

SYSMAC CJ-series EtherNet/IP Unit

CJ1W-EIP21

CSM_CJ1W-EIP21_DS_E_4_1

Introducing the New EtherNet/IP Unit. More Than 180,000 Words of Tag Data Link Capacity!

- EtherNet/IP is an industrial multivendor network that uses Ethernet. Managed by the ODVA (Open DeviceNet Vendors Association), it has open standards and is used with a wide range of industrial devices.
- The EtherNet/IP Unit supports tag data links to enable sharing data between devices at Ethernet nodes and a message service for sending and receiving data when required.
- The EtherNet/IP Unit supports the same FINS/UDP and FINS/TCP functionality as Ethernet Units.



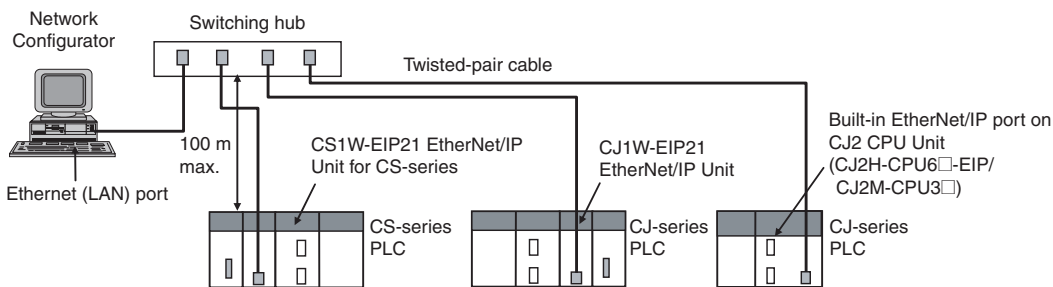
CJ1W-EIP21

EtherNet/IP™
conformance tested

Features

- Large-capacity tag data links are easily enabled by simply setting connections, with no programming required.
- Tag data links can be used to exchange data with up to 256 nodes over up to 256 connections.
- Up to 256 connections can be set per Unit with up to 722 words of data per connection, for a total of up to 184,832 words of link data. (There is no limit to the data link capacity for the overall network.)
- Data concurrency is maintained within each connection (for up to 722 words).
- Tag data link settings can be changed for individual Units even while tag data links are being used on a network.
- Errors can be diagnosed using the Network Configurator, and system errors can be monitored with a wide array of status flags.

System Configuration




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.

EtherNet/IP Unit

| Unit type | Product name | Specifications | | | No. of unit numbers allocated | Current consumption (A) | | Model | Standards |
|------------------|--|---|---|-----------------------|-------------------------------|-------------------------|-------------|------------|---------------|
| | | Communications cable | Communications functions | Units per CPU Unit | | 5 V system | 24 V system | | |
| CJ1 CPU Bus Unit |  EtherNet/IP Unit | Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e | Tag Data Link Functions, Message Communications Functions | 8 max. (See note.) | 1 | 0.41 | – | CJ1W-EIP21 | UC1, N, L, CE |

Note: Up to seven EtherNet/IP Units can be connected to a CJ2H-CPU6□-EIP. Up to two EtherNet/IP Units can be connected to a CJ2M CPU Unit.

Industrial Switching Hubs

| Product name | Appearance | Specifications | | | Accessories | Current consumption (A) | Model | Standards |
|---------------------------|--|--|--------------|-------------------|---|-------------------------|----------|-----------|
| | | Functions | No. of ports | Failure detection | | | | |
| Industrial Switching Hubs |  | Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation | 3 | No | • Power supply connector | 0.22 | W4S1-03B | UC, CE |
| | 5 | | No | 0.22 | | W4S1-05B | | |
| |  | | 5 | Yes | • Power supply connector • Connector for informing error | 0.22 | W4S1-05C | CE |

Recommended Network Devices

The following table shows the devices recommended for use with the EtherNet/IP.

| Part | Manufacturer | Model number | Inquires |
|---------------------------|---------------------|-----------------------------|---------------------------------------|
| Switching Hub | Phoenix Contact | FL SWITCH SFN 8TX (8 ports) | Phoenix Contact USA Customer Service |
| | Contec USA, Inc. | SH8008(FIT)H (8 ports) | CONTEC USA Inc. |
| | Cisco Systems, Inc. | WS-C2955T-12 (12 ports) | Cisco Systems, Inc. Main Corporate HQ |
| Twisted-pair cable | 100BASE-TX | | |
| | Fujikura | F-LINK-E 0.5mm × 4P | Fujikura America, Inc. |
| | | EtherNet/IP compliant cable | – |
| Connectors (Modular plug) | STP Plug | | |
| | Panduit Corporation | MPS588 | Panduit Corporation US Headquarters |
| Boots | Tsuko Company | MK boot (IV) LB | Tsuko Company Japan Headquarters |

Note: 1. Always use a switching hub when using tag data links in the network.

