YASKAWA

Integrated Machine Controller
MP3200

Certified for
ISO9001 and
ISO14001

JQA-0422 JQA-EM0202

MECHATROLINK

Integrated Machine Controller

MP3200

VISION

ROBOT

Offering a new way for machine control to take shape

MOTION

Tact times improved by high-speed processing

- High-speed processing of applications at speeds up to 125 μs
- Zero delay in communicating with vision systems*

Maintainability and traceability improved by batch control of information

- Operation information unified by system integration
- Logging function and FTP server functions

High-grade automation achieved by optimal control

- Motion, vision units, and robot systems integrated to enable the construction of systems best suited for your equipment needs

YASKAWA

Contents

Integrated Machine Controller

MP3200

NEW CONCEPT

Building-Block Units for Easier System Design

System design used to be complicated but is now an easy job thanks to the building-block method.
Simply connect units to integrate motion, vision, and robot systems into one.

MP3200 Components Functions

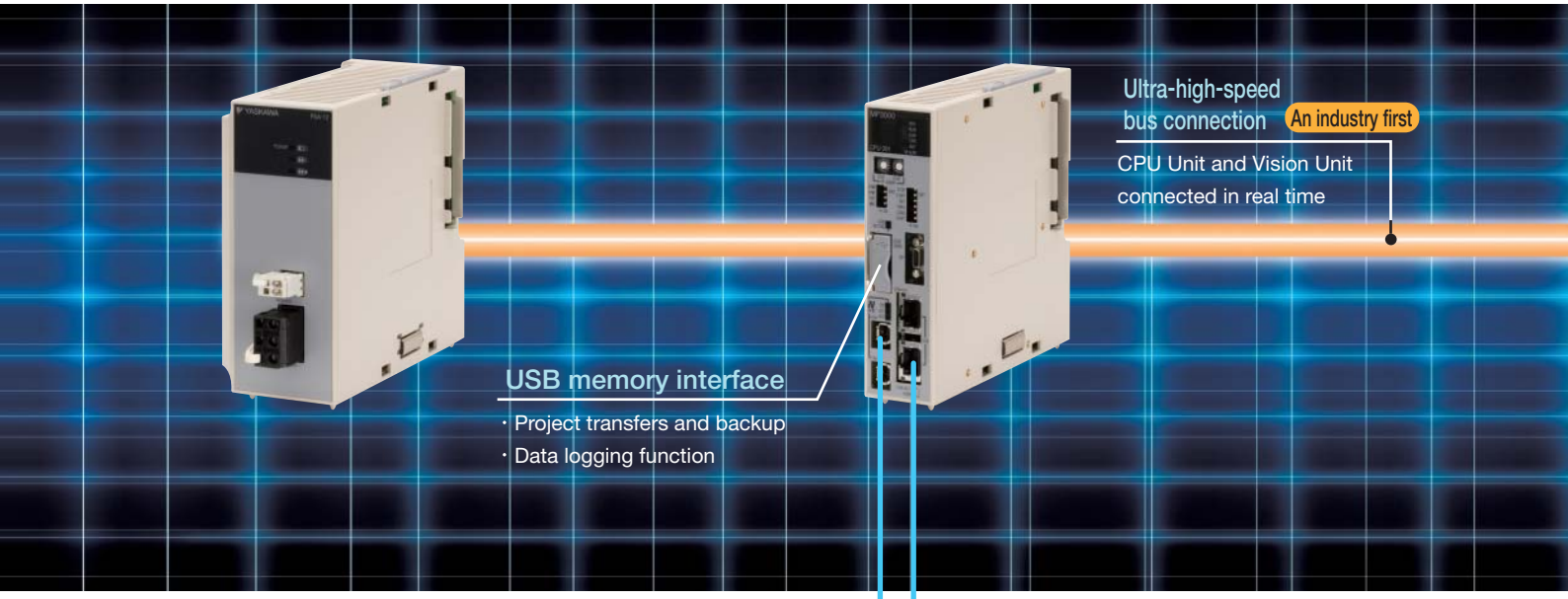
PS Unit

Power supply: Both AC/DC

CPU Unit

For details, see page 6.

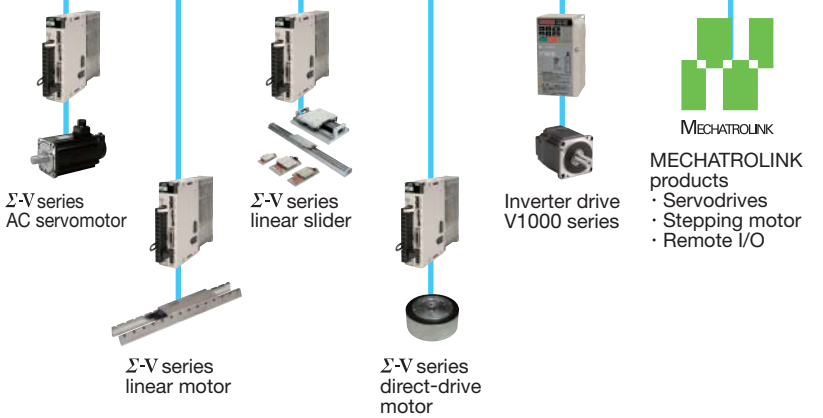
- High speed: Fastest control of applications in the industry
- Large capacity: Construction of large-scale systems with expanded capacity for programs and registers
- High precision: Supports double-precision real-number and 64-bit integer data



Easy connection with built-in MECHATROLINK-Ⅲ port

Control 32 servo-drive axes for 42 stations.

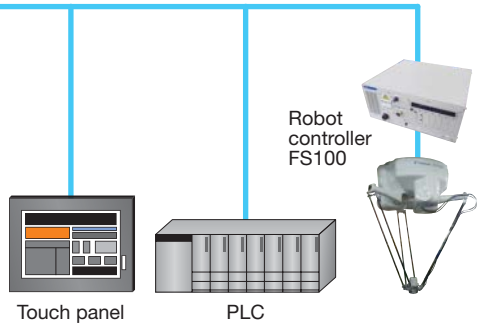
MOTION



Easy connection with built-in Ethernet port

- Supports protocols for major PLCs
- Programming-free connection for 10 lines
- Hub function and FTP function incorporated

ROBOT



Engineering environment also integrated

System integrated engineering tool

MPE720 Ver.7

For details, see page 20.

- Engineering of entire systems (covering setup, adjustments, programming, maintenance, and control)
- Concurrent adjustment of multiple axes on multiple windows
- New user interface for the ultimate in viewing and operation ease

VISION Unit

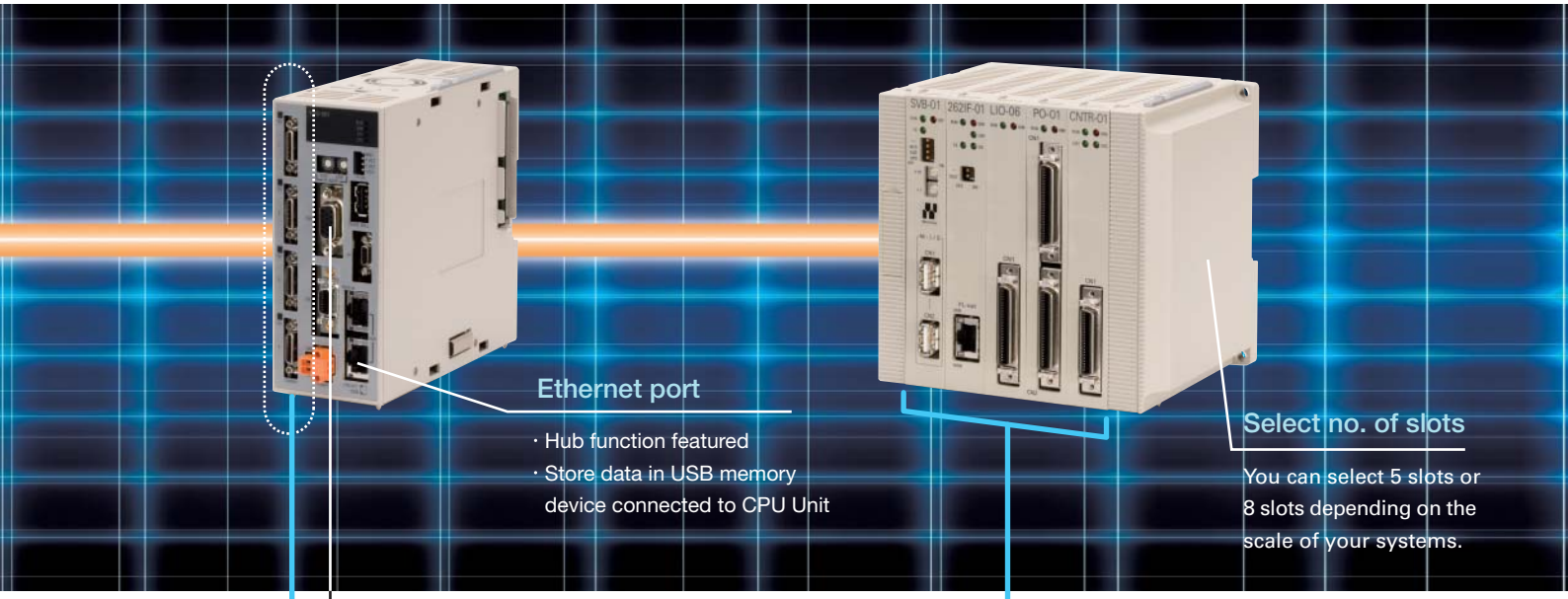
For details, see page 14.

- Ultra-high-speed processing
- High-resolution digital cameras supported
- Simple vision programming with MPE720

Base Unit

Supports all MP2000 optional modules

- Motion control modules
- I/O modules
- Communication modules



Ethernet port

- Hub function featured
- Store data in USB memory device connected to CPU Unit

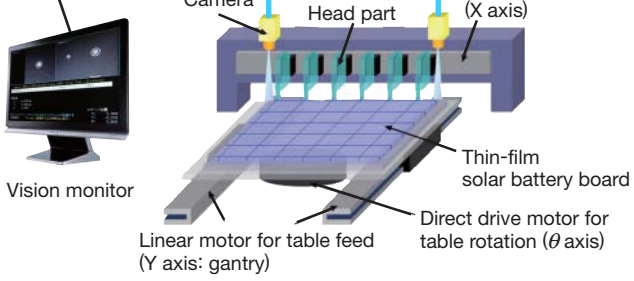
Select no. of slots

You can select 5 slots or 8 slots depending on the scale of your systems.

4-channel Camera Link available as a standard feature

- 5-megapixel high-resolution cameras supported
- Simultaneous image capture of 4 cameras supported (independently triggered)

VISION



Application example: Dispenser

Optional modules

Any of the 30 or so MP2000 optional modules can be mounted.

CPUs with the Highest Performance in the Industry

High speeds, high precision, and high-performance motion all achieved concurrently.
Clear-cut operations carried out precisely as desired.

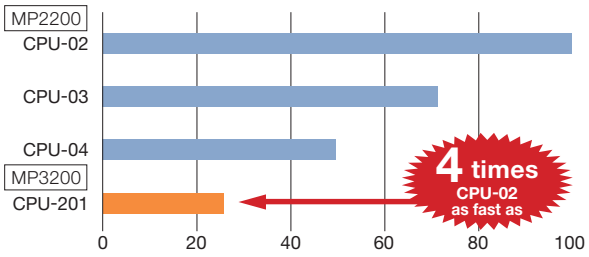
Tact times improved by ultra-high-performance CPU

Fastest application processing in the industry: 4-axis, 125 μs

Arithmetic processing must be performed at higher speeds for systems to work faster. The MP3200 features an ultra-high-speed CPU that runs four times faster than previous models to improve tact times.

When the CPU-201 is used:
1000 IC chips are transferable every 15 seconds, in 60 seconds handling time of the CPU-02. (The productivity is four times.)

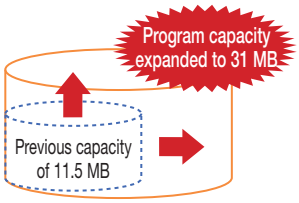
Where the scan time of the CPU-02=100



Varied applications by expanding program capacity

Application program capacity: 31 MB

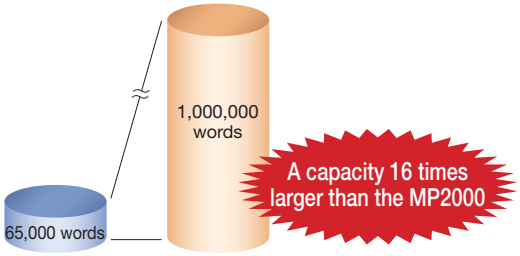
The program capacity has been dramatically expanded to 31 MB (over the previous capacity of 11.5 MB) so that large-scale control systems can now be supported.
The number of application drawings has also been increased significantly to support many different kinds of applications.



Controller Name	MP2200 (Conventional)	MP3200
No. of high-speed scan drawings	200 DWGs	1000 DWGs
No. of low-speed scan drawings	500 DWGs	2000 DWGs
No. of user function drawings	500 DWGs	2000 DWGs

M register capacity: 1 M words

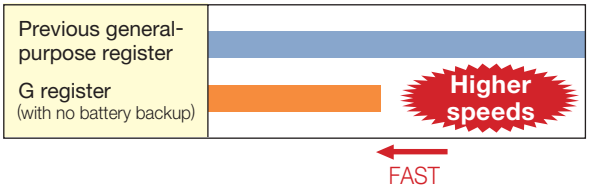
The capacity of the M register (general-purpose register with backup capability) has been greatly expanded for use with system recipes in diversified small-quantity production.



New memory area increases the speed of applications

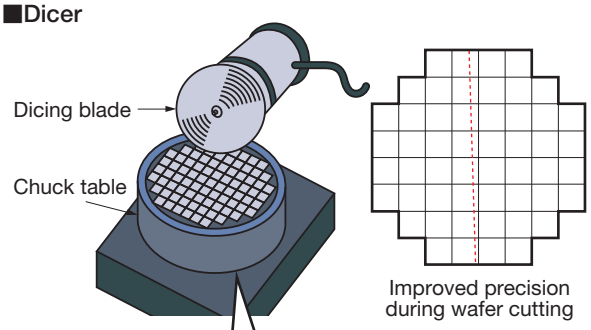
G register: New capacity of 2 M words

A new G register, a general-purpose register (with no battery backup) has been added, making it possible to process even complex applications at higher speeds.



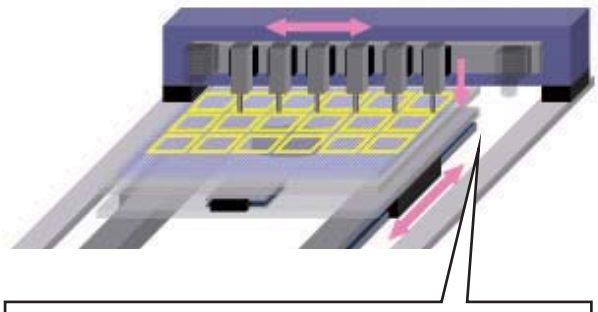
Double-precision real-number, 64-bitintege data for higher precision

■Dicer



With double-precision real-number 64-bit integer data, rounding errors during arithmetic calculations are reduced, and control at higher levels of precision can be achieved.

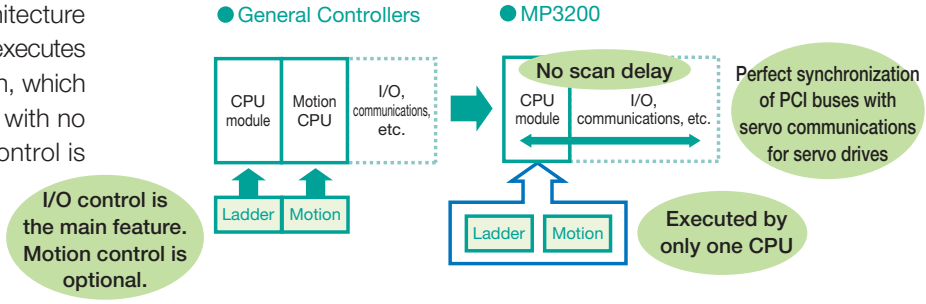
■Dispenser



Controlling the path performance in the corner areas is an issue: however, implementing path control with a higher level of precision enhances dispensing quality.

Perfectly synchronized control for delay-free ideal operations

The MP3200 uses the ideal architecture for system control. The MP3200 executes the processing for I/O and motion, which are usually executed separately, with no delay so that an ideal level of control is achieved.



Synchronous high-speed scanning of several controllers with sub CPU functions*

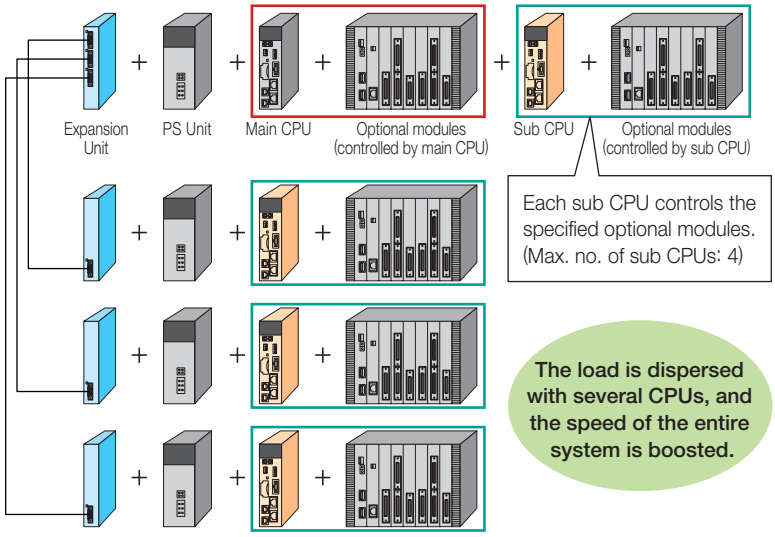
* : To be released soon.

A maximum 4 sub CPUs can be arranged by using expansion racks. Because both the main CPU and sub CPUs control optional modules, high-speed processing can be achieved even with large programs.

Sub CPU functions

Item	Sub CPU function
Connection method	MP3000 bus connection
Max. number of CPUs	5 CPUs (1 main CPU + 4 sub CPUs)
Data update cycle between CPUs	125 μs, 250 μs, ···32 ms
Max. CPU interface register size	Input: 2048 W Output: 2048 W
Servo connection for sub CPUs	For the servo connections on the sub-CPU side, 32 axes can be connected with the built-in SVC.

Example of program configuration



MECHATROLINK-Ⅲ Provided as a Standard Option

High-speed, multi-axis system configurations assembled with ease.
Optimal control over complex systems by switching control modes while on-line.

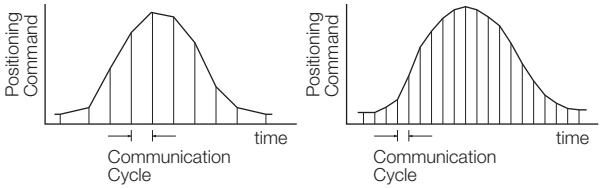
Fastest motion network in the industry

Fastest transmission cycle: 125 μs (4 stations)

The MECHATROLINK-Ⅲ motion network, which is among the fastest in the industry, is provided with the main unit CPU of the MP3200 as a standard option. The smoother motion control results in higher levels of precision.

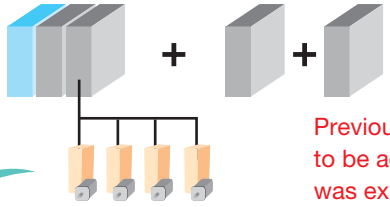
MECHATROLINK-Ⅲ		
Transmission Speed	Transmission Cycles (Number of Connected Stations)	
100Mbps	125 μs (4 stations)	500 μs (14 stations)
	250 μs (8 stations)	1.0ms (16 stations)*

*: The maximum number of stations, including I/O, is 21.



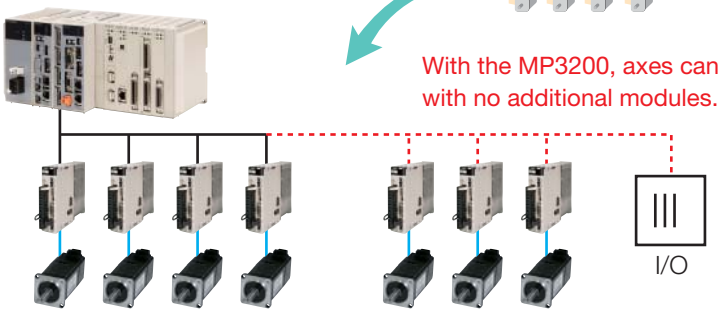
Control of 32 axes; systems expansion at no additional cost

The MP3200 can control large-scale systems with 32 servo-drive axes for a maximum of 42 stations per circuit. If a system is to be expanded, this makes it possible to minimize the additional cost of the options and construct a flexible system.



Previously, modules had to be added when a system was expanded.

With the MP3200, axes can be added with no additional modules.



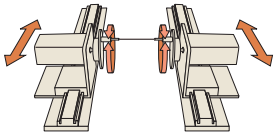
42 stations max. (Number of servo axes are 32 axes max.)

All-in-one four control modes

Every aspect of control from simple to complex operations can be achieved using one CPU without adding optional modules for each kind of control.

Synchronous Phase Control

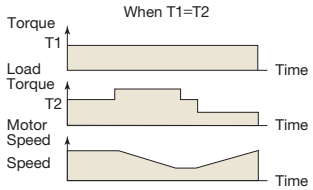
Speed control with position compensation (electronic shaft) or position control with 100% speed feed forward (electronic cam). Multi-axis servomotors can be controlled synchronously.



0.3 mm dia. mechanical pencil lead does not break.

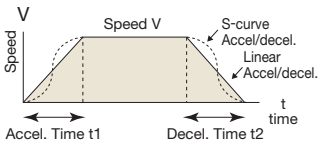
Torque Control

Generates a constant torque, regardless of speed.



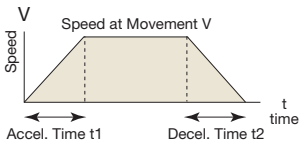
Position Control

Advances to the target position, and stops or holds.



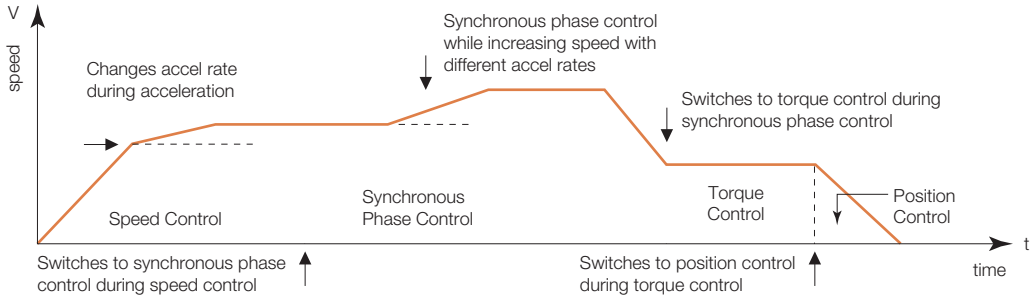
Speed Control

Turns the motor at the specified speed, with user-defined acceleration/deceleration slopes.



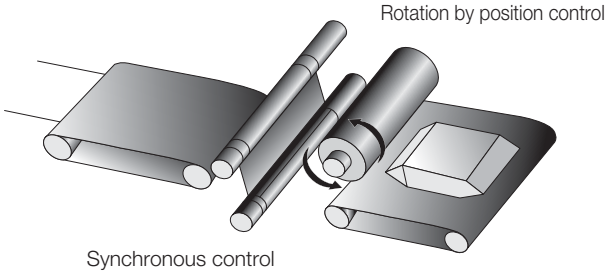
Switch between any of the modes while on-line

In addition to the position, speed and torque modes of control that are required for controlling a system, the MP3200 also features the synchronous phase control mode for which a high control performance is required, and switching between these four modes can be readily accomplished while on-line.



●Packaging machines

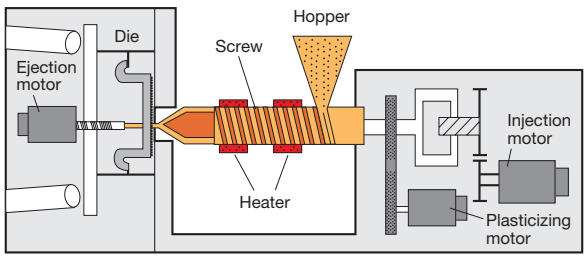
Switching from position control to synchronous control allows cutting, sealing and other such operations.



Synchronous control according to the work speed

●Injection molding machines

Switching from position control to torque control can be executed without deceleration.



Injection (torque control) Integration with nozzle (position control)

Return operation (positioning)

Enhanced Usability and Traceability

Large volumes of data handled with ease.
Effective use of function for data logging and file transfers.

Logging Data

File Transfer

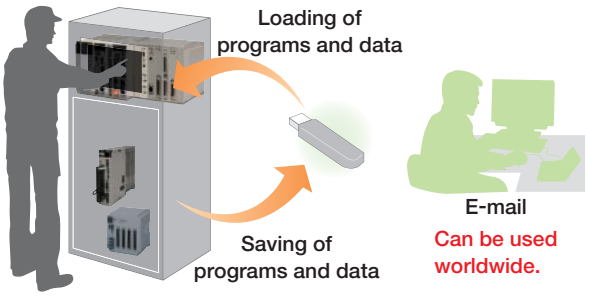
●USB memory device
The following table lists the USB memory device recommended by and available from Yaskawa.

Model	Spec.	Manufacturer
SFU24096D1BP1TO-C-QT-111-CAP	4GB USB memory	Swissbit Japan Inc.

Easy loading and saving of project files on-site

USB memory device

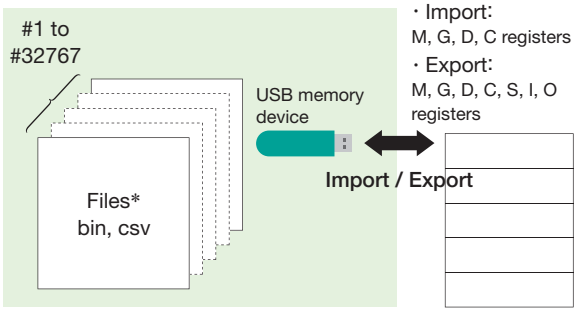
Operations can be performed using the DIP switches on the CPU unit body. Even in places where a PC cannot be brought in, you can update the versions of the equipment and back up the data on-site with ease.



Reading and writing large volumes of register data

USB memory device

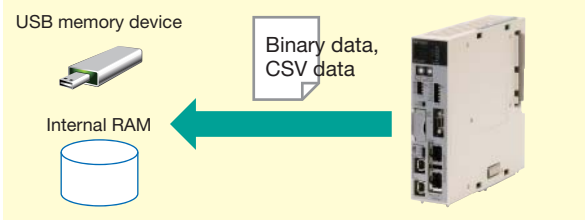
Import and export register data with new ladder program instructions. Even large volumes of data can be handled with ease.



