

Mitsubishi Servo System Controllers MELSEC iQ-R Series

February 2015

New Product Release

SV1502-2E

SERVO SYSTEM CONTROLLER

Upgraded!



MELSEC iQ-R
series

The Simple Motion module has enhanced engineering functionalities dramatically.

- The simulation function can conduct debugging only with a personal computer, increasing efficiency dramatically in system design.
- The whole module configuration of the advanced synchronous control can be checked at a glance, which facilitates easier debugging.

The Motion controller offers a unique, advanced control, enabling further application expansion.

- Pressure control with a pressure sensor has become available, enabling further application expansion.
- A large system can be configured thanks to the multiple CPU advanced synchronous control that allows up to 96-axis synchronization.

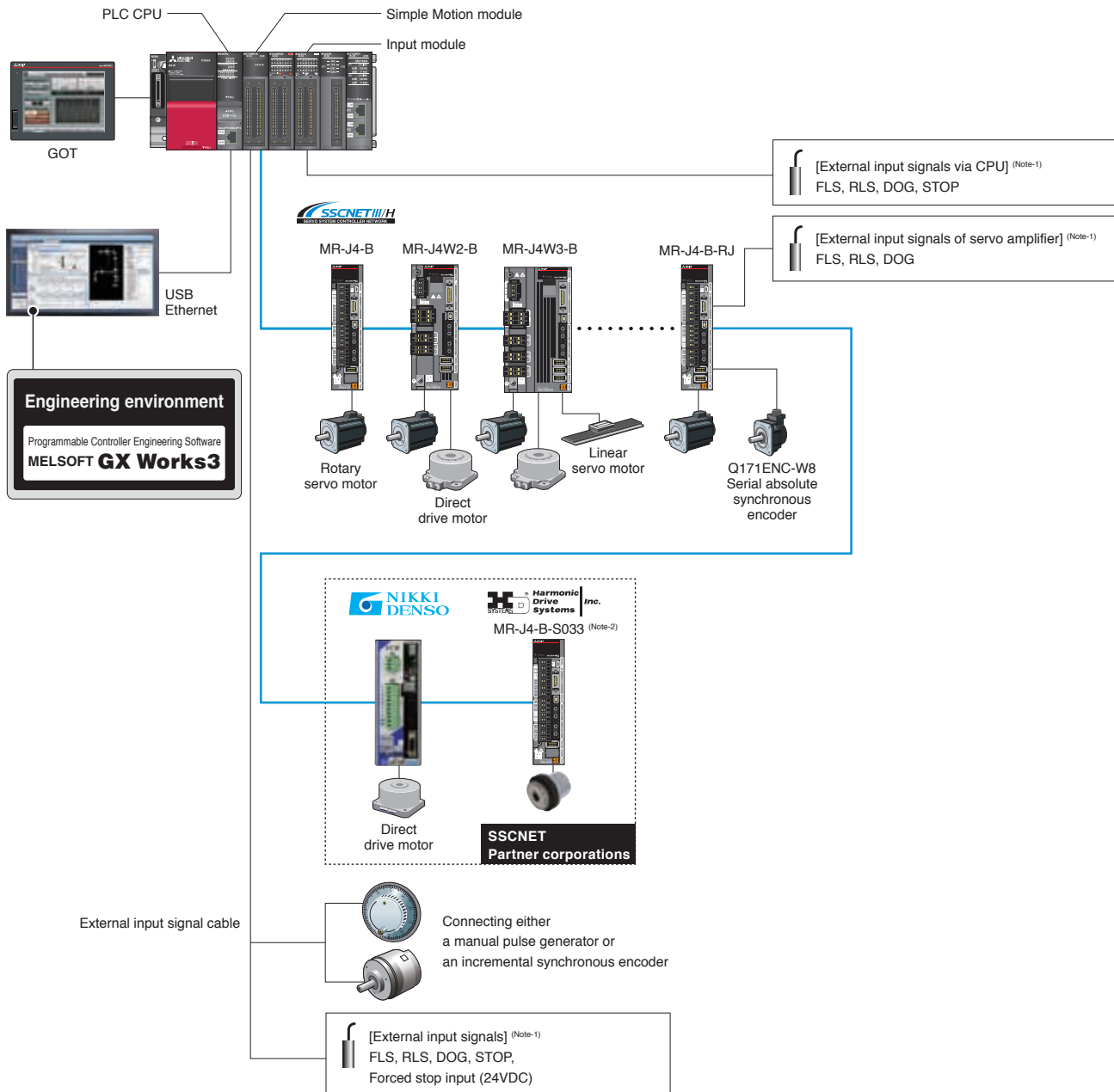
MELSEC iQ-R series SSCNET III/H compatible MELSEC iQ-R series

Simple Motion Module



- The MELSOFT GX Works3 simulator can conduct debugging without an actual machine.
- The whole module configuration of advanced synchronous control can be viewed on one monitoring screen.
- Error information and events occurred on each module can be displayed, which facilitates quick cause investigation and restoration.
- Helical interpolation that enables boring of large holes is easily achieved.

