

# CJ-series CompoNet Master Units

# CJ1W-CRM21

CSM\_CJ1W-CRM21\_DS\_E\_11\_10

## NJ/CJ-series CompoNet Master Units Increase the Range of Applicability of Sensors and Actuators.

- The NJ/CJ-series CompoNet Master Unit manages the CompoNet network, controls communications between the Controller and Slave Units, and handles I/O data and message data.

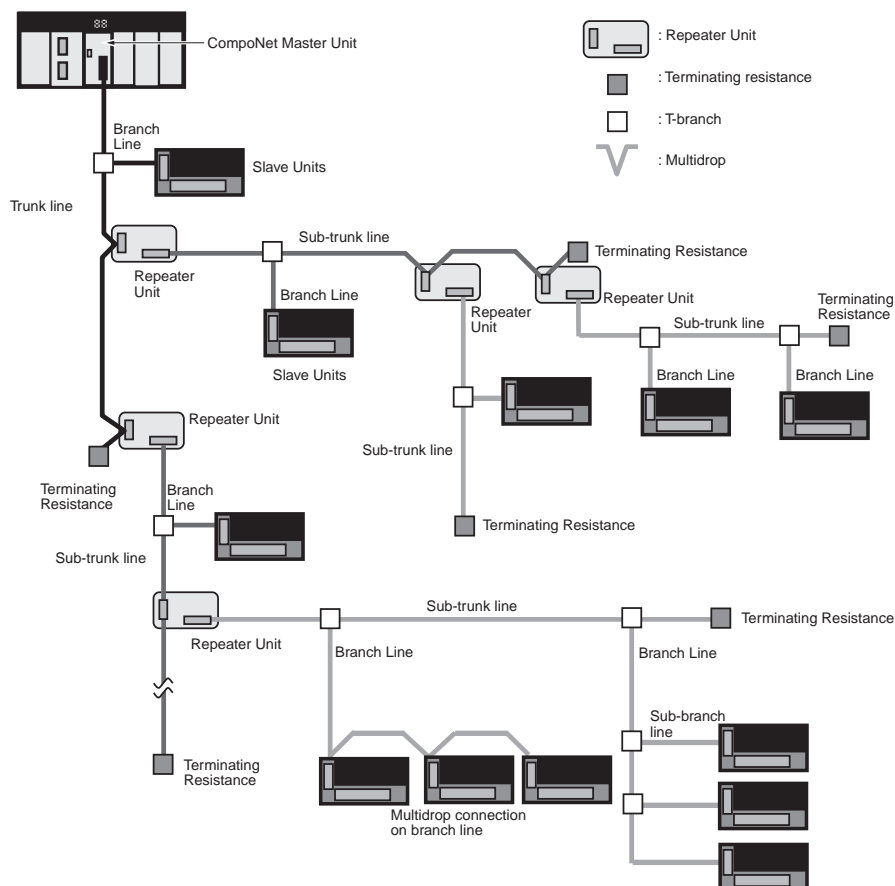


CJ1W-CRM21

## Features

- Setup is simple. Make the master's mode settings and set the baud rate, and you're ready to go.
- Control up to 2,560 points and 384 nodes with one Master Unit.
- Intuitive memory mapping with separate areas for Word Slave Units and Bit Slave Units.
- Seven-segment display helps with startup and enables prompt detection of problems.
- Collect information from Slave Units using message communications, or use message communications to set parameters.
- Inherits the ease of use of the CompoBus/S.
- Flexible I/O allocations with software setting function.

