

Advanced Power in Three Applications: Motion Control, Measurement Control, and High-speed Response Control

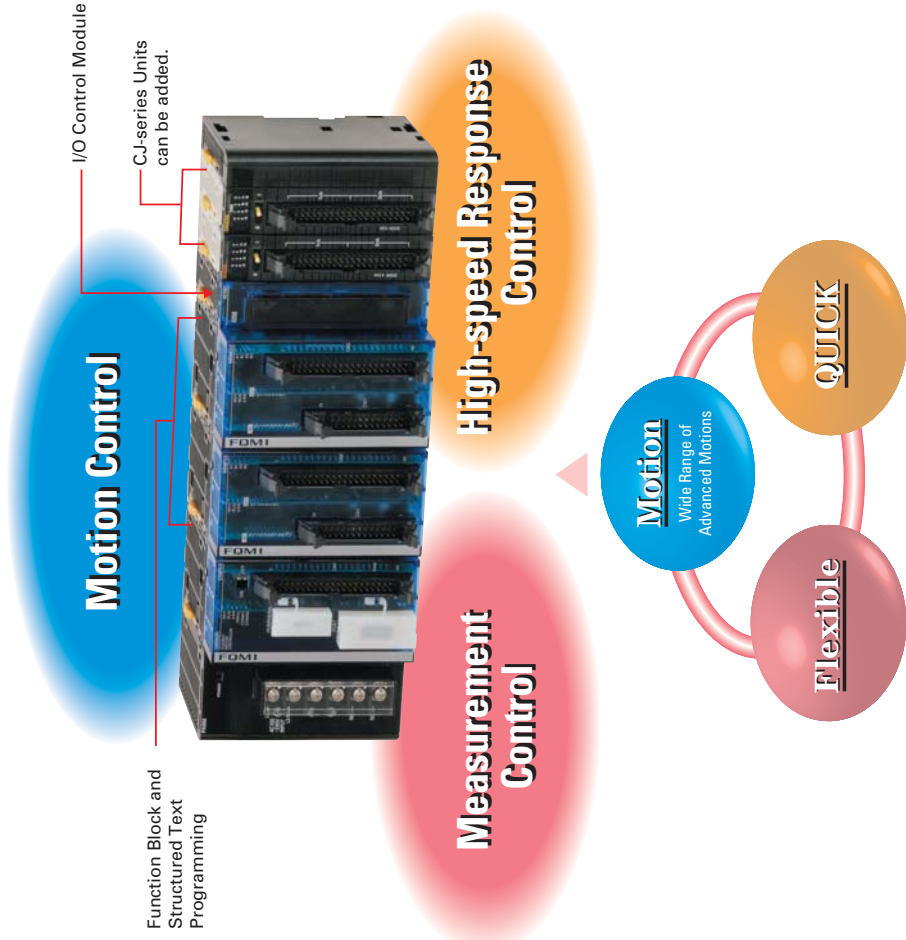
The All New FQM (Flexible Quick Motion)[®]

The FQM1 now supports I/O expansion, communications slaves, multiaxis control, data storage, and function block /structured text programming.

Flexibility, quickness, and a wide range of advanced motion operations enable the FQM1 to easily handle applications in the following three control areas.

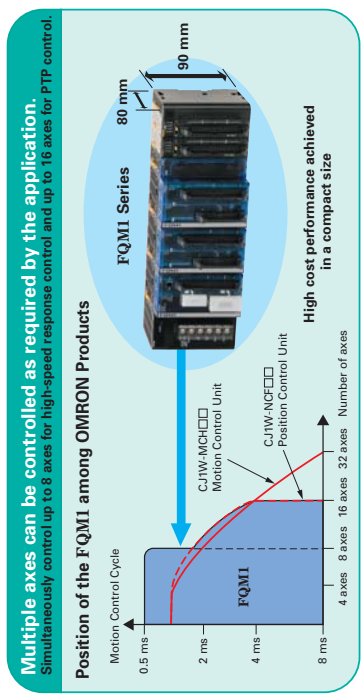
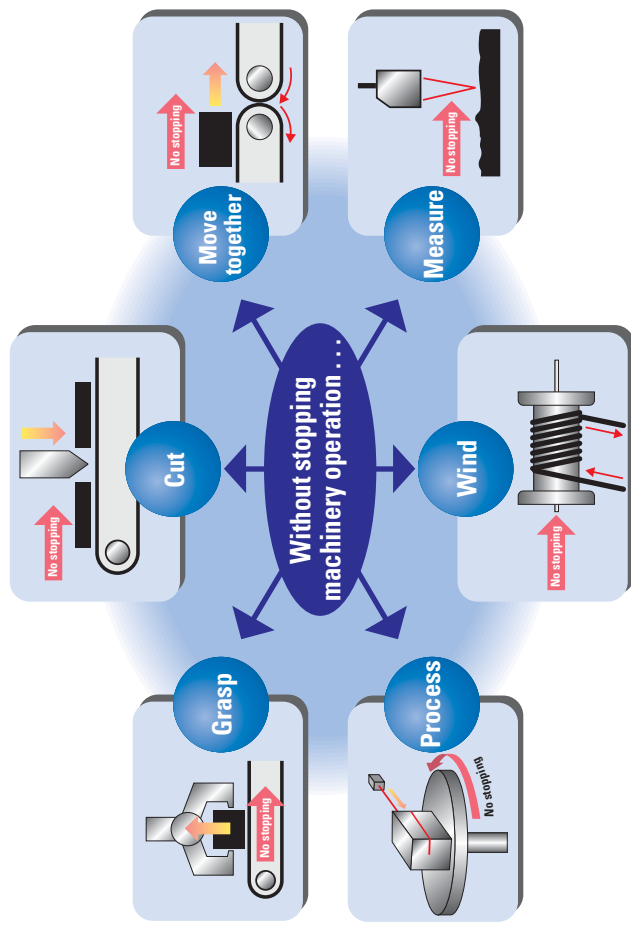
- 1 Motion Control
- 2 Measurement Control
- 3 High-speed Response Control

The all new FQM1-CM002/MMA22/MMMP22 (FQM1-series unit version 3.0) can be expanded using CJ-series Units. In addition, function block and structured text programming are supported.



For the Non-stop Control Ideal for Applications Performing Processing without Stopping Machinery Operation

To improve machinery performance, it is important to increase productivity by eliminating waste. Here, the FQM1 really performs to enable processing must be achieved without stopping machinery operation.

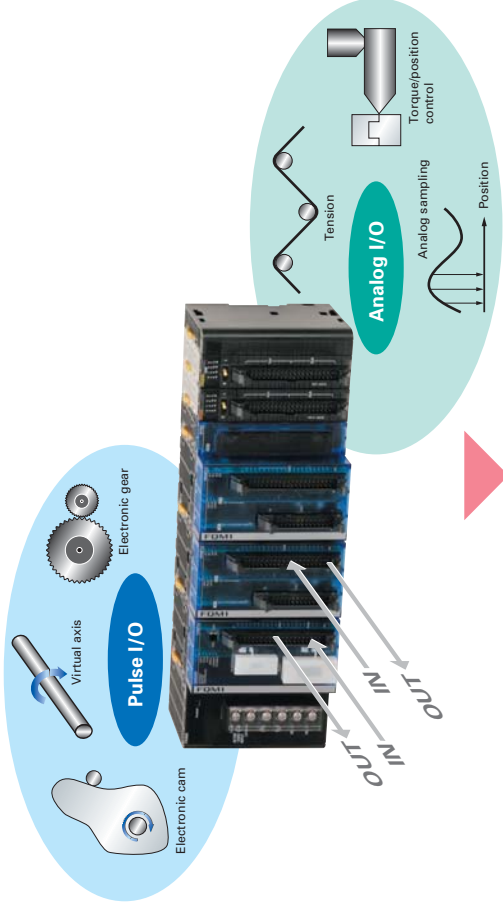


A Variety of Applications Accomplished with Motion, Measurement, and High-speed Response

High-level Wide-ranging Motion Achieved from F (Flexibility) and Q (Quickness).

● From High-speed PTP Control to Synchronous, Torque, and Tension Control

Pulse/analog I/O feedback gives the FQM1 power in high-speed I/O applications.



● Wide-ranging FQM1 Applications

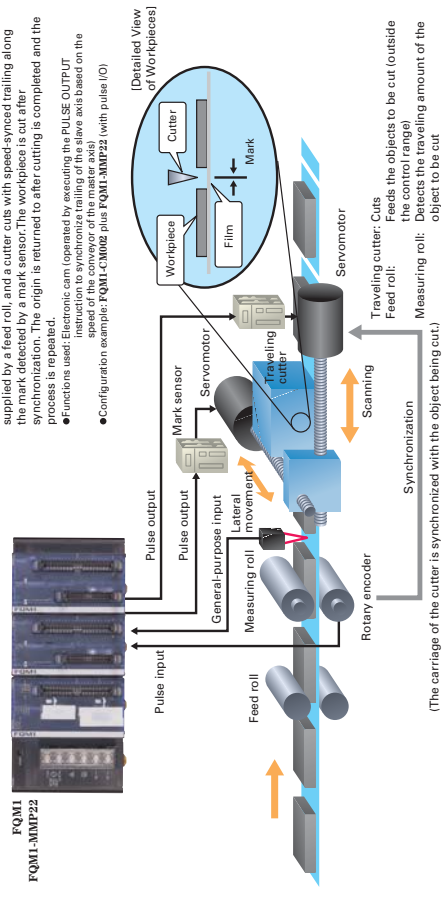
In addition to motion control, the FQM1 handles the following control areas through its ability to perform high-speed I/O processing through feedback from analog or pulse input data. Actual applications have already been implemented.

Control Category		Application example
Motion control	Synchronous control	Packaging machines
	Rotary cutters	Traveling cutters
	Flying cutters	Processing line and lens processing
	Electronic cams	Winding and feeding
	Tension control	Paper feeding
Torque control	Draw control	Injection molding
	Torque control	Molding and pressing
	Torque limit	Processing and coating
	CP control	Winding
	Traverse control	Sheet thickness inspection and quality management
Measurement control	High-speed analog sampling	Distance constant control
	High-speed PID control	Measurement (high-speed) and FV conversion
	High-speed counters	Conveyors
High-speed response control	Synchronous startup	Conveyors
	Interrupt feeding	Labelers
	High-speed PTP control	Conveyors
	High-speed counters	Conveyors

Motion Control Applications

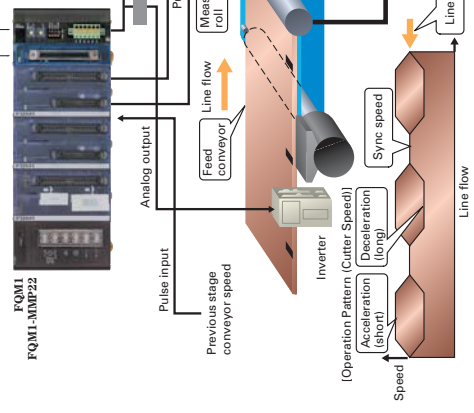
The FQM1 Achieves High-precision Trailing Using High-speed Control Cycles

High-precision trailing with little fluctuation is possible due to the high-speed responsiveness of the FQM1. An instruction for line segment approximation can be used during operation to change the pattern of the curve.



The high-speed cycle and processing method of the FQM1 enable flexible cam patterns.

The high-speed cycle and high level of processing functions enable synchronous control of electronic cams using either a cam table method or a data processing method. In particular, when the data processing method is used, it is possible to realize a high-speed control cycle during processing, enabling the cam to be changed during operation. When using the cam table method, tables can be linked and used even while switching cam tables, enabling high-resolution curves.



Application Examples

- Operating the rotary cutter of a packaging machine or a food processing machine
- Matching the timing between lines - Printing

For example, a sheet is fed continuously on a production line and cut to the specified dimension without stopping the line. The encoder on the measuring roll measures the length of the feed amount, which serves as the basis of the operation of the line speed. Cutting time (the blade intersection time) is synchronized to the line speed, and the cutter is accelerated or decelerated in the remaining time to cut to the preset dimension.