System configuration



(Note-1): Destination of external input signals (FLS, RLS, DOG, and, STOP) can be changed with parameters.
(Note-2): The MR-J4-B-S033 is the servo amplifier intended to connect to a servo motor of Harmonic Drive Systems Inc.

Features

Simulation coordinated with programmable controllers **NEW**



The MELSOFT GX Works3 can simulate the program on a personal computer without an actual machine during the debugging process, shortening startup time.

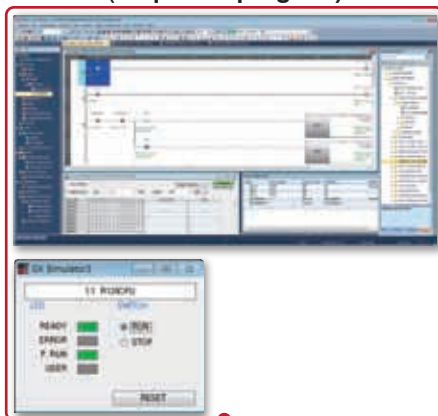


Point Debugging can be done on a personal computer.

[Simulation examples]

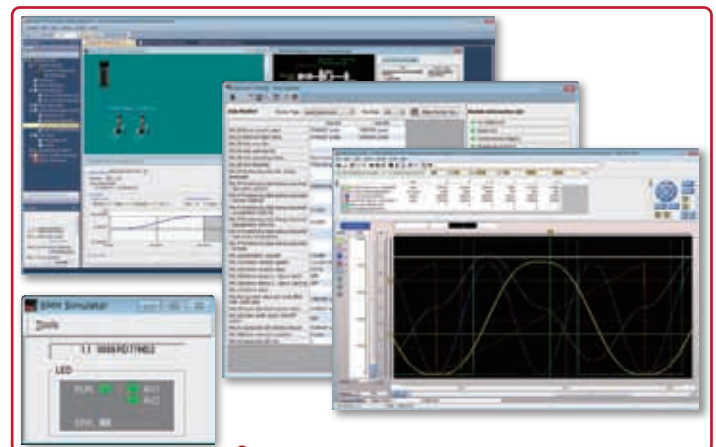
With a start from a sequence program, the Simple Motion module simulator is used to verify operation.

MELSOFT GX Works3 Simulator (Sequence program)



The simulation can be started with a sequence program or device, and then monitoring can be executed.

Simple Motion Module Simulator



Simulation of positioning and synchronous controls can be executed while the Simple Motion module simulator is coordinated with MELSOFT GX works3 simulator. Also, operation can be checked through the axis monitor and digital oscilloscope.



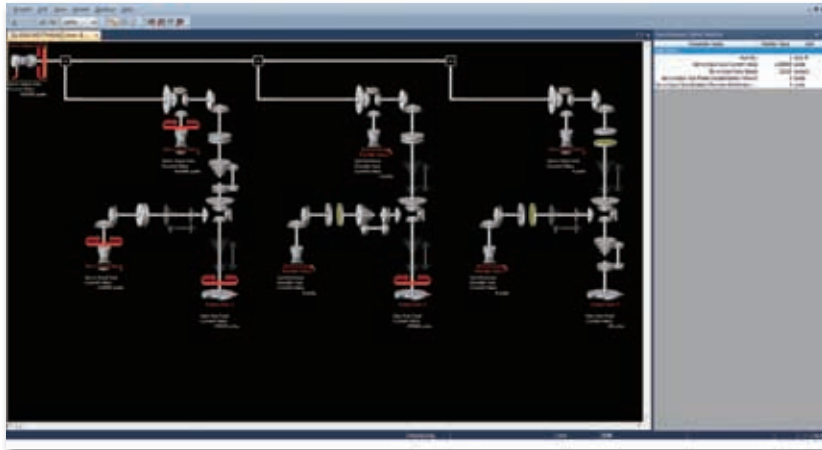
Features

The whole configuration of output axes can be checked at a glance on the monitoring screen **NEW**



The whole module configuration of the advanced synchronous control can be displayed in one screen, and monitoring of the target modules can be also viewed, which enables more efficient debugging.

- All the output axes that are connected to the main shaft main input axes modules can be displayed in the monitoring screen.
- Monitoring on each module can be performed, and parameter settings can be made.



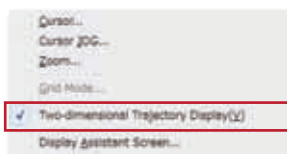
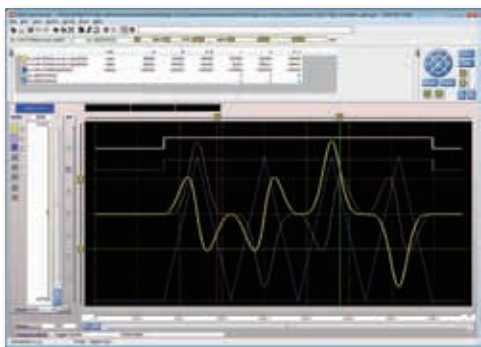
Point The whole configuration can be checked at a glance, which increases efficiency in debugging.

