CS1 Series
CS1W-ETN01
Ethernet Unit

Specification Sheets

OMRON

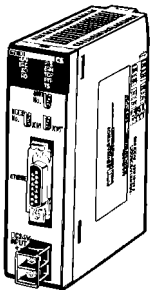
CS1 Series

Ethernet Unit

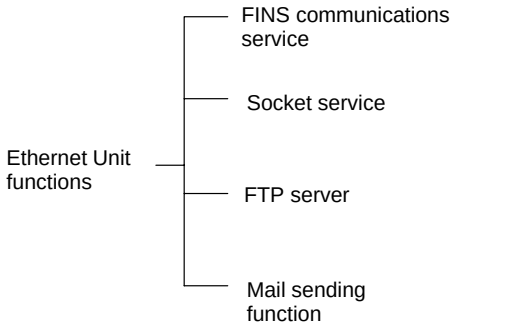
CS1W-ETN01

Supports Various Ethernet Protocols to Combine OA Information and FA Controls

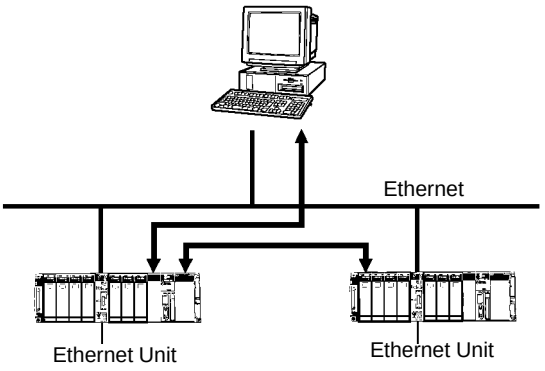
- Send and receive data from the PC using TCP/IP and UDP/IP (socket service) protocols, send commands using OMRON's standard FINS protocol, transfer files using FTP, and send mail using SMTP. By selecting the communications services to meet your needs, you can combine an information-based Ethernet network flexibly with your PCs.

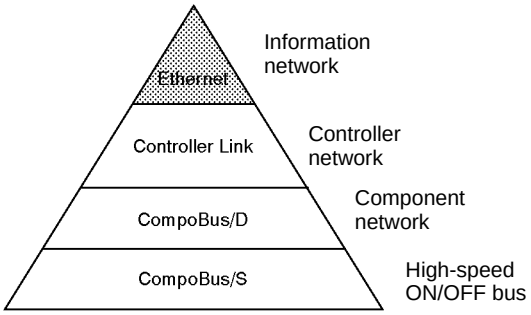


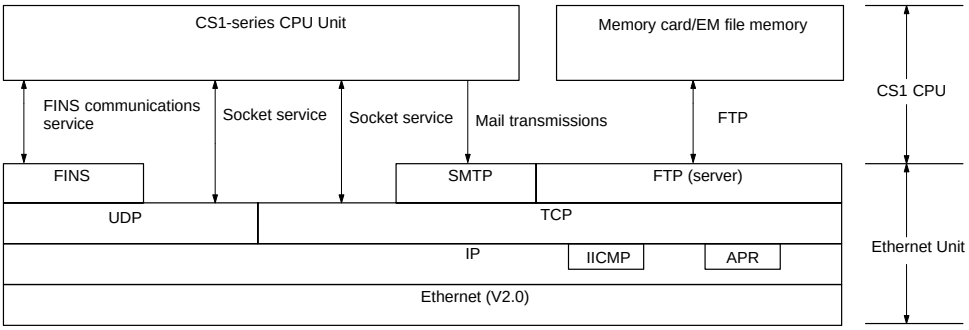
CS1W-ETN01



■ System Configuration







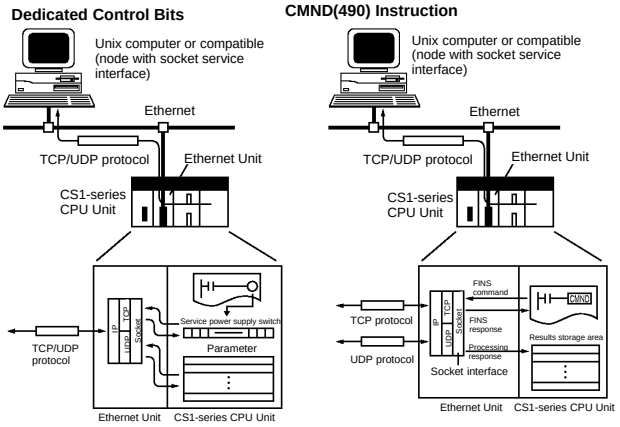
"Programmable Controller" is abbreviated as "PC" in these *Specification Sheets.*

