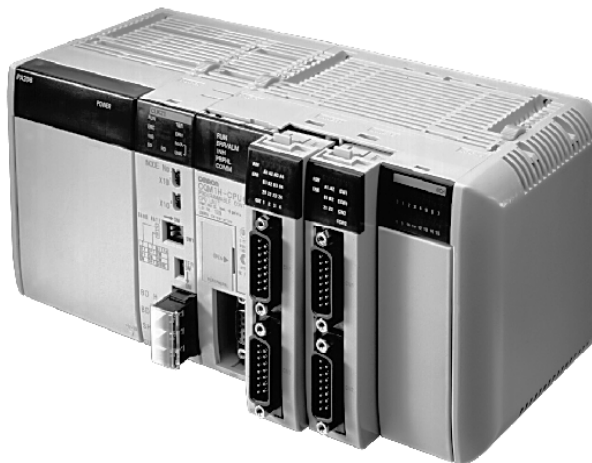


# Programmable Controller CQM1H

The CQM1H's rack-less modular design lets you customize your control system by adding "inner boards" for advanced functions, as well as specialized I/O and communications modules. CQM1H offers the most flexibility of all PLC systems in its class.

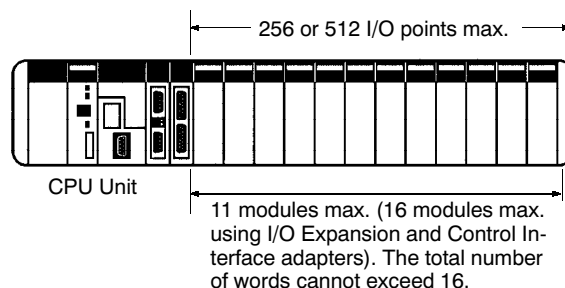
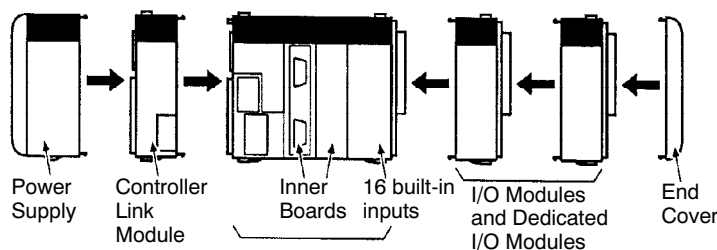
- 4 different base CPUs to choose from; 16 DC inputs built in; expands up to 512 points
- No separate backplane required
- Inner Boards allow "customized" configuration of the CPU
- Serial communications inner board supports protocol macro feature for communication with third-party serial devices
- Supports all existing and new CQM1 I/O and specialized I/O modules
- Optional memory cassettes allow backup of sensitive data, provides a real-time clock
- ControllerLink network transmits 8 kword data packets at up to 2 Mbps; 32 nodes
- Advanced instruction set includes PID, floating point math, protocol macro instructions and more
- CompoBus/S, SYSMAC BUS and AS-interface masters support remote I/O
- Up to 15.2 kwords of program memory



## Basic Configuration

Select the CPU and I/O modules (discrete, analog and dedicated special function types) then determine the power supply based on the current consumption. The I/O Control and Interface adapters give you the option of dividing the CPU and I/O system into two narrower units than the examples shown below. The CQM1H-CPU51/CPU61 models offer space-saving position and motion control solutions as well as additional analog and serial communications capabilities right at the CPU.

CQM1H modules are assembled with connectors on their sides.



# Ordering Information

## ■ CPU

**Stock Note:** Shaded models are normally stocked.

| Specifications   |                   |                 |                       |                         |                                 | International standards | Part number        |
|--|-------------------|-----------------|-----------------------|-------------------------|---------------------------------|-------------------------|--------------------|
| Memory capacity  | Max. I/O capacity | Built-in inputs | Built-in RS-232C port | Support of Inner Boards | Support of Controller Link Unit |                         |                    |
| Program: 3.2 kwords<br>DM area: 3 kwords                       | 256 points        | 16 DC inputs    | No                    | No                      | No                              | U, C, N, CE             | <b>CQM1H-CPU11</b> |
|  |                   |                 | Yes                   |                         |                                 |                         |                    |
| Program: 7.2 kwords<br>DM area: 6 kwords                       | 512 points        |                 |                       | Yes                     | Yes                             |                         | <b>CQM1H-CPU51</b> |
| Program: 15.2 kwords<br>DM area: 6 kwords<br>EM area: 6 kwords |                   |                 |                       |                         |                                 |                         |                    |

## ■ POWER SUPPLY MODULES

**Stock Note:** Shaded models are normally stocked.

| Item                    | Specifications           |                                 |                 |                      | International standards | Part number       |
|-------------------------|--------------------------|---------------------------------|-----------------|----------------------|-------------------------|-------------------|
|                         | Rated voltage            | Allowed voltage range           | Output capacity | Service power supply |                         |                   |
| AC power supply modules | 100 to 240 VAC, 50/60 Hz | 85 to 265 VAC                   | 18 W            | None                 | U, C, N, L, CE          | <b>CQM1-PA203</b> |
|                         |                          |                                 | 30 W            | 24 VDC, 0.5 A        | U, C, L, N              | <b>CQM1-PA206</b> |
|                         | 110/230 VAC, 50/60 Hz    | 80 to 138 VAC<br>160 to 276 VAC | 30 W            | 24 VDC, 0.5 A        | CE                      | <b>CQM1-PA216</b> |
| DC power supply modules | 24 VDC                   | 20 to 28 VDC                    | 30 W            | —                    | U, C, N, L, CE          | <b>CQM1-PD026</b> |

## ■ MEMORY CASSETTES

**Stock Note:** Shaded models are normally stocked.

| Memory   | Memory capacity/Clock function                             | International standards | Part number        |
|--|--|-------------------------|--------------------|
| Flash memory                                     | 16 kwords  | U, C, N, CE             | <b>CQM1H-ME16K</b> |
|  | with clock   |                         | <b>CQM1H-ME16R</b> |
| EEPROM   | 8 kwords   | U, C, N, L, CE          | <b>CQM1-ME08K</b>  |
|  | with clock   |                         | <b>CQM1-ME08R</b>  |
|  | 4 kwords   |                         | <b>CQM1-ME04K</b>  |
|  | with clock   |                         | <b>CQM1-ME04R</b>  |
| EPROM memory cassette (Memory chip not included) | Cassette with IC socket only (EPROM chip sold separately)  |                         | <b>CQM1-MP08K</b>  |
|  | with clock   |                         | <b>CQM1-MP08R</b>  |
| EPROM chip                                       | 128 KB (8 kwords), 150 ns, 27128 IC or equivalent, 12.5 V  | L                       | <b>ROM-ID-B</b>    |
|  | 256 KB (16 kwords), 150 ns, 27256 IC or equivalent, 12.5 V | CE                      | <b>ROM-JD-B</b>    |
|  | 512 KB (32 kwords), 150 ns, 27512 IC or equivalent, 12.5 V |                         | <b>ROM-KD-B</b>    |

## ■ I/O EXPANSION AND CONTROL INTERFACE ADAPTERS

**Stock Note:** Shaded models are normally stocked.

Use I/O Expansion and Control Interface adapters for applications that require 11 to 16 I/O modules.

| Memory                | Memory capacity/Clock function                              | International standards | Part number                              |
|-----------------------|---|-------------------------|--|
| I/O control adapter   | Connects to right-hand side of CPU block                    | U, C, CE                | <b>CQM1H-IC101</b>                       |
| I/O interface adapter | Connects to left-hand side of Expansion I/O block           |                         | <b>CQM1H-II101</b>                       |
| I/O extension cable   | Connects the I/O control module to the I/O interface module | L, CE                   | Cable length: 0.3 m<br><b>CS1W-CN313</b> |
|                       |   |                         | Cable length: 0.7 m<br><b>CS1W-CN713</b> |

Note: U: UL, C: CSA, N: NK, L: LLOYD, CE: EC Directives

## ■ I/O MODULES

**Stock Note:** Shaded models are normally stocked.

### Input Modules

| Input type | Number of inputs | Input voltage  | Input current | Common type | Connector type | International standards | Part number       |
|------------|------------------|----------------|---------------|-------------|----------------|-------------------------|-------------------|
| DC inputs  | 8                | 12 to 24 VDC   | 10 mA         | Independent | Terminal block | U, C, N, L, CE          | <b>CQM1-ID211</b> |
|            | 16               | 12 VDC         | 6 mA          | Shared      |                | U, C                    | <b>CQM1-ID111</b> |
|            |                  | 24 VDC         |               |             |                | U, C, N, L, CE          | <b>CQM1-ID212</b> |
|            | 32               | 12 VDC         | 4 mA          | Shared      | Connector      | U, C                    | <b>CQM1-ID112</b> |
| 24 VDC     |                  | U, C, N, L, CE |               |             |                | <b>CQM1-ID213</b>       |                   |
| AC inputs  | 8                | 100 to 120 VAC | 5 mA          | Shared      | Terminal block | U, C, L, CE             | <b>CQM1-IA121</b> |
|            |                  | 200 to 240 VAC | 6 mA          |             |                |                         | <b>CQM1-IA221</b> |

### Output Modules

| Output type     | Number of outputs | Max. switching voltage | Max. switching current | Common type                      | Connector type | International standards | Part number       |
|-----------------|-------------------|------------------------|------------------------|----------------------------------|----------------|-------------------------|-------------------|
| Contact outputs | 8                 | 250 VAC, 24 VDC        | 2 A                    | Independent                      | Terminal block | U, C, N, L              | <b>CQM1-OC221</b> |
|                 | 16                |                        |                        | Shared                           |                |                         | <b>CQM1-OC222</b> |
|                 | 8                 |                        |                        | Independent                      |                |                         | CE, U             |
| Transistor      | 8                 | 24 VDC                 | 2 A (NPN)              | Shared (fused)                   | Terminal block | U, C, N, L, CE          | <b>CQM1-OD211</b> |
|                 | 16                |                        |                        |                                  |                |                         | 0.3 A (NPN)       |
|                 | 32                |                        |                        |                                  | 0.1 A (NPN)    |                         | Connector         |
| Transistor      | 8                 | 24 VDC                 | 1 A (PNP)              | Shared (fused)                   | Terminal block | U, C, L, CE             | <b>CQM1-OD215</b> |
|                 | 16                |                        |                        |                                  |                |                         | 0.3 A (PNP)       |
|                 | 32                |                        |                        |                                  | 0.5 A (PNP)    |                         | Connector         |
| Triac           | 8                 | 240 VAC                | 0.4 A                  | Shared (short circuit protected) | Terminal block | U, C, L                 | <b>CQM1-OA221</b> |
|                 | 6                 |                        |                        |                                  |                | CE                      | <b>CQM1-OA222</b> |

