CJ-series Serial Communications Units
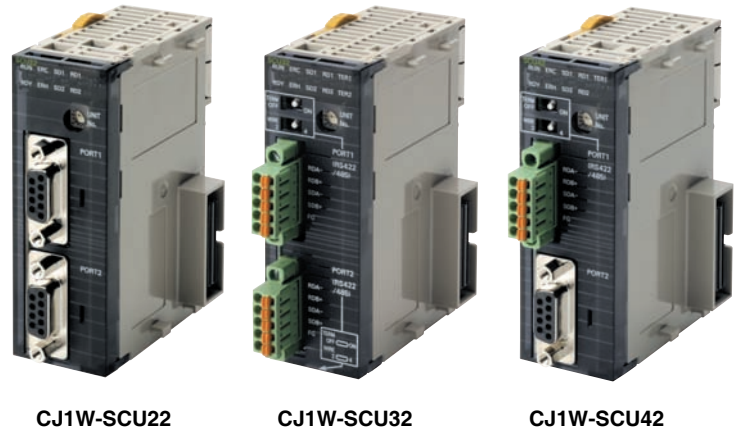# CJ1W-SCU

The Serial Communications Units That Enable High-speed Connections with External Devices

• Each Serial Communications Unit provides two serial communications ports: RS-232C and RS-422A/485, and the serial communications mode can be set separately for each port from Protocol Macro, Host Link, NT Link, Serial Gateway, and No-protocol.

| CJ1W-SCU22 | CJ1W-SCU32 | CJ1W-SCU42 |

Features

• Mount a total of up to 16 CPU Bus Units, including these Serial Communications Units, to the CPU Rack or Expansion Racks to create systems with up to 32 serial communications ports.
• Connect an NT-AL001 RS-232C/RS-442A Link Adapter to the RS-232C port to enable 1:N communications.
• With the CJ1W-SCU□2, you can use a faster baud rate (up to 230.4 kbps) and faster data transfer to the CPU Unit to enable connecting to high-speed external devices.
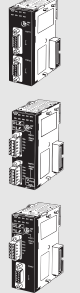
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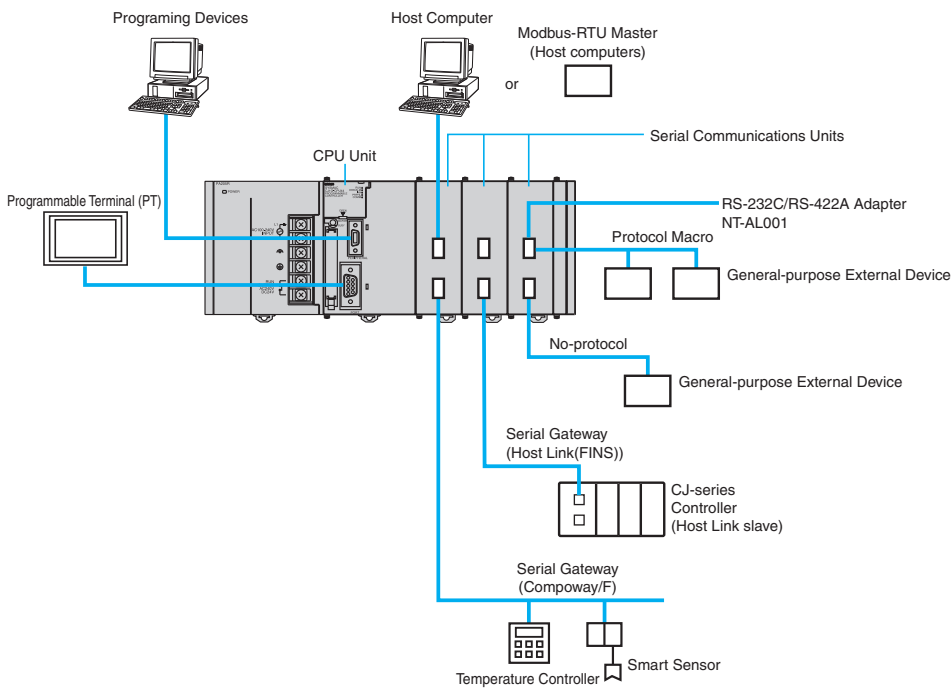
Ordering Infomation

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.

Unit type	Product name	Specifications		No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Communications Interface	Communications functions		5V	24V		
CJ1 CPU Bus Units	Serial Communications Units [High-speed type]	2 RS-232C ports	The following functions can be selected for each port with an CJ-system: • Protocol macro • Host Link • NT Links (1:N mode) • Serial Gateway • No-protocol *3 • Modbus-RTU Slave	1	0.28 *1	—	CJ1W-SCU22 *2	UC1, N, L, CE
		2 RS-422A/485 ports	The following functions can be selected for each port with an NJ-system: • Protocol macro • Serial Gateway • No-protocol • Modbus-RTU Slave		0.40	—	CJ1W-SCU32 *2	
		1 RS-232C port and 1 RS-422A/485 port			0.36 *1	—	CJ1W-SCU42 *2	
CJ1 CPU Bus Units	Serial Communications Units	2 RS-232C ports	The following functions can be selected for each port: • Protocol macro *4 • Host Link • NT Links (1:N mode) • Serial Gateway *5 • No-protocol *6 • Modbus-RTU Slave *7	1	0.28 *1	—	CJ1W-SCU21-V1 *8	UC1, N, L, CE
		2 RS-422A/485 ports			0.38	—	CJ1W-SCU31-V1 *8	
		1 RS-232C port and 1 RS-422A/485 port			0.38 *1	—	CJ1W-SCU41-V1 *8	

*1. When an NT-AL001 RS-232C/RS-422A Conversion Unit is used, this value increases by 0.15 A/Unit.
*2. Sinple Backup Function and Interrupt notification function cannot be used with an NJ-system.
*3. A Serial Communications Unit with unit version 2.1 or later, a CPU Unit with unit version 1.03 orlater, and Sysmac Studio version 1.04 or higher are required to use the SerialRcvNoClear instruction.
*4. You can activate Protocol macro trace function when the CPU Unit is set to the RUN/MONITOR mode. (MONITOR mode is not available with the NJ-series CPU Units.)
*5. The Serial Gateway function is enabled only for Serial Communications Units of unit version 1.2 and later.
*6. The no-protocol function is enabled only for Serial Communications Units of unit version 1.2 and later (and a CS1/CJ1 CPU Unit of unit version 3.0 or later or a CJ2 CPU Unit is also required).
*7. The Modbus-RTU Slave function is enabled only for Serial Communications Units of unit version 1.3 and later.
*8. This unit cannot be used, with the Machine Automation Controller NJ-series.

