

Mitsubishi Electric

Melsec-A Link (SIO) Driver

- 1 System Structure
- 2 Cable Diagrams
- 3 Supported Device Addresses
- 4 Consecutive Device Addresses
- 5 Environment Setup
- 6 I/O Manager Configuration
- 7 Driver Configuration
- 8 Protocol Configuration
- 9 Device Address Configuration

- This manual explains how to connect the target machine with other manufacturer devices. 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 version of Pro-Designer. For information about the compatibility of target machines, please refer to the Pro-Designer Online Help.

1 System Structure

The following table describes the basic system setup for connecting the target machine to Mitsubishi Melsec-A Series PLCs.

To view a cable connection diagram for a particular communication format, see Section 2 – *Cable Diagrams*.

Series	CPU	Link I/F	Comm.Format	Diagram
MELSEC-A Series	A2A	AJ71C24-S6	RS-232C	Cable Diagram 1
	A3A			
	A2U	AJ71C24-S8	RS-422(4-wire)	Cable Diagram 2
	A3U	AJ71UC24		
	A1N	AJ71C24	RS-232C	Cable Diagram 1
	A2N	AJ71C24-S3		
	A3N	AJ71C24-S6	RS-422(4-wire)	Cable Diagram 2
		AJ71C24-S8 AJ71UC24		
A1SJ	A1SJ71UC24-R2	RS-232C	Cable Diagram 3	
A1SJH				
A1SH	A1SJ71UC24-R4	RS-422(4-wire)	Cable Diagram 2	
A2SH				
A2US				
A1USH-S1				

2 Cable Diagrams

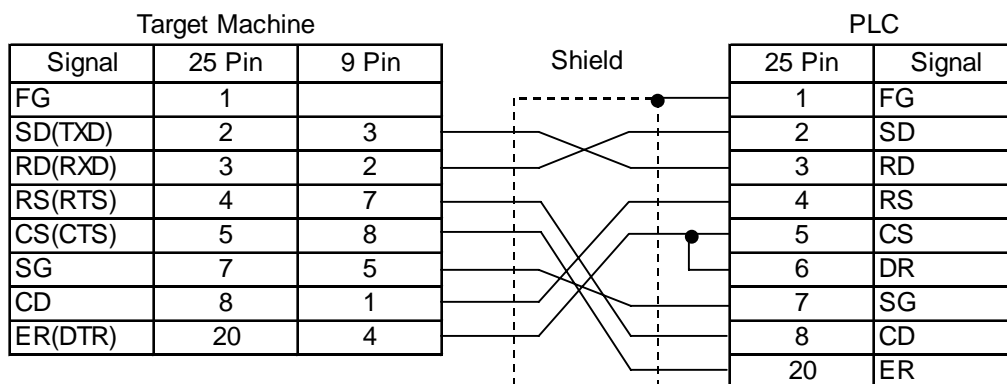
The illustrated cable diagrams and those recommended by Mitsubishi may differ. However, Pro-face recommends using the following diagrammed connections.

- Ground the PLC's FG terminal according to your country's applicable standard. For details, refer to the PLC manual.
- When making your own communication cable, be sure to connect the SG signal.

Cable Diagram 1 RS-232C

To connect the target machine and the PLC, use a recommended cable or create your own cable using the following specifications.

Target Machine	Cable / Adapter	Comments
GP, PS-P, PC/AT(PL), PS-G	RS-232C Cable (Pro-face: GP410-IS00-O (5m))	When connecting to a 9pin port on the target machine, use a 9-25pin conversion adapter.



Cable Diagram 2 RS-422 (4-wire)

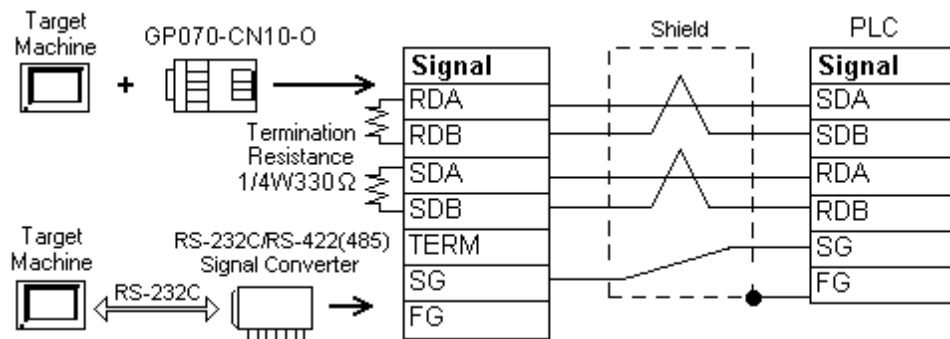
To connect the target machines and the PLC, use a recommended cable (and a pin adapter if necessary), a signal converter, or create your own cable using the following specifications.

