TM AI COBOT

www.tm-robot.com

Social media

Techman Robot

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TM ROBOT



The future is here,

TM AI COBOT

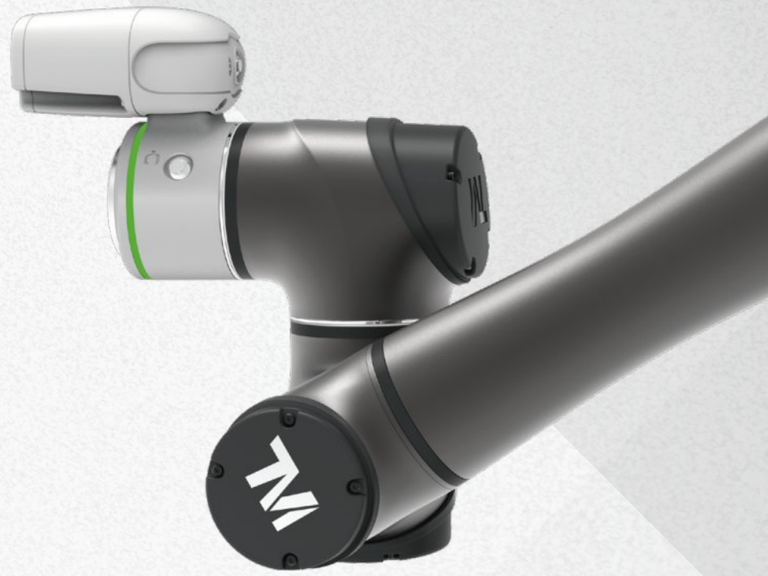
Native AI engine + Robotic arm + Vision system

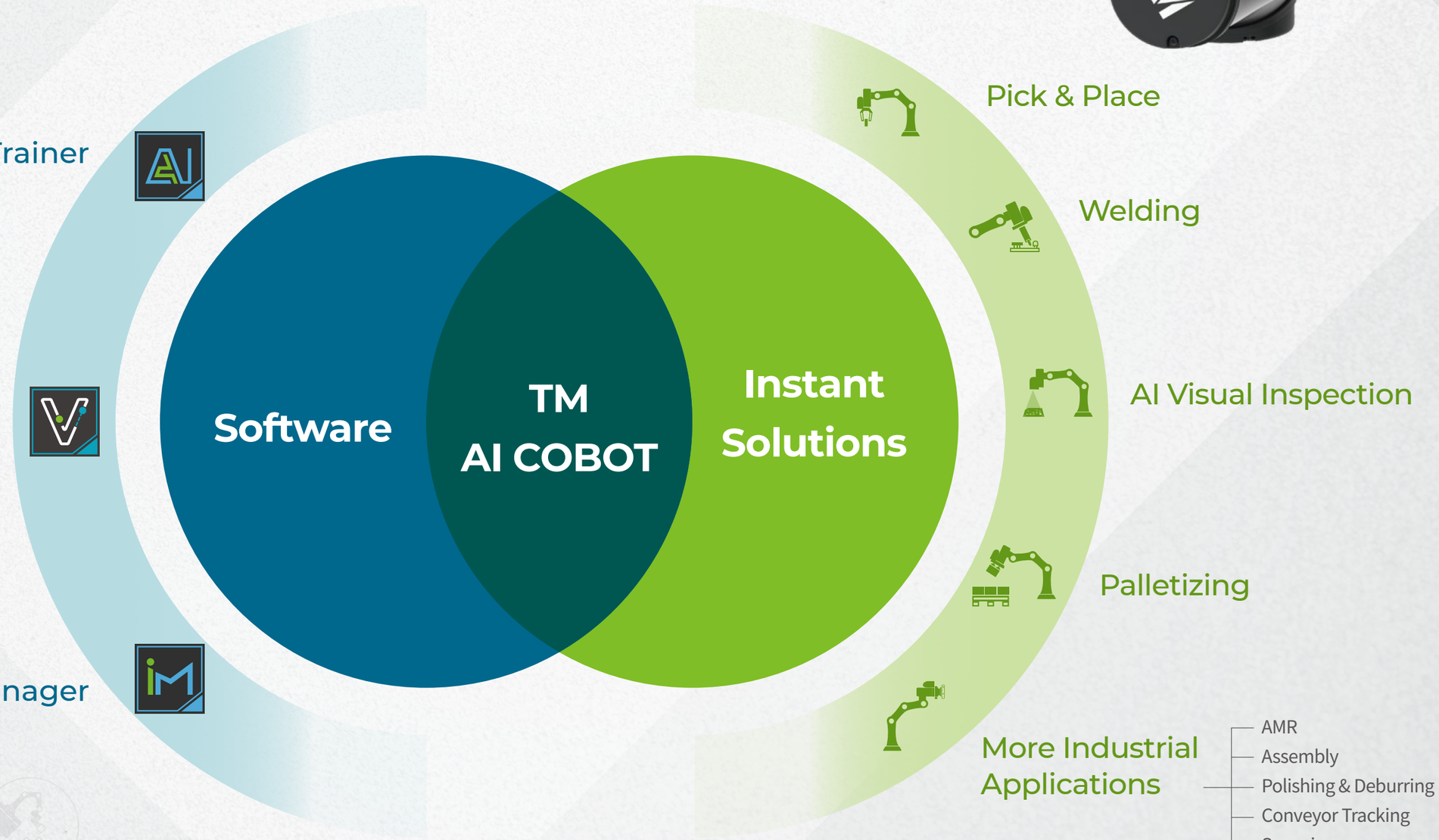
All in **ONE**

What Is An AI Cobot?

AI Cobot is a collaborative robot that seamlessly blends three technological domains together - AI, Vision, and Cobot. This integration effectively combines the functions of a 'brain,' 'eyes,' and 'hands,' enabling the cobot to perform visual tasks, making judgments, and executing actions much like a human. Automating processes not only saves time and resources but also promotes effective human-robot collaboration, enhancing overall production quality, and adds a significant value to your factory.

Fifteen years ago, collaborative robots introduced the concept of humans and robots working together. Today, the new generation of AI collaborative robots has turned the dream of having intelligent and reliable partners into a reality.