Two-dimensional trajectory display by digital oscilloscope **NEW**

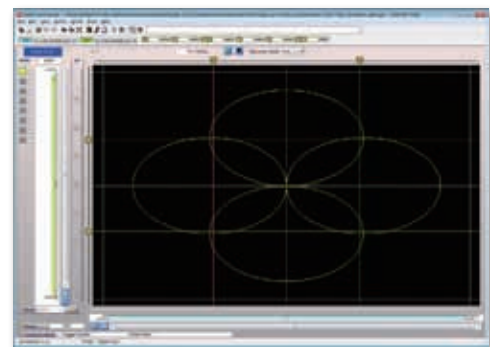


Sampled data can be traced on 2-dimensional coordinate with two-dimensional trajectory display of the digital oscilloscope.

The data can be played in slow motion or fast-forward, etc. by switching the trace speed.



Easy switching



Point Trace can be checked in 2 dimensions, which increases efficiency in debugging.

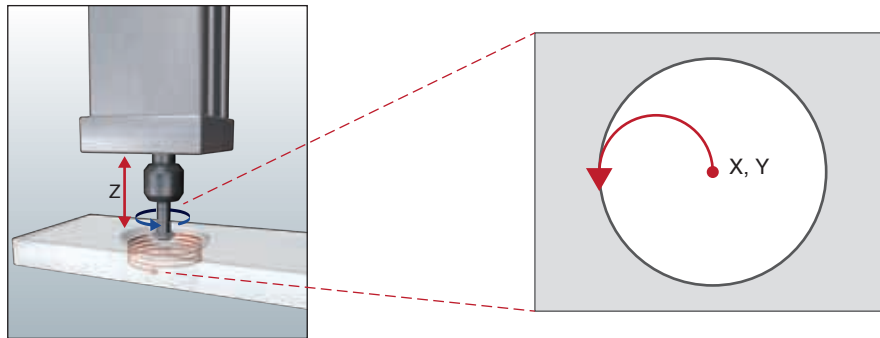
Features

Helical interpolation **NEW**



For applications that require the boring of deep, large holes, usually multiple interpolation control of three axes (X, Y and Z) or more is performed.

- The actual milling is done in a circle, with the X and Y axes synchronized to achieve the pre-set size.
- The depth of the hole is simultaneously controlled along the Z axis, ensuring minimal deviation in the cutting bit position.



Point Complicated helical interpolation is easily achieved.

Event history facilitates easier maintenance **Upgraded**



For the MELSEC iQ-R series, events occurred on each module and servo amplifiers can be stored to the CPU module. "WRITE" operation to the program, error information, and written data to the flash ROM, etc. are listed chronologically, which makes error cause investigation and restoration work smoother and quicker.

MELSOFT GX Works3

Detailed information	Axis information	Current value	Signal
	Event occurs axis:2 Axis operation status:20 (Servo amplifier has not been connected/servo amplifier power OFF) Start No.:5 Occurrence data No.:5 Starting axis:2	Current feed value:10762666 Real current value:10762666 Feedrate:0 Unit:2 (degree)	PLC READY:On All axis servo ON:On BUSY:OFF External input signal (Md.30):0003 Servo Status 1:0000 Servo Status 2:0000 Servo status 3:0000
Cause	Start is requested when the '(Md.26) Axis operation status' is 'Servo amplifier has not been connected/servo amplifier power OFF.'		
Corrective Action	Do not request the start when the '(Md.26) Axis operation status' is other than 'standby', 'stop', and 'start'.		

Displays the detailed information regarding the cause that stops the operation.

The cause of event can be easily identified through the event history which chronologically lists errors and operation for the CPU module.

