Omron Robotics Overview

The Omron Total Solution

Omron offers products that help manufacturers fulfill the needs of mass customization, and address issues related to rising labor costs and labor shortages.

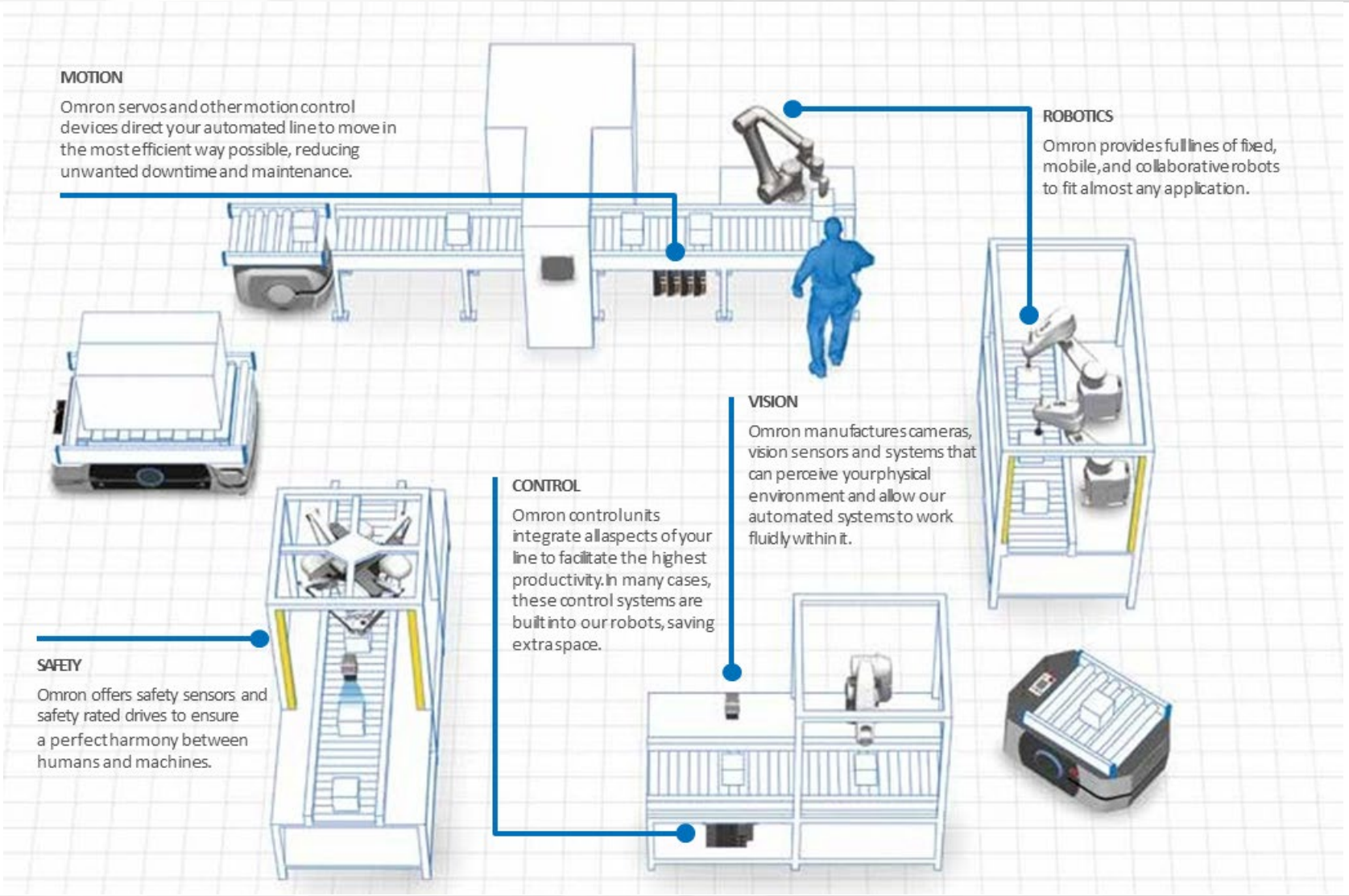
Robotics and More

Along with Industrial, Collaborative and Mobile robots, Omron provides a variety of automation equipment that enable manufacturers to meet their production demands. Ranging from control components and vision sensors to controllers and servomotors, as well as an array of safety devices, Omron's full line of automation products and services can help you take your operations to new heights.

Full Line Automation Portfolio

- Robotics: Industrial, Collaborative and Mobile
- Control
- Motion
- Vision
- Safety
- *Components
- *Sensing
- *Services

(*not illustrated)



Industrial Robotics Overview

Industrial Robots

Fast, precise and ready to perform

Full Line Offering

Industrial robots are the “workhorses” of modern-day manufacturing. Able to run day or night, in rough conditions without complaint, Omron’s portfolio of industrial robots can help manufacturers meet even the most demanding production requirements and offer the tools to make integration and maintenance easy.

Industrial Lines

- SCARA
- Parallel
- Articulated (6-Axis)

SCARA

Parallel

Articulated

i4L Series
SCARA Robots

Small package, big performance, enormous value

Small but mighty

The i4L is a compact SCARA robot series that offers strong performance, a flexible design that makes it simple to integrate and easy to use features that help maximize productivity.

Offering high inertia and high duty ratings which are uncommon to lighter duty SCARA robots, combined with a 5kg payload and a high degree of repeatability, the i4L can tackle more challenging processes with ease and without fear of unexpected faults.

i4L Highlights

- 5kg payload
- High inertia and duty ratings
- 350/450/550mm reaches
- 180/350mm Z stroke
- Built-in controller/amplifier
- Compatibility with the NJ501-R series of Integrated Controllers
- RGB status dome light
- Versatile table and wall mounting provisions

i4H Series
SCARA Robots

When nothing but the best will do

The standard for high performance SCARAs

The i4H series of industrial SCARAs is the benchmark in high-performance SCARAs. Built with performance, precision, and utility in mind, the i4H is ready to take on even the most demanding applications. No matter which size reach, protection rating, or control type is needed, all 96 possible combinations of the i4H offer an industry leading 15kg standard payload so you are sure to be able to do what you want, where you want, and how you want.

i4H Highlights

- High speed and duty ratings
- 15kg payload
- 650/750/850mm reaches
- 210/410mm vertical strokes
- Floor mount and inverted ceiling configurations
- Optional IP65, and Cleanroom w/ESD protection
- Available food grade grease variants
- Robot mounted LCD health/status display
- Built-in controller/amplifier
- Compatibility with the NJ501-R series of Integrated Controllers
- RGB status ring light
- Thru-arm EtherCAT connection

Standard

IP65 & Cleanroom w/ESD

Inverted

Hornet & iX3 Parallel Robots

Fast, flexible and ready to work

The perfect pick for pick & place

The Hornet and iX3 are parallel robots designed for picking and packaging applications, perfect for primary and secondary food packaging. The powerful controls are fully embedded into the base of the robot, saving valuable floor space and reducing installation costs and complexity. It features a hygienic design that minimizes contamination risks, including a standard IP65-rated work area and corrosion-resistant materials for easy washdown.

