

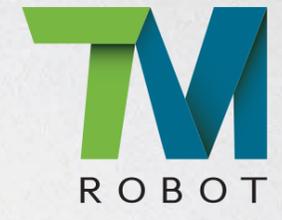
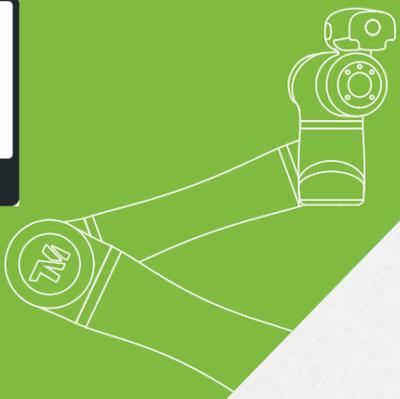


Uchimura Robotics LLC:  
1600 Parkwood Circle SE, Suite 320 Atlanta, GA 30339  
sales@uchimurarobotics.com

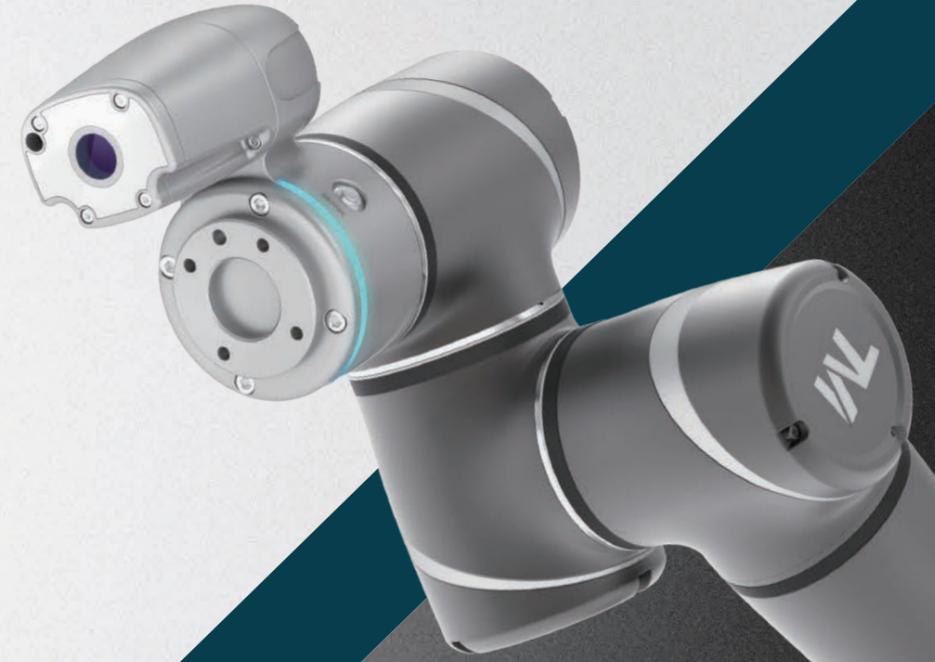
4050 Executive Park Drive Suite 205 Cincinnati, OH 45241  
sales@uchimurarobotics.com  
www.uchimurarobotics.com



Learn More



# TECHMAN ROBOT



### HEADQUARTER

#### TECHMAN ROBOT INC.

4F, No. 188 Wenhua 2nd Rd., Guishan Dist., Taoyuan City, 33383, Taiwan | TEL: +886-3328-8350  
EMAIL: tmsales@tm-robot.com

### SUBSIDIARY COMPANY

#### TECHMAN ROBOT (SHANGHAI) LTD.

Room 402, Building 6, No. 1158 Zhongxin Rd., Songjiang District, Shanghai, 201615, China  
TEL: +86-021-37748058 # 60105 / +86-13621868920 / +86-15002148013  
EMAIL: TRI\_Sales\_China@tm-robot.com

### BRANCH OFFICE

#### SHANGHAI BRANCH OFFICE

No.6, Valley 66 Sanzhuang Rd., Songjiang Export Processing Zone, Shanghai, 201600, China | TEL: +86-021-37748068 #60105

#### CHONGQING BRANCH OFFICE

F0, No. 18 Zongbao Rd., Shapingbai District, Chongqing, 401331, China | TEL: +86-23-88288168 #10351 / +86-17782160499

#### SOUTH-CHINA BRANCH OFFICE

4F, Building B3 Heping Industrial Park, Shitouling, Longhua District, Shenzhen, 518109, China | TEL: +86-136-3260-5790  
EMAIL: tmsales@tm-robot.com / Francine.Chu@tm-robot.com

#### KOREA BRANCH OFFICE

No.904, 99, Centum dong-ro, Haeundae-gu, Busan, 48059, Republic of Korea  
EMAIL: daniel.yun@tm-robot.com | TEL: +82-10-6382-1619



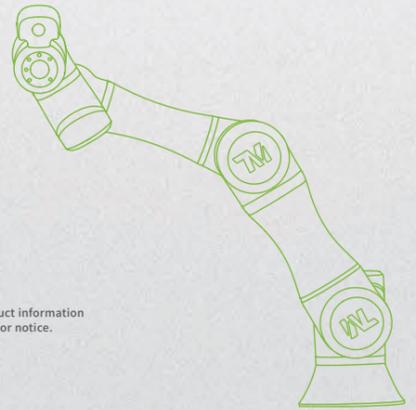
www.tm-robot.com



Socialmedia



Techman Robot |



## Industrial 4.0 Smart factory

- Highly flexible deployment and quick job changeover
- Low integration and maintenance costs

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Ver.19K08EN

# About Us

## Hi! We're Techman Robot.

We are a leading collaborative robot and vision technologies company, dedicated to improving the world of work for businesses and their people through (robotic) technology applications.

We believe that when robotic technology is deployed correctly it can make an extremely positive impact to performance, efficiency and productivity, even creating a lasting positive impact on whole industries. We think that every business should have access to beneficial technology to advance their position.

We are determined to use our experience, knowledge and skills to break boundaries, solve challenges, meet new industry requirements and continue to bring smart, simple and safe solutions to the international market.