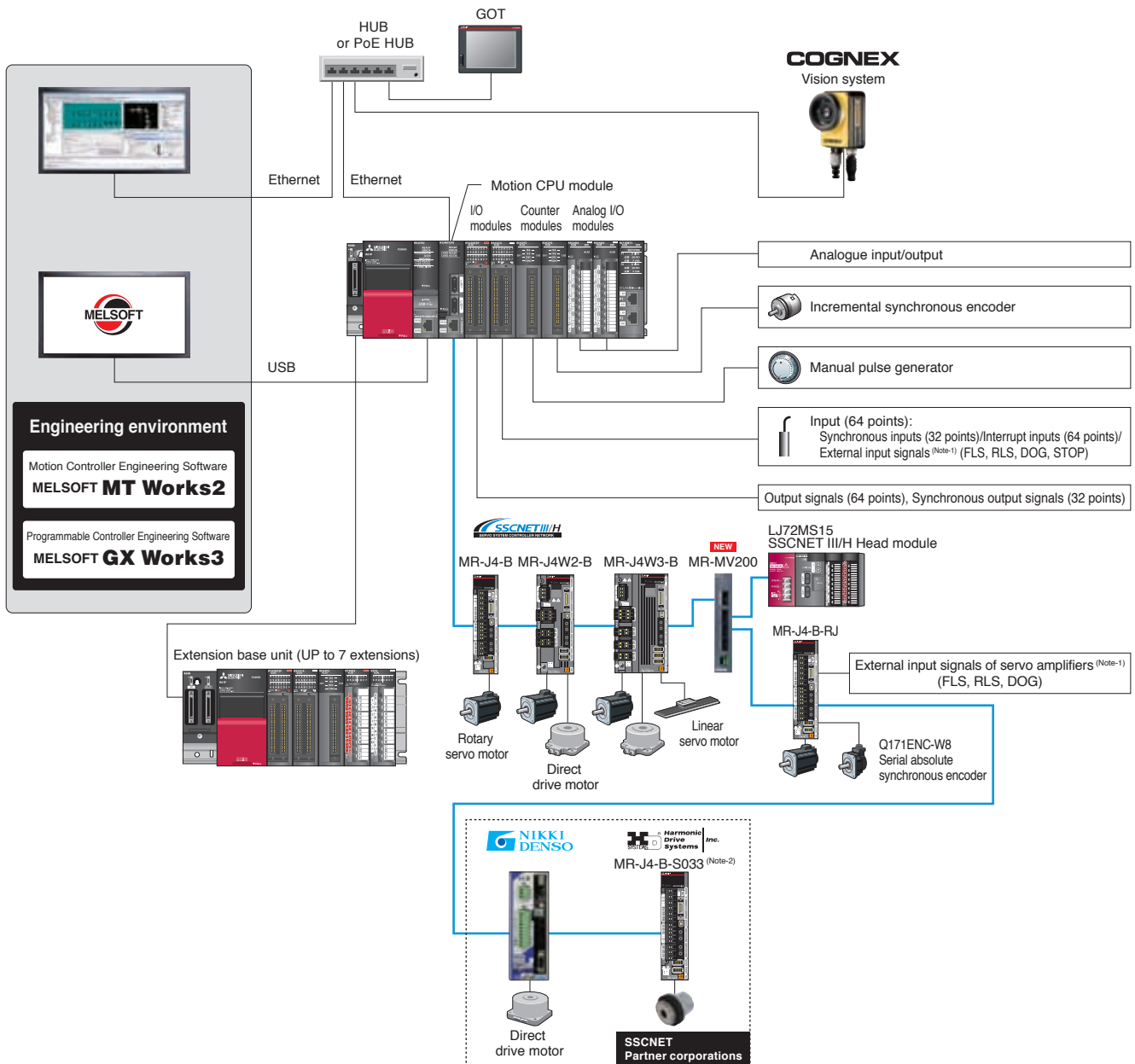
Point Error cause investigation and restoration work can be quickly implemented.

MELSEC iQ-R series SSCNET III/H compatible MELSEC iQ-R series Motion Controller

- Programs can be created using labels and axis labels, instead of using device names.
- Up to 96 axes can be synchronized by use of three R32MTCPU modules.
- Advanced pressure control is achieved with a pressure sensor.
- The optical hub unit enables distribution of SSCNET III/H compatible devices with flexible wiring arrangement.



System configuration



R32MTCPU : 2 lines (Up to 32 axes), R16MTCPU : 1 line (Up to 16 axes)

(Note-1): Destination of external input signals (FLS, RLS, DOG) can be changed with parameters.

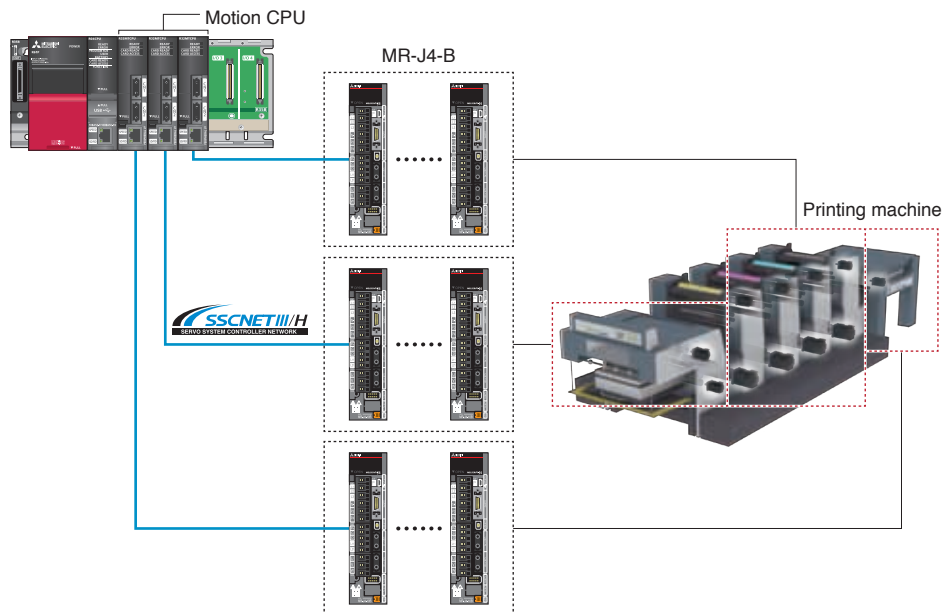
(Note-2): The MR-J4-B-S033 is the servo amplifier intended to connect to a servo motor of Harmonic Drive Systems Inc.

Features

Multiple CPU advanced synchronous control **NEW**



A large system can be configured thanks to the advanced synchronous control that allows up to 96-axis synchronization with high accuracy by use of three Motion CPU modules.

