

Yaskawa Electric

Yaskawa Electric MP900 Series 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 table describes the basic system setup for connecting the target machine to Yaskawa PLCs over a serial connection.

To view a cable connection diagram for a particular communication format, see Section 2 – [Cable Diagrams](#).

Series	CPU	Link I/F	Comm. Format	Diagram
MP900 Series	MP920	Memobus Port (Port1, Port2) JEPMC-CM200 (CN1, CN2)	RS-232C	Cable Diagram 1
		JEPMC-CM200 (CN3)	RS-422(4-wire)	Cable Diagram 2
			RS-422(4-wire) (1:n)*1	Cable Diagram 3
	MP930	Memobus Port (Port1, Port2)	RS-232C	Cable Diagram 1
	MP940	Memobus Port (Port1)	RS-232C	Cable Diagram 4
		Memobus Port (Port2)	RS-422(4-wire)	Cable Diagram 2
			RS-422(4-wire) (1:n)*1	Cable Diagram 3

*1 Up to 32 PLCs can be connected to a target machine.

2 Cable Diagrams

The illustrated cable diagrams and those recommended by Yaskawa 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.

Diagram 1 RS-232C

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

Target Machine	Cable / Adapter	Comments
GP, PS-P, PC/AT(PL), PS-G	User-created Cable	Cable length: 15m max.

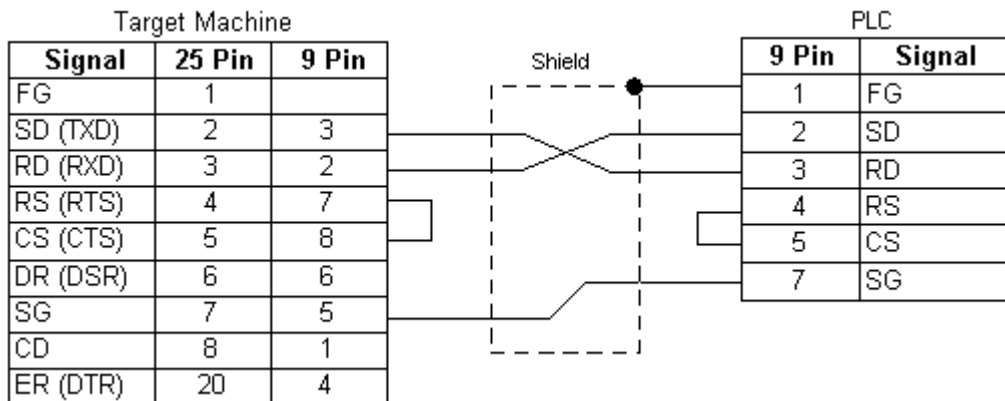


Diagram 2 RS-422 (4-wire)

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

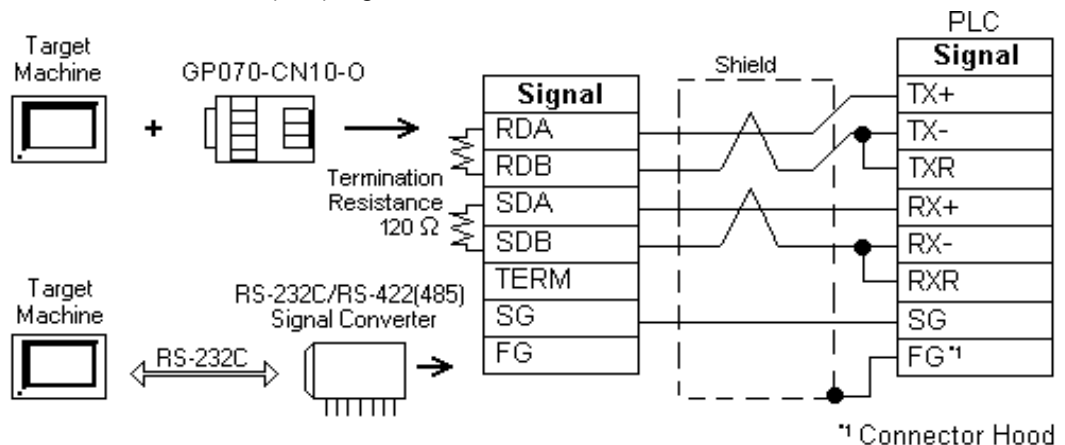
Target Machine	Cable / Adapter	Comments
GP*1, PS-P*1	a RS-422 Connection Terminal Adapter (Pro-face: GP070-CN10-O)	Cable length: 300m max.
	b User-created Cable	
PC/AT(PL), PS-G	a RS-232C / RS-422(485) Signal Converter	