At Techman Robot, we close the gap for every business.



## Our Profile

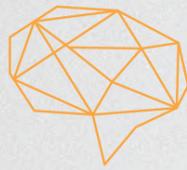
Established in 2016, **Techman Robot** is the only collaborative robot manufacturer based in Taiwan. We offer collaborative robots with **embedded visual systems, software** and **application-based solutions** to the market, through our network of over 100 distributors in China, Europe, Japan, South Korea and Southeast Asia.

Following our launch in 2016, we are now the world's second-largest collaborative robot brand. We have been rapidly expanding into the international market ever since. Due to the high demand, we expanded our factory to 13,000 square meters in early 2019, providing large scale production and ensuring exceptional production quality. We have also established branches in Shanghai, Busan, and multiple overseas sales offices located in Changshu, Shenzhen and Chongqing, offering our global customers localized service to support their smart manufacturing and automation ventures.

Our company's streamlined production process is based locally in Taiwan, covering product research, development, production and manufacturing. With strict manufacturing and quality control in our factories, Techman Robot is known for delivering excellent products, bearing the reputation of "**Made in Taiwan.**" We benefit from the well-established R&D team at our parent company, Quanta Storage, and the global resources of its parent, **Quanta Computer, the world's largest notebook manufacturer.**

Techman Robot has obtained many patents in Taiwan, the United States, and China, with dozens more currently under review. Our industry-leading collaborative robots have also earned recognition from prestigious awards bodies including the **iF Product Design Award, Red Dot Award, Golden Pin Design Award, COMPUTEX d&i Award, and Taiwan Excellence Awards.**





## SMART

### Built-in vision system

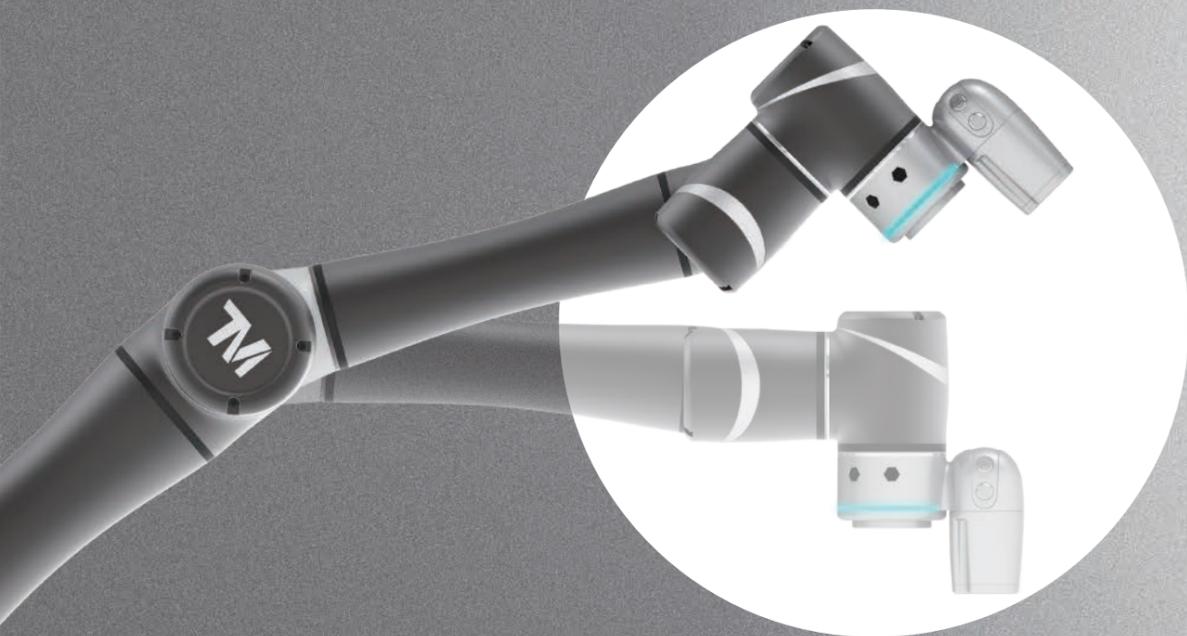
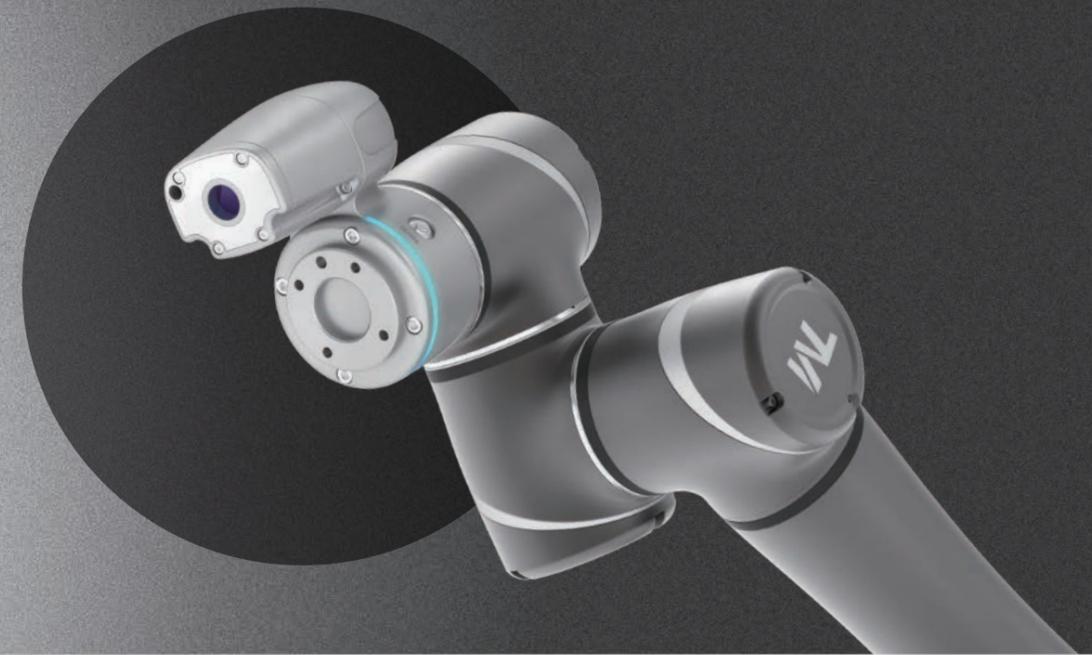
TM Robot is equipped with a built-in vision system, which integrates into both the hardware and software perfectly, whereas traditional add-on vision solutions to robotics are complicated, time consuming and costly to implement.

