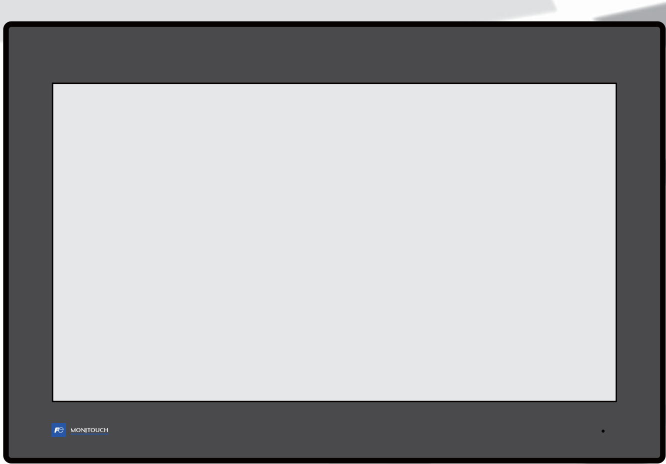
Fuji Electric

MONITOUCH

Connection Manual [3]

Contents



X1 Series

Record of Revisions

Reference numbers are shown at the bottom left corner on the back cover of each manual.

Printing Date	Reference No.	Revised Contents
January, 2021	2219NE0	First edition
November, 2021	2219NE1	Second edition
June, 2022	2219NE2	Third edition

Preface

Thank you for selecting the MONITOUCH X1 series.
This manual describes the connection and communication parameters for the X1 series and controllers.
For correct use of the X1 series, you are requested to read through this manual and understand the contents.
For details on other operating procedures for the X1 series, refer to the following related manuals.

Manual Name	Contents	Reference No.
X1 Series Reference Manual 1	Explains the functions and operation of the X1 series.	1090NE
X1 Series Reference Manual 2		1091NE
X1 Series Setup Manual	Explains the X1 series setup procedure, the installation procedure of V-SFT version 6, the creation process of basic screen programs as well as how to transfer a created screen program using V-SFT version 6.	1092NE
X1 Series Hardware Specifications	Explains precautions for handling, hardware specifications and operating procedures and provides an error list for the X1 series.	2024NE
X1 Series Connection Manual 1	Explains the connection and communication parameters for the X1 series and controllers in detail.	2217NE
X1 Series Connection Manual 2		2218NE
X1 Series Connection Manual 3		2219NE

For details about controllers (PLCs, temperature controllers, etc.), refer to the manual issued by each controller manufacturer.

Notes:

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2. The information in this manual is subject to change without prior notice.
3. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and other countries.
4. All other company names or product names are trademarks or registered trademarks of their respective holders.
5. This manual is intended to give accurate information about MONITOUCH. If you have any questions, please contact your local distributor.

Notes on Safe Usage of MONITOUCH

In this manual, you will find various notes categorized under the following two levels with the signal words “Danger” and “Caution.”

⚠DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and could cause property damage.

Note that there is a possibility that an item listed under ⚠CAUTION may have serious ramifications.

⚠DANGER

- Never use the output signal of the X1 series for operations that may threaten human life or damage the system, such as signals used in case of emergency. Please design the system so that it can cope with a touch switch malfunction. A touch switch malfunction may result in machine accidents or damage.
- Turn off the power supply when you set up the unit, connect new cables, or perform maintenance or inspections. Otherwise, electrical shock or damage may occur.
- Never touch any terminals while the power is on. Otherwise, electrical shock may occur.
- The liquid crystal in the LCD panel is a hazardous substance. If the LCD panel is damaged, do not ingest the leaked liquid crystal. If leaked liquid crystal makes contact with skin or clothing, wash it away with soap and water.
- Never disassemble, recharge, deform by pressure, short-circuit, reverse the polarity of the lithium battery, nor dispose of the lithium battery in fire. Failure to follow these conditions will lead to explosion or ignition.
- Never use a lithium battery that is deformed, leaking, or shows any other signs of abnormality. Failure to follow these conditions will lead to explosion or ignition.
- Switches on the screen are operable even when the screen has become dark due to a faulty backlight or when the backlight has reached the end of its service life. If the screen is dark and hard to see, do not touch the screen. Otherwise, a malfunction may occur resulting in machine accidents or damage.
- Tighten the mounting screw on the fixtures of the X1 series to an equal torque of 7.08 Ibf-in (0.8 N·m).
  Excessive tightening may cause deformation, breakage, or malfunction of the touch switch, which may result in damage to the machine or an accident. Loose mounting screws may cause the unit to fall down, malfunction, or short-circuit.

⚠CAUTION

- Check the appearance of the unit when it is unpacked. Do not use the unit if any damage or deformation is found. Failure to do so may lead to fire, damage, or malfunction.
- For use in a facility or as part of a system related to nuclear energy, aerospace, medical, traffic equipment, or mobile installations, consult your local sales representative.
- Operate (or store) the X1 series under the conditions indicated in this manual and related manuals. Failure to do so could cause fire, malfunction, physical damage, or deterioration.
- Observe the following environmental restrictions on use and storage of the unit. Otherwise, fire or damage to the unit may result.
  - Avoid locations where there is a possibility that water, corrosive gas, flammable gas, solvents, grinding fluids, or cutting oil can come into contact with the unit.
  - Avoid high temperatures, high humidity, and outside weather conditions, such as wind, rain, or direct sunlight.
  - Avoid locations where excessive dust, salt, and metallic particles are present.
  - Avoid installing the unit in a location where vibrations or physical shocks may be transmitted.
- Equipment must be correctly mounted so that the main terminal of the X1 series will not be touched inadvertently. Otherwise, an accident or electric shock may occur.
- Check periodically that terminal screws on the power supply terminal block and fixtures are firmly tightened. Loosened screws or nuts may result in fire or malfunction.
- Tighten the terminal screws on the power supply terminal block of the X1 series to an equal torque of 4.43 to 5.31 Ibf-in (0.5 to 0.6 N·m). Improper tightening of screws may result in fire, malfunction, or other serious trouble.
- The X1 series has a glass screen. Do not drop the unit or impart physical shocks to the unit. Otherwise, the screen may be damaged.
- Correctly connect cables to the terminals of the X1 series in accordance with the specified voltage and wattage. Overvoltage, overwattage, or incorrect cable connection could cause fire, malfunction, or damage to the unit.
- Always ground the X1 series unit. The FG terminal must be used exclusively for the X1 series unit with the level of grounding resistance being 100 Ω or less. Failure to do so may result in electric shock, fire, prevent correct touch operations or cause malfunctions.
- Prevent any conductive particles from entering into the X1 series unit. Failure to do so may lead to fire, damage, or malfunction.

⚠CAUTION

- Do not attempt to repair, disassemble, or modify the X1 series unit yourself. Contact Hakko Electronics or the designated contractor for repairs.
- Do not repair, disassemble, or modify the X1 series. Hakko Electronics Co., Ltd. is not responsible for any damages resulting from repair, disassembly, or modification of the unit that was performed by an unauthorized person.
- Do not use sharp-pointed tools to press touch switches. Doing so may damage the display unit.
- Only experts are authorized to set up the unit, connect cables, and perform maintenance and inspection.
- Lithium batteries contain combustible material such as lithium and organic solvents. Mishandling may cause heat, explosion, or ignition resulting in fire or injury. Read the related manuals carefully and correctly handle the lithium battery as instructed.
- Take safety precautions during operations such as changing settings when the unit is running, forced output, and starting and stopping the unit. Any misoperations may cause unexpected machine movement, resulting in machine accidents or damage.
- In facilities where the failure of the X1 series could lead to accidents that threaten human life or other serious damage, be sure that such facilities are equipped with adequate safeguards.
- When disposing of the X1 series, it must be treated as industrial waste.
- Before touching the X1 series, discharge static electricity from your body by touching grounded metal. Excessive static electricity may cause malfunction or trouble.
- There is a heat sink in the back side of the unit which becomes hot during operation. Take care not to touch during operation.
- Capacitive touch switches are used. Note the following limitations.
  - Use a safety extra-low voltage (SELV) power supply for 24 VDC models. Using the X1 series with an unstable power supply may result in incorrect touch switch activation.
  - Because capacitive touch switches are susceptible to the effects of conductors, do not place conductors, such as metal, near the panel screen or use the touch switch panel when the screen is wet. Otherwise, malfunctions may occur.
  - Calibration is performed upon turning the power on. Do not touch the screen for 10 seconds immediately after turning the power on. Otherwise, malfunctions may occur.

[General Notes]

- Never bundle control cables or input/output cables with high-voltage and large-current carrying cables such as power supply cables. Keep control cables and input/output cables at least 200 mm away from high-voltage and large-current carrying cables. Otherwise, malfunction may occur due to noise.
- When using the X1 series in an environment where a source of high-frequency noise is present, it is recommended that the FG shielded cable (communication cable) be grounded at each end. However, when communication is unstable, select between grounding one or both ends, as permitted by the usage environment.
- Be sure to plug connectors and sockets of the X1 series in the correct orientation. Failure to do so may lead to damage or malfunction.
- If a LAN cable is inserted into the serial communication connector, the device on the other end may be damaged. Check the connector names on the unit and insert cables into the correct connectors.
- Do not use thinners for cleaning because it may discolor the X1 series unit surface. Use commercially available alcohol.
- Clean the display area using a soft cloth to avoid scratching the surface.
- If a data receive error occurs when the X1 series unit and a counterpart unit (PLC, temperature controller, etc.) are started at the same time, read the manual of the counterpart unit to correctly resolve the error.
- Avoid discharging static electricity on the mounting panel of the X1 series. Static charge can damage the unit and cause malfunctions. Discharging static electricity on the mounting panel may cause malfunction to occur due to noise.
- Avoid prolonged display of any fixed pattern. Due to the characteristic of liquid crystal displays, an afterimage may occur. If prolonged display of a fixed pattern is expected, use the backlight's auto OFF function.
- The X1 series is identified as a class-A product in industrial environments. In the case of use in a domestic environment, the unit is likely to cause electromagnetic interference. Preventive measures should thereby be taken appropriately.
- The signal ground (SG) and frame ground (FG) are connected inside the X1 series unit. Take care when designing systems.
- The X1 series is equipped with a battery that contains lithium metal and therefore observance of transport regulations is necessary. Hakko Electronics ships X1 series units packed in accordance with transport regulations. If there is a need to transport an X1 series unit after it is once unpacked, transport the unit in accordance with the IATA Dangerous Goods Regulations, International Maritime Dangerous Goods (IMDG) Code, and transport regulations of the countries concerned.
  Ask your forwarding agent for details of transport regulations.

[Notes on the LCD]

Note that the following conditions may occur under normal circumstances.

- The response time, brightness, and colors of the X1 series may be affected by the ambient temperature.
- Tiny spots (dark or luminescent) may appear on the display due to the characteristics of liquid crystal.
- Unevenness in brightness and flickering may occur depending on the screen display pattern due to the characteristics of liquid crystal.
- There are variations in brightness and color between units.
- Display colors may vary depending on the viewing angle because a converging lens is used in the backlight unit.

[Notes on the Capacitive Touch Switch]

- Touch switches may be unresponsive if touched with dry fingers. In such a case, use a capacitive stylus pen.
- Touch switches are calibrated each time the power is turned on. Do not touch the screen for 10 seconds immediately after turning the X1 series on. Otherwise, malfunctions may occur.
- When a metal object is near a touch switch for 5 minutes or longer, the touch switch is calibrated to recognize that state as the default state. Note that after the metal object is removed, the touch switch will become inoperable.
- Water droplets or conductive material can cause the sensor to make a false detection and lead to malfunctions.
- When using multi-touch operations, points must be at least 3 cm apart. Points may not be recognized if in close proximity of each other.
- In an environment with excess noise, the responsiveness of touch switches may be lowered and the point that responds may deviate by up to 1 cm. Implement measures such as adding a filter to the input power supply.
- Periodically clean the touch panel surface for optimum touch operations.
  When cleaning, take note of the following points.
  <When cleaning>
  - The panel surface is made of glass. Be sure to clean the surface gently with a cloth or sponge. Otherwise, you may scratch or damage the glass.
  - Take care not to let cleaning detergent to seep into the touch panel unit.
    Do not directly apply or spray cleaning detergent on the panel surface.

[Notes on the Operating System (OS) and Scope of Operation Guarantee]

- The operating system (OS) used on this product is the Windows 10 IoT Enterprise LTSC by Microsoft. Therefore, Windows Update is not applicable to this OS. Also, the apps Cortana, Microsoft Edge, Microsoft Store, and UWP are not supported.
- Custom user apps for use on Windows can be used on this product. Hakko Electronics does not guarantee the operation of apps installed by the customer. Make sure to thoroughly check the operation before actual use.
- Hakko Electronics shall not be held responsible for dealing with trouble or liable for damages stemming from Microsoft products while using this product. When trouble occurs with a Microsoft product or there is a need to check the specifications, refer to the manual of the Microsoft product or contact Microsoft. Refer to the following website to contact Microsoft.
  https://support.microsoft.com/en-us/contactus/

[Notes on Turning Power Off]
The System Configurator built into the X1 series unit provides a write filter function. When the write filter function is enabled, the power of the X1 series unit can be turned off suddenly without damaging system files. If the write filter function is disabled, the shutdown procedure is necessary. Perform the shutdown procedure on System Configurator and after waiting for at least 15 seconds from when the screen has gone out, turn the X1 series unit power off.

[Notes on the Built-in Solid-state Drive (SSD)]

- The X1 series unit has a built-in SSD (C drive). Do not change partitions or split the drive.
- 3D NAND is used in the built-in SSD of the X1 series unit. Keep in mind the service life of the SSD.

[Notes on the Battery]
The X1 series unit has a built-in battery which is used for backing up time data and BIOS settings (retention during power outage). The battery must be replaced within three years after the unit is purchased. Note that the X1 series unit can start up in the same way as usual even if time data and BIOS settings are lost. Time data is reset to the default value in such a case. Set again as necessary.

[Notes on Wireless LAN]
For details regarding supported wireless LAN standards, radio law certifications, and countries where wireless LAN can be used, refer to the “X1 Series Notes on Wireless LAN” manual provided with the X1 series unit at delivery.

[Notes on the Startup Time]
Since a Windows OS is used, the startup time differs depending on the devices that are connected and software that is additionally installed.
Carefully consider devices and software before use.

Contents

34. Universal Serial Communication

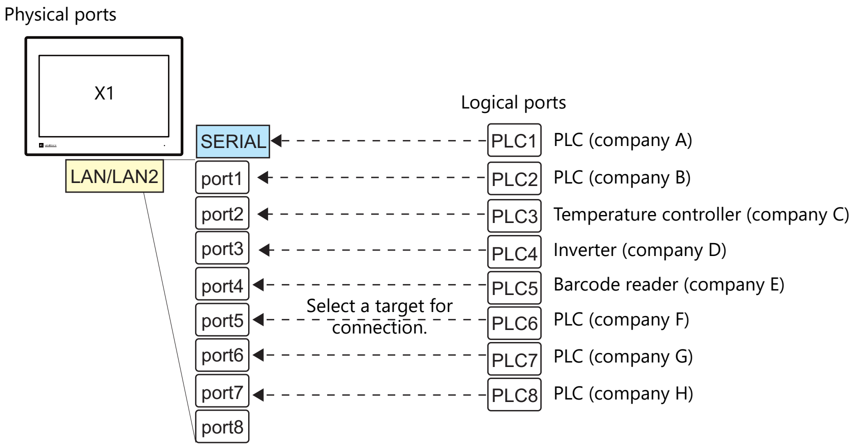
1. Overview

1.1 System Configuration

1.1.1 Overview

The X1 series is equipped with nine physical ports consisting of one serial port, two LAN ports, four USB-A ports*1, one audio port, and one HDMI port. For models with wireless LAN and Bluetooth*2, one WLAN port and one Bluetooth port are also provided.
The LAN port can open eight ports simultaneously. A maximum of eight different devices can be connected to the serial port and LAN ports so that the X1 series can communicate with them at the same time. This is called 8-way communication.

