SYSMAC CS-series FL-net Unit

CS1W-FLN22

CSM_CS1W-FLN22_DS_E_1_1

Connect to Multivendor Controller Networks

This Unit allows you to connect to FL-net, an open network based on Ethernet. Multivendor FL-net networks can be built to combine CS-series PLCs with CNC machines, robots, and PLCs from other manufacturers.

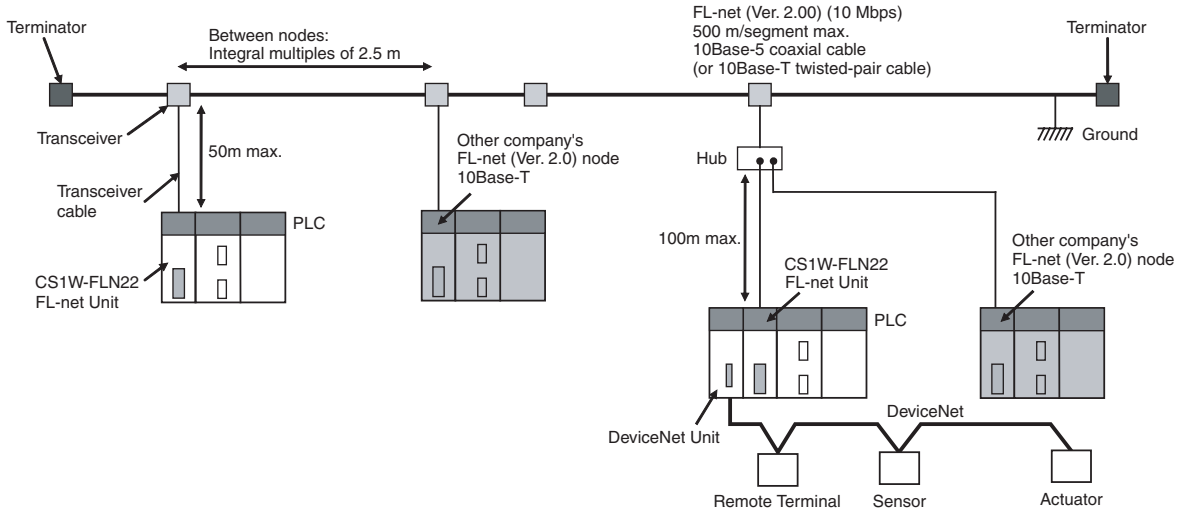
CS1W-FLN22

Features

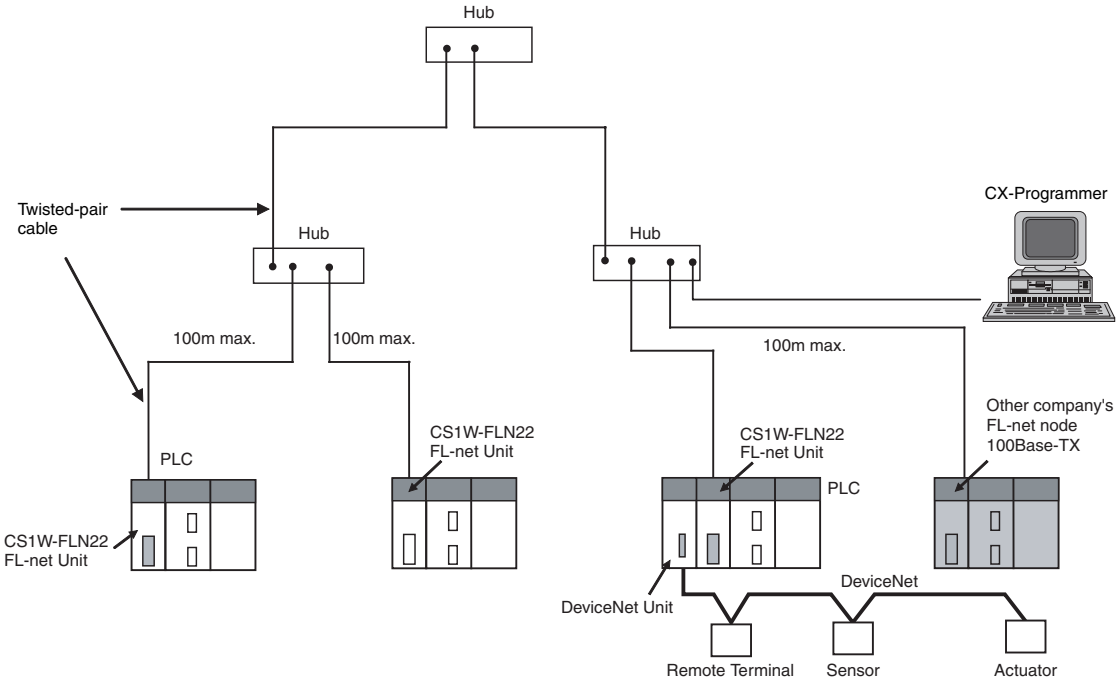
- Conforms to FL-net, a quickly spreading standard.
- FL-net is a multivendor FA network at the controller/machine level that is based on Ethernet. (It uses UDP/IP.)
- FL-net supports message transmissions and cyclic data transmissions. (Message transmissions are also possible using FINS communications.)
- A CS-series PLC can be used to interface communications between Ethernet information networks, OMRON's Controller Link FA network, and DeviceNet field bus.

