

# TECHMAN ROBOT

## The future is here, AI Cobot

Native AI engine + Robotic arm + Vision system  
**Perfectly in one**



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Techman Robot |

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Still using the traditional collaborative robot in the era of AI?

The future is here, **AI Cobot**

**TM AI COBOT**

Equipped with **Native AI engine + Robotic arm + Vision system**

A perfect combination of brain, hands and eyes

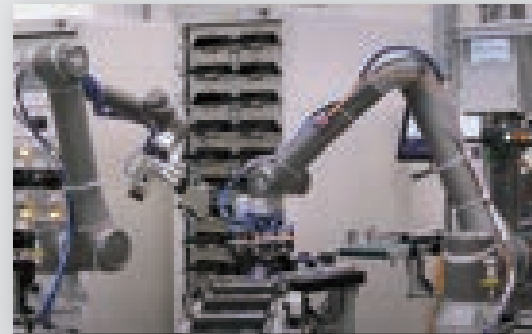
All robots should be this **Smart, Simple** and **Safe**



# Application advantages of TM AI Cobot

## Pick & Place

- Use TM Landmark to flexibly configure the arm and surroundings
- 2D Vision for high positioning accuracy with a repeatability error of  $0.07 \pm 0.02$ mm
- 3D Vision to support pick application of disorderly stacked materials and the positioning of non-planar objects
- Fence-free



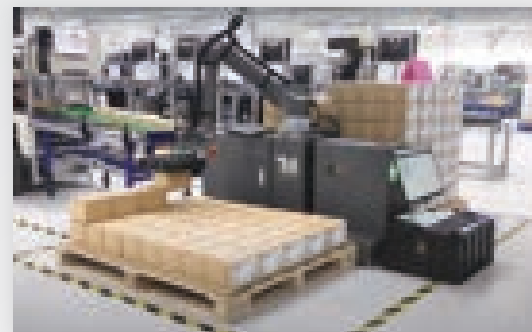
## Autonomous Mobile Robot (AMR)

- Use TM Landmark to smartly compensate the repeatability error of self-propelled vehicle to specified position
- M series enables easy AMR integration through DC power input



## Palletizing

- Use TM Landmark to accelerate the positioning of incoming material
- 2D Vision for different incoming materials and classification
- Support palletizing of 2 kinds of boxes, pallet change and de-palletizing
- Integrated pillar with a maximum stack height of 230cm



## Welding

- TMflow™ UI for simple and easy welding instruction
- Simple operation with direct manual instruction. Paths are automatically generated by the program to allow the user to start welding in a few minutes
- An exclusive parameter setting page for welding offers general functions like voltage, current, speed, swing arc, etc.
- Equipped with an exclusive welder setting interface for quick communication setting between the arm and welder, applicable to most welders in the market



## Food & Service

- Use TM Landmark to flexibly deploy the arm and surroundings
- Collaborate with human and fence-free
- AI Vision for recognition and quality inspection of irregular items (like takoyaki)



## AOI Inspection

- AI & Machine Vision supports applications like barcode reading, character recognition, assembly check, measurement and defect inspection
- Use TM Landmark to flexibly deploy the arm and surroundings
- 2D & 3D Vision for incoming material positioning error compensation
- TM Image Manager for image storage and search and creation of product digital history



# TM AI Cobot

TM AI Cobot incorporates high functionality and compatibility and achieves tasks through a perfect integration of built-in vision system which allows the robot to see, AI brain that translates image data into commands to perform tasks like recognition, positioning and detection and an arm completing the work smoothly. In the era of AI, TM AI Cobot is the best and smartest choice for smart factory.