2. If a repeater hub is used for EtherNet/IP tag data links (cyclic communications), the network's communications load will increase, data collisions will occur frequently, and stable communications will be impossible.

Mountable Racks

| Model | CJ1 System | | CP1H System | NSJ System | |
|------------|------------------|---|--------------------------|----------------|---------------------|
| | CPU Rack | Expansion Backplane | CP1H PLC | NSJ Controller | Expansion Backplane |
| CJ1W-EIP21 | Unit version 2.0 | 8 Units (per CPU Unit) (See note 1.) | 2 Units (See note 2.) | Not supported | 8 Units |

Note: 1. Up to seven EtherNet/IP Units can be connected to a CJ2H-CPU6□-EIP. Up to two EtherNet/IP Units can be connected to a CJ2M CPU Unit.

2. A CP1W-EXT01 CJ Unit Adaptor is required.

EtherNet/IP Units Specifications

| Item | | Specifications |
|--|--|---|
| Model number | | CJ1W-EIP21 |
| Type | | 100Base-TX (See note.) |
| Applicable PLCs | | CJ (CJ1, CJ2) series, CP1H, and NSJ series PLCs. |
| Unit classification | | CJ-series CPU Bus Unit |
| Mounting location | | CPU Rack or Expansion Rack |
| Number of Units that can be mounted | | CJ series System and NSJ series System: 8 max. (including Expansion Racks) Note: Up to seven EtherNet/IP Units can be connected to a CJ2H-CPU6□-EIP. Up to two EtherNet/IP Units can be connected to a CJ2M CPU Unit. CP1H System: 2 max. |
| CPU Unit words used | Allocated CIO Area words (CPU Bus Unit words) | 25 words/Unit (one unit number's words) These words contain control bits and flags, the target node PLC's operating and error information, Unit status, communications status, registered/normal target node information, and FINS/TCP connection status. |
| | Allocated DM Area words (CPU Bus Unit words) | 100 words/Unit (one unit number's words) These words contain the IP address display/setting area. |
| | User-set area | Any usable data area words Target node PLC's operating and error information, and registered/normal target node information |
| | CPU Bus Unit System Setup | Not used. |
| Non-volatile memory within EtherNet/IP Unit (See note.) | | The following settings are stored in the EtherNet/IP Unit's non-volatile memory. Note: Unlike the regular Ethernet Units, the CPU Bus Unit Setup Area in the CPU Unit is not used for these settings. 1. Unit Setup (communications settings for the EtherNet/IP Unit, such as the IP address, DNS server settings, host name, baud rate, FINS/UDP settings, and FINS/TCP settings) 2. Tag data link settings (device parameters) |
| Transfer specifications | Media access method | CSMA/CD |
| | Modulation method | Baseband |
| | Transmission paths | Star form |
| | Baud rate | 100 Mbit/s (100Base-TX) |
| | Transmission media | Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e |
| | Transmission distance | 100 m (distance between hub and node) |
| | Number of cascade connections | There is no limitation when a switching hub is used. |
| Current consumption (Unit) | | 410 mA max. at 5 V DC |
| Weight | | 94 g max. |
| Dimensions | | 31 × 90 × 65 mm (W × H × D) |
| Other general specifications | | Other specifications conform to the general specifications of the CJ-series. |

Note: If tag data links are being used, use 100Base-TX. Otherwise, 10Base-T can be used, but this is not recommended.

