

# OMRON TM Collaborative Robots



**OMRON**



# OMRON TM Collaborative Robots

OMRON's line-up of collaborative robots include a variety of models to guarantee the right reach and payload for different applications, including mobile robot compatible (DC) versions.



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



TM12  
Reach: 1300 mm

MAX  
PAYLOAD  
12 Kg



TM14  
Reach: 1100 mm

MAX  
PAYLOAD  
14 Kg



TM 5-900  
Reach: 900 mm

MAX  
PAYLOAD  
4 Kg



TM16  
Reach: 900 mm

MAX  
PAYLOAD  
16 Kg



TM 5-700  
Reach: 700 mm

MAX  
PAYLOAD  
6 Kg



TM20  
Reach: 1300 mm

MAX  
PAYLOAD  
20 Kg

# Key Industries & Applications

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

## Key Industries

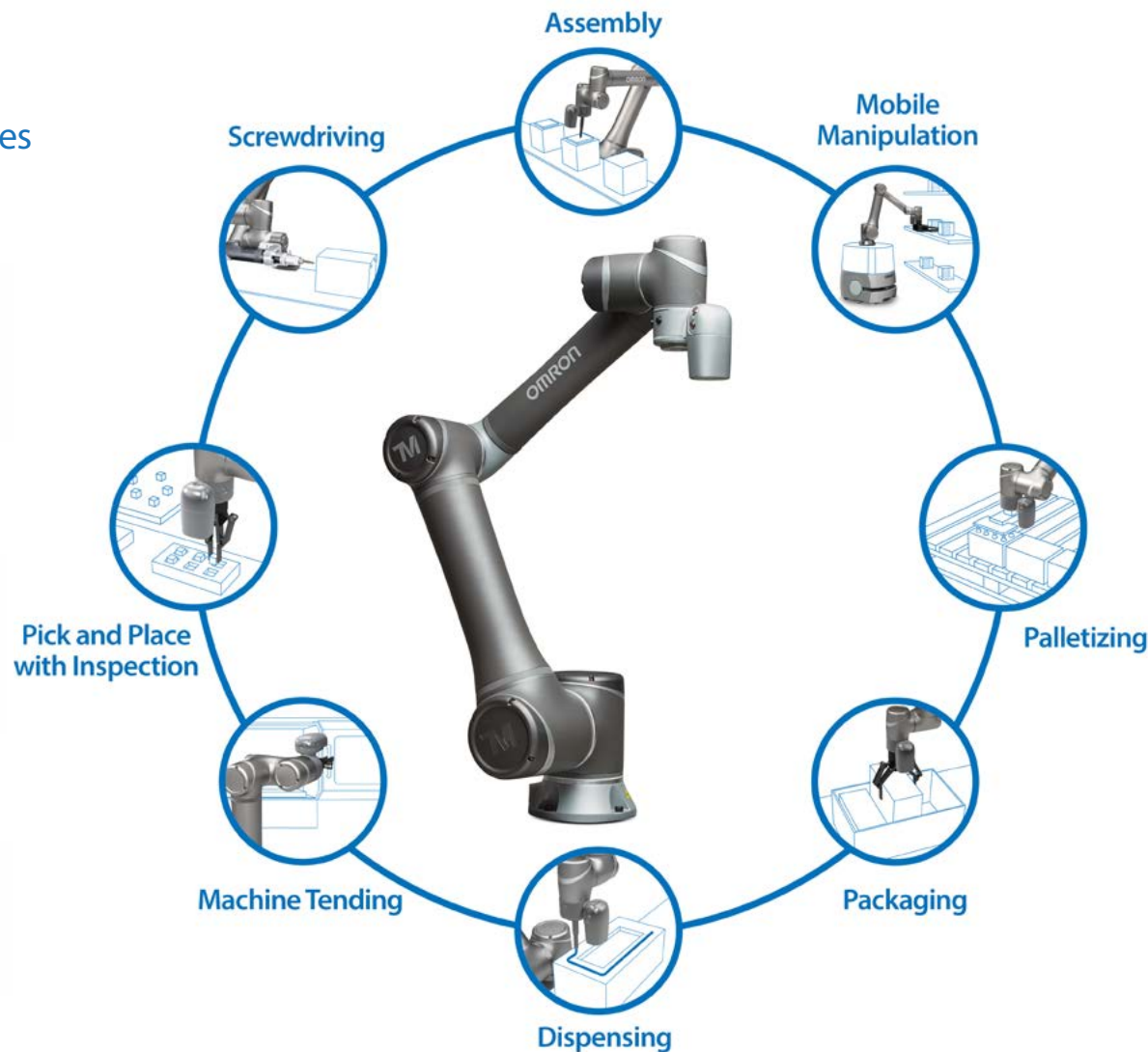
Automotive



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, this robotics solution automates not only transportation of goods but also complicated picking operations.

### Palletizing:

Our space-saving cobots can streamline end-of-line case stacking onto a pallet. With the Operator Platform, users can build their own palletizing software with a customized interface. OMRON also provides a built-in palletizing wizard in the Operator Platform.

### Packaging/Pick and Place with Inspection:

With built-in vision and lighting, our cobots can inspect, sort and pick up products from a conveyor belt 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.

### 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.

### Dispensing:

Our cobots add flexibility, efficiency, and freedom to gluing, sealing, painting and other dispensing tasks. Users can record the path using the hand guide and any complex paths can be deployed within minutes.

# Easy to Use

With graphical programming, hand guiding, 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 Guide

Hand guide 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.



## ISO/TS 15066 Oriented Safety Settings

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.

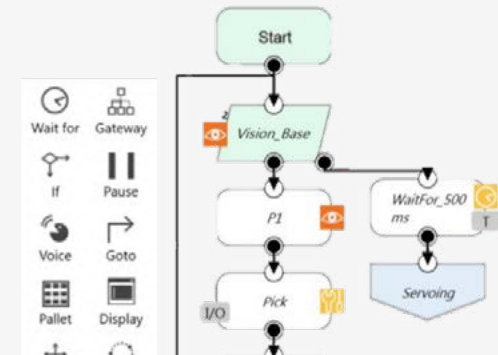


## Landmark

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

Our innovative programming allows users to automate a task with flow-based software, creating full workflows with a click-and-drag method in TMflow. Via Operator Platform, building an application software layout is very intuitive by drag and drop visual elements, no need for trial and error via complex coding.



