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.

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

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

TM 5-900
Reach: 900 mm

MAX PAYLOAD 4 Kg

TM 5-700
Reach: 700 mm

MAX PAYLOAD 6 Kg

TM12
Reach: 1300 mm

MAX PAYLOAD 12 Kg

TM14
Reach: 1100 mm

MAX PAYLOAD 14 Kg

TM16
Reach: 900 mm

MAX PAYLOAD 16 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.
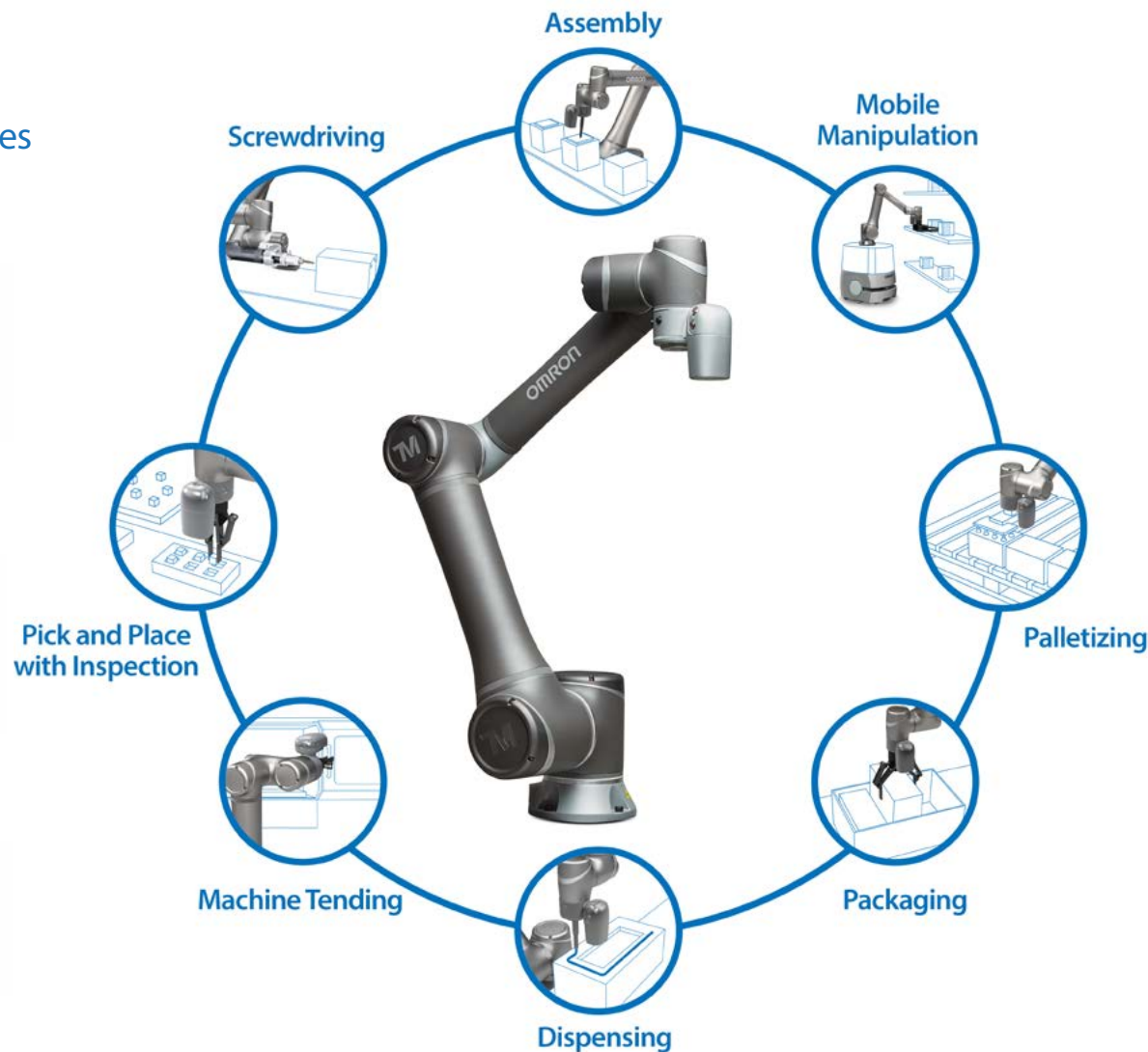
Key Industries