■ Features

Communications by UDP/IP and TCP/IP

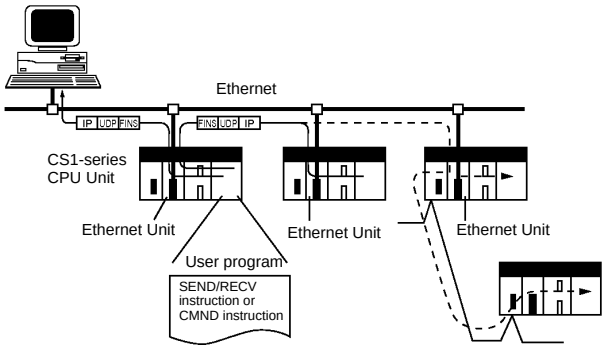
The Ethernet Unit supports socket services for the standard Ethernet protocols, UDP/IP and TCP/IP, so it can communicate with other Ethernet devices, workstations, personal computers, and Ethernet Units produced by other manufacturers. It can use up to eight socket ports for the various protocols, allowing it to be employed in a wide range of applications.

TCP or UDP socket services can be easily accessed either by executing the CMND(490) instruction or by presetting parameters and then manipulating dedicated control bits in memory. Presetting parameters eliminates the need for ladder programs to monitor the completion timing of instructions and socket service processing, and thereby reduces the work hours involved in program development.



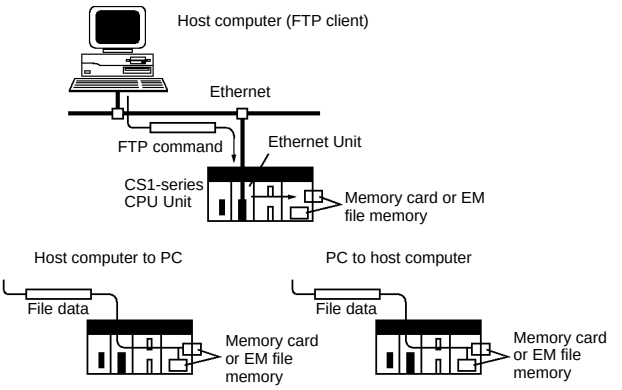
FINS Message Communications

The Ethernet Unit also supports FINS message communications, OMRON's standard communications service, so other OMRON PCs can be accessed by using SEND(090), RECV(098), and CMND(490) instructions in ladder programs. In addition, the FINS gateway function can be used to allow access to other PCs on not only the same Ethernet network but also on other networks such as Controller Link and SYSMAC Link.



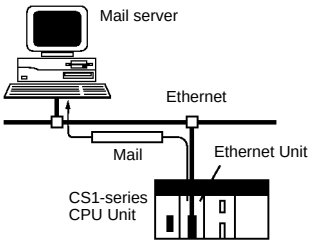
File Transfers Between PC and Host Computer

The Ethernet Unit has a built-in FTP server function, so any workstation or personal computer with an FTP client function can be used for reading files from or writing files to the PC. This enables large amounts of data to be transferred at one time without any need for writing a ladder program.



Email Capability

User-defined messages, Unit error information, status information, and so on, can be sent from the PC to the mail server as email. This function allows information generated at the production site to be sent out as email.



Controller Link Network Connection

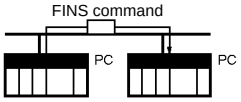
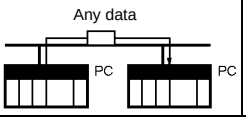
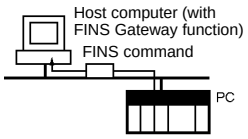
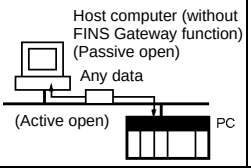
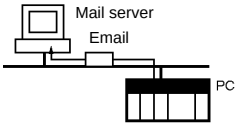
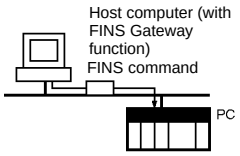
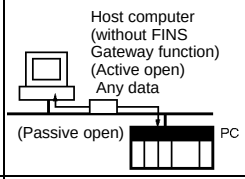
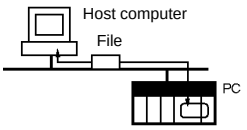
Ethernet, the information-system network, can be connected to Controller Link, the control-system network, using the FINS communications service. This allows a PC on the Controller Link network to be monitored from a PC on the Ethernet network, and, conversely, for data to be exchanged between a PC on the Controller Link network and a PC on the Ethernet network.