Target Machine	Cable / Adapter	Comments
GP, PS-P	a RS-422 Connection 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	

MEMO

- Use shielded twisted-pair cables for noise immunity. Connect the cable shields, then connect the cable to a single-point ground on the PLC side.
- Turn on the PLC's termination resistance switch. If no dip switch is available, depending on the PLC model you may need to add a termination resistance of 330Ω 1/2W on the PLC between SDA and SDB, and also between RDA and RDB. (Not illustrated)

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

**MEMO**

- As the RS-422(485) side of the RS-232C/RS-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

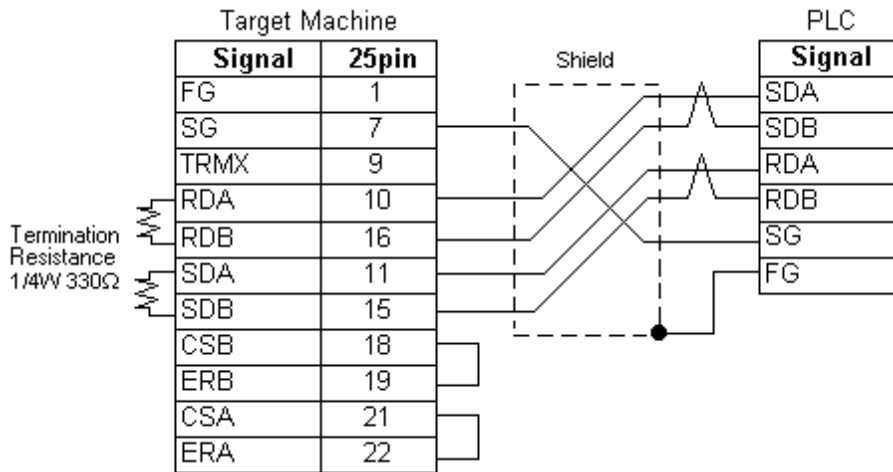
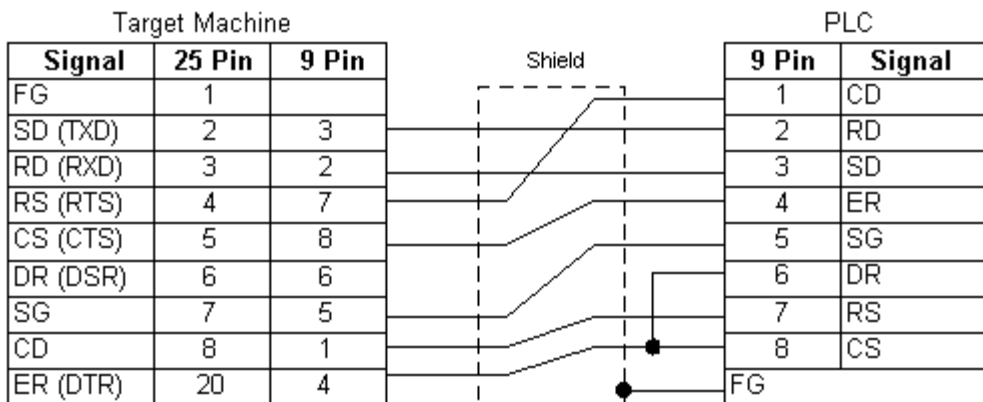


Diagram 3 RS-232C

To connect the target machine and the PLC, use a recommended cable (and a pin adapter if necessary) or create your own cable using the following specifications.

Target Machine	Cable / Adapter	Comments
GP, PS-P, PC/AT(PL), PS-G	RS-232C Cable (Proface: GP000-IS02-MS 3m)	When connecting to a 9pin port on the target machine, use a 9-25pin conversion adapter.
	User-created Cable	Cable length: 15m max.



3 Supported Device Addresses

The following table lists the device address ranges you can enter from the [Device Address Keypad](#).

For actual device address ranges supported by the PLC, refer to the corresponding PLC manual. Supported device addresses differ from protocol to protocol and between PLC models.