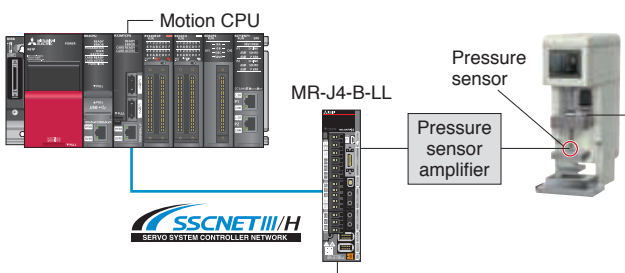


Point A large system can be configured by flexibly expanding synchronized axes.

Advanced pressure control **NEW**



The machine is controlled so that the pressure commands match the pressure sensor values; therefore pressure is maintained constant even with a changing load. Each pressure process ("Feed", "Pressure maintaining", and "Pressure release") can be set with the Pressure Profile, and those processes can be tested on MELSOFT MT Works2, which makes a changeover and adjustment easy.

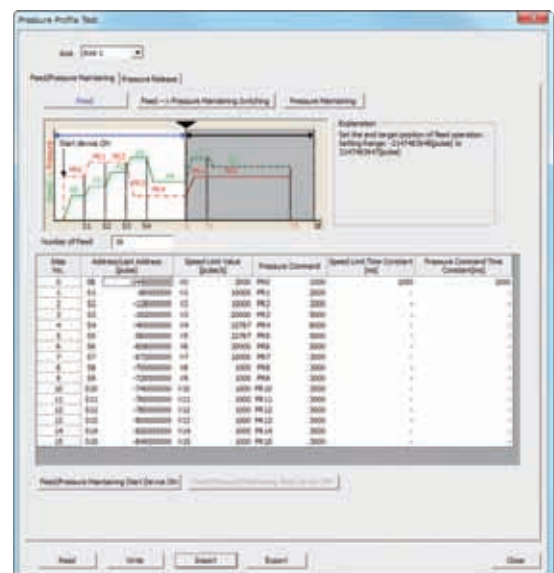


- Application examples**
- Injection machines
 - Bonder

Point Injection machines, bonder, etc. that require high-accuracy pressure control are easily achieved.

[Test operation example]

Tests can be carried out individually for each process of pressure control, which increases efficiency in debugging. For example, the feed process is divided into multiple steps, and the pressure command can be sent for each step; so pressure can be tested in great details.



Features

Easier programming with labels, free from worries about devices

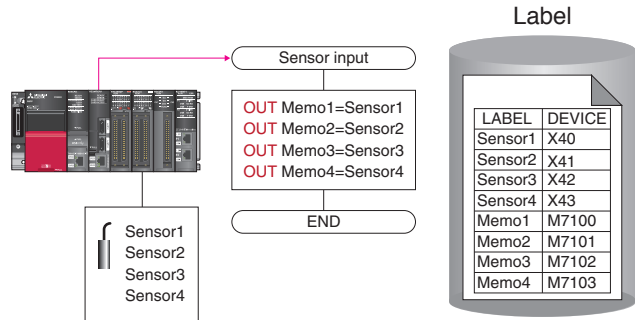


MELSOFT MT Works2 allows you to program with easy-to-understand names (labels) instead of using device names or CPU buffer memory. This programming method enables an easy program reuse and standardization of projects.

■ Example of using labels

The use of labels removes the need to remember devices when programming. Also, labels allow a different model/product to be used with the same program.

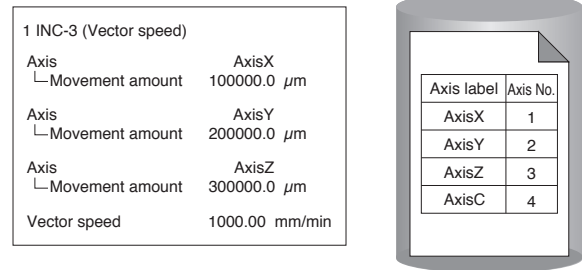
Point Motion SFC Program is created easily with labels, instead of using device names.



■ Example of using axis labels

Motion servo programs can be created with axis labels (axis names).

Point Servo programs can be created easily with axis labels, instead of using axis No.

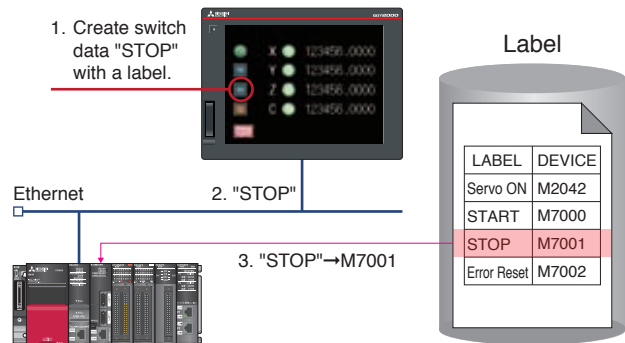


■ Using common labels with GOT **NEW**

Since GOT uses common labels with the Motion controller, the screen can be designed with those labels without worries about devices. GOT can send/receive data to/from the Motion controllers using the common labels. Additionally, when the device allocation is changed on the Motion controller side, there is no need to change a GOT project accordingly.

1. Create switch data using a label.
2. Access to the controller is requested via the label.
3. The label is converted to the corresponding device.