Industry Applications

TM AI Cobot offers exceptional performance and compatibility. Equipped with a built-in vision system, it enables the robot to perceive its surroundings. Its AI brain also translates image data into precise commands for tasks such as positioning and detection, seamlessly integrating with the robot arm to execute tasks efficiently.
In the era of AI, **TM AI Cobot** is the best choice to for realizing smart factories.



Electronics Industry



Food Industry





Machine tending



Warehousing Industry

Semiconductor Industry



Automotive



Introducing TM AI Cobot

The only AI-powered collaborative robot with advanced vision capabilities

TM AI Cobot

TM AI Cobot S Series



	TM5**S**	TM6**S**	TM7**S**	TM12**S**	TM14**S**	TM20**S**	TM25**S**	TM30**S**	TM30**SC**
Payload |	5 kg	6 kg	7 kg	12 kg	14 kg	20 kg	30 kg*	35 kg*	35 kg*
Reach |	946 mm	1800 mm	758 mm	1300 mm	1100 mm	1300 mm	1902 mm	1702 mm	1502 mm

TM AI Cobot Series



	TM5-700	TM5-900	TM12	TM14	TM16	TM20
Payload |	6 kg	4 kg	12 kg	14 kg	16 kg	20 kg
Reach |	746 mm	946 mm	1300 mm	1100 mm	917 mm	1300 mm

+ Additional Types

TM Mobile Series

TM Mobile Series cobots can be integrated with almost all AGV/AMR brands on the market.
With its embedded vision and TM Landmark vision function, the mobile series is extremely suitable for applications and tasks that require mobility. Such as machine tending or palletizing.

No Built-in Vision Robot Series

TM Robot Series offers robot arms with no built-in vision for users who want to integrate external cameras by themselves. Feel free to check on the pre-verified list of cameras from our TM Plug&Play™ series to save time on finding a compatible camera.

*Under the palletizing scenario

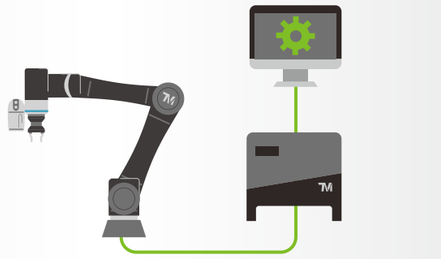
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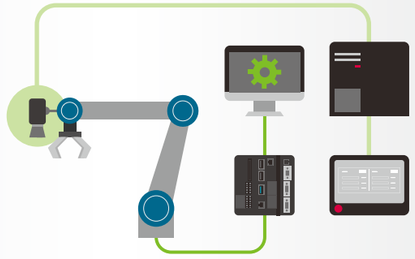
SMART

A perfect integration of cobot and machine vision

- Hand and eye integration for time/labor-saving solution
- Powerful vision function: The combination of traditional machine vision and AI vision offers the user a comprehensive vision function including vision positioning, measurement, defect inspection, OCR and barcode reading
- Easily manage both robot arm and vision functions within a single software, eliminating the need to learn two separate programs and concerns about system compatibility or interface issues



- TM built-in vision, integrated in one system

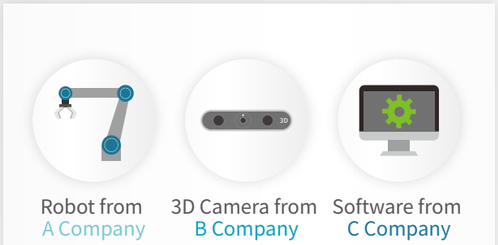


- Integrating separate systems for robot arm and external vision

	TM built-in vision	Robot arm + External vision
Camera	All-in-one	Requires additional mechanism for integration
Camera signal cable and power cord	Internally routed cables	Externally routed cables can lead to problems like tangled or pulled cables or dust resulted from friction
Vision recognition system	5M color camera, auto focus, built-in light source, various applications	Complicated configuration of lens, camera, light source and software
Vision and Robot Programming	Integrated in one software TMflow™ for easy programming	Need to handle the communication interface of 2 different software
Charge	The cost of the robot arm includes the vision system	Additional charge of vision software /hardware is required

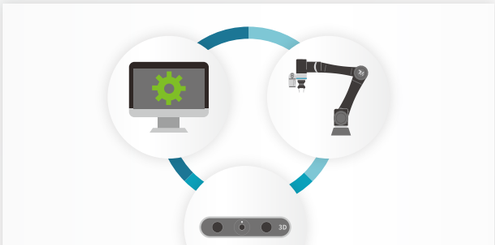
A plug-and-play 3D vision solution requires no additional software/hardware integration

When incoming materials are stacked or arranged in different configurations, the positioning function may become ineffective or less accurate due to the limitations of a standard robot's 2D vision, which cannot capture 3D coordinates. To overcome this challenge, Techman Robot has introduced TM 3D Vision™, a 3D machine vision solution with paried designated Plug&Play 3D camera, designed to expand the range of items recognizable by the vision system and enhance the precision of both vision-based positioning and arm movement.



Traditional Solution

Requires more time and labor costs to integrate robot arm, 3D camera, and software from different brands

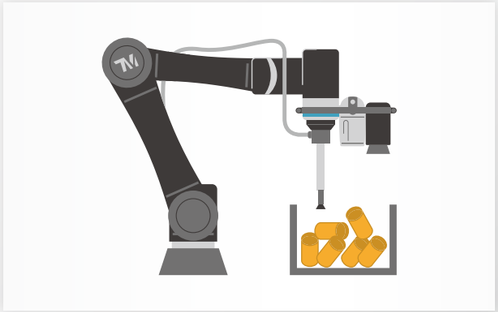


All-In-one Solution

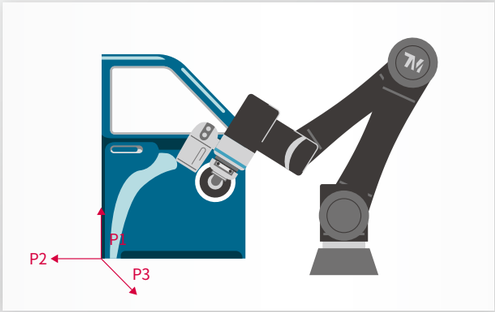
Significantly reduces integration costs and efforts, maintenance and accountability issues

Features

- The integration of 3D software and TMflow™ interface achieves high integration and easy operation
- No additional vision controller is required. No need for complicated system handshaking settings
- Can be used with the collision check function and prevent any potential collision risks. This is highly recommended for the Random Bin Picking applications.



