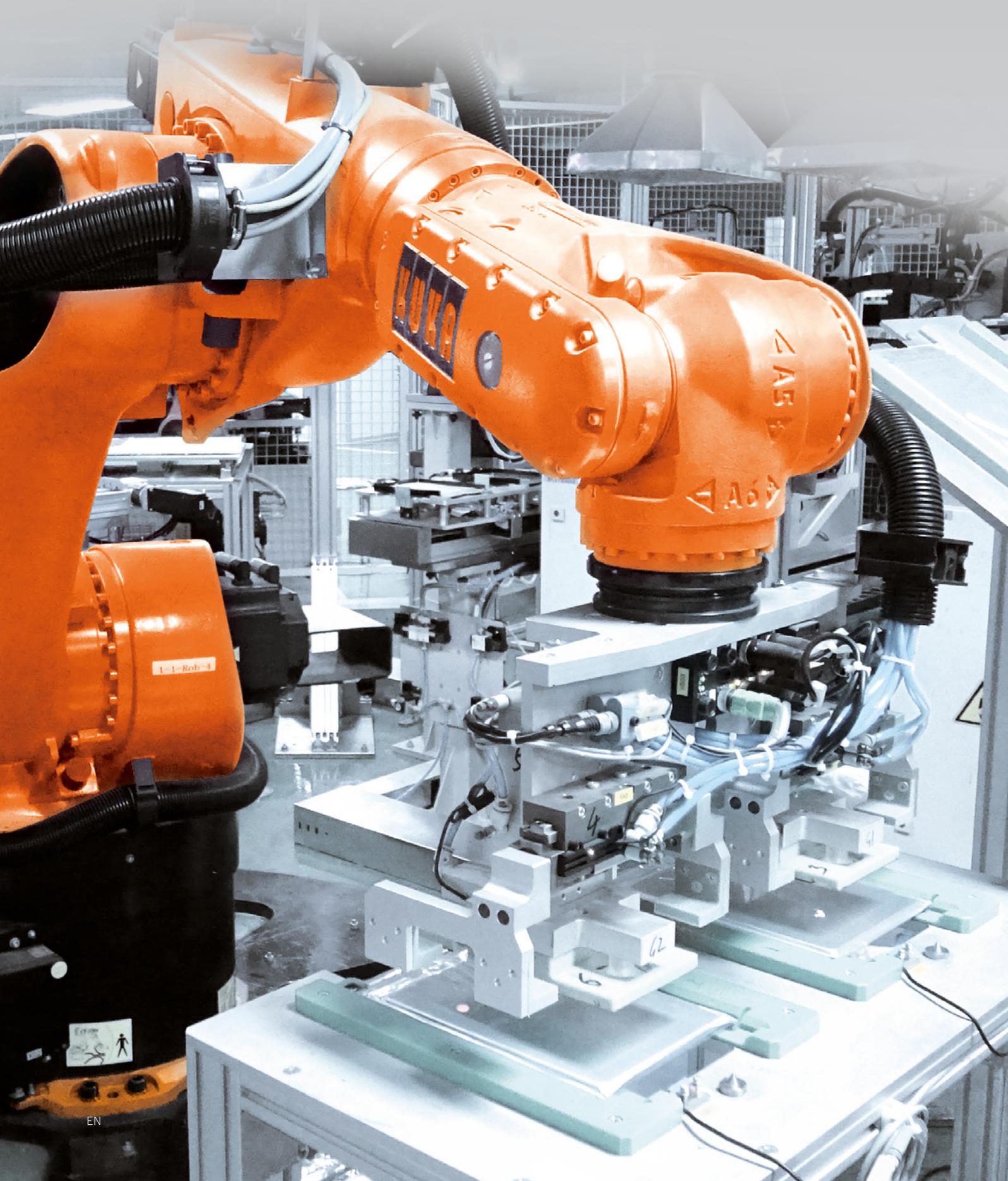