Hornet / iX3 Highlights

- Up to an 8kg payload (depending on config.)
- 565mm reach (1130mm total)
- Zero dead zone, 360° work envelope
- 3 and 4 axis (3 arm w/theta rotation) versions
- Optional IP67 protection ratings
- Built-in controller/amplifier
- Compatibility with the NJ501-R series of Integrated Controllers (iX3 only)

Hornet* / iX3
(3 axis)

Hornet* / iX3
(4 axis)

(*iX3 model shown)

Quattro & iX4 Parallel Robots

What you need to maximize your throughput potential

The legendary champion of parallel robots

The Quattro & iX4 parallel robots excel at high-speed applications in packaging, manufacturing, assembly and material handling. They are the only parallel robots (or "delta robots") in the world with our patented four-arm rotational platform, delivering maximum speed, maximum acceleration and exceptional performance across the entire work envelope. Ultra-compact controls and embedded amplifiers improve footprint efficiency while simplifying installation. USDA/FDA acceptance also allows these robots to work in sensitive food handling applications where many other cannot.

Quattro / iX4 Highlights

- Unique, patented 4 arm design
- Up to a 15kg payload (depending on config.)
- 650/800mm reaches (1300/1600mm total)
- Zero dead zone, 360° work envelope
- Unique “no drive shaft” theta rotation (optional)
- Optional IP67 and USDA/FDA accepted protection ratings
- Built-in controller/amplifier
- Compatibility with the NJ501-R series of Integrated Controllers (iX4 only)

Quattro* / iX4
(650mm)

Quattro* / iX4
(800mm)

(*iX4 model shown)

Viper
Articulated Robots

Ready to tackle complex assembly and processing applications

The flexible choice

The Omron Viper™ robot is a high-performance articulated robot ideal for assembly, material handling, packaging, machine tending, and many other operations requiring speed and accuracy. The familiar 6-axis design enables it to articulate tooling and workpieces with great dexterity which is critical for more complex applications. The Viper's available IP54/65 & Class 10 cleanroom protections, ultra compact controller and flexible mounting ensure that it can work in many environments and where floor space is scarce.

Viper Highlights

- Smooth, precise, 6-axis motion
- Excellent precision: +/-20 micron repeatability
- 650/850mm reaches
- 5kg payload
- Compact space saving controller
- IP54/65, Cleanroom Class 10
- Table-top and inverted mounting
- Stand alone and Integrated controller modes
- ePLC support to allow programming and control via Omron and 3rd party PLCs

Viper

iPF
Part Feeder

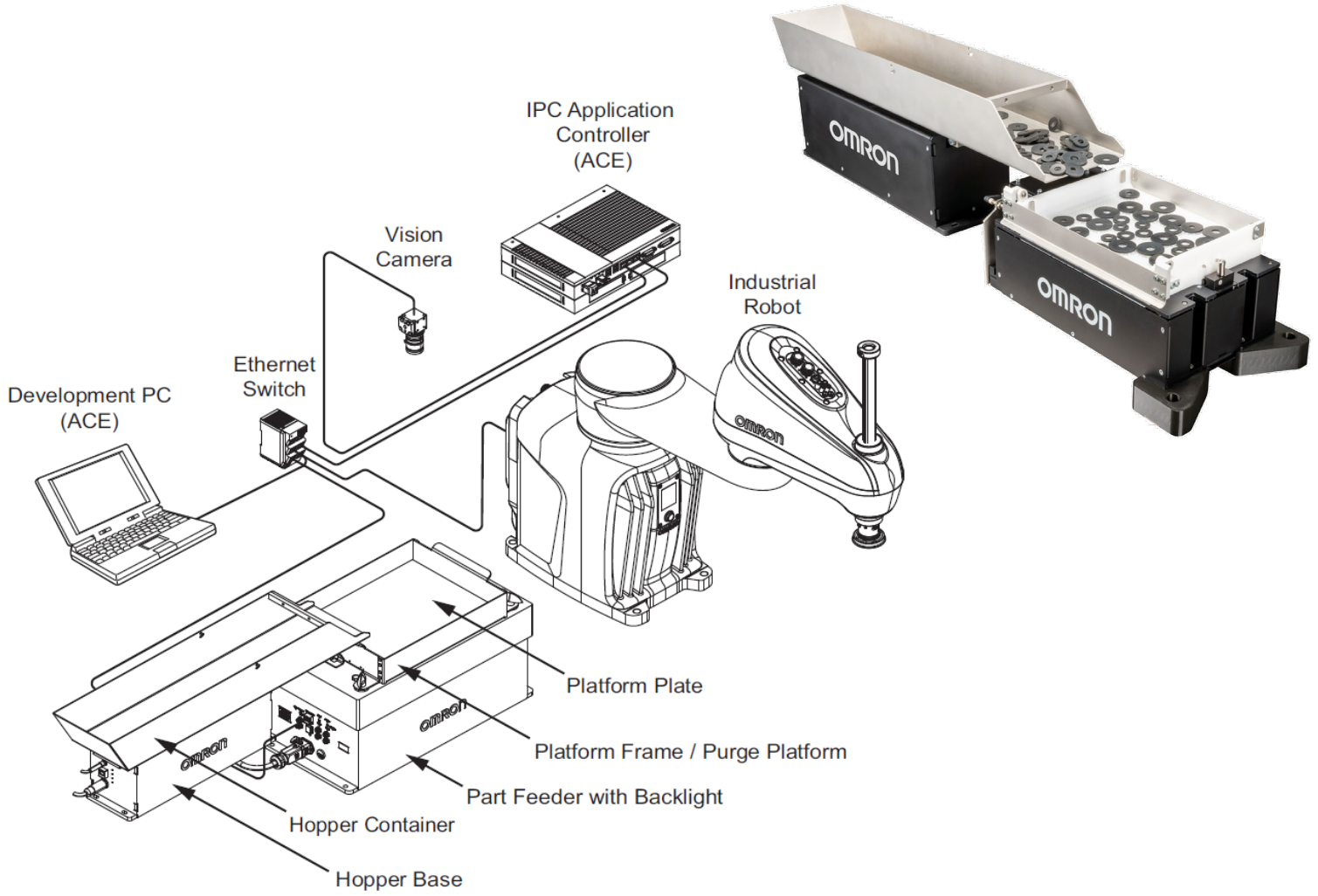
An easy-to-use part feeding solution configurable to your needs