Communications Specifications

| Item | | Specifications | | |
|------------------------------|---|--|--|--|
| | | CJ1 | CJ2 | |
| CIP service | Tag data links (Cyclic communications) | Number of connections | 256 | |
| | | Packet interval (refresh cycle) | 0.5 to 10,000 ms (in 0.5-ms units) Can be set independently for each connection. (Data is refreshed over the network at the preset interval and does not depend on the number of nodes.) | |
| | | Allowed communications bandwidth per Unit | 6000 pps (See note 1.) | |
| | | Number of tag sets | 256 | |
| | | Tag types | CIO Area, DM Area, EM Area, Holding Area, Work Area, and network symbols (See note 8.) | |
| | | Number of tags per connection (= 1 tag set) | 8 (7 tags when the tag set contains the PLC status) | |
| | | Maximum link data size per node | 184,832 words | |
| | | Maximum data size per connection | 252 words or 722 words (See note 2.) Note: Data synchronicity is maintained within each connection. | |
| | | Number of registrable tag sets | 256 (1 connection = 1 tag set) | |
| | | Maximum size of 1 tag set | 722 words (The PLC status uses 1 word when the tag set contains the PLC status.) | |
| | | Maximum number of tags that can be refreshed per CPU Unit cycle (See note 3.) | Output/Transmission (CPU to EtherNet/IP): 19 Input/Reception (EtherNet/IP to CPU): 20 (See note 4.) | Output/Transmission (CPU to EtherNet/IP): 256 Input/Reception (EtherNet/IP to CPU): 256 |
| | | Data that can be refreshed per CPU Unit cycle (See note 3.) | Output/Transmission (CPU to EtherNet/IP): 7,405 words Input/Reception (EtherNet/IP to CPU): 7,405 words | Output/Transmission (CPU to EtherNet/IP): 6,432 words Input/Reception (EtherNet/IP to CPU): 6,432 words |
| | | Changing tag data link parameters during operation | Supported (See note 5.) | |
| | | Multicast packet filter function (See note 6.) | Supported | |
| | Explicit messaging | Class 3 (connected) | Number of connections: 128 | |
| UCMM (unconnected) | | Number of clients that can communicate at one time: 32 max. Number of servers that can communicate at one time: 32 max. | | |
| CIP routing | | CJ1W-EIP21 CJ2H-CPU6□-EIP CJ2M-CPU3□ | | |
| FINS service | FINS/UDP | Supported | | |
| | FINS/TCP | 16 connections max. | | |
| EtherNet/IP conformance test | | Conforms to A5 | | |
| Ethernet interface | | 10BASE-T or 100BASE-TX Auto Negotiation or fixed settings | | |

Note: 1. In this case, pps means "packets per second" and indicates the number of packets that can be processed in one second.

- To use 505 to 1,444 bytes as the data size, the system must support the Large Forward Open standard (an optional CIP specification). The SYSMAC CS/CJ-series Units support this standard, but before connecting to nodes of other companies, confirm that those devices also support it.
- If the maximum data size is exceeded, the data refreshing with the CPU Unit will extend over two or more cycles.
- If status layout is selected in the user settings, the maximum number of tags that can be received is 19 tags.
- If parameters are changed in the EtherNet/IP Unit, however, the EtherNet/IP Unit will be restarted. When other nodes are communicating with the affected node, the communications will temporarily time out and automatically recover later.
- Because the EtherNet/IP Unit is equipped with an IGMP client, unnecessary multicast packets can be filtered by using a switching hub that supports IGMP snooping.
- The EtherNet/IP Unit uses the TCP/UDP port numbers shown in the following table.

| Service | Protocol | Port number | Remarks |
|------------------|----------|-------------|---|
| Tag data links | UDP | 2222 | Fixed value |
| Class 3, UCMM | TCP/UDP | 44818 | |
| DNS | UDP | 53 | |
| FINS/UDP service | UDP | 9600 | Port numbers in the Unit Setup can be changed with the CX-Programmer. |
| FINS/TCP service | TCP | 9600 | |
| FTP | TCP | 20, 21 | |
| SNTP | UDP | 123 | |
| SNMP | UDP | 161 | |
| SNMP trap | UDP | 162 | |

- Network symbols can be used only by the CJ2H-CPU6□-EIP and CJ2M-CPU3□.