- Picking up scattered materials



- Single item 3D positioning

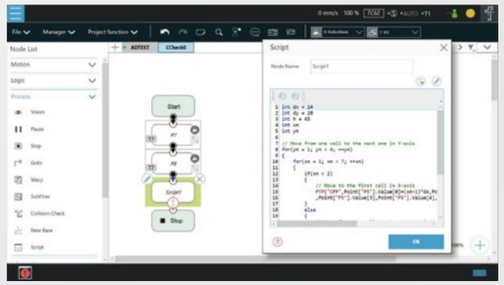
Introducing TM AI Cobot

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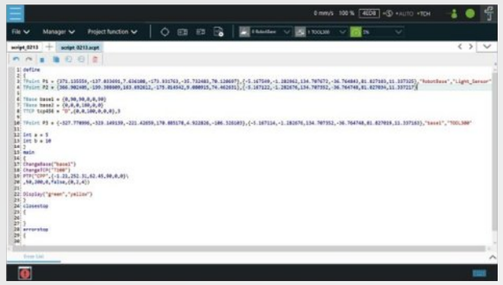
SIMPLE

More Freedom to Program the Cobot

TMflow™ is a user-friendly software that allows you to create and edit robot tasks through a graphical interface using a series of function nodes, making it easy for first-time users to learn our flow-based programming without any robotics experience.
If you prefer non-graphical programming, experience a more flexible way to program by using the new Script Node and Script Project. The Script feature allows experienced engineers to program with complex logic, and freely edit robot tasks by compiling codes. Embrace the method that suits you best and enjoy coding with unparalleled freedom!



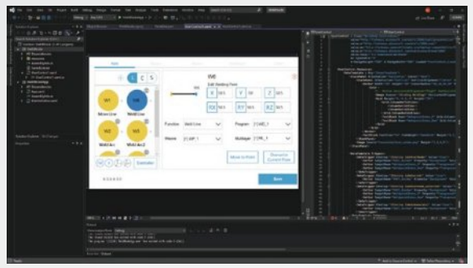
▪ Flow-based UI



▪ Script for Complex Logical Programming

Create Personalized Interface with TMcraft for 2nd Development

TMcraft is a new architecture that allows you to create your own customized UI or background program and embed it onto TMflow™, our cobot programming software. It offers the freedom to develop third-party plug-and-play applications using **C#** and **WPF** development. Additionally, a wizard is available to facilitate the development of high-level applications, such as welding, palletizing, and sanding, making it easier to customize and create the applications you need.

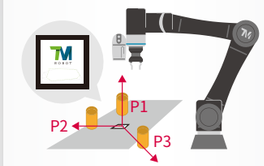


▪ Developers can develop nodes in their own environment

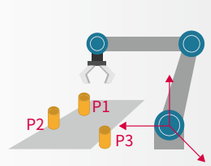


▪ Embed into TMflow™ using third-party plugins

Built-in vision with one-click positioning



▪ Coordinate System with TM Landmark



▪ Coordinate System on other robot

TM Landmark

General robot has the coordinate system built on its base, when the relative position between the objects and the robot changes, the robot require re-adjustment. With TM Landmark, the coordinate system is built on the landmark, the robot will only need to scan the landmark and the coordinate info can be updated without re-adjustment. This is especially recommended to robot with AGV!



Visual Calibration

TM Calibration board can largely reduce the complexity of visual calibration process. Whether users are using EIH, ETH or Upward- looking camera, just simply place the calibration board under the camera, press the button and TMvision™ will do all the work!

Built-in vision application

Positioning



Eye-in-Hand



Eye-to-Hand



Upward-looking



Conveyor Tracking

Identification



Barcode/ QR code Reading



OCR

Measurement



Distance and Angle Measurement



Caliper



Count (Edge)

AI inspection



Image Classification



Object Detection



Semantic Segmentation



Anomaly Detection



Instance Segmentation

AI Vision Software

Powering the future of factories with AI power

TM AI+™ Trainer

Completely integrate hands, eyes and brain in automation field

TM AI+™ Trainer is a software tool that will help you manage image data, set up AI training parameters, and train AI models. The AI solution can help you train a model that fits your needs effortlessly. This AI model can be applied to both the robot arm and machine vision, thus forming a powerful combination of the arm(cobot), eye(machine vision), and brain(AI).
Easy and simple UI helps the user to rapidly and conveniently introduce AI vision technology to production. AI incorporating vision system can effectively eliminate quality issues resulted from fatigue or human error.

Features

- A graphical interface that is easy to learn
- Designed as a browser-based software that you can log in anywhere with a web browser
- All image data used for AI model training is stored in a local database to ensure enterprise classified data is secure
- Powerful AI Vision technology with capabilities including anomaly detection, classification, object detection, and semantic segmentation

4 steps for easy AI model training

Image collection

Annotation

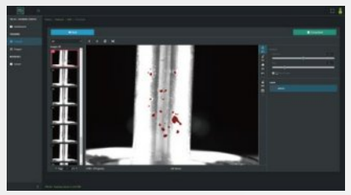
Training

Deployment



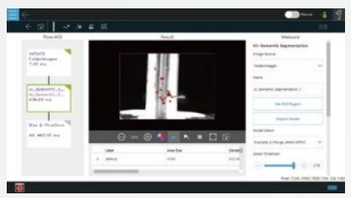
Collect Image Data

- Take multiple photos of the object and upload them to TM AI+™ Trainer



TM AI+™ Trainer

- Select the type of vision task: Classification, Detection, Segmentation, Anomaly Detection
- Label the uploaded image samples
- Configure training parameters and begin training
- Evaluate the training outcome



Import AI model

- Download the trained AI model from the TM AI+™ Trainer to TM Robot or external camera
- Begin AI inference

TM Image Manager

Comprehensive quality traceability for your product

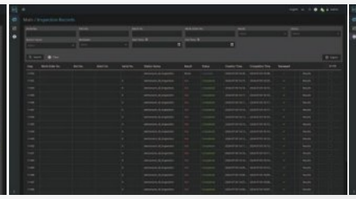
After an enterprise sells its product to customers, they often must deal with customer feedback or complaints. Therefore, companies need to establish a comprehensive quality traceability system.
TM Image Manager is a software tool that is highly compatible with the vision function of TM AI Cobot. It can help you effectively manage the quality inspection records of each product.
The inspector can monitor the inspection progress in real time and the results are automatically recorded as image data. This data can be reviewed at any time to increase inspection accuracy. Furthermore, a quality resume can be improved and the potential cost of after-sales service activities can be reduced.