## TM5-700

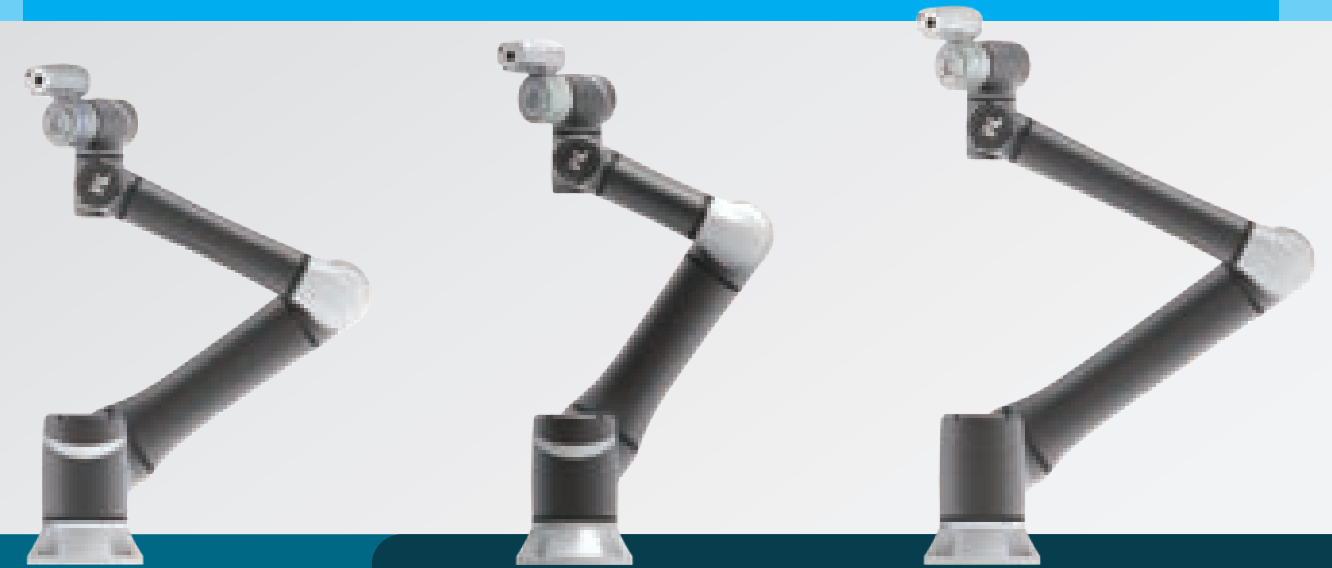
- Reach: 700 mm
- Payload: 6 kg

## TM5-900

- Reach: 900 mm
- Payload: 4 kg

## TM12

- Reach: 1300 mm
- Payload: 12 kg



## TM14

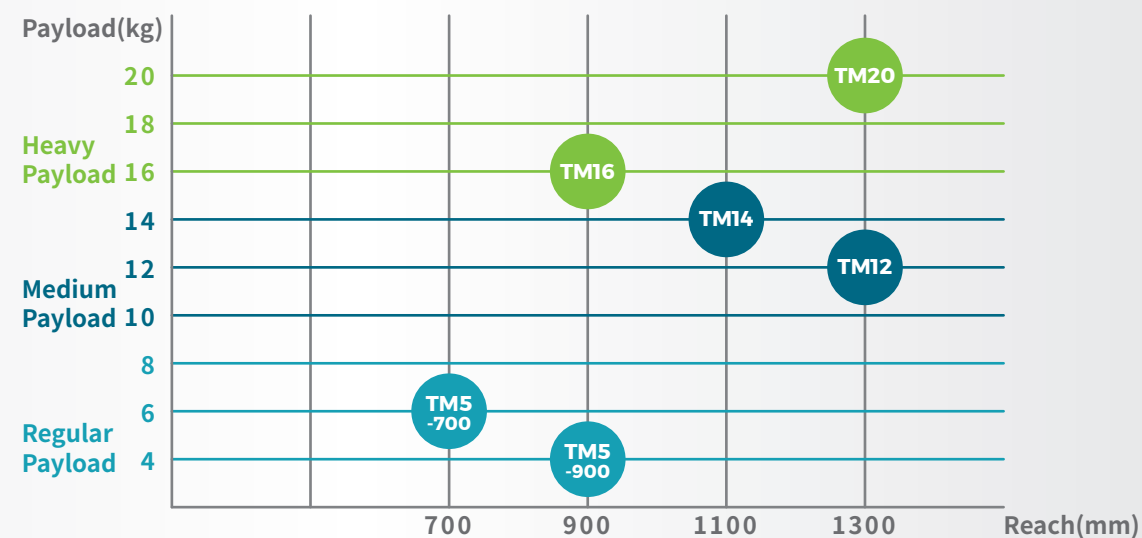
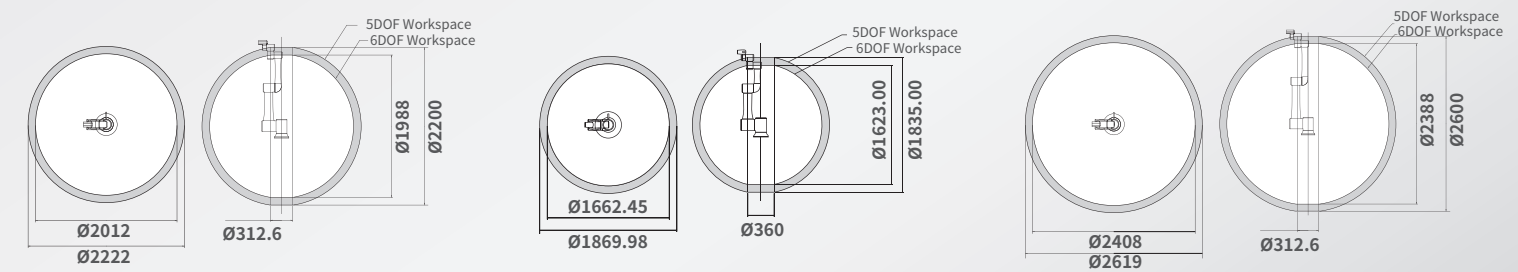
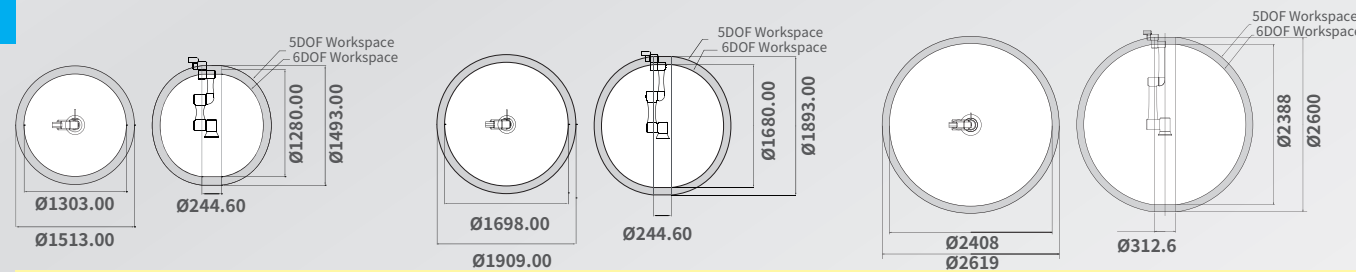
- Reach: 1100 mm
- Payload: 14 kg

## TM16

- Reach: 900 mm
- Payload: 16 kg

## TM20

- Reach: 1300 mm
- Payload: 20 kg



## Industries Application

### TM5-700

3D Bin Picking, Assembly, Labeling, PCB Handling, Pick & Place, Polishing & Deburring, Quality Inspection, Screw Driving.

### TM5-900

3D Bin Picking, AGV, Assembly, Labeling, Conveyor Tracking, Glue Dispensing, Machine Tending, Packaging, PCB Handling, Pick & Place, Welding, Screw Driving, Polishing & Deburring, Quality Inspection.

### TM12/ TM14

3D Bin Picking, AGV, Conveyor Tracking, Injection Molding, Machine Tending, Packaging, Palletizing, PCB Handling, Pick & Place, Welding, Polishing & Deburring, Screw Driving.

### TM16/ TM20

3D Bin Picking, AGV, Conveyor Tracking, Injection Molding, Screw Driving, Machine Tending, Packaging, Palletizing, Pick & Place, Welding, Polishing & Deburring.





# TM AI Cobot

# TMflow™

## TM5X / TM12X / TM14X / TM16X / TM20X Pure Cobot Arm without Embedded Vision

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.