Save system's operation statuses onto internal RAM or USB memory device

Logging function

The logging function allows the system's operation statuses (logging data) to be saved in the USB memory device connected to the CPU or in the RAM inside the CPU unit.
Either the binary or CSV format can be selected for the data to be saved.

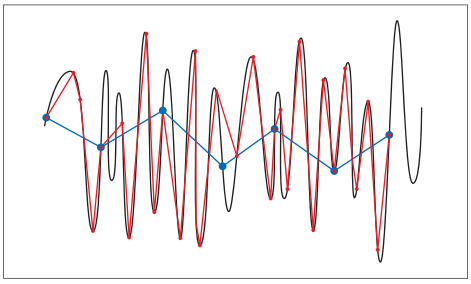


Recognize and note every single data change

Logging function

Data logging is possible at the timing that is synchronized with the scanning, so even the smallest data changes not normally recognized can now be caught.

Scanning time setting
Normal controller setting (slow)

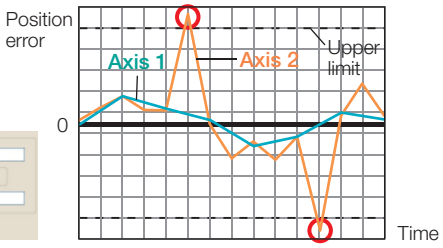


High-speed logging in sync with the scanning allows the kind of trouble that was missed before to be discovered and the causes of the trouble to be cleared up with a high degree of accuracy.

Setting of conditions also possible

Logging function

Settings can be selected for the conditions under which the logs are output. The logging data is saved only if the values of the specified registers fail to meet the output conditions. This enables a rapid response when trouble occurs.

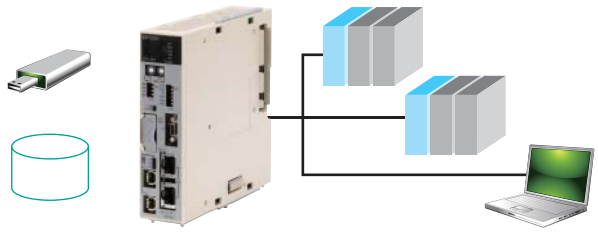


Easy access from remote host systems

File transfer function

By using the file transfer function file transfer function (FTP server function), the logging data or register data in the CPU unit's internal RAM or the USB memory device can be downloaded from a remote location to a host system*.

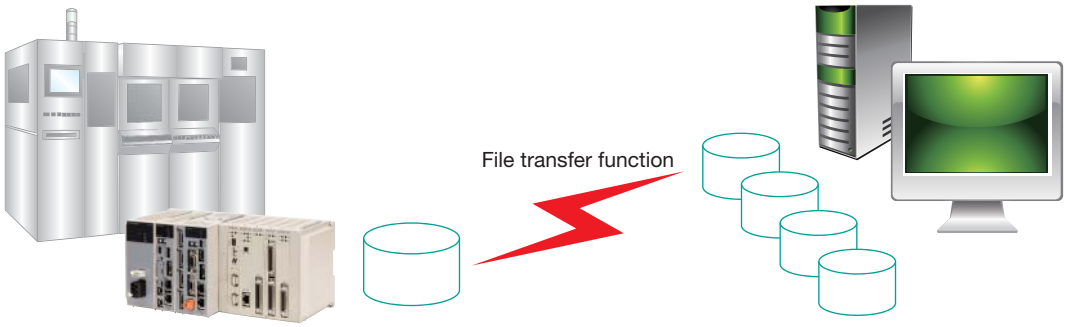
*: System provided with an FTP client function



Improved traceability with large accumulation of data

File transfer function

By transferring the system's operation data (logging data and register data) at the specified synchronization, large volumes of operation data can be acquired with no fear that the data may be unexpectedly damaged. As a result, the traceability at the production site is vastly improved.



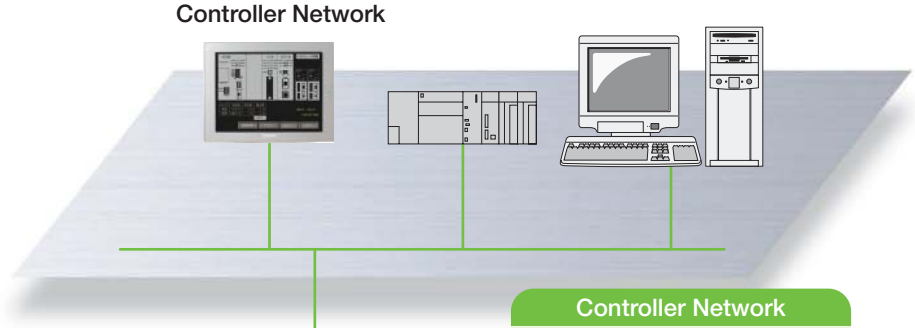
Flexible System Construction

Effective Use of a Wide Variety of Modules and Previously Available Programs

Easy access to varied network connections
and easy use of resources.
Design systems without restrictions!

OPEN NETWORK

Controller Network



Controller Network

Supported open networks

- FL-net
- EtherNet/IP
- Ethernet
- RS-232C, RS-422/485

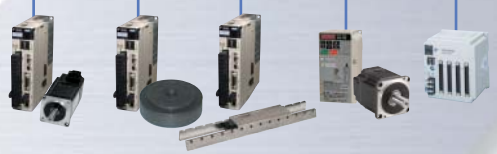
Motion Network

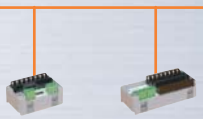
Supported open networks

- MECHATROLINK-Ⅱ
- MECHATROLINK-Ⅲ

Motion Network

Field Network





Field Network

Supported open networks

- DeviceNet
- PROFIBUS
- PROFINET
- CC-LINK (By Anywire Corporation)
- CompoNet
- EtherCAT

Supported closed networks

- MP-LINK
  (Real-time network developed by Yaskawa)
- A-net/A-Link
  (By Algo System Co., Ltd.)
- CUnet
  (By Algo System Co., Ltd.)
- AnyWire-DB
  (By Anywire Corporation)

All MP2000 optional modules supported

Either 5 or 8 slots can be selected as the base units for the MP2000 optional modules (approx. 30 types) depending on the scale of the system to be designed.

■MP2000 Optional Modules

❖ Motion Control Modules

Connects to the SERVOPACK for motion control. Various MECHATROLINK slaves can be connected to the SVB-01 module.

Name	Model	Description
SVB-01	JAPMC -MC2310-E	MECHATROLINK-Ⅱ× 1 channel
SVC-01	JAPMC -MC2320-E	MECHATROLINK-Ⅲ× 1 channel
SVA-01	JAPMC -MC2300	Analog-output 2-axis servo control
PO-01	JAPMC -PL2310-E	Pulse-output 4-axis servo control

∗: One CPU can control up to 16 modules.

❖ I/O Modules

Provides digital or analog I/O interface.

Name	Model	Description
LIO-01	JAPMC -IO2300-E	Digital input: 16 points (sink output mode) Digital output: 16 points (sink output mode) Pulse input: 1 point
LIO-02	JAPMC -IO2301-E	Digital input: 16 points (source output mode) Digital output: 16 points (source output mode) Pulse input: 1 point
LIO-04	JAPMC -IO2303-E	Digital input: 32 points Digital output: 32 points (sink output mode)
LIO-05	JAPMC -IO2304-E	Digital input: 32 points Digital output: 32 points (source output mode)
LIO-06	JAPMC -IO2305-E	Digital input: 8 points Digital output: 8 points (sink output mode) Analog input: 1 channel Analog output: 1 channel Pulse counter: 1 channel
DO-01	JAPMC -DO2300-E	Digital output: 64 points (sink output mode)
AI-01	JAPMC -AN2300-E	Analog input: 8 channels
AO-01	JAPMC -AN2310-E	Analog output: 4 channels
CNTR-01	JAPMC -PL2300-E	Pulse-input counter

Note: One CPU can control unlimited number of modules.

❖ Communication Modules

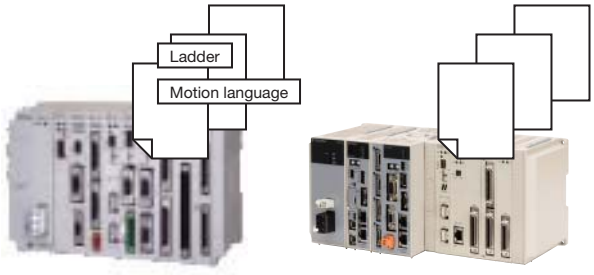
Used to construct an open network. Modules with various types of interfaces are available.

Name	Model	Description
218IF-01	JAPMC -CM2300-E	Ethernet (10BASE-T) port × 1 RS-232C port × 1
218IF-02	JAPMC -CM2302-E	Ethernet (100BASE-TX) port × 1 RS-232C port × 1
217IF-01	JAPMC -CM2310-E	RS-232C port × 1 RS-422/485 port × 1
260IF-01	JAPMC -CM2320-E	DeviceNet port × 1 RS-232C port × 1
261IF-01	JAPMC -CM2330-E	PROFIBUS port × 1 RS-232C port × 1
262IF-01	JAPMC -CM2303-E	FL-net (100BASE-TX) port × 1 (10BASE-TX) port × 1
263IF-01 EtherNet/IP	JAPMC -CM2304-E	EtherNet/IP (Scanner and adapter) port × 1
264IF-01 EtherCAT	JAPMC -CM2305-E	Port for EtherCAT slave × 2 (1 circuit)
265IF-01 CompoNet	JAPMC -CM2390-E	CompoNet port × 1
215AIF-01 MPLINK	JAPMC -CM2360-E	MPLINK communication/ RS-232C
215AIF-01 CP-215	JAPMC -CM2361-E	CP-215 communication/ RS-232C
266IF-01 PROFINET	JAPMC -CM2306-E	PROFINET master*
266IF-02 PROFINET	JAPMC -CM2307-E	PROFINET slave

∗: Estimates are required before ordering this product.
Contact your Yaskawa representative for more information.
Note: One CPU can control up to 8 modules.
For RS-232C communications, 16 ports can be used.

MP2000 application programs usable without modifications

Compatibility with the MP2000 applications eliminates the need for re-design and paves the way to the effective use of software resources.



YVD-001: The Vision Unit that has Undergone an Exciting Evolution.

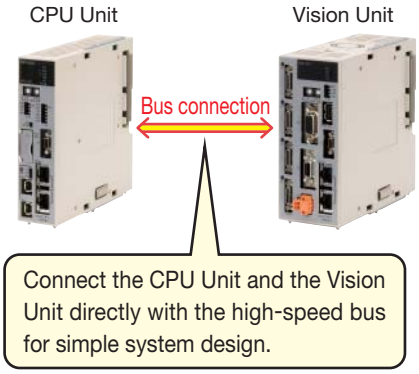
Absolutely no delays in motion and vision processing.
Get the high-speed image processing you desire!

Simple programming with only one integrated environment for motion and vision engineering.

⇨For details, see pages 22 and 23.

Faster speeds and higher precision simple with system design

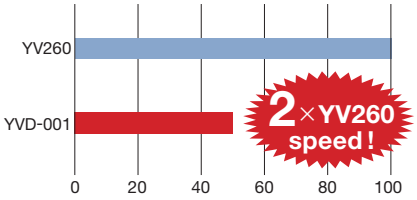
With a high-speed bus connection, motion processing and vision processing can now be executed with absolutely no communications delays.
Your machine systems will deliver faster speeds and higher precision with ease.

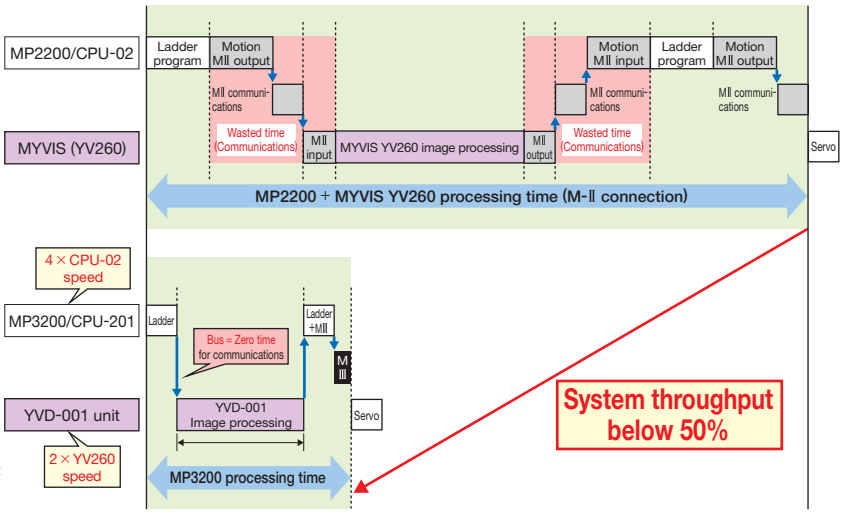


System throughput below 50%

Compared with the YV260, which was the MYVIS unit used previously, the system throughput has been greatly reduced to less than half. This is achieved by using CPUs that are twice as fast, a new image processing engine and a high-speed bus connection that eliminates delays in communications.

When using YV260 processing speed as reference (100)



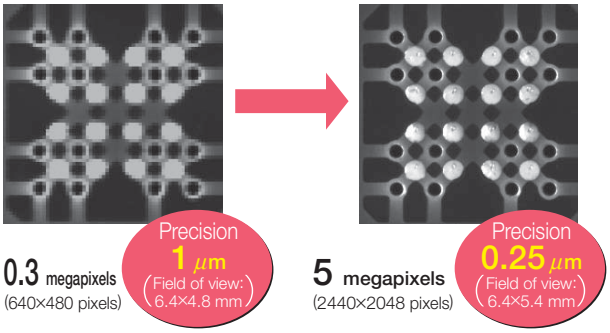


High-resolution digital cameras (5 megapixels)

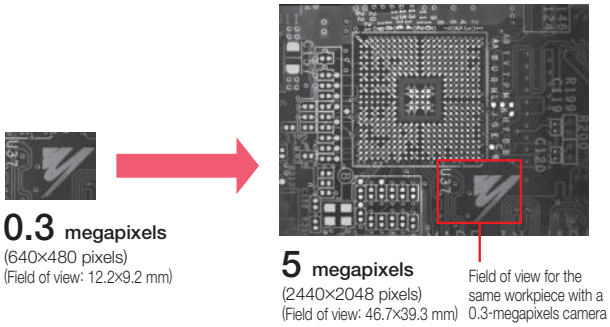
- Precision in detecting a position has improved by four times when the same views are compared. (For example, precision increases for 1 μm to 0.25 μm.)
- Tiny objects that cannot be distinguished at 0.3-megapixels resolution can now be recognized.
- 5 megapixels allows a large object image to be captured in one view where it previously required multiple views at 0.3 megapixels.
- Tact time can be shortened by reducing machine movements.
- The workpiece transfer mechanism and camera shifting mechanism can be eliminated.
- Accuracy in workpiece transfers is less important. (Even a symbol that could not be in the view of a camera at 0.3 megapixels can now be in the view.)

●High precision

One part of captured image enlarged.

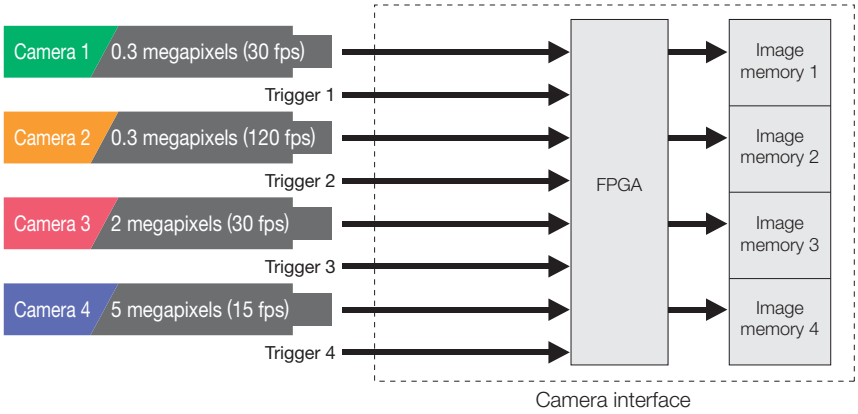


●Expanded view



Combination of Cameras with Different Image Formats Possible

- 4 digital cameras can be connected with camera link.
- Cameras with different image formats can be used in combination, depending on applications and equipment.
- The same external trigger can be used for all cameras, or a different trigger can be used for each.



List of Camera (Black and White)

Manufacturer	Model	Specification
Sony Corporation	XCL-U100	2 megapixels, 15 fps*
	XCL-5005	5 megapixels, 15 fps
TOSHIBA TELI CORPORATION	CSCV90BC3	0.3 megapixels, 90 fps
	CSCX30BC3	0.8 megapixels, 30 fps
	CSCS20BC2	1.4 megapixels, 20 fps
	CSCU15BC18	2 megapixels, 15 fps
	CSCU30BC18	2 megapixels, 30 fps

Manufacturer	Model	Specification
Hitachi Kokusai Electric, Inc.	KP-F30PCL	0.3 megapixels, 60 fps
	KP-F39PCL	0.3 megapixels, 90 fps
	KP-F31PCL	0.3 megapixels, 120 fps
	KP-F80PCL	0.8 megapixels, 36 fps
	KP-F200PCL	2 megapixels, 15 fps
	KP-F230PCL	2 megapixels, 30 fps
Computer Intelligence Service Inc.	VCC-G22V31APCL	0.3 megapixels, 120 fps
	VCC-G22S21APCL	1.4 megapixels, 25 fps
	VCC-G22U21APCL	2 megapixels, 20 fps

*fps: Frame per second

Enables High-Speed Image Processing

Features high-speed filtering and high-precision template matching functions

Pre-process Filtering with ASIC

Image inputs are pre-processed at high-speeds by using FPGA. Images can be improved at high-speeds before image processing such as pattern matching. (The YVD unit can process a 300,000-pixel image in 2 to 3 ms.) Pre-processing improves unclear images and images with noise, enabling easy recognition of symbols.

Inter-image operations

Addition, average, subtraction, difference

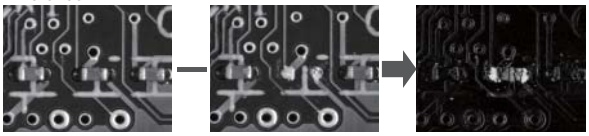
Convolution filter (5×5)

Parameters can be set according to purpose
(such as smoothing, suppressing noise, and emphasizing edges).

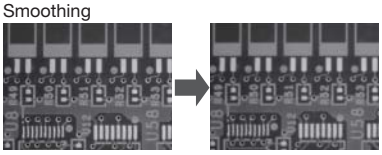
Dilation and erosion

Dilation: A function to fill gaps, such as missing part from an image of holes or breaks in lines.
Erosion: A function to eliminate noise such as isolated points.

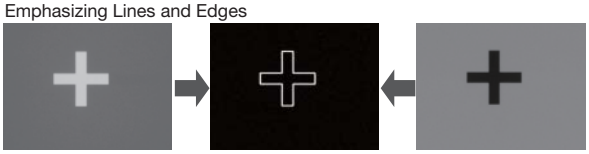
Difference



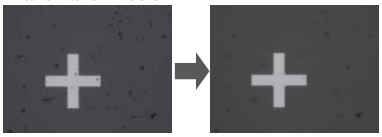
Smoothing



Emphasizing Lines and Edges



Dilation after Erosion

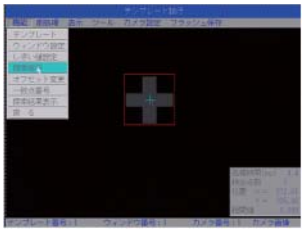


Gray Scale Pattern Matching Function (Normalized Correlation)

Our proprietary hardware and search algorithm enable high-speed, high-precision position detection. Multiple position detection is the default setting of the YVD unit.

▶ The photo on the right shows the detection of the position of an alignment mark on a glass substrate.

- Search area: 640×480 (Full field of view)
- Template size: 110×110 pixels
- Search time:
  3.0 ms
  (When subpixel mode is OFF)
  4.4 ms
  (When subpixel mode is ON)



Binary Blob Analysis Function

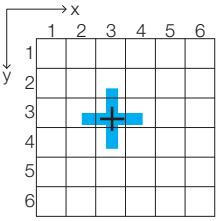
Our proprietary ASIC enables high-speed processing by generating binary data.

▶ The photo on the right shows an example of the blob analysis results.

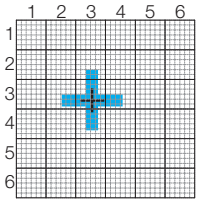
- Analysis area: 640×480 (Full field of view)
- Number of blobs: 5
- Processing time: 1.2 ms

Subpixel Detection Function

The YVD unit has proven detection precision of between 1/10 and 1/5 pixels when used in manufacturing lines.



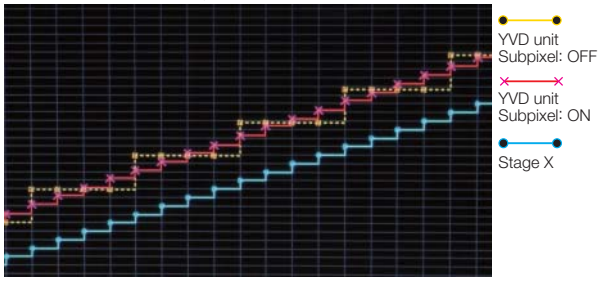
Subpixel: OFF
Detected position= (3, 3)



Subpixel: ON
Detected position= (3.52, 3.77)

Test Results of YVD unit Subpixel Detection Mode

Detected position (unit: 5 μm)



The number of detections

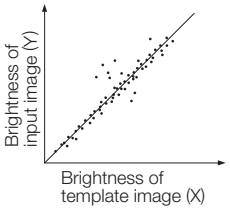
This graph shows the detection results of the demonstration MYVIS where a mark is continuously shifted by 5 μm with a 20 μm/pixel optical system. Changes in detected pixel values form steps when subpixels are not used, and appear more linear when they are used. Subpixel detection mode ON provides optimal resolution.

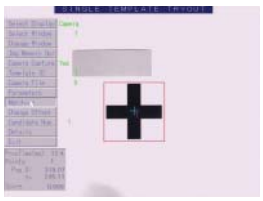
Improved Position Detection with Normalized Correlation Method

Accurate positioning is possible even when the appearance of a mark changes.

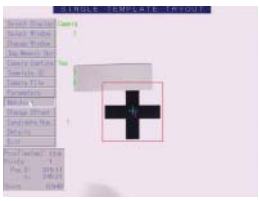
The following examples show incomplete marks. Even though a normalized correlation score deteriorates as the missing part of the mark gets larger, the detected positions do not change.

As long as most dots are located near the straight line in a scatter diagram, the effect of some dots apart from the line will be insignificant.

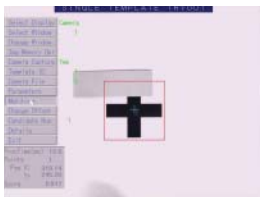




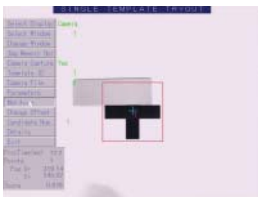
Position X: 319.07
Position Y: 245.11
Correlation score: 0.999



Position X: 319.11
Position Y: 245.21
Correlation score: 0.948



Position X: 319.14
Position Y: 245.20
Correlation score: 0.911

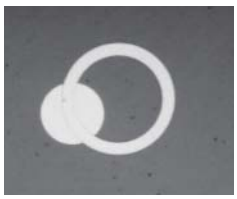


Position X: 319.14
Position Y: 245.07
Correlation score: 0.879

Template Mask

The template mask can be set to accurately detect marks in which the appearance varies. The photo on the right shows a template mask being used on a ring mark. Even though a part of the mark is covered, the mark can still be detected correctly.

Template with masking
(mask is marked in pink)



Part of the mark is covered.

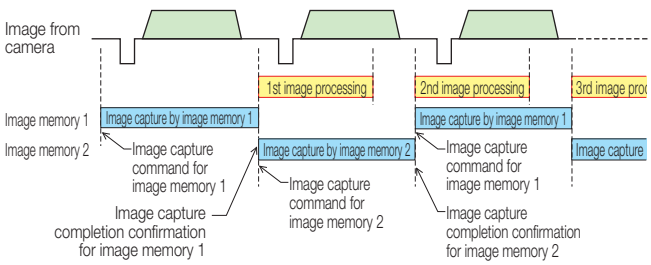
Detection of Positioning Marks of Any Shape

When there is no mark, you can substitute distinctive forms such as circuit patterns for the mark.

Typical Marks

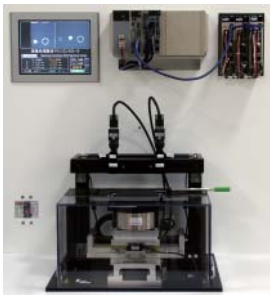
Pipeline Image Input

The YVD unit can input and process images simultaneously while alternatively using plane 1 and plane 2 of the image memory. As no waiting time is required for image capture, this enables high-speed processing with a cycle time almost equal to the time required for image capture.



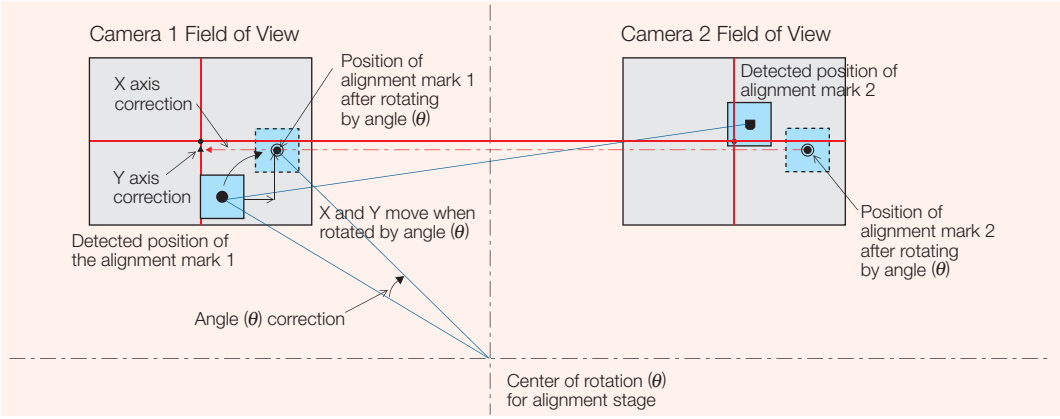
Get Precise Alignment with a Single Image Capture

Achieves the target precision with a single correction.



