

TM AI COBOT



The future is here,
TM AI COBOT
Native AI engine + Robotic arm + Vision system
All in ONE



www.tm-robot.com



Social media

Techman Robot |



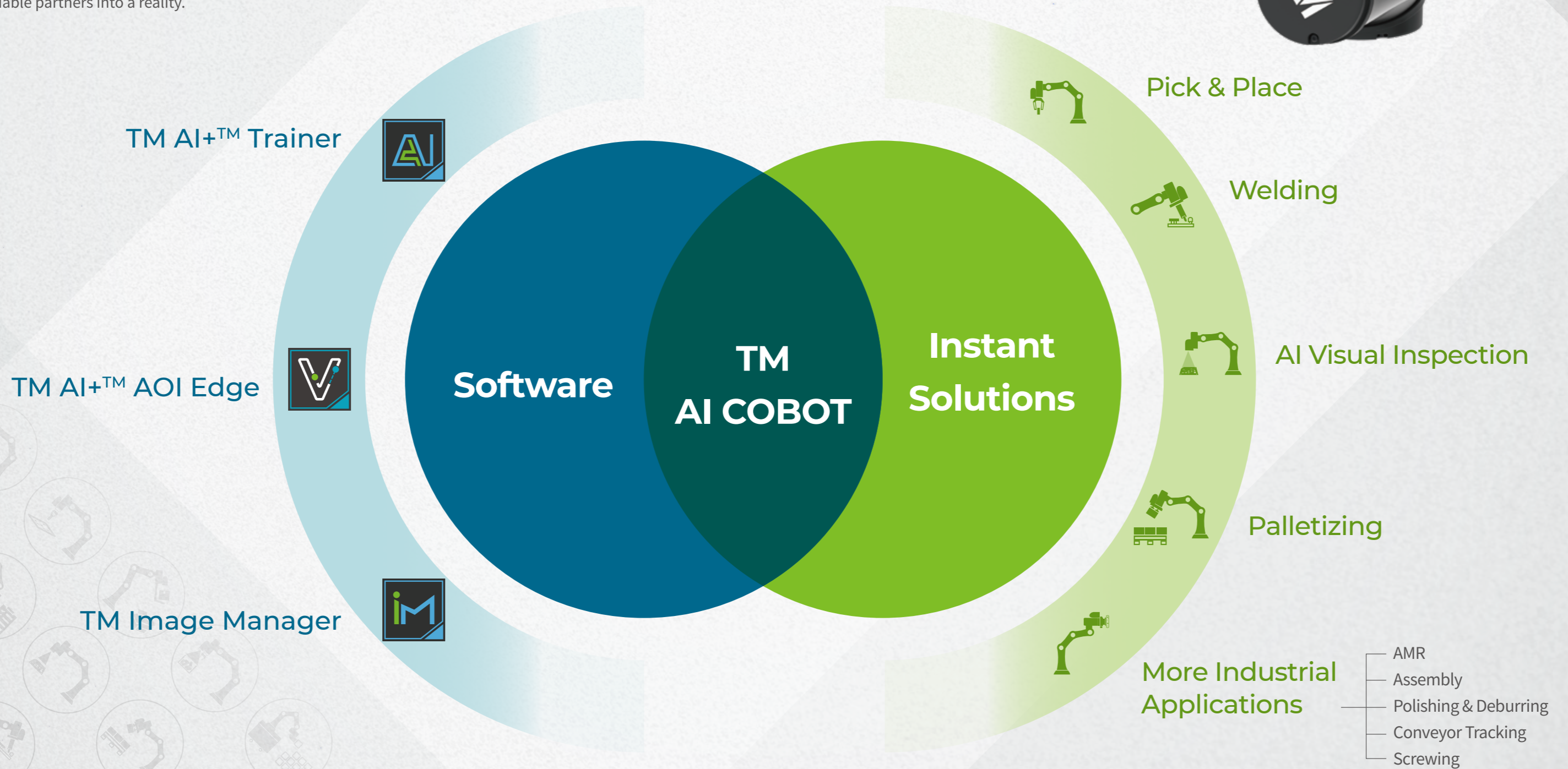
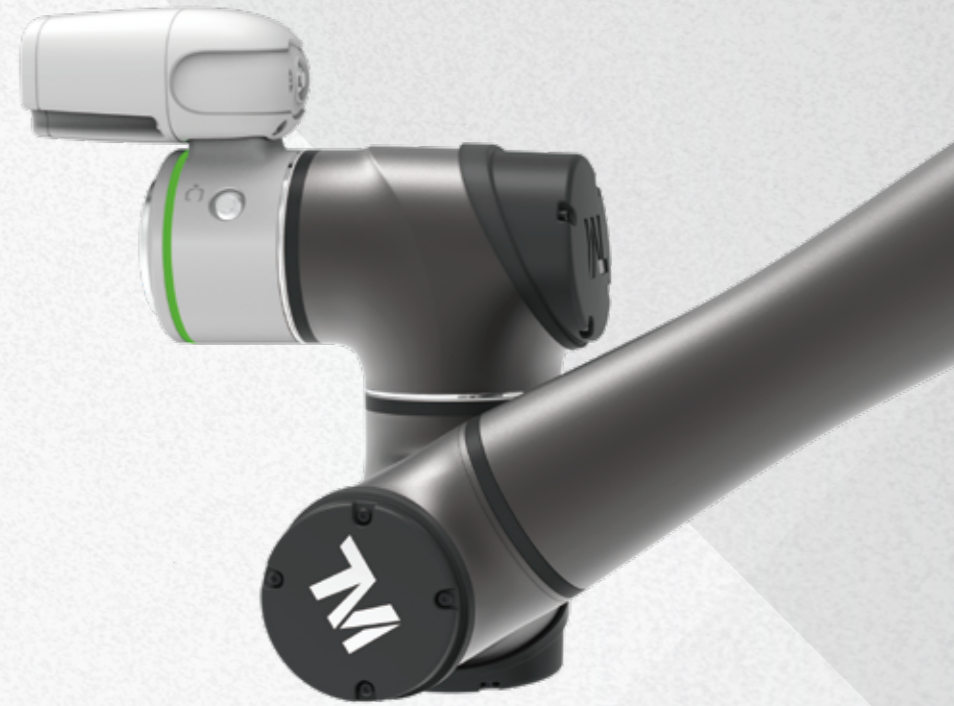
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What Is An AI Cobot?