*1 Two ports of USB version 3.0, two ports of USB version 2.0
*2 For models with "R" in model name



Port			No. of Ports	Applicable Devices	
				8-way Communication	Other than 8-way
Serial	SERIAL	RS-232C RS-422 (4-wire) RS-485 (2-wire)	1	PLC, temperature controller, servo, inverter, RFID controller, V-Link, slave communication (Modbus RTU, Modbus ASCII)	Sato's barcode printer (MR-400)
Ethernet	LAN	All models	8	PLC, controller, slave communication (Modbus TCP/IP)	Computer, network camera *1, network printer *1
	LAN2		8		Computer, network printer *1
	WLAN	Models with "R" in model name	1	-	Computer, tablet *1, network printer *1
USB	USB-A	All models	4	-	USB flash drive, keyboard, mouse, USB hub, printer *1
AUDIO		All models	1	-	External speaker
HDMI		All models	1	-	External monitor
Bluetooth		Models with "R" in model name	1	-	Bluetooth devices

*1 Use the function of Windows to establish connection.

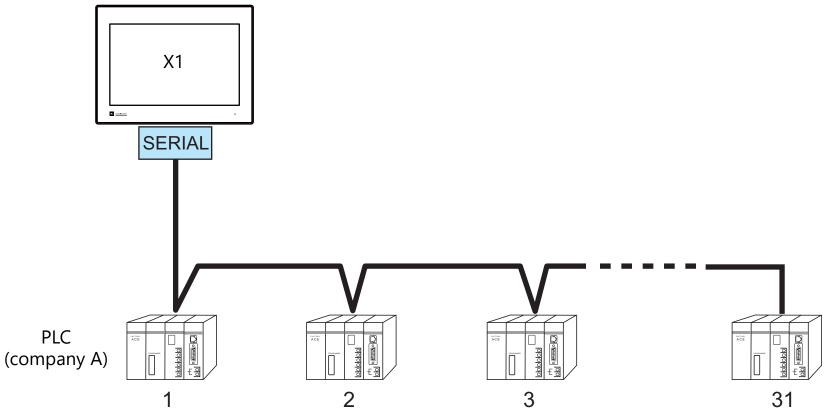
- Only the logical port PLC1 can be selected for the following devices and functions. They cannot be connected at the same time.
  - Devices
    Without PLC connection, Mitsubishi Electric A-Link + Net10, Allen-Bradley Control Logix / Compact Logix*, Allen-Bradley Micro800 controllers*, 3S-Smart Software Solutions CODESYS V3 (Ethernet)
    * Control Logix / Compact Logix Tag and Micro800 Controllers Tag can be selected at PLC1-8.
  - Functions
    Ladder monitor function, MICREX SX variable name cooperation function

1.1.2 System Composition

Serial Communication

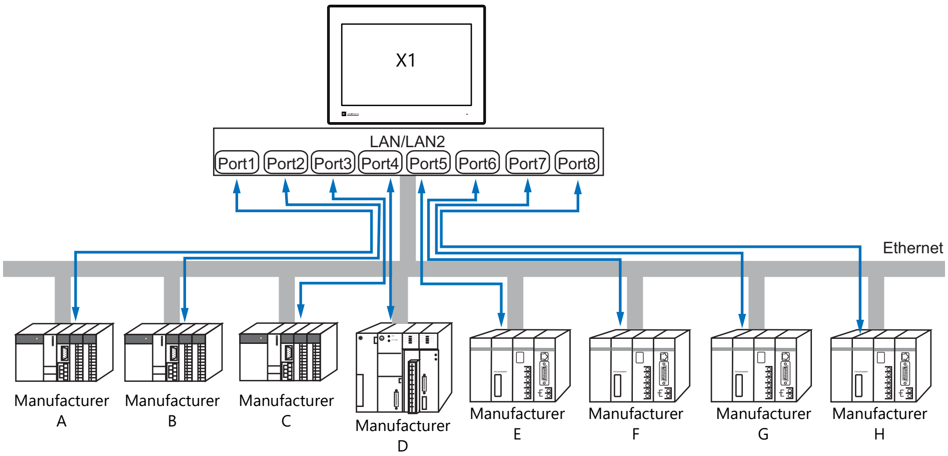
- 1 : 1 connection
  A serial port is used as a communication port.
  For more information, see “1 : 1 Connection” (page 1-12) in “1.3 Connection Method”.

- 1 : n connection
  A serial port is used as a communication port. A maximum of 31 units of the same model can be connected to each port.
  For more information, see “1 : n Connection (Multi-drop)” (page 1-16) in “1.3 Connection Method”.

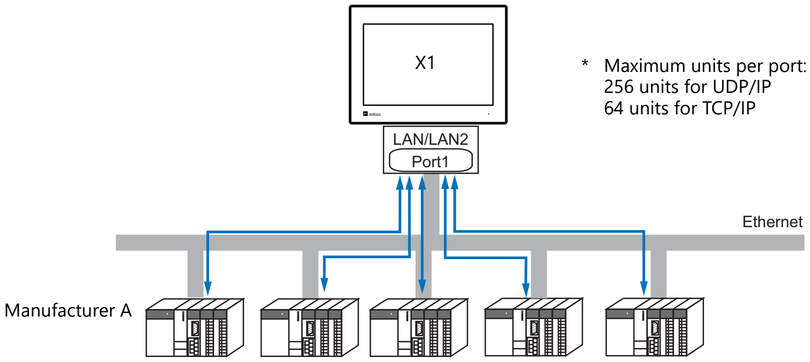


Ethernet Communication

The X1 series unit can open up to eight ports for communication, which means that the unit can simultaneously communicate with up to eight types of PLCs.



When there are two or more PLCs of the same model, the X1 series can carry out 1 : n communication via one port.

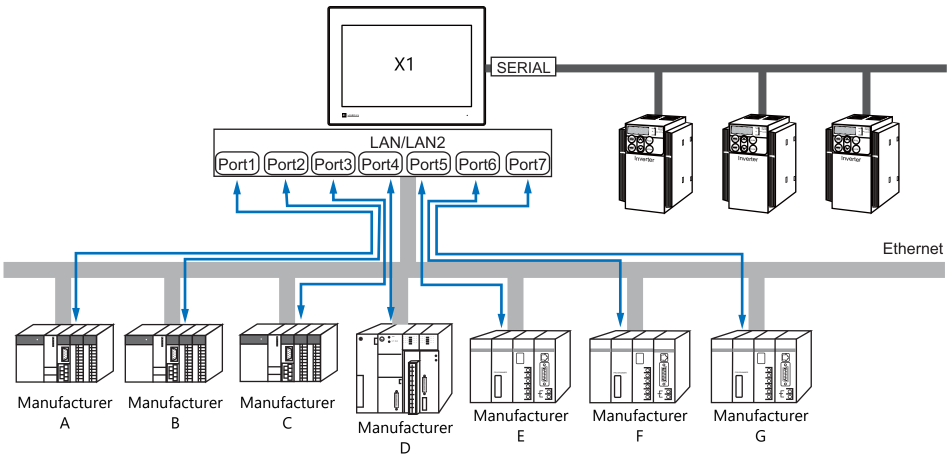


* For more information, refer to “1.3.2 Ethernet Communication” (page 1-18) in “1.3 Connection Method”.

Mixed Serial-Ethernet Communication

In the case of mixed serial-Ethernet communication, the X1 series can simultaneously communicate with up to eight types of PLCs.

- Connection of 1 model for serial communication and 7 models for Ethernet communication



* For the connection method, refer to “1.3.1 Serial Communication” and “1.3.2 Ethernet Communication”.

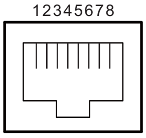
1.2 Physical Ports

1.2.1 SERIAL

The SERIAL port supports communication via RS-232C, RS-485 (2-wire connection), and RS-422 (4-wire connection).

⚠CAUTION	The SERIAL and LAN/LAN2 connectors are RJ-45 connectors. Check the connector names on the unit and insert cables into the correct connectors.

Pin Arrangement

SERIAL RJ-45 8pin	No.	RS-232C		RS-485 (2-wire connection)		RS-422 (4-wire connection)	
		Signal	Description	Signal	Description	Signal	Description
12345678 	1	RD	Receive data	+SD/RD	Send/receive data (+)	+SD	Send data (+)
	2	-	Not used	−SD/RD	Send/receive data (−)	−SD	Send data (−)
	3			-	Not used	-	Not used
	4						
	5	SG	Signal ground	SG	Signal ground	SG	Signal ground
	6						
	7	SD	Send data	-	Not used	+RD	Receive data (+)
	8	-	Not used	-	Not used	-RD	Receive data (−)

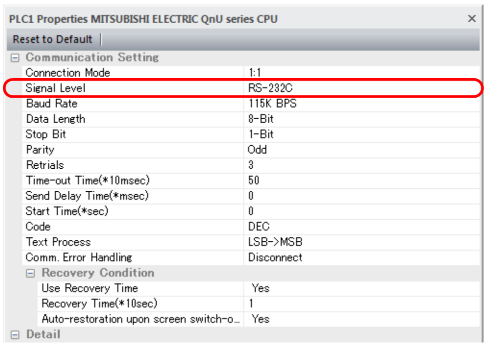
Switching between RS-232C and RS-422/485

There are two ways to select the signal level (RS-232C or RS-422/485): using the V-SFT editor or using Local mode on the X1 series unit.

⚠CAUTION	The setting changed on the X1 series unit takes priority. To restore the screen program settings, press the [Restore Screen Data Settings] switch on the Local mode screen.

Setting Using the V-SFT Editor

[System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]



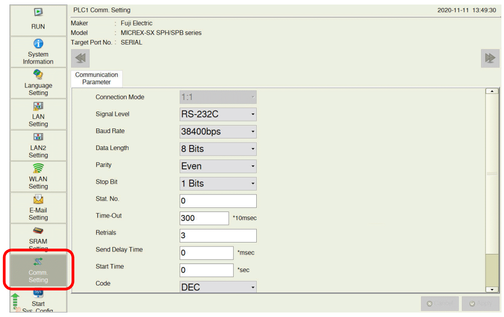
Item	Description
Connection Mode	Configure according to the connected device.
Signal Level	RS-232C / RS-422/485
Baud Rate	Configure according to the connected device.
Data Length	
Stop Bit	
Parity	
Target Port No.	
Transmission Mode	

For settings other than the above, see “1.4 Hardware Settings” (page 1-29).

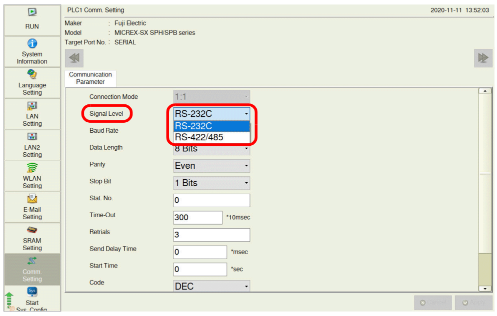
Setting Using Local Mode on the Unit

Set the signal level in Local mode on the X1 series unit.

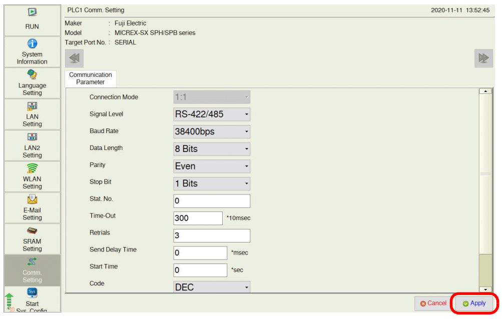
1. Press any of the four corners of the screen for more than two seconds and then press any of the remaining corners for more than two seconds to display the system menu.
2. Press the [Local] switch. The display switches to Local mode.
3. Press the [Comm. Setting] icon to display the Communication Setting screen.



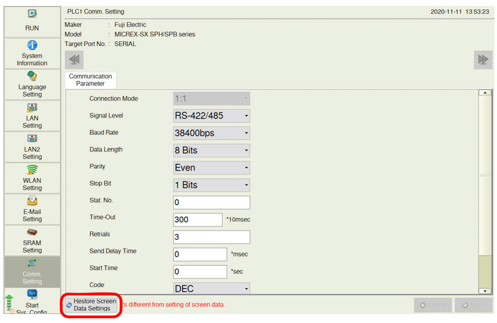
4. Select [RS-232C] or [RS-422/485] at [Signal Level].



5. Press the [Apply] switch to confirm the setting.



* Press the [Restore Screen Data Settings] switch to restore the screen program settings.



Switching between RS-485 (2-wire Connection) and RS-422 (4-wire Connection)

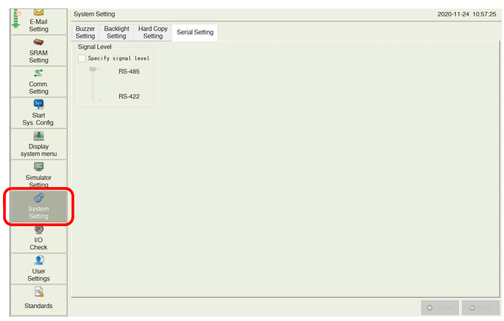
Set the signal level (RS-485/RS-422) in the [Serial Setting] tab window in Local mode of the X1 series unit.
This setting is necessary when all of the following three conditions apply.

- The [Target Port No.] setting is set to [SERIAL] for PLCx in the [Hardware Setting] window of a screen program.
- The [Signal Level] setting is set to [RS-422/485] at either of the following locations:
  [Hardware Setting] → [PLCx Properties] in the screen program
  [Comm. Setting] → [Communication Parameter] in Local mode
- A connected device supports both RS-485 (2-wire connection) and RS-422 (4-wire connection) and RS-422 is used for connection.

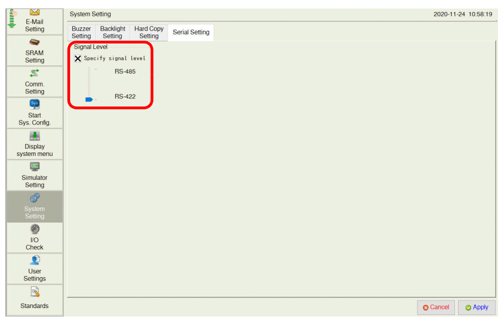
CAUTION

- Signal level: RS-232C
  Communication is performed via RS-232C, irrespective of whether the [Specify signal level] checkbox is selected or not.
- Signal level: RS-422/485
  - * When the [Specify signal level] checkbox is selected, the following setting takes priority.
  - When communicating with devices that support RS-485 (2-wire connection) only or RS-422 (4-wire connection) only:
    The following setting is not necessary. (The signal level is automatically recognized.)
  - When communicating with devices that support both RS-485 (2-wire connection) and RS-422 (4-wire connection):
    If the [Specify signal level] checkbox is not selected, communication is performed via RS-485 (2-wire connection).
    To perform communication via RS-422 (4-wire connection), the following setting is necessary.

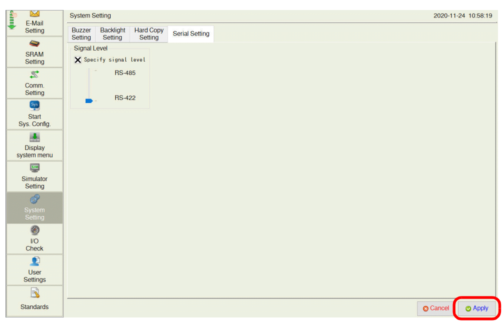
1. Press any of the four corners of the screen for more than two seconds and then press any of the remaining corners for more than two seconds to display the system menu.
2. Press the [Local] switch. The display switches to Local mode.
3. Press [System Setting] → [Serial Setting].