Accessories

Model	Accessories	Specifications
CJ1W-SCU32	2 Serial Port (RS-422A/485) Connector	Terminal Block Connector (FMC1.5/5-STF-3.5AU by Phoenix Contact)
CJ1W-SCU42	1 Serial Port (RS-422A/485) Connector	Terminal Block Connector (FMC1.5/5-STF-3.5AU by Phoenix Contact)

Note: A serial port connector is not provided. Purchase a connector separately for serial port connection.
Plug : XM3A-0921 (manufactured by OMRON) or equivalent
Hood : XM2S-0911-E (manufactured by OMRON) or equivalent

Mountable Racks

Model		NJ system		CJ system (CJ1, CJ2)		CP1H system	NSJ system	
		CPU Rack *4	Expansion Rack *4	CPU Rack	Expansion Backplane	CP1H PLC	NSJ Controller	Expansion Backplane
CJ1W-SCU22	Unit version 2.0	10 Units	10 Units (per Expansion Backplane)	10 Units *1	10 Units *2 (per Expansion Backplane)	2 Units *3	Not supported	10 Units *2 (per Expansion Backplane)
CJ1W-SCU32	Unit version 2.0							
CJ1W-SCU42	Unit version 2.0							
CJ1W-SCU21-V1	Unit version 1.3	Not supported						
CJ1W-SCU31-V1	Unit version 1.3							
CJ1W-SCU41-V1	Unit version 1.3							

Note: It may not be possible to mount this many Units to a Rack depending on the current consumption of the other Units.
*1. This is the number of Units for a CJ2H-CPU6□ CJ2H CPU Unit (without EtherNet/IP) and a CJ1W-PA205□ or CJ1W-PD025 Power Supply Unit. (When not using NT-AL001)
*2. This is the number of Units for a CJ1W-PA205□ or CJ1W-PD025 Power Supply Unit.
*3. A CP1W-EXT01 CJ Unit Adaptor is required
*4. A total of up to 16 Units, including all other CPU Bus Units.

Specifications

Item		Description					
Device name		Serial Communications Unit					
Classification		CPU Bus Unit					
Model number		CJ1W-SCU22	CJ1W-SCU32	CJ1W-SCU42	CJ1W-SCU21-V1	CJ1W-SCU31-V1	CJ1W-SCU41-V1
Serial ports	Port 1	RS-232C	RS-422A/485	RS-422A/485	RS-232C	RS-422A/485	RS-422A/485
	Port 2	RS-232C	RS-422A/485	RS-232C	RS-232C	RS-422A/485	RS-232C
Protocol	Port 1	Host Link, protocol macro, Serial Gateway, No-protocol, NT Link, Modbus-RTU Slave, loopback test , or 1:1 Host Link can be selected for each port. *1 *2			Host Link, protocol macro, NT Link, or loopback test can be selected for each port. • Unit Ver. 1.2 or later also supports Serial Gateway, no-protocol, and 1:1 Host Link modes. (Note: The Serial Gateway can also be executed in protocol macro mode.) *1 • Unit Ver. 1.3 or later also supports Modbus-RTU slave mode.		
	Port 2						
Number of mountable Units	CPU Unit	None					
	CPU Rack	A total of up to 16 Units, including all other CPU Bus Units. No restrictions on the mounting location. However, if an external interrupt task is used, the Unit must be mounted in one of the following slots on the CPU Rack.			A total of up to 16 Units, including all other CPU Bus Units. No restrictions on the mounting location.		
	Expansion Rack	• CJ2H-CPU6☐-EIP CPU Unit: Slots 0 to 3 • CJ2H-CPU6☐, CJ2M-CPU☐☐ or CJ1G/H-CPU☐☐H CPU Unit: Slots 0 to 4 • CJ1M-CPU☐☐ CPU Unit: Slots 0 to 2 External interrupt tasks will not be started if the Unit is mounted to any other slot.					
Data exchange with the CPU Unit	Ordinary refreshing of software switches and status	Allocated 25 words of the 25 words in the CPU Bus Unit CIO Area (constant data exchange with the CPU Unit)					
	Transfer from the CPU Unit set by the system	Of the CPU Bus Unit DM Area, each serial port is allocated 10 words (total 20 words). Data is transferred from the CPU Unit at the following times: • Startup or restart • Ladder instruction: STUP(237) • Port Settings Changing Flag turns ON (Auxiliary Area)					
Simple Backup Function		The CPU Unit's Simple Backup Function can be used to backup the Protocol Macro data in the Serial Communications Unit to the CPU Unit's Memory Card. The backed-up data can be restored or compared. (The Simple Backup Function can be used with the CJ1-H and CJ1M CPU Units only.)					
Current consumption *3		280mA+x	400mA	360mA+x	280mA+x	380mA	380mA+x
Weight		160g Max.	120g Max.	140g Max.	110g Max.	110g Max.	110g Max.
General specifications		Conforms to general specifications for CJ Serise.					

*1. Serial Gateway: The Serial Gateway can also be executed in protocol macro mode.
*2. No-protocol: An external interrupt task can be executed when data is received in No-protocol Mode. If the CJ2H CPU Units with unit version 1.1 or later and CJ2M CPU Units is used, the high-speed communications instructions (DRXDU(261) and DTXDU(262)) can also be used.
*3. The current consumption is for one Serial Communications Unit. When an NT-AL001 Link Adapter is connected to the Serial Communications Unit, power is supplied to the Link Adapter from the Unit. A current consumption of 0.15A must be added for each Link Adapter that is connected. In the above specifications, "x" indicates that 0.15A must be added for each port to which an NT-AL001 Link Adapter is connected to provide the required 5-V power supply.

Protocol Specifications

Host Link Specifications

Item	Description		
Communications mode	Half-duplex (Full-duplex for slave-initiated communications)		
Synchronous mode	Start-stop synchronization (asynchronous mode)		
Baud rate *1	RS-232C port and RS-422A/485 ports: 1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400 bps *2 Default setting: 9,600 bps		

Communications distance *1	RS-232C port : 15 m max. *3
	RS-422A/485 Port :
	• CJ1W-SCU□1-V1
	  500 m max. (total cable length: 500 m max., T-branch branch lines: 10 m max.)
	• CJ1W-SCU□2
	  1,200 m max. (total cable length: 1,200 m max., Multidrop connections are possible. However, maximum cable length is 500 m if the NT-AL001 is used for RS-422A-485 connections.)		