A Full, Customizable Part Feeding Solution

The Omron iPF allows you to configure a part feeding solution to your exact needs. With its revolutionary 3-axis vibration technology, the iPF can move parts quickly and easily in all directions to eliminate build-up in corners. No matter your batch size or part type, the OMRON iPF can handle it. With 3L, 7L, and 14L hopper sizes, and three different part feeder sizes, the OMRON iPF can handle a wide variety of part shapes, sizes, and volumes. The OMRON iPF can easily be integrated alongside Omron's industrial robot and vision offerings to streamline the solution design process. This is all capped off with the ACE programming environment, which contains sample wizards that can provide quick and easy setups to automatically generate application code.

iPF Highlights

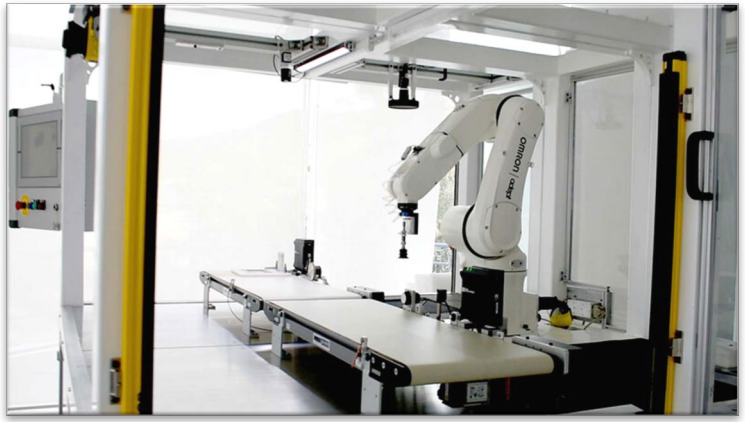
- Three different models to address part sizes 5mm to 150mm
- 3L, 7L, and 14L hopper options (multi-hopper configurations available)
- Optional "purge" packages that can remove undesired parts from part feeding surface
- Red, white, and infrared backlight options
- Easy ACE integration – integrate robots, part feeders, and cameras all in one platform
- Sysmac integration via Ethernet TCP/IP



Target Applications for Industrial Robots

Our Industrial Robot portfolio's diversity and capabilities can be applied to nearly every industry and application, but have particularly repeated and proven successes in the following areas.

SCARA and Articulated Arm Robots



Life Science, Digital, and Automotive

- Available protection ratings (IP65, food-grade grease, cleanroom and ESD rated) enable use in specialized environments and applications
- Delicate, high precision assembly reduces scrap rate and guarantees consistency and quality
- Part feeders can easily be integrated alongside these robots
- Can be tied into larger systems for inspection and traceability functionality

Parallel Robots

Food, Commodities, and Recycling

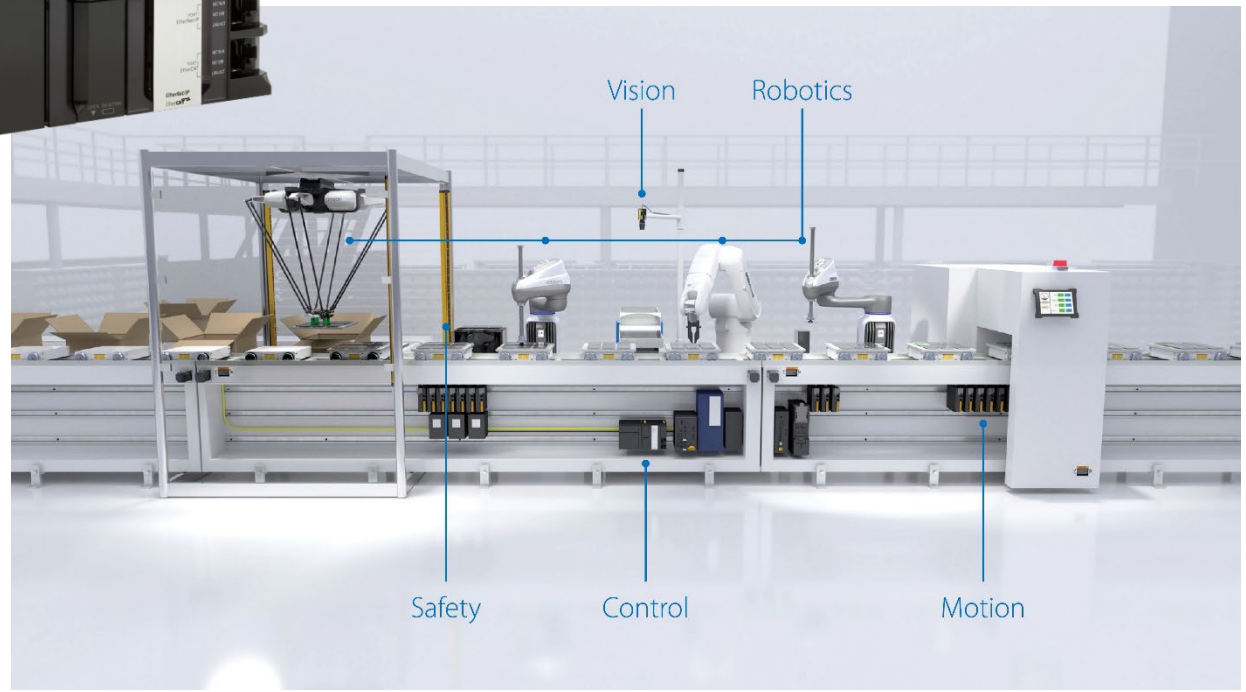
- High speed pick-and-place for irregular parts (organic material, recyclable objects, etc)
- Enables high-mix, low-volume pick-and-place applications
- Protection ratings available to prevent contamination and damage to the robot

Integrated Controller

Omron's total automation solution in controller form

Integrated performance

Performance is measured in many ways, processing time, communication speed, intelligent functions that enable complex operations and more. The Integrated Controller is a Machine automation controller that combines Omron Robotics technology with the Omron ecosystem of control products. This unique system architecture provides the foundation that enables users to achieve the performance they need for a wide range of applications.