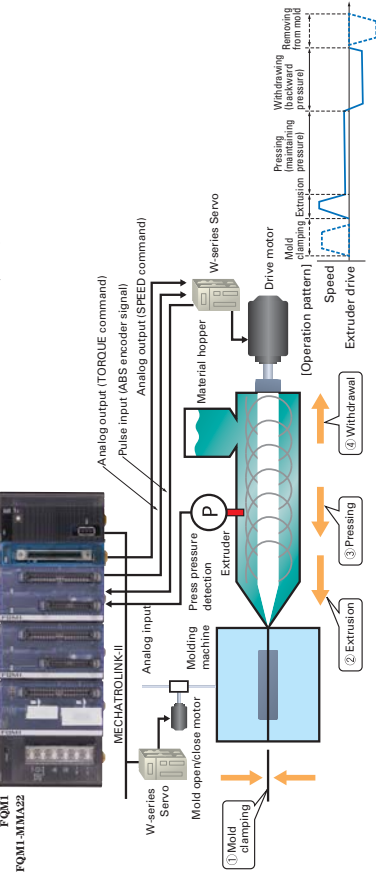
- Functions used: Electronic cam (operated by executing the PULSE OUTPUT instruction on the target position multiplied by the curve table processing) and data processing (approximation for the position of the slave axis or by using data processing)
- Configuration example: FQM1-CH002 plus FQM1-MMP22 (with pulse I/O) plus FQM1-I/O Control Module plus CFW-SRM21 (CompoBus Master Unit)

FQM1 High-speed Control Cycles and High Resolution Enable Free Speed Control

The FQM1 high-speed control cycle enables various speed controls required in production equipment such as molding machines (injection speed, mold clamping/mold opening, screw turning speed, etc.) to be programmed in detail. In particular, high-precision control is achieved by incorporating feedback using analog input, servo drive SPEED commands, and analog output.

Position Control Unit with MECHATROLINK-II

IO Control Module communications



Process without stopping

Application Examples • Speed control for injection molding machine • Torque control for extruding and pressing

For example, the amount of material pushed into the molding machine and the pressure are controlled. Position control (the output amount equals the number of rotations) and torque control (the pressing pressure equals the pressure) are performed during operation.

- Functions used: Switching from position control (SPEED command) to pressure control (SPEED command and torque limit) to Position Control (SPEED command) plus FQM1-MMA22 (with analog I/O) plus FQM1-IC101 (IO Control Module)

The FQM1 High-speed Feedback Loop Enables Stable Control

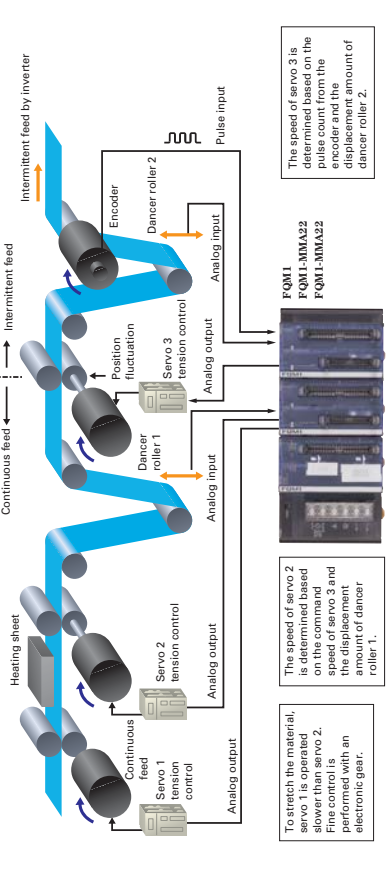
High-speed analog I/O and a high-speed control cycle enable stable line control. A high-speed feedback loop for controlling the motor speed can be set up with the analog input data from the dancer roller or the tension detector. Also, the internal program can be flexibly combined for compensation processing.

Control without stopping

Application Examples • Winding, feeding control

For example, the tautness can be controlled by adjusting the speed of the feeding axis and the winding axis while detecting the position of the dancer roller using an analog input.

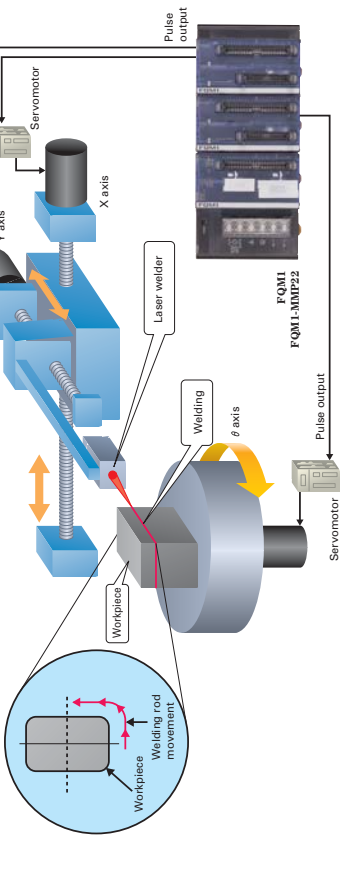
- Functions used: Analog I/O, PI with ladder program, ratio calculations
- Configuration example: FQM1-CM002 plus FQM1-MMA22 (with analog I/O) plus FQM1-MMA22 (with analog I/O)



The FQM1 High-speed Control Cycle Enables High-precision Processing

Applying synchronous control of the electronic cam, the FQM1 high-speed control cycle can be used to achieve minute tracking control during processing. The ability to execute position commands in a high-speed control cycle of 1 to 2 ms enables improved manufacturing accuracy even for complicated processes, such as elliptical tracking. Tracking control, such as linear interpolation, circular interpolation, and elliptical interpolation, can be performed by changing the target position.

The welding point is moved in a relatively normal manner, as shown below.



Process without stopping

Application Examples • Gluing, welding, or grinding a design to a unique shape

For example, taking the master axis as the base axis, two real axes are synchronized to the base axis, and then a tracking pattern is formed with an instruction for the line segment approximation to set the target position.

- Functions used: Synchronous control of the electronic cam, linking of the line segment approximation using an instruction for line segment approximation
- Configuration example: FQM1-CM002 plus FQM1-MMP22 (with pulse I/O)

High-quality Winding Control with the FQM1's High-speed Control Cycle

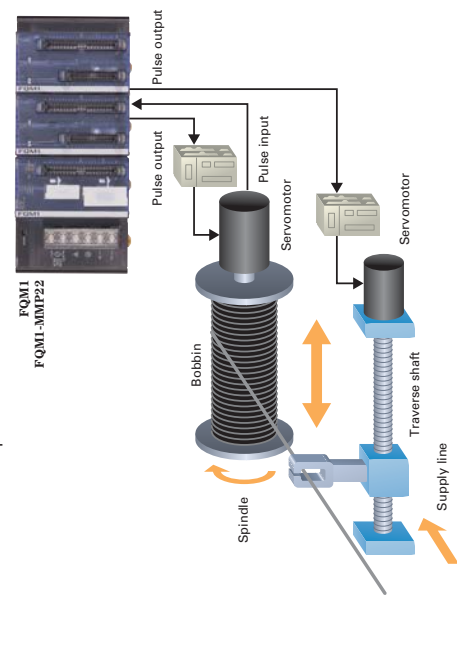
High-speed pulse I/O and a high-quality winding cycle are used to achieve high-quality winding control. An accurate winding pitch is achieved by controlling the relation between the spindle and the traverse amount using an electronic cam system and tracking the transverse motion of the spindle.

Wind without stopping

Application Examples • Wire/thread winding control

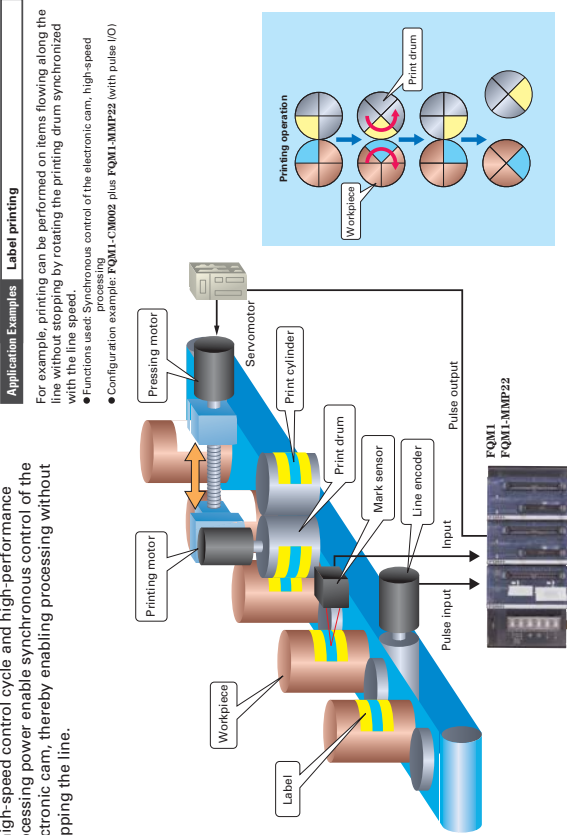
For example, the transverse motion is controlled using an electronic cam system in response to spindle commands or rotation feedback.

- Functions used: Synchronous control of the electronic cam, switching of the linear pattern using an instruction for linear approximation
- Configuration example: FQM1-CM002 plus FQM1-MMP22 (with pulse I/O)



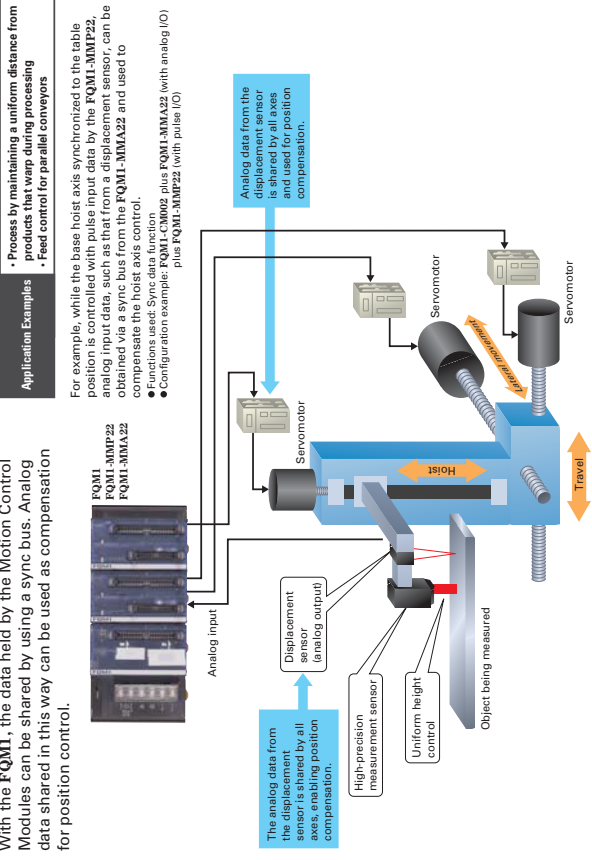
The High-speed Control Cycle and Processing Power of the FQM1 Expand the Range of Synchronous Control.

A high-speed control cycle and high-performance processing power enable synchronous control of the electronic cam, thereby enabling processing without stopping the line.



