

CQM1H Programmable Controller

Features

The CQM1H series programmable controller offers advanced flexibility, powerful communication options, and has features traditionally found only in full rack PLC systems. The CQM1H's rack-less modular design allows the user to customize the control system to their own system requirements. Advanced inner-boards, specialized I/O, and communication modules allow flexibility that no other PLC system in this class can offer.



- **4 different base CPUs to choose from with up to 512 points of I/O**
- **Modular design requires no back plane**
- **Inner Boards allow a “customized” configuration of CPU**
- **Serial Communications inner-board supports protocol macros allowing communication with 3rd party devices**
- **Supports all existing and new CQM1 I/O and specialized I/O modules**
- **Optional memory cassettes allow backup of sensitive data and provides real time clock**
- **ControllerLink Module transmits data along Controller Link network at up to 2Mbps (8K word packets) for up to 32 nodes**
- **Advanced instruction set includes PID, Floating point math, Protocol macro instructions and more**
- **Compobus/S and AS-interface master modules support remote I/O**
- **Supported by CX-Programmer V1.2**
- **Up to 15.2 K words of program memory**
- **16 DC inputs built into CPU**
- **UL/CSA/CE**

System Configuration

ControllerLink module allows connection of a CQM1H to a ControllerLink network. Large amounts of data can be transferred easily and flexibly with personal computers as well with other Omron PLCs that support Controller Link.

Inner boards (CPU51 and CPU61 only) allow custom configuration of CPU. Options such as Analog I/O, Pulse I/O, Absolute encoder interface, Serial communications, and Analog setting boards give the user complete control flexibility.



Power supply options are available in 18W or 30W output with input ranges of 100 to 40VAC

4 different base CPUs to choose from. Built in serial port and 16 DC inputs standard on most models

Customize I/O with 8,16, or 32 point I/O modules. Dedicated I/O modules provide analog control, temperature sensor control, and interfacing capability.

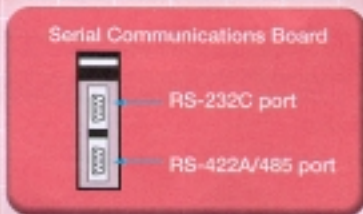
Inner Boards

Equipment functions can be upgraded easily with a variety of advanced Inner Boards.

The CQM1H features Inner Boards that allow simple positioning, multi-point high-speed counter inputs, absolute rotary encoder inputs, analog I/O, analog settings, and serial communications for connection to standard serial devices. Select Inner Boards to customize the PLC's capabilities for your applications.

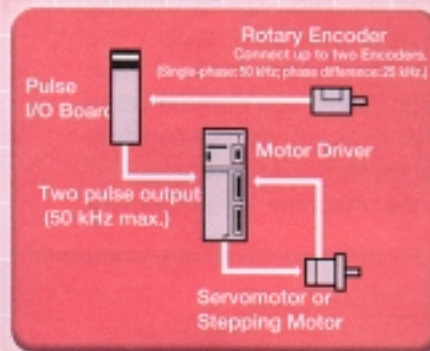
Built-in protocol macro function

● Serial Communications Board



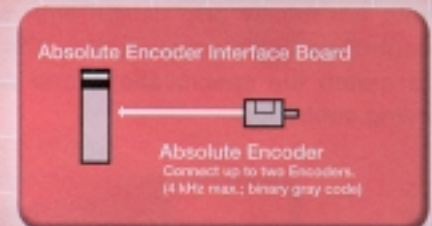
Ideal for Simple Positioning and Simple Speed Control

● Pulse I/O Board



Read position data directly from an Absolute Encoder.

● Absolute Encoder Interface Board



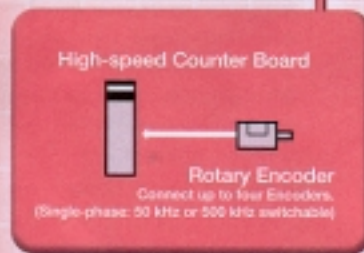
Four analog settings for on-site adjustments, such as timer settings.

● Analog Setting Board



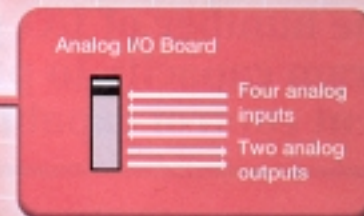
Read high-speed pulses of 4 axes at up to 500 kHz.