Highlights

- Single controller capable of controlling the entire Omron portfolio of automation devices including robots
- Up to 8* Omron robots can be controlled at once per CPU
- Standard dedicated networks (EtherCAT – control & Ethernet – communications)
- Real-time QNX operating system
- High-Speed Synchronization of devices (ie: robots, motion, vision, etc.)
- Single unified program for all connected devices
- Supports 3D simulation of entire work cell (optional)
- Easy to configure hardware and setup wizards
- Optional support for up to 64 external axes (min 16) and remote DB connectivity

(*Application dependent)

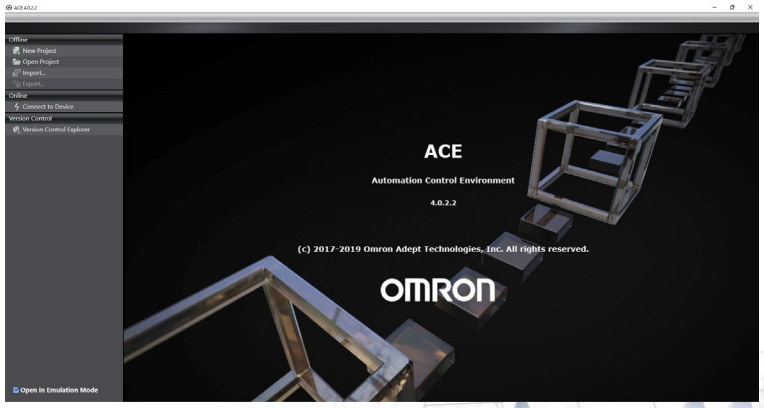
ACE

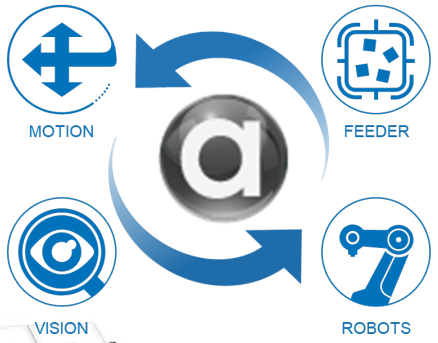
The benchmark for industrial robot programming software

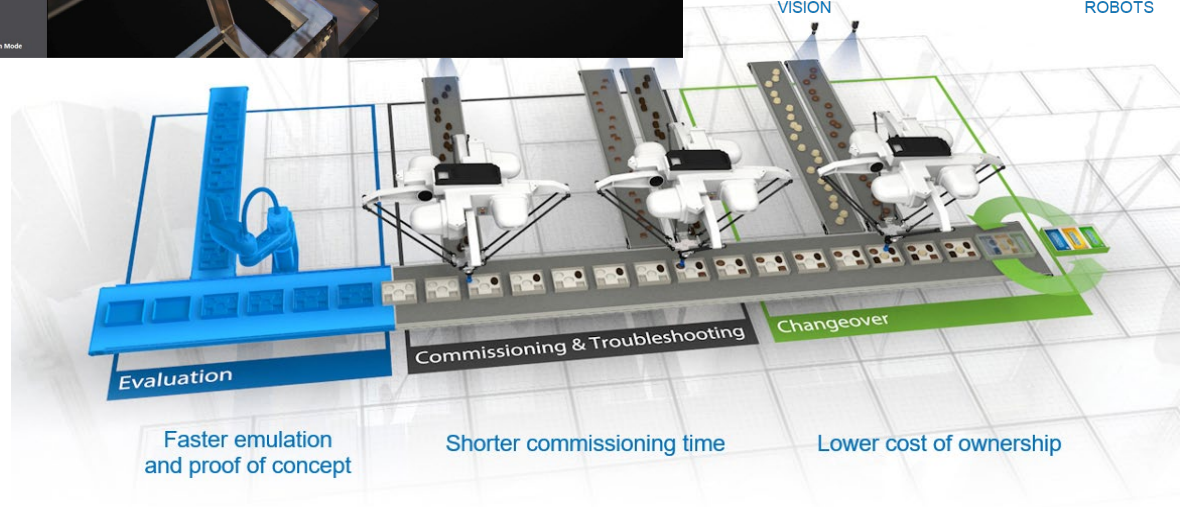
Powerful and easy to use

Omron's Automation Control Environment (ACE) is a powerful software platform that provides an effective way to deploy industrial automation applications. ACE allows users to easily configure robots and vision, and guides users through step-by-step calibration processes to streamline setup and ultimately increase productivity.

ACE helps you quickly and easily set up your robot systems. It now offers a new user-friendly interface and includes new capabilities to make it even simpler to design and deploy the most efficient production lines







Highlights

- Platform to manage Omron's entire portfolio of stand-alone industrial robots, vision and flexible feeding systems
- Step-by-step wizards to design a scalable packaging line, 3D bin picking system, or assembly process from proof-of-concept to deployment
- Advanced vision tools for localization, identification, measurement, and inspection
- Intuitive flowchart programming capability

Sysmac Studio

The command center for all your automation systems

The only software you need

Omron's renowned Sysmac Studio software package has been expanded and now incorporates all the capabilities of the Omron ACE robot programming software as well as all new functions such as full machine simulation and IEC sequential robot programming. The merging of these software packages not only eliminates the need for multiple software packages, but the wizard driven setup, intuitive UI and unified programming greatly aid in user's ability to quickly and easily setup automation systems that include robots.

Highlights

- Configuration of entire Sysmac portfolio of products (control, motion, vision, safety, etc.) including *Omron Robots, and Application Manager packages
- eV+ and Sequential (IEC) scripting for Omron robot programming
- Monitoring and visualization of robot data alongside the rest of the EtherCAT devices
- Full robot-machine simulation, with takt time estimation
- Centralized error management and troubleshooting window
- Configuration of Pack Manager, Vision Manager, and Recipe Manager
- Wizard driven programming (packaging, vision, and feeding)
- Standard Sysmac Studio license will provide robot programming and robot simulation functionality (separate license needed for system simulation)

(*Robots must be connected and compatible with an NJ501-R series controller)

Omron Collaborative Robots

Omron TM Collaborative Robots

Omron's lineup of collaborative robots includes a variety of models to guarantee the right reach and payload capacity for different applications, including mobile robot-compatible (DC) versions.