*1 Connect to COM1.

MEMO

- Use shielded twisted-pair cables for noise immunity. Connect the cable shields, then connect the cable to a single-point ground.
- When connecting TX- and TXR, and RX- and RXR on the PLC, termination resistance is added between TX+ and TX-, and RX+ and RX-.

- 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

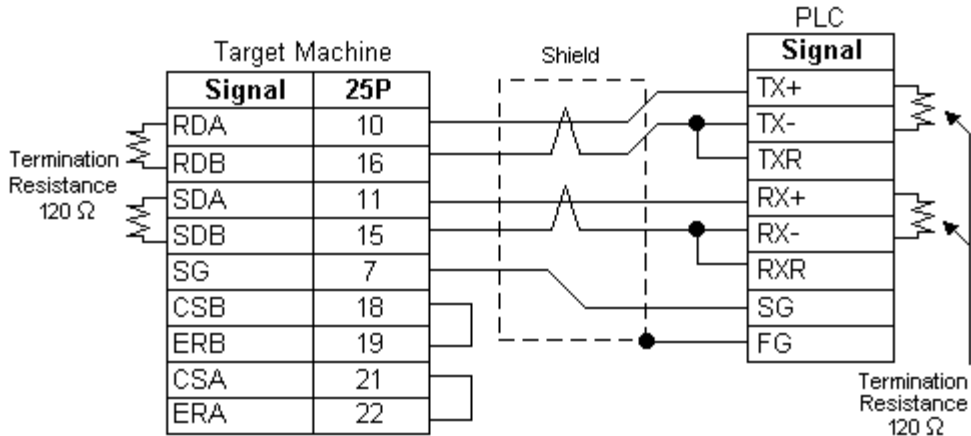


Diagram 3 RS-422 (4-wire) (1:n)

To connect the target machine and PLCs, use a signal converter or create your own cable using the following specifications.

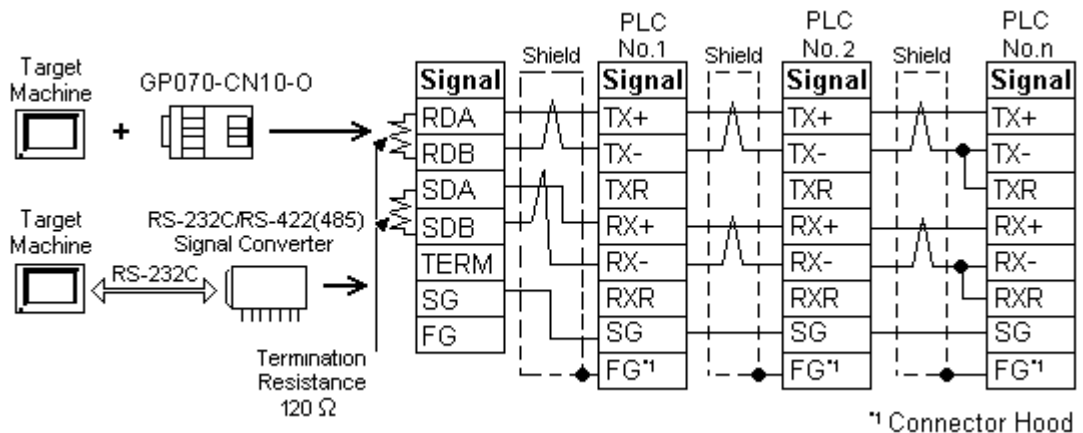
Target Machine	Cable / Adapter	Comments
GP*1, PS-P*1	a RS-422 Connection Terminal Adapter (Pro-face: GP070-CN10-O)	Cable length 300m max.
	b User-created Cable	
PC/AT(PL), PS-G	a RS-232C / RS-422(485) Signal Converter	

*1 Connect to COM1.

