Dear C language programmers,

Invitation to programmable controllers

Introducing CW Workbench:
The engineering tool for C Controllers that allows for easier implementation and reduced cost.
Introducing a revolutionary platform for C language development!

Dear C language programmers,

One of the first things that may come to mind when discussing the use of programmable controllers is ladder logic programming. However, using the MELSEC C Controller it is possible to continue to use the same skilled workforce to gain the advantages of using a proven, quality platform.

Mitsubishi Electric is proud to announce the iQ Platform compatible, high-speed, large capacity, C Controller CPU and the CW Workbench engineering tool for C Controllers.

MELSEC’s growing integrated system aims to deliver reassurance and competitiveness to you.

Common problems with Microcomputers and Industrial computers

- Short product life cycle
- Lack of physical space required
- Frequent maintenance required
- Discontinued production of boards & cips

Advantages of using MELSEC-Q Series hardware

- Highly reliable, long-term stable supply
- Total solution provided by a large number of Q Series I/Os and seamless network access
- Significantly reduced maintenance cost
- Reduced equipment size

Old Platform
(Microcomputer / Personal computer)

- Unstable product supply due to discontinued board production
- Ever increasing management and maintenance costs

New platform
(MELSEC-Q)

- Stable product supply
- Lower maintenance and management cost allows assets to be focused on development

Tougher, smaller, and faster than the competition: The C Controller for the integrated Q systems platform.

Systems once controlled by industrial PCs and microcontrollers can be replaced with the C-language controller. It boasts a best-in-class real-time OS (as of October 2010), VxWorks®, is immediately compatible with a vast array of Q Series hardware, and a long-term stable supply of hardware is available.

A flexible, easily expandable system incorporating ultra high-speed motion control can easily be created. Utilize a wide range of certified, proven Q Series I/O and networking modules and the new CW Workbench engineering tool for straightforward application development.

MELSEC’s growing integrated system aims to deliver reassurance and competitiveness to you.
Two types of C Controller module to deliver reassurance and competitiveness

iQ Platform ready CPU module with high-speed performance and capable handling large volumes of data communication

**Q12DCCPU-V**
- Highly reliable
- Compact size
- Pre-installed operating system
- iQ Platform compatible
- 7-segment LED display
- Ethernet (2 channels), USB, RS-232

**Q06CCPU-V**
- Highly reliable
- Compact size
- Pre-installed operating system
- Ethernet (1 channel), RS-232

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**Development environment**
- Engineering tool for C Controller
- CW Workbench
- Integrated development environment
- Wind River Workbench™
- Setting/monitoring tools for C Controller

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**Q12DCCPU-V**
- CompactFlash card
  - For saving user programs, recipe data, etc.
- USB
  - For setting and maintaining motion CPUs and positioning CPUs.
- Battery backup RAM
  - For saving user data
  - (operation history, diagnostic data, etc.)
- Ethernet (10BASE-T/100BASE-TX)
  - For TCP/IP communication with computers, etc.
- RS-232 (on the bottom)
  - For communication with HMI (touch panel), etc.

**Q06CCPU-V**
- CompactFlash card
  - For saving user programs, recipe data, etc.
- Ethernet (10BASE-T/100BASE-TX)
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- Battery backup RAM
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  - (operation history, diagnostic data, etc.)
- RS-232
  - For communication with HMI (touch panel), etc.
Providing a development environment for embedded systems that is priced affordably

**CW Workbench**

Support for Q12DCCPU-V only

Reduce installation costs and develop applications easily

Traditionally, development environments for embedded systems have been very expensive, but now they are affordable. This allows full-scale embedded systems development at low cost. CW Workbench has all of the basic functionality expected such as a code editor, compiler, and debugger. More importantly, the application empowers developers to be able to easily create applications for the C Controller.

Support for multiple languages using plug-ins

Eclipse based CW Workbench supports multiple languages and its functionality can be expanded using third-party plug-ins for things like source code management.

Windows® 7 compatible

CW Workbench is compatible with Windows® 7, Windows Vista® and Windows® XP operation systems.

Reduce TCO with simple settings, diagnostics, and monitoring capabilities!

**Setting/monitoring tools for C Controller module**

**Program-free Parameter Settings**

Easily configure C Controller systems, CC-Link IE controller networks (for managing the C Controllers), and the parameters for network devices such as CC-Link, all without using any programs.

**Program-free Diagnostics**

Quickly troubleshoot the system by confirming the history of events that have occurred in the C Controller and examine the status of connected networks using network diagnostics.

Perform monitoring and testing using convenient tools

Monitor the status (input, output, buffer memory, shared memory between multi-CPU) of connected modules, and easily perform simple debugging and check module operation with data input.

Support for all phases of application development

**Wind River Workbench™ 2.6.1**

Incorporate advanced runtime diagnostic tools

In addition to basic functions for program editing, compiling and source debugging, Wind River Workbench™ incorporates advanced runtime diagnostic tools. When advanced diagnostics are required, use these diagnostic tools to analyze the execution order of tasks and interruption processes and confirm and debug application operations in fine detail.
The C Controller offers numerous advantages over the competition.

**CASE 1**

Reduce total cost of ownership and increase the stability of equipment operation.

**Issue**
- Concerns about discontinuation of products, boards, and chips.
- Programs developed in-house are difficult to replace.
- Development software and OS runtime licences are expensive.

**Solution**
- Useless programs
- Maintenance costs can be significantly reduced thanks to a dependable supply of MELSEC products.
- Development costs can be reduced by reusing existing program code.
- Develop applications using GX Workbench. No runtime OS licence fees required!