System Configuration

10BASE-T



100BASE-TX



Note: Do not combine nodes using a baud rate of 10 Mbps with nodes using a baud rate of 100 Mbps in the same configuration, where possible. If nodes with a baud rate of 10 Mbps are used, use a baud rate of 10 Mbps for all the connected devices in the configuration.

About FL-net

FL-net is an open network that is based on Ethernet and that is being promoted as a standard by the Special Committee for Network. Promotion organized by JEMA (The Japan Electrical Manufacturers' Association). FL-net enables multivendor, multi-model connections at the controller/machine level. FL-net provides the following features.

- Ethernet-based FA Network
  - NL-net defines a new Ethernet-based FL link protocol.
  - The standard UDP/IP communications protocol of Ethernet is used.
  - Cables, hubs, and other network components are easy to obtain.
- Message Transmissions and Cyclic Data Transmissions
  - Interlocks between devices, manufacturing instructions, collection of manufacturing results can be achieved on the same network.
- Master-less, Token System
  - Prevents data collisions and provides consistent transmission times.
  - Nodes can be automatically added to or removed from the network.
  - Communications are maintained between all nodes that are capable of communicating even if a power interruption occurs or a fault occurs in network devices or cables.

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.

FL-net Unit

Unit type	Product name	Specifications			No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Communications interface	Communications functions	Max. Units mountable per CPU Units		5V	26V		
CS1 CPU Bus Unit	FL-net Unit	100BASE-TX	With FL-net Ver. 2.0 specifications (OPCN-2) Data links and message service	4	1	0.38	—	**CS1W-FLN22**	UC1, CE

Note: There is no accessory for the CS-series Ethernet Unit.

Recommended Network Devices

The following products are recommended for use with the FL-net Unit.

Part	Maker	Model number	Specification
Twisted-pair cable	100BASE-TX		
	Fujikura	F-LINE-E 0.5mm × 4P	STP (shielded twisted-pair) cable: Category 5,5e Note: Impedance is limited 100 Ω.
	Fujikura	CTP-LAN5 0.5mm × 4P	UTP (unshielded twisted-pair) cable: Category 5,5e
	100BASE-TX		
	Fujikura	F-LINE-E 0.5mm × 4P	STP (shielded twisted-pair) cable: Category 3,4,5,5e Note: Impedance is limited 100 Ω.
	Fujikura	CTP-LAN5 0.5mm × 4P	UTP (unshielded twisted-pair) cable: Category 3,4,5,5e
Connector (Modular plug)	STP Plug		
	Panduit Corp	MPS588	—
	UTP Plug		
	Panduit Corp	MP588-C	—

