![MITSUBISHI ELECTRIC — Changes for the Better]

for a greener tomorrow — eco Changes

Mitsubishi iQ Platform Compatible Servo System Engineering Software

MELSEC iQ-R series

Intuitive engineering and operation environment.

Now, servo systems move one step ahead.

iQ Platform

Our outstanding servo system engineering software unlocks full potential of your machine

Our engineering software:

- allows you to configure desired systems with a great ease
- increases efficiency by covering a whole product development cycle - from system design, programming, debugging, to maintenance
- provides comprehensive support, from controller to servo amplifier
- is designed for more intuitive operation
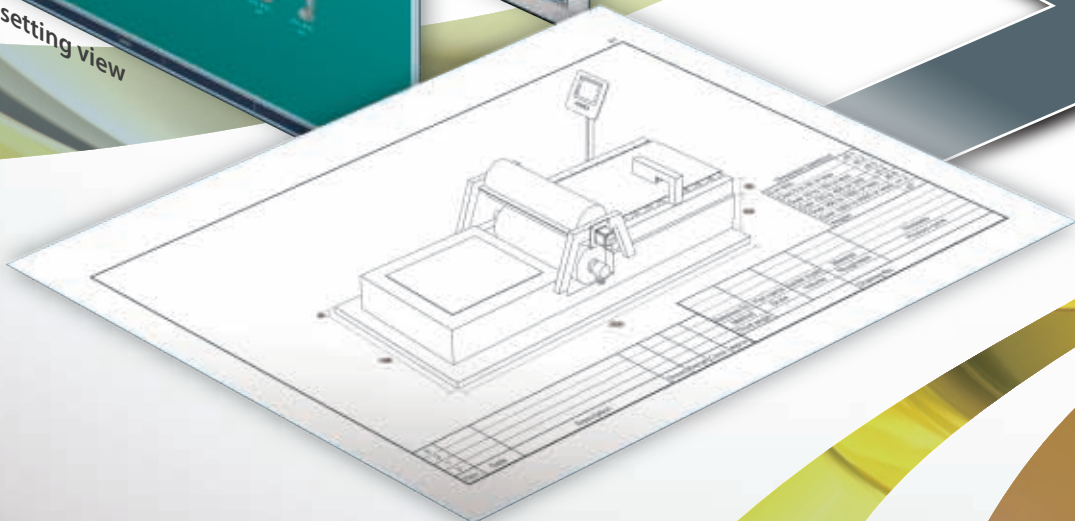- supports multiple languages

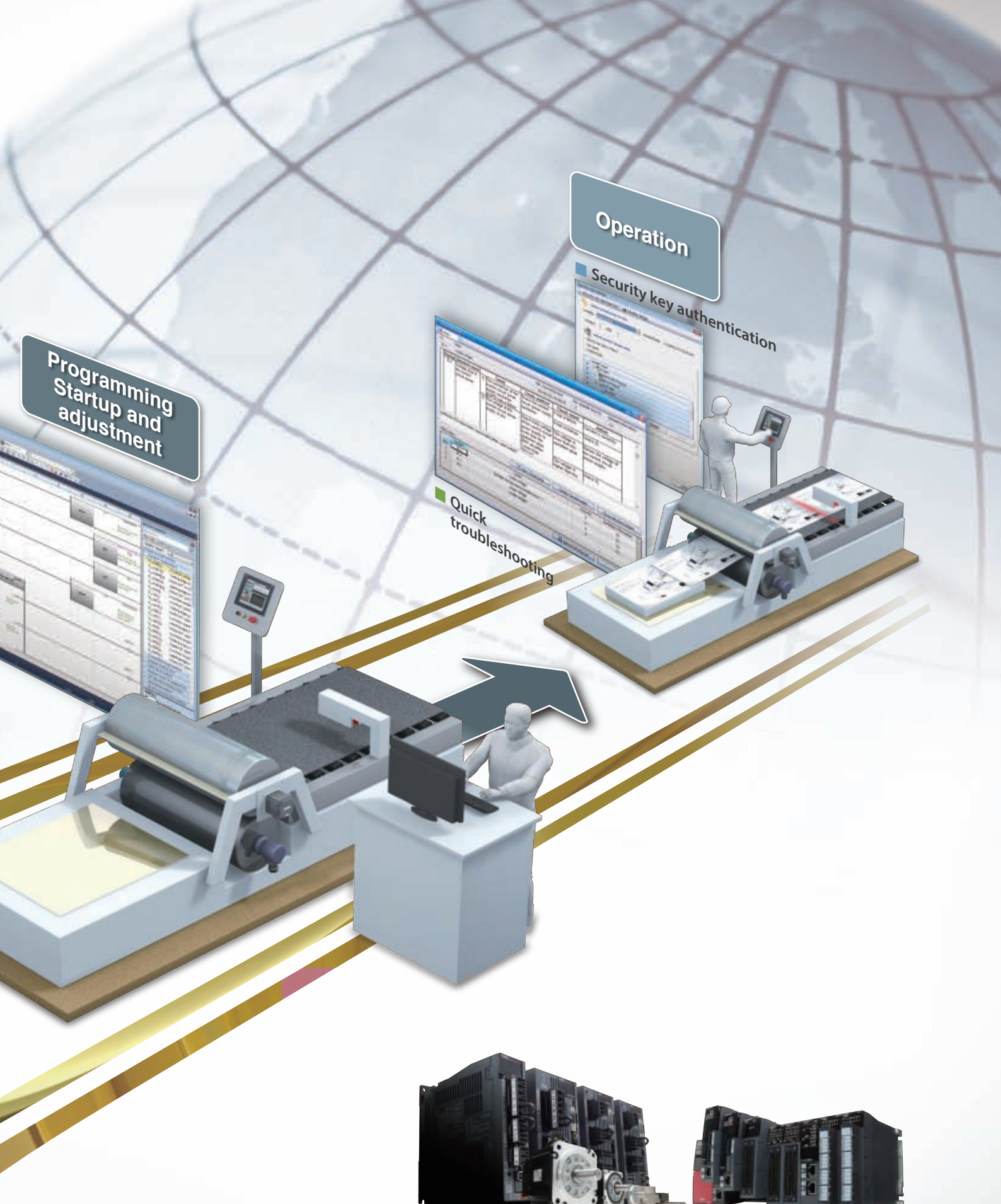Just one tool for programming

Easy servo setup

Capacity selection

System design

Various Motion control

Graphical setting view

Operation

Security key authentication

**Programming
Startup and
adjustment**

Quick
troubleshooting
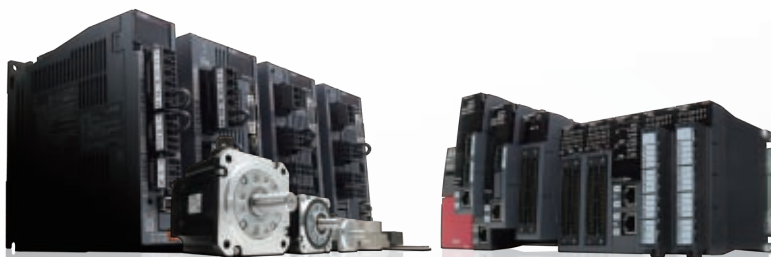
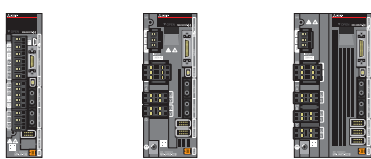**Mitsubishi iQ Platform Compatible**
Servo System Engineering Software

MELSOFT GX Works3 | MELSOFT MR Configurator2 | MELSOFT MT Works2 | AC Servo Capacity Selection

Servo System Engineering Environment

Mitsubishi Electric offers diverse software to fully support all phases of product development cycle- from sizing, system design, startup, to maintenance.

Simple Motion module	Servo amplifier			Servo motor		
MELSEC iQ-R series	MR-J4-B	MR-J4W2-B	MR-J4W3-B	Rotary servo motor	Linear servo motor	Direct drive motor

Servo amplifier	Servo motor		
MR-J4-A	Rotary servo motor	Linear servo motor	Direct drive motor

Motion controller	Servo amplifier			Servo motor		
MELSEC iQ-R series MELSEC-Q series	MR-J4-B	MR-J4W2-B	MR-J4W3-B	Rotary servo motor	Linear servo motor	Direct drive motor

| Servo amplifier				Servo motor		
MR-J4-B	MR-J4W2-B	MR-J4W3-B	MR-J4-A	Rotary servo motor	Linear servo motor	Direct drive motor
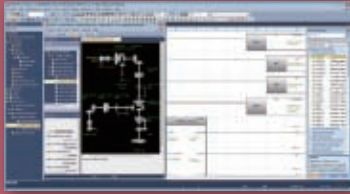
Programmable Controller Engineering Software

MELSOFT GX Works3

Supporting settings of Simple Motion modules as well as sequence program development

This software supports a whole product development cycle - from development, startup, debugging through maintenance of sequence programs, Simple Motion module parameters, and positioning/cam data.
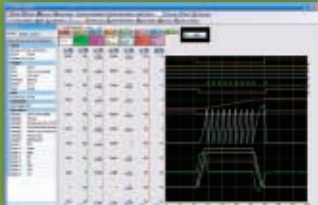
Servo Setup Software

MELSOFT MR Configurator2

Achieving a stable machine system, optimum control, and short setup time

Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer.

Motion Controller Engineering Software

MELSOFT MT Works2

Comprehensibly supporting Motion controller design and maintenance

With features including Motion SFC programming, parameter setting, and the digital oscilloscope function, etc., this software covers system configuration, programming, debugging, and maintenance for Motion controllers.

Servo Sizing Software

AC Servo Capacity Selection

The optimum servo amplifier, servo motor, and regenerative option can be selected just by setting machine specifications and operation pattern.

4
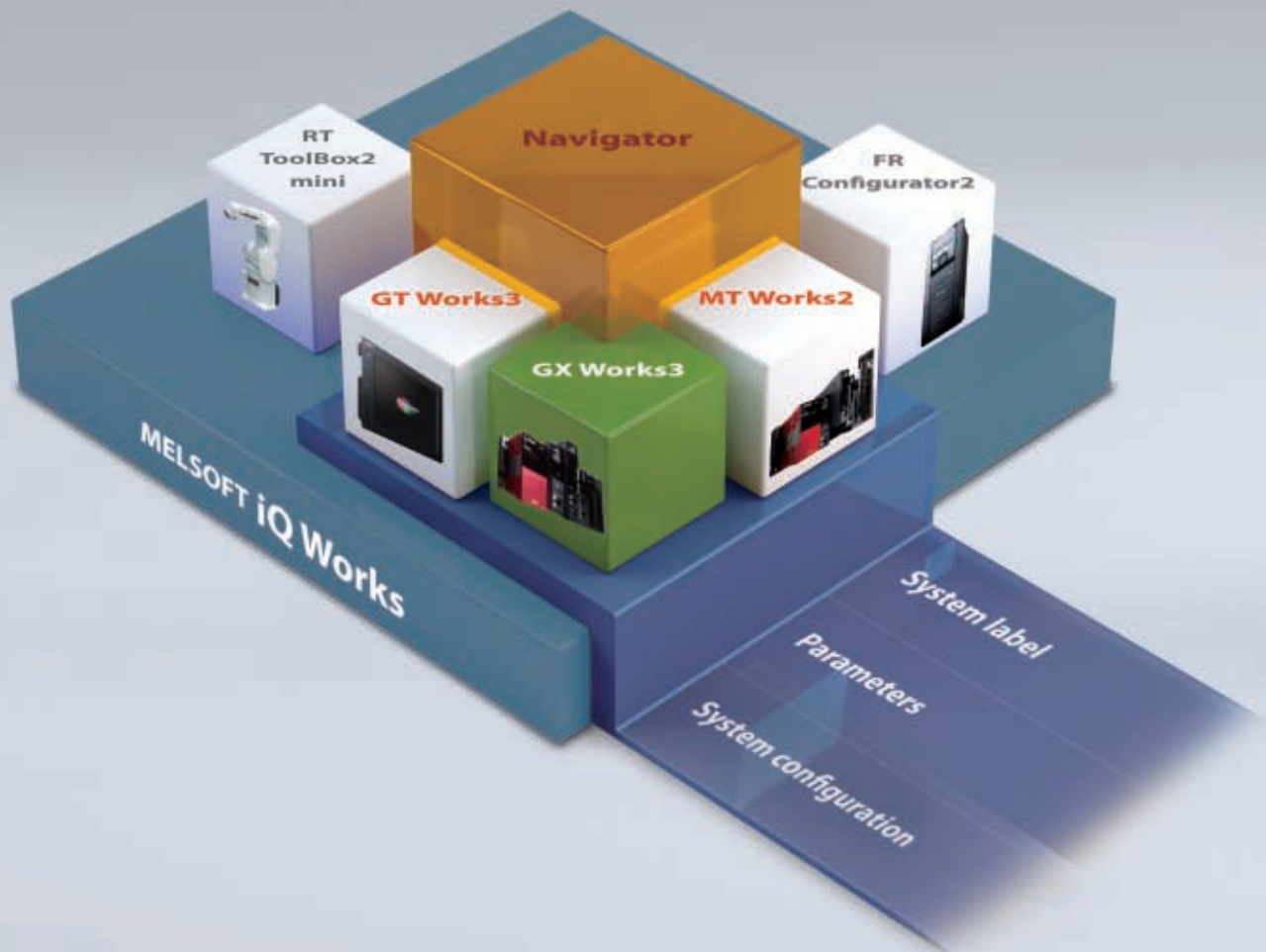
MELSOFT iQ Works is an integrated software suite consisting of GX Works3, MT Works2, GT Works3, RT Toolbox2 mini and FR Configurator2, which are programming software for each respective product. Integration is further enhanced with MELSOFT Navigator as the central system configuration incorporating an easy-to-use, graphical user interface with additional project-sharing features such as system labels and parameters. The advantages of this powerful integrated software suite are that system design is made much easier with a substantial reduction in repetitious tasks, cutting down on errors while helping to reduce the overall TCO (Total Cost of Ownership).

FA Integrated Engineering Software
MELSOFT iQ Works

System management software

MELSOFT Navigator

System level graphic-based configuration tool that simplifies the system design by providing a visual representation of the system. System management features such as system-wide parameterization, labels and block reading of project data are also included.

Programmable controller engineering software

MELSOFT GX Works3

GX Works3 is the latest generation of programming and maintenance software offered by Mitsubishi Electric specifically designed for the MELSEC iQ-R Series control system. It includes many new features such as graphic-based system configuration, integrated motion control setup, multiple language support, providing an intuitive engineering environment solution.

HMI/GOT screen design software

MELSOFT GT Works3

This integrated software is used to create professional screen designs for Graphic Operation Terminals (GOTs). Developed with the concepts of "Simplicity", "Sleekness", and "User-friendliness" in mind, this is a powerful tool that pushes boundaries and delivers endless design possibilities.

## Motion controller engineering software

MELSOFT MT Works2

This motion control design and maintenance software includes intuitive graphic-based programming together with a digital oscilloscope simulator.

## Robot engineering software

MELSOFT RT ToolBox2 mini

This robot setup software supports various steps from programming, to commissioning, evaluation, and maintenance. In addition, improved preventative maintenance is realized through the use of an integrated 3D robot simulator.
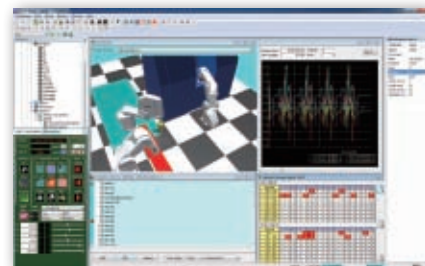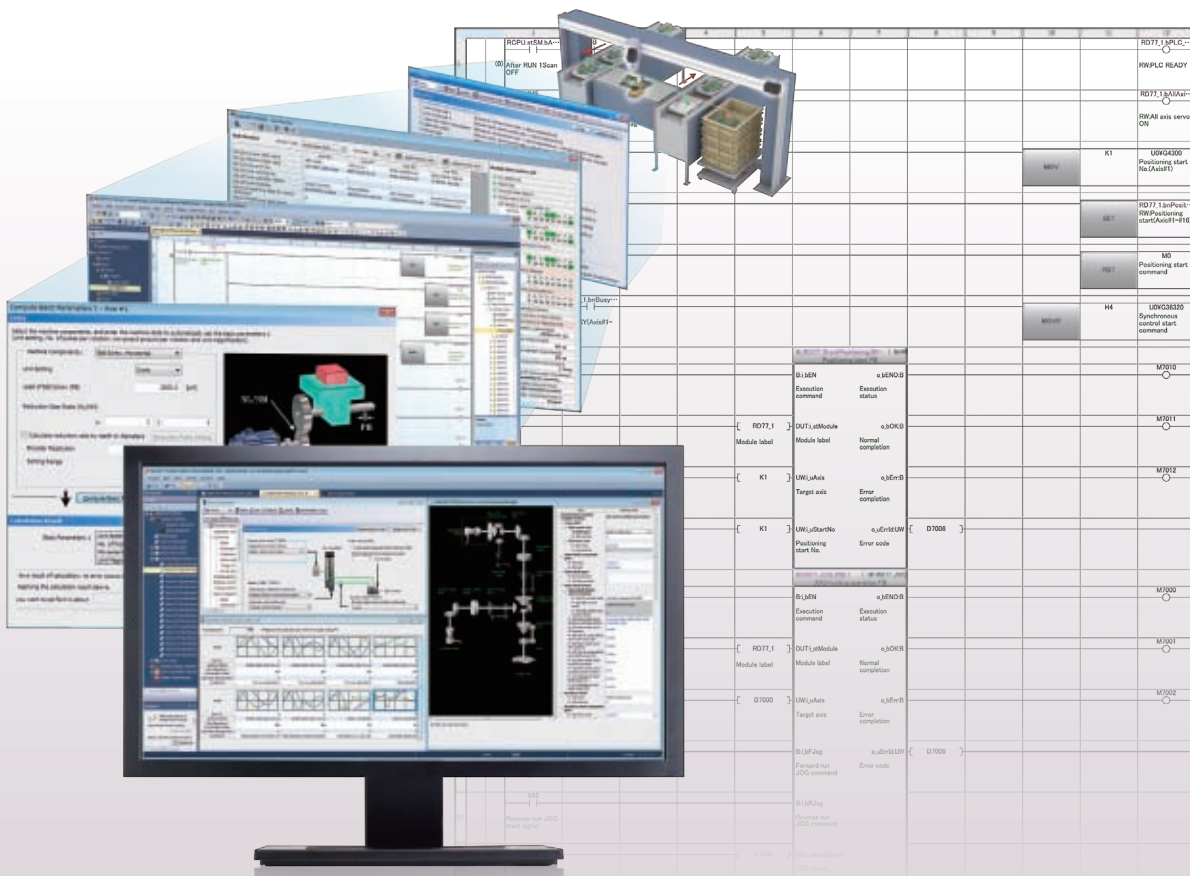
Inverter setup software

MELSOFT FR Configurator2

This software simplifies the setup and maintenance of AC Inverters. Parameters can be registered easily and distributed to multiple inverters when replacing, and activation of the PLC function all from one setup screen.
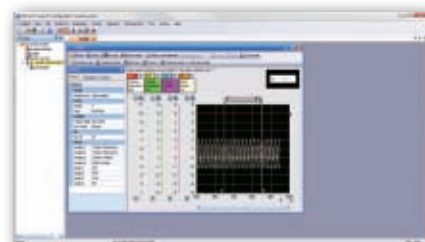
MELSOFT GX Works3

All-in-one Tool
for Quick and Easy Startup

This all integrated software offers a wide range of features - sequence program and function block creation, parameter settings for Simple Motion modules, servo adjustment and debugging.

Easy-to-use features
- Intuitive, point-and-click programming using module labels/FBs on the graphical user interface is achieved.
- Parameters for the Simple Motion modules and other modules can be set easily and managed collectively.
- MELSOFT GX Works3 conforms to an international standard, IEC 61131-3, supporting structured programming.
- Existing program assets can be easily imported.

Powerful security features protecting intellectual property
- Security key authentication function protects your project data.

Global realization by multi-language support
- Multiple languages (Japanese, English, and Chinese) are supported at various levels (Menu display, etc.).

All-in-one Software - MELSOFT GX Works3

Simple Motion Module Settings

This all-in-one software covers all aspects of the product development cycle - from system design, programming, to debugging and maintenance - maximizing efficiency and minimizing your effort.

Easy system design

No need for manuals in system and parameter settings

- MELSOFT GX Works3 includes everything needed, from system configuration to servo parameter settings.
- Servo parameter setting has been carried out more smoothly since MELSOFT MR Configurator2 is integrated.
- One-point help eliminates the need for manuals.

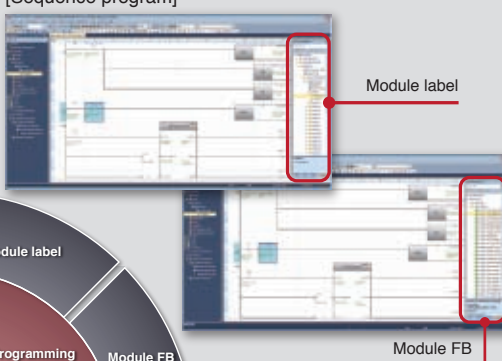[System configuration]

[Servo parameter]

Easy programming

Faster programming through point-and-click

- A sequence program can be created effortlessly via drag & drop of module labels/FBs.

[Sequence program]

Module label

Module FB

Graphical screen

Module label

MELSOFT MR Configurator2 integrated

System design

Programming

Module FB

Easy to Use

Servo adjustment

Startup, maintenance

Programming (Motion control)

Sub functions

Customization

Synchronous control
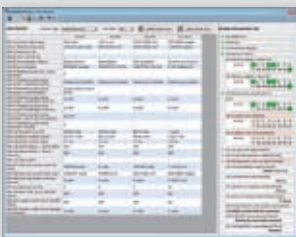
Easy startup

Easy servo adjustment with one-touch tuning function

[One-touch tuning]

[Axis monitor]

- Servo adjustment is automatically completed using the One-touch tuning function.
- Customizable axis monitor increases efficiency in startup.
- Operation can be checked easily through digital oscilloscope waveforms.

Easy Motion settings

Maximized usability in synchronous/positioning controls settings

[Synchronous control parameter]

[Positioning data]

- An array of sub functions helps you create positioning data.
- Synchronous control is achieved just by setting parameters.
- Cams are created easily. First, create a rough cam graph via drag & drop. Then, make it more precise by entering the numerical value.