**CASE 2**

Programmable controllers allow integrated control and reduce costs by decreasing equipment size.

**Issue**
- A large amount of space is required for computers, VME crates, and boards.
- Complicated wiring increases maintenance costs.
- Systems developed in-house (personal computers / boards) are complicated to maintain.

**Solution**
- Space is used efficiently by combining different control functions on the same programmable controller platform.
- The amount of wiring is reduced by using CC-Link and SSCNET.
- Total maintenance costs are significantly reduced due to increased reliability and a stable supply of MELSEC products.

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**Point**
- Two Ethernet ports per C Controller module allow for flexible network configurations. Improve equipment operating rate and productivity by allowing real-time communication thanks to a distributed network load.
- Perform sequential control, tracking control, and data collection. The C Controller has been specifically engineered to work with the Motion CPU for high-speed operation. Collect large volumes of data required for traceability, and establish real-time database communication.

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**Point**
- The C Controller not only controls the machine’s operation, but also collects large volumes of data at high speed. Communication with upper-level systems is accomplished via Ethernet.
- Engineering costs are reduced because using GX Configurator-QP, programs to establish parameters for positioning modules are unnecessary.
CASE 3
Increase system life-span by upgrading to MELSEC hardware.

Issue
- Personal computers used in locations without environmental controls are vulnerable to harsh conditions.
- Personal computers have many maintenance concerns including frequent updates, virus infection, failure of moving parts, etc.
- Dedicated communication protocols and programs written in C language cannot be used by typical PLC systems.

Solution
Remote monitoring/control of public infrastructure
- MELSEC products are built to industrial specifications to handle harsh environments.
- Eliminate maintenance concerns by switching to MELSEC hardware.
- The cost of upgrading to more reliable hardware is reduced because the same communication protocols and programs can be used without further development.

CASE 4
Equipment can be automated easily using SECS communication and program-free settings.

Issue
- Significant amount of time and cost are required for developing SECS communication interface.
- Significant amount of time and cost are required for developing SECS communication interface.
- Personal computers used in locations without environmental controls are vulnerable to harsh conditions.
- Personal computers have many maintenance concerns including frequent updates, virus infection, failure of moving parts, etc.
- Dedicated communication protocols and programs written in C language cannot be used by typical PLC systems.
- Protocol
  - Can I utilize them somehow?

Solution
C Controller + CIMOPERATOR®
- Standardized SECS communication interface
- Construction and commissioning of lines can proceed smoothly
- No need for a personal computer gateway.
- Cost is reduced as neither programs or personal computers are needed.
- Flexible to changes in SECS communication specification after operation
- Communication with MES server is standardized by CIMOPERATOR®
**Features**

**Designed for ease of use and high performance**

**Enhanced motion integration**

**Shorten system takt time**

In a multiple CPU system, large volumes of data can be efficiently shared between CPUs (14K words/0.88ms), independently of the programs, resulting in quicker takt times.

**Motion synchronization function**

**High-performance, high-precision sequential control and tracking control**

The C Controller CPU can synchronize interrupt program execution with the Motion CPU’s operation cycle and the multiple CPU high-speed transmission function. This synchronization ensures a high-speed response time because data is constantly refreshed every 0.88ms.

**Real-time interrupt function**

**Get real-time responses to interrupts from intelligent function modules and interrupt input modules**

When interrupt signals are issued from intelligent function modules or interrupt modules, the appropriate interrupt program is run immediately, without delays resulting from the execution cycle of a user program. This real-time response to interrupt signals is just one more way the C Controller can help to push the performance and accuracy of control to the limits.

**Positioning module setting/monitoring tool**

**Easy positioning module configuration and start-up**

Reduce engineering costs by eliminating the need for parameters to be set by a user program. Instead, parameters can be configured quickly using the user-friendly interface of GX Configurator-QP. In addition to configuring settings, GX Configurator-QP helps to speed up the start-up and commissioning process by providing advanced monitoring and debugging capabilities.
Information system function

Flexible network structure

Improve equipment operation rate and productivity by leveraging separate networks to ensure real-time communication.

Application example 1: Real-time communication with MES and EES servers

Two Ethernet ports allow communication with separate networks for more flexibility.

Application example 2: Enhanced network security

Improved reliability
Enhanced security

Device function

Quickly and easily establish communications without a program using the device function.

Create virtual devices, similar to those used by MELSEC programmable controllers, in the memory of the C Controller CPU using the device function. These devices can be accessed without the need for a user program by Mitsubishi GOTs or PCs running MX Component programs. Reduce engineering costs by simplifying the implementation of HMIs and other devices by removing the need to write communication programs.

Traceability function

Collect and forward large amounts of data at high speed for comprehensive traceability.

The C Controller module can collect various types of data including device values from sequence CPUs and detailed servo information like current position and rotational velocity from motion CPUs. These data can be updated every 0.88ms using the multiple CPU high speed transmission auto refresh function. The C Controller module can then compile the desired data to a log file and send it to a separate system for storage and analysis.
High Speed Data Logger Module compatibility

High speed data logging with no personal computer
C Controller CPUs are now compatible with the High Speed Data Logger Module. Just by making some simple settings, device values from the C Controller module can be captured and saved in Excel, CSV, or binary format. Additionally, the system can be monitored using a real-time view mode. To allow for ease of preventive maintenance or hasten the response to machine trouble, e-mail messages can be sent automatically when user defined conditions are met.

GX LogViewer & High Speed Data Logger Module setting tool

Logging data display and analysis tool
Even in the event of an anomaly, GX LogViewer can provide a trend graph of the data to be monitored, allowing easy troubleshooting. Additionally, GX LogViewer ensures key information is immediately visible.

