

Omron

Sysmac FINS (SIO) Driver

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- This manual explains how to connect the target machine with devices from other manufacturers. For information about how to use the Pro-Designer software, please refer to the Pro-Designer Online Help.
- The types of target machines that are compatible with Pro-Designer depends on the Pro-Designer version. For information about target machine compatibility, please refer to the Pro-Designer Online Help.

1 System Structure

The following describes the system setup for connecting the target machine to Omron PLCs.
To View a cable diagram for a particular communication format, see Section 2 - *Cable Diagrams*.

Series	CPU	Link I/F	Comm. Format	Diagram
SYSMAC CS1 Series	CS1H-CPU□□ CS1G-CPU□□ CS1H-CPU□□H CS1G-CPU□□H	RS-232C port for CPU unit	RS-232C	Cable Diagram 1
		Peripheral Port for CPU unit	RS-232C	Cable Diagram 2
		CS1W-SCU21 CS1W-SCB21 CS1W-SCB41	RS-232C	Cable Diagram 1
		CS1W-SCB41	RS-422 (4-wire type)	Cable Diagram 3
SYSMAC CJ Series	CJ1G-CPU□□ CJ1M-CPU□□	RS-232C port for CPU unit	RS-232C	Cable Diagram 1
		Peripheral Port for CPU unit	RS-232C	Cable Diagram 2
		CJ1W-SCU41	RS-232C	Cable Diagram 1
		CJ1W-SCU41	RS-422 (4-wire type)	Cable Diagram 3

2 Cable Diagrams

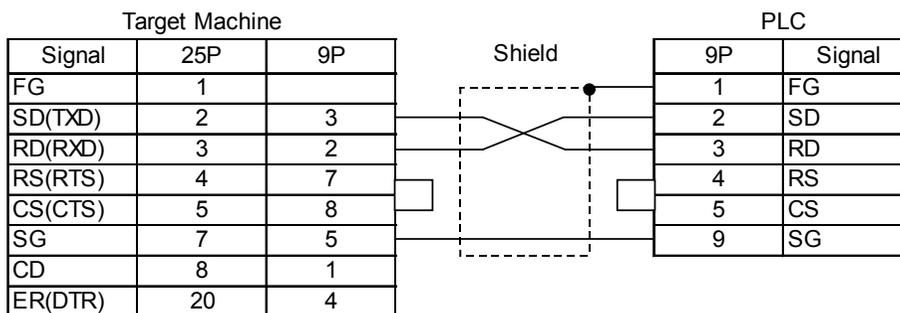
The cable diagrams illustrated below and the cable diagrams recommended by Omron may differ, however, using these cables for your PLC operations will not cause any problems.

- Ground your PLC's FG terminal according to your country's applicable standard. For details, refer to the PLC's manual.
- If a communications cable is used, the SG (signal ground) must be connected.

Cable Diagram 1 RS-232C

Please choose the appropriate cable and adaptor for your target unit from the table below, or create your own cable to connect the PLC to the target machine.

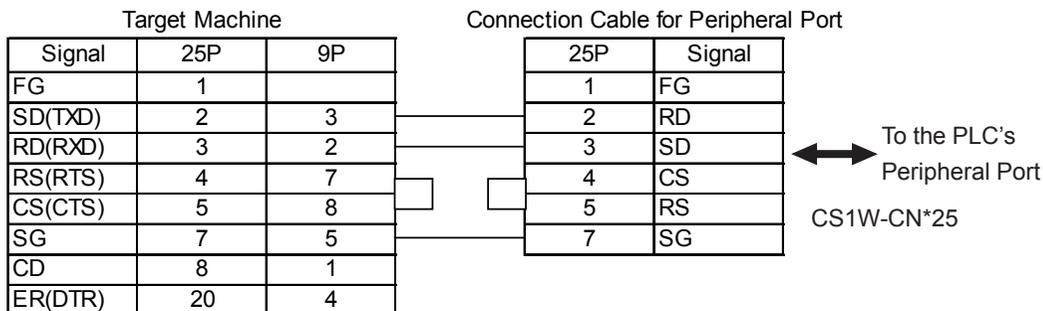
Target Machine	Cable / Adapter	Comments
GP, PS-P, PC/AT(PL), PS-G	RS-232C Cable (Pro-face: GP000-IS03-MS 3m)	When connecting to a 9pin port on the target machine, use a 9-25pin conversion adapter.
	Omron: XW2Z-200S 2m, XW2Z-500S 5m	
	User-created Cable	Cable length: 15m max.