Abundant Troubleshooting Functions

The Ethernet Unit is provided with a variety of troubleshooting functions for prompt recovery in case of errors.

- Self-diagnostic function at startup
- PING command for checking remote nodes
- Inter-nodal tests for checking remote nodes
- Error log for recording error history data
- Email notification when errors occur

■ Functions

Function		FINS communications	Socket services	FTP server	Mail
Client to server	PC to PC	By executing SEND(090), RECV(098), or CMND(490) 	By executing CMND(490) or manipulating dedicated control switches in memory. 	---	---
	PC to host computer	By executing SEND(090), RECV(098), or CMND(490) 	At PC: By executing CMND(490) or manipulating dedicated control switches in memory. 	---	Email can be set to be sent when specified bits turn ON, when errors occur, or at fixed intervals. 
	Host computer to PC	By sending FINS messages from the host computer. 	At PC: By executing CMND(490) or manipulating dedicated control switches in memory. 	FTP commands executed by host computer 	---
Data type		FINS commands (various commands for I/O memory communications in the PC, changing the operating mode, reading and writing files, and so on)	Any data (PC's internal I/O memory)	DOS files in File Memory (Memory Card or EM File Memory)	User-defined messages, error log information, status information
Maximum data size		PC to PC: 1,980 bytes max. PC to host computer: 1,980 bytes max. Host computer to PC: 2,000 bytes max.	1,984 bytes max.	No particular limit.	User-defined messages: 1,024 bytes max.
Features		Enables control of PC and host computer that support FINS commands.	Communications by standard TCP/IP and UDP/IP via Ethernet. No need to set FINS addresses.	Files are read by means of simple commands and applications from host computers with FTP client functions.	Ethernet Unit status is obtained by email. Notification of errors is received by email.

■ Models

Applicable PCs	Unit classification	Type of communications	Model number
CS1	CPU Bus Unit	FINS communications service function, socket service function, FTP server function, mail communications function	CS1W-ETN01

■ Programming Software for Setting CPU Bus Unit Settings (Sold Separately)

Name	Computer		Specifications	Model number
CX-Programmer	IBM PC/AT or compatible Windows 95 or Windows 98		Sets the CPU Bus Unit System Settings in the CPU Unit	WS02-CX□□E
Connector cable	Connect to peripheral port	DOS	2.0 m, 6.0 m	CS1W-CN□□□
Connector cable	Connect to RS-232C port	DOS	2.0 m, 5.0 m	XW2Z-□□□□(-□)

■ Specifications

Item		CS1W-ETN01
Applicable PCs		CS1 series
Unit classification		CS1 CPU Bus Unit
Mounting position		CPU Rack or CS1 Expansion Rack
Number of Units that can be mounted		4 Units max.
Unit numbers		0 to F (Each number can be used only once for the CPU Bus Units)
Data exchange with CPU Units	CPU Bus Unit words in CIO Area	25 words allocated to each Unit
		CPU Unit to Ethernet: Control bits Ethernet to CPU Unit: UDP/TCP socket status, service status, error status Between CPU Unit and Ethernet: Control bits required by socket service
	CPU Bus Unit words in DM Area	100 words per Unit
		CPU Unit to Ethernet: Test data between nodes Ethernet to CPU Unit: Results of tests between nodes, TCP socket connection status, mail send status Between CPU Unit and Ethernet: Socket service parameter area
	CPU Bus Unit system settings	Allocated 412 bytes Mode setting, subnet mask, FINS UDP port number, FTP login name, FTP password, IP address table, IP router table, mail communications timing setting, user-created day address, SMTP server address, local mail address, mail destination address
Communications method (media access method)		CSMA/CD
Modulation		Baseband code
Transmission media		Coaxial cable
Transmission path form		Bus
Baud rate		10 Mbps
Transmission distance		Maximum segment length: 500 m, maximum distance between nodes: 2.5 km
Number of connected nodes		100 node per segment max.
Node connection method		Transceiver cable and connector connection
Distance between nodes		Multiples of 2.5 meters
Transceiver cable length		50 m max.
Protocol	Application	FTP server, mail communications, FINS service
	Application layer	FTP, SMTP, FINS
	Transport layer	TCP, UDP
	Network layer	APR, IP, ICMP
	Physical layer	Ethernet Ver. 2.0
IP address setting		Set using the 8 rotary switches on the back of the Unit.
Effect on CPU Unit cycle time		25 ms If executing socket service using dedicated control bits, add another 0.002 ms x (number of send bytes or number of receive bytes). If executing a FINS message service, socket service using CMND instruction, or FTP service, also add event execution time.
Power consumption		400 mA max. at 5 VDC (from power supply unit)