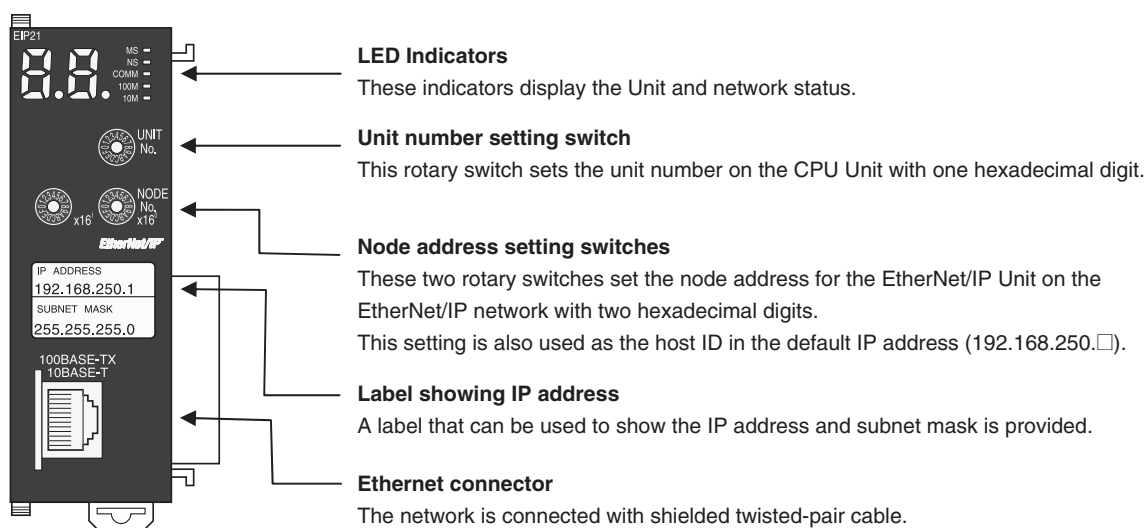
Network Configurator Requirements

The Network Configurator Ver. 3.0 or higher is a software package designed for building, setting, and controlling a multi-vendor EtherNet/IP Network using OMRON's EtherNet/IP. It is included in CX-One version 3.0. The Network Configurator provides the following functions for building, setting, and controlling EtherNet/IP.

| Item | Specification |
|--|---|
| Operating environment | Refer to the <i>CX-One Setup Manual</i> (Cat. No. W463). CXONE-AL□□C-V□/CXONE-AL□□D-V□ |
| Network connection method | CS1/CJ1 |
| | CJ2 |
| Serial interface | CPU Unit's Peripheral or RS-232C port |
| Ethernet interface | CPU Unit's Ethernet port EtherNet/IP Unit's Ethernet port |
| Location on Network | A single node address is used (only when directly connected to EtherNet/IP). |
| Number of Units that can be connected to Network | A single Network Configurator per Network (More than one Configurator cannot be used in the same system.) |
| Main functions | Network control functions |
| | Configuration functions |
| Supported file formats | Configurator network configuration files (*.ncf) Configuration files (*.ncf) created using the Network Configurator for EtherNet/IP (version 2) can be imported by selecting External Data - Import from the File Menu. |

External Interface

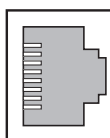
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Ethernet Connectors

The following standards and specifications apply to the connectors for the Ethernet twisted-pair cable.

- Electrical specifications: Conforming to IEEE802.3 standards.
- Connector structure: RJ45 8-pin Modular Connector (conforming to ISO 8877)



| Connector pin | Signal name | Abbr. | Signal direction |
|---------------|---------------------|-------|------------------|
| 1 | Transmission data + | TD+ | Output |
| 2 | Transmission data - | TD- | Output |
| 3 | Reception data + | RD+ | Input |
| 4 | Not used. | - | - |
| 5 | Not used. | - | - |
| 6 | Reception data - | RD- | Input |
| 7 | Not used. | - | - |
| 8 | Not used. | - | - |
| Hood | Frame ground | FG | - |