## ■ INNER BOARDS

**Stock Note:** Shaded models are normally stocked.

| Item                             | Specifications   | International standards | Part number        |
|----------------------------------|--|-------------------------|--------------------|
| High-speed counter board         | 4 pulse inputs (high-speed counter) at 500 kHz max.<br>4 external outputs  | U, C, N, CE             | <b>CQM1H-CTB41</b> |
| Pulse I/O board                  | 2 pulse inputs: Single-phase: 50 kHz,<br>Differential phase: 25 kHz<br>2 pulse outputs: 50 kHz max., both fixed and variable duty factors are supported. | U, C                    | <b>CQM1H-PLB21</b> |
| Absolute encoder interface board | 2 absolute encoder (gray code binary) inputs (4 kHz)   | U, C, N                 | <b>CQM1H-ABB21</b> |
| Analog setting board             | 4 analog settings  | U, C, N, CE             | <b>CQM1H-AVB41</b> |
| Analog I/O board                 | 4 analog inputs of 0 to 5 V, 0 to 20 mA, -10 to +10 V<br>2 analog outputs of 0 to 20 mA, -10 to +10 V  | CE                      | <b>CQM1H-MAB42</b> |
| Serial communications board      | One RS-232C port and one RS-422A/RS-485 port   | U, C, N, CE             | <b>CQM1H-SCB41</b> |

Note: U: UL, C: CSA, N: NK, L: LLOYD, CE: EC Directives

## ■ COMMUNICATION MODULES

**Stock Note:** Shaded models are normally stocked.

### Controller Network Module

| Item                           | Specifications   | International standards | Part number        |
|--------------------------------|--|-------------------------|--------------------|
| Controller Link module (wired) | Data link (Maximum number of words per node: 8,000)<br>Communications instructions: SEND/RECV/CMND | U, C, CE                | <b>CQM1H-CLK21</b> |

### Field Network Modules

| Item                       | Specifications  | International standards | Part number          |
|----------------------------|---|-------------------------|----------------------|
| CompoBus/S master module   | Number of I/O points per Master: 128 (64 inputs and 64 outputs; )<br>Communications cycle time: 0.5 ms min.<br>Max. transmission distance:<br>500 m in long-distance mode<br>100 m in high-speed mode<br>Max. slaves per master: 32   | U, C, CE                | <b>CQM1-SRM21-V1</b> |
| SYSMAC BUS modules         | Remote master (*Use G730 transistor and relay output modules.)<br>Connects CQM1H to G730 SYSMAC BUS remote I/O modules; max. 64 I/O (32 or 16 inputs or outputs, DIP switch selectable)<br>Number of I/O points per Master: 128<br>Communications cycle time: 187.5 kbps<br>Max. transmission distance: 200 m<br>One master and two expansions allowed per system |                         | <b>CQM1-G7M21</b>    |
|                            | Input expansion<br>Expands G730 input capacity of G730 remote master; adds 32 or 16 inputs, DIP switch selected   |                         | <b>CQM1-G7N11</b>    |
|                            | Output expansion<br>Expands G730 output capacity of G730 remote master; adds 32 or 16 outputs, DIP switch selected  |                         | <b>CQM1-G7N01</b>    |
| DeviceNet I/O link module  | Number of I/O points: 16 inputs and 16 outputs<br>Maps the 16 inputs and 16 outputs as a single node.   |                         | <b>CQM1-DRT21</b>    |
| Profibus-DP I/O link unit  | Number of I/O points: 128 inputs and 128 outputs  | U, C, CE                | <b>CQM1-PRT21</b>    |
| AS-interface master module | Number of I/O points: 248 (124 inputs and 124 outputs; 4 inputs/4 outputs per slave)<br>Communications cycle time: 5.148 ms min.<br>Max. transmission distance: 100 m;<br>300 m with 2 repeaters<br>Max. slaves per master: 31 slaves per master module   | U, C, CE                | <b>CQM1-ARM21</b>    |

Note: \*G730 transistor and relay output modules are shown in the Complementary Products section in this catalog.

■ DEDICATED I/O MODULES

Stock Note: Shaded models are normally stocked.

| Item                                       | Specifications  | International standards | Part number            |                   |
|--|---|-------------------------|------------------------|-------------------|
| Analog I/O modules                         | Analog inputs: 4 points, built-in power supply  | U, C, N, CE             | <b>CQM1-AD042</b>      |                   |
|  | Analog inputs: 4 points, order separate power supply  | U, C, N, CE             | <b>CQM1-AD041</b>      |                   |
|  | Analog outputs: 2 points, built-in power supply   | U, C, N, CE             | <b>CQM1-DA022</b>      |                   |
|  | Analog outputs: 2 points, order separate power supply   |                         | <b>CQM1-DA021</b>      |                   |
|  | Power Supply Module re-quired for AD041 and DA021 modules   |                         | For one Analog module  | <b>CQM1-IPS01</b> |
|  |   |                         | For two Analog modules | <b>CQM1-IPS02</b> |
| B7A Master link modules*                   | 16 outputs  | —                       | <b>CQM1-B7A02</b>      |                   |
|  | 16 inputs   | U, C                    | <b>CQM1-B7A12</b>      |                   |
|  | 32 outputs  |                         | <b>CQM1-B7A03</b>      |                   |
|  | 32 inputs   |                         | <b>CQM1-B7A13</b>      |                   |
|  | 16 inputs and 16 outputs  | —                       | <b>CQM1-B7A21</b>      |                   |
| Temperature controller modules             | Thermocouple input, transistor (NPN) output, 2 loops  | U, C, CE                | <b>CQM1-TC001</b>      |                   |
|  | Thermocouple input, transistor (PNP) output, 2 loops  |                         | <b>CQM1-TC002</b>      |                   |
|  | Platinum resistance thermometer input, transistor (NPN) output, 2 loops                             |                         | <b>CQM1-TC101</b>      |                   |
|  | Platinum resistance thermometer input, transistor (PNP) output, 2 loops                             |                         | <b>CQM1-TC102</b>      |                   |
| Temperature controller modules (continued) | Thermocouple input, transistor (NPN) output, 4 loops  | U, C, CE                | <b>CQM1-TC201</b>      |                   |
|  | Thermocouple input, transistor (PNP) output, 4 loops  |                         | <b>CQM1-TC202</b>      |                   |
|  | Thermocouple input, transistor (NPN) output, 2 loops (with heater burnout alarm)                    |                         | <b>CQM1-TC203</b>      |                   |
|  | Thermocouple input, transistor (PNP) output, 2 loops (with heater burnout alarm)                    |                         | <b>CQM1-TC204</b>      |                   |
|  | Platinum resistance thermometer input, transistor (NPN) output, 4 loops                             |                         | <b>CQM1-TC301</b>      |                   |
|  | Platinum resistance thermometer input, transistor (PNP) output, 4 loops                             |                         | <b>CQM1-TC302</b>      |                   |
|  | Platinum resistance thermometer input, transistor (NPN) output, 2 loops (with heater burnout alarm) |                         | <b>CQM1-TC303</b>      |                   |
|  | Platinum resistance thermometer input, transistor (PNP) output, 2 loops (with heater burnout alarm) |                         | <b>CQM1-TC304</b>      |                   |
| Linear sensor interface modules            | Standard  | —                       | <b>CQM1-LSE01</b>      |                   |
|  | With monitor output   |                         | <b>CQM1-LSE02</b>      |                   |
| Safety relay module                        | Emergency stop unit: 2 inputs/2 outputs, 4 general-purpose inputs                                   | U, C                    | <b>CQM1-SF200</b>      |                   |

Note: U: UL, C: CSA, N: NK, L: LLOYD, CE: EC Directives

\*B7A Slave Link Modules are listed in the Dedicated I/O Modules section describing B7A Master Link Modules.

## ■ PROGRAMMING DEVICES AND ACCESSORIES

**Stock Note:** Shaded models are normally stocked.

### Programming Consoles

| Item                             | Specifications  | International standards | Part number          |
|----------------------------------|---|-------------------------|----------------------|
| Programming consoles             | 2-m Connecting Cable included (No other Connecting Cables required.)  | U, C, CE                | <b>CQM1H-PRO01-E</b> |
|                                  | Requires a separate Connecting Cable, see below.  | U, C, N, CE             | <b>C200H-PRO27-E</b> |
| Connecting cables                | Cable length: 2 m   | N                       | <b>C200H-CN222</b>   |
|                                  | Cable length: 2 m (for CPUs complying with EC directives)   | CE                      | <b>C200HS-CN222</b>  |
|                                  | Cable length: 2 m   | CE                      | <b>CS1W-CN224</b>    |
|                                  | Cable length: 6 m   | CE                      | <b>CS1W-CN624</b>    |
| Peripheral port conversion cable | Connects the peripheral port on the CQM1H to a personal computer or Programming Console through a CQM1-CIF02 cable. | CE                      | <b>CS1W-CN114</b>    |