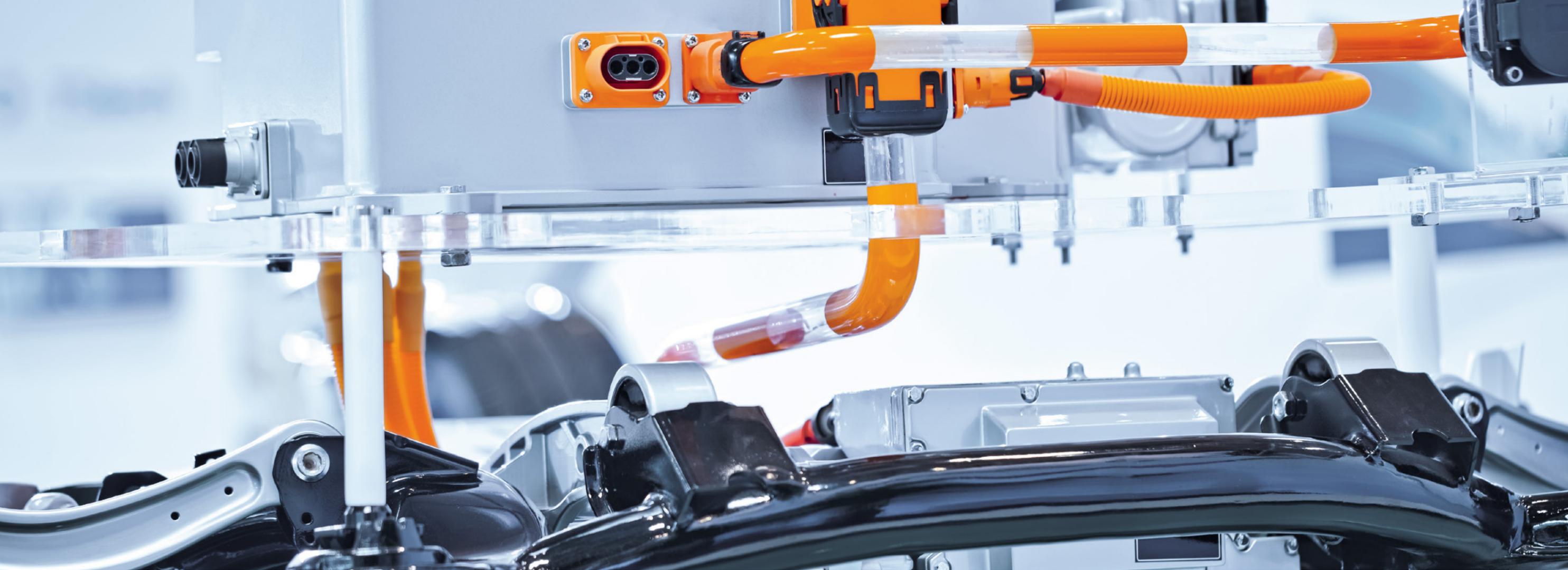