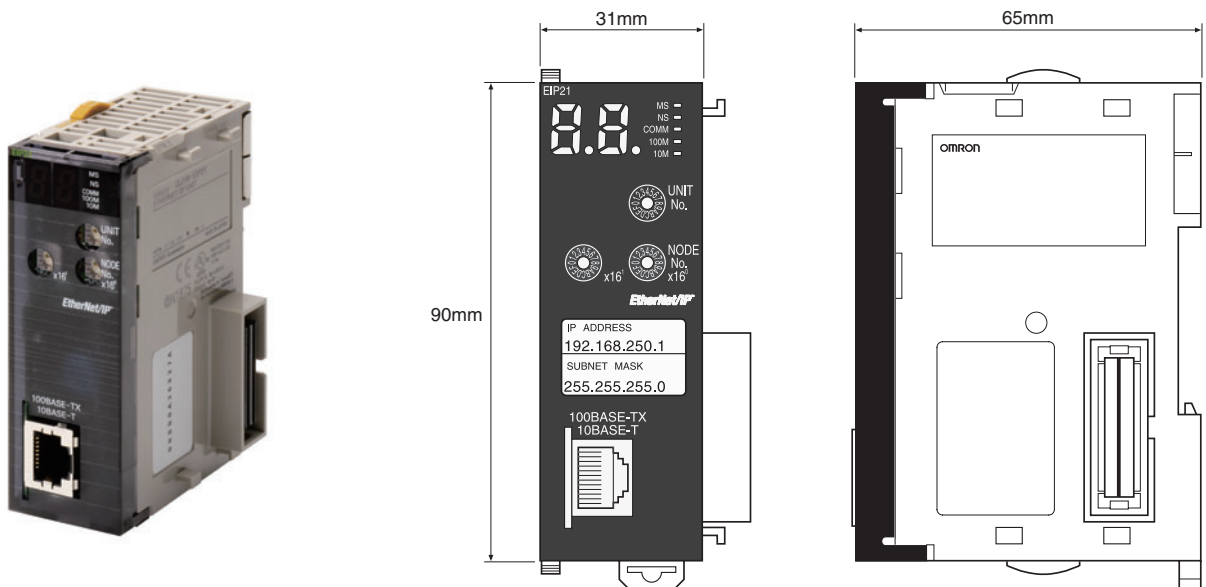
Ethernet Unit Function Comparison

| Item | Support for function | | |
|---|----------------------|---|------------------|
| | Ethernet Unit | EtherNet/IP Unit or built-in EtherNet/IP port | |
| | | Unit version 1.0 | Unit version 2.0 |
| Tag data link communications service | No | Yes | Yes |
| CIP message communications service | No | Yes | Yes |
| FINS/UDP service | Yes | Yes | Yes |
| FINS/TCP service | Yes | Yes | Yes |
| Socket service | Yes | No | No |
| File transfer (FTP) | Yes | No | Yes |
| Mail send/receive | Yes | No | No |
| Web functions | Yes | No | No |
| Automatic adjustment of PLC's internal clock | Yes | No | Yes |
| Simple backup function | Yes | Yes | Yes |
| Error log | Yes | Yes | Yes |
| Response to PING command | Yes | Yes | Yes |
| SNMP/SNMP trap | No | No | Yes |
| CIDR function for IP addresses | No | No | Yes |
| Online connection by EtherNet/IP using CX-One | No | No | Yes |
| Online connection by Ethernet (FINS) using CX-One | Yes | Yes | Yes |
| Online connection by EtherNet/IP using Network Configurator | No | Yes | Yes |

Dimensions

(Unit: mm)

CJ1W-EIP21



Related Manuals

| Manual number | Model | Name | Contents |
|---------------|--|---|--|
| W465 | CS1W-EIP21 CJ1W-EIP21 CJ2H-CPU□□-EIP CJ2M-CPU3□ | EtherNet/IP Units Operation Manual | Provides information on operating and installing EtherNet/IP Units, including details on basic settings, tag data links, and FINS communications. Refer to the <i>Communications Commands Reference Manual</i> (W342) for details on FINS commands that can be sent to CS-series and CJ-series CPU Units when using the FINS communications service. Refer to the <i>Ethernet Units Operation Manual Construction of Applications</i> (W421) for details on constructing host applications that use FINS communications. |
| W421 | CS1W-ETN21 CJ1W-ETN21 | Ethernet Units Operation Manual Construction of Applications | Provides information on constructing host applications for 100Base-TX Ethernet Units, including functions for sending/receiving mail, socket service, automatic clock adjustment, FTP server functions, and FINS communications. |
| W342 | CS1G/H-CPU□□H CS1G/H-CPU-□□V1 CS1W-SCU21 CS1W-SCB21/41 CJ1G/H-CPU□□H CJ1G-CPU□□ CJ1W-SCU41 | Communications Commands Reference Manual | Describes the C-series (Host Link) and FINS communications commands used when sending communications commands to CS-series and CJ-series CPU Units. |
| W463 | CXONE-AL□□C/D-V□ | CX-One Setup Manual | Describes the setup procedures for the CX-One. Information is also provided on the operating environment for the CX-One. |

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