4. Select the [Specify signal level] checkbox and select [RS-485] (default) or [RS-422].



5. Press the [Apply] switch to confirm the setting.

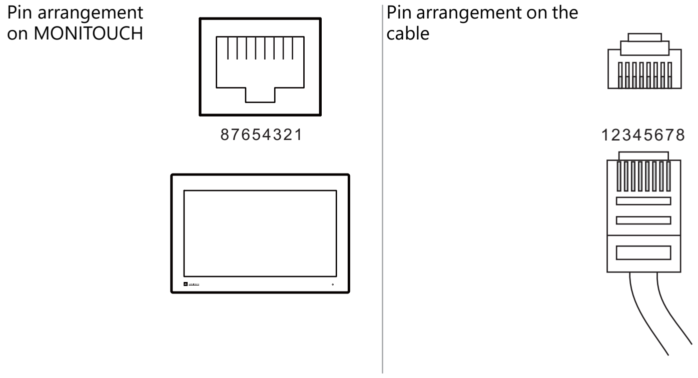


Recommended Cable

AWG 26 stranded wire, braided shield

* Check the operation in advance in the usage environment.

Notes on Configuring a Cable



Applicable Devices

Port	Applicable Devices
SERIAL	PLC, temperature controller, inverter, servo, RFID controller, V-Link, slave communication (Modbus RTU, Modbus ASCII), Sato’s barcode printer (MR-400)

1.2.2 LAN/LAN2

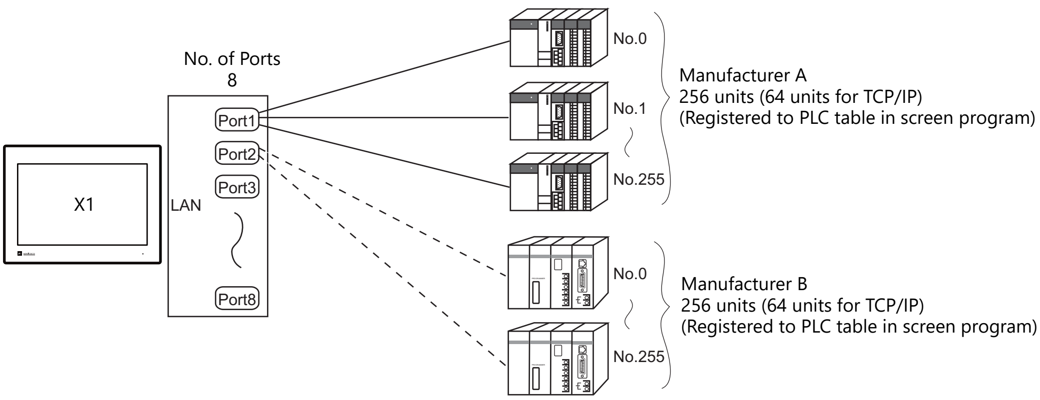
⚠CAUTION	The LAN/LAN2 and SERIAL connectors are RJ-45 connectors. Check the connector names on the unit and insert cables into the correct connectors.

LAN Port Specifications

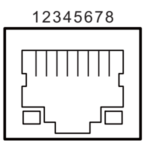
Item	Specification		
	1000BASE-T (IEEE802.3ab)	100BASE-TX (IEEE802.3u)	10BASE-T (IEEE802.3)
Baud Rate	1000 Mbps	100 Mbps	10 Mbps
Transmission Method	Base band		
Maximum Segment Length	100 m (between the node and the hub, or between hubs)		
Connecting cable	100 Ω, STP cable, category 5e or above		
Protocol	UDP/IP, TCP/IP		
Port	Auto-MDIX, Auto-Negotiation functions compatible		
Number of Concurrently Opened Ports	8 ports		
Maximum Number of Connectable Devices	UDP/IP: 256 units via each of ports PLC1 to PLC8 TCP/IP: 64 units via each of ports PLC1 to PLC8		

* Jumbo frames not supported

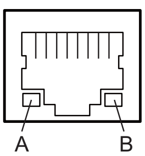
Maximum number of connectable devices



Pin Arrangement

LAN/LAN2 RJ-45	No.	1000BASE-T		100BASE-TX / 10BASE-T	
		Name	Description	Name	Description
	1	BI_DA+	Transmit/receive data A+	TX+	Transmit signal +
	2	BI_DA–	Transmit/receive data A–	TX–	Transmit signal –
	3	BI_DB+	Transmit/receive data B+	RX+	Receive signal +
	4	BI_DC+	Transmit/receive data C+	NC	Not used
	5	BI_DC–	Transmit/receive data C–		
	6	BI_DB–	Transmit/receive data B–	RX–	Receive signal –
	7	BI_DD+	Transmit/receive data D+	NC	Not used
	8	BI_DD–	Transmit/receive data D–		

LED

LAN/LAN2	A: Activity LED	B: Speed LED	Status
	On	Off	10BASE link established / Data is being transmitted
	On	Lit green	100BASE link established / Data is being transmitted
	On	Lit orange	1000BASE link established / Data is being transmitted

Applicable Devices

Applicable Devices
PLC, slave communication (Modbus TCP/IP), computer (screen program transfer), network camera, network printer, etc.

1.2.3 WLAN

WLAN Port Specifications

Item	Specification
Complying Antennas	Two antennas (2T2R) built into the X1 series unit
Wireless LAN Standards	IEEE802.11ac/a/b/g/n
Communication Frequency	• 2.4 GHz band (2.412 GHz to 2.484 Hz) • 5.0 GHz band (W52*: 5.150 GHz to 5.250 GHz, W53*: 5.250 GHz to 5.350 GHz, W56: 5.470 GHz to 5.725 GHz) * Outdoor use of the W52 and W53 bands is prohibited by radio law.
Modulation Method	• 11b: DSSS (DBPSK, DQPSK, CCK) • 11a/g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) • 11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) • 11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
Max. Baud Rate	• 11b: 11 Mbps • 11a/g: 54 Mbps • 11n: 300 Mbps (MCS0 to 15) • 11ac: 867 MHz (MCS0 to 9)
Operation Mode	Station
Usage Environment	Indoor use only
Security	64/128-bits WEP, WPA, WPA2, 802.1x, 802.11i
Conformance Standards	• MIC • FCC • ISED • RED • KC • NCC

Applicable Devices

Applicable Devices
Computer (screen program transfer), tablet, network printer, etc.

Notes on Wireless LAN

- Antennas are built into the X1 series unit for wireless communication. (Wireless LAN communication is possible within 10 meters from the front face of the X1 series unit.)
  Make sure to check that a stable wireless connection can be established beforehand if using the interface. Placing the access point within 10 meters is recommended for a stable connection.
- Radio waves used by wireless LAN pass through wood and glass, and therefore communication is possible even if floors and walls are made of wooden or glass material. However, radio waves cannot penetrate reinforcing rods, metal, or concrete, so if these materials are used, communication is not possible.
  Signal intensity can be checked using the Received Signal Strength Indication (RSSI) as a guideline. Placing the access point in a position indicating a higher RSSI value will attain a more stable communication status.
  A low RSSI value which cannot be improved by moving the access point indicates that the radio wave intensity is attenuated due to a long communication distance or physical obstructions.

Notes on radio waves

- The wireless LAN function of the X1 series corresponds to “radio equipment for radio stations (antenna power: 10 mW/MHz or less) of low-power data communication systems” defined by radio law, and therefore does not require a radio license.
- Depending on the peripheral environment or installation conditions, data transmission via wireless LAN may be unstable compared to wired connections and result in packet loss.
  Be sure to check the connection before actual use.
- Do not use the wireless LAN function in the following situations.
  1. Near a person who uses a cardiac pacemaker: The function may cause electromagnetic interference in cardiac pacemakers, leading to malfunctions.
  2. Near medical devices: The function may cause electromagnetic interference in medical devices, leading to malfunctions.
  3. Near microwaves: Microwaves may cause electromagnetic interference in wireless communications of the X1 series unit.
- Notes on using wireless LAN
  Models that support wireless LAN use the 2.4 GHz and 5.0 GHz frequency bands. These frequency bands are used for industrial, scientific, and medical equipment; on-site radio stations (requiring a radio license) and certain low-power radio stations (no radio license required) for identifying moving objects in production lines; and amateur radio stations (requiring a radio license).

1. Before using the wireless LAN function, check that there are no on-site radio stations and certain low-power radio stations for identifying moving objects or amateur radio stations in use nearby.
2. If ever the X1 series unit causes wave interference to an on-site radio station for identifying moving objects, immediately stop wireless LAN communication and ensure that waves are no longer emitted. Then take necessary actions to resolve the interference (e.g. changing frequencies, relocating, installing partitions).
3. If the X1 series unit causes wave interference to a certain low-power radio station for identifying moving objects, or if any other problem occurs, contact your distributor.
4. Communications conforming to IEEE802.11ac, IEEE802.11n or IEEE802.11a use the 5.0 GHz frequency band. Outdoor use of the 5.2 GHz (W52) and 5.3 GHz (W53) bands is prohibited by radio law.

- The wireless LAN function conforms to the radio standards in the following countries.
  Never use the X1 series unit outside of these countries.
  Australia, Belgium, Canada, Czech, Denmark, Finland, France, Germany, Great Britain, Greek, Hungary, Ireland, Italy, Japan, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Taiwan, United States of America

Notes on security

A wireless LAN transmits data between a computer and a wireless LAN access point without using a LAN cable. Therefore, as long as radio waves are transmitted, LAN connection can be established whenever desired.
On the other hand, within a certain range, radio waves will pass through all obstructions (such as walls) and reaches the entire area. If security settings are not made, the following problems may occur.

Transmission contents can be eavesdropped on

- A malicious third party can eavesdrop on communication contents and steal identity such as your ID, password, and credit card numbers, or eavesdrop on email contents.

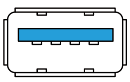
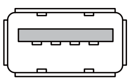
Unauthorized intrusions

- A malicious third party may access personal or corporate networks without authorization and steal identity or confidential information (information leakage).
- An attacker can impersonate you and send out false information (impersonation).
- Communication contents can be intercepted and then manipulated before sending (manipulation).
- Data and systems can be destroyed using a computer virus (destruction).

Principally, models that support wireless LAN have security functions. If such functions are properly configured before use, any risks of sustaining the above attacks can be reduced.
We recommend configuring security functions before use at your own judgment and responsibility, and fully understand the problems that may occur if the X1 series unit is used without configuring security functions.

1.2.4 USB-A

USB Port Specifications

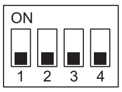
Item		Specification
USB3.0 	Applicable Standards	Compliant with USB version 3.0
	Baud Rate	Super speed: 5.0 Gbps
USB2.0 	Applicable Standards	Compliant with USB version 2.0
	Baud Rate	High speed: 480 Mbps

Applicable Devices

Applicable Devices
USB flash drive, numeric keypad, keyboard, mouse, USB hub, printer

1.2.5 DIP Switch (DIPSW) Settings

The X1 series unit is equipped with DIP switches 1 to 4. Turn off power to the unit before changing any DIP switches.

No.		Description	
Factory settings 	1	Storage automatic upload	The System Configurator is displayed if No. 1 and No. 2 are both set to the ON position.
	2	Display of touch switch test screen	
	3	Terminating resistance of transmitting line for serial communication RS-422 (4-wire connection) and RS-485 (2-wire connection)	
	4	Terminating resistance of receiving line for serial communication RS-422 (4-wire connection)	

DIPSW1* (Storage Automatic Upload)

Set DIP switch 1 to the ON position to automatically upload screen programs from a USB flash drive.
* This function is valid when HMI is selected as the startup mode on System Configurator.

For details, refer to the X1 Series Hardware Specifications.

* Be sure to set DIP switch 1 to the OFF position when not using automatic upload.

DIPSW2 (Display of Touch Switch Test Screen)

Set DIP switch 2 to the ON position to display the touch switch test screen.

DIPSW1, 2 (System Configurator Start)

Set DIP switches 1 and 2 to the ON position to display the System Configurator screen.

* After completing settings on System Configurator, be sure to set DIP switches 1 and 2 to the OFF position.

DIPSW3, 4 (Terminating Resistance Setting)

- When connecting a controller at SERIAL via RS-422/485 (2-wire connection), set DIP switch 3 to the ON position.
- When connecting a controller at SERIAL via RS-422/485 (4-wire connection), set DIP switches 3 and 4 to the ON position.

CAUTION	When executing communication via RS-232C at SERIAL, set DIP switches 3 and 4 to the OFF position.

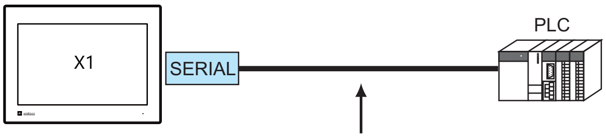
1.3 Connection Method

1.3.1 Serial Communication

1 : 1 Connection

Overview

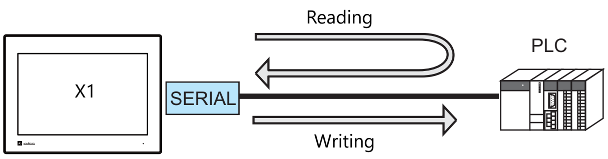
- Connect one X1 series unit with one PLC (1 : 1 connection).
- You can make settings for 1 : 1 connection in [Communication Setting] for the logical ports PLC1 to PLC8 and use SERIAL as the communication port.



RS-232C or RS-422 (RS-485) connection
Maximum length of wiring
RS-232C connection: 15 m
RS-422/RS-485 connection: 500 m

* The maximum length of wiring varies depending on the connected device. Check the specifications for each device.

- The X1 series unit (master station) communicates with a PLC (slave station) under the PLC's protocol. Therefore, there is no need to prepare a communication program for the PLC.
- The X1 series unit reads from PLC device memory for screen display. It is also possible to write switch data or numerical data entered through the keypad directly to PLC device memory.

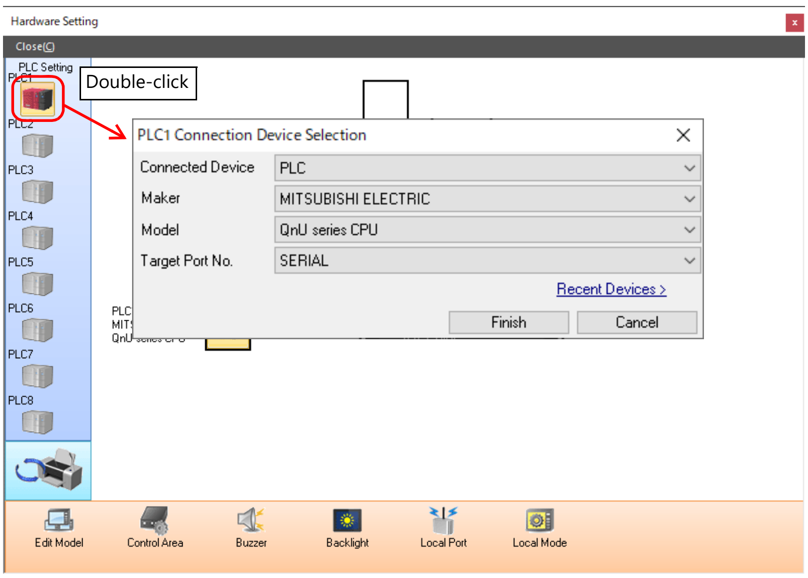


V-SFT Ver. 6 Settings

Hardware Settings

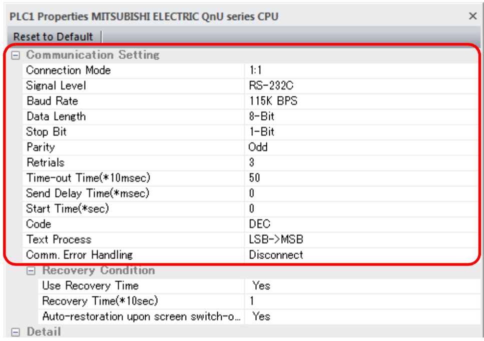
Selecting a device to be connected

Select a device to connect from [Communication Setting] → [Hardware Setting].



