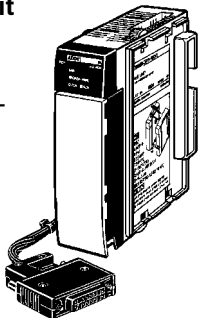# Dedicated I/O Units

Dedicated I/O Units Offer a Wide Variety of Applications

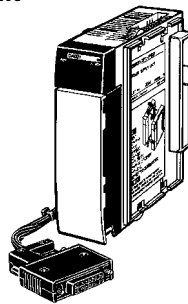## Analog Input and Output Units

● **CQM1-AD041 Analog Input Unit**

The CQM1-AD041 Analog Input Unit retrieves four analog signals from sensors or measuring equipment. Use this Unit in combination with a Power Supply Unit.

● **CQM1-DA021 Analog Output Unit**

A single Analog Output Unit makes two-point digital-to-analog conversion possible at a speed of 0.5 ms/two points. Use the Analog Output Unit together with the Power Supply Unit.

● **CQM1-IPS01/IPS02 Power Supply Unit**

The Analog Input and Output Units require a Power Supply Unit. There are two kinds of Power Supply Units (i.e., a Power Supply Unit connecting to a single Analog Unit and the other one connecting to two Analog Units).
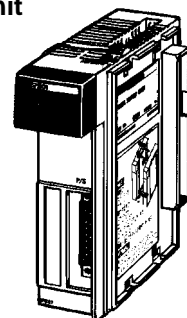
● **Performance Specifications**

Item		Specification
No. of analog input points		4 or 2 (selected with DIP switch)
Input signal range	Voltage input	−10 to +10 V 0 to 10 V 1 to 5 V
	Current input	4 to 20 mA
Input impedance	Voltage input	1 MΩ min.
	Current input	250 Ω
Resolution		1/4000
Accuracy		±1.0%
Conversion speed		2.5 ms/1 pt.
Internal current consumption		80 mA max. at 5 V DC

● **Performance Specifications**

Item		Specification
No. of analog output points		2
Output signal range	Voltage output	−10 to 10 V
	Current output	0 to 20 mA
External output permissible load resistance	Voltage output	1 kΩ min.
	Current output	520 Ω max. (including wiring impedance)
External output impedance	Voltage output	0.5 Ω max.
Resolution	Voltage output	1/4096
	Current output	1/2048
Accuracy		±1.0%
Conversion speed		0.5 ms/2 points
Internal current consumption		90 mA at 5 V DC

● **Specifications**

Item	Specification	Internal current consumption
CQM1-IPS01	Connecting to a single Analog Unit.	5 V DC 420 mA max.
CQM1-IPS02	Connecting to two Analog Units.	5 V DC 950 mA max.

Note: The CQM1-IPS02 connects to a maximum of two Analog Input Units. A single Analog Input Unit and single Analog Output Unit can be connected to the CQM1-IPS02 Power Supply Unit. Two Analog Output Units cannot be connected to the CQM1-IPS02 Power Supply Unit. When using two Analog Output Units, prepare two CQM1-IPS01 Power Supply Units.