# 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.

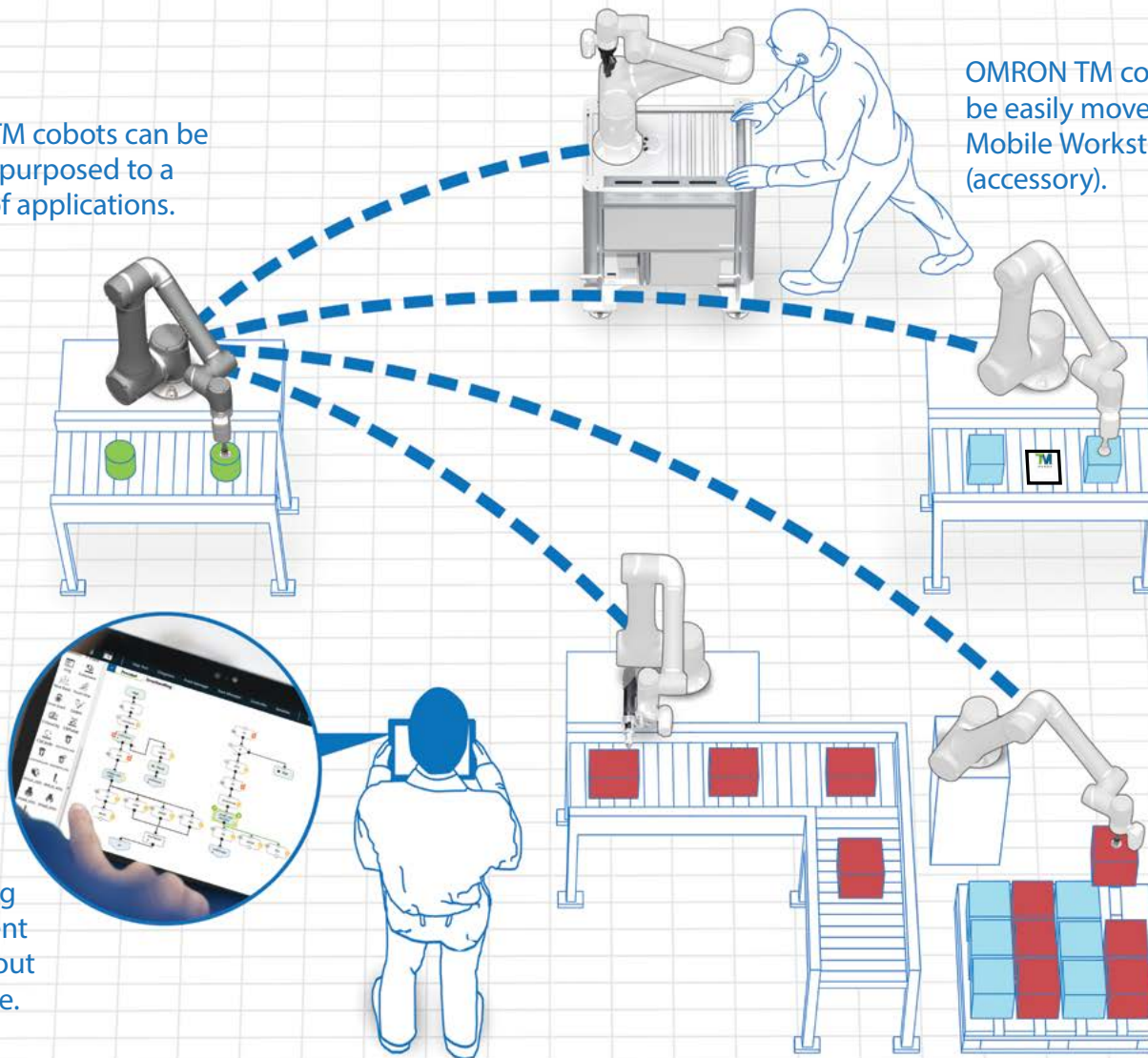
OMRON TM robots can be quickly repurposed to a number of applications.

OMRON TM robots can be easily moved on the Mobile Workstation (accessory).

The built-in vision system uses Landmarks that help the robot navigate without the need for fixed jigs.

Graphical programming allows quick deployment and changeovers without prior coding experience.

OMRON TM Collaborative Robots can fit into small spaces, even inverted or at any angle, making them adaptable to almost any factory environment.



# Global Network

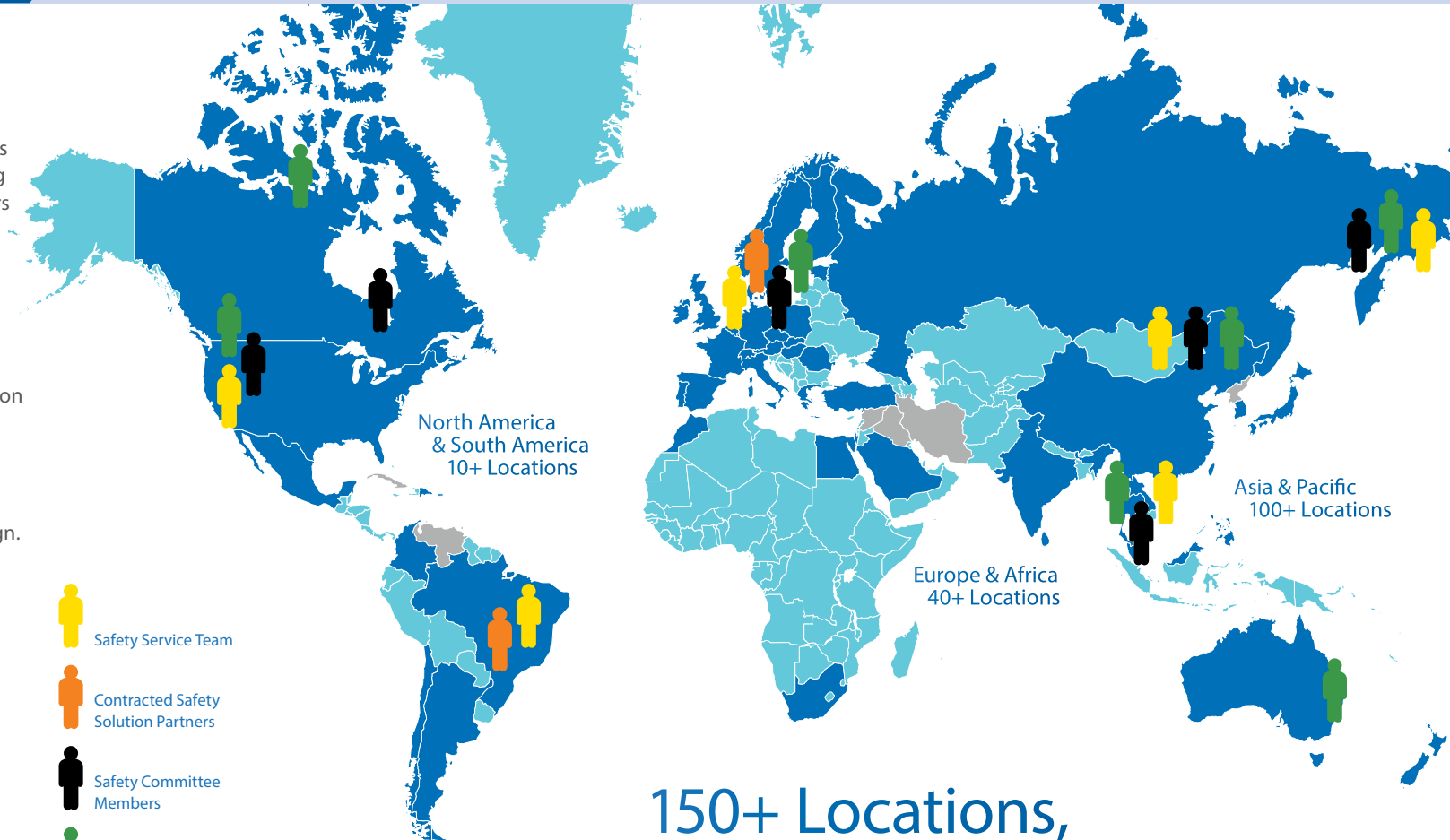
For decades, OMRON safety services have been the partner of choice of global brands and machine manufactures in automotive, food and beverage, consumer electronics and cosmetics industries. Our expertise in industrial, mobile, and collaborative robotics combined with 85+ years of experience in industrial automation gives us unparalleled expertise in safety.

## Risk Assessment Service

OMRON's Risk Assessment Service helps customers mitigate potential safety hazards before deploying a robotics solution. Our functional safety engineers bring unrivaled expertise to work with customers onsite, to identify relevant standards and requirements for human-machine interaction.