Use the FQM1 Synchronized Data Function to Enable Synchronized Compensation Control

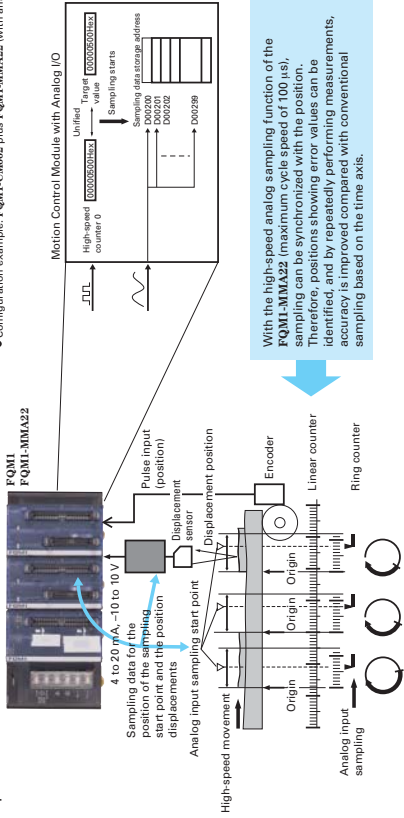
With the FQM1, the data held by the Motion Control Modules can be shared by using a sync bus. Analog data shared in this way can be used as compensation for position control.



Measurement Control Applications

High-speed Analog Sampling Synced on an FQM1 Pulse Input

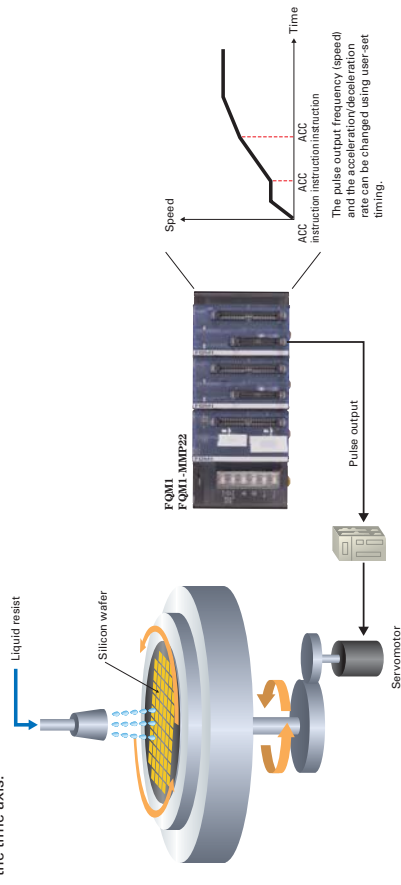
The FQM1-MMA22 has a high-speed sampling and storage function for analog input data that is synced with input pulses (i.e., the position of the target object). This achieves sampling performance beyond that achieved with conventional controllers, and also supports sampling in sync with an external signal, whereas only sampling over specified times was possible until now.



High-speed Response Control Applications

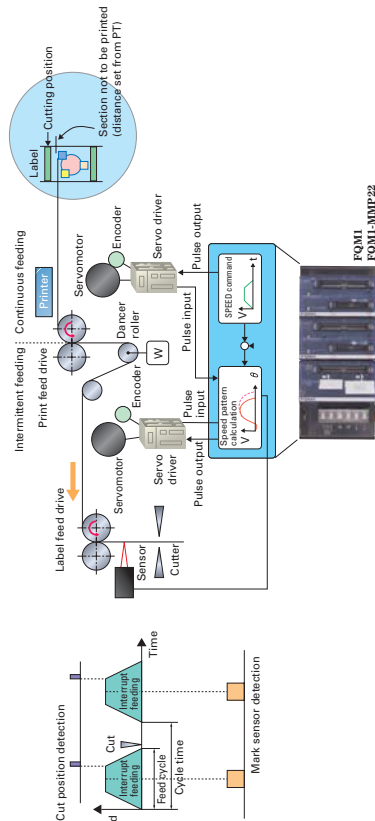
Flexible Speed Control with Freely Controlled Pulse Outputs

With the renewed FQM1, the freedom in speed control has been greatly increased by using pulse outputs. In the operation of infinite-axis feeding, the rotation speed can be changed by changing the frequency of the pulse output as desired based on the time axis.



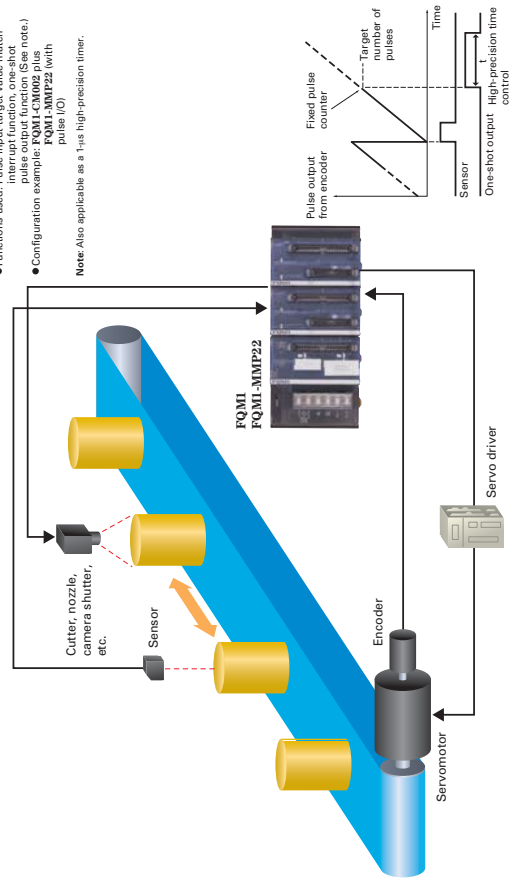
Pulse Output Control with the FQM1's High-speed Input Response

Sensor inputs can be detected with high precision by using the FQM1's dependable interrupt latch function for pulse inputs. This improves precision when switching or stopping machine operation and performing processing from sensor inputs.



Timing Control with the FQM1's Pulse Inputs

The pulse input and high-precision output functions of the FQM1 provide support to perform processing at a specific distance after detection for when processing cannot be performed based on time after an ON/OFF sensor detects an object or when precision is insufficient.

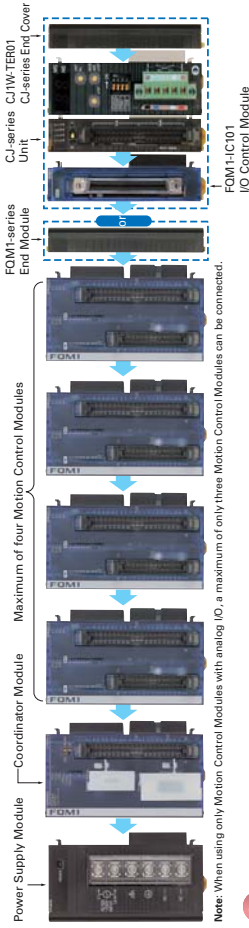


For the Optimal Control Customers Demand for Their Machines Flexible

Flexible System Configuration Using Modular Configuration

The FQM1 consists of a Power Supply Module, a Coordinator Module, Motion Control Modules, and an End Module. Motion Control Modules are available with pulse I/O or analog I/O, and up to four Motion Control Modules of either type can be connected. (See note.) Each Motion Control Module controls two axes. Therefore, when four

Modules are connected, motion control can be performed for up to eight axes. Also, CJ-series Units can be mounted if an I/O Control Module is used, enabling a flexible system configuration to meet the needs of the application.

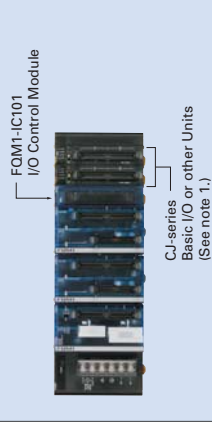


I/O and Other Functions Expandable with CJ-series Units

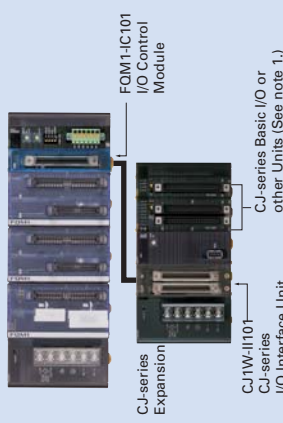
Some of the PLC SYSMAC CJ-series Units can be used by mounting an I/O Control Module for the FQM1 to the FQM1. CJ-series Units can be connected on the right end

of the FQM1 or using the CJ-series I/O Interface Unit with up to one Expansion Rack.

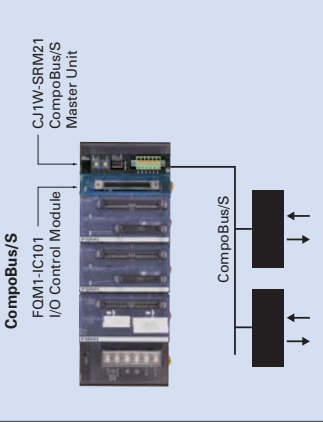
Example 1: Expansion with CJ-series Basic I/O Units



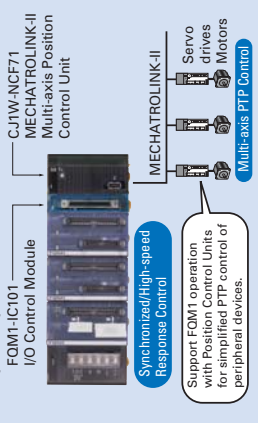
Example 2: Expansion with CJ-series Expansion Rack



Example 3: I/O Expansion and Reduced Wiring with CompoBus/S



Example 4: Expansion with Multi-axis Position Control Units



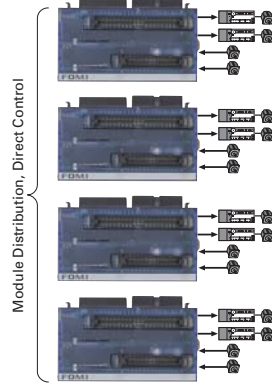
Note 1: The follow CJ-series Units can be connected as long as the current consumption does not exceed the supply capacity.
 • FQM1-IC101 I/O Control Module • CompoBus/S Master Unit • DeviceNet Units • Position Control Units (NCP Units) with MECHATROLINK-II (See note 2.)
 • SYSMAC SPU High-speed Data Collection Unit

Note 2: MECHATROLINK is a registered trademark of Yaskawa Electric Corporation.

For the Optimal Control Customers Demand for Their Machines Flexible

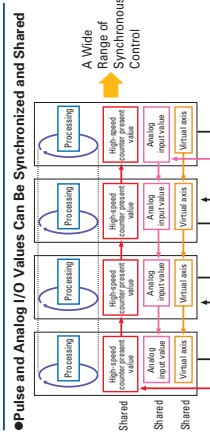
Each Module Controls I/O Directly

The FQM1 distributes control to each Module, and each Module controls I/O directly. The Motion Control Modules and Coordinator Module independently execute their own ladder programming, enabling independent, high-speed processing of analog and or pulse I/O controls.



Sync Data Shared between Modules

With the FQM1, each Module can broadcast any two types of data as shared data. Data, such as present values of high-speed counters, analog input values, and virtual axes, can be shared between Modules, enabling a wide variety of synchronized control.

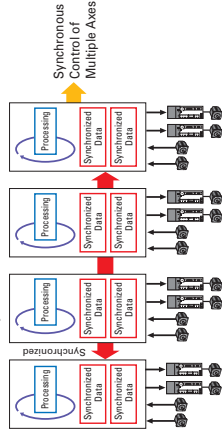


Note: The following types of information can be shared between Modules: Ladder processing results, high-speed counter present values, pulse output present values, analog input values, analog output values, and built-in input values.

Synchronize Up to Eight Axes

With the FQM1, each Motion Control Module can control two axes. If you mount four Modules, synchronous control can be performed for up to eight axes.

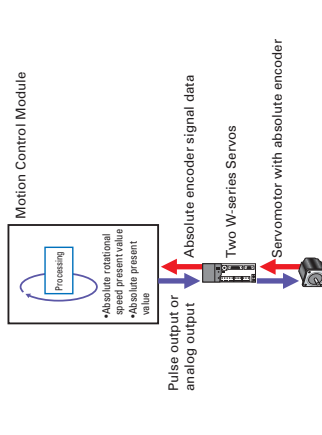
Up to Eight Axes Can Be Synchronized (Processing Cycles of All Modules Are Synchronized)



Compatible with Absolute Encoders

A Servo Driver with an absolute encoder can be connected to the FQM1.

