



**Rockwell  
Automation**

# EV Battery Production. **Optimized.**

Boost speed-to-market and first-time quality with a holistic Manufacturing Execution System (MES) tailored to industry challenges.

## UNPRECEDENTED DEMAND. EXACTING REQUIREMENTS.

As the electric vehicle (EV) market ramps up globally, so does the need for lithium-ion (Li-ion) batteries. Across the broad ecosystem of battery-cell producers – from startups to legacy automakers – the manufacturing challenges are difficult to overstate.

Producers must focus on innovation to improve battery performance – and simultaneously grow capacity to meet unprecedented demand and support increasingly localized supply chains.

But that's not all. Li-ion battery production is an exacting, complex process. It also relies on some of the scarcest minerals on the planet. And faces an increasing array of traceability and other regulatory requirements.

**What's the bottom line?** If you're an EV battery producer, your success depends on strategically upscaling battery gigafactory operations and maintaining extraordinary throughput, quality and yield.

The right Manufacturing Execution System is critical to achieving your goals.

Li-ion battery-cell demand is expected to **increase by about 33%** annually through 2030.

-McKinsey & Company

## CHALLENGES

Improve quality & performance

Increase capacity & yield

Support localized supply chains

Manage scarce resources

Comply with regulatory requirements

## HOW AN MES SOLUTION DELIVERS VALUE

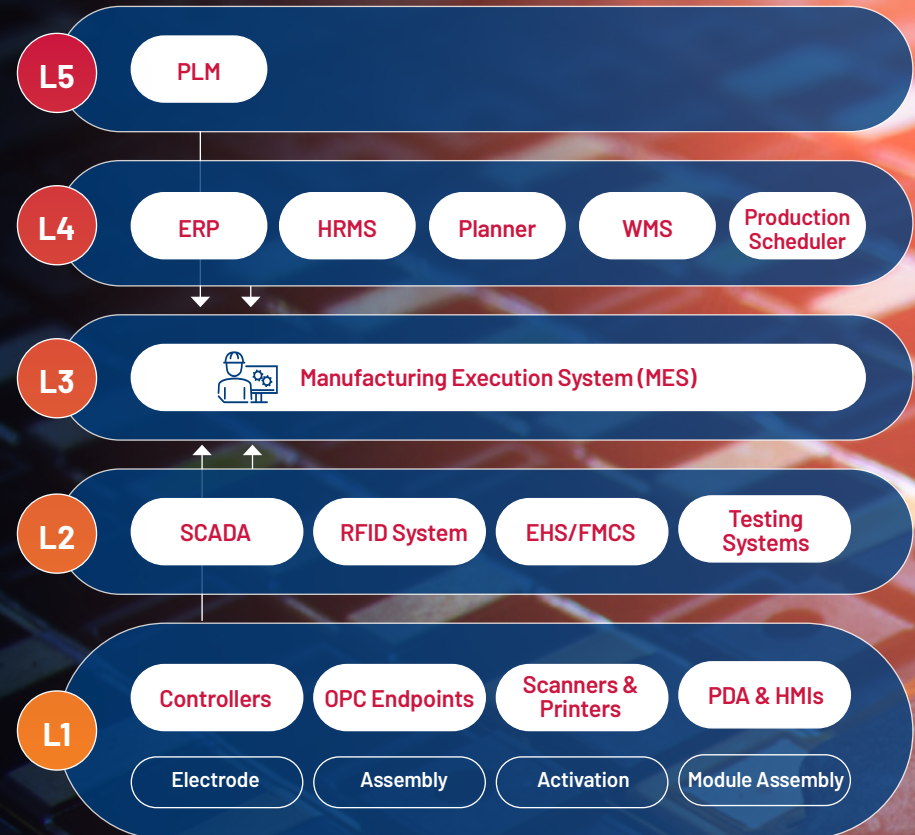
A Manufacturing Execution System (MES) is the cornerstone of successful gigafactory operations. Positioned between business systems and the plant floor, MES solutions are powerful software systems that integrate and share information to manage production, increase throughput, monitor quality and improve visibility.

Ideally, an MES empowers business systems and people with real-time information about what's happening in plant-floor processes. And tracks and enforces every step.

Put simply, an MES is the foundation for efficient day-to-day operations and the launch point for future innovation.



## MES Solutions Enable Efficient Operation



## A BETTER WAY TO MANAGE COMPLEXITY

Rockwell Automation has been a leader in automation solutions for automotive production since the inception of the industry. With EVs now the future of mobility, we have trained our expertise on developing game-changing solutions to meet evolving needs.