KUKA



Automation Solutions_Battery production



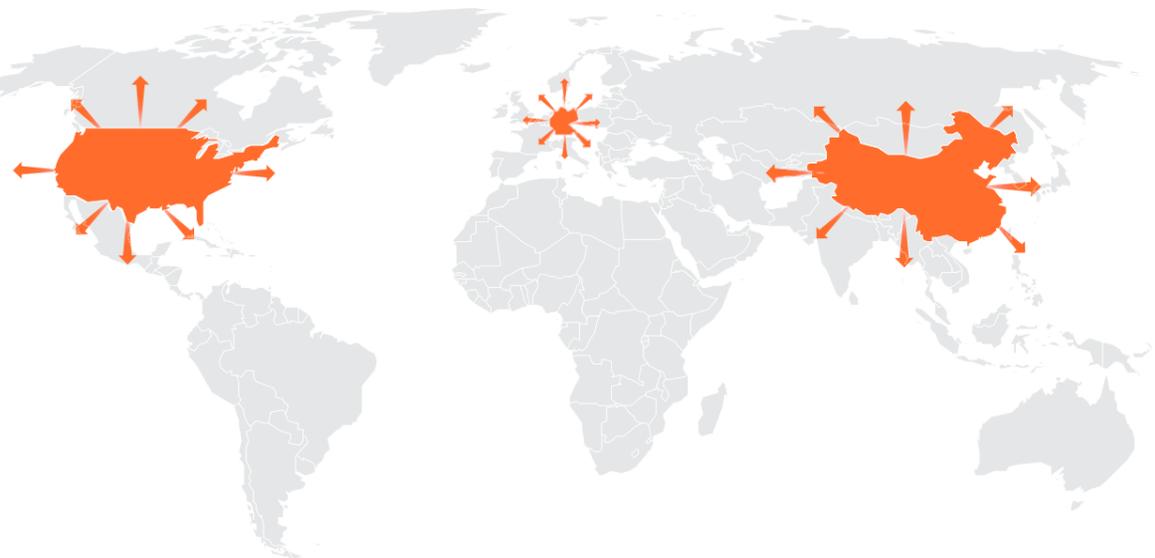


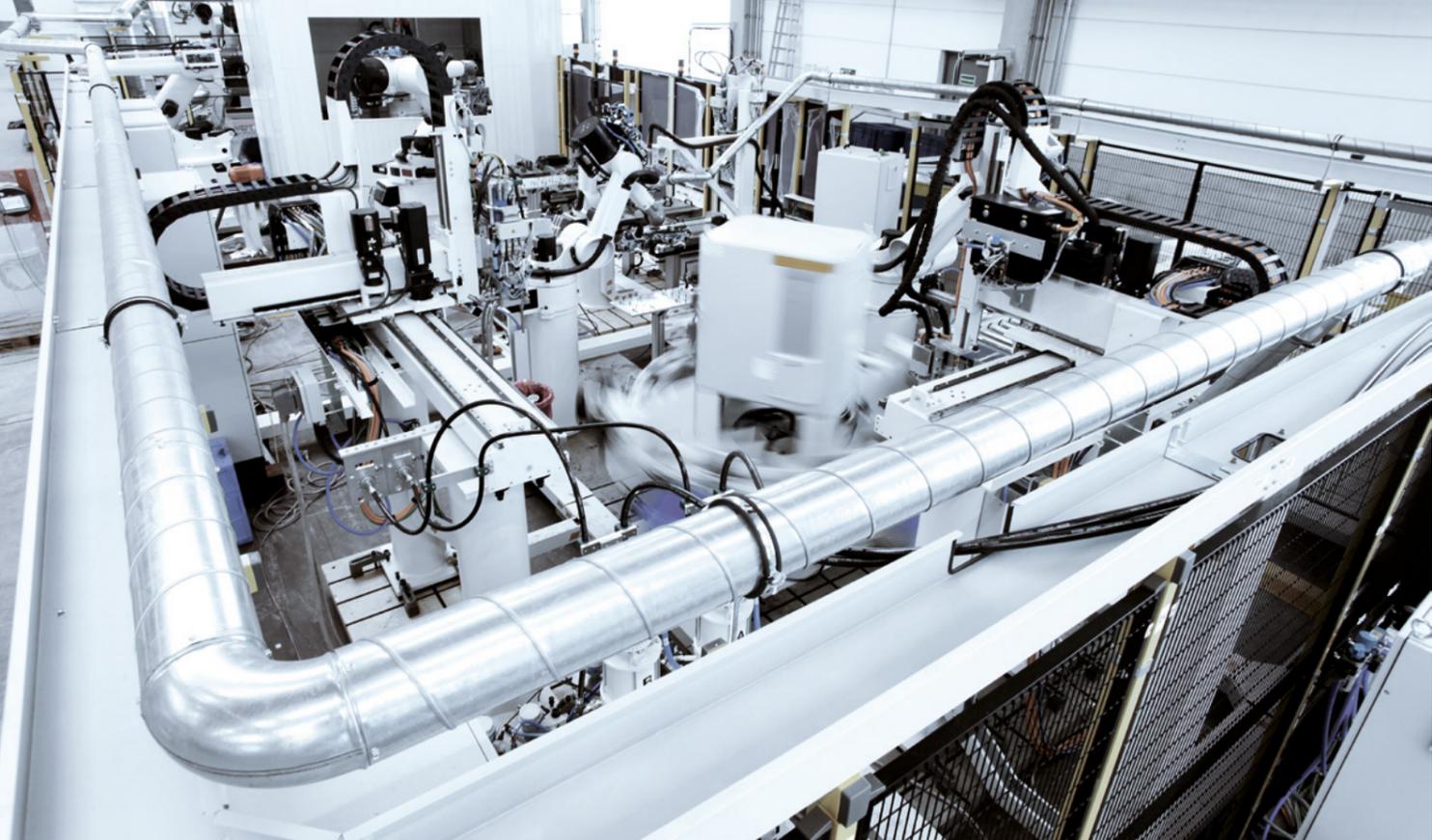
We are there for you – on site

Thanks to our locations across the globe, we are there for you on site with knowledgeable contact persons. We also support you with concepts, manufacturing options or trial installations through to production support in the start-up phase and up to the service after the start of production.

Automation in the energy industry Innovative technology for the growing e-mobility market

The industry is undergoing a transformation: green energy requires storage devices, and production is fundamentally changing. Flexibility and these innovative energy utilization concepts are in demand. KUKA knows the challenges and can support you in your production. Battery production and photovoltaics are prominent growth areas in energy technology. Particularly in the field of e-mobility, the focus is on energy storage. KUKA Industries brings the comprehensive experience resulting from many years of cooperation with the automotive industry. This is supplemented by our know-how as a systems integrator. For every project, we bring together specialists from all areas in order to offer maximum expertise. We develop holistic solutions and react flexibly to dynamic markets and the trends of tomorrow.





KUKA always offers the right technology

You profit from KUKA's process expertise in your production system

Battery cell