We offer:

- Support with process analysis, identification of application use cases, tasks, and potential collision points.
- Risk, compliance, and conformity assessment according to latest industry standards.
- Risk reduction strategies with a focus on shared human-robot workspace and end-effector design.



- Safety Service Team
- Contracted Safety Solution Partners
- Safety Committee Members
- Safety Product Specialists
- Local Offices
- Extended Support Available

150+ Locations,  
40+ Countries  
20+ Languages

# Anatomy of OMRON TM Cobot



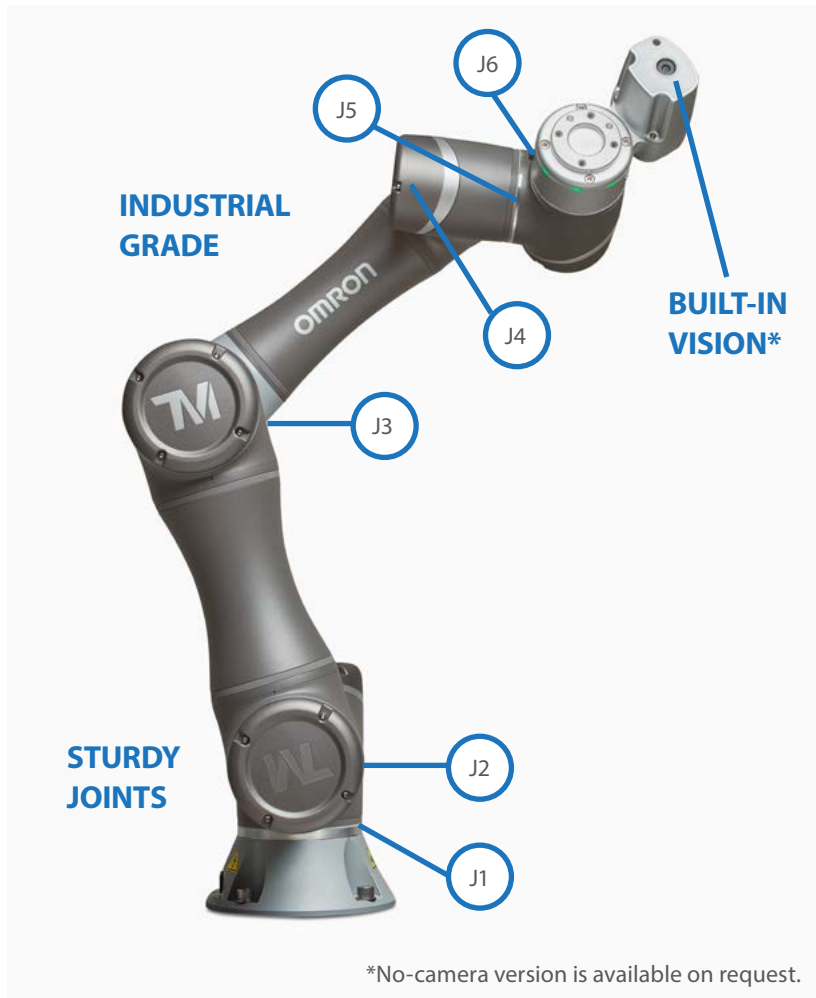
- 1 VISION button teaches vision tasks and task sequences
- 2 POINT button records position in cobot program
- 3 FREE button allows hands-on teaching



- 4 Analog I/O port
- 5 Indicator light ring shows robot status
- 6 Digital I/O port



- 7 Built-in camera with integrated light
- 8 Gripper button
- 9 End-of-arm tooling flange



\*No-camera version is available on request.

# Built-In Vision

The integrated vision system is the biggest advantage of OMRON™ cobots. It is designed for industrial grade pattern recognition, object positioning, and feature identification. Users can set up vision tasks for immediate deployment without going through complex steps of integrating external cameras or lighting equipment.



Landmarks



Contrast



Color Plane Extraction



Smoothing



Thresholding



Morphology



Image Flipping

Character Recognition



Anchor



Pattern Matching (Shape)



Pattern Matching (Image)



Fiducial Mark Matching



Blob Detection



Barcode, 2D, QR Reading



Color Identification





# Operator Platform

Expand your flexibility to build complex applications with OMRON's TM Collaborative Robot Operator Platform.

## OMRON has introduced the Operator Platform to provide a unique application software suite with an expanded range of features

The Operator Platform checks off all the boxes with its smart drag and drop UI builder, integrated wizards, virtual workspaces and more. The Operator Platform is designed for those with limited know-how to address complex applications.

### Key features:

- Built-in palletizing wizard and simulation to optimize different palletizing strategies.
- Smart drag-and-drop UI builder uses keyboard shortcuts to create a customized application setup.
- Generate virtual workspaces for your robot with obstacle detection and import CAD models for collision detection.
- Scripting language for process management and system changeover.



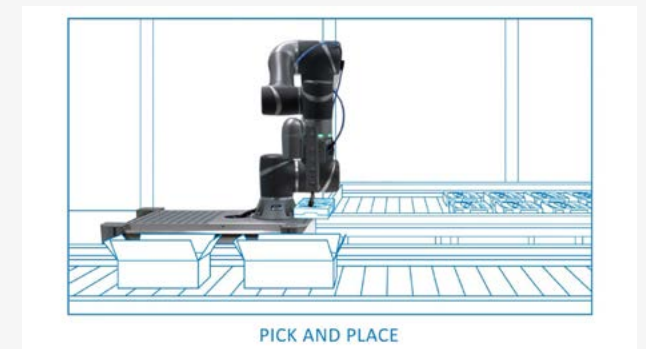
## The most innovative software yet

The Operator Platform allows for quick changeover and productivity. Its comprehensive application software not only allows flexibility but it's completely customizable. This complete solution software allows you to build your own customized UI based on your company's needs.



## Do more with less

OMRON is guaranteed to be your one stop partner in automation and robotics technology. Whether you're looking to improve your process, boost productivity, or expand your program capability, OMRON's TM Operator Platform enables you to do more with less equipment for a wide range of cobot applications.



