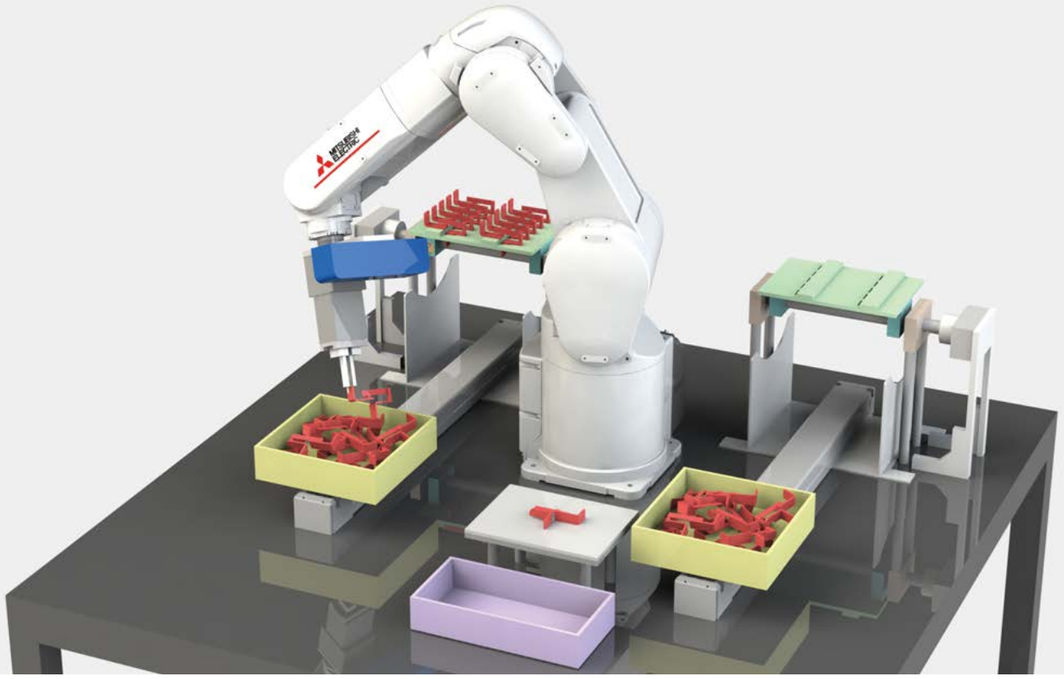
MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

Mitsubishi Electric Industrial Robot MELFA-3D Vision 3.0

MELFA-3D Vision 3.0



Feature 1

Lightweight and Compact

Feature 2

High-speed Picking

Feature 3

Auto Calibration Function

MELFA SmartPlus

This function is available with the optional function expansion card “MELFA SmartPlus.”

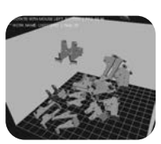
Models supporting vision sensors	N35-804-16-IR, N35-806-16-IR, N35-808-16-IR

Recognized parameter auto adjusting AI

AI automatically adjusts the 3D sensor parameters (image processing parameters, grip position recognition parameters) to the optimal values in the virtual space. Easy adjustment of complex parameters using 3D CAD data without a camera head. Substantially reduce the time required for vision sensor parameter adjustments.

Features - AI automatically adjusts parameters on PC - No technical knowledge required

3D part information



Reproduce bulk supply of parts via physical simulation

Reproduce part measurement and recognition via 3D sensor simulation

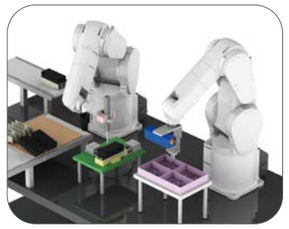
AI automatically adjusts sensor parameters

Maisart

Proprietary AI technology automatically and efficiently adjusts parameters to optimal values using large volume of learning data generated in virtual space

Lightweight and Compact

Smaller and more lightweight, equipped with ENSENSO camera head. Both hand-eye and fixed installation are available. Additionally, the camera itself supports oil mist environments (IP65/IP67), and increased workpiece distance and visual field allow for broader application. It flexibly supports everything from precision assembly of small parts to bulk picking from large pallets.



Small part assembly (hand-eye)

Picking from large pallet (fixed camera)

High-speed Picking

High-speed recognition technology reduces the time required for image recognition (30% improvement over previous model). Choose between modelless recognition for high-speed picking and model matching recognition for accurate recognition of workpiece position and orientation according to application.

Modelless recognition

A method of recognizing workpiece grip by registering the shape of the hand tip and suction pad and looking for a space to insert the tip or where the pad can stick. The shape of the workpiece does not need to be registered.

Model matching recognition

A method of recognizing workpiece grip by registering the shape of the workpiece using a 3D CAD model and looking for workpieces matching that model. This allows the grip location and orientation of the workpiece to be specified.

Auto Calibration Function

Equipped with an auto calibration function to automatically align the robot and vision sensor. This simplifies adjustment work.

