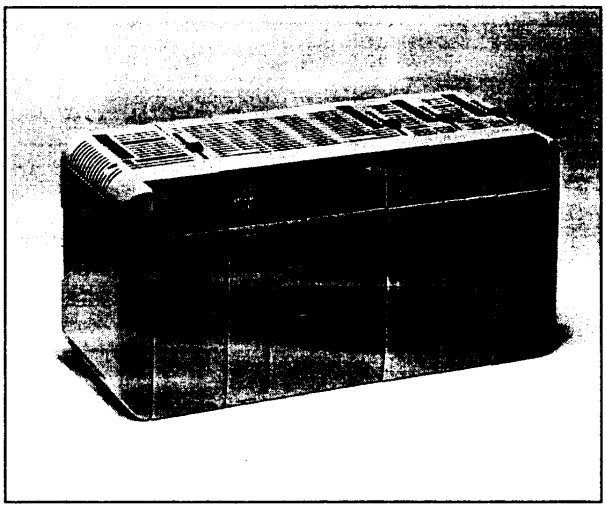
200 -967

OMRON

SYSMAC Programmable Controller | CQM1

Six CPUs Available, Four of Which Have a Special I/O Function such as Absolute Encoder Feedback, 50 KHz Pulse I/O or Analogue Timers



3.2K word to 7.2K word user memory and 1K word to 6K word data memory with a maximum I/O of 192.

Instruction execution from 0.5 μs.

Built-in hard-wire interrupts will operate associated sub-routines in a guaranteed 1.0 ms from an input being made.

Up to three high-speed programs with execution times of only 0.5 ms can be placed within the normal program.

Maximum of 137 instructions including Keypad Input (Hex and BCD), Scale, Sum calculate, FCS calculate, double-length maths with mark, PWM output, positioning and PID control.

CQM1 PLC Overview

Position Control

- All CPUs have a resident instruction enabling a 1 KHz pulse output to be directed to one standard output. Also, a Special CPU has the ability to control a further 2 stepper or servo motors (via a suitable driver) at a rate of up to 50 KHz. Speed, direction, acceleration and position can all be set.
- A CPU is available with all standard features, plus the ability to accept two Absolute Encoder inputs (gray scale), thus facilitating advanced position detection.
- All CPUs have 4 hard-wire interrupts with a guaranteed reaction time of 1.0 ms, these interrupts can be prioritised by the user. Alternatively, any number of these inputs can be designated as 1 KHz high-speed counters.
- Every CPU has at least one dedicated high-speed counter (in addition to those configurable as interrupts) which has a response of 2.5 KHz in bi-directional mode and 5 KHz in incremental mode.
- Advanced counting is further enhanced by a CPU with two 50 KHz pulsed inputs in addition to its standard features.

Networking

- In-built, bi-directional RS232 ports both for programming and communication to devices such as printers, bar-code readers, temperature controllers and Man-machine Interfaces.
- CQM1 can be a master or slave via these RS232 ports, with the user being able to easily change the ports' configuration from 'ASCII' to 'Host' Mode.
- ASCII text to be stored by the CQM1 CPU can be loaded by Omron Ladder Support Software (LSS) avoiding the need for time-consuming conversions.
- CQM1 can be easily incorporated into a Sysmac Bus network on RS485 using a unique I/O Link Map structure, C200H/S being the master.
- PLC to PLC link can be performed between CQM1 CPUs through their in-built ports.
- Up to 16 input points and 16 output points can be distributed to a maximum distance of 500 metres via a B7A interface module.
- Resident Frame Check Sum instruction simplifies communications when CQM1 is a master to another RS232 device.

Process Control

- PID loop instruction with option for Autotuning.
- Four channel analogue input module, -10 to +10V, 1 to 5 V, 0 to 10 V, 4 - 20 mA. Includes mean data calculation function. Data is convertible to engineering terms with 'Scale' command. Two channel analogue output module available.
- Up to two, bi-directional RS232 ports enable CQM1 to communicate to devices such as Temperature controllers, Process controllers and Instrumentation.
- Can be incorporated in an RS485, 187.5 K baud Omron Sysmac Bus network with Temperature and Process controllers, Load Cells and PID modules.
- Two channel Temperature Control module with PID algorithm.