Positioning with No Retries Required (Instant Alignment)

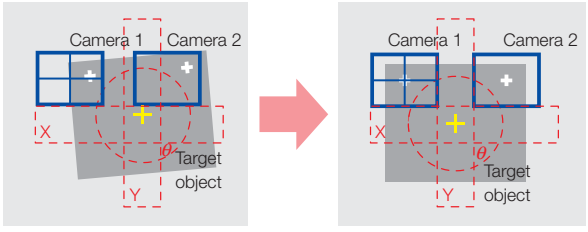
The YVD unit alignment program takes overall machine motions into account, and can recognize the current value of the servo axis at the alignment stage. High-precision correction for positioning can be done by a one-step process for image recognition and correction. This one-step-process uses a calibration based on the current position of the servo axis and the mechanical coordinate system plus calculated corrections in reference to the center of rotation.



Basic Positioning Calculation

As shown in the figure above, the two alignment mark coordinates are used to perform the calculation in units of servo axis movement.
The inclination from the center of the θ axis is corrected to move the mark to the reference point (target position).

Example:
In the figure at right, the left mark is being centered in the search area of the left-side camera (camera 1). This enables various combinations of processing, including processing center position of the marks and processing with four cameras.

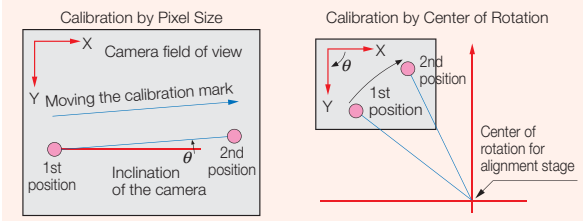


Before Positioning Correction

After Positioning Correction

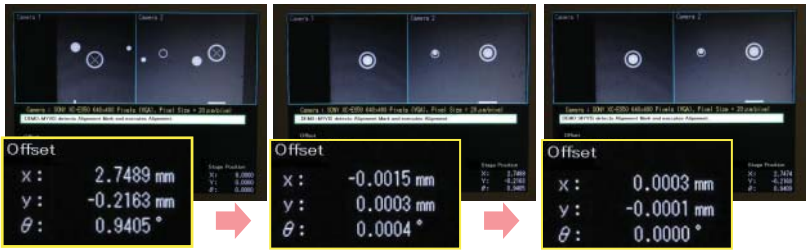
■ **Calibration by Pixel Size**
The calibration mark is moved by moving the stage to obtain the pixel size and the angle of the surface on which the camera is mounted against the axis of the stage.

■ **Calibration by Center of Rotation**
The calibration mark is moved by the rotation of the stage, and the position of rotational center is calculated from two detected positions.



Great Improvement in Correction Values

The photos on the right show an alignment done by the demonstration YVD unit installed at the Yaskawa showroom. Even though the pixel size is about 20 μm, position has been corrected to the 2 to 3 μm level with a single recognition and correction. If more precision is required, accuracy can be improved to the 1 μm level by repeating the correction.



Recognition Results (Before Correction)

Results of First Correction

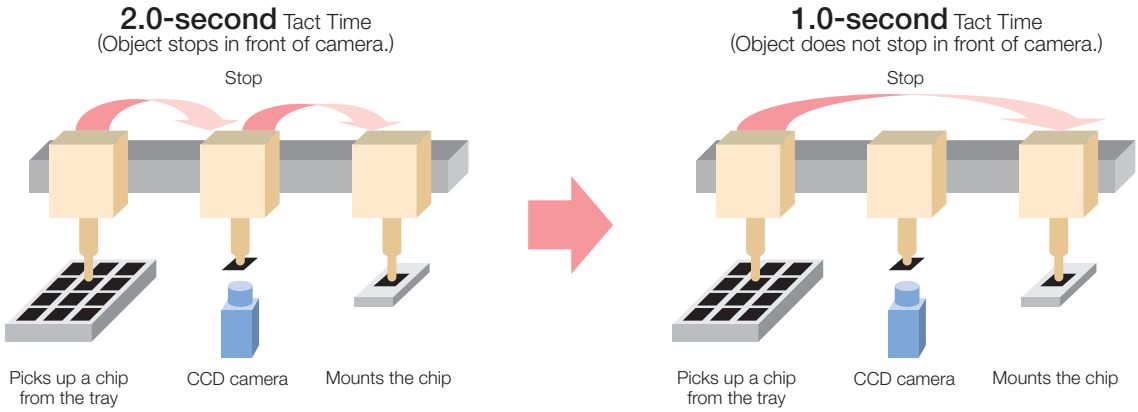
Results of Second Correction

No Need to Stop for the Camera

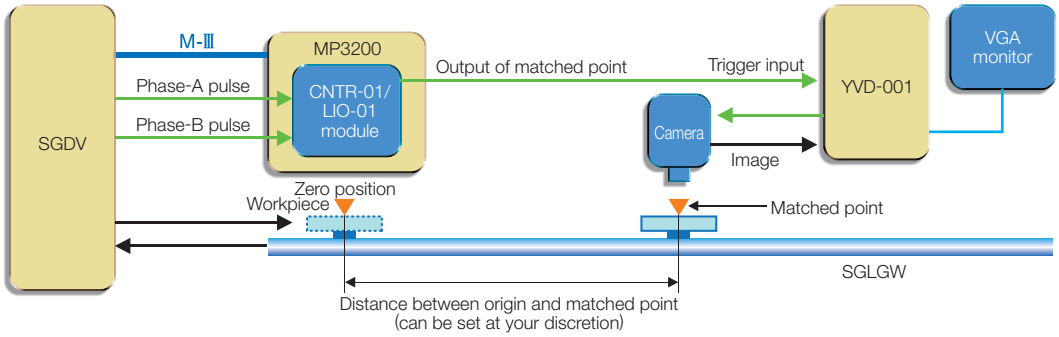
Achieves reduced tact time with non-stop alignment.

Non-stop System

Tact time is reduced because there is no need to pause the object in front of the camera to calculate chip misalignment.

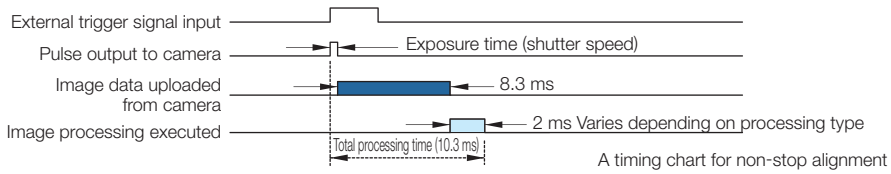


System Configuration



System Outline

If an external trigger signal is input, the YVD unit outputs a shutter trigger pulse to the camera. The image is captured immediately after it has been exposed.
When using a Yaskawa MP controller with an LIO-01 module, no sensor is needed for the external trigger, and you can select any position as the destination for the trigger signal.

Equipment	MP3200 machine controller, Σ-V series servomotor, YVD-001 machine vision system, super luminosity LED light illumination, KP-F31PCL (quad-speed progressive-scan digital camera)
Specifications	Move speed: 1,000 mm/s; camera shutter speed: 1/16,000 s; field of view: 20 mm
Image processing time	Image capture (8.3 ms) + image processing (2 ms) =10.3 ms
Positioning correction accuracy	3 to 6 μm (When pixel size is 30 μm)
Time chart	

A timing chart for non-stop alignment

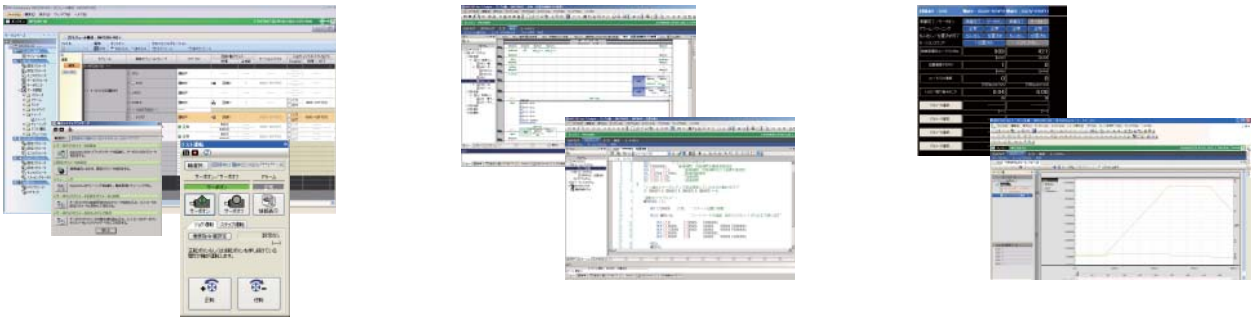
System Integrated Engineering Tool MPE720 Ver.7

Consolidated control over the entire system
Multiple axes can be set up and adjusted concurrently.

ALL-IN-ONE ENGINEERING

Each development process is carried out with one tool

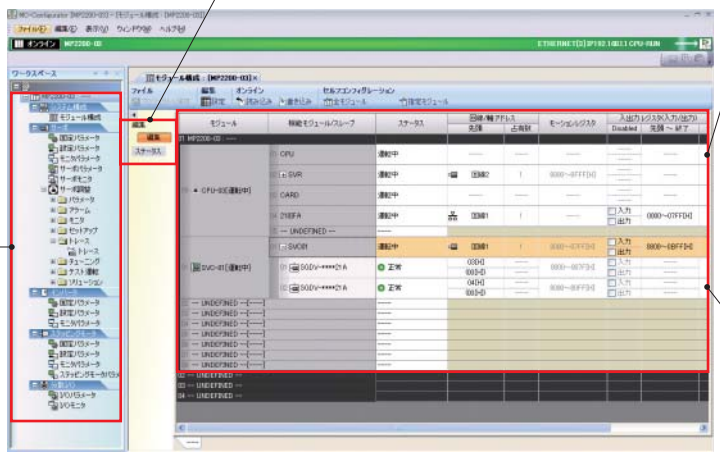
Setup and adjustments → **Programming** → **Maintenance and control**



All settings and monitoring of the system executed together

This executes all the system settings, parameter settings, and monitoring of all the units. All the information can be controlled together, making the entire system "visible."

● **MC-Configurator display**



The mode can be changed here.

System configuration set automatically

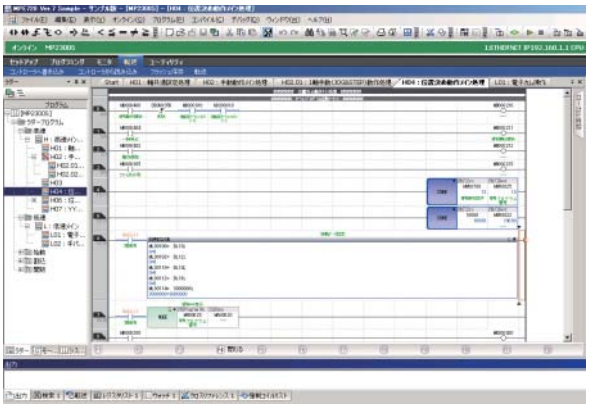
Using MC-Configurator, the setup of an entire system can be executed automatically. The connected units and register allocation information, and other design information of the entire system can be checked out here.

Simultaneous displays and edittings for more than one axis

The parameter settings and monitoring of the slave units are performed here.

Efficiency improved by choosing the programming method that works best for the user

Ladder programming



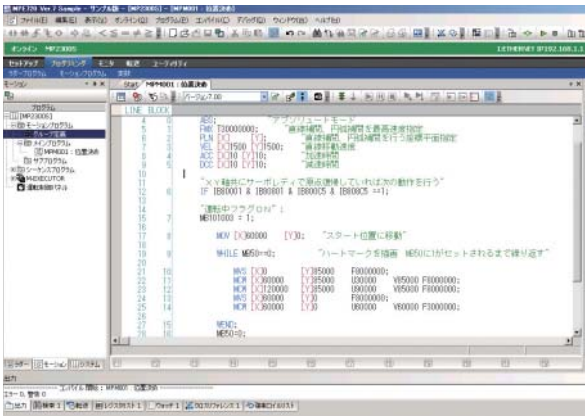
Features

- A new user interface (UI) enables operations to be undertaken easily by anybody.
- All types of control including position, speed, torque, and phase control are supported.
- Arithmetic expressions in the ladders have been made even simpler by boosting the EXPRESSION instructions.

This system is recommended for:

- Users who are using a PLC

Motion programming



Features

- Positioning and interpolation instructions can be described using single instructions.
- Programs can be very easily edited using expressions in a text format.
- New variable programming can provide PC-like programming.

This system is recommended for:

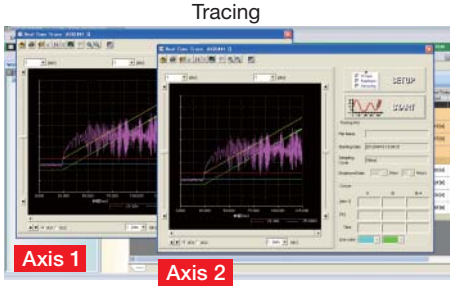
- Users of PC based devices and in-house fabricated boards (C language, BASIC language)

Adjustment work supported by a variety of adjustment functions

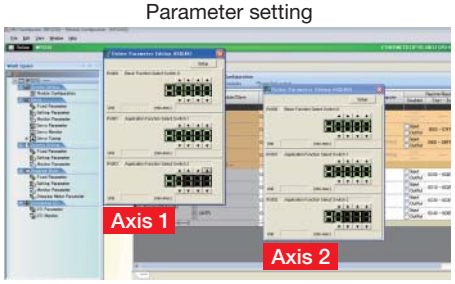
The servo adjustment functions are integrated in MC-Configurator. Previously, the setup and adjustments had to be done for each and every axis, whereas the adjustment work can now be accomplished on multiple windows. This dramatically reduces the adjustment time and enhances efficiency.

Executed from
MC-Configurator

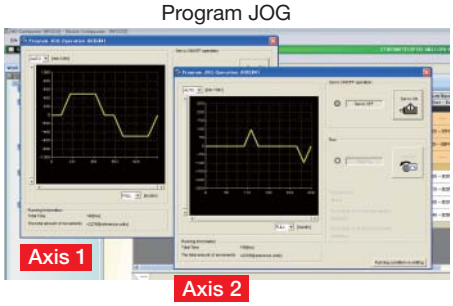
Tracing



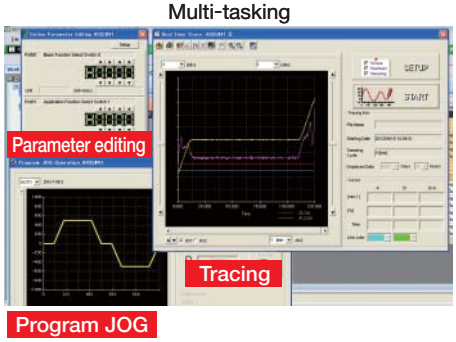
Parameter setting



Program JOG

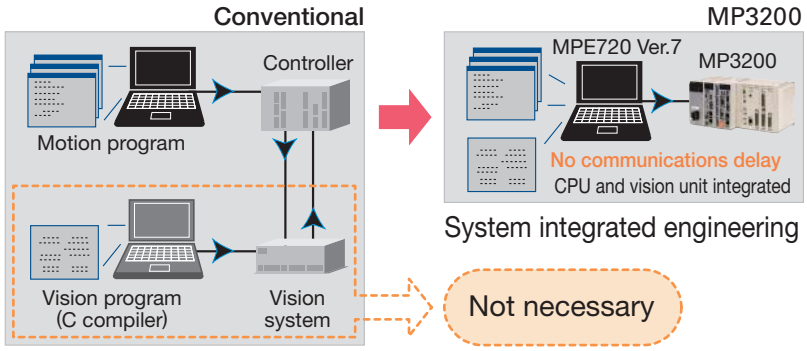


Multi-tasking



Both motion and vision engineered in the same environment

No longer is it necessary to add a dedicated compiler and debugger for the vision system so that programs can now be developed with no additional investment.



Executable instructions now integrated into 4 basic instructions

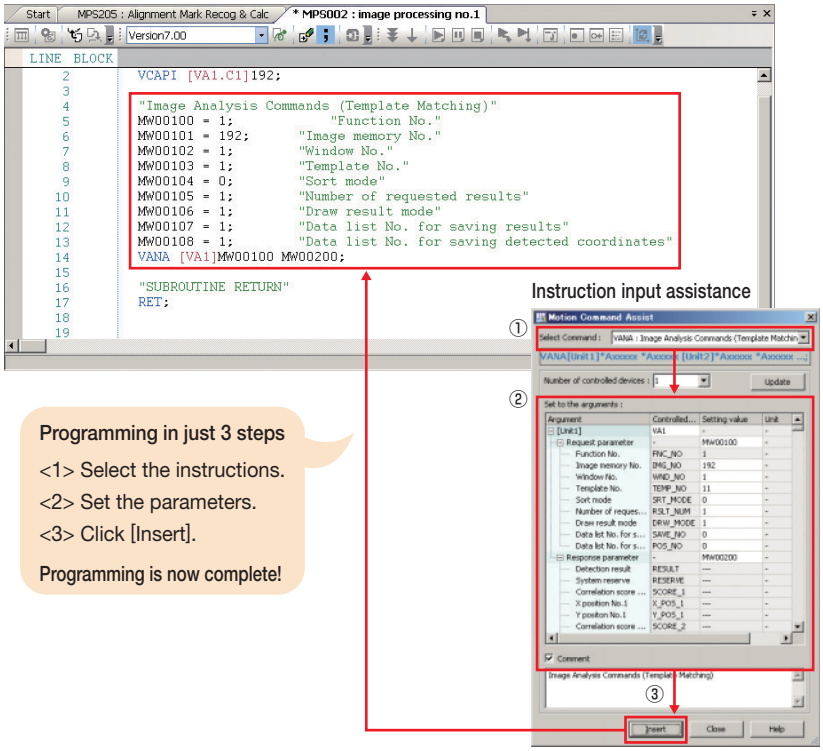
More than 300 instructions were previously required, but these have now been integrated into 4 basic instructions. These basic instructions can be used extensively from simple to complex image processing.

4 basic instructions

VCAP: Image capture
VFIL: Pre-processing (filtering)
VANA: Image analysis
VRES: Image analysis result acquisition

Easy programming with Instruction Input Assistance

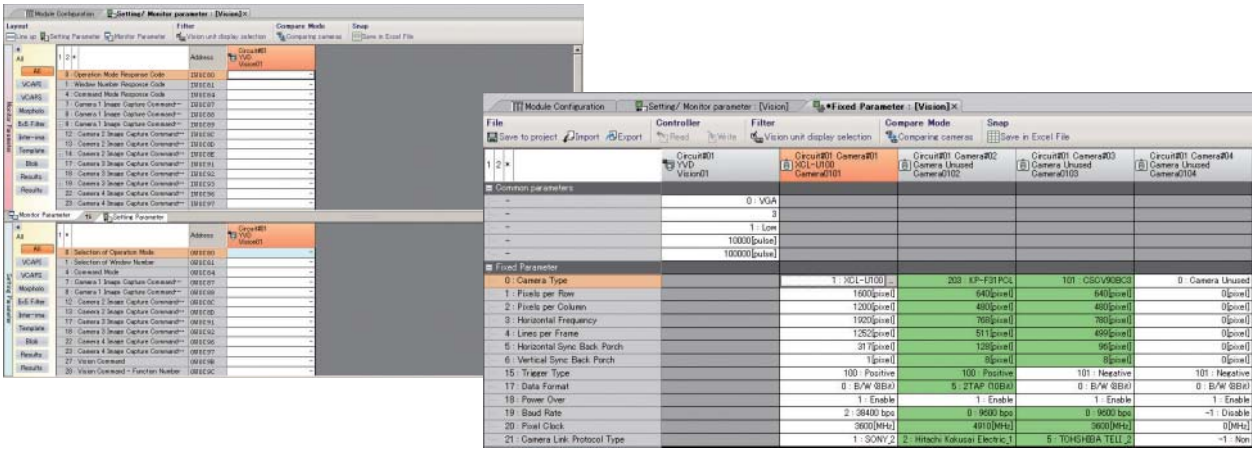
Programming can now be done with the Instruction Input Assistance function. The parameters that need to be set are displayed in dialog boxes so programming proceeds smoothly without referring to the manual.



Vision Unit settings and monitoring all together

■ Camera selection and parameter controls enabled

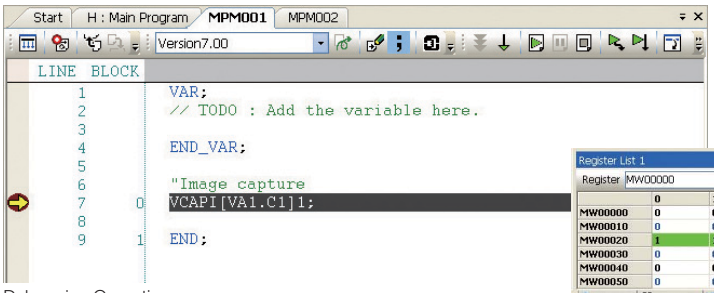
· As with the drive units, the Vision Unit settings and control can easily be executed on the MC-Configurator window.



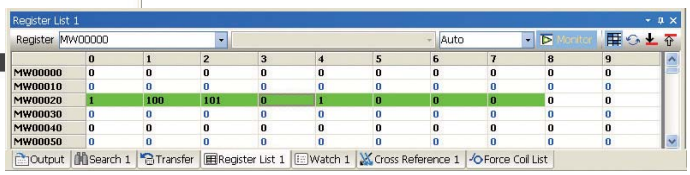
■ One-step execution for debugging and monitoring

· Debugging operations such as program pauses, breakpoint settings, and one-step execution

· View the register status on the register list.



Debugging Operation



Register List

Easy customizing with the vision window designer*

＊: To be released soon.

■ Programming-free window creation

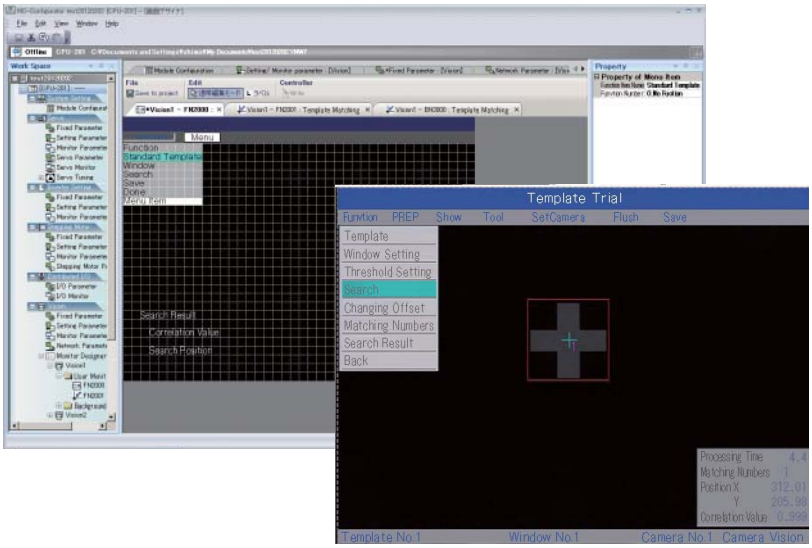
· Select the parts and place them in the window.

· Select the parts for menus, numerical values, and text.

■ Straightforward menu operation

· Pull-down menus to easily view

· Easy operations with interface for coordinate operations



Connect an MP3200 Controller to a display monitor, such as one made by Digital Electronics, to view information about the servo axes or the status of your motion control system without a PC. Visualize your system with MP3200 Controller.

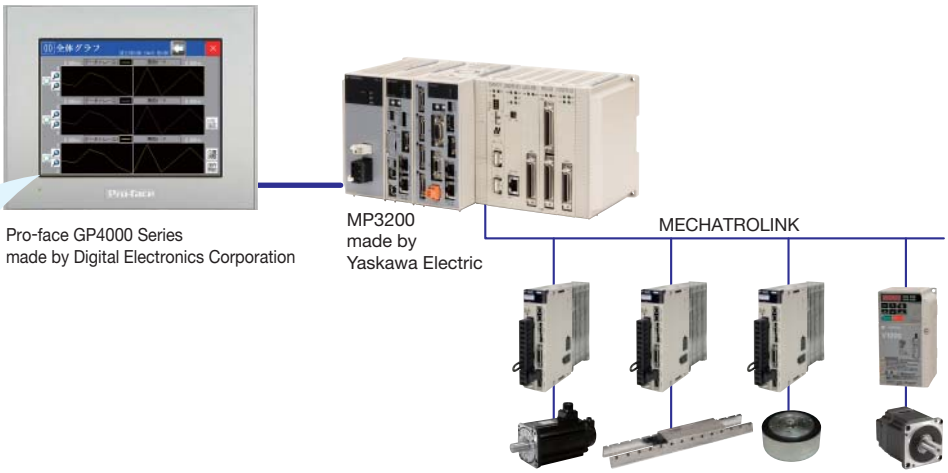
Programmable Display Unit Pro-face GP4000 Series

Made by Digital Electronics Corporation

Machine controllers, servo drives, and inverters can be adjusted and maintained with this display unit. You can easily check system startup and maintenance status, pinpoint the causes when an error occurs, and update or back up application programs with the display on-site without using a computer.

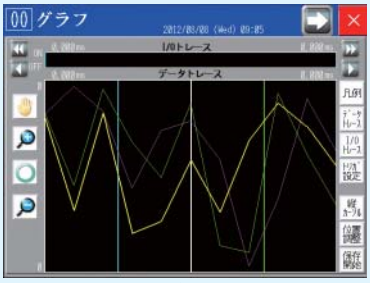
Features

1 Touchscreen to easily confirm the status of the MP3200 Controller
2 Wide variety of windows to monitor all axes and the status of MP3200 Controller
3 Register list to easily monitor and edit registers
4 Application programs can be updated or backed up by using the program transfer function, without using a computer.
5 Free samples of windows for various functions can be downloaded. No special device is required to set up screens.

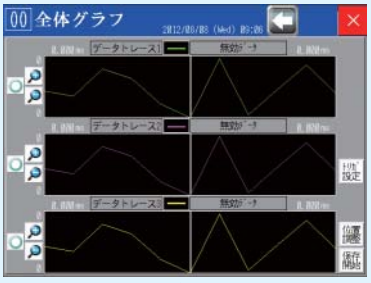


The cockpit parts can be downloaded from the homepage of Digital Electronics Corporation:
http://www.pro-face.com/otasuke/

Note: For the English-language displays, contact the Digital Electronics Corporation.