Features

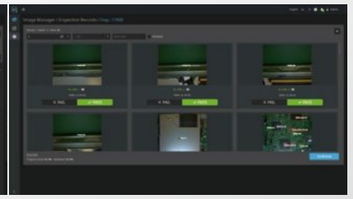
- Browser-based interface for intuitive and easy operation
- Manage inspection images and results through the database to address the needs of backup and search
- The user can filter the images of quality inspection by different conditions, like time, work order, barcode, etc. at any time
- Help inspectors to compare the images of inspection and standard item to effectively reduce the probability of misjudgement
- The user can plan and design inspection configuration to perform real-time monitoring on inspection position, result and progress



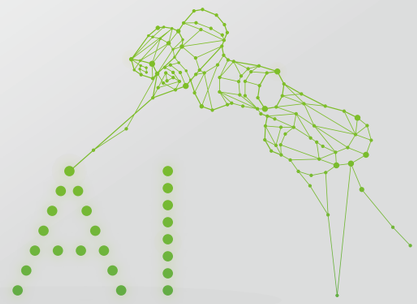
- Configuration inspection and progress review



- Backup and search of inspection history



- Support human double-check interface

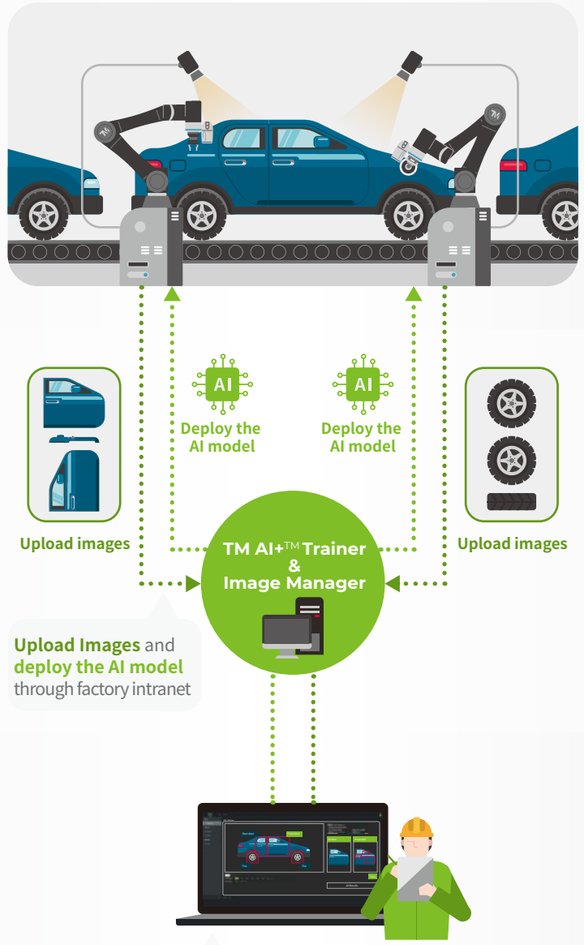


AI Vision Software

Powering the future of factories with AI power

AI Vision Operating Architecture

The graphical interface of TM AI Cobot's integrated vision system eliminates the need for programming and enables a seamless process from image collection and annotation to training and deployment. It serves as an ideal solution for small and medium-sized enterprises (SMEs) lacking an AI or software division. Throughout production, AI Cobot accumulates valuable production history data, empowering companies to track, analyze, and integrate this information to proactively prevent defects, enhance quality, and reduce costs.



Capture & Identification

TM AI Cobot
TM AI+™ AOI Edge

- Built-in AI vision robot arm
- Easy to integrate robot arm and vision

Neural network model training

TM AI+™ Trainer

- AI model training software
- Easy to learn and simple to operate

Image storage & retrieval

TM Image Manager

- AOI image management software
- Backup all AOI inspection images and establish product traceability

Application Examples

Assembly Inspection



- Checking if the tires are wrapped with PE film



- Checking if all wires are connected correctly

Classification

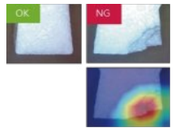


- Sorting different materials for wooden furniture

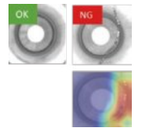


- Recognition of pizza flavor and crust

Defects Inspection



- Identifying objects with damage on the edge



- Checking if there are metal scrap on the surface

Counting /Detection



- Counting the amount of the object in the tray



- Objects detection and 3D positioning

Scratches /Cuts /Dents Inspection



- Checking scratches on DRAM gold fingers



- Checking the dents on metal parts

AI OCR



- Label text reading



- Label text reading

TM Plug&Play™ Solution

TM certified, perfect integration, and usable upon installation

TM AI Cobot works with peripheral equipment vendors to create a comprehensive TM Plug&Play™ ecosystem. Each certified TM Plug&Play™ product has been calibrated and tested by Techman Robot and peripheral equipment vendors. This ensures users benefit from an optimal experience and highly reliable robot performance, while significantly reducing the time and labor costs associated with hardware production and automation programming.

Start to use within 5 minutes

Purchase TM AI Cobot

Purchase TM Plug&Play™ solution

→ Download software package → Apply and test → Editing automation program

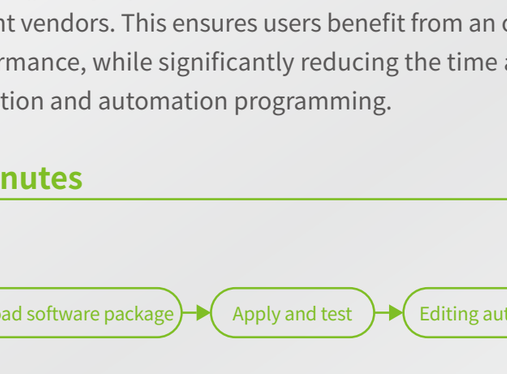
Simple, efficient, and fast production line introduction