MEMO

- Use shielded twisted-pair cables for noise immunity. Connect the cable shields, then connect the cable to a single-point ground.
- When connecting TX- and TXR, and RX- and RXR on the PLC, termination resistance is added between TX+ and TX-, and RX+ and RX-.
- Up to 32 PLCs can be connected to a target machine.

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

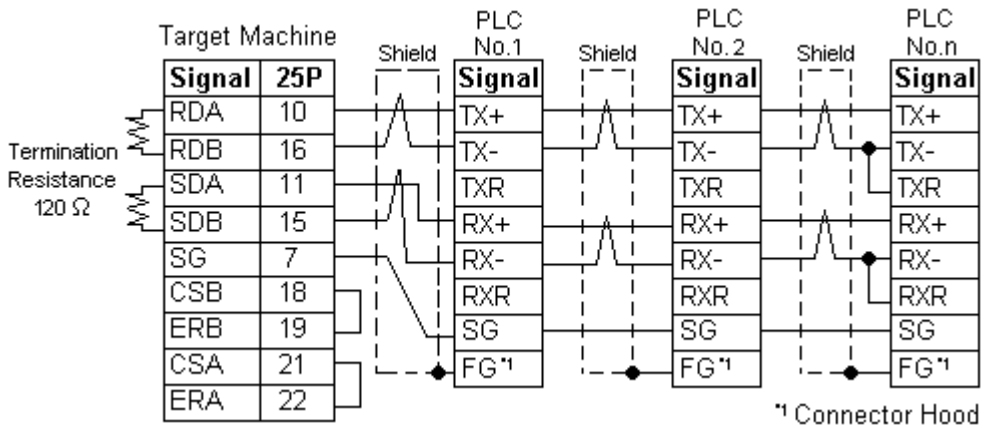
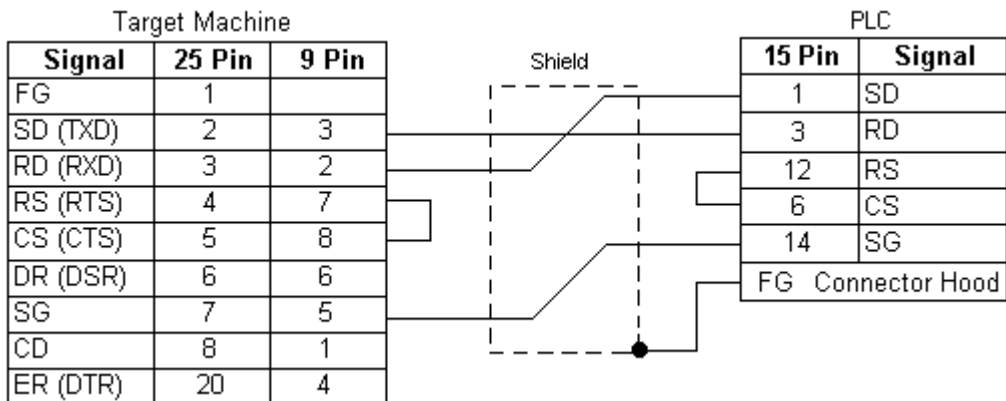


Diagram 4 RS-232C

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

Target Machine	Cable / Adapter	Comments
GP, PS-P, PC/AT(PL), PS-G	User-created Cable	Cable length: 15m max.



3 Supported Device Addresses

The following table lists the device address ranges you can enter from the PLC 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.