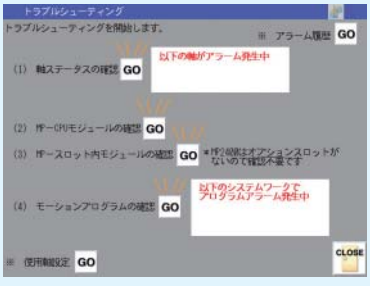


▲ Data tracing: Waveform details

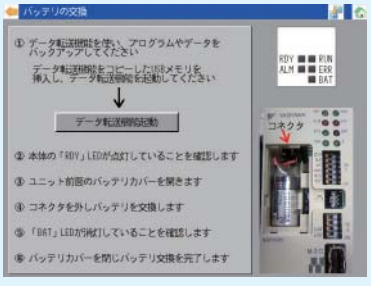


▲ Data tracing: Waveform division

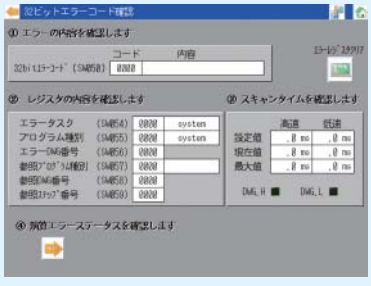
▲ Data tracing: Settings



▲ Troubleshooting

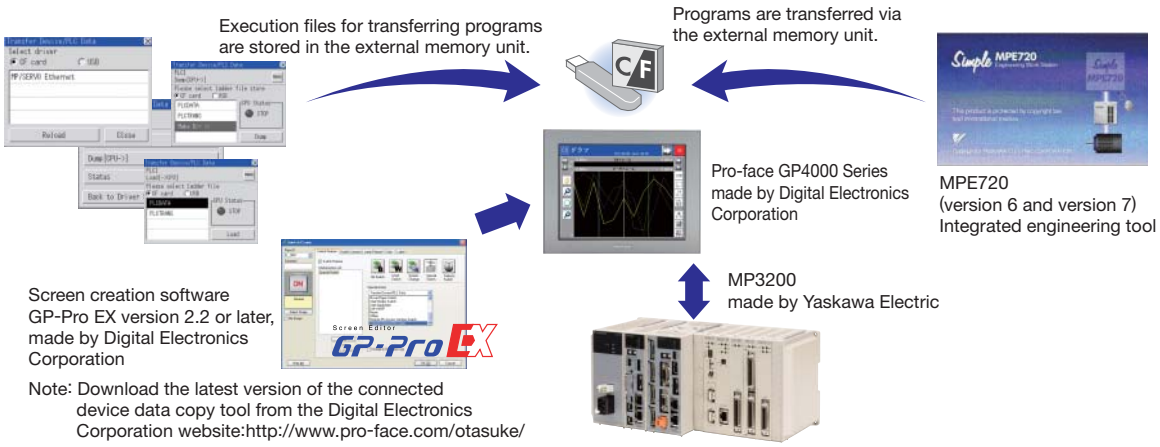


▲ Battery replacement



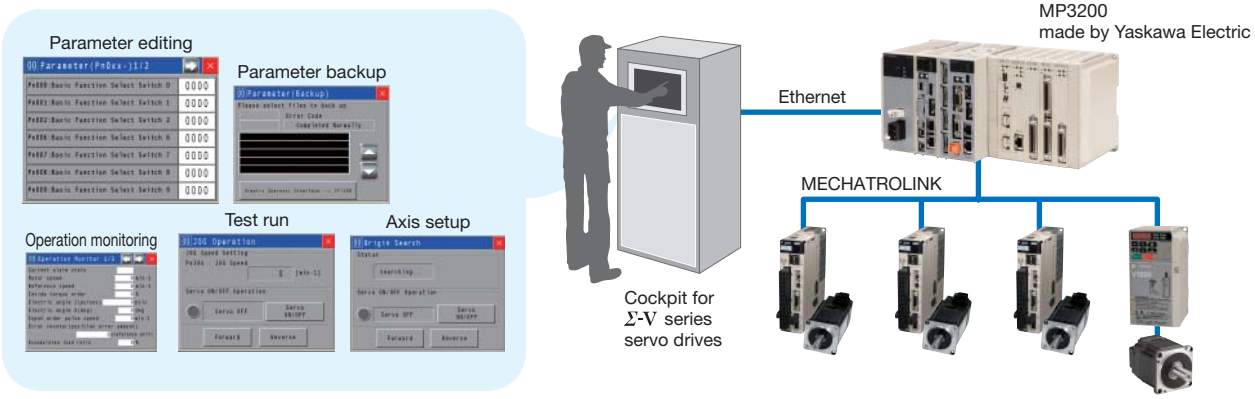
▲ Error code check

Program Transfer with an External Memory Unit!



Note: Download the latest version of the connected device data copy tool from the Digital Electronics Corporation website:http://www.pro-face.com/otasuke/

Adjustment and Maintenance of Servo Drives and Inverters Right on the Touch Panel!



Other Manufacturer Products — MECHATROLINK-compliant Devices

Partners of the MECHATROLINK Members' Association manufacture the following MECHATROLINK-compliant devices. These devices can be connected to the MECHATROLINK connector on MP3200 Controller for a bus with reduced wiring.

Remote I/O R3 Sreies for MECHATROLINK-Ⅲ

Made by M-System Co., Ltd

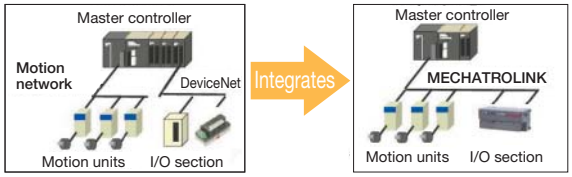
The R3-NML3 communications card for MECHATROLINK-Ⅲ is now available for the R3 series of multi-channel, remote I/O modules that can be freely used in many combinations. The construction of slaves is possible by combining a wide variety of I/O cards such as contact I/O, DC, AC, temperature, load cell, and pulse signal cards.

Note: For inquiries on R3 or R7 series Compact Remote I/O, contact M-System Co., Ltd.
For more details, visit the M-System website:
http://www.m-system.co.jp/

Remote I/O R3 Sreies for MECHATROLINK-Ⅰ/Ⅱ

Made by M-System Co., Ltd

The R7 series of compact integrated remote I/O modules designed for a small number of channels features an all-in-one construction that neatly combines modular units for I/O, communications, and power supply. The basic unit provides contact I/O units, DC I/O units, thermocouple input units, etc. The analog I/O unit comes with insulation between the channels. You can connect additional units to the basic unit, and these can be as a mix of analog and contact units.

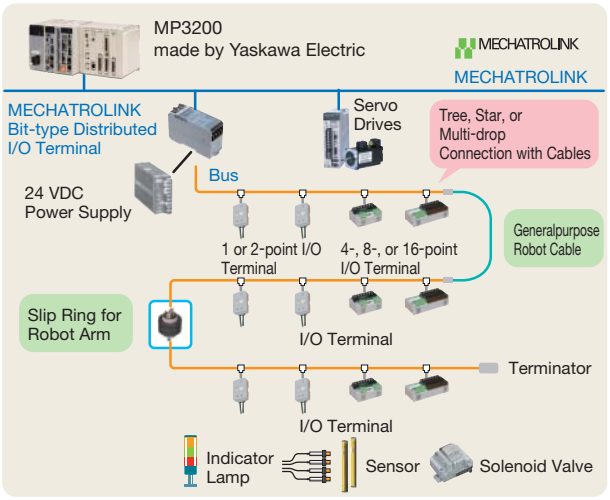


MECHATROLINK Bit-type Distributed I/O Terminal

Made by Anywire Corporation

The MECHATROLINK Bit-type distributed I/O terminal contributes to the reduction of wiring required for drive systems that use MECHATROLINK-Ⅰ/Ⅱ.
Introduction of this new I/O terminal into a MECHATROLINK open-network system significantly reduces the total costs and increases system reliability, because the MECHATROLINK I/O terminal can be used with any transmission media such as robot cables and slip rings.
The Bitty series of I/O terminals from AnyWire can be connected to increase the flexibility in transmissions by supporting the connection of cables for signals from sensors and actuators in the system. Possible to expand number of I/O points to 432 by connecting I/Os with a bus that reduces the amount of wiring required.

Model: AB023-M1



Note: For more details on AFMP-01 module and AB023-M1 I/O terminal, contact Anywire Corporation or visit its web site, http://www.anywire.jp.

No Out-of-step Stepping Motor and Driver Package

Made by Oriental Motor Co., Ltd.

- The MECHATROLINK-Ⅱ compliant αSTEP stepping motor and driver in the AS-series uses a unique closed-loop control and eliminates missed steps.
- The αSTEP does not require tuning or hunting to achieve high-response positioning without any missing steps during sudden load changes or acceleration.
- Only one cable is required to connect the motor to the driver.
- A wide range of products including various types of geared motor, the EZ Limo motorized sliders, and the DG series of hollow rotary actuators can be connected and controlled with MECHATROLINK-Ⅱ.

Note: For more information on ASD□□-□ME stepping motors, contact Oriental Motor Co., Ltd. or visit its website at http://www.orientalmotor.com.

Model: ASD□□-□ME

Controller for Stepping & Servo Motors

Made by Melec Inc.

- Easy operation by combining I/O bit signals.
- Specially designed software enables you to make settings or confirm operation status on the personal computer.
- Individual control of four axes with compact motion controller: 88.5 × 94 × 59 mm (W×D×H)

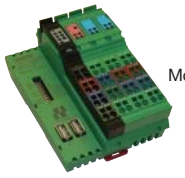
Model: C-M581S

Note: For more information on C-580-series controllers, contact Melec Inc. or visit its website at http://www.melec-inc.com.

MECHATROLINK Inline Bus Coupler for Modular I/O Systems

Made by Phoenix Contact GmbH & Co. KG

- The Inline bus coupler, model IL M Ⅱ BK DI8 DO4-PAC, has eight digital input terminals and four digital output terminals as a standard feature.
- The Inline modules for I/O signals can be expanded, and 52 modules can be connected.
- A wide range of input and output modules are available, including digital input, digital output, analog input, analog output, and temperature control modules.



Model: IL M Ⅱ BK DI8 DO4-PAC

Digital I/O modules

Analog I/O modules

Note: For more information on IL M Ⅱ BK DI8 DO4-PAC, contact Phoenix Contact GmbH & Co. KG or visit its website at, http://phoenixcontact.com/global/.

Module-type Digital Temperature Controller

Made by RKC Instrument Inc.

- Easily construct a multi-channel temperature control system by connecting the MECHATROLINK-compliant communications converter module to the temperature control modules.
- A single temperature control module can control temperatures of four points or two points. Also, 16 modules can be connected for temperature control of maximum 64 points.
- Digital I/O modules to output temperature alarms and to switch operation modes by using contact signals can also be connected.

Model: SRZ
Communications converter module COM-MY
Temperature control module Z-TIO
Digital I/O module Z-DIO

Note: For more information on SRZ temperature controllers, contact RKC Instrument Inc. or visit its website at http://www.rkcinst.co.jp.

Modules from the listed manufacturers can be directly installed and used with the MP3200. A wire-saving bus can be formed with the bit-type distributed I/O terminal connected to the MECHATROLINK-cable connector of the MP3200 Controller.

AnyWire DB Master Module

Made by Anywire Corporation

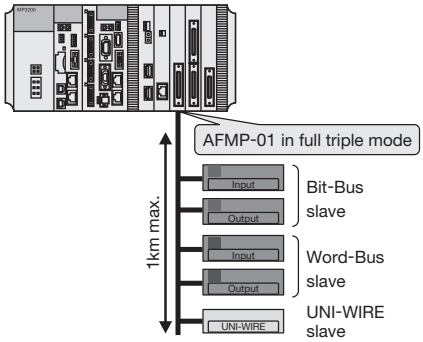
The AnyWire DB Master module allows a direct connection between the MP3200 controller and the AnyWire system. Because the AnyWire DB Master module has upper compatibility with the UNI-WIRE system, new ways to construct a system are possible.

Model: AFMP-01

Features

1 The AnyWire system reduces the wiring, time, space, and costs, because you can use general-purpose cables instead of the costly cables.
2 The Dual-Bus system realizes high-efficiency, high-speed transmissions and allows analog transmission (128 W) to be connected without disturbing the digital transmission (512 I/O points).
3 Recommended for the drive section, which requires reduced wiring, because general-purpose robot cables, cableveyor devices, slip rings, etc. can be used.

System Configuration: Full Triple Mode Transmission



Note: For more details on the AFMP-01 module, contact the Anywire Corporation or visit its web site, http://www.anywire.jp.

CC-Link Interface Board

Made by Anywire Corporation

Slave interface board for connecting the MP3200 to the host CC-Link. Two models are available: the AFMP-02-CA with an AnyWire DB port for reduced wiring and the AFMP-02-C without an Anywire DB port.

Model: AFMP-02-CA

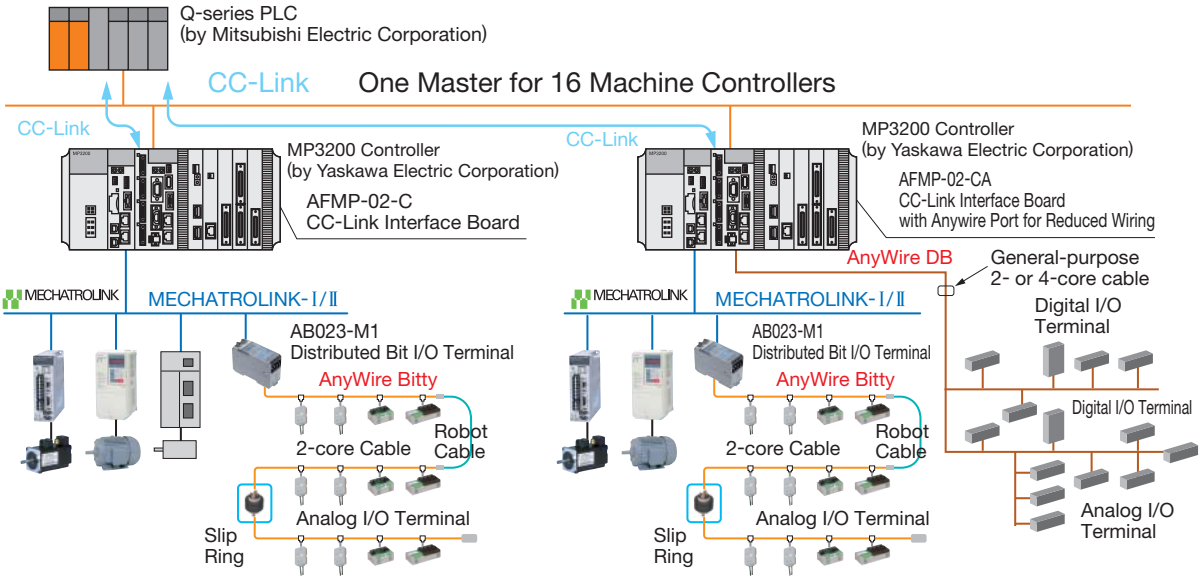
Features

1 A single CC-Link master station, a PLC from the Q series by Mitsubishi Electric Corporation, can be connected to 16 MP3200 controller with the CC-Link.
2 The setup time can be greatly reduced by the self-configuration function of the MP3200.
3 Anywire port for reduced wiring saves costs and space.

Note: For more details on the AFMP-02-CA board, contact the Anywire Corporation or visit its web site, http://www.anywire.jp.

System Configurations

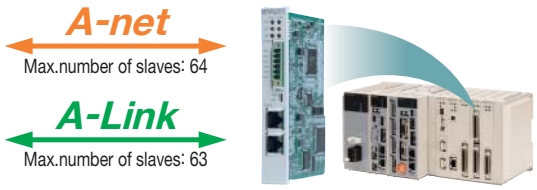
If a Q-series PLC made by Mitsubishi Electric Corporation is connected to a Machine Controller through CC-Link, only one CC-link master allows you to connect to 16 controllers including MP3200 Controller.



A-net/A-Link Master Unit Module

Made by Algo System Co., Ltd.

This A-net/A-Link master unit module can be directly connected to the MP3200 Controller. The resulting system construction uses less wiring and conforms to SEMI E54.17.



Model: MPANL00-0

Features

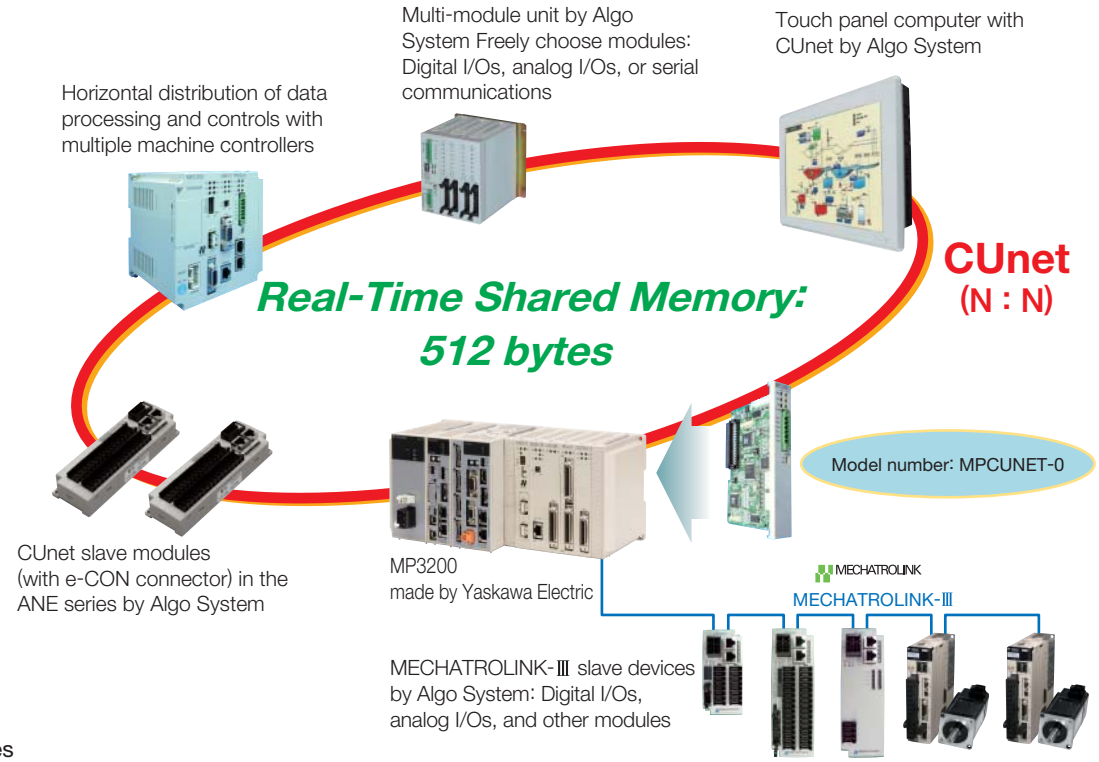
1 Two H8S units by Renesas Technology Corp. can be added.
2 Max. 4032 points can be scanned in 0.95 ms (at 12 Mbps).
Note: Using two A-Link systems (2016 points/system, 0.95 ms at 12 Mbps).
3 Shared memory of 512 Bytes (response speed: 2.36 ms) with A-net.
4 Self-diagnostic function.

Note: For more details about the CUnet master unit module (MPCUNET-0), contact Algo System. For more information, visit the following website. http://www.algosystem.co.jp

CUnet Master Unit Module (Model number: MPCUNET-0)

Made by Algo System Co., Ltd.

The master module for CUnet communications that can be directly connected to the MP3200 Controllers.



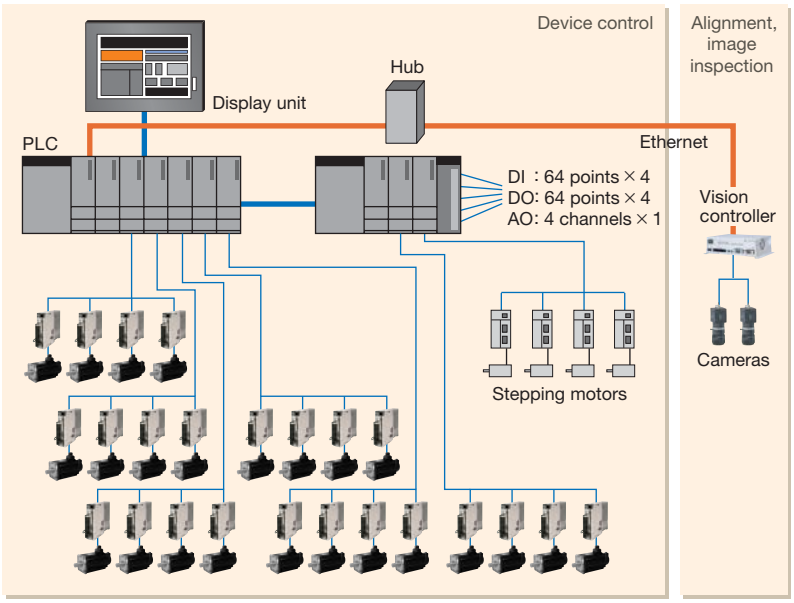
Features

1 Pre-mounted H8S unit (By Renesas Electronics).
2 Large shared memory of 512 bytes (Response speed: 2.36 ms).
3 Distributed control in real time.

Note: For more details about the CUnet master unit module (MPCUNET-0), contact Algo System. For more information, visit the following website. http://www.algosystem.co.jp

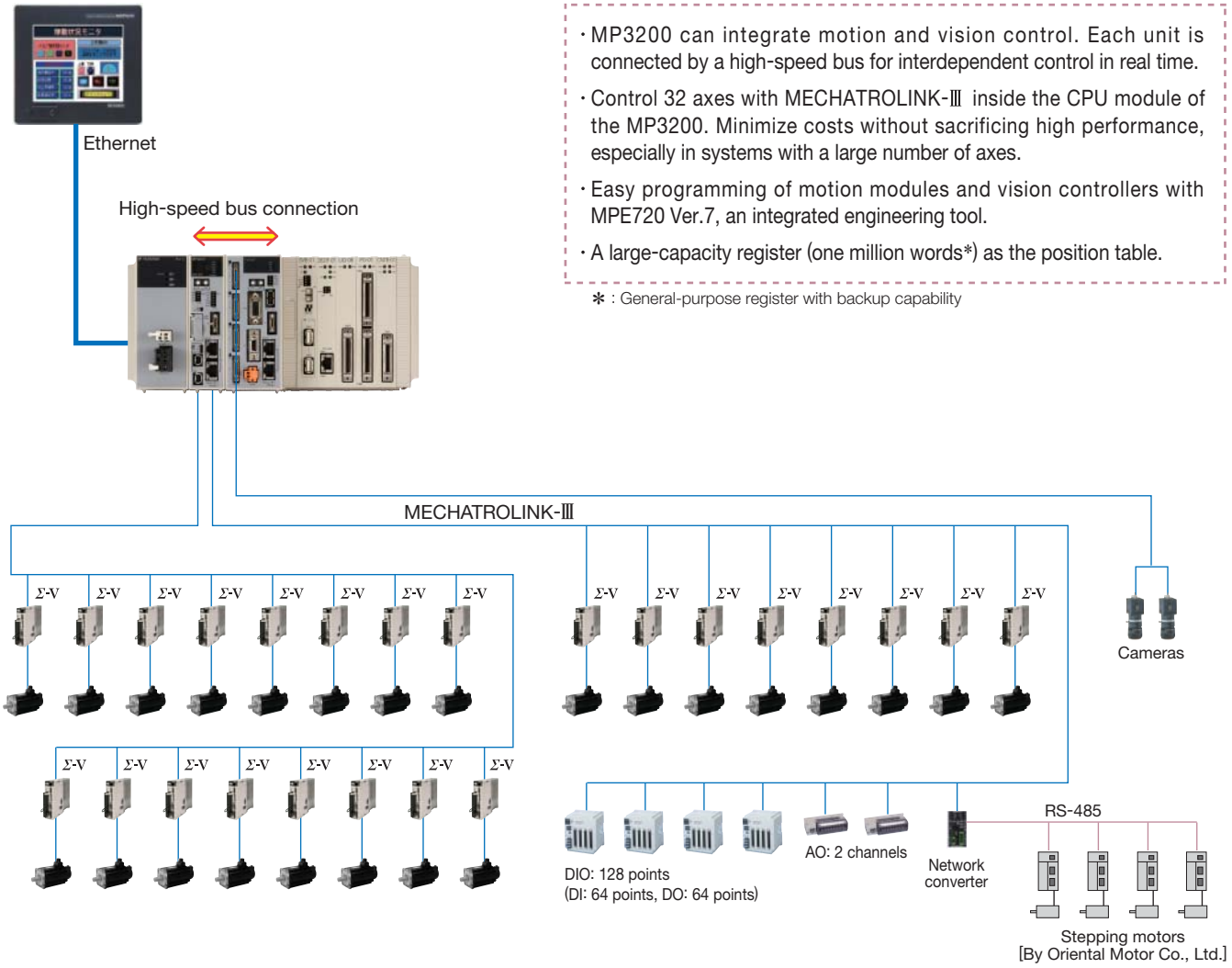
Replacement Example With PLCs (motion modules) and vision system configuration

Problems



- PLCs, motion modules, and vision controllers are each separate units. A great deal of time is wasted in communications.
- Expensive motion modules and vision controllers are required.
- Different programs are required for the PLCs and vision control.
- Limited number of positioning points.
  Example: 500 points/axis

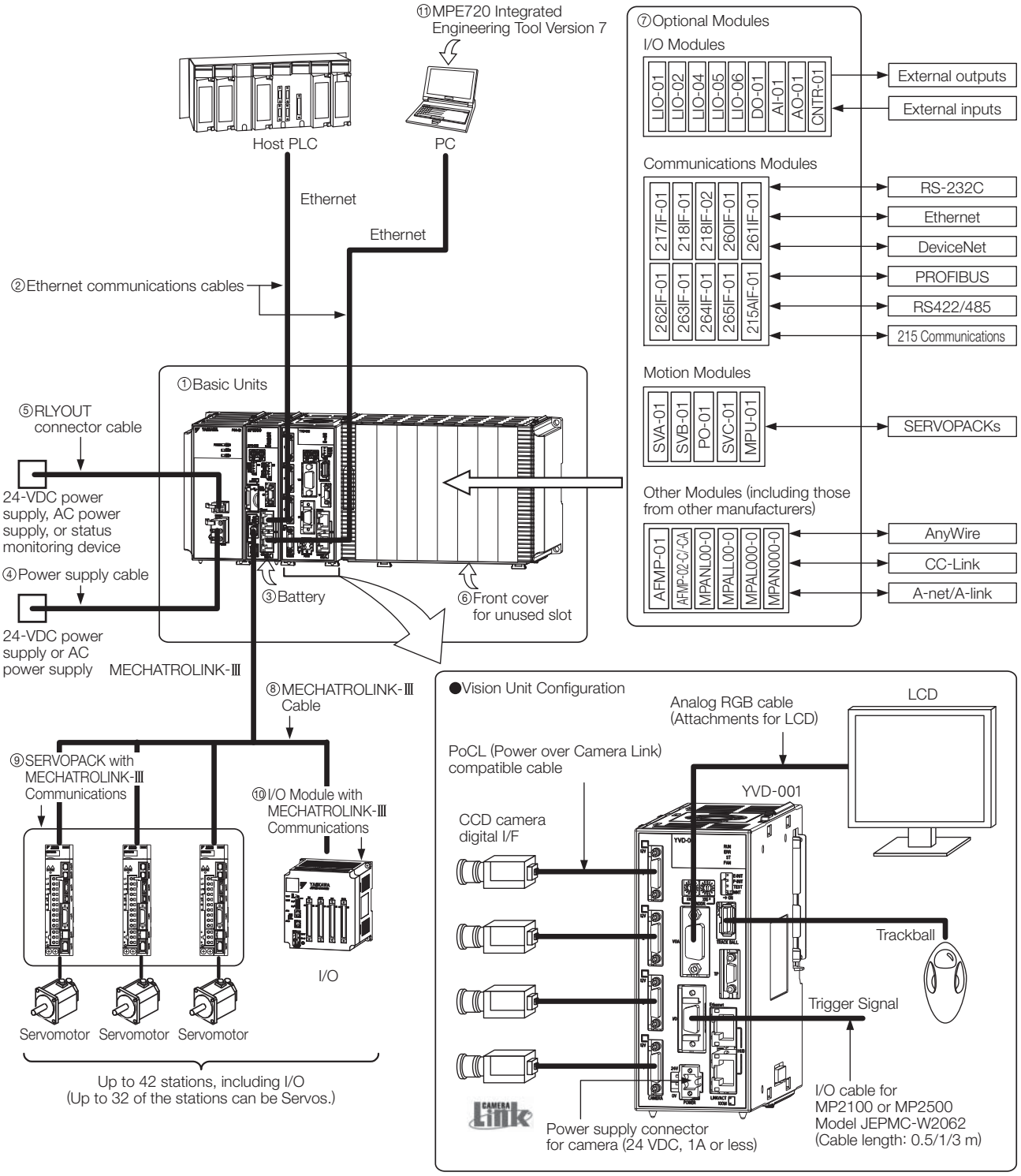
MP3200 advantages



- MP3200 can integrate motion and vision control. Each unit is connected by a high-speed bus for interdependent control in real time.
- Control 32 axes with MECHATROLINK-Ⅲ inside the CPU module of the MP3200. Minimize costs without sacrificing high performance, especially in systems with a large number of axes.
- Easy programming of motion modules and vision controllers with MPE720 Ver.7, an integrated engineering tool.
- A large-capacity register (one million words*) as the position table.