System Configuration Example

CQM1-AD041 Analog Input Unit

CQM1-IPS02 Power Supply Unit

CQM1-DA021 Analog Output Unit

Liquid flow

Pressure

Temperature

Current

Voltage

Power

K3T□ Intelligent Signal Processor

K3FK Signal Transmitter

Temperature recorder

3G3□V Inverter
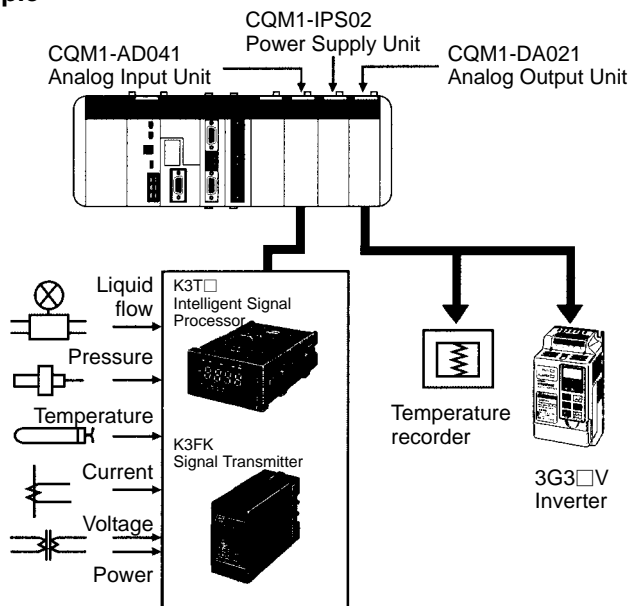
Dedicated I/O Units

CompoBus/S Master Unit

● CQM1-SRM21-V1

The CompoBus/S Master Unit supports both a High-speed Communications Mode and a Long-distance Communications Mode.
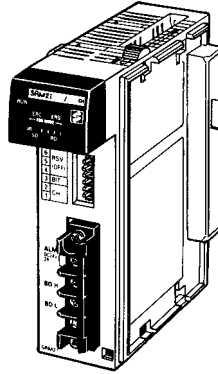
- Number of I/O points per Master: 128 max. (may be set to 64 or 32 points)

- Number of Slaves per Master: 16 or 32

- Communications cycle time: 0.5 ms max. (baud rate: 750K bps)

- Communications distance: 500 m max. (baud rate: 93.75K bps)

- Supports Analog Terminal connections.

Communications Specifications

Communications protocol		Dedicated CompoBus/S protocol
Code		Manchester code
Connection method		Multi-drop, T-type bifurcation (both methods require external terminating resistor) (See note 1.)
Baud rate		750K bps, 93.75K bps (selectable with a DIP switch) (See note 2.)
Communications cycle time	High-speed Communications Mode	0.5 ms (with a maximum number of 8 Input and 8 Output Slaves) 0.8 ms (with a maximum number of 16 Input and 16 Output Slaves)
	Long-distance Communications Mode	4.0 ms (with a maximum number of 8 Input and 8 Output Slaves) 6.0 ms (with a maximum number of 16 Input and 16 Output Slaves)
Cable		Two-conductor cable (VCTF 0.75 x 2), four-conductor cable (VCTF 0.75 x 4), or dedicated flat cable

Communications distance	High-speed Communications Mode	Two-conductor VCTF cable			
		Communications Mode	Trunk line length	Branch line length	Total line length
		High-speed mode	100 m max.	3 m max.	50 m max.
		Long-distance mode	500 m max.	6 m max.	120 m max.
		Dedicated flat cable/ four-conductor VCTF cable			
		Communications Mode	Trunk line length	Branch line length	Total line length
		High-speed mode (see note 3)	30 m max.	3 m max.	30 m max.
		Long-distance mode (see note 4)	Free branching (total cable length: 200 m max.)		

Max. number of connectable nodes	32
Error control	Manchester code, frame length, and parity checks

Note:
1. An external Terminating Resistor is required.

2. Setting must be made using the DIP switch. (Change the DM setting for selecting the communications mode. Default setting: 750 kbps)

3. If the number of Slaves connected is smaller than 16, the trunk line length can be less than 100 m and the total line length can be less than 50 m.

4. There are no restrictions on the branching method, trunk line length, branch line length, or total line length. Connect the Terminating Resistor farthest from the Master.

Master Unit Specifications

Internal current consumption	180 mA max. at 5 V DC
Number of I/O points	128 points (64 inputs and 64 outputs), 64 points (32 inputs and 32 outputs), or 32 points (16 inputs and 16 outputs) selectable with a switch.
Number of occupied words	128 points: 4 input words and 4 output words 64 points: 2 input words and 2 output words 32 points: 1 input word and 1 output word
Number of points per node	8 or 4 points (selectable with a switch)
Max. number of connectable Slaves	32 (with 4 points per node)
Status data	Alarm terminal output
Weight	200 g max.