Faster Programming through Point-and-click

**Just drag & drop the desired model name from the module list and module label list.
Module configuration and sequence program creation have become faster and simpler.**

1 Module configuration
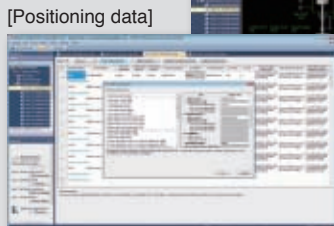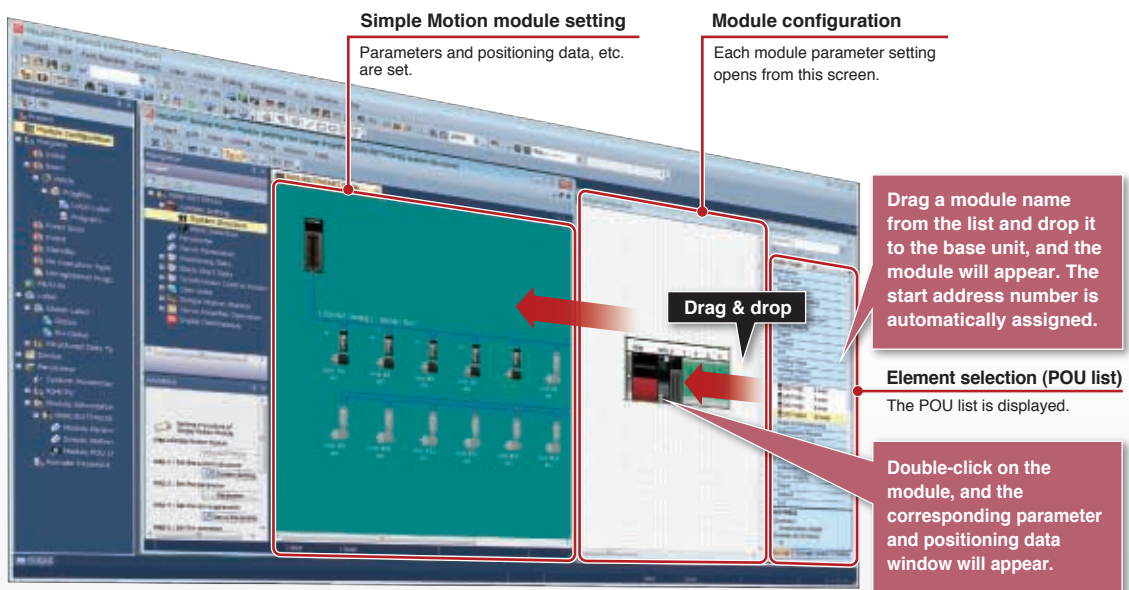
A system is simply and quickly designed just by selecting a module needed for your system via drag & drop.
The parameter and positioning data window appear by double-clicking on the desired module.

Simple Motion module setting
Parameters and positioning data, etc. are set.

Module configuration
Each module parameter setting opens from this screen.

Drag & drop

Drag a module name from the list and drop it to the base unit, and the module will appear. The start address number is automatically assigned.

Element selection (POU list)
The POU list is displayed.

Double-click on the module, and the corresponding parameter and positioning data window will appear.

2 Simple Motion module parameters

Basic parameters, such as electronic gear, etc., can be set just by choosing items from pull-down lists and inputting some required values.

Basic parameter calculation
The electronic gear is easily set just by setting the lead for ball screw, etc.
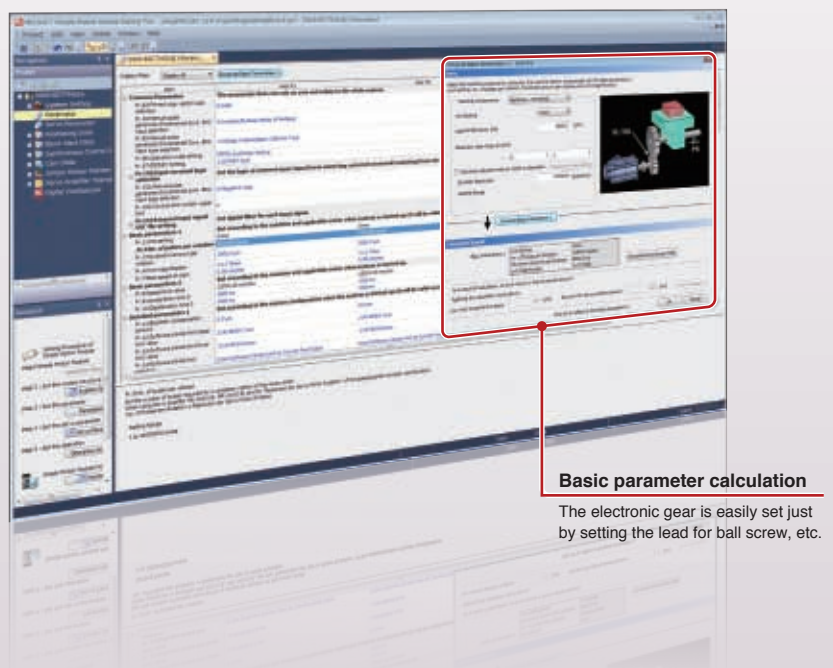
3 Sequence program creation

A sequence program can be created easily just by dragging a module FB and dropping it to the ladder editor.
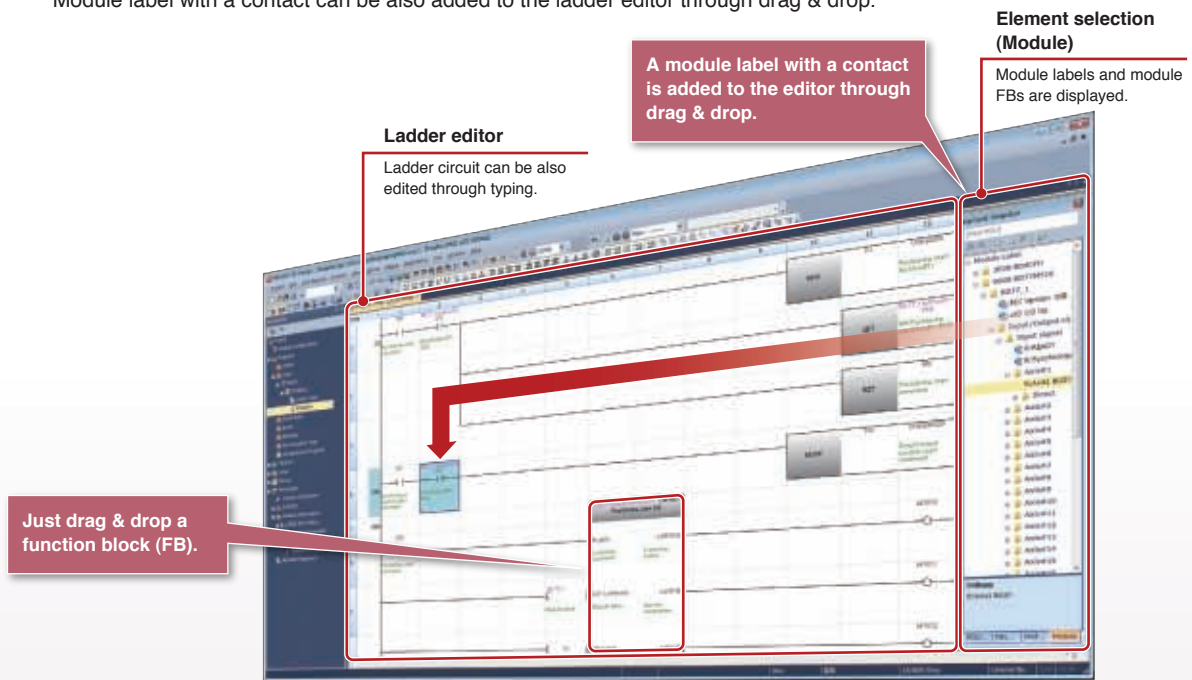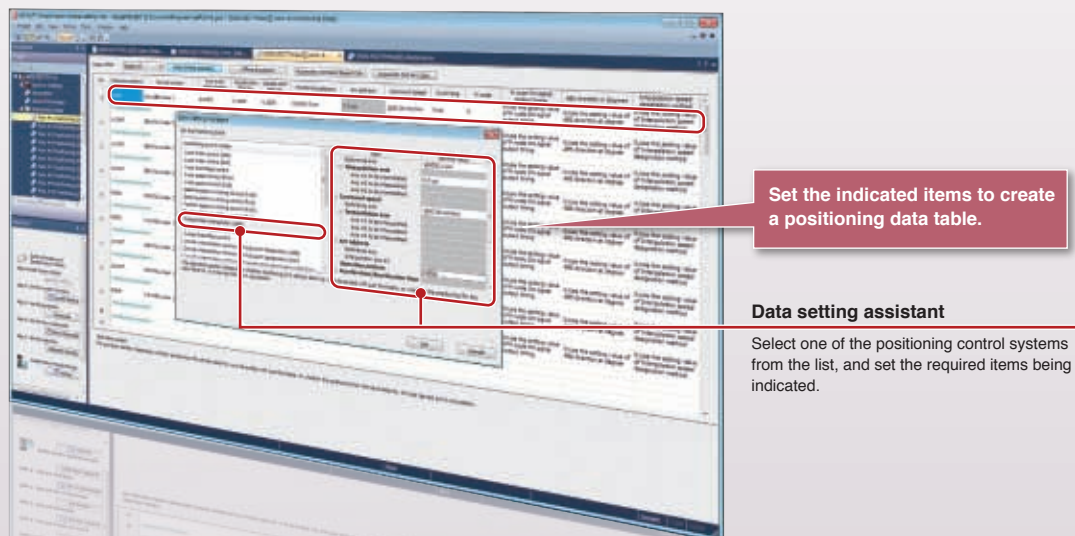Module label with a contact can be also added to the ladder editor through drag & drop.

Element selection (Module)

Module labels and module FBs are displayed.

A module label with a contact is added to the editor through drag & drop.

Ladder editor

Ladder circuit can be also edited through typing.
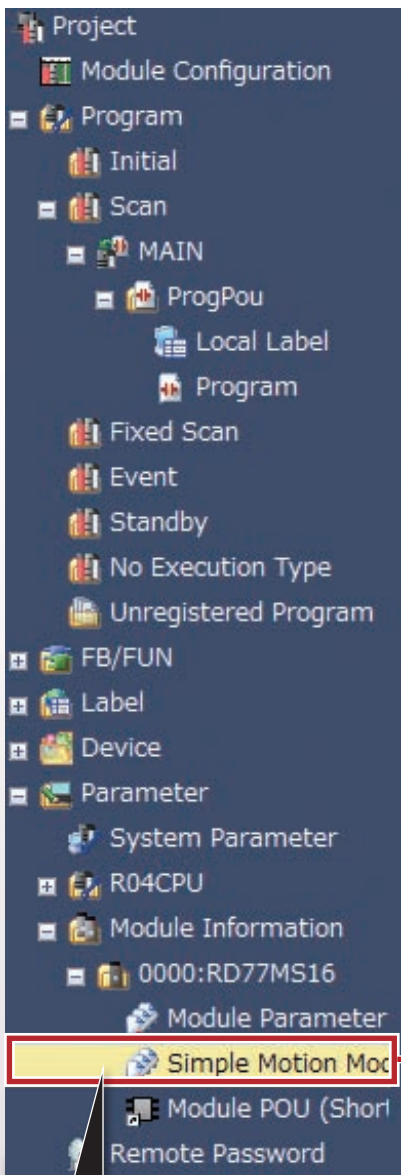
Just drag & drop a function block (FB).

4 Simple Motion module positioning data table

Positioning data table can be easily set with Data setting assistant function.

Set the indicated items to create a positioning data table.

Data setting assistant

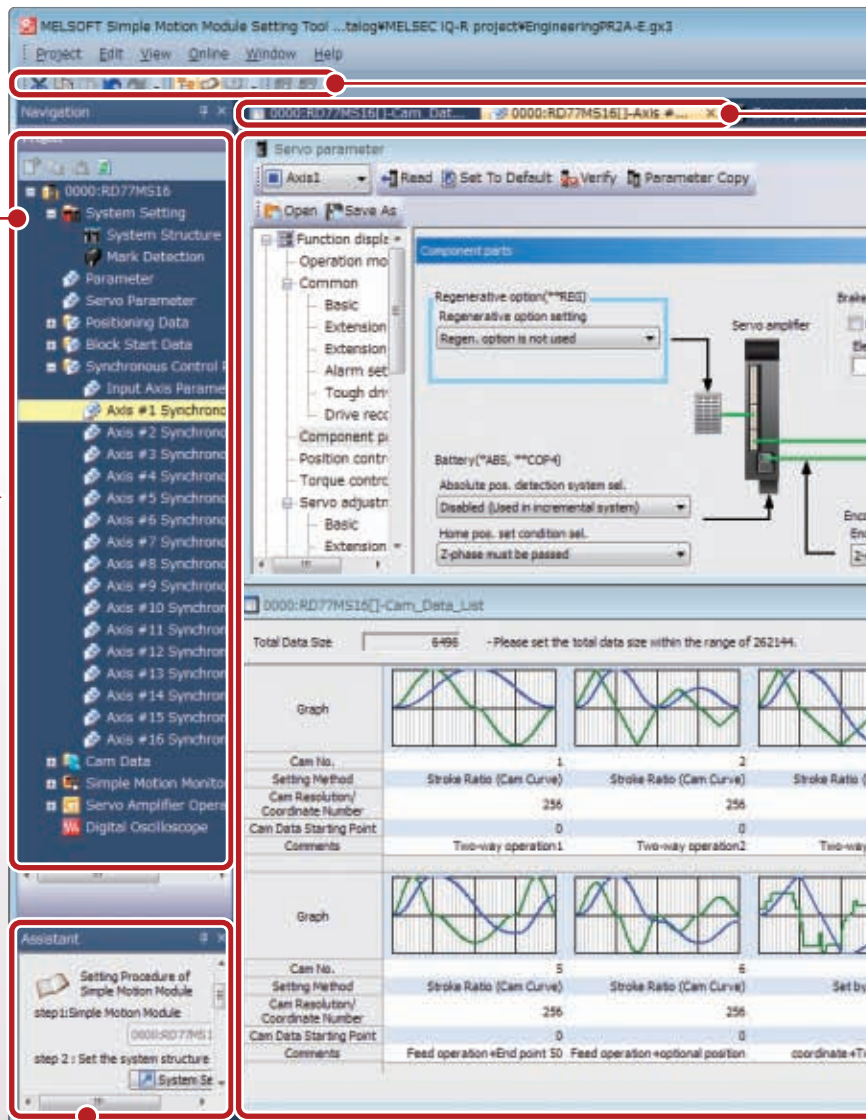Select one of the positioning control systems from the list, and set the required items being indicated.

MELSOFT GX Works3 Simple Motion module setting screen layout

Project window

Items are listed in tree structure.
Addition/Deletion of items are easy.

MELSOFT GX Works3 menu

Double click
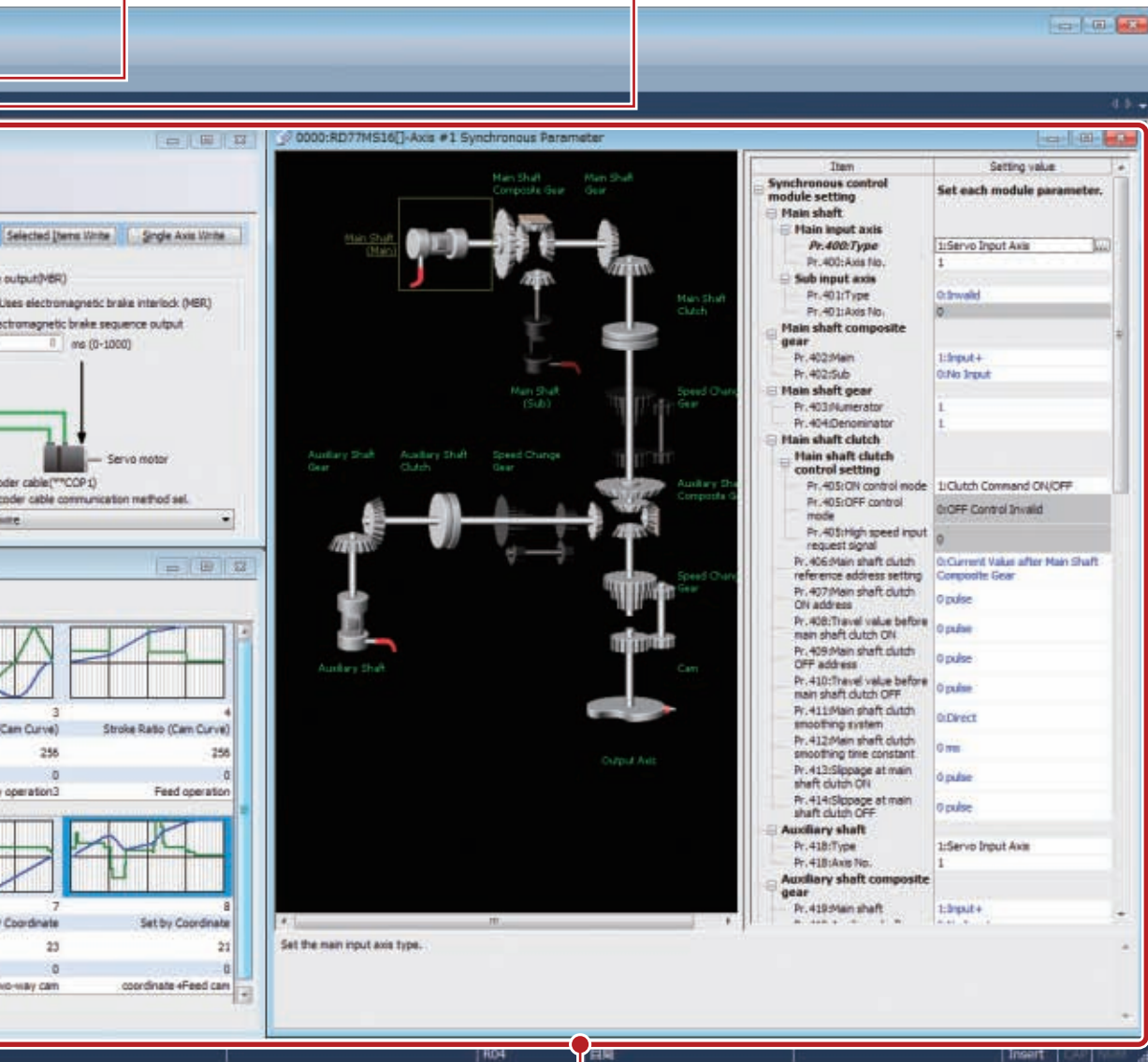

Assistant window

Selective tools further simplifying setup

Toolbar

Quick and easy access to the executable commands for each function

Tab

Windows can be switched using the tabs for more efficient work.

0000:RD77MS16[]-Axis #1 Synchronous Parameter

| Item	Setting value
Synchronous control module setting	Set each module parameter.
Main shaft	
Main input axis	
Pr.400:Type	1:Servo Input Axis
Pr.400:Axis No.	1
Sub input axis	
Pr.401:Type	0:Invalid
Pr.401:Axis No.	0
Main shaft composite gear	
Pr.402:Main	1:Input +
Pr.402:Sub	0:No Input
Main shaft gear	
Pr.403:Numerator	1
Pr.404:Denominator	1
Main shaft clutch	
Main shaft clutch control setting	
Pr.405:ON control mode	1:Clutch Command ON/OFF
Pr.405:OFF control mode	0:OFF Control Invalid
Pr.405:High speed input request signal	0
Pr.406:Main shaft clutch reference address setting	0:Current Value after Main Shaft Composite Gear
Pr.407:Main shaft clutch ON address	0 pulse
Pr.408:Travel value before main shaft clutch ON	0 pulse
Pr.409:Main shaft clutch OFF address	0 pulse
Pr.410:Travel value before main shaft clutch OFF	0 pulse
Pr.411:Main shaft clutch smoothing system	0:Direct
Pr.412:Main shaft clutch smoothing time constant	0 ms
Pr.413:Slippage at main shaft clutch ON	0 pulse
Pr.414:Slippage at main shaft clutch OFF	0 pulse
Auxiliary shaft	
Pr.418:Type	1:Servo Input Axis
Pr.418:Axis No.	1
Auxiliary shaft composite gear	
Pr.419:Main shaft	1:Input +

Set the main input axis type.

Work window

Parameters, servo parameters, and positioning data can be set here. Multiple screen display allows you to work on programming and debugging simultaneously.

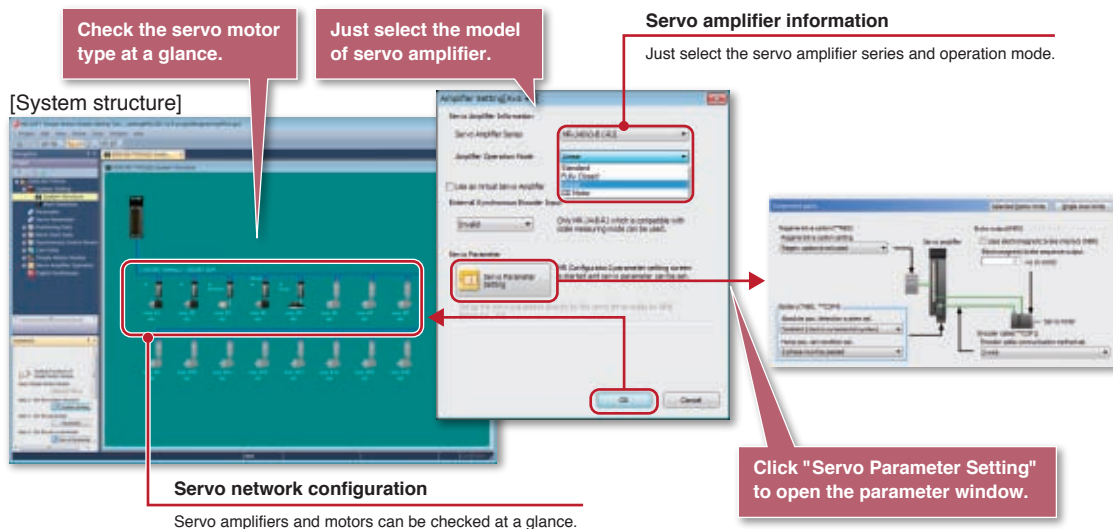# Intuitive Design for Efficient System and Parameter Settings

Project Window

The work items are listed sequentially in tree structure, which increases work efficiency further.
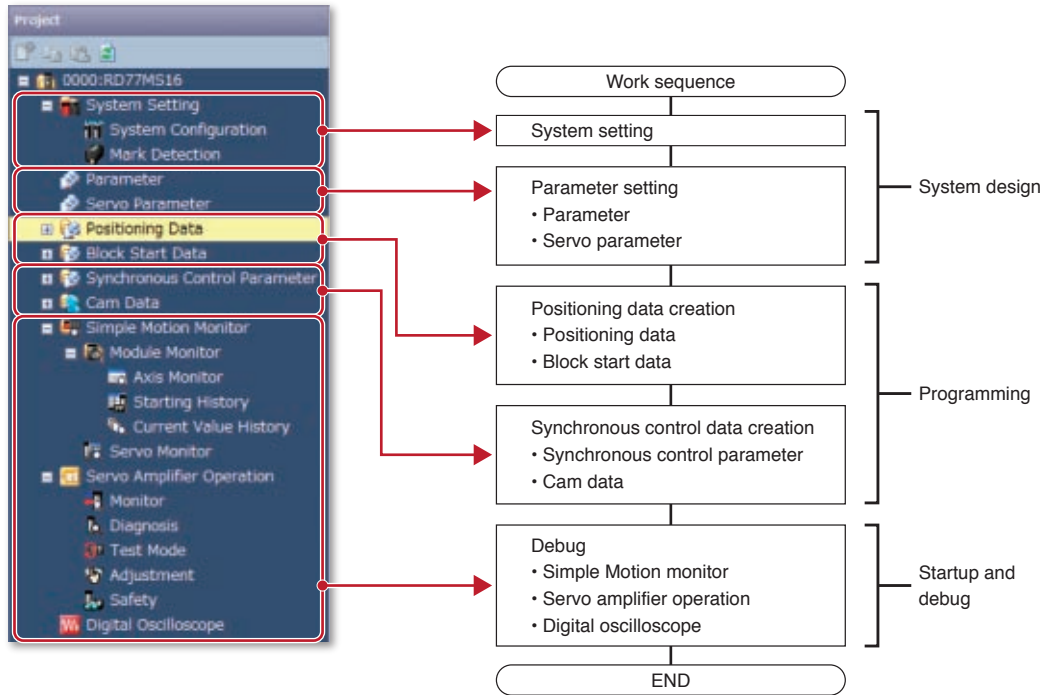
Graphic-based System Configuration

The graphical screen allows you to easily configure servo amplifiers and motors, and check them at a glance.

