Electric Vehicle Manufacturing Solutions

OMRON

Sustainable future for EV Manufacturing

All the technologies you need for a complete solution

80+ years in automation

Founded in 1933, Omron is a global leader in the field of automation with 37,000+ employees.

Global support and expertise

We build automation systems in nearly every country and all regions of the world.

Easy integration & programming

We develop intuitive technologies that save time when you scale up or add new functionality.

End-to-end engineering support

We provide full support throughout the life cycle of your project, from design to post-sale.

The electrified future is here

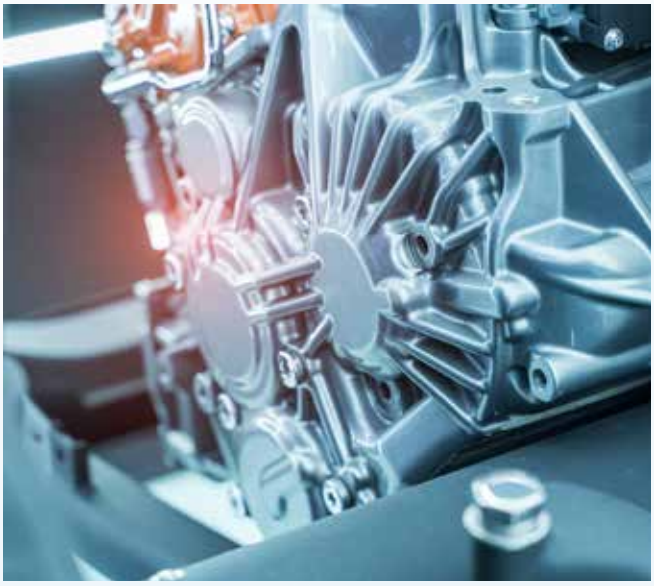
Not that long ago, designing and manufacturing electric vehicles for automotive manufacturers was a minor point. Fast-forward to now where major news outlets are proclaiming the imminent triumph of this technology with headlines like "Why electric cars will take over sooner than you think" (BBC) and "Forecast: More than half of U.S. care sales will be EVs by 2030" (Automotive News). It seems like EVs are all over the place — but how did that happen?

The answer is that we are right in the middle of a technological revolution, and these sorts of shifts can happen surprisingly quickly. Combine this change with government efforts to minimize — or outright ban — the sale of cars that use internal combustion engines, and you have a recipe for rapid EV adoption.

So what does this mean for major automotive manufacturers? First, it means they need to shift their focus to designing and producing the majority of their fleet to be electric like so many have already done. Second, it means these companies, along with their suppliers, need to build all-new production lines and get accustomed to the processes for manufacturing these new technologies. Finding — and building a close relationship with — a trusted automation partner can help mitigate the stress of this once-in-a-lifetime, industry-wide transition. With a broad technology portfolio, global support, and extensive automotive expertise, Omron is ready to guide automotive manufacturers on their electrified journey.

Omron solutions can help you with applications in:

- ADAS, ECU, and electronics manufacturing
- Battery and fuel cell manufacturing
- Electric vehicle subassembly
- Electric vehicle final assembly



Solutions for EV manufacturing: The significant shift to focus on the design and production of electric vehicles and EV-related technologies is evident through the billions of dollars invested by automakers, tier suppliers and government incentives and mandates. Finding an industrial automation partner to support EV manufacturing is critical now more than ever.