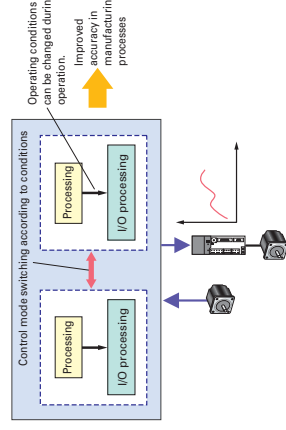
Servo Drivers with Absolute Encoders Can Be Used.



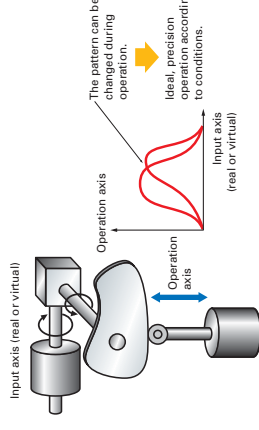
Detailed Programming of Motion Control

With the FQM1, each Module contains a user ladder program, enabling programming detailed operations that conventionally could not be implemented by the comparatively conservative processing of specialized motion languages.

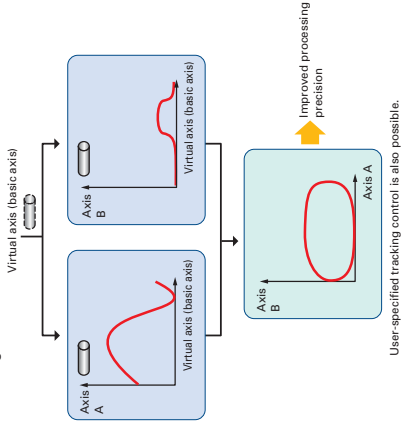
Support for Highly Flexible Programming, such as Control Mode Switching, Operating Condition Changes during Operation, etc.



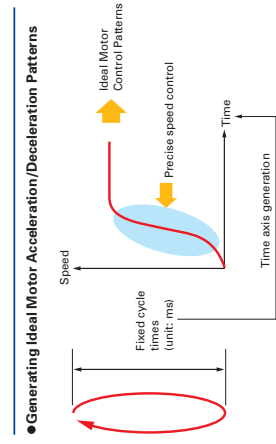
Ideal Flexible Electronic Cam Operation



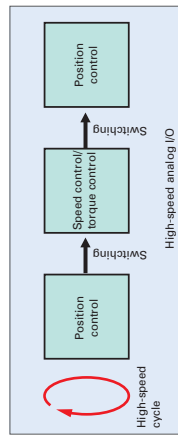
Tracking Pattern Generation



Generating Ideal Motor Acceleration/Deceleration Patterns



Operation Switching, such as from Position Control to Speed Control or from Torque Control to Position Control



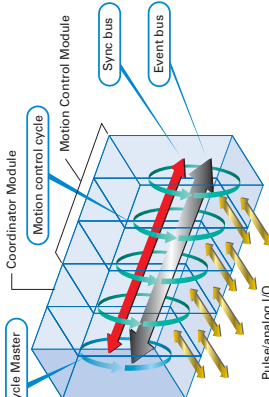
High-speed cycle and high-speed analog I/O make higher precision control, and enable speed/torque limit switching.

Improved accuracy in manufacturing processes

For the Optimal Response Demanded from Your Machines Quick

Parallel Distributed Processing System

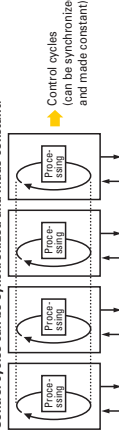
Stable Motion Control Cycles for 2 to 8 Axes
With the FQM1, the Coordinator Module and each Motion Control Module have its own application program (ladder diagram). The Coordinator Module processes communications services with peripherals, such as computers and PTs. This enables each Motion Control Module to concentrate on its processing exclusively, as a closed unit, resulting in high-speed motion control cycles of 0.5 to 2 ms (overhead time in cycle time is 0.19 ms min.). Also, even if the number of control axes increases, control is distributed and executed at each Module so that the same stable motion control cycles can be achieved as for only a few control axes.



Control Cycles Synced between Axes

The FQM1 has a sync bus running between the Modules so that control can be carried out in the same control cycle (Coordinator Module cycle, or specified cycle time between 0.5 and 10.0 ms) while data, e.g., for virtual axes and real axes, is shared among all Motion Control Modules. By making the control cycle of the Coordinator Module constant, it also becomes possible to make the control cycles of the Motion Control Modules constant.

Control cycles can be synchronized and made constant.



High-speed Processing Performance

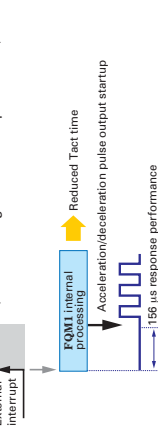
High-speed Cyclic Processing Engine Directly Controls Built-in Pulse/Analog I/O

Each FQM1 Motion Control Module has built-in I/O. Therefore each Motion Control Module can perform I/O processing directly as a self-contained unit. Also, the I/O interfaces are designed specifically for speed to enable the following high-speed I/O.

High-speed Pulse Startup

High-speed Pulse Startup at 25 μ s Minimum
Examples: Electronic cam pulse output 32 μ s Trapezoidal PTP pulse output: 54 μ s
Pulse startup
Improved accurate positioning
Electronic cam pulse output startup
Highly accurate positioning
Improved processing precision

● **Input Interrupt** Interrupt Response: approx. 70 μ s
(Not including hardware response time)



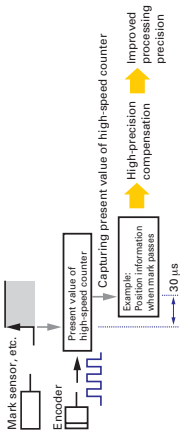
This results in, for example, an interval of 156 μ s between an external input and pulse distribution startup when pulses are output for a PTP operation in response to an input interrupt (using the PLS2 instruction).

High-speed Analog I/O

• Analog input conversion: 40 μ s
• Analog output conversion: 40 μ s
High-speed analog input
Linear sensor
High-speed conversion: 40 μ s
High-speed analog measurement in the FQM1
Detection of acceleration/deceleration pulse output startup
Product quality improvement in warpage, sagging, fouling, etc. collection

● **Capturing High-speed Counter Present Value with Hardware Latch**

• Latch input response: 30 μ s
• Latching captured present value of high-speed counter: Control cycle
External latch: Hardware latch



Higher-Frequency Pulse I/O

To support applications demanding high precision, the FQM1 has increased the frequencies for pulse I/O.
• Pulse input: 500 kHz (phase difference with multiple of 4: 2 MHz)
• Pulse output: Maximum output frequency of 1 MHz

High-speed Pulse Inputs



High-speed Pulse Outputs

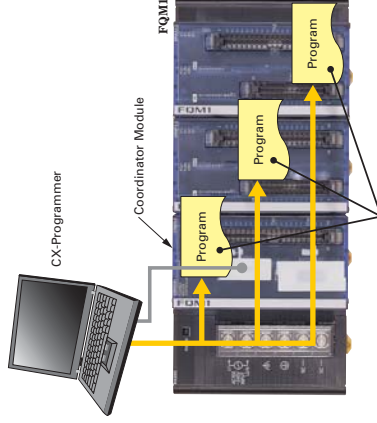


High-speed Analog Outputs



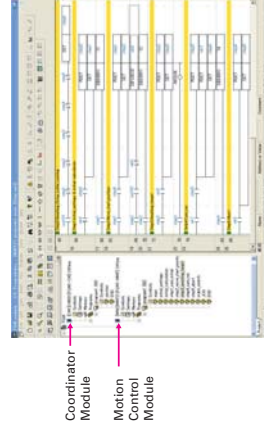
Program Development Environment Application program development is as easy for the FQM1 as for a PLC.

Connect the CX-Programmer Support Software to the Coordinator Module to create and monitor programs for all Modules. While monitoring the ladder programs in Motion Control Modules, it is possible to input operation conditions for monitoring the I/O of the Coordinator Module, and to debug programs.



Ladder programs for the Coordinator Module and all Motion Control Modules can be created, transferred, and monitored.

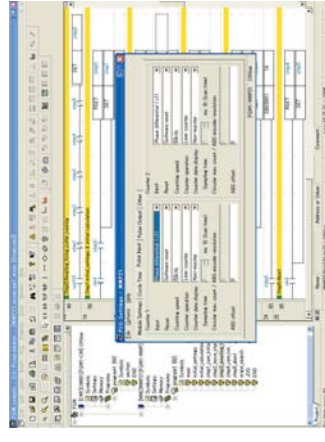
Manage the FQM1 Module Configuration on a Directory Tree on the Support Software.



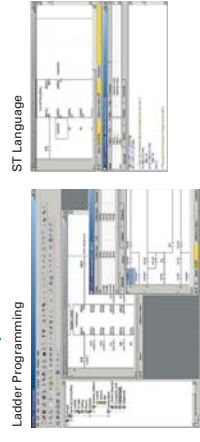
Note: Use CX-Programmer version 6.11 or higher with the FQM1.

Set the Module Operations on the System Setup Window

System Setup, such as the FQM1 synchronous/asynchronous mode setting, to determine the FQM1 operation modes are required along with creating application programs and can be selected in special windows.

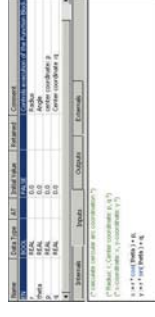


Function Block (Ladder Programming and ST Language) Support Further Improve Development Efficiency and Maintenance.



Calculation processing can be written with Structured Text

Efficiency of development and maintenance is increased for motion control applications with a lot of calculation processing.



Connecting Peripherals

Serial communications systems can be constructed with the host PC.

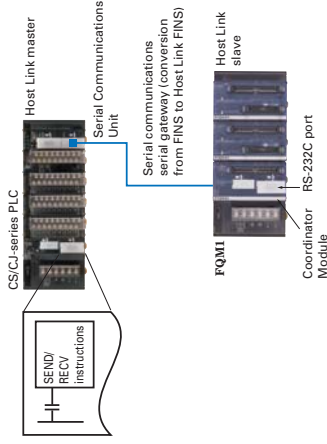
- Host Links with CS/CJ-series PLCs
- Serial PLC Links with CJ1M PLCs

Serial Communications with the Host PLC

FQM1 data can be read and written using communications instructions from the host PLC.

■ Equipped with Host Link Functions as Standard Feature: Coordinator Module

By mounting a Serial Communications Unit (of Unit version 1.2 or later) to a CS/CJ-series PLC, accessed data can be read and written for the **FQMI** using the SEND/REC network communications instructions with the CS/CJ-series PLC as the Host Unit master and the **FQMI** as the Host Unit slave (using the RS-232C port on the Coordinator Module).



Seamless Data Exchange with Host Controllers

Serial PLC Links Supported

(Data Sharing with the OMRON CJ1M PLC)

Exchange of control data with the machine's main controller (PLC) can be performed without any special programming. With the Cj1M CPU Unit as master and the **FQM1** as slave, data can be exchanged between the two without special programming. Connect the **FQM1** Coordinator Module to the RS-232C port.

Note 1: The master link method and complete link method for Serial PLC Links are supported.

2: When connecting 1:N (where N = 8 units max.) via RS-422A/485, use an RS-422A converter (CJ1W-CIF11).

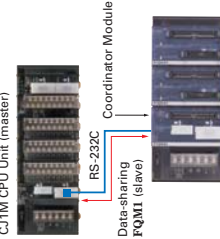
2: When connecting 1:N (where $N =$

RS-422A converter (CJ1W-CIF-11):

The maximum size of each CJ1M/FQMI transmission is ten words. Transmissions smaller than ten words (unified CJ1M/FQMI size) can also be sent (set as the number of link words).