Check the servo motor type at a glance.

Just select the model of servo amplifier.

Servo amplifier information
Just select the servo amplifier series and operation mode.

[System structure]

Click "Servo Parameter Setting" to open the parameter window.

Servo network configuration
Servo amplifiers and motors can be checked at a glance.

For More Efficient System Design | MELSOFT GX Works3

Easy-to-set Parameter

Just by setting machine components and gear reduction ratio, etc., the parameter can automatically calculate "Number of pulses per rotation" and "Movement amount per rotation". Also, One-point help function provides easy-to-understand explanations using pictures and figures, enabling you to set parameters effortlessly without the need for manuals.

[Parameter]

Input mechanical specification data for auto calculation.

Just set the number of teeth of the gear.

One-point help

Explanations for the selected item are displayed. Data can be set without the need for manuals.

Provides necessary information.

Basic parameter 1 calculation

Set "Lead of Ball Screw" and click "Compute Basic Parameters 1". The electronic gear parameter will be calculated.

Calculate gear reduction ratio by teeth or diameter.

Servo Parameter Settings Integrated

MELSOFT GX Works3 adopts exactly the same servo parameter setting as MELSOFT MR Configurator2, improving work efficiency by offering familiar screen operation.

MELSOFT MR Configurator2 settings integrated

Servo parameter

List display or Function display is selectable.

Docking help

The setting details, setting range, and initial values, etc. are shown here, so you do not need manuals when setting parameters.

MELSOFT GX Works3 Offers Various Features for Ease of Use

Just drag & drop a module FB or FB to the editor - That's all you need to do for creating a sequence program.
Powerful sub functions also greatly help you create positioning and cam data.

Sequence Program	Positioning Data	Synchronous Control Parameter
Drag & Drop of Component	Data Setting Assistant	Visualization of Sync. control Module
Drag & Drop of Module FB	Command Speed Auto Calculation	Pull-down List for Easy Setting
Drag & Drop of Module Label	Sub Arc Auto Calculation	Easy Cam Data Creation
	Offline Simulation	At-a-glance Cam Data List

Help

Manual-free Operation with One-point Help

Simple Point-and-Click Programming Architecture

Intuitive and easy programming is achieved through drag & drop of module labels/FBs on the graphical screen.

Sequence program

Just select an instruction from the component list, and drag & drop it to the editor.
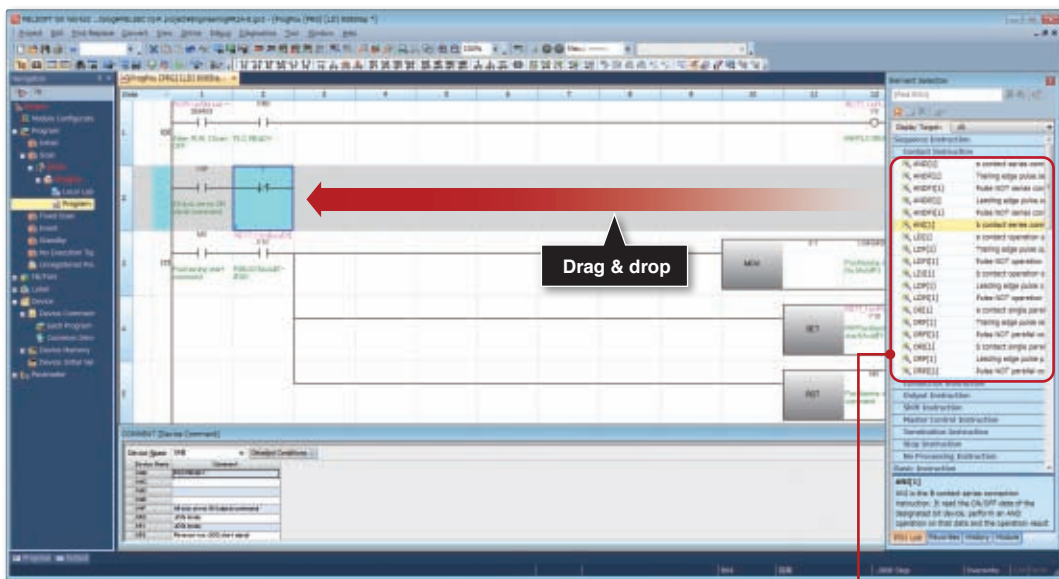
Drag & drop

POU list

Just drag & drop the contact and output instructions.

For More Efficient Programming

Just select a Module FB

Module function blocks (Mitsubishi products) and user-registered function blocks appear in the list for Simple Motion module programming. Select a necessary FB, and drag & drop it to the program editor screen.

Drag & drop
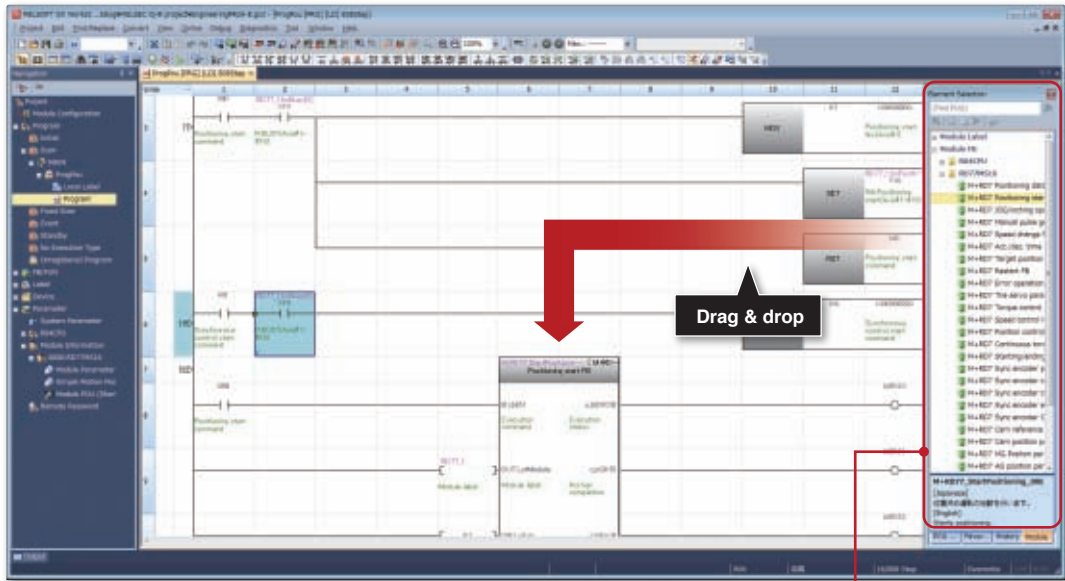
Module FB

Automatically generated based on the selected modules

Just select a Module label

Devices are already registered as "Module labels ", which are easy-to-understand signal names.
When a Simple Motion module is added, the corresponding module labels/FBs are automatically registered.
The use of the module labels enables easy programming not requiring manuals.

Drag & drop
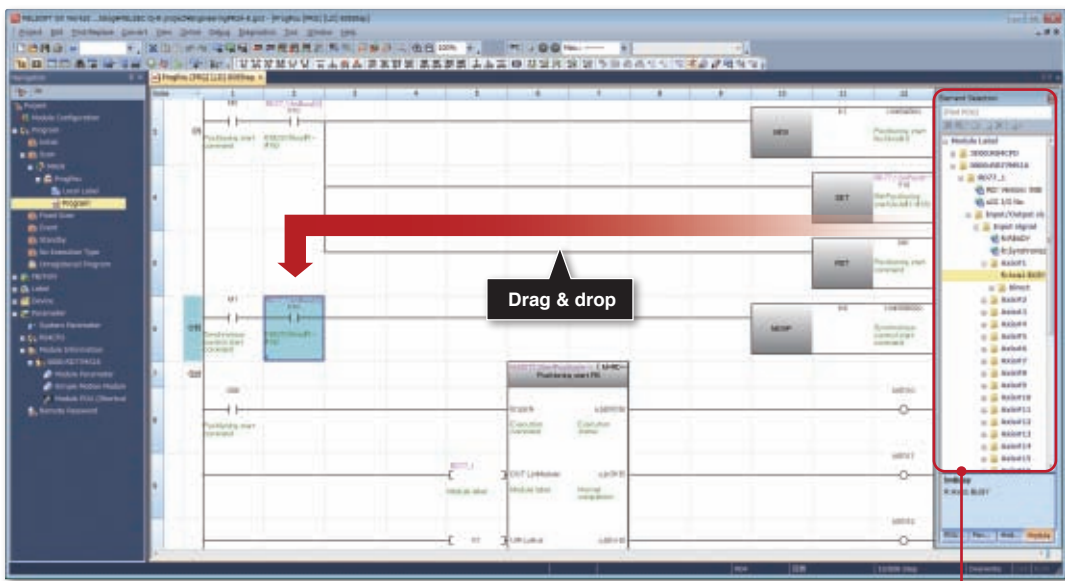
Module label

A Wide Array of Functions for Positioning Data Setting

Positioning control can be executed just with a positioning data table and a sequence program.
Various sub functions are provided to help you create a positioning data table.
  • Data setting assistant
  • Automatic command speed calculation
  • Automatic sub arc calculation
  • Offline simulation

Point data setting made easy with Data setting assistant

Positioning data tables are automatically generated just by setting some items required on the Data setting assistant screen.
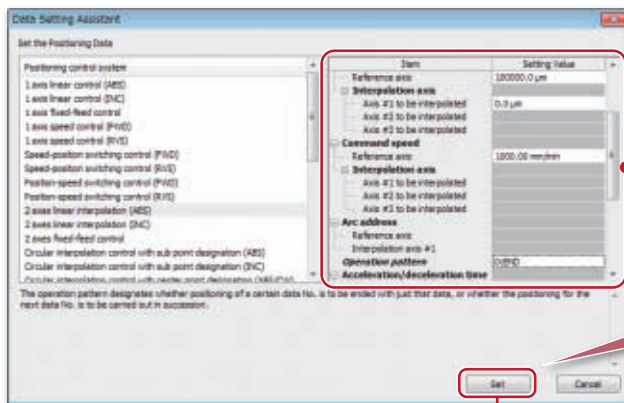
The interpolation instructions can be set easily since all the items you need to set are shown here.

Data setting assistant
Positioning data is easily created just by setting the indicated items which corresponds to the control system you chose. This eliminates the need for manuals.

Click "Set", and then the positioning data table are automatically created.

[Axis-1 positioning data]

No.	Operation pattern	Control system	Axis to be interpolated	Acceleration time No.	Deceleration time No.	Positioning address	Arc address	Command speed	Dwell time
1	0:END	0Ah:ABS Linear 2	#2	0:1000	0:1000	100000.0 µm	0.0 µm	1000.00 mm/min	0 ms
	<Positioning Comment>								
2	<Positioning Comment>								

[Axis-2 positioning data]

No.	Operation pattern	Control system	Axis to be interpolated	Acceleration time No.	Deceleration time No.	Positioning address	Arc address	Command speed	Dwell time
1						200000.0 µm	0.0 µm	0.00 mm/min	
	<Positioning Comment>								
2	<Positioning Comment>								

For More Efficient Programming

MELSOFT GX Works3

Automatic command speed calculation

Command speed is automatically calculated based on the movement amount, the acceleration/deceleration time, and the operation time.

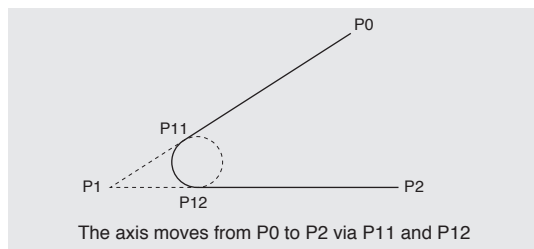**Command speed can be calculated according to tact time.**

Possible to simulate the result.

[Automatic command speed calculation]

[Simulate calculation result]

Automatic sub arc calculation

An arc can be easily inserted between two lines which intersect at a point.
After calculation, the result can be simulated.

P0

P11

P1   P12   P2

The axis moves from P0 to P2 via P11 and P12

The angle can be rounded.

Possible to simulate the result.

[Automatic sub arc calculation]

[Simulate calculation result]

Automatic sub arc calculation

An arc can be easily inserted at the intersection point.

Synchronous Control Parameter

Synchronous control is easily performed just by setting data with parameters and turning ON the "Synchronous control start".

Synchronous control parameter for each axis

Synchronous control parameter for each axis is easy to set using One-point help and pull-down lists.

[Synchronous control parameter for each axis]

Visualization of synchronous control module

One-point help

An explanation for the selected item is displayed. Therefore, manuals are not required for the settings.

One-point help eliminates the need for manuals.

For More Efficient Programming

MELSOFT GX Works3

Cam Data

Cam data can be easily created. First, create a rough cam waveform on the graph per drag & drop, and then make it more precise by entering the numerical values for the graph.

Easy cam data creation

- Stroke, speed, acceleration, and acceleration jerk can be set while checking graph change.
- Cam data can be imported/exported in CSV format.
- Created cam data can be password protected.

[Creating a new cam data]
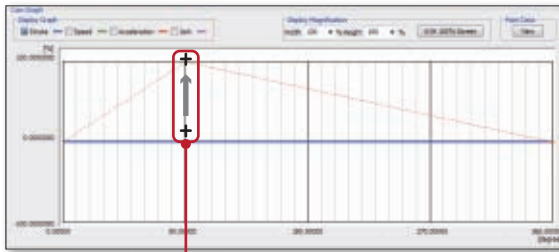
Create a cam graph freely with mouse.

Cam creation

Click the graph and drag it, which causes the waveform to automatically change according to the pointer movement.

Fine-tune the numerical values and complete the graph.

[Cam data creation]
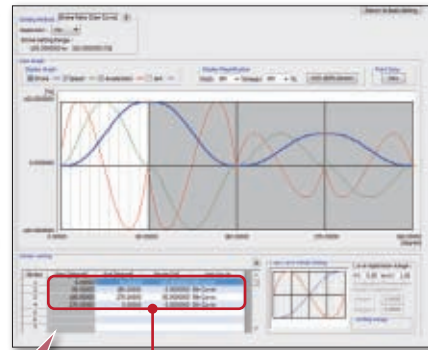
Stroke setting

Fine-tune the end point and stroke, and finish the graph.

Cam profile at a glance

The created cam data are easily viewed in thumbnails.

Check the graphs at a glance.

[Cam data list]

Comment

Comments can be edited, enabling easier management of multiple cam data.

Increased Efficiency through Customizable Axis Monitor

Customization of Axis Monitor

Monitor items, the axis to be monitored, and the display order can be set.

[Axis Monitor]

Monitor item

Monitor items and display order can be set.

Customizable axis monitor

[Select Monitor Item]

Select necessary items.

Change the display order.

[Select Monitor Axis]

Select an axis needed for debugging, and click [Add].

For More Efficient Startup and Adjustment

MELSOFT GX Works3

Servo Operation Information through Servo Monitor

This function indicates servo amplifier and motor data (e.g. Unit power consumption, Unit total power consumption), allowing you to check servo axis information at a glance.

[Servo monitor]

MELSOFT MR Configurator2 integrated

Monitor item

Monitor setting window

Servo Amplifier Operation of MELSOFT MR Configurator2 Integrated

All necessary diagnosis and adjustment functionalities are included in MELSOFT GX Works3.

[Diagnosis]

MELSOFT MR Configurator2 integrated

MELSOFT MR Configurator2 [Diagnosis]

[Diagnosis]
· Alarm display
· Alarm onset data
· Drive Recorder
· No motor rotation
· System configuration
· Life diagnosis
· Machine diagnosis
· Fully closed loop diagnosis
· Linear diagnosis

[Adjustment]

MELSOFT MR Configurator2 integrated

MELSOFT MR Configurator2 [Adjustment]

[Adjustment]
· One-touch tuning
· Tuning
· Machine analyzer
· Advanced gain search

Powerful Digital Oscilloscope for Quick Startup

Digital Oscilloscope

Data collection and waveform display which are synchronized to the Motion operation cycle greatly help you check operation and perform troubleshooting.

- Probe items can be set by selecting the purpose from the list.
- 16CH word and 16CH bit data can be sampled, of which, 8CH word and 8CH bit data can be displayed in real time.

CURSOR JOG

Use the buttons in the cursor window to move the vertical cursor [A] and [B], and horizontal cursor [1] and [2].

Word waveform selection button

Select the word waveform to be operated.

CURSOR window

Position data of the vertical, horizontal, and trigger cursors are displayed. When the cursor is moved, the values are changed accordingly.

Waveform display area

Waveform of 8CH word and 8CH bit data is displayed.

Probe setting by selecting items from the purpose-based list.
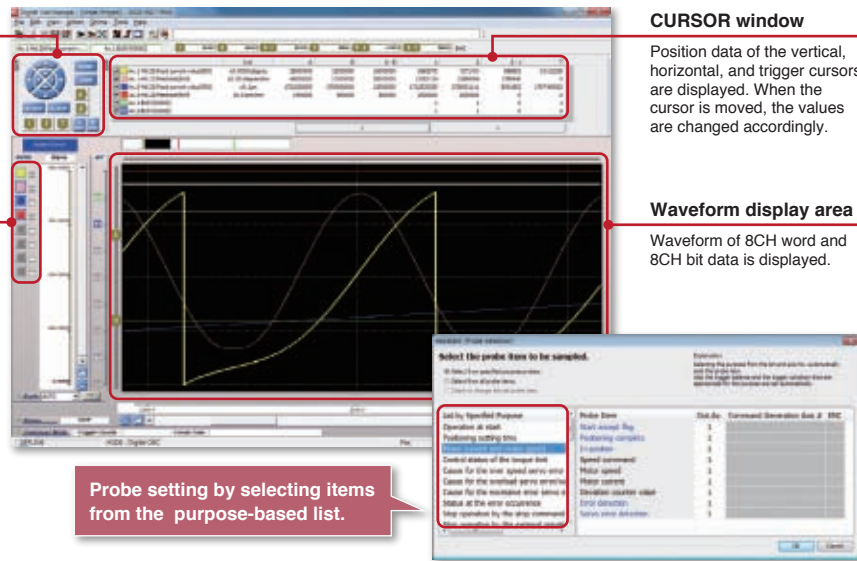
[Digital oscilloscope assistant]

Data are easily sampled just by following the instructions of the Oscilloscope assistant function.

1. Make settings for the communication between the controllers and the personal computer.
2. Select a probe item to be sampled.
3. Set the condition of sampling.
4. Start sampling.
5. The sampled data and its condition can be saved in files.

Just follow the instructions of the Assistant function.

Easy setting of the sampling condition
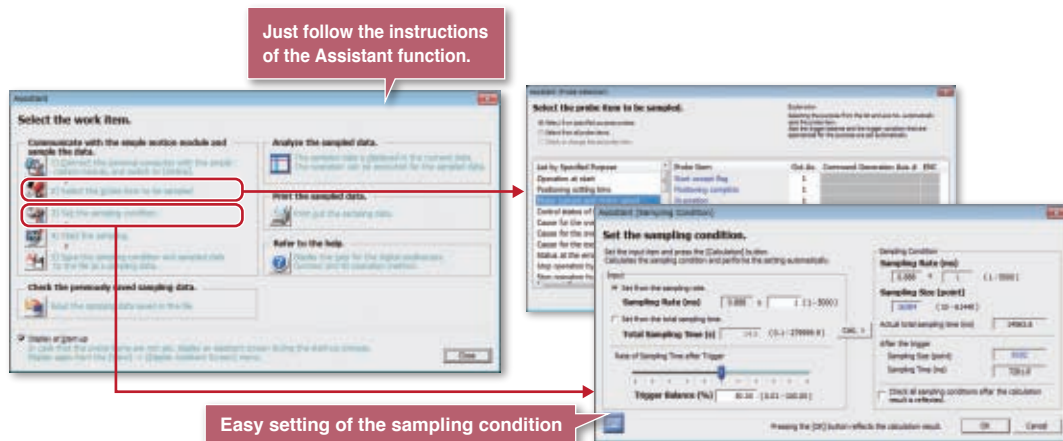
For More Efficient Startup, Adjustment, and Maintenance

MELSOFT GX Works3

Simulation Coordinated with PLC CPU

The MELSOFT GX Works3 can simulate the program on a personal computer without an actual machine during debugging process. Motion control can be simulated as well.

Offline debugging without a control CPU required
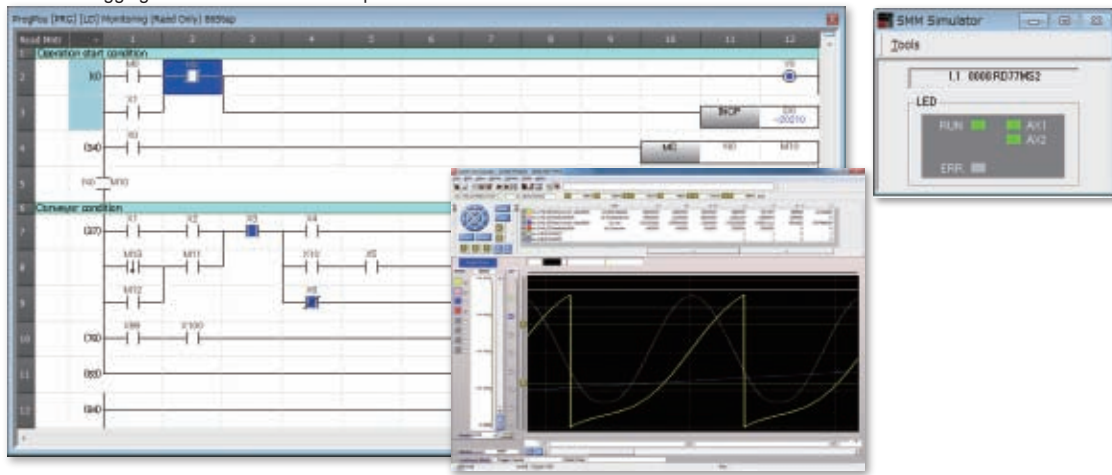
Directly debugging on the computer

Event History

For the MELSEC iQ-R series, events occurred on each module can be stored to the CPU module. "WRITE" operation to the program, error information, etc. are listed chronologically, which makes error cause investigation and restoration work smoother and quicker.
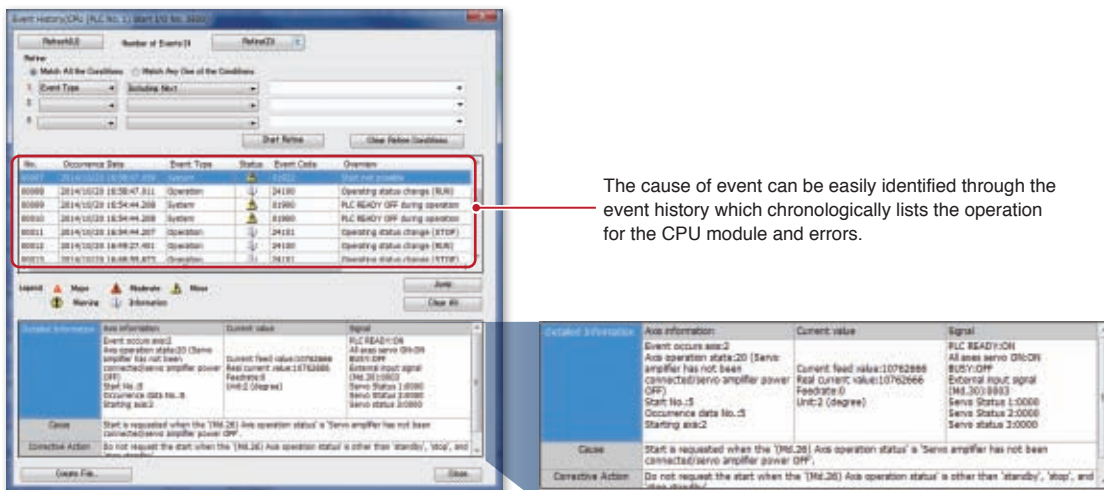
The cause of event can be easily identified through the event history which chronologically lists the operation for the CPU module and errors.

