

Melsec-A Link (SIO) Driver

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- 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

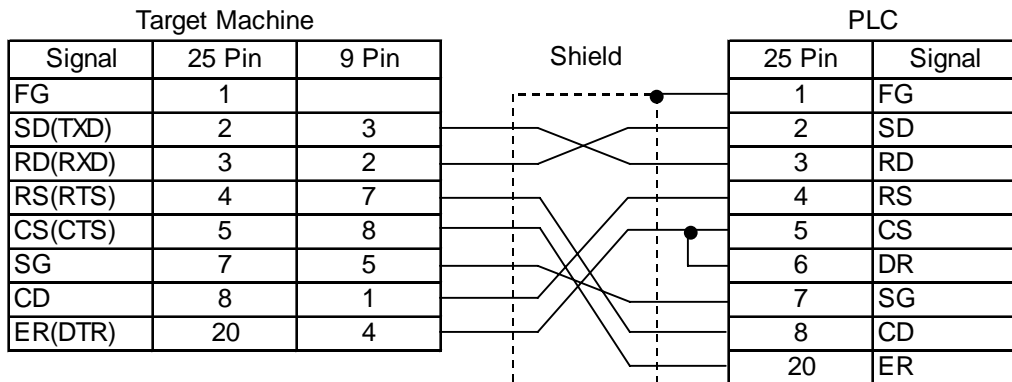
The illustrated cable diagrams and those recommended by Mitsubishi may differ. However, Pro-face recommends using the following diagrammed connections.

- 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)

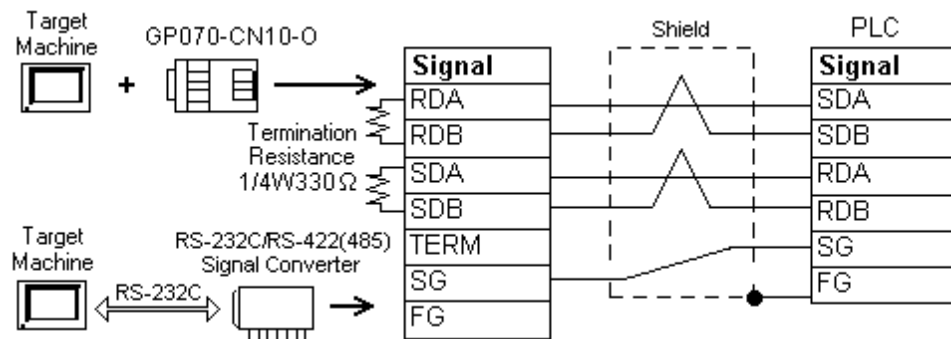
To connect the target machines and the PLC, use a recommended cable (and a pin adapter if necessary), a signal converter, or create your own cable using the following specifications.

| 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

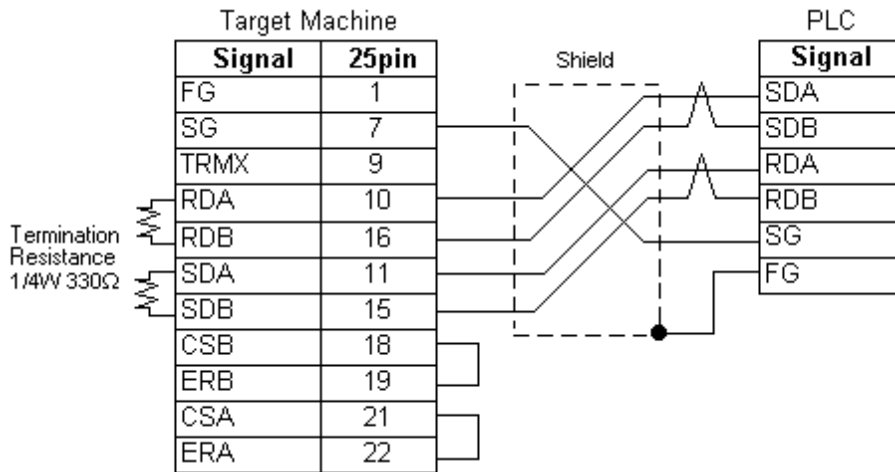
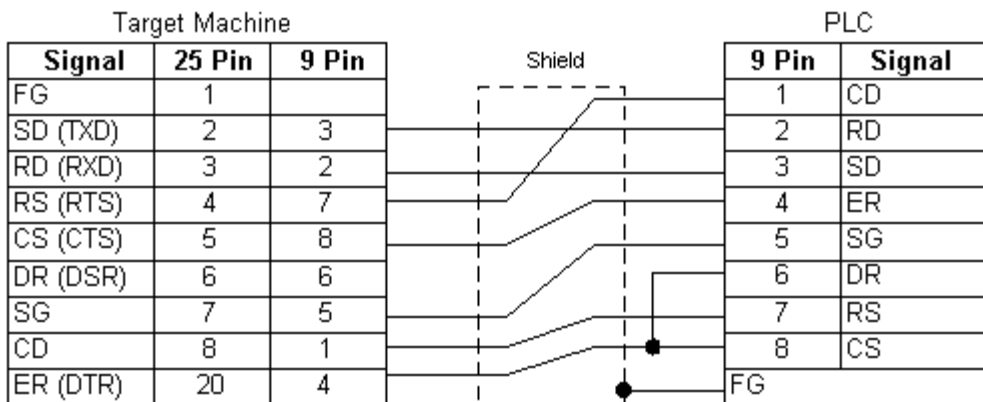


Diagram 3 RS-232C

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

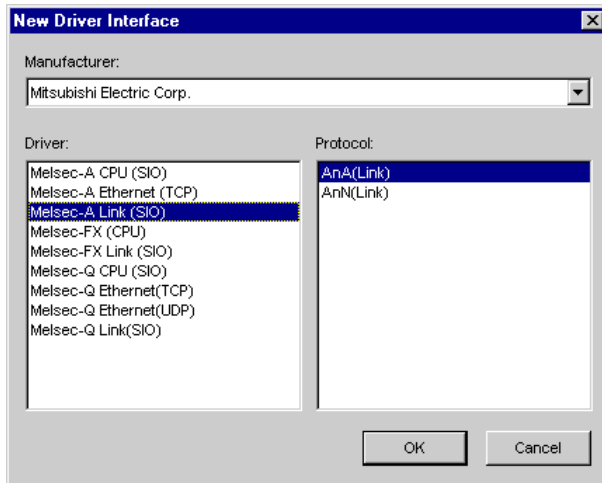
*1 By using a RS-232C/RS-422(485) signal converter, you can use RS-422 connections with PC/AT (PL Series) and PS Series Type G target machines. In such a configuration, make sure you set the Driver's Serial Interface to RS-232C.

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.

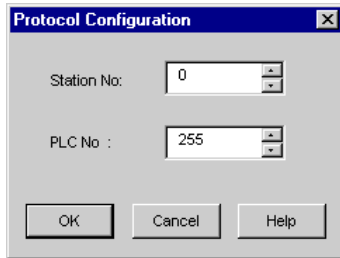
8 Protocol Configuration

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.