Item	CS1W-ETN01
External power supply	Capacity: 0.3 A min. at 24 VDC (per node) Inrush current: 2.5 A max. (when 24-VDC startup time is 5 ms) Permissible voltage fluctuation range: 20.4 VDC to 26.4 VDC (24 VDC –15% to +10%) Recommended power supply: OMRON S82J-series
Power supply to transceiver	Capacity: 0.4 A at 12 V Voltage fluctuation range: 13.05 VDC to 14.48 VDC Ripple: 2% p-p
Setting switches	Front panel Rotary switch: Unit number Rotary switch: Node address (Set to between 01 and 7E Hex when using FINS service.)
Indicators	There are nine LED indicators on the front of the Unit: RUN (operating), power ON, ERC (error detected by Unit), ERH (error in the CPU Unit), sending, receiving, TCP socket in use, FTP server servicing, and executing test between nodes.
Front connector	One Ethernet connector (for Ethernet transceiver cable connection), power supply connection terminals (24-VDC input)
Dimensions	35 x 130 x 101 mm (W x H x D)
Weight	300 g max.
Standard accessories	None
Cat. No.	W343

■ Recommended Products

Part	Company	Model
24-VDC power supply	OMRON	S82J Series
Transceiver	Hirakawa Hewtech Corp.	MTX-210TZ
	Mitsubishi Cable Industries,Ltd.	ET-10081
Transceiver cable	Mitsubishi Cable Industries,Ltd.	Transceiver cables (molded type)