MELSOFT MR Configurator2

User-friendly Software for Easy Setup, Tuning and Operation
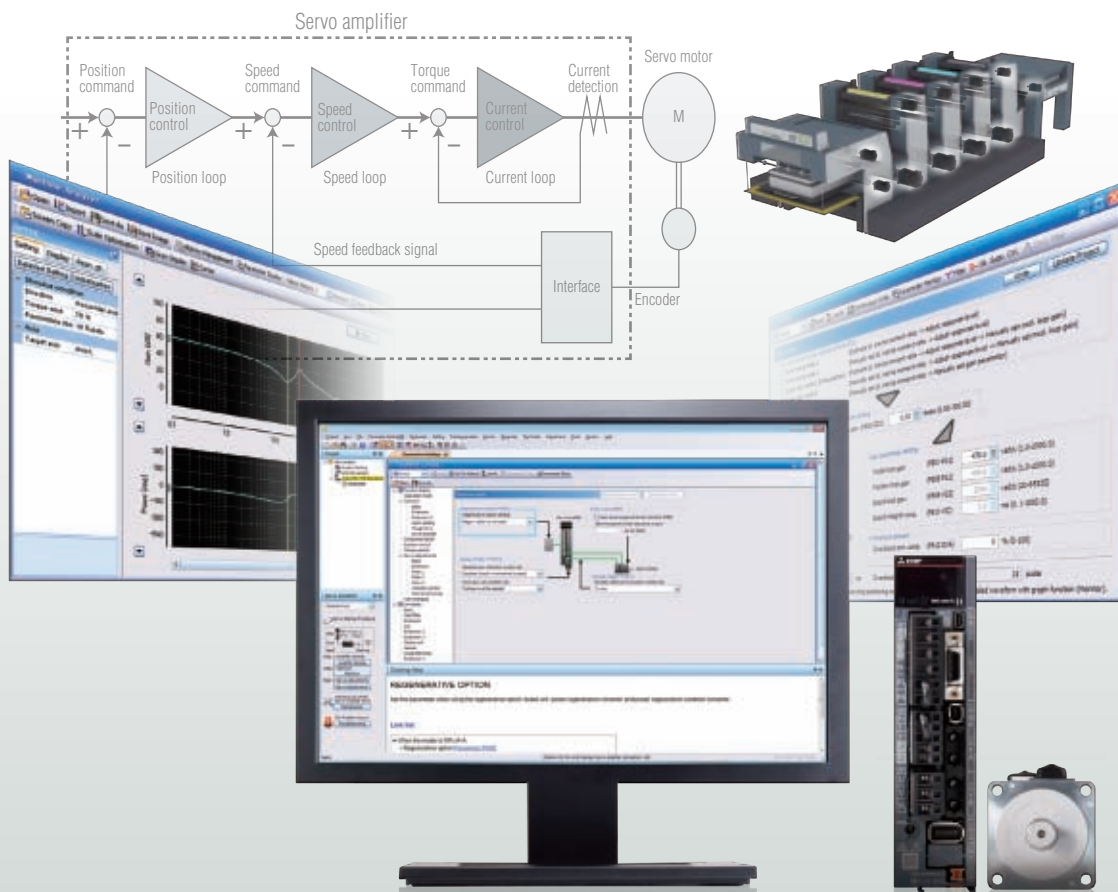
Tuning, monitoring, reading/writing of parameters, and test operation can be performed by connecting servo amplifiers to MR Configurator2, maximizing your machine capability.

(Note): MELSOFT MR Configurator2 is integrated with MELSOFT GX Works3/MT Works2.

Easy-to-use features
● With the One-touch tuning function, servo adjustment can be finished effortlessly, even for first-time user.
● Advanced, easy-to-operate servo adjustment increases efficiency.
● Pull-down lists and Docking help providing necessary information for the servo parameter settings eliminate the need for manuals.

Powerful maintenance features
● A wealth of maintenance features is available: Machine diagnosis function which displays estimated machine friction and vibration; and Servo amplifier life diagnosis function which provides indication of replacement time for servo amplifier parts.
● In case of errors, Drive recorder function saves servo data for error cause analysis.

Global realization by multi-language support
● Multiple languages (Japanese, English, and Chinese) are supported at various levels (Menu display, etc.).

Harness the Full Potential of Servo Performance through MELSOFT MR Configurator2

Increasing efficiency in startup, debugging, and maintenance with various features

Easy system design
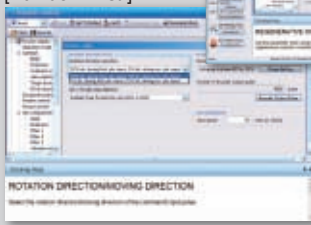
No need for manuals in parameter settings

- Detailed explanations for servo parameters can be checked in Docking help.
- Servo parameters are easily set by selecting items from pull-down lists.

[Function display]

[Pull-down list]

ROTATION DIRECTION/MOVING DIRECTION

Easy servo adjustment

Servo adjustment made easier with One-touch tuning
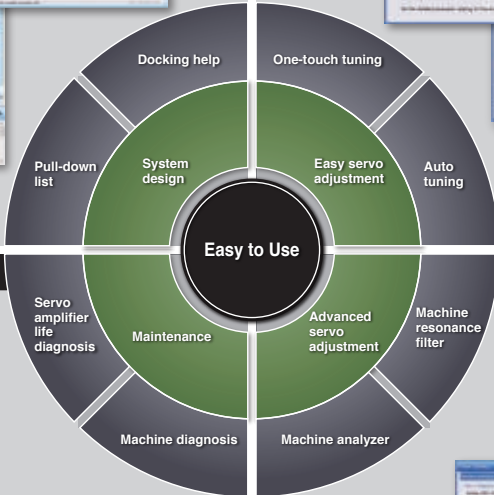
- Servo is automatically adjusted to the perfect condition.
- The adjustment results (settling time and overshoot amount) can be checked.

[One-touch tuning]

[Auto tuning]
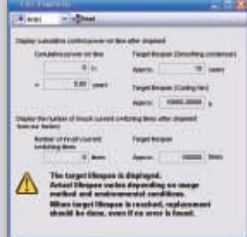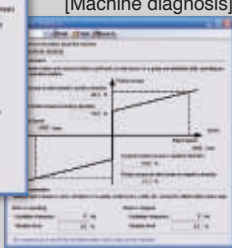
Easy maintenance

Enhanced maintainability

[Servo amplifier life diagnosis]

[Machine diagnosis]

- The cumulative power-on time and the number of inrush current switching times can be easily checked.
- Machine aging is displayed by comparing the initial machine operation data with that after years of usage.
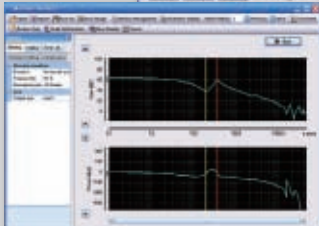
Advanced servo adjustment

Advanced servo adjustment

[Filter setting]

[Machine analyzer]

- The machine resonance frequency can be measured through waveforms displayed by Machine analyzer function.
- The machine resonance suppression filter can be set easily.

Docking help

One-touch tuning

Pull-down list

System design

Easy servo adjustment

Auto tuning

Easy to Use

Servo amplifier life diagnosis

Maintenance

Advanced servo adjustment

Machine resonance filter

Machine diagnosis

Machine analyzer

MELSOFT MR Configurator2 screen layout

Project window

Items are listed in tree structure.
Addition/Deletion of items are easy.

Servo assistant

Servo settings/adjustment can be
made easily just by following the
guidance indicated here.
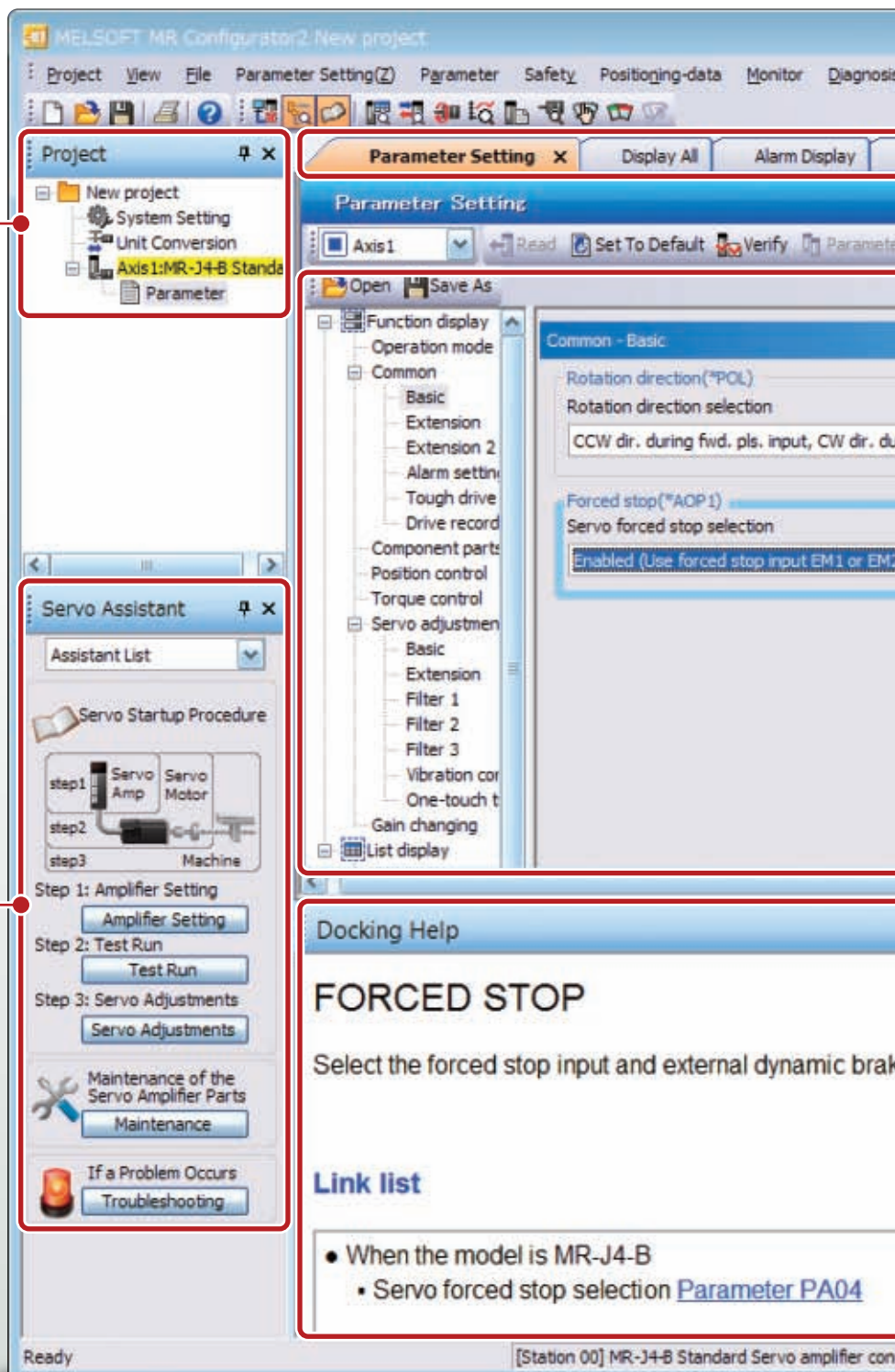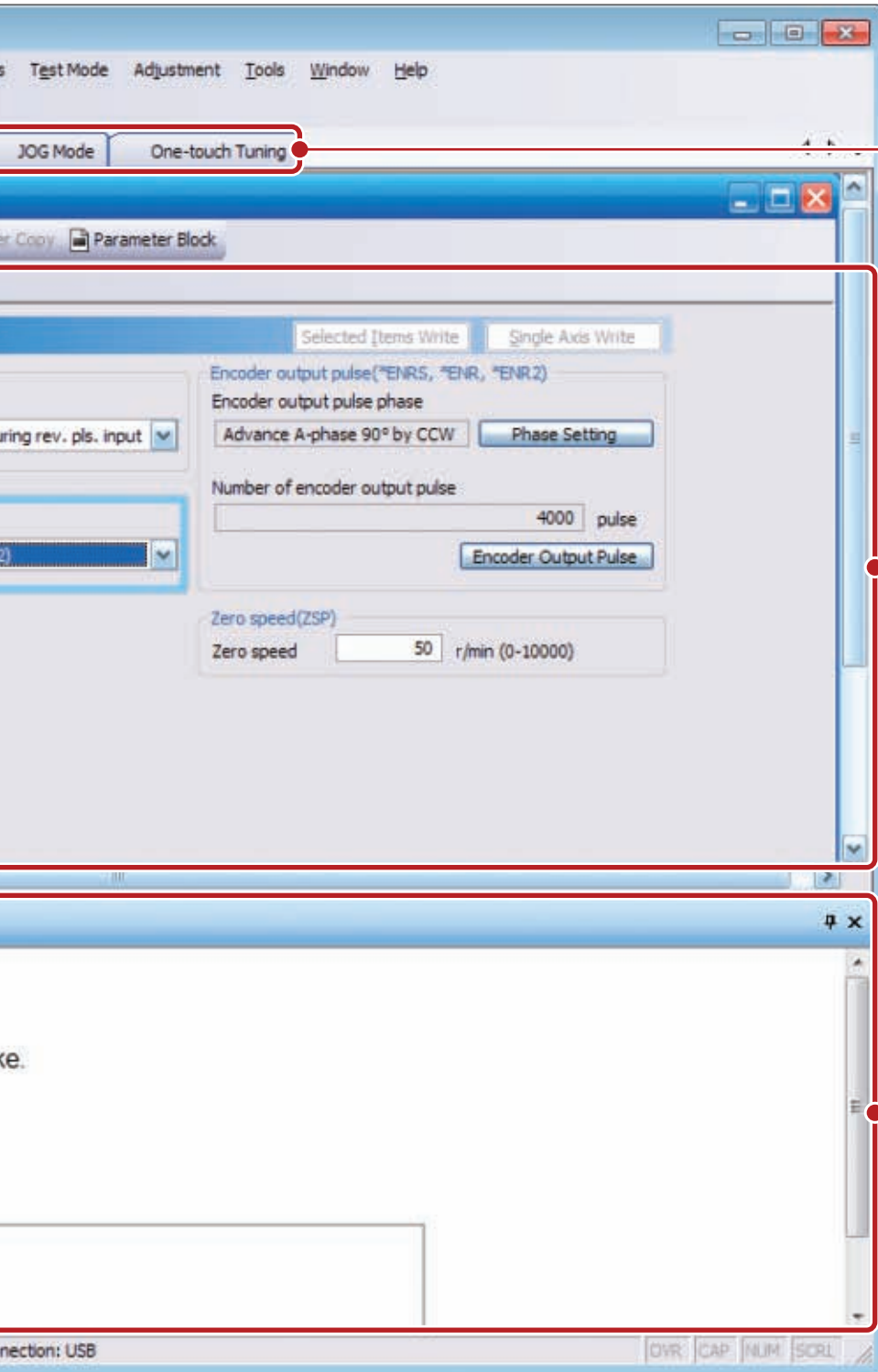
Test Mode　　Adjustment　　Tools　　Window　　Help

JOG Mode　　One-touch Tuning

Tab

Windows can be switched using the tabs for more efficient work.

Copy　■ Parameter Block

Selected Items Write　　Single Axis Write

Encoder output pulse(*ENRS, *ENR, *ENR2)
Encoder output pulse phase

ring rev. pls. input ∨　　Advance A-phase 90° by CCW　　Phase Setting

Number of encoder output pulse

4000　pulse

Encoder Output Pulse

Work window

Parameters and programs are set easily through pull-down lists.

Zero speed(ZSP)
Zero speed　　50　r/min (0-10000)

ke.

Docking window

The details of parameters are shown here, eliminating the need for manuals.

nection: USB　　　　OVR　CAP　NUM　SCRL

MELSOFT MR Configurator2 Offers Various Features for Ease of Use

System Design	Startup, Adjustment	Maintenance
List/Function Display	One-touch Tuning	Servo Amplifier Life Diagnosis
Pull-Down List	Fine-tuning of Gain	Machine Diagnosis
	Graph for Servo Waveform	Drive Recorder for Cause Analysis
	Measuring Machine Characteristics	

Help

Manual-free Operation with Docking Help

Servo Assistant Function
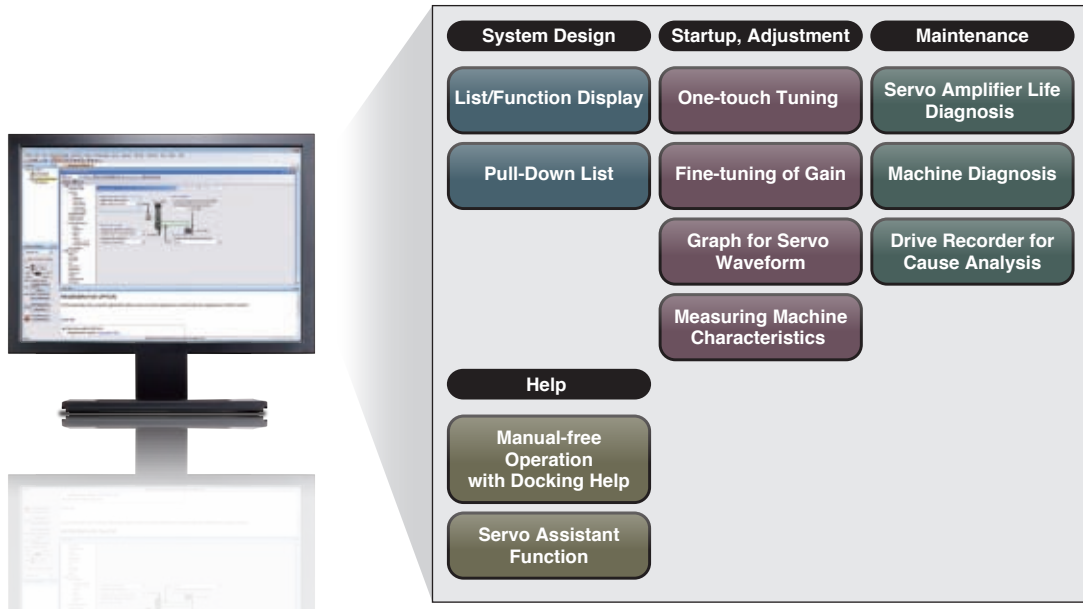
Servo Assistant Function Promoting Efficiency in Setting Work

Complete setting up the servo amplifier just by following guidance displays.
Setting parameters and tuning are easy since related functions are called up with shortcut buttons.

[Alarm display]

System design Startup Adjustment Maintenance
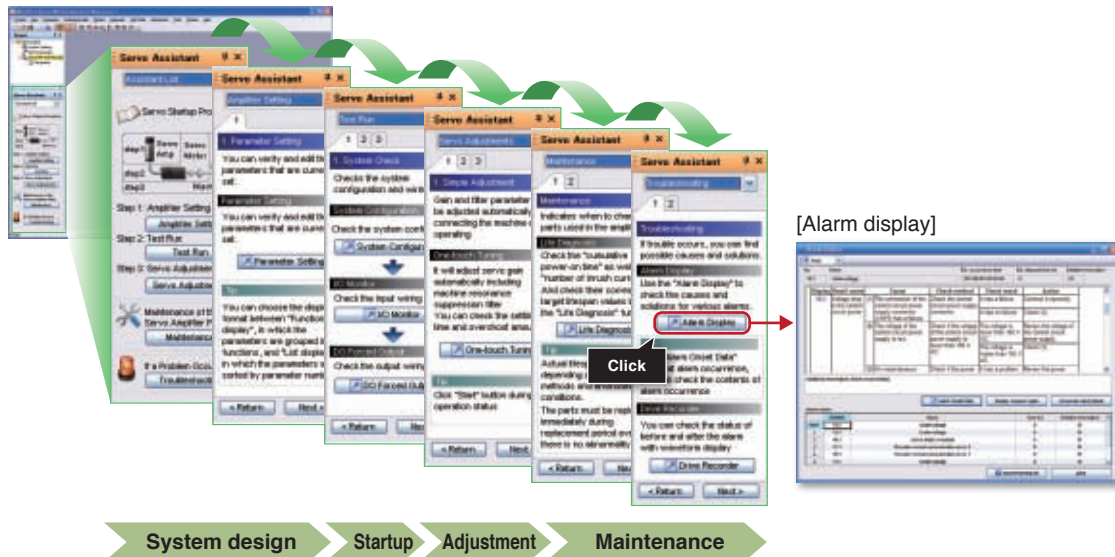
For More Efficient System Design

MELSOFT MR Configurator2

Function/List Display for Servo Parameter Setting

Function display or List display is selectable for parameter settings.

Function display

Parameters can be set axis by axis while confirming the detailed explanation for the parameter.
With Docking help and pull-down list, parameters can be set without having to refer to manuals.

No need for manuals

Pull-down list
Set parameters by selecting an item from the list.

Docking help
An explanation for the selected item is shown here.

List display

Multiple axes can be displayed at once in the list and set altogether, enhancing efficiency in system design.
Other axes data can be reused via copy & paste.

List display
Parameters can be set while checking other axes information in the table.

Batch copy

More Efficient Startup and Adjustment

Servo Status at a Glance via Servo Monitor

Servo amplifier and motor data are monitored through various monitor items.
- Batch display
- ABS data display
- System configuration
- Alarm display
- Alarm onset data
- No motor rotation

Batch display

Monitor items such as Unit power consumption, Unit total power consumption, etc. can be monitored in real time.

Check the power consumption through "Unit power consumption" and "Unit total power consumption".

[Monitor setting]
Select the axis and data needed for debugging, increasing efficiency in debugging.
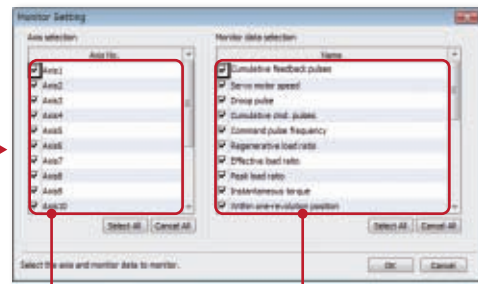
Axis selection
Select the axis to be displayed.

Monitor data selection
Select the monitor item to be displayed.