Improving quality of EV battery module and pack assembly process

BATTERY AND FUEL CELL MANUFACTURING - APPLICATION EXAMPLE

Challenge

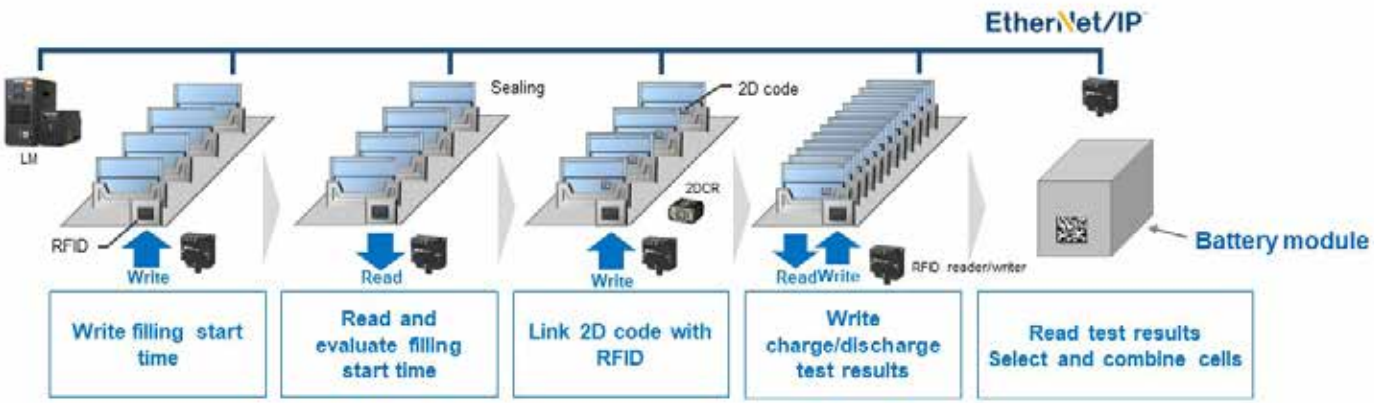
Capacity varies from battery cell to battery cell, which can lead to overcharge, over discharge, and overcurrent to battery packs. The capacities of cells in protective circuits should be equal to avoid this problem.

Solution

Our solutions measure the thickness of electrode sheets immediately after they are pressed, and relay the data, in real time, to pressing equipment. The press equipment then uses this data to control roller pressure and clearance. Omron technology provides double-sided thickness measurement, where sheet thickness is measured from the upper and lower sides. This method delivers more accurate measurements for flapping sheets compared to those that reflect light from only one side of the sheet.

Our solution for cell sorting technology

- Enables management of time and cell capacity with RFID
- Use of 2D codes enables to produce battery packs from cells with the same capacities



Enabling Technologies

RFID

Vision

V680S HF

MicroHAWK V430

Click or scan to learn more ›

Reducing cost needed for introducing inspection at the connector inspection process

ADAS, ECU, AND ELECTRONICS MANUFACTURING - APPLICATION EXAMPLE

Challenge

A wide range of vehicle features is being electrified, not only in electric vehicles but in internal combustion engine (ICE) vehicles as well, to make them more energy-conserving and efficient. This has led to an increase in the production volume and types of electric control units, or ECUs, needed to control these features. Omron provides algorithms essential to connector inspection to reduce algorithm design effort, allowing you to build your inspection system faster.

Solution

With previous image inspection methods, inspection settings needed to be configured for each of the several dozen connector pins. Our new module for configuring settings for connector pin inspections significantly reduces this configuration effort. Omron offers algorithms and configuration features essential to connector inspection as utility software.

Enabling Technologies

Vision

FH Vision System

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The Omron solution provides an inspection system quickly adaptable to new models

Introducing connector inspection creates a huge initial cost for automotive tier suppliers. Significantly reducing design adjustments with an inspection system that can add products at the production process in a short period can help offset those costs.

- Equipped with connector inspection functions, cutting man-hours for design
- Utilities to help adapt the system to new models
- A variety of cameras to build optimal systems

Faster visual inspection process for HV and EV motors

ELECTRIC VEHICLE SUBASSEMBLY - APPLICATION EXAMPLE

Challenge

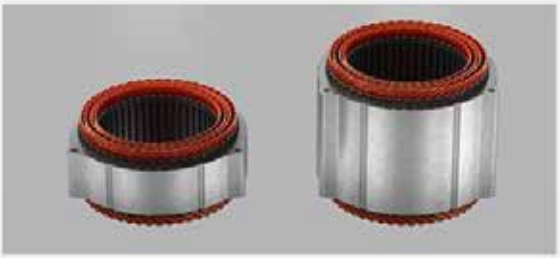
Motors with higher output have more welding points and more wide-ranging quality requirements, making it difficult to reduce appearance inspection time while stabilizing inspection quality. Our solutions enable stable and accurate high-speed inspection through image sensors that support high-speed inspection and our unique non-stop inspection technologies.