Connection configuration	RS-232C port : 1:1 (1:N (N = 32 Units max.) is possible using an Converting Link Adapters.) RS-422A/485 port : 1:N (N = 32 Units max.)		
Number of connected Units	32 Units max. (unit numbers 0 to 31; unit number 0 is set for 1:1 connection)		
Frame structure	C-mode commands	Header: @, address: (host link unit number) 0 to 31 (BCD), data: header code + text, error check code: FCS, terminator: * +CR	
	FINS commands	Header: @, address: (host link unit number) 0 to 31 (BCD), data: header code (always "FA") + FINS header + FINS command + text, error check code: FCS, terminator: * +CR	
Error check codes	Vertical parity: Even, odd. or none FCS (horizontal parity converted to ASCII)		
Command flow and support	Command flow	Commands	Contents
	Host computer to Controller	C-mode commands	1:1 or 1:N communications with directly connected Controller *4
		FINS commands (in Host Link protocol)	1:1 or 1:N communications with directly connected Controller.
	Controller to host computer	FINS commands (in Host Link protocol)	Communications using SEND(090), RECV(098), and CMND(490) from CPU Unit. *5

*1. Confirm the baud rates and communications distance supported by connected devices.
*2. The CJ1W-SCU□2 is required for communications at 230,400 bps.
*3. The maximum cable length for RS-232C is 15 m. The RS-232C standard, however, does not cover baud rates above 19.2 Kbps. Refer to the manual for the device being connected to confirm support.
*4. The specified frame format must be prepared on the host computer and then sent.
*5. The host computer must interpret the commands and return a response in the correct format.
    Connection between the host computer and Controller must be 1:1.

Protocol Macro Function Specifications

Item		Description	
Number of protocols	20 max.	Can be created and registered with the Protocol Support Tool (CX-Protocol).	
Number of sequences	1,000 max.		
Per protocol	Number of sequences	60 max.	
	Number of messages	300 max.	
	Number of reception matrixes	100 max.	
Sequence execution condition		Using the CPU Unit's PMCR (260) instruction (specifying the sequence number)	
Communications mode		Half-duplex or full-duplex	
Synchronous mode		Start-stop synchronization (asynchronous mode)	
Baud rate *1		RS-232C port and RS-422A/485 ports: 1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400 bps Default setting: 9,600 bps *2	

Communications distance *1		RS-232C port : 15 m max.
		RS-422A/485 port :
		• CJ1W-SCU□1-V1
		  500 m max. (total cable length: 500 m max., T-branch branch lines: 10 m max.)
		• CJ1W-SCU□2
		  1,200 m max. (total cable length: 1,200 m max., Multidrop connections are possible. However, maximum cable length is 500 m if the NT-AL001 is used for RS-422A-485 connections.)	

Connection configuration		RS-232C port : 1:1 (1:N (N = 32 Units max.) is possible using a Converting Link Adapter.) RS-422A/485 port : 1:N (N = 32 Units max.)	
Number of connected Units		32 Units max. (unit numbers 0 to 31; unit number 0 is set for 1:1 connection)	
Maximum number of data exchange words between Controller and protocol macro function	Operand setting	250 words	Including the word that specifies the number of words (1 word)
	Link word setting	500 words	O1, O2, I1, and I2: 500 words total
	Direct setting	500 words	Maximum number of words per data attribute

Item						Description		
Sequence contents (step common parameters)	**Number of steps per sequence**					16 max.		
	Transmission control parameters					X-on/X-off flow, RS/CS flow, delimiter control, or contention control, and modem control can be selected.		
	Response notification method (operand)					Scan notification: Writes the receive data to I/O memory during CPU Unit scanning.		
						Scan method (fixed)		Support
						Interrupt notification		Not support
						Interrupt notification for reception case number		Not suppprt
	Monitoring time during send/receive processing					Receive wait, receive completion, or send completion can be monitored. Setting range: 0.01 to 0.99 s, 0.1 to 9.9 s, 1 to 99 s, or 1 to 99 minutes		
	Link word setting					Area in which data is exchanged between the CPU Unit and the Serial Communications Unit during Communications Unit refreshing. Two areas are possible for each device: An area for storing receive data and an area for storing send data. *3		
Step contents	**Commands**					Send only (SEND), receive only (RECV), send and receive (SEND&RECV), wait (WAIT), reception buffer clear (FLUSH), ER-ON (OPEN), or ER-OFF (CLOSE)		
	Repeat counter					1 to 255 times		
	Retry count					0 to 9 (Only when the command is SEND&RECV)		
	Send wait time					0.01 to 0.99 s, 0.1 to 9.9 s, 1 to 99 s, or 1 to 99 minutes (Only when the command is SEND or SEND&RECV)		
	With or without response write (operand)					When receive processing is completed (when the receive data is stored in the area specified in the 4th operand of the PMCR(260) instruction), whether or not to store the received messages can be selected.		
	Next processing					When a step has ended normally, End (sequence completed), Next (proceed to the next step No.), Goto (go to the specified step No.), or Abort (interrupt the step and terminate that sequence) can be selected.		
	Error processing					When a step has ended abnormally, End, Next, Goto, or Abort can be selected.		
	Send message					Data sent to the specified address when the command is SEND or SEND&RECV.	Consists of a header, address, length, data, error check code, and terminator.	
	Receive message					Data sent from the specified address when the command is RECV or SEND&RECV.		
	Reception matrix					When the command is RECV or SEND&RECV, sets the expected receive messages (15 max.), and switches to the next processing according to the message received.	Specifies the receive messages and the next processing for each of cases No. 00 to No. 15. Of the maximum 16 cases, one case must be set as "Other" in the receive messages (in addition to the set receive messages).	
Message unit contents	**Header and terminator data attributes**	**Con-stant**				ASCII data, hexadecimal data, or control code		
	Data attributes of addresses and data in send/receive messages	**Con-stant**				ASCII data, hexadecimal data, or control code (with an address, no control code is possible)		
		Vari-able				No conversion, conversion to ASCII data, or conversion to hexadecimal data (the read/write direction can be specified)		
						Designa-tion method	(X, Y) X: Effective address (where read from, or where written to) Y: Data size (1 to 1,000) *4	
			X	Word designation	Word read (I/O memory to send data)	Specify using the 3rd operand of the PMCR(260) instruction.		Set leading address + n (The linear expression aN + b, including repeat counter N, is also possible for n.)
						Specify using a link word.		
						I/O memory direct designation		
					Word write (receive data to I/O memory)	Specify using the 4th operand of the PMCR(260) instruction.		
						Specify using a link word.		
						I/O memory direct designation		
				Wild card	*	Any data or address can be received (only in receive messages)		
				Repeat counter	N			

Item				Description		
Message unit contents	**Data attributes of addresses and data in send/receive messages**	**Variable**	Y	Linear expression including repeat counter	aN+b	a: 0 to 1000; b: 1 to 1000 N: Repeat counter value
				Wild card	*	Can be received regardless of the length (only in receive messages)
				Word designation	Word read (I/O memory to send data)	Specify using the 3rd operand of the PMCR(260) instruction.
						Specify using a link word.
						I/O memory direct designation
	Error check codes			LRC, LRC2, CRC-CCITT, CRC-16, SUM, SUM1, and SUM2 can be calculated.		
	Maximum length of send/receive messages			1,000 bytes. (A maximum length between 200 and 1,000 bytes can be set in the Setup Area.)		
	Maximum number of data attributes registered in one message			96 attributes *5		
	Maximum number of write data attributes registered in one message			30 attributes *6		
Trace function *7				• A total of up to 1,700 bytes (characters) of time-series data can be traced in send and receive messages. • Changes to the step No. and control signals such as RS and CS can also be traced.		