Device	Bit Address	Word Address	16 Bit	32 Bit
Coil	MB000000 – MB65535F ^{*1}	–	L/H ^{*3}	L/H ^{*3}
Input Relay ^{*2}	IB000000 – IBFFFFFF ^{*1}	–		
Input Register ^{*2}	–	IW00000 – IWFFFFFF		
Hold Register	–	MW000000 – MW65535		

*1 Read-modify-write applies to these Coil addresses (MB40960-MB65535F) and Input Relay addresses (IB10000-IBFFFFFF).

When you write to one of these bit addresses, the target machine reads the entire word address, sets the defined bit, then returns the new value to the word address on the PLC. If the ladder program writes data to this word address during the bit read/write process, the resulting data may be incorrect.

*2 Read-only.

*3 High and Low refer to 16-bit and 32-bit data as defined in the following examples.

		16 bit				32 bit			
Byte				Word					
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.

MEMO

- To speed up data communication, use consecutive device addresses on the same panel.
- 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
Coil (MB)	2000 Bits	127 Bits
Input Relay (IB)		
Input Register (IW)	125 Words	24 Words
Hold Register (MW)		

5 Environment Setup

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

For details, see Section 8 – *Driver Configuration*, and Section 9 – *Protocol Configuration*.

RS-232C

Target Machine Settings		PLC Settings		
Driver Interface	Serial Interface	RS-232C	Comm.Format	RS-232C
	Flow Control	DTR(ER)/CTS	—	
	Transmission Speed	19200 bps	Baud Rate	19200 bps
	Retry Count	2	—	
	Parity Bit	Even	Parity Bit	Even
	Stop Bit	1 bit	Stop Bit	1 bit
	Data Length	8 bits	Data Length	8 bits
	Rcv. Timeout	10 sec	—	
	TX Wait Time	0 msec	—	
	—	—	Mode	RTU
—	—	Master Slave	Slave	
—	—	Transmission Protocol	Memobus	
Protocol	Station No.	1	Station No.	1

MEMO

To connect multiple CN ports (CN1, CN2, or CN3) on the JEPMC-CM200 at the same time, or to connect CN ports to MP930 Memobus Ports (Port1, Port2), create a ladder program for each. See Section 6, *Sample Ladder Program*.

RS-422(4-wire) (1:1 or 1:n)

		Target Machine Settings		PLC Settings	
		GP, PS-P	PC/AT(PL),PS-G		
Driver Interface	Serial Interface	RS-422(4-wire)	RS-232C* ¹	Comm.Format	RS-422/485
	Flow Control	None	DTR(ER)/CTS	—	
	Transmission Speed	19200 bps		Baud Rate	19200 bps
	Retry Count	2		—	
	Parity Bit	Even		Parity Bit	Even
	Stop Bit	1 bit		Stop Bit	1 bit
	Data Length	8 bits		Data Length	8 bits
	Rcv. Timeout	10 sec		—	
	TX Wait Time	0 msec		—	
		—		Mode	RTU
		—		Master Slave	Slave
	—		Transmission Protocol	Memobus	
Protocol	Station No.	1		Station No.* ²	1