Point Just change device allocation on Motion controller side. There is no need to change a GOT project accordingly.

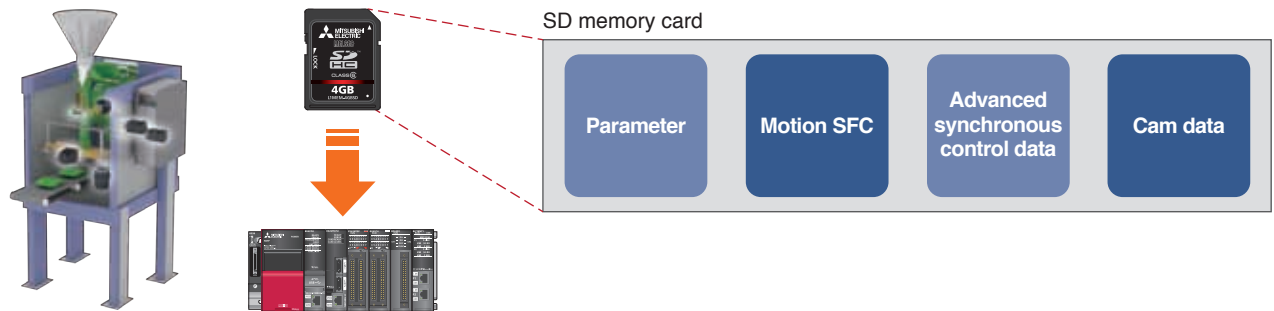


Features

Boot operation with a SD memory card **NEW**



Applications can be changed just by inserting a SD memory card, even at a manufacturing field where MELSOFT MT Works2 cannot be prepared.



Point Programs can be changed just by inserting a SD memory card, which shortens maintenance time.

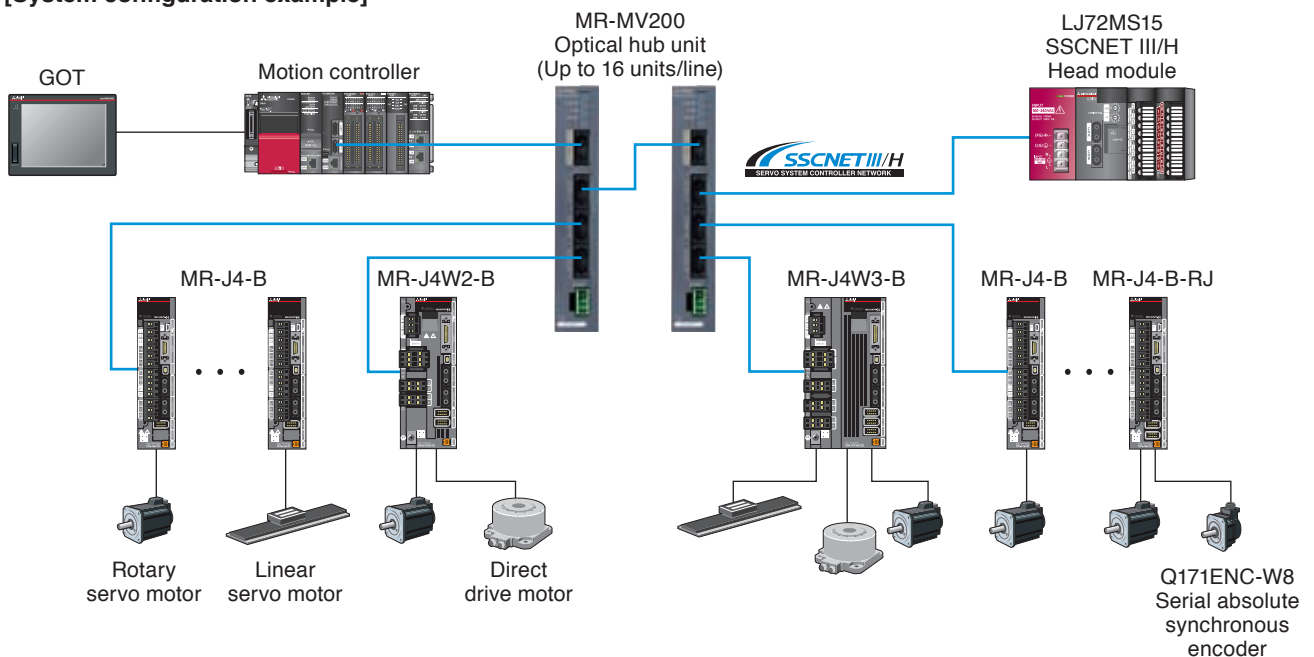
Distribution made possible by the optical hub unit **NEW**



The MR-MV200 optical hub unit can branch a single SSCNET III/H network line in three separate directions. This enables distribution of the SSCNET III/H compatible devices with flexible wiring arrangement. In addition, the distributed amplifier can be partly OFF for maintenance without stopping the whole system; thus, the machine availability can be improved.

- The SSCNET connect/disconnect function of the Motion controller allows you to power off only the desired servo amplifiers.
- The optical hub unit is introduced just by making some changes in wiring without making any new settings.
- Longer-distance wiring becomes available by using the optical hub unit.