ISO 10218-1 ISO/TS 15066 ISO 13849-1

Designed to meet safety regulations ISO 10218-1 (including TS 15066) and ISO 13849-1.

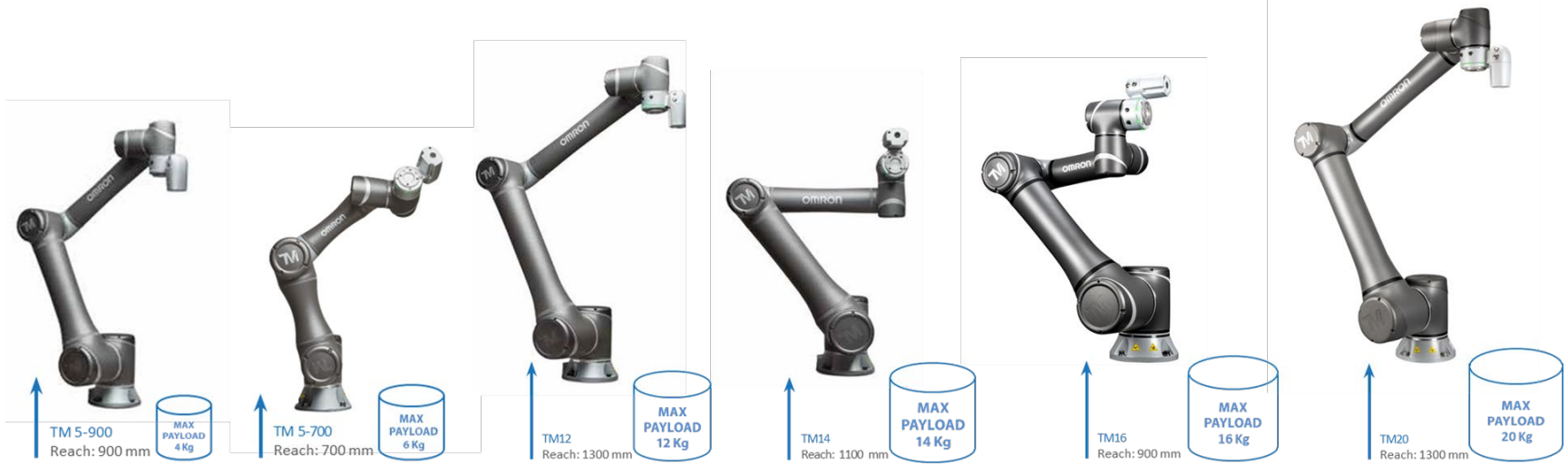
TM5S
Payload: 5 kg
Reach: 900 mm

TM7S
Payload: 7 kg
Reach: 700 mm

TM12S
Payload: 12 kg
Reach: 1300 mm

TM14S
Payload: 14 kg
Reach: 1100 mm

TM25S
Payload: 25 kg
Reach: 1902mm



Omron TM Collaborative Robots

The Omron TM Collaborative Robot is available in a variety of special models suited for specific applications and operational environments:

SEMI-S2 Rated

- Designed for semiconductor manufacturing and material handling to ensure the safety of the equipment

Integrated Fieldbus

- Enabled for EtherNet/IP or PROFINET communication

Mobile (DC) Power Supply

- Includes a 22-60 VDC power supply to enable the integration with mobile robots for fully autonomous machine tending and logistics handling applications

Food-Grade Grease

- Features H1 rated grease sealed in the actuators allows the Omron TM Cobot installation in environments with incidental food contamination risk

Mobile (DC) Power Supply Omron TM Cobot mounted on a Mobile Robot

Food Grade Grease Omron TM Cobot

Key industries and applications

Omron TM Collaborative Robots are designed for a wide variety of applications in a number of industries.

Key Industries

Automotive

Food & Commodities

Digital & Semiconductor

Assembly:

Our cobots can improve throughput and consistency of repetitive or complex assembly tasks including part joining, insertion, tool changing, and working alongside people.

Mobile Manipulation:

Mounting an Omron TM cobot onto an Omron LD mobile robot automates not only materials transport, but also complicated picking operations.

Palletizing:

Our space-saving cobots can streamline end-of-line case stacking onto a pallet. With built-in vision, cases can be sorted by barcode or other visual indication.

Packaging:

Our cobots can inspect and sort products, before putting them into cases. Customers can quickly adapt production lines to new products or seasonal models.

Machine Tending:

A cobot can be used to tend CNC machines, injection molding machines, stamping and punch pressers, grinding, and cutting machines, relieving workers from repetitive and dangerous work. Our cobots are equipped with anti-cutting oil corrosion joint covers.

Pick and Place with Inspection:

Our cobots feature a built-in vision system that allows for easy pick-and-place together with sophisticated inspection, without the need for installing additional cameras or lighting equipment.

Screwdriving:

Our cobots add precision and consistency to your screwdriving and parts fastening applications. A complete ready-to-use solution is provided with a screwdriving kit and pneumatic control box.

Easy to use

With graphical programming, hand guidance, and intelligent vision, Omron TM cobots are designed to be easy and intuitive. Customers can set up simple applications in just a few minutes.

Hand Guidance

Hand guidance mode allows users to easily set points and assign tasks to the robot. With buttons built into the cobot arm, users can guide the robot into position and automatically record the position in the software.

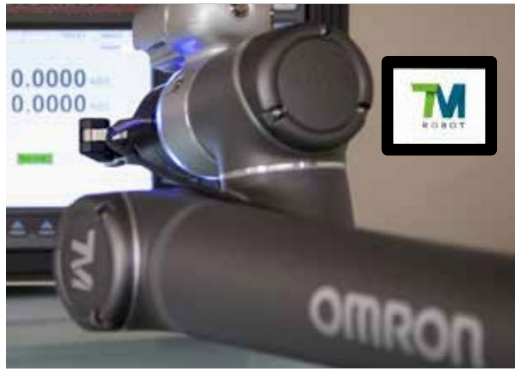
Advanced Safety features and ISO/TS 15066 Oriented Safety Settings

The safety functions available on our cobots provide a wide variety of safety devices configurations to meet safety standard requirements without the need for an additional safety controller.