### Masters in robot vision

Many robot vision functions are already built into our system: pattern matching, object localisation, image enhancement, bar code reading, colour recognition, etc. All these functions have been integrated into our remarkably easy-to-use user interface.

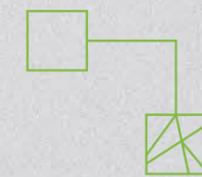
### 5 Minutes to achieve a visual pick & place task

Combining our smart vision system and our hand-guiding functions, everyone, even those without robotic programming experience, can achieve a visual pick & place task within 5 minutes.



### Revolutionary user interface

No more coding! You can implement your TM Robot using our revolutionary simple-to-use interface, an all-graphic flow chart based HMI. Users, even those without coding experience with industrial robots, can learn to use TM Robot easily and quickly. You can program every built-in vision function on the GUI. Furthermore, the traditional heavy umbilical wired pendant is gone. Our user interface can be operated on PCs, notebooks or tablets.



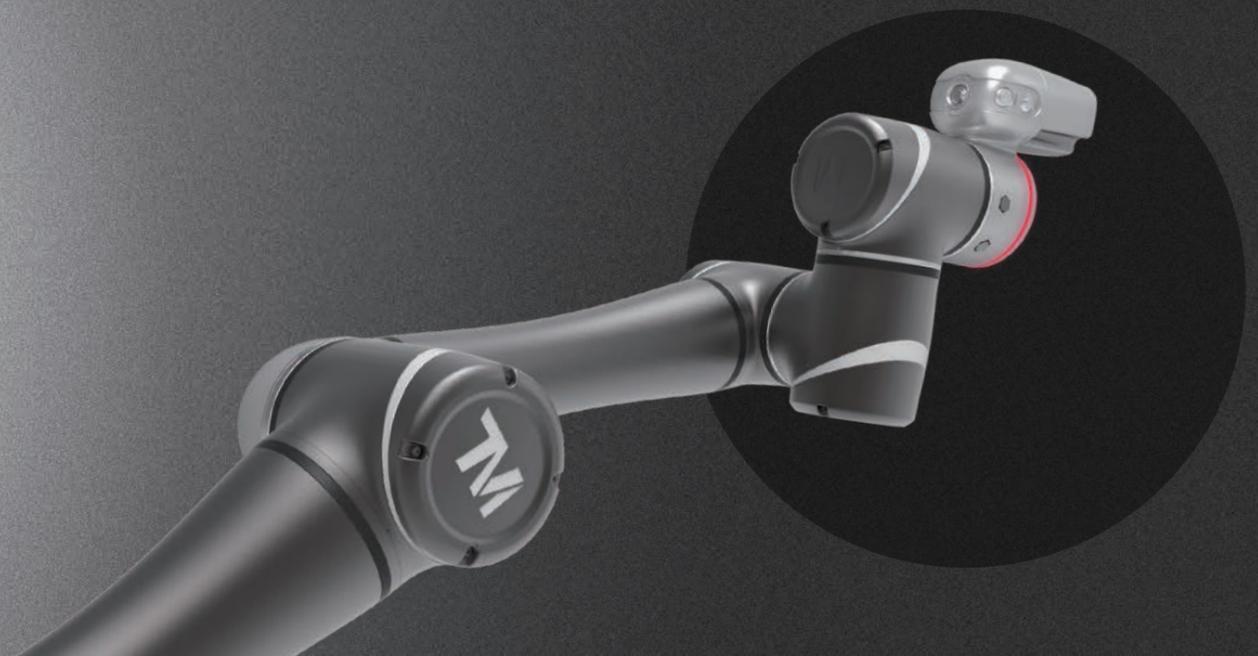
## SIMPLE

### Hand-guide functionality

Another reason TM Robot is more simple to program than the other modern robots is our well designed hand-guiding functions with servo assist. You can lock selected axes to allow adjustment in defined planes and then fine tune the co-ordinates with easy editing of those co-ordinates within the programming package.

### Easy to deploy

Because TM Robot is so simple to program, it is very easily deployed into different applications, reducing your time-to-production and saving your total cost in automation.



## SAFE

### Force limiting

TM Robot complies with the ISO 10218-1:2011 & ISO/TS 15066:2016 human-robot co-operation safety requirements for collaborative robots, allowing the robot to be programmed with both speed and force limits.

### Safety is our priority

TM Robot is serious about safety in every aspect of the design of the whole robot system, through hardware, software and operational design.

### Ergonomic design

TM Robots are physically designed to be safe to their surroundings, soft end caps and no sharp edges are all part of the collaborative experience.

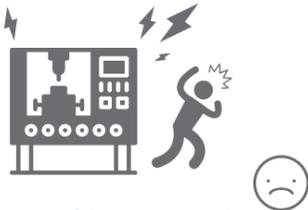
ISO 10218-1:2011 ISO/TS 15066:2016 

# What is the difference between the TM smart collaborative robot and traditional industrial robots?

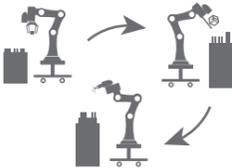


Collaborative robots are designed to be safe to operate around people, working alongside their 'colleagues' without the need for additional safety precautions. Collaborative robots are very easy to program unlike traditional industrial robots that require advanced programming skills, cobots can be given work instructions without coding. TM's range of collaborative robots can achieve human-machine collaboration by combining its safe robotic technology, simple user interface and smart integrated vision system, significantly increasing efficiency and decreasing costs.