## TM5M / TM12M / TM14M / TM16M / TM20M TM Mobile Series

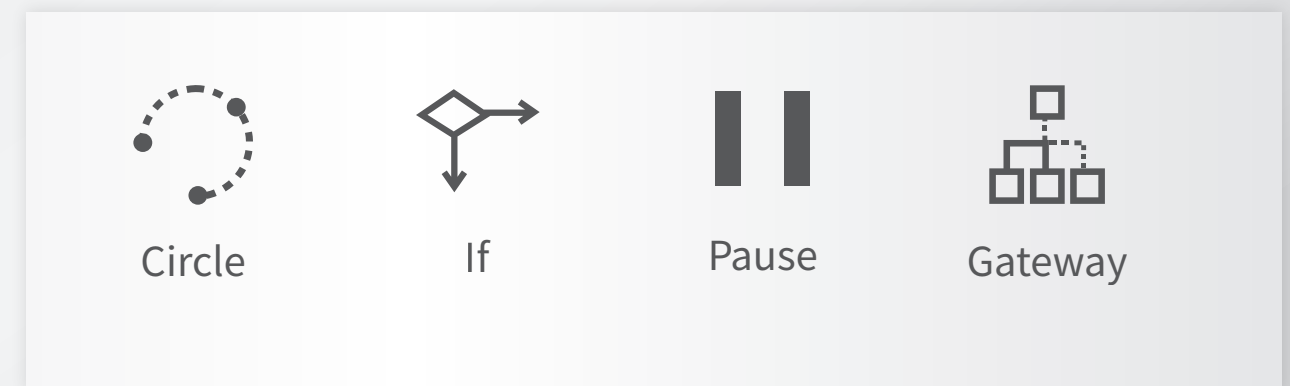
TM Mobile Series cobots can be integrated with almost all AGV/AMR brands on the market. With its embedded vision and TM Landmark vision function, the mobile series is extremely suitable for applications and tasks that require mobility. Such as machine tending or palletizing.



TMflow™ is the innovative graphical UI of TM AI Cobot. It includes dozens of function nodes that are shown as different icons. Users can drag and combined these nodes to make a set of motion for robot arms to complete the task instead of coding.



▪ Graphical user interface

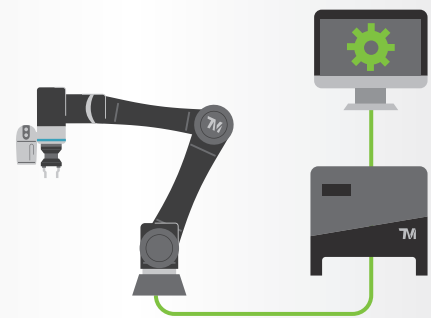


▪ Using different function nodes to compile a task

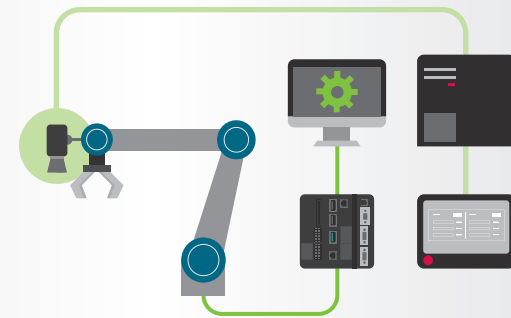
## A perfect integration of collaborative arm and machine vision

### 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
- Complete settings of the arm and vision function within one software. No need to learn 2 sets of software or worry about potential system compatibility or interface problem



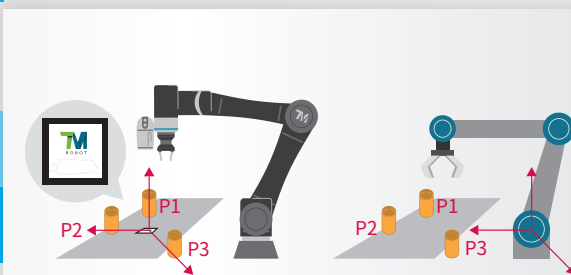
▪ TM built-in vision, integrated in one system



▪ Arm + external vision, need to integrate different systems

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

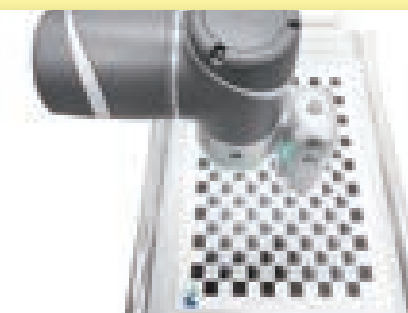
## TMvision™



- 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!