For the production of battery cells, there is a particular challenge in joining materials between which it is difficult to form a bond, for example, copper and aluminum. Beyond this, KUKA has many years of experience in using cutting edge technologies (such as rotational friction welding) which guarantee an optimal result.

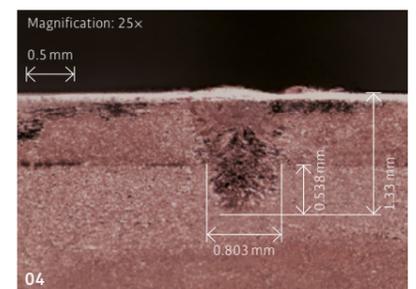
Battery module

Individual battery cells are integrated into modules. Besides optimal handling and welding solutions, key processes also include adhesive bonding, pressing and electrical as well as thermal contacting. For this, KUKA offers the experience and expertise to design and implement reliable customized solutions.

Battery pack

For the assembly of complex overall systems into packs, we offer fully or partially automated and also manual solutions. Cast aluminum structures are primarily used for the battery housing itself. Thanks to our expert knowledge of the foundry sector and aluminum castings in particular, KUKA is your ideal partner. For the sealing of cooling circuits in aluminium structures (such as battery packs) the KUKA friction stir welding technology (FSW) is a very suitable process.

As a partner for manufacturers and their suppliers in the energy industry, we maintain research partnerships with the world's leading institutions. KUKA Industries successfully combines experience in battery design with expertise in materials research. You profit from the results of these partnerships in your projects: KUKA Industries offers both the required planning tools and components for a complete automation concept as well as excellent process expertise.