**Comparison 1**

<p><b>TM Robot</b></p>  <p>Human-machine cooperation</p>	<p><b>Traditional Robot</b></p>  <p>Human-machine separation</p>
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**Comparison 2**

<p><b>TM Robot</b></p>  <p>Smart and flexible</p>	<p><b>Traditional Robot</b></p>  <p>Single-function</p>
--	---

**Comparison 3**

<p><b>TM Robot</b></p>  <p>Low maintenance costs</p>	<p><b>Traditional Robot</b></p>  <p>High maintenance costs</p>
---	--

## Significant Costs Reduction

### Time Saving

- Built-in smart vision system can be directly customized for visual detection, recognition, and positioning applications without spending time on vision system integration.
- Peripheral products supplied by TM Plug & Play™ partners allow rapid implementation of automated applications that greatly reduces integration time.

### Lower Integration and Equipment Costs

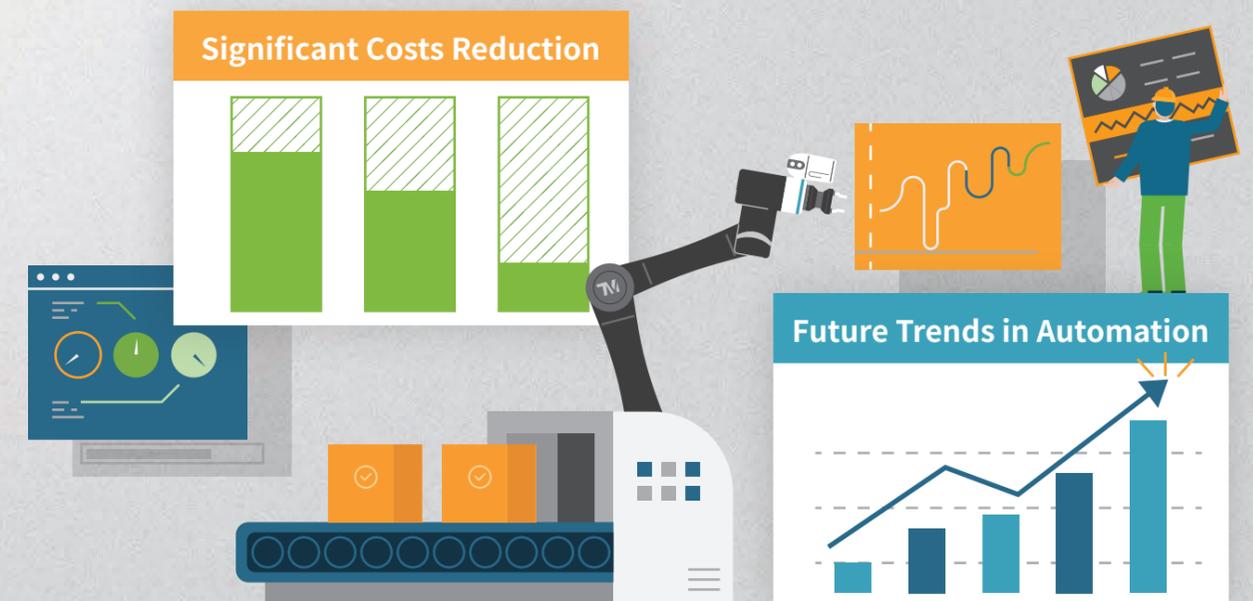
- The built-in smart vision system accelerates production processes so there is no need to spend extra money on integrating a third party vision system.
- Smart vision can identify the location of objects, eliminating the cost of expensive jigs. This will benefit the current trend of low-volume and high variety production.

### Lower Manpower Costs at Every Stage

- Reduce the number of engineers needed for preliminary integration of machine vision and workstation processes.
- The intuitive user interface of TMflow™ is designed to replace complex program coding, and also allows for manual hand-guide teaching.
- Highly intelligent design lowers the overall complexity of automation and reduces after-sales maintenance manpower.

## Fulfill Future Trends

- Built-in smart vision system enables fast and flexible production line reconfiguration to meet the market's demand for low-volume and high variety production.
- TMmanager combined with smart AI decision-making software makes a powerful tool for AI automation. Effective management and analysis of gathered data from robotic arms and factory equipment enables real-time production status monitoring



# TM Robot Series

SEMI S2 ISO 10218-1:2011 ISO/TS 15066:2016 CE

The stand-alone cobot solution offers a variety of payload capacities, reach radius, and a mobile series for automated guided vehicle that can satisfy the needs of different types of industry.

Our collaborative robots solutions are designed smart and simple to provide the optimal performance businesses needs, allowing them to be operated with ease, minimizing the efforts of business and accelerating deployment.

TM Robot Series is also available in the SEMI S2 certified version, suitable for semiconductor industry and is also the best choice for automated guided vehicle applications.



- Reach: **700 mm**
- Payload: **6 kg**



- Reach: **900 mm**
- Payload: **4 kg**



- Reach: **1300 mm**
- Payload: **12 kg**



- Reach: **1100 mm**
- Payload: **14 kg**



## TM5-700 Regular Payload Series TM5-900

- The hand, eye, and brain have traditionally been separate systems for traditional industry robots. TM5 has integrated all three into one robot. The built-in vision system allows the robot to identify different objects, carry out self-calibration, and perform visual tasks. The innovative and intuitive user interface and hand-guide teaching mode makes cobots operations as easy as using a mobile phone for operators.

## TM12 Medium-Heavy Pay load Series TM14

- Our payload capacity exceeds that of other collaborative robots with the same reach on the market. The cobot can move heavy objects weighing up to 12kg (TM12) and 14kg (TM14). The work area of the robot is also expanded due to the long reach radius of the TM12 (1300mm) and TM14 (1100mm). The ease of use allows for high flexibility and rapid re-configuration of production lines. Reducing the deployment and maintenance costs for automation, greatly increases return on investment and production quality for all industries.

## TM5M/TM12M/TM14M Mobile Series

- TM Robot's mobile series can be powered by DC power. The integrated DC power circuitry is compatible with all AGR/MR brands, making it the best combined solution for cobots and AGV machine. The TM Landmark function of the vision system makes accurate positioning easy in 3D, and is suitable to use with mobile palletizing and machine tending applications.