Our unique patented "body region safety settings" have preset safety parameter values, based on TS 15066 and robot kinematics. There is no need to understand complicated safety calculations to set up a safe application.

Intelligent Vision

Our built-in vision system allows for quick setup of pick-and-place tasks, with the help of easy hand guiding and landmark positioning.

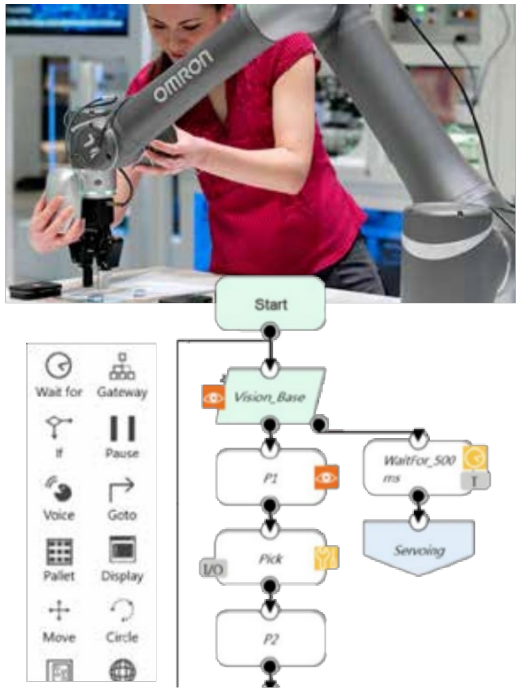


Landmark

A landmark is a physical object that can be recognized by the robot's built-in camera, and acts as a beacon to help the robot navigate. The robot uses a Landmark as a reference point so it can better locate objects within the workspace. During high-mix, low-volume production with quick changeovers, customers can redeploy the robot without spending time to recalibrate the vision system.

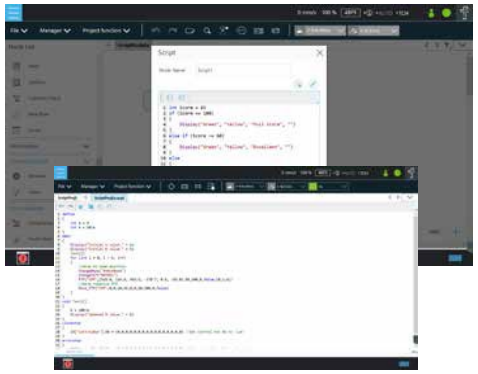
Graphical Programming

Intuitive programming allows users to automate a task with flow-based software, creating full workflows with a click-and-drag method.



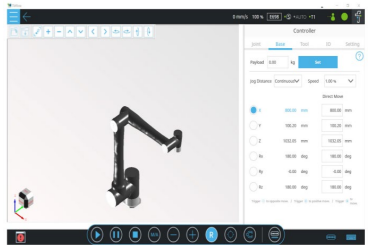
Script Programming

The Script language enables the advanced users to program Cobot projects more concise and organized.



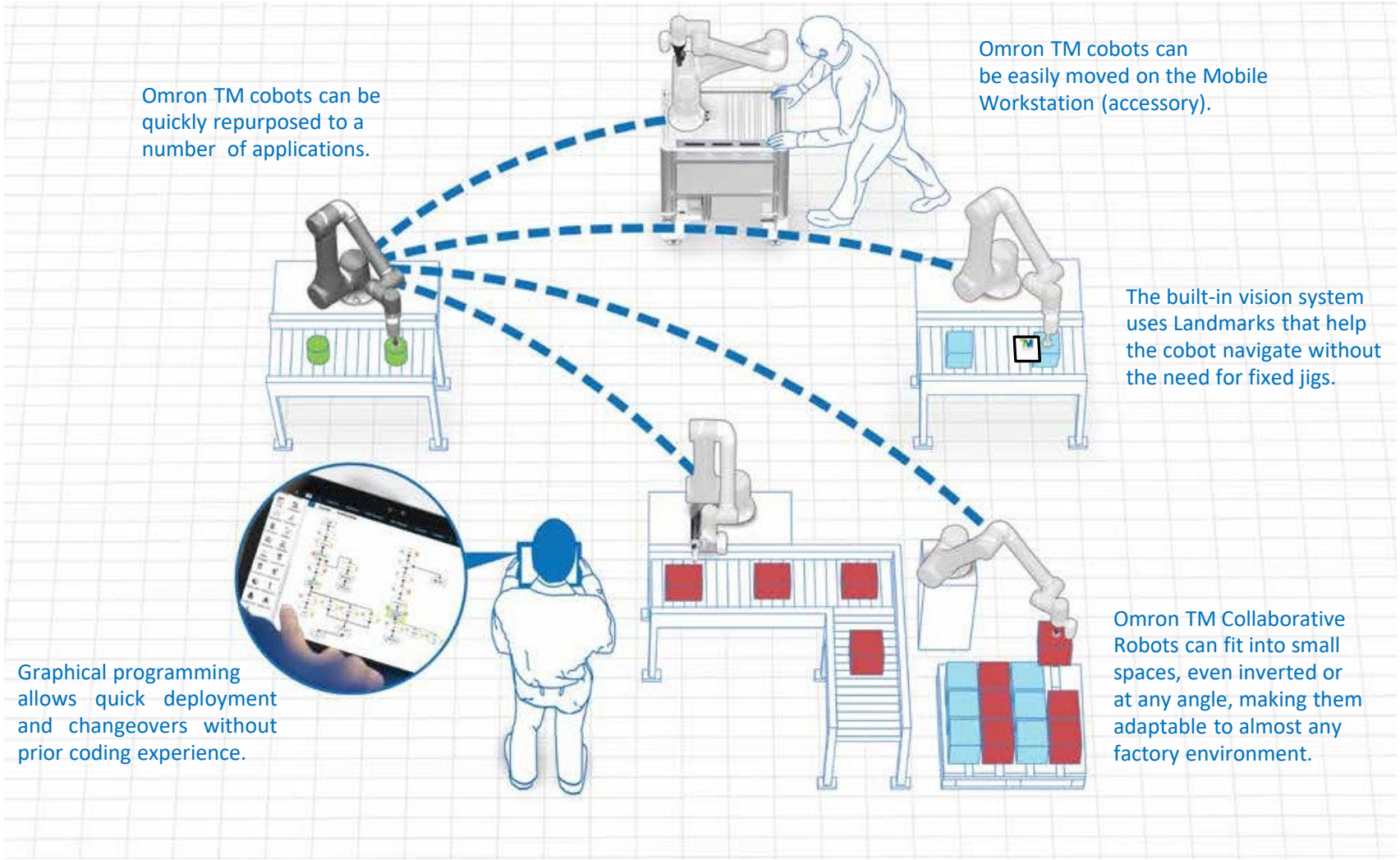
Simulator

The simulator allows users to develop, edit, and run programs offline for testing and verifying proper operation.