Specifications

■ Characteristics

Item	CQM1-CPU11-E/CPU21-E	CQM1-CPU41-E/CPU42-E/CPU43-E/CPU44-E
I/O points	128 points max.	192 points max.
Control method	Stored program method	
I/O control method	Cyclic scan method with direct output; immediate interrupt processing	
Programming language	Ladder diagram	
Instruction length	1 step per instruction, 1 to 4 words per instruction	
Types of instructions	117 instructions (14 basic and 103 special instructions)	137 instructions (14 basic and 123 special instructions)
Instruction execution time	Basic instructions: 0.5 μs to 1.5 μs (eg. LD=0.5 μs, TIM=1.5 μs) Special instructions (eg. MOV(21)=24 μs)	
Program capacity	Program Memory: 3.2K words Data Memory: 1K words	Program Memory: 7.2K words Data Memory: 6K words
Interrupt inputs	4 points (IN00000 to IN00003)	
Backup function	The contents of HR, AR, CNT, DM and RTC areas are maintained during power interruptions	
Battery life (memory backup)	The life of the battery is 5 years whether or not the RTC function is used. The possible memory backup time of the Unit varies with the ambient temperature. Replace the battery within a week after the battery error indicator lights. Do not spend more than 5 minutes replacing the battery.	
Self-diagnostic function	CPU error (WDT), memory check, I/O bus check, battery error, host link error and CPU bus error	

■ Data Areas

Name		CPU	I/O points	Words	Bits	Comments
I/O words	Input Area	CPU11-E CPU21-E	128 points max.	IR 000 to IR 007	IR 00000 to IR 00715	Input Areas: Input words are assigned to Units that bring inputs into the PC. Output Areas: Output words are assigned to Units that send outputs from the PC.
	Output Area			IR 100 to IR 107	IR 10000 to IR 10715	
	Input Area	CPU41-E CPU42-E CPU43-E CPU44-E	192 points max.	IR 000 to IR 011	IR 00000 to IR 01115	
	Output Area			IR 100 to IR 111	IR 10000 to IR 11115	
Work Area		CPU11-E CPU21-E CPU41-E CPU42-E CPU43-E CPU44-E	2,720 points max.	Any words from IR 001 to IR 229 that are not being used as I/O words or for the MACRO instruction.		These words and bits can be used as work words and bits in the program.
MACRO instruction words	Input		64 points	IR 096 to IR 099	IR 09600 to IR 09915	These words are used by the MACRO instruction to receive data from I/O bits.
	Output			IR 196 to IR 199	IR 19600 to IR 19915	
Internal high-speed counter PV Area			2 words	IR 230 to IR 231	IR 23000 to IR 23115	These words are used to store the counter's PV.
SR Area			192 points	SR244 to SR255	SR 24400 to SR 25515	The SR Area bits are used for special functions, such as flags and control bits.
Temporary Memory Area			8 points	–	TR0 to TR7	The 8 bits of the TR Area are used for branching in complex ladder diagram programs.
Holding Area			1,600 points	HR00 to HR99	HR0000 to HR9915	Data in the HR Area retains its status when PC power is interrupted.
Auxiliary Area			448 points	AR00 to AR27	AR0000 to AR2715	The AR Area bits are used for special functions, such as flags and control bits.