PLC properties

Configure [Communication Setting] on the [PLC Properties] window.



Item	Description
Connection Mode	1 : 1
Signal Level	Configure according to the connected device.
Baud Rate	
Data Length	
Stop Bit	
Parity	
Target Port No.	
Transmission Mode	

For settings other than the above, see “1.4 Hardware Settings” (page 1-29).

Settings of a Connected Device

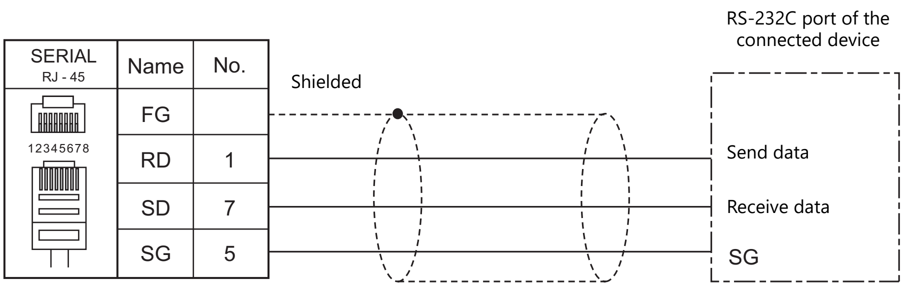
Refer to the chapter of the respective manufacturer.
For descriptions of connecting PLCs, refer to the manual for each PLC.

Wiring

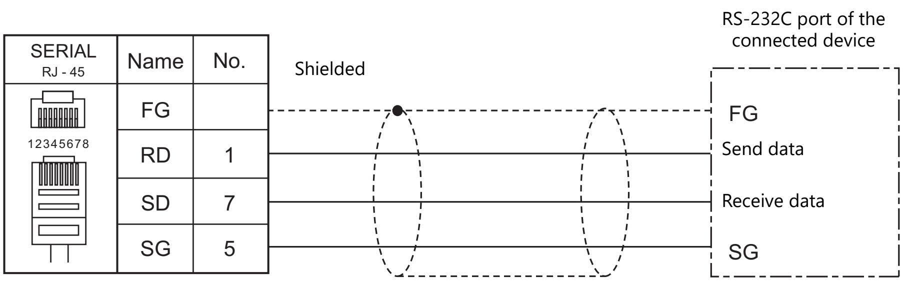
⚠DANGER	Be sure to turn off the power before connecting cables. Otherwise, you may sustain an electrical shock or equipment may be damaged.

RS-232C Connection

- The maximum length of wiring is 15 m.
  * The maximum length varies depending on the connected device. Check the specifications for each device.
- Connect a shielded cable to either the X1 series unit or the connected device. Connect the cable to the FG terminal on the backside of the X1 series unit.
- The signal ground (SG) and frame ground (FG) are connected inside the X1 series unit. Take care when designing systems.

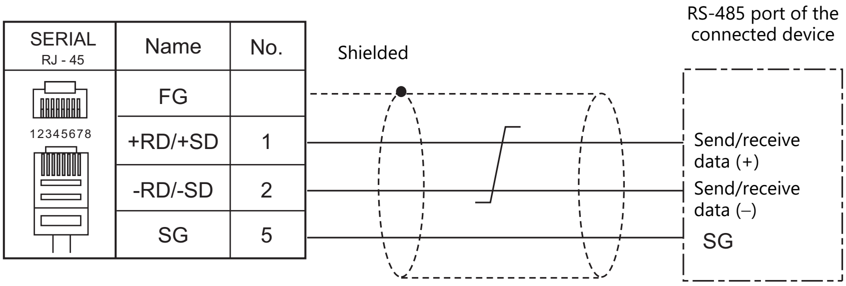


- If noise disturbs communications, connect a shielded cable to both the X1 series unit and the connected device.

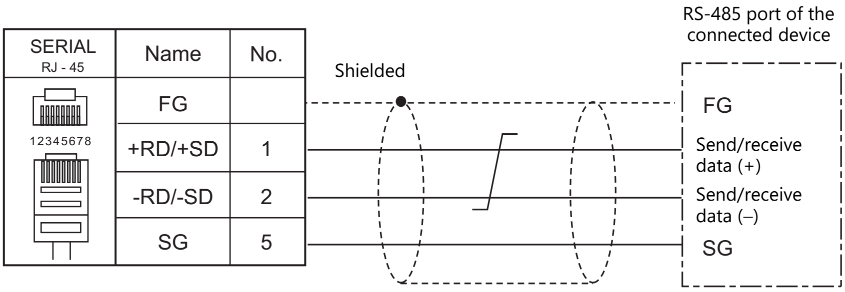


RS-485 (2-wire) Connection

- The maximum length of wiring is 500 m.
  * The maximum length varies depending on the connected device. Check the specifications for each device.
- If the PLC has a signal ground (SG) terminal, connect it.
- DIP switch 3 on the back of the X1 series unit is used to set the terminating resistance. For more information, see "1.2.5 DIP Switch (DIPSW) Settings" (page 1-11).
- Connect a shielded cable to either the X1 series unit or the connected device. Connect the cable to the FG terminal on the backside of the X1 series unit.
- The signal ground (SG) and frame ground (FG) are connected inside the X1 series unit. Take care when designing systems.

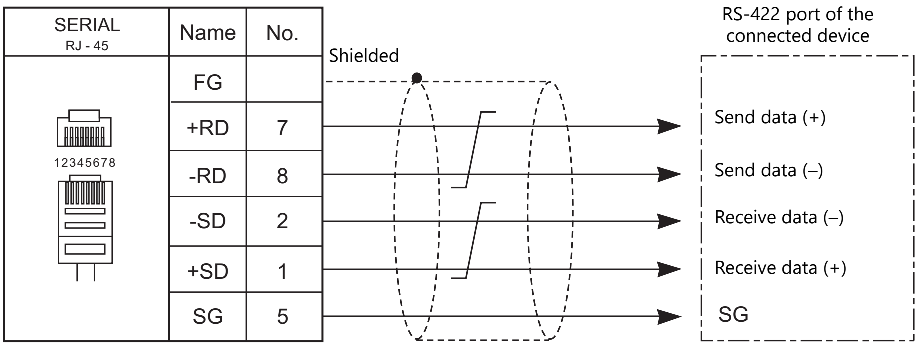


- If noise disturbs communications, connect a shielded cable to both the X1 series unit and the connected device.

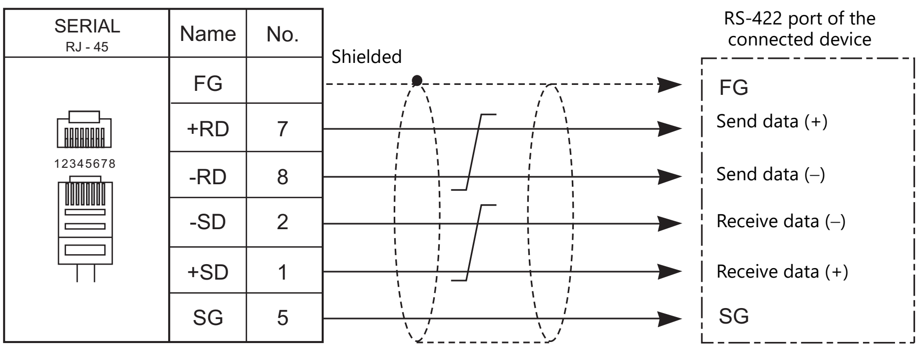


RS-422 (4-wire) Connection

- The maximum length of wiring is 500 m.
  * The maximum length varies depending on the connected device. Check the specifications for each device.
- If the PLC has a signal ground (SG) terminal, connect it.
- DIP switches 3 and 4 on the back of the X1 series unit are used to set the terminating resistance. For more information, see “1.2.5 DIP Switch (DIPSW) Settings” (page 1-11).
- Connect a shielded cable to either the X1 series unit or the connected device. Connect the cable to the FG terminal on the backside of the X1 series unit.
- The signal ground (SG) and frame ground (FG) are connected inside the X1 series unit. Take care when designing systems.



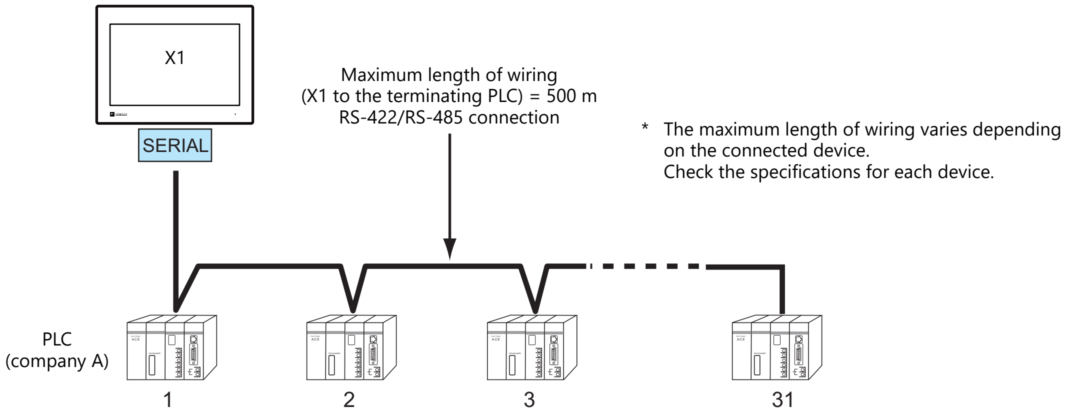
- If noise disturbs communications, connect a shielded cable to both the X1 series unit and the connected device.



1 : n Connection (Multi-drop)

Overview

- Multi-drop connection connects one X1 series unit to multiple PLCs of the same model as a 1 : n connection. (Maximum connectable units: 31)
- You can make settings for 1 : n connection in [Communication Setting] for the logical ports PLC1 to PLC8.



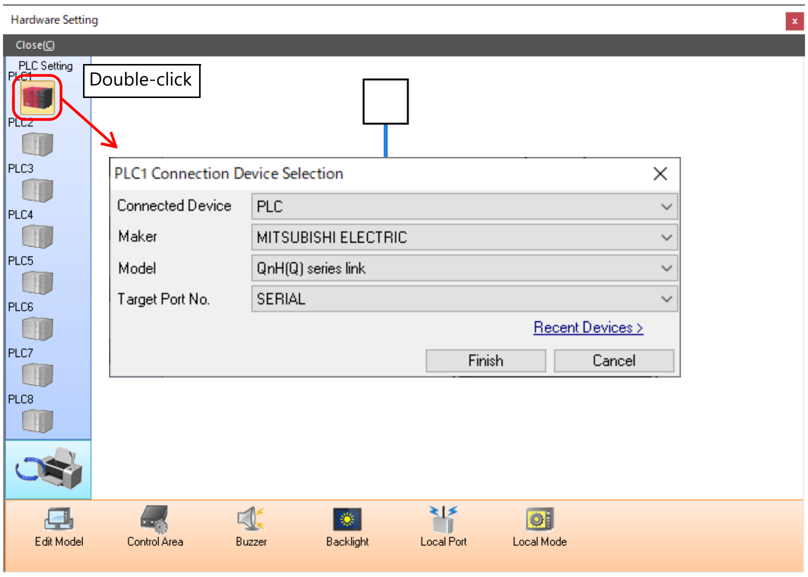
- For models that support multi-drop connection, refer to the “Connection Compatibility List” provided at the end of this manual or the chapters on individual manufacturers.

V-SFT Ver. 6 Settings

Hardware Settings

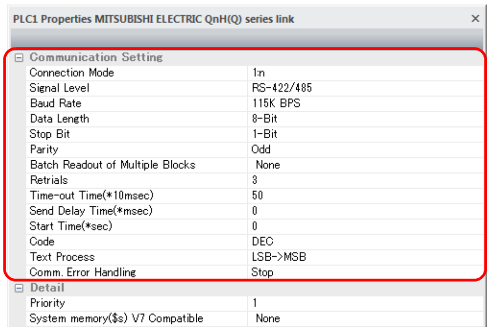
Selecting a device to be connected

Select a device to connect from [Communication Setting] → [Hardware Setting].



PLC properties

Configure [Communication Setting] on the [PLC Properties] window.



Item	Description
Connection Mode	1 : n
Signal Level	RS-422/485
Baud Rate	Configure according to the connected device.
Data Length	
Stop Bit	
Parity	
Target Port No.	
Transmission Mode	

For settings other than the above, see “1.4 Hardware Settings” (page 1-29).

Settings of a Connected Device

Refer to the chapter of the respective manufacturer.
For descriptions of connecting PLCs, refer to the manual for each PLC.

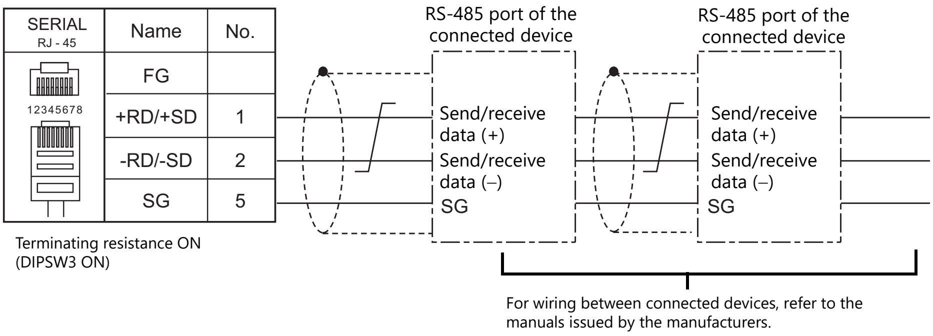
Wiring

⚠ DANGER	Be sure to turn off the power before connecting cables. Otherwise, you may sustain an electrical shock or equipment may be damaged.

The wiring between an X1 series unit and a connected device is the same as that for 1 : 1 communication. For descriptions of wiring between connected devices, refer to the manuals issued by the manufacturers.