And when it comes to EV battery production, our MES solution delivers extraordinary performance – where other systems can fall short.

### Meets hybrid manufacturing challenges head-on

Battery-cell production includes a wide range of applications, beginning with the validation, release and management of raw materials to mixing, electrode coating, discrete assembly and more. Put simply, Li-ion battery producers face hybrid manufacturing at its most complex.

Not all MES solutions can address this range of applications, with typical solutions tailored to either process or discrete control. As a result, battery manufacturers may need separate MES solutions for various process steps, adding more complexity and integration challenges in the end.

### Here Rockwell Automation delivers a distinct advantage.

Our MES experience extends across a wide range of hybrid industries – from food and beverage and mining to tire. Therefore, we have designed our MES solutions without the artificial boundaries common in other systems.

Our tailored MES for battery is built to manage complex, hybrid production. So you can take a simpler approach – and apply one, integrated and information-enabled solution across your operations.



### Matches data speed & volume to improve first-pass quality

A typical gigafactory produces millions of battery cells each day. While the industry's large-scale approach to production helps reduce costs, maintaining quality at this scale is challenging.

In fact, battery manufacturing scrap rates exceeding 10% are typical across the industry.

**One reason why?** The big data generated by battery production is not being used to the fullest extent.

Unlike less robust systems, our MES solution matches both the speed and volume of giga-scale data acquisition holistically. It captures and aggregates data across your operations in real time to identify process results, anomalies and attributes. Then, tracks that data throughout the process to contain issues and manage quality on the fly.

In other words, our MES for battery provides the critical linkage between process steps – plus full traceability – to drive better quality and speed-to-market.

The battery-cell manufacturing scrap rate is as high as 30%.\*  
**MES can help change this equation.**

*\*McKinsey & Company*

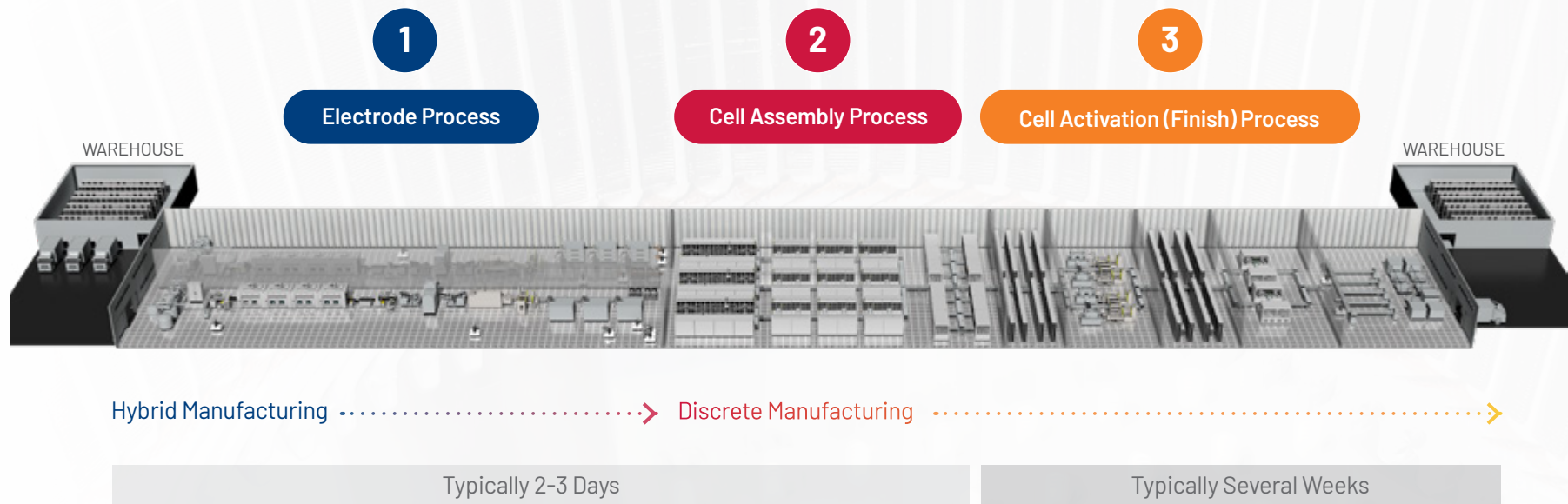


# OPTIMIZING PERFORMANCE – END-TO-END

To improve operations, the Rockwell Automation MES for battery production seamlessly manages and tracks your prismatic, cylindrical or pouch cell-manufacturing process – from raw materials through the unique identification and serialization of each battery cell.