● High-speed Counter Board



Four analog inputs and two analog outputs built into one Board.

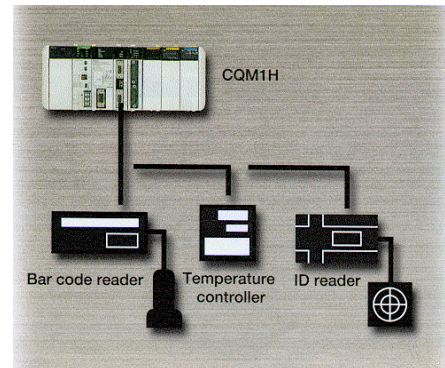
● Analog I/O Board



Communication

Serial and Peripheral Communication

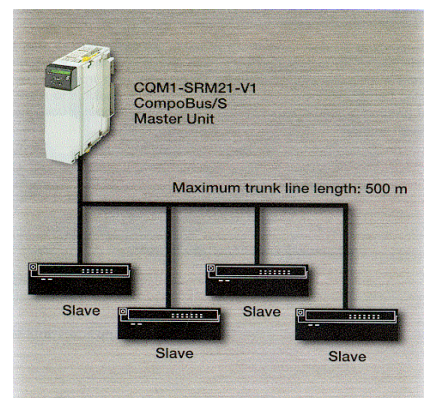
- Built in RS232C and peripheral port (excludes CPU11)
- Connect directly to Omron programming devices and operator interface terminals
- 1:1 connection to other Omron PLCs allows CPUs to seamlessly share data
- Protocol macro function allows user to create macros for protocols to match communication specifications of an external device allowing data transfers between CPU and devices to be executed with a single PMCR instruction
- Serial communication inner-board supports RS232C, RS422/485, and protocol macro function



Protocol macro function supported by Serial Communications inner-board

Device Level Communication

- Compobus/S master unit enables long distance remote I/O connection with Compobus/S slaves
- DeviceNet slave enables the CQM1H to act as a slave on a DeviceNet network
- AS-Interface master module enables remote I/O connection with ASi slaves



CompoBus/S Master allows connection to remote slaves via Compobus/S network

ControllerLink Module

- ControllerLink module can be connected to CQM1H allowing connection to a controller link network via twisted pair wiring
- Data can be exchanged efficiently between PLCs in the network using data links and message communications
- Data and messaging can be transferred between personal computers, CS1, C200H Alpha, CVM1, and CV series controllers
- High speed connection at up to 2 Mbps link
- High capacity data link of up to 32K words per network and 8K words per node
- Connect up to 32 nodes per network
- Supports FINS protocol on ControllerLink as a node in a multi-layer network architecture



ControllerLink Module allows large amounts of high speed data to be exchanged between multiple Omron PLCs or a personal computer via the ControllerLink Network

Input Modules



- 8, 16, or 32 point modules
- AC or DC inputs
- Independent or shared commons
- Screw terminal or I/O connector versions

Output Modules



- 8, 16, or 32 point modules
- Relay contact, transistor, or triac outputs
- Independent or shared commons
- Screw terminal or I/O connector versions

Specialized I/O

| | | |
|---|--|---|
| <p>● QCM1-SRM21-V1 CompoBus/S Master Unit A high-speed ON/OFF Remote I/O Master Unit that controls up to 128 I/O points. Also supports a long-distance communications mode.</p> | <p>● QCM1-DA021 Analog Output Unit Performs digital-to-analog conversion for two outputs.</p> | <p>● QCM1-SEN01 Sensor Unit Three models of Sensor Modules can be mounted to the Sensor Unit and optical fiber sensors can be connected directly to the QCM1H.</p> |
| <p>● QCM1-DRT21 CompoBus/D I/O Link Unit Operates as a DeviceNet slave to establish an I/O link of 32 I/O points with a CompoBus/D Master.</p> | <p>● QCM1-IPS01/02 Analog Power Supply Units Required to supply power when using an Analog Input Unit or Analog Output Unit.</p> | <p>● QCM1-TC00□ and QCM1-TC10□ Temperature Control Units One Unit can receive data from two temperature control devices and is ideal for ON/OFF control.</p> |
| <p>● QCM1-AD041 Analog Input Unit Receives 4 analog voltage or current inputs into the QCM1H.</p> | <p>● QCM1-B7A□□ B7A Interface Units Five Units are available that can connect with B7A Link Terminals.</p> | <p>● QCM1-LSE01/02 Linear Sensor Interface Units Make high-speed and high-precision measurements of voltage or current inputs from linear sensors and convert the measurements to numeric data for comparative decision processing.</p> |