High Speed Data Logger Module Configuration Tool

Event logging function
Superior event condition detection and time-line of events facilitates the detection of failures before they happen.

GX LogViewer and the High Speed Data Logger Module configuration tool are available at no additional cost. Please contact your nearest Mitsubishi Electric representative for details.

User programmable display

The built-in double-digit 7-segment display allows the equipment status to be identified at a glance.

Quickly the troubleshooting response to equipment issues by determining the system status at a glance. User programs can easily access the display, allowing for customized status codes. This feature can help in debugging operations or during commissioning. Also, the LED status can be seen remotely from a PC using the monitoring tool.

Intellectual property protection

Prevent the theft of source code and other files

Only the compiled, executable, binary data is stored in the C Controller CPU which prevents the original source code being obtained from the module. Additionally, FTP access is password protected to keep out unauthorized users.
Dedicated library functions

Using dedicated library functions for easy access to MELSEC hardware devices allows for simple programming, without all of the concerns associated with microcontrollers.

Use the QBF and MD functions to easily access devices in the C Controller, I/O modules, intelligent function modules, network modules, and other CPUs including sequence and motion CPUs.

**QBF functions**

These dedicated library functions enable the C Controller to access I/O modules and intelligent function modules.

<table>
<thead>
<tr>
<th>Category</th>
<th>Function (note-words)</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O access</td>
<td>QBF_X_In_Word_ISR</td>
<td>Reads input signal (X) in 1-word units.</td>
</tr>
<tr>
<td></td>
<td>QBF_Y_Out_Word_ISR</td>
<td>Outputs output signal (Y) in 1-word units.</td>
</tr>
<tr>
<td></td>
<td>QBF_Y_In_WordEx</td>
<td>Reads output signal (Y) in 1-word units.</td>
</tr>
<tr>
<td></td>
<td>QBF_Y_In_BitEx</td>
<td>Reads a single point in the output signal (Y).</td>
</tr>
<tr>
<td>CPU shared memory/memory access</td>
<td>QBF_ToBuf_ISR</td>
<td>Writes data to the CPU shared memory of the specified module.</td>
</tr>
<tr>
<td></td>
<td>QBF_FromBuf_ISR</td>
<td>Reads data from the CPU shared memory of the specified module.</td>
</tr>
<tr>
<td>CPU operating clock control</td>
<td>QBF_WriteSRAM_ISR</td>
<td>Writes data to the battery-backed-up RAM.</td>
</tr>
<tr>
<td></td>
<td>QBF_ReadSRAM</td>
<td>Reads data from the battery-backed-up RAM.</td>
</tr>
<tr>
<td></td>
<td>QBF_ResetDevice_ISR</td>
<td>Resets the internal user or system devices (bit devices) of the C Controller module.</td>
</tr>
<tr>
<td></td>
<td>QBF_SetDevice_ISR</td>
<td>Sets the internal user or system devices (bit devices) of the C Controller module.</td>
</tr>
<tr>
<td></td>
<td>QBF_ReadDevice</td>
<td>Reads data from the internal user or system devices of the C Controller module.</td>
</tr>
<tr>
<td></td>
<td>QBF_WriteDevice</td>
<td>Writes data to the internal user or system devices of the C Controller module.</td>
</tr>
</tbody>
</table>

**MD functions**

These dedicated library functions are also access other programmable controller CPUs.

<table>
<thead>
<tr>
<th>Category</th>
<th>Function (note-words)</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative</td>
<td>QBF_EtherCAT</td>
<td>Operative module for EtherCAT.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionSVST</td>
<td>Requests to start the specified servo program.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionSVAB</td>
<td>Requests to stop the specified servo program.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionAB</td>
<td>Requests to change the axis communication method from EtherCAT to EtherCAT.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionCHGT</td>
<td>Requests to change the torque limit value of the specified axis.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionCHGA</td>
<td>Requests to change the current value of the specified axis.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionDDRD</td>
<td>Reads data from the Motion CPU devices.</td>
</tr>
<tr>
<td></td>
<td>QBF_MotionDDWR</td>
<td>Writes data to the Motion CPU devices.</td>
</tr>
</tbody>
</table>

**Programming example: Y output**

**Features**

Build a compete machine vision solution using a Cognex In-Sight® series vision system and the C Controller CPU.

Collaboration with Cognex for machine vision

Build a compete machine vision solution using a Cognex In-Sight® series vision system and the C Controller CPU.

Collaboration with Cognex In-Sight® vision systems allows the C Controller to easily automate various product manufacturing steps including measurement, inspection and identification.

These Cognex vision systems deliver world-class performance. When connected via Ethernet to a C Controller CPU, sending instructions using C language programs, capturing images, and importing images has never been easier.

Reduce wiring by using PoE (Power over Ethernet) compatible vision systems.

*Native mode is a dedicated communication protocol for the COGNEX vision system.
**Features**

**Information system function**

Implement SECS communication (GEM/non-GEM) through an easy setup process that doesn't require programming.

Using CIMOPERATOR®, it is possible to perform GEM compatible functions that do not require a PC or PLC programs. Engineering costs can be drastically reduced thanks to program-free SECS communication with existing servers.

**Previous solution**

A PC is required between the controller and SECS server.

Creating ladder programs and PC programs to enable communication is difficult and time consuming.