RS-485 (2-wire) Connection

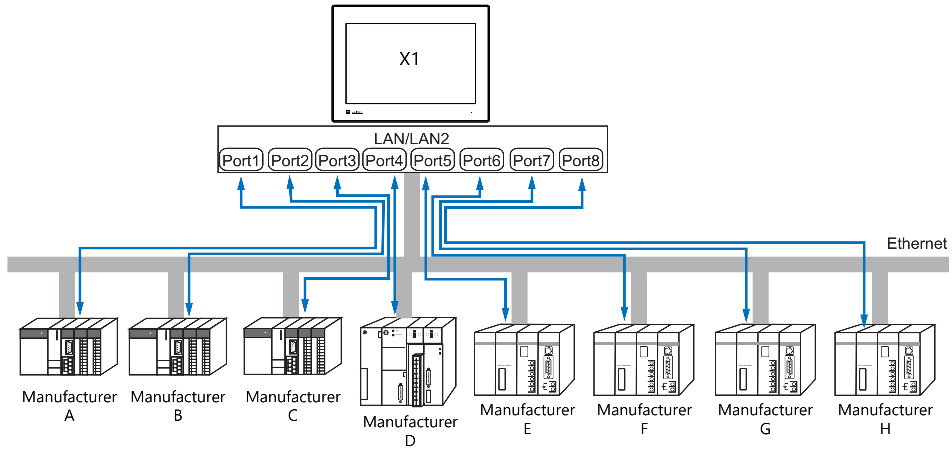
- Connection example



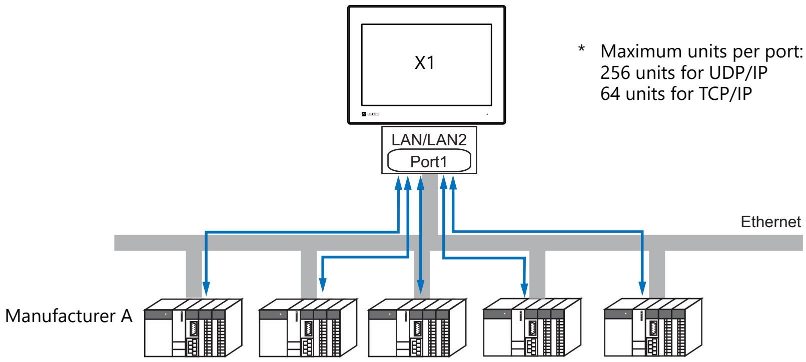
1.3.2 Ethernet Communication

Overview

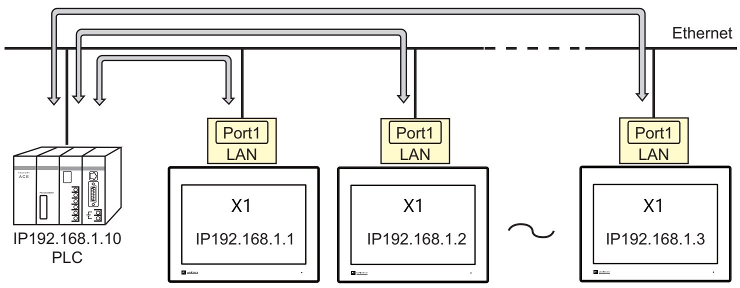
- The X1 series unit can open up to eight ports for communication, which means that the unit can simultaneously communicate with up to eight types of PLCs.



- When multiple PLCs of the same model are connected, a single port on the X1 series unit can be used to perform 1 : n communication with these PLCs.



- If multiple X1 series units are connected to one single PLC, the maximum permissible number of these units depends on the PLC specifications. Refer to the PLC manual issued by the manufacturer.



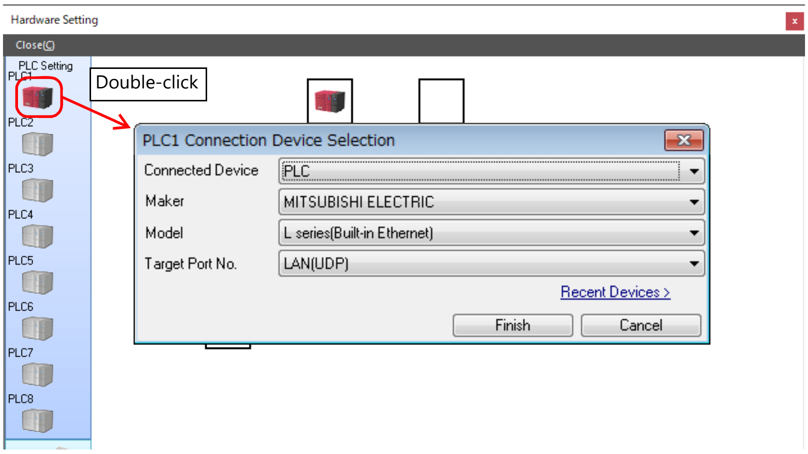
- You can make settings for Ethernet communication in [Communication Setting] for the logical ports PLC1 - PLC8.

V-SFT Ver. 6 Settings

Hardware Settings

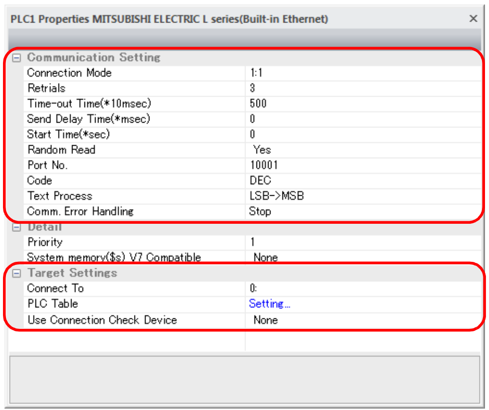
Selecting a device to be connected

Select a device to connect from [Communication Setting] → [Hardware Setting].

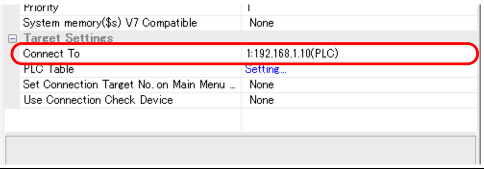
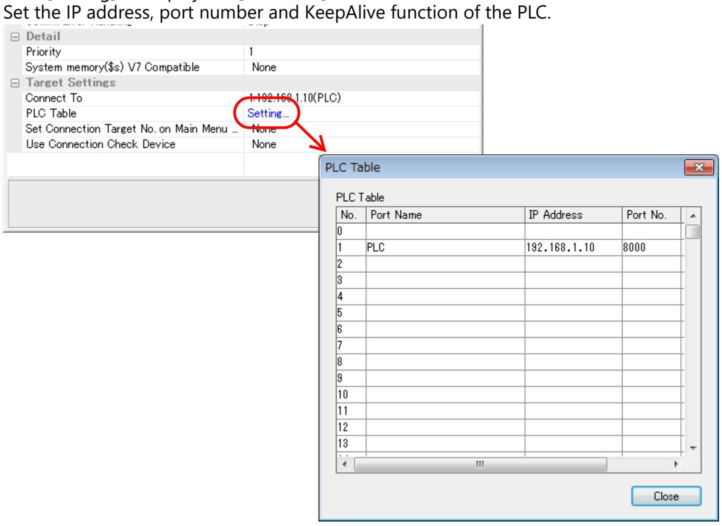


PLC properties

Configure the [PLC Properties].



Item		Description
Communication Setting	Connection Mode	1:1 / 1:n Set the number of PLCs that are to be communicated with.
	Port No.	Set the port number of the X1 series unit to be used for communication with the PLCs.
	KeepAlive	This setting is used when using the “KeepAlive” function. The “KeepAlive” function is used for periodically checking the connection with devices on the network. This function enables a prompt detection of a communication error, thus, significantly shortens the time to wait until a “disconnect” process takes place after an occurrence of the time-out error. * When using this function, select [Disconnect] for [Comm. Error Handling]. • [Use KeepAlive] Select [Yes] when using the “KeepAlive” function. The following settings will take effect. - [Retrials] Specify the number of retrials. If a timeout persists even after as many retrials as specified, an error handing routine will take place. 0 to 255 Default: 0 - [Time-out Time] Specify a period of time allowed for the X1 series unit to monitor a response from its connected device. If no response is given within the specified time, retrial will be made. 1 to 999 (× 10 msec) Default: 30 (× 10 msec) - [Checking Cycle] Set the cycle time of “KeepAlive” communication. 1 to 999 (× 10 msec) Default: 10 (× 10 msec)

Item		Description
Target Settings	Connect To	These settings are valid when [1 : 1] is selected for [Connection Mode]. Select the IP address of the PLC registered in the PLC table. 1 : 1 communications are executed with the PLC selected here. 
	PLC Table	Click [Setting] to display the [PLC Table] window. Set the IP address, port number and KeepAlive function of the PLC. 

* For settings other than the above, see "1.4 Hardware Settings" (page 1-29).

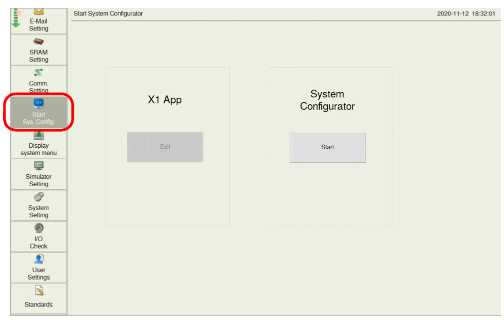
IP Address Setting of the X1 Series Unit

An IP address must be set for the X1 series unit to connect to devices via Ethernet. Set the IP address using System Configurator on the X1 series unit.

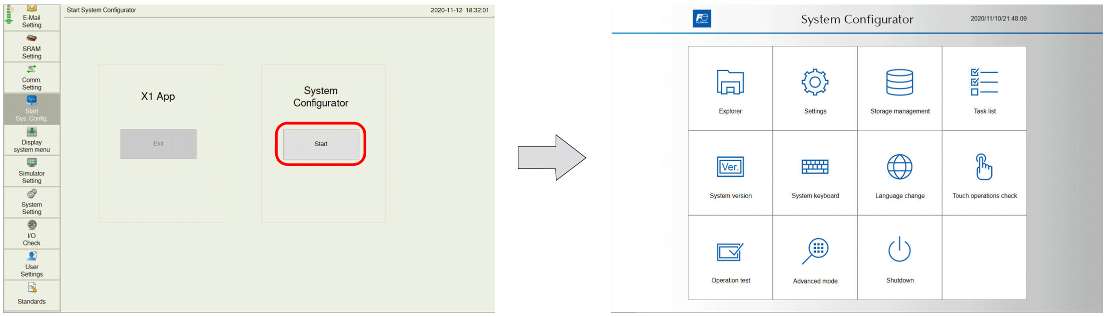
System Configurator

Set the IP address using System Configurator on the X1 series unit.

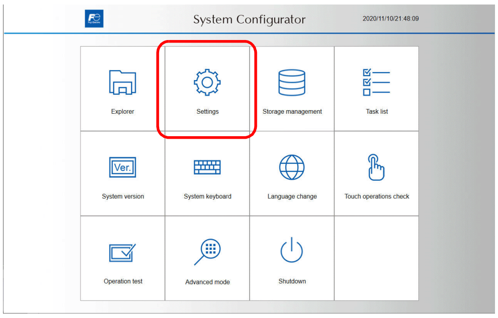
1. Press any of the four corners of the screen for more than two seconds and then press any of the remaining corners for more than two seconds to display the system menu.
2. Press the [Local] switch. The display switches to Local mode.
3. Press the [Start Sys. Config.] icon to display the System Configurator screen.



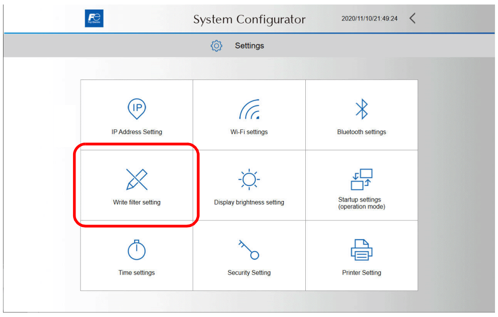
4. Press the [Start] switch. System Configurator starts.



5. Press [Settings].

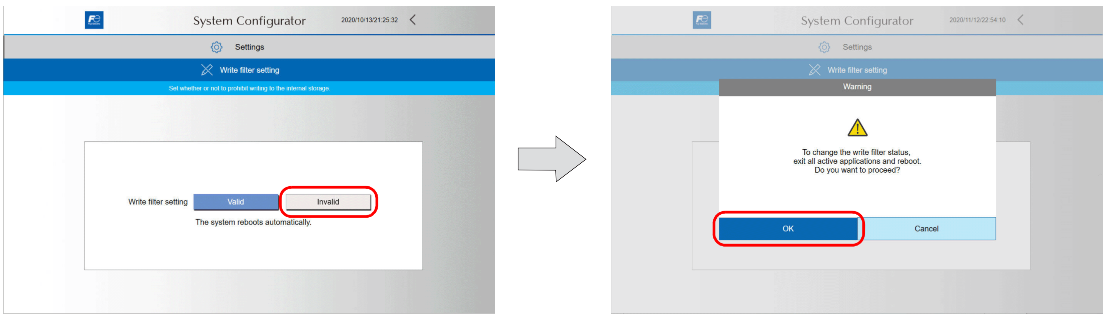


6. Press [Write filter setting].



7. If [Write filter setting] is set to [Valid], press [Invalid].
   The following dialog appears. Press [OK] to reboot the X1 series unit.
   After the X1 series unit reboots, perform steps 1 to 5.

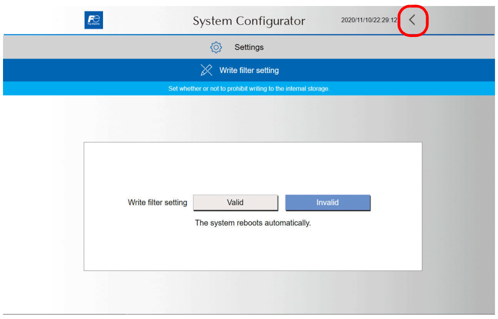
When [Write filter setting] is set to [Valid]



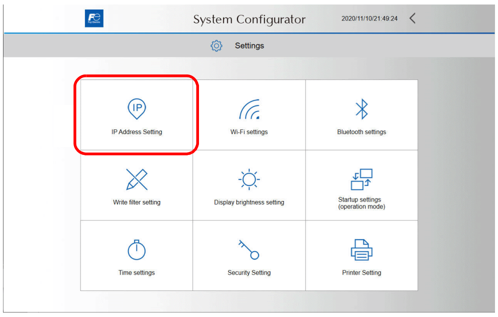
⚠CAUTION	The IP address cannot be changed when [Write filter setting] is set to [Valid]. Set [Write filter setting] to [Invalid] and reboot the X1 series unit.

When [Write filter setting] is set to [Invalid], press [<] to return to the settings screen.

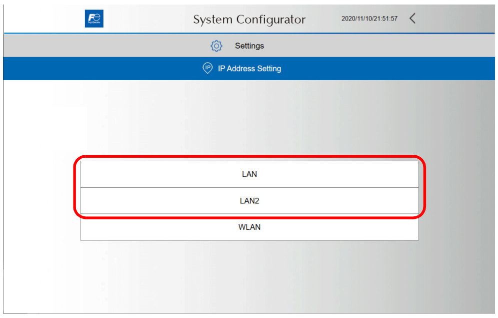
When [Write filter setting] is set to [Invalid]



8. Press [IP Address Setting].

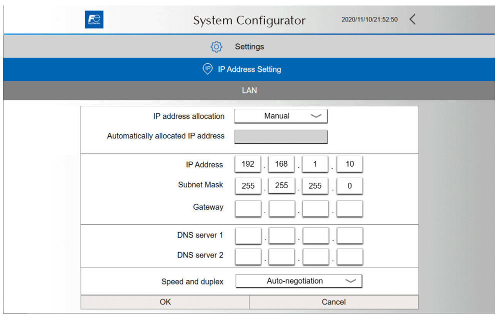


9. Press [LAN] or [LAN2].

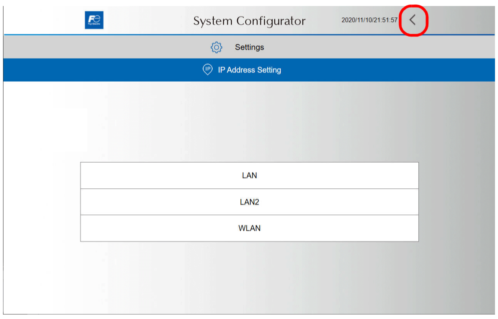


10. Configure settings and press [OK] to confirm.*

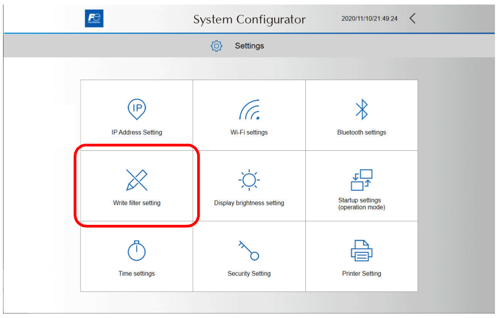
* In order to input numbers, either connect a USB keyboard or display the system keyboard on the X1 series unit. For details on the system keyboard, see "Displaying the system keyboard" (page 1-24).