Cable Diagram 2 RS-232C

Please choose the appropriate cable and adaptor for your target machine from the table below. Additionally, create your own cable to connect the PLC to the target machine.

Target Machine	Cable / Adaptor	Comments
GP, PS-P, PC/AT(PL), PS-G	Omron: CS1W-CN225 2m, CS1W-CN625 6m and User-created Cable	Total cable length: 15m max.



Cable Diagram 3 RS-422 (4-wire type)

Please choose the appropriate cable and adaptor for your target unit from the table below, or create your own cable to connect the PLC to the target machine.

Target Machine	Cable / Adaptor	Comments
GP*1,PS-P*1	a RS-422 Connector Terminal Adapter (Pro-face: GP070-CN10-O)	Cable length: 500m max.
	b User-created Cable	
PC/AT(PL), PS-G	a RS-232C/RS-422(485) Signal Converter	

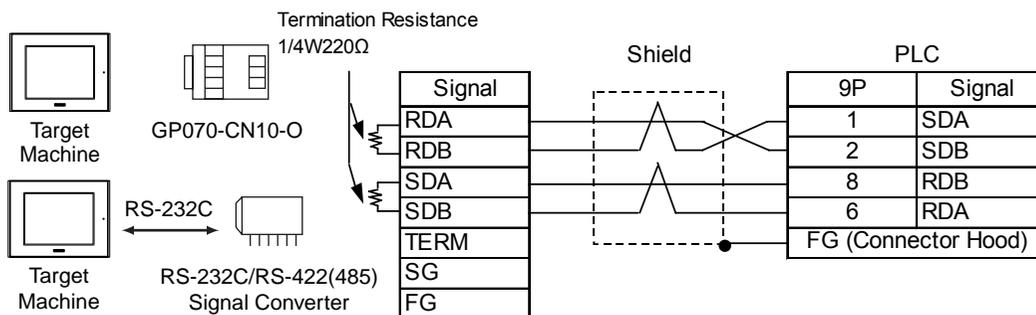
*1 The available interface is COM1 only.

- Setup the PLC's RS-232C/RS-422 toggle switch to RS-422.

MEMO

- Signals A and B are opposite on the target machine and PLC.
- When making your own cable connections, we recommend using Hirakawa Densen's H-923A (CO-HC-ESV-3P*7/02) cable.

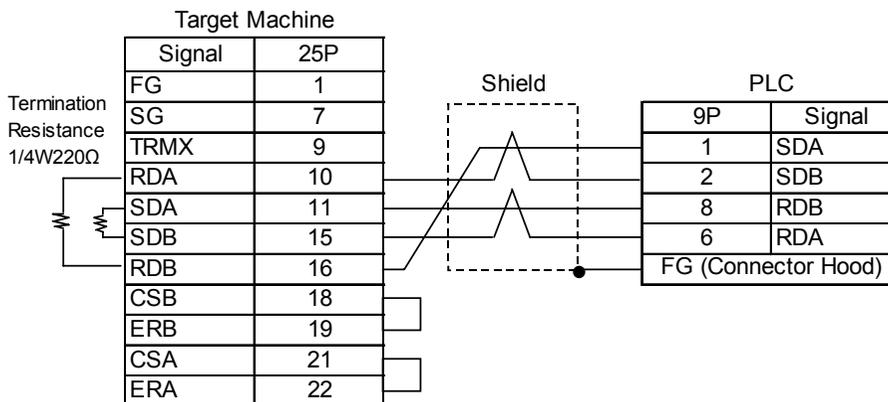
a. RS-422 Connection Terminal Adapter (Pro-face: GP070-CN10-0)
OR: RS-232C/RS-422(485) Signal Converter



MEMO

- As the RS-422(485) side of the RS-232C/422(485) signal converter is a terminal, use any external line other than the communication line for the power cable.
- Follow the specifications for your RS-232C/RS-422(485) signal converter when connecting termination resistance on the RS-422(485) terminal.
- The RS-232C connection between the RS-232C/RS-422(485) signal converter and target machine depends on the signal converter. Refer to its specifications when connecting the signal converter and target machine.

b. User-created Cable



3 Supported Device Addresses

The following tables list the device address ranges you can enter from in Pro-Designer. For actual device address ranges supported by the PLC, refer to the PLC's manual.