Mountable Racks

Model	CS1 System						CS1D System				
	CPU Rack		Expansion Backplane (including Longdistance Expansion Rack)		SYSBUS Remote I/O Slave Rack	C200HX/ HG/HE Expansion I/O Rack	CPU Rack			Expansion Backplane	
	CS1W-BC		CS1W-BI				CS1D-BC			CS1D-BI	
	□□3	□□2	□□3	□□2			052	042D	082S	092	082D
CS1W-FLN22	4 Units (per CPU Unit)				Not supported	Not supported	4 Units (per CPU Unit)				

FL-net Unit Specifications

Item		Specifications	
Model number		CS1W-FLN22	
Type		100Base-TX (10Base-T is also possible)	
Applicable PLCs		CS-series PLCs	
Unit classification		CS-series CPU Bus Unit	
Mounting location		CPU Rack or Expansion Rack	
Number of Units that can be mounted		4 max. (including Expansion Racks)	
Transfer specifications	**Media access method**	CSMA/CD	
	Modulation	Baseband	
	Transmission paths	Star	
	Baud rate	100 Mbps (100Base-TX)	10 Mbps (10Base-T)
	Transmission media	Unshielded twisted-pair (UTP) cable Categories: 5, 5e Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e	Unshielded twisted-pair (UTP) cable Categories: 3, 4, 5, 5e Shielded twisted-pair (STP) cable Categories: 100 Ω at 3, 4, 5, 5e
	Transmission distance	100 m max. (distance between hub and node)	
	Number of cascade connections with repeater hub	2	4
Current consumption (Unit)		380 mA max. at 5 VDC	
Vibration resistance		Conforms to JIS 0040. 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes each (Time coefficient; 8 minutes × coefficient factor 10 = total time 80 minutes)	
Shock resistance		Conforms to JIS 0041. 147 m/s^2 three times each in X, Y, and Z directions	
Ambient temperature		Operating: 0 to 55°C Storage: –20 to 75°C	
Humidity		10% to 90% (with no condensation)	
Atmosphere		Must be free from corrosive gas.	
Weight		200 g max.	
Dimensions		35 × 130 ×101 mm (W × H × D)	

CX-FLnet

CX-FLnet

The CX-FLnet Support Software is used to make settings for OMRON FL-net Units mounted to Programmable Controllers (PLCs). The CX-FLnet Support Software is installed on a computer running Windows 2000 (Service Pack 4 or higher), XP, Vista, or 7.
The CX-FLnet can be used to make settings for the following FL-net Units:
CS1W-FLN22, CJ1W-FLN22, CS1W-FLN02/12

CX-FLnet Functions

The CX-FLnet provides mainly the following functions.