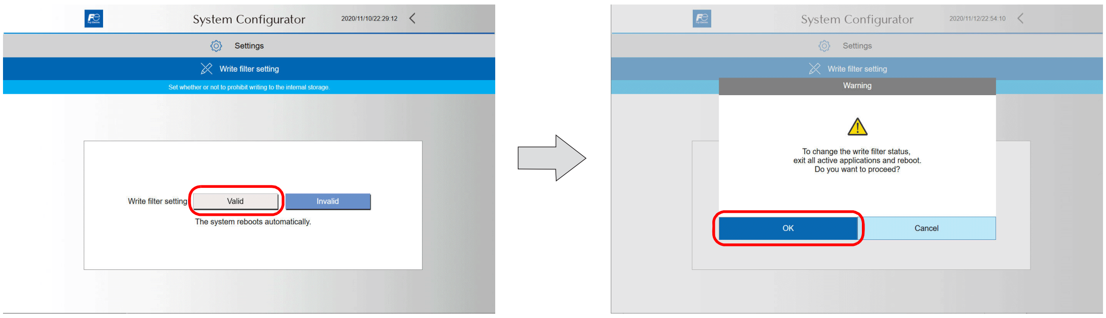
11. The IP address setting screen is displayed. Press [<].



12. Press [Write filter setting].



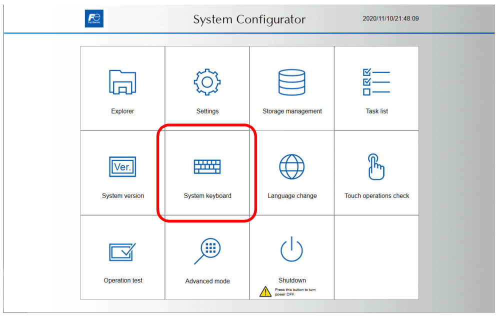
13. Press [Valid].
    The following dialog appears. Press [OK] to reboot the X1 series unit.



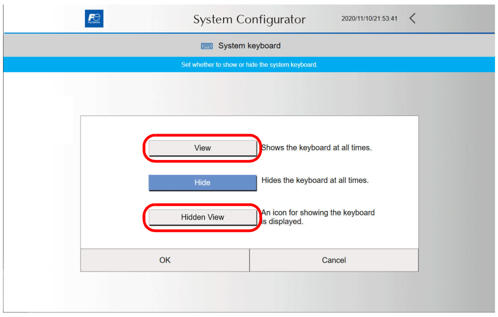
Displaying the system keyboard

The system keyboard can be used to input characters on System Configurator.
Display the system keyboard by the following procedure. (Default: System keyboard is hidden.)

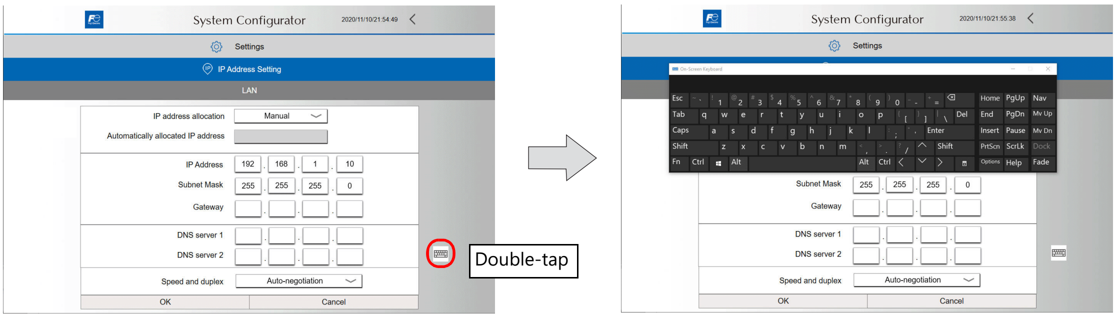
1. Start System Configurator.
   For details on how to start System Configurator, see steps 1 to 4 in “System Configurator” (page 1-20).
2. Press [System keyboard].



3. Press [View] or [Hidden View] and then press [OK].



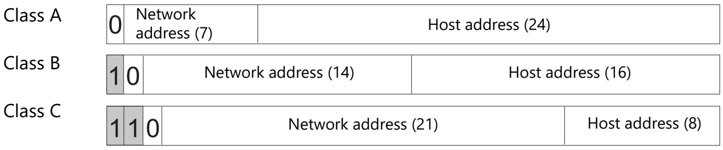
<Hidden view mode>
An icon is displayed as indicated below. Double-tap the icon to display the system keyboard.
The location of the icon can be changed by dragging.



Basics of ethernet settings

IP address

This is an address that is used for recognizing each node on the Ethernet and should be unique.
The IP address is 32-bit data which consists of the network address and the host address and can be classified into classes A to C depending on the network size.



<Notation>
A string of 32-bit data is divided into four, and each segment delimited with a period is in decimal notation.
Example: The IP address in class C shown below is represented as "192.128.1.50".
11000000 10000000 00000001 00110010

<Unusable IP addresses>

- "0" is specified for one byte at the extreme left. Example: 0.x.x.x
- "127" is specified for one byte at the extreme left (loop back address). Example: 127.x.x.x
- "224" or more is specified for one byte at the extreme left (for multi-cast or experiment). Example: 224.x.x.x
- The host address consists of only "0" or "255" (broadcast address). Example: 128.0.255.255, 192.168.1.0

Port No.

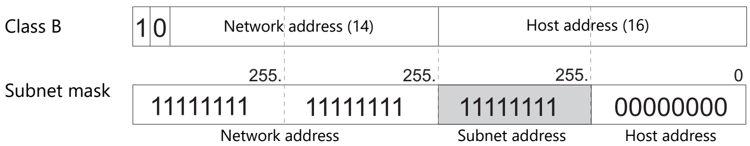
Multiple applications are running on each node, and communications are carried out for each application between the nodes. Consequently, it is necessary to have a means to identify the application that data should be transferred to. The port number works as this identifier. Each port number is 16-bit data (from 0 to 65535).
The X1 series uses the port for screen program transfer (8001), PLC communication (as desired), and the simulator (8020). Set a unique number in the range of 1024 to 65535. For a PLC or a computer, set the port number in the range of 256 to 65535. It is recommended to set a greater number.

Default gateway

A gateway and a router are used for communication between different networks.
The IP address of the gateway (router) should be set to communicate with the node(s) on other networks.

Subnet mask

A subnet mask is used for dividing one network address into multiple networks (subnet).
The subnet is assigned by specifying a part of the host address in the IP address as a subnet address.

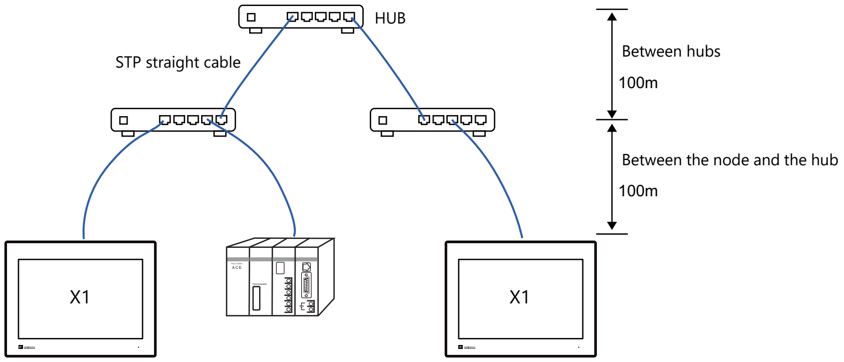


<Unusable subnet masks>

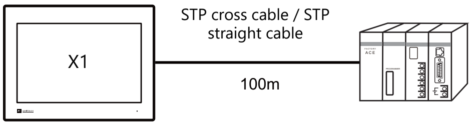
- All bits are set to "0"...... 0.0.0.0
- All bits are set to "1"...... 255.255.255.255

Connection Example

With hub



Without hub

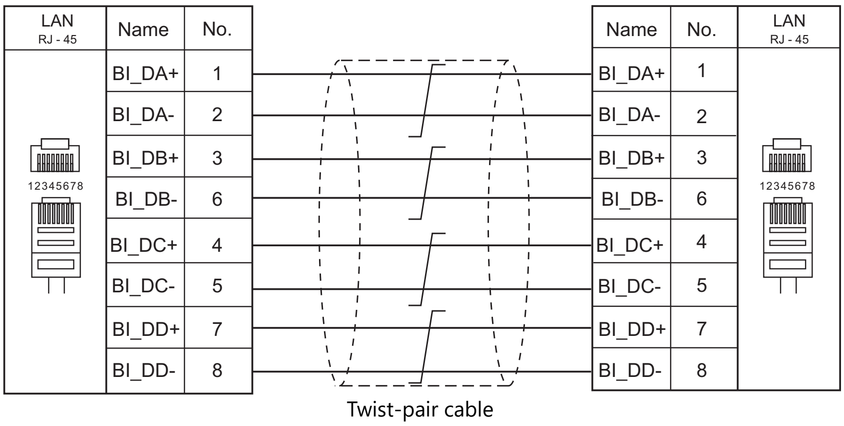


Wiring

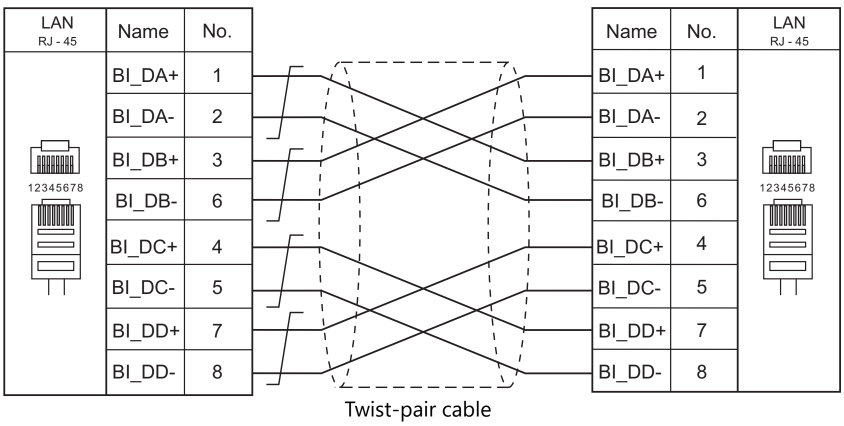
⚠ CAUTION	• Use a commercially available cable. Using a self-made cable may cause an error in network connection. • If the use of a cross cable cannot stabilize communication, use a hub.

For 1000BASE-T

- Straight cable

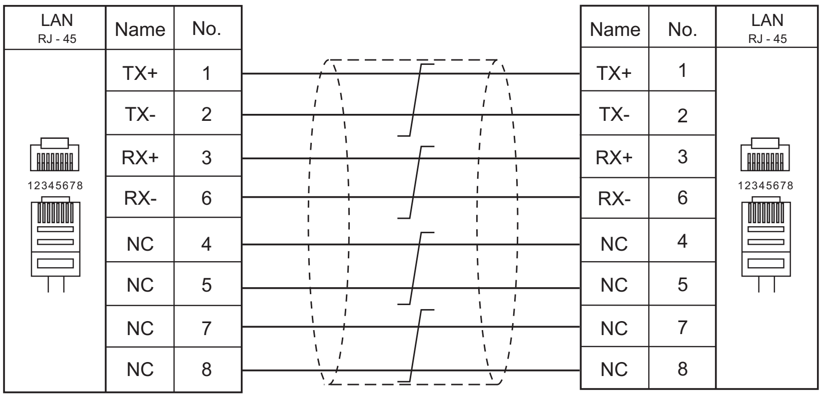


- Cross cable



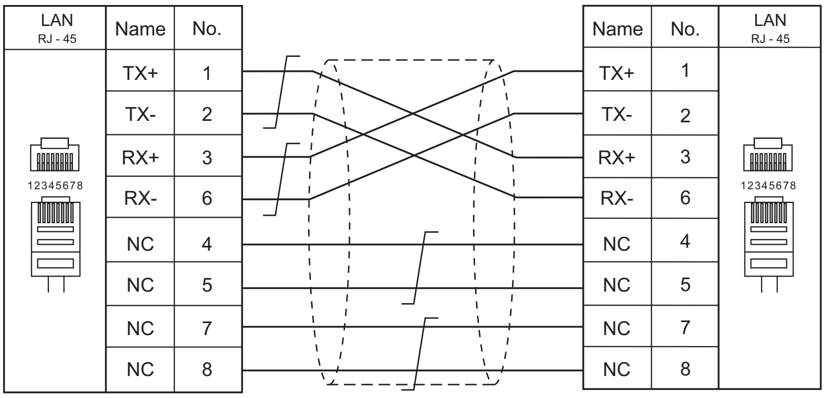
For 100BASE-TX / 10BASE-T

- Straight cable



Twist-pair cable

- Cross cable



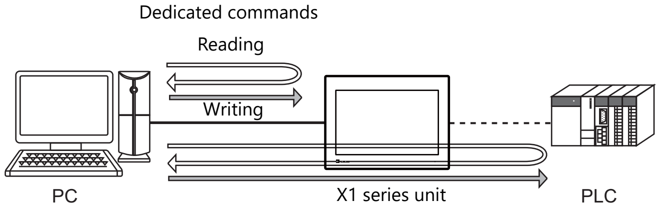
Twist-pair cable

1.3.3 Slave Communication

Connecting via V-Link, Modbus RTU, Modbus ASCII, or Modbus TCP/IP is applicable to slave communication using the X1 series unit. V-Link, Modbus RTU and Modbus ASCII are used for serial communication, and Modbus TCP/IP is used for Ethernet (TCP/IP) communication.

V-Link

- "V-Link" is the network where the PC reads from and writes to the internal device memory of the X1 series unit or the device memory of PLC1 to PLC8 using a dedicated protocol.



- You can make settings for V-Link communication in [Communication Setting] for the logical ports PLC2 to PLC8.
- For more information, refer to "V-Link" in book 3 of the X1 Series Connection Manual.

MODBUS RTU

- The X1 series unit is connected to a Modbus RTU master via serial connection.
- The Modbus slave communication device memory table is prepared for the X1 series unit. The master is allowed to access the device memory table and read/write data from/into the PLC.
- For more information, refer to the Modbus Slave Communication Specifications manual separately provided.

MODBUS ASCII

- The X1 series unit is connected to a Modbus ASCII master via serial connection.
- The Modbus slave communication device memory table is prepared for the X1 series unit. The master is allowed to access the device memory table and read/write data from/into the PLC.
- For more information, refer to the Modbus Slave Communication Specifications manual separately provided.

MODBUS TCP/IP

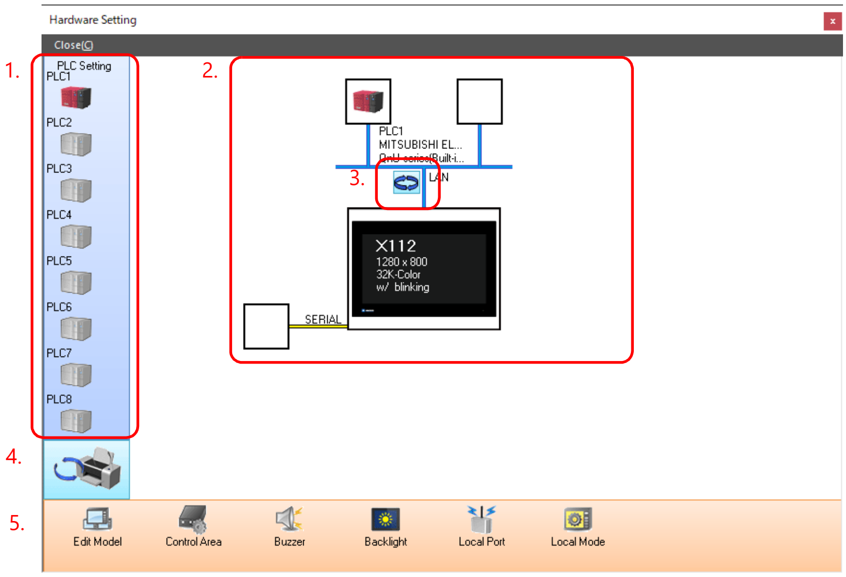
- The X1 series unit is connected to a Modbus TCP/IP master via Ethernet communication.
- The Modbus slave communication device memory table is prepared for the X1 series unit. The master is allowed to access the device memory table and read/write data from/into the PLC.
- For more information, refer to the Modbus Slave Communication Specifications manual separately provided.