Device	Bit Address ^{*1}	Word Address	16 bit	32 bit
Channel I/O ^{*7}	0000:00-9999:15	0000-9999	*8 L/H	*8 L/H
Internal Auxiliary Relay ^{*7}	W000:00-W999:15	W000-W999		
Special Auxiliary Relay ^{*2*7}	A000:00-A999:15	A000-A999		
Hold Relay ^{*7}	H000:00-H999:15	H000-H999		
Timer (Contact) ^{*3}	T0000-T9999	--		
Counter (Contact) ^{*3}	C0000-C9999	--		
Timer (Current)	--	T0000-T9999		
Counter (Current)	--	C0000-C9999		
Data Memory ^{*4*7}	D00000:00-D99999:15	D00000-D99999		
Exp. Data Memory ^{*5*7}	E000000:00-EC99999:15	E000000-EC99999		
Exp. Data Memory (Current Bank)	--	EM00000-EM99999		
Task Flag ^{*3*7}	TK0:00-TK31:07	TK0-TK31		
Index Register ^{*3*7}	IR0:00-IR15:31 ^{*6}	IR0-IR15		
Data Register ^{*3*7}	DR0:00-DR15:15	DR0-DR15		

- *1 You can define a bit address by adding a colon followed by the bit position (0-15) at the end of the word address.
- *2 Addresses A000 to A447 cannot be written to.
- *3 Cannot be written.
- *4 When using the Communication Unit (CS1W-SCU21), addresses D30000 to D31599, since they are used for PLC system settings, should not be written to from the target machine. When using the Communication Board (CS1W-SCU21/41), addresses D32000 to D32767 are used for PLC settings, should not be written to from the target machine.
- *5 You can use a maximum of 13 banks (E0-EC). A bank contains 32,768 words. The number of usable banks depends on the CPU unit.
- *6 An index register is a 32-bit device having bit position range from 0 to 31. Only word addresses (32-bit) can be written into it.
- *7 When the bit write operation is performed, the target machine reads the PLC's corresponding word address and turns a bit ON, then sends it back to the PLC. Do not write to the word address from the ladder program in the middle of this operation.
- *8 16-bit and 32-bit data, High and Low, refer to data as defined in the following examples.

Byte	16 bit	Word	32 bit
0	7 ... 0	0	15 ... 0
1	15 ... 8	1	31 ... 16
	L (Low)		L (Low)
	H (High)		H (High)

4 Consecutive Device Addresses

The following table lists the maximum number of consecutive addresses and the gap span (the maximum gap span between PLC device addresses that are used as consecutive device addresses) that be read by each PLC. Refer to these tables to utilize *Block Transfer*.

MEMO

- When the device is setup using the methods below, the Data Communication Speed slows because the number of times the device is read is increased.
 - When consecutive addresses exceed the maximum data number range
 - When an address is designated for division
 - When device types are different

To speed up data communication, use consecutive device addresses on a single target machine.

Device	Maximum Consecutive Addresses	Gap Span	
Timer (Contact) (T)	538 bits	21 bits	
Counter (Contact) (C)			
Timer (Initial) (T)	269 words	21 words	
Counter (Initial) (C)			
Channel I/O (CIO)			
Internal Auxiliary Relay (W)			
Special Auxiliary Relay (A)			
Hold Relay (H)			
Data Memory (D)			
Exp. Data Memory (E-EC)			
Exp. Data Memory (Current Bank) (EM)			
Task Flag (TK)			32 words
Index Register (IR)			16 words
Data Register (DR)	16 words		

5 Environment Setup

The following tables list Pro-face's recommended communication settings for the target machine and PLC.

For details, see Section 7 – *Driver Configuration*, and Section 8 – *Protocol Configuration*.