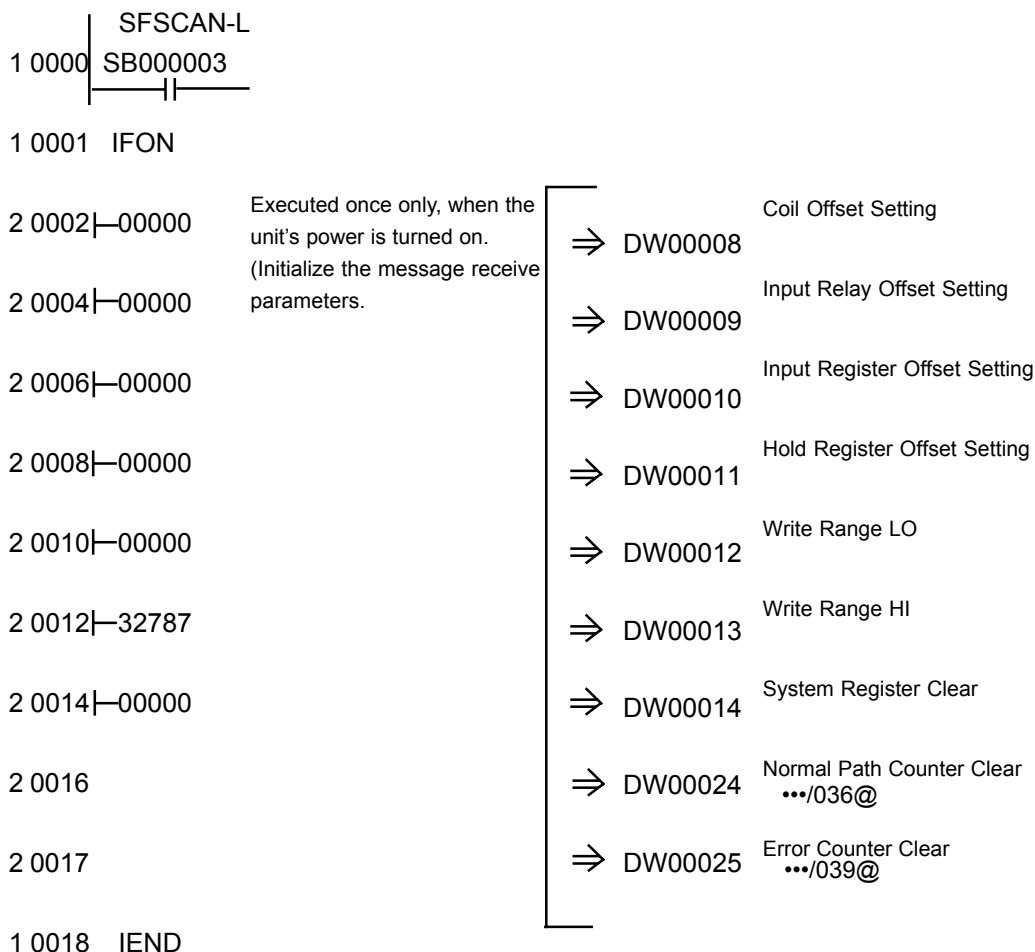
- *1 By using a RS-232C/RS-422(485) signal converter, you can use RS-422/485 connections with PC/AT (PL Series) and PS Series Type G target machines. In such a configuration, make sure you set the Driver's Serial Interface to RS-232C.
- *2 When using a 1:n connection, set up a different Station No. for each PLC. You can connect a maximum 32 PLCs.