# 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 Categories



### Plug & Play Kits

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

## TM Collaborative Robot – Food Grade Grease Cobot

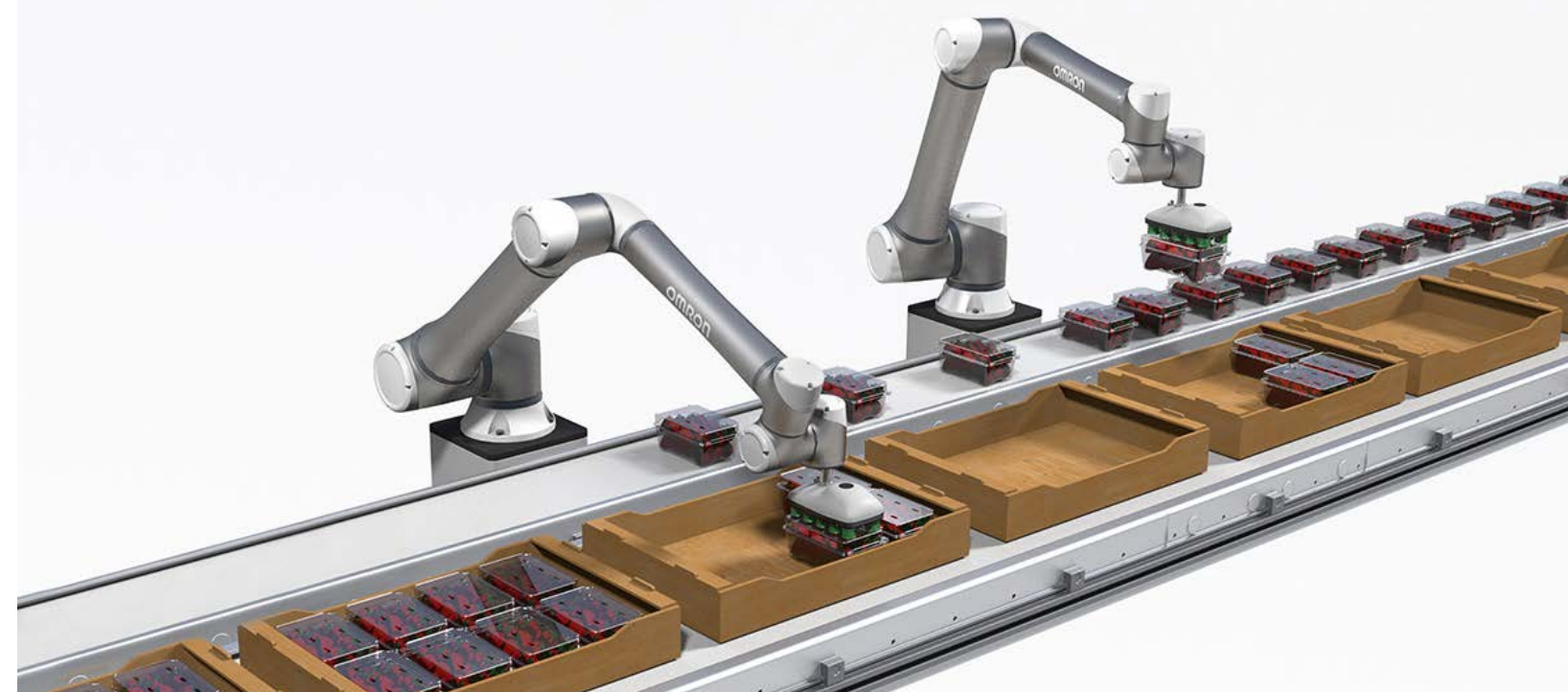
OMRON introduces the TM Collaborative Robot – Food Grade Grease (FGG), our advanced solution to prevent potential food contamination from oil leakage. The OMRON TM Cobot - FGG allows customers to expand their material-handling possibilities and operate freely in a selected food-handling, packaging, and palletizing environment. Our collaborative robot family is designed for various applications and now provides a worry-free process by eliminating product waste and creating a more sanitary workplace.

### Food-grade lubricants are a must

These specially formulated lubricants are designed to meet the stringent requirements of the food industry. Not only is the food-grade grease tasteless and odorless, but it's resistant to plastics and other common packaging materials. In addition, OMRON's lineup of FGG collaborative robots includes a variety of models to guarantee the right reach and payload for different applications, including the fieldbus version with Profinet and EtherNet/IP options.

### A safe and contamination-free environment

OMRON offers exceptionally low contamination levels due to the included food-grade grease (FGG) as special offerings, allowing the OMRON TM Cobot to be used in environments with incidental food contact risk. When using food-grade lubricants, customers can easily handle food materials while meeting safety regulations. Our unit design is ISO 10218-1 (including TS 15066) and ISO 13849-1.



### More flexibility and productivity than ever.

Quality is never sacrificed when it comes to productivity due to accurate automation that can reduce waste. The cobot can seamlessly handle delicate

food products with an extensive range of grippers. Cobots not only work side-by-side with human workers but have now met the strict food contamination requirements when it comes to the food and beverage industry, allowing more flexibility.

# Mobile Manipulator

More manufacturers are exploring mobile manipulator solutions to combine the benefits of collaborative robotics with autonomous mobile robotics, so they can deploy the most agile solution into their factories. With our extensive experience in industrial automation, both mobile and collaborative robots, OMRON is uniquely capable of providing a complete mobile manipulation solution. The whole manipulator can be built with OMRON products, with the best performance in the market.

By mounting an OMRON TM collaborative robot arm onto an OMRON LD series autonomous mobile robot, this mobile manipulator is capable of picking up a product and carrying it to different locations. It greatly reduces human error associated with transporting high-value products, as well as human contamination associated with products such as wafer FOUP. Working as a standalone platform or in a fleet, this solution adds traceability to your production and increases efficiency.

OMRON's mobile manipulator solution provides the easiest integration, and offers the most stable performance and longest battery life in the market. Our collaborative robot models adhere to SEMI S2 standards. OMRON's local application engineering team can provide guidance on how to optimally integrate our mobile and cobot offerings.

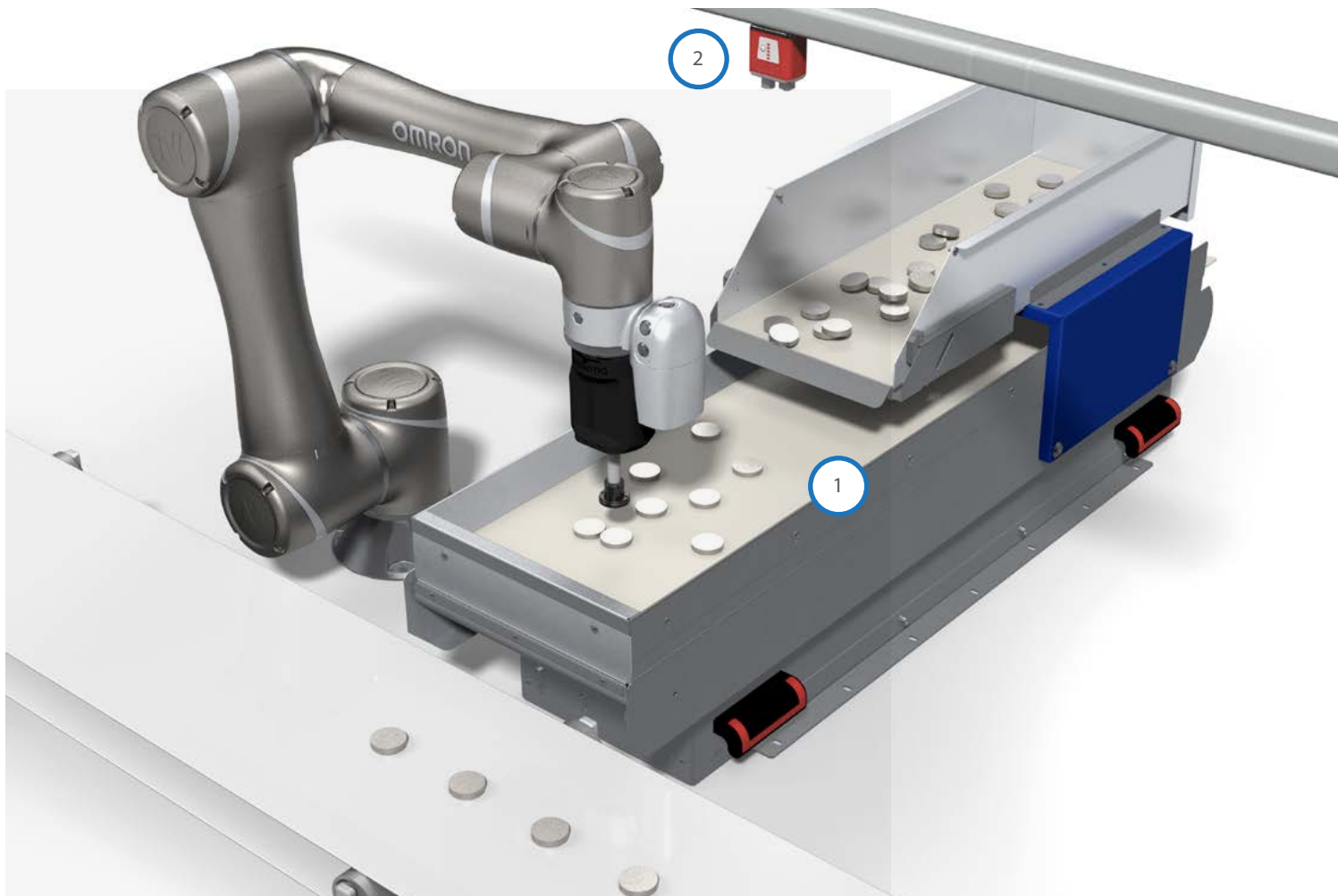
## The solution is ideal for:

- Material transportation of high-value products (e.g., semiconductor wafers, jewelry, biological samples)
- Picking boxes of assembled parts and delivering to inspection station
- Machine tending and tool changing at multiple stations
- Random spot checking, such as identifying cracks of paint imperfection on moving products



## Flexible Feeding

OMRON's flexible feeding solution provides a compact and cost-effective system for automated assembly. The full solution includes: an OMRON cobot, an OMRON Microscan smart camera, and an OMRON AnyFeeder.



The solution is ideal for flexible feeding applications requiring vision systems to identify the location, orientation, and shape of different parts, where occasional human interaction might be needed.

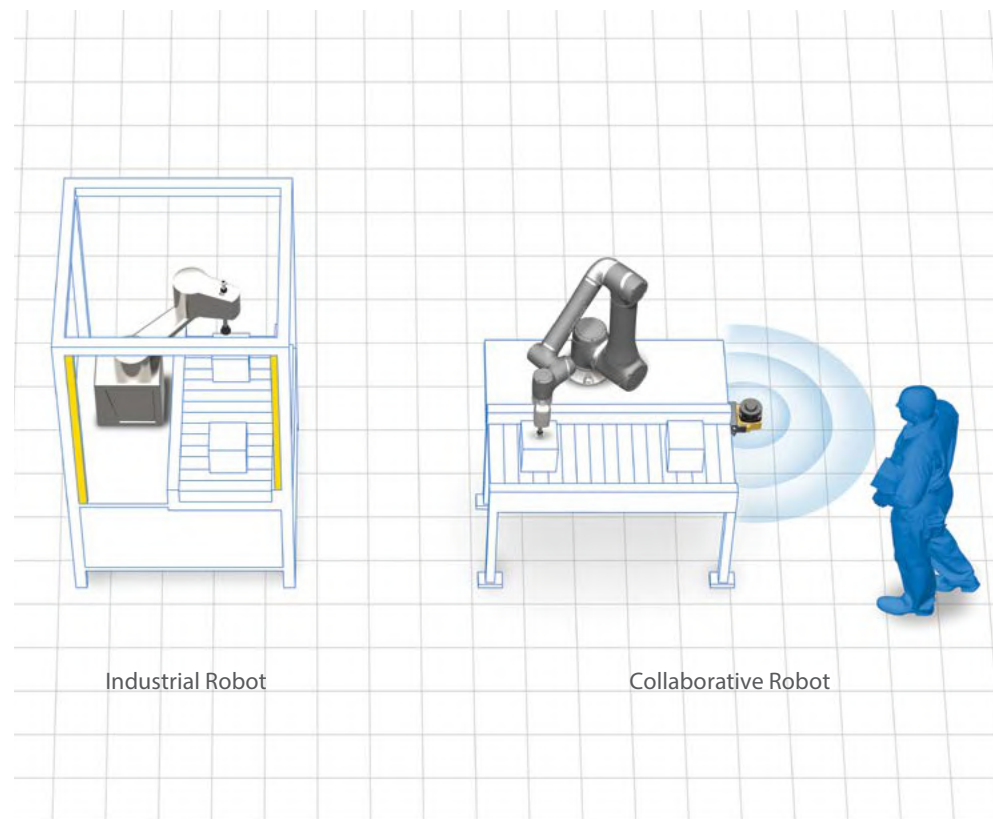
- Simplifies consolidation of compact feeding systems by incorporating integrated vision
- Safe collaboration with humans during feeding and assembly processes
- All cobot and AnyFeeder models are compatible with the solution

1: OMRON's AnyFeeder is an advanced and flexible bulk parts feeder with storage to hold components of various shapes and materials.

2: OMRON's MicroHAWK platform offers the most advanced machine vision capability on the world's smallest smart cameras. MicroHAWK cameras are fully-integrated with optics, processors, and lighting to take on any inspection task.

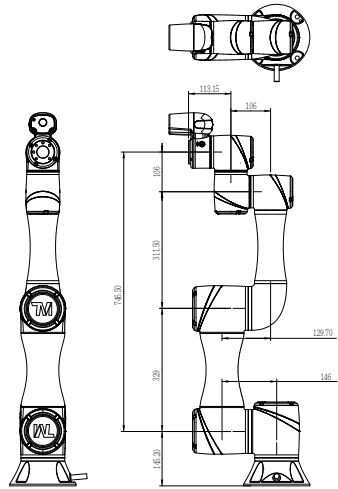
# Choosing Cobots vs. Industrial Robot

OMRON TM Collaborative Robots change the way in which traditional factories work. Physical cages are no longer needed. Designed for high-mix, low-volume production at a speed comparable to human workers, OMRON TM cobots can work in harmony with humans.

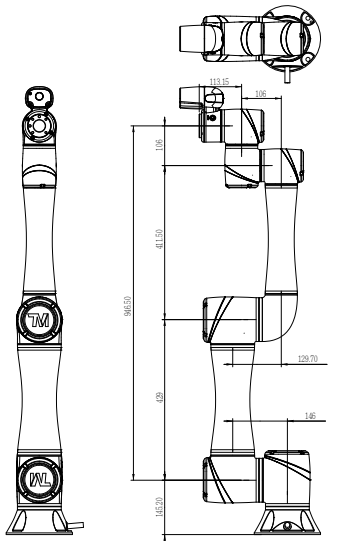


|                           | Traditional Industrial Robots  | OMRON Cobots  |
|---------------------------|--|---|
| Safety                    | Needs a physical barrier, such as a fence or cage, to ensure safety. | Designed to be inherently safe but may need safety sensors to ensure that the application is safe (e.g. OMRON safety laser scanner) based on risk assessment. Typically does not need physical barrier if working in collaborative mode. Software safety setting is easy with graphical user interface. |
| Workspace                 | Separated from human workspace.                                      | Can be shared with people.  |
| Footprint                 | Large  | Small   |
| Flexibility               | No. Fixed to one location and works on dedicated task.               | Yes. Can be moved between locations during the day to work on different tasks. Built-in camera and Landmark positioning enable quick relocation.  |
| Programming               | Difficult. Requires skill and training.                              | Easy. Can be done with minimal training.  |
| Setup                     | Requires advanced skills and is time-consuming.                      | Quick and easy.   |
| Application               | Fit for mass production at high speeds.                              | Fit for high-mix, low-volume production at a speed comparable to human workers. Can be used at high speeds with safety measures.  |
| Cycle Time (Pick & Place) | Down to seconds  | Over 5 seconds  |
| Speed of Process (Path)   | Below 8.2 m/s  | Below 1.4 m/s   |
| Repeatability             | +/- 0.02 mm  | +/- 0.05 mm for TM5<br>+/- 0.1 mm for TM12, TM14, TM16 and TM20   |
| Environment               | IP requirements above IP54   | IP54 (robot arm), IP32 (control box)  |
| Process Complexity        | Can be complex   | Should be simple  |

# Technical Data TM5



TM5-700



TM5-900

\*no-camera version available on request.