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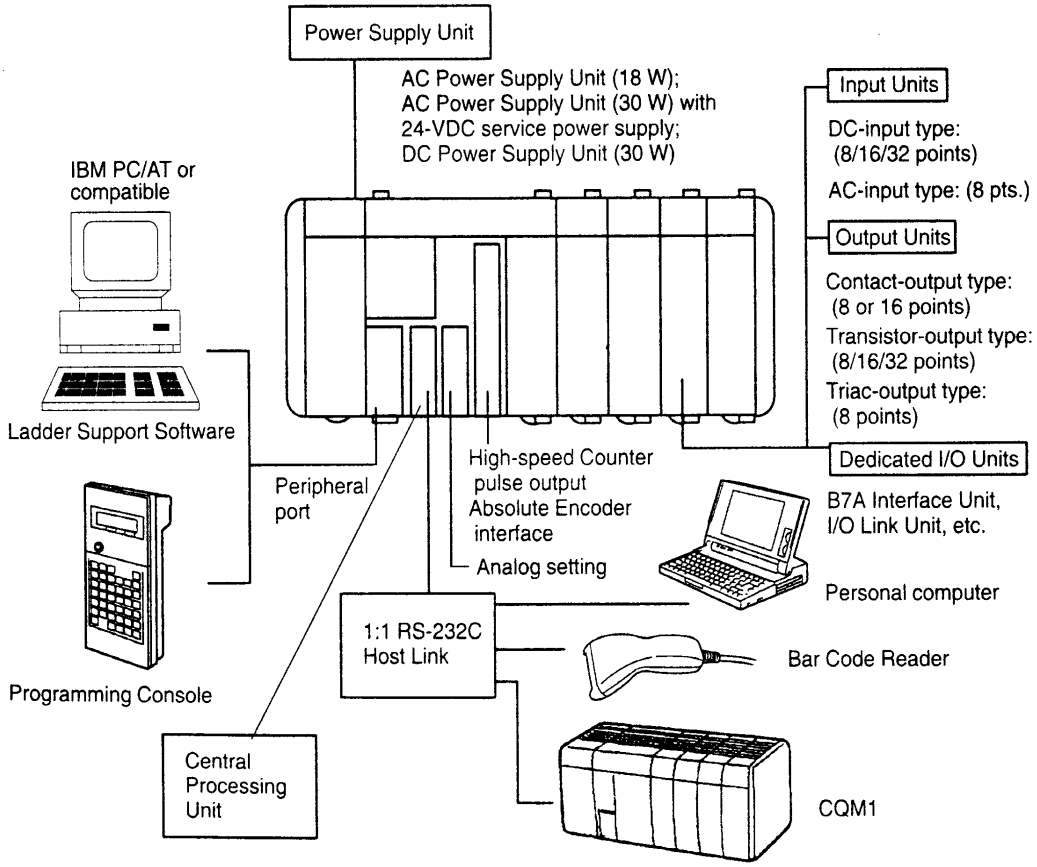
Name		CPU	I/O points	Words	Bits	Comments
Link Area		CPU11-E CPU21-E CPU41-E CPU42-E CPU43-E CPU44-E	1,024 points	LR00 to LR63	LR0000 to LR6315	The LR Area is used as a common data area to transfer information automatically between two CQM1 PCs. Data links can involve 8, 16 or 32 LR words. LR words that are not used in a data link can be used as work words in programming.
Timer/Counter Area			512 points	TIM/CNT000 to TIM/CNT511		TC numbers are used to define timers and counters.
High-precision timer			3 points	–		Adjustable in increments of 0.1 ms and set in increments of 0.5 ms.
Data Memory	READ/ WRITE	CPU11-E CPU21-E	1,024 words	DM0000 to DM1023		Data in the DM Area is accessible only by word and retains its status when PC power is interrupted. Read-only DM cannot be overwritten from the program. DM6600 to DM6655 contain the PC Setup data. Make the PC Setup settings before operating the PC.
	READ only		512 words	DM6144 to DM6655 (DM6600 to DM6655 contain the PC Setup data)		
	READ/ WRITE	CPU41-E CPU42-E CPU43-E CPU44-E	6,144 words	DM0000 to DM6143		
	READ only		512 words	DM6144 to DM6655 (DM6600 to DM6655 is the system setting area of the CPU)		

■ Memory Cassette

Item	CQM1-ME04K	CQM1-ME04R	CQM1-ME08K	CQM1-ME08R	CQM1-MP08K	CQM1-MP08R
Program capacity	4K words max.		8K words max.		8K words max. (EPROM chip not included)	
DM capacity	DM 6144 to DM 6655					
Memory type	EEPROM				EPROM (purchase separately)	
Clock function	No	Yes	No	Yes	No	Yes

Selecting a CQM1 System



Ordering Information

■ CPUs

Standard CPUs

Name	Description	Model Number
CPU, with 16, 24 VDC I/Ps	3.2K words Program Memory. 1K words Data Memory	CQM1-CPU11E
	3.2K words with RS232C port	CQM1-CPU21E

Advanced CPUs

Name	Description	Model Number
CPU, with 16, 24 VDC I/Ps	7.2K words Program Memory. 6K words Data Memory	CQM1-CPU41E
	7.2K with Analogue setting	CQM1-CPU42E
	7.2K with pulse I/O	CQM1-CPU43E
	7.2K with ABS I/F	CQM1-CPU44E

■ Power Supplies

Name	Description	Model Number
AC Power Supply Unit	18W consumption	CQM1-PA203
	30W consumption	CQM1-PA206
DC Power Supply Unit	30W consumption	CQM1-PD026