Designed for flexible manufacturing

Omron TM Collaborative Robots are designed to be easily redeployed to different tasks and applications, making production as flexible as needed.



Built-In Vision

Users can set up vision tasks for immediate deployment without going through complex steps of integrating external cameras or lighting equipment. For even greater utility, users can choose to add up to two optional external cameras to best suit their unique application needs.

Standard Vision Package

- Contrast Enhancement
- Pattern Matching (Shape)
- Barcode QR Code
- Color Plane Extraction
- Pattern Matching (Image)
- Color Classifier
- Smoothing
- Blob Finder
- String match
- Thresholding
- Anchor
- Morphology
- Fiducial Mark Matching
- Flip

Optional Vision Package

- Pose Variation (Shape)
- Counting (Blobs)
- Line Burr
- Gauge (Distance & Angle)
- Pose Variation (Image)
- Counting (Shape)
- Circle Burr
- OCR (Number)
- Specific Color Area Size
- Counting (Image)
- OCR (Letter)
- Subtract Reference Image
- Counting (Edges)

Plug & Play

Omron has partnered with a select number of companies to offer a wide variety of peripherals that quickly and easily integrate with our cobots, allowing for a faster deployment and return on investment. They are collectively referred to as Plug & Play devices and software, designed to serve a broad range of customer applications and meet the highest testing standards of Omron.

Plug & Play Kits

All products come as a ready-to-use kit for easy installation.

Omron
Mobile Robots

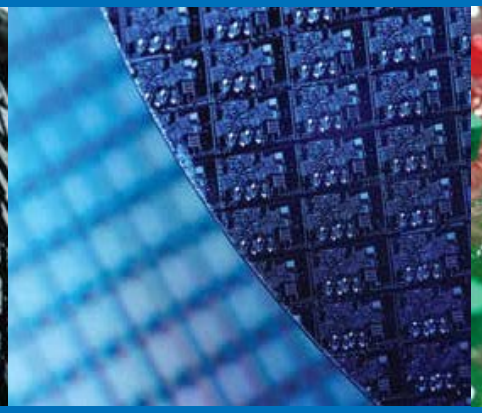
The world's most popular
mobile robot solution

Omron is the original pioneer of industrial mobile robots, working closely with customers to develop best-in-class solutions.

1933	210	1000s	20+
Omron established	Locations Worldwide	of robots deployed globally	years of robotics experience

Made for Industry

With the largest install base in the world, Omron mobile robots are deployed in thousands of applications across multiple industries.


Automotive

- Tire assembly
- Automotive electronics
- Automotive accessories
- Assembly and inspection

Digital

- Semiconductor wafer fabrication
- Semiconductor packaging and test
- Mobile device manufacturing
- Data center environmental surveillance

Consumer products

- Stockroom transport
- Transport goods to assembly and sorting stations

Medical

- Sterilization room transport
- Laboratory sample transport

Logistics

- Material Handling
- Parts transfer
- Non-conforming good handling
- Reduce use of forklifts

AMRs vs AGVs

The difference is flexibility

Conveyors have been used by factories and warehouses for over 100 years, but they are expensive and can be very difficult to modify when products or processes change.

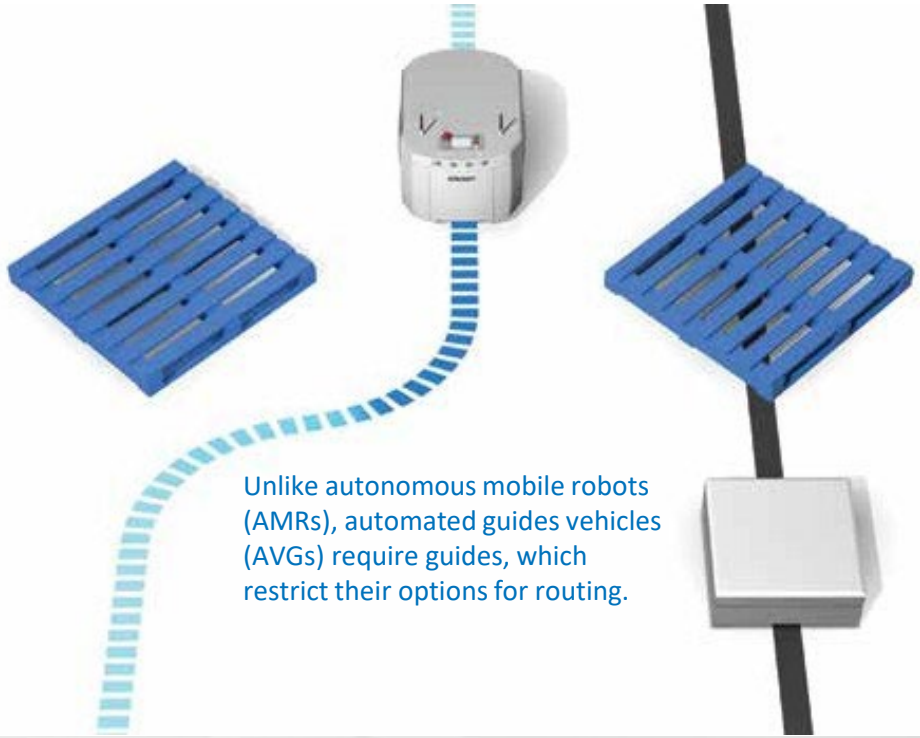
About a decade ago, automated guided vehicles (AGVs) became an alternative to conveyors for material handling. So what is the difference between an autonomous mobile robot (AMR) and an AGV?

AGVs require a predefined path to follow, either a network of magnetic lines on the floor or beacons on the walls. So although AGVs allow modifications to production lines, acilities will need to install new equipment every time the AGV path is changed, leading to downtime and extra costs.