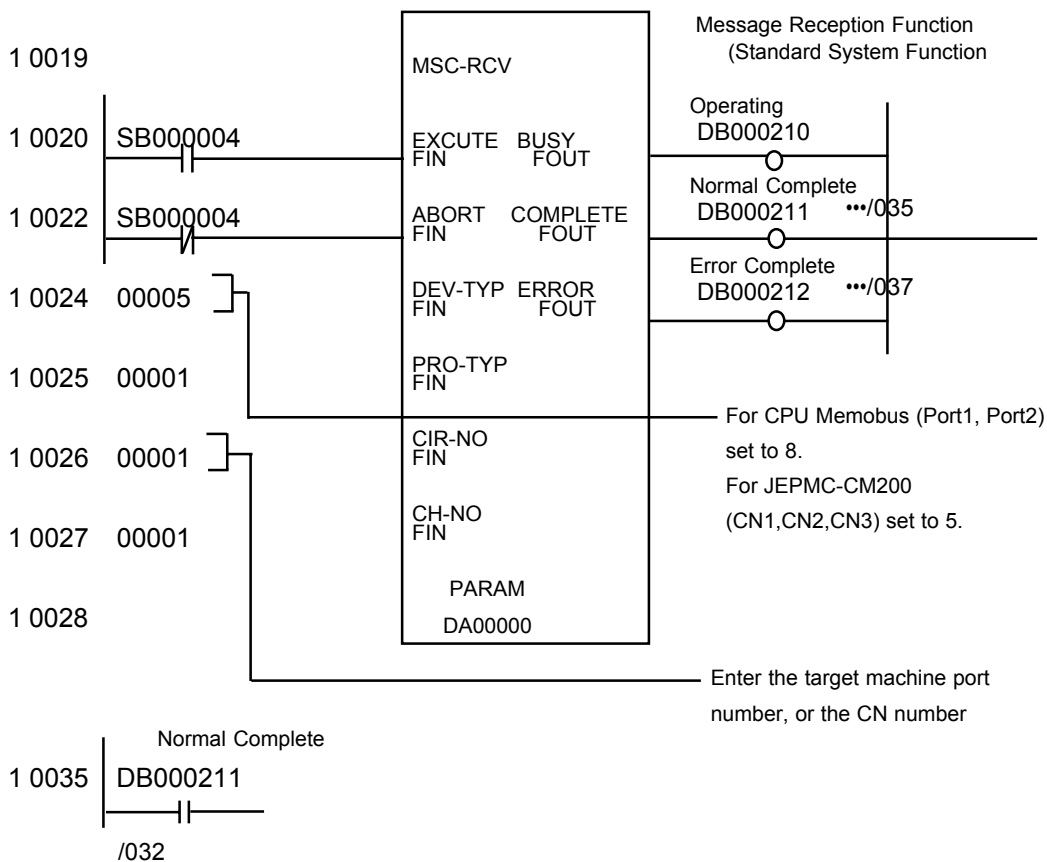
MEMO

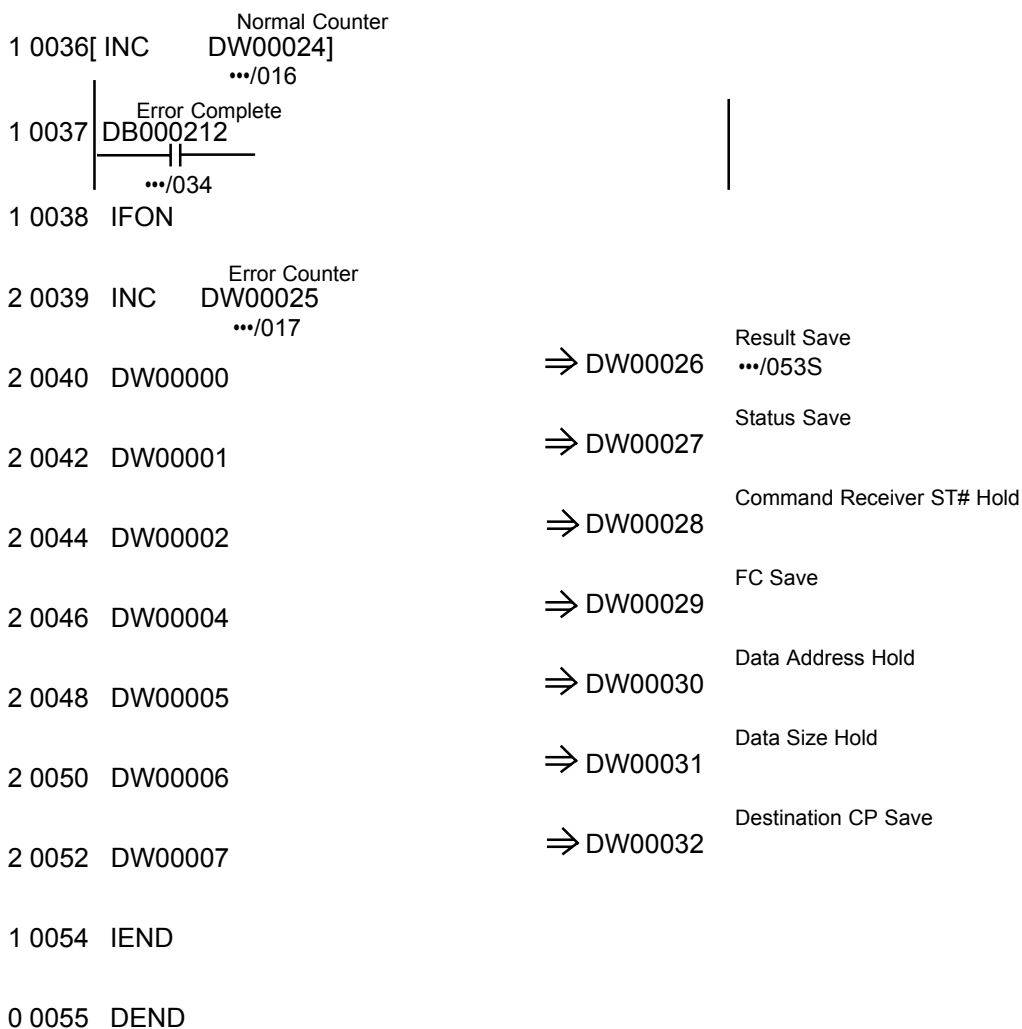
To connect multiple CN ports (CN1, CN2, or CN3) on the JEPMC-CM200 at the same time, or to connect CN ports to MP930 Memobus Ports (Port1, Port2), create a ladder program for each. See Section 6, [Sample Ladder Program](#).