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.
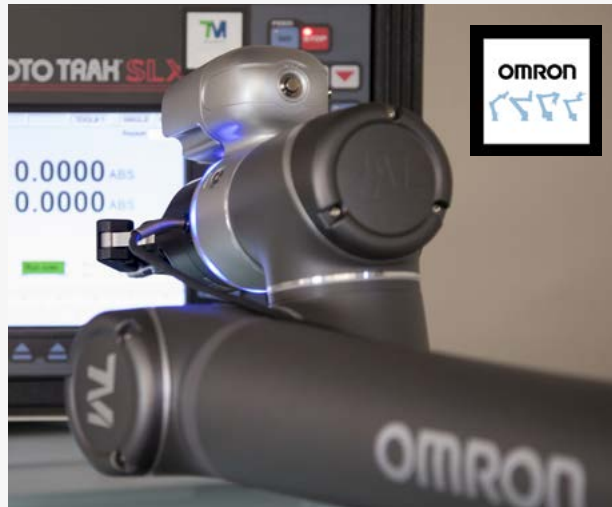

Landmark

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.
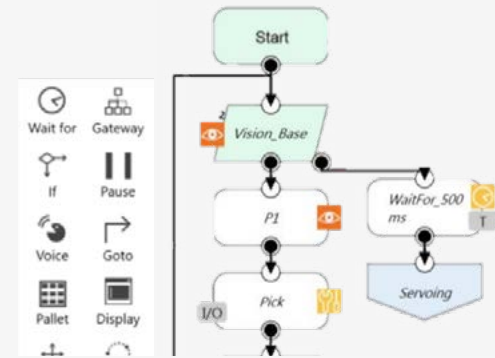
Designed for Flexible Manufacturing