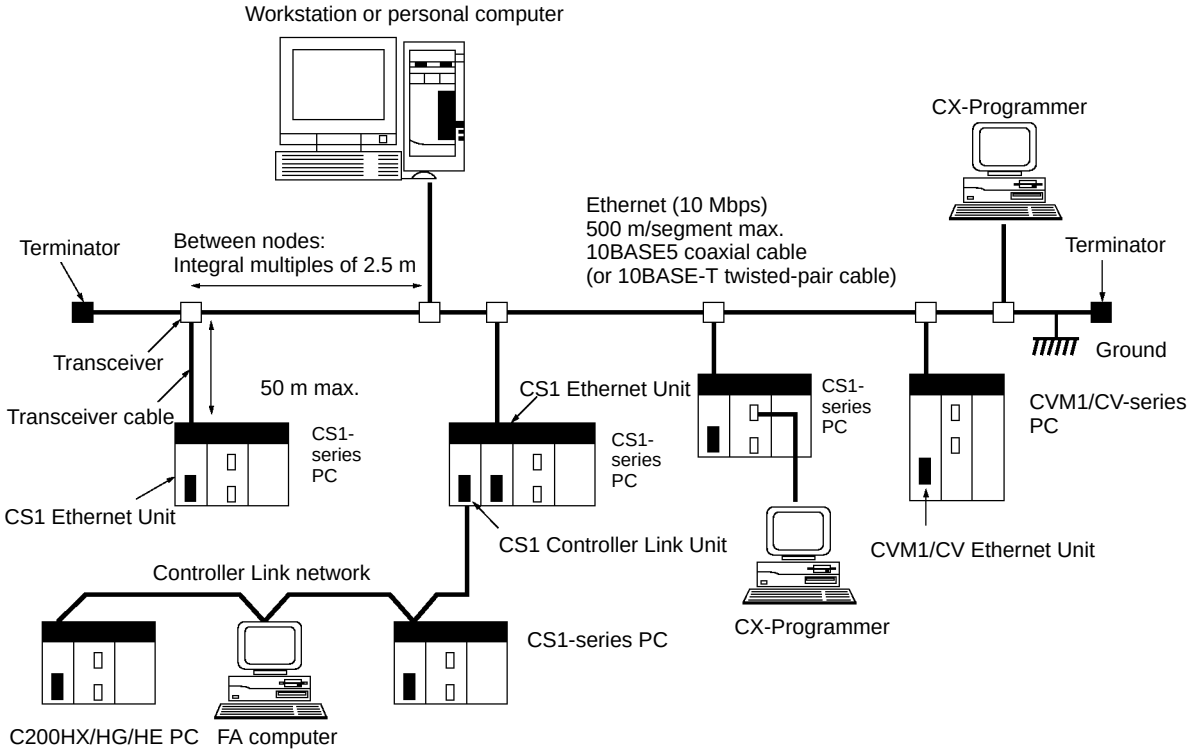
■ Applicable CPU Units

PC	CPU Unit model number	Maximum number of Units that can be mounted on CPU Racks and CS1 Expansion Racks	Mounting position limitations
CS1 Series	CS1H-CPU□□ CS1G-CPU□□	4 Units max. (unit numbers 0 to F)	None

■ Ethernet Unit Functions

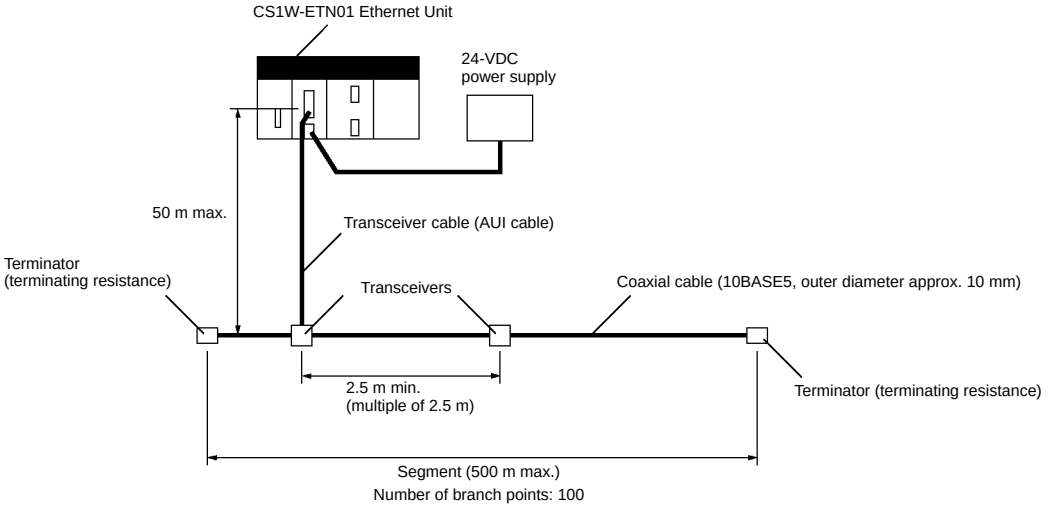
Function	Contents
FINS communications	A SEND, RECV, or CMND instruction from the PC's ladder program is used to send a FINS command to a remote node, and a response is received.
	A FINS command is received from a remote node. If the command is addressed to the local Unit, it is processed internally. If it is addressed to another Unit, a request is made to the CPU Unit and the result is sent back to the remote node as a response.
	Following the FINS header information, the Ethernet Unit serves as a gateway for FINS commands and responses between other Communications Units mounted to the same PC.
Socket services	The Ethernet Unit supports up to 16 ports (8 TCP ports and 8 UDP ports) for socket interfaces that can be manipulated from the ladder program. When socket services are used, communications can be carried out by either TCP or UDP with various devices on the Ethernet network. This function can be used by either by though the CMND(490) instruction or by manipulating dedicated control bits in memory. 1) Using the CMND(490) Instructions Socket services can be used by utilizing the CMND(490) instruction to execute FINS commands. Up to 16 socket ports can be used with CMND(490). 2) Using Dedicated Control Bits: Socket services can be used by first setting the required parameters in the Socket Service Parameter Area allocated in the DM Area and then turning ON dedicated control bits in memory. There is no need to monitor the completion timing for instructions or socket services, so the work hours involved in developing ladder programs can be reduced. Only eight socket ports (UDP and TCP combined) can be used with this method. For any ports that exceed that number, use the CMND(490) instruction.
FTP server	The FTP server function allows data files to be transferred between a client workstation or personal computer and the PC's file system (Memory Card or EM Area).
Mail	The types of data listed below can be sent as email when a dedicated control switch in memory is turned ON, when an error occurs, or when a preset time interval elapses. Any of the following types of data can be specified for transmission with any of these timing methods. User-created data (Data at PC: ASCII, 1,024 bytes max.) Error log information (64 records) Status information A mail server must be provided separately in order to use the mail function.
Communications tests	Check connection to other nodes using PING command. Check connection to other nodes using internode testing.