### Communications Adapters and Cables

| Description  | Function  | Cable length          | Part number            |
|--|---|-----------------------|------------------------|
| Cables and adapters  | DB 9-pin on computer to CQM1H mini-peripheral port    | 2 m                   | <b>CS1W-CN226</b>      |
|  |   | 6 m                   | <b>CS1W-CN626</b>      |
|  | Serial port on computer to Omron DB 9-pin serial port | 2 m                   | <b>C200HS-CN220-EU</b> |
|  |   |                       | <b>CBL-202*</b>        |
|  | 25-9 pin cable, operator interface to Omron PLC       | 50 cm                 | <b>NT31C-CN510-EU</b>  |
|  |   |                       | <b>NT31C-CN320-EU</b>  |
|  |   |                       | <b>CBL-803*</b>        |
|  | 25-9 pin cable, operator interface to Omron PLC       | 5 m                   | <b>NT31C-CN520-EU</b>  |
|  | Operator interface to Omron peripheral port cable     | 2 m                   | <b>XW2Z-200T-2</b>     |
|  |   |                       | <b>XW2Z-500T-2</b>     |
|  | 9-9 pin cable, operator interface to Omron PLC        | 50 cm                 | <b>C200H-CN510-EU</b>  |
|  |   |                       | <b>C200H-CN320-EU</b>  |
|  |   |                       | <b>CBL-804*</b>        |
|  |   | 3 m                   | <b>C200H-CN520-EU</b>  |
|  |   |                       | <b>C200H-CN320-EU</b>  |
| Serial port on computer to Omron DB 9-pin serial port                                | 2 m   | <b>C200H-CN229-EU</b> |                        |
|  |   | <b>CBL-202*</b>       |                        |
| Converts the CQM1H CPU mini-peripheral port to an RS-232C port                       | 0.1 m   | <b>CS1W-CN118</b>     |                        |
| Converts CQM1-CIF02 peripheral connector to CQM1H's mini-peripheral port             | 0.05 m  | <b>CS1W-CN114</b>     |                        |
| Cable mounted communication adapter converts peripheral port to DB 9-pin serial port | 3.3 m   | <b>CQM1-CIF02</b>     |                        |
| Mini-peripheral port to RS-422 adapter, DIN mount                                    | —   | <b>CQM1H-CIF12</b>    |                        |

\* Available in Canada only.

### Software

| Item          | Specifications                                     | Cable length | International standards | Part number               |
|---------------|--|--------------|-------------------------|---------------------------|
| CX-Programmer | Write and debug programs; monitor operation CD-ROM | —            | —                       | <b>WS02-CXPC1-E-V</b> □.□ |

### Program Transfer Tools

| Item   | Specifications | International standards | Part number              |
|--|----------------|-------------------------|--------------------------|
| Expansion memory unit uploads and downloads program and setup memory areas to and from the controller. |                | —                       | <b>CPM1-EMU01-V1</b>     |
| EEPROM (256 kbits)   |                | —                       | <b>EEPROM-CPM1-EMU01</b> |

## ■ MAINTENANCE PRODUCTS

**Stock Note:** Shaded models are normally stocked.

| Item      | Function  | International standards | Part number |
|-----------|---|-------------------------|-------------|
| Battery   | Backs up memory in the CPU.                             | —                       | CPM2A-BAT01 |
| End cover | Connects to the I/O module located on the extreme right | U, C, CE                | CQM1H-TER01 |

## ■ DIN TRACK

**Stock Note:** Shaded models are normally stocked.

| Item           | Specifications  |                | International standards | Part number |
|----------------|---|----------------|-------------------------|-------------|
| Mounting track | Track length: 50 cm   | Height: 7.3 mm | L                       | PFP-50N     |
|                | Track length: 1 m   |                |                         | PFP-100N    |
|                | Track length: 1 m   | Height: 16 mm  |                         | PFP-100N2   |
| End plate      | Fasten mounting brackets on both sides of the PLC to prevent it from sliding left or right. |                |                         | PFP-M       |

Note: U: UL, C: CSA, N: NK, L: LLOYD, CE: EC Directives

## ■ MANUALS

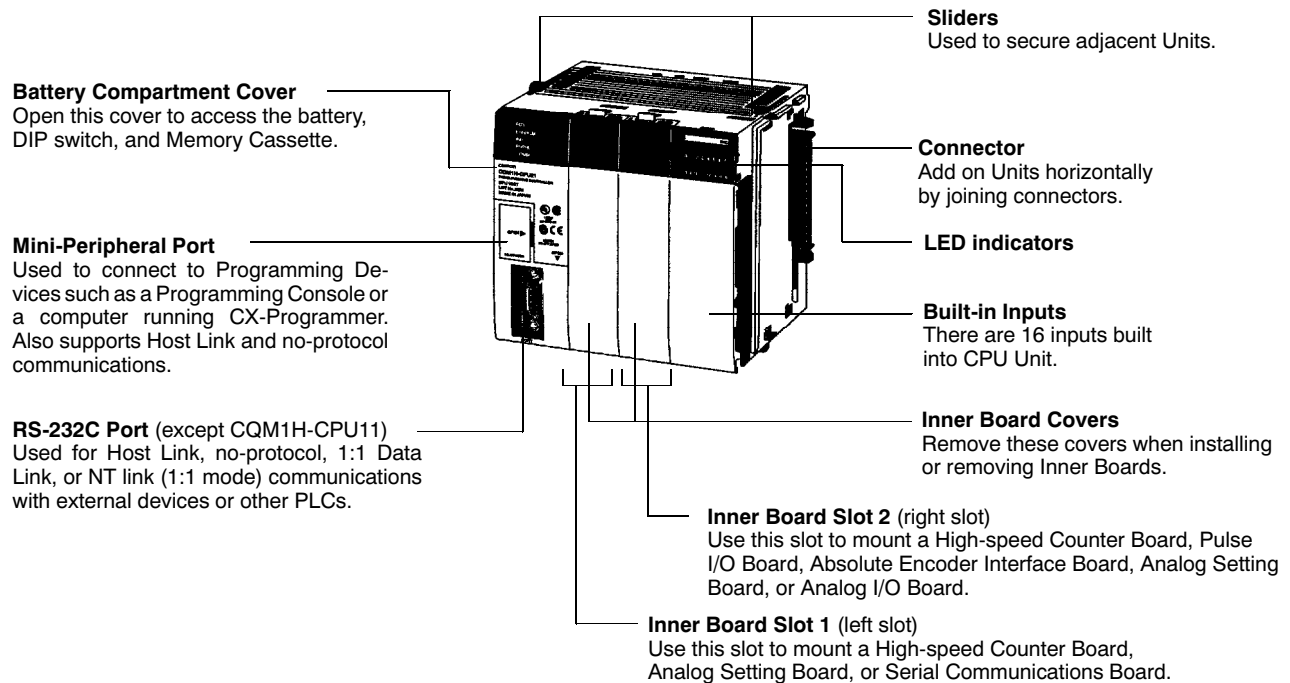
| Product                      | Description   | Part number |
|------------------------------|---|-------------|
| Operation manual             | CQM1H CPUs and Inner Boards operation manual  | W363        |
| Programming manual           | CQM1H CPUs and Inner Boards programming manual  | W364        |
| Dedicated I/O Modules manual | Covers analog input/output, B7A Link master, temperature controller, linear sensor interface, and safety relay modules. | W238        |

# CPUs

The four models of CPUs can be broadly divided into two groups: Models that support Inner Boards and the Controller Link Unit, and models that do not. The CPUs also vary in their program capacities, I/O capacities, memory capacities, and the presence of an RS-232C port, as shown in the *Basic Specifications* table, below.

## ■ NOMENCLATURE

The following illustration shows the main components of a CQM1H-CPU61 CPU.



## ■ OVERVIEW

| Model       | I/O capacity<br>(See Note.) | Program capacity<br>(words) | DM capacity<br>(words) | EM capacity<br>(words) | CPU Unit built-in inputs | Built-in serial ports |              | Inner Boards  | Controller Link Module |
|-------------|-----------------------------|-----------------------------|------------------------|------------------------|--------------------------|-----------------------|--------------|---------------|------------------------|
|             |                             |                             |                        |                        |                          | Peripheral port       | RS-232C port |               |                        |
| CQM1H-CPU61 | 512                         | 15.2 K                      | 6 K                    | 6 K                    | DC: 16                   | Yes                   | Yes          | Supported     |                        |
| CQM1H-CPU51 |                             | 7.2 K                       | 6 K                    | None                   |                          |                       |              |               |                        |
| CQM1H-CPU21 | 256                         | 3.2 K                       | 3 K                    |                        |                          |                       |              | Not supported |                        |
| CQM1H-CPU11 |                             |                             |                        |                        |                          |                       |              |               |                        |

## ■ MAXIMUM NUMBER OF MODULES

| CPU         | Controller Link Module | Inner Boards   | I/O Modules and Dedicated I/O Modules                     |
|-------------|------------------------|----------------|---|
| CQM1H-CPU61 | 1 max.                 | 2 max.         | 11 max.   |
| CQM1H-CPU51 |                        |                | 16 max. using I/O Expansion and Control Interface modules |
| CQM1H-CPU21 | Not supported.         | Not supported. |   |
| CQM1H-CPU11 |                        |                |   |

Note: I/O capacity = Number of input points (≤ 256) + Number of output points (≤ 256).