Note: For the Word designation row, the rightmost cell spanning the three sub-rows reads: "Set leading address + n (The linear expression aN + b, including repeat counter N, is also possible for n.)"

*1. The baud rate and the communications distance sometimes depend on the remote device.
*2. A baud rate of 57,600 bps can be selected when using Unit Ver. 1.2 or later (115,200 bps is not possible). The CJ1W-SCU☐2 is required for communications at 115,200 or 230,400 bps.
*3. Unit Ver. 1.2 or later supports continuous I/O refreshing in addition to the previous on-request I/O refreshing.
*4. The data size is the number of bytes on the transmission path.
*5. The CX-Protocol can be used to register up to 96 attributes per message.
*6. A macro syntax error will occur when the protocol macro is executed if more than 31 write attributes are registered in one message.
*7. The CPU Unit is set to the RUN/MONITOR mode. (MONITOR mode is not available with the NJ-series CPU Units.)
Note: When using 2-wire RS-422A/485 communications in Protocol Macro Mode, set only modem controls for the send control parameters, and do not use RS/CS flow controls.

Serial Gateway Specifications

Item	Description
Conversion source	FINS commands (received through network (including Host Link FINS) or CPU bus)
Conversion functions	• The received FINS command sent to the Unit's serial port is converted according to the FINS command code as follows: 2803 hex: FIN header removed and converted to Compo-Way/F command. 2804 hex: FIN header removed and converted to Modbus-RTU command. 2805 hex: FIN header removed and converted to Modbus-ASCII command. The converted command is sent to the serial port. • When the received FINS command is sent to the Unit (user-specified FINS command code), the FINS command is enclosed in a Host Link header and terminator.
Converted format	• CompoWay/F commands • Modbus-RTU commands • Modbus-ASCII commands • Host Link FINS commands
Enabled serial communications mode	Serial Gateway mode or protocol macro mode
Queuing functions	Up to five FINS commands can be converted and then queued for processing.
Protocol macro execution processing	When a FINS command is received during protocol macro execution, the Serial Gateway is executed using an interrupt between steps in the communications sequence. If the next step is a RECEIVE command, the Serial Gateway will not be executed until the next step. For other conditions, the interrupt is executed immediately. *1
Response timeout monitoring	The time is monitored from when the message is converted into the specified protocol using the Serial Gateway until the response is received (in Serial Gateway mode or protocol macro mode). Default: 5 s (setting range: 0.1 to 25.5 s) *2
Send start timeout monitoring	The time is monitored from when the FINS command is received until it is converted into the specified protocol and starts to be sent (in protocol macro mode only). Default: 5 s (setting range: 0.1 to 25.5 s) *3
Send delay	The time can be set from when the message is converted into another protocol using Serial Gateway conversion until the data is actually sent. (Serial Gateway or protocol macro mode) Default: 0 s (setting range: 0.01 to 300.00 s)

*1. The reception buffer is cleared during Serial Gateway execution.
The Serial Gateway can be prohibited in protocol macro mode by turning ON the Serial Gateway Prohibit Switch in the CIO Area.
*2. When a timeout occurs, the FINS end code (0205 hex: Response timeout) is returned to the source of the FINS command and a response is received after a timeout occurs.
*3. When a timeout occurs, the FINS end code (0204 hex: Remote node busy) is returned to the source of the FINS command. The send processing will not be executed and the received FINS command will be discarded.

No-protocol Specifications

Item	Description
Communications mode	Full-duplex
Baud rate *1	RS-232C port and RS-422A/485 ports: 1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400 bps *2 Default setting: 9,600 bps

Communications distance *1	RS-232C port : 15 m max.
	RS-422A/485 port :
	• CJ1W-SCU☐1-V1
	  500 m max. (total cable length: 500 m max., T-branch branch lines: 10 m max.)
	• CJ1W-SCU☐2
	  1,200 m max. (total cable length: 1,200 m max., Multidrop connections are possible. However, maximum cable length is 500 m if the NT-AL001 is used for RS-422A-485 connections.)

Messages (communications frame structure)	Set either of the following types in the Setup Area in the allocation DM Area. 1. Data only (without start code and end code) 2. Start code + data 3. Data + end code 4. Start code + data + end code 5. Data + CR + LF 6. Start code + data +CR + LF Set in allocated DM Area (The start code can be included by setting it to between 00 and FF hex, and the end code can be included by setting it to between 00 and FF hex. To exclude the end code, set the number of receive data bytes.)
	Start code	None or 00 to FF hex
	End code	None, 00 to FF hex, or CR + LF
	Number of receive data bytes during reception	Set the number of receive data bytes between 1 and 256 bytes (according to the DM Area settings) when frame structure 1 or 2 above is used.
Sending messages	CJ: TXDU(256) instruction *3
	NJ: SerialSend instruction
Receiving messages	CJ: RXDU(255) instruction *3
	NJ: SerialRcv or SerialRcvNoClear instruction *4
Maximum message length	Sending and receiving: Up to 259 bytes including the start code and end code (up to 256 bytes excluding start/end codes)
Data conversion	No conversion
Communications protocol	None

Message delay time	CJ: When the TXD (236), TXDU (256) instruction is executed, after the send delay time, the data is sent from the port. *3
	  0 to 300 s (0 to 300,000 ms)
	  (Can be set in 10-ms units depending on the DM Area settings)

	NJ: When the SerialSend instruction is executed, after the send delay time, the data is sent from the port.
	  0 to 300 s (0 to 300,000 ms)
	  (Can be set in 10-ms units: Set in System Studio or by using a device variable for CJ-series Unit.)

Receive counter	The number of data bytes (0 to 256) received at the port can be counted.