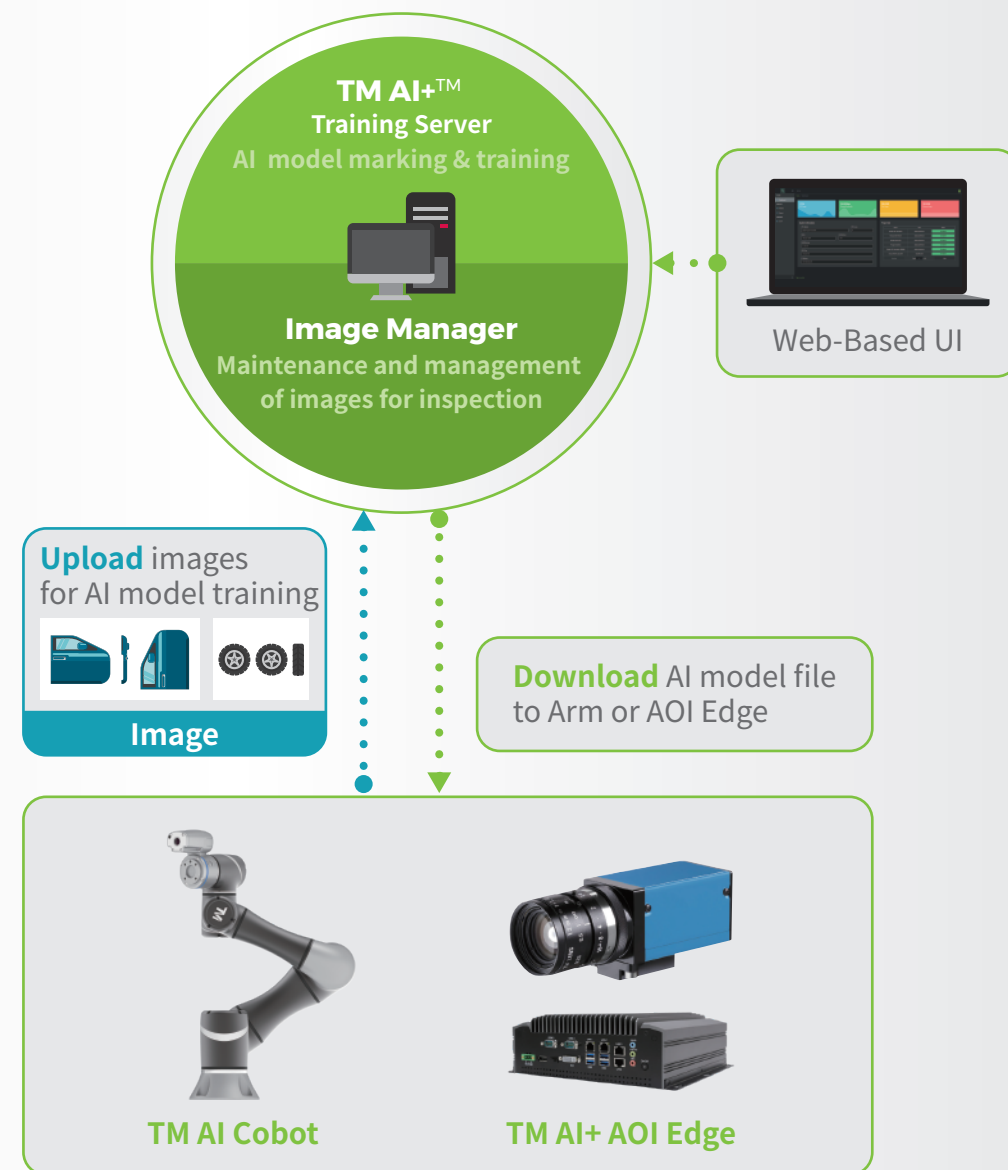
## Built-in vision application

<b>Positioning</b>	Eye-in-Hand	Eye-to-Hand	Upward-looking	Conveyor Tracking
<b>Recognition</b>	Barcode/QR code Reading	OCR		
<b>Measurement</b>	Distance and Angle Measurement	Count (Irregular Object)	Count (Shape)	Count (Image)
<b>AI inspection</b>	Image classification	Object detection	Defect detection	

# AI Vision

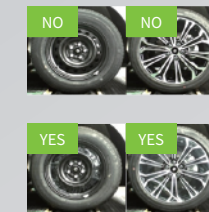
The graphical interface of TM AI Cobot's built-in vision system requires no programming and enables a complete process from AI collection, marking, training to deployment. AI Cobot is the best partner for SMEs without AI or software section. During production, AI Cobot generates big data of production history to facilitate the company to track, analyze and integrate data to prevent defects, improve quality and lower production cost.