<table>
<thead>
<tr>
<th>Increased development cost</th>
<th>Reduced product quality</th>
<th>Failure of automatic transportation</th>
<th>Operational delays</th>
<th>Management of an additional PC required</th>
</tr>
</thead>
</table>

**With CIMOPERATOR®**

Engineers responsible for the programmable controller can easily develop, implement, and test SECS communication on their own.

Flexible communication specifications

<table>
<thead>
<tr>
<th>Computer-free</th>
<th>Program-free</th>
<th>GEM compatible</th>
</tr>
</thead>
</table>

**MEMO**
Total Control

Take complete control of an application using multiple CPUs

The Q series platform provides outstanding flexibility by scaling to match the needs of the system.

- A multiple CPU configuration can be used to divide control tasks among the CPU types best suited to the application. Perform information system and data processing tasks, sequence control, and motion control on the same high-speed main base unit using a C Controller CPU, Universal series CPU, and Motion CPU respectively.

- Create the optimum configuration according to the control application and system scale.

Simultaneously perform data processing tasks and simple positioning using a C Controller CPU.

Implement high-speed precision control of multiple axes for medium/large applications.

Simultaneous sequence control (machine interlock, etc)

Easily communicate with Sequence and Motion CPUs using dedicated library functions.

- Function libraries are included with the C Controller CPU. By simply calling these functions, it is possible to execute instructions or issue interrupt requests directly from the C Controller CPU to sequence and motion CPUs.

- Simultaneously perform data processing tasks and simple positioning using a C Controller CPU.

- Implement high-speed precision control of multiple axes for medium/large applications.

- Simultaneous sequence control (machine interlock, etc.)

- Easily communicate with Sequence and Motion CPUs using dedicated library functions.
Seamless communication from the top floor to the shop floor

**Information network**

- Networking
- Total control
- Specifications
- Product List
- Support

**Controller network**

- CC-Link IE Control
- MELSECNET/H

**Motion network**

- Greatly improve machine performance using synchronous communication.
- Advantages of centralized network management.
- Easy setup of an absolute positioning (ABS) system

**Field network**

- CC-Link
- CC-Link/LT

**Sensor level network**

- CC-Link/LT

**Enterprise level network**

- Ethernet
- Industrial Ethernet is typically the top layer of the manufacturing network hierarchy and is used to transfer information between factories and offices, and around the factory. These networks may be used for MES, ERP, SCADA, and other production and quality control management systems.
  - Controller CPU connection up to 100Mbps.
  - Convenient connection path for programming, terminal access, and FTP services.

**Controller level network**

- These highly-reliable control networks are designed to transfer large amounts of data at real-time speeds between PLCs. The CC-Link IE Control network includes a variety of functions and allows seamless communications among other CC-Link networks.
  - The CC-Link IE controller network and MELSECNET/H network have a maximum speed of 1 Gbps and 25Mbps respectively.
  - Programs using network shared memory (up to 128 K points per station) can be created without considering network operation. This helps to make modular, independent design and production easier to achieve.
  - Reliability is ensured through dual fiber optic loop connections and extensive RAS functions.

**Motion network**

- Greatly improve machine performance using synchronous communication.
  - In standard solutions using pulse train command, servo amplifiers and controllers are operated asynchronously. Synchronous start and high-precision two axes interpolation is difficult.
  - The SSCNET motion network paves the path for accurate synchronization and has set the standard for performance improvement in machines such as those being use for printing, food, and processing for instance. Moreover, users find the motion controller’s flexible software camming functionality not just intelligent but superior to use.

**Advantages of centralized network management.**

- Share large volumes of data between controllers and servo amplifiers in real time.
- Directly set servo parameters using the motion controller from a PC connected to the controller.
- Monitor and sample various axis data using the digital oscilloscope, such as rotational speed, current position, and current value of each axis.

**Easy setup of an absolute positioning (ABS) system**

- In constructing an ABS system with SSCNET, wiring to connect the I/O module to the servo amplifier is not required unlike an ABS system using pulse train control. This not only reduces system engineering time and complexity, but also diminishes stress and need for maintenance.
- Even multi-axis machines can begin operation quickly after power ON as a home positioning routine is made unnecessary.

**Field network**

- Field network is a high-speed network capable of controlling the system and simultaneously handle information.
  - Communication speeds up to 10 Mbps
  - 8192 link device remote I/O points and 2048+2048 remote register points
  - Connect with over 1,000 different 3rd party CC-Link compatible products

**Sensor level network**

- At the bottom of the network hierarchy, sensor level networks can reduce wiring costs inside panels between simple discrete devices such as push-buttons and sensors. CC-Link/LT accomplishes this and allows tremendous flexibility through innovative connection technology which does not require cutting/stripping of the network cable to make connections.
  - General-purpose communication cable also supplies power so a seperate cable is not required.
  - Make connections quickly and easily using dedicated connectors.
  - Use I/O points efficiently by using ‘number of points mode’ (4 points, 8 points, 16 points).
  - Connect up to 1024 link points in 16-point mode.
Choose from a wide range of I/O modules to fit any application.

### DC high-speed input modules
- **DC high-speed input module (positive common type)**: GX40H
- **DC high-speed input module (negative common type)**: GX50H
- **DC high-speed input module (negative common type)**: GX50H
- **DC high-speed input module (negative common type)**: GX50H

Reduce takt times by taking advantage of a 1 µs response time to input signals. More than one power supply can be used to supply connected devices thanks to the 8 points per common wiring layout. Input and interrupt functions are configurable via switch settings.