Note: For details regarding CompoBus/S, refer to the CompoBus/S catalog (Catalog number: Q103-E1-□)

Dedicated I/O Units

Connections with Flat Cable

Master

CQM1H

Master Unit (64 inputs and 64 outputs max. points)

Slaves

Remote I/O Terminal
(Transistor model: 4/8 inputs
and 4/8 outputs)

Sensor Terminals
(4/8 sensor inputs)

Bit Chain Terminals
(8 inputs and 8 outputs)

Remote I/O Terminal
(Relay model: 8/16 outputs)

B1T Slave

B1T terminator

Press-fit connector for bifurcation

Dedicated flat cable

Press-fit connector with terminating resistor

Connections with VCTF Cable

Master

CQM1H

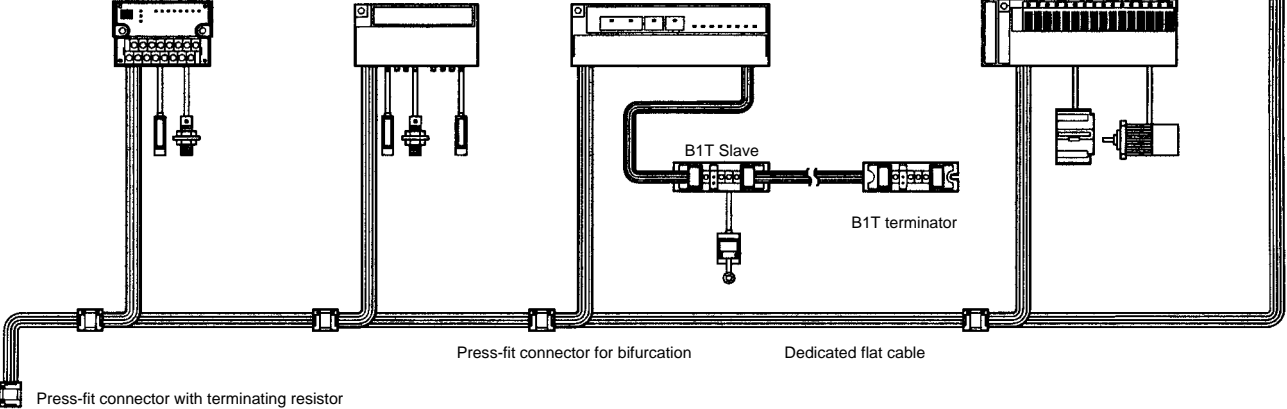Master Unit (64 inputs and 64 outputs max.)

Slaves

Remote I/O Terminal
(Transistor model: 4/8 inputs
and 4/8 outputs)

