More power to manufacturers

Improving electric vehicle production processes
By 2040, it’s expected that 54% of new vehicle sales will be electric vehicles (EVs). 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 – in under two years – 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 for EV and battery manufacturers is to accelerate production at a sufficient rate to meet demand in the short term. They also need to future-proof their production operations for further inevitable innovations in the automotive powertrain.

1. Bloomberg, New Energy Finance, July 6 2017

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 EVs and EV batteries requires manufacturers to scale-up their 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 will 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.

Enabling faster startups

Speed, flexibility and connectivity are not only critical for today’s giga-plant, 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.

In the end, Hirata achieved a 30% footprint and 10% 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
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. Layered above are information solutions capabilities – in the FactoryTalk® Cloud, on premise and at the edge – including scalable MES systems powered by AutoSuite™ software, scalable analytics powered by FactoryTalk® Analytics, mobility and collaboration tools, and connected services.

Realizing The Connected Enterprise

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

A leading tier 1 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% increase in OEE and productivity, despite the increasing flexibility demands on the facility. They also reduced project development time to 3 months from six, a large competitive advantage in an increasingly competitive market.
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.