■ CPU UNIT SPECIFICATIONS

Characteristics

| Item  | Specifications   |  |
|---|--|--|
| Control method                                  | Stored program method  |  |
| I/O control method                              | Cyclic scan and direct output/immediate interrupt processing   |  |
| Programming language                            | Ladder-diagram programming   |  |
| I/O capacity                                    | CQM1H-CPU11/21: 256<br>CQM1H-CPU51/61: 512   |  |
| Program capacity                                | CQM1H-CPU11/21 : 3.2 kwords<br>CQM1H-CPU51 : 7.2 kwords<br>CQM1H-CPU61 : 15.2 kwords   |  |
| User data memory capacity                       | CQM1H-CPU11/21 : 3 kwords<br>CQM1H-CPU51 : 6 kwords<br>CQM1H-CPU61 : 12 kwords (DM: 6 kwords; EM: 6 kwords)  |  |
| Instruction length                              | 1 step per instruction, 1 to 4 words per instruction   |  |
| Number of instructions                          | 162 (14 basic, 148 special instructions)   |  |
| Instruction execution times                     | Basic instructions: 0.375 to 1.125 $\mu$ s<br>Special instructions: 17.7 $\mu$ s (MOV instruction)   |  |
| Overseeing time                                 | 0.70 ms  |  |
| Mounting structure                              | No backplane (Modules are joined horizontally using connectors)  |  |
| Mounting  | DIN Track mounting (screw mounting not possible)   |  |
| CPU built-in DC input points                    | 16   |  |
| Maximum number of modules                       | Maximum of 11 modules total for I/O modules and Dedicated I/O modules  |  |
| Inner Boards                                    | CQM1H-CPU11/21: None<br>CQM1H-CPU51/61: 2 Boards   |  |
| Communications modules (Controller Link Module) | CQM1H-CPU11/21: None<br>CQM1H-CPU51/61: 1 module   |  |
| Types of interrupts                             | Input interrupts (4 inputs max.)   | Input Interrupt Mode:<br>Interrupts are executed in response to inputs from external sources to the CPU's built-in input points.<br><br>Counter Mode:<br>Interrupts are executed in response to reception of a set number of pulses (counted down) via the CPU's internal built-in input points (4 points).  |
|   | Interval timer interrupts (3 timers max.)  | Scheduled Interrupt Mode:<br>Program is interrupted at regular intervals measured by one of the CPU's internal timers.<br><br>One-shot Interrupt Mode:<br>An interrupt is executed after a set time, measured by one of the CPU's internal timers.   |
|   | High-speed counter interrupts  | Target Value Comparison:<br>Interrupt is executed when the high-speed counter PV is equal to a specified value.<br><br>Range Comparison:<br>Interrupt is executed when the high-speed counter PV lies within a specified range.<br><br>Counting is possible for high-speed counter inputs from the CPU's internal input points, Pulse I/O Boards, or Absolute Encoder Interface Boards. (The High-speed Counter Board has no interrupt function, but can output bit patterns internally and externally.) |
| I/O allocations                                 | I/O is automatically allocated in order from the Unit nearest to the CPU. (Because there are no I/O tables, it is not necessary to create I/O tables from a Programming Device.) |  |

Memory Area Structure

| Data area                    |             | Size            | Words  | Bits                 | Function  |
|------------------------------|-------------|-----------------|--|----------------------|---|
| IR area                      | Input area  | 256 bits        | IR 000 to IR 015                                   | IR 00000 to IR 01515 | Input bits are allocated to Input Units or Dedicated I/O Units. The 16 bits in IR 000 are always allocated to the CPU's built-in inputs. Bits in IR 001 to IR 015 are allocated to I/O or Dedicated I/O Units connected to the CPU.   |
| IR area                      | Output area | 256 bits        | IR 100 to IR 115                                   | IR 10000 to IR 11515 | Output bits are allocated to Output Units or Dedicated I/O Units connected to the CPU.  |
|                              | Work areas  | 2,528 bits min. | IR 016 to IR 089                                   | IR 01600 to IR 08915 | Work bits do not have any specific function and they can be freely used within the program.<br><br>(A minimum 2,528 bits are available as work bits. Most bits in the IR and LR areas can be used as work bits when they are not used for their allocated functions, so the total number of available work bits depends on the configuration of the PLC.) |
|                              |             |                 | IR 116 to IR 189                                   | IR 11600 to IR 18915 |   |
|                              |             |                 | IR 216 to IR 219                                   | IR 21600 to IR 21915 |   |
|                              |             |                 | IR 224 to IR 229                                   | IR 22400 to IR 22915 |   |
| Controller Link status areas |             | 96 bits         | IR 090 to IR 095                                   | IR 09000 to IR 09515 | Status Area 1: Stores the Controller Link data link status information.   |
|                              |             |                 | IR 190 to IR 195                                   | IR 19000 to IR 19515 | Status Area 2: Stores the Controller Link error and network participation information.  |
| MACRO operand area           | Input area  | 64 bits         | IR 096 to IR 099                                   | IR 09600 to IR 09915 | Used when the MACRO instruction, MCRO(99), is used.   |
|                              | Output area | 64 bits         | IR 196 to IR 199                                   | IR 19600 to IR 19915 |   |
| Inner Board slot 1 area      |             | 256 bits        | IR 200 to IR 215                                   | IR 20000 to IR 21515 | These bits are allocated to the Inner Board mounted in slot 1 of a CQM1H-CPU51/61.<br>High-speed Counter Board: IR 200 to IR 213<br>Serial Communications Board: IR 200 to IR 207   |
| Analog settings area         |             | 64 bits         | IR 220 to IR 223                                   | IR 22000 to IR 22315 | Used to store the analog settings when a CQM1H-AVB41 Analog Setting Board is mounted.   |
| High-speed Counter, 0 PV     |             | 32 bits         | IR 230 to IR 231                                   | IR 23000 to IR 23115 | Used to store the present values of high-speed counter 0.   |
| Inner Board slot 2 area      |             | 192 bits        | IR 232 to IR 243                                   | IR 23200 to IR 24315 | These bits are allocated to the Inner Board mounted in slot 2.<br>High-speed Counter Board: IR 232 to IR 243<br>Absolute Encoder Interface Board: IR 232 to IR 239<br>Pulse I/O Board: IR 232 to IR 239<br>Analog I/O Board: IR 232 to IR 239   |
| SR area                      |             | 184 bits        | SR 244 to SR 255                                   | SR 24400 to SR 25507 | These bits serve specific functions such as flags and control bits.   |
| HR area                      |             | 1,600 bits      | HR 00 to HR 99                                     | HR 0000 to HR 9915   | These bits store data and retain their ON/OFF status when power is turned OFF or when the operating mode is changed.  |
| AR area                      |             | 448 bits        | AR 00 to AR 27                                     | AR 0000 to AR 2715   | These bits serve specific functions such as flags and control bits.   |
| TR area                      |             | 8 bits          | —  | TR 0 to TR 7         | These bits are used to temporarily store ON/OFF status at program branches.   |
| LR area                      |             | 1,024 bits      | LR 00 to LR 63                                     | LR 0000 to LR 6315   | Used for 1:1 data link through the RS-232 port or through a Controller Link module.   |
| Timer/Counter area           |             | 512 bits        | TIM/CNT 000 to TIM/CNT 511 (timer/counter numbers) |                      | The same numbers are used for both timers and counters.<br><br>Timer numbers 000 to 015 can be used with TIMH(15) for interrupt-refreshed PVs to ensure proper timing without inaccuracy being caused by the cycle time.  |

(This table continues on the next page.)

Memory Area Structure - continued from previous page

| Data area |                    | Size        | Words              | Bits | Function  |
|-----------|--------------------|-------------|--------------------|------|---|
| DM area   | Read/write         | 3,072 words | DM 0000 to DM 3071 | —    | DM area data can be accessed in word units only. Word values are retained when the power is turned OFF.   |
|           |                    | 3,072 words | DM 3072 to DM 6143 | —    | Available in CQM1H-CPU51/61 CPUs only.  |
|           | Read-only          | 425 words   | DM 6144 to DM 6568 | —    | Cannot be written from the program (only from a Programming Device).<br>DM 6400 to DM 6409: Controller Link parameters<br>DM 6450 to DM 6499: Routing tables<br>DM 6550 to DM 6559: Serial Communications Board Setup |
|           | Error history area | 31 words    | DM 6569 to DM 6599 | —    | Cannot be written from the program (only from a Programming Device). Stores the time of occurrence and error code of errors that occur.   |
|           | PLC setup          | 56 words    | DM 6600 to DM 6655 | —    | Cannot be written from the program (only from a Programming Device). Stores various parameters that control PLC operation.  |
| EM area   |                    | 6,144 words | EM 0000 to EM 6143 | —    | EM area data can be accessed in word units only. Word values are retained when the power is turned OFF or the operating mode is changed. (CQM1H-CPU61 CPU Unit only.)   |

Other Functions

| Item   | Specification   |
|--|---|
| Macro instructions                             | Subroutines called by instructions containing arguments.  |
| Min. cycle time                                | 1 to 9,999 ms (Unit: 1 ms)  |
| Cycle time monitoring                          | When the cycle time exceeds 100 ms, the Cycle Time Over Flag turns ON, and operation continues. (A setting can be made in the PLC Setup so that this error is not generated.)<br>When the cycle time exceeds the cycle monitor time, operation is stopped.<br>Cycle monitor time settings: 0 to 990 ms in 10-ms units, 0 to 9,900 ms in 100-ms units, 0 to 99 s in 1-s units.<br>The maximum and current values of the cycle time are stored in the AR area.  |
| I/O refreshing                                 | Cyclic refreshing, refreshing by IORF(97), direct output refreshing (set in the PLC Setup), interrupt input refreshing. (The inputs that are refreshed can be set separately for input interrupts, high-speed counter interrupts, and interval timer interrupts in the PLC Setup.)  |
| I/O memory status when changing operating mode | Depends on the ON/OFF status of the I/O Hold Bit (SR 25212).  |
| Load OFF                                       | All outputs on Output Units can be turned OFF when the CPU is operating in RUN, MONITOR, or PROGRAM mode. (Used for stopping output in emergencies, for debugging, etc.)  |
| User-customized DIP switch setting             | A pin setting on the DIP switch on the front of the CPU is stored in AR 0712. This setting can be used as an ON/OFF condition (e.g., to switch between trial operation and actual operation).   |
| Mode setting at power-up                       | Possible  |
| Debugging                                      | Forced set/reset, differential monitoring, data tracing (scheduled, cyclic, or when instruction is executed).   |
| Online editing                                 | User programs can be overwritten in program-block units when the CPU is in MONITOR mode. With the CX-Programmer, more than one program block can be edited at the same time.  |
| Program protection                             | Write-protection of user program and data memory (DM 6144 to DM 6655: read-only DM):<br>Set using pin 1 of the DIP switch.  |
| Error check                                    | User-defined errors (i.e., user can define fatal errors and non-fatal errors using the FAL(06) and FALS(07) instructions.) (It is possible to stop operation using FALS(07) for fatal errors.)<br>User-defined error logs can be created in specific bits (logging) when using FAL(06).   |
| Error log                                      | Up to 10 errors (including user-defined errors) are stored in the error log. Information includes the error code, error details, and the time the error occurred.   |
| Serial communications                          | Built-in mini-peripheral port: Programming Device (including Programming Console) connections, Host Links, no-protocol communications<br>Built-in RS-232C port: Programming Device (excluding Programming Console) connections, Host Links, no-protocol communications, NT Links (1:1 mode), 1:1 Data Links<br>RS-232C port and RS-422A/485 port on Serial Communications Board (sold separately): Programming Device (excluding Programming Console) connections, Host Links, no-protocol communications, NT Links (1:1 mode, 1:N mode), 1:1 Data Links, protocol macros |

(This table continues on the next page.)