■ **Start up**

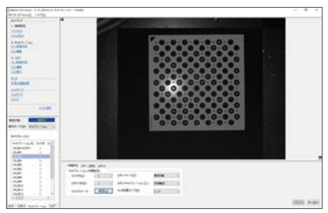
1 Attach vision sensor ▶ 2 Robot Calibration ▶ 3 Adjust measurement parameters ▶ 4 Adjust recognition parameters

Using vertical 6-axis robot

STEP 1

Imaging position teaching

Initialize and configure patterns



Initialization (items)
- Camera ID
- Robot ID
- Robot type
- Robot calibration
- Camera installation type
- Camera parameters

Pattern settings (items)
- Number of patterns
- Grid size (mm)

STEP 2

Generate calibration program

Press “Generate program” button to generate program

STEP 3

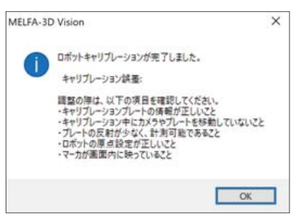
Start calibration

Open control panel and press “Start” button

(Calibration will start automatically)

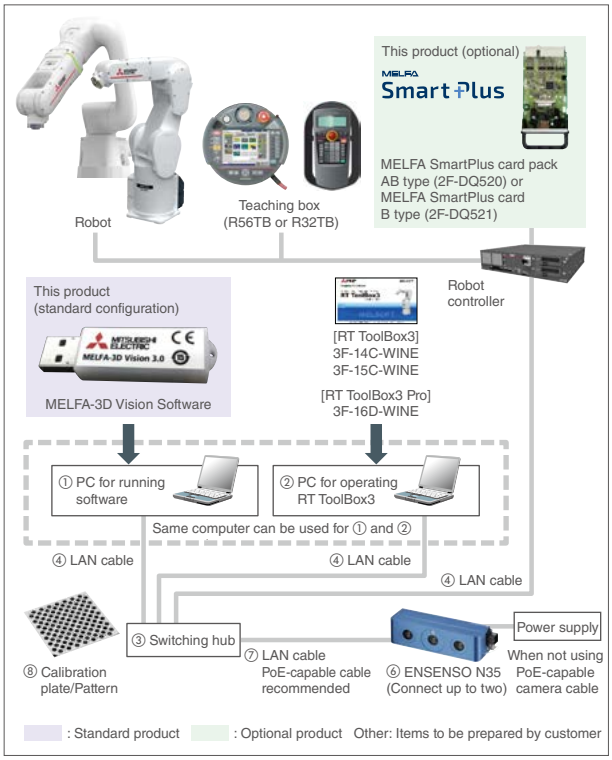
STEP 4

Calibration complete



Just 4 steps! Quick and simple setup!

Product components



Prepared by customer

Item	Overview of specifications	Quantity
① PC MELFA-3D Vision Software	OS: Windows 10 Professional/ Enterprise (64bit) CPU: Intel Core i7 (9th gen) RAM: At least 8GB HDD: At least 100GB Gigabit Ethernet port x 1	1
② PC for operating RT ToolBox3	RT ToolBox3 installed (can be same PC as (1) above)	1
③ Switching hub*1	At least 1000 BASE-T, PoE-capable	1
④ LAN cable	Cat 5e or higher	3 cake
⑤ Camera head attachment jig	-	1
⑥ Camera head*2	ENSENSO N35 series (infrared model) See table below. Manufacturer: ENSENSO GmbH Distributor: IDS Imaging Development Systems GmbH	1
⑦ LAN cable*3	Cat 5e or higher, PoE-capable Recommended: AD00268 (Distributor: IDS Imaging Development Systems GmbH)	1 cake
⑧ Calibration plate/Pattern	Compatible with camera head model selected for (6) Distributor: IDS Imaging Development Systems GmbH	1

*1. Use a switching hub that has Gigabit Ethernet capacity and is PoE-capable. If a PoE-capable cable is not used, a separate power cable will be necessary for the camera.
*2. There are models in the ENSENSO N35 series other than those in the table below. Check with IDS Imaging Development Systems GmbH for details.
*3. We recommend a PoE-capable LAN cable. If a PoE-capable cable is not used, a separate power cable will be necessary for the camera.

Our recommended models (Manufacturer: ENSENSO GmbH)

Model	N35-804-16-IR	N35-806-16-IR	N35-808-16-IR	N35-1204-16-IR	N35-1604-20-IR
Measuring range*1 (mm)	388 x 291 - 860 x 645	287 x 215 - 435 x 326	231 x 173 - 290 x 217	315 x 236 - 431 x 323	248 x 186 - 268 x 201
Minimum workpiece size (reference)	Modelless : Short side of 1/25 of measurable area - long side of 1/3 of measurable area Model matching: Short side of 1/10 of measurable area - long side of 1/3 of measurable area				
Measuring time	Approx. 0.8 seconds				
Recognition time*2	Modelless: Approx. 0.5 seconds/Model matching: Approx. 1 second				
Workpiece distance*3	480 - 1000	350 - 550	280 - 360	600 - 850	700 - 800
Focal distance	650	420	310	700	750
External dimensions (mm)	W175 x D52 x H50				
Weight [kg]	0.65				
Usage environment (°C)	0 - 45				
Protection level	IP65/ IP67				

*1. When using MELFA-3D Vision 3.0. Not the same as the camera head measuring range.
*2. Standard time from start of recognition to output. May exceed standard time depending on various conditions, including peripherals, workpiece, and processing parameters.
*3. Distance from front end of camera to what is measured. Whole range cannot be used simultaneously.
*4. You can select the optimal camera for the workpiece distance and measuring range on IDS Imaging Development Systems GmbH's website. (Camera selection tool)

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO 14001 (standards for environmental management systems) and ISO 9001(standards for quality assurance management systems)

ISO 14001 JACO EC 98 J 2017 UKAS MANAGEMENT SYSTEMS 0051

ISO 9001 BUREAU VERITAS Certification UKAS MANAGEMENT SYSTEMS 0008

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