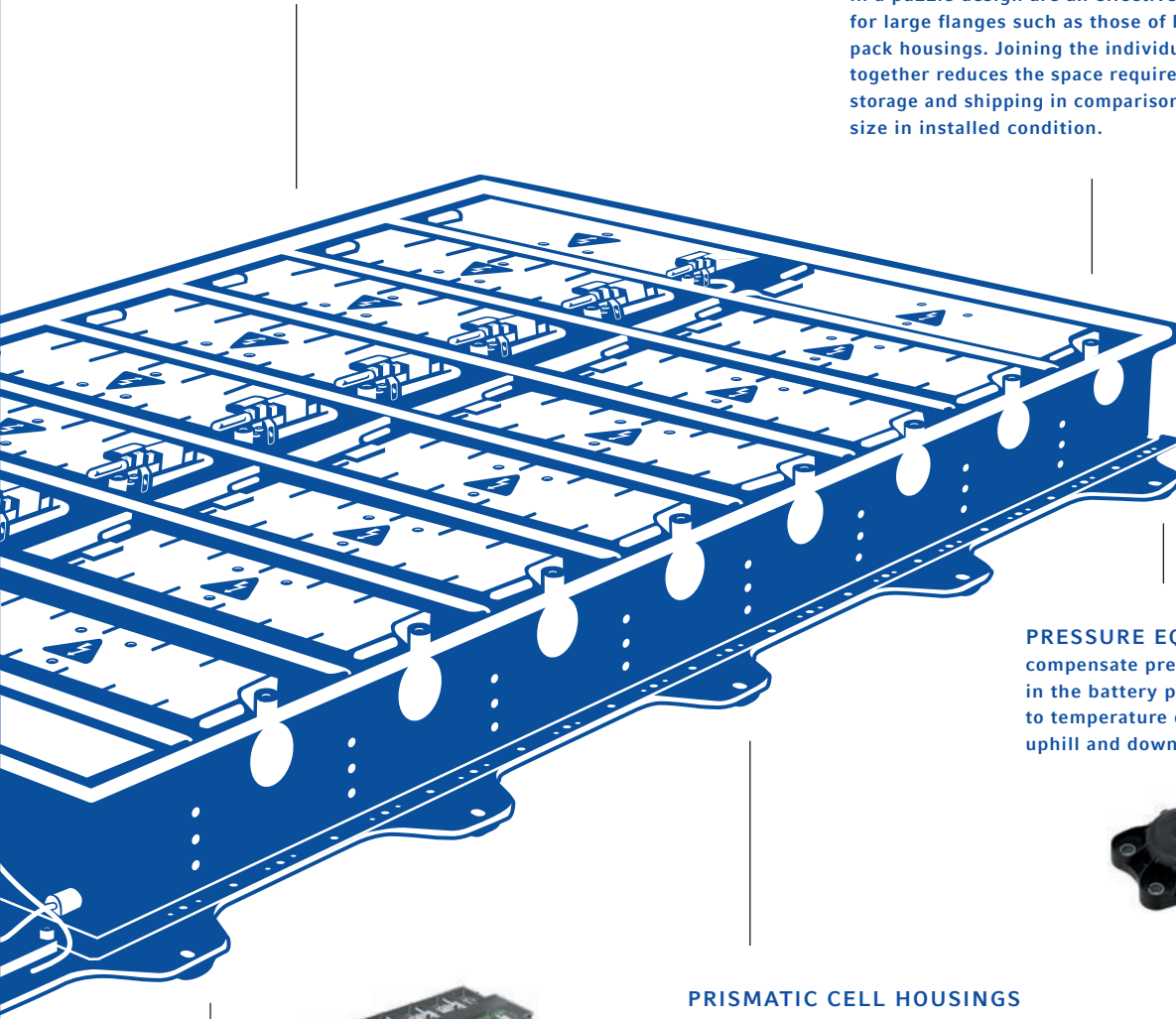
CELL CONNECTORS

carry current between the individual cells of the module. The aluminum connectors have the appropriate cross-section for optimal current carrying capacity.



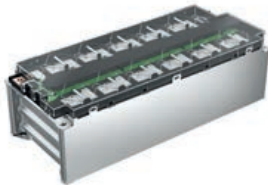
METAL-ELASTOMER GASKETS

in a puzzle design are an effective solution for large flanges such as those of battery pack housings. Joining the individual gaskets together reduces the space required during storage and shipping in comparison with their size in installed condition.



PRESSURE EQUALIZING ELEMENTS

compensate pressure differences that occur in the battery pack housing with regard to temperature differences or when driving uphill and downhill, for instance.



BATTERY MODULES

from ElringKlinger can be joined together to form overall systems with a voltage level of up to 800 V and can be used in numerous configurations in battery pack sizes from 2.2 to 60 kWh.