## System Configuration



## Communication Specifications

Item	Specification
<b>Communications protocol</b>	CompoNet Network protocol
<b>Types of communications</b>	Remote I/O communications (programless, constant sharing of data with Slave Units) and message communications (explicit message communications as required with Slave Units and FINS message communications as required with Controllers *1)
<b>Baud rate</b>	4 Mbps *2, 3 Mbps, 1.5 Mbps, 93.75 kbps
<b>Modulation</b>	Base-band
<b>Coding</b>	Manchester code
<b>Error control</b>	Manchester code rules, CRC
<b>Communications media</b>	The following media can be used. *3 Round cable I (JIS C 3306, 2-conductor 0.75 mm <sup>2</sup> ) Round cable II (JIS C3306 4-conductor 0.75 mm <sup>2</sup> ) Flat Cable I (DCA4-4F10 Standard Flat Cable) Flat Cable II (DCA5-4F10 Sheathed Flat Cable)
<b>Communications distance and wiring</b>	Refer to <i>Cable Types, Baud Rates, and Maximum Distances</i> on page 3.
<b>Connectable Master Units</b>	CompoNet Master Units
<b>Connectable Slave Units</b>	CompoNet Slave Units
<b>Maximum I/O capacity</b>	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total)
<b>Maximum number of nodes</b>	Word Slave Units: 64 input nodes and 64 output nodes Bit Slave Units: 128 input nodes and 128 output nodes Repeater Units: 64 nodes
<b>Bits allocated per node address</b>	Word Slave Units: 16 bits Bit Slave Units: 2 bits
<b>Maximum number of nodes per trunk line or sub-trunk line</b>	32 nodes (including Repeater Units)
<b>Applicable node addresses</b>	Word Slave Units: IN0 to IN63 and OUT0 to OUT63 Bit Slave Units: IN0 to IN127 and OUT0 to OUT127 Repeater Units: 0 to 63
<b>Repeater Unit application conditions</b>	Up to 64 Repeater Units can be connected per network. When Repeater Units are connected in series from the Master Unit, up to 2 extra segment layers can be created (i.e., up to 2 Repeater Units are allowed between a Slave Unit and the Master Unit).
<b>Signal lines</b>	Two lines: BDH (communications data high) and BDL (communications data low)
<b>Power lines</b>	Two lines: BS+ and BS- (power for communications and internal Slave Unit circuits) • Power is supplied from the Master Unit or Repeater Units.
<b>Communications power supply</b>	24 VDC ±10%
<b>Connection forms</b>	Flat Cable at baud rate of 93.75 kbps: No restrictions Other cables or baud rates: Trunk line and branch lines Connections for Slave Units and Repeater Units: T-branch or multidrop connections

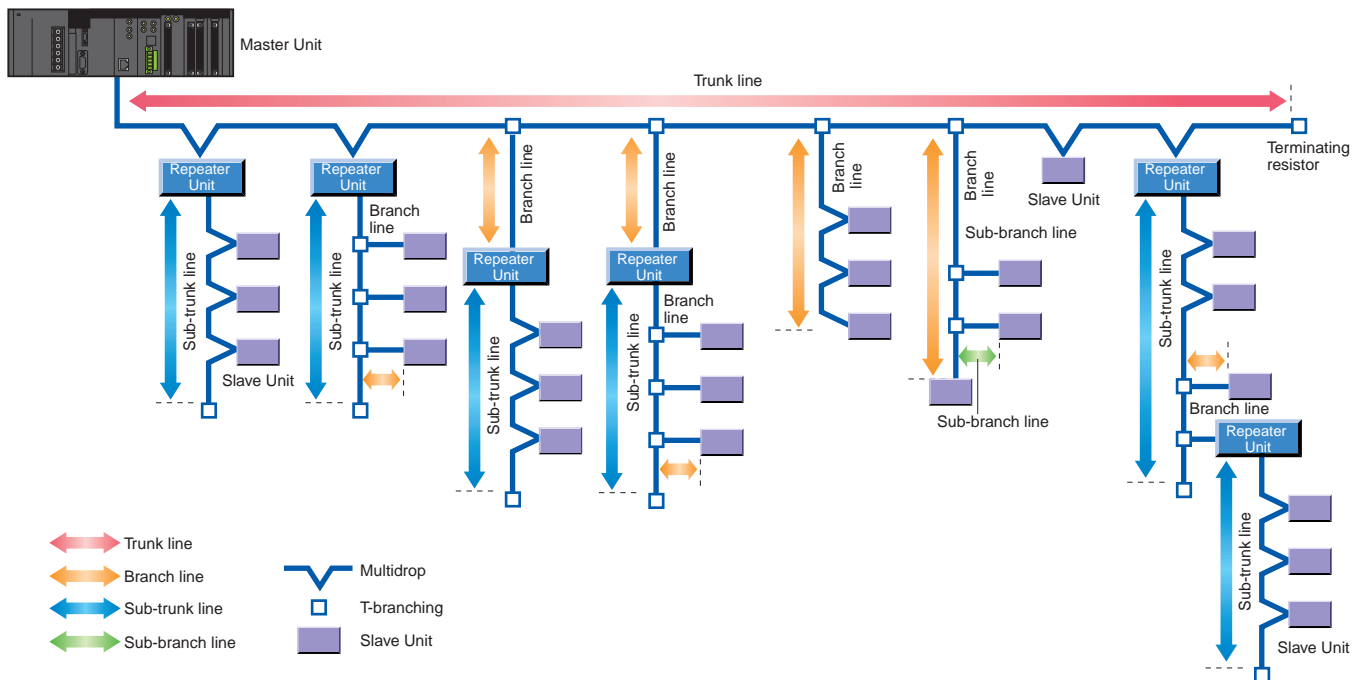
\*1. FINS message communications are supported by CJ-series Controllers only.