1.3.4 Other Connections

The serial port (SERIAL) is used for serial printer connection and communications other than 8-way communication.

1.4 Hardware Settings

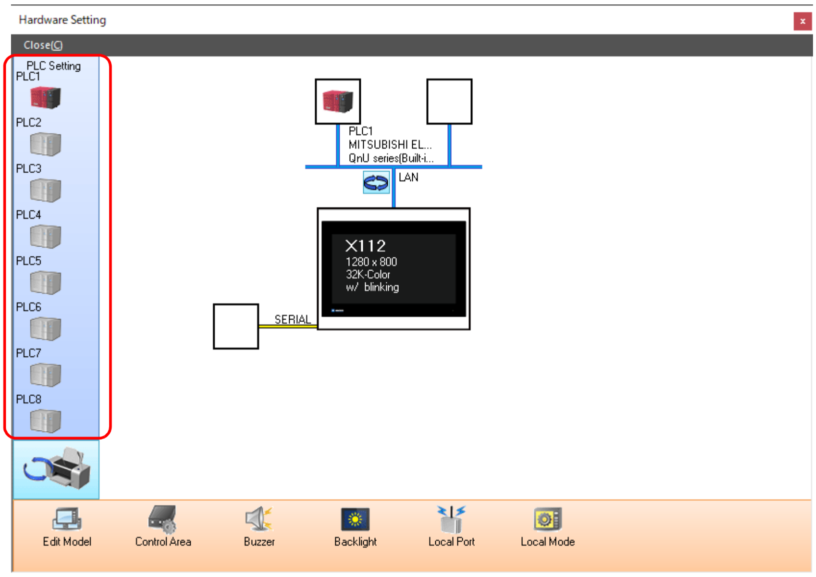
Select devices to connect to the X1 series unit and configure settings on the [Hardware Setting] screen.



Item		Description
1.	PLC Settings	Set the devices (PLC, temperature controller, servo, inverter, etc.) to connect to PLC1 to PLC8.
2.	Connection diagram	Displays the devices configured for connection. Devices as well as communication settings can be changed.
3.	LAN/LAN2 Selection	Select LAN or LAN2 for the Ethernet connection port of the X1 series unit. The display changes each time the button is clicked.
4.	PLC Setting / Other Settings Toggle	Switch the display between PLC settings and other settings. The display changes each time the button is clicked.
5.	Unit Settings	Configure the settings of the X1 series unit.

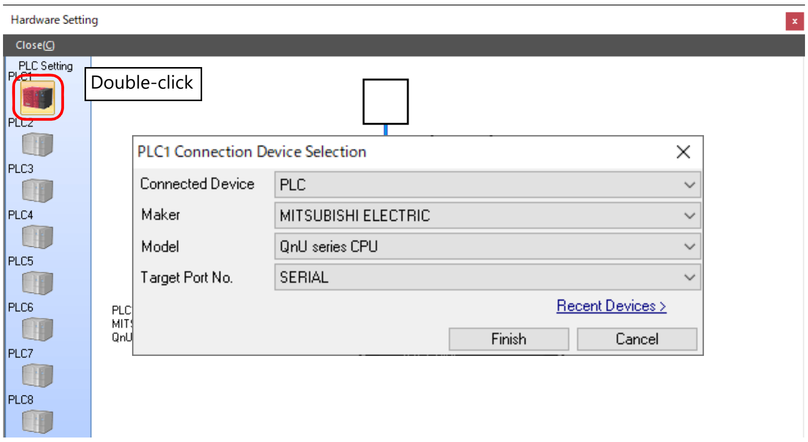
1.4.1 PLC Settings

To enable communication with a PLC, a temperature controller, an inverter, etc., configure the following settings on the editor.
These settings are displayed on the Local mode screen of the X1 series unit.
For details on the Local mode screen, refer to the X1 Series Hardware Specifications.



Selecting a Device to be Connected

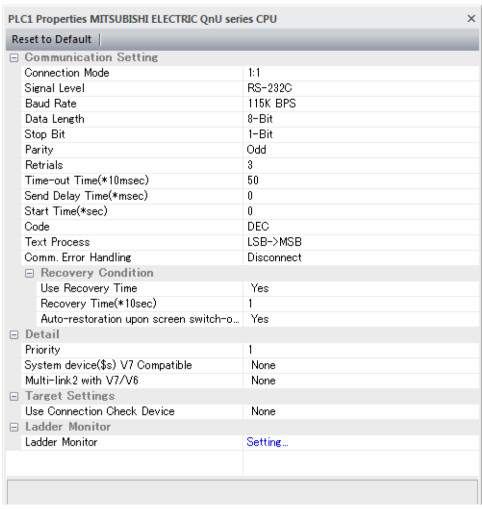
Double-click on a PLC icon in the [Hardware Setting] window to display the window shown below.



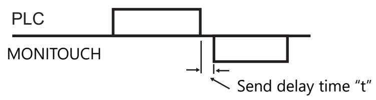
Item	Description
Applicable Devices	Select the device to connect.
Maker	Select the manufacturer of the device.
Model	Select the model of the device to connect. Refer to the respective chapter of each manufacturer and select the appropriate model.
Target Port No.	Select the port to which the device connects to on the X1 series unit.

PLC Properties

Click on the PLC icon in [Hardware Setting] to display the window shown below.



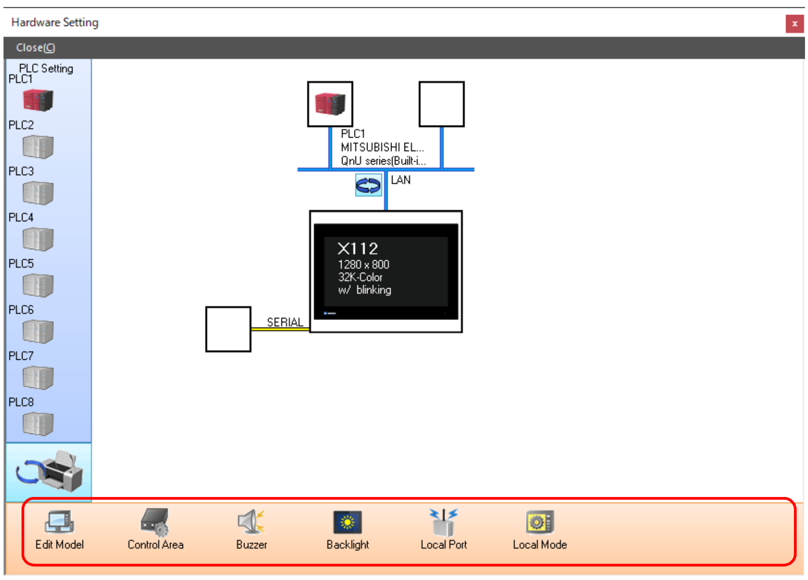
Item		Description
Communication Setting	Connection Mode	Select a connection mode. 1:1 / 1:n Available options vary, depending on which device is connected. For details, see “Connection Compatibility List” provided at the end of this manual.
	Signal Level *1	Select a signal level. RS-232C / RS-422/485
	Baud Rate *1	Select a baud rate. 4800 / 9600 / 19200 / 38400 / 57600 / 76800 / 115K bps
	Data Length *1	Set the number of bits for data. 7 / 8 bits
	Stop Bit *1	Set the number of stop bits. 1 / 2 bits
	Parity *1	Select an option for parity bit. None / Odd / Even
	Target Port No. *1	Specify a port number of the connected device. 0 to 31 (Modbus RTU/Modbus ASCII: 1 to 255)

Item			Description
Communication Setting	Transmission Mode *1		Select a transmission mode for the connected device. This setting is required if a device of Mitsubishi, Omron, Hitachi Industrial Equipment Systems, Yokogawa, JTEKT, or Yaskawa is used.
	Retrials		Specify the number of retrials to be allowed in the event of a timeout during communication. If a timeout persists even after as many retrials as specified, an error handing routine will take place. 1 to 255
	Time-out Time		Specify a period of time allowed for the X1 series unit to monitor a response from its connected device. If no response is given within the specified time, retrial will be made. PLC: 0 to 999 (× 10 msec) Temperature controller, servo, inverter: 1 to 255 (× 100 msec)
	Send Delay Time		Specify a delay time that elapses before the X1 series unit sends the next command after receiving a response from its connected device. Normally use the default setting. 0 to 255 (× 1 msec) 
	Start Time		Specify a delay time that elapses before the X1 series unit starts to send commands upon power-up. If the X1 series unit and its connected device are turned on at the same time and the device is slower to start up, set [Start Time]. 0 to 255 (×1 sec)
	Code		Select a code for the connected device. The selected option is reflected through the data displayed on graphs or trending sampling parts. DEC/BCD
	Text Process		Specify a byte order in text data. This setting is valid for macro commands that handle text. LSB → MSB / MSB → LSB [LSB → MSB] 15 – 0: MSB (2nd byte), LSB (1st byte) [MSB → LSB] 15 – 0: MSB (1st byte), LSB (2nd byte)
	Comm. Error Handling		Select an action to be taken in the event of a communication error. • [Stop] Communication will be stopped entirely and the communication error screen will be displayed. The [RETRY] switch is available for attempting reestablishment of communication. • [Continue] A communication error message will be displayed at the center of the screen. The same communication will continue until restoration, and screen operation is not allowed for that duration. When communication has been returned to a normal state, the message disappears and screen operation is allowed. • [Disconnect] No error message will appear and communication will proceed to the next one.* However, communication with the device, in which a timeout was detected, will be disconnected. When a timeout is detected, ⚠ will be displayed for the part that is monitoring the address of the timeout device. * The communication status is displayed on the status bar. For details, refer to the X1 Series Hardware Specifications.
	Recovery Condition	Use Return Time	This setting is valid when [Disconnect] is selected for [Comm. Error Handling].
		Recovery Time	[Recovery Time]: 1 to 255 (×10 sec) When the specified time has elapsed, the X1 series unit sends a recovery check command to the device which discontinued communication.
		Auto-restoration upon screen switch-over	When the screen is switched, the X1 series unit checks the recovery of the device which discontinued communication.

Item		Description
Detail	Priority	[1] (higher priority) - [8] (lower priority) Specify the priority taken during 8-way communication. If interruptions from two or more devices occur at the same time, communication with these devices will take place in order of priority.
	System device ($s) V7 Compatible (PLC1)	This is set to [Yes] when a V7 series screen program (including temperature control network/PLC2Way settings) is converted to an X1 series screen program. System information relevant to 8-way communication will be stored in device memory addresses $P1 and $s. * For more information, see "1.5.1 $Pn (For 8-way Communication)" (page 1-37).
	System device ($s) V7 Compatible (PLC2)	This is set to [Yes] when a V7 series screen program (including temperature control network/PLC2Way settings) is converted to an X1 series screen program. • [None] $P2:493/494/495 is used for controlling the device memory map. • [Yes] $s762/763/764 is used for controlling the device memory map. * For more information, see "1.5.1 $Pn (For 8-way Communication)" (page 1-37).
	Device Memory for Device Memory Map Control	Specify the device memory for device memory map control of PLC1 to PLC8. The device memory specified here is the same as [Control Device] in [Device Memory Map Setting] ([System Setting] → [Device Memory Map] → [Device Memory Map Edit] window → [Device Memory Map Setting]). * For details, refer to the X1 Series Reference Manual 2.
Target Settings	Connect To	Set this for Ethernet communication. For more information, see "1.3.2 Ethernet Communication" (page 1-18).
	PLC Table	
	Use Connection Check Device	Select [Yes] for connection confirmation using a desired device memory address at the start of communication.
	Device for Confirming Connection	Specify a desired device memory address used for connection confirmation.

*1 Be sure to match the settings to those made on the connected device.

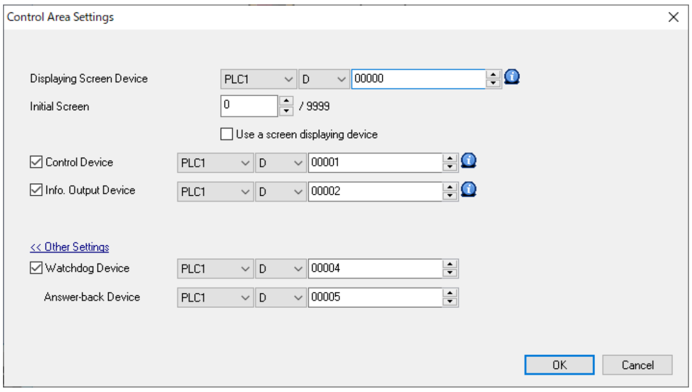
1.4.2 Unit Settings



Edit Model Selection

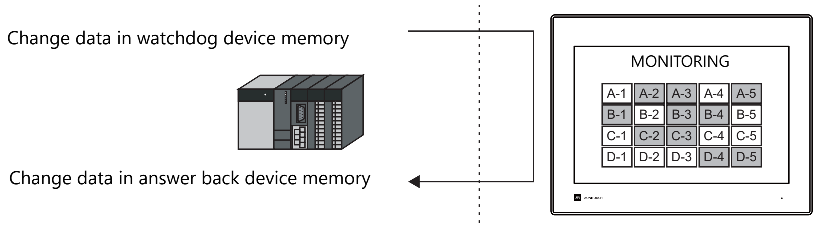
Select an X1 series model to edit.
For details, refer to the X1 Series Reference Manual 1.

Control Area

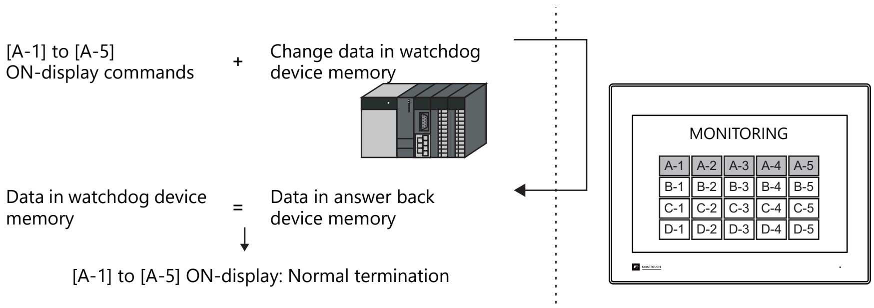


Item		Description
Screen	Displaying Screen Device	Used for switching the screen by an external command. When a screen number is specified in a device memory, the screen is displayed as specified. Also, the currently displayed screen number is stored in this device memory.
	Initial Screen	Set the screen number to display at startup. * When recovering from a communication error, the screen number which was set for the screen displaying device memory is displayed.
	Use a screen displaying device	When this checkbox is selected, the screen number which was set for the screen displaying device memory is displayed as the initial screen.
	Control Device	For details, refer to the X1 Series Reference Manual 1.
	Info. Output Device	
Other Settings	Watchdog Device	When data is saved in this area, the same data is written to the [Answer-back Device] after the screen is displayed. Utilizing this operation, these device memory can be used for watchdog monitoring*1 or display scanning*2.
	Answer-back Device	

*1 Watchdog
When the PLC is communicating with the X1 series unit, there is no means for the PLC to know whether or not the unit is operating correctly.
To solve this one-way communication, forcibly change data in the watchdog device memory and check that the same data is saved in the answer back device memory. This proves that the X1 series unit is correctly operating through communications with the PLC. This verification is called "watchdog".