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

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

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

The built-in vision system uses Landmarks that help the cobot 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.
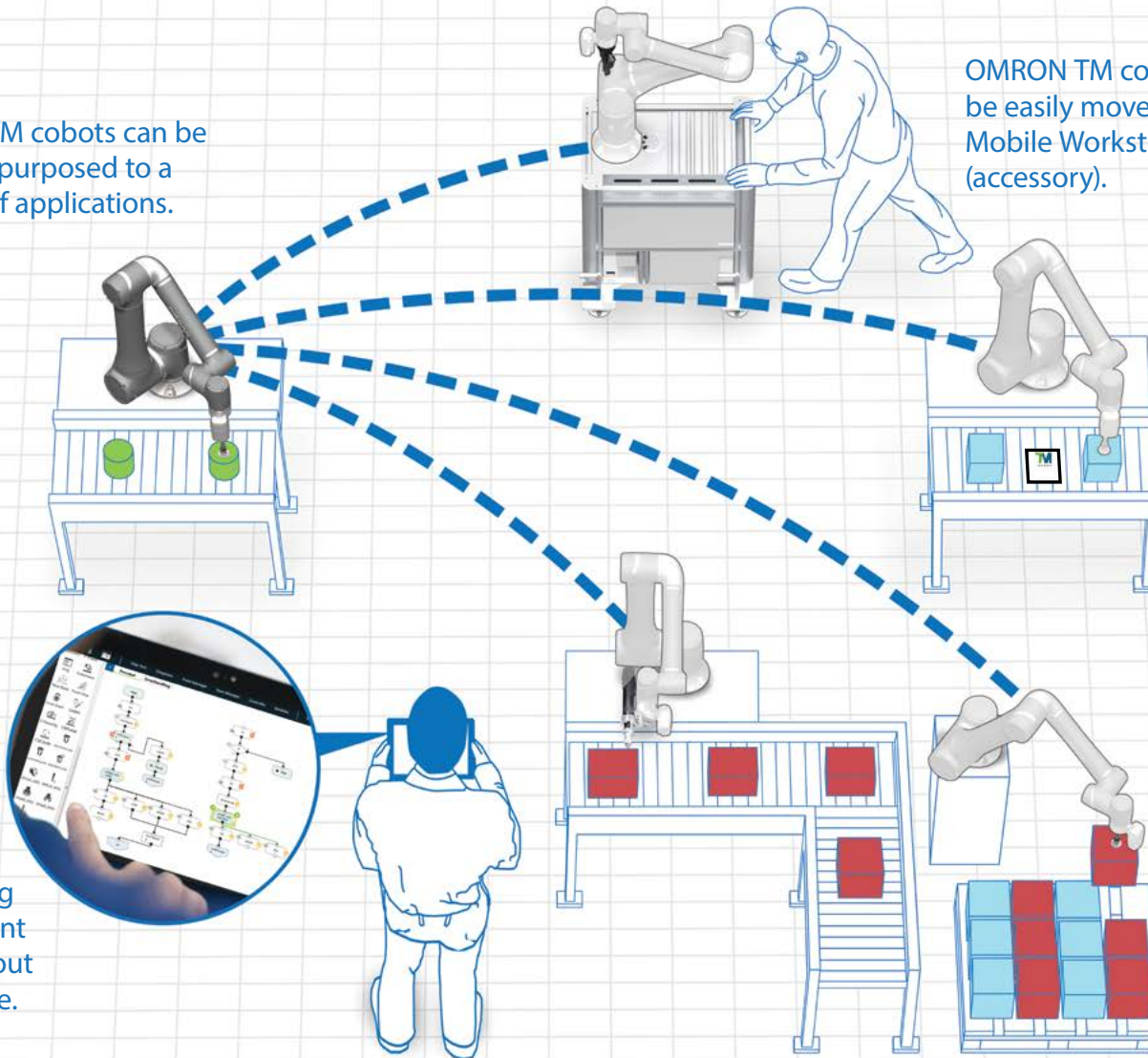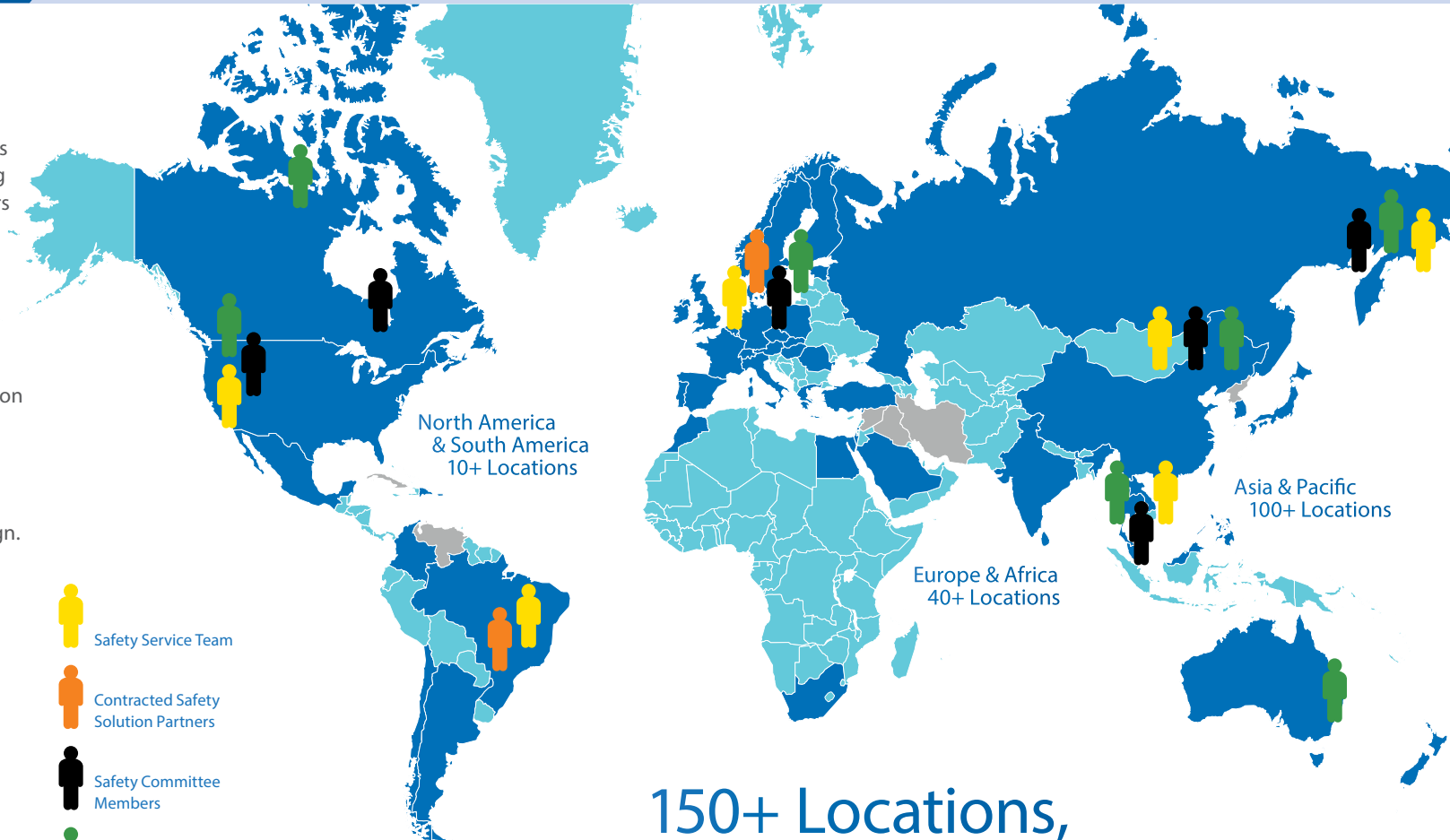
Global Network