## TM5 Specifications

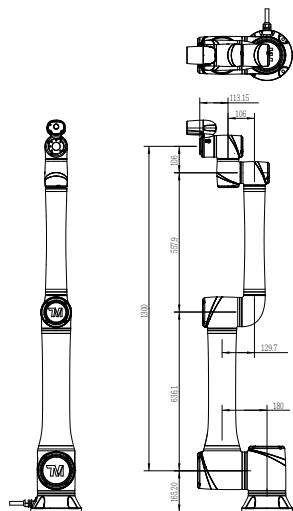
| Product Name                     |             | TM5-700   |           | TM5X-700              |           | TM5-900               |           | TM5X-900              |           |
|----------------------------------|-------------|---|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|
| Power Source                     |             | AC  | DC        | AC                    | DC        | AC                    | DC        | AC                    | DC        |
| Weight (kg)                      |             | 22.1  |           | 21.8                  |           | 22.6                  |           | 22.3                  |           |
| Controller Weight (kg)           |             | 13.5  | 14.5      | 13.5                  | 14.5      | 13.5                  | 14.5      | 13.5                  | 14.5      |
| Max Payload (kg)                 |             | 6   |           |                       |           | 4                     |           |                       |           |
| Reach (mm)                       |             | 700   |           |                       |           | 900                   |           |                       |           |
| Mounting                         |             | Wall, Table, Ceiling  |           |                       |           |                       |           |                       |           |
| Typical Speed (m/s)              |             | 1.1   |           |                       |           | 1.4                   |           |                       |           |
| Joint Range                      | Joint 1     | +/- 270°  |           | +/- 360°              |           | +/- 270°              |           | +/- 360°              |           |
|                                  | Joint 2,4,5 | +/- 180°  |           | +/- 360°              |           | ±+/- 180°             |           | +/- 360°              |           |
|                                  | Joint 3     | +/- 155°  |           |                       |           |                       |           |                       |           |
|                                  | Joint 6     | +/- 270°  |           | +/- 360°              |           | +/- 270°              |           | +/- 360°              |           |
| Joint Speeds                     | Joint 1,2,3 | 180°/s  |           |                       |           |                       |           |                       |           |
|                                  | Joint 4,5,6 | 225°/s  |           |                       |           |                       |           |                       |           |
| Repeatability (mm)               |             | +/- 0.05  |           |                       |           |                       |           |                       |           |
| IP                               |             | IP54 (robot arm), IP32 (control box), IP40 (robot stick)      |           |                       |           |                       |           |                       |           |
| Cleanroom Class                  |             | ISO Class 3   |           |                       |           |                       |           |                       |           |
| Operating Temperature & Humidity |             | 0 to 50°C, 85% max. (with no condensation)                    |           |                       |           |                       |           |                       |           |
| Storage Temperature & Humidity   |             | -20 to 60°C, 75% max. (with no condensation)                  |           |                       |           |                       |           |                       |           |
| Operating & Storage Environment  |             | No corrosive gases or exposure to water-soluble cutting oil.* |           |                       |           |                       |           |                       |           |
| Motor Power Supply               |             | 100-240 VAC, 50-60 Hz   | 22-60 VDC | 100-240 VAC, 50-60 Hz | 22-60 VDC | 100-240 VAC, 50-60 Hz | 22-60 VDC | 100-240 VAC, 50-60 Hz | 22-60 VDC |
| Robot Arm Cable Length           |             | 3m/12m  | 1.5m      | 3m/12m                | 1.5m      | 3m/12m                | 1.5m      | 3m/12m                | 1.5m      |
| I/O Ports                        | Control Box | Digital In: 16 Digital Out: 16 Analogue In: 2 Analogue Out: 1 |           |                       |           |                       |           |                       |           |
|                                  | Tool        | Digital In: 4 Digital Out: 4 Analogue In: 1 Analogue Out: 0   |           |                       |           |                       |           |                       |           |
| I/O Interface                    |             | COM: 3, HDMI: 1, LAN: 3, USB2.0: 4, USB3.0: 2                 |           |                       |           |                       |           |                       |           |
| Communication                    |             | RS232, Ethernet (master), Modbus TCP/RTU (master & slave)     |           |                       |           |                       |           |                       |           |
| I/O Power Supply                 |             | 24 VDC 1.5 A (control box and tool)                           |           |                       |           |                       |           |                       |           |
| Programming Environment          |             | TMflow, flowchart based                                       |           |                       |           |                       |           |                       |           |
| Integrated Camera Available      |             | 5M pixels, colour   |           |                       |           |                       |           |                       |           |
| SEMI S2 Certified* Available     |             | No  | Yes       | No                    | Yes       | No                    | Yes       | No                    | Yes       |
| Fieldbus Available               |             | EtherNet/IP, PROFINET*  |           |                       |           |                       |           |                       |           |

\* SEMI (Semiconductor Equipment and Materials International) is the central global network of manufacturers of micro and nano electronics that issues safety guidelines. SEMI S2 is the most well-known standard in semiconductor manufacturing equipment for Environmental, Health, and Safety (EHS).

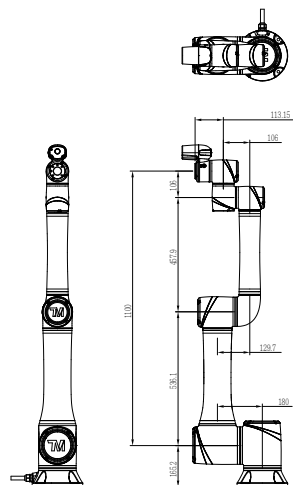
\* A fieldbus upgrade is available for HW3.2 robots with TMflow v1.80 or higher. Contact your local OMRON representative for more information. The fieldbus option is not available for SEMI S2 certified robots.

\* If water-soluble cutting oil is present, use a protective sleeve to prevent damage to the robot housing.

# Technical Data TM12/14



TM12



TM14

\*no-camera version available on request.