HARDWARE PACKAGE

+

SOFTWARE PACKAGE





▪ Screw Plug&Play example

TM Plug&Play CERTIFIED



Advantech
AIR-3002022
-TM AI+ Trainer



ARS Automation
FlexiBowl® Kit for TM



ASPINA
ARH350A Kit for TM



ATI
9105-TM-Axia80



Basler
Industrial Camera



CKD
RCKL/RHLF/RLSH
-TM Gripper



COBOTRACKS
Linear Motion
Plug&Play for TM



DH-Robotics
Adaptive Gripper
DH-3 TM Kit



EWELLIX
LIFTKIT-TM



FerRobotics
ACF-K Active
Contact Flange-Kit



Flir
Industrial Camera



Gimatic
KIT-TM-J



HIWIN
Electric Gripper X-series



IDS
Ensenso N36/N46
3D camera



Igus®
3D e-chain TM Kit - PMA Tubes



KILEWS
Screw Driver Solution



Mindman
All-in-One Gripper
for TM Robot (3-Finger)



Murrplastik
Murrplastik FHS-SH-Set



NABELL
Robot Flex



NITTOSEIKO
Pick and Drive System
PD400TM



OnRobot
Sander



OnRobot
2FG7



OnRobot
Screwdriver



Pickit
Pickit3D Vision Solution



RoboDK
Simulation and Offline
Programming Software
for TM



Robotiq
FTS-300-TM-KIT



Robotiq
Adaptive Gripper,
2-Finger 85/140 TM Kit



Schmalz
FXCB



SCHUNK
Changing by SCHUNK
- Plug & Work Portfolio
Techman Robot



SCHUNK
Collaborative
gripping EGP-C



SMC
Magnet Gripper Unit
for Collaborative Robots



TOYO
CHY2B-S80



Weiss Robotics
GRIPKIT-CR-PRO-L



Zimmer
HRC-03 TM-Kit



ZLÍN ROBOTICS
Universal Mobile Stand

More Information on
www.tm-robot.com

TM AI Cobot S Series Specification



Specification												
Model		TM5S	TM6S	TM7S	TM12S	TM5S-M	TM6S-M	TM7S-M	TM12S-M	TM5S-X	TM6S-X	TM7S-X	TM12S-X
Weight		23.9kg	35.5kg	22.9kg	33.3kg	23.9kg	35.5kg	22.9kg	33.3kg	23.6kg	35.2kg	22.6kg	33kg
Maximum Payload		5kg	6kg	7kg	12kg	5kg	6kg	7kg	12kg	5kg	6kg	7kg	12kg
Reach		946mm	1800mm	758mm	1300mm	946mm	1800mm	758mm	1300mm	946mm	1800mm	758mm	1300mm
Joint Ranges	J1, J2, J4,J5, J6	+/- 360°											
	J3	+/- 158°	+/- 166°	+/- 152°	+/- 162°	+/- 158°	+/- 166°	+/- 152°	+/- 162°	+/- 158°	+/- 166°	+/- 152°	+/- 162°
Speed	J1	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s
	J2	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s	210°/s	130°/s
	J3	210°/s											
	J4	225°/s											
	J5	225°/s											
	J6	450°/s											
Maximum Speed		4.5m/s											
Repeatability		+/- 0.03mm	+/- 0.10mm	+/- 0.03mm	+/- 0.03mm	+/- 0.03mm	+/- 0.10mm	+/- 0.03mm	+/- 0.03mm	+/- 0.03mm	+/- 0.10mm	+/- 0.03mm	+/- 0.03mm
Degree Of Freedom		6 rotating joints											
Control Box Weight		13.5kg				8.9kg				13.5kg			
I/O	Control Box	Digital In: 16 / Digital Out: 16											
		Analog In: 2 / Analog Out: 2											
	Tool Conn.	Digital In: 3 / Digital Out: 3											
		DO_0 (DO-0/AI) / DO_1 (DO-1/RS485-) / DO_2 (DO-2/RS485+)											
I/O Power Supply		24V 2.0A for control box, 24V 1.5A for tool											
IP Classification		IP65 (Robot Arm) IP54 (Control Box)				IP65 (Robot Arm)				IP65 (Robot Arm) IP54 (Control Box)			
Typical Power Consumption		240 W	400 W	240 W	400 W	240 W	400 W	240 W	400 W	240 W	400 W	240 W	400 W
Temperature		0~50°C											
Cleanliness		ISO Class 3											
Power Supply		100~240 VAC, 50~60 Hz				24~60 VDC				100~240 VAC, 50~60 Hz			
I/O Interface		2×COM, 1×HDMI, 3×LAN, 2×USB2.0, 4×USB3.0											
Communication		RS-232/RS-422/RS-485, Ethernet, Modbus TCP/RTU (master & slave)											
		Optionally support specified network card of PROFINET, EtherNet/IP, EtherCAT, CC-Link *(1)											
Programming Environment		TMflow (flowchart based), TMscript (script based), TMcraft (developer based)											
Certification		TÜV certificated ISO 13849-1, ISO 10218-1, ISO/TS 15066											
		SGS certificated UL1740, CAN/CSA Z424-14 (R2019)											
		CE, NSF/ANSI 169 (optional), SEMI S2 (optional)											
Nano Control Box													
Control Box Weight		7.2 kg											
Control Box Dimension		156.5 x 359.0 x 322.1 mm											
IP Classification		N/A											
Power Supply		200~240 VAC, 50~60 Hz				42~60 VDC				200~240 VAC, 50~60 Hz			
Typical Power Consumption		240 W	400 W	240 W	400 W	240 W	400 W	240 W	400 W	240 W	400 W	240 W	400 W
AI & Robot Vision													
AI Function		Classification, Object Detection, Segmentation, Anomaly Detection, AI OCR								N/A			
Application		Positioning, 1D/2D Barcode Reading, OCR, Defect Detection, Measurement, Assembly Check											
Positioning Accuracy		2D Positioning: 0.1 mm *(2)											
		TM Landmark 3D Positioning (Working Point away from Landmark 100/200/300 mm): 0.10/ 0.20/ 0.33 mm *(2)											
Eye in Hand (Built in)		Auto-focused color camera with 5M resolution, Working distance 100 mm ~ ∞											
Eye to Hand (Optional)		Support Maximum 2× GigE 2D cameras or 1× GigE 2D Camera + 1× 3D Camera *(3)											
Force Sensing *(4) Optional													
Force x-y-z	Range	+/- 300 N											
	Precision	2 % F.S.											
	Accuracy	5.5 % F.S.											
Torque x-y-z	Range	+/- 30 Nm											
	Precision	0.3 % F.S.											
	Accuracy	5 % F.S.											