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.

North America
& South America
10+ Locations
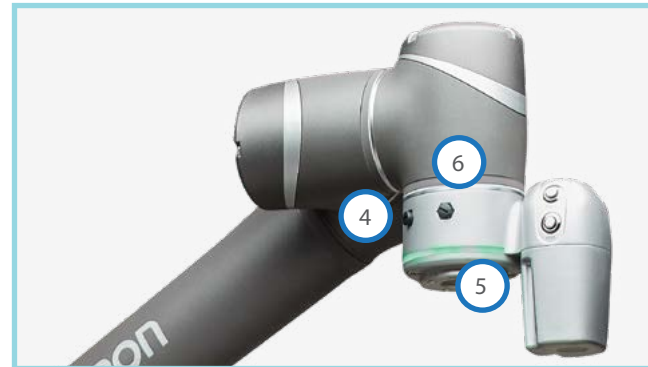
Asia & Pacific
100+ Locations

Europe & Africa
40+ Locations

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

INDUSTRIAL GRADE

STURDY JOINTS

BUILT-IN VISION*

J1
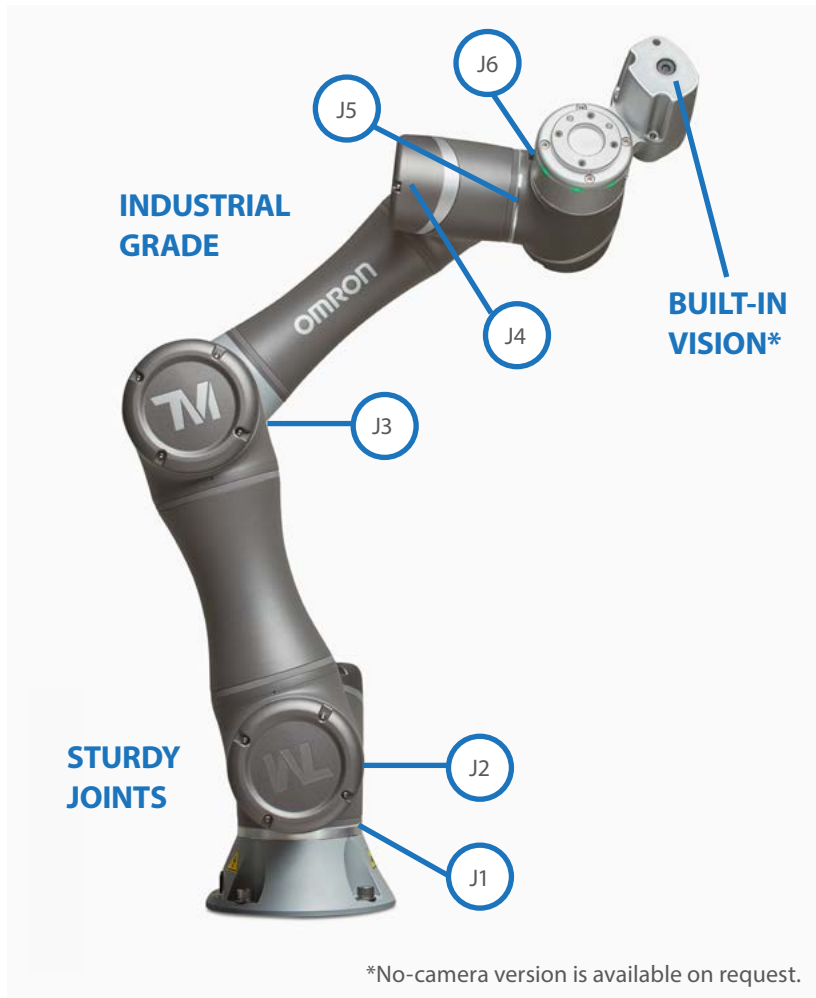J2
J3
J4
J5
J6

*No-camera version is available on request.