For ordering information and other models, see [Ordering Guide section at the rear of this document](#)

SPECIFICATIONS

| Item | | Specification | | |
|------------------------------|------------|---|--------------------------|---------------|
| Power Supply Capacity | CQM1-PA203 | Supply Voltage: 100-240VAC | Aux. Output: N/A | Capacity: 18W |
| | CQM1-PA206 | Supply Voltage: 100-240VAC | Aux. Output: 5, 24VDC | Capacity: 30W |
| | CQM1-PD206 | Supply Voltage: 24VDC | Aux. Output: 5 VDC (30W) | |
| Control method | | Stored program method | | |
| I.O control method | | Cyclic scan with direct output; Immediate refresh processing | | |
| Programming language | | Ladder diagram | | |
| Program Capacity | | CQM1H-CPU11/21: 3.2K words CQM1H-CPU51: 7.2K words CQM1H-CPU61: 15.2K words | | |
| Data Memory Capacity | | CQM1H-CPU11/21: 3K words CQM1H-CPU51: 6K words CQM1H-CPU61: 12K words (DM: 6K words; EM 6K words) | | |
| Instruction length | | 1 step per instruction, 1 to 4 words per instruction | | |
| Types of instructions | | Basic instructions: 14 Special instructions: 148 | | |
| Execution time | | Basic instructions: .375 to 1.125 µsec Special instructions: 17.7 µsec | | |
| Mounting Structure | | No Backplane (Units are joined horizontally using connectors) | | |
| Mounting | | Din Track mounting | | |
| Maximum number of modules | | 11 I/O and Special I/O (12 with CLK module) | | |
| Inner board support | | CQM1H-CPU11/21: Not supported CQM1H-CPU51/61: 2 Boards maximum (See CQM1H manual for configuration details) | | |
| Controller Link Unit Support | | CQM1H-CPU11/21: None CQM1H-CPU51/61: 1 unit | | |
| Certification | | UL/CSA/CE | | |

Dimensions

| | PA203 | PA206/PD026 | CPU11/21/51/6 1 | Modules (all) |
|---------------|-------------------|-------------------|--------------------|------------------|
| Width | 53.5 mm (2.11 in) | 85.5 mm (3.36 in) | 120 mm (4.72 in) | 32 mm (1.26 in) |
| Depth | 107 mm (4.21 in) | 107 mm (4.21 in) | 107 mm (4.21 in) | 107 mm (4.21 in) |
| Height | 110 mm (4.33 in) | 110 mm (4.33 in) | 110 mm (4.33 in) | 110 mm (4.33 in) |

Calculating Overall PLC width with “n” I/O modules

| Power Supply | W (mm) |
|--------------|----------------|
| CQM1-PA203 | (32 x n) + 187 |
| CQM1-PA206 | (32 x n) + 219 |
| CQM1-PD026 | |

Note: The total number of I/O modules and specialized modules (n) is limited to 11 Units (12 including the ControllerLink module)

Power Supplies

| Description | Rated Voltage | Output Capacity | Auxiliary Supply | Part Number |
|-----------------|---------------|-----------------|------------------|-------------|
| AC Power Supply | 100 to 240VAC | 18W | N/A | CQM1-PA203 |
| | | 30W | 24VDC; .5A | CQM1-PA206 |
| DC Power Supply | 24VDC | 30W | N/A | CQM1-PD026 |

CPUs

| Memory Capacity | I/O Capacity | Built In Inputs | Built In RS232C port | Supports Inner Boards | Supports Controller Link | Part Number |
|--|--------------|-----------------|----------------------|-----------------------|--------------------------|--|
| Program: 3.2K words DM area: 3K words | 256 points | 16 DC Inputs | No | No | No | CQM1H-CPU11 |
| | | | Yes | | | CQM1H-CPU21 |
| Program: 7.2K words DM area: 6K words | 512 Points | | Yes | Yes | Yes | CQM1H-CPU51 |
| | | | | | | Program: 15.2K words DM area: 6K words EM area: 6K words |

