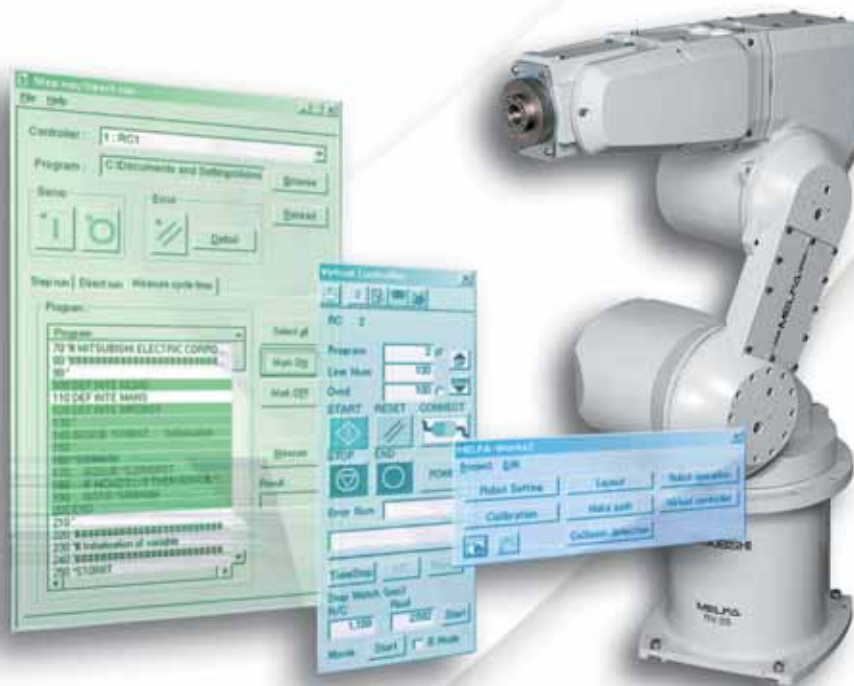


# MELFA SW

## Software for Industrial Robots

### Virtual engineering

Programming and vision software from your desktop



The ultimate add-in tool for the 3D CAD software "SolidWorks"



Automatically generate robot programs from existing CAD models to reduce installation and commissioning time



Complete robot simulation capability allows system design verification before purchasing hardware



Extract robot operation parameters from existing CAD data to avoid complex manual teaching

# Reduce project times and costs



Simulation of industrial robots with the SolidWorks® user interface

In today's global economy, competition can come from anywhere in the world. Established manufacturing methods need constant review. Robotics have made key contributions to quality and productivity, but implementing a robotic cell can be costly and time consuming.

## Virtual engineering

MELFA-Works from Mitsubishi Electric is an add-on tool for the widely popular SolidWorks® 3D CAD software package.

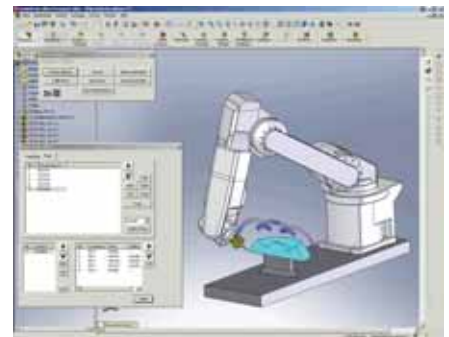
This powerful combination of software allows users to create and develop teaching position data and robotic programming sequences in a virtual world, i.e. without the need of hardware.

Together, MELFA-Works and the SolidWorks® platform can extend an existing robot simulation system with new capabilities and supplementary functions.

MELFA-Works provides extensive help and support. It also facilitates offline development and testing of robot programs that will be used later in real applications.

Production engineering needs to be fast and accurate. Few modern production facilities offer the chance for lengthy iterative R&D. This mandate seems mutually exclusive to complex robotics, with its opportunities for collisions, sub-optimal travel paths and other challenges.

MELFA-Works addresses this with a virtual engineering workbench which allows you to test and prove production environments using existing CAD data. Hence any design issues can be identified and resolved quickly before real hardware is ever purchased.



Following workpiece contours in MELFA-Works

## Test in real time

MELFA-Works is able to precisely simulate and determine system cycle times. Hence, users can test all parts of their program under real-time conditions, allowing quick and easy system optimization.

## A powerful software toolbox

MELFA-Works significantly reduces the engineering time and overheads involved in both robot teaching and operation through a powerful software toolbox. For example, the loading and organizing of parts data for external units can be made in the way that suits each user's unique requirements. Other highlights include the use of Automated Tool Changers (ATCs) generated by SolidWorks® to manage the installation of hand grippers.

Of course programs generated during simulation can be used directly or edited for deployment on robots with similar tasks, even multitasking modes can be simulated in the software's "task slot manager".

In addition, programs can be tested step-by-step or by direct execution, including observance of user defined breakpoints. Robot simulations can even be used in Jog mode.

The complete engineering environment also means additional axes can also be simulated along with I/O operation. Furthermore, the complete simulation (including movement paths) can be saved as an AVI video file for reference later on.