Solution

Omron's solutions enable non-stop inspection, allowing for stable inspection while reducing inspection time to 1/10. Our technology speeds up the visual inspection processes and features a unique control algorithm, essential to high-speed appearance inspection.

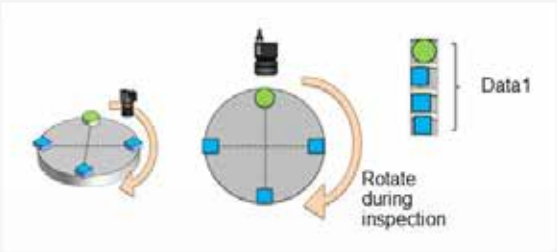
Challenge: To cut weld inspection times

- High power motors have many welds (about 200 points)
- Many inspection items for weld quality diagnosis
- Inspection times increase because workpieces are stopped every time an image is captured



Solution: Nonstop fast inspection

- Enables to capture images while rotating workpieces, speeding up inspections

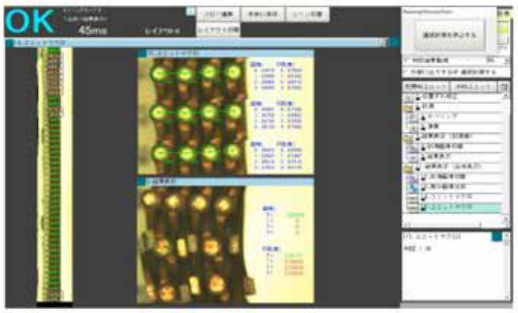


Accurate, fast image capturing of rotating cicular workpieces

Go from increased inspection times and unstable inspection results to nonstop inspection and image capturing at accurate timing to enable more stable inspections.

- Caputring images of rotating workpieces cuts inspection times per rotation (48 points) from about 37 seconds to about 3 seconds.[1]
- Capturing every image at the same point while rotating workpieces makes inspections stable