\*2. Drop-line connections are not supported with a baud rate of 4 Mbps, so Slaves with prewired cables (Bit Slaves) cannot be used.

\*3. Round cable, Flat Cable, and Flat Cable II are all different types of cable. To use more than one type of cable at a time, Repeater Units must be used to separate them on trunk lines and sub-trunk lines.

### Cable Types, Baud Rates, and Maximum Distances

This section provides specifications on the maximum cable length and maximum number of nodes for each type of cable. Do not exceed these specifications.



#### Restrictions (at Baud Rate of 4 Mbps (No Branch Lines))

Cable type	Maximum length per segment (maximum length with Repeater Units)	Branch line length	Total branch line length per segment	Branch location restrictions	Maximum number of Slave Units per segment *2
Round cable I	30 m (90 m)	0 m *1	0 m *1	–	32 nodes
Flat Cable I and Flat Cable II Round Cable II	30 m (90 m)	0 m *1	0 m *1	–	32 nodes

\*1. T-branches cannot be connected (only multidrop connections are possible).  
\*2. Number of nodes including Repeater Units

#### Restrictions (at Baud Rate of 3 Mbps)

Cable type	Maximum length per segment (maximum length with Repeater Units)	Branch line length	Total branch line length per segment	Branch location restrictions	Maximum number of nodes per branch *1	Sub-branch line length	Total sub-branch line length per segment	Maximum number of Slave Units per segment *2
Round cable I	30 m (90 m)	0.5 m	8 m	3 branches/m	1 node	0 m	0 m	32 nodes
Flat Cable I and Flat Cable II Round Cable II	30 m (90 m)	0.5 m	8 m	3 branches/m	1 node	0 m	0 m	32 nodes

\*1. The maximum number of nodes per branch is the maximum number of Slave Units or Repeater Units that can be connected to one branch line using multidrop or T-branch connections (sub-branches).  
\*2. Number of nodes including Repeater Units

#### Restrictions (at Baud Rate of 1.5 Mbps)

Cable type	Maximum length per segment (maximum length with Repeater Units)	Branch line length	Total branch line length per segment	Branch location restrictions	Maximum number of nodes per branch *1	Sub-branch line length	Total sub-branch line length per segment	Maximum number of Slave Units per segment *2
Round cable I	Without branches	0 m *3	0 m *3	–	–	–	–	32 nodes
	With branches	30 m (90 m)	25 m	3 branches/m	3 nodes	0 m	0 m	32 nodes
Flat Cable I and Flat Cable II Round Cable II	30 m (90 m)	2.5 m	25 m	3 branches/m	3 nodes	0.1 m *4	2 m *4	32 nodes