ABS data display
(Absolute position data display)

This function displays "Absolute encoder data" and "Motor rotations No." calculated based on the home position saved in the servo amplifier. The difference between the encoder data from the servo motor and the actual machine position can be checked during startup work.
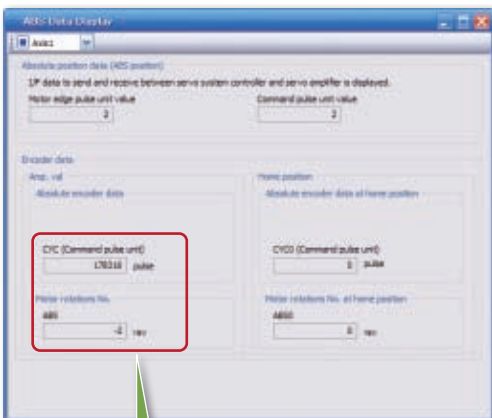
Easy check for current position

System configuration

Various servo amplifier and motor information can be checked at a glance. For example, the model names of the servo amplifiers on the cabinet and servo motors installed in the machine.

Model names at a glance

For More Efficient Startup and Adjustment
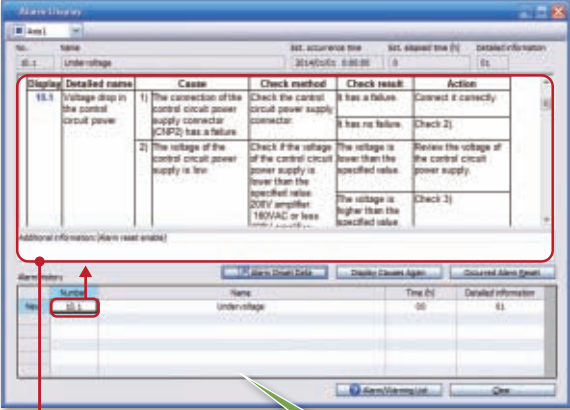
Alarm display

MELSERVO-J4 series indicates servo alarms in three digits.
This enables you to identify the specific error causes via the displayed error No., making troubleshooting easier.
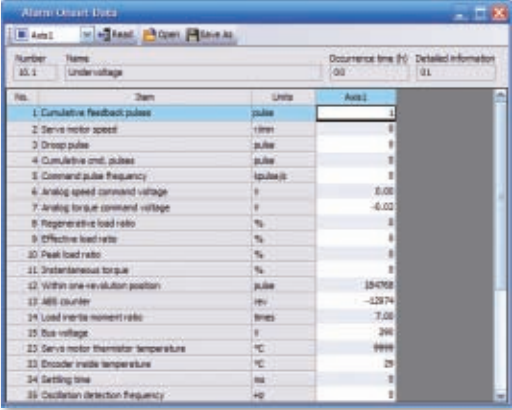
Troubleshooting without the need for manuals

Check the status of an error occurrence.

[Alarm Onset Data]

Alarm display

Cause, Check method, Check result, and Action are displayed for the errors occurred. This enables troubleshooting to be performed without the need for manuals.

For the undervoltage alarm, whether the alarm occurred in the main or the control circuit is identified by the alarm No.

No motor rotation

In case that the target axis does not rotate, the cause for that failure can be obtained from servo amplifiers, which ensures smooth and faster startup.
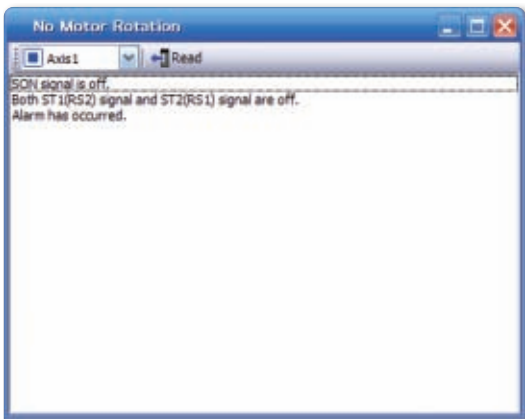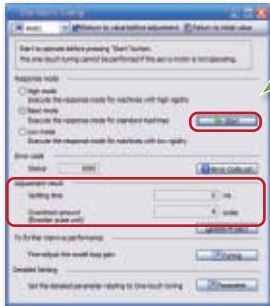
Selective Servo Adjustment

An ideal servo adjustment is realized with various servo adjustment features.

Easy servo adjustment with the One-touch tuning
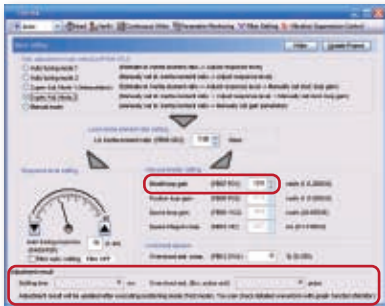
- The One-touch tuning function displays the adjusted settling time and the overshoot amount.
- After one-touch tuning, the control gain can be fine-tuned further on the "Tuning" window. This allows you to pursue more precise, accurate performance.

[One-touch tuning]

[Tuning]

Just a click away for one-touch tuning

Display the adjustment results.

Further adjustment for higher machine performance

Fine-tune the gain.

Display the adjustment results.

Real-time servo adjustment by Auto tuning

The Auto tuning function is effective even for a high rigidity machine.
While this function is enabled, the optimum servo adjustment is executed in real time.

Sealing machine

Auto tuning can be performed just by setting the "Auto tuning response".

Auto tuning
Automatic servo adjustment

For More Efficient Startup and Adjustment   MELSOFT MR Configurator2

Advanced servo adjustment

A variety of servo adjustment functionalities is offered, enabling more sophisticated, high-level adjustment.

- The machine resonance frequency can be measured through waveforms displayed by Machine analyzer function.
- Machine resonance suppression can be implemented by setting the filter and the vibration suppression control from the "Tuning" screen
- Adjustment results can be viewed in Graph function.
- The waveforms of before/after the adjustment can be visually compared by overwriting the graphs.
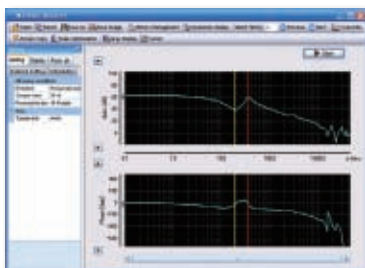
[Machine analyzer]
This function inputs random torque automatically and analyzes frequency characteristics (10 Hz to 4500 Hz) of a machine system. This function also supports setting of machine resonance suppression filter, etc.

Check the machine-specific vibration easily.

Just click [Tuning], which automatically sets necessary parameters.

[Tuning]
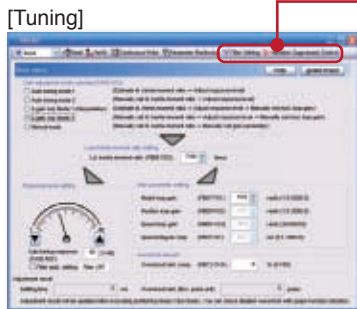
Set filter and vibration suppression.

[Filter setting]
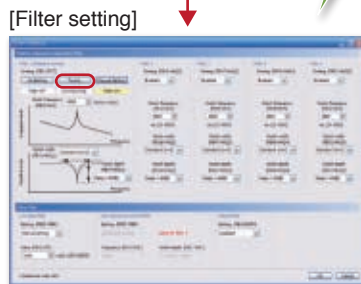
Up to 5 filters can be set in the range from 10 Hz to 4500 Hz.

[Vibration suppression control setting]
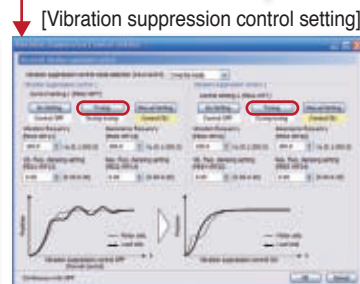
Up to 2 filters can be set in the range from 0.1 Hz to 300 Hz.

[Graph]

Adjustment results viewed in Graph function

Useful functions for servo adjustment

- Increased measurement channels: 7 channels for analog, and 8 channels for digital.
- History management
- Overwriting of graphs
- Torque characteristic figure (ST characteristic)
- FFT display

Measurable analog data

- Motor speed
- Command pulse frequency
- Speed command
- Effective load ratio
- Position within one revolution
- Settling time, etc.

Servo Diagnosis Features Boost Ease of Maintenance

Various tools are available for more efficient maintenance of servo amplifiers and motors.

Check the status of alarm occurrence with large capacity Drive recorder of servo amplifier

Servo data (motor current and position command, etc.) of before/after the error can be read from the Drive recorder for error cause analysis. Monitor values and waveforms of up to 16 alarms occurred can be checked.

Data are stored in non-volatile memory at alarm occurrence.

▶▶▶

The waveform and monitor value at alarm occurrence are displayed.

Waveform display   Monitor value display

Data over certain period of time are constantly stored in the memory.

The error cause can be easily analyzed.

Lowered bus voltage

It is revealed that the main circuit power is turned off.
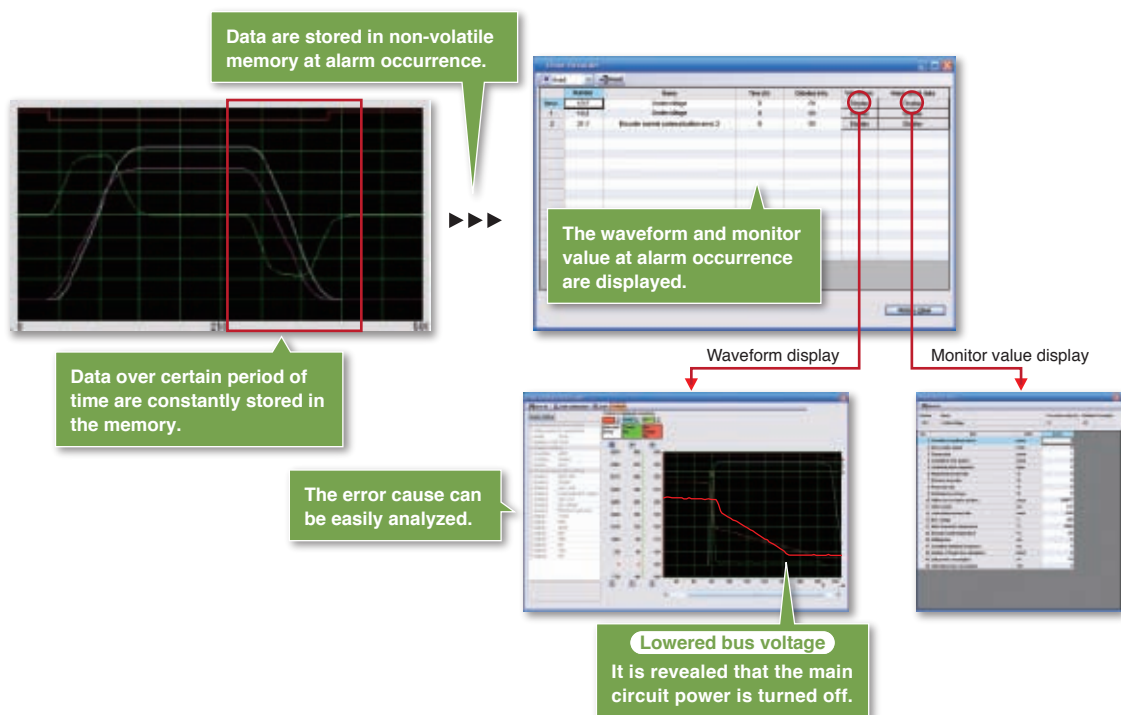
Servo amplifier life diagnosis function preventing system downtime in advance

The Servo amplifier life diagnosis function displays cumulative operation time and on/off times of inrush relay, providing an indication of replacement time for servo amplifier parts such as capacitors and relays.

▶

Periodic check

Easy check for smoothing capacitor and number of inrush current switching times
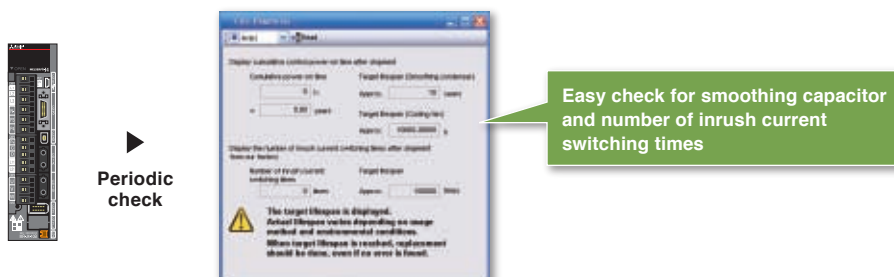
For More Efficient Startup, Adjustment, and Maintenance

MELSOFT MR Configurator2

Fully closed loop diagnosis

The load-side feedback pulses from an external encoder, the polarity and the electronic gear settings can be viewed on the screen at a glance, enabling shorter adjustment time.

Easy check for fully closed loop information

Easy check for semi/fully closed loop status

Cumulative command pulses

Load-side cumulative feedback pulse

Easy polarity check
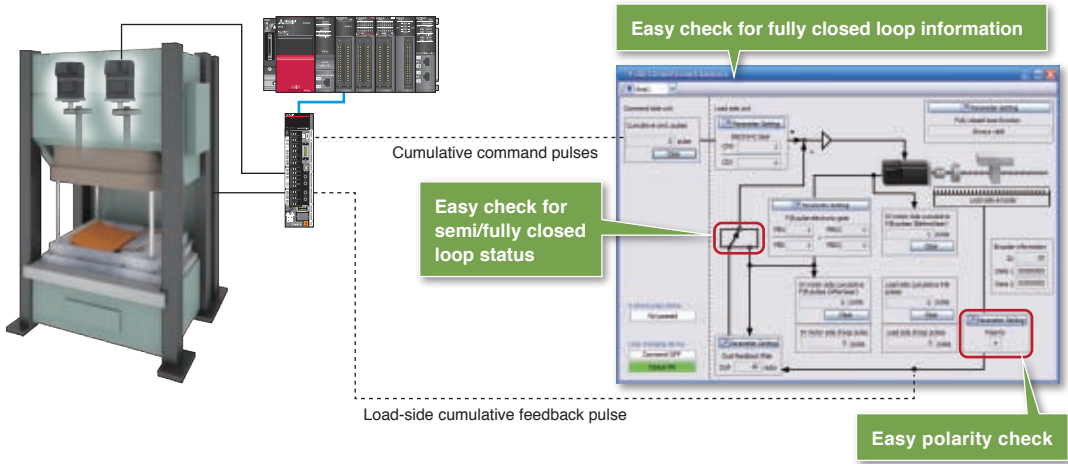
Linear diagnosis

The feedback pulses from an external linear encoder, the polarity and the resolution settings can be checked at a glance, enabling shorter adjustment time.

Linear servo motor information at a glance

Cumulative command pulse

Cumulative feedback pulse

Easy encoder resolution setting

Easy polarity check
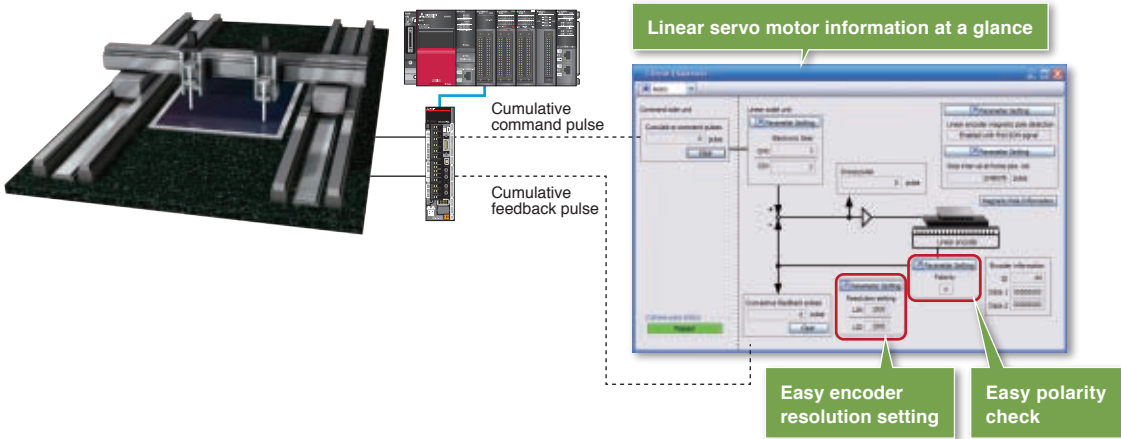
Machine diagnosis function providing machine aging information for preventive maintenance

This function estimates and displays machine friction and vibration based on data in normal operation.
Machine aging can be checked by comparing the initial machine operation data with that after years of usage. This is beneficial for preventive maintenance.

A new machine before operation

The machine with vibration due to aging after many years of usage

Periodic check
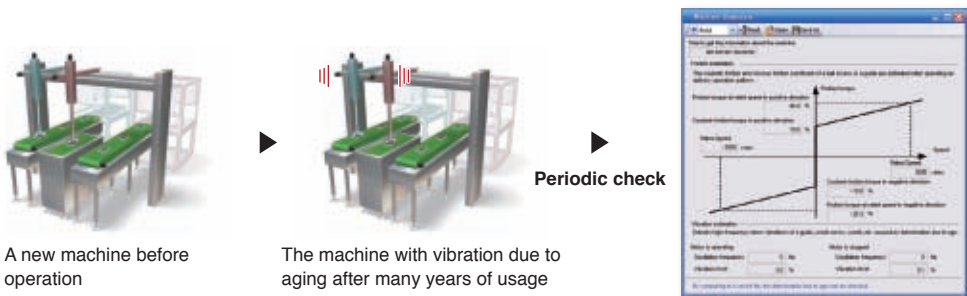
MELSOFT MT Works2

Harness the Full Potential of Motion Performance through MELSOFT MT Works2
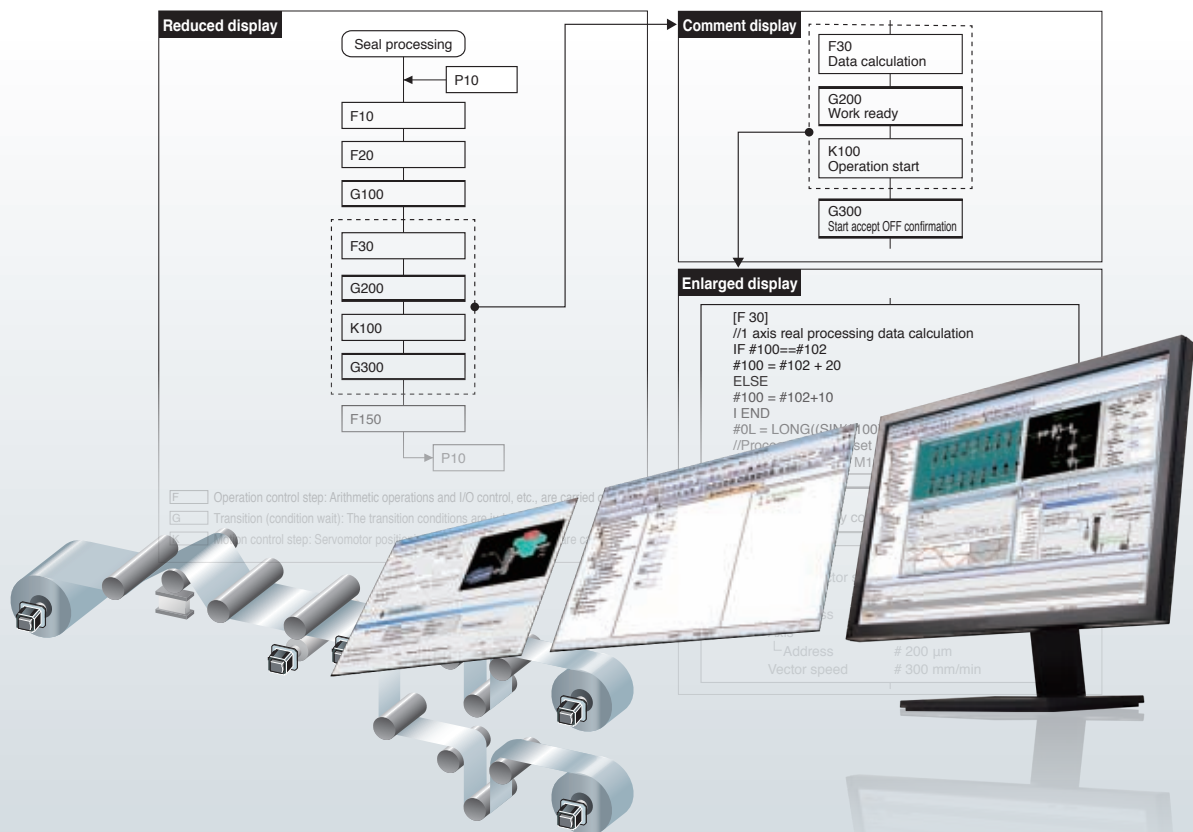
MELSOFT MT Works2 supports entire product development cycle - parameter settings, Motion SFC programming, servo adjustment to debugging for Motion controller.

Easy-to-use features
- Powerful functions support Motion programming.
- One-point help eliminates the need for manuals when setting.
- "Number of pulses per rotation" and "Movement amount per rotation" are automatically calculated just by inputting mechanical specifications and gear reduction ratio.
- The Motion controller operation status can be easily confirmed through various monitoring features.
- Existing program assets can be easily imported.

Powerful security features protecting intellectual property
- Security key authentication function protects your project data.

Global realization by multi-language support
- Multiple languages (Japanese, English, and Chinese) are supported at various levels (Menu display, etc.).
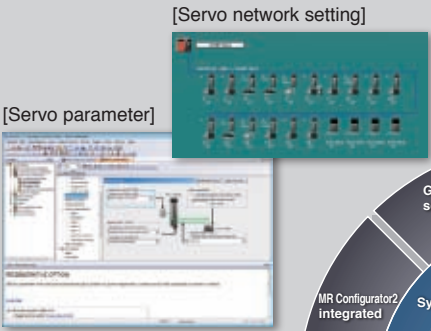
Comprehensive Support for Motion Controller from Design through Maintenance

This software maximizes the Motion controller performance with overall support - from system design, startup adjustment through maintenance.

Easy system design

No need for manuals in parameter settings and system configuration

● MELSOFT MT Works2 covers everything, from system setting to servo parameter settings.
● Servo parameter setting has been carried out more smoothly since MELSOFT MR Configurator2 is integrated.
● One-point help eliminates the need for manuals.
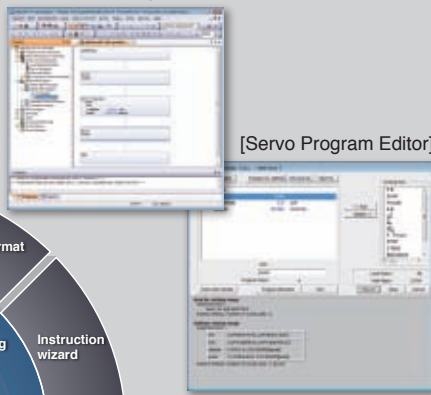
[Servo network setting]

[Servo parameter]

Easy programming

Motion SFC program adopts an easy-to-understand flow chart format

● The Motion control program is described in flowchart form using the Motion SFC (Sequential Function Chart) format.
● One-point help and Instruction wizard help you program easily.