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

Built-In Vision

The integrated vision system is the biggest advantage of OMRON TM 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.

PICK AND PLACE

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

GRIPPERS
- 2-Fingers
- Vacuum
- 3-Fingers
- Magnet Gripper

APPLICATIONS
- Screwdriving
- 2D Vision
- Force Sensing
- 3D Bin Picking

OTHERS
- Simulation Software
- Cable Management

CONNECTIVITY
- EtherCAT I/O Expansion
- Modbus to PROFINET Gateway

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.
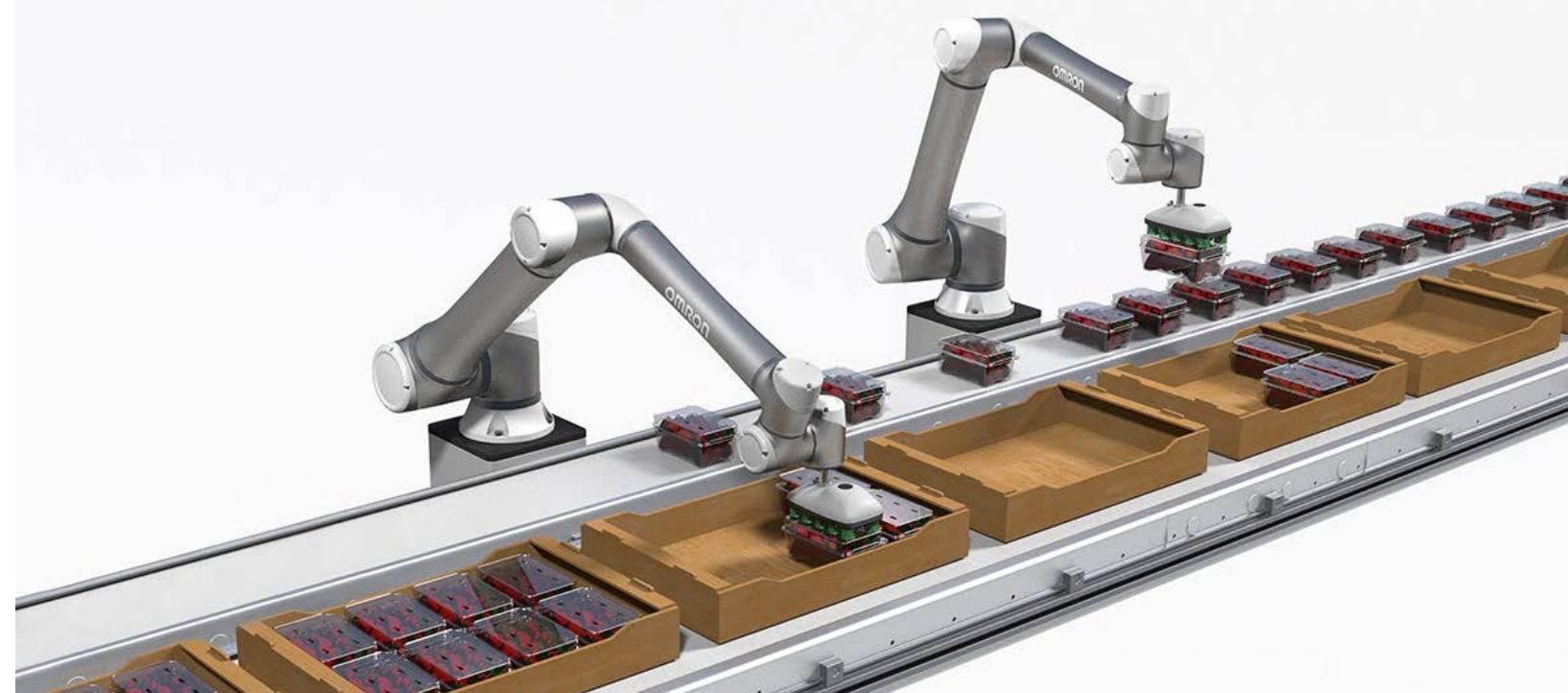
More flexibility and productivity than ever.