\*1. The maximum number of nodes per branch is the maximum number of Slave Units or Repeater Units that can be connected to one branch line using multidrop or T-branch connections (sub-branches).  
\*2. Number of nodes including Repeater Units  
\*3. T-branches cannot be connected (only multidrop connections are possible).  
\*4. T-branch connections from sub-branch lines.

#### Restrictions (at Baud Rate of 93.75 kbps)


Cable type	Maximum length per segment (maximum length with Repeater Units)	Branch line length	Total branch line length per segment	Branch location restrictions	Maximum number of nodes per branch *1	Sub-branch line length	Total sub-branch line length per segment	Maximum number of Slave Units per segment *2
Round cable I	500 m (1500 m)	6 m	120 m	3 branches/m	1 node	–	–	32 nodes
Flat Cable I and Flat Cable II Round Cable II	No restrictions to a total length per segment of 200 m							32 nodes

\*1. The maximum number of nodes per branch is the maximum number of Slave Units or Repeater Units that can be connected to one branch line using multidrop or T-branch connections (sub-branches).  
\*2. Number of nodes including Repeater Units

## Ordering Information

### International Standards

- The standards are abbreviated as follows: U: UL, U1: UL(Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details and applicable conditions for these standards.

Name	Appearance	Specifications		Number of unit numbers allocated	Power consumption (A)		Model	Standards
		Type of communications	Maximum number of I/O points per Master Unit		5-V system	24-V system		
CJ1 Special I/O Unit		<ul style="list-style-type: none"> <li>• Remote I/O communications</li> <li>• Message communications</li> </ul>	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total)	1, 2, 4, or 8	0.4	–	CJ1W-CRM21	CE, U, U1, L, N

**Note:** Observe the following precautions if you use the CompoNet Master Unit in an NJ-series Machine Automation Controller.

- Supported only by the CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.
- You cannot use the simple backup function.
- You cannot send FINS commands to the CompoNet Master Unit.

## Software

### How to Select Required Support Software for Your Controller

The required Support Software depends on the Controller to connect. Please check the following table when purchasing the Support Software.

Item	Omron PLC System	Omron Machine Automation Controller System
Controller	CS, CJ, CP, and other series	NJ-series
Software	FA Integrated Tool Package CX-One	Automation Software Sysmac Studio

### FA Integrated Tool Package CX-One

Product name	Specifications	Number of licenses	Media	Model	Standards

**Note:** For details, refer to the CX-One Catalog (Cat. No. R134), visit your local OMRON website.

\*1. Multi licenses (3, 10, 30, or 50 licenses) and DVD media without licenses are also available for the CX-One.

### Automation Software Sysmac Studio

The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI.

For details, refer to your local OMRON website and *Sysmac Studio Catalog* (Cat. No. P138).