[Motion SFC program]

[Servo Program Editor]

Graphical setting screen

Flowchart programming format

MR Configurator2 integrated

System design

Programming

Instruction wizard

Easy to Use

Powerful security

Maintenance

Startup

Easy adjustment

Backup function

Customized axis monitor
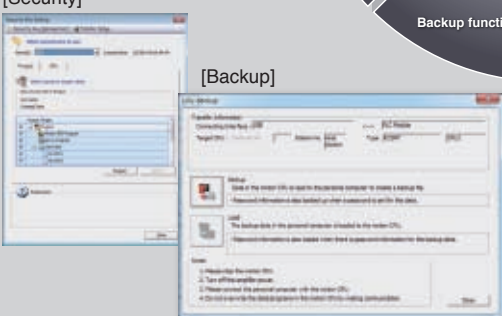
Powerful maintenance

Robust security that can be relied on

[Security]

[Backup]

● Security function protects data.
● Module replacement is carried out easily with Backup function.
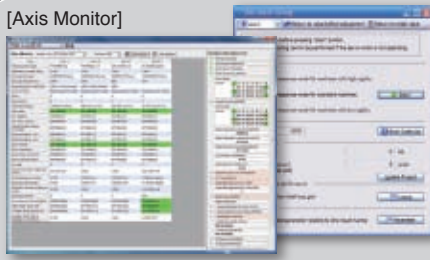
Easy startup

One-touch tuning function simplifies servo adjustment

[One-touch Tuning]

[Axis Monitor]

● Customizable axis monitor improves efficiency in startup.
● Various servo adjustment functions enable more advanced and high-level adjustment.
● Operation can be easily checked with digital oscilloscope waveforms. Offline sampling is possible, increasing efficiency in data collection.

MELSOFT MT Works2 screen layout

Tab

Windows can be switched using the tabs for more efficient work.

Project window

Items are listed in tree structure. Addition/Deletion of items are easy.

Output window

Warnings and errors occurred when converting a project are displayed.

Servo Network Setting

Axis 1 Synchronous Parameter

Main Shaft
Composite Gear Main Shaft Gear

Main Shaft
(Main)

Main Shaft
Clutch

Main Shaft
(Sub)

Speed Change
Gear

Item	Setting Value
Synchronous Control Module Setting	**Set each module parameter.**
Main Shaft	
Main Input Axis	
Type	201:Command Generation Axis
Axis No.	1
Sub Input Axis	
Type	0:Invalid
Axis No.	0
Main Shaft Composite Gear	
Main	1:Input+
Sub	0:No Input
Main Shaft Gear	
Numerator	1
Denominator	1
Main Shaft Clutch	
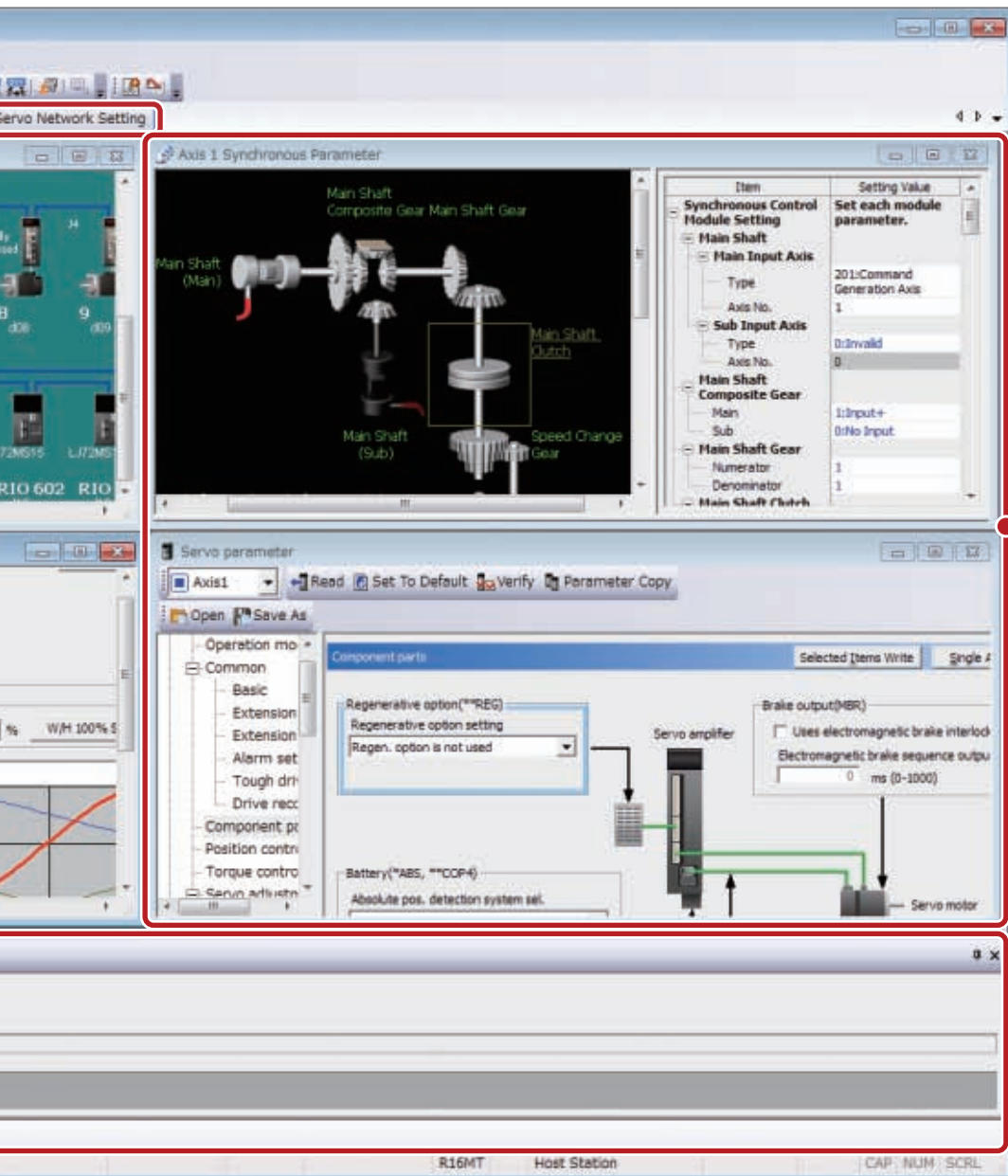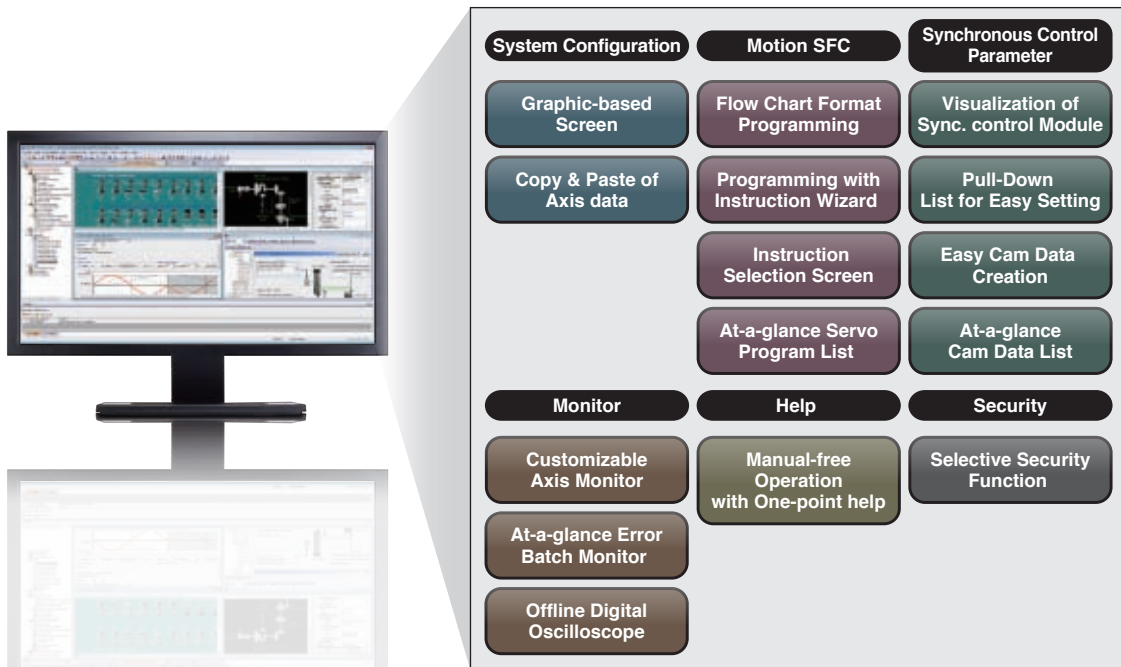
Work window

Parameters and servo parameters can be set easily just by selecting an item from the pull-down list.

Servo parameter

Axis1 ┃ Read ┃ Set To Default ┃ Verify ┃ Parameter Copy

Open Save As

- Operation mo
- Common
  - Basic
  - Extension
  - Extension
  - Alarm set
  - Tough driv
  - Drive reco
- Component p
- Position contr
- Torque contro
- Servo adjustn

Component parts

Selected Items Write Single

Regenerative option(**REG)
Regenerative option setting
Regen. option is not used

Brake output(MBR)
☐ Uses electromagnetic brake interlock
Electromagnetic brake sequence outpu
0 ms (0-1000)

Servo amplifier

Battery(*ABS, **COP4)
Absolute pos. detection system sel.

Servo motor

R16MT   Host Station

CAP NUM SCRL

MELSOFT MT Works2 Offers Various Features for Ease of Use
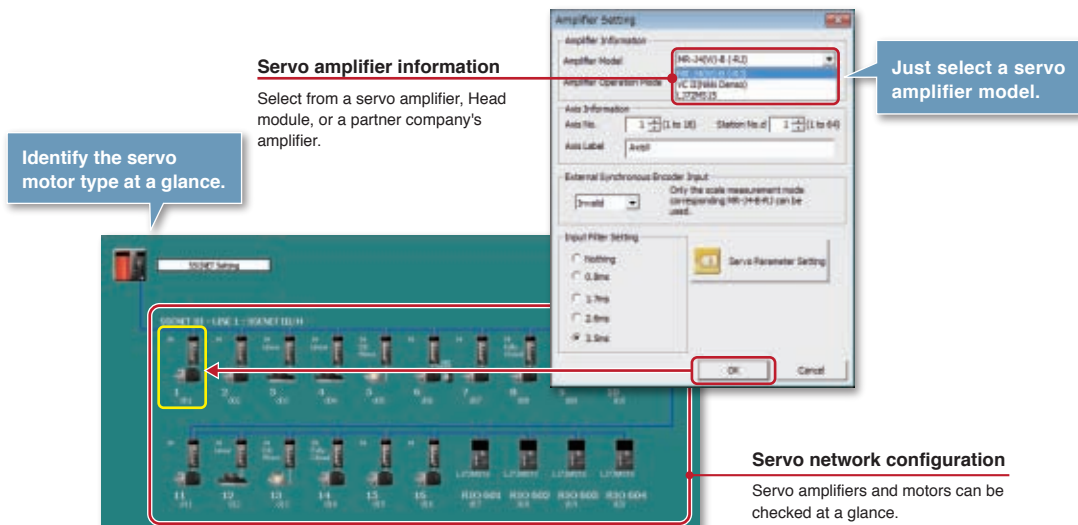
Comprehensive supports - from system design, startup, adjustment to maintenance

System Configuration	Motion SFC	Synchronous Control Parameter
Graphic-based Screen	Flow Chart Format Programming	Visualization of Sync. control Module
Copy & Paste of Axis data	Programming with Instruction Wizard	Pull-Down List for Easy Setting
	Instruction Selection Screen	Easy Cam Data Creation
	At-a-glance Servo Program List	At-a-glance Cam Data List

Monitor	Help	Security
Customizable Axis Monitor	Manual-free Operation with One-point help	Selective Security Function
At-a-glance Error Batch Monitor		
Offline Digital Oscilloscope		

Graphic-based System Configuration

Servo amplifiers, motors, and Head modules can be configured on the graphical user interface screen.
The set data can be checked at a glance on the configuration screen.

Servo amplifier information

Select from a servo amplifier, Head module, or a partner company's amplifier.

Just select a servo amplifier model.

Identify the servo motor type at a glance.

Servo network configuration

Servo amplifiers and motors can be checked at a glance.

For More Efficient System Design   MELSOFT MT Works2

Motion Control Parameter

Just by setting machine components and gear reduction ratio, etc., the parameter can automatically calculate "Number of pulses per rotation" and "Movement amount per rotation". Also, One-point help function provides easy-to-understand explanations using pictures and figures, enabling you to set parameters effortlessly without the need for manuals.

Axis setting parameters without the need for manuals

Axis label

Axis No. and axis labels are displayed.

No need for manuals

Input machine specifications for automatic calculation.

One-point help

Set parameters by referring to the One-point help.

Smooth acceleration achieved with the Advanced S-curve acceleration/deceleration

Machine vibration can be minimized and a shorter tact time can be achieved by setting the smooth acceleration period (Sin wave interval) and maximum acceleration period (Constant acceleration interval) with the Advanced S-curve acceleration/deceleration function.

Create acceleration/deceleration waveforms freely with mouse.

Motion CPU Common Parameter

Just select items from pull-down lists for Mark detection, Limit switch output, and Vision system, etc.

[Mark detection]

[Limit output data]

Pull-down list

Pull-down list shows all selectable items. This eliminates the need for manuals.

Improved Ease of Operation in Programming

Motion SFC Designed with People in Mind

The Motion SFC programs are designed based on the way people think (flowchart).

The way people think (flowchart)

Positioning

Stopping

Position command

Wait for positioning completion

END

Motion SFC program

Positioning

!M2001

ABS-1
Axis   1
  └Address   12345.0μm
Speed   10000.00mm/min

M2401

END
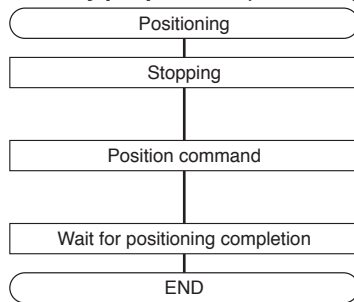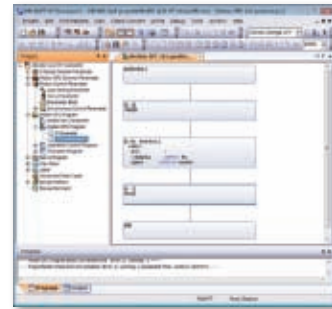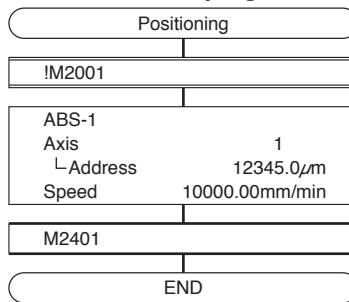
Motion SFC program editor

Motion SFC Program Adopting Flow Chart Format

The Motion control program is described in flowchart form using the Motion SFC (Sequential Function Chart) format.
The entire system operation is easily programmed by arranging icons such as **F** (Arithmetic Operation, I/O Control), **G** (Transition Conditional judgment) and **K** (Motion Control) in a sequential process.

Program editor

The Motion SFC can be edited easily with the Instruction wizard and One-point help.

Double-click

[Editor]

Select an instruction.

Instruction wizard
Select an instruction to be used.
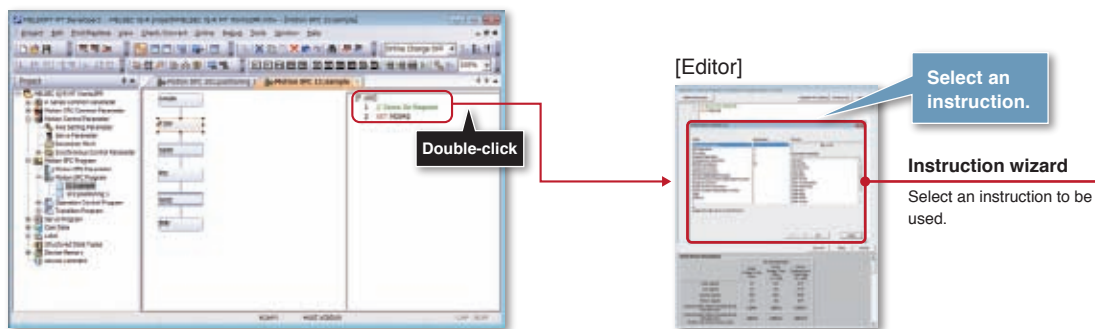
Cross reference

Devices and labels in the program are automatically registered in the cross reference list.
Double-click the device name in the cross reference list to open the corresponding program.

Double click to open the corresponding program.

For More Efficient Programming | MELSOFT MT Works2
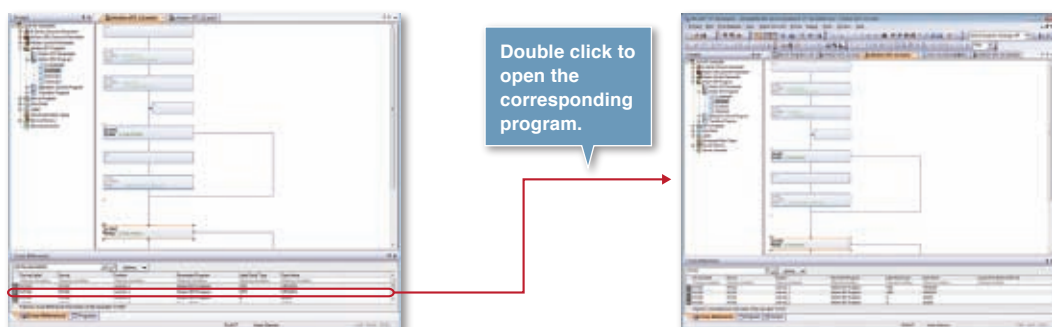
Servo Program

A variety of convenient functions helps you create servo programs.
- Axis label (Name)
- One-point help and Instruction help, eliminating the need for manuals

Servo program editor using Instruction wizard

The servo programs can be edited easily with the Instruction wizard and Instruction help.

Easy-to-understand axis label for more efficient programming

[Select Instruction]

[Servo Program Editor]

One-point help, Instruction help

Setting items and ranges, etc. are displayed here, which eliminates the need for manuals.

Servo program list at a glance

The programs and its comments can be checked and edited in the servo program list window.

Easily edit the servo programs in the list.
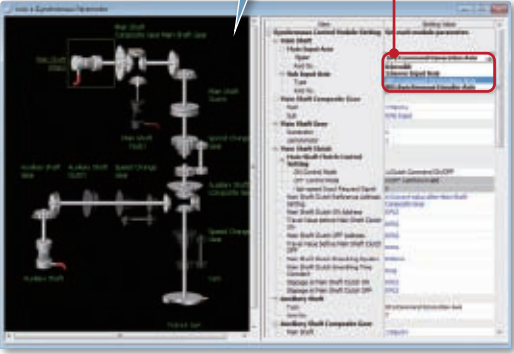
Servo program list

Created servo programs can be listed and edited in the list.

Synchronous Control Parameter

Synchronous control can be easily performed by setting necessary data with parameters and turning ON the "Synchronous control start".

Visualization of synchronous control modules
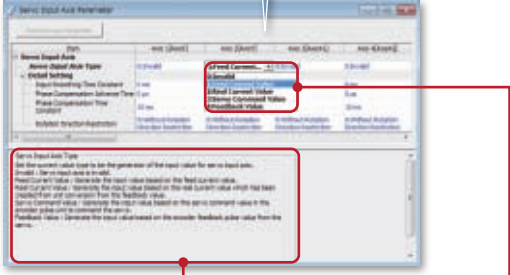
Synchronous control parameter

Easy setting with pull- down list

Just select an item from the pull-down list.

[Synchronous control parameter for each axis]

[Input axis parameter]

One-point help

Helps you set the items.
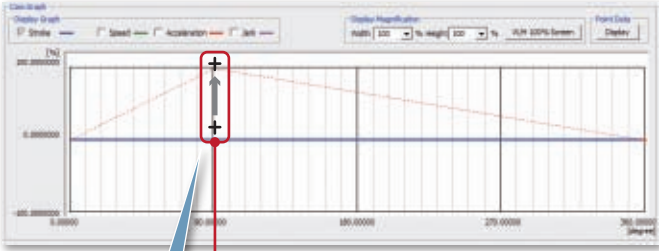
Input axis parameter

Selectable items are displayed in the pull-down list, so you do not need manuals for the settings.

Creating Cam Data More Freely

Cam data can be easily created. First, create a rough cam waveform on the graph per drag & drop, and then make it more precise by inputting the numerical values for the graph.
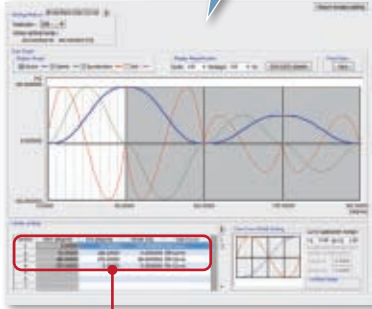
  · Cam stroke range: -100 to 100 [%]
  · Stroke, speed, acceleration, and acceleration jerk can be set while checking graph change.
  · Cam data can be imported and exported in CSV format.

Complete the graph by fine-tuning values.

Create a cam graph freely with mouse.

Cam data creation

Click the graph and drag it, which causes the waveform to automatically change according to the pointer movement.

Stroke setting

Fine-tune the end point and stroke, and finish the graph.
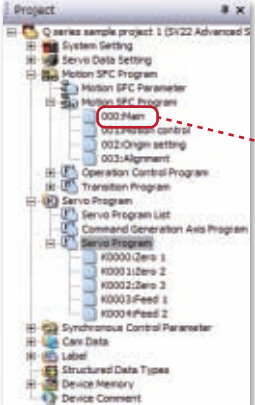
For More Efficient Programming

MELSOFT MT Works2

Importing Existing Program Asset

To import the existing SFC programs, just drag & drop them to the project window of the new series.
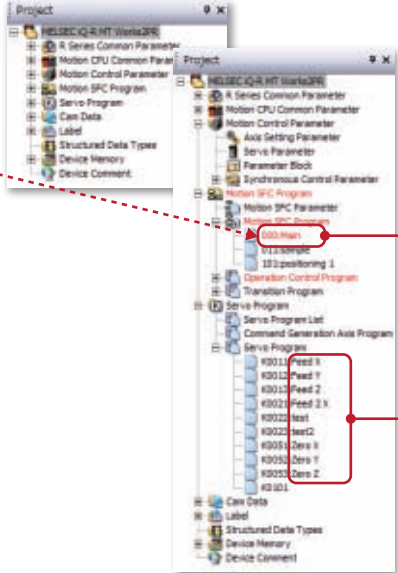
[MELSEC-Q series projects]   [MELSEC iQ-R series projects]

Drag & drop

File copy
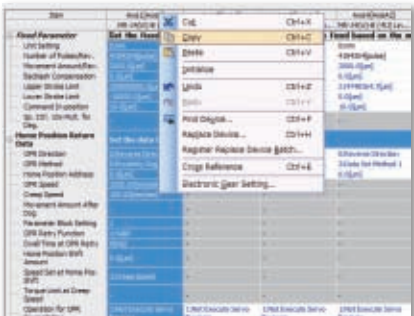
Copy the existing MELSEC-Q series project to the MELSEC iQ-R series.

Comment display

Program comments can be displayed.

Copy & Paste of Axis Data

Axis data can be reused via copy & paste without typing.