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



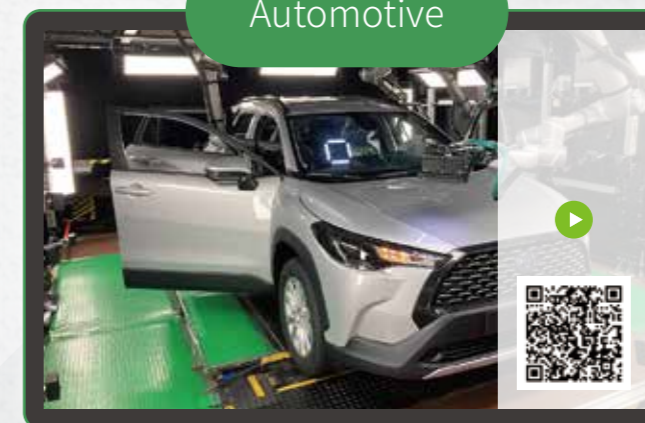
Machine tending



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



	TM5S	TM6S	TM7S	TM12S	TM14S	TM20S	TM25S	TM30S
Payload	5 kg	6 kg	7 kg	12 kg	14 kg	20 kg	30 kg*	35 kg*
Reach	946 mm	1800 mm	758 mm	1300 mm	1100 mm	1300 mm	1902 mm	1702 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