## TM AI Vision Structure



## Application Examples

### Assembly Inspection

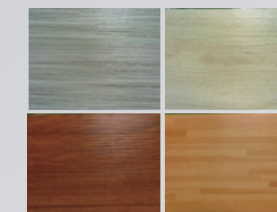


- Checking if the tires are wrapped with PE film

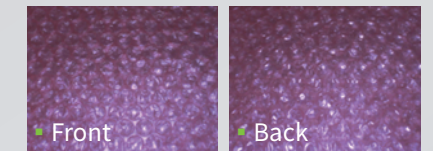


- Checking if all wires are connected correctly

### Classification

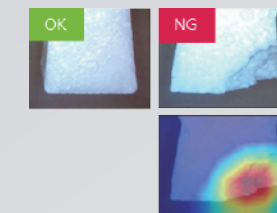


- Sorting different materials for wooden furniture

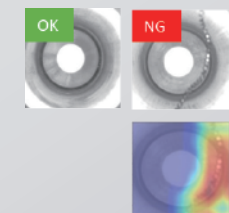


- Sorting the front and back side of bubble wrap

### 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



- Check if there are component missing on the PCBA

### Scratches /Cuts /Dents Inspection



- Checking scratches on DRAM gold fingers



- Checking the dents on metal parts





# AI Vision- TM AI+™ Training Server



# AI Vision- TM AI+™ AOI Edge

## Completely integrate hands, eyes and brain in automation field

TM AI+™ Training Server 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

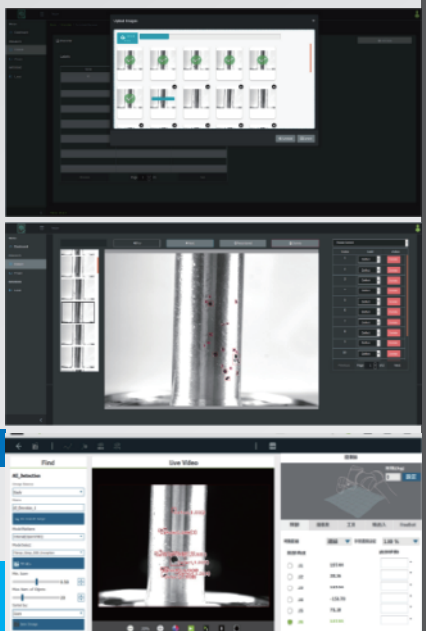
## 4 steps for easy AI model training

Image collection

Annotation

Training

Deployment



### Collect Image Data

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

### TM AI+™ Training Server

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

### Import AI model

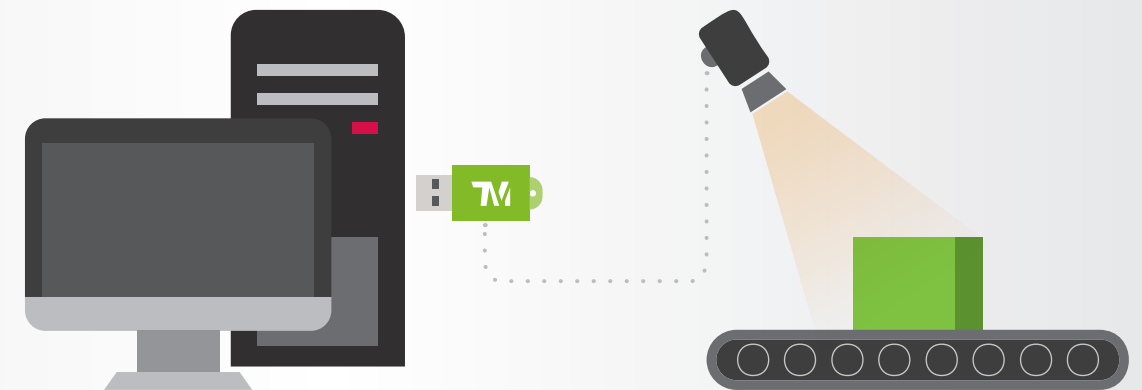
- Download the trained AI model from the training server onto TM Robot or external camera
- Begin AI inference

## The smart function software that helps you to deploy TMvision™ to all required spots in the factory

TMvision™, one of the most iconic functions of TM Robot, is now becoming more flexible to deploy. If you have requirements for setting up pure visual working areas in the factory or require multiple cameras in a single visual working area, TM AI+™ AOI Edge will be the best solution for you to optimize your implementation costs while fulfilling visual function needs.