Click or scan to learn more ›



1. According to our measurement results

Enabling Technologies

Machine Control | Modular I/O | Motion | Vision | HMI

NJ3 Controller

NX Series Modular I/O

1S Drives Ether CAT Servo

FH Vision Systems

Human Machine Interface

Material Transport

ELECTRIC VEHICLE FINAL ASSEMBLY - APPLICATION EXAMPLE

Challenge

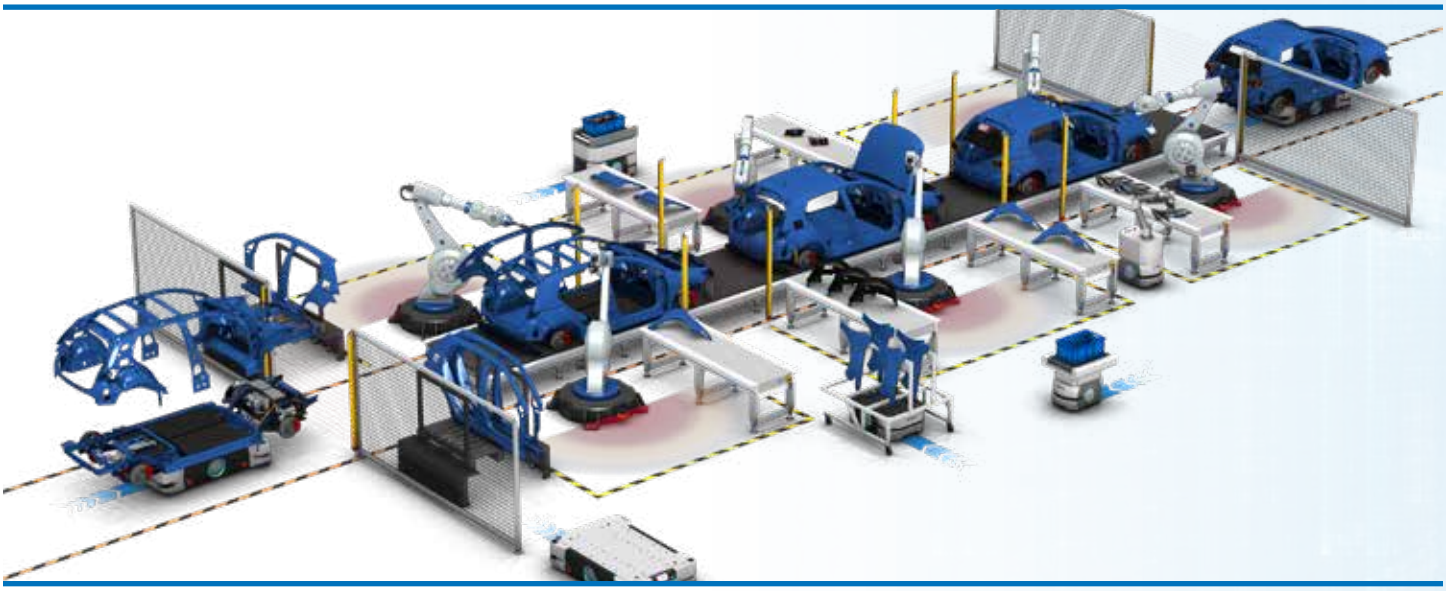
The need for flexibility and optimized working conditions while making it possible for an automotive manufacturer to easily change its factory layout whenever necessary is key to remain competitive. Workforce safety is also a critical topic in an automotive final assembly plant. For example, automotive manufacturers are challenged with replacing forklifts to reduce injury on the plant floor. Labor shortage is also an issue because transporting material is often considered a mundane task and the scarcity of workers very quickly leads to disruption in production.

Solution

Omron's AMRs streamline production and liberate workers from the burden of manual materials transport. The LD Series mobile robots dramatically increase productivity in manufacturing and logistics operations. This unique solution boosts throughput, reduces machine dwell time, eliminates errors and improves material traceability. The HD-1500 is an advanced, autonomous intelligent vehicle specifically designed to transport heavy payloads up to 1500kgs. It is designed for industrial environments and allows for the movement of large payloads while reducing the need for forklifts, ultimately doing more with less equipment and without sacrificing safety.

The future of material transport for final assembly

The factory of the future for automotive manufacturing needs to be connected, flexible and optimized. Imagine a plant floor where AMRs handle all material transport including moving vehicles through final assembly to the final inspection process. Omron's mobile robot solutions are extremely versatile and can be adapted to perform a wide variety of tasks and applications. Advanced intelligence and fleet control provide optimal and dynamic route planning for a safer and more efficient work environment.