# Industry Application

## Pick & Place

TM Robot can independently complete pick & place applications with the aid of our built-in smart vision system. Its high flexibility in deployment schedule helps you improve your productivity across the factory.



Pick & Place

## Assembly

The exclusive TM Landmark technology uses smart vision to accurately locate and assemble parts. It can also be used with TM Plug & Play™ force control sensors to help assemble more sophisticated parts and components.



Assembly

## Smart Palletizing

The smart vision system can accurately identify and automatically correct the location of objects and pallets. The innovative TMflow™ also provides users to do quick program editing.



Smart Palletizing

## Quality Inspection

TM Robot's smart vision system can be used with the optional TMvision™ function to carry out automated optical inspection, for monitoring product quality, and reduce the risk of human errors.



Quality Inspection

## Glue Dispensing

TM Robot is a cobot that supports rapid production line re-configurations, which is especially suitable for manufacturing low-volume but high-variety production. Third-party software can also be implemented to allow gluing on curved surfaces.



Glue Dispensing

## Screw Driving

The built-in vision system can accurately locate every screw position, and can also be combined with force sensors to ensure the assembly of every screw and component during the production process.



Screw Driving

## Polishing & Deburring

The force sensors from TM Plug & Play™ partners can be used to control the polishing process, with third-party programming software, it can also be used to operate polishing and deburring of complex curved surfaces.



Polishing & Deburring

## Machine Tending

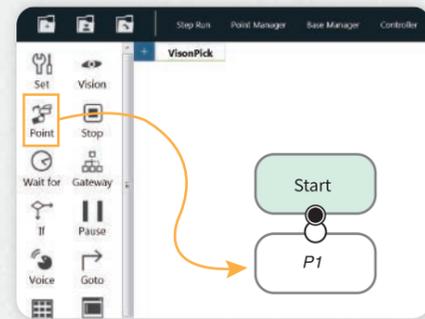
It is easy to teach the robot to perform visual tasks, and you can also quickly integrate robots to the material production machine. It can complete the material loading and unloading application quickly, and also have high flexibility to deploy incoming materials.



Machine Tending

# TMflow™

Developed by Techman Robot, TMflow™ Is our Innovative flow-based robot editing software. Each function is shown as a different image and features intuitive click and drag methods. Users without coding experience of industrial robots can complete a visual pick & place program in as little as 5 minutes.



- All-graphic procedure flow
- Simply click and drag image to easily complete robot program editing

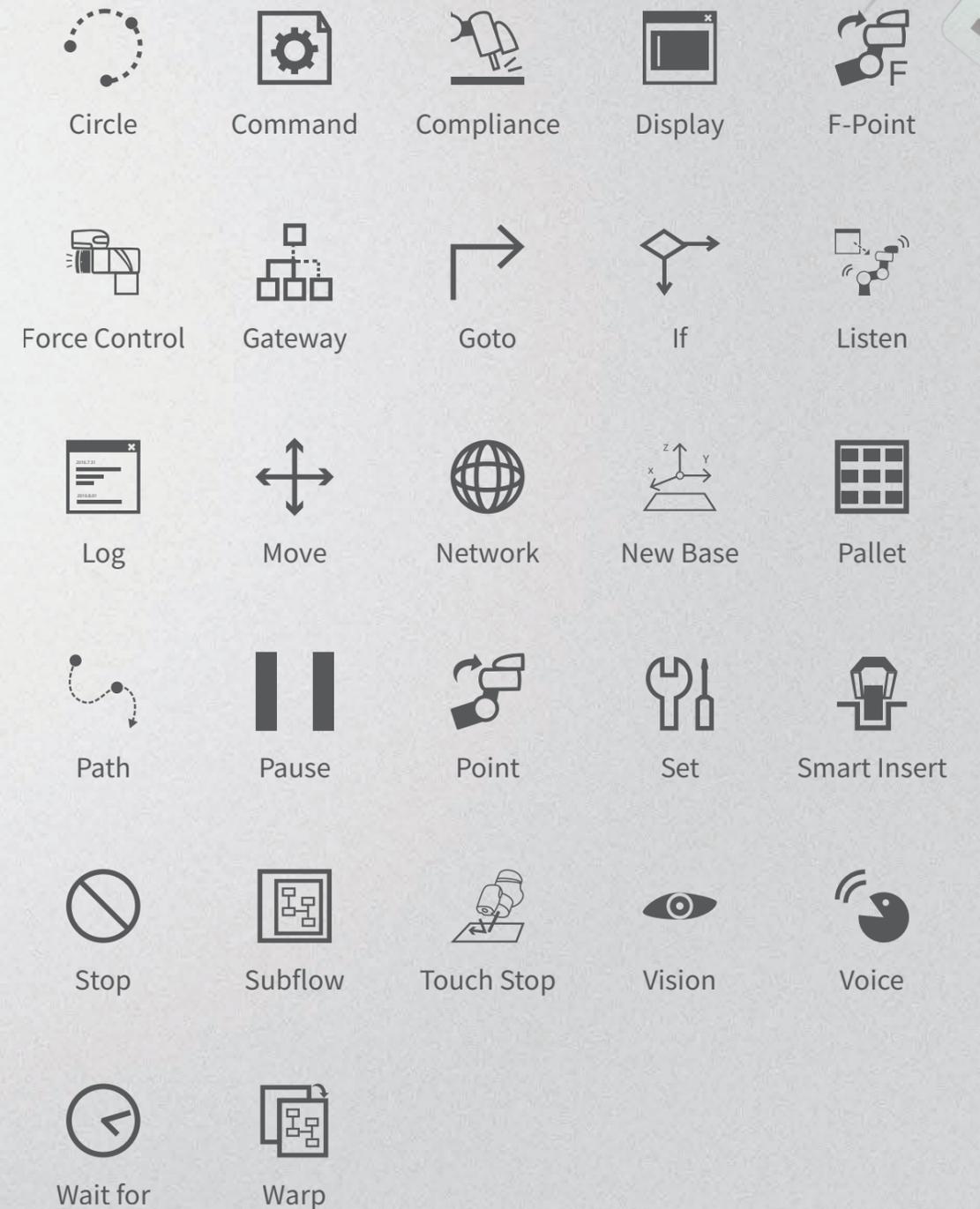
## TM Component Editor™

TM Component Editor™ provides developers with components compiled by TMflow™ projects as independent nodes for users to compose with other projects easily or for applications in parallel developments with simplified data density.