Reception buffer clear timing	• CJ1W-SCU☐1-V1
	  The reception buffer is cleared immediately after executing the RXD(235)/RXDU(255) instruction
	• CJ1W-SCU☐2
	  With the DRXDU(261) instruction, you can specify whether the reception buffers will be cleared or not in a setting in the DM Area words allocated to the Unit. *3
	• NJ: SerialRcv instruction: After reading the receive data
	    SerialRcvNoClear instruction: When the receive data size variable (Size) is set to 0 *4

*1. The baud rate and the communications distance sometimes depend on the remote device.
*2. The CJ1W-SCU☐2 is required for communications at 115,200 or 230,400 bps.
*3. The DTXDU (262) and DRXDU (261) instructions can be used only when a CJ1W-SCU☐2 Serial Communications Unit is connected to the CJ2H CPU Units with unit version 1.1 or later and CJ2M CPU Units.
*4. A Serial Communications Unit with unit version 2.1 or later, a CPU Unit with unit version 1.03 or later, and Sysmac Studio version 1.04 or higher are required to use the SerialRcvNoClear instruction.

Modbus-RTU Specifications

Item	Description
Mode	Modbus-RTU slave mode *1
Baud rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400 bps *2 Default: 19,200 bps
Data length	8 bits
Parity	Odd, even, or none Default: Even
Stop bits	Odd or even parity :1 bit No parity : 2 bits
Address setting range	1 to 247 (broadcasting: 0)
Frame format	Slave address : 1 byte Function code : 1 byte Data : 0 to 252 bytes CRC code : 2 bytes

*1. Modbus-ASCII mode is not supported.
*2. The CJ1W-SCU☐2 is required for communications at 230,400 bps.

Supported Commands

Function code (hexadecimal)	Function	Modbus name
01	Reads multiple bits from the CIO, Work, Holding, or Auxiliary Area of I/O memory.	Read Coils
02	Reads multiple bits from the CIO Area of I/O memory.	Read Discrete Inputs
03	Reads multiple words from the DM or EM Area of I/O memory.	Read Holding Registers
04	Reads multiple words from the CIO, Work, Holding, or Auxiliary Area of I/O memory.	Read Input Registers
05	Writes a bit in I/O memory.	Write Single Coil
06	Writes a word in the DM or EM Area of I/O memory.	Write Single Register
08	Executes an echoback test.	Diagnostic
0F	Writes multiple bits in I/O memory.	Write Multiple Coils
10	Writes multiple words in the DM or EM Area of I/O memory.	Write Multiple Registers

Unit Version and Manufacturing Dates/Lot Numbers

CJ1W-SCU□1-V1

Classification	Type	Model	May 2004	June 2004	November 2005
CPU Bus Units	Serial Communications Units	CJ1W-SCU21-V1	Per-Ver 1.2	Unit version 1.2 (Lot No:040617 and later)	Unit version 1.3
		CJ1W-SCU41-V1			
		CJ1W-SCU31-V1	—	—	Unit version 1.3 *
Support Software	CX-Programmer	—	Ver.4.0 or earlier	Ver.5.0	Ver.6.1
	CX-Protocol	—	Ver.1.4 or earlier	Ver.1.5	Ver.1.7

* Available April, 2006

CJ1W-SCU□2

Classification	Type	Model	September 2009	September 2012
CPU Bus Units	Serial Communications Units	CJ1W-SCU22	Unit version 2.0	Unit version 2.1 *1
		CJ1W-SCU32		
		CJ1W-SCU42		
Support Software	CX-Programmer	—	Ver.8.3 or higher	
	CX-Protocol	—	Ver.1.9 or higher	
	Sysmac Studio	形SYSMAC-SE□	Ver.1.04 or higher	
Machine Automation Controller	CPU Unit	形NJ5-□□□□	Ver.1.00 or earlier *	
		形NJ3-□□□□	Ver.1.01 or earlier *	

* A Serial Communications Unit with unit version 2.1 or later, a CPU Unit with unit version 1.03 or later, and Sysmac Studio version 1.04 or higher are required to use the SerialRcvNoClear instruction.

Function Support by Unit Version

Function Support by Unit Version 2.1

Unit version		Unit version 2.1
CJ Series	Serial Communications Units model	CJ1W-SCU22
		CJ1W-SCU32
		CJ1W-SCU42
Functions No-protocol	NJ: SerialRcvNoClear instruction	Supported

Function Support by Unit Version 2.0

Product		Unit version 2.0
CJ Series	Serial Communications Units	CJ1W-SCU22
		CJ1W-SCU32
		CJ1W-SCU42
Functions	Serial gateway	Supported
	Host Link 1:1 links	Supported
	Host Link compatible device selection	Supported
	No-protocol	Supported
	Protocol macro Link word specification data exchange timing	On-request I/O refreshing Continuous I/O refreshing
	Reception buffer processing for PMCR(260) instruction execution	Select to clear or hold contents.
	Baud rate (bps)	230,400 supported.
	Standard system protocol additions	Supported
	MODBUS slave protocol added	Supported

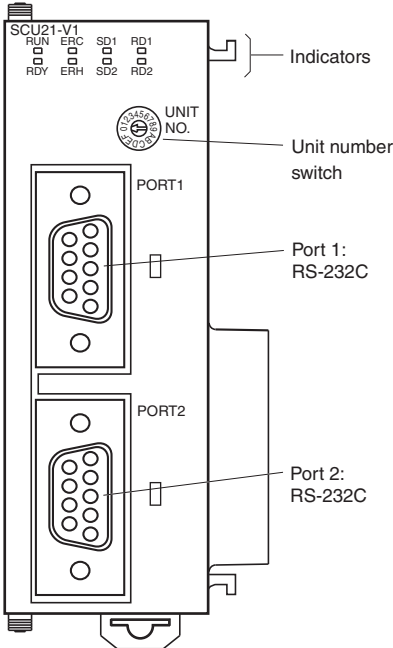## Function Support by Unit Version 1.2 and Unit Version 1.3

Product		Earlier version (pre-ver. 1.2)	Unit version 1.2	Unit version 1.3
CJ Series	Serial Communications Units	CJ1W-SCU21	CJ1W-SCU21-V1	CJ1W-SCU21-V1
		—	—	CJ1W-SCU31-V1
		CJ1W-SCU41	CJ1W-SCU41-V1	CJ1W-SCU41-V1
Functions	Serial gateway	Not supported	Supported	Supported
	Host Link 1:1 links	Not supported	Supported	Supported
	Host Link compatible device selection	Not supported	Supported	Supported
	No-protocol	Not supported	Supported	Supported
	Protocol macro Link word specification data exchange timing	On-request I/O refreshing only	On-request I/O refreshing Continuous I/O refreshing	On-request I/O refreshing Continuous I/O refreshing
	Reception buffer processing for PMCR(260) instruction execution	Clearing only	Select to clear or hold contents.	Select to clear or hold contents.
	Baud rate (bps)	38,400 max. (57,600 and 115,200 not supported)	57,600 supported.	57,600 supported.
	Standard system protocol additions	Not supported	Supported	Supported
	MODBUS slave protocol added	—	—	Supported