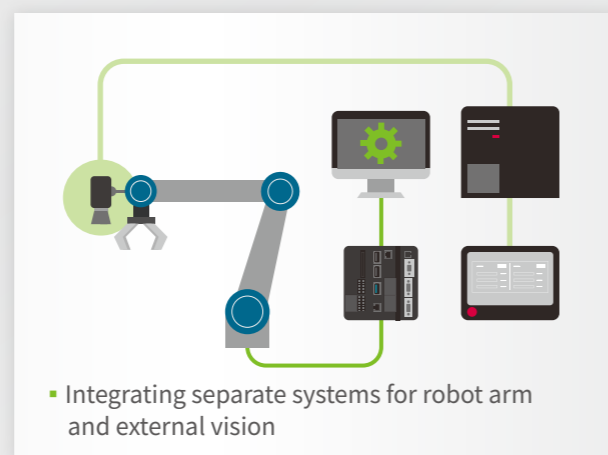
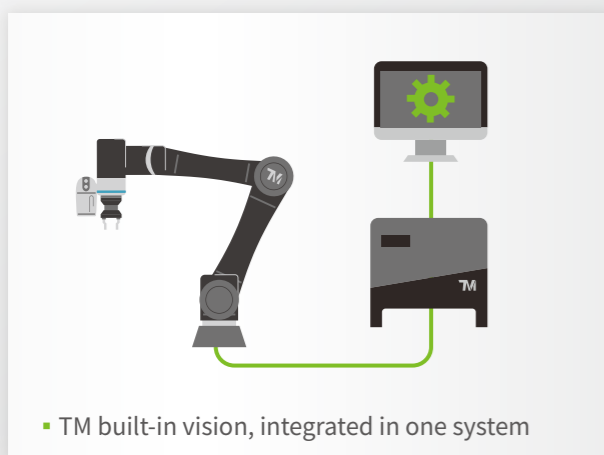
Introducing TM AI Cobot

The only AI-powered collaborative robot with advanced vision capabilities

SMART

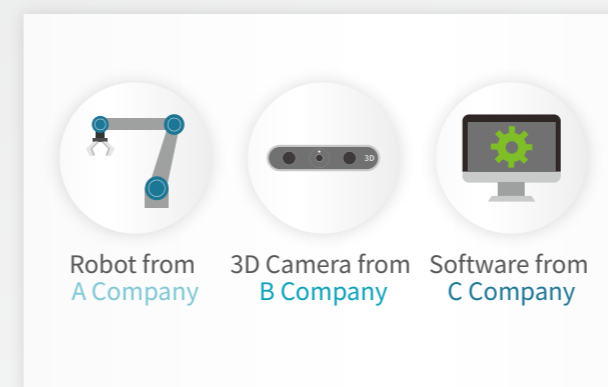
A perfect integration of cobot and machine vision

- 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



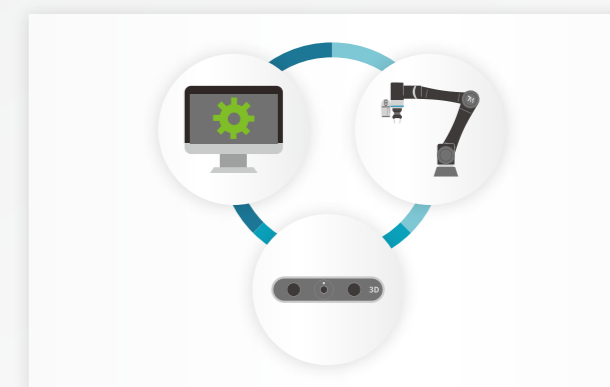
A plug-and-play 3D vision solution requires no additional software/hardware integration

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 paired 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



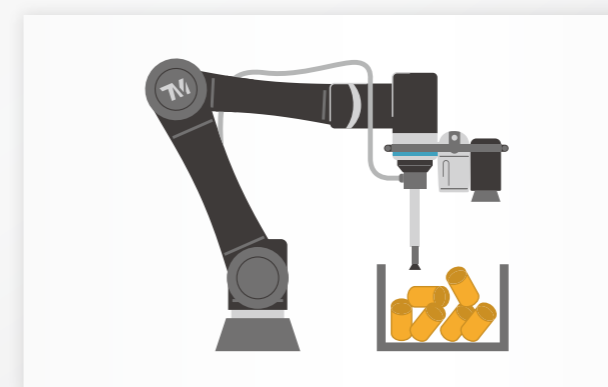
All-In-one Solution

Significantly reduces integration costs and efforts, maintenance and accountability issues