## NODE

Provide a variety of nodes, allowing users to quickly and easily task programming.



# TMvision™

Tmvision™ is a software built-in feature of TM Robot. The software comes in two functions: Standard and Licensed. The Standard function supports most robot applications, while the Licensed function consists of separate modules that may be purchased as needed.

Tmvision™ comes with such functions as feature identification, object location, enhance mode, barcode identification and color classifier. These diversified functions have been integrated into TMflow™'s robot control system for you to set up the robot tasks by defining setup steps.

## Standard module

### Item detection module (Find)



**Template matching (shape-based pattern matching):** use the item's shape characteristics to find its location on the image.



**Position alignment (fiducial-mark matching):** use two points on the target for positioning



**Template matching (image-based pattern matching):** use the item's pixel value distribution to find its location on the image.



**Irregular item detection (blob finder):** use the item and background color difference to find the foreground item.



Change home coordinates of object detection by manually adjusting the anchor point.

### Image enhancement module (Enhance)



Contrast enhancement is used to adjust image contrast



Morphology can turn lines thicker or thinner, patch holes, or break apart lines



Image smoothing



Color plane extraction can extract specific color planes such as red, blue, green, or saturation



Image thresholding converts the image into black and white



Image flipping

### Image Identify Module (Identify)



Read the barcode, the 2D DataMatrix, or the QR code.



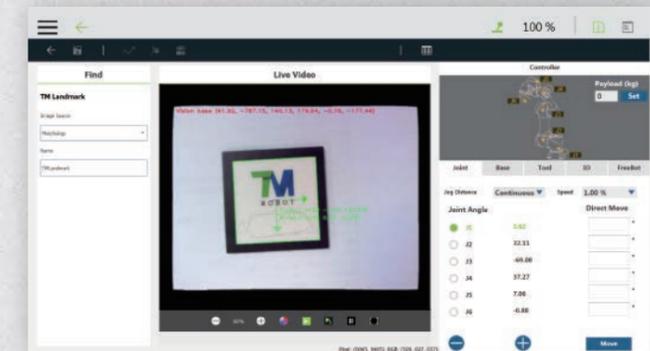
Color classifier



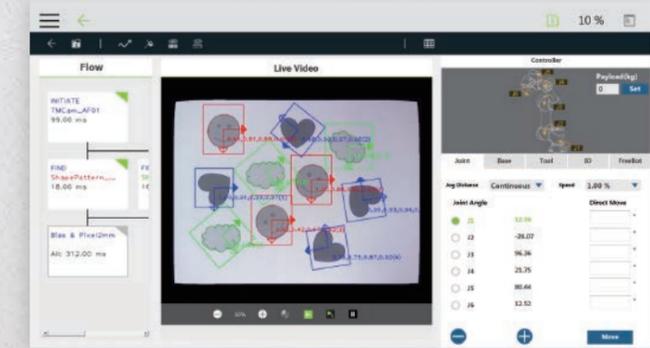
String Match

## Built in vision system

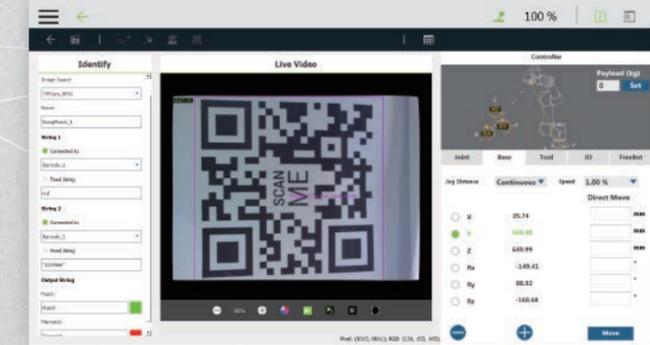
### TM Landmark



### Template matching

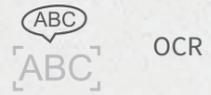


### Barcode reading



## Software License

### TM OCR



OCR



Number OCR

### TM Identify & Measure Module



Pose Variation (Shape)



Pose Variation (Image)



Specific Color Area Size



Subtract Reference Image



Line Burr



Circle Burr



Count (Irregular Object)



Count (Shape)



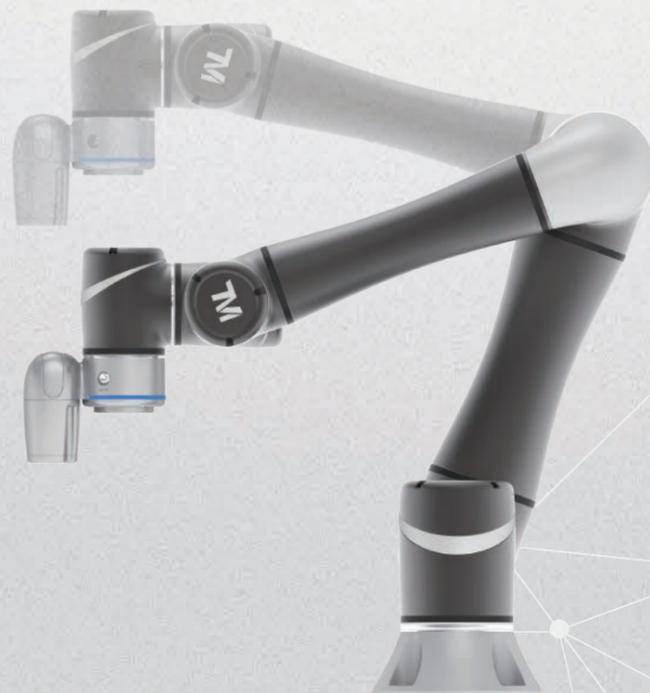
Count (Image)