[System configuration example]



(Note): Be sure to confirm that "SSCNET III/H" is selected in the system setting when introducing the optical hub unit.

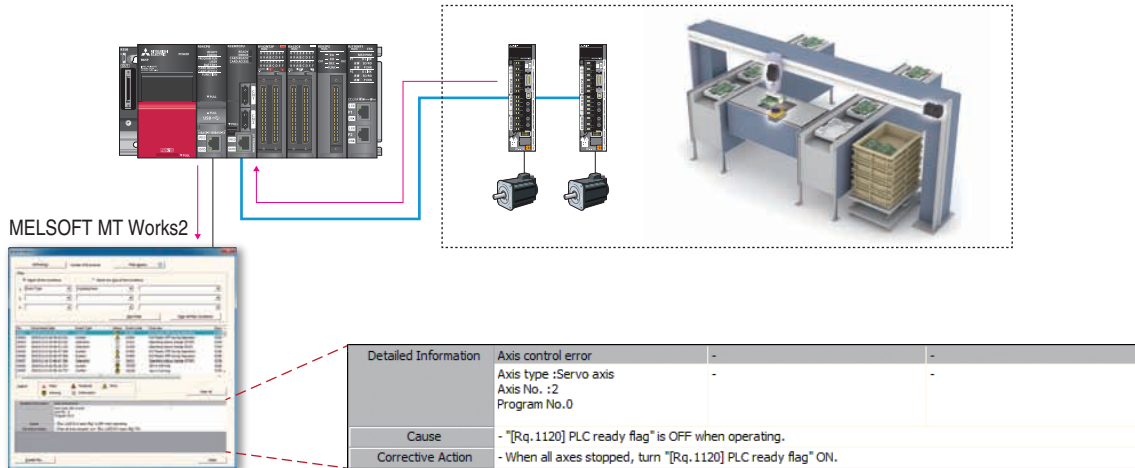
Point Branching a single network line in three separate directions allows more flexible wiring arrangement.

Features

Event history facilitates easier maintenance **NEW**



For the MELSEC iQ-R series, events occurred on each module and servo amplifiers can be stored to the CPU module or a SD memory card. "WRITE" operation to the program, error information, and written data to the flash ROM, 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 errors and operation for the CPU module.

Displays the detailed information regarding the cause that stops the operation.

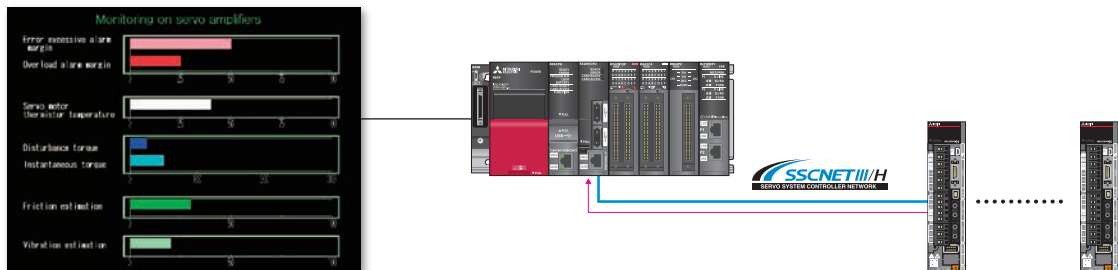
Point Error cause investigation and restoration work can be quickly implemented.

Monitoring on various information of servo amplifiers with the optional data monitor **Upgraded**



The monitor setting points have been increased from 6 (fixed) to 14 points (Can be changed in the program), and the monitor items from 33 to approximately 50 items. More information about servo amplifiers and motors, which is transferred via SSCNET III/H, can be displayed on GOT screen.

The machine condition can be checked based on the estimated friction/vibration values, which is beneficial for machine maintenance.



[Monitor items]
 Error excessive alarm margin
 Overload alarm margin
 Servo motor thermistor temperature
 Disturbance torque
 Instantaneous torque
 Friction estimation
 Vibration estimation, etc.

Item	Number
Monitor item	Approx. 50
Monitor setting points	Up to 14 points

Point Load condition can be checked by monitoring the status of the servo amplifier. Machine aging can be also checked for preventive maintenance.

Component

Simple Motion module RD77MS16/RD77MS8/RD77MS4/RD77MS2
[Simple Motion dedicated equipment]

Part	Model	Description	Standards		
Simple Motion Module	RD77MS16 (Note-1)	Up to 16 axes	CE, UL, KC		
	RD77MS8 (Note-1)	Up to 8 axes	CE, UL, KC		
	RD77MS4 (Note-1)	Up to 4 axes	CE, UL, KC		
	RD77MS2 (Note-1)	Up to 2 axes	CE, UL, KC		
SSCNET III cable (Note-2)	MR-J3BUS_M	Standard code for inside panel	0.15m (0.49ft.), 0.3m (0.98ft.), 0.5m (1.64ft.), 1m (3.28ft.), 3m (9.84ft)	—	
	MR-J3BUS_M-A	• Simple Motion module⇔MR-J4-B • MR-J4-B⇔MR-J4-B	Standard cable for outside panel	5m (16.40ft.), 10m (32.81ft.), 20m (65.62ft.)	—
	MR-J3BUS_M-B (Note-3)		Long distance cable	30m (98.43ft.), 40m (131.23ft.), 50m (164.04ft.)	—
Manual pulse generator	MR-HDP01	Number of pulses per revolution: 25pulse/rev (100pulse/rev after magnification by 4), Permitted speed: 200r/min (Normal rotation)	—		