● System Configuration

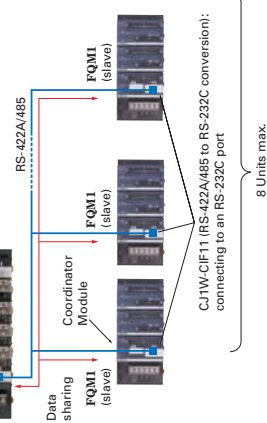
- CJ1M:FQM1 = 1:1 Connection



- **CJ1M:FQM1 = 1:N (8 Max.) Connection**

C:\1MCP\11Init (master)

CJ1W-CIF11
(RS-422A/485 to RS-232C conversion):
Connection to an RS-232C port



Reference information: In the complete link method, the CJ1M CPU Unit will be the master and data transfer will be possible among the **FQM1** slaves.

Connecting Peripherals

Construct Touch Panel (PT) Systems and DeviceNet Systems.

- NS-series PTs supported.
- DeviceNet supported.

Serial Communications with NS-series PTs

Easy Servo Parameter Setup/Monitoring from NS-series PTs

Serial Gateway Function

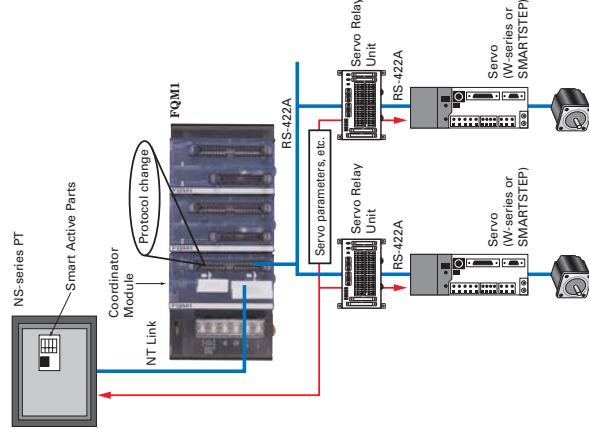
(Built-in RS-422A for Connecting to Servo)

Servo parameters and other data can be read or written from an NS-series PT or computer (application running on the CX-Server) via the **FQMI** Coordinator Module for servo drivers connected by RS-422A. This makes it easy to enter servo driver parameter settings at system startup, and to monitor operation.

- RS-422A-compatible Servo Drivers
OMRON W-series or SMARTSTEP

●System Configuration

Example: Accessing a Servo Driver (W-series or SMARTSTEP) Using Smart Active Parts on an NS-series PT Connected Using an NT Link



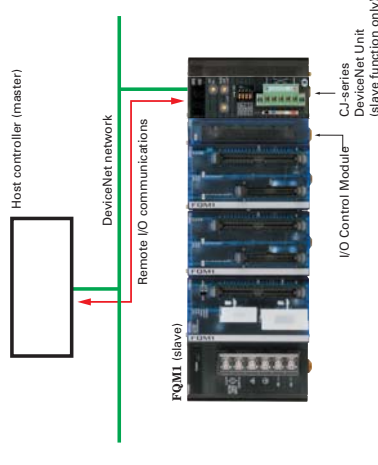
Note: The Servo Relay Unit has a built-in RS-422A connector for connecting to the **FQM1**.

DeviceNet communications with the host controller

Data can be exchanged with the host controller using DeviceNet without special programming.

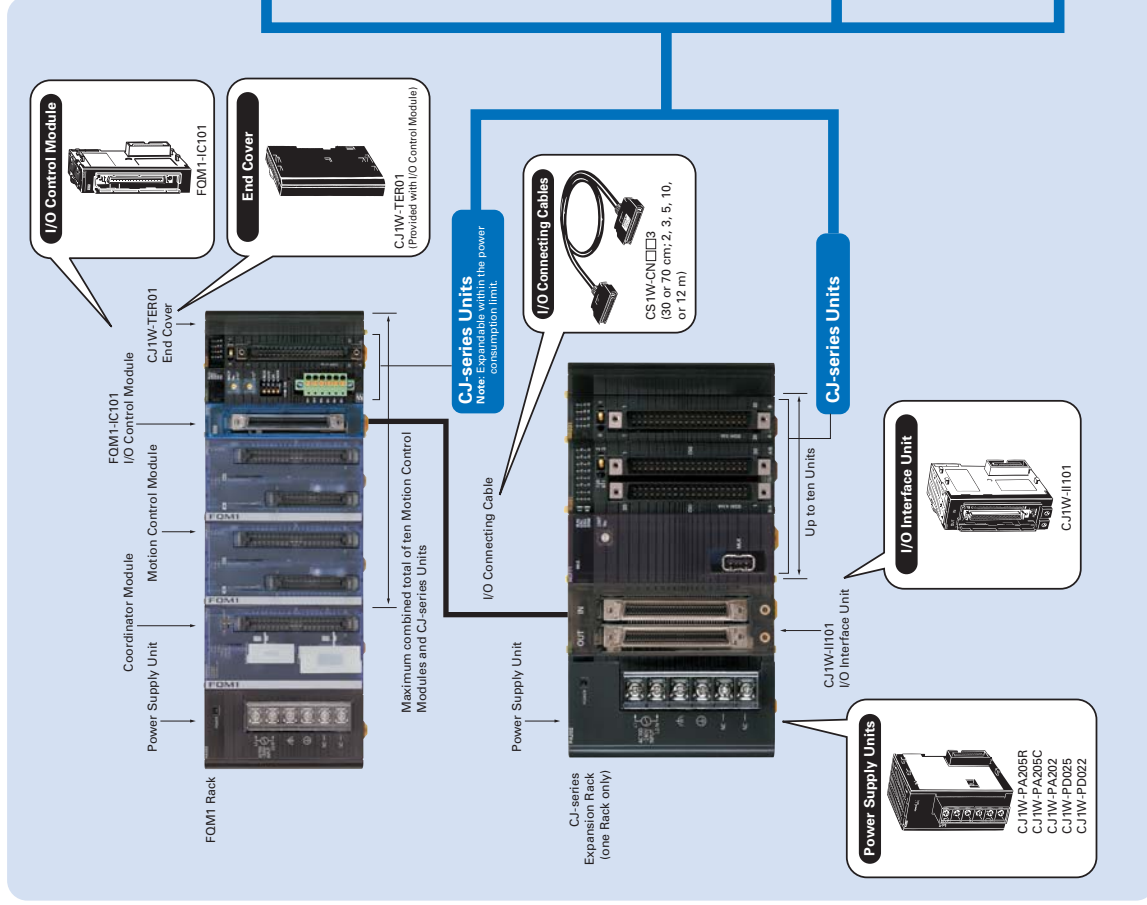
■ Add a DeviceNet Slave Function

Remote I/O communications will be possible between the host controller (master) and **FQM1** (slave) if the **FQM1** is expanded using an I/O Control Module and the slave function of a CJ-series DeviceNet Unit.

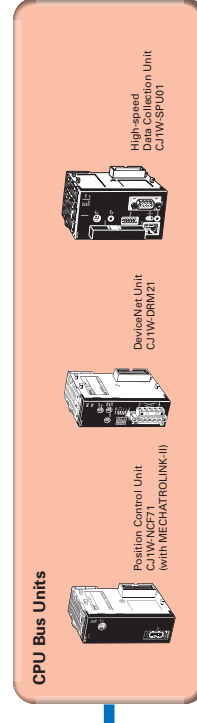
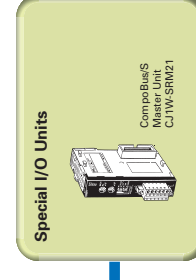
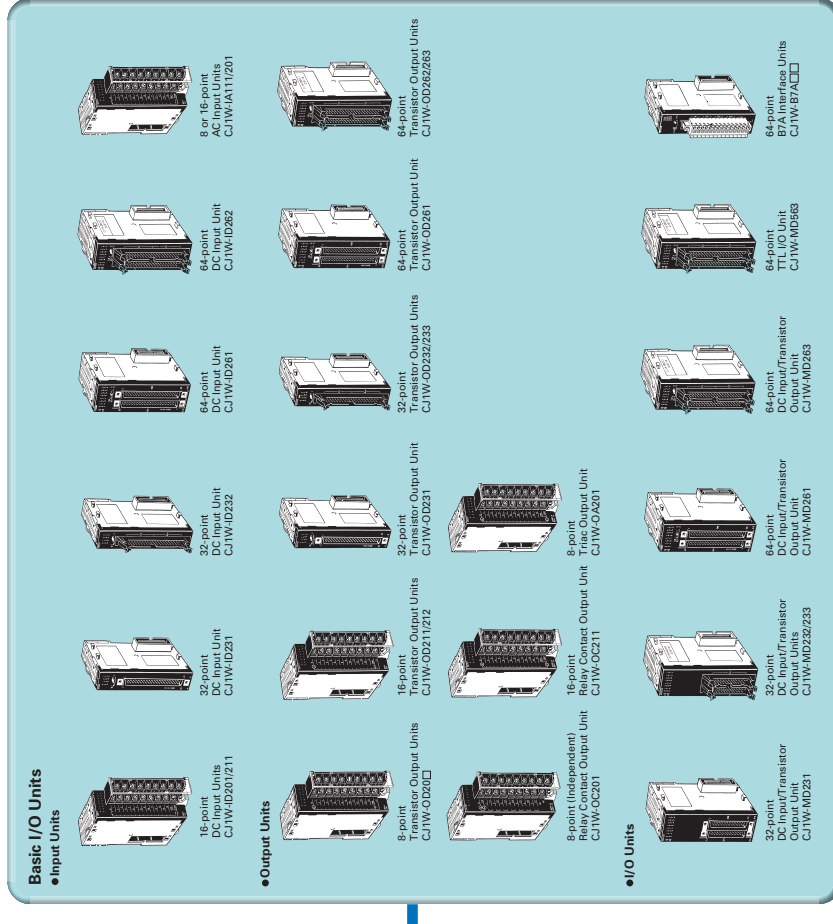


Expansion Possible Using CJ-series Units Expansion Is Performed though an I/O Control Module (for Bus Conversion and I/O Expansion)

- CJ-series Basic I/O Units
- CompoBus/S Master Units, Position Control Units, High-speed Data Collection Units
- CJ-series Expansion Rack (The above Units can be mounted; one Rack only.)