Edge Count

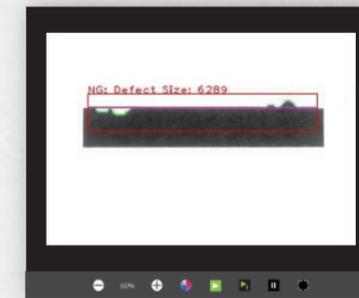


Distance and Angle Measurement

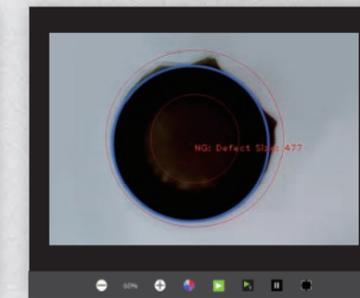


## Built in vision system

### Quality Identification

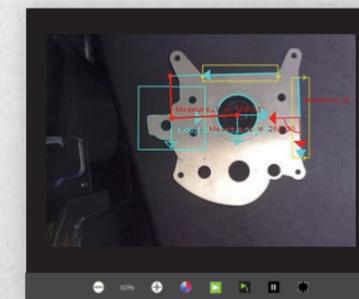


Identify: Line Burr

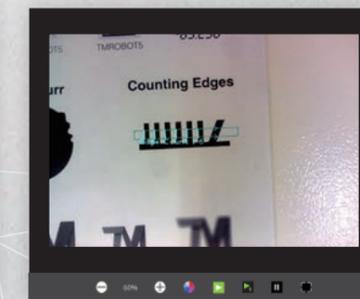


Identify: Circle Burr

### Counting and Gauge



Gauge: Pixel Distance or Angle



Counting (Edges)



Counting (Blob)

# Case Study

## Greater Assembly Output and Efficiency in the Electronics Industry

Techman Electronics' Thailand factory specializes in the processing, assembly, and production of hard disk drives. There are two U-shaped production lines for gluing, and eighteen production lines for system assembly, which all require large amounts of manpower for assembly operations. The biggest challenge they faced is to improve assembly and production efficiency. Highly automated factory management is also essential to meet the requirements of low-volume and high-variety production.

Hsing-Min Lin, the Factory Manager at Techman Electronics, said: "TM Robot with integrated smart vision can be used for fully automated optical inspections. In addition to massive savings on peripheral jigs, they also saved the time and manpower that would have been spent on integration, while ensuring comprehensive inspection quality. Workstations that can be moved around at any time are also very suitable for low-volume and high-variety products. These were all factors that made the implementation of TM Robot attractive to us."

- Number of TM Robot used : **30+**
- Implementation Time: **6** months, and **80%** of the costs has already been recouped



## Introduced Applications

### Automatic Pick & Place

Image recognition technology is used to establish a routing database. The cobot follows the route set out in the database to perform the pick and place functions.



### Automatic Labeling

The learning mode in TMflow™ can be easily used to establish a routing database, so the cobot can follow the route set in the database to help perform automatic labeling in the product line.



### Automatic Optical Inspection

The cobot's arm and smart vision system can work together to perform automatic optical inspections of produced goods.



Case study



# Case Study

## Integrated Smart Vision for Automatic Feeding Boosts Machine Center Production Efficiency

ITEQ Engineering, a system integrator of the Netherlands distributor Valk Welding combined TM12 with its own ILOAD C.12.01 workstation, a loading and unloading station for cnc machine. This implementation automates all steps of the machining process including pick & place, feeding, unloading, and processing. This automated process greatly lowers labor costs and boosts productivity, since you can keep your machine running in the night or weekend for unmanned hours.

According to ITEQ Engineering, using TM Robot for the loading/unloading machine helps boost the flexibility and efficiency of machining, testing, and factory operations.

The ILOAD C.12.01 workstation is equipped with a drawer system where rough and machined workpieces are stored. Parts can be precisely picked out by TM Robot's smart vision system for rapid loading/unloading. The feed can therefore be deployed in a highly flexible manner. TM12 supports can also be mounted on either sides of the workstation, so that the robot's location can be changed according to the production requirements.

- TM Robot Model Used: **TM12**
- Cost of investment recouped within **4-6** months



The strong connection

<https://www.valkwelding.com>



vision with robots

<https://vwco.eu/>

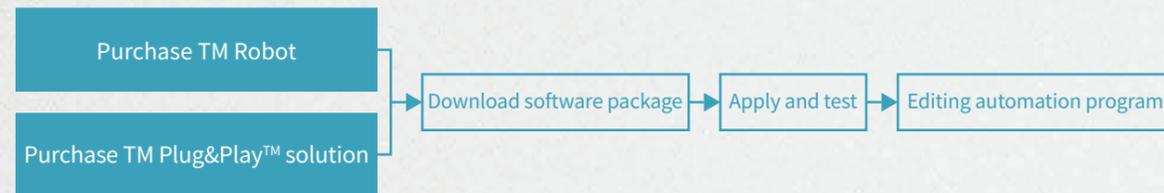


# TM Plug&Play™ solution



With the help of TM Plug&Play™, TM Robots can connect to multiple robotic peripheral products available on the market. TM Plug&Play™ is available as standard allowing users to easily integrate third party peripherals to the robot, considerably reducing time and cost.

## Start to use within five minutes



## Simple, efficient, and fast production line introduction

**Software package**

**Hardware package**

Grip

Release

Screw Plug&Play example

## TM certified, perfect integration, and usable upon installation

TM Robot works with peripheral equipment vendors to co-build a comprehensive TM Plug&Play™ eco system. Each certified TM Plug&Play™ product has been calibrated and tested by TM Robot and peripheral equipment vendors. This ensures that users receive the optimal user experience and the most reliable robot operating quality.