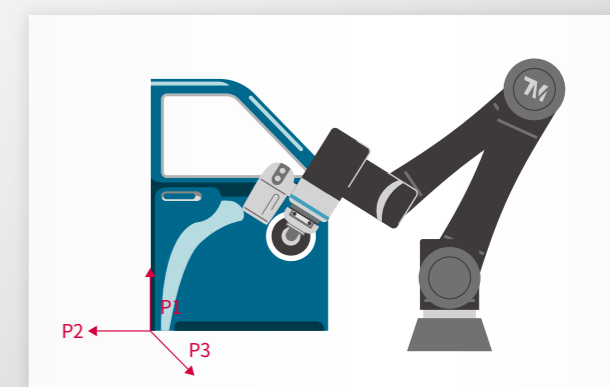
	TM built-in vision	Robot arm + External vision
Camera	All-in-one	Requires additional mechanism for integration
Camera signal cable and power cord	Internally routed cables	Externally routed cables can lead to problems like tangled or pulled cables or dust resulted from friction
Vision recognition system	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

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

The only AI-powered collaborative robot with advanced vision capabilities

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!



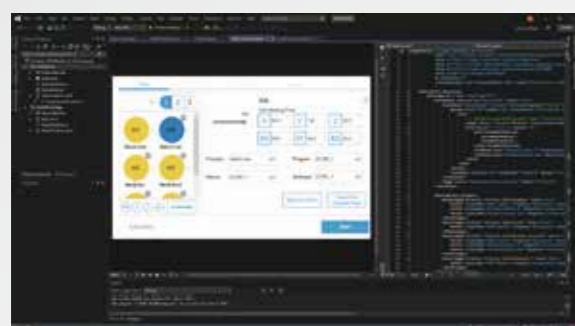
▪ Flow-based UI



▪ 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.

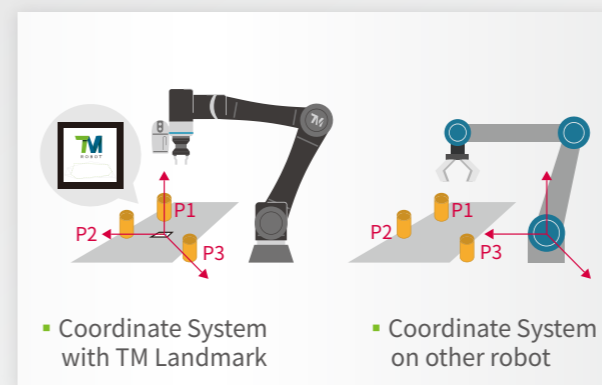


▪ Developers can develop nodes in their own environment



▪ 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!

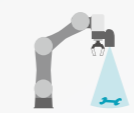


Visual Calibration

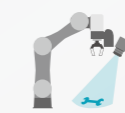
TM Calibration board can largely reduce the complexity of visual calibration process. Whether users are using EIH, ETH or Upward-looking camera, just simply place the calibration board under the camera, press the button and TMvision™ will do all the work!