CJ-series Units for FQM1 Expansion



Performance and Specifications

■ General Specifications

Item		Specifications	
Control method		Stored program method	Motion Control Module
I/O control method		Cyclic scan method	Stored program method
Programming language		Ladder diagram method	Ladder diagram method
Instruction length		1 to 7 steps/instruction	1 to 7 steps/instruction
Number of instructions		Approx. 300	Approx. 300
Executing speed	Basic instructions	0.1 μs/min.	0.1 μs/min.
	Special instructions	0.3 μs/min.	0.3 μs/min.
Common processing time (overhead)		Synchronous mode: 390 μs when 1 Motion Control Module is connected	Synchronous mode: 250 μs
		Asynchronous mode: 180 μs	Asynchronous mode: 180 μs
Program capacity	Ladder	10 Ksteps	10 Ksteps
	Comment storage	Yes	Yes
Number of tasks		Cyclic tasks: 1, Interrupt tasks: 50	Cyclic tasks: 1, Interrupt tasks: 50
Subroutines		256	256
JMP instruction		256	256
Number of basic I/O points		24	20 per Module
Built-in Input Bits		16 bits (1 word): CIO 2960.00 to CIO 2960.15	12 bits (1 word): CIO 2960.00 to CIO 2960.11
Built-in Output Bits		8 bits (1 word): CIO 2961.00 to CIO 2961.07	8 bits (1 word): CIO 2961.00 to CIO 2961.07
I/O bits		320 bits (20 words): CIO 0000 to CIO 0019	None
CPU Bus Unit Area		6,400 bits (400 words): CIO 1500 to CIO 1999	None
Special I/O Unit Area		13,760 bits (860 words): CIO 2100 to CIO 2999	None
Cyclic Refresh Bit Area		640 bits (40 words): CIO 4000 to CIO 4039 Refresh with Motion Module # 1: CIO 4000 to CIO 4009 Refresh with Motion Module # 2: CIO 4010 to CIO 4019 Refresh with Motion Module # 3: CIO 4020 to CIO 4029 Refresh with Motion Module # 4: CIO 4030 to CIO 4039	160 bits (10 words): CIO 4000 to CIO 4009 Refresh with Motion Module # 1: CIO 4000 to CIO 4009 Output refresh from Motion Control Module to Coordinator Module: CIO 4000 to CIO 4004 CIO 4005 to CIO 4009
Sync Data Link Bit Area		320 bits (20 words): CIO 1200 to CIO 1219 Transmission refresh from Coordinator Module: CIO 1200 to CIO 1203 Transmission refresh from Motion Module # 1: CIO 1204 to CIO 1207 Transmission refresh from Motion Module # 2: CIO 1208 to CIO 1211 Transmission refresh from Motion Module # 3: CIO 1212 to CIO 1215 Transmission refresh from Motion Module # 4: CIO 1216 to CIO 1219	320 bits (20 words): CIO 1200 to CIO 1219 Transmission refresh from Coordinator Module: CIO 1200 to CIO 1203 Transmission refresh from Motion Module # 1: CIO 1204 to CIO 1207 Transmission refresh from Motion Module # 2: CIO 1208 to CIO 1211 Transmission refresh from Motion Module # 3: CIO 1212 to CIO 1215 Transmission refresh from Motion Module # 4: CIO 1216 to CIO 1219
Serial PLC Link Bit Area (complete link method)		1,440 bits (90 words): CIO 3100 to CIO 3189 CIO 3100 to CIO 3189: C/JIM to C/JIM and sources other than FQM1 (10 words each according to unit number)	None
Serial PLC Link Bit Area (master link method)		320 bits (20 words): CIO 3100 to CIO 3119 CIO 3100 to CIO 3109: C/JIM to FQM1 CIO 3110 to CIO 3119: FQM1 to C/JIM Connectable to the host PLC (C/JIM) as a Serial PLC Link slave.	None
DeviceNet Link Bit Area		9,600 bits (600 words): CIO 3200 to CIO 3799	None
Internal Auxiliary Area	CIO Area	48,792 bits (CIO 0070 to CIO 1199, CIO 1220 to CIO 1499, CIO 1500 to CIO 2099, CIO 2602 to CIO 3999, CIO 3180 to CIO 3189, CIO 3800 to CIO 3999, CIO 4040 to CIO 4999, CIO 6000 to CIO 6143	81,792 bits (CIO 0070 to CIO 1199, CIO 1220 to CIO 2699, CIO 2692 to CIO 3999, CIO 4010 to CIO 4999, CIO 6000 to CIO 6143
	Work Area	4,096 bits: W000 to W255	4,096 bits: W000 to W255

■ Performance Specifications

Item		Specifications	
Auxiliary Area	READ/WRITE	Read-only: 7,168 bits (A000 to A437) Read/Write: 6,192 bits (A448 to A959)	Motion Control Module Read-only: 7,168 bits (A000 to A437) Read/Write: 6,192 bits (A448 to A959)
	Error log	100 words: A100 to A199 (20 records)	100 words: A100 to A199 (20 records)
Trn Area		16 bits: TR0 to TR15	16 bits: TR0 to TR15
Timer Area		256 timers: T0000 to T0255 (1-ms timers, 10-ms timers, 100-ms timers)	256 timers: T0000 to T0255 (1-ms timers, 10-ms timers, 100-ms timers)
Counter Area		256 counters: C0000 to C0255 (decrementing counters, reversible counters) *Not retained on power interruption.	256 counters: C0000 to C0255 (decrementing counters, reversible counters) *Not retained on power interruption.
DM Area	Read/Write (not retained)	20,000 words: D00000 to D19999 (Not retained on power interruption)	30,000 words: D00000 to D29999 (Not retained on power interruption) (See note 1.)
	Read/Write (retained)	12,768 words: D20000 to D32767 Data is retained when power is lost, and when written by ladder program, however, saved in flash memory (written by Programming Device such as the CX-Programmer.)	2,768 words: D30000 to D32767 (backed up by super capacitor)
System Setup		System Setup Area (shared by Coordinator Module, Motion Control Modules, and peripheral services), Peripheral Service Settings	System Setup Area (shared by Coordinator Module and Motion Control Modules), Motion Parameter Settings
Function block address allocation area	CIO Area	16,000 bits (1,000 words): CIO 5000 to CIO 9999	16,000 bits (1,000 words): CIO 5000 to CIO 9999
	Counter Area	100 bits: T0206 to T0255	100 bits: T0206 to T0255
Index Registers		100 bits: C0206 to C0255	100 bits: C0206 to C0255
Data Registers		D00 to D015 (D00 and D01 used with the JSB instruction) Note: D0 to IR 63 for FBST (used by the system)	D00 to D015 (D00 and D01 used with the JSB instruction) Note: D0 to IR 63 for FBST (used by the system)
Interrupts	Input interrupts	None	DR0 to DR15
	Timer interrupts	1 (scheduled or one-shot interrupts)	1 (scheduled or one-shot interrupts)
Power OFF backup function (momentary power interruptions)		Super capacitor	Super capacitor
Memory backup	Super capacitor	Error log	Error log, a portion of DM (for momentary interruptions)
	Flash memory	User programs, System Setup, part of DM	User programs, System Setup
Trace Memory		4,000 words	4,000 words
Peripheral services		Peripheral port CX-Programmer connection only, RS-232C port (servo driver connection) services	Event requests from the Coordinator Module
Self-diagnosis		CPU error (WDT), memory error	CPU error (WDT), memory error
Program check functions		Checked using Programming Device	Checked using Programming Device
Super capacitor life		Approx. 100 hours (ambient temperature: 25°C, see note 2.)	Approx. 100 hours (ambient temperature: 25°C, see note 2.)
Clock		None	None
Power interruption detection time		AC: 10 to 25 ms (not fixed)	—
Power interruption detection delay		0 to 10 ms	—
RUN output		Yes (When using C.JTW-PA205R)	—

Note 1. Can also be retained in flash memory. A bit can be manipulated to automatically restore the data according to a parameter setting in the System Setup when the power supply is turned ON.
2. Depends on the ambient temperature and number of years in use.

Performance and Specifications

■ General Specifications

Item	Specifications
Insulation resistance	20 MΩ min. between AC external terminals and GR terminal at 500 VDC, see note 1.)
Dielectric strength	2,300 VAC, 50/60 Hz between AC external terminals and GR terminal for 1 min, leakage current: 10 mA max. (See notes 1 and 3.)
Noise immunity	720 VAC, 50/60 Hz between DC external terminals and GR terminal for 1 min, leakage current: 10 mA max. (See note 1.)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance	Conforms to JIS C0040 (10 to 57 Hz) Acceleration: 9.8 m/s ² (57 to 150 Hz for 80 min in X, Y, and Z directions (10 sweeps of 8 min = 80 min total))
Shock resistance	Conforms to JIS C0041 147 m/s ² 3 times each in X, Y, and Z directions
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (with no condensation)
Atmosphere	No corrosive gases
Ambient storage temperature	-20 to 75°C
Ground	Less than 100 Ω
Structure	For installation in a control panel
Dimensions (mm)	49 x 90 x 80 mm (W x H x D) excluding cable
Weight	5 kg max. per Module
Safety standards	EC, CE, Ticks, UL approval pending (See note 4.)

Note 1: Disconnect the LG terminal on the Power Supply Unit from the GR terminal before performing the insulation resistance test. If the test is performed with the GR terminal connected, the test results may be destroyed. If testing is performed with the LR and GR terminals connected.

Note 2: Values for AC power are at room temperature and a cold start. Values for DC power are for a cold start. A thermostat is used in the inrush current control circuit of the AC power supply. The inrush current may be higher than the value given above. If the inrush current exceeds the value given above by up to twice the given value when starting at high temperatures or if a hot start is performed immediately after the current is turned OFF for a short period of time because the thermostat element will not be sufficiently cooled, the inrush current may be higher than the value given above. The capacitor-charged delay circuit is used for the inrush current control circuit in the DC power supply. If hot starts are performed after turning OFF the power supply for only a short period of time, the inrush current may be higher than the value given above by up to twice the given value because the capacitor will not be discharged.

Note 3: Do not apply voltages exceeding 600 V when performing dielectric testing for the analog I/O terminals. Internal elements may deteriorate.

Note 4: UL-approved products are scheduled for shipment in March 2006.

■ Combinations of Power Supply Unit and Models

FQ01 without Expansion Using CJ-series Units			
No. of axes	No. of FQ01-MMP22 Modules	No. of FQ01-MMA322 Modules	Power Supply Units
2 Axes	1	0	CJ1W-PA202 CJ1W-PA205R
4 Axes	1	1	
	0	2	
	3	0	
	2	1	
6 Axes	1	2	CJ1W-PA205R
	0	3	
	4	0	
	3	1	
8 Axes	2	2	
	1	3	
	0	4	Not possible.

Item	Specifications	
	Coordinator Module	
Individual Functions	Serial communications	Peripheral port (toolbus, Host Link) Coordinator Module built-in RS-292C port (Host Link, no protocol), INT Link, Serial PC Link (slave)
		Coordinator Module built-in RS-422A port (servo driver interface, serial gateway, no protocol)
	High-speed pulse outputs	Single phase, up-down counting, pulse plus direction input (50 kHz/1 ms max. resolution), phase difference multiplier of 4: 2 MHz
	High-speed pulse outputs	CW/CW (1 MHz line-driver) one-shot pulse output Resolution: 100 to 10 V, 16,000 to 10 V, 8,000 to 10 V, 4,000 to 5 V, 4,000 to 1 to 5 V, 4,000 to 20 mA, 4,000
Analog outputs	Analog inputs	Conversion speed: 40 is/point Resolution: 100 to 10 V, 16,000 to 10 V, 8,000 to 10 V, 4,000 to 5 V, 4,000 to 1 to 5 V, 4,000 to 20 mA, 4,000
	Analog outputs	Conversion speed: 40 is/point Resolution: -10 to 10 V, 10,000 to 10 V, 0 to 5 V, or 1 to 5 V, 4,000

■ Coordinator Module

● Built-in General-purpose I/O

Item	Specifications
Input specifications	16
Input voltage	20.4 to 26.4 V
Input voltage	Normal inputs (I ₀): ON: 100 μs, OFF response: 1 ms max. 8 inputs common
Outputs	8
Output form	NPN transistors
Switching capacity	4.5 to 30 VDC, 0.3 A per transistor
ON response time	0.1 ms max.
OFF response time	1 ms max.

■ Motion Control Module

● Built-in General-purpose I/O

Item	Specifications
Input	12
Input voltage	20.4 to 26.4 V
Input voltage	Interrupt inputs (4) ON response: 30 μs max. OFF response: 0.2 ms max.
Outputs	8
Output form	NPN transistors
Switching capacity	4.5 to 30 VDC, 0.3 A per transistor
Output response	ON response: 0.1 ms max. OFF response: 1 ms max.