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.
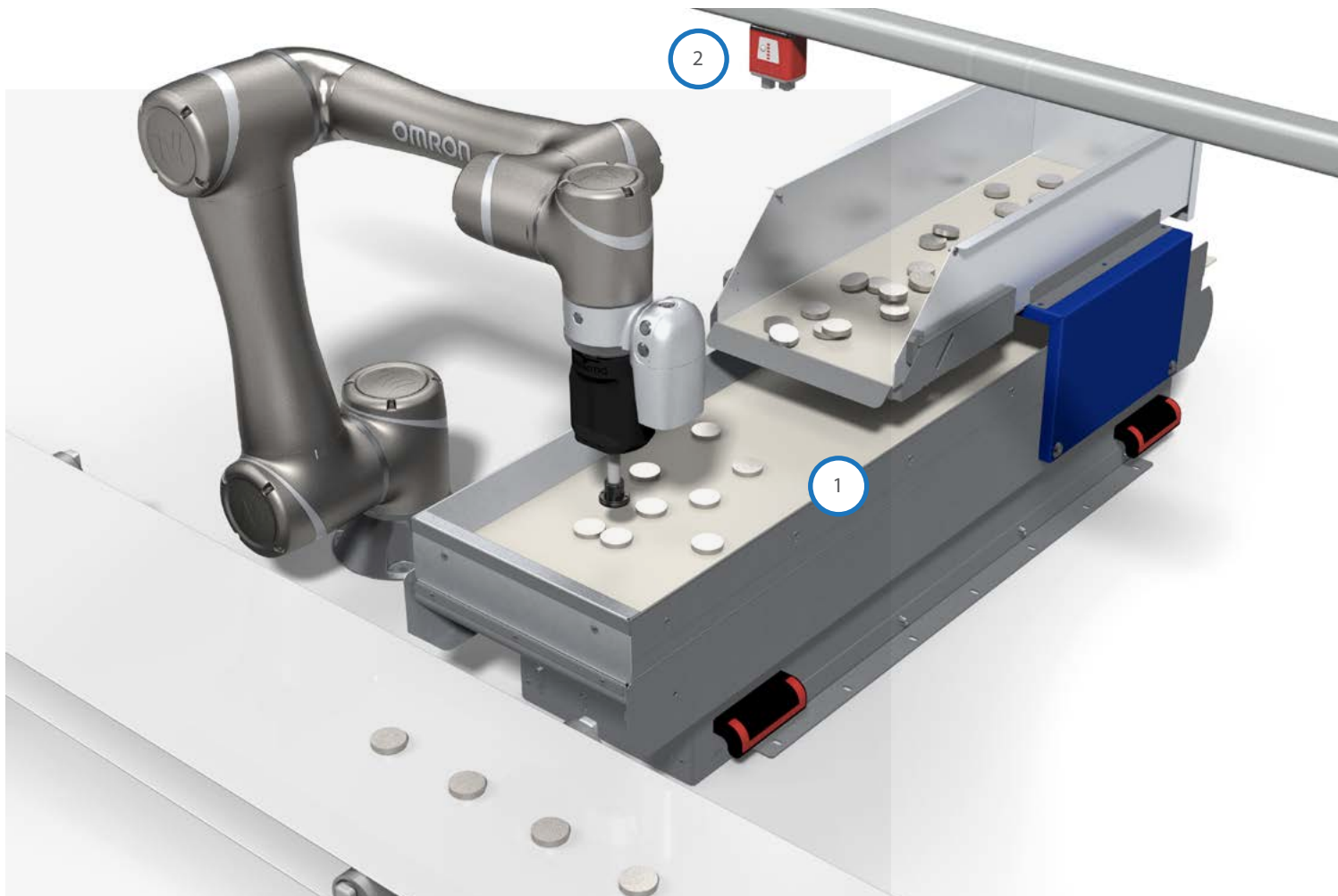
The solution is ideal for:

– 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.