6 Sample Ladder Program

To connect multiple CN ports (CN1, CN2, or CN3) on the JEPMC-CM200 at the same time, or to connect CN ports to MP930 Memobus Ports (Port1, Port2), create a ladder program for each.





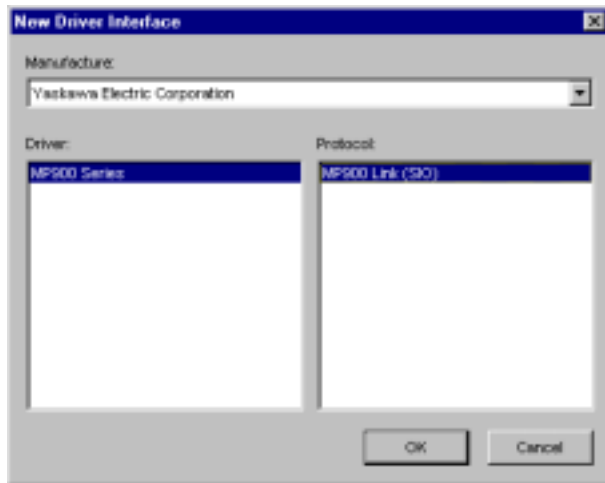


7 I/O Manager Configuration

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, or for details about the I/O Manager, see the online help.



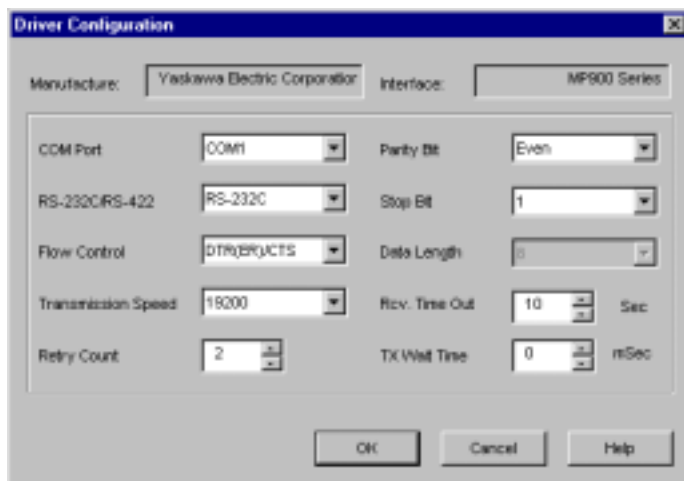
8 Driver Configuration

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 bit or 2 bits.

Data Length

Defines the length of each unit of data.

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.

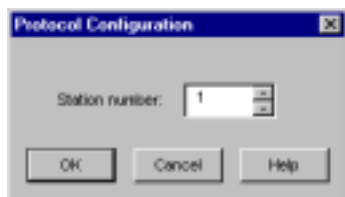
9 Protocol Configuration

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 (1–63) to identify the PLC unit.

Up to 32 PLCs can be connected to a target machine in 1:n connection.

10 Device Address Configuration

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