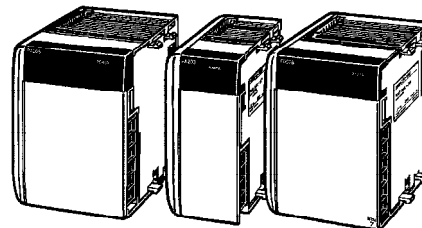
Other Functions - continued from previous page

| Item                              | Specification   | Built-in mini-peripheral port | Built-in RS-232C port | Serial communications board |
|-----------------------------------|---|-------------------------------|-----------------------|-----------------------------|
| Serial communications modes       |   |                               |                       |                             |
| Programming console bus           | Connects to Programming Console.  | YES (pin 7 OFF)               | No                    | No                          |
| Peripheral bus                    | Connects to a computer running CX-Programmer or other Support Software. (Automatically used if the network type is set to peripheral bus on the Support Software.)  | YES (pin 7 ON)                | No                    | No                          |
| Host Link (SYSMAC WAY)            | Enables reading/writing CPU I/O memory or program using Host Link commands. Computers running Support Software or OMRON Programmable Terminals can also be connected. PLC-initiated communications are possible.  | YES (pin 7 ON)                | YES                   | YES                         |
| No-protocol                       | Enables sending or receiving up to 256 bytes of data without a protocol or data conversion. A start code, end code, and transmission delay can be set.  | YES (pin 7 ON)                | YES                   | YES                         |
| 1:1 data link                     | Enables 1:1 data link with a CQM1H, CQM1, CPM-series, C200HX/HG/HE, C200HS, or SRM1 PLC.  | No                            | YES                   | YES                         |
| NT links (1:1 and 1:N)            | Enables 1:1 or 1:N communications with OMRON Programmable Terminals without additional programming.   | No                            | YES (1:1 only)        | YES (1:1 and 1:N)           |
| Protocol macros                   | Enables user-created protocols to communicate with essential any device equipped with a serial communications port (e.g., RS-232C). Standard protocols are also provided.   | No                            | No                    | YES                         |
| Clock                             | Some Memory Cassette are equipped with a clock. (The time of the error will recorded if a clock is used.)   |                               |                       |                             |
| Input time constants              | Used to set the ON (or OFF) response times for DC Input modules. Settings: 1, 2, 4, 8, 16, 32, 64, and 128 ms.  |                               |                       |                             |
| Power OFF detection time          | AC power supply: 10 to 25 ms (not fixed), DC power supply: 5 to 25 ms (not fixed)   |                               |                       |                             |
| Memory protection                 | Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of the counter Completion Flags and present values.<br>If the I/O Hold Bit (SR 25212) is turned ON, and the PLC Setup is set to maintain the I/O Hold Bit status when power is turned ON, the contents of the IR area and the LR area will be saved. |                               |                       |                             |
| Commands to a host computer       | Host Link command responses can be sent to a computer connected via the Host Link System using the TXD(—) (communications port output) instruction.   |                               |                       |                             |
| Remote programming and monitoring | Host Link or peripheral bus communications via a CPU's serial communications port can be used for remote programming and remote monitoring of the PLC through a Controller Link System. (This function is, however, not supported for the serial communications ports on the Serial Communications Board.)                                  |                               |                       |                             |
| Program check                     | Program is checked at the beginning of operation for items such as no END(01) instruction and instruction errors. CX-Programmer can also check programs. (The level of program checking can be set.)  |                               |                       |                             |
| Battery life                      | 5 years at 25°C (Depends on the ambient temperature and power supply conditions. Min.: 1 yr)<br>Battery replacement must be performed within 5 minutes.   |                               |                       |                             |
| Errors from self-diagnostics      | CPU (watchdog timer), I/O verification, I/O bus, memory, FALS system (FALS execution or cycle monitor time over), FAL system (FAL execution or PLC Setup error etc.), battery, cycle time over and communications port.   |                               |                       |                             |
| Other functions                   | Storage of number of times power has been interrupted. (Stored in AR area.)   |                               |                       |                             |

# Power Supply Units

Both AC and DC Power Supply Units are available. The AC Power Supply Units require a power supply input from 100 to 240 VAC and two of the AC Power Supply Units are equipped with an auxiliary 24 VDC power supply output.

The CQM1H's left End Cover is part of the Power Supply Unit.



CQM1-PA206 CQM1-PA203 CQM1-PD026  
CQM1-PA216

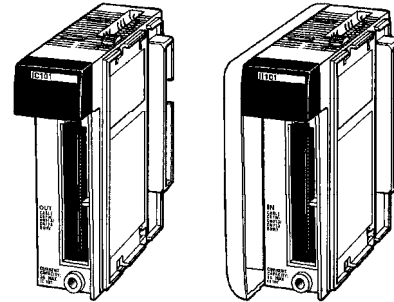
## ■ SPECIFICATIONS

| Item                         | CQM1-PA203  | CQM1-PA206                                  | CQM1-PA216                            | CQM1-PD026           |
|------------------------------|---|---|---------------------------------------|----------------------|
| Supply voltage               | 100 to 240 VAC, 50/60 Hz  |   | 100 or 230 VAC (selectable), 50/60 Hz | 24 VDC               |
| Operating voltage range      | 85 to 264 VAC   |   | 85 to 132 VAC or 170 to 264 VAC       | 20 to 28 VDC         |
| Operating frequency range    | 47 to 63 Hz   |   |                                       | —                    |
| Power consumption            | 60 VA max.  | 120 VA max.                                 |                                       | 50 W max.            |
| Inrush current               | 30 A max.   |   |                                       |                      |
| Output capacity              | 5 VDC: 3.6 A (18 W)   | 5 VDC: 6 A<br>24 VDC: 0.5 A<br>(30 W total) |                                       | 5 VDC: 6 A<br>(30 W) |
| Insulation resistance        | 20 MΩ min. at 500 VDC between AC external terminals and GR terminals  |   |                                       |                      |
| Dielectric strength          | 2,300 VAC 50/60 Hz for 1 min between AC external and GR terminals, leakage current: 10 mA max.<br>1,000 VAC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 20 mA max.  |   |                                       |                      |
| Noise immunity               | Conforms to IEC61000-4-4, 2 kV (power lines)  |   |                                       |                      |
| Vibration resistance         | 10 to 57 Hz with an amplitude of 0.075 mm, and 57 to 150 Hz with an acceleration of 9.8 m/s <sup>2</sup> in the X, Y, and Z directions for 80 minutes each (i.e., swept for 8 minutes, 10 times). |   |                                       |                      |
| Shock resistance             | 147 m/s <sup>2</sup> (118 m/s <sup>2</sup> for Contact Output Units) 3 times each in X, Y, and Z directions   |   |                                       |                      |
| Ambient temperature          | Operating: 0° to 55°C (32° to 131°F)<br>Storage: -20° to 75°C (-4° to 167°F), except battery  |   |                                       |                      |
| Ambient operating humidity   | 10% to 90% RH (no condensation)   |   |                                       |                      |
| Operating environment        | No corrosive gas  |   |                                       |                      |
| Ground                       | Less than 100 Ω   |   |                                       |                      |
| Construction                 | Panel mounted   |   |                                       |                      |
| Weight                       | 5 kg max.   |   |                                       |                      |
| Internal current consumption | CQM1H-CPU11:  | 820 mA at 5 VDC                             |                                       |                      |
|                              | CQM1H-CPU21/51/61:  | 840 mA at 5 VDC                             |                                       |                      |
| Dimensions (without cables)  | CQM1H-CPU11/21: 187 to 571 × 110 × 107 mm (W×H×D)<br>CQM1H-CPU51/61: 187 to 603 × 110 × 107 mm (W×H×D)  |   |                                       |                      |
| Accessories                  | RS-232C connector (one XM2A-0901 Plug and one XM2S-0911-E Hood) (except CQM1H-CPU11)<br>CPM2A-BAT01 Battery Set (installed in CPU Unit when shipped)  |   |                                       |                      |

Note: The total power consumed at 5 VDC and 24 VDC must be less than 30 W.  
(5 × Current consumed at 5 VDC) + (24 × Current consumed at 24 VDC) ≤ 30 W

# I/O Expansion Adapters

Use Expansion I/O adapters to split the configuration into more than one group, allowing greater flexibility with mounting space as well as the use of at least 16 I/O Modules or Dedicated I/O Modules. Expansion Adapters can be used with any CQM1H CPU.



CQM1H-IC101

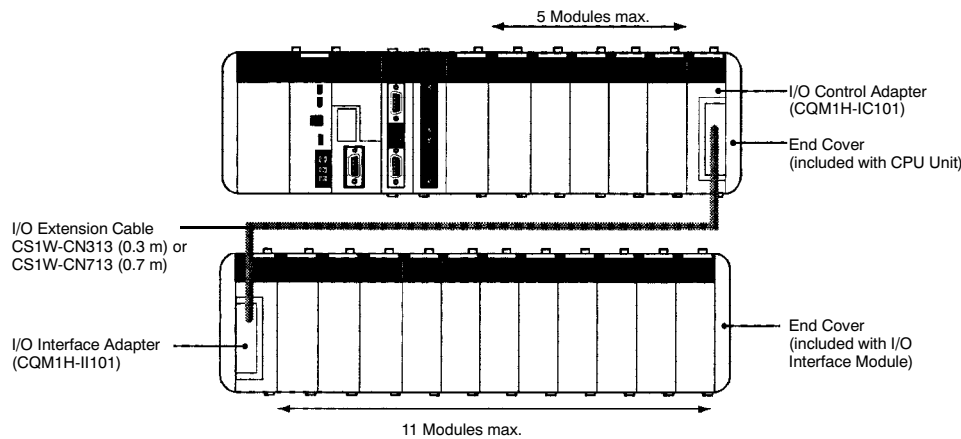
CQM1H-II101

## ■ SPECIFICATIONS

### Maximum Number of Units Mountable

| CPU model   | CPU Block only                      |                         | CPU Block + I/O Expansion Adapter |                                     |   |
|-------------|-------------------------------------|-------------------------|-----------------------------------|-------------------------------------|---|
|             | CPU grouping                        | CPU grouping            |                                   |                                     |   |
|             | I/O Modules + Dedicated I/O Modules | Controller Link Modules | Inner Boards                      | I/O Modules + Dedicated I/O Modules | Extension grouping<br>I/O Modules + Dedicated I/O Modules |
| CQM1H-CPU61 | 11 Modules max.                     | 1 Module                | 2 Boards max.                     | 5 Modules max.                      | 11 Modules max.   |
| CQM1H-CPU51 |                                     |                         |                                   |                                     |   |
| CQM1H-CPU21 |                                     | Not supported           | Not supported                     |                                     |   |
| CQM1H-CPU11 |                                     |                         |                                   |                                     |   |

## ■ CONFIGURATION



**CPU Grouping**  
Total current consumption:  
3.0 A max. (including CPU)

**Extension Grouping**  
Total current consumption:  
2.0 A max. (I/O Modules and  
Dedicated I/O Modules)

Note: If the CQM1-PA203 Power Supply Unit is used, the maximum current consumption total is 3.6 A.