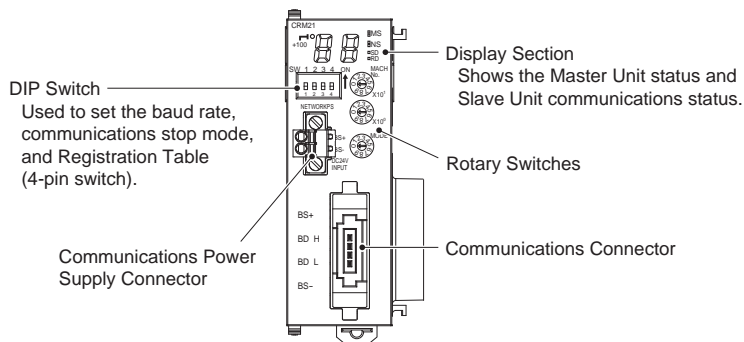
## Specifications

Item	Model	CJ1W-CRM21
Applicable Controllers		NJ *1 /CJ Series
Unit classification		CJ-series Special I/O Unit
Current consumption (Power supplied from Power Supply Unit)		400 mA max. at 5 VDC
Communications power supply connector		One communications power supply connector for Slave Units and Repeater Units on the trunk line when using Flat Cable *2
Communications power supply connector allowable current capacity		5 A max.
Maximum number of mountable Master Units		One word number assigned: 40 Units Two word numbers assigned: 40 Units Four word numbers assigned: 24 Units Eight word numbers assigned: 12 Units
Mounting location		According to NJ/CJ-series Special I/O Unit specifications.
Communications power ON/OFF monitoring		The ON/OFF status of the communications power supply can be detected at the communications power supply connector.
Data stored in Master Unit (built-in EEPROM)		1) The following device parameters: <ul style="list-style-type: none"> <li>• Registration Table</li> <li>• Registration Table Check Type</li> <li>• Registered Slave Unit Participation Monitoring Time, Registered Slave Unit Participation Standby Mode, and Event Disable Setting</li> <li>• Software Settings Table</li> <li>• Communications Error Communications Stop Mode</li> <li>• Communications Error Input Data Zero Clear Mode</li> <li>• Network settings</li> </ul> 2) Part of error history (depends on type of error; mainly serious error related to communications stopping)
Noise immunity		Conforms to IEC 61000-4-4 2 kV (applied to power supply).
Vibration resistance		10 to 61.2 Hz with single-amplitude of 0.1 mm, 61.2 to 150 Hz and 14.7 m/s <sup>2</sup> in X, Y, and Z directions for 80 min each (sweep time of 8 min × 10 sweeps = 80 min)
Shock resistance		196 m/s <sup>2</sup> (3 times each in X, Y, and Z directions)
Dielectric strength		1,000 VAC for 1 min, Leakage current: 1 mA max. <ul style="list-style-type: none"> <li>• Between communications connector or external current supply connector and GR terminal on Power Supply Unit</li> <li>• Between communications connector or external current supply connector and all Unit connectors</li> </ul>
Insulation resistance		20 MΩ min. (between isolated circuits)
Ambient operating temperature		0 to 55°C
Ambient operating humidity		10 to 90% (no condensation)
Ambient operating atmosphere		No corrosive gases
Storage temperature		-20 to 75°C
Weight		130 g max. (Master Unit only)

\*1. Supported only by the CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.

\*2. The Master Unit does not required communications power.

## External Interface



### Communications Power Supply Connector

Connect this connector to a 24-VDC power supply when using Flat Cable (4-conductor).

Doing so will supply communications power to the Slave Units and Repeater Units on the trunk line from the communications connector through the Flat Cable.

BS+	Communications power +
BS-	Communications power -

**Note:** Do not connect anything to this connector when using Round Cable.

### Ferrules

The following ferrules are recommended for the communications power supply cable.

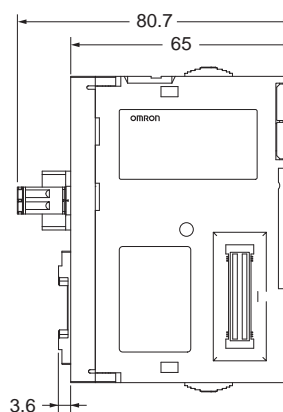
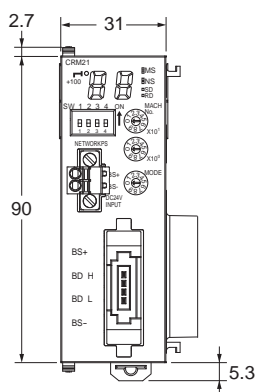
Model	Applicable wire size	Crimping tool	Manufacturer
AI0, 5-10 WH	0.5 mm/AWG20	CRIMPFOX UD6 (product number 1204436) or the CRIMPFOX ZA3 Series	Phoenix Contact K.K.
H 0.5/16 orange	0.5 mm/AWG20	Crimper PZ 1.5 (Product number 900599)	Weidmuller Co. Ltd.