Note: Make sure that a CS1/CJ1 CPU Unit of unit version 3.0 or later or a CJ2 CPU Unit is used when using no-protocol mode.
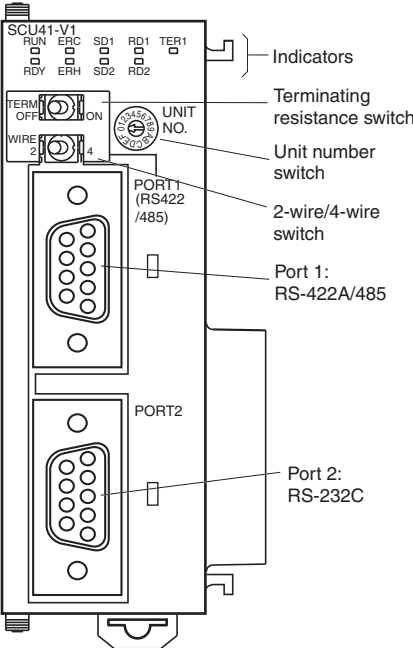
External Interface

Serial Communications Units provide two communications ports for external interface: RS-232C and/or RS-422A/485 ports.
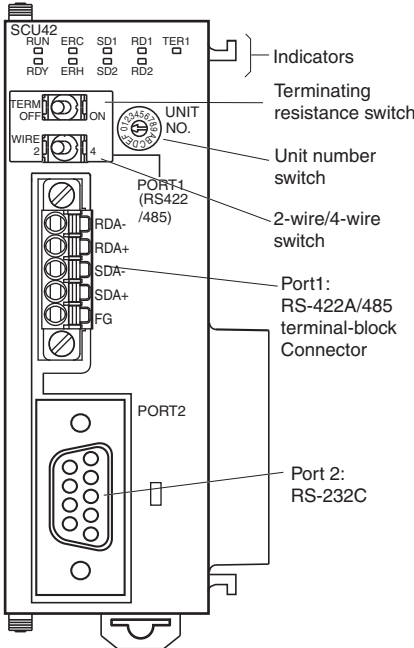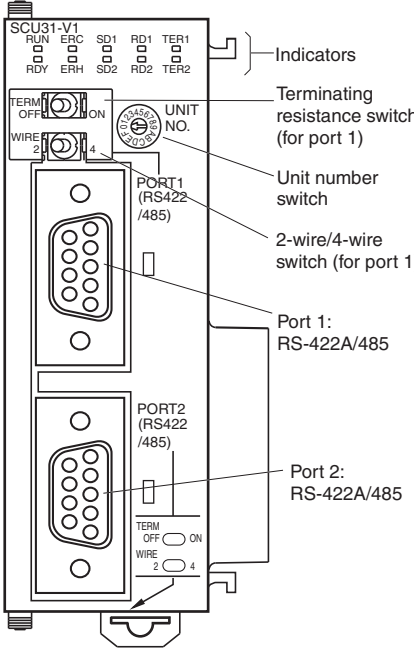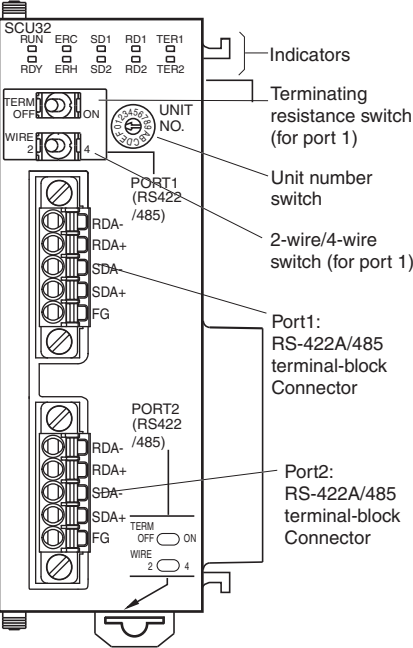
CJ1W-SCU21-V1/SCU22

SCU21-V1

RUN ERC SD1 RD1
RDY ERH SD2 RD2

— Indicators

UNIT NO. — Unit number switch

PORT1

Port 1: RS-232C

PORT2

Port 2: RS-232C

CJ1W-SCU41-V1

SCU41-V1

RUN ERC SD1 RD1 TER1
RDY ERH SD2 RD2

— Indicators

TERM OFF ON — Terminating resistance switch

WIRE 2 4

UNIT NO. — Unit number switch

PORT1 (RS422 /485) — 2-wire/4-wire switch

Port 1: RS-422A/485

PORT2

Port 2: RS-232C

CJ1W-SCU42

SCU42

RUN ERC SD1 RD1 TER1
RDY ERH SD2 RD2

— Indicators

TERM OFF ON — Terminating resistance switch

WIRE 2 4

UNIT NO. — Unit number switch

PORT1 (RS422 /485) — 2-wire/4-wire switch

RDA-
RDA+
SDA-
SDA+
FG

Port1: RS-422A/485 terminal-block Connector

PORT2

Port 2: RS-232C

CJ1W-SCU31-V1

SCU31-V1

RUN ERC SD1 RD1 TER1
RDY ERH SD2 RD2

— Indicators

TERM OFF ON — Terminating resistance switch (for port 1)

WIRE 2 4

UNIT NO. — Unit number switch

PORT1 (RS422 /485) — 2-wire/4-wire switch (for port 1)

Port 1: RS-422A/485

PORT2 (RS422 /485)

TERM OFF ON
WIRE 2 4

Port 2: RS-422A/485

CJ1W-SCU32

SCU32

RUN ERC SD1 RD1 TER1
RDY ERH SD2 RD2 TER2

— Indicators

TERM OFF ON — Terminating resistance switch (for port 1)

WIRE 2 4

UNIT NO. — Unit number switch

PORT1 (RS422 /485) — 2-wire/4-wire switch (for port 1)

RDA-
RDA+
SDA-
SDA+
FG

Port1: RS-422A/485 terminal-block Connector

PORT2 (RS422 /485)

RDA-
RDA+
SDA-
SDA+
FG

TERM OFF ON
WIRE 2 4

Port2: RS-422A/485 terminal-block Connector

Magnified view of bottom-right corner<CJ1W-SCU3□ (-V1) only>

Terminating resistance switch (for port 2)