AMRs can safely navigate without the use of floor magnets or wall-mounted beacons. An AMR will first create a baseline map of a facility using built-in sensors, then will constantly detect its surroundings. When processes change, AMRs can easily change as well, creating networks of new routes or being reassigned to new tasks.

Unlike AGVs, which will stop at obstacles indefinitely, AMRs avoid stationary or moving obstacles and automatically reroute themselves when necessary. AMR paths automatically change without human intervention, making operations more flexible and decreasing total cost of ownership.

	Omron AMR	AGV
Set Up	Ready to go after simple mapping	Requires navigation guides
Navigation	Navigates autonomously and safely without physical guides	Needs guides, such as floor magnets or beacons
Obstacles	Safely avoids obstacles without stopping	Stops at obstacles and remains still until obstacles are removed
Map Chage	Easy	Factory modifications
Changing Destinations	Easy	Factory modifications
Scalability	Easy	Factory modifications



Unlike autonomous mobile robots (AMRs), automated guides vehicles (AVGs) require guides, which restrict their options for routing.

Flexible Functionality

Omron's mobile robot solutions are extremely versatile and can be adapted to perform a wide variety of tasks and applications.

We're also scalable, so we can grow with your business.

LD-60/90(ESD) LD-60/90 LD-250(ESD) LD-250 MD-650/900 HD-1500

Collaborative robot
Shown with 3rd party Collaborative Robot

Mobile Manipulator
Shown with Omron TM Collaborative Robot

Conveyor top
Shown with Motorized Drive Roller (MDR)

Open/Closed Courier
Closed Courier shown with RFID Lock boc

Standard Solutions | Build Your Own Integrated Solutions

Easy Install

Omron mobile robots are easy to get up and running, requiring no construction such as the installation of magnets, and minimal programming. In addition, our software integrates with your other systems so you can get the solution up and running in minimal time.

Key Installation Features

- No construction required
- Easy integration with MES, ERP, and WMS
- Enhanced security to comply with IT systems
- Autonomous navigation doesn't require preset routes, magnets, or beacons
- Automatic software updates across fleet while maintaining continuous workflow

1 UNBOX

The complete mobile solution comes with everything you need for quick setup.

2 MAP

After a short drive through your facility, the robot will make a custom map of your floor plan.

3 SET GOALS

Use simple commands to set up goals for pick- ups and drop-offs.

4 SEND JOBS

Simple integration between the Omron Fleet Manager and your MES and WMS allows you to get your robots working immediately.

Feature packed by design

Omron mobile robots are fundamentally built to serve human workers.

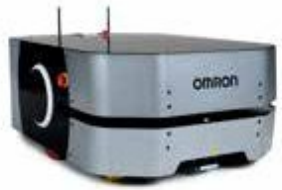
Designed to meet the industry's latest requirements, our mobile robots interact with people to promote a collaborative, safe working environment. Safety lasers and rear sensors allow our robots to detect obstacles in their path and prevent collisions

Safety Features

- Avoids static and moving obstacles
- Additional E-stops easily added
- Complies with ISO EN1525, JIS D6802 and ANSI B56.5 safety standards

LD-60/90

- 60kg or 90kg maximum payload
- Onboard laser sensing and navigation
- Rearward obstacle detection
- Automatic dock charging
- Power & control of custom topper units
- Available in ESD and Cleanroom protections



LD-250

- 250kg maximum payload
- Onboard laser sensing and navigation
- Heavy duty, all metal construction
- Rearward obstacle detection
- Automatic dock charging
- Power & control of custom topper units
- Available in ESD and Cleanroom protections

MD-650/900

- 650kg & 900kg maximum payloads
- Heavy duty, all metal construction
- Onboard navigation with Dynamic safety system, 360° obstacle detection and automatic safety footprint switching
- Capable of forward and reverse navigation
- Power & Onboard PLC control of custom and standard topper units

HD-1500

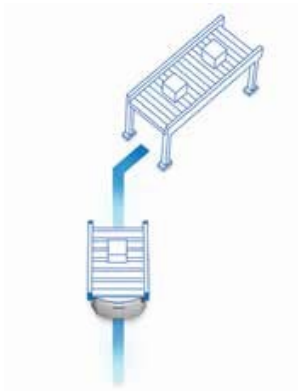
- 1500kg maximum payload
- Heavy duty, all metal construction
- Onboard navigation with Dynamic safety system, 360° obstacle detection
- Capable of forward and reverse navigation
- Power & Onboard PLC control of custom and standard topper units

Precise
Performance

Our safe and intelligent navigation leads the industry in speed and accuracy. Using multiple systems, our robots learn to become even more efficient after they're installed. Every robot in our fleet acts as a sensor to map out the most challenging environments and optimize its performance, from navigating tight aisles to planning the most efficient routes.

Cell Alignment Positioning System (CAPS)

Evaluates real-worldfeatures to effectively align robots for high accuracy drop-offs and pick-ups.



High Accuracy Positioning System (HAPS)

Enables Omron mobile robots to move along fixed paths in applications that require tight tolerances.

Key Performance Capabilities

- Dynamic obstacle avoidance
- Faster navigation times
- Smoother driving
- Fast goal approach speeds
- Superior alignment at goals

Acuity

Omron's patented Acuity sensing system generates navigation markers from ceiling lights and objects, since these are more likely to remain fixed. Using these ceiling features along with the standard floor level map, the system can identify the robot's position no matter how frequently the environment on the floor changes.

Powerful Fleet Management

Omron FLeet Operations Workspace (FLOW) Core

The Omron Fleet Operations Workspace (FLOW) solution provides an intelligent fleet management system that monitors mobile robot locations, traffic flow, and job requests, ensuring your factory operates at peak efficiency.

The FLOW Core solution also reduces programming in your manufacturing execution system (MES) or enterprise resource planning (ERP) system by automating robot tasks.

Fleets are controlled via the Virtual Fleet Manager, a scalable virtualization solution that enables you to choose hardware and hypervisors to meet your IT / OT infrastructure standards.

Key Functions

- Displays robot location and status
- Displays job queue
- Prioritizes important jobs
- Selects fastest routes based on human and robot traffic
- Identifies blocked paths and creates alternative routes
- Fleets are scalable and can consist of mixed OMRON AMR models
- Optimizes job assignments
- Optimizes battery charging

The Omron Fleet Manager, running with FLOW Core software, can manage fleets with a virtually unlimited* number of robots in any configuration.

*Must be running the VFM on a system with adequate system resources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