

# Bring more power to electric vehicle and battery production

Maximizing speed, flexibility and throughput in production processes



**Rockwell  
Automation**



# a need for **SPEED**

**There's nowhere to go but  
up in the electric vehicle  
(EV) market. It's estimated  
that nearly 6 out of every  
10 new vehicles sold by  
2040 will be electric.**

**Whether you're an EV start-up or established automaker**, you're starting in the same place, with a challenge of turning an EV concept into a road-ready offering.

To be productive and stay competitive, you need connected, information-driven operations to produce vehicles as rapidly as possible, with the lowest possible cost and risk. And you need agile production systems that allow you to quickly and effortlessly pivot if demand or technology changes.

**If you're an EV battery maker**, you have the tremendous challenge of delivering enough power for the world's growing volume of EVs. Accomplishing this requires operations that can:

- Maximize battery production rates to meet exponential demand growth.
- Use track-and-trace capabilities to consistently deliver high-quality, safe batteries.
- Adjust on the fly to keep up with the rapid evolution of battery technology.

As you build a giga-scale production plant to meet demand, you need a smart and scalable production strategy that allows them to build for growth from the start.

# Win the race to market

To meet demand and get in front of growing competition, you need to get your electric vehicles (EVs) to market quickly and at the lowest possible cost.

## LAUNCH FASTER

Rediscover what's possible at the launch stage and accelerate your manufacturing plans by working with a partner that gives you a depth of expertise and breadth of thinking.

Rockwell Automation launch- and program-management teams can help you develop your manufacturing plans in a way that reduces time and risk. They can provide consultation and design support for factory production planning. They can also reduce the risk of startup delays and align all areas of your plant by helping you develop corporate control standards and specifications – and then help enforce those standards with OEMs or other suppliers.

## CONNECT MORE EASILY

Build out your infrastructure in faster and simpler ways with the technologies like an Industrial Data Center (IDC).

Deploying a server rack can be a hassle, requiring that you work with several vendors to build and support it. An IDC can help simplify server deployment in your plant with a virtualized environment. The IDC provides compute, storage and multi-layer network switching for all your applications in a pre-engineered and validated package.

# Electric Power

**The high-quality data required for smart operations is only possible with strict adherence to specifications and seamless integration of plant-floor equipment.**

# The connected EV factory

**Connected from mine to dispatch bay, a Rockwell Automation connected EV factory launches faster, for less cost, with less risk – and achieves optimized production to the fastest possible timescale.**

It starts with smart connected assets, connected to an EtherNet/IP™-enabled network.

On top of this foundation is our Integrated Architecture® automation infrastructure. It replaces multiple disparate control systems with one common framework to maximize efficiency and productivity. It allows you to use one software platform to program controllers, one protocol to seamlessly send data across different networks and one software package to configure all your graphics displays.

Layered above are information solutions capabilities – in the FactoryTalk® Cloud, on premises and at the edge. These capabilities include scalable MES systems powered by AutoSuite™ software, scalable analytics powered by FactoryTalk® Analytics, mobility and collaboration tools, and connected services.

## **IN FOCUS: Simulation software**

An information solution like our Emulate3D™ simulation software can speed up launches and reduce start-up risks by using the power of your own machine data. The software uses a digital twin, or digital replica, of a machine to prototype and test machines before they're built. This can help you identify issues in the design stage and optimize machines.

Then, as your launch date nears, the software can help you avoid costly changes and keep the launch on track with virtual commissioning. This involves synchronizing a machine's model to its controller to validate and debug the machine before it's commissioned.



## **BUT IS IT SECURE?**

**Security is a top priority in connected plants. We can help you implement security in a layered and holistic way to help protect your intellectual property and your plant uptime.**







# Realizing The Connected Enterprise

Shorter timelines, connectivity and increased flexibility are key requirements for EV and EV battery production plants as innovation continues to unfold.

A leading tier one automotive supplier faced similar challenges as customer demand created the need to frequently adjust production volume. The increased flexibility and changeovers were at odds with ongoing pressure to reduce downtime and boost productivity.

They turned to Rockwell Automation for help accessing and leveraging data to make more informed operational decisions. The company successfully integrated AutoSuite™ MES to collect manufacturing performance data, improve processes and generate production reports. Maintenance activities were managed through FactoryTalk® AssetCentre and real-time data reporting was achieved with Allen-Bradley® PanelView™ and FactoryTalk® View software.

This improved connectivity helped the facility execute more than 11.5 million data collection transactions each day. The result was a 50 percent increase in OEE and productivity, despite the increasing flexibility demands on the facility. They also reduced project development time from 6 to 3 months, a large competitive advantage in an increasingly competitive market.