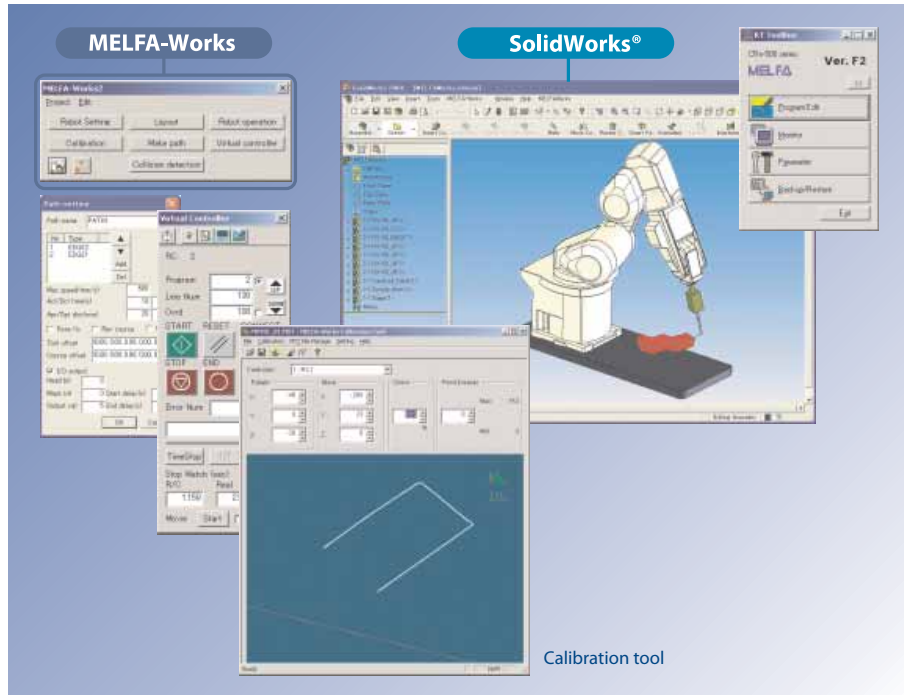
## Vision solutions made easy

MELFA-Works is complemented by MELFA-Vision. This software allows users to quickly and easily set-up and customize networked vision systems in-conjunction with robotic operation.

Vision solutions allow robot users the chance to either visually inspect production parts against predefined templates or to manage production parts delivered in a random presentation.

Once items are checked and oriented against an image "mask" the robot can then perform its assigned tasks.

MELFA-Vision allows data from up to seven networked vision sensors to be shared between three robots, reducing setup times and hardware costs as well as producing more compact engineering environments.



The interaction of MELFA-Works and SolidWorks®

### ■ Easy and efficient: MELFA-Vision

The MELFA-Vision software enables easy setup and programming using the MELFA Basic IV robot language. Standard job programs supporting various types of operations are provided. Using these programs, even a first-time user can simply operate vision sensor systems.

An easy calibration function is integrated as well as a log function that allows the user to check sensor images on a personal computer.

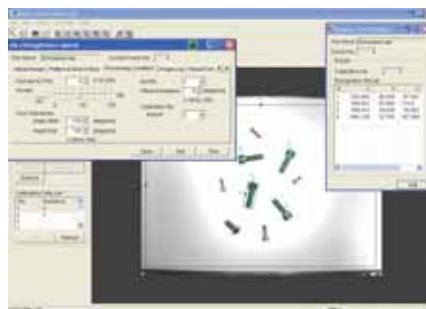
Network vision templates (job library) support pattern matching and blob functions, ready to use.

The enhanced high speed image processing function can detect moving parts, including those rotated 360 degrees.

The MELFA-Vision software is the only tool needed to easily and quickly customize vision applications.



Screen shot of reference point setting



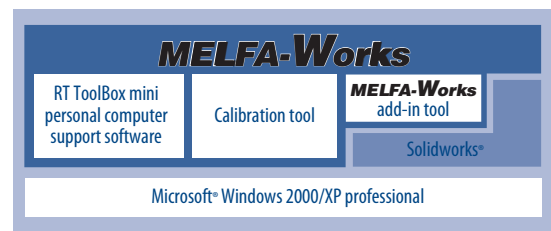
Screen shot of job editing

# Product Configuration ///

Name	Model	Quantity
3D simulator (SolidWorks® add-in tool)		
MELFA-Works	3D-21C-WINE	1

## Notes:

MELFA-Works is an add-in tool for SolidWorks® products. The customer needs to purchase or already have SolidWorks®. The personal computer support software (RT ToolBox mini) is preinstalled in the MELFA-Works CD-ROM. When MELFA-Works is installed, RT ToolBox mini is also installed automatically.



# Operating Environment ///

Operating environment of MELFA-Works	Required	Recommended
CPU	Intel Pentium 4 or compatible processor of 2.0 GHz or higher	Intel® Pentium™, Intel Xeon™, AMD® Athlon, AMD Opteron or other processor of equivalent performance class
Main memory	512 MB or more	1024 MB or more
Graphic display	XGA (1024x768) or higher	SXGA (1280x1204) or higher, with graphic board installed
Hard disk	Available disk space of 1GB or more	
Disk drive	CD-ROM drive	
Pointing device	Any device that operates in the Microsoft Windows® environment, with wheel button	
Keyboard	PC/AT compatible keyboard	
Operating system	Microsoft Windows® 2000 Professional SP4, Microsoft Windows® XP Professional (32-bit) SP2	
3D-CAD 12	SolidWorks® 2004 SP4.1 or more, SolidWorks® 2005	
External application	GX Simulator Version7 3	

- ① SolidWorks® 2006 is not supported.
- ② Due to the design specifications of SolidWorks®, data created in a higher version of SolidWorks® cannot be transferred to a lower version of SolidWorks®.
- ③ Use this application when simulating I/O signals with ladders.

Operating environment of the calibration tool	Recommended
CPU	Intel Pentium4 or compatible processor of 1.0 GHz or higher
Main memory	256 MB or more
Graphic display	XGA (1024x768) or higher
Hard disk	Available disk space of 1GB or more
Disk drive	CD-ROM drive
Pointing device	Any device that operates in the Microsoft Windows® environment, with wheel button
Keyboard	PC/AT compatible keyboard
OS	Microsoft Windows® 2000, Microsoft Windows® XP Professional
3D-CAD	Not required

Note: The calibration tool can be operated independently of MELFA-Works.

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