* : General-purpose register with backup capability

Connection Example MECHATROLINK-Ⅲ



● Details of Components (corresponding to the configuration on page 30.)

No.	Name		Use	Model	Remarks
①	Basic Units	Power supply unit	Supplies the power that is needed for the operation of the units that are connected to each other and to any optional modules that are connected in the controller.	Refer to pages 33 and 34 for details.	
		CPU unit	Stores the module definitions and programs, and interprets the programs. The CPU unit also controls the optional modules.		
		Vision unit	Connects the digital cameras, and carries out high-speed and high-accuracy image processing at high resolution.		
		Base unit	Used to mount optional modules.		
②	Ethernet communications cables		Used to connect the CPU unit to Ethernet communications devices or to connect the CPU unit to a PC that has the MPE720 installed on it.	–	Use a commercially available cable that meets the following conditions: ・Ethernet specification: 100Base-TX ・Category 5 or higher ・Twisted-pair cable with RJ-45 connectors
③	Battery with special connector		Provides power for the calendar and backup memory while the power is turned OFF.	JEPMC-OP3005	–
④	Power supply cable		Connects the power supply unit to a 24-VDC power supply or an AC power supply.	–	Use a commercially available cable that meets the following conditions: ・Wire size: AWG18 to AWG13 (0.8 to 2.6 mm^2) ・Twisted-pair cable
⑤	RLYOUT connector cable		Connects the power supply unit to a 24-VDC power supply, an AC power supply, or a status monitoring device.	–	Use a commercially available cable that meets the following conditions: ・Wire size: AWG28 to AWG14 (0.08 to 2.0 mm^2)
⑥	Front cover for unused slot		Used to cover unused slots on the base unit.	JEPMC-OP2300-E	–
⑦	Optional modules		Motion modules, I/O modules, and communications modules are selected based on the application.	Refer to pages 12 to 13 for details.	
⑧	MECHATROLINK-Ⅲ cable		Connects the CPU unit to MECHATROLINK-Ⅲ communications devices.	JEPMC-W6012-□□-E	Standard cable Length: 0.2 to 50 m
				JEPMC-W6013-□□-E	Cable with ferrite cores Length: 10 to 50 m
				JEPMC-W6014-□□-E	Cable with loose wires at one end Length: 0.5 to 50 m
⑨	SERVOPACK with MECHATROLINK-Ⅲ communications		Used to control servomotors.	SGDV-□□□□ 21□□□□□□	Σ-Ⅴ-series AC SERVOPACK with MECHATROLINK-Ⅲ communications for Rotational Motor
				SGDV-□□□□ 25□□□□□□	Σ-Ⅴ-series AC SERVOPACK with MECHATROLINK-Ⅲ communications for Linear Motor
⑩	I/O Modules with MECHATROLINK-Ⅲ Communications	64-point I/O module	Used to input or output digital, analog, or pulse train signals.	JEPMC-MTD2310-E	24 VDC, 64 inputs, 64 outputs
		Analog input module		JEPMC-MTA2900-E	8 analog input channels
		Analog output module		JEPMC-MTA2910-E	4 analog output channels
		Pulse train input module		JEPMC-MTP2900-E	2 pulse-train inputs
		Pulse train output module		JEPMC-MTP2910-E	4 pulse-train outputs
⑪	MPE720 Integrated Engineering Tool Version 7		Used to adjust and maintain AC Servo drives and inverters that are connected to the network.	CPMC-MPE780	—
—	Panel-mounting bracket		Used to mount the basic units inside a control panel.	JEPMC-OP3001-E	This attachment is provided with the power supply unit.

Installation Conditions

Item		Specification
Environmental Conditions	Ambient Operating Temperature	0 to +55°C (0 to +50°C only for vision unit)
	Ambient Storage Temperature	−25 to +85°C
	Ambient Operating Humidity	30% to 95% RH (with no condensation)
	Ambient Storage Humidity	5% to 95% RH (with no condensation)
	Pollution Level	Conforms to JIS B 3502 Pollution Degree 2.
	Corrosive Gas	There must be no combustible or corrosive gas.
	Operating Altitude	2,000 m max.
Electrical Operating Conditions	Noise Resistance	Conforms to EN 61000-6-2 and EN 55011 (Group 1, Class A). Power supply noise (FT noise): ±2 kV min. for one minute Radiation noise (FT noise): ±1 kV min. for one minute Ground noise (impulse noise): ±1 kV min. for 10 minutes Electrostatic noise (contact discharge method): ±6 kV or more, 10 times

Item		Specification
Mechanical Operating Conditions*	Vibration Resistance	Conforms to JIS B 3502. ・Continuous vibration: 5 to 9 Hz with single-amplitude of 1.75 mm 9 to 150 Hz with fixed acceleration of 4.9 m/s^2 ・Intermittent vibration: 5 to 9 Hz with single-amplitude of 3.5 mm 9 to 150 Hz with fixed acceleration of 9.8 m/s^2 10 sweeps each in X, Y, and Z directions for both intermittent and continuous vibration
	Shock Resistance	Size of shock: Peak acceleration of 147 m/s^2 (15 G) Duration: 11 ms 3 times each in X, Y, and Z directions
Installation Conditions	Ground	Ground to 100 Ω max.
	Cooling Method	Natural cooling or forced-air cooling

*: The conditions also at the time of transporation.

● Control Panel Cooling Method

The components that are used in the Machine Controller require the ambient operating temperature to be between 0 and 55°C. Use one of the methods described below to ensure adequate cooling in the control panel.
Note: If the ambient temperature exceeds 50°C, we recommend forced-air cooling.

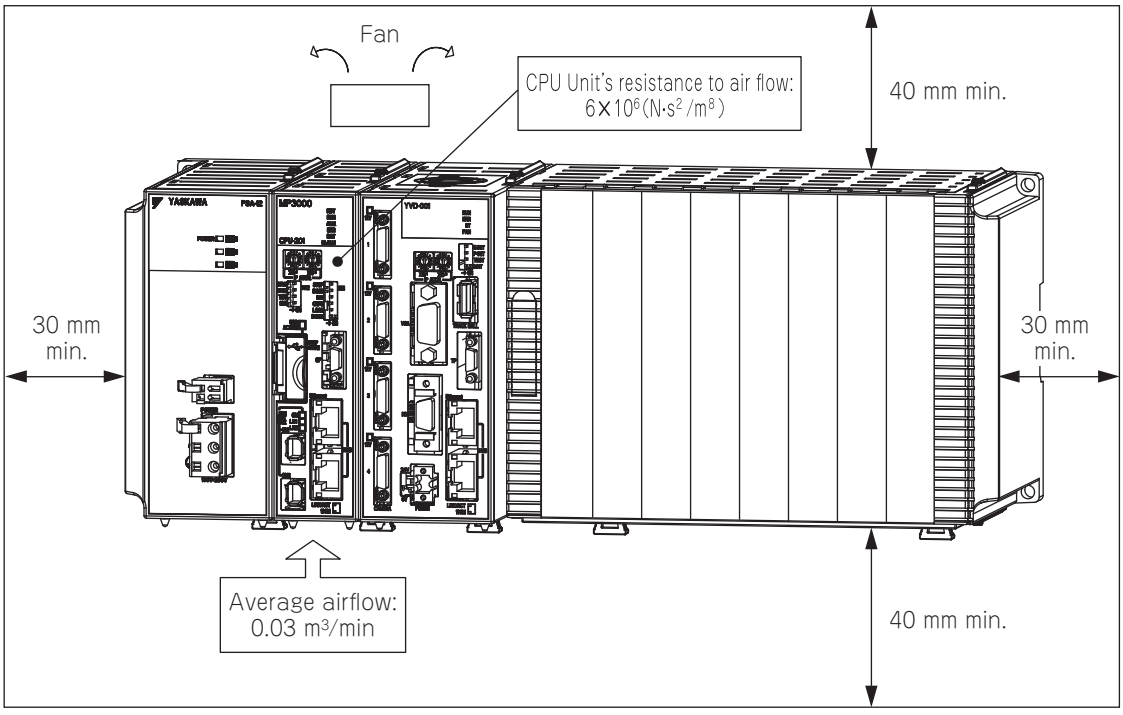
Control Panels with Natural Cooling

1. Do not mount the machine controller at the top of the control panel, where the hot air that is generated inside the panel collects.
2. Leave sufficient space above and below the units, and maintain adequate distances from other devices, cable ducts, and other objects to ensure suitable air circulation. Refer to the following figure.
3. Do not mount the machine controller in any direction other than the specified direction.
4. Do not mount the machine controller on top of any device that generates a significant amount of heat.
5. Do not subject the machine controller to direct sunlight.

Control Panels with Forced-air Cooling

Use one of the following methods to ensure 0.03 m^3/min average airflow below the CPU unit.
1. Forced draft method (A fan or a similar device is used to circulate the air in the interior and the exterior of the panel.)
2. Forced circulation method (A fan or a similar device is mounted to the airtight panel to circulate the air inside.)

Note: Use the following guideline when selecting the fan:
CPU Unit's resistance to air flow: 6×10^6 ($N \cdot s^2/m^8$)



Basic Units

● Power Supply Unit

Approx. Mass : 600 g

Items		Specifications	
		AC power supply Unit	DC power supply Unit
Model		JEPMC-PSA3012-E	JEPMC-PSD3012-E
Abbreviation		PSA-12	PSD-12
Power Supply	Input Voltage	100/200 VAC	24 VDC
	Allowable Input Voltage Range	85 to 132 VAC or 170 to 276 VAC	19.2 to 28.8 VDC
	Allowable Frequency Range	47 to 63 Hz	–
	Input Current	4.0 A max. (at rated input/output)	5.0 A max. (at rated input/output)
	Inrush Current	50 A, 10 ms max. (fully discharged, 276-VAC input, rated output)	50 A, 10 ms max. (fully discharged, 28.8-VDC input, rated output)
	Allowable Momentary Power Loss Time	20 ms	1 ms
	Rated Voltage	5.15 V	
	Rated Current	12.0 A	
	Output Current Range	0 to 12.0 A	0.2 to 12.0 A
	Constant Voltage Accuracy	5.15 V ±2% max. (5.05 to 5.25 V)	

● CPU Unit (CPU-201)

Approx. Mass : 600 g

Items	Specifications
Model	JEPMC-CP3201-E
Abbreviation	CPU-201
Flash Memory	Capacity: 40 MB (32 MB of user memory)
SDRAM	Capacity: 128 MB
SRAM	Capacity: 8 MB (battery backup)
Calendar	Seconds, minutes, hour, day, week, month, year, day of week, and timing (battery backup)
Ethernet	10BASE-T/100BASE-TX ×2 ports (hub)
MECHATROLINK	・One circuit for MECHATROLINK-Ⅲ ×2 ports ・Master function (slave function under development)
USB	・USB 2.0 Type-A host, 1 port ・Compatible devices: USB storage (under development)

● Vision Unit (YVD-001)

Approx. Mass : 590 g

Items		Specifications
Model		JEPMC-YVD3001-E
Image Processing	Blob Analysis	Feature extraction and measurement using binary images
	Template Matching	Normalized correlation pattern matching
Image Input	Camera Interface	Mini Camera Link (PoCL)×4
	No. of Pixels	640×480 to 2440×2048 (5 megapixels)
Monitor Output	Monitor Interface	VGA 15pin D-sub connector
	Display Colors	Graphics: 64 colors, Images: 256 gray levels
Operating Interface	Trackball	USB mouse interface
Communication Interface	Ethernet	100BASE-TX ×2 ports (hub)
Memory	Image Capture Memory	64 MB
	Image Analysis Memory	32 MB
	Image Display Memory	64 MB
	Data Storage Memory	32 MB (Data storage: 128 KB; Templates: Remaining memory), non-volatile
	External Memory	USB memory (2 GB) of CPU unit
I/O	Trigger Input	4 points
	Flashlight Output	4 points
Programming Methods	Image Processing Programs	Programming at CPU side (ladder language, motion language)
	User Window Creation	Programming-free (using MPE720 window designer* for vision systems)

*: To be released soon.

Basic Units/Optional Modules

● Base Units (for MP2000 Optional Modules)

Approx.Mass : 0.4 kg

Approx.Mass : 0.5 kg

Itmes	Specifications	
	5 Slots	8 Slots
Model	JEPMC-BUB3005-E	JEPMC-BUB3008-E
Abbraviation	MBU-B05	MBU-B08
Number of Slots	5	8
Attachable Modules	Optional modules	

Sub CPU Module (MPU-01)

Model: JAPMC-CP2700-E
Approx. Mass : 86 g

Itmes	Specifications
Motion Network	MECATROLINK-Ⅲ ×1 port
Max. Number of Controlled Axes	16 axes
High-speed Scan	0.25 ms, 0.5 to 32.0 ms (in units of 0.5 ms)
Low-speed Scan	2.0 to 300.0 ms (in units of 0.5 ms)
Program Memory Capacity	11.5 MB

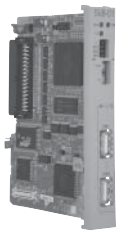
Motion Control Modules

● MECHATROLINK-Ⅲ Motion Control Module (SVC-01)

Model: JAPMC-MC2320-E
Approx. Mass: 70 g

Items	Specifications
Communication Circuits	1 circuit
Communication Ports	2 ports
Terminator	Not required
Transmission Speed	100 Mbps
Communication Cycle	125μs, 250μs, 500μs, 1ms
Number of Connecting Stations	21 stations (16 axes for servo drives)/1 ms, 14 stations (14 axes for servo drives) /500μs, 8 stations (8 axes for servo drives) /250μs, 4 stations (4 axes for servo drives) /125μs
Retry Function	Available with MECHATROLINK-Ⅲ
Slave Function	Not available
Transmission Distance	Distance between stations : 20 cm to 100 m

● MECHATROLINK-Ⅱ Motion Control Module (SVB-01)

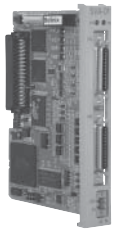


Model: JAPMC-MC2310-E
Approx. Mass: 80 g

Items	Specifications
Communication Circuits	1 circuit
Communication Ports	2 ports
Terminator	External resistor (JEPMC-W6022 required)
Transmission Speed	10 Mbps
Communication Cycle	0.5 ms, 1 ms, 1.5 ms, 2 ms
Number of Connecting Stations*	21 stations (16 axes for servo drives) /2 ms, 15 stations (15 axes for servo drives) /1.5 ms, 9 stations (9 axes for servo drives) /1 ms, 4 stations (4 axes for servo drives) /0.5 ms
Retry Function	Available with MECHATROLINK-Ⅱ
Slave Function	Available with MECHATROLINK-Ⅱ
Transmission Distance	See "MECHATROLINK-Ⅱ Repeater" on page 49.

∗: MECHATROLINK-Ⅱ (32-byte mode)

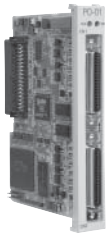
● Analog Output Motion Control Module (SVA-01)



Model: JAPMC-MC2300
Approx. Mass: 100 g

Items	Specifications
Number of Controlled Axes	2
Analog Output	2 channels/1 axis, −10 V to +10 V, 16-bit D/A
Analog Input	2 channels/1 axis, −10 V to +10 V, 16-bit A/D
Pulse Input	1 channel/1 axis, 5-V differential inputs, phase A/B pulse, and 4 Mpps (16 Mpps with 4 multipliers)
Input Signals	6 points/1 axis, 24 VDC, 4 mA, and source mode or sink mode input
Output Signals	6 points/1 axis, 24 VDC, 100 mA, open collector, and sink mode output

● Pulse Output Motion Control Module (PO-01)

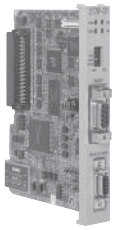


Model: JAPMC-PL2310-E
Approx. Mass: 100 g

Items	Specifications
Number of Controlled Axes	4
Pulse Output	Output Method : CW/CCW, sign + pulse, and phase A/B Maximum Frequency: 4 Mpps with CW/CCW or sign + pulse, 1 Mpps with phase A/B (before multiplication) Interface : 5-V differential outputs
Digital Input	5 points × 4 channels, source mode input DI_0 : Separate for each power supply··· 5 V/3.9 mA, 12 V/10.9 mA, 24 V/4.1 mA DI_1 to DI_4 : Power supply shared ··· 24 V/4.1 mA
Digital Output	4 points × 4 channels Open collector (sink mode) output (24 V/100 mA)
Current Consumption	5 V, 1.0 A max.

Communication Modules

● General-purpose Serial Communication Module (217IF-01)



Model: JAPMC-CM2310-E
Approx. Mass: 100 g

For RS-232C Communication

Items	Specifications
Interface	One port
Connector	D-sub 9 pins (Female)
Max. Transmission Distance	15 m
Max. Transmission Speed	76.8 kbps
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

For RS-422/485 Communication

Items	Specifications
Interface	One port (RS-422 or -485)
Connector	MDR 14 pins (Female)
Max. Transmission Distance	300 m
Max. Transmission Speed	76.8 kbps
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1 (RS-422), 1: N (RS-485)
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

Optional Modules

● Ethernet Communication Module (218IF-01/02)

218IF-01 Module
Model: JAPMC-CM2300-E
Approx. Mass: 90 g

218IF-02 Module
Model: JAPMC-CM2302-E
Approx. Mass: 90 g

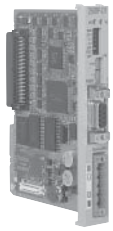
For Ethernet Communication

Items	Specifications
Interface	One port (10BASE-T for 218 IF-01, 100BASE-TX/10BASE-T for 218 IF-02) (RJ-45 modular jack)
Max. Segment Length	100 m
Transmission Speed	218IF-01: 10 Mbps, 218IF-02: 100 Mbps/10 Mbps
Access Mode	IEEE802.3
Connections	TCP/UDP/IP/ARP/ICMP
Max. Number of Words in Transmission	218IF-01: 510 words, 218IF-02: 2044 words
Communication Protocols	Extended MEMOBUS, MEMOBUS, MELSEC (A-compatible 1E frame), Non-procedure, MODBUS/TCP
Max. Number of Connections	20 stations

For RS-232C Communication

Items	Specifications
Interface	One port
Connector	D-sub 9 pins (Female)
Max. Transmission Distance	15 m
Max. Transmission Speed	19.2 kbps (Using 218IF-01), 115.2 kbps (Using 218IF-02)
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

● DeviceNet Communication Module (260IF-01)



Model: JAPMC-CM2320-E
Approx. Mass: 90 g

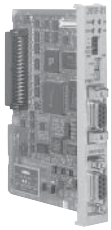
For DeviceNet Communication

Items		Specifications
Number of Circuits		1
Applicable Communication		Conforms to DeviceNet • I/O transmission (polled I/O and bit-strobed I/O) • Explicit messaging
I/O Communication	Max. Number of Slaves	63 nodes
	Max. I/O Bytes	1024 bytes, 256 bytes per node
Message Communication (Only for Master)	Max. Number of Nodes	63 nodes Synchronous communications possible: 8 nodes
	Max. Message Length	256 bytes
	Executed Functions	MSG-SND function
Switches on the Front		Two rotary switches: Node address settings DIP switch: Settings for transmission speed and switching master or slave
Indicators		2 LEDs: MS and NS
Power Voltage for Communication		24 VDC ±10% (Using the specially designed cable)
Max. Current Consumption		Communication power: 45 mA (Supplied by transmission connectors)

For RS-232C Communication

Items	Specifications
Interface	One port
Connector	D-sub 9 pins (Female)
Max. Transmission Distance	15 m
Max. Transmission Speed	19.2 kbps
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

● PROFIBUS Communication Module (261IF-01)



Model: JAPMC-CM2330-E
Approx. Mass: 90 g

For PROFIBUS Communication

Items	Specifications
Functions	DP slave, Cyclic communication (DP standard function)
Transmission Speed	12 M/6 M/4 M/3 M/1.5 M/750 k/500 k/187.5 k/93.75 k/19.2 k/9.6 kbps (Automatic detection)
Configuration	By PROFIBUS Master
Slave Address	1 to 64
I/O Processing	Total capacity of IW/OW registers: 64 words Max. I/O allocation (IN and OUT each): 64 words
Diagnostic Functions	Display for status and slave status using the EWS. I/O error display for SW registers.

For RS-232C Communication

Items	Specifications
Interface	One port
Connector	D-sub 9 pins (Female)
Max. Transmission Distance	15 m
Max. Transmission Speed	19.2 kbps
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

● FL-net Communication Module (262IF-01)

Model: JAPMC-CM2303-E
Approx. Mass: 80 g

For 262IF-01 Communication

Items			Specifications	
FL-net Transmission	Transmission Specifications*1	Interface	100BASE-TX	10BASE-T
		Transmission Mode	Full duplex or half duplex	
		Transmission Speed	100 Mbps	10 Mbps
		Max. Segment Length	100 m between hub and nodes if UTP cables are used	
		Connector	RJ-45 connector	
		Auto Negotiation	Supported (Transmission speed and communication mode cannot be fixed.)	
	Cyclic Communication Specifications	Max. Number of Nodes	254 nodes max. if repeaters are used (Only 64 nodes, including the local node, can be allocated.)*2	
		Data Size	Max. data size within network Area 1 (Bit data) : 8 kbits Area 2 (Word data) : 8 kwords Max. data size per station (node) Area 1 + Area 2 : 8 kbits + 8 kwords can be allocated.	
		Media Access Control Method	N : N	
	Message Communication Specifications	Number of Message Channels	10	
		Engineering Communication	None	
		Message Service	Read Word Block, Write Word Block, Read Network Parameter, Write Network Parameter*3, Change Other Node to Stop Mode*3, Change Other Node to Run Mode*3, Read Profile, Transmissive Message, Read Log Data, Clear Log Data, Return Message	
		Number of Transmission Words	512 words max.	

∗1 : Conforms to Ethernet specifications
∗2 : The number of nodes that the 262IF-01 can allocate to I/O is limited to 64, including the local node, in accordance with the specifications of the MP series Machine Controllers.
∗3 : Supported by client nodes only. (In FL-net communications, the node sending data is called the client, and the node receiving data is called the server.)

Optional Modules

● EtherNet / IP Communication Module (263IF-01)

Model: JAPMC-CM2304-E
Approx. Mass: 80 g

For 263IF-01 Communication

Items			Specifications	
EtherNet / IP Transmission	Transmission Specifications*1	Interface	100BASE-TX	10BASE-T
		Transmission Mode	Full duplex or half duplex	
		Transmission Speed	100 Mbps	10 Mbps
		Max. Segment Length	100 m between hub and nodes if UTP cables are used	
		Connector	RJ-45 connector	
		Auto Negotiation	Supported (Transmission speed and communication mode cannot be fixed.)	
	I/O Communication Specifications	Max. Number of Connectable I/O Devices	64 units (Does not include the devices used for explicit message communication)*2	
		Max. Number of I/O Bytes	Max. Number of I/O Bytes within the network Inputs/outputs : 8192 bytes each per system (Total number of bytes of I/O data exchanged among all connected devices) Inputs/outputs : 500 bytes each per device	
		Communication Mode	Scanner and adapter	
	Explicit Message Communication Specifications	Max. Number of Connectable Devices for Explicit Message Communication	64 units (Number of devices that can communicate simultaneously : 10)*2	
		Number of Message Channels	10	
		Max. Number of Message Bytes	504 bytes	
		Communication Mode	Client and server	
		Connection Type	Unconnected type (UCMM) When the module functions as a server, connected type (class 3) is also supported.	

∗1 : Conforms to Ethernet specifications
∗2 : Max. Number of connectable devices is based on the specifications of the MP series Machine Controllers.

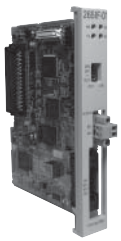
● EtherCAT Communication Module (264IF-01)

Model : JAPMC-CM2305-E
Approx. Mass : 100 g

For 264IF-01 Communication

Items			Specifications
EtherCAT Transmission	Transmission Specifications	Transmission Mode	Full duplex
		Transmission Speed	100 Mbps
		Distance between Nodes	100 m
		Connector	RJ-45 connector, 2 ports (1 circuit)
		Cable	CAT 5e STP cable Straight or cross cable
		Topology	Line topology (structure)
		Functions	As a slave station of EtherCAT
		Address	Automatic allocation by Master
	Process Data Communications (Cyclic)	Supported Protocol	EtherCAT standard (Protocols such as CoE, SoE, and VoE are not supported.)
		Data Size	Input data : 198 words max. Output data : 198 words max. Input data + Output data : 200 words max. in total
		Media Access Control Method	Between master and slave (1 : 1)
		Communication Cycle	According to the configuration of Master
	Mailbox Communication (Message)	Supported Protocol	EtherCAT standard (Protocols such as CoE, EoE, FoE, SoE, and VoE are not supported.)
		Message Service	System message only (Cannot use user messages such as read/write memory.)