■ System Configuration



■ Ethernet Network Configuration

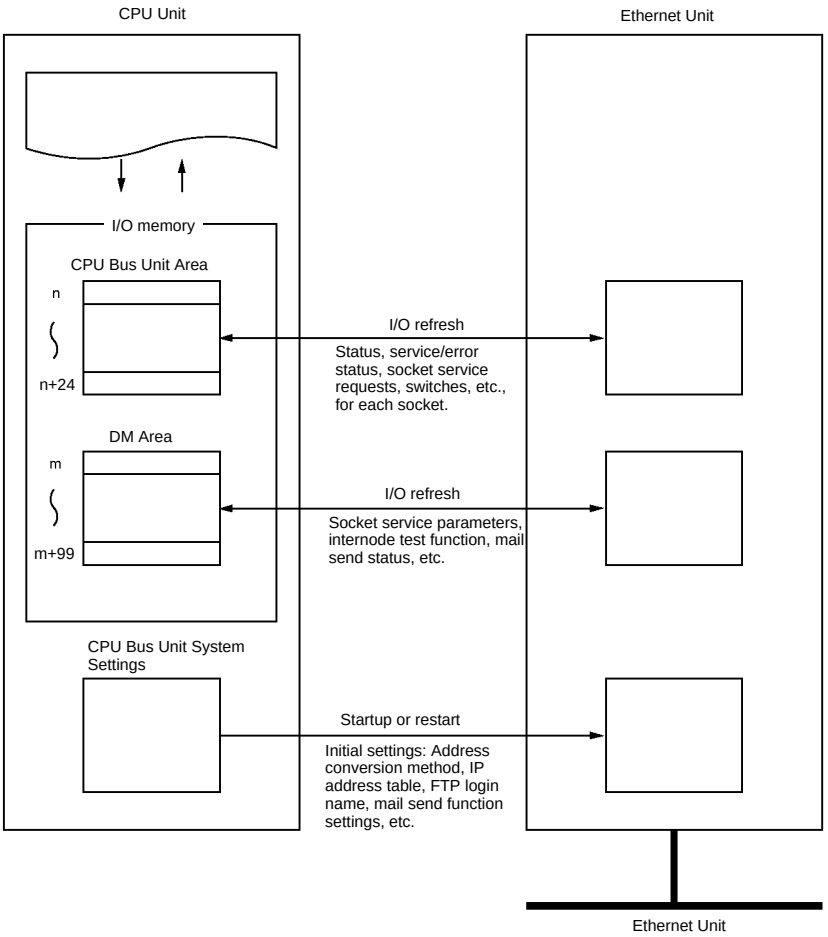
The basic configuration of an Ethernet System consists of a single coaxial cable together with the transceivers, transceiver cables, nodes, and so on, that are connected to it. In an Ethernet System, this basic configuration is called a “segment.”