### Features

- Easy integration of TM AI+™ to improve the precision and width of AOI inspection
- Support TM Plug&Play™ camera to save the time of camera integration
- User-friendly TMflow™ interface is easy to master. No need for experienced workers to learn new software



- TM AI+™ AOI Edge can be installed on any personal/industrial computer at production lines. After connecting the computer to external camera, the user can perform vision tasks like item recognition, image enhancement and measurement through TMvision™.





# AI Vision- TM Image Manager

# AI Vision- TM 3D Vision™

## Build quality traceability for your product

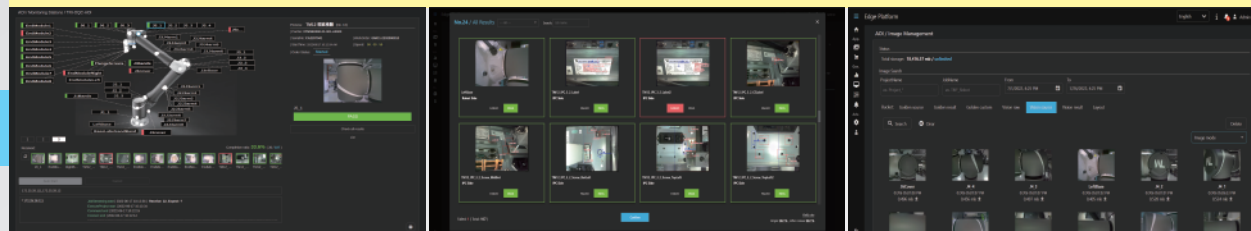
After an enterprise sells their product to customers, they will often need to deal with customers' feedback or complaints. Therefore, a comprehensive quality tracking system is essential for businesses to establish.

TM Image Manager is a software tool that is highly compatible with TM Robot's vision function. 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 will automatically be recorded as image data. These data can be reviewed anytime in order to increase inspection accuracy. Furthermore, a quality resume can also be built for each product and the potential costs needed for 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 misjudgment
- 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

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

When incoming materials are stacked on each other or placed in different ways, the positioning function will become invalid or its accuracy lowered because 2D vision of a general robotic arm cannot acquire 3D coordinates. To solve this, Techman developed TM 3D Vision™, a plug & play 3D machine vision solution to work with dedicated Plug&Play 3D camera, to expand the type of items recognizable by vision as well as improve the accuracy of vision positioning and arm movement.



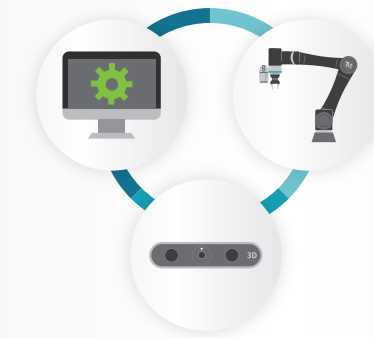
Robot from A Company



3D Camera from B Company



Software from C Company



## Traditional Solution

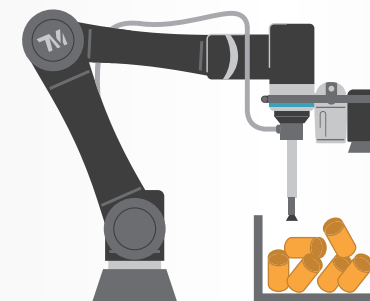
Requires more time and labor costs to integrate robot arm, 3D camera, and software from different brands