### Isolated analog modules
- **Channel-isolated high resolution A/D module**: Q64AD-GH
- **Channel-isolated high resolution A/D module**: Q64AD-GH
- **Channel-isolated high resolution D/A module**: Q64DA-PG

The channel-isolated analog modules are designed to support even the most demanding applications by offering high accuracy conversion combined with high isolation voltage. Flow meters, pressure gauges, etc. can be directly connected to the analog input, and control valves to analog outputs. Hardware and installation costs can be substantially reduced because external isolation amplifiers are not required. When used with the C Controller, a fast process control solution can be created.

### Analog modules
- **A/D modules**: Q64AD, Q64AD-P, Q64AD-A
- **D/A modules**: Q64DAN, Q64DAN-P, Q64DAN-A
- **D/A - D/A module**: Q64AD2DA

Many high-speed A/D and D/A conversion (analog) modules are available. These modules are feature packed to allow maximum flexibility when connecting to devices. Both speed and accuracy are great enough to control sensitive motion applications using servo or inverters.

### Load cell input module
- **Load cell input module**: Q61L

The need for a signal converter is eliminated when utilizing a direct connection to the load cell input module. The module achieves rock solid accuracy thanks to a steady data conversion speed that guarantees the accuracy of load cell measurements.

### Temperature control modules
- **Temperature control modules**: Q64TCT(P), Q64TCTR(P)

Just by setting PID constants or SV values, these modules perform temperature control independent of any controller CPU. This leaves the controller CPU free to process other tasks and increases performance. The auto-tuning feature allows PID constants to be set automatically. A wide range of thermocouple types can be used, including platinum RTDs (Pt100, JPt100) which are supported by the Q64TCT(P). These intelligent modules comes packed with features like the ability to control 4 PID loops simultaneously, PID auto-tuning, online module change, and broken wire detection.

### Temperature input modules
- **Channel-isolated temperature input modules**: Q64TDV-GH, Q64TDV-GH
- **Channel-isolated RTD input modules**: Q64RD-G, Q64RD-G
- **RTD input module**: Q64RD-G

Thermocouple, platinum RTD, and/or nickel RTD temperature sensors can be used.

### Positioning modules
- **Various types of motion control are supported including 2 to 4 axes linear interpolation, 2-axes circular interpolation, speed control, speed-position changeover, path control and constant speed control. For servo control, Q series leverages the benefits of SSCNET, a Mitsubishi high performance motion control network. This allows Mitsubishi intelligent digital servos to be connected by a simple daisy chain cable that reduces cost and increases performance.**

### Pulse train output types
- **Pulse train output types**: QD71P, QD70
- **Open collector pulse train output types**: QD75P, QD70

For compatibility with the widest range of motion hardware, both open collector and differenial drive type positioning modules are available. Transmission of high-speed pulses, up to 10Mbps, to a servo amplifier can be made reliably up to 10 meters away. These pulse train output positioning modules can provide a high level of speed and accuracy for practically any application.

### SSCNET connection types
- **SSCNET connection types**: QD71M, QD70M

Using SSCNET, optical cables minimize the required wiring, permits distances of up to 50 m between stations, and is highly resistant to EMI/RFI. This format is also compatible with absolute position systems where the home position is established by a home position return data setting operation. Using the CH3 connection, limit switches and proximity DOG inputs can be made directly to the servo amplifier, greatly reducing the required wiring.
iQ Platform compatible controllers

Advancing the state-of-the-art in high speed, precision control.

- Improve the accuracy of calculations and shorten task time
  - Basic operation processing speed (8 instruction) of 9.5ns
- Perform calculations with high-precision real number data at high speed.
  - The processing speed of real number (floating point) operations has been increased significantly to 0.05µs (previous 13.7µs)
- Handle large volumes of data
  - Stores large amounts of data with an increased standard RAM memory size.
  - Standard RAM memory capacity (the regular capacity):
    - QnHCPU: 768k words
    - QnUD(E)HCPU: 1536k words
    - Q173HCPU: 3072k words
    - Q173DCPU: 6144k words
    - Capacity is calculated by the estimated double precision operation processing speed

New algorithms have been implemented for greater speed and accuracy

- Multiple CPU high-speed bus
  - Continuously shares the CPU of data with a transfer period of 0.88ms. The Multiple CPU high-speed transmission cycle can be synchronized with the motion control cycle, thus optimizing the entire control system.
- Improved motion control performance
  - Motion operation processing speed is improved more than twice, resulting in shorter system task time.
  - After motion, the calculation time reduces only one quarter of the time.
- Shortened read/write communication time
  - Program data read/write time is shortened by half, substantially improving debugging efficiency.
  - Motion control performance:
    - Single precision addition instruction processing speed: 0.05µs
    - Double precision addition instruction processing speed: 0.34µs

iQ Platform compatible robot controller

Directly connect programmable controllers and robot controllers

- Improved control performance
  - CPU processing time is shortened significantly by high-speed communication function between the programmable controller and robot controller.
  - Standard RAM memory capacity of the regular capacity:
    - QnHCPU: 768k words
    - QnUD(E)HCPU: 1536k words
    - Q173HCPU: 3072k words
    - Q173DCPU: 6144k words
- Reduced system cost
  - 1024 words of I/O points are shared between the programmable controller and robot controller, reducing the need for additional peripheral devices.
- Reduced wiring through direct connection
  - The amount of wiring and I/O modules necessary are reduced by placing the robot controller directly on the Q bus.

iQ Platform compatible HMI models

Improve production efficiency using iQ Platform compatible products.