■ Memory Units (optional)

Name	Description	Model Number
EEPROM	4K words	CQM1-ME04K
	4K words with clock function	CQM1-ME04R
	8K words	CQM1-ME08K
	8K words with clock function	CQM1-ME08R
EPROM	Memory cassette only	CQM1-MP08K
	Memory cassette with clock function	CQM1-MP08R

■ Input Units

Name	Description	Model Number
DC Input Unit	8 points, 12 to 24 VDC	CQM1-ID211
	16 points, 24 VDC	CQM1-ID212
	32 points, 24 VDC	CQM1-ID213
AC Input Unit	8 points, 100 to 120 VAC	CQM1-IA121
	8 points, 200 to 240 VAC	CQM1-IA221

■ Output Units

Name	Description	Model Number
Contact Outputs	8 points, 250 VAC/24 VDC 2A	CQM1-OC221
	16 points, 250 VAC/24 VDC 2A	CQM1-OC222
Transistor Outputs	8 points, 24 VDC, 2A	CQM1-OD211
	16 points, 4.5 VDC, 50 mA at 26.4 V 300 mA	CQM1-OD212
	32 points, 4.5 VDC, 16 mA at 26.4 V 100 mA	CQM1-OD213
	16 points, 24 VDC, 300 mA, PNP outputs	CQM1-OD214
	8 points, 24 VDC, 1A, PNP outputs, built-in circuit breaker	CQM1-OD215
Triac Outputs	8 points, 0.4A at 100 to 240 VAC	CQM1-OA221

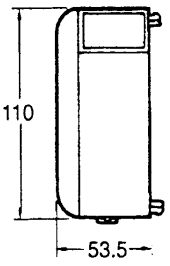
■ Special I/O Units

Name	Model Number
Analogue Input Unit	CQM1-AD041
Power Supply unit for 1 Analogue Input Unit or 1 Analogue Output Unit	CQM1-IPS01
Power Supply unit for 2 Analogue Input Units or 1 analogue Input/1 Analogue Output Unit	CQM1-IPS02
B7A Interface Unit , 16 inputs, 16 outputs	CQM1-B7A01
I/O Link Unit – use as slave unit	CQM1-LK501
Sensor Unit – no. of sensor input points: 4 max.	CQM1-SEN01
Temperature control unit; 2 J/K thermocouple inputs, NPN outputs	CQM1–TC001
Temperature control unit; 2 J/K thermocouple inputs, PNP outputs	CQM1–TC002
Temperature control unit; 2 Pt100/JPt 100 RTD inputs, NPN outputs	CQM1–TC101
Temperature control unit; 2 Pt100/JPt100 RTD inputs, PNP outputs	CQM1–TC102
2 Channel analogue output module	CQM1–DA021

Name	Model Number
Programming console with 2m cable attached (compatible with all C-series PLCs except C20; CK requires adaptor C500–AP003)	CQM1-PRO01E
Programming software to run on a computer, for all OMRON C-series PLCs	LSS 3
Connecting cable and converter for CQM1 Peripheral port to a PC or OMRON NT (Note: All CQM1 CPUs except CPU11E have a standard RS232 port in addition to the peripheral port)	CQM1–CIF02
Connecting cable for CQM1 to a computer	RS232 cable
Battery	C500–BAT08

Dimensions

PA203



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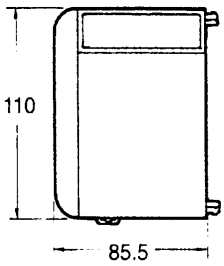
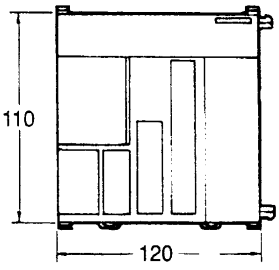
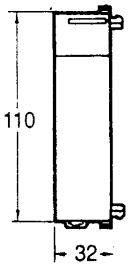


CPU11–E/21–E/41–E /42–E/43–E/44–E

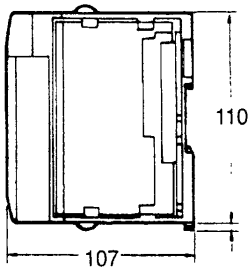


I/O Units



End plate

Side view (All units)



Note: Please refer to Technical Brochure Number P031–E1 for further details on the CQM1 range.