Powering your Battery Production

End-to-end solutions to maximize throughput and improve quality
Driving demand for battery makers

Battery manufacturers are in a unique situation. Sitting at the crux of the electric vehicle (EV) revolution, you have the tremendous responsibility of delivering enough power for the world’s growing volume of EVs. And as you build a giga-scale production plant to meet this demand, you need a smart and scalable production strategy that allows you to build end-to-end growth from the start. At the core of that strategy, a few things must be prioritized to come out on top:

**Speed to market:** To be productive and stay competitive, you need connected information-driven operations to produce as rapidly as possible, with the lowest possible cost and risk. Agile production systems allow you to quickly and effortlessly pivot if demand or technology changes. Maximizing battery production rates to meet exponential growth and demand is essential.

**Regional regulations:** The rapid growth of this market means a scramble for regulators to create standardization. Responsible sourcing, traceability and tracking your CO₂ footprint should all be top of mind and worked into your production strategy. Getting ahead of the regulations means less rework in the long run and more time spend on optimization.

**End-to-end optimization:** When you look at the big picture – a connected factory from mine to dispatch bay, you can gain a full view of your operations. Native data from your software, directly connected to visualize the status of your plant, and a cyber secure solution to help protect it all. A connected battery factory launches faster, for less cost, with less risk – and achieves optimized production to the fastest possible timescale.

It’s estimated that nearly 6 out of every 10 new vehicles sold by 2040 will be electric. The demand for battery production has never been greater.
The rise of the **Gigafactory**

Building a Battery Gigafactory presents large-scale challenges. Rockwell Automation is here to help as your end-to-end solutions provider.

In order to be successful, you need:

**Faster launches**
Experience helps Rockwell Automation understand – and avoid – the pitfalls that can delay a launch, meaning factories can be up and running in a quicker time frame.

**Flexible technology**
Our product range comprises the most integrated and comprehensive technology available for EV battery manufacturing.

**Full integration**
Rockwell Automation solutions provide complete and seamless connectivity from the sensor to the ERP, from OT to IT.

**Leading partners**
Rockwell Automation has a comprehensive PartnerNetwork™ program from fostering close relationships with leading manufacturing partners globally.

**Worldwide support**
Irrespective of your factory location, we can provide total on-the-spot support, spanning from design to launch.

With over 4000 successfully designed, installed and commissioned large-scale manufacturing projects globally, Rockwell Automation is a highly experienced partner in the field.
Solutions to meet multiple battery production processes

As a battery maker, you are not only powering the automobiles of the future – you’re powering the world. Developing batteries to support energy storage, automotive and industrial applications is no small undertaking, and we understand the intricate differences and are ready to support you, no matter where your product ends up.

This understanding also extends to the different battery making processes like electrode coating, cell assembly, cell activation/finishing, module and pack assembly. Rockwell Automation is prepared with different solutions to support that journey.
Helping you through every stage of your manufacturing process

As an end-to-end solutions provider, we get it - every stage of your manufacturing process is important to achieving your performance goals. That means we’re here for you in the early planning and discovery phases, all the way to the launch of your plant and on as you work to continuously improve your operations and future-proof what you’re building today.

DISCOVER

CREATE

MAKE

IMPROVE

AI/ML -> PREDICTIVE DECISION MAKING, AUTONOMOUS AUTOMATION, INCREASED SPEED, LEARNING

PRODUCT LIFECYCLE MANAGEMENT -> INCREASED SPEED + EFFICIENCY

DIGITAL PRODUCT CREATION -> INCREASED SPEED, LOWER MANUFACTURING COSTS

SMART CONNECTED PRODUCTS -> CUSTOMER & CONSUMER SATISFACTION

SMART CONNECTED OPERATIONS -> INCREASED EFFICIENCY + QUALITY

MES -> SPEED, QUALITY, TRACEABILITY

MACHINE VISION -> EFFICIENCY + QUALITY

AGVS & AMRS -> EFFICIENCY

ROBOTICS AUTOMATION -> EFFICIENCY, SPEED, QUALITY

XR -> ENHANCED SAFETY, QUALITY
Battery makers require smart operations

Our technology enables you to focus on what’s really important: ramping up production to get to market as quickly as possible while improving your bottom line.

**Production Management Data**
Continuity from raw materials through finished goods. Dedicating all resources to producing the highest grade of batteries

**Modeling and Simulation**
A digital twin allows you to accurately test scenarios offline, enabling continuous improvement of life-long assets like a coating line

**Device Embedded Analytics**
Smart sensors and integrated motion on tensioners, rollers and coating to provide real-time data to prevent failures or quality drift over time

**Always on IIoT**
Providing the right information to the right people at the right time. No dependencies on where they are working or what device they have access to

**Augmented Reality**
Increase productivity with remote visual support, work instructions provided in context, and visibility into hazardous locations like a running dryer
Optimize your Battery Manufacturing

Achieving smart, flexible, and low-cost operations in your battery facility doesn’t have to be complex. Rockwell Automation solutions are proven to help you achieve your manufacturing goals while prioritizing speed to market, quality and regulation compliance.

1. MANUFACTURING EXECUTION SYSTEM
   Better manage the demands of modern battery production

2. INDEPENDENT CART TECHNOLOGY
   Learn how your machines and plants can run better

3. DIGITAL TWIN
   Discover a better way to design, test and optimize machines

   • Improve efficiency with digital insights and processes
   • Explore new possibilities in battery production
   • Learn how digital solutions can help solve top production challenges
Battery is the future
MES will help make it happen

Currently, the battery represents a third of the cost of an Electric Vehicle. As battery costs continue to fall, demand for EVs will rise, and soon the automotive market is set to become the single largest application for batteries. That means a growth in demand to 40 million new EV batteries a year to power the new vehicles.