TOYO CHG2-S30-002	SCHUNK Gripping System for TM WSG-25	SCHUNK Gripping System for TM - WSG32	SCHUNK Gripping System for TM - WSG50	SCHUNK EGP 40	SCHUNK Co-act
ROBOTIQ Adaptive Gripper 2-Finger 85/140 TM Kit	ROBOTIQ Adaptive Gripper Hand-E TM-KIT	ROBOTIQ EPick	ROBOTIQ Airpick	Schmalz ECBPi	HIWIN STG-16-TM
HIWIN XEG-16-TM	HIWIN XEG32-TM	HIWIN XEG-64-TM	HIWIN SEG-04-TM	HIWIN SEG-24-TM	ATI Force Sensor
AUTOMAPPS Offline Programming Software for TM	KILEWS Screwing Solution	BASLER Industrial Camera	Robotiq FTS-300 TM-KIT	WACOH QRS-W200-K101-KIT	ADLINK EtherCAT I/O Expansion Modules
ADVANTECH Serial Device Server	ADVANTECH Modbus to PROFINET Gateways	Weidmüller u-remote	ZLÍN UMS	igus 3D e-chain TM Kit	Murrplastik FHS-C-Set
Murrplastik FHS-RS-Set	Murrplastik FHS-SH-Set	Murrplastik FHS-UHE-Set	NABELL Robot-Flex	More Information on <a href="http://www.tm-robot.com">www.tm-robot.com</a>	

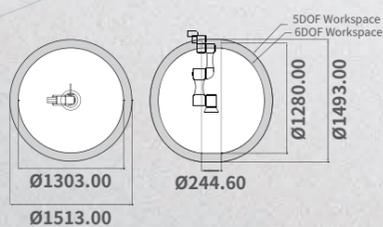
# Specification

## TM5-700 Regular Payload Series TM5-900

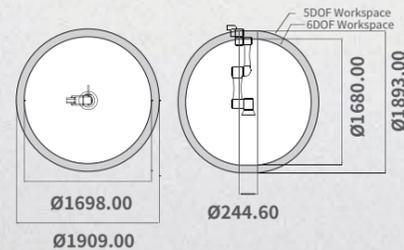
SEMI S2 ISO 10218-1:2011 ISO/TS 15066:2016 CE



### Operating Area



TM5-700, TM5M-700



TM5-900, TM5M-900

Model	TM5-700	TM5-900	TM5M-700	TM5M-900
Weight	22.1kg	22.6kg	22.1kg	22.6kg
Maximum Payload	6kg	4kg	6kg	4kg
Reach	700mm	900mm	700mm	900mm
Typical Speed	1.1m/s	1.4m/s	1.1m/s	1.4m/s
Joint ranges	J1,J6	+/- 270°		
	J2,J4,J5	+/- 180°		
	J3	+/- 155°		
Speed	J1,J2,J3	180°/s		
	J4,J5,J6	225°/s		
Repeatability	+/- 0.05 mm			
Degrees of freedom	6 rotating joints			
I/O Ports	Control Box	Digital In: 16 Digital Out: 16 Analog In: 2 Analog Out: 1		
	Tool Conn.	Digital In: 3/4 (by Regional Model) Digital Out: 3/4 (by Regional Model) Analog In: 1 Analog Out: 0		
I/O power supply	24V 1.5A / 2.0A for control box (by Regional Model) 24V 1.5A for tool			
IP classification	IP54 (Robot Arm); IP32 (Control Box)			
Power Consumption	Typical 220 watts			
Temperature	The robot can work in a temperature range of 0-50°C			
Power supply	100-240 VAC, 50-60 Hz		24/48/22-60 VDC (by Regional Model)	
I/O Interface	3×COM, 1×HDMI, 3×LAN, 4×USB2.0, 2×USB3.0, 1×VGA (by Regional Model)			
Communication	RS232, Ethernet, Modbus TCP/RTU (master & slave)			
Programming Environment	TMflow, flowchart based			
Certification	CE (by Regional Model), SEMI S2 (Option)			
Variation Models	X: without hand eye camera, SEMI: SEMI S2 certified			
<b>Robot Vision</b>				
Eye in Hand (Built in)	1.2M/5M pixels, color camera			
Eye to Hand (Optional)	Support Maximum 2 GigE cameras*			

\*Refer to the official website of TM Plug&Play for camera models compatible to TM Robot.

# Specification

## TM12 Medium-Heavy Payload Series TM14

SEMI S2 ISO 10218-1:2011 ISO/TS 15066:2016 CE



### Operating Area



Model	TM12	TM14	TM12M	TM14M	
Weight	32.8kg	32.5kg	32.8kg	32.5kg	
Maximum Payload	12kg	14kg	12kg	14kg	
Reach	1300mm	1100mm	1300mm	1100mm	
Typical Speed	1.3m/s	1.1m/s	1.3m/s	1.1m/s	
Joint ranges	J1	+/- 270°			
	J2,J4,J5	+/- 180°			
	J3	+/- 166°	+/- 163°	+/- 166°	+/- 163°
	J6	+/- 270°			
Speed	J1,J2	120°/s			
	J3	180°/s			
	J4,J5	180°/s	150°/s	180°/s	150°/s
	J6	180°/s			
Repeatability	+/- 0.1 mm				
Degrees of freedom	6 rotating joints				
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 power supply	24V 2.0A for control box and 24V 1.5A for tool				
IP classification	IP54 (Robot Arm); IP32 (Control Box)				
Power Consumption	Typical 300 watts				
Temperature	The robot can work in a temperature range of 0-50°C				
Power supply	100-240 VAC, 50-60 Hz		22-60 VDC		
I/O Interface	3×COM, 1×HDMI, 3×LAN, 4×USB2.0, 2×USB3.0				
Communication	RS232, Ethernet, Modbus TCP/RTU (master & slave)				
Programming Environment	TMflow, flowchart based				
Certification	CE, SEMI S2 (Option)				
Variation Models	X: without hand eye camera, SEMI: SEMI S2 certified				
<b>Robot Vision</b>					
Eye in Hand (Built in)	1.2M/5M pixels, color camera				
Eye to Hand (Optional)	Support Maximum 2 GigE cameras*				

\*Refer to the official website of TM Plug&Play for camera models compatible to TM Robot.