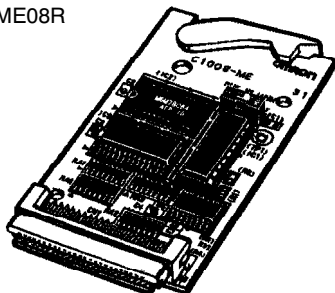
# Memory Cassettes

An optional Memory Cassette can be used to store the user program, PLC setup, and other data in ROM so that vital data will not be lost in the event of battery expiration or careless programming/monitoring operations.

If the PLC's settings need to be changed to execute another process, the entire software setup and user program can be changed just by exchanging the Memory Cassette and rebooting the PLC.

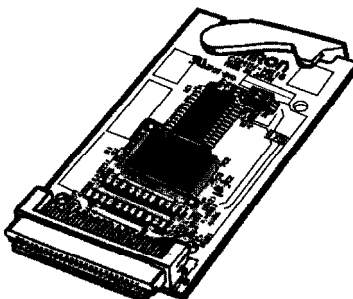
**EEPROM:**

- CQM1-ME04K
- CQM1-ME04R
- CQM1-ME08K
- CQM1-ME08R



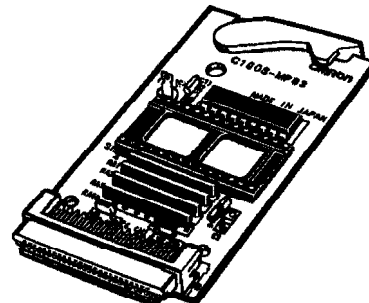
**Flash Memory:**

- CQM1H-ME16K
- CQM1H-ME16R



**EPROM:**

- CQM1-MP08K
- CQM1-MP08R



## ■ SPECIFICATIONS

| Memory                                      | Model       | Specifications   |
|---|-------------|--|
| EEPROM                                      | CQM1-ME04K  | 4 kwords without clock   |
|   | CQM1-ME04R  | 4 kwords with clock  |
|   | CQM1-ME08K  | 8 kwords without clock   |
|   | CQM1-ME08R  | 8 kwords with clock  |
| EPROM                                       | CQM1-MP08K  | Without clock (see below)  |
|   | CQM1-MP08R  | With clock (see below)   |
| Flash                                       | CQM1H-ME16K | 16 kwords without clock  |
|   | CQM1H-ME16R | 16 kwords with clock   |
| Memory Cassette<br>(EEPROM or flash memory) |             | Mounted from the front of the CPU and used to store and read the user's program, DM (read-only DM and PLC Setup), and expansion instruction information as one block. It is possible to set the CPU so that data stored in the Memory Cassette (user's program, DM, expansion instruction information) is automatically sent to the CPU (auto-boot) at startup. Transfer and comparison of data between the CPU and Memory Cassette are possible using AR area control bits. |

### EPROM Chips

The following EPROM chips (sold separately) are required for EPROM Memory Cassettes. The chip is mounted in the I/O socket on the Memory Cassette.

| Model    | ROM version         | Capacity  | Access speed |
|----------|---------------------|-----------|--------------|
| ROM-ID-B | 27128 or equivalent | 8 kwords  | 150 ns       |
| ROM-JD-B | 27256 or equivalent | 16 kwords | 150 ns       |
| ROM-KD-B | 27512 or equivalent | 32 kwords | 150 ns       |

# Inputs and Outputs for CPUs and Modules

## ■ I/O MEMORY ALLOCATION

I/O words are allocated to I/O Modules according to a fixed location. When the I/O Modules and Dedicated I/O Modules are connected, the I/O words will be allocated as follows.

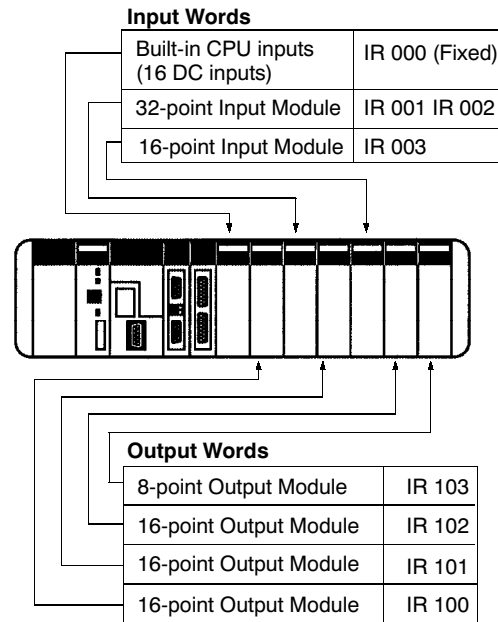
### Input Word Allocation

IR 000 to IR 015 are allocated as input bits. The first input word (IR 000), however, is allocated to the CPU's 16 built-in input points.

Note: Built-in CPU's inputs are used for interrupt processing and built-in high-speed counter inputs.

### Output Word Allocation

IR 100 to IR 115 are allocated as output bits. When Output Modules or Dedicated I/O Modules are connected, words will be allocated in order starting from IR 100.





**I/O Word Allocation**

| Module type   |                                   | I/O word allocation |              |   |
|---|-----------------------------------|---------------------|--------------|---|
|   |                                   | Input words         | Output words | Description   |
| Input module  |                                   | 1 or 2              | —            | Each 8-point or 16-point input module is allocated one input word and each 32-point input module is allocated two input words. Words will be allocated in order starting from IR 001.                             |
| Output modules  |                                   | —                   | 1 or 2       | Each 8-point or 16-point output module is allocated one output word and each 32-point output module is allocated two output words. Words will be allocated in order starting from IR 100.                         |
| B7A Master link modules                               | B7A02                             | —                   | 1            | Depending on the module, each B7A Master link module is allocated input words and output words.   |
|   | B7A12                             | 1                   | —            |   |
|   | B7A03                             | —                   | 1            |   |
|   | B7A13                             | 2                   | —            |   |
|   | B7A21                             | 1                   | 1            |   |
| DeviceNet I/O link module                             |                                   | 1                   | 1            | Each DeviceNet I/O link module is allocated one input word and one output word.   |
| Profibus-DP I/O link module                           | IN: 32 points<br>OUT: 32 points   | 2                   | 2            | The Profibus-DP master configuration data must match this setting.  |
|   | IN: 64 points<br>OUT: 64 points   | 4                   | 4            |   |
|   | IN: 96 points<br>OUT: 96 points   | 6                   | 6            |   |
|   | IN: 128 points<br>OUT: 128 points | 8                   | 8            |   |
| AS-Interface master module                            | IN: 44 points<br>OUT: 44 points   | 3                   | 3            | This setting will influence the maximum number of AS-Interface slaves that can be addressed by the PLC.   |
|   | IN: 60 points<br>OUT: 60 points   | 4                   | 4            |   |
|   | IN: 92 points<br>OUT: 92 points   | 6                   | 6            |   |
|   | IN: 76 points<br>OUT: 76 points   | 5                   | 5            |   |
|   | IN: 92 points<br>OUT: 92 points   | 6                   | 6            |   |
|   | IN: 124 points<br>OUT: 124 points | 8                   | 8            |   |
| CompoBus/S master modules                             | IN: 16 points<br>OUT: 16 points   | 1                   | 1            | Depending on the module, each CompoBus/S master module is allocated input words and output words.   |
|   | IN: 32 points<br>OUT: 32 points   | 2                   | 2            |   |
|   | IN: 64 points<br>OUT: 64 points   | 4                   | 4            |   |
| Analog input module                                   |                                   | 2 or 4              | —            | Each analog input module can be set to input either 2 or 4 points. If the module is set to input 2 points, two input words are allocated. If the module is set to input 4 points, four input words are allocated. |
| Analog output module                                  |                                   | —                   | 2            | Each analog output module is allocated two output words.  |
| Analog power supply modules for CQM1-AD041 and -DA021 |                                   | —                   | —            | Power supply modules are not involved directly in I/O operations and are thus not allocated I/O words.  |
| Temperature control modules                           | 00□/10□                           | 2 or 1              | 2 or 1       | Each temperature control module is allocated two input words and two output words when two loops are used. Only one input word and one output word are allocated when one loop is used.                           |
|   | 20□/30□                           | 1                   | 1            | One input word and one output word are allocated in the order the module is connected.  |
| Safety relay module                                   |                                   | 1                   | —            | One input word is allocated per module in the order the module is connected.  |

## ■ INPUT SPECIFICATIONS

All of the Input Modules listed in the following tables have photocoupler isolation and LED input indicators.

### CPUs

| Number of inputs | Input voltage      | Input current                                   | Input impedance                           | Operating voltage |              | Response times (See Note) |           | External connection | Inputs/common | Current consumption (5 VDC) | Weight |
|------------------|--------------------|---|---|-------------------|--------------|---------------------------|-----------|---------------------|---------------|-----------------------------|--------|
|                  |                    |   |   | ON voltage        | OFF voltage  | ON delay                  | OFF delay |                     |               |                             |        |
| 16 pts           | 24 VDC<br>+10%/15% | 10 mA for IN04/05<br>6 mA for the rest (24 VDC) | 2.2 kΩ for IN04/05<br>3.9 kΩ for the rest | 17.4 VDC min.     | 5.0 VDC max. | 8 ms max.                 | 8 ms max. | Terminal block      | 16            | —                           | —      |

Note: Selectable from 1 to 128 ms in the PLC Setup.