Built-in vision application

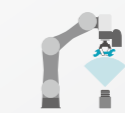
Positioning



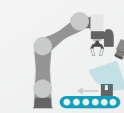
Eye-in-Hand



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

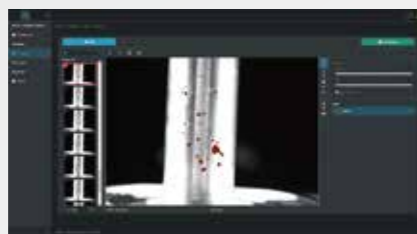
Image collection



Collect Image Data

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

Annotation



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

Training



Import AI model

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

Deployment

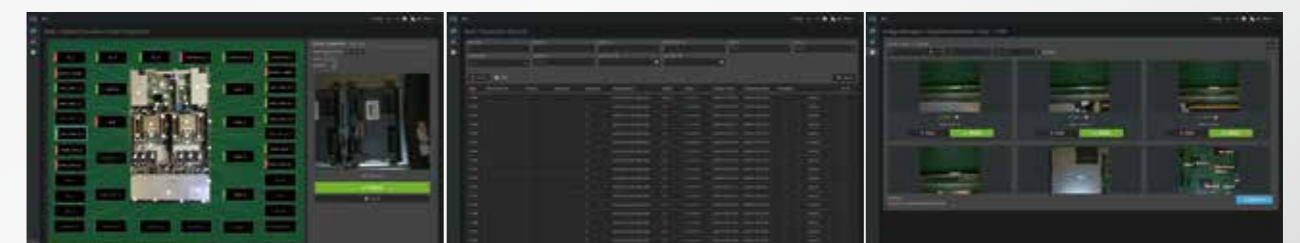
TM Image Manager

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

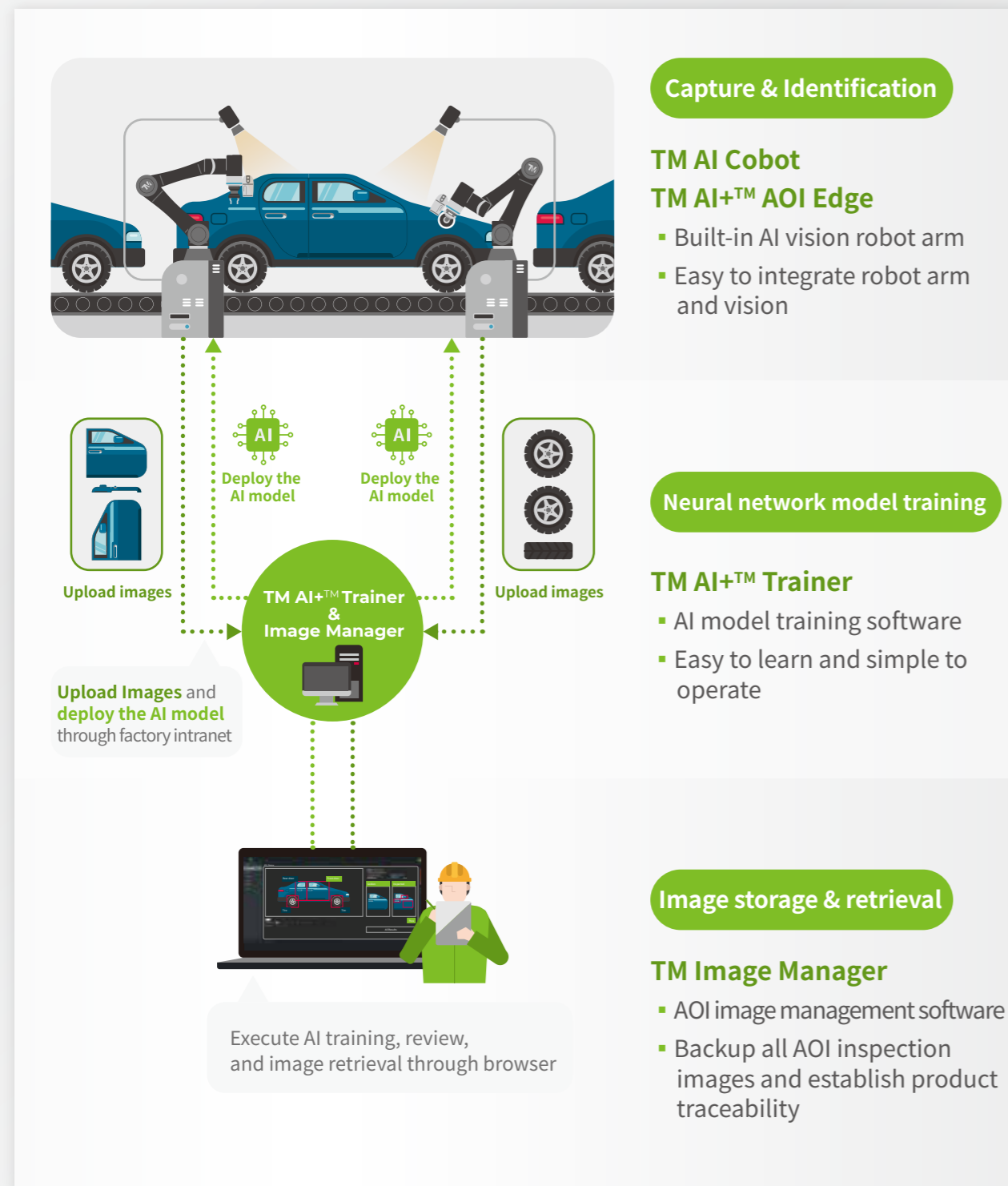


AI Vision Software

Powering the future of factories with AI power

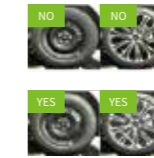
AI Vision Operating Architecture

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.