The challenge if you’re a battery manufacturer is to accelerate production at a sufficient rate to meet demand in the short term. You also need to future-proof production operations for further inevitable innovations in the automotive powertrain.

“What used to take an hour per user, can now be achieved within five minutes, shows how quickly this solution has amortized itself”

- Christian Neubauer, Head of Production IT, Samsung SDI Battery Systems GmbH
MES is the heartbeat of your Gigafactory

The latest digital technologies can help you stay productive even as your operations undergo changes

MES/MOM applications can address your specific manufacturing challenges and grow with your operations and their needs. A quality application, for instance, can track, identify and alert when a machine or operator’s processes go outside of their prescribed limits. Then, when you’re ready, you can scale up MES applications to an enterprise MES software. Flexible production solutions can help you more easily respond to demand and technology changes.

**Operational excellence**
- Production order management
- Quality integrated into production
- Data in context of production

**Workforce productivity**
- Automatic equipment set-up
- Work instruction management
- Electronic record creation

**Compliance**
- Quality checks
- Process enforcement
- Record keeping/EBR
World class battery makers strive to realize value across every operational axis.
Maximize your operations potential

**PRODUCTION**
- Consistency of operations
  - Inventory optimization
  - Increased throughput

**OPERATIONS**
- Accelerate product introductions
  - Dynamic production management
  - Data-driven intelligent processes

**EMPOWER**
- Enforce best practices
  - Monitoring workflow execution
  - Reduce labor and training costs
  - Leverage remote collaboration

**IT AND SECURITY**
- No capital investment
  - Integrated IT managed and security
  - Reallocation of resources

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Driving demand
Gigafactory
Solutions
Smart operations
Battery is the future

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Intelligent Conveyance is powering production to all-time highs

We’re helping Battery Cell manufacturers innovate to meet the needs of the markets during this period of exponential growth

The result for you?

Reduce downtime & improve yield.
By deploying ICT, battery cell manufacturers can see a productivity increase in 40%

Enable flexible manufacturing.
Removing bottle necks and buffers to improving asset utilization

Leverage digital engineering.
Forget about conveying, focus on the process. Virtual commissioning and libraries to reduced development efforts

Provide operation expense savings.
Reduced component failure, militance and future proofing.

40%  Productivity Increased

+4500 meters  Installed in EV & battery manufacturing annually

30%  Floor layout saving

25%  Energy savings with quality up
Speed up launch time with digital engineering

Reduce startup risks and optimize your machines with simulation software

**Virtual Commissioning**
Emulate your machine controls in a virtual environment long before the machine is ever built or on the plant floor

**Simulation**
Simulate your machine, line, and the material handling system behavior in a virtual environment. Run “what-if” scenarios to determine how process changes affect throughput

**Demonstration**
Create impressive and accurate visual representations to gain mindshare

**VR Training**
Operators and maintenance can be trained on the machine in the virtual environment, before the machine is ever built
Get ahead of Regulations

Global and regional regulations are an important consideration for manufacturers and directives need to be understood and adhered to.

Rockwell Automation along with global digital partners are delivering solutions for the Digital Battery Passport in Europe and beyond. The battery passport allows for easy aggregation of environmental footprint data from upstream supply chains and enables manufacturers to transfer Extended Producer Responsibility when a battery is repurposed.

Get verifiable notice of destruction from recyclers and data on material recovery rates and pass environmental footprint data on to manufacturers with greater efficiency. Lifetime performance data is also easily accessible and allows for continuous improvement and the reduction of raw materials sourcing risk.
Industry expertise through acquisitions, investments & partnerships

- Investments to enhance our industry capabilities: MORE THAN $2B
- Doubled our delivery capacity: INCREASED BY 100%
- Co-Innovation with industry-leading technology companies

Partnerships & Acquisitions

**ACQUISITIONS**
- Fiix
- KALYPSO
- ASEM
- AVNET
- Ansys
- OYLO Trust Engineering
- EMULATE3D
- PLEX
- AVATA
- MESTECH
- odos imaging

**PARTNERSHIPS**
- Microsoft
- Cisco
- Claroty
- Kezzler
- Accenture

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Smart operations
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Battery is the future
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Your project lifecycle partner

Rockwell Automation can work with you throughout your entire manufacturing project lifecycle.

Experience tells us first, that no two automotive projects are the same. Second, it helps us to understand that the factory of the future will be as different from a traditional automotive project as an EV is from a horse. Third, we know that the factory of the future need to be under construction now, to be ready to meet demand.

Rely on our experience at every stage of the project lifecycle:

1. Factory production planning
   Consulting, process design, supplier engagement, MES design

2. Production Equipment Development
   Design, including specification development, automation libraries, production engineering

3. Equipment Installation
   Integration, including line integration, network validation, and startup engineering

4. Start of Production
   Launch, followed by maintenance engineering, production reporting, OEE and KPIs

5. Ramp-up and Optimization
   Predictive maintenance, production analytics, and production acceleration

6. Product Design
   Digitization, including - for example - battery process know-how and a battery design studio

7. Production Planning
   Plant simulation, including virtual design and prototyping

8. Production Engineering
   Automation concepts for digital equipment, based on battery libraries

9. Production Execution
   Plant integration from the production Control Centre

10. Service
    Including Predictive Maintenance and Condition Monitoring
Working together with Rockwell Automation

Make more of your Connected Enterprise by connecting with Rockwell Automation and our partners.

- Get answer to your questions on sales, products, services and technical support. Find out more.
- Access help to design, build and maintain your system solution through the Rockwell Automation® Partner Network™ of leading distributors, system integrators and others. Find out more.