● CompoNet Communication Module (265IF-01)

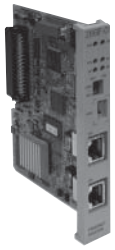


Model: JAPMC-CM2390-E
Approx. Mass: 80 g

For CompoNet Communication

Items		Specifications
Number of Circuits		1
Applicable Communication		I/O communication, message communication
Transmission Speed		4 Mbps, 3 Mbps, 1.5 Mbps, 93.75 kbps
Master/Slave		Master
Conditions of Use for Repeater Units		Up to 64 units can be connected in one network. Lines can be extended a maximum of two levels from the master unit using repeater units.
I/O Communication	Max. Number of Slaves	384 nodes
	Max. I/O Bytes	32 bytes per node
Message Communication	Max. Number of Nodes	384 nodes Synchronous communications possible: 10 nodes
	Max. Message Length	256 bytes
	Executed Functions	MSG-SND function
Switches on the Front		DIP switch: Transmission speed
Indicators		4 LEDs: MS, NS, TX, RX
Power Voltage for Communication		24 VDC ±10% (Using the specially designed cable)

● PROFINET Communication Master Module (266IF-01)*



Model: JAPMC-CM2306-E
Approx. Mass: 100 g

For PROFINET Communication

Items	Specifications
Real-time Class	Class 1 and class 2
PROFINET IO Conformance Class	Class A
Transmission Speed	100 Mbps
Max. Transmission Distance	100 m/segment (between nodes)
Max. Number of Connecting Stations	128
Communication Cycle	1, 2, 4, 8, 16, 32, 64, 128, 256, or 512 (unit: ms)
Max. Transmission Size	1024 bytes/station Input: 5712 bytes; Output: 5760 bytes

*: Estimates are required before ordering this product. Contact your Yaskawa representative for more information.

● PROFINET Communication Slave Module (266IF-02)

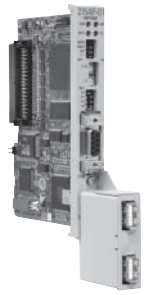
Model: JAPMC-CM2307-E
Approx. Mass: 100 g

For PROFINET Communication

Items	Specifications
Real-time Class	Class 1, class 2, and class 3
PROFINET IO Conformance Class	Class A
Transmission Speed	100 Mbps
Max. Transmission Distance	100 m/segment (between nodes)
Max. Number of Connecting Stations	–
Communication Cycle	Same as master module
Max. Transmission Size	Input: 512 bytes; Output: 512 bytes

Optional Modules

● MPLINK Communication Module (215AIF-01 MPLINK)



Model: JAPMC-CM2360-E
Approx. Mass: 130 g

For MPLINK Communication

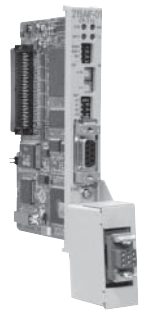
Items	Specifications
Transmission Method	MPLINK
Interface	One port
Connector	USB port with T-branch connector*
Cable	MECHATROLINK cable (JEPMC-W6002-□□)
Transmission Speed	10 Mbps
Max. Transmission Distance	50 m: 16 stations 100 m: 32 stations (With MECHATROLINK-Ⅱ JEPMC-REP2000 repeater)
Max. Number of Words in Link Transmission	4096 words per circuit. 1024 words per station.
Media Access Control Method	N : N
Max. Number of Connecting Stations	16 stations (32 stations with repeater)
Relay Function	Available

*: A T-branch connector is included in the package. Spares can also be ordered separately. (Model: JEPMC-OP2310)

For RS-232C Communication

Items	Specifications
Interface	One port
Connector	D-sub 9 pins (Female)
Max. Transmission Distance	15 m
Max. Transmission Speed	19.2 kbps
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

● CP-215 Communication Module (215AIF-01 CP-215)



Model: JAPMC-CM2361-E*1
Approx. Mass: 130 g

For RS-232C Communication

Items	Specifications
Transmission Method	CP-215
Interface	One port
Connector	USB port with MR connector converter*2
Cable	No ready-made cable available. See page 61 for details on cable specifications.
Transmission Speed	2 Mbps / 4 Mbps
Max. Transmission Distance	270 m at 2 Mbps and 170 m at 4 Mbps.
Max. Number of Words in Link Transmission	2048 words per circuit. 512 words per station.
Media Access Control Method	N : N
Max. Number of Connecting Stations	32 stations (64 stations with repeater)
Relay Function	Available

*1 : Cannot be mounted in the slot to the left of 260IF-01. JAPMC-CM2361 modules cannot be mounted side by side.
*2 : An MR connector converter is included in the package. Spares can also be ordered separately. (Model: JEPMC-OP2320)

For RS-232C Communication

Items	Specifications
Interface	One port
Connector	D-sub 9 pins (Female)
Max. Transmission Distance	15 m
Max. Transmission Speed	19.2 kbps
Access Mode	Asynchronous (Start-stop synchronization)
Communication Protocols	MEMOBUS (Master or Slave), MELSEC (A-compatible 1C frame, type:1), OMRON (only for host mode), Non-procedure
Media Access Control Method	1:1
Transmission Format (Can be set)	Data bit length: 7 or 8 bits Stop bits: 1 or 2 bits Parity bits: Even, odd, or none

I/O Modules

● I/O Modules (LIO-01/-02)

LIO-01 Module
Model: JAPMC-IO2300-E
Approx. Mass: 80 g

LIO-02 Module
Model: JAPMC-IO2301-E
Approx. Mass: 80 g

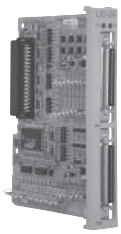
Digital I/O for LIO-01/-02 Modules

Items	Specifications
Input Signals	16 points (All connected) and 24 VDC ±20%, 5 mA (TYP) Sink mode or source mode input and photocoupler isolation Min. ON voltage/current: 15 V/1.6 mA Max. OFF voltage/current: 5 V/1.0 mA Max. Response time: OFF→ON 1 ms and ON→OFF 1 ms Interruption (DI-00): DI-00 can be used for interruptions. If an interruption is enabled, the interrupt drawing is started when DI-00 is set to ON. Pulse latch (DI-01): DI-01 can be used for pulse latching. If pulse latching is enabled, the pulse counter is latched when DI-01 is set to ON.
Output Signals	16 points (All connected) and 24 VDC ±20%, 100 mA max. Open collector: sink mode output (LIO-01 module) source mode output (LIO-02 module) Photocoupler isolation and Max. OFF current: 0.1 mA Max. Response time: OFF→ON 1 ms and ON→OFF 1 ms Output protection : Fuse (for protection against fires caused by an overcurrent when outputting after a short circuit occurred) If circuit protection is required, provide a fuse for each output circuit.

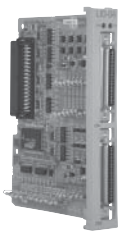
Pulse Input for LIO-01/-02 Modules

Items	Specifications
Number of Channels	1 (Phase A, B, or Z input)
Input Circuit	Phase A/B: 5 V differential inputs, no insulation, and max. frequency 4 MHz Phase Z: 5 V/12 V photocoupler inputs and max. frequency 500 kHz
Input Method	A/B (1,2, or 4 multipliers), sign (1 or 2 multipliers), UP/DOWN (1 or 2 multipliers)
Latch Input	Pulse latch with phase Z or DI-01 Max. Response time: 5µs when input with phase Z; 60µs when input with DI-01
Others	Coincident detection; Preset and clear functions for counter values

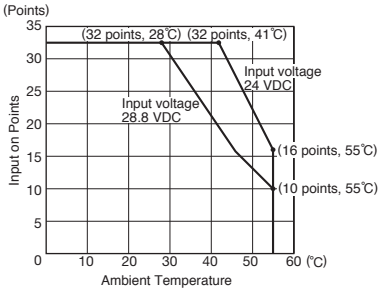
● I/O Modules (LIO-04/-05)



LIO-04 Module
Model: JAPMC-IO2303-E
Approx. Mass: 80 g

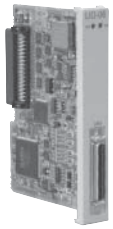


LIO-05 Module
Model: JAPMC-IO2304-E
Approx. Mass: 80 g

Items	Specifications
Input Signals	32 points (8 points connected) and 24 VDC ±20%, 5 mA (TYP) Sink mode or source mode input and photocoupler isolation Min. ON voltage/current: 15 V/1.6 mA Max. OFF voltage/current: 5 V/1.0 mA Max. Response time: OFF→ON 0.5 ms and ON→OFF 0.5 ms Interruption (DI-00, DI-01, DI-16, DI-17): DI-00, DI-01, DI-16, and DI-17 can be used for interruptions. If an interruption is enabled, the interrupt drawing is started when DI-00, DI-01, DI-16, or DI-17 is set to ON. Note: See right for the derating conditions.  Number of Input ON Points, Temperature Derating
Output Signals	32 points (8 points connected) and 24 VDC ±20%, 100 mA max. Open collector: sink mode output (LIO-04 module), source mode output (LIO-05 module) Photocoupler isolation and Max. OFF current: 0.1 mA Max. Response time: OFF→ON 0.5 ms and ON→OFF 1 ms Output protection: Fuse (for protection against fires caused by an overcurrent when outputting after a short circuit occurred) If circuit protection is required, provide a fuse for each output circuit.

Optional Modules

● I/O Module (LIO-06)



Model: JAPMC-IO2305-E
Approx. Mass: 80 g

LIO-06 Module Specifications

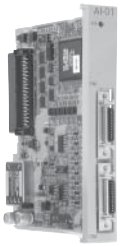
Items		Specifications
Digital Input Signals	Number of Input Points	8
	Input Method	Sink mode/source mode
	ON Voltage/Current	15 VDC min./2 mA min.
	OFF Voltage/Current	5 VDC max./1 mA max.
	Max. Response Time	OFF→ON: 0.5 ms max., ON→OFF: 0.5 ms max.
	Number of Common Points	1
Digital Output Signals	Number of Output Points	8
	Output Method	Sink mode
	External Voltage	19.2 VDC to 28.8 VDC
	Output Current	100 mA/point
	ON Voltage	1 V max.
	Current Leakage while OFF	0.1 mA max.
	Max. Response Time	OFF→ON: 0.25 ms max., ON→OFF: 1 ms max.
	Number of Common Points	1
Analog Input Signals	Analog Input Range	−10 V to +10 V
	Number of Channels	1
	Input Impedance	Approx. 20 kΩ
	Input Voltage Characteristics	±10 V (±31276) Resolution: 16 bits
Analog Output Signals	Analog Output Range	−10 V to +10 V
	Number of Channels	1
	Output Voltage Characteristics	±10 V (±31276) Resolution: 16 bits
Pulse Counter	Number of Channels	1
	Counter Mode	Reversible counter
	A/B Pulse Signal Form	5-V differential input
	A/B Pulse Signal Polarity	Positive logic/negative logic
	Pulse Counting Methods	Sign (Multiplier: 1 or 2) UP/DOWN (Multiplier: 1 or 2) A/B pulse (Multiplier: 1, 2, or 4)
	Max. Frequency	4 MHz
	Number of Latch Input Points	Can be selected from two points (Phase-Z latch or DI latch)
	Coincidence Detection Function	Available (Output terminal: DO_07)
	Coincident Interruption	Available

● Output Module (DO-01)

Model: JAPMC-DO2300-E
Approx. Mass: 80 g

Items	Specifications
Number of Output Points	64
Output Method	Transistor or open collector: sink mode output
Isolation	Photocoupler isolation
Output Voltage	24 VDC (19.2 V to 28.8 V)
Max. Output Current	100 mA
Max. OFF Current	0.1 mA
Max. Response Time	OFF→ON: 0.5 ms / ON→OFF: 1 ms
Number of Common Points	8
Protective Circuit	Fuse for common circuits
Fuse Rating	1 A
Error Detection	Fuse blowout detection

● Analog Input Module (AI-01)



Model: JAPMC-AN2300-E
Approx. Mass: 100 g

Items	Specifications	
Analog Input Range	− 10 V to +10 V	0 mA to 20 mA
Number of Channels	8 [(4 channels/connector)×2]	
Number of Channels to be Used	1 to 8	
Isolation	Between channels: Not isolated, Between input connector and system power supply: Photocoupler isolation	
Max. Rated Input	±15 V	±30 mA
Input Impedance	20 kΩ	250Ω
Resolution	16 bits (−31276 to +31276)	15 bits (0 to +31276)
Accuracy (0°C to 55°C)	±0.3% (±30 mV)*	±0.3% (±0.06 mA)*
Input Conversion Time	1.4 ms max.	
Current Consumption	5 V, 500 mA	

∗: After offset and gain adjustment by MPE720.

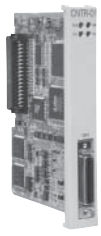
● Analog Output Module (AO-01)

Model: JAPMC-AN2310-E
Approx. Mass: 90 g

Items		Specifications	
Number of Channels		4	
Number of Channels to be Used		1 to 4	
Isolation		Between channels: Not isolated, Between input connector and system power supply: Photocoupler isolation	
Analog Output Range		−10 V to +10 V	0 V to +10 V
Resolution		16 bits (−31276 to +31276)	15 bits (0 to +31276)
Maximum Allowable Load Current		±5 mA	
Accuracy	25°C	±0.1% (±10 mV)	
	0°C to 55°C	±0.3% (±30 mV)	
Output Delay Time		1.2 ms*	
Current Consumption		5 V, 800 mA max.	

∗: After change with a full scale of −10 V to +10 V.

● Counter Module (CNTR-01)



Model: JAPMC-PL2300-E
Approx. Mass: 85 g

Items	Specifications
Number of Channels	2
Input Circuit (Selected by software)	5-V differential: 4-MHz response frequency (RS-422, not isolated) 12 V: 120-kHz response frequency (12 V, 7 mA, current source mode input, and photocoupler isolation)
Input Method	A/B (1, 2, or 4 multipliers), UP/DOWN (1 or 2 multipliers), and sign (1 or 2 multipliers)
Counter Functions	Reversible counter, interval counter, and frequency measurement
Maximum Frequency	4 MHz with 5-V differential input (16 MHz with 4 multipliers)
Coincident Interruption	Simultaneous output to CPU module via system bus and output module.
Coincident Output	2 points, 24 V, 50 mA current sink mode input, and photocoupler isolation
DO Output	2 points, 24 V, 50 mA, current sink mode input, and photocoupler isolation (zone output, speed-coincidence output, and frequency-coincidence output)
PI Latch Input	2 points, 24 V, source mode input, and photocoupler isolation
Current Consumption	5 V, 600 mA

Optional Modules

MECHATROLINK-Ⅲ Compatible Modules

● Hub Module

Model : JEPMC-MT2000-E
Approx. Mass : 800 g

Items	Specifications
Data Transfer Method	MECHATROLINK-Ⅲ
Transmission Speed	100 Mbps
Transmission Medium	MECHATROLINK-Ⅲ cable, model : JEPMC-W6012-□□-E
Number of MECHATROLINK Ports	Master-side port : 1 (CNM1) to connect the master station Slave-side port : 8 (CNS1 to CNS8) to connect slave stations
Arbitration	FIFO arbitration discipline Error when multiple slave-side ports receive data at the same time
Transmission Delay Time between Ports	600 ns (typ)
Indicators	1 indicator for power supply ON/OFF, 9 indicators for port link status
External Power Supply	24 VDC (±20%), 0.5 A (CN1)
Installation Orientation	Vertical or horizontal
Exterior	Painted

● 64-point I/O Module

Model : JEPMC-MTD2310-E
Approx. Mass : 550 g

Items	Specifications
I/O Signals	Input: 64 points, 24 VDC, 5 mA, sink/source mode input Output: 64 points, 24 VDC, 50 mA when all points ON* sink mode output
Module Power Supply	24 VDC (20.4 V to 28.8 V) Rated current: 0.5 A

∗ : The max. rating is 100 mA per point (depending on derating conditions).

● Pulse Input Module (MTP2900)

Model : JEPMC-MTP2900-E
Approx. Mass : 300 g

Items		Specifications
Pulse Input	Number of Channels	2
	Input Circuit (Selected by software)	5-V differential: 4-MHz response frequency (RS-422, not isolated) 12 V: 120-kHz response frequency (12 V, 7 mA, current source mode input, and photocoupler isolation)
	Input Method	A/B (1, 2, or 4 multipliers), UP/DOWN (1 or 2 multipliers), and sign (1 or 2 multipliers)
	Counter Functions	Reversible counter, interval counter, and frequency measurement
	Maximum Frequency	4 MHz with 5-V differential input (16 MHz with 4 multipliers)
	Coincident Output	2 points, 24 V, 50 mA current sink mode input, and photocoupler isolation
	DO Output	2 points, 24 V, 50 mA, current sink mode input, and photocoupler isolation (zone output, speed-coincidence output, and frequency-coincidence output)
	PI Latch Input	2 points, 24 V, source mode input, and photocoupler isolation
Input Method		Sign, UP/DOWN and A/B pulse
Motion Network		Two circuits for MECHATROLINK-Ⅲ Transmission speed : 100 Mbps Transmission distance : 20 cm to 100 m Terminator : not required
Module Power Supply		24 VDC (20.4 V to 28.8 V), 500 mA

● Pulse Output Module (MTP2910)

Model : JEPMC-MTP2910-E
Approx. Mass : 300 g

Items		Specifications
Pulse Output	Number of Controlled Axes	4
	Pulse Output	Output Method : CW/CCW, sign + pulse, and phase A/B Maximum Frequency : 4 Mpps with CW/CCW or sign + pulse, 1 Mpps with phase A/B (before multiplication) Interface : 5-V differential outputs
	Digital Input	5 points × 4 channels, source mode input DI_0 : Separate for each power supply··· 5 V/3.9 mA, 12 V/10.9 mA, 24 V/4.1 mA DI_1 to DI_4: Power supply shared ··· 24 V/4.1 mA
	Digital Output	4 points × 4 channels Open collector and sink mode output (24 V/100 mA)
Motion Network		Two circuits for MECHATROLINK-Ⅲ Transmission speed : 100 Mbps Transmission distance : 20 cm to 100 m Terminator : not required
Module Power Supply		24 VDC (20.4 V to 28.8 V), 500 mA

● Analog Input Module (MTA2900)

Model : JEPMC-MTA2900-E
Approx. Mass : 300 g

Items		Specifications	
Analog Input	Analog Input Range	−10 V to +10 V	0 mA to 20 mA
	Number of Channels	8 [(4 channels/connector)×2]	
	Number of Channels to be Used	1 to 8	
	Isolation	Between channels: Not isolated	
	Max. Rated Input	±15 V	±30 mA
	Input Impedance	20 kΩ	250Ω
	Resolution	16 bits (−31276 to +31276)	15 bits (0 to +31276)
	Accuracy (0°C to 55°C)	±0.3% (±30 mV)	±0.3% (±0.06 mA)
	Input Conversion Time	1.4 ms max.	
Motion Network		Two circuits for MECHATROLINK-Ⅲ Transmission distance : 20 cm to 100 m	Transmission speed : 100 Mbps Terminator : not required
Module Power Supply		24 VDC (20.4 V to 28.8 V), 500 mA max.	

● Analog Output Module (MTA2910)

Model : JEPMC-MTA2910-E
Approx. Mass : 300 g

Items			Specifications	
Analog Output	Analog Output Range		−10 V to +10 V	0 V to +10 V
	Number of Channels		4	
	Number of Channels to be Used		1 to 4	
	Isolation		Between channels: Not isolated	
	Resolution		16 bits (−31276 to +31276)	15 bits (0 to +31276)
	Maximum Allowable Load Current		±5 mA	
	Accuracy	25°C	±0.1% (±10 mV)	
		0°C to 55°C	±0.3% (±30 mV)	
	Output Delay Time		1.2 ms*	
Motion Network			Two circuits for MECHATROLINK-Ⅲ Transmission distance : 20 cm to 100 m	Transmission speed : 100 Mbps Terminator : not required
Module Power Supply			24 VDC (20.4 V to 28.8 V), 500 mA max.	

*: After change with a full scale of −10 V to +10 V.

● Network Analyzer Module

Model : JEPMC-MT2010-E
Approx. Mass : 270 g

Traces the data sent or received through MECHATROLINK-Ⅲ communication (cyclic communication).

Items	Specifications
Power Supply	Input supply voltage : 24 VDC ±20% Current consumption : 1 A max. Inrush current : 40 A
Motion Network	Two circuits for MECHATROLINK-Ⅲ (To be connected to the end of network connection.) Transmission speed : 100 Mbps (MECHATROLINK-Ⅲ) Transmission distance : 20 cm to 100 m Terminator : not required
Communication Ports	1 port (Ethernet : 100BASE-TX/10BASE-T)

Note : Requires the network analyzer tool (model : CMPC-NWAN710) for settings and operation.

● Network Adapter Module

Model : JEPMC-MT2020-E
Approx. Mass : 270 g

Relays MECHATROLINK-Ⅲ messages from Ethernet port to MECHATROLINK-Ⅲ network.

Items	Specifications
Power Supply	Input supply voltage : 24 VDC±20% Current consumption : 1 A max. Inrush current : 40 A
Motion Network	Two circuits for MECHATROLINK-Ⅲ (To be connected to the end of network connection.) Transmission speed : 100 Mbps (MECHATROLINK-Ⅲ) Transmission distance : 20 cm to 100 m Terminator : not required
Communication Ports	1 port (Ethernet : 100BASE-TX/10BASE-T)

Note : Requires the adapter tool (model : CMPC-NWAD710) for settings and operation.
The adapter tool is available for free. Download it from Yaskawa's Product and Technical Information on Yaskawa's website at http://www.e-mechatronics.com/en/.

Optional Modules

I/O Modules for MECHATROLINK-Ⅱ

● 64-point I/O Modules (IO2310/IO2330)

Model: JEPMC-IO2310
Approx. Mass: 590 g

Model: JEPMC-IO2330
Approx. Mass: 590 g

Items	Specifications
I/O Signals	Input: 64 points, 24 VDC, 5 mA, sink/source mode input Output: 64 points, 24 VDC, 50 mA sink mode output (IO2310), source mode output (IO2330) Signal connection method: Connector (FCN360 series)
Module Power Supply	24 VDC (20.4 V to 28.8 V) Rated current: 0.5 A, Inrush current: 1 A

● Various I/O Modules

Model: JEPMC-PL2900/PL2910,
JEPMC-AN2900/AN2910
Approx. Mass: 300 g

Model: JAMSC-IO2900-E/-IO2910-E,
JAMSC-IO2920-E/-IO2950-E
Approx. Mass: 300 g

Counter Module (PL2900)

Model	JEPMC-PL2900
Number of Input Channels	2
Functions	Pulse counter, notch output
Pulse Input Method	Sign (1/2 multipliers), A/B (1/2/4 multipliers) , UP/DOWN (1/2 multipliers)
Max. Counter Speed	1200 kpps (4 multipliers)
Pulse Input Voltage	3/5/12/24 VDC
External Power Supply	For input signal: 24 VDC For driving load: 24 VDC For module: 24 VDC (20.4 V to 26.4 V) 150 mA max.

Pulse Output Module (PL2910)

Model	JEPMC-PL2910
Number of Output Channels	2
Functions	Pulse positioning, JOG run, zero-point return
Pulse Output Method	CW, CCW pulse, sign + pulse
Max. Output Speed	500 kpps
Pulse Output Voltage	5 VDC
Pulse Interface Circuit	Open collector output 5 VDC,10 mA/circuit
External Control Signal	Digital input: 8 points/module 5 VDC ×4 points, 24 VDC×4 points Digital output: 6 points/module 5 VDC ×4 points, 24 VDC×2 points

Analog Input Module (AN2900)
Analog Output Module (AN2910)

Model	JEPMC-AN2900	JEPMC-AN2910
Number of Input/Output Channels	Input : 4	Output : 2
Input/Output Voltage Range	Input : −10 V to +10 V	Output : −10 V to +10 V
Input Impedance	1 MΩ min.	–
Max. Allowable Load Current	–	±5 mA (2 MΩ)
Data Region	−32000 to +32000	
Input/Output Delay Time	Input : 4 ms max.	Output : 1 ms max.
Error	+0.5% F.S (at 25°C), ±1.0% F.S (at 0°C to 60°C)	+0.2% F.S (at 25°C), ±0.5% F.S (at 0°C to 60°C)
External Power Supply	24 VDC (20.4 V to 26.4 V), 180 mA max.	