PRISMATIC CELL HOUSINGS

and cell cover modules make a significant contribution to the high power density and safety of prismatic lithium-ion cells. They have integrated safety devices for overpressure, overcurrent, and excessive temperatures.



When the heart of a vehicle no longer beats in the location in which it has functioned perfectly for over 100 years, this is obviously due to a major change that effects vehicle technology as a whole. It is a change that ElringKlinger recognized two decades ago. Since then, the company has been undertaking development work in the field of alternative drive systems, irrespective of technology. With a small organizational unit that acts like a start-up within the company, the Group commenced fully automated series production of the cell contact system for lithium-ion batteries – the first product for battery-powered electric vehicles – back in 2011 and gathered valuable experience in what was then a completely new drive area for ElringKlinger.

Over the next few years, the company dedicated large parts of its development know-how to battery technology, with a clear objective: demonstrating not only component but also system expertise – because the individual components can only be technologically perfected if the systems are understood in full. Extensive market research work that was undertaken in advance delivered the necessary framework data concerning flexibility, performance, size, and costs. One thing is certain: an efficient energy storage concept that is durable and optimized with regard to both installation space and costs is crucial to the universal acceptance of battery-powered vehicles. A battery concept tailored to the respective vehicle also directly affects the characteristics of an electric vehicle and therefore the benefit to the consumer.



ElringKlinger is good to go in helping to structure this technological revolution with its high-performance product solutions. The newly developed ElringKlinger standard module forms the basis of ElringKlinger battery packs. With a voltage level of up to 800 V, individual modules can be connected as required in the vehicle and be used in various configurations in battery pack sizes from 2.2 to 60 kWh – an innovation that is triggering profound structural changes in the ElringKlinger Group. For instance, the high demands on cost-effectiveness but also on the sustainability of the overall system necessitate holistic thinking and close cooperation between various areas of the company. While projects used to be initiated by Development, Sales, and Logistics employees, project managers, Purchasing, the production plants, Industrial Engineering, Supplier Management, and Testing are now also involved in e-mobility projects from the word go. After all, complex large-scale projects can only be realized in the shortest space of time through close interaction. In terms of system procurement, a variety of special machines, joined end-to-end to form a large assembly line, are also required to manufacture the systems.



The industrialization experts at ElringKlinger are responsible for setting up the first production system for battery systems.



Special machines tailored precisely to the manufacturing processes developed by ElringKlinger are used almost exclusively to produce the battery systems.

As early as the development phase, ElringKlinger's industrialization experts supported the Development department in implementing manufacturing-friendly designs that directly affect the choice of processes and accompanying manufacturing methods. ElringKlinger is treading new ground in a number of areas with this project. While the company can benefit from its core competencies in the fields of stamping, forming, laser welding, coating, and injection molding, it requires further manufacturing technologies, some of which are completely new, for the different production processes. Extensive safety measures, which have never existed at ElringKlinger before in this form, are also needed for testing and validation facilities in some process steps – cell testing, module testing, or component validation, for instance.

The complexity of the ElringKlinger standard module in terms of modularity and package dimensions also increased the requirements made on special machine manufacturers that design custom production, assembly, and transport systems on the basis of numerous requirement specifications. It is precisely this system flexibility that ultimately enables ElringKlinger to work on different customer projects on the same assembly line. This is a clear competitive advantage when future customer projects have to be realized quickly.

Initial highly automated series production of the powerful 800 V overall battery system is now being set up in an area covering 5,000 square meters at ElringKlinger's plant in Thale, Saxony-Anhalt. The Group is setting new standards here, since this will be its largest interconnected assembly line. It extends over a length of 70 meters and offers a maximum production capacity of 300,000 battery modules per year. The first battery systems are literally due to come off the line in 2020.

Sometimes, the past and the future lie virtually side by side. Here, the future is a new building that is scheduled for completion very soon and is located directly adjacent to the traditional cylinder-head and specialty gasket production facility at the company's headquarters in Dettingen an der Erms. This is the new development center, in which prototypes and preproduction series for alternative drive technologies will be produced in the future in an area measuring around 5,000 square meters. This newly created space will enable the Group to test theoretical process developments under practical conditions at a very early stage. To do this, resources are available for all manufacturing processes, albeit with a considerably lower level of automation than during subsequent series production. The new possibilities that are now readily available will enable ElringKlinger firstly to run through sample phases faster with customers and secondly to optimize its own manufacturing processes, quality checks, and throughput times prior to the start of series production in order to ensure a smooth and cost-optimized start of production for other projects as well.

ElringKlinger is ready to serve the e-mobility market with efficient and flexibly configurable battery systems, because the key to future mobility ultimately lies in the battery technology. It is crucial to the success of hybrid, electric, and fuel cell vehicles.

Prototype construction at the new development center in Dettingen an der Erms.