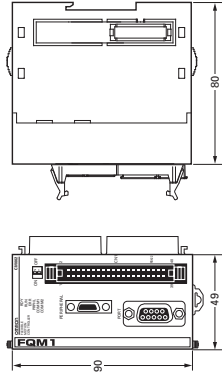
■ Power Supply Unit Specifications

Item	Specifications
Power Supply Unit model	CJ1W-PA205R
Power supply voltage	100 to 240 VAC (wide range), 50/60 Hz
Allowable power supply voltage and frequency ranges	85 to 264 VAC, 47 to 63 Hz
Power consumption	100 VA max. 50 VA max. 100 to 120 VAC input: 15 A max. for 8 ms max. (for cold start at room temperature) 100 to 240 VAC input: 0.5 A at 120 VAC (inductive load) 200 to 240 VAC input: 0.5 A at 240 VAC (inductive load) 200 to 240 VAC input: 0.5 A at 240 VAC (inductive load)
Inrush current (See note 2.)	15 A max. for 8 ms max. (for cold start at room temperature) 200 to 240 VAC input: 0.5 A at 120 VAC (inductive load) 200 to 240 VAC input: 0.5 A at 240 VAC (inductive load)
Power supply capacity	5.0 A at 5 VDC (including power supplied to Modules) 2.5 A at 5 VDC (including power supplied to Modules) 0.8 A at 24 VDC 0.4 A at 24 VDC
Power output terminals	25 W total max. 14 W total max.
RUN output	None
Insulation resistance	20 MΩ min. between AC external terminals and GR terminal at 500 VDC. (See note 1.)
Dielectric strength	2,300 VAC, 50/60 Hz between AC external terminals and GR terminal for 1 min, leakage current: 10 mA max. (See note 1.)
Noise immunity	720 VAC, 50/60 Hz between DC external terminals and GR terminal for 1 min, leakage current: 10 mA max. (See note 1.)
Vibration resistance	Conforms to JIS C0040 (10 to 57 Hz) Acceleration: 9.8 m/s ² (57 to 150 Hz for 80 min in X, Y, and Z directions (10 sweeps of 8 min = 80 min total))
Shock resistance	Conforms to JIS C0041 147 m/s ² 3 times each in X, Y, and Z directions
Ambient operating temperature	0 to 55°C
Ambient operating humidity	0% to 90% (with no condensation)
Atmosphere	No corrosive gases
Ambient storage temperature	-20 to 75°C
Ground	Less than 100 Ω
Structure	For installation in a control panel
Weight	5 kg max. per Module
Dimensions (mm)	80 x 90 x 65 mm (W x H x D) excluding cable
Safety standards	cULus, EC directives

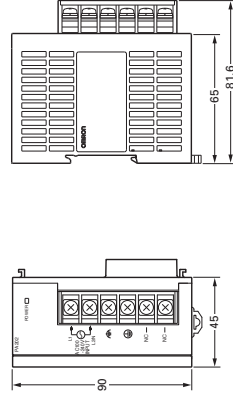
Dimensions

Unit: mm

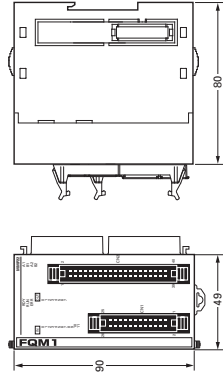
Coordinator Module FQM1-CM002



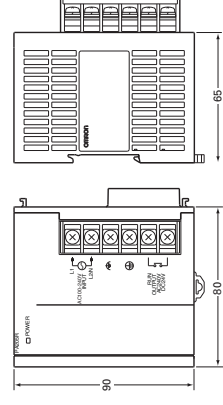
Power Supply Units CJ1W-PA202



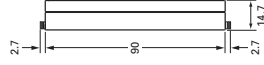
Motion Control Modules FQM1-MMP22/MMA22



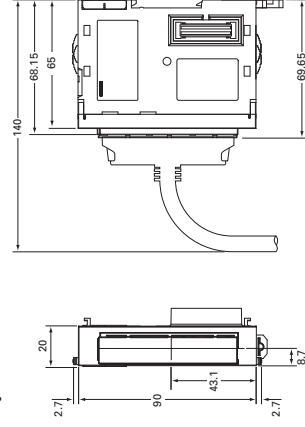
Power Supply Units CJ1W-PA205R



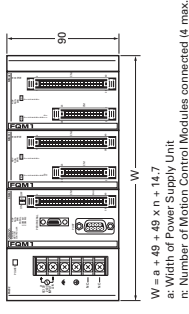
End Module FQM1-TER01



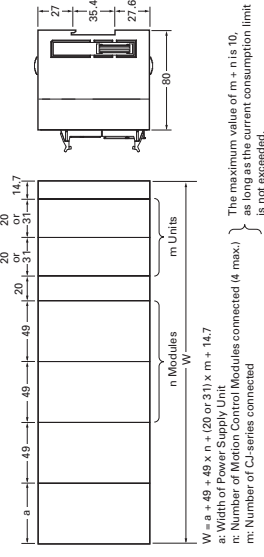
I/O Control Module FQM1-IC101



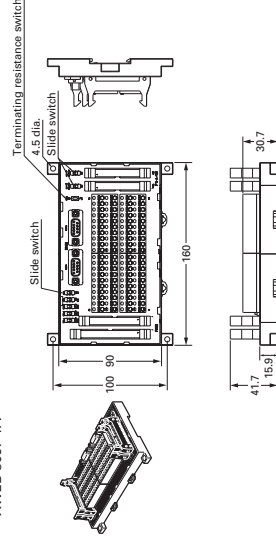
Assembled Dimensions



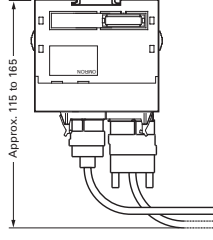
FQM1 Expanded Using CJ-series Units



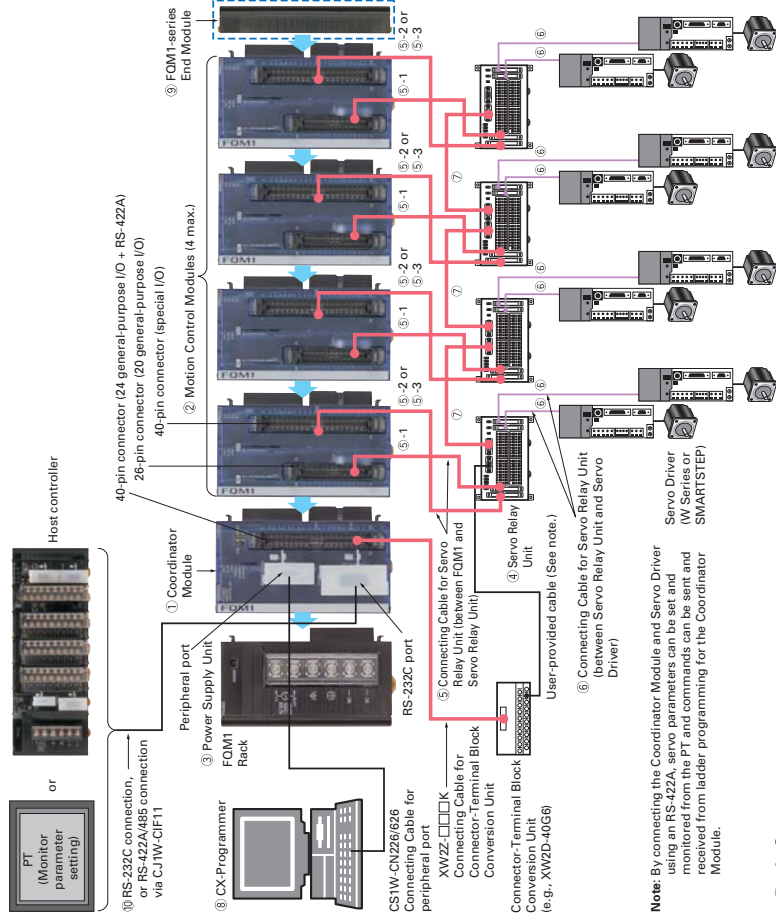
Servo Relay Unit XW2B-80J7-1A



Height with Cables Connected Height with Peripheral Port and RS-232C Port Connected



Ordering Information



Note: By connecting the Coordinator Module and Servo Driver using an RS-422A, servo parameters can be set and monitored from the PT and commands can be sent and received from ladder programming for the Coordinator Module.

■ **Basic Sets** **NEW**

Name	Specifications	Model	Standards
FQMI Pulse Set	A basic set for pulse outputs and 2 axes ③ CJ1W-PA202 + ① FQMI-CM002 + ② FQMI-MMP22 + ③ FQMI-TEB01	FQMI-MC238 (See note 1.) (See note 2.)	CE, UL approval (See table 2.)
FQMI Analog Set	A basic set for analog outputs and 2 axes ③ CJ1W-PA206R + ① FQMI-CM002 + ② FQMI-MAA22 + ③ FQMI-TEB01	FQMI-MC234 (See note 1.) (See note 2.)	CE, UL approval (See table 2.)

Note 1: The I/O Control Module (FQM1-ICI01) is not included.
Note 2: UL-approved products are scheduled for shipment in March 2006.

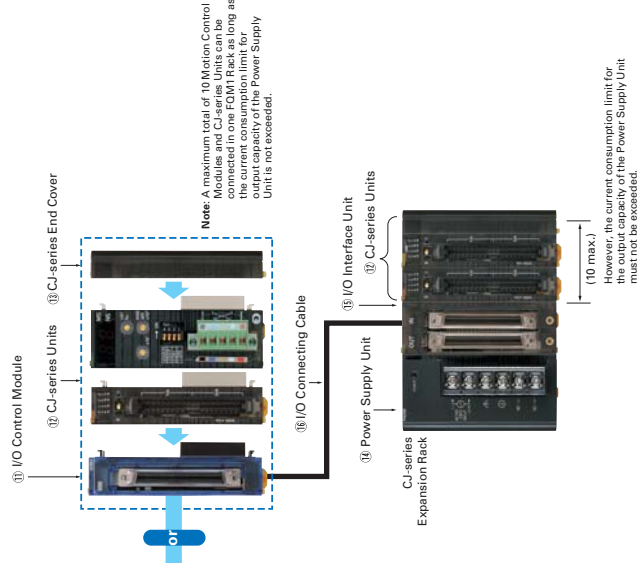
Basic Modules **NEW**

No. in diagram	Name	Specifications	Current consumption (A)		Model	Standards
			5 V	24 V		
①	Coordinator Module	Program capacity: 10 Ksteps, DM Area capacity: 32 Kwords, Built-in I/O (16 inputs and 8 outputs), RS-485 interface, CE series BACnet Unit: 220 bits, Serial port CUI, baud rate: 9600, DTE mode, 5 pins output, Built-in peripheral port, RS-232C port, and RS-422 port.	0.37	—	FQMI-CM002 (See note 1.)	CE UL approval pending (see note 2)
②	Motion Control Modules	Program capacity: 10 Ksteps, DM Area capacity: 32 Kwords, Built-in I/O: 12 inputs and 8 outputs, two pulse inputs, two pulse outputs. Program capacity: 10 Ksteps, DM Area capacity: 32 Kwords, Built-in I/O (12 inputs and 8 outputs), 2 pulse inputs, 1 analog input, 2 analog outputs	0.824	—	FQMI-MMP22	CE UL approval pending (see note 2)
			0.772	0.095	FQMI-MMA32	CE UL approval pending (see note 2)
③	Power Supply Unit	100 to 240 VAC, output capacity: 2.8 A at 5 VDC, 0.4 A at 24 VDC, total power consumption: 14 W 100 to 240 VAC (with RUN output) output capacity: 5 A at 5 VDC, 0.8 A at 24 VDC, total power consumption: 25 W 100 to 240 VAC replacement time notification function, no RUN output. Output capacity: 5 A at 5 VDC, 0.8 A at 24 VDC, total power consumption: 25 W	CJ-IW-PA202		CJ-IW-PA205R	UCI, CE N, L
			CJ-IW-PA205C			

Note 1: A FQM1-TER01 End Module is included.
Note 2: UL-approved products are scheduled for shipment in March 2006.