Inner Boards

| Item | Description | Part Number |
|----------------------------------|--|-------------|
| High-speed counter board | 4 pulse inputs (high speed counter) at 500kHz max 4 external outputs | CQM1H-CTB41 |
| Pulse I/O board | 2 Pulse inputs, Single phase 50Khz, Differential phase: 25kHz | CQM1H-PLB21 |
| Absolute encoder Interface board | 2 absolute encoder (gray code binary) inputs (4kHz) | CQM1H-ABB21 |
| Analog setting board | 4 analog settings | CQM1H-AVB41 |
| Analog I/O board | 4 analog inputs: 0 to 5v, 0 to 20mA, -10 to +10V 2 analog outputs: 0 to 20mA, -10 to +10V | CQM1H-MAB42 |
| Serial communications board | One RS-232C port and one RS-422A/485 port | CQM1H-SCB41 |

Communications Modules

| Item | Description | Part Number |
|-----------------------|--|-------------|
| ControllerLink Module | Data Link (Maximum number of words per node: 8K) Message communications (SEND/RECV/CMND instructions) | CQM1H-CLK21 |

Memory Cassettes

| Memory | Memory Capacity | Clock Function | Part Number |
|---|--|----------------|-------------|
| Flash memory | 16K words | No | CQM1H-ME16K |
| | | Yes | CQM1H-ME16R |
| EEPROM | 8K words | No | CQM1-ME08K |
| | | Yes | CQM1-ME08R |
| | 4K words | No | CQM1-ME04K |
| | | Yes | CQM1-ME04R |
| EPROM memory cassette (Memory chip not included) | Cassette with IC socket Only (EPROM chip sold separately) | No | CQM1-MP08K |
| | | Yes | CQM1-MP08R |
| EPROM Chip | 128 KB (8K words) | N/A | ROM-ID-B |
| | 256 KB (16K words) | N/A | ROM-JD-B |
| | 512 KB (32K words) | N/A | ROM-KD-B |

Ordering Guide

I/O and Specialized I/O

Input Modules

| Input Type | Number of inputs | Input Voltage | Input Current | Common Type | Connector Type | Part Number | |
|------------|------------------|---------------|---------------|-------------|----------------|----------------|------------|
| DC | 8 | 12 to 24Vdc | 10mA | Independent | Terminal Block | CQM1-ID212 | |
| | 16 | 12Vdc | 6mA | Shared | | CQM1-ID111 | |
| | | 24Vdc | | | | CQM1-ID212 | |
| | 32 | 12Vdc | 4mA | | | Connector | CQM1-ID112 |
| | | 24Vdc | 4mA | | | | CQM1-ID213 |
| | | 24Vdc | 6mA | | | | CQM1-ID214 |
| AC | 8 | 100 to 120VAC | 5mA | | | Terminal Block | CQM1-IA121 |
| | | 200 to 240VAC | 6mA | CQM1-IA221 | | | |

Output Modules

| Output Type | Number of outputs | Max Switching Voltage | Max Switching Current | Common Type | Connector Type | Part Number |
|-------------|-------------------|-----------------------|-----------------------|----------------------------------|----------------|-------------|
| Contact | 8 | 250VAC 24VDC | 2 Amps | Independent | Terminal Block | CQM1-OC221 |
| | 16 | | | Shared | | CQM1-OC222 |
| | 8 | | | Independent | | CQM1-OC224 |
| Transistor | 8 | 24VDC | 2 Amps (NPN) | Shared (Fused) | Terminal Block | CQM1-OD211 |
| | 16 | | .3 Amps (NPN) | | | CQM1-OD212 |
| | 32 | | .1 Amps (NPN) | | | Connector |
| | 8 | | 1 Amp (PNP) | | Terminal Block | CQM1-OD215 |
| | 16 | | .3 Amps (PNP) | | Connector | CQM1-OD214 |
| | 32 | | .5 Amps (PNP) | | | CQM1-OD216 |
| Triac | 8 | 240VAC | .4 Amps | Shared (Short circuit protected) | Terminal Block | CQM1-OA221 |
| | 6 | | | | | CQM1-OA222 |