The following screwdriver is recommended for removing ferrules.

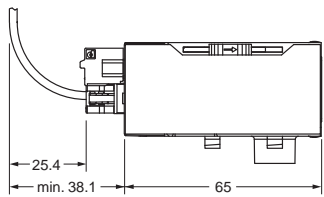
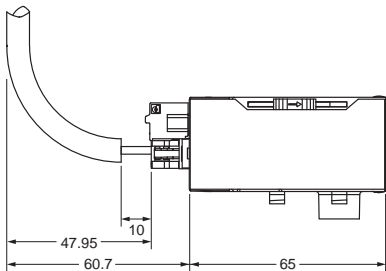
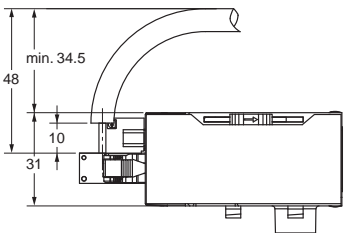
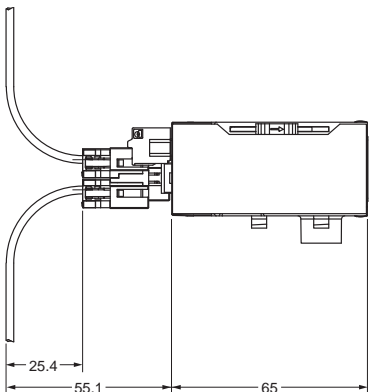
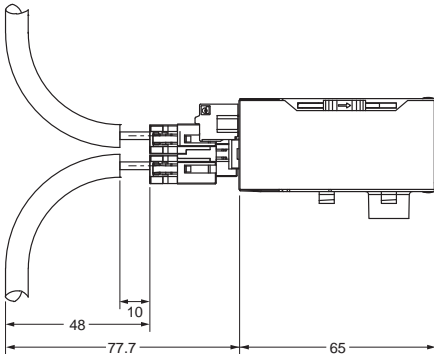
Model	Manufacturer
XW4Z-00C	OMRON Corporation

## Dimensions

(Unit: mm)



## Dimensions When the Cable is Attached

	Flat Cable I (w/o sheath) DCA4-4F10	Round Cable I (2 core) JIS C3306 compliant 0.75 mm <sup>2</sup> × 2 core
Flat Connector Plug (DCN4-BR4)		
Open Type Connector (DCN4-TB4)	—	
Multidrop Connector (DCN4-MD4)		

**Note:** Minimum cable bend R

- Flat Cable I (w/o sheath): The bend R should be 10 times (R25.4) of the external coating.
- Round Cable I (2 core): The bend R should be 5 times (R38) of the max. external coating.

## Related Manual

The manuals related the CJ Series CompoNet Master Unit are configured as in the following table. Please also refer to them.

Cat.No.	Name	Contents
W456	CJ1W-CRM21/CJ1W-CRM21 CompoNet Master Units Operation Manual	Contains general information on CompoNet networks, information on communications specifications and wiring methods common to communications networks, and information on CS/CJ-series Master Units.
W493	CJ-series CompoNet Master Unit Operation Manual for NJ-series CPU Unit	Contains information on the functions and operating procedures of a CJ-series CompoNet Master Unit when it is used in an NJ-series Controller.
W342	CS/CJ/CP Series NSJ Series Communications Commands Reference Manual	Contains information on communications commands for CS/CJ-series Master Units.
W457	CompoNet Slave Units and Repeater Unit Operation Manual	Contains information on the specifications of CompoNet Slave Units and Repeater Units.

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