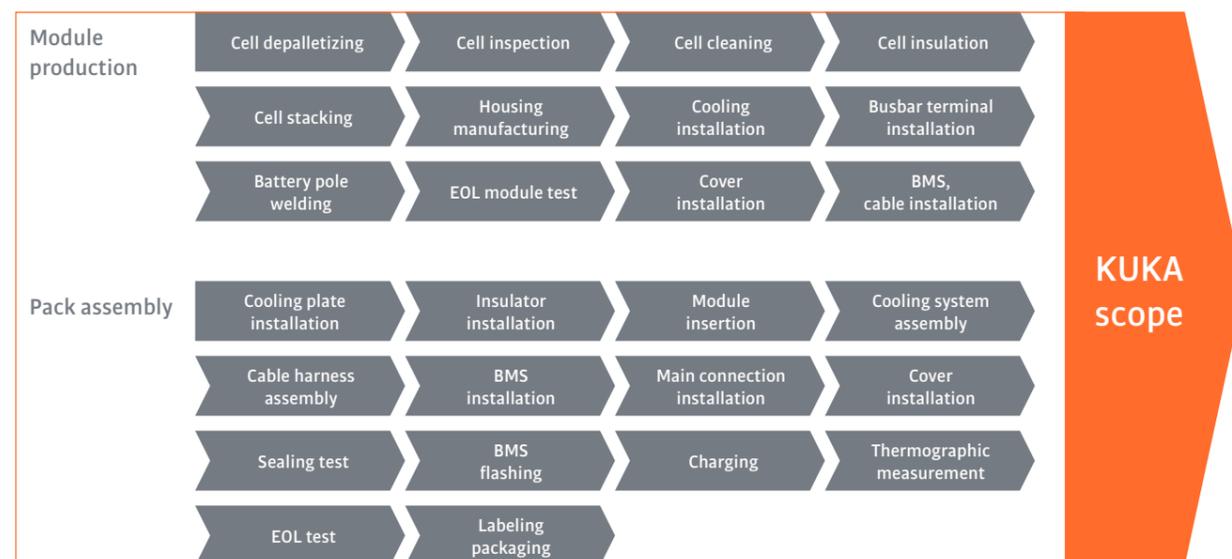


01 Laser welded joint of bus bar to prismatic cell contact
 02 Intermetallic (Cu-Al) FSW joint in battery cell components
 03 Process development on the example of laser-contacting of cylindrical cells
 04 Analysis of welded joints on the example of a laser welded copper connection

Full service throughout the value chain

In the production process for in the sectors e-mobility and energy storage, highly complex technological challenges must be met. This requires specialist knowledge about the manufacture of battery modules and complete battery systems ("packs") as well as the experience to organize your production operation cost-effectively. This is exactly what KUKA contributes. We cover the entire value chain: from the generation of energy through to storage, KUKA Industries is your ideal partner. Our systems are reliable, powerful and optimized in terms of cycle time. This guarantees the quality of your products.

Typical process chain.
 The details depend on the type of cell used as well as the module and pack design