Sensor Terminals
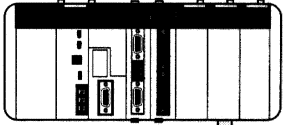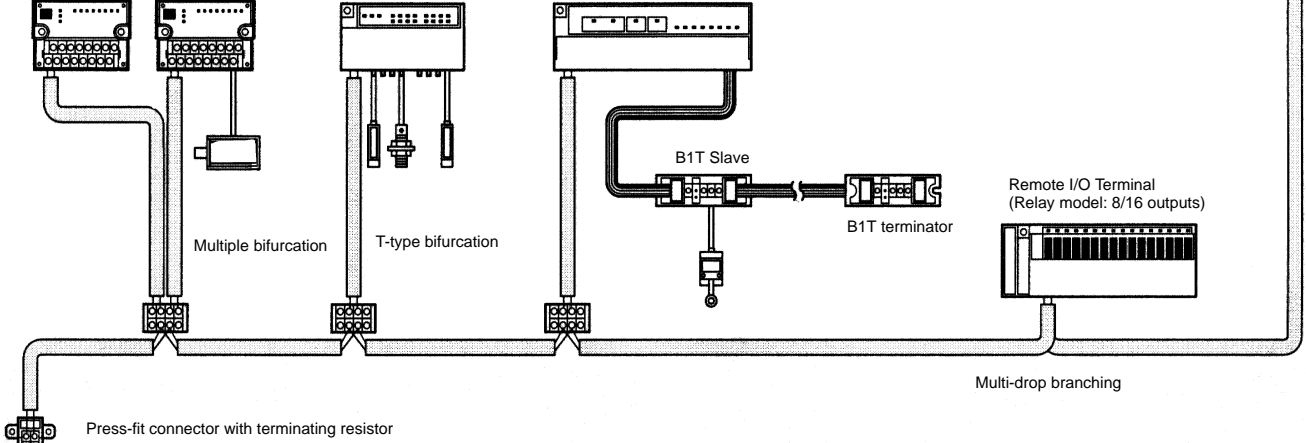(4/8 sensor inputs)

Bit Chain Terminals
(8 inputs and 8 outputs)

B1T Slave

B1T terminator

Remote I/O Terminal
(Relay model: 8/16 outputs)

Multiple bifurcation

T-type bifurcation

Multi-drop branching

Press-fit connector with terminating resistor

Note: For details regarding CompoBus/S, refer to the CompoBus/S catalog (Catalog number: Q103-E1-□)

Dedicated I/O Units

DeviceNet I/O Link Unit

- **CQM1-DRT21**

The DeviceNet I/O Link Unit is a DeviceNet slave that conforms to the multi-vender DeviceNet standards. DeviceNet I/O Link Units can be used to connect one or more CQM1H PLCs to a DeviceNet Master.
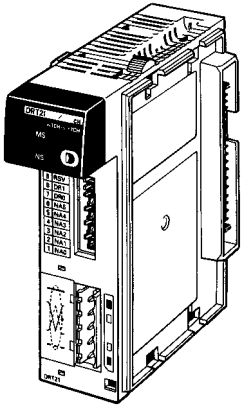
Performance Specifications

Communications power supply voltage	11 to 25 V DC supplied through communications connector
Current consumption	Communications power supply: 40 mA max. at 24 V DC Internal circuit power supply: 80 mA max. at 5 V DC
Number of I/O points	16 inputs and 16 outputs (32 in total)
Number of occupied words	1 input word and 1 output word (2 words in total)
Weight	185 g max.

Communications Specifications (Conforming to DeviceNet Standards)
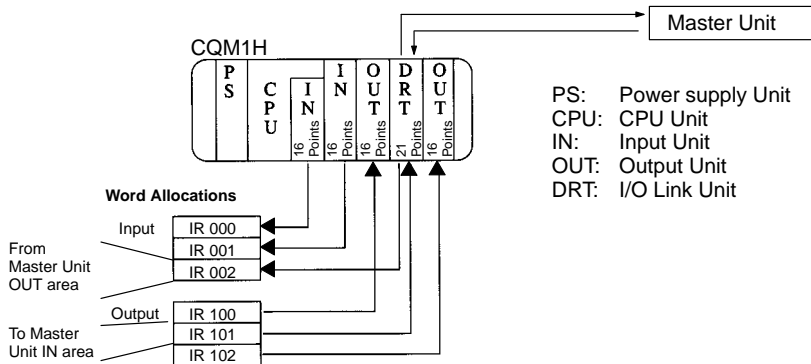
Connection method	Multi-drop, T-type bifurcation (both require external terminating resistor)
Baud rate	500K, 250K, or 125K bps (selectable with a switch)
Communications cycle time	9.3 ms with 16 Input Slaves (16 inputs) and 16 Output Slaves (16 outputs) at a speed of 500K bps.
Cable	Dedicated 5-conductor cable (with two signal wires, two power wires, and a shield wire)
Communications distance	Baud rate / Max. network length (see note 1) / Branch line length / Total branch line length 500K bps — 100 m max. (see note 2) — 6 m max. — 39 m max. 250K bps — 250 m max. (see note 2) — 6 m max. — 78 m max. 125K bps — 500 m max. (see note 2) — 6 m max. — 156 m max.
Max. number of connectable nodes	CVM1 or CV Series: 64 nodes, C200HX/HG/HE: 50 nodes, C200HS: 32 nodes
Error control	CRC errors, node address duplication, scan line checks