Copy & paste
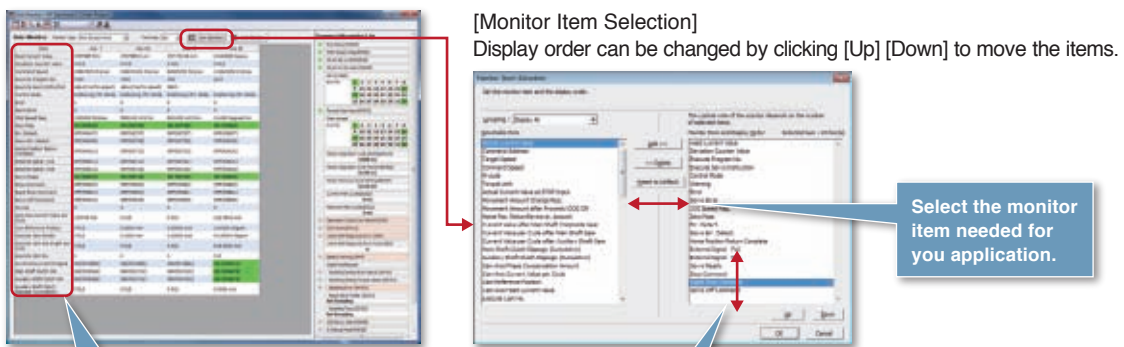
Monitor Functions for More Efficient Startup and Adjustment

Monitor

Debugging efficiency can be further increased by customizing axis monitor for your machine.
Motion CPU error batch monitor allows you to find all related errors all at once, making troubleshooting much easier.

Customizable axis monitor

Based on your application, select the monitor items and the axis to be monitored from various monitoring information.

[Monitor Item Selection]
Display order can be changed by clicking [Up] [Down] to move the items.

Customizable axis monitor
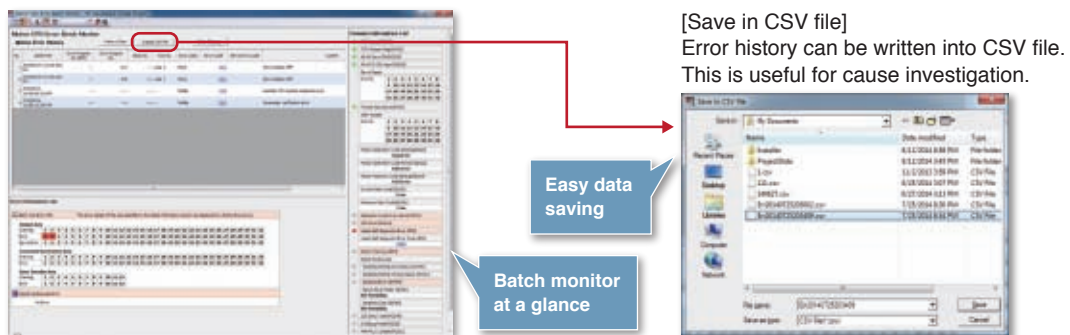
Select the monitor item needed for you application.

Change the display order.

Motion CPU error batch monitor at a glance

The Motion CPU and servo amplifier error information can be checked all at once.

[Save in CSV file]
Error history can be written into CSV file.
This is useful for cause investigation.

Easy data saving

Batch monitor at a glance

For More Efficient Startup and Adjustment

MELSOFT MT Works2

Servo Amplifier Operation of MELSOFT MR Configurator2 Integrated

The servo diagnosis and adjustment can be performed since MELSOFT MR Configurator2 is integrated with MELSOFT MT Works2.

MELSOFT MR Configurator2 integrated

MELSOFT MR Configurator2 [adjustment]

[Adjustment]
• One-touch tuning
• Tuning
• Machine analyzer
• Advanced gain search

A Digitalized Version of Oscilloscope

Data collection and waveform display which are synchronized to the Motion operation cycle greatly help you check operation and perform troubleshooting.

- Probe items can be set by selecting the purpose from the list.
- 16CH word and 16CH bit data can be sampled, of which, 8CH words and 8CH bits can be displayed in real time.
- Offline sampling is possible.
- Sampled data saved in a SD card can be analyzed on a personal computer.
- With Digital oscilloscope assistant function, the digital oscilloscope settings can be made easily.

Displays the waveform with the assistant function.

CURSOR JOG

Use the buttons in the cursor window to move the vertical cursor [A] and [B], and horizontal cursor [1] and [2].

Word waveform selection button

Select the word waveform to be operated.

CURSOR window

Position data of the vertical, horizontal and trigger cursors are displayed. When the cursor is moved, the values are changed accordingly.

Waveform display area

Waveform of 8CH word and 8CH bit data is displayed.

Probe setting by selecting an item.

Robust Security that Can Be Relied on

Security Function as Needed

Select security functions for your system as needed.
Each data item and cam data can be locked individually.

Security key function

Security key set to the Motion CPU and a personal computer prevents unauthorized access to your intellectual property.
 ・The security key authentication prevents programs from being opened on personal computers where the security key has not been registered.
 ・Programs cannot be executed by CPU modules where the security key has not registered.
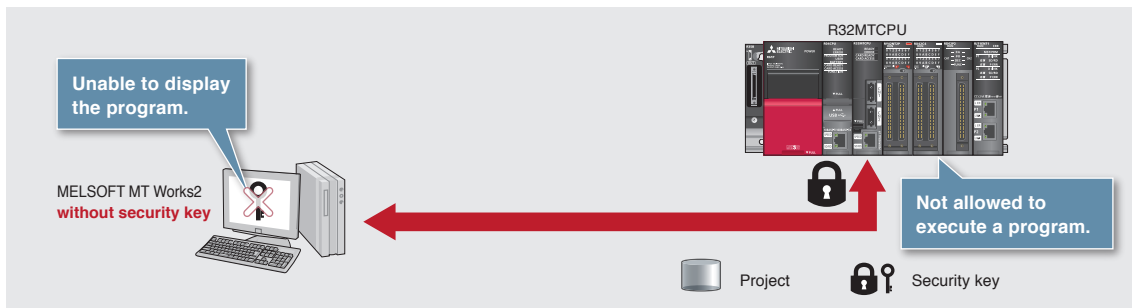
[Security Key Setting]
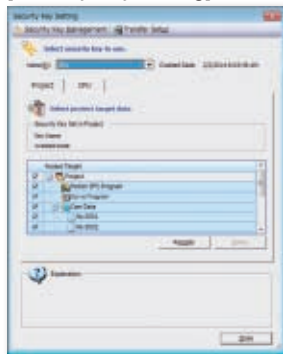
Password can be set for each item.

[Security Key Management]

Status of each security key can be checked in the list.

For More Efficient Maintenance

MELSOFT MT Works2

File password

Password can be set for data stored in the Motion CPU.
The Motion CPU data requires password entry when read or written to protect the data.

[File password]
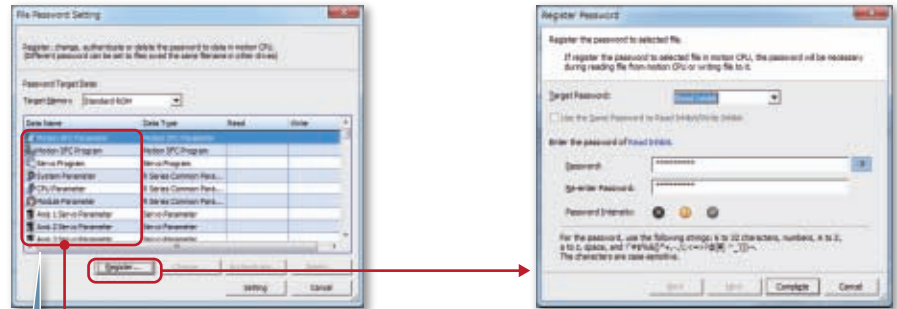
Data that can be locked by password

Motion SFC Parameter, Motion SFC Program, Servo Program, Parameters, and Cam data

Password can be set for each item.

Easy Module Replacement with CPU Backup

When replacing a module, the Backup function can save/load the data in Motion CPU.
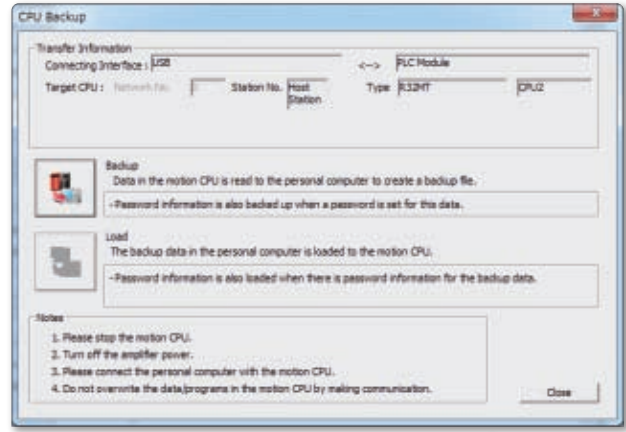
[Backup data]
- R series common parameter
- Motion CPU common parameter
- Motion SFC program data
- Synchronous control parameter
- Cam data, Cam edit data
- Latch device
- Password information
- Absolute position information on a Motion CPU, etc.

Start up CPU without the need of executing home position return.

AC Servo Capacity Selection

Select the Optimum Servo Amplifier and Motors

AC Servo Capacity Selection MRZJW3-MOTSZ111E

The optimum servo amplifier, servo motor, and regenerative option can be selected for your machine just by setting machine specifications and operation pattern. The software is available for free download. Contact your local sales office for more details.

Amplifier series selection

Calculation result in graph

Operation pattern

Sizing result

- Horizontal ball screws, vertical ball screws, rack and pinions, roll feeds, rotating tables, carts, elevators, conveyors, linear servo, other components
- Prints entered specifications, operating pattern, calculation process, graph of selection process feed speed and torque, and sizing results.

Machine Configuration Selection

Select the machine configuration.

[Horizontal ball screw]
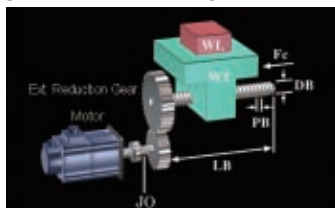
[Vertical ball screw]
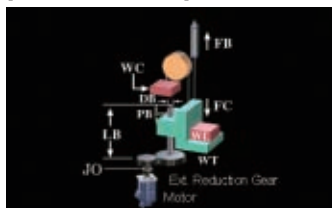
[Rack and pinion]
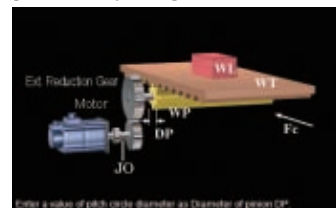
[Roll feed]
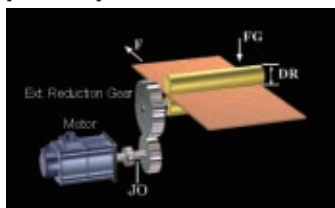
[Rotating table]
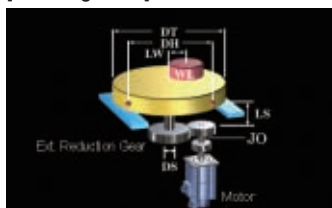
[Cart]
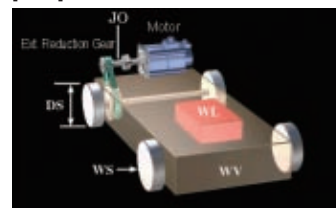
[Elevator]
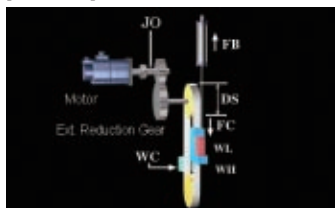
[Conveyor]

[Linear servo]
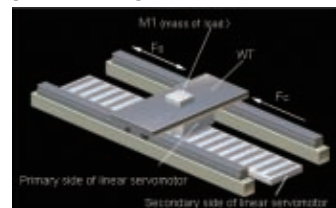
Procedures for Sizing

Sizing is completed easily. First, select the servo amplifier, servo motor, and the operation pattern. After that, input other necessary machine specification data.

Select the servo amplifier series.

Select the servo motor series.

Set the operation pattern.

Inertia Calculation (Load Moment of Inertia)

This software is provided with a tool that calculates the moment of inertia.
This function can calculate inertia of various load shapes such as cylinder, square block, variable speed, linear movement, hanging, conical, and conical base.
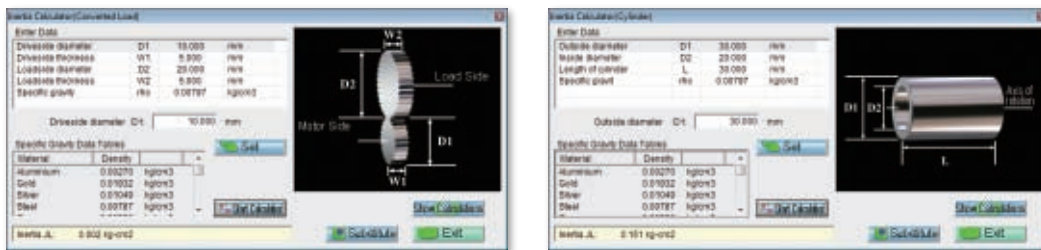
Sizing Results

The sizing results for the capacity of the servo amplifier and motor, and regenerative options that fit your application most will be displayed. The calculation process can be also displayed.

[Results]

Capacity calculation

[Calculation process]

Machine data

Sizing results

Easy capacity calculation
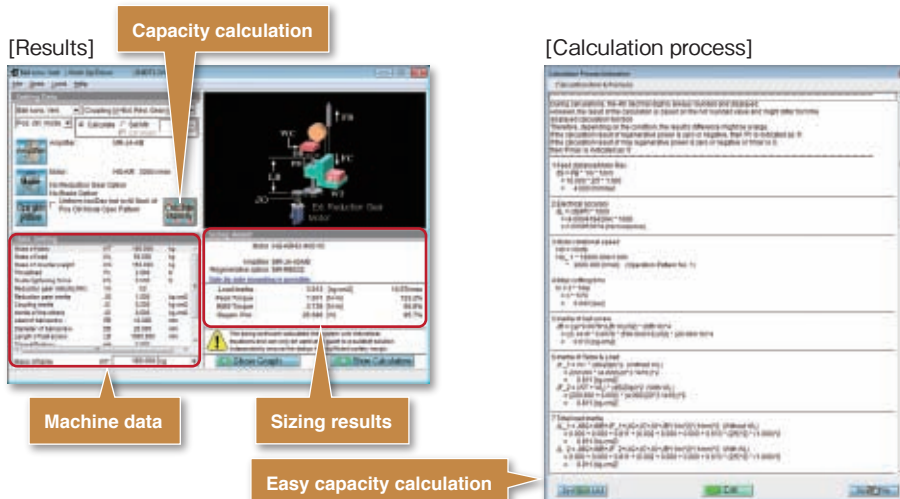
■ Operating environment
MELSOFT GX Works3

Item	Description
OS	Microsoft® Windows® 8.1 (64bit/32bit), Microsoft® Windows® 8.1 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 8 (64bit/32bit), Microsoft® Windows® 8 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 7 (Enterprise, Ultimate, Professional, Home Premium, Starter) (64bit/32bit) Microsoft® Windows Vista® (Enterprise, Ultimate, Business, Home Premium, Home Basic) (32bit) Microsoft® Windows® XP Service Pack3 or later (Professional, Home Edition) (32bit)
CPU	Intel® Core™2 Duo Processor 2 GHz or more recommended
Required memory	For 32-bit edition: 1GB or more recommended For 64-bit edition: 2GB or more recommended
Available hard disk capacity	When installing MELSOFT GX Works3: HDD available capacity is 5GB or more.
Optical drive	DVD-ROM supported disk drive
Monitor	Resolution 1024 × 768 dots or higher

(Note): Refer to Installation Instructions for precautions and restrictions regarding the operating environment.
・ If .NET Framework 2.0, .NET Framework 4.0, and Windows Installer 3.0 are not installed to the personal computer to which GX Works3 is to be installed, approximately 500 MB of memory is required in the system drive to install them.
・ For Windows® 8 and Windows® 8.1, if .NET Framework 3.5 (including .NET 2.0 and 3.0) and NET Framework 4.5 (including .NET4.0) are invalid on the personal computer to which GX Works3 is to be installed, they needs to be valid.
・ For Windows® 7, if .NET Framework 3.5 (including .NET 2.0 and 3.0) is invalid, it needs to be valid.
・ The following functions cannot be used. This product may not perform properly, when these functions are used.
　　　・ Activating the application with Windows® compatible mode.
　　　・ Simplified user switch-over
　　　・ Remote desktop
　　　・ Large font size (Advanced setting of Display Properties)
　　　・ DPI setting other than 100% (set the size of text and illustration other than [smaller-100%])
　　　・ Windows XP Mode
　　　・ Windows Touch or Touch
　　　・ Modern UI
　　　・ Client Hyper-V
・ Use the product as a 'Standard user' or 'Administrator' for Windows Vista®, Windows® 7, Windows® 8, and Windows® 8.1.
・ If the Windows firewall is enabled, "Module Find" and "Direct Connection" functions may not operate properly. Disable the Windows firewall setting.
・ The screens of this product may not perform properly when multi-display is set on Display Properties.
・ The operations on the screen of this product may not be executed properly when the screen resolution is changed while the product is being activated.

MELSOFT MR Configurator2

Item	Description
OS	Microsoft® Windows® 8.1 (64bit/32bit), Microsoft® Windows® 8.1 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 8 (64bit/32bit), Microsoft® Windows® 8 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 7 (Enterprise, Ultimate, Professional, Home Premium, Starter) (64bit/32bit) Microsoft® Windows Vista® (Enterprise, Ultimate, Business, Home Premium, Home Basic) (32bit) Microsoft® Windows® XP Service Pack2 or later (Professional, Home Edition) (32bit)
CPU	Desktop: Intel® Celeron® Processor 2.8 GHz or more recommended Laptop　: Intel® Pentium® M Processor 1.7 GHz or more recommended
Required memory	For 32-bit edition: 512MB or more recommended For 64-bit edition: 1GB or more recommended
Communication interface	USB port
Available hard disk capacity	1 GB or more
Optical drive	CD-ROM supported disk drive
Monitor	Resolution 1024 × 768 dots or higher

(Note): Refer to Installation Instructions for precautions and restrictions regarding the operating environment.
・ The following functions cannot be used. This product may not perform properly, when these functions are used.
　　　・ Activating the application with Windows® compatible mode.
　　　・ Simplified user switch-over
　　　・ Remote desktop
　　　・ Large font size (Advanced setting of Display Properties)
　　　・ DPI setting (Advanced setting of Display Properties) other than normal size (96DPI)
　　　・ Windows XP Mode
　　　・ Windows Touch or Touch
　　　・ Modern UI
　　　・ Client Hyper-V

MELSOFT MT Works2

Item	Description
OS	Microsoft® Windows® 8.1 (64bit/32bit), Microsoft® Windows® 8.1 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 8 (64bit/32bit), Microsoft® Windows® 8 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 7 (Enterprise, Ultimate, Professional, Home Premium, Starter) (64bit/32bit) Microsoft® Windows Vista® (Enterprise, Ultimate, Business, Home Premium, Home Basic) (32bit) Microsoft® Windows® XP Service Pack2 or later (Professional, Home Edition) (32bit)
CPU	Desktop : Intel® Celeron® Processor 2.8 GHz or more recommended Laptop : Intel® Pentium® M Processor 1.7 GHz or more recommended
Required memory	For 32-bit edition : 1GB or more recommended For 64-bit edition : 2GB or more recommended
Available hard disk capacity	When installing MT Developer2 : HDD available capacity is 3GB or more. When operating MT Developer2 : Virtual memory available capacity is 512MB or more.
Optical drive	DVD-ROM supported disk drive
Monitor	Resolution 1024 × 768 dots or higher

(Note): Refer to Installation Instructions for precautions and restrictions regarding the operating environment.
- For Windows® 8 and Windows® 8.1, Windows® 7, if .NET Framework 3.5 (including .NET 2.0 and 3.0) is invalid on the personal computer to which GX Works3 is to be installed, it needs to be valid.
- The following functions cannot be used. This product may not perform properly, when these functions are used.
  - Activating the application with Windows® compatible mode.
  - Simplified user switch-over
  - Remote desktop
  - Large font size (Advanced setting of Display Properties)
  - DPI setting other than 100% (set the size of text and illustration other than [smaller-100%])
  - Windows XP Mode
  - Windows Touch or Touch
  - Modern UI
  - Client Hyper-V
- Use the product as a 'Standard user' or 'Administrator' for Windows Vista®, Windows® 7, Windows® 8, and Windows® 8.1.
  Otherwise, you should have the administrator level to link to SoftGOT.
- If the Windows firewall is enabled, "Module Find" and "Direct Connection" functions may not operate properly. Disable the Windows firewall setting.
- The screens of this product may not perform properly when multi-display is set on Display Properties.
- The operations on the screen of this product may not be executed properly when the screen resolution is changed while the product is being activated.

AC servo capacity selection MRZJW3-MOTSZ111E

Item	Description
OS	Microsoft® Windows® 8.1 (64bit/32bit), Microsoft® Windows® 8.1 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 8 (64bit/32bit), Microsoft® Windows® 8 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 7 (Enterprise, Ultimate, Professional, Home Premium, Starter) (64bit/32bit) Microsoft® Windows Vista® (Enterprise, Ultimate, Business, Home Premium, Home Basic) (32bit) Microsoft® Windows® XP (Professional, Home Edition) (32bit) Microsoft® Windows® 2000 Professional Microsoft® Windows® Millennium Edition, Microsoft® Windows® 98
CPU	Pentium® 133 MHz or more (Windows® 98, Windows® 2000) Pentium® 150 MHz or more (Windows® Millennium Edition) Pentium® 300 MHz or more (Windows® XP) 1 GHz or more 32-bit (×86) processor (Windows Vista®) 1 GHz or more 32-bit (×86) or 64-bit (×64) processor (Windows® 7, Windows® 8, Windows® 8.1)
Required memory	1GB or more (Windows® 8.1, Windows® 8, Windows® 7, Windows Vista®) 128MB or more (Windows® XP) 32MB or more (Windows® 2000, Microsoft® Windows® Millennium Edition) 24MB or more (Windows® 98)
Available hard disk capacity	40MB or more
Monitor	Resolution 800 × 600 dots or higher

(Note): Refer to Installation Guide for precautions and restrictions regarding the operating environment.
- The following functions cannot be used when Microsoft® Windows® XP or later is used. This product may not perform properly when these functions are used.
  - Activating the application with Windows® compatible mode.
  - Simplified user switch-over
  - Remote desktop
  - Large font size (Advanced setting of Display Properties)
  - DPI setting (Advanced setting of Display Properties) other than normal size (96DPI)
  - Windows XP Mode
  - Windows Touch or Touch
  - Modern UI
  - Client Hyper-V

■ Engineering software list

Product	Model	Description	
MELSOFT GX Works3	SW1DND-GXW3-E	Simple Motion module parameter settings, Sequence program creation	DVD-ROM
MELSOFT MT Works2	SW1DND-MTW2-E	Parameter settings and program creation for Motion controllers	DVD-ROM
MELSOFT iQ Works	SW2DND-IQWK-E	FA Engineering Software [Note-1] • System Management Software [MELSOFT Navigator] • Programmable Controller Engineering Software [MELSOFT GX Works3] • Motion Controller Engineering Software [MELSOFT MT Works2] • HMI/GOT Screen Design Software [MELSOFT GT Works3] • Robot Total Engineering Support Software [MELSOFT RT ToolBox2 mini] • Inverter Setup Software [MELSOFT FR Configurator2]	DVD-ROM
MELSOFT MR Configurator2	SW1DNC-MRC2-E	Servo setup software	CD-ROM

(Note-1): Refer to each product manual for software needed for the model.
(Note-2): MR Configurator2 can be obtained by either of the following:
    • Purchase MR Configurator2 alone.
    • Purchase GX Works3 or MT Works2: MR Configurator2 is included in GX Works3 and MT Works2 with software version 1.34L or later.