(Note-1): Order the A6CON1, A6CON2, and A6CON4 separately because the connectors are not included in the package.
 (Note-2): "-" indicates cable length (015: 0.15m (0.49ft.), 03: 0.3m (0.98ft.), 05: 0.5m (1.64ft.), 1: 1m (3.28ft.), 3: 3m (9.84ft.), 5: 5m (16.40ft.), 10: 10m (32.81ft.), 20: 20m (65.62ft.), 30: 30m (98.43ft.), 40: 40m (131.23ft.), 50: 50m (164.04ft))
 (Note-3): For a long distance cable or ultra-long bending life cable of up to 100m (328.08ft.), contact Mitsubishi Electric System & Service Co., Ltd.
 [Sales office] FA PRODUCT DIVISION mail: osb.webmaster@melsc.jp

Motion controller R32MTCPU/R16MTCPU
[Motion dedicated equipment]

Part	Model	Description	Standards		
Motion CPU module	R32MTCPU	Up to 32 axes, Operation cycle 0.222 ms or more	CE, UL, KC		
	R16MTCPU	Up to 16 axes, Operation cycle 0.222 ms or more	CE, UL, KC		
SSCNET III cable (Note-1)	MR-J3BUS_M	• Motion CPU module⇔MR-J4-B • MR-J4-B⇔MR-J4-B	Standard code for inside panel	0.15m (0.49ft.), 0.3m (0.98ft.), 0.5m (1.64ft.), 1m (3.28ft.), 3m (9.84ft)	—
	MR-J3BUS_M-A		Standard cable for outside panel	5m (16.40ft.), 10m (32.81ft.), 20m (65.62ft.)	—
	MR-J3BUS_M-B (Note-2)		Long distance cable	30m (98.43ft.), 40m (131.23ft.), 50m (164.04ft.)	—
Optical hub unit	MR-MV200	Three branches/unit, DC power supply connector enclosed	CE, UL, KC		
Serial absolute synchronous encoder	Q171ENC-W8	Resolution: 4,194,304 pulse/rev, Permitted speed: 3600r/min	CE, UL, KC		
Serial absolute synchronous encoder cable	Q170ENCCBL2M-A	Serial absolute synchronous encoder Q171ENC-W8⇔MR-J4-B-RJ	2m (6.56ft.)	—	
	Q170ENCCBL5M-A		5m (16.40ft.)	—	
	Q170ENCCBL10M-A		10m (32.81ft.)	—	
	Q170ENCCBL20M-A		20m (65.62ft.)	—	
	Q170ENCCBL30M-A		30m (98.43ft.)	—	
	Q170ENCCBL50M-A		50m (164.04ft.)	—	
Manual pulse generator	MR-HDP01	Number of pulses per revolution: 25pulse/rev (100pulse/rev after magnification by 4), Permitted speed: 200r/min (Normal rotation)	—		

(Note-1): "-" indicates cable length (015: 0.15m (0.49ft.), 03: 0.3m (0.98ft.), 05: 0.5m (1.64ft.), 1: 1m (3.28ft.), 3: 3m (9.84ft.), 5: 5m (16.40ft.), 10: 10m (32.81ft.), 20: 20m (65.62ft.), 30: 30m (98.43ft.), 40: 40m (131.23ft.), 50: 50m (164.04ft))
 (Note-2): For a long distance cable or ultra-long bending life cable of up to 100m (328.08ft.), contact Mitsubishi Electric System & Service Co., Ltd.
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[Manual pulse generator on the market]

Mitsubishi Electric has confirmed the operation of the following manual pulse generators. Contact each manufacturer for details.

Part	Model	Description	Manufacturer
Manual pulse generator	RE45BA2R5C	Number of pulses per revolution: 25pulse/rev (100pulse/rev after magnification by 4), Permitted speed: 200r/min (Normal rotation)	Tokyo Sokuteikizai Co.,Ltd.
	UFO-M2-0025-2Z1-B00E	Number of pulses per revolution: 25pulse/rev (100pulse/rev after magnification by 4), Permitted speed: 200r/min (Normal rotation)	Nemicon Corporation

Software for Motion controller

Part	Model		Description
	R32MTCPU	R16MTCPU	
Operating system software	SW10DNC-RMTFW		Pre-installed before shipment

Engineering software list

Part	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] • Screen Design Software [MELSOFT GT Works3] • Robot Total Engineering Support Software [MELSOFT RT ToolBox2 mini] • Inverter Setup Software [MELSOFT FR Configurator2]	DVD-ROM

(Note-1): Refer to each product manual for software needed for the model.

 **Safety Warning**

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)



MITSUBISHI ELECTRIC CORPORATION

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NAGOYA WORKS: 1-14, YADA-MINAMI 5, HIGASHI-KU, NAGOYA, JAPAN