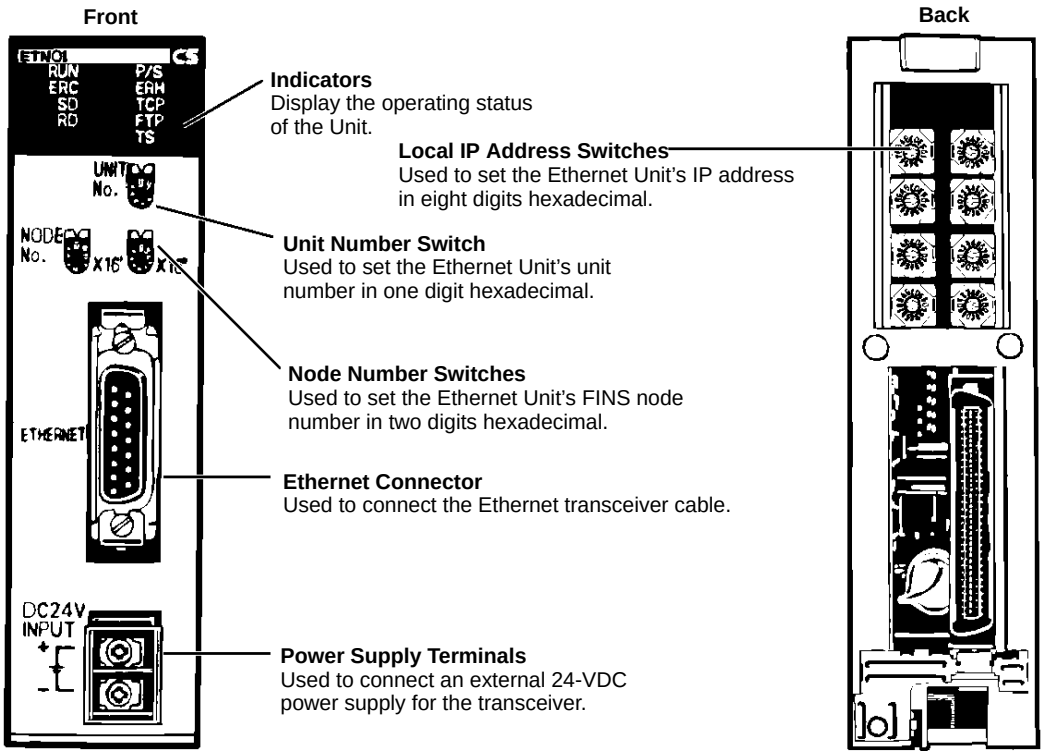
The devices shown in the following table must be obtained to configure a network using an Ethernet Unit, so prepare them in advance. Use only devices in the network that conform to IEEE802.3 standards.

Network device	Contents
CS1 Ethernet Unit	The Ethernet Unit is a Communications Unit that connects a CS1-series PC to an Ethernet network.
24-VDC power supply	This is a external 24-VDC power supply for the purpose of providing power to the transceivers via transceiver cable. Use a power supply with an output current of at least 0.3 A per node. The power is converted within the Unit to the transceiver power supply voltage, and is provided to the transceiver.
Transceiver	The transceiver is a device for interfacing between the coaxial cable and the nodes. Note: The Ethernet Unit can provide a maximum current of 0.4 A to the transceiver, so use a transceiver with a current consumption of not more than 0.4 A. Check with the manufacturer for information regarding transceiver current consumption.
Transceiver cable (AUI cable)	This is the cable for connecting between transceivers and nodes.
Coaxial cable	The coaxial cable comprises the main line of the Ethernet System.
Terminator for coaxial cable (terminating resistance)	The Terminators connect to both ends of the coaxial cable.