### DC Input Modules

| Model      | Number of inputs | Input voltage            | Input current  | Input impedance | Operating voltage |              | Response times (See Note) |           |
|------------|------------------|--------------------------|----------------|-----------------|-------------------|--------------|---------------------------|-----------|
|            |                  |                          |                |                 | ON voltage        | OFF voltage  | ON delay                  | OFF delay |
| CQM1-ID211 | 8 pts            | 12 to 24 VDC<br>+10%/15% | 10 mA (24 VDC) | 2.4 kΩ          | 10.2 VDC min.     | 3.0 VDC max. | 8 ms max.                 | 8 ms max. |
| CQM1-ID111 | 16 pts           | 12 VDC<br>+10%/15%       | 6 mA (12 VDC)  | 1.8 kΩ          | 8.0 VDC min.      | 3.0 VDC max. | 8 ms max.                 | 8 ms max. |
| CQM1-ID212 | 16 pts           | 24 VDC<br>+10%/15%       | 6 mA (24 VDC)  | 3.9 kΩ          | 14.4 VDC min.     | 5.0 VDC max. | 8 ms max.                 | 8 ms max. |
| CQM1-ID112 | 32 pts           | 12 VDC<br>+10%/15%       | 4 mA (12 VDC)  | 2.2 kΩ          | 8.0 VDC min.      | 3.0 VDC max. | 8 ms max.                 | 8 ms max. |
| CQM1-ID213 | 32 pts           | 24 VDC<br>+10%/15%       | 4 mA (24 VDC)  | 5.6 kΩ          | 14.4 VDC min.     | 5.0 VDC max. | 8 ms max.                 | 8 ms max. |

Note: Selectable from 1 to 128 ms in the PLC Setup.

| Model      | Number of inputs | External connection | Inputs/common         | Current consumption (5 VDC) | Weight     |
|------------|------------------|---------------------|-----------------------|-----------------------------|------------|
| CQM1-ID211 | 8 pts            | Terminal block      | 8 independent commons | 50 mA max.                  | 180 g max. |
| CQM1-ID111 | 16 pts           |                     | 16                    | 85 mA max.                  | 180 g max. |
| CQM1-ID212 | 16 pts           |                     | 16                    | 85 mA max.                  | 180 g max. |
| CQM1-ID112 | 32 pts           | Connector           | 32                    | 170 mA max.                 | 160 g max. |
| CQM1-ID213 | 32 pts           |                     | 32                    | 170 mA max.                 | 160 g max. |
| CQM1-ID214 | 32 pts           |                     | 32                    | 170 mA max.                 | 160 g max. |

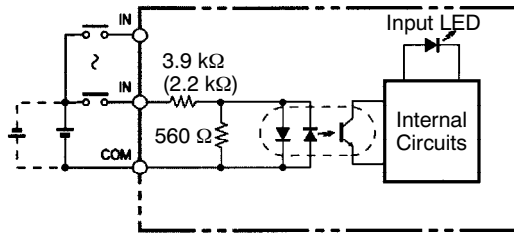
### AC Input Modules

| Model      | Number of inputs | Input voltage              | Input current  | Input impedance                | Operating voltage |             | Response times |            |
|------------|------------------|----------------------------|----------------|--------------------------------|-------------------|-------------|----------------|------------|
|            |                  |                            |                |                                | ON voltage        | OFF voltage | ON delay       | OFF delay  |
| CQM1-IA121 | 8 pts            | 100 to 120 VAC<br>+10%/15% | 5 mA (100 VAC) | 20 kΩ (50 Hz)<br>17 kΩ (60 Hz) | 60 VAC min.       | 20 VAC max. | 35 ms max.     | 55 ms max. |
| CQM1-IA221 | 8 pts            | 200 to 240 VAC<br>+10%/15% | 6 mA (200 VAC) | 38 kΩ (50 Hz)<br>32 kΩ (60 Hz) | 150 VAC min.      | 40 VAC max. | 35 ms max.     | 55 ms max. |

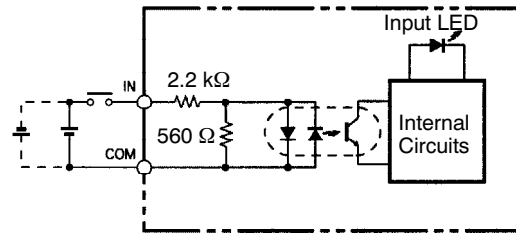
| Model      | Number of inputs | External connection | Inputs/common | Current consumption (5 VDC) | Weight     |
|------------|------------------|---------------------|---------------|-----------------------------|------------|
| CQM1-IA121 | 8 pts            | Terminal block      | 8             | 50 mA max.                  | 210 g max. |
| CQM1-IA221 | 8 pts            |                     | 8             | 50 mA max.                  | 210 g max. |

■ INPUT CIRCUIT CONFIGURATION

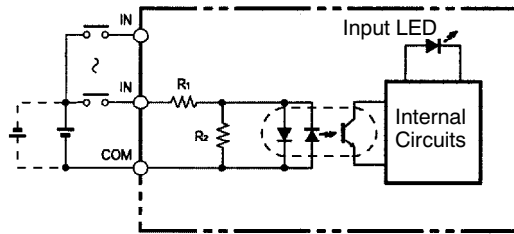
CPU Inputs



CQM1-ID211

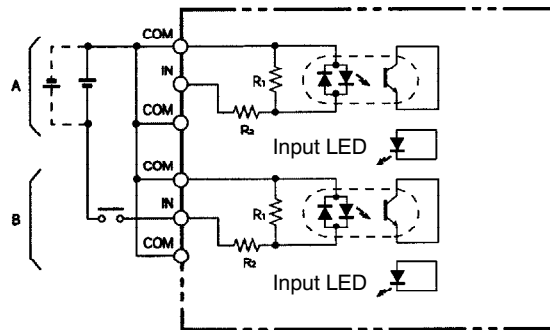


CQM1-ID111/212



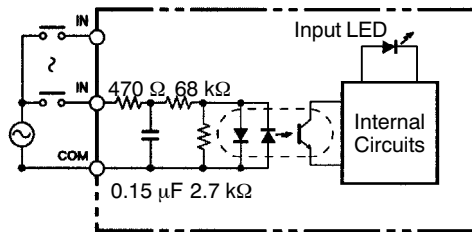
- ID111: R<sub>1</sub>: 1.8 kΩ  
R<sub>2</sub>: 620 Ω
- ID212: R<sub>1</sub>: 3.9 kΩ  
R<sub>2</sub>: 560 Ω

CQM1-ID112/213/214

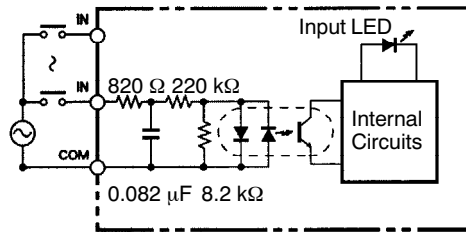


- ID112: R<sub>1</sub>: 750 Ω  
R<sub>2</sub>: 2.2 kΩ
- ID213: R<sub>1</sub>: 620 Ω  
R<sub>2</sub>: 5.6 kΩ
- ID214: R<sub>1</sub>: 620 Ω  
R<sub>2</sub>: 3.9 kΩ

CQM1-IA121



CQM1-IA221



## ■ OUTPUT MODULE SPECIFICATIONS

All of the Output Modules have LED output indicators.

### Contact Output Modules

| Model      | Number of outputs | Max. switching capacity   | Min. switching capacity | Response times |           | External connector | Leakage current |
|------------|-------------------|---|-------------------------|----------------|-----------|--------------------|-----------------|
|            |                   |   |                         | ON delay       | OFF delay |                    |                 |
| CQM1-OC221 | 8 pts             | 2 A, 250 VAC (cosφ= 1)<br>2 A, 250 VAC (cosφ= 0.4)<br>2 A, 24 VDC (16 A/Unit) | 10 mA, 5 VDC            | 10 ms max.     | 5 ms max. | Terminal block     | —               |
| CQM1-OC222 | 16 pts            | 2 A, 250 VAC (cosφ= 1)<br>2 A, 250 VAC (cosφ= 0.4)<br>2 A, 24 VDC (8 A/Unit)  | 10 mA, 5 VDC            | 10 ms max.     | 5 ms max. |                    |                 |
| CQM1-OC224 | 8 pts             | 2 A, 250 VAC (cosφ= 1)<br>2 A, 250 VAC (cosφ= 0.4)<br>2 A, 24 VDC (16 A/Unit) | 10 mA, 5 VDC            | 15 ms max.     | 5 ms max. |                    |                 |

| Model      | Number of outputs | Outputs/common       | Fuses | External power supply capacity | Internal current consumption (5 VDC) | Weight     |
|------------|-------------------|----------------------|-------|--------------------------------|--------------------------------------|------------|
| CQM1-OC221 | 8 pts             | Independent commons  | None  | —                              | 430 mA max.                          | 200 g max. |
| CQM1-OC222 | 16 pts            | 16 pts to one common |       | —                              | 850 mA max.                          | 230 g max. |
| CQM1-OC224 | 8 pts             | Independent commons  |       | —                              | 440 mA max.                          | 270 g max. |