Industrial Robot   Collaborative Robot
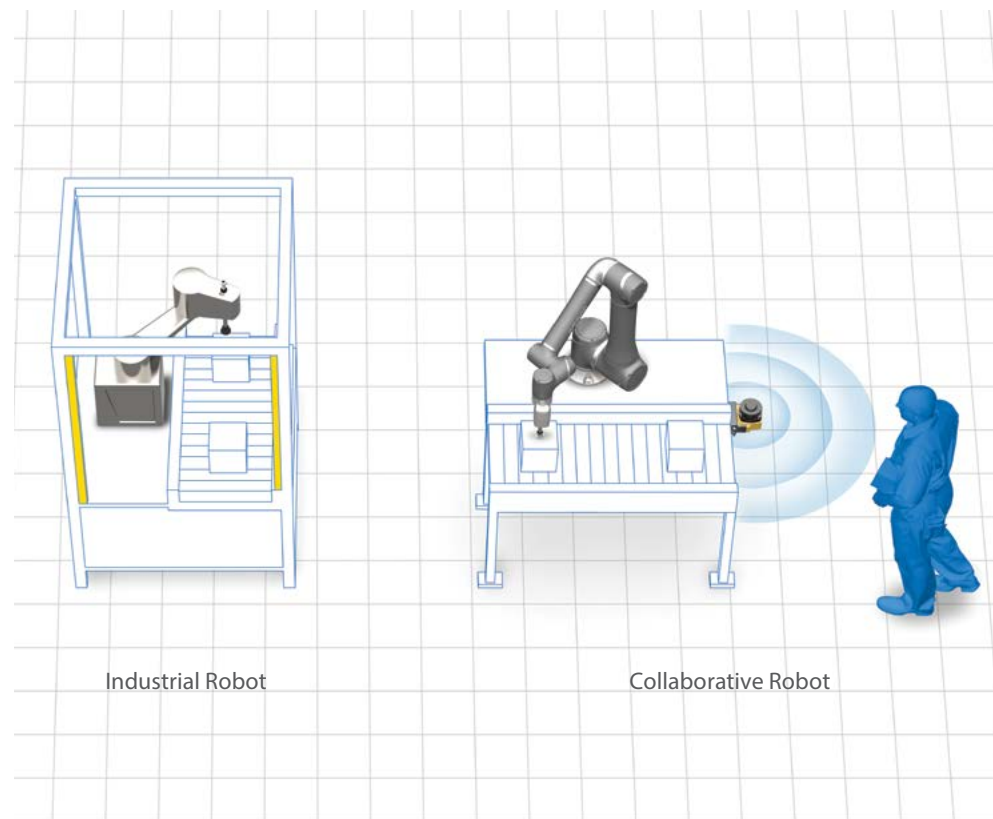
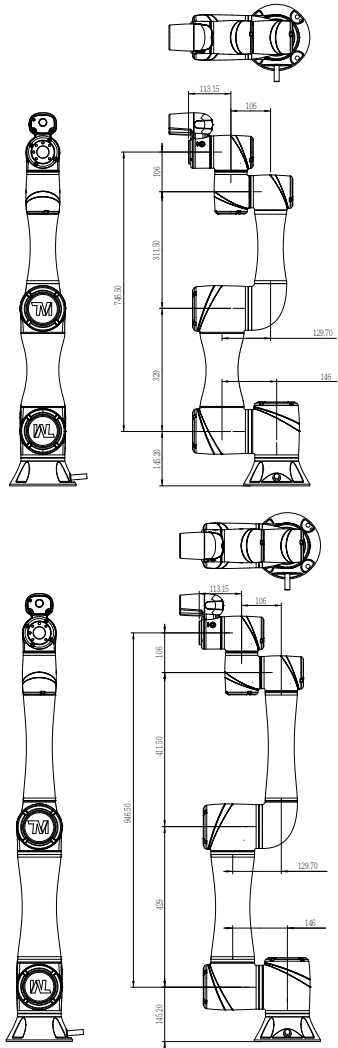|	Traditional Industrial Robots	OMRON Cobots
Safety	Needs a physical barrier, such as a fence or cage, to ensure safety.	Designed to be inherently safe but may need safety sensors to ensure that the application is safe (e.g. OMRON safety laser scanner) based on risk assessment. Typically does not need 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 +/- 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

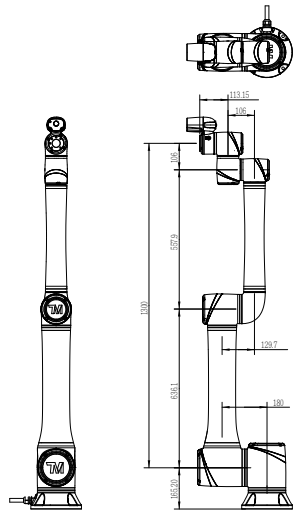*no-camera version available on request.