## TM12/14 Specifications

| Product Name                     |             | TM12  |           | TM12X                 |           | TM14                  |           | TM14X                 |           |
|----------------------------------|-------------|---|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|
| Power Source                     |             | AC  | DC        | AC                    | DC        | AC                    | DC        | AC                    | DC        |
| Weight (kg)                      |             | 32.8  |           | 32.25                 |           | 32.5                  |           | 32.2                  |           |
| Controller Weight (kg)           |             | 13.8  | 14.5      | 13.8                  | 14.5      | 13.8                  | 14.5      | 13.8                  | 14.5      |
| Max Payload (kg)                 |             | 12  |           |                       |           | 14                    |           |                       |           |
| Reach (mm)                       |             | 1300  |           |                       |           | 1100                  |           |                       |           |
| Mounting                         |             | Wall, Table, Ceiling  |           |                       |           |                       |           |                       |           |
| Typical Speed (m/s)              |             | 1.3   |           |                       |           | 1.1                   |           |                       |           |
| Joint Range                      | Joint 1     | +/- 270°  |           | +/- 360°              |           | +/- 270°              |           | +/- 360°              |           |
|                                  | Joint 2,4,5 | +/- 180°  |           | +/- 360°              |           | ±+/- 180°             |           | +/- 360°              |           |
|                                  | Joint 3     | +/- 166°  |           |                       |           |                       |           |                       |           |
|                                  | Joint 6     | +/- 270°  |           | +/- 360°              |           | +/- 270°              |           | +/- 360°              |           |
| Joint Speeds                     | Joint 1,2   | 120°/s  |           |                       |           |                       |           |                       |           |
|                                  | Joint 3     | 180°/s  |           |                       |           |                       |           |                       |           |
|                                  | Joint 4,5   | 180°/s  |           |                       |           | 150°/s                |           |                       |           |
|                                  | Joint 6     | 180°/s  |           |                       |           |                       |           |                       |           |
| Repeatability (mm)               |             | +/- 0.1   |           |                       |           |                       |           |                       |           |
| IP                               |             | IP54 (robot arm), IP32 (control box), IP40 (robot stick)      |           |                       |           |                       |           |                       |           |
| Cleanroom Class                  |             | ISO Class 3   |           |                       |           |                       |           |                       |           |
| Operating Temperature & Humidity |             | 0 to 50°C, 85% max. (with no condensation)                    |           |                       |           |                       |           |                       |           |
| Storage Temperature & Humidity   |             | -20 to 60°C, 75% max. (with no condensation)                  |           |                       |           |                       |           |                       |           |
| Operating & Storage Environment  |             | No corrosive gases or exposure to water-soluble cutting oil.* |           |                       |           |                       |           |                       |           |
| Motor Power Supply               |             | 100-240 VAC, 50-60 Hz   | 22-60 VDC | 100-240 VAC, 50-60 Hz | 22-60 VDC | 100-240 VAC, 50-60 Hz | 22-60 VDC | 100-240 VAC, 50-60 Hz | 22-60 VDC |
| Robot Arm Cable Length           |             | 3m/12m  | 1.5m      | 3m/12m                | 1.5m      | 3m/12m                | 1.5m      | 3m/12m                | 1.5m      |
| I/O Ports                        | Control Box | Digital In: 16 Digital Out: 16 Analogue In: 2 Analogue Out: 1 |           |                       |           |                       |           |                       |           |
|                                  | Tool        | Digital In: 4 Digital Out: 4 Analogue In: 1 Analogue Out: 0   |           |                       |           |                       |           |                       |           |
| I/O Interface                    |             | COM: 3, HDMI: 1, LAN: 3, USB2.0: 4, USB3.0: 2                 |           |                       |           |                       |           |                       |           |
| Communication                    |             | RS232, Ethernet (master), Modbus TCP/RTU (master & slave)     |           |                       |           |                       |           |                       |           |
| I/O Power Supply                 |             | 24 VDC 1.5 A (control box and tool)                           |           |                       |           |                       |           |                       |           |
| Programming Environment          |             | TMflow, flowchart based                                       |           |                       |           |                       |           |                       |           |
| Integrated Camera Available      |             | 5M pixels, colour   |           |                       |           |                       |           |                       |           |
| SEMI S2 Certified* Available     |             | No  | Yes       | No                    | Yes       | No                    | Yes       | No                    | Yes       |
| Fieldbus Available               |             | EtherNet/IP, PROFINET*  |           |                       |           |                       |           |                       |           |

\* SEMI (Semiconductor Equipment and Materials International) is the central global network of manufacturers of micro and nano electronics that issues safety guidelines. SEMI S2 is the most well-known standard in semiconductor manufacturing equipment for Environmental, Health, and Safety (EHS).

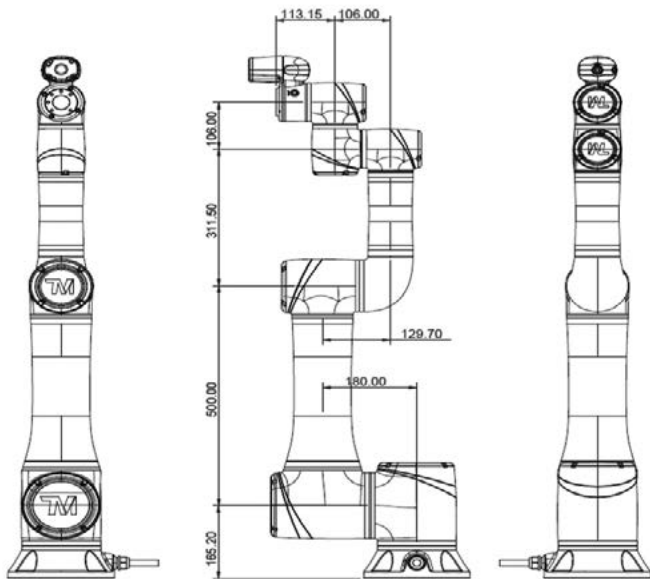
\* A fieldbus upgrade is available for HW3.2 robots with TMflow v1.80 or higher. Contact your local OMRON representative for more information. The fieldbus option is not available for SEMI S2 certified robots.

\* If water-soluble cutting oil is present, use a protective sleeve to prevent damage to the robot housing.



# Technical Data

## TM16



TM16

### TM16 Specifications

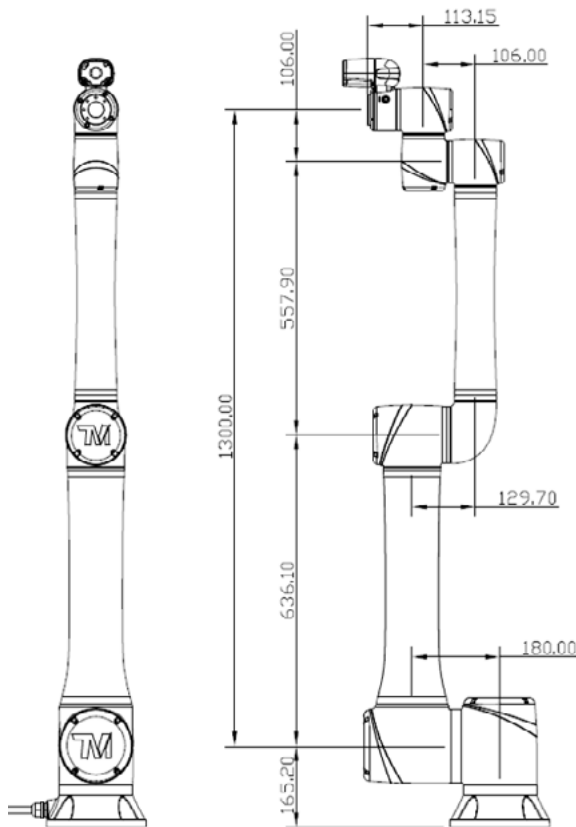
| Product Name                                 |             | TM16  |                  | TM16X                      |              |
|--|-------------|---|------------------|----------------------------|--------------|
| Power Source                                 |             | AC  | DC               | AC                         | DC           |
| Weight (kg)                                  |             | 32  |                  | 32                         |              |
| Controller Weight (kg)                       |             | 14.1  |                  | 14.1                       |              |
| Max Payload (kg)                             |             | 16  |                  |                            |              |
| Reach (mm)                                   |             | 900   |                  |                            |              |
| Mounting                                     |             | Wall, Table, Ceiling  |                  |                            |              |
| Typical Speed (m/s)                          |             | 1.1   |                  |                            |              |
| Joint Range                                  | Joint 1     | +/-270°   |                  | +/- 360°                   |              |
|  | Joint 2,4,5 | +/-180°   |                  | +/-360°                    |              |
|  | Joint 3     | +/-155°   |                  |                            |              |
|  | Joint 6     | +/-270°   |                  | +/- 360°                   |              |
| Joint Speeds                                 | Joint 1,2   | 120°/s  |                  |                            |              |
|  | Joint 3-6   | 180°/s  |                  |                            |              |
| Repeatability (mm)                           |             | +/- 0.1   |                  |                            |              |
| Ingress Protection                           |             | IP 54 (robot arm), IP 32 (control box), IP 40 (robot Stick)                                   |                  |                            |              |
| Cleanroom Class                              |             | ISO Class 3   |                  |                            |              |
| Operating Temperature & Humidity             |             | 0 to 50°C, 85% max (with no condensation)   |                  |                            |              |
| Storage Temperature & Humidity               |             | -20 to 60°C, 75% max (with no condensation)   |                  |                            |              |
| Operating & Storage Environment              |             | No corrosive gases or exposure to water-soluble cutting oil                                   |                  |                            |              |
| Motor Power Supply                           |             | 110 to 240 VAC<br>50/60 HZ  | 22 to 60 VDC     | 110 to 240 VAC<br>50/60 HZ | 22 to 60 VDC |
| Robot Arm Cable Length                       |             | 3 m   | 1.5 m            | 3 m                        | 1.5 m        |
| I/O Ports                                    | Control Box | Digital In: 16; Digital Out: 16; Analog In: 2; Analog Out: 1                                  |                  |                            |              |
|  | Tool Conn.  | Digital In: 4; Digital Out: 4; Analog In:1; Analog Out:0                                      |                  |                            |              |
| Communication                                |             | RS232, Ethernet, Modbus TCP/RTU (master & slave), PROFINET (optional), EtherNet/IP (optional) |                  |                            |              |
| I/O Power Supply                             |             | 24 VDC 2.0 A(control box), 24 VDC 1.5A(tool)  |                  |                            |              |
| Programming Environment                      |             | TMFlow, flowchart based   |                  |                            |              |
| Integrated Camera Available                  |             | 5M Pixels, color  | 5M Pixels, color | None                       | None         |
| SEMI S2 Certification <sup>2</sup> Available |             | No  | Yes              | No                         | No           |