16-point Input Module (IO2900-E)
16-point Output Module (IO2910-E)

Model	JAMSC-IO2900-E	JAMSC-IO2910-E
Number of Input/Output Points	Input : 16	Output : 16
Rated Voltage	12/24 VDC	
Rated Current	2 mA/5 mA	0.3 A
Input/Output Method	Input : sink/source mode input	Output : sink mode output
External Power Supply	24 VDC (20.4 V to 28.8 V), 90 mA	24 VDC (20.4 V to 28.8 V), 110 mA

8-point I/O Module (IO2920-E)

Model	JAMSC-IO2920-E
Number of I/O Points	Input : 8, Output : 8
Rated Voltage	12/24 VDC
Rated Current	Input : 2 mA/5 mA Output : 0.3 A
Input/Output Method	Input : sink/source mode input Output : sink mode output
External Power Supply	24 VDC (20.4 V to 28.8 V), 90 mA

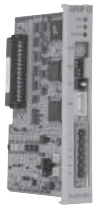
Relay Output Module (IO2950-E)

Model	JAMSC-IO2950-E
Number of Output Points	8
Rated Voltage	12/24 VDC, 100/200 VAC
Rated Current	1.0 A
Output Method	Contact output
External Power Supply	24 VDC (20.4 V to 28.8 V), 150 mA

Other Manufacturer Modules

● AnyWire DB Master

Made by Anywire Corporation



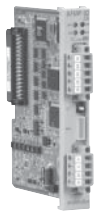
Model: AFMP-01
Approx. Mass: 90 g

Items	Specifications			
Transmission Clock	7.8 kHz	15.6 kHz	31.3 kHz	62.5 kHz
Max. Transmission Distance	1 km	500 m	200 m	100 m
Transmission Protocol	Special protocol (Anywire Bus DB protocol) Note: Upper compatibility with UNI-WIRE protocol			
Max. Number of I/Os	Full triple mode: 2304 points (Bit-Bus: 256 points, Word-Bus: 2048 points) Full quadruple mode: 2560 points (Bit-Bus: 512 points, Word-Bus: 2048 points)			
Dual-Bus Function	Bit-Bus Full triple mode: 256 bits max., Full quadruple mode: 512 bits max. Word-Bus Full triple mode: 128 words max. (64 words each for IN and OUT), Full quadruple mode: 128 words max. (64 words each for IN and OUT)			
Max. Number of Stations	128 stations (Fan-out = 200) Note: Anywire DB products: Fan-in = 1, UNI-WIRE products: Fan-in = 10			
Connection Cable	General-purpose 2-wire cable or 4-wire cable (VCTF 0.75 sq to 1.25 sq) Special flat cable (0.75 sq), general purpose wire (0.75 sq to 1.25 sq)			

● CC-Link Interface Board

Made by Anywire Corporation

Model: AFMP-02-C
Approx. Mass: 90 g



Model: AFMP-02-CA
Approx. Mass: 90 g

Items		Specifications	AFMP -02-C	AFMP -02-CA
CC-Link Specifications	Station Type	Remote device station	●	●
	Number of Stations	4	●	●
	No. of Remote Stations	Station number setting range: 1 to 61 (4 stations are occupied after setting the number of stations)	●	●
	No. of Remote Device Points	Input: Max. 896 points, Output: Max. 896 points (Version 2.0 with 8 times setting) Input: Max. 112 points, Output: Max. 112 points (Version 1.1)	●	●
	No. of Remote Register Points	Input: Max. 128 points, Output: Max. 128 points (Version 2.0 with 8 times setting) Input: Max. 16 points, Output: Max. 16 points (Version 1.1)	●	●
	Transmission Speed	10 M, 5 M, 2.5 M, 625 k, and 156 kbps (Select with the switch.)	●	●
	Transmission Distance	100 m (10 Mbps), 160 m (5 Mbps), 400 m (2.5 Mbps), 900 m (625 kbps), and 1200 m (156 kbps)	●	●
	No. of CC-Link that can be connected	(1×a) + (2×b) + (3×c) + (4×d) ≦ 64 [a: Number of slave products that occupy one station, b: Number of slave products that occupy two stations, c: Number of slave products that occupy three stations, d: Number of slave products that occupy four stations] (16 × A) + (54 × B) + (88 × C) ≦ 2304 [A: Number of remote I/O stations (Max. 64 units) B: Number of remote device station units (Max. 42 units) C: Number of local station and intelligent device station units (Max. 26 units)]	●	●
	Connection Cable	CC-Link cable; a three-core, shielded, twisted-pair cable	●	●
Anywire DB Specifications	Transmission Clock	7.8 kHz, 15.6 kHz, 31.3 kHz, and 62.5 kHz	–	●
	Max. Transmission Distance	Max. Overall Cable Extension Length: 100 m, 200 m, 500 m, or 1 km.	–	●
	I/O Points	Full triplex mode: Max. 2304 points (Bit-bus: Max. 256 points, Word-bus: Max. 2048 points) Full quadruplex mode: 2560 points (Bit-bus: Max. 512 points, Word-bus: Max. 2048 points)	–	●
	Anywire Bus Port	One port, detachable terminal block	–	●
	Connection Cable	General-purpose 2-core or 4-core cable (VCTF 0.75 sq to 1.25 sq), dedicated flat cable (0.75 sq), general-purpose wire (0.75 sq to 1.25 sq)	–	●

Other Manufacturer Modules

● A-net/A-Link Master Unit Module

Made by Algo System Co., Ltd.

Model: MPANL00-0
Approx. Mass: 90 g

Items	A-net	A-Link
Communication Control IC	MKY40	MKY36
Communication Mode	Two-wire half duplex	Four-wire full duplex / two-wire half duplex
Transmission Speed	3/6/12 Mbps	3/6/12 Mbps
Error Detection	CRC-16	CRC-12
Transmission Distance	300/200/100 m	300/200/100 m

● CUnet Master Module

Made by Algo System Co., Ltd.

Model: MPCUNET-0
Approx. Mass: 85 g

Items	Specifications
Communication Control IC	MKY40 ×1
Communication Mode	Two-wire, half-duplex (comforms to RS-485 specifications)
Isolation Method	Pulse transformer
Transmission Speed	3 Mbps, 6 Mbps, or 12 Mbps (recommended)
Synchronization Method	Bit synchronization
Error Detection	CRC-16
Max. Transmission Distance	12 Mbps: 100 m; 6 Mbps: 200 m; 3 Mbps: 300 m
Connection Method	Multidrop connection
Impedance	100Ω
Terminator	Enabled or disabled with the built-in switch.
External Interface	Euro-style, 6-pin terminal block

Other Devices

● Image-processing Unit (MYVIS)

Model: JEVSA-YV260
Approx. Mass: 2.5 kg

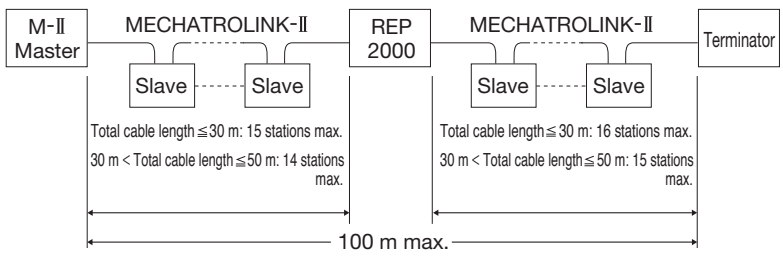
A networked machine vision system that processes images and takes into account the servo coordinate system with detection of the servo-axis position.

Items			Standalone Type	
			Unit Type	
			For Analog Cameras	For Camera Link
Model			JEVSA-YV260□1-E	JEVSA-YV260□2-E
Image Processing			Gray scale pattern matching, binary image analysis etc.	
CPU			Main CPU : SH-4A (600 MHz), Sub CPU : SH-2A (200 MHz)	
Image Processing Hardware	LSI		FPGA	
	Pre-processing Function		Inter-image operations (addition, averaging, subtraction, and difference operation), 3×3 filter, dilation/erosion	
Memory	Application Program		512 Kbytes (flash memory)	
	Backup Memory		256 Kbytes CMOS (for saving parameters)	
	Template Storage Memory		CF cards (2 Gbytes max.)	
	Image Memory	Frame Memory	4096×4096×8 bits×4 images (Can be used for 640×480×8 bits×192 images)	
		Template Memory	16 Mbytes	
Image Input	Camera Interface		New EIAJ 12-pin connector ×4 EIA (640×480) to (1400×1050) Four B&W, 8-bit A/D-converter circuits	CameraLink (MDR26pin) ×4 VGA (640×480) to QSXGA (2440×2048), Base Configuration, PoCL-compatible
	Camera Power Supply		Single camera : 12 V, 400 mA, Total : 1.2 A max.	
	Camera Sync Mode		Internal/external sync	Internal sync
	Random Shutter Supported		Sync-nonreset, sync-reset, single VD or V reset	
	Simultaneous Image Capture		Four cameras	
	Input Image Conversion		Gray level conversion (LUT), mirror mode	
Monitor	Monitor Output		VGA, XGA (color), 15pin D-sub	
	Image Display		A full-screen or a partial-screen for one camera, simultaneous screen reduction for two or four cameras, gray level conversion (binary image display supported)	
I/F	Field Network		MECHATROLINK-Ⅰ / Ⅱ	
	LAN (Ethernet)		10BASE-T/100BASE-TX	
	General-purpose Serial		RS-232C×2 channels (115.2 kbps)	
	Parallel I/O		16 general-purpose outputs (4 of these are also used for stroboscope) + 2 outputs exclusive for alarms (24 VDC, photocoupler isolation) 16 general-purpose inputs (4 of these are also used for trigger) + 3 inputs exclusive for mode switchings + 1 input exclusive for trigger (24 VDC, photocoupler isolation)	
	Track Ball		USB mouse	
Power Supply			100 V/200 VAC, 24 VDC, 30 W	

● MECHATROLINK-Ⅱ Repeater

Model: JEPMC-REP2000
Approx. Mass: 340 g

Required to stabilize communication and to extend the total length of the cable.

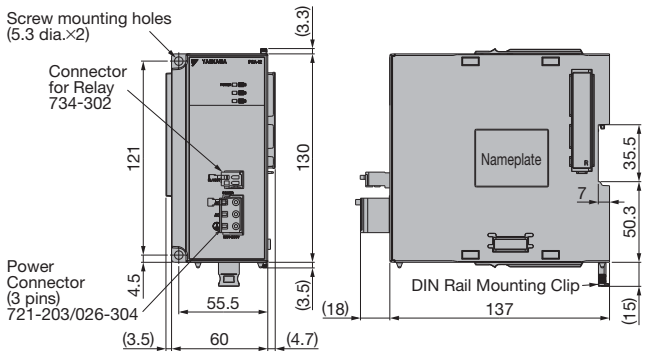
Items	Specifications
Communication Type	MECHATROLINK-Ⅱ
Max. Cable Length	Between controller and repeater: 50 m, After repeater: 50 m
Max. Connected Stations	Total stations on both sides of repeater: 30*
Restrictions	
Power Supply	24 VDC, 100 mA

*: Limited to the max. number of connectable stations of the controller (e.g., 21 stations for the MP2000 series).

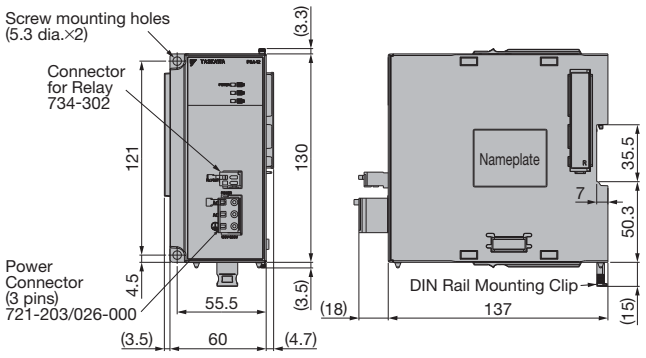
Dimensions Units: mm

● Power Supply Unit

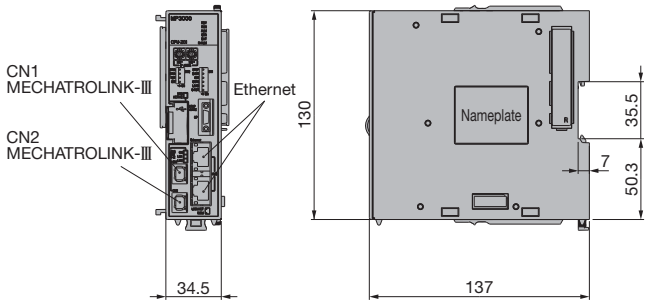
AC Power Supply Unit



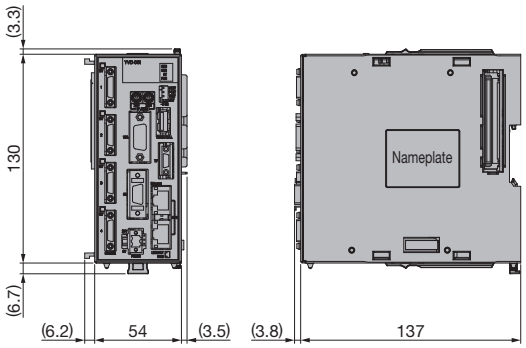
DC Power Supply Unit



● CPU Unit

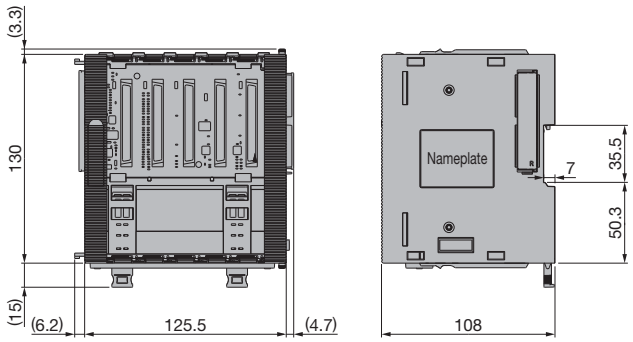


● Vision Unit

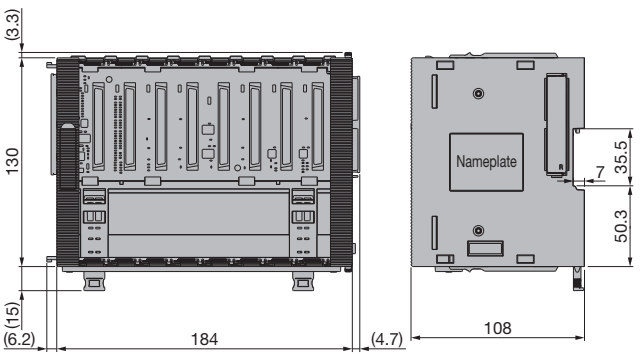


● Base Unit

5 Slots

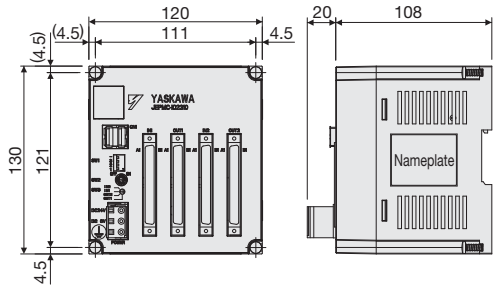


8 Slots

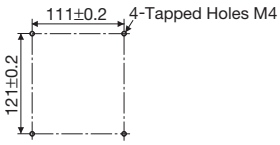


● MECHATROLINK-Ⅲ Compatible Modules

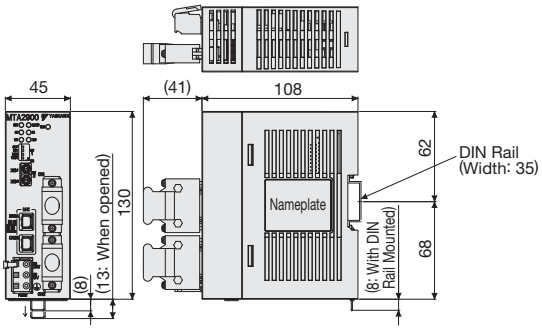
64-point I/O Module



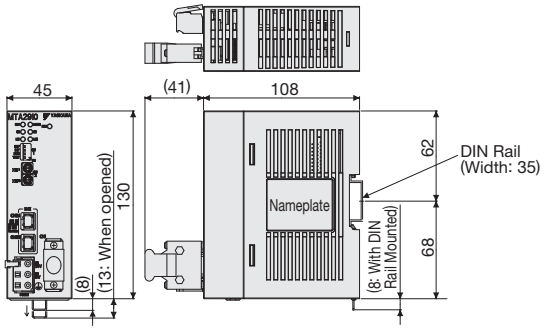
■ **Mounting Hole Diagram**



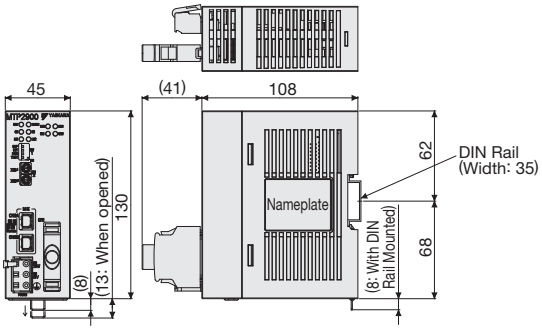
Analog Input Module



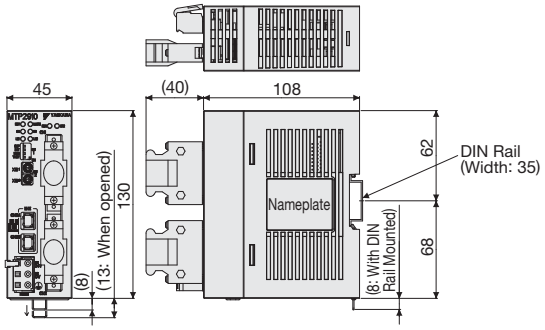
Analog Output Module



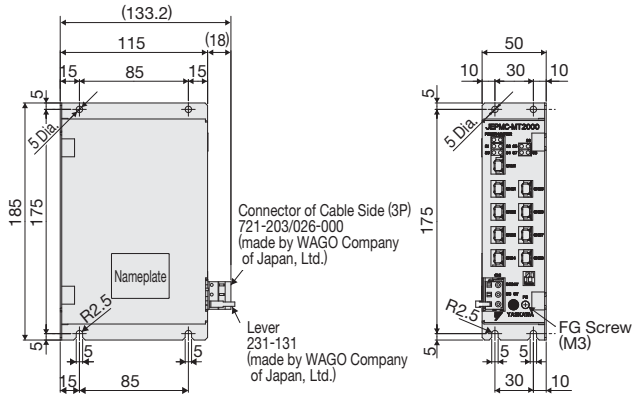
Pulse Input Module



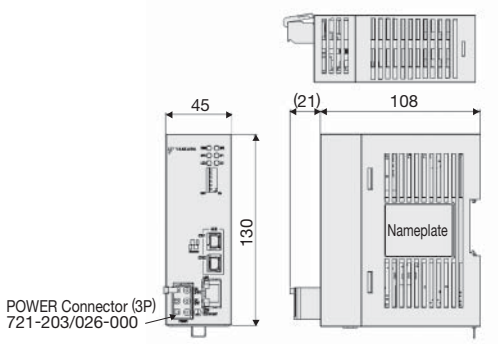
Pulse Output Module



Hub Module



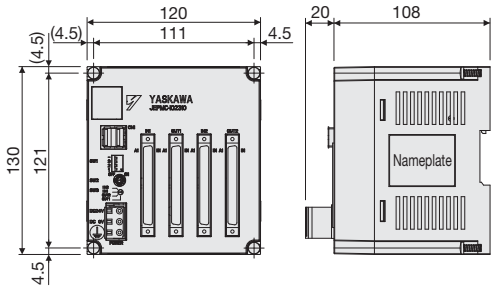
Network Analyzer, Network Adapter Module



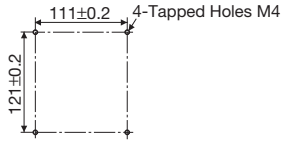
Dimensions Units: mm

● MECHATROLINK-Ⅱ Compatible Modules

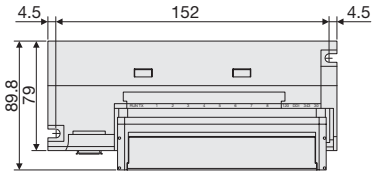
64-point I/O Module

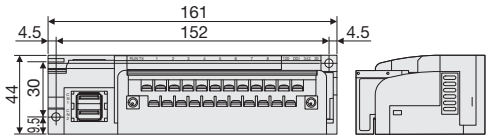


■Mounting Hole Diagram



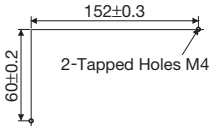
Counter, Pulse, and Analog Modules



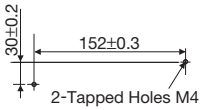


■Mounting Hole Diagram (Two Methods)

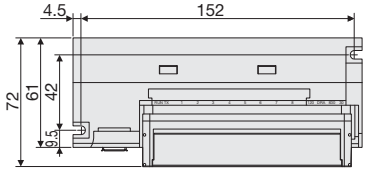
・Base mounted

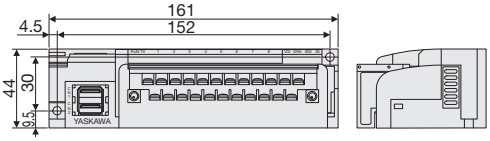


・Rear mounted



16-point/8-point I/O Module, Relay Output Module





Sequence Controls/Motion Controls

● Sequence Controls

Items	Specifications
Program Capacity	32 MB
Control Method	Sequence: High-speed and low-speed scan methods
Programming Language	Ladder language: Relay circuit　Textual language: Numerical operations, logic operations, etc.
Scanning	2 scan levels : High-speed scan and low-speed scan High-speed scan time setting: 0.125 ms to 32 ms (Integral multiple of a MECHATROLINK communication cycle) Low-speed scan time setting : 2.0 ms to 300 ms (Integral multiple of a MECHATROLINK communication cycle)
User Drawings, Functions, and Motion Programs	Startup drawings (DWG.A) : 64 drawings max. Up to 3 hierarchical drawing levels High-speed scan process drawings (DWG.H): 1000 drawings max. Up to 3 hierarchical drawing levels Low-speed scan process drawings (DWG.L) : 2000 drawings max. Up to 3 hierarchical drawing levels Interrupt processing drawings (DWG.I) : 64 drawings max. Up to 3 hierarchical drawing levels Number of steps : Up to 1000 steps/drawing User functions : Up to 2000 functions Motion programs : Up to 512 Revision history of drawings and motion programs Security functions of drawings and motion programs
Data Memory	System (S) registers : 64 K words Common data (M) registers : 1 M words (battery backup) Common global registers (G) : 2 M words (no battery backup) Drawing local (D) registers : 16 K words Drawing constant (#) registers : 16 K words Input (I) registers : 64 K words (shared with output registers) Output (O) registers : 64 K words (shared with input registers) Constant (C) registers : 16 K words
Trace Memory	Data trace : 4 M words (1 M words × 4 groups), 16 items/group defined
Memory Backup	Program memory : Flash memory (Battery backup for M registers)
Data Types	Bit (B) : 0.1 Integer (W) : −32,768 to +32,767 Double-length integer (L) : −2,147,483,648 to +2,147,483,647 Quadruple-length ingeger (Q) : −9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 single-precision real number (F) : ± (1.175E−38 to 3.402E+38), 0 Double-precision real number (D): ± (2.225E−308 to 1.798E+308), 0 Address : 0 to 16777214
Register Designation Method	Register number : Direct designation of register number Symbolic designation: Up to 8 alphanumeric characters (up to 200 symbols/drawing) With automatic number or symbol assignment

● Motion Controls

Items		Specifications
Control Specifications		PTP control, interpolation, speed reference output, torque reference output, position reference output, phase reference output
Zero-point Return (17 types)		① DEC1+C　② ZERO　③ DEC1+ZERO　④ C pulse ⑤ DEC2+ZERO　⑥ DEC1+LMT+ZERO　⑦ DEC2+C　⑧ DEC1+LMT+C ⑨ C pulse only　⑩ POT & C pulse　⑪ POT only　⑫ HOME LS & C ⑬ INPUT　⑭ HOME only　⑮ NOT & C pulse　⑯ NOT only ⑰ INPUT & C pulse Note: Types ⑤ to ⑧ are available only with SVA.
Number of Controlled Axes		1 to 32 axes (1 group)
Reference Unit		mm, inch, deg, pulse
Reference Unit Minimum Setting		1, 0.1, 0.01, 0.001, 0.0001, 0.00001
Coordinate System		Rectangular coordinates
Max. Programmable Value		−9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 (signed 64-bit value)
Speed Reference Unit		mm/min, inch/min, deg/min, pulse/min, mm/s, inch/s, deg/s, pulse/s
Acceleration/Deceleration Type		Linear, asymmetric, S-curve
Override Function		Positioning : 0.01% to 327.67% by axis Interpolation: 0.01% to 327.67% by group
Programs	Language	Motion language, ladder language
	Number of Tasks	32 (Equal to the number of tasks that the ladder instruction, MSEE, can execute at the same time.)
	Number of Programs	Up to 512

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● Hardware and Software Requirements

Item	Specifications
CPU	Pentium 800 MHz or more (1 GHz or more recommended)
Memory	512 Mbytes or more (1 Gbytes or more recommended)
Free Hard Disk Space	700 Mbytes min.
Display	Resolution: 1024×768 pixels min.
CD Drive	1 (only for installation)
Communication Port	RS-232C, Ethernet, MP2100 bus, or USB
OS	Windows7 (32bit, 64bit) (recommended) WindowsVista (HomeBasic, HomePremium, Business, Ultimate, Enterprise) WindowsXP (Professional, HomeEdition)
.Net Environment	.Net Framework2.0 SP1 or later
Languages Supported	English, Japanese
Applicable Model	MP3200 and MP2000 series

● Functions

Item	Specifications
Programming	Ladder programs (ladder language) Motion programs (motion language) Text format programming (position teaching)
Variables, Comments	Variable database management System and user variables, axis variables, input/output variables, global variables, system and user structures
Search, Replace	Cross-reference searches, instruction searches, character string and comment searches Register replacement, character string and comment replacement
Monitor	Register lists Watch Adjustment panel Axis operation monitor Axis alarm monitor Operation control panel
Tracing	Real-time tracing X-Y tracing Trace manager Data logging
MC-Configulator	Module configuration definitions (unit, module, slave allocation) Module detail definitions (system settings, communication settings, etc.) Parameter editing (fixed, setting, monitor, servo, distributed I/O, etc.) Servo adjustments (setup, test operation, tuning) Inverter adjustments (setup) Vision adjustments
Security Functions	Project file security Program security (ladder programs, motion programs) On-line security (access limited to users with specific levels of authority) User management
Servicing and Maintenance	Writing prohibit mode Status list
Project Conversion	Conversion of MP2000 project into MP3200 project
System	Language switching (between Japanese and English)
Remote Engineering	Modem connection RAS server connection
Electronic Cam Tool	Electronic cam data generation
Help	On-line manual help (help for instructions, operations) Version information
Printing	Preview Program Cross reference
Customized Functions	Editor Toolbar

● Instructions for Motion Programs

: New instructions for MP3200

Type	Instruction	Function
Axis Setting Instructions	ABS	Absolute Mode
	INC	Incremental Mode
	ACC	Change Acceleration Time
	DCC	Change Deceleration Time
	SCC	Change S-curve Time Constant
	VEL	Set Speed
	FMX	Set Maximum Interpolation Feed Speed
	IFP	Set Interpolation Feed Speed Ratio
	IAC	Change Interpolation Acceleration Time
	IDC	Change Interpolation Deceleration Time
	IDH	Change Interpolation Deceleration Time for Temporary Stop
	ACCMODE	Set Interpolation Acceleration/ Deceleration Mode
Axis Movement Instructions	MOV	Positioning
	MVS	Linear Interpolation
	MCW	Clockwise: Circular Interpolation, Herical Interpolation
	MCC	Counterclockwise: Circular Interpolation, Herical Interpolation
	ZRN	Zero Point Return
	DEN	Position after Distribution
	SKP	Skip Function
	MVT	Set-time Positioning
	EXM	External Positioning
Axis Control Instructions	POS	Set Current Position
	MVM	Move on Machine Coordinates
	PLD	Update Program Current Position
	PFN	In-Position Check
	INP	In-Position Range
	PFP	Positioning Completed Check
	PLN	Coordinate Plane Setting
Vision Instructions	VCAPI	Image Capture
	VCAPS	Image Capture (With External Trigger Signal Sync)
	VFIL	Pre-Processing
	VANA	Image Analysis
	VRES	Analysis Acquisition