- Deal with unexpected issues using the backup and restore functions.
  - Backup programs, parameters, and other data from the programmable controller (CPU) to the GOT’s CF card.
  - When data are backed up:
    - Backup programs, parameters, and other data from the programmable controller (CPU) to the GOT’s CF card.
    - When data are restored:
      - Programs, parameters, and other data are restored to the programmable controller from the GOT’s CF card.
- The FA transparent function allows for easy on-site adjustments
  - Programming, start-up, and maintenance duties are made easier by using a GOT in the system.
  - CU direct connection/bus connection

Expanding the built-in capabilities of the C Controller

System optimization and integration through advanced technologies effectively reduce the total cost of operation. The iQ Platform is key to achieving effective communication between controllers and HMIs in the production environment.
### Performance specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q12DCPU-V</td>
<td>Q16DCPU-V</td>
</tr>
<tr>
<td>Q12DCPU-V-B</td>
<td>Q16DCPU-V-B</td>
</tr>
<tr>
<td><strong>Uploading format (memory assignment)</strong></td>
<td></td>
</tr>
<tr>
<td>Internal memory size</td>
<td>3MB</td>
</tr>
<tr>
<td>Standard RAM</td>
<td>512MB</td>
</tr>
<tr>
<td>Number of I/O points (For user file storage)</td>
<td></td>
</tr>
<tr>
<td>Socket 1 (Q12DCPU-V)</td>
<td>Socket 1 (Q16DCPU-V)</td>
</tr>
<tr>
<td>Number of loadable cards</td>
<td>1</td>
</tr>
<tr>
<td>Communication method</td>
<td>10BASE-T/100BASE-TX</td>
</tr>
<tr>
<td>Interface</td>
<td></td>
</tr>
<tr>
<td>10BASE-T/100BASE-TX</td>
<td></td>
</tr>
<tr>
<td><strong>Battery-backed RAM</strong></td>
<td></td>
</tr>
<tr>
<td>Battery-backed RAM</td>
<td>128MB</td>
</tr>
<tr>
<td><strong>Battery live time</strong></td>
<td></td>
</tr>
<tr>
<td>Battery live time</td>
<td>Maximum of 180,000 hours (under the same conditions)</td>
</tr>
<tr>
<td><strong>Software specifications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Operating system</strong></td>
<td></td>
</tr>
<tr>
<td>Operating system</td>
<td>(Installed at product shipment)</td>
</tr>
<tr>
<td><strong>Development environment</strong></td>
<td></td>
</tr>
<tr>
<td>Development environment</td>
<td>Wind River Workbench™</td>
</tr>
<tr>
<td>Programming language</td>
<td>C language ( Little Endian )</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td></td>
</tr>
<tr>
<td>Interfaces</td>
<td>Ethernet/RS-232/USB 2CH/1CH/1CH 1CH/1CH/1CH</td>
</tr>
<tr>
<td><strong>Hardware specifications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Number of I/O points</strong></td>
<td></td>
</tr>
<tr>
<td>Number of I/O points</td>
<td>Depends on the CompactFlash card used</td>
</tr>
<tr>
<td><strong>Software specifications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Development environment</strong></td>
<td></td>
</tr>
<tr>
<td>Development environment</td>
<td>CW Workbench</td>
</tr>
<tr>
<td>Programming language</td>
<td>C language ( Little Endian )</td>
</tr>
</tbody>
</table>

### General specifications

**General specifications**

- General specifications refer to the specifications of the environment in which the product can be installed and used. Unless exceptional specifications are provided, these specifications apply to all Q-Series products. Install and use the Q-Series products within the environment given in the general specifications.

**Performance specifications**

- For use in a pressurized environment, please contact your sales representative.

**Software specifications**

- For use in a pressurized environment, please contact your sales representative.
### Specifications

#### List of C Controller CPU functions

<table>
<thead>
<tr>
<th>Item</th>
<th>Q12DCCPU-V</th>
<th>Q06CCPU-V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General I/O modules</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O module</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Input</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Output</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Analog I/O module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog input/output</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Positioning module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse input/output</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Positioning module</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Powering module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power unit</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Network module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network modules</td>
<td>Yes</td>
<td>Yes</td>
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</table>

#### Comparison of CW Workbench / Wind River Workbench™ 2.6.1 specifications and functions

<table>
<thead>
<tr>
<th>Item</th>
<th>CW workbench</th>
<th>Wind River Workbench™ 2.6.1</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compiler</strong></td>
<td>GCC (GIC for 844.x 32-bit compiler)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Debug module</strong></td>
<td>GCC (GIC for WindRiver Simulator Windows compiler)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Extended functions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Agent</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Debug operation</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Download</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Debug target</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Monitoring tool</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>MemScope</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>BlockScope</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

---

**Note 1:** Systems licensed product (GW-PCCP) and additional license product (GW-PCCP-EDA) are available.  
**Note 2:** Wind River Workbench™ 2.6.1 (purchased separately from Wind River Systems, Inc.)  
**Note 3:** Tornado® 3.1 (purchased separately from Wind River Systems, Inc.)

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**Comparison of CW Workbench / Wind River Workbench™ 2.6.1 specifications and functions**

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<td>Yes</td>
</tr>
<tr>
<td><strong>BlockScope</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Support

1. Technical support assistance service regarding the C Controller module

For technical support assistance service regarding the C Controller module, refer to the table below. If you are not sure which type the inquiry belongs to, please contact us. Please note that inquiries other than MELSEC-related inquiries may not be able to be answered.