5.1 CS1/CJ Series (RS-232C Port for CPU Unit)

Target Machine Setup		RS-232 Port Setup		
Driver Configuration	Serial Interface	RS-232C	--	
	Flow Control	DTR(ER)/CTS	--	
	Transmission Speed	19200bps	Baud Rate	19200bps
	Retry Count	2	--	
	Parity Bit	Even	Parity Bit	Even
	Stop Bit	2 bits	Stop Bit	2 bits
	Data Length	7 bits	Data Length	7 bits
	Rcv. Time Out	10sec	--	
	TX Wait Time	0msec	--	
Protocol Configuration	Unit No.	0	Station No.	0
	--		Dip Switch	SW1: OFF SW5: OFF SW7: OFF SW8: OFF
	--		Mode Setup	Upper Link

5.2 CS1/CJ Series (Peripheral Port for CPU Unit)

Target Machine Setup			Peripheral Port Setup	
Driver Configuration	Serial Interface	RS-232C	--	
	Flow Control	DTR(ER)/CTS	--	
	Transmission Speed	19200bps	Baud Rate	19200bps
	Retry Count	2	--	
	Parity Bit	Even	Parity Bit	Even
	Stop Bit	2 bits	Stop Bit	2 bits
	Data Length	7 bits	Data Length	7 bits
	Rcv. Time Out	10sec	--	
	TX Wait Time	0msec	--	
Protocol Configuration	Unit No.	0	Station No.	0
	--		Dip Switch	SW1: OFF SW4: ON SW7: OFF SW8: OFF
	--		Mode Setup	Upper Link

5.3 CS1 Series (Communication Board/Unit)

RS-232C

Target Machine Setup		Communication Board/Unit Setup		
Driver Configuration	Serial Interface	RS-232C	--	
	Flow Control	DTR(ER)/CTS	--	
	Transmission Speed	19200bps	Baud Rate	19200bps
	Retry Count	2	--	
	Parity Bit	Even	Parity Bit	Even
	Stop Bit	2 bits	Stop Bit	2 bits
	Data Length	7 bits	Data Bit	7 bits
	Rcv. Time Out	10sec	--	
	TX Wait Time	0msec	--	
	--	--	TERM (Termination Resistance Switch)	Termination Resistance ON
Protocol Configuration	Unit No.	0	Upper Link Station No.	0
	--	--	Serial Communication mode	Upper Link
	--	--	Communication Delay time	0
	--	--	CTS Control	None

RS-422 (4-wire type)

Target Machine Setup			Communication Board/Unit Setup		
	GP, PS-P	PC/AT(PL) PS-G			
Driver Configuration	Serial Interface	RS-422 (4-wire type)	RS-232C ^{*1}	WIRE (2-wire/ 4-wire type switch)	4-wire type
	Flow Control	DTR(ER)/CTS		--	
	Transmission Speed	19200bps		Baud Rate	19200bps
	Retry Count	2		--	
	Parity Bit	Even		Parity Bit	Even
	Stop Bit	2 bits		Stop Bit	2 bits
	Data Length	7 bits		Data Bit	7 bits
	Rcv. Time Out	10sec		--	
	TX Wait Time	0msec		--	
		--		TERM (Termination Resistance Switch)	Termination Resistance ON
Protocol Configuration	Unit No.	0		Upper Link Station No.	0
		--		Serial communication mode	Upper Link
		--		Communication Delay time	0
		--		CTS Control	None

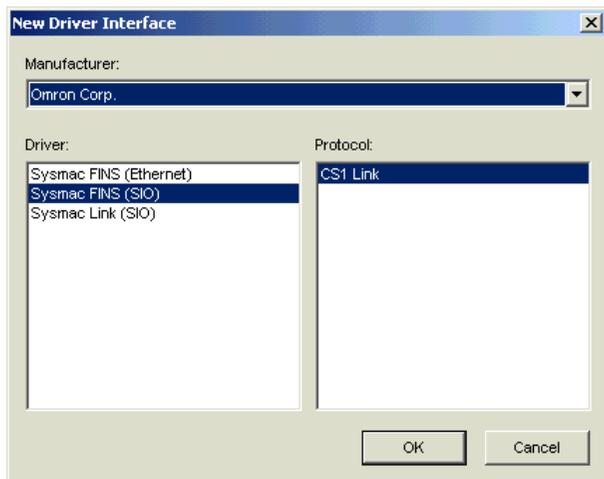
*1 By using a RS-232C/RS-422(485) signal converter, you can use RS-422 connections with PC/AT(PL Series) and PS Series Type G target machines. In such a configuration, make sure you set the Driver's Serial Interface to RS-232C.