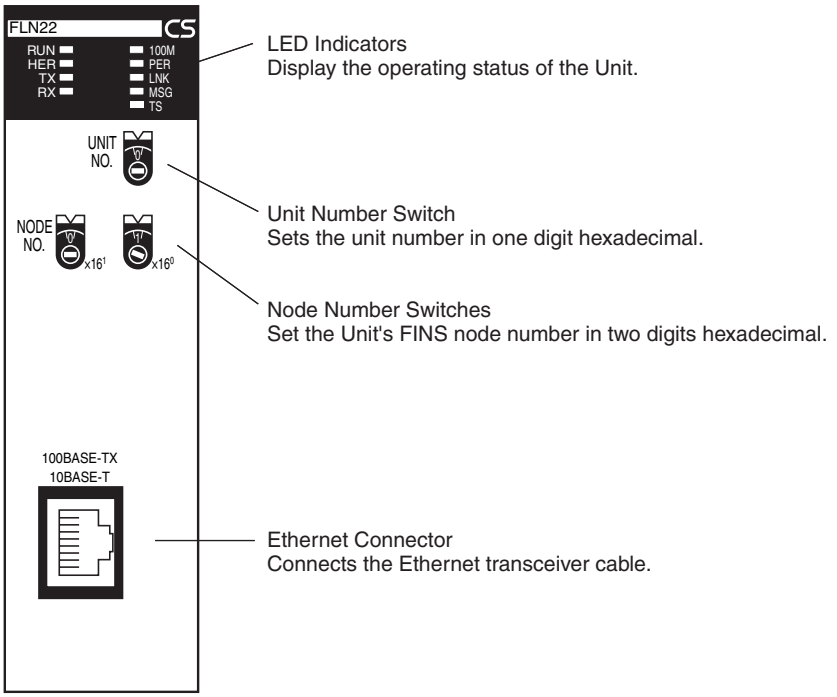
Function	Description
Online connection	The following two methods can be used for connection. • Direct PLC Connection Perform the settings after making a direct serial connection to each PLC to which FL-net Units are mounted. • Connection via a Network Online connection and settings are made from the PLC connected to the computer running CX-FLnet (i.e., the gateway PLC) to each PLC (i.e., the target PLCs) to which FL-net Units are mounted via the FL-net network or other networks (e.g., Ethernet or Controller Link).
Settings	The following settings can be made. • CPU Bus Unit Setup Area • Data Link Setup - Local Node Setup Area - Other Node Setup Area - Extension Setting - Unit Area Setup (token watchdog timer)
File	Communications settings for the online connection and data link settings can be saved and read in CSV format.
Monitor	• Data Link Status • FL-net Unit Status (FA Link active status, transceiver power supply, received message or not, token monitoring timeout setting exceeded, and IP address setting error) • Communications Cycle Time • Message Sequential Status • FL-net Unit Error Log • Status of nodes participating in the FL-net network

CX-FLnet Availability

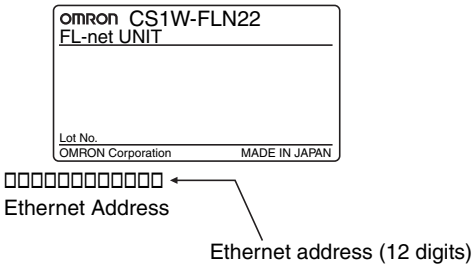
The CX-FLnet is available only as a component of the CX-One FA Integrated Tool Package. Refer to the CX-One Setup Manual (W463, provided with the CX-One) for the CX-One installation and uninstallation procedures.
For detalis on CX-FLnet Support Software Operations refer to the FL-net Units Operation Manual (W440).

External Interface

CS1W-FLN22, 100BASE-TX



Individual Ethernet addresses are assigned to all communications devices connected to an Ethernet system. With the FL-net Unit, the Ethernet address is shown in 12 digits, hexadecimal, on the right side of the Unit.

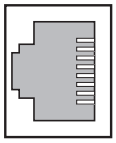


Note: The Ethernet address can also be checked by means of the FINS command CONTROLLER DATA READ.

Ethernet Connectors

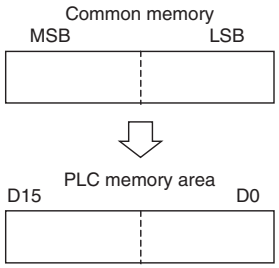
The following standards and specifications apply to the connectors for the Ethernet twisted-pair cable.