As a recognized leader in factory automation, Mitsubishi Electric offers a world-class level of customer satisfaction.

Production/Development System

For more than 80 years from the start of operations in 1924, Mitsubishi Electric Nagoya Works has manufactured various universal devices including motors, programmable controllers and inverters. The history of AC servo production at Nagoya Works spans over 30 years. We have expanded our production system based on the technology and tradition amassed during this time, and have incorporated world-class research and development to create high-performance, high-quality products that can be supplied for a long time.

Production system

To guarantee the high quality and performance of MELSERVO, Mitsubishi Electric has built a cooperative system of three facilities - Shinshiro Factory, a branch factory of Nagoya Works; Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd., a manufacturing base; and Nagoya Works at the core. Mitsubishi Electric responds to various needs throughout the world by uniting technologies and know-how of these facilities. Mitsubishi Electric's FA energy solutions, "e&eco-F@ctory", are at work in the servo motor factory at the Nagoya Works. They are being used to boost capacity utilization and product quality, and reduce energy consumption.

Development system

To spread advanced servo systems to the world as quickly as possible, Mitsubishi Electric has established FA-related development centers at its Nagoya Works, and in North America and Europe. Furthermore, we have established strong connections between our Advanced Technology R&D Center, which pushes technology development beyond the limits of FA, and Information Technology R&D Center. We are moving forward with the development of new products that reflect the latest technological directions and customer input.

Mitsubishi Electric Nagoya Works

FA Development Center

e&eco-F@ctory implementation

EDC (Europe Development Center)

A global support network for MELSERVO users

Global FA Center

Across the globe, FA Centers provide customers with local assistance for purchasing Mitsubishi Electric products and with after-sales service. To enable national branch offices and local representatives to work together in responding to local needs, we have developed a service network throughout the world. We provide repairs, on-site engineering support, and sales of replacement parts. We also provide various services from technical consulting services by our expert engineers to practical training for equipment operations.

Ratingen, Germany
Germany FA Center/
Europe Development Center

Krakowska, Poland
Europe FA Center (Poland)

St. Petersburg, Russia
Russia FA Center

**Pune/Gurgaon/Bangalore/
Chennai/Ahmadabad, India**
India FA Center

Bangkok, Thailand
Thailand FA Center

Hatfield, U.K.
UK FA Center

Praha, Czech Republic
Czech Republic FA Center

Istanbul, Turkey
Turkey FA Center

China (including Hong Kong District)

Beijing, China
Beijing FA Center

Tianjin, China
Tianjin FA Center

Guangzhou, China
Guangzhou FA Center
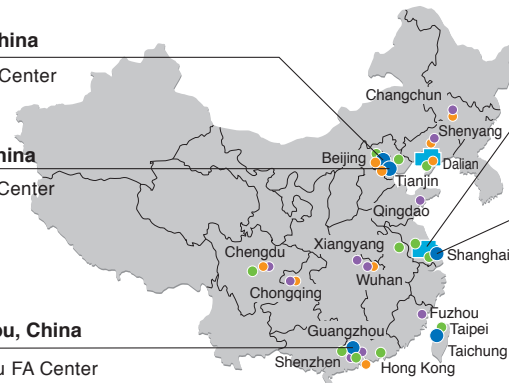
Changshu, China
China Local Factory
Mitsubishi Electric
Automation Manufacturing
(Changshu) Co., Ltd.

Shanghai, China
Shanghai FA Center

Changchun
Shenyang
Beijing
Dalian
Tianjin
Qingdao
Chengdu
Xiangyang
Shanghai
Chongqing
Wuhan
Fuzhou
Guangzhou
Taipei
Shenzhen
Taichung
Hong Kong

● Global FA Center ● FA Center Satellite (China) ● Mechatronics Service Base (China) ● Mitsubishi Sales Offices
■ Production Facility ◆ Development Center

Seoul, Korea
Korea FA Center

Nagoya, Japan
Nagoya Works

Taipei/Taichung, Taiwan
Left: Taipei FA Center/
Right: Taichung FA Center

Chicago IL, U.S.A.
North America FA Center/
North American Development Center

Tlalnepantla Edo., Mexico
Mexico FA Center

Hanoi/Ho Chi Minh, Vietnam
Left: Hanoi FA Center/
Right: Ho Chi Minh FA Center

Sao Paulo SP, Brazil
Brazil FA Center

Singapore
ASEAN FA Center

Bekasi, Indonesia
Indonesia FA Center

Global FA Centers
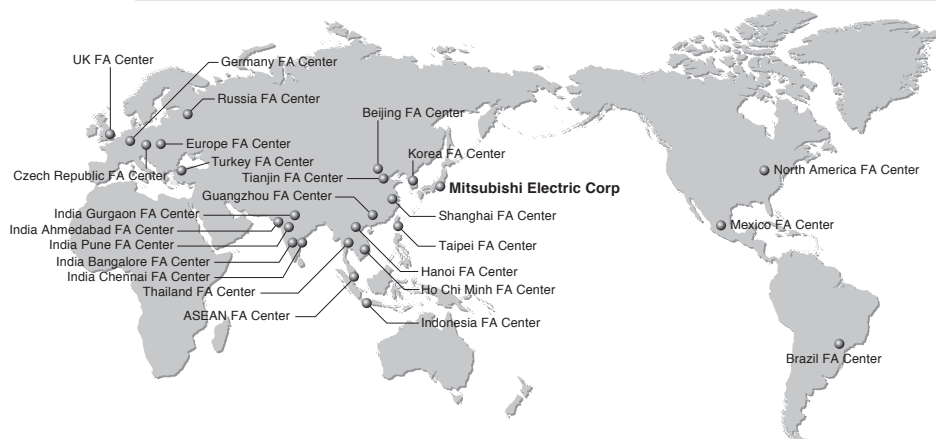
China

Shanghai FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.
No.1386 Hongqiao Road,
Mitsubishi Electric Automation Center,
Shanghai, China
Tel: 86-21-2322-3030 Fax: 86-21-2322-3000 (9611#)

Beijing FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Beijing Branch
Unit 901, 9F, Office Tower 1, Henderson Centre,
18 Jianguomennei Avenue, Dongcheng District,
Beijing, China
Tel: 86-10-6518-8830 Fax: 86-10-6518-2938

Tianjin FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Tianjin Branch
Room 2003 City Tower, No.35, Youyi Road,
Hexi District, Tianjin, China
Tel: 86-22-2813-1015 Fax: 86-22-2813-1017

Guangzhou FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Guangzhou Branch
Room 1609, North Tower, The Hub Center,
No.1068, Xingang East Road, Haizhu District,
Guangzhou, China
Tel: 86-20-8923-6730 Fax: 86-20-8923-6715

Taiwan

Taipei FA Center
SETSUYO ENTERPRISE CO., LTD.
3F, No.105, Wugong 3rd Road, Wugu District,
New Taipei City 24889, Taiwan, R.O.C.
Tel: 886-2-2299-9917 Fax: 886-2-2299-9963

Korea

Korea FA Center
MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD.
7F-9F, Gangseo Hangang Xi-tower A, 401,
Yangcheon-ro, Gangseo-Gu, Seoul 157-801, Korea
Tel: 82-2-3660-9630 Fax: 82-2-3663-0475

Thailand

Thailand FA Center
MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD.
12th Floor, SV.City Building, Office Tower 1,
No. 896/19 and 20 Rama 3 Road,
Kwaeng Bangpongpang, Khet Yannawa, Bangkok
10120, Thailand
Tel: 66-2682-6522 to 6531 Fax: 66-2682-6020

ASEAN

ASEAN FA Center
MITSUBISHI ELECTRIC ASIA PTE. LTD.
307, Alexandra Road, Mitsubishi Electric Building,
Singapore 159943
Tel: 65-6470-2480 Fax: 65-6476-7439

Indonesia

Indonesia FA Center
PT. MITSUBISHI ELECTRIC INDONESIA Cikarang Office
Jl. Kenari Raya Blok G2-07A Delta Silicon 5,
Lippo Cikarang - Bekasi 17550, Indonesia
Tel: 62-21-2961-7797 Fax: 62-21-2961-7794

Vietnam

Hanoi FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Hanoi Branch
6 - Floor, Detech Tower, 8 Ton That Thuyet Street,
My Dinh 2 Ward, Nam Tu Liem District, Hanoi,
Vietnam
Tel: 84-4-3937-8075 Fax: 84-4-3937-8076

Ho Chi Minh FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED
Unit 01-04, 10th Floor, Vincom Center, 72 Le
Thanh Ton Street, District 1, Ho Chi Minh City,
Vietnam
Tel: 84-8-3910-5945 Fax: 84-8-3910-5947

India

India Pune FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch
Emerald House, EL -3, J Block, M.I.D.C Bhosari,
Pune - 411026, Maharashtra, India
Tel: 91-20-2710-2000 Fax: 91-20-2710-2100

India Gurgaon FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Gurgaon Head Office
2nd Floor, Tower A & B, Cyber Greens, DLF
Cyber City, DLF Phase - III, Gurgaon - 122002
Haryana, India
Tel: 91-124-463-0300 Fax: 91-124-463-0399

India Bangalore FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Bangalore Branch
Prestige Emerald, 6th Floor, Municipal No. 2,
Madras Bank Road (Lavelle Road), Bangalore -
560001, Karnataka, India
Tel: 91-80-4020-1600 Fax: 91-80-4020-1699

India Chennai FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Chennai Branch
"Citilights Corporate Centre" No.1,
Vivekananda Road, Srinivasa Nagar, Chetpet,
Chennai – 600031, Tamil Nadu, India
Tel: 91-44-4554-8772 Fax: 91-44-4554-8773

India Ahmedabad FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Ahmedabad Branch
B/4, 3rd Floor, Safal Profitaire, Corporate Road,
Prahaladnagar, Satellite, Ahmedabad,
Gujarat - 380015, India
Tel: 91-79-6512-0063 Fax: -

America

North America FA Center
MITSUBISHI ELECTRIC AUTOMATION, INC.
500 Corporate Woods Parkway, Vernon Hills,
IL 60061, U.S.A.
Tel: 1-847-478-2100 Fax: 1-847-478-2253

Mexico

Mexico FA Center
MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch
Mariano Escobedo #69, Col. Zona Industrial,
Tlalnepantla Edo, C.P.54030, Mexico
Tel: 52-55-3067-7511 Fax: -

Brazil

Brazil FA Center
MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA.
Rua Jussara, 1750- Bloco B Anexo, Jardim Santa
Cecilia, CEP 06465-070, Barueri - SP, Brasil
Tel: 55-11-4689-3000 Fax: 55-11-4689-3016

Europe

Europe FA Center
MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch
ul. Krakowska 50, 32-083 Balice, Poland
Tel: 48-12-630-47-00 Fax: 48-12-630-47-01

Germany FA Center
MITSUBISHI ELECTRIC EUROPE B.V. German Branch
Gothaer Strasse 8, D-40880 Ratingen, Germany
Tel: 49-2102-486-0 Fax: 49-2102-486-1120

UK FA Center
MITSUBISHI ELECTRIC EUROPE B.V. UK Branch
Travellers Lane, Hatfield, Hertfordshire, AL10
8XB, U.K.
Tel: 44-1707-28-8780 Fax: 44-1707-27-8695

Czech Republic FA Center
MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch
Avenir Business Park, Radlicka 751/113e,
158 00 Praha5, Czech Republic
Tel: 420-251-551-470 Fax: 420-251-551-471

Russia FA Center
MITSUBISHI ELECTRIC EUROPE B.V. Russian Branch St. Petersburg office
Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua",
office 720; 195027, St. Petersburg, Russia
Tel: 7-812-633-3497 Fax: 7-812-633-3499

Turkey FA Center
MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch
Şerifali Mahallesi Nutuk Sokak No:5,
TR-34775 Ümraniye, İstanbul, Türkey
Tel: 90-216-526-3990 Fax: 90-216-526-3995

MEMO

FA Products

PLC | MELSEC iQ-R Series

Revolutionary, next generation controllers building a new era in automation

◎High-speed, high-accuracy multiple CPU control system based on the iQ Platform

◎New high-speed system bus and inter-module sync realizes improved productivity and reduced TCO*

◎Reducing development costs through intuitive engineering (GX Works3)

◎Robust security features (such as security key authentication, IP filter)

Product Specifications

Program capacity	40K steps to 1200K steps
LD instruction speed	0.98 ns
Available modules	I/O, analog, high-speed counter, positioning, simple motion, network module
Control system architecture	Rack-mounted modular based system
Supported networks	Ethernet, CC-Link IE Control Network, CC-Link IE Field Network, CC-Link, RS-232, RS-422/485

*Total Cost of Ownership

AC Servo | Mitsubishi General-Purpose AC Servo MELSERVO-J4 Series

Industry-leading level of high performance servo

◎Industry-leading level of basic performance: Speed frequency response (2.5kHz), 4,000,000 (4,194,304p/rev) encoder

◎Advanced one-touch tuning function achieves the one-touch adjustment of advanced vibration suppression control Ⅱ, etc.

◎Equipped with large capacity drive recorder and machine diagnosis function for easy maintenance.

◎2-axis and 3-axis servo amplifiers are available for energy-conservative, space-saving, and low-cost machines.

Product Specifications

Power supply specifications	1-phase/3-phase 200V AC, 1-phase 100V AC, 3-phase 400V AC
Command interface	SSCNET Ⅲ/H, SSCNET Ⅲ (compatible in J3 compatibility mode), CC-Link IE Field Network interface with Motion, pulse train, analog
Control mode	Position/Speed/Torque/Positioning function/Fully closed loop
Speed frequency response	2.5kHz
Tuning function	Advanced one-touch tuning, advanced vibration suppression control Ⅱ, robust filter, etc.
Functional safety	Conforms to functions of IEC/EN 61800-5-2, STO: Category 3 PL d, SIL 2 Conforms to Category 4 PL e, SIL 3 by a combination with MR-D30 functional safety unit
Compatible servo motor	Rotary servo motor (rated output: 0.05 to 55kW), linear servo motor (continuous thrust 50 to 3000N), direct drive motor (rated torque: 2 to 240N・m)

HMI | Graphic Operation Terminal GOT2000 Series GT27 Model

To the top of HMIs with further user-friendly, satisfactory standard features.

◎Comfortable screen operation even if high-load processing (e.g. logging, device data transfer) is running. (Monitoring performance is twice faster than GT16)

◎Actual usable space without using a SD card is expanded to 128MB for more flexible screen design.

◎Multi-touch features, two-point press, and scroll operations for more user-friendliness.

◎Outline font and PNG images for clear, beautiful screen display.

Product Specifications

Screen size	15", 12.1", 10.4", 8.4"
Resolution	XGA, SVGA, VGA
Intensity adjustment	32-step adjustment
Touch panel type	Analog resistive film
Built-in interface	RS-232, RS-422/485, Ethernet, USB, SD card
Applicable software	GT Works3
Input power supply voltage	100 to 240VAC (+10%, −15%), 24VDC (+25%, −20%)

High-functionality, high-performance inverter

◎Realize even higher responsiveness during real sensor-less vector control or vector control, and achieve faster operating frequencies.

◎The latest automatic tuning function supports various induction motors and also sensor-less PM motors.

◎The standard model is compatible with EU Safety Standards STO (PLd, SIL2). Add options to support higher level safety standards.

◎Control and monitor inverters via CC-Link/CC-Link IE Field Network (option interface).

Product Specifications

Inverter capacity	200V class: 0.4kW to 90kW, 400V class: 0.4kW to 500kW
Control method	High-carrier frequency PWM control (Select from V/F, advanced magnetic flux vector, real sensorless vector or PM sensorless vector control), vector control (when using options)
Output frequency range	0.2 to 590Hz (upper limit is 400Hz when using advanced magnetic flux vector control, real sensorless vector control, vector control or PM sensorless vector control)
Regenerative braking torque (Maximum allowable duty)	200V class: 0.4K to 1.5K (150% at 3%ED) 2.2K/3.7K (100% at 3%ED) 5.5K/7.5K (100% at 2%ED) 11K to 55K (20% continuous) 75K or more (10% continuous), 400V class: 0.4K to 7.5K (100% at 2%ED) 11K to 55K (20% continuous) 75K or more (10% continuous)
Starting torque	200% 0.3Hz (3.7K or less), 150% 0.3Hz (5.5K or more) (when using real sensorless vector, vector control)

GOOD DESIGN AWARD 2014

Technologies based on long year experience realize more improved performance.

◎The new electronic circuit breakers can display various measurement items.

◎Improvement of breaking performance with new breaking technology "Expanded ISTAC".

◎Compliance with global standard for panel and machine export.

◎Commoditization of internal accessories for shorter delivery time and stock reduction.

Product Specifications.

Frame	32-250A Frame
Applicable standard	Applicable to IEC, GB, UL, CSA, JIS and etc.
Expansion of UL listed product line-up	New line-up of 480VAC type with high breaking performance for SCCR requirement
Commoditization of internal accessories	Reduction of internal accessory types from 3 to 1
Commoditization for AC and DC circuit use	Common use of 32/63A frame in both AC and DC circuit
Compact size for easy to use	Thermal adjustable and electronic circuit breakers are same size as 250AF fixed type
Measuring Display Unit (MDU) breakers	MDU breakers measure, display and transmit energy date to realize energy management.

Exceed your expectations.

◎10A frame model is over 16% smaller with a width of just 36mm!!

◎New integrated terminal covers.

◎Reduce your coil inventory by up to 50%.

◎Be certified to the highest international levels while work is ongoing to gain other country.

Product specifications

Frame	10 A to 32 A
Applicable standards	Certification to various standards including IEC, JIS, CE, UL, TÜV, CCC.
Terminal cover	Standard terminal cover improves safety, simplifies ordering, and reduces inventory, etc.
Improved wiring	Wiring and operability are improved with streamlining wiring terminal BC specifications.
Operation coil rating	Wide range of operation coil ratings reduces number of coil types from 14 (N Series) to 7 types and simplifies selection.
Option units	Diverse lineup includes Auxiliary Contact Block, Operation Coil Surge Absorber Unit, Mechanical Interlock Unit.

FA Products

Robot		MELFA F Series

High speed, high precision and high reliability industrial robot

◎Compact body and slim arm design, allowing operating area to be expanded and load capacity increased.

◎The fastest in its class using high performance motors and unique driver control technology.

◎Improved flexibility for robot layout design considerations.

◎Optimal motor control tuning set automatically based on operating position, posture, and load conditions.

Product Specifications

Degrees of freedom	Vertical:6 Horizontal:4
Installation	Vertical:Floor-mount, ceiling mount, wall mount (Range of motion for J1 is limited) Horizontal:Floor-mount
Maximum load capacity	Vertical:2-20kg Horizontal:3-20kg
Maximum reach radius	Vertical:504-1503mm Horizontal:350-1,000mm

CNC		Mitsubishi Numerical Control Unit C70 Series

iQ Platform compatible CNC to provide TCO reduction effect.

◎A CNC structured in building block method on iQ Platform.

◎High performance CNC integrated with high-speed PLC offers high-speed control to reduce cycle time.

◎A wide variety of FA products helps construct flexible lines.

Product specifications

Maximum number of control axes (NC axis + spindle + PLC axis)	16 axes
Maximum number of part system	Machining center system: 7 systems, Lathe system: 3 systems
Maximum number of NC axes per part system	8 axes
Maximum program capacity	2,000 KB (5,120 m)
Maximum number of files to store	124 files/252 files
Number of input/output points	4,096 points
Safety observation function	Safety signal comparison function, speed monitoring function, duplexed emergency stop

Three-Phase Motor		High Performance Energy-Saving Motor Super Line Premium Series SF-PR

Premium Efficiency & Compatible. New Launch of Super Line Premium Series SF-PR Model

◎Compared to general efficiency motor SF-JR model, generated loss is reduced by 37% on average, and it is compatible with highly efficient premium IE3.

◎Easy replacement is achieved as mounting dimension (frame number) is compatible with general efficiency motor SF-JR model.

◎One motor can accommodate different power sources of Japan and the U.S. Three ratings in Japan meet the Top Runner standards, while it corresponds to EISA in the U.S.

◎Can be driven by inverters as standard. Advanced magnetic-flux vector control by our FR-A800 achieves constant torque drive up to 0.5Hz.

Product Specifications

Number of poles	2-poles, 4-poles, 6-poles
Voltage·Frequency	200/200/220/230V 50/60/60/60Hz EISA 230V 60Hz or 400/400/440/460V 50/60/60/60Hz EISA 460V 60Hz
Exterior	Totally enclosed fan cooled type (indoor, outdoor installation)
Protection system	IP44
Power transmission system	Motor with 2-poles over 11kW is dedicated for a direct connection. Motors with 4-poles and 6-poles are for both direct and belt connections.
Rotation direction	Counter-clock-wise (CCW) direction viewed from the shaft end.
Compatible standard	JIS C 4213 JEC-2137-2000 (Efficiency is compatible with IEC 60034-30.)

MEMO

Mitsubishi iQ Platform Compatible Servo System Engineering Software

Country/Region	Sales office	Tel/Fax
USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col. Zona Industrial, Tlalnepantla Edo, C.P.54030, Mexico	Tel : +52-55-3067-7500 Fax : –
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA. Rua Jussara, 1750- Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri - SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Strasse 8, D-40880 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio Viale Colleoni 7, 20864 Agrate Brianza(Milano) Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubí, 76-80-Apdo. 420, 08173 Sant Cugat del Vallés (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch Avenir Business Park, Radlicka 751/113e, 158 00 Praha5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
Poland	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch ul. Krakowska 50, 32-083 Balice, Poland	Tel : +48-12-630-47-00 Fax : +48-12-630-47-01
Russia	MITSUBISHI ELECTRIC EUROPE B.V. Russian Branch St. Petersburg office Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; RU-195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Sweden	MITSUBISHI ELECTRIC EUROPE B.V. (Scandinavia) Fjelievägen 8, SE-22736 Lund, Sweden	Tel : +46-8-625-10-00 Fax : +46-46-39-70-18
Turkey	MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch Şerifali Mahallesi Nutuk Sokak No:5, TR-34775 Ümraniye, İstanbul, Türkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
UAE	MITSUBISHI ELECTRIC EUROPE B.V. Dubai Branch Dubai Silicon Oasis, P.O.BOX 341241, Dubai, U.A.E.	Tel : +971-4-3724716 Fax : +971-4-3724721
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, Fourways, Johannesburg, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan, R.O.C.	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 7F-9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 157-801, Korea	Tel : +82-2-3660-9510 Fax : +82-2-3664-8372/8335
Singapore	MITSUBISHI ELECTRIC ASIA PTE. LTD. 307, Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120, Thailand	Tel : +66-2682-6522 to 6531 Fax : +66-2682-6020
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-8-3910-5945 Fax : +84-8-3910-5947
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL -3, J Block, M.I.D.C Bhosari, Pune - 411026, Maharashtra, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

MITSUBISHI ELECTRIC CORPORATION