Note: 1. The maximum network length refers to the distance between two nodes farthest from each other.
2. The communications distance will be 100 m or less if a thin dedicated cable is used for the trunk line.
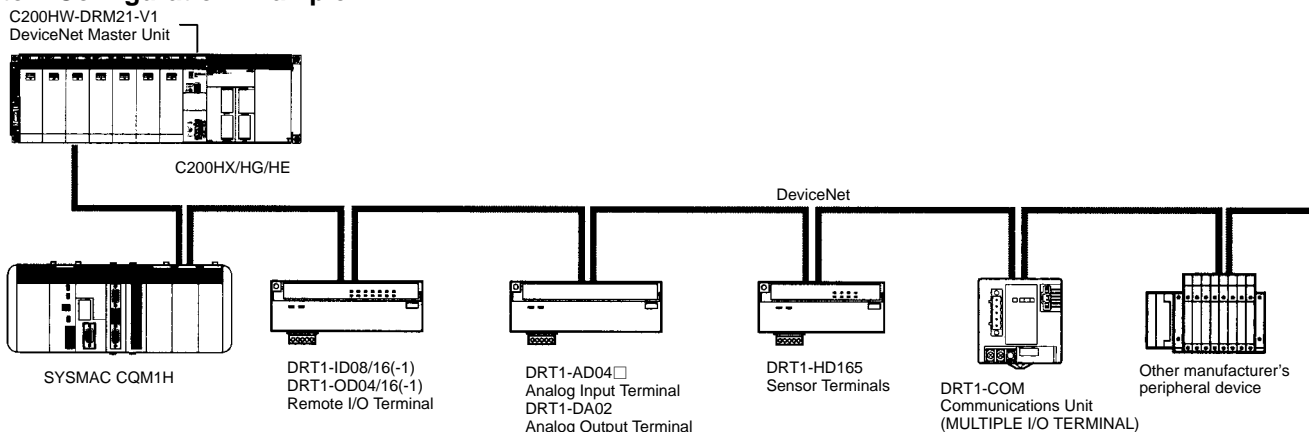
Words Allocated by CQM1H Slaves

The CQM1H treats the I/O Link Unit as a single I/O Unit that has one input word and one output word. Words are allocated like I/O Units (i.e., input words from IR 001 and output words from IR 100 in order of the Units) beginning with the leftmost Unit.

Allocation Example

PS: Power supply Unit
CPU: CPU Unit
IN: Input Unit
OUT: Output Unit
DRT: I/O Link Unit

System Configuration Example

C200HW-DRM21-V1 DeviceNet Master Unit

C200HX/HG/HE

DeviceNet

SYSMAC CQM1H

DRT1-ID08/16(-1)
DRT1-OD04/16(-1)
Remote I/O Terminal

DRT1-AD04☐
Analog Input Terminal
DRT1-DA02
Analog Output Terminal

DRT1-HD165
Sensor Terminals

DRT1-COM
Communications Unit
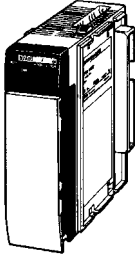(MULTIPLE I/O TERMINAL)

Other manufacturer's peripheral device

Note: For details on DeviceNet, refer to the DeviceNet catalog (Catalog number: Q102-E1-☐)

B7A Interface Unit

● **CQM1-B7A02 (16 outputs)**
CQM1-B7A03 (32 outputs)
CQM1-B7A12 (16 inputs)
CQM1-B7A13 (32 inputs)
CQM1-B7A21 (16 inputs/16 out-puts)

A B7A Interface Unit can connect to I/O devices located up to 500 m way using a single cable. Units are available with a wide range of I/O capacities to help reduce wiring in just about any application. Connect to PLCs for simple digital communications, connect to a control panel, or connect to a robot. Whatever you connect to, you'll achieve more efficient wiring by reducing the number of connection cables required.