- 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	—

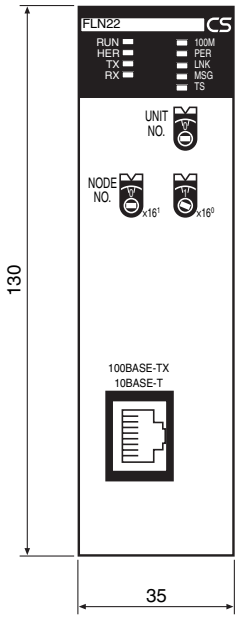
Comparison with Previous Models (CS1W-FLN02, CS1W-FLN12)

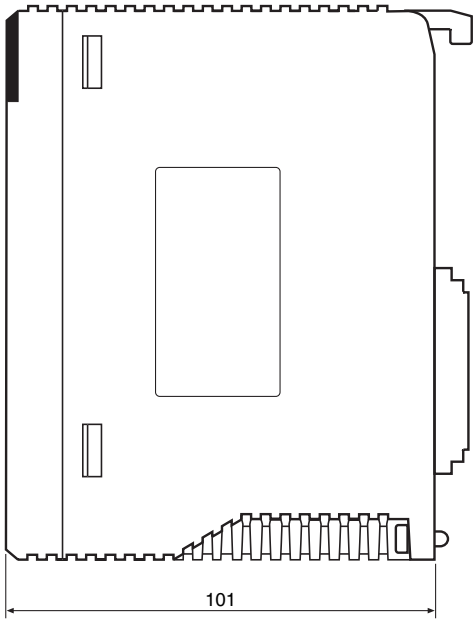
Model	CS1W-FLN22 CJ1W-FLN22	CS1W-FLN02/12
Type	100Base-TX (10Base-T is also possible)	10Base-5 (CS1W-FLN02) 10Base-T (CS1W-FLN12) This model is discontinued.
Switches/indicators	100M indicator provided This indicator indicates when baud rate of 100 Mbps is being used.	No 100M indicator
	No rotary switch for setting the IP address. The IP address is set using the CX-FLnet or FL-net Unit Support Software. Either of the following two methods can be used to set the IP address. 1.192.168.250 + node number 2.Setup area	Rotary switch provided on rear of Unit for setting the IP address. Either of the following four methods can be used to set the IP address 1.192.168.250 + node number 2.Rotary switch on rear of Unit. 3.Rotary switch on rear of Unit + node number 4.Setup area
Data link functions	Total capacity: 8,704 words (Area 1: 512 words, Area 2: 8,192 words) If the total number of words in Area 1 and Area 2 for a single node exceeds 7,677 words, the data for the corresponding node will be refreshed over two scans of the CPU Unit. The data will be split from the 7,678th word counted from the beginning of the combined Area 1 and Area 2.	Total capacity: 8,704 words (Area 1: 512 words, Area 2: 8,192 words) Data link tables that exceed the following conditions, however, cannot be set. Number of words in local node setup area (Area 1 and Area 2) ≤ 7,677 words. Number of words in local node setup area (Area 1 and Area 2) + the number of words in setup area (Area 1 and Area 2) for node with the largest setup area size (except local node) ≤ 7,677 words
	The order of the upper and lower byte in the word data can be swapped for each node when exchanging data between the data link area in the PLC and the FL-net.	The data order cannot be changed and is fixed as shown in the following diagram. 
Simple backup function	Supported.	Not supported.
Support Software	CX-FLnet or FL-net Unit Support Software version 1.60 or higher (CS1W-FLN22 and CJ1W-FLN22 settings cannot be made using Ver. 1.51 or lower)	FL-net Unit Support Software Ver. 1.51 or higher (CS1W-FLN02 and CS1W-FLN12 settings can also be made using Ver. 1.60 or higher)

Dimensions

(Unit : mm)

CS1W-FLN22





Related Manuals

Name	Cat. No.	Contents
SYSMAC CS/CJ Series CS1W-FLN22 (100Base-TX) and CJ1W-FLN22 (100Base-TX) FL-net Units Operation Manual	W440	Describes the installation and operation of the CS1W-FLN22 and CJ1W-FLN22 FL-net Units. Refer to the Communications Commands Reference Manual (W342) for information on FINS commands that can be addressed to CS/CJ-series CPU Units.
CXONE-AL□□C-V□/AL□□D-V□ CX-One FA Integrated Tool Package Setup Manual	W463	Provides an overview of the CX-One FA Integrated Tool and installation procedures.

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