■ Outline of Data Exchange



■ Nomenclature



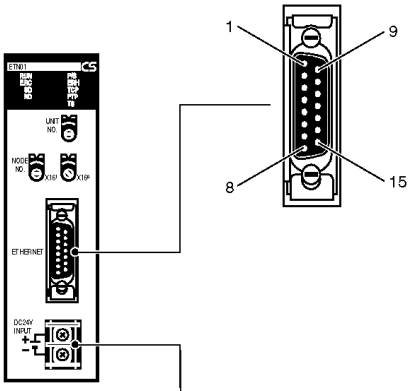
LED Indicators

Indicator	Color	Status	Meaning
RUN	Green	Not lit	Operation stopped. Hardware error.
		Lit	Normal operation.
P/S (Power Supply)	Green	Not lit	Power is not being supplied to the transceiver.
		Lit	Power is being supplied to the transceiver.
ERC (Ethernet Unit Error)	Red	Not lit	Unit normal.
		Lit	Node number not between 1 and 126. A hardware (e.g., internal memory) error has occurred.
		Flashing	An illegal IP address has been set. With automatic address generation, the rightmost two digits of the IP address do not match the node number.
ERH (PC Error)	Red	Not lit	PC normal.
		Lit	A PC error has occurred. An error exists in I/O table, unit number, system data, or routing table settings.
SD (Send Data)	Yellow	Not lit	Not sending data. (Ready to send.)
		Lit	Sending data.
RD (Receive Data)	Yellow	Not lit	Not receiving data. (Ready to receive.)
		Lit	Receiving data.
TCP (TCP Socket in Use)	Yellow	Not lit	None of the eight TCP sockets provided for socket services is in use.
		Lit	At least one of the eight TCP sockets provided for socket services is in use.
FTP (File Server Service)	Yellow	Not lit	FTP server on stand-by.
		Lit	FTP server operating.
TS (Internode Testing)	Yellow	Not lit	Not running internode test.
		Lit	Running internode test.

■ Ethernet Connectors

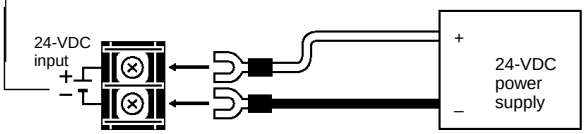
The following standards and specifications apply to the connectors for the Ethernet transceiver cable.

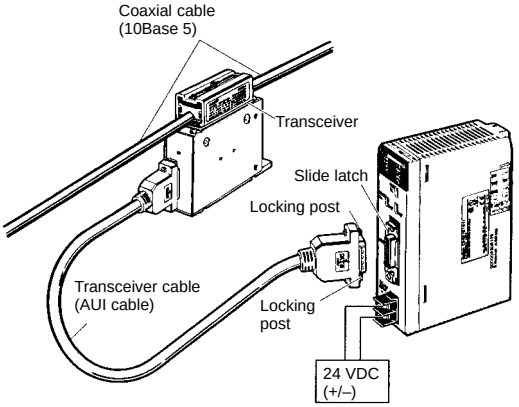
- Electrical specifications: Conform to IEEE802.3.
- Lock structure: IEEE802.3 standards for slide latches



Connector pin	Signal name	Abbr.	Signal direction
1	Signal ground	GND	---
2	Collision detection signal +	COL+	Input
3	Send data +	TX+	Output
4	Signal ground	GND	---
5	Receive data +	RX+	Input
6	Power ground (common with signal ground)	VC	---
7	Not used	---	---
8	Signal ground	GND	---
9	Collision detection signal –	COL–	Input
10	Send data –	TX–	Output
11	Signal ground	GND	---
12	Receive data –	RX–	Input
13	Transceiver +12 VDC power supply	+12 V	Output
14	Signal ground	GND	---
15	Not used	---	---
Connector hood	Frame ground	FG	---

Connect a 24-VDC power supply to the power supply terminals. The Ethernet Unit converts this 24-VDC power supply to the power supply voltage for the transceivers and provides it through the transceiver cable.

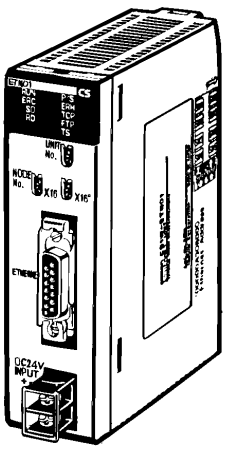


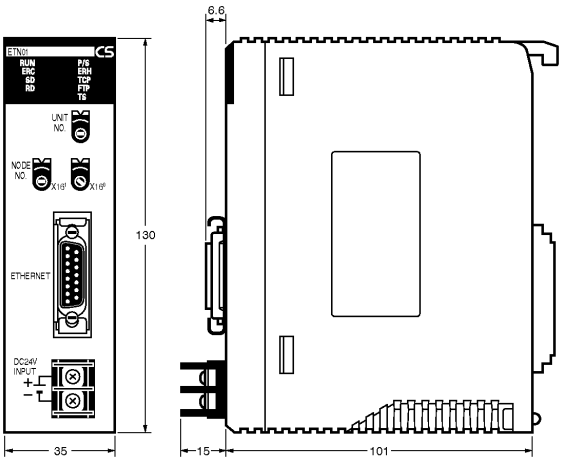


■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

CSW1-ETN01





Unit: mm

16.5 with cover attached

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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Note: Specifications subject to change without notice.

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