B7A Link Terminals

● **Performance Specifications**

Item	Specification
I/O points	CQM1- B7A21: 16 input points (see note 1), 16 output points B7A13: 32 input points (see note 2) B7A03: 32 output points B7A12: 16 input points (see note 1) B7A02: 16 output points
I/O word allocation	CQM1- B7A21: 1 word each for input and output (2 words in total) B7A13: 2 words for input B7A03: 2 words for output B7A12: 1 word for input B7A02: 1 word for output
Communication method	Unidirectional, time-shared multiplex
Transmission distance	STANDARD: 500 m max. (see note 3) RAPID: 100 m max. (see note 3)
I/O delay	STANDARD: 19.2 ms (rated delay), 31 ms max. RAPID: 3 ms (rated delay), 5 ms max. (STANDARD or RAPID set via switch.)
Power consumption	100 mA at 5 V DC
External power supply	12 to 24 V DC ±10%, 0.11 A min. (excluding the power required by the B7A Link Terminals)
Weight	200 g max.
Dimensions	32 x 110 x 107 mm (W x H x D)

Note 1. Input mode setting allows selection between 16-point input and 15-point+1 error input.
2. Input mode setting allows selection between 32-point input and 30-point+2 error input.
3. The transmission distance depends on the power supply wiring methods.

● **Input Units**

Name	Model	Transmission delay time
Screw terminal models	B7A-T6☐1	STANDARD (19.2 ms)
	B7AS-T6☐1	
	B7A-T6☐6	RAPID (3 ms)
	B7AS-T6☐6	
Module models	B7A-T6D2	STANDARD (19.2 ms)
	B7A-T6D7	RAPID (3 ms)
PLC connector models	B7A-T☐E3	STANDARD (19.2 ms)
	B7A-T☐E8	RAPID (3 ms)

● **Output Units**

Name	Model	Transmission delay time
Screw terminal model	B7A-R6☐☐1	STANDARD (19.2 ms)
	B7AS-R6☐☐1	
	B7A-R6☐☐6	RAPID (3 ms)
	B7AS-R6☐☐6	
	G70D-R6R☐1-B7A	STANDARD (19.2 ms)
	G70D-R6M☐1-B7A	
Module model	B7A-R6A52	STANDARD (19.2 ms)
	B7A-R6A57	RAPID (3 ms)
PLC connector models	B7A-R☐A☐3	STANDARD (19.2 ms)
	B7A-R☐A☐8	RAPID (3 ms)

Note Combine B7A Interface Units and B7A Link Terminals with equal transmission delay times. Do not connect B7A Link Terminals with 10 points and mixed I/O points.

● **I/O Unit and 32-point Input Unit**

Name		Model	Transmission delay time
Screw terminal model	**I/O**	B7AM-6BS	STANDARD (19.2 ms)/ RAPID (3 ms) (switchable)
	32 inputs (16 pts/circuit)	B7AS-T3BS	

Dedicated I/O Units

System Configuration

CQM1-B7A21 (16 input and 16 output points)
CQM1-B7A03 (32 output points)
CQM1-B7A13 (32 input points)
CQM1-B7A02 (16 output points)
CQM1-B7A12 (16 input points)

CQM1H

B7A Link Terminals

16 inputs

16 outputs

16 inputs
16 inputs

16 outputs
16 outputs

16 inputs
16 outputs