<sup>1</sup> If water-soluble cutting oil is present, use a protective sleeve to prevent damage to the robot housing.

<sup>2</sup> SEMI (Semiconductor Equipment and Materials International) is the central global network of manufacturers of micro and nano electronics that issues safety guidelines. SEMI S2 is the most well-known standard in semiconductor manufacturing equipment for Environmental, Health, and Safety (EHS).

# Technical Data

## TM20



TM20

### TM20 Specifications

| Product Name                                 |             | TM20  |                  | TM20X                      |              |
|--|-------------|---|------------------|----------------------------|--------------|
| Power Source                                 |             | AC  | DC               | AC                         | DC           |
| Weight (kg)                                  |             | 33  |                  | 33                         |              |
| Controller Weight (kg)                       |             | 14.1  |                  | 14.1                       |              |
| Max Payload (kg)                             |             | 20  |                  |                            |              |
| Reach (mm)                                   |             | 1300  |                  |                            |              |
| Mounting                                     |             | Wall, Table, Ceiling  |                  |                            |              |
| Typical Speed (m/s)                          |             | 1.3   |                  |                            |              |
| Joint Range                                  | Joint 1     | +/-270°   |                  | +/- 360°                   |              |
|  | Joint 2,4,5 | +/-180°   |                  | +/-360°                    |              |
|  | Joint 3     |   |                  | +/-166°                    |              |
|  | Joint 6     | +/-270°   |                  | +/- 360°                   |              |
| Joint Speeds                                 | Joint 1,2   | 90°/s   |                  |                            |              |
|  | Joint 3     | 120°/s  |                  |                            |              |
|  | Joint 4     | 150°/s  |                  |                            |              |
|  | Joint 5     | 180°/s  |                  |                            |              |
|  | Joint 6     | 225°/s  |                  |                            |              |
| Repeatability (mm)                           |             | +/- 0.1   |                  |                            |              |
| Ingress Protection                           |             | IP 54 (robot arm), IP 32 (control box), IP 40 (robot Stick)                                   |                  |                            |              |
| Cleanroom Class                              |             | ISO Class 3   |                  |                            |              |
| Operating Temperature & Humidity             |             | 0 to 50°C, 85% max (with no condensation)   |                  |                            |              |
| Storage Temperature & Humidity               |             | -20 to 60°C, 75% max (with no condensation)   |                  |                            |              |
| Operating & Storage Environment              |             | No exposure to corrosive gases or liquids   |                  |                            |              |
| Motor Power Supply                           |             | 110 to 240 VAC<br>50/60 HZ  | 24 to 60 VDC     | 110 to 240 VAC<br>50/60 HZ | 24 to 60 VDC |
| Robot Arm Cable Length                       |             | 3 m or 12 m   | 1.5 m            | 3 m or 12 m                | 1.5 m        |
| I/O Ports                                    | Control Box | Digital In: 16; Digital Out: 16; Analog In: 2; Analog Out: 1                                  |                  |                            |              |
|  | Tool Conn.  | Digital In: 4; Digital Out: 4; Analog In:1; Analog Out:0                                      |                  |                            |              |
| I/O Interface                                |             | COM: 3, HEMI: 1, LAN: 3, USB2.0: 4, USB3.0: 2   |                  |                            |              |
| Communication                                |             | RS232, Ethernet, Modbus TCP/RTU (master & slave), PROFINET (optional), EtherNet/IP (optional) |                  |                            |              |
| I/O Power Supply                             |             | 24 VDC 2.0 A(control box), 24 VDC 1.5A(tool)  |                  |                            |              |
| Programming Environment                      |             | TMFlow, flowchart based   |                  |                            |              |
| Integrated Camera Available                  |             | 5M Pixels, color  | 5M Pixels, color | None                       | None         |
| SEMI S2 Certification <sup>1</sup> Available |             | No  | Yes              | No                         | No           |


<sup>1</sup>SEMI (Semiconductor Equipment and Materials International) is the central global network of manufacturers of micro and nano electronics that issues safety guidelines. SEMI S2 is the most well-known standard in semiconductor manufacturing equipment for Environmental, Health, and Safety (EHS).

### OMRON Asia Pacific Regional HQ

**T** (65) 6835 3011  
**F** (65) 6835 2711  
**E** enquiry-apac@omron.com  
**W** omron-ap.com

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### Australia

**TF** 1300 766 766  
**F** 1300 434 682  
**E** enquiry-au@omron.com  
**W** omron.com.au

### New Zealand

**T** 0800 466 766  
**F** (64-9) 358 4411  
**E** enquiry-nz@omron.com  
**W** omron-ap.co.nz

### Indonesia

**T** (62-21) 2949 7500  
**F** (62-21) 2949 7555  
**E** enquiry-id@omron.com  
**W** omron.co.id

### Malaysia

**T** (60-3) 7688 2888  
**F** (60-3) 7688 2833  
**E** enquiry-my@omron.com  
**W** omron-ap.com.my

### Thailand

**T** (66-2) 942 6700  
**F** (66-2) 937 0501  
**E** enquiry-th@omron.com  
**W** omron-ap.co.th

### Philippines

**T** (63-2) 811 2831  
**F** (63-2) 811 2583  
**E** enquiry-ph@omron.com  
**W** omron-ap.com.ph

### Singapore

**T** (65) 6547 6789  
**F** (65) 6547 6769  
**E** enquiry-sg@omron.com  
**W** omron-ap.com.sg

### Vietnam

**T** (84-28) 3920 4338  
**F** (84-28) 3920 4335  
**E** enquiry-hn@omron.com  
**W** omron.com.vn

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