# Built to last

Your EV production operations must be as nimble as they are productive to keep up with growing demand and evolving vehicle technologies. By creating smart, flexible and scalable operations, you can remain competitive over time.

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

As production processes evolve, for example, a digital twin allows you to test new products and configurations before you physically implement them to reduce downtime risks. Augmented reality (AR)-based knowledge-capture tools also allow you to capture and share step-by-step instructions to help cut training time, increase operator effectiveness and achieve compliance.

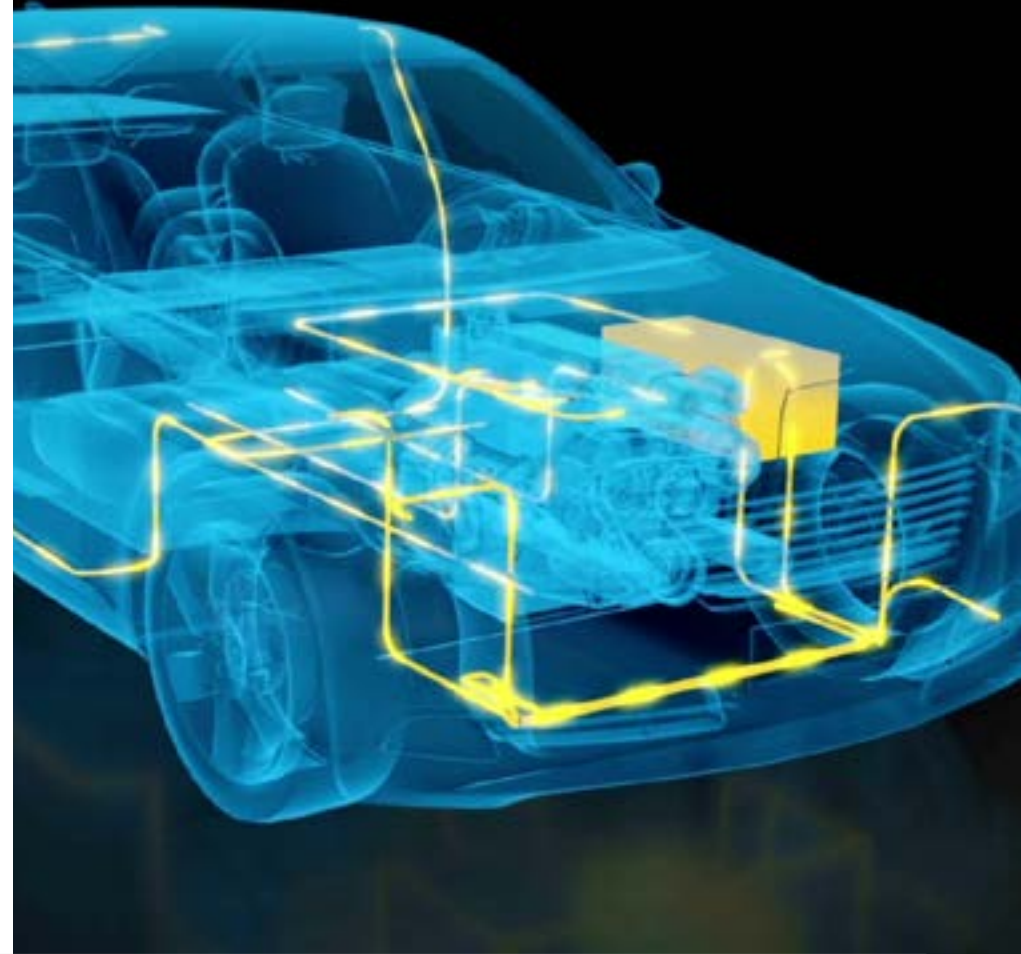
Operations designed for resiliency and agility can give you the ingenuity you need today and prepare you for future growth.

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's 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.

Our QuickStick® and iTRAK® motion-control systems with independent cart technology can help you speed up changeovers and reduce downtime. Their software-configured move profiles allow you to change system functions with the push of a button. They also allow you to move components or even car bodies around a plant faster and more precisely than conventional mechanical solutions.

Experienced operators can use AR-based knowledge-capture tools to record procedures, note relevant locations and highlight key safety precautions. New operators can then use this recording to learn on the job.



## THE FUTURE OF THE AUTOMOTIVE POWERTRAIN

The continuing story of innovation in the automotive industry shows no sign of coming to an end. The latest chapter is the change in fuel sources.