*(1)Please contact sales/agent for detailed specifications.
*(2)The data in this table are measured by TM laboratory and the working distance is 100mm. It should be noted that in practical applications, the relevant values may be different due to factors such as the on-site ambient light source, object characteristics, and vision programming methods that will affect the change in accuracy.
*(3)Refer to the official website of TM Plug&Play for camera models compatible to TM Robot.
*(4)Standard on TM25S & TM30S series; Optional on others and total weight will increase by 500g.

Specification													
TM14S	TM20S	TM25S	TM30S	TM30SC	TM14S-M	TM20S-M	TM25S-M	TM30S-M	TM30SC-M	TM14S-X	TM20S-X	TM25S-X	TM30S-X	TM30SC-X
33kg	33.3kg	82.1kg	81.1kg	79.7kg	33kg	33.3kg	82.1kg	81.1kg	79.7kg	32.7kg	33kg	81.8kg	80.8kg	79.4kg
14kg	20kg	25kg	30kg	30kg	14kg	20kg	25kg	30kg	30kg	14kg	20kg	25kg	30kg	30kg
1100mm	1300mm	1902mm	1702mm	1502mm	1100mm	1300mm	1902mm	1702mm	1502mm	1100mm	1300mm	1902mm	1702mm	1502mm
+/- 360°														
+/- 159°	+/- 162°	+/- 166°	+/- 170°	+/- 168°	+/- 159°	+/- 162°	+/- 166°	+/- 170°	+/- 168°	+/- 159°	+/- 162°	+/- 166°	+/- 170°	+/- 168°
130°/s	130°/s	100°/s	100°/s	100°/s	130°/s	130°/s	100°/s	100°/s	100°/s	130°/s	130°/s	100°/s	100°/s	100°/s
130°/s	95°/s	100°/s	100°/s	100°/s	130°/s	95°/s	100°/s	100°/s	100°/s	130°/s	95°/s	100°/s	100°/s	100°/s
210°/s	125°/s	130°/s	130°/s	130°/s	210°/s	125°/s	130°/s	130°/s	130°/s	210°/s	125°/s	130°/s	130°/s	130°/s
225°/s	160°/s	195°/s	195°/s	195°/s	225°/s	160°/s	195°/s	195°/s	195°/s	225°/s	160°/s	195°/s	195°/s	195°/s
225°/s	190°/s	210°/s	210°/s	210°/s	225°/s	190°/s	210°/s	210°/s	210°/s	225°/s	190°/s	210°/s	210°/s	210°/s
450°/s	225°/s	225°/s	225°/s	225°/s	450°/s	225°/s	225°/s	225°/s	225°/s	450°/s	225°/s	225°/s	225°/s	225°/s
4.5m/s	4.5m/s	5.2m/s	5.2m/s	5.0m/s	4.5m/s	4.5m/s	5.2m/s	5.2m/s	5.0m/s	4.5m/s	4.5m/s	5.2m/s	5.2m/s	5.0m/s
+/- 0.03mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.03mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.03mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm
6 rotating joints														
13.5kg		16.3kg			8.9kg		11.7kg			13.5kg		16.3kg		
Digital In: 16 / Digital Out: 16														
Analog In: 2 / Analog Out: 2														
Digital In: 3 / Digital Out: 3														
DO_0 (DO-0/AI) / DO_1 (DO-1/RS485-) / DO_2 (DO-2/RS485+)														
24V 2.0A for control box, 24V 1.5A for tool														
IP65 (Robot Arm) IP54 (Control Box)					IP65 (Robot Arm)					IP65 (Robot Arm) IP54 (Control Box)				
400 W		580 W			400 W		580 W			400 W		580 W		
0~50°C														
ISO Class 3														
100~240 VAC, 50~60 Hz		200~240 VAC, 50~60 Hz			24~60 VDC		48~60 VDC			100~240 VAC, 50~60 Hz		200~240 VAC, 50~60 Hz		
2×COM, 1×HDMI, 3×LAN, 2×USB2.0, 4×USB3.0														
RS-232/RS-422/RS-485, Ethernet, Modbus TCP/RTU (master & slave)														
Optionally support specified network card of PROFINET, EtherNet/IP, EtherCAT, CC-Link *(1)														
TMflow (flowchart based), TMscript (script based), TMcraft (developer based)														
TÜV certificated ISO 13849-1, ISO 10218-1, ISO/TS 15066														
SGS certificated UL1740, CAN/CSA Z424-14 (R2019)														
CE, NSF/ANSI 169 (optional), SEMI S2 (optional)		CE, SEMI S2 (optional)			CE, NSF/ANSI 169 (optional), SEMI S2 (optional)		CE, SEMI S2 (optional)			CE, NSF/ANSI 169 (optional), SEMI S2 (optional)		CE, SEMI S2 (optional)		
Nano Control Box														
7.2 kg		N/A			7.2 kg		N/A			7.2 kg		N/A		
156.5 x 359.0 x 322.1 mm					156.5 x 359.0 x 322.1 mm					156.5 x 359.0 x 322.1 mm				
N/A					N/A					N/A				
200~240 VAC, 50~60 Hz					42~60 VDC					200~240 VAC, 50~60 Hz				
400 W					400 W					400 W				
AI & Robot Vision														
Classification, Object Detection, Segmentation, Anomaly Detection, AI OCR										N/A				
Positioning, 1D/2D Barcode Reading, OCR, Defect Detection, Measurement, Assembly Check														
2D Positioning: 0.1 mm *(2)														
TM Landmark 3D Positioning (Working Point away from Landmark 100/200/300 mm): 0.10/ 0.20/ 0.33 mm *(2)														
Auto-focused color camera with 5M resolution, Working distance 100 mm ~ ∞														
Support Maximum 2× GigE 2D cameras or 1× GigE 2D Camera + 1× 3D Camera *(3)														
Force Sensing *(4) Optional		**Force Sensing Standard**			**Force Sensing *(4) Optional**		**Force Sensing Standard**			**Force Sensing *(4) Optional**		**Force Sensing Standard**		
+/- 300 N														
2 % F.S.														
5.5 % F.S.														
+/- 30 Nm														
0.3 % F.S.														
5 % F.S.														