3.1 AnA Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X00000-XFFFFF	X00000-XFFFF0 ^{*1}	L/H ^{*6}	L/H ^{*6}
Output Relay	Y00000-YFFFFF	Y00000-YFFFF0 ^{*1}		
Internal Relay	M0000-M8991	M0000-M8976 ^{*2}		
Latch Relay	L000000-L999999	L000000-L999984 ^{*2}		
Special Relay	M9000-M9991	M9000-M9976 ^{*2}		
Annunciator	F000000-F999999	F000000-F999984 ^{*2}		
Link Relay	B00000-BFFFFF	--		
Timer (contact)	TS00000-TS65535	--		
Timer (coil)	TC00000-TC65535	--		
Counter (contact)	CS00000-CS65535	--		
Counter (coil)	CC00000-CC65535	--		
Timer (current value)	--	TN00000-TN65535		
Counter (current value)	--	CN00000-CN65535		
Data Register ^{*3}	D00000:0-D65535:15	D0000-D65535 ^{*4}		
Special Register ^{*3}	D00000:0-D65535:15	D0000-D65535 ^{*4}		
Link Register ^{*3}	W0000:0-WFFFF:F	W0000-WFFFF ^{*5}		
File Register(Normal) ^{*3}	R0000:0-R8191:15	R0000-R8191 ^{*4}		

*1 To use as word address, the bit number (last digit) must be 0.

*2 To use as word address, must be multiple of 16.

*3 When the bit write operation is performed, the Target Machine reads the PLC's corresponding word address and turns a bit ON, then send back to PLC. Do not write to the word address from the ladder program in the middle of this operation.

*4 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0100:8)

*5 You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0001:A)

*6 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)

3.2 AnN Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X0000-XFFFF	X0000-XFFFF ^{*1}	L/H ^{*6}	L/H ^{*6}
Output Relay	Y0000-YFFFF	Y0000-YFFFF ^{*1}		
Internal Relay	M0000-M8991	M0000-M8976 ^{*2}		
Latch Relay	L0000-L8991	L0000-L8976 ^{*2}		
Special Relay	M9000-M9991	M9000-M9976 ^{*2}		
Annunciator	F0000-F9999	F0000-F9984 ^{*2}		
Link Relay	B00000-BFFFFF	--		
Timer (contact)	TS000-TS999	--		
Timer (coil)	TC000-TC999	--		
Counter (contact)	CS000-CS999	--		
Counter (coil)	CC000-CC999	--		
Timer (current value)	--	TN000-TN999		
Counter (current value)	--	CN000-CN999		
Data Register ^{*3}	D0000:0-D9999:15	D0000-D9999 ^{*4}		
Link Register ^{*3}	W0000:0-WFFFF:F	W0000-WFFFF ^{*5}		
File Register(Normal) ^{*3}	R0000:0-R8191:15	R0000-R8191 ^{*4}		
Expanded File Register(0R-28R) ^{*3}	0R0000:0-0R8191:15	0R0000-0R8191 ^{*4}		
	1R0000:0-1R8191:15	1R0000-1R8191 ^{*4}		
	2R0000:0-2R8191:15	2R0000-2R8191 ^{*4}		
		
	27R0000:0-27R8191:15	27R0000-27R8191 ^{*4}		
	28R0000:0-28R8191:15	28R0000-28R8191 ^{*4}		

*1 To use as word address, the bit number (last digit) must be 0.

*2 To use as word address, must be multiple of 16.

*3 When the bit write operation is performed, the Target Machine reads the PLC's corresponding word address and turns a bit ON, then send back to PLC. Do not write to the word address from the ladder program in the middle of this operation.

*4 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0100:8)

*5 You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0001:A)

*6 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	L (Low)	0	15	...	0	L (Low)
1	15	...	8	H (High)	1	31	...	16	H (High)

4 Consecutive Device Addresses

The following table lists the maximum number of consecutive addresses that can be read by each PLC. Refer to this table when using block transfers. The number of consecutive addresses is the same for AnA and AnN protocols.

MEMO

- To speed up data communication, use consecutive device addresses on the same panel screen.
- The following situations increase the number of times that the device is read, and reduces the data communication speed between the target machine and the PLC:
 - when the number of consecutive addresses exceeds the maximum
 - when an address is designated for division
 - when different device types are used

Device	Max. Consecutive Addresses	Gap Span
Input Relay (X)	256 bits	47 bits
Output Relay (Y)		
Internal Relay (M)		
Latch Relay (L)		
Special Relay (M)		
Annunciator (F)		
Link Relay (B)		
Timer [contact] (TS)		
Timer [coil] (TC)		
Counter [contact] (CS)		
Counter [coil] (CC)		
Data Register (D)	64 words	6 words
Link Register (W)		
File Register (R)		
Expanded File Register (0R-28R)		
Special Register (D)		
Timer [current value] (TN)		
Counter [current value] (CN)		

5 Environment Setup

The following table lists the communication settings, recommended by Pro-face, for the target machine and Mitsubishi Melsec PLCs.