Enabling Technologies

Robotics

Robotics

LD Series Mobile Robots

HD-1500 Mobile Robots

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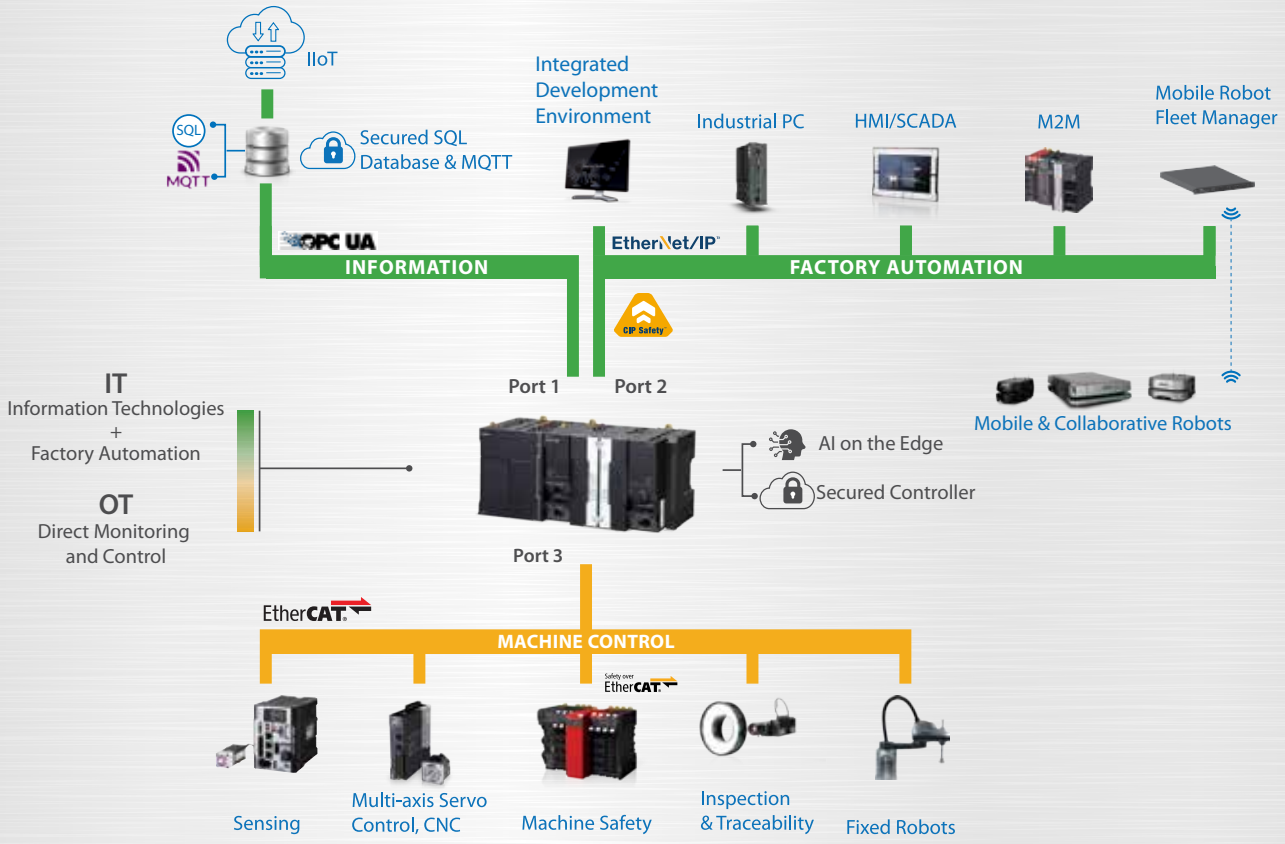
Sysmac Architecture



Omron Product Portfolio

Automation Systems

Machine Automation Controllers
Programmable Logic Controllers
Human Machine Interface
Industrial PC
Remote I/O

Identification & Marking

Barcode Readers & Scanners
RFID Solutions
Verification and Print Quality
Inspection Solutions
Fiber Laser Marker

Industrial Control Panel Products

Control Components
Switching Components

IO-Link

Color Mark
Masters
Photoelectric
Proximity

Machine Safety Technology

Safety Logic Devices - Controllers
Safety Light Curtains
Safety Laser Scanners
Safety Door Switches
Safety Limit Switches
Safety Operator Controls
Emergency Stop Devices
Safety Logic Devices - Relays
Safety Outputs

Machine Vision

Smart Cameras/Vision Sensors
Vision Systems
PC-Based Vision
Machine Vision Cameras
Machine Vision Software

Motion and Drives

Advanced Motion Controllers
Servo Systems
Frequency Inverters

Robotics

Articulated Robots
Collaborative Robots
Integrated Robotic Controllers
Mobile Robots
Parallel Robots
Part Feeders
Robot Software
SCARA Robots

Sensing

Proximity Sensors
Photoelectric Sensors
Fiber Optic Sensors and Amplifiers
Measurement Sensors
Connectors and Cordsets
Rotary Encoders
Ultrasonic Sensors

Software

SPI AOI AXI

3D SPI
3D AOI
3D CT AXI
Process Improvement
3D Verification Station
AVI