### Transistor Output Modules

| Model                      | Number of outputs | Max. switching capacity                 | Min. switching capacity | Response times |             | External connector | Leakage current |
|----------------------------|-------------------|---|-------------------------|----------------|-------------|--------------------|-----------------|
|                            |                   |   |                         | ON delay       | OFF delay   |                    |                 |
| CQM1-OD211 (NPN, sinking)  | 8 pts             | 2 A at 24 VDC<br>+10%/-15% 5 A/Unit     | —                       | 0.1 ms max.    | 0.3 ms max. | Terminal block     | 0.1 mA max.     |
| CQM1-OD212 (NPN, sinking)  | 16 pts            | 50 mA at 4.5 VDC<br>to 300 mA at 26.4 V | —                       | 0.1 ms max.    | 0.4 ms max. |                    | 0.1 mA max.     |
| CQM1-OD213 (NPN, sinking)  | 32 pts            | 16 mA at 4.5 VDC<br>to 100 mA at 26.4 V | —                       | 0.1 ms max.    | 0.4 ms max. | Connector          | 0.1 mA max.     |
| CQM1-OD214 (PNP, sourcing) | 16 pts            | 50 mA at 4.5 VDC<br>to 300 mA at 26.4 V | —                       | 0.1 ms max.    | 0.4 ms max. | Terminal block     | 0.1 mA max.     |
| CQM1-OD215 (PNP, sourcing) | 8 pts             | 1.0 A at 24 VDC<br>+10%/-15% 4 A/Unit   | —                       | 0.2 ms max.    | 0.8 ms max. |                    | 0.1 mA max.     |
| CQM1-OD216 (PNP, sourcing) | 32 pts            | 0.5 A at 24 VDC<br>+10%/-15% 5 A/Unit   | —                       | 0.1 ms max.    | 0.3 ms max. | Connector          | 0.1 mA max.     |

| Model                      | Number of outputs | Outputs/common | Fuses (See Note)                  | External power supply capacity  | Internal current consumption (5 VDC) | Weight     |
|----------------------------|-------------------|----------------|-----------------------------------|---------------------------------|--------------------------------------|------------|
| CQM1-OD211 (NPN, sinking)  | 8 pts             | 8              | 7 A (one fuse/common)             | 24 VDC +10%/-15%<br>15 mA min.  | 90 mA max.                           | 200 g max. |
| CQM1-OD212 (NPN, sinking)  | 16 pts            | 16             | 5 A (one fuse/common)             | 5 to 24 VDC ±10%<br>40 mA min.  | 170 mA max.                          | 180 g max. |
| CQM1-OD213 (NPN, sinking)  | 32 pts            | 32             | 3.5 A (one fuse/common)           | 5 to 24 VDC ±10%<br>110 mA min. | 240 mA max.                          | 180 g max. |
| CQM1-OD214 (PNP, sourcing) | 16 pts            | 16             | 3.5 A (two fuses/common)          | 5 to 24 VDC ±10%<br>60 mA min.  | 170 mA max.                          | 210 g max. |
| CQM1-OD215 (PNP, sourcing) | 8 pts             | 8              | Short-circuit protection function | 24 VDC +10%/-15%<br>24 mA min.  | 110 mA max.                          | 240 g max. |
| CQM1-OD216 (PNP, sourcing) | 32 pts            | 32             | 7 A (one fuse/common)             | 24 VDC +10%/-15%<br>160 mA min. | 240 mA max.                          | 210 g max. |

Note: Fuses are not user-serviceable.

**AC Output Modules**

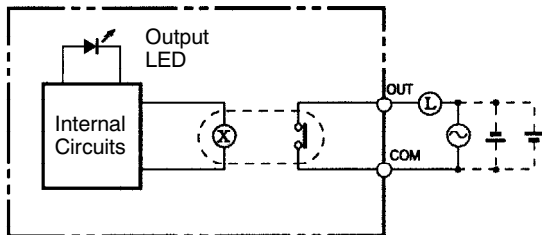
| Model      | Number of outputs | Max. switching capacity | Min. switching capacity   | Response times |   | External connector | Leakage current                            |
|------------|-------------------|-------------------------|---|----------------|---|--------------------|--|
|            |                   |                         |   | ON delay       | OFF delay                               |                    |  |
| CQM1-OA221 | 8 pts             | 0.4 A at 100 to 240 VAC | —   | 6 ms max.      | 1/2 cycle + 5 ms max.                   | Terminal block     | 1 mA max. at 100 VAC, 2 mA max. at 200 VAC |
| CQM1-OA222 | 6 pts             | 0.4 A at 100 to 240 VAC | 100 mA at 10 VAC<br>50 mA at 24 VAC<br>10 mA at 100 VAC<br>10 mA at 240 VAC | 1 ms max.      | Load frequency of 1/2 cycle + 1 ms max. |                    |  |

| Model      | Number of outputs | Outputs/common       | Fuses (See note)      | External power supply capacity | Internal current consumption (5 VDC) | Weight     |
|------------|-------------------|----------------------|-----------------------|--------------------------------|--------------------------------------|------------|
| CQM1-OA221 | 8 pts             | 4 each (2 circuits)  | 2 A (one fuse/common) | —                              | 110 mA max.                          | 240 g max. |
| CQM1-OA222 | 6 pts             | 4 and 2 (2 circuits) | 5 A (one fuse/common) | —                              | 250 mA max.                          | 240 g max. |

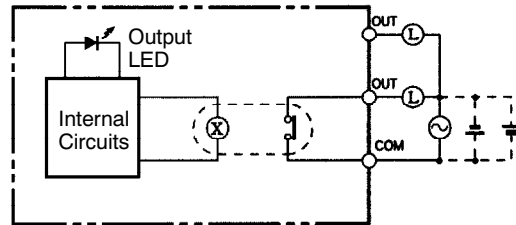
Note: Fuses are not user-serviceable.

**OUTPUT CIRCUIT CONFIGURATION**

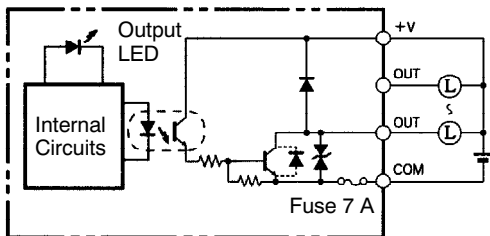
**CQM1-OC221**



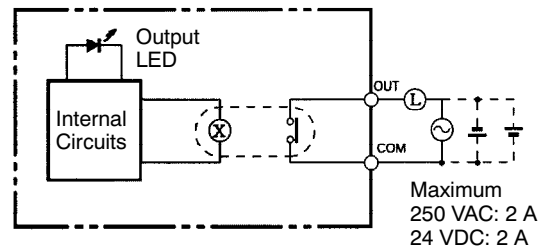
**CQM1-OC222**



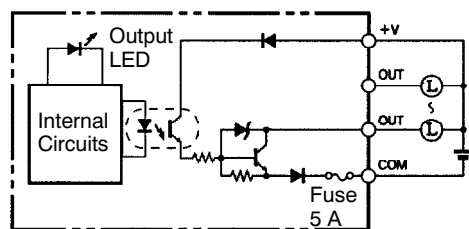
**CQM1-OD211**



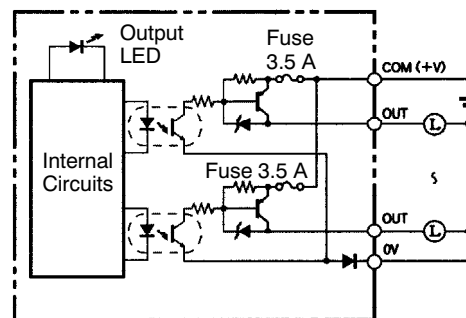
**CQM1-OC224**



**CQM1-OD212**

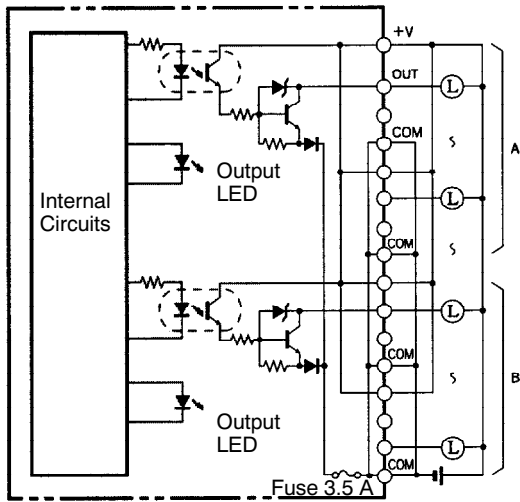


**CQM1-OD214**

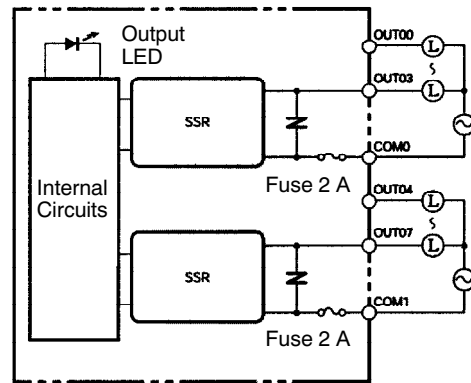


(Output Circuit Configuration continues on the next page.)

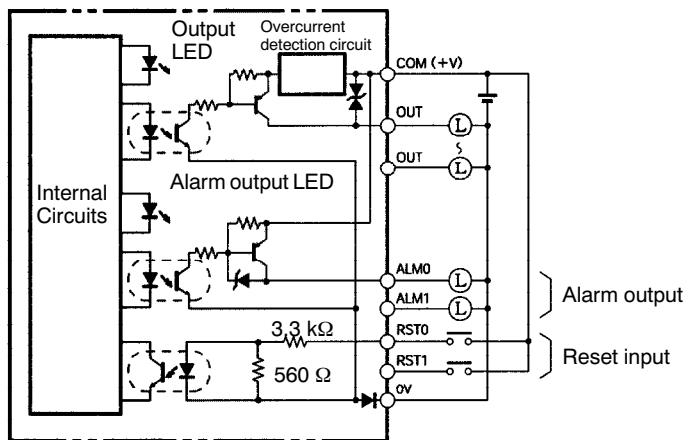
**CQM1-OD213**



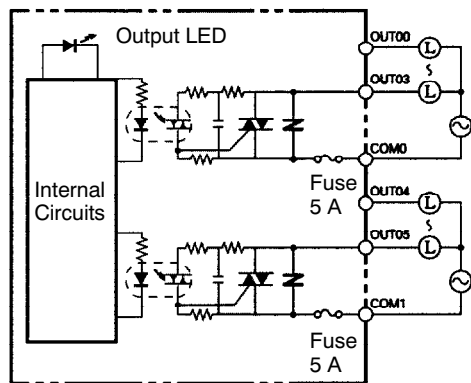
**CQM1-OA221**



**CQM1-OD215**



**CQM1-OA222**



**CQM1-OD216**