<table>
<thead>
<tr>
<th>Category</th>
<th>Type of inquiry</th>
<th>Place to contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>MELSEC-related</td>
<td>Specifications of the C Controller module</td>
<td>Mitsubishi Electric Corporation</td>
</tr>
<tr>
<td></td>
<td>Specifications and usage of the library function (GIF function, MX function) provided by Mitsubishi Electric Corporation</td>
<td>Mitsubishi Electric Corporation URL: <a href="http://www.mitsubishielectric.co.jp/melsecvfpspec/">http://www.mitsubishielectric.co.jp/melsecvfpspec/</a></td>
</tr>
<tr>
<td></td>
<td>Functions and specifications of CW Workbench</td>
<td>Mitsubishi Electric Corporation URL: <a href="http://www.mitsubishielectric.co.jp/cwworkbench/">http://www.mitsubishielectric.co.jp/cwworkbench/</a></td>
</tr>
<tr>
<td></td>
<td>Functions and specifications of the Mitsubishi products to be used with the C Controller module (such as win and MELSOFT™)</td>
<td>Mitsubishi Electric Corporation URL: <a href="http://www.mitsubishielectric.co.jp/melsecvfpspec/">http://www.mitsubishielectric.co.jp/melsecvfpspec/</a></td>
</tr>
<tr>
<td>Operating system-related</td>
<td>Functions and specifications of VxWorks®; API functions provided by Mitsubishi Electric Corporation</td>
<td>Mitsubishi Electric Corporation URL: <a href="http://www.mitsubishielectric.co.jp/pxworkbench/">http://www.mitsubishielectric.co.jp/pxworkbench/</a></td>
</tr>
<tr>
<td></td>
<td>Functions and specifications of Wind River System, Inc.</td>
<td>Wind River Systems, Inc. URL: <a href="http://www.windriver.com">http://www.windriver.com</a></td>
</tr>
<tr>
<td>Plug-in software-related</td>
<td>Inquiries regarding the plug-in software to be used with CW Workbench or Wind River Workbench™</td>
<td>Plug-in software manufacturer</td>
</tr>
</tbody>
</table>

Ensuring an extensive global support network to provide diverse support for today’s needs

Complying with international quality assurance standards

All of Mitsubishi Electric’s FA component products have acquired the international quality assurance "ISO9001" and environment management system standard "ISO14001" certification.

Safety Standards

Global FA Centers

"Mitsubishi Global FA Centers" are located throughout North America, Europe, and Asia to develop products complying with international standards and to provide attentive services.
### Product List

#### CPU, power supply

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of CPUs, 4096 points, program capacity: 104 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 104 KB, peripheral connection ports: USB and Ethernet, with memory card I/F</td>
<td>Q172CPU</td>
<td>High Performance model CPU</td>
</tr>
<tr>
<td>No. of CPUs, 4096 points, program capacity: 63 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 63 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
<td>Q172CPU</td>
<td>High Performance model CPU</td>
</tr>
<tr>
<td>No. of CPUs, 4096 points, program capacity: 33 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 33 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
<td>Q172CPU</td>
<td>High Performance model CPU</td>
</tr>
<tr>
<td>No. of CPUs, 4096 points, program capacity: 17 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 17 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
<td>Q172CPU</td>
<td>High Performance model CPU</td>
</tr>
</tbody>
</table>

#### Universal model (CPU)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 104 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 104 KB, peripheral connection ports: USB and Ethernet, with memory card I/F</td>
</tr>
<tr>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 63 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 63 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
</tr>
<tr>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 33 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 33 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
</tr>
<tr>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 17 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 17 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
</tr>
</tbody>
</table>

#### Support

*Contact your local Mitsubishi sales office or representative for the latest information on the MELSOFT versions and compatible OS.*

#### Product List

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q172CPU</td>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 104 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 104 KB, peripheral connection ports: USB and Ethernet, with memory card I/F</td>
</tr>
<tr>
<td>Q172CPU</td>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 63 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 63 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
</tr>
<tr>
<td>Q172CPU</td>
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<td>No. of CPUs, 4096 points, program capacity: 33 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 33 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
</tr>
<tr>
<td>Q172CPU</td>
<td>Q172CPU</td>
<td>No. of CPUs, 4096 points, program capacity: 17 k steps, basic operation processing speed (LD instruction): 0.0095 μs, program memory capacity: 17 KB, peripheral connection ports: USB and RS232, with memory card I/F</td>
</tr>
</tbody>
</table>

#### Note

1. For use with Q12DCCPU-V
2. For use with Q06CCPU-V
3. For use with Q06CCPU-V
4. For use with Q06CCPU-V
## Product List

### Power supply

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Output Current</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q60P</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>6 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q62P</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>8.5 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q312B</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>3 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q35SB</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>5 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q33SB</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>3 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q55B</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>0.6 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q52B</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>2 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q63B</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>1 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q65B</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>2 A</td>
<td>Double Brand Product</td>
</tr>
</tbody>
</table>

### Extension cable

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Output Current</th>
<th>Description</th>
</tr>
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<td>Q35SB</td>
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<td>Q33SB</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>3 A</td>
<td>Double Brand Product</td>
</tr>
</tbody>
</table>

### Power supply with I/O module

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Output Current</th>
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### I/O module

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<tr>
<td>Q312B</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>3 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q35SB</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>5 A</td>
<td>Double Brand Product</td>
</tr>
<tr>
<td>Q33SB</td>
<td>100 to 240 V AC</td>
<td>5 V DC</td>
<td>3 A</td>
<td>Double Brand Product</td>
</tr>
</tbody>
</table>