## All-In-one Solution

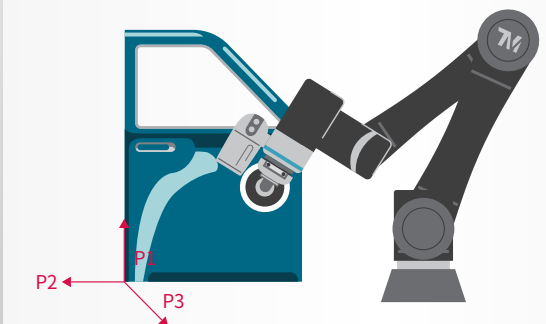
Significantly reduces integration costs and efforts, maintenance and accountability issues

## 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 application



▪ Picking up scattered materials

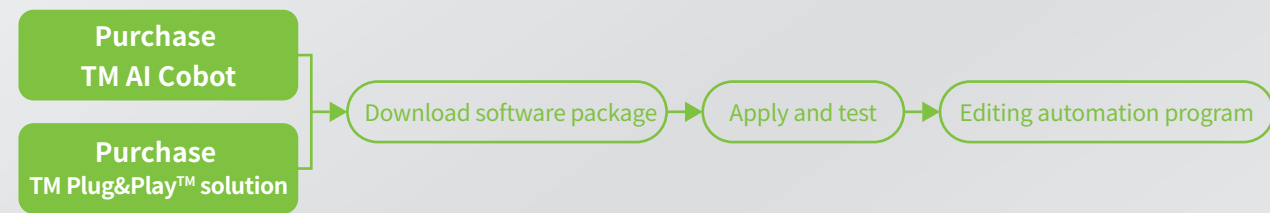


▪ Single item 3D positioning

# TM Plug&Play™ Solution

All leading robot peripherals work with Techman Robot and developed TM Plug&Play™ together, a suite integrating related software and hardware. All software and hardware are tested and verified to allow the user to download the software package and apply to the hardware they purchase. This can significantly reduce the time and labor costs required by producing hardware and programming for automation.

## Start to use within 5 minutes



## Simple, efficient, and fast production line introduction

Software package

+

Hardware package

▪ 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.

<b>ADLINK</b> EtherCAT I/O Expansion Modules	<b>Advantech</b> AIR-3002020 -TM AI+ Training Server	<b>ARS Automation</b> FlexiBowl® Kit for TM	<b>ASPINA</b> ARH350A Kit for TM	<b>ATI</b> 9105-TM-Axia80	<b>Basler</b> Industrial Camera
<b>CKD</b> RCKL/RHLF/RLSH -TM Gripper	<b>COBOTRACKS</b> Linear Motion Plug&Play for TM	<b>DH-Robotics</b> Adaptive Gripper DH-3 TM Kit	<b>EWELLIX</b> LIFTKIT-TM	<b>Flir</b> Industrial Camera	<b>Gimatic</b> KIT-TM-J
<b>HIWIN</b> Electric Gripper X-series	<b>IDS Ensenso</b> N35 3D camera	<b>Igus®</b> 3D e-chain TM Kit - PMA Tubes	<b>KILEWS</b> Screw Driver Solution	<b>Mindman</b> All-in-One Gripper for TM Robot (3-Finger)	<b>Murrplastik</b> Murrplastik FHS-SH-Set
<b>NABELL</b> Robot Flex	<b>NexCOBOT</b> TP-100-1 TM Kit	<b>OnRobot</b> Sander	<b>OnRobot</b> 2FG7	<b>OnRobot</b> Screwdriver	<b>Pickit</b> Pickit M bin picking TM Kit
<b>RoboDK</b> Simulation and Offline Programming Software for TM	<b>Robotiq</b> FTS-300-TM-KIT	<b>Robotiq</b> Adaptive Gripper, 2-Finger 85/140 TM Kit	<b>Schmalz</b> FXCB	<b>SCHUNK</b> Changing by SCHUNK - Plug & Work Portfolio Techman Robot	<b>SCHUNK</b> Gripper EGH in starter kit for TM
<b>SMC</b> Magnet Gripper Unit for Collaborative Robots	<b>TOYO</b> CHY2B-S80	<b>Weiss Robotics</b> GRIPKIT-CR-PRO-L	<b>Zimmer</b> HRC-03 TM-Kit	<b>ZLÍN ROBOTICS</b> Universal Mobile Stand	More Information on <a href="http://www.tm-robot.com">www.tm-robot.com</a>