■ Servo Relay Unit and Cables

No. in diagram	Name	Specifications	Model	Standard
④	Servo Relay Unit	FQMT series Servo Relay Unit with 2 axis connections	XW2B-80J7-1A	UC1
⑤	Connecting Cable for Servo Relay Unit (between FQMT and Servo Relay Unit)	⑤-1 For connecting 25-pin connector on FQMT-MMC122 to Servo Relay Unit	XW2Z-060J-A28	UC1
		⑤-2 For connecting 40-pin connector on FQMT-MMP22 to Servo Relay Unit	XW2Z-100J-A28	UC1
		⑤-3 For connecting 40-pin connector on FQMT-MMA22 to Servo Relay Unit	XW2Z-060J-A30	UC1
⑥	Connecting Cable for Servo Relay Unit (between Servo Relay Unit and Servo Driver)	FQMT-MMP22 connection	XW2Z-100J-A31	UC1
		For connecting Servo Relay Unit to W-series Servo Driver	XW2Z-100J-B9	—
		For connecting Servo Relay Unit to SMARTSTEP	XW2Z-200J-B9	—
⑦	RS-422A Communications Cable between Servo Relay Units	FQMT-MMA22 connection	XW2Z-100J-B10	—
		For connecting Servo Relay Unit to W-series Servo Driver	XW2Z-200J-B10	—
			XW2Z-200J-B13	—
⑧	Connecting Cable for Servo Relay Unit (between Servo Relay Unit and Servo Driver)		XW2Z-100J-C1	—
			XW2Z-200J-C1	—



Note: A maximum total of 10 Motion Control Modules and CJ-series Units can be connected in one FQM1 Rack as long as the current consumption limit for the output capacity of the Power Supply Unit is not exceeded.

However, the current consumption limit for the output capacity of the Power Supply Unit must not be exceeded.

■ Support Software

No. in diagram	Name	Specifications	Model	Standards
③	FX Integrated Tool Package CX-One version 1.1	The CX-One is an integrated tool package that provides programming and monitoring software for OMRON PLCs and components. The CX-Programmer Ver.6.11 or higher includes Windows 98 SE, Me, NT 4.0 (Service Pack 6), 2000 (Service Pack 3 or higher), or XP. CX-One includes CX-Programmer version 6.1. Refer to the CX-One Catalog (R134) for details.	1 license CXONE-AL01C-E	—
			3 licenses CXONE-AL03C-E	—
			10 licenses CXONE-AL10C-E	—
④	CX-Programmer Ver.6.11 or higher	As previously, the CX-Programmer can also be ordered individually using the following model numbers.	30 licenses CXONE-AL30C-E	—
			50 licenses CXONE-AL50C-E	—
			1 license WS02-CXPC1-E-V6□	—
⑤	CX-Programmer Ver.6.11 or higher	Support Software for PLC programming on Windows 98SE, Me, NT 4.0 (Service Pack 6), 2000 (Service Pack 3 or higher), or XP	3 licenses WS02-CXPC1-E03-V6□	—
			10 licenses WS02-CXPC1-E10-V6□	—
			10 licenses WS02-CXPC1-E10-V6□	—

Site licenses are also available for users that need to use the CX-One on many computers. Ask your OMRON representative for details.

■ Others

No. in diagram	Name	Specifications	Model	Standards
③	End Module	Connected to the right end of the FQM1 Rack. Provided with the FQM1 Sats and with the FQM1-CM002.	FQM1-TER01	UC1, CE
	DIN Track	Track length: 0.5 m, Height: 7.3 mm Track length: 1 m, Height: 7.3 mm Track length: 1 m, Height: 16 mm	PPF-SIN PPF-100N PPF-100N2	— — —
	End Plate	Placed on both ends of the Controller on the DIN Track to hold the Controller in place. Two End Plates are provided with the FQM1 Sats and with the FQM1-CM002.	PPF-M	—
④	RS-422A Adapter	Converts RS-232C to RS-422A/485.	CJ1W-CF11	UC, CE, N

■ Expansion Using CJ-series Units

No. in diagram	Name	Specifications	Current consumption (A)	Model	Mountable Racks	Standards
①	I/O Control Module	Used when CJ-series Units are connected to the FQM1. A CJ-series Expansion Rack can be connected at the same time.	5 V 24 V	FQM1-IC101 (See note 1.)	○ ×	UL approval (See note 4), CE
		Terminal block, 12 to 24 VDC, 10 mA, 8 inputs	0.02	CJ1W-ID201	○	UC, CE, N, L
		Terminal block, 24 VDC, 7 mA, 16 inputs	0.09	CJ1W-ID211	○	UC1, CE, N, L
②	Input Units	Terminal block, 24 VDC, 7 mA, 16 inputs	0.08	CJ1W-ID231 (See note 2.)	○	—
		Fujitsu connector, 24 VDC, 4.1 mA, 32 inputs	0.09	CJ1W-ID232 (See note 2.)	○	—
		MIL connector, 24 VDC, 4.1 mA, 32 inputs	0.09	CJ1W-ID261 (See note 2.)	○	—
		Fujitsu connector, 24 VDC, 4.1 mA, 64 inputs	0.09	CJ1W-ID262 (See note 2.)	○	—
		MIL connector, 24 VDC, 4.1 mA, 64 inputs	0.09	CJ1W-ID263 (See note 2.)	○	—
		Terminal block, 100 to 120 VAC, 7 mA (100 V, 50 Hz), 16 inputs	0.08	CJ1W-IA201	○	—
③	AC Input Units	Terminal block, 200 to 240 VAC, 10 mA (200 V, 50 Hz), 8 inputs	0.08	CJ1W-IA201	○	—

■ CJ-series Unit Expansion

No. in diagram	Name	Specifications	Current consumption (A)	Model	Mountable Racks	Standards
④	Output Units	Relay Output Units	5 V 24 V	CJ1W-QC201	○	—
		Terminal block, 250 VAC, 24 VDC max., 2 A, 8 outputs, independent contacts	0.09	CJ1W-QC201	○	—
		Terminal block, 250 VAC, 24 VDC max., 2 A, 16 outputs, independent contacts	0.11	CJ1W-QC211	○	—
		Terminal block, 12 to 24 VDC, 2 A, 8 sinking outputs	0.08	CJ1W-QD201	○	—
		Terminal block, 24 VDC, 2 A, 8 sourcing outputs, load short-circuit protection, wiring disconnect detection and alarm function	0.11	CJ1W-QD202	○	—
		Terminal block, 12 to 24 VDC, 0.5 A, 8 sinking outputs	0.10	CJ1W-QD203	○	—
		Terminal block, 24 VDC, 0.5 A, 8 sourcing outputs, with load short-circuit protection and alarm function	0.10	CJ1W-QD204	○	—
		Terminal block, 12 to 24 VDC, 0.5 A, 16 sinking outputs	0.10	CJ1W-QD211	○	—
		Terminal block, 24 VDC, 0.5 A, 16 sourcing outputs, load short-circuit protection and alarm function	0.10	CJ1W-QD212	○	—
		Transistor Output Units	0.14	CJ1W-QD231 (See note 2.)	○	—
⑤	I/O Units	Fujitsu connector, 12 to 24 VDC, 0.5 A, 32 sinking outputs	0.15	CJ1W-QD232 (See note 2.)	○	—
		MIL connector, 12 to 24 VDC, 0.5 A, 32 sourcing outputs, load short-circuit protection and alarm function	0.14	CJ1W-QD233 (See note 2.)	○	—
		MIL connector, 12 to 24 VDC, 0.5 A, 32 sinking outputs	0.17	CJ1W-QD261 (See note 2.)	○	—
		Fujitsu connector, 12 to 24 VDC, 0.3 A, 64 sinking outputs	0.17	CJ1W-QD262 (See note 2.)	○	—
		MIL connector, 12 to 24 VDC, 0.3 A, 64 sourcing outputs	0.17	CJ1W-QD263 (See note 2.)	○	—
		MIL connector, 12 to 24 VDC, 0.3 A, 64 sinking outputs	0.22	CJ1W-QA201	○	—
		Thick Output Unit	0.13	CJ1W-MD231 (See note 3.)	○	—
		24 VDC, 7 mA, 16 inputs	0.13	CJ1W-MD232 (See note 3.)	○	—
		12 to 24 VDC, 0.5 A, 16 sinking outputs	0.13	CJ1W-MD233 (See note 3.)	○	—
		24 VDC, 0.5 A, 16 sourcing outputs, load short-circuit protection and alarm function	0.13	CJ1W-MD261 (See note 3.)	○	—
⑥	B7A Interface Unit	DC Input/Transistor Output Units	0.13	CJ1W-MD233 (See note 3.)	○	—
		24 VDC, 4.1 mA, 16 inputs	0.14	CJ1W-MD261 (See note 3.)	○	—
		12 to 24 VDC, 0.5 A, 16 sinking outputs	0.14	CJ1W-MD262 (See note 3.)	○	—
		24 VDC, 4.1 mA, 32 inputs	0.14	CJ1W-MD263 (See note 3.)	○	—
		12 to 24 VDC, 0.3 A, 32 sinking outputs	0.19	CJ1W-MD563 (See note 2.)	○	—
		24 VDC, 4.1 mA, 32 inputs	0.19	CJ1W-MD563 (See note 2.)	○	—
		12 to 24 VDC, 0.3 A, 32 sinking outputs	0.07	CJ1W-B7A14	○	—
		5 VDC, 3.5 mA, 32 inputs	0.07	CJ1W-B7A04	○	—
		64 inputs	0.07	CJ1W-B7A22	○	—
		32 inputs/32 outputs	0.07	CJ1W-B7A22	○	—

Note 1: The CJ-series End Cover (CJ1W-TER01) is included.

Note 2: Connectors are not included with the Unit. For the 40-pin connector, or use an OMRON Connector Terminal Block Conversion Unit (XW2□ series) or a GT□-series I/O Block.

Note 3: Connectors are not included with the Unit.

Note 4: UL-approved products are scheduled for shipment in March 2006.

■ CJ-series Unit Expansion

No. in diagram	Name	Specifications	Current consumption (A)	Model	Mountable Racks FOM1 Expansion Rack	Standards
②	CJ-series Special I/O Units	Communications functions: Remote I/O communications, maximum number of I/O points per master: 256 (128 inputs, 128 outputs)	0.15	CJ1W-SRM21	○ ○	UC1, CE, N, L
		Communications functions: Remote I/O communications, maximum number of I/O points per master: 128 (64 inputs, 64 outputs)				
	DeviceNet Unit	Provides DeviceNet remote I/O communications (Slave functions only) for 3200 bits max. (with fixed or user-set allocation).				
③	CJ-series CPU Bus Units	Position Control Unit with MECHATROLINK-II communications	0.36	CJ1W-NGF71	○ ○	UC1, CE,
		High-speed Collection Unit				
	CJ-series End Cover	Automatically collects the specified data through the CJ bus at intervals of a few ms.				
④	CJ-series Power Supply Units	Mounted on the right end when CJ-series Units are used for expansion.	0.56	CJ1W-SPU01	○ ○	U, CE
		100 to 240 VAC, output capacity: 2.8 A at 5 VDC, 0.4 A at 24 VDC, total power consumption: 14 W				
		100 to 240 VAC (with RUN output), output capacity: 5 A at 5 VDC, 0.8 A at 24 VDC, total power consumption: 25 W				
		100 to 240 VAC, replacement time notification function, no RUN output, output capacity: 5A at 5 VDC, 0.8 A at 24 VDC, total power consumption: 25 W				
		24 VDC, output capacity: 5 A at 5 VDC, 0.8 A at 24 VDC, total power consumption: 25 W				
⑤	CJ-series I/O Interface Unit	24 VDC, output capacity: 2 A at 5 VDC, 0.4 A at 24 VDC, total power consumption: 19.6 W	0.13	CJ1W-PD022	○ ○	UC1, CE, N, L
		One Unit required on the CJ-series Expansion Rack to connect CJ-series Expansion Rack.				
		Cable length: 0.3 m				
⑥	CJ-series I/O Connecting Cables	Connects I/O Control Module on FOM1 Rack to I/O Interface Unit on CJ-series Expansion Rack	—	CS1W-CN133	—	L, CE

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