**But that’s not all.** The integrated solution also expands to module and pack assembly to enable seamless traceability of battery components to the vehicle. And provides critical information supporting a sustainable battery chain that extends to recycling and emerging battery passport requirements.

## Li-ion Battery Cell Manufacturing



**One holistic solution. Better visibility. Complete traceability.**

# CONNECTED. AGILE. TRACKED.

When you choose our MES solution for battery, you can achieve consistent functionality, connected operations – and the agility you need to control and track diverse and evolving processes.

**What can you expect?** Comprehensive product genealogy. Plus a new level of intelligence that helps manage quality, enables continuous improvement – and boosts productivity.



## Production Management

Integrates with the enterprise resource planning (ERP) system to schedule and execute production orders – and compares orders to raw material inventory on hand. Real-time production data is continuously fed back into the system, creating alerts for any disruptions to the schedule.



## Quality Management

Handles raw material, inline and visual quality inspection processes. Includes test definitions, LIMS quality, sampling, process control rule definition, live data integration, non-conformance, anomaly capture and corrective actions.



## Performance Management

Measures and analyzes key performance data continuously to determine key corrective actions required to improve overall equipment effectiveness (OEE) – and “first time right” (FTR) production.



## Resource Management

Guides operators and tracks their current and completed tasks. Operator traceability provides important data for OEE comparisons between workers, shifts and plants. And delivers insights that improve worker coaching and training.

The MES also integrates with training systems as required to monitor and manage the worker certification process. The system only allows operators to complete tasks for which they are certified.



## Material Management: Raw Materials to Finished Goods

Interfaces with the ERP, laboratory information management system (LIMS) and warehouse management system (WMS). Delivers full management and tracking for raw materials, including material receipt, quality sampling, lot creation, warehouse storage – and material retrieval and release in line with “first in, first out” (FIFO) procedures.

The system continues to manage aging and track materials through work-in-progress (WIP) to finished goods.



## Recipe Management

Manages recipe creation and download, golden copy generation, machine and parameter mapping, and processing reports. The solution also delivers descriptive analysis on contextualized process parameters.

## MES delivers. Better decision-making. Better bottom-line performance.

## SOLUTIONS YOUR WAY

Li-ion battery production is evolving at a rapid pace to meet the needs of the EV industry. And the learning curve is steep for both startups focused on niche solutions – and legacy automakers entering unfamiliar industrial territory.

At Rockwell Automation, we have tailored our solution delivery to meet you wherever you are on your journey.

Some producers have yet to deploy the equipment, networks and standards that enable a modern MES – and must start with fundamentals. Others have a robust digital infrastructure in place.

### To address diversity and deliver the right fit, our solution methodology:

- Focuses first on consulting to determine your needs and expectations.
- Prioritizes steps you can take now to ready your operation for an MES solution.
- Builds a functional requirement specification (FRS) document. The FRS defines **what the system must achieve** and serves as a continuous reference point to keep your solution on track.
- Includes a functional design specification (FDS) document. The FDS defines **how the system will achieve** the functionality required – for example, how the MES integrates with the controllers or how the interface is designed. The FDS minimizes any ambiguity regarding the end result.
- Delivers an execution and deployment plan that considers your budget – and outlines ways you can start small and expand as you grow.

### Consistent global delivery

Many MES suppliers are challenged to support their solutions globally – and instead rely on regional system integrators to deliver their solutions. But because not every integrator applies solutions in the same way, deploying a globally consistent MES requires significant coordination and management.

**At Rockwell Automation, we take a different approach.** Unlike other suppliers, our MES solutions are planned, executed and supported by our in-house global team.

The result? You can achieve a “common core” solution globally, yet tailored to fit regional needs. And you can expect consistent operations and visibility at every facility to drive better performance worldwide.

Learn more about our [solutions for EV battery production >](#)



Rockwell Automation was recognized by Gartner® as a leader in their Magic Quadrant™ Report for MES.



Connect with us.    

[rockwellautomation.com](https://rockwellautomation.com)

expanding **human possibility**<sup>®</sup>

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2663 0600, Fax: (32) 2 663 0640

ASIA PACIFIC: Rockwell Automation, No. 2 Corporation Road, Singapore, 618494, Singapore, Tel: (65) 6302 8686, Fax: (65) 6302 8787

UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44)(1908) 838-800, Fax: (44)(1908) 261-917

expanding human possibility is a trademark of Rockwell Automation, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

Publication AUTO-SP048A-EN-P - July 2023

Copyright © 2023 Rockwell Automation, Inc. All Rights Reserved. Printed in USA.