Currently, the battery represents a third of the cost of an EV. 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.

**"Adopting the Rockwell Automation solution has helped to standardize our MES landscape."**

- Jagdish Belwal, Chief Information Office, Tata Motors





# The rise of the giga-plant

Meeting the demand for EV batteries requires scaling up production at an unprecedented rate. Nothing less than giga-plants – massive production facilities – will achieve the necessary output. However, sheer size should not be the only principle.

You have a unique opportunity to design and build digitalized, state-of-the-art manufacturing facilities, which deliver massive product volumes at a level of efficiency never before seen. These plants require:

- A data and information strategy, designed-in from the beginning
- Factory operations that deliver information to drive business analytics and better business decisions
- Seamless supply chain connectivity and operation, backward to the mines and forward to product dispatch, to improve cost-efficiency and product quality
- Built-in flexibility and scalability, to leverage emerging technologies.

## Unlock the power of data

Rockwell Automation can identify the data you'll need to effectively manage your giga-plant and then design those requirements into your facility. We can also help craft strategies for turning plant data into valuable information. For example, we can help you use a digital thread of information to improve production efficiencies and achieve consistent product quality.

## Get agile

Our QuickStick® and iTRAK® motion-control systems with independent cart technology can operate faster and more flexibly than traditional mechanical solutions. These systems can help you:

- **Create faster, more flexible battery lines** using their independent, programmable movers.
- **Dramatically reduce changeover times** with simple software profiles that allow you to change products at the push of a button.
- **Reduce maintenance and downtime** because they have fewer moving parts.

**A digital thread connects previously siloed business functions and improves their ability to work together.**



## ENABLING FASTER STARTUPS

Speed, flexibility and connectivity are not only critical for today's gigaplant, but for the OEMs supporting the exponential growth needs of the EV market as well.

Hirata is a provider of modular assembly cell systems (ACS) used for production of EV batteries and other auto components. As manufacturers are competing to quickly scale production, Hirata has been called on to support the EV industry's first mass production line. They want smaller machines with the same output, delivered faster than ever before.

To save footprint, Hirata optimized axis architecture, added more operations to each station and more gantries in each ACS. The machines connect to end users' MES for seamless integration and real-time data.

A key to success was having a single automation provider, and Hirata turned to Rockwell Automation. The gantries are controlled by Kinetix® 5700 servo drives. Movement and assembly of materials is controlled with a ControlLogix® control system. And PowerFlex® 525 AC drives move the conveyor between cells.

In the end, Hirata achieved a **30 percent footprint and 10 percent startup time reduction** for this EV battery production machine that is a first of its kind.

# The driving force

Building a giga-scale factory can present giga-scale challenges to the inexperienced or inexpert. With over 4000 successfully designed, installed and commissioned automotive manufacturing projects globally, Rockwell Automation is a highly experienced partner in the field.

## Faster launch

Experience helps Rockwell Automation know – and avoid – the pitfalls and stumbling blocks that can significantly delay launch. We also know the shortcuts that can actually shorten your launch schedule by many months.

## Flexible technology

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

## Full integration

Rockwell Automation solutions provide complete and seamless connectivity from the sensor to the ERP.

## Leading partners

We have the most comprehensive PartnerNetwork™ program and the closest relationships with leading manufacturing partners, worldwide.

## Worldwide support

Wherever your factory is being built, we provide total on-the-spot support, from design to launch.

**“A robust solution based on an EtherNet/IP network, and the fact that its architecture is open and more technologically agonistic, made Rockwell Automation more attractive in the long term.”**

Alastair Moore,  
Section Manager Assembly Engineering,  
Toyota Motor Manufacturing (UK) Ltd.



## THE WHOLE STORY

The more experience you can call on, the smoother the design, construction, and operation of your EV giga-plant will be. Rockwell Automation has experience in the following EV manufacturing spaces:

- Drive unit
- Electric motor
- Power electronics
- Battery cell
  - Cylindrical
  - Prismatic
  - Pouch
- Battery Module
- Battery Pack
- Mixing
- Coating
- Slitting
- Assembly
- Filling
- Calendaring
- Winding
- Stacking
- Sealing
- Labeling
- Formation
- Testing
- Machining
- Casting
- Material Flow

# 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 needs 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

## **8. Production Engineering**

Automation concepts for digital equipment, based on battery libraries

## **9. Production Execution**

Plant integration from the production Control Center

## **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 answers 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® PartnerNetwork™ of leading distributors, system integrators and others. [Find out more.](#)

Connect with us.

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