6 I/O Manager Configuration

The driver and protocol, which enable communication between the target machine and the PLC, depends on the PLC type.

MEMO

For information on how to display the [New Driver Interface] dialog box, see the online help.



7 Driver Configuration

To configure the communication settings of the serial driver in the target machine, use the [Driver Configuration] dialog box. Make sure the settings match those of the PLC.

For an overview of the driver and protocol settings, see Section 5 – *Environment Setup*.

MEMO

For information on how to display the [Driver Configuration] dialog box, see the online help.

Manufacturer

Displays the name of the PLC manufacturer. This property is read-only.

Interface

Displays the type of serial connection used to connect the target machine to the PLC. This property is read-only.

COM Port

Defines which COM port (COM1-COM4) to use on the target machine, for connecting to the PLC.

MEMO

Select COM1 for PS Series Type G target machines. Connection is not possible using COM2.

Serial Interface

Defines the serial connection: RS-232C or RS-422 (4-wire).

For details about the supported connections, see Section 2 – *Cable Diagrams*.

Flow Control

Defines the signals that control the data flow. Select from [DTR(ER)/CTS], [RTS/CTS] or [None].

Transmission Speed

Sets the communication speed between the target machine and the PLC, in bits per second. This setting must match the PLC baud rate.

Retry Count

Defines the number of times the driver tries to send or receive data when there is an error. Specify an integer value between 0 and 255, both inclusive.

Parity Bit

Sets either a parity bit [Even or Odd] for use in detecting communication errors, or [None] at all.

Stop Bit

Defines the length of the stop bit. Specify either 1 or 2.

Data Length

Defines the length of each unit of data. Specify either 7 or 8.

Rcv. Timeout

Defines the length of time (in seconds) the target machine waits for a response before it outputs a timeout error or sends another communication. Specify an integer value between 1 and 127, both inclusive.

TX Wait Time

Defines the number of milliseconds that the target machine waits after receiving a communication packet, before sending a response.

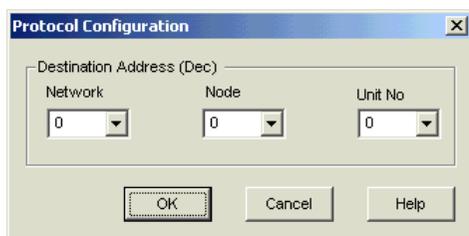
8 Protocol Configuration

To set up details about the communication process between the target machine and the PLC, use the [Protocol Configuration] dialog box.

For an overview of the driver and protocol settings, see Section 5 – *Environment Setup*.

MEMO

For information on how to display the [Protocol Configuration] dialog box, see the online help.



Destination Address

Specifies the PLC's network settings.

Network

The address that identifies the network. Specifies the network address of the communicating PLC. All the nodes in a network have the same network address. Specify an integer value between 0 and 127, both inclusive. Specify 0 in order to communicate with a private network address's PLC.

Node

The address that identifies the node (PLC) within the network. Specifies the node address of the communicating PLC. Specify an integer value between 0 and 126, both inclusive.

Unit No.

Specify an integer value between 0 and 31, both inclusive. To be added to the unit no. of the serial port that is directly connected to the target machine.

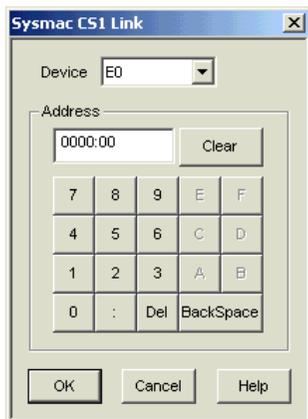
9 Device Address Configuration

To set up a PLC variable in the Variable List, use the device address keypad from the variable properties.

See Section 3 – *Supported Device Addresses*.

MEMO

For information on how to display the device address keypad, see the online help.



Device

Lists the PLC's discrete and word device types.

Address

Enter the device address for the PLC variable. The keypad ensures that you enter the correct format for bit and word devices.