Application Examples

Assembly Inspection



- Checking if the tires are wrapped with PE film



- Checking if all wires are connected correctly

Classification

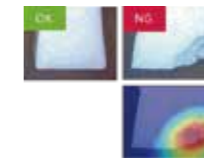


- Sorting different materials for wooden furniture

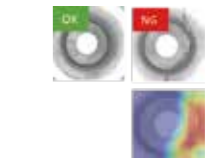


- Recognition of pizza flavor and crust

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



Simple, efficient, and fast production line introduction

■ Screw Plug&Play example

TMPlug&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											
Max. 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) IP54 (Control Box)				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), TMsript (script based), TMcrafter (developer based)												
Certification	TÜV certificated ISO 13849-1, ISO 10218-1, ISO/TS 15066 SGS certificated UL1740, CAN/CSA 2424-14 (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) Optional on others and total weight will increase by 500g.													

Specification												
TM14S	TM20S	TM25S	TM30S	TM14S-M	TM20S-M	TM25S-M	TM30S-M	TM14S-X	TM20S-X	TM25S-X	TM30S-X	
33kg	33.3kg	82.1kg	81.1kg	33kg	33.3kg	82.1kg	81.1kg	32.7kg	33kg	81.8kg	80.8kg	
14kg	20kg	25kg	30kg	14kg	20kg	25kg	30kg	14kg	20kg	25kg	30kg	
1100mm	1300mm	1902mm	1702mm	1100mm	1300mm	1902mm	1702mm	1100mm	1300mm	1902mm	1702mm	
+/- 360°												
+/- 159°	+/- 162°	+/- 166°	+/- 170°	+/- 159°	+/- 162°	+/- 166°	+/- 170°	+/- 159°	+/- 162°	+/- 166°	+/- 170°	
130°/s	130°/s	100°/s	100°/s	130°/s	130°/s	100°/s	100°/s	130°/s	130°/s	100°/s	100°/s	
130°/s	95°/s	100°/s	100°/s	130°/s	95°/s	100°/s	100°/s	130°/s	95°/s	100°/s	100°/s	
210°/s	125°/s	130°/s	130°/s	210°/s	125°/s	130°/s	130°/s	210°/s	125°/s	130°/s	130°/s	
225°/s	160°/s	195°/s	195°/s	225°/s	160°/s	195°/s	195°/s	225°/s	160°/s	195°/s	195°/s	
225°/s	190°/s	210°/s	210°/s	225°/s	190°/s	210°/s	210°/s	225°/s	190°/s	210°/s	210°/s	
450°/s	225°/s	225°/s	225°/s	450°/s	225°/s	225°/s	225°/s	450°/s	225°/s	225°/s	225°/s	
4.5m/s	4.5m/s	5.2m/s	5.2m/s	4.5m/s	4.5m/s	5.2m/s	5.2m/s	4.5m/s	4.5m/s	5.2m/s	5.2m/s	
+/- 0.03mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.03mm	+/- 0.05mm	+/- 0.05mm	+/- 0.05mm	+/- 0.03mm	+/- 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) IP54 (Control Box)				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), TMsript (script based), TMcrafter (developer based)												
TÜV certificated ISO 13849-1, ISO 10218-1, ISO/TS 15066 SGS certificated UL1740, CAN/CSA 2424-14 (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		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			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			
						+/- 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) 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°	+/- 360°	+/- 360°
	J2,J4,J5	+/- 180°	+/- 180°	+/- 180°	+/- 360°	+/- 360°
	J3	+/- 155°				
Speed	J1,J2	180°/s				
	J3	180°/s				
	J4	225°/s				
	J5	225°/s				
	J6	225°/s				
Max. 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				
I/O	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
<p>^{*(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.</p>	



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)}
<p>^{*(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.</p>	

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