Type	Instruction	Function
Program Control Instructions	IF, ELSE, IEND	Branching
	WHILE, WEND	Repetition
	WHILE, WENDX	Repetition with One Scan Wait
	PFORK, JOINTO, PJOINT	Parallel Execution
	SFORK, JOINTO, SJOINT	Selective Execution
	MSEE	Call Subprogram
	FUNC	User Function
	END	Program End
	RET	Subprogram Return
	TIM	Dwell Time (10ms)
	TIM1MS	Dwell Time (1ms)
	IOW	I/O Variable Wait
	EOX	One Scan Wait
	SNGD, SNGE	Disable Single-block Signal (SNGD) and Enable Single-block Signal (SNGE)
Other Control Instructions	=	Substitution
	+, −, ✻, /, MOD	Numeric operations
	++	Extended Add
	−−	Extended Subtract
	| , ^, &, !	Logic operations
	SIN, COS, TAN, ASN, ACS, ATAN, SQRT, BIN, BCD	Basic functions
	= =, <>, >, <, >=, <=	Numeric comparison
	SFR, SFL, BLK, CLR, ASCII	Data manipulation
	SETW	Table Initialization
	(), S{}, R{}	Others

● Instructions for Sequence Programs

Type	Instruction	Function
Control Instructions	SSEE	Sequence program call
	UFC	User function call
Sequence Control Instructions	PON	Rising pulse
	NON	Falling pulse
	TON	Turn On Delay timer (10 ms)
	TON1MS	Turn On Delay timer (1 ms)
	TOF	Turn OFF Delay timer (10 ms)
	TOF1MS	Turn OFF Delay timer (1 ms)

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● Instructions for Ladder Programs

: New instructions for MP3200

Type	Instruction	Function
Relay Circuit Instructions	NOC	NO Contact
	ONP-NOC	Rising-edge NO Contact
	OFFP-NOC	Falling-edge NO Contact
	NCC	NC Contact
	ONP-NCC	Rising-edge NC Contact
	OFFP-NCC	Falling-edge NC Contact
	TON (1 ms)	1-ms ON-Delay Timer
	TOFF (1 ms)	1-ms OFF-Delay Timer
	TON (10 ms)	10-ms ON-Delay Timer
	TOFF (10 ms)	10-ms OFF-Delay Timer
	TON (1 s)	1-s ON-Delay Timer
	TOFF (1 s)	1-s OFF-Delay Timer
	ON-PLS	Rising-edge Pulses
	OFF-PLS	Falling-edge Pulses
	COIL	Coil
	REV-COIL	Reverse Coil
	ONP-COIL	Rising-edge Detection Coil
	OFFP-COIL	Falling-edge Detection Coil
	S-COIL	Set Coil
	R-COIL	Reset Coil
Numeric Operation Instructions	STORE	Store
	ADD (+)	Add
	ADDX (++)	Extended Add
	SUB (–)	Subtract
	SUBX (––)	Extended Subtract
	MUL (×)	Multiply
	DIV (÷)	Divide
	MOD	Integer Remainder
	REM	Real Remainder
	INC	Increment
	DEC	Decrement
	TMADD	Add Time
	TMSUB	Subtract Time
	SPEND	Spend Time
	INV	Invert Sign
	COM	One's Complement
	ABS	Absolute Value
	BIN	Binary Conversion
	BCD	BCD Conversion
	PARITY	Parity Conversion
	ASCII	ASCII Conversion 1
	BINASC	ASCII Conversion 2
	ASCBIN	ASCII Conversion 3

Type	Instruction	Function
Logic Operation Instructions	AND	AND
	OR	Inclusive OR
	XOR	Exclusive OR
	<	Less Than
	≦	Less Than or Equal
	=	Equal
	≠	Not Equal
	≧	Greater Than or Equal
	>	Greater Than
	RCHK	Range Check
Program Control Instructions	SEE	Call Sequence Subprogram
	MSEE	Call Motion Program
	FUNC	Call User Function
	INS	Direct Input String
	OUTS	Direct Output String
	XCALL	Call Extended Program
	WHILE END_WHILE	WHILE construct
	FOR END_FOR	FOR construct
	IF END_IF	IF construct
	IF ELSE END_IF	IF-ELSE construct
	EXPRESSION	Numerical expressions
Basic Function Instructions	SQRT	Square Root
	SIN	Sine
	COS	Cosine
	TAN	Tangent
	ASIN	Arc Sine
	ACOS	Arc Cosine
	ATAN	Arc Tangent
	EXP	Exponential
	LN	Natural Logarithm
	LOG	Common Logarithm

● Instructions for Ladder Programs (Cont' d)

: New instructions for MP3200

Type	Instruction	Function
Data Manipulation Instructions	ROTL	Bit Rotate Left
	ROTR	Bit Rotate Right
	MOVB	Move Bit
	MOVW	Move Word
	XCHG	Exchange
	SETW	Table Initialization
	BEXTD	Byte-to-word Expansion
	BPRESS	Word-to-byte Compression
	BSRCH	Binary Search
	SORT	Sort
	SHFTL	Bit Shift Left
	SHFTR	Bit Shift Right
	COPYW	Copy Word
	BSWAP	Byte Swap
DDC Instructions	DZA	Dead Zone A
	DZB	Dead Zone B
	LIMIT	Upper/Lower Limit
	PI	PI Control
	PD	PD Control
	PID	PID Control
	LAG	First-order Lag
	LLAG	Phase Lead Lag
	FGN	Function Generator
	IFGN	Inverse Function Generator
	LAU	Linear Accelerator/Decelerator 1
	SLAU	Linear Accelerator/Decelerator 2
	PWM	Pulse Width Modulation

Type	Instruction	Function
Table Manipulation Instructions	TBLBR	Read Table Block
	TBLBW	Write Table Block
	TBLSRL	Search Table Row
	TBLSRC	Search Table Column
	TBLCL	Clear Table Block
	TBLMV	Move Table Block
	QTBLR	Read Queue Table
	QTBLRI	Read Queue Table with Pointer Increment
	QTBLW	Write Queue Table
	QTBLWI	Write Queue Table with Pointer Increment
	QTBLCL	Clear Queue Table Pointer
Standard System Function Instructions	COUNTER	Counter
	FINFOUT	First-in First-out
	TRACE	Trace
	DTRC-RD	Read Data Trace
	ITRC-RD	Inverter trace read
	MSG-SND	Send Message
	MSG-SNDE	Send Message (Extension)
	MSG-RCV	Receive Message
	MSG-RCVE	Receive Message (Extension)
	ICNS-WR	Inverter constant write
	ICNS-RD	Inverter constant read
	MLNK-SVW	SERVOPACK constant write
	MOTREG-W	Motion register write
	MOTREG-R	Motion register read
	IMPORT	Import
	EXPORT	Export

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● EXPRESSION instructions

: New instructions for MP3200

Type	Symbol	Function
Arithmetic Operators	=	Store instruction
	+	Addition
	++	Extended Add
	–	Subtraction
	––	Extended Subtract
	*	Multiplication
	/	Division
	&	AND instruction (bit operation)
	|	OR instruction (bit operation)
	^	Exclusive OR instruction (bit operation)
Logical Operators	&&	AND instruction
	||	OR instruction
	!	Logical NOT instruction
Comparison Operators	<	Less than
	<=	Less than or equal
	= =	Equal
	! =	Not equal
	>=	Greater than or equal
	>	Greater than
Program Control Instructions	FOR <variable> = <initial value> TO <final value> STEP <step value> · · · FEND	Fixed count repetition control
	WHILE <conditional expression> · · · WEND	Pre-tested repetition control
	IF<conditional expression> · · · ELSE · · · IEND	Conditional branching

Type	Symbol	Function
Basic Function Instructions	SQRT	Square root instructions
	SQRT_W SQRT_F SQRT_D	
	SIN	Sine instructions (real number operations)
	SIN_W SIN_F SIN_D	
	COS	Cosine instructions (real number operations)
	COS_W COS_F COD_D	
	TAN	Tangent instruction
	ASIN	Arc sine instruction
	ACOS	Arc cosine instruction
	ATAN	Arc tangent instructions (real number operation)
	ATAN_W ATAN_F ATAN_D	
	EXP	Exponential instruction
	LN	Natural logarithm instruction
	LOG	Common logarithm instruction
Cast Operators	(WORD)	word
	(LONG)	long
	(QUAD)	quad
	(FLOAT)	float
	(DOUBLE)	double
	FTYPE	Float-type operation specification
	DTYPE	Double-type operation specification

● Electronic Cam Data Generation Tool

Items	Specifications
Data Generation	Cam curves can be selected from: · Straight line · Parabolic · Simple harmonic · Cycloid · Modified trapezoid · Modified sine · Modified constant velocity · Asymmetrical cycloid · Asymmetrical modified trapezoid · Trapecloid · Single-dwell cycloid m=1 · Single-dwell cycloid m=2/3 · Single-dwell modified trapezoid m=1 · Single-dwell ferguson trapezoid · Single-dwell modifi ed trapezoid m=2/3 · Single-dwell modified sine · Single-dwell trapecloid · No-dwell simple harmonic · No-dwell modified trapezoid · No-dwell modified constant velocity · NC2 curve · Free-form curve · Inverted trapecloid · Paired strings · Inverted paired strings
Data Editing	Data graph: Parameter setting, style setting, graph data editing Data list: Insert, delete, etc. Control graph display: Displacement data, speed data, acceleration data, jerk data, graph comparison
Data Transfer	Cam data file is transferred to registers (M or C)

Order List

● MP3200 Basic Units

Classifications	Products	Model Name	Model	Specifications	Qty
MP3200	Power Supply Unit	PSA-12	JEPMC-PSA3012-E	AC power supply unit (85 to 276 VAC input)	
		PSD-12	JEPMC-PSD3012-E	DC power supply unit (24VDC input)	
	CPU Unit	CPU-201	JEPMC-CP3201-E	High-speed scan time setting: Min. 125μs Program capacity: 32 MB Battery (JEPMC-OP3005) for backup data is included.	
	Vision Unit	YVD-001	JEPMC-YVD3001-E	High-performance vision unit	
	Base Unit	MBU-B05	JEPMC-BUB3005-E	5-slot base unit for MP2000 optional modules	
		MBU-B08	JEPMC-BUB3008-E	8-slot base unit for MP2000 optional modules	

● MP2000 Optional Modules

Classifications	Products	Model Name	Model	Specifications	Qty
Sub CPU	Sub CPU module	MPU-01	JAPMC-CP2700-E	MECHATROLINK-Ⅲ×1, Program memory 11.5MB	
Motion Modules	Motion control module	SVB-01	JAPMC-MC2310-E	1 channel for MECHATROLINK-Ⅱ	
		SVC-01	JAPMC-MC2320-E	1 channel for MECHATROLINK-Ⅲ	
	Analog motion control module	SVA-01	JAPMC-MC2300	Analog-output 2-axis servo control	
	Pulse Output Motion Control Module	PO-01	JAPMC-PL2310-E	Pulse-output, 4-axis servo control	
Communication Modules	General-purpose serial communication module	217IF-01	JAPMC-CM2310-E	RS-232C/RS-422 communication	
	Ethernet communication module	218IF-01	JAPMC-CM2300-E	RS-232C/Ethernet communication	
		218IF-02	JAPMC-CM2302-E	RS-232C/Ethernet (100 Mbps) communications	
	DeviceNet communication module	260IF-01	JAPMC-CM2320-E	RS-232C/DeviceNet communication	
	PROFIBUS communication module	261IF-01	JAPMC-CM2330-E	RS-232C/PROFIBUS communication	
	FL-net communication module	262IF-01	JAPMC-CM2303-E	Cyclic transmission and message transmission	
	EtherNet / IP communication module	263IF-01	JAPMC-CM2304-E	I/O transmission and Explicit message transmission	
	EtherCAT communication module	264IF-01	JAPMC-CM2305-E	As a slave station of EtherCAT	
	CompoNet communication module	265IF-01	JAPMC-CM2390-E	CompoNet communication	
	PROFINET communication module	266IF-01*	JAPMC-CM2306-E	PROFINET master	
		266IF-02	JAPMC-CM2307-E	PROFINET slave	
	MPLINK communication module	215AIF-01 MPLINK	JAPMC-CM2360-E	RS-232C/MPLINK communication	
	CP-215 communication module	215AIF-01 CP-215	JAPMC-CM2361-E	RS-232C/CP-215 communication	
I/O Modules	I/O module	LIO-01	JAPMC-IO2300-E	16-point input, 16-point output (sink mode output), pulse input: 1 channel	
		LIO-02	JAPMC-IO2301-E	16-point input, 16-point output (source mode output), pulse input: 1 channel	
		LIO-04	JAPMC-IO2303-E	32-point input and 32-point output (sink mode output)	
		LIO-05	JAPMC-IO2304-E	32-point input and 32-point output (source mode output)	
		LIO-06	JAPMC-IO2305-E	Digital input: 8 points, digital output: 8 points, analog input: 1 channel, analog output: 1 channel, pulse counter: 1 channel	
	Output module	DO-01	JAPMC-DO2300-E	64-point output (sink mode output)	
	Analog input module	AI-01	JAPMC-AN2300-E	8 channels for analog input	
	Analog output module	AO-01	JAPMC-AN2310-E	4 channels for analog output	
	Counter module	CNTR-01	JAPMC-PL2300-E	2 channels, selection of 2 input circuits: 5-V differential or 12 V.	
MECHATROLINK-Ⅲ Compatible Modules	64-point I/O module	MTD2310	JEPMC-MTD2310-E	64-point input and 64-point output (sink mode output)	
	Analog Input Module	MTA2900	JEPMC-MTA2900-E	Analog input: 8 channels	
	Analog Output Module	MTA2910	JEPMC-MTA2910-E	Analog output: 4 channels	
	Pulse Input Module	MTP2900	JEPMC-MTP2900-E	Pulse input: 2 channels	
	Pulse Output Module	MTP2910	JEPMC-MTP2910-E	Pulse output: 4 channels	
	Hub module	HUB	JEPMC-MT2000-E	–	
	Network analyzer module	MTNA-01	JEPMC-MT2010-E	–	
	Network adapter module	MTNA-02	JEPMC-MT2020-E	–	

*: Estimates are required before ordering this product. Contact your Yaskawa representative for more information.

(Cont'd)

Order List

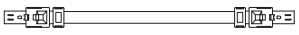
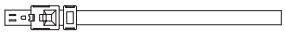
● MP2000 Optional Modules (Cont' d)

Classifications	Products	Model Name	Model	Specifications	Qty
MECHATROLINK-Ⅱ Compatible Modules	64-point I/O module	IO2310	JEPMC-IO2310(-E)	64-point input and 64-point output (sink mode output)	
		IO2330	JEPMC-IO2330(-E)	64-point input and 64-point output (source mode output)	
	Counter module	PL2900	JEPMC-PL2900(-E)	Reversible counter: 2 channels	
	Pulse output module	PL2910	JEPMC-PL2910(-E)	Pulse output: 2 channels	
	Analog input module	AN2900	JEPMC-AN2900(-E)	Analog input: −10 V to +10 V, 4 channels	
	Analog output module	AN2910	JEPMC-AN2910(-E)	Analog output: −10 V to +10 V, 2 channels	
	16-point input module	IO2900-E	JAMSC-IO2900-E	16-point input	
	16-point output module	IO2910-E	JAMSC-IO2910-E	16-point output (sink mode output)	
	8-point I/O module	IO2920-E	JAMSC-IO2920-E	8-point input and 8-point output (sink mode output)	
	Relay output module	IO2950-E	JAMSC-IO2950-E	8 contact outputs	

● Support Tool

Classifications	Products	Model Name	Model	Specifications	Qty
System Integrated Engineering Tool	MPE720 Version 7	-	CPMC-MPE780	Engineering tool for MP3200 Controller	
				OS: Windows XP/Vista/7	

● Cables and Connectors

Name	Model	Length m	Specifications	Qty
Cable for Expansion Unit	JAPMC-W3401-A5-E	0.5	-	
	JAPMC-W3401-2A5-E	2.5	-	
	JAPMC-W3401-06-E	6.0	-	
Cable for MECHATROLINK-Ⅲ	JEPMC-W6012-A2-E	0.2	With MECHATROLINK-Ⅲ connectors on both ends	
	JEPMC-W6012-A5-E	0.5		
	JEPMC-W6012-01-E	1.0		
	JEPMC-W6012-02-E	2.0		
	JEPMC-W6012-03-E	3.0		
	JEPMC-W6012-05-E	5.0		
	JEPMC-W6012-10-E	10.0		
	JEPMC-W6012-20-E	20.0		
	JEPMC-W6012-30-E	30.0		
	JEPMC-W6012-50-E	50.0		
	JEPMC-W6013-10-E	10.0	With ring core	
	JEPMC-W6013-20-E	20.0		
	JEPMC-W6013-30-E	30.0		
	JEPMC-W6013-50-E	50.0		
	JEPMC-W6014-A5-E	0.5	With a connector on the controllers end	
	JEPMC-W6014-01-E	1.0		
	JEPMC-W6014-03-E	3.0		
	JEPMC-W6014-05-E	5.0		
	JEPMC-W6014-10-E	10.0		
	JEPMC-W6014-30-E	30.0		
	JEPMC-W6014-50-E	50.0		
Cable for MECHATROLINK-Ⅱ and MPLINK	JEPMC-W6002-A5(-E)	0.5	With connectors on both ends	
	JEPMC-W6002-01(-E)	1.0		
	JEPMC-W6002-03(-E)	3.0		
	JEPMC-W6002-05(-E)	5.0		
	JEPMC-W6002-10(-E)	10.0		
	JEPMC-W6002-20(-E)	20.0		
	JEPMC-W6002-30(-E)	30.0		
	JEPMC-W6002-40(-E)	40.0		
	JEPMC-W6002-50(-E)	50.0		

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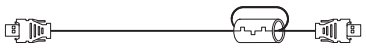
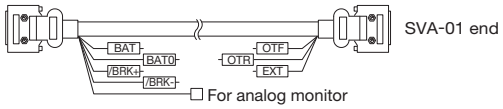
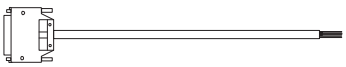
● Cables and Connectors (Cont' d)

Name	Model	Length m	Specifications	Qty
Cable for MECHATROLINK-Ⅱ and MPLINK	JEPMC-W6003-A5(-E)	0.5	With ring core 	
	JEPMC-W6003-01(-E)	1.0		
	JEPMC-W6003-03(-E)	3.0		
	JEPMC-W6003-05(-E)	5.0		
	JEPMC-W6003-10(-E)	10.0		
	JEPMC-W6003-20(-E)	20.0		
	JEPMC-W6003-30(-E)	30.0		
	JEPMC-W6003-40(-E)	40.0		
	JEPMC-W6003-50(-E)	50.0		
MPLINK Cable	JEPMC-W6011-A5	0.5	With a connector on the controller end Notes: 1 Never use these cables with MECHATROLINK-Ⅱ. 2 When the MP2000 Series Machine Controller is connected to a Σ-Ⅰ series servodrives, use these cables. 	
	JEPMC-W6011-01	1.0		
	JEPMC-W6011-03	3.0		
	JEPMC-W6011-05	5.0		
	JEPMC-W6011-10	10.0		
	JEPMC-W6011-20	20.0		
	JEPMC-W6011-30	30.0		
	JEPMC-W6011-40	40.0		
	JEPMC-W6011-50	50.0		
Terminator	JEPMC-W6022(-E)	–	For MECHATROLINK-Ⅱ 	
Ring Core	JEPMC-W6021	–	For MECHATROLINK-Ⅱ cable 	
Connection Cable for SVA-01	JEPMC-W2040-A5	0.5	With connectors on both ends 	
	JEPMC-W2040-01	1.0		
	JEPMC-W2040-03	3.0		
	JEPMC-W2041-A5	0.5	With a connector on the controller end 	
	JEPMC-W2041-01	1.0		
	JEPMC-W2041-03	3.0		
RS-232C Communication Cable (217IF-01, 218IF-01, 260IF-01, 261IF-01, and 215AIF-01)	JEPMC-W5311-03-E	2.5	Connection cable for MPE720-installed PC 	
	JEPMC-W5311-15-E	15.0		
RS-422/485 Communication Cable for 217IF-01	No ready-made cable available. Prepare a cable that meets these specifications. : Connector: 10114-3000PE made by Sumitomo 3M Co., Ltd. Shell : 10314-52A0-008 made by Sumitomo 3M Co., Ltd. Cable : Max. length 300 m, shielded (Use shielded cable and a modem to reduce noise.)			
Ethernet Communication Cable for 218IF-01	Use 10Base-T cross or straight cables.			
DeviceNet Communication Cable for 260IF-01	Use DeviceNet cables. Refer to the ODVA-J web site. (http://www.odva.astem.or.jp/)			
PROFIBUS Communication Cable for 261IF-01	Use PROFIBUS cables. Refer to the PROFIBUS web site (http://www.profibus.jp/). Make sure the cable outlet position and direction so that it will not stand in the way of the RS-232C connector connection when selecting a cable.			
CP-215 Communication Cable for 215AIF-01	No ready-made cable available. Prepare a cable that meets these specifications.: Wire: YS-IPEV-SB (75Ω) or YS-IPEV-S (77Ω) made by Fujikura Ltd. Connector on module end: MR-8RFA4 (G) made by Honda Tsushin Kogyo, Co., Ltd. Connector on cable end: MR-8M (G) made by Honda Tsushin Kogyo, Co., Ltd.			
I/O Cable for LIO-01 and LIO-02	JEPMC-W2061-A5	0.5	With a connector on the LIO-01/-02 end 	
	JEPMC-W2061-01	1.0		
	JEPMC-W2061-03	3.0		

(Cont' d)

Order List

● Cables and Connectors (Cont' d)

Name	Model	Length m	Specifications	Qty
I/O Cable for MP2100 or MP2500	JEPMC-W2062-A5-E	0.5	With a connector on the MP2100/MP2500 end. 	
	JEPMC-W2062-01-E	1.0		
	JEPMC-W2062-03-E	3.0		
I/O Cable for LIO-04, LIO-05, DO-01, and PO-01	JEPMC-W6060-05-E	0.5	With a connector on the LIO-04/LIO-05/ DO-01 end 	
	JEPMC-W6060-10-E	1.0		
	JEPMC-W6060-30-E	3.0		
I/O cable for LIO-06	JEPMC-W2064-A5-E	0.5	With a connector on the LIO-06 end, 50 pins (With shielded wire) 	
	JEPMC-W2064-01-E	1.0		
	JEPMC-W2064-03-E	3.0		
Input Cable for AI-01	JEPMC-W6080-05-E	0.5	With a connector on the AI-01 end 	
	JEPMC-W6080-10-E	1.0		
	JEPMC-W6080-30-E	3.0		
Output Cable for AO-01	JEPMC-W6090-05-E	0.5	With a connector on the AO-01 end 	
	JEPMC-W6090-10-E	1.0		
	JEPMC-W6090-30-E	3.0		
I/O Cable for CNTR-01	JEPMC-W2063-A5-E	0.5	With a connector on the CNTR-01 end 	
	JEPMC-W2063-01-E	1.0		
	JEPMC-W2063-03-E	3.0		

● Optional Products

Applicable Unit	Product Name	Product Model	Specifications	Qty
CPU Unit	Battery	JEPMC-OP3005	Supplied power to a calendar and backup memory when the power to the CPU unit is turned OFF.	
Basic Units	Attachment for mounting screws	JEPMC-OP3001-E	Used to mount a unit with screws	
Basic Units	Unit mounting fixtures	JEPMC-OP300	Used to mount a unit on DIN rail	
Base Unit	Protective cover	JEPMC-OP2300	Front cover for empty slot	

Read Before Ordering

(1) Details of Warranty

■ Warranty Period

The warranty period for a product that was purchased (hereafter called "delivered product") is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

■ Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the warranty period above. This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

1. Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
2. Causes not attributable to the delivered product itself
3. Modifications or repairs not performed by Yaskawa
4. Abuse of the delivered product in a manner in which it was not originally intended
5. Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
6. Events for which Yaskawa is not responsible, such as natural or human-made disasters

(2) Limitations of Liability

1. Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
2. Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
3. The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
4. Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

(3) Suitability for Use

1. It is the customer's responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
2. The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
3. Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
   - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
   - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
   - Systems, machines, and equipment that may present a risk to life or property
   - Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
   - Other systems that require a similar high degree of safety
4. Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
5. The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
6. Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

(4) Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

Product Information

e-Mecha Site (http://www.e-mechatronics.com/en/)

To see details on Yaskawa's controllers, click Controllers on Yaskawa's Products and Technical Information website.

Users can download catalogs, manuals, and dimensional drawings from the e-mechatronics website.

Note: Users must register as members to use some of these documents.

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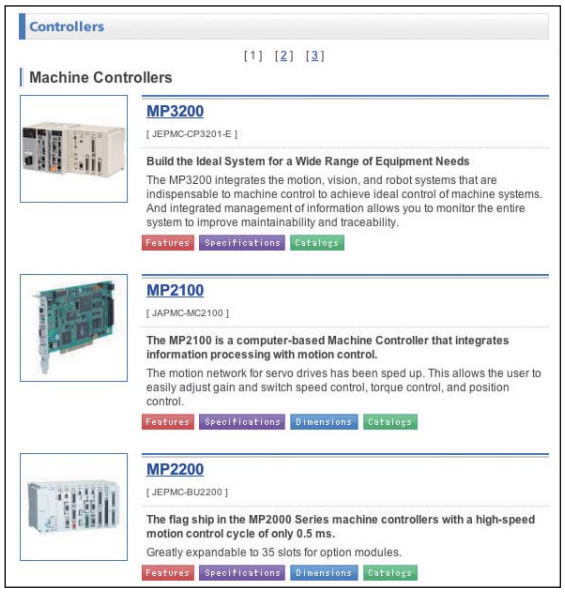
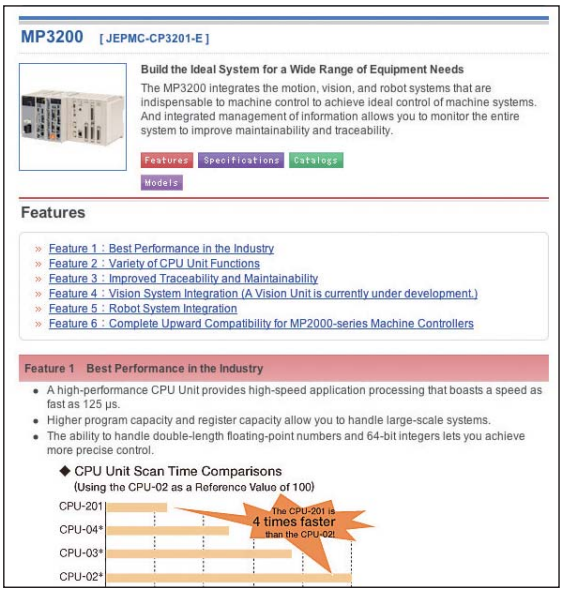


Catalogs and manuals for download



Product features

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Software

- The MP3200 uses the KASAGO TCP/IP by Zuken Elmic, Inc.
- The MP3200 uses the Ricoh bit map font developed and sold by Ricoh Co., Ltd.

MP3200

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LITERATURE NO. KAEP C880725 02A

Published in Japan March 2013 12-11 ◇0◇-1
13-1-7