*(1)Please contact sales/agent for detailed specifications.
*(2)The data in this table are measured by TM laboratory and the working distance is 100mm. It should be noted that in practical applications, the relevant values may be different due to factors such as the on-site ambient light source, object characteristics, and vision programming methods that will affect the change in accuracy.
*(3)Refer to the official website of TM Plug&Play for camera models compatible to TM Robot.
*(4)Standard on TM25S & TM30S series; Optional on others and total weight will increase by 500g.

TM AI Cobot Specification



Specification							
Model		TM5-700	TM5-900	TM5M-700	TM5M-900	TM5X-700	TM5X-900
Weight		22.1kg	22.6kg	22.1kg	22.6kg	21.8kg	22.3kg
Maximum Payload		6kg	4kg	6kg	4kg	6kg	4kg
Reach		746mm	946mm	746mm	946mm	746mm	946mm
Joint Ranges	J1,J6	+/- 270°	+/- 270°	+/- 270°	+/- 270°	+/- 360°	+/- 360°
	J2,J4,J5	+/- 180°	+/- 180°	+/- 180°	+/- 180°	+/- 360°	+/- 360°
	J3	+/- 155°					
Speed	J1,J2	180°/s					
	J3	180°/s					
	J4	225°/s					
	J5	225°/s					
	J6	225°/s					
Maximum Speed		4m/s					
Repeatability		+/- 0.05mm					
Degree Of Freedom		6 rotating joints					
I/O	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, 24V 1.5A for tool					
IP Classification		IP54 (Robot Arm) IP32 (Control Box)					
Typical Power Consumption		220 W					
Temperature		0-50°C					
Cleanliness		ISO Class 3					
Power Supply		100-240 VAC, 50-60 Hz		22-60 VDC		100-240 VAC, 50-60 Hz	
I/O Interface		3×COM, 1×HDMI, 3×LAN, 4×USB2.0, 2×USB3.0					
Communication		RS-232, Ethernet, Modbus TCP/RTU (master & slave)					
		Optionally support specified network card of PROFINET, EtherNet/IP, EtherCAT, CC-Link *(1)					
Programming Environment		TMflow (flowchart/script based)					
Certification		ISO 13849-1, ISO 10218-1, ISO/TS 15066					
		CE, SEMI S2 (optional)					
AI & Robot Vision							
AI Function		Classification, Object Detection, Segmentation, Anomaly Detection, AI OCR				N/A	
Application		Positioning, 1D/2D Barcode Reading, OCR, Defect Detection, Measurement, Assembly Check					
Positioning Accuracy		2D Positioning: 0.1 mm *(2)					
		TM Landmark 3D Positioning (Working Point away from Landmark 100/200/300 mm): 0.24/0.53/1.00 mm *(2)					
Eye in Hand (Built in)		Auto-focused color camera with 5M resolution, Working distance 100 mm ~ ∞					
Eye to Hand (Optional)		Support Maximum 2× GigE 2D cameras or 1× GigE 2D Camera + 1× 3D Camera *(3)					

*(1)Please contact sales/agent for detailed specifications.
*(2)The data in this table are measured by TM laboratory and the working distance is 100mm. It should be noted that in practical applications, the relevant values may be different due to factors such as the on-site ambient light source, object characteristics, and vision programming methods that will affect the change in accuracy.
*(3)Refer to the official website of TM Plug&Play for camera models compatible to TM Robot.

Specification											
TM12	TM14	TM16	TM20	TM12M	TM14M	TM16M	TM20M	TM12X	TM14X	TM16X	TM20X
32.8kg	32.5kg	32kg	32.8kg	32.8kg	32.5kg	32kg	32.8kg	32.5kg	32.2kg	31.7kg	32.5kg
12kg	14kg	16kg	20kg	12kg	14kg	16kg	20kg	12kg	14kg	16kg	20kg
1300mm	1100mm	917mm	1300mm	1300mm	1100mm	917mm	1300mm	1300mm	1100mm	917mm	1300mm
+/- 270°	+/- 270°	+/- 270°	+/- 270°	+/- 270°	+/- 270°	+/- 270°	+/- 270°	+/- 360°	+/- 360°	+/- 360°	+/- 360°
+/- 180°	+/- 180°	+/- 180°	+/- 180°	+/- 180°	+/- 180°	+/- 180°	+/- 180°	+/- 360°	+/- 360°	+/- 360°	+/- 360°
+/- 166°	+/- 163°	+/- 155°	+/- 166°	+/- 166°	+/- 163°	+/- 155°	+/- 166°	+/- 166°	+/- 163°	+/- 155°	+/- 166°
120°/s	120°/s	120°/s	90°/s	120°/s	120°/s	120°/s	90°/s	120°/s	120°/s	120°/s	90°/s
180°/s	180°/s	180°/s	120°/s	180°/s	180°/s	180°/s	120°/s	180°/s	180°/s	180°/s	120°/s
180°/s	150°/s	180°/s	150°/s	180°/s	150°/s	180°/s	150°/s	180°/s	150°/s	180°/s	150°/s
180°/s	150°/s	180°/s	180°/s	180°/s	150°/s	180°/s	180°/s	180°/s	150°/s	180°/s	180°/s
180°/s	180°/s	180°/s	225°/s	180°/s	180°/s	180°/s	225°/s	180°/s	180°/s	180°/s	225°/s
4m/s											
+/- 0.1mm											
6 rotating joints											
Digital In: 16 / Digital Out: 16											
Analog In: 2 / Analog Out: 1											
Digital In: 4 / Digital Out: 4											
Analog In: 1 / Analog Out: 0											
24V 2.0A for control box, 24V 1.5A for tool											
IP54 (Robot Arm) IP32 (Control Box)											
300 W											
0-50°C											
ISO Class 3											
100-240 VAC, 50-60 Hz			22-60 VDC				24-60 VDC			100-240 VAC, 50-60 Hz	
3×COM, 1×HDMI, 3×LAN, 4×USB2.0, 2×USB3.0											
RS-232, Ethernet, Modbus TCP/RTU (master & slave)											
Optionally support specified network card of PROFINET, EtherNet/IP, EtherCAT, CC-Link *(1)											
TMflow (flowchart/script based)											
ISO 13849-1, ISO 10218-1, ISO/TS 15066											
CE, SEMI S2 (optional)											
AI & Robot Vision											
Classification, Object Detection, Segmentation, Anomaly Detection, AI OCR										N/A	
Positioning, 1D/2D Barcode Reading, OCR, Defect Detection, Measurement, Assembly Check											
2D Positioning: 0.1 mm *(2)											
TM Landmark 3D Positioning (Working Point away from Landmark 100/200/300 mm): 0.24/0.53/1.00 mm *(2)											
Auto-focused color camera with 5M resolution, Working distance 100 mm ~ ∞											
Support Maximum 2× GigE 2D cameras or 1× GigE 2D Camera + 1× 3D Camera *(3)											