2-wire/4-wire switch (for port 2)
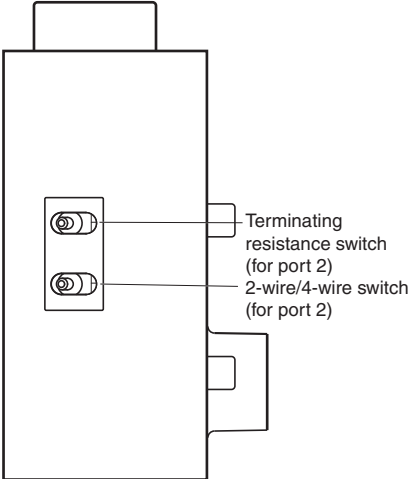
Specifications of the RS-232C port and RS-422A/485 port

RS-232C Port

Protocol	Host Link	Protocol macro	1:N NT Links
Communications method	Full-duplex	Full-duplex or half-duplex	Half-duplex
Synchronization	Start-stop synchronization (asynchronous)		
Baud rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400 bps *1		Standard NT link or high-speed NT link *2
Connections	1:1 (1:N is possible using Link Adapters)		
Transmission distance	15 m max. *3		
Interface	Complies with EIA RS-232C		

Protocol	No-protocol	Serial Gateway	Modbus-RTU
Communications method	Full-duplex	—	—
Synchronization	—	—	—
Baud rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/ 230,400 bps *1		
Connections	1:1 (1:N is possible using Link Adapters)		
Transmission distance	15 m max. *3		
Interface	Complies with EIA RS-232C		

*1. The CJ1W-SCU☐2 is required for communications at 230,400 bps.
*2. High-speed NT link is only available with Serial Communications Units manufactured on or after December 20th, 1999. With earlier models, only standard NT link is available.
*3. The maximum cable length for RS-232C is 15 m. The RS-232C standard, however, does not cover baud rates above 19.2 Kbps. Refer to the manual for the device being connected to confirm support.

Connector Pin Layout

Pin No.	Abbreviation	Signal name	I/O
1 *1	FG	Shield	—
2	SD	Send data	Output
3	RD	Receive data	Input
4 *2	RTS (RS)	Request to send	Output
5 *2	CTS (CS)	Clear to send	Input
6 *3	5V	Power supply	—
7 *2	DSR (DR)	Data set ready *4	Input
8 *2	DTR (ER)	Data terminal ready	Output
9	SG	Signal ground	—
Shell *1	FG	Shield	—
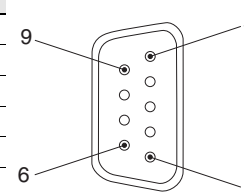
*1. Pin No. 1 and the shell are connected to the ground terminal (GR) of the Power Supply Unit inside of the Serial Communications Unit. Therefore, the cable shield can be grounded by grounding the GR of the Power Supply Unit.
*2. The status of the RTS (RS), CTS (CS), DSR (DR), and DTR (ER) signals can be monitored in the words allocated in the CIO Area. For details, refer to 2-3 I/O Memory Allocations.
*3. Pin 6 (5 V) is required when the NT-AL001 Link Adapter is connected.
*4. The DSR signal is used to monitor the signal cable. It can also be used as a CD (carrier detect) signal. (The DSR signal does not affect system operation, and is available for use by the user.)

Note: Do not connect the 5-V power supply of Pin 6 to any external device other than an NT-AL001 Link Adapter. Otherwise, the external device and the Serial Communications Unit may be damaged.

The following cables are provided for connection to NT-AL001 Link Adapters. We recommend that these cables be used.
NT-AL001 connecting cables: XW2Z-070T-1 (0.7 m)
XW2Z-200T-1 (2 m)

Applicable Connectors
Plug : XM3A-0921 (manufactured by OMRON) or equivalent
Hood : XM2S-0911-E (manufactured by OMRON) or equivalent

Recommended Cables
UL2426 AWG28 × 5P IFS-RVV-SB (UL-approved, Fujikura Ltd.)
AWG28 × 5P IFVV-SB (not UL-approved, Fujikura Ltd.)

UL2426-SB (MA) 5P × 28AWG (7/0.127) (UL-approved, Hitachi Metals, Ltd.)
CO-MA-VV-SB 5P × 28AWG (7/0.127) (not UL-approved, Hitachi Metals, Ltd.)
Cable length: 15 m max.

RS-422A/485 Port

Protocol	Host Link	Protocol macro	1:N NT Links
Communications method	Full-duplex	Full-duplex or half-duplex	Half-duplex
Synchronization	Start-stop synchronous (asynchronous)		
Baud rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400 bps *1		Standard NT link or high-speed NT link *2
Connections	1:N (N: 32 Units max.)		1:N (N: 8 Units max.)
Transmission distance	500 m max. (The total combined cable length is 500 m max. Tbranch lines must be a maximum of 10 m long.)		
Interface	Complies with EIA RS-485		

Protocol	No-protocol	Serial Gateway	Modbus-RTU
Communications method	Full-duplex	—	—
Synchronization	—	—	—
Baud rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/ 230,400 bps *1		
Connections	1:N (N: 32 Units max.)		
Transmission distance	500 m max. (The total combined cable length is 500 m max. Tbranch lines must be a maximum of 10 m long.)		
Interface	Complies with EIA RS-485		

*1. The CJ1W-SCU□2 is required for communications at 230,400 bps.
*2. High-speed NT link is only available with Serial Communications Units manufactured on or after December 20th, 1999. With earlier models, only standard NT link is available.

Connector Pin Layout (CJ1W-SCU31-V1/SCU41-V1)

Pin No.	Abbreviation	Signal name	I/O
1 *1	SDA	Send data -	Output
2 *1	SDB	Send data +	Output
3	NC	Not used	—
4	NC	Not used	—
5	NC	Not used	—
6 *1	RDA	Receive data -	Input
7	NC	Not used	—
8 *1	RDB	Receive data +	Input
9	NC	Not used	—
Shell *2	FG	Shield	—
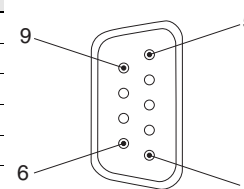
*1. When 2-wire connections are used, use Pins 1 and 2, or Pins 6 and 8.
*2. The shell is connected to the ground terminal (GR) of the Power Supply Unit inside of the Serial Communications Unit. Therefore, the cable shield can be grounded by grounding the GR of the Power Supply Unit.

Note: With SDA/B or RDA/B, the signal polarity may be reversed by the remote device. Be sure to check the polarity before wiring.