Specialized I/O Modules

| Item | Description | Part Number | |
|---------------------------|---|--------------------------------------|------------|
| CompoBus/S Master | Controls up to 128 remote I/O points via twisted pair | CQM1-SRT21-V1 | |
| CompoBus/D I/O Link | Operates as a DeviceNet slave | CQM1-DRT21 | |
| AS-interface | Operates as a ASi master unit | CQM1-ARM21 | |
| Analog Input unit | 4 Analog voltage or current inputs | CQM1-AD041 | |
| Analog Output | 2 Analog voltage or current outputs | CQM1-DA021 | |
| Analog Power Supply | Power Supply for Analog modules | One Analog unit supply | CQM1-IPS01 |
| | | Two Analog unit supply | CQM1-IPS02 |
| B7A Interface Unit | Connects to B7A link terminals | 16 outputs | CQM1-B7A02 |
| | | 16 inputs | CQM1-B7A12 |
| | | 32 outputs | CQM1-B7A03 |
| | | 32 inputs | CQM1-B7A13 |
| | | 16 inputs/16 outputs | CQM1-B7A21 |
| Sensor unit | Connect up to 4 sensor modules to a single unit | | CQM1-SEN01 |
| | Fiber Photoelectric Module | For E32 Series fiber units | E3X-MA11 |
| | Photoelectric Module w/amplifier | For E3C series photoelectric sensors | E3C-MA11 |
| | Proximity module w/amplifier | For E2C series proximity sensors | E2C-MA11 |
| | Dummy module | Spacers for empty modules | E39-MA11 |
| | Remote console | Provides sensitivity adjustment | CQM1-TU001 |
| Temperature control Units | Thermocouple input, transistor (NPN) output, 2 loops | | CQM1-TC001 |
| | Thermocouple input, transistor (PNP) output, 2 loops | | CQM1-TC002 |
| | Platinum resistance thermometer, transistor (NPN) output, 2 loops | | CQM1-TC101 |
| | Platinum resistance thermometer, transistor (PNP) output, 2 loops | | CQM1-TC102 |
| Linear sensor interface | Standard | | CQM1-LSE01 |
| | With monitor output | | CQM1-LSE02 |

OMRON ELECTRONICS INC.
One Commerce Drive
Schaumburg, IL 60173
1-800-55-OMRON

Please contact your
local Omron office
for further information

CQM1H Product Overview

Programming Consoles

| Item | Description | Part Number |
|----------------------------------|---|---------------|
| Programming console | 2-m connecting cable included (Compatible with C-series PLCs) | CQM1-PRO01-E |
| Programming console | Requires a separate connecting cable, see below | C200H-PRO27-E |
| Connecting cable | Cable length: 2m | C200H-CN222 |
| Peripheral port conversion cable | Connects the peripheral port on the CQM1H to a personal computer or Programming console through a CQM1-CIF-CIF01/02 cable | CS1W-CN114 |

Programming Device Connecting Cables

| Item | Description | Part Number |
|------------------------|---|-------------|
| Conversion cable | Converts CQM1H peripheral port to CQM1-CIF01/02 adapter or Programming console | CS1W-CN114 |
| Program download cable | Connects peripheral port to RS232C computer port (Use with CS1W-CN114) | CQM1-CIF02 |
| Connecting cable | Connects peripheral port to D-sub 9pin connector. Must be used with CS1W-CN114 (3.3m) | CQM1-CIF02 |
| Connecting cable | Directly connects Peripheral port to D-sub 9 pin connector (2 m) (No CIF required) | CS1W-CN226 |
| Connecting cable | Directly connects Peripheral port to D-sub 9 pin connector (6 m) (No CIF required) | CS1W-CN626 |

Peripheral devices

| Item | Description | Part Number |
|---------------------|--|---------------|
| Programming console | Handheld programming console with 2m cable attached | CQM1-PRO01-E |
| Programming console | Handheld programming console with back light (Cable not included) | C200H-PRO27-E |
| Connecting cable | Connects C200H programming console to peripheral port (2m) | C200H-CN222 |
| Connecting cable | Connects C200H programming console to peripheral port (4m) | C200H-CN422 |
| Conversion cable | Converts CQM1H peripheral port to CQM1-CIF01/02 adapter or Programming console | CS1W-CN114 |

Software

| Item | Description | Part Number |
|---------------|--------------------|------------------|
| SYSWIN | SYSWIN V3.4 CD ROM | SYSWIN-V3.4 |
| CX Programmer | CX Programmer V1.2 | WS02-CXPC1-EV1.2 |

*CX-programmer, V1.2 available spring 2000, will support New CQM1H functions

Literature

| Item | Description | Part Number |
|--------------------|--|-------------|
| Operation Manual | CQM1H CPU and Inner board operation manual | W363-E1-1 |
| Operation Manual | CQM1H Serial Communications Board operation manual | W365-E1-1 |
| Programming Manual | CQM1H programming manual | W364-E1-1 |

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