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

RS-232C

Target Machine		PLC Settings		
Driver	Serial Interface	RS-232C	Mode	4 (Format 4 Protocol mode)
	Flow Control	DTR(ER)/CTS		
	Transmission Speed	19200 bps	Baud Rate	19200 bps
	Retry Count	2	Parity Check	YES
	Parity Bit	Even	Parity Bit	EVEN
	Stop Bit	2 bit	Stop Bit	2 bit
	Data Length	7 bits	Data Length	7 bits
	Rcv Timeout	10 sec		--
	TX Wait Time	0 msec		--
		--	Write possible in RUN mode	Possible
		--	Checksum	Yes
		--	Enable Sender Termination Resistor	Yes
		--	Enable Receiver Termination Resistor	Yes
Protocol	Station No.	0	Station No.	0
	PLC No.	255	PLC No.	255

RS-422 (4-wire)

		Target Machine		PLC Settings	
		GP, PS-P	PC/AT(PL), PS-G		
Driver	Serial Interface	RS-422(4 Wire)	RS-232C ^{*1}	Mode	8 (Format 4 Protocol mode)
	Flow Control	None	DTR(ER)/CTS		
	Transmission Speed	19200 bps		Baud Rate	19200 bps
	Retry Count	2		Parity Check	YES EVEN
	Parity Bit	Even		Parity setting even/odd	
	Stop Bit	2 bit		Stop Bit	2 bit
	Data Length	7 bits		Data Length	7 bits
	Rcv Timeout	10 sec			--
	TX Wait Time	0 msec			--
		--		Write possible in RUN mode	Possible
		--		Checksum	Yes
		--		Enable Sender Termination Resistor	Yes
	--		Enable Receiver Termination Resistor	Yes	
Protocol	Station No.	0		Station No.	0
	PLC No.	255		PLC No.	255

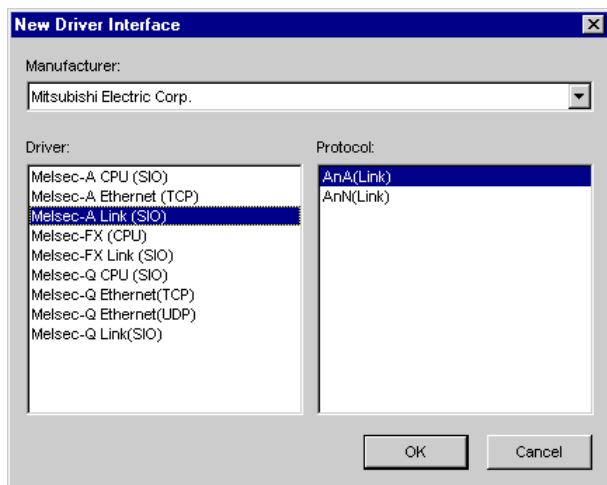
*1 By using a RS-232C/RS-422(485) signal converter, you can use RS-422 connections with PC/AT (PL Series) and PS Series Type G target machines. In such a configuration, make sure you set the Driver's Serial Interface to RS-232C.

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.

Interface

Displays the type of serial connection used to connect the target machine to the PLC.

COM Port

Defines which COM port 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.

Transmission Speed

Sets the communication speed 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.

Parity Bit

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

Stop Bit

Defines the stop bit: 1, 1.5, or 2 bits.

Data Length

Defines the length of each unit of data: 7 bit or 8 bit.

Rcv. Timeout

Defines the length of time the target machine waits for a response before it outputs a timeout error or sends another communication.

TX Wait Time

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

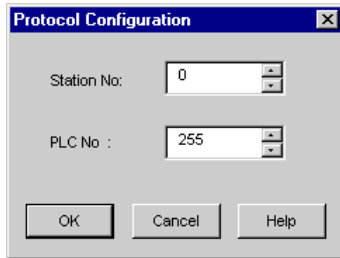
8 Protocol Configuration

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.

**Station No.**

Enter a value (0–31) to identify the PLC unit.

PLC No.

Enter a value to identify the PLC on the network. (0-64). If you will not use the network for data transfer, be sure to enter “255”.

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.