Applicable Connectors
Plug : XM3A-0921 (OMRON) or equivalent
Hood : XM2S-0911-E (OMRON) or equivalent

Recommended Cables
CO-HC-ESV-3P × 7/0.2 (manufactured by Hirakawa Hewtech Corp.)
Cable length: 500 m max. (The total combined cable length is 500 m max. Tbranch lines must be a maximum of 10 m long.)

Connector Pin Layout (CJ1W-SCU32/SCU42)

Pin No.	Abbreviation	Signal name	I/O
1 *1	RDA	Receive data-	Input
2 *1	RDB	Receive data+	Input
3 *1	SDA	Send data-	Output
4 *1	SDB	Send data+	Output
5 *2	FG	Shield	—
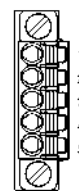
*1. For 2-wire connections, use either pins 1 and 2 or pins 3 and 4.
*2. Pin 5 (the shield) is connected to the GR terminal on the Power Supply Unit though the Serial Communications Unit. The cable shield can thus be grounded by grounding the GR terminal of the Power Supply Unit.

Note: The signal names SDA/B and RDA/B do not always have the same polarity as that shown above. Check the polarity of the external device before making connections.

Applicable Connectors
Plug: FMC 1.5/5-STF-3.5AU (by Phoenix Contact)

Recommended Cable
CO-HC-ESV-3P×7/0.2 (by Hirakawa Hewtech)
Cable length: 1,200 m max. (multidrop connections)

Dimensions

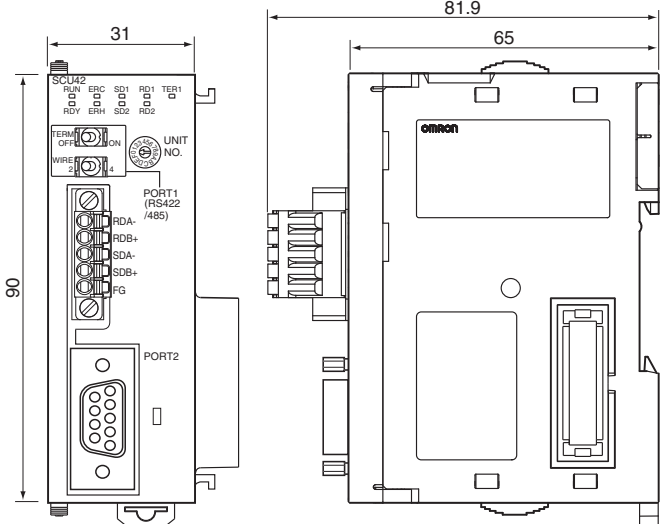**CJ1W-SCU22**
CJ1W-SCU21-V1/SCU31-V1/SCU41-V1
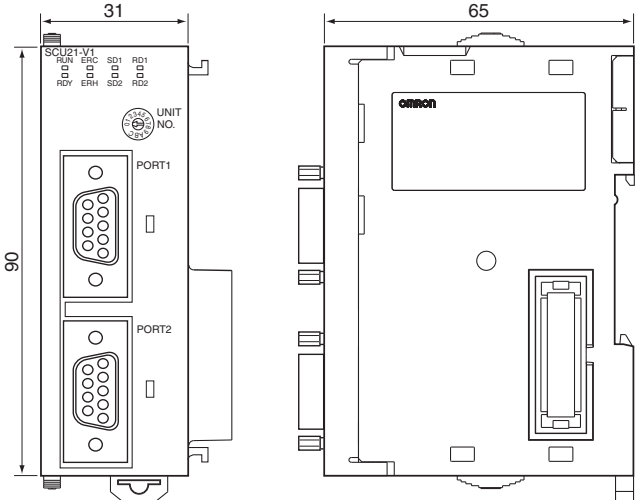
Note: The appearance varies with the model.

CJ1W-SCU32
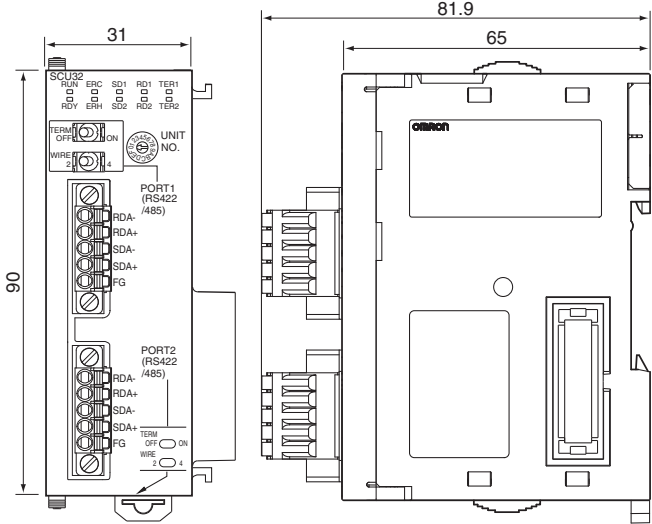
CJ1W-SCU42

Related Manuals

Manual name	Cat. No.	Model numbers	Application	Description
CJ-series Serial Communications Units Operation Manual for NJ-series CPU Unit	W494	CJ1W-SCU☐2	Learning about the functions to use Serial Communications Unit and Boards with NJ series configuration (hardware and serial communications mode). Learning about the standard system protocol with OMRON components	Describes the use of Serial Communications Unit and Boards with NJ-series configuration (hardware and serial communications mode), including the usage of standard system protocols. Refer to the CX-Protocol Operation Manual (Cat. No. W344) for the details of functions of protocol macros made by users.
Serial Communications Boards and Serial Communications Units Operation Manual	W336	CS1W-SCB☐1-V1 CS1W-SCU☐1-V1 CJ1W-SCU☐1-V1 CJ1W-SCU☐2	Learning about the functions to use Serial Communications Unit and Boards (hardware and serial communications mode) . Learning about the standard system protocol with OMRON components	Describes the use of Serial Communications Unit and Boards with CJ-series configuration (hardware and serial communications mode), including the usage of standard system protocols. Refer to the CX-Protocol Operation Manual (Cat. No. W344) for the details of functions of protocol macros made by users.
CX-Protocol Operation Manual	W344	---	Learning about the use of CX-Protocol, which enables protocol macro creation. Learning about the details of functions of protocol macros made by users.	Describes 1) the use of the CX-Protocol, and 2) details on protocol macros. Use this manual to create protocol macros for serial communications, or to customize the standard system protocol.
CX-Integrator CS/CJ/CP/NSJ-series Network Configuration Tool Operation Manual	W464		Learning how to configure networks (data links, routing tables, Communications Unit settings, etc.).	Describes operating procedures for the CX-Integrator.

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