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
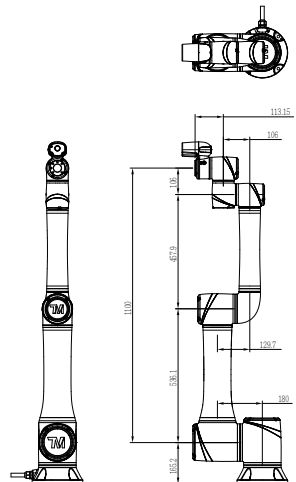
TM14

*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).
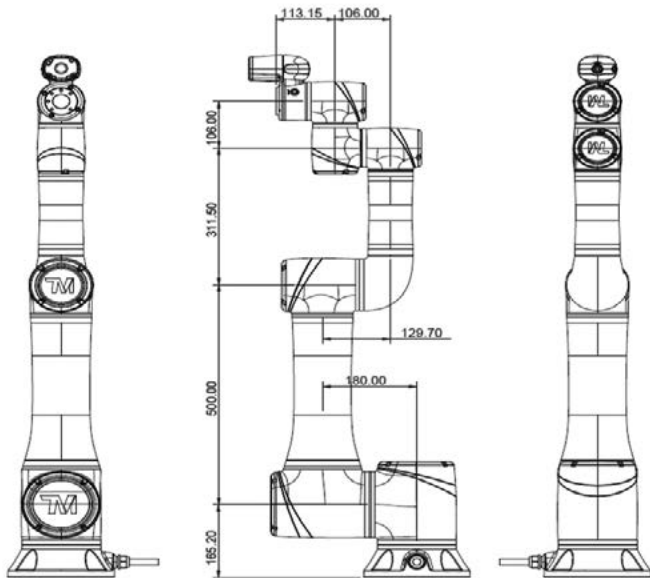* A fieldbus upgrade is available for HW3.2 robots with TMflow v1.80 or higher. Contact your local OMRON representative for more information. The fieldbus option is not available for SEMI S2 certified robots.
* If water-soluble cutting oil is present, use a protective sleeve to prevent damage to the robot housing.
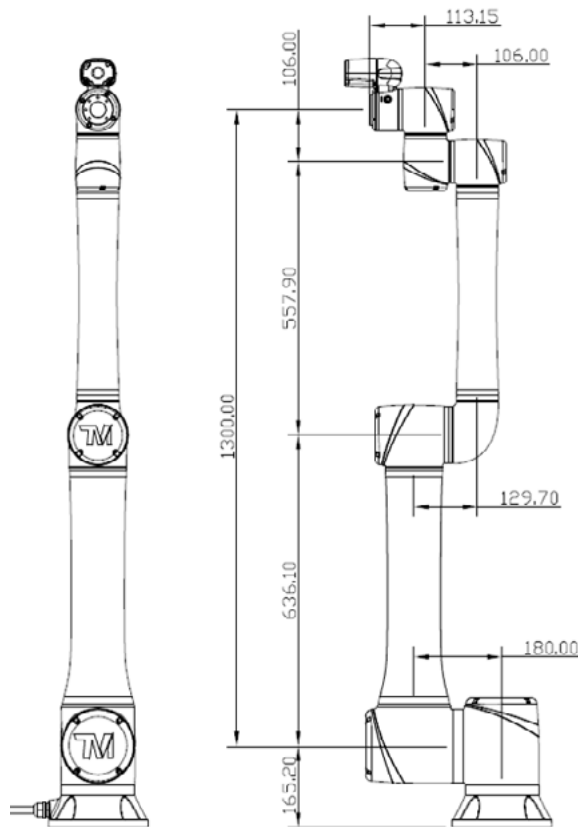
Technical Data
TM16

TM16

TM16 Specifications

		TM16		TM16X	
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 50/60 HZ	22 to 60 VDC	110 to 240 VAC 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[2] Available		No	Yes	No	No

[1] If water-soluble cutting oil is present, use a protective sleeve to prevent damage to the robot housing.
[2] 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 50/60 HZ	24 to 60 VDC	110 to 240 VAC 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[1] Available		No	Yes	No	No

[1]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).

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