### Summary

- **Q60P**: Input voltage: 100 to 240 V AC, output voltage: 5 V DC, output current: 6 A
- **Q62P**: Input voltage: 100 to 240 V AC, output voltage: 5 V DC, output current: 8.5 A
- **Q312B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q35SB**: 12 slots, 1 slim type power supply module required, for Q Series modules
- **Q33SB**: 12 slots, 1 power supply module required, for Q Series modules
- **Q55B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q52B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q63B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q65B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q60P**: Input voltage: 100 to 240 V AC, output voltage: 5 V DC, output current: 6 A
- **Q62P**: Input voltage: 100 to 240 V AC, output voltage: 5 V DC, output current: 8.5 A
- **Q312B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q35SB**: 12 slots, 1 slim type power supply module required, for Q Series modules
- **Q33SB**: 12 slots, 1 power supply module required, for Q Series modules
- **Q55B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q52B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q63B**: 12 slots, 1 power supply module required, for Q Series modules
- **Q65B**: 12 slots, 1 power supply module required, for Q Series modules

Note 1: "Positive common" indicates that the positive lead of a DC power supply must be connected to the common terminal. Accordingly, "Negative common" indicates that the negative lead must be connected to the common terminal.

Note 2: Connector is not provided. Separately order one of the following: A6CON1/A6CON2/A6CON3/A6CON4.

Note 3: The rated input currents are different. [QX41: approx. 4 mA, QX41-S2: approx. 6 mA, QX81: approx. 4 mA, QX81-S2: approx. 6 mA]

Note 4: Connector is not provided. Separately order one of the following: A6CON1/A6CON2/A6CON3/A6CON4.

Note 5: The number of occupied input/output points is different. [QH42P: 32 points; QX41Y41P: 64 points (first 32 points: input / second 32 points: output)]]
# Analog I/O module

**Product List**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q840DV</td>
<td>Voltage input</td>
<td>4 channels; input: 0 to 10 V DC; output (resistive): 0 to 4000, 0 to 10000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block, with 5 PID control modes</td>
</tr>
<tr>
<td>Q84AD-DGH</td>
<td>Current input</td>
<td>4 channels; input: 4 to 20 mA DC; output (resistive): 0 to 5000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block, with 5 PID control modes</td>
</tr>
<tr>
<td>Q84AD-DG</td>
<td>Analog input</td>
<td>4 channels; input: 0 to 10 V DC; output (resistive): 0 to 4000, 0 to 10000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block</td>
</tr>
</tbody>
</table>

## Voltage input

| Q84AD-Q | Current input | 4 channels; input: 4 to 20 mA DC; output (resistive): 0 to 5000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block, channel isolated |
| Q84AD | Analog input | 4 channels; input: 0 to 10 V DC; output (resistive): 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block, channel isolated |

## Current input

| Q84AD-G | Analog input | 4 channels; input: 0 to 10 V DC; output (resistive): 0 to 4000, 0 to 10000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block, channel isolated |

## Analog input

### Temperature

- **RTD**
  - Q64AD-G: 4 channels, input/output: 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block
  - Q64AD-DGH: 4 channels, input/output: 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block

- **Thermocouple**
  - Q64AD-G: 4 channels, input/output: 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block

### Load cell input

- Q64AD-G for 6 channels: input/output: 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block

### Positioning

- Q64AD-G for 6 channels: input/output: 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block

### High-Speed Counter

- Q64AD-G for 6 channels: input/output: 0 to 4000, 0 to 15000 to 16000, conversion speed: 10 ms/channel, 18-point terminal block

### Pulse I/O and positioning module

**Legend**

- **DB** Double brand product
- **NEW** Product available soon
- **SOON** Product available soon
- **NEW** Product available soon
- **Note 1** Connectors are not provided. The A6CON1/A6CON2/A6CON4 connector must be ordered separately.
- **Note 2** Connectors are not provided. The A6CON1/A6CON2/A6CON4 connector must be ordered separately.
- **Note 3** Connectors are not provided. The A6CON1/A6CON2/A6CON4 connector must be ordered separately.
### Product List

#### Information module

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link IE Controller Network</td>
<td>QJ71FL71-B5</td>
<td>10BASE5</td>
</tr>
<tr>
<td></td>
<td>QJ71FL71-B2</td>
<td>10BASE2</td>
</tr>
<tr>
<td></td>
<td>QJ71FL71-T</td>
<td>10BASE-T</td>
</tr>
<tr>
<td></td>
<td>QJ71FL71-B5-F01</td>
<td>10BASE5</td>
</tr>
<tr>
<td></td>
<td>QJ71FL71-B2-F01</td>
<td>10BASE2</td>
</tr>
<tr>
<td></td>
<td>QJ71FL71-T-F01</td>
<td>10BASE-T, 100BASE-TX</td>
</tr>
</tbody>
</table>

#### Control network module

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link IE Controller Network</td>
<td>QJ71EP11-EX</td>
<td>Multi-mode fiber optic cable, dual loop, controller network (control/normal station)</td>
</tr>
<tr>
<td></td>
<td>QJ71EP11-SE</td>
<td>Multi-mode fiber optic cable, dual loop, controller network (control/normal station) with external power supply function</td>
</tr>
</tbody>
</table>

#### Ethernet related products

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial switching hub</td>
<td>PVC-CCPU-E</td>
<td>A tool for setting/monitoring C Controller module, CC-Link, MELSECNET/H, CC-Link IE Controller network</td>
</tr>
<tr>
<td></td>
<td>PVC-CCPU-E</td>
<td><em>Industrial OEM tool (IOT)</em></td>
</tr>
</tbody>
</table>

### Product purchasing information

#### Necessary interactions for using CW Workbench

1. **Purchase**
2. **Apply with the packaged "permanent license application" by e-mail**
3. **Receive the permanent license file**

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1. **Purchase**
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