*(1)Please contact sales/agent for detailed specifications.
*(2)The data in this table are measured by TM laboratory and the working distance is 100mm. It should be noted that in practical applications, the relevant values may be different due to factors such as the on-site ambient light source, object characteristics, and vision programming methods that will affect the change in accuracy.
*(3)Refer to the official website of TM Plug&Play for camera models compatible to TM Robot.

Software Specification



TM AI+ Trainer Installation Requirements

Software Requirements	
TM AI+ Trainer Software version	Ver. 2.20
Hardware Requirements	
Operating System	Ubuntu 22.04 *(1)
CPU	7th Generation Intel® Core™ i7 Processors or above
RAM	32 GB or above
Graphics Cards	Supports only NVIDIA Turing, Ampere, and Ada Lovelace architecture GPUs *(2) *(3) *(4). Recommended: NVIDIA GeForce RTX 40 series (4060 Ti 16GB or above), NVIDIA Quadro RTX series (4000 Ada 20GB or above).
Storage	2TB or above (SSD Recommended)
Communication Interface	Ethernet
Language Support	EN, TW, CN, DE, ES, FR, JP, KO, PT, TH, VI

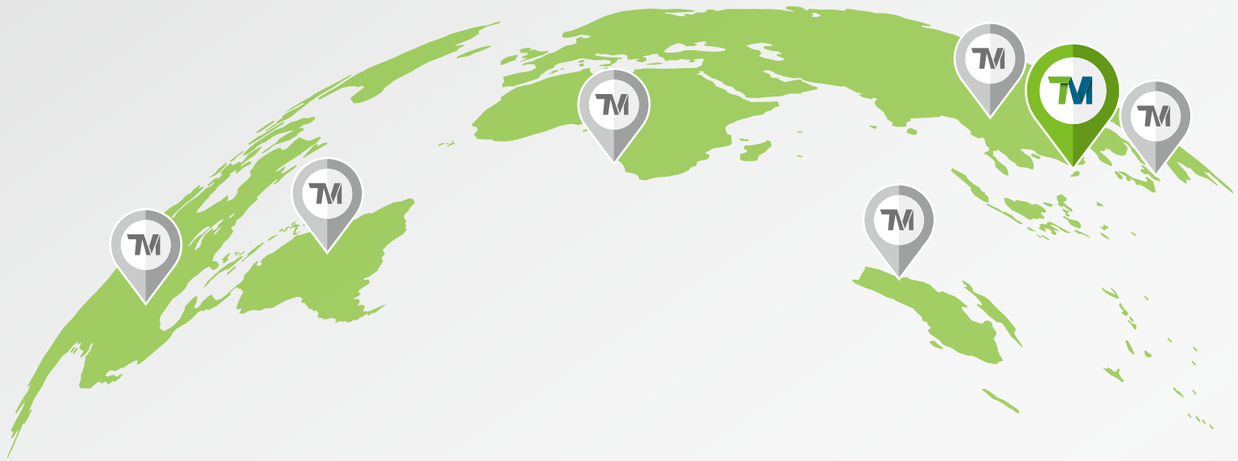
*(1) If TM AI+ Trainer is installed on a host already running TM Image Manager, RAM must be at least 64 GB.
*(2) TM AI+ Trainer cannot be installed in a virtual environment on a personal computer, such as VirtualBox.
*(3) GPUs other than NVIDIA are not supported, such as NVIDIA 50 series Blackwell architecture GPUs.
*(4) NVIDIA GPUs based on other micro-architectures, such as the GeForce RTX 40 series (Ada Lovelace architecture), are also not supported.

TM Image Manager Installation Requirements

Software Requirements	
TMflow Software Version	Ver. 2.20
Hardware Requirements	
Operating System	Ubuntu 22.04 *(1)
CPU	Gen 7 intel i7 or above
RAM	32 GB or above
Storage	SSD 2TB-8TB
Communication Interface	Ethernet
Language Support	EN, TW, CN, JP, KO, TH
Remark	Supports up to 10 TM AI Cobots and AI+ AOI Edges for continuous, simultaneous image transmission*(2)

*(1) Image Manager is not allowed to be installed on the virtual environment of personal computer, like VirtualBox.
*(2) When more than 10 connections are established with simultaneous image transmissions, users should assess the potential risks of system overload.

Contact Us



HEADQUARTER

TECHMAN ROBOT INC.
5F., No. 58-2, Huaya 2nd Rd., Guishan Dist., Taoyuan City, 333411 , 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**
2107A, Building C, Huanzhi Center, Longhua Street, Longhua District, Shenzhen City, Guangdong Province, China
TEL: +86-183-6086-5487 | EMAIL: TRI_Sales_China@tm-robot.com
- **EUROPE OFFICE**
Staalindustrieweg 21 NL-2952 AT Alblasserdam, Netherlands
EMAIL: TRI_Sales_NL@tm-robot.com
- **KOREA BRANCH OFFICE**
No.904, 99, Centum dong-ro, Haeundae-gu, Busan, 48059, Republic of Korea
TEL: +82-10-6382-1619 | EMAIL: daniel.yun@tm-robot.com
- **JAPAN BRANCH OFFICE**
〒461-0001 Aichi, Nagoya, Higashi Ward, Izumi, 2 Chome-21-28 5F
EMAIL: tmsales@tm-robot.com

Robovision
Machine Vision Experts

Main:
20th Elpidos str
56533 Thessaloniki, GR
T: +30 2310672436

Branch:
81st Platonos str
10441 Athens, GR
T: +30 2105157861

email: contact@robovision.gr | url: www.robovision.gr