Customized solutions as required

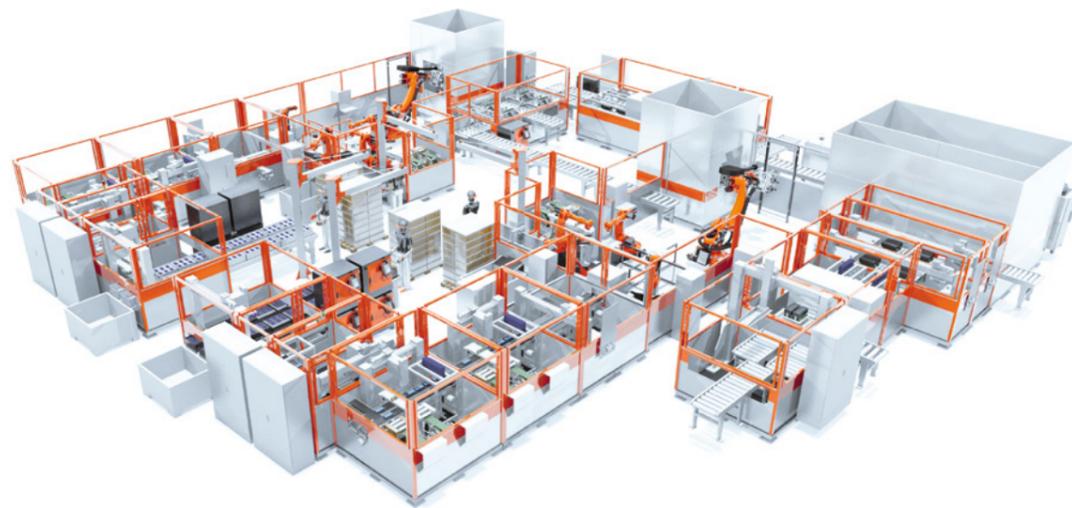
KUKA Industries has been working in the field of robot-guided automation for more than 30 years and thus has a wealth of experience. As a leading supplier, KUKA Industries has implemented systems in practically all variants and with widely varying degrees of automation. The technology packages developed for productive processes contain matching hardware components, including the required software.

At the same time, we place great emphasis on finding the optimal solution for you: we are flexible in our thinking and planning, and we engineer your individual solution according to your needs – for every step in photovoltaic and battery production.

Batteries are a market of the future with great potential for innovations. Our intelligent solutions enable us to accompany our customers into the future and to help them participate optimally in these developments – technologically and economically.

It is also possible to combine multiple manufacturing processes in a complete production system such as:

- Arc welding
- Bonding / sealing
- Component handling
- Component measurement
- Friction welding
- Laser processing
- Magnetarc welding
- Marking / engraving
- Quality control
- Spot welding
- Stud and nut welding
- Test systems



From the machine to the system KUKA Industries is prepared for Industrie 4.0

Even higher productivity can be achieved if the cells and systems are fully integrated into your production network. This requires open interfaces and intelligent control. As a manufacturer of flexible systems for automated production, KUKA Industries has the experience and expertise to develop and implement cost-effective complete solutions with high process reliability. With their readily accessible working area and the network capability of the control systems, the machines lay the ideal groundwork for the new era of Industrie 4.0.

We offer

- Solutions fully integrated into the specific production workflow using modern 3D process simulation
- Our virtual commissioning shortens start-up times, ensures process and product quality and thus reduces your production costs



KUKA Industries – Your global partner from engineering to service

Long before the first workpiece passes through your application, we support you with our know-how.

Consultation, planning, engineering, implementation all the way through to complete customer service – all around the globe. We know what you need and have the right solution ready for you. One of the ways we ensure this is through our unique KUKA TechCenter. Our engineers carry out feasibility studies and test the practicability of innovative concepts.

Of course, the best kind of service is the kind you don't need to waste any words about because everything functions perfectly. KUKA Industries offers you exactly this kind of service – and it doesn't just start with maintenance and end with spare parts: from process and system training to comprehensive concepts for supplying and stocking spare and wearing parts, not forgetting maintenance, servicing, telediagnosics and hotline support.

Together with our affiliated companies, KUKA Robotics and KUKA Systems, we can be found locally all over the world:

Argentina	Malaysia
Australia	Mexico
Austria	New Zealand
Belgium	Norway
Brazil	Poland
Canada	Portugal
Chile	Russia
China	Sweden
Czech Republic	Switzerland
Germany	Singapore
Hungary	Slovakia
France	Spain
Great Britain	South Africa
India	Taiwan
Italy	Thailand
Japan	Turkey
Korea	USA

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