*2 Display scanning
This operation can be used for display scanning. Forcibly change data in the watchdog device memory when giving a graphic change command and check that the same data is saved in the answer back device memory. This proves that the graphic change command is received and executed correctly.



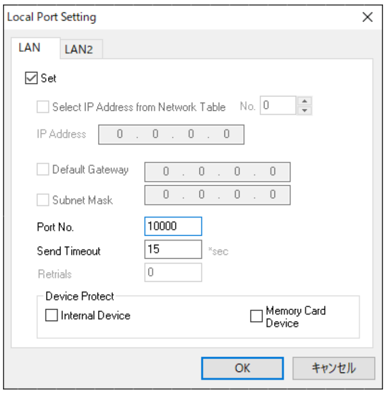
Buzzer

Make settings for the buzzer.
For details, refer to the X1 Series Hardware Specifications.

Backlight

Make settings for the backlight.
For details, refer to the X1 Series Hardware Specifications.

Local Port Setting



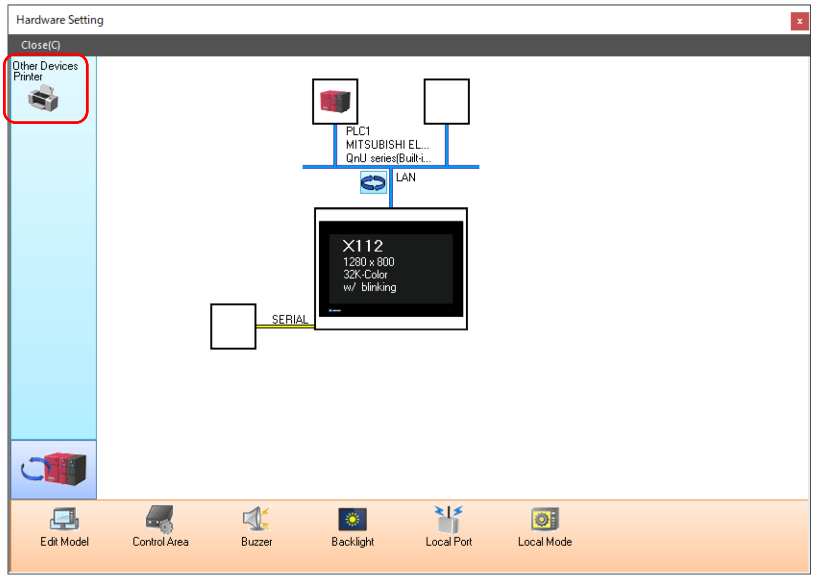
Item	Description
Port No. *1	Set a port number from 1024 to 65535. (“8001” is not available.)
Send Timeout	Specify the timeout time to send the EREAD/EWRITE/SEND/MES macro commands.
Device Protect Internal Device Memory Card Device	Select either checkbox to write-protect the corresponding device memory from computers or other stations.

*1 For more information on each setting item, see “Basics of ethernet settings” (page 1-25).

Local Mode

Make prohibition settings for Local mode.
For details, refer to the X1 Series Hardware Specifications.

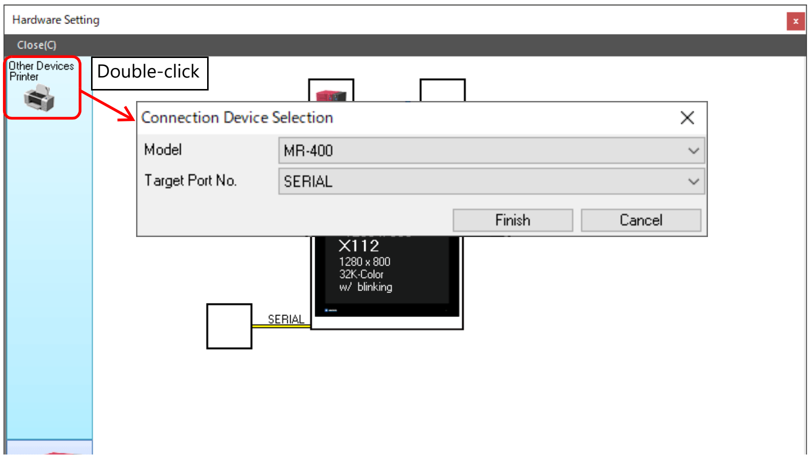
1.4.3 Other Equipment



Printer

Configure these settings when connecting a printer.

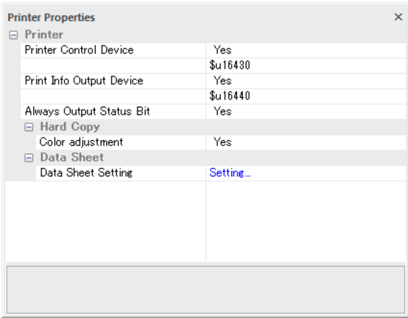
Selecting the printer model



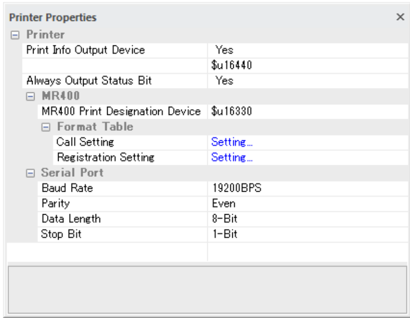
Item	Description
Model	Select the model of the printer to connect. When [None] is selected, printing can be executed by using the function of Windows. For details on configuring the printer settings, refer to the X1 Series Hardware Specifications.
Target Port No.	Select the port where the printer cable is connected.

Printer Properties

When [Model] is set to [None]



When [Model] is set to [MR-400]



<table>
<tr><th colspan="2">Item</th><th>Description</th></tr>
<tr><td colspan="2">Printer Control Device</td><td>When this setting is enabled and the bit is set to ON (0 → 1), screen images and data sheets can be printed out.
MSB LSB
15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 → 1: Screen image output
0 → 1: Data sheet output</td></tr>
<tr><td colspan="2">Printer Info Output Device
(Yes/None)</td><td>When using device memory for outputting printer information, the printer state is output to the specified address.
MSB LSB
15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
0 0 0 0 0 0 0 0 0 0 0 0 0 0
0: End (standby)
1: Transferring print data
0: Not busy
1: Busy</td></tr>
<tr><td colspan="2">Always Output Status Bit
(Yes/None)</td><td>The X1 series unit outputs [0 → 1] when starting to transfer data upon receiving a print command, and outputs [1 → 0] upon finishing transfer. However, these signals may not be output if the print data is small.
Set to [Yes] when bit output is required regardless of the data size.
The output area is shown below.
• Bit 1 of the device memory for outputting printer information
• Bit 0 of internal device memory $s16
$s16
MSB LSB
15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
0 0 0 0 0 0 0 0 0 0 0 0 0 0
0: End (standby)
1: Transferring print data</td></tr>
<tr><td>Hard Copy</td><td>Color adjustment
(Yes/None)</td><td>This setting is enabled when [Reversed] is selected on the X1 series unit. (For details, refer to the X1 Series Hardware Specifications.)
Enabling color adjustment also adjusts colors other than black and white (dark → light, light → dark).
Select [Yes] when TTF fonts are used.</td></tr>
<tr><td>Data Sheet</td><td>Data Sheet Setting</td><td>Make settings for data sheet printing. For more information, refer to the X1 Series Reference Manual 1.</td></tr>
<tr><td rowspan="2">MR400</td><td>MR400 Print Designation Device</td><td>This setting can be configured when MR400 is selected for the printer model.
Set the device memory used to issue printing commands to the MR400.
For details, refer to the X1 Series Reference Manual 1.</td></tr>
<tr><td>Format Table</td><td>Register the printing format.
For details, refer to the X1 Series Reference Manual 1.</td></tr>
<tr><td rowspan="4">Serial port</td><td>Baud Rate</td><td>Specify the baud rate.
4800 / 9600 / 19200 / 38400 / 57600 / 76800 / 115K BPS</td></tr>
<tr><td>Parity</td><td>Set the parity.
None / Odd / Even</td></tr>
<tr><td>Data Length</td><td>Set the number of bits for data.
7-Bit / 8-Bit</td></tr>
<tr><td>Stop Bit</td><td>Set the number of stop bits.
1-Bit / 2-Bit</td></tr>
</table>

* For details on printing, refer to the X1 Series Reference Manual 1.

1.5 System Device Memory for Communication Confirmation

The X1 series has addresses $s and $Pn as system device memory.

- $Pn
  This is the system device memory for 8-way communications, and 512 words are allocated for each logical port. For more information, see "1.5.1 $Pn (For 8-way Communication)".

- $s518
  This is the system device memory for confirming the Ethernet status. For more information, see "1.5.2 $s (Ethernet Status Confirmation)".

  For the device memory address $s, $s0 to 2047 (2 K words) are assigned and data can be read from written to this area. For more information on addresses other than $s518, refer to the X1 Series Reference Manual 1.

1.5.1 $Pn (For 8-way Communication)

This is the system device memory for 8-way communications, and 512 words are assigned for each logical port. Refer to the next section for more information.

$P1: 0000 : $P1: 0511	PLC1 area
$P2: 0000 : $P2: 0511	PLC2 area
$P3: 0000 : $P3: 0511	PLC3 area
$P4: 0000 : $P4: 0511	PLC4 area
$P5: 0000 : $P5: 0511	PLC5 area
$P6: 0000 : $P6: 0511	PLC6 area
$P7: 0000 : $P7: 0511	PLC7 area
$P8: 0000 : $P8: 0511	PLC8 area

$Pn List

The $Pn list is presented below. Part of the information of logical ports PLC1/PLC2 can also be stored in $s.[*1]

$Pn (n = 1 to 8)	$s[*1]	Contents	Device Type
000	111 (PLC1)	X1 local port number Stores the local port number of the X1 series. (Universal serial communication, slave communication, etc.)	←X1
:	-	:	
004	130 (PLC1)[*2]	Modbus TCP/IP Sub Station communications Relay station No. designated device memory When a relay station number is set with a MOV macro command, the error information of the sub station number that is connected to that relay station is stored in $Pn010 to 025.	→X1
:	-	:	
010	128 (PLC1)	Link down information (station No. 0 - 15) 0: Normal 1: Down	←X1
011	129 (PLC1)	Link down information (station No. 16 - 31) 0: Normal 1: Down	
012	114 (PLC1)	Link down information (station No. 32 - 47) 0: Normal 1: Down	
013	115 (PLC1)	Link down information (station No. 48 - 63) 0: Normal 1: Down	
014	116 (PLC1)	Link down information (station No. 64 - 79) 0: Normal 1: Down	
015	117 (PLC1)	Link down information (station No. 80 - 95) 0: Normal 1: Down	
016	118 (PLC1)	Link down information (station No. 96 - 111) 0: Normal 1: Down	
017	119 (PLC1)	Link down information (station No. 112 - 127) 0: Normal 1: Down	
018	120 (PLC1)	Link down information (station No. 128 - 143) 0: Normal 1: Down	
019	121 (PLC1)	Link down information (station No. 144 - 159) 0: Normal 1: Down	
020	122 (PLC1)	Link down information (station No. 160 - 175) 0: Normal 1: Down	
021	123 (PLC1)	Link down information (station No. 176 - 191) 0: Normal 1: Down	
022	124 (PLC1)	Link down information (station No. 192 - 207) 0: Normal 1: Down	
023	125 (PLC1)	Link down information (station No. 208 - 223) 0: Normal 1: Down	
024	126 (PLC1)	Link down information (station No. 224 - 239) 0: Normal 1: Down	
025	127 (PLC1)	Link down information (station No. 240 - 255) 0: Normal 1: Down	
:	-	:	
099	-	Error information hold (page 1-41) Setting for the update timing of the $Pn: 010 to 025 link down information 0: Always updated with the latest information Other than 0: Only updated when a communication error occurs	→X1
100	730 (PLC2)	Error status Station No. 00 status (page 1-42)	←X1
101	731 (PLC2)	Error status Station No. 01 status (page 1-42)	
102	732 (PLC2)	Error status Station No. 02 status (page 1-42)	
103	733 (PLC2)	Error status Station No. 03 status (page 1-42)	
104	734 (PLC2)	Error status Station No. 04 status (page 1-42)	
105	735 (PLC2)	Error status Station No. 05 status (page 1-42)	
106	736 (PLC2)	Error status Station No. 06 status (page 1-42)	
107	737 (PLC2)	Error status Station No. 07 status (page 1-42)	
108	738 (PLC2)	Error status Station No. 08 status (page 1-42)	
109	739 (PLC2)	Error status Station No. 09 status (page 1-42)	

$Pn (n = 1 to 8)	$s[*1]	Contents	Device Type
110	740 (PLC2)	Error status Station No. 10 status (page 1-42)	←X1
:	:	:	
120	750 (PLC2)	Error status Station No. 20 status (page 1-42)	
:	:	:	
130	760 (PLC2)	Error status Station No. 30 status (page 1-42)	
131	761 (PLC2)	Error status Station No. 31 status (page 1-42)	
132	820 (PLC2)	Error status Station No. 32 status (page 1-42)	
133	821 (PLC2)	Error status Station No. 33 status (page 1-42)	
:	:	:	
140	828 (PLC2)	Error status Station No. 40 status (page 1-42)	
:	:	:	
150	838 (PLC2)	Error status Station No. 50 status (page 1-42)	
:	:	:	
160	848 (PLC2)	Error status Station No. 60 status (page 1-42)	
:	:	:	
170	858 (PLC2)	Error status Station No. 70 status (page 1-42)	
:	:	:	
180	868 (PLC2)	Error status Station No. 80 status (page 1-42)	
:	:	:	
190	878 (PLC2)	Error status Station No. 90 status (page 1-42)	
:	:	:	
199	887 (PLC2)	Error status Station No. 99 status (page 1-42)	
200	-	Error status Station No. 100 status (page 1-42)	
:	:	:	
350	-	Error status Station No. 250 status (page 1-42)	
:	:	:	
355	-	Error status Station No. 255 status (page 1-42)	
356	-	Device memory map 0 Status	←X1
357	-	Device memory map 0 Error code 1	
358	-	Device memory map 0 Error code 2	
359-361	-	Device memory map 1 Status, error code	
362-364	-	Device memory map 2 Status, error code	
365-367	-	Device memory map 3 Status, error code	
368-370	-	Device memory map 4 Status, error code	
371-373	-	Device memory map 5 Status, error code	
374-376	-	Device memory map 6 Status, error code	
377-379	-	Device memory map 7 Status, error code	
380-382	-	Device memory map 8 Status, error code	
383-385	-	Device memory map 9 Status, error code	
386-388	-	Device memory map 10 Status, error code	
389-391	-	Device memory map 11 Status, error code	
392-394	-	Device memory map 12 Status, error code	
395-397	-	Device memory map 13 Status, error code	
398-400	-	Device memory map 14 Status, error code	
401-403	-	Device memory map 15 Status, error code	
404-406	-	Device memory map 16 Status, error code	
407-409	-	Device memory map 17 Status, error code	
410-412	-	Device memory map 18 Status, error code	
413-415	-	Device memory map 19 Status, error code	
416-418	-	Device memory map 20 Status, error code	

$Pn (n = 1 to 8)	$s*1	Contents	Device Type
419-421	-	Device memory map 21 Status, error code	←X1
422-424	-	Device memory map 22 Status, error code	
425-427	-	Device memory map 23 Status, error code	
428-430	-	Device memory map 24 Status, error code	
431-433	-	Device memory map 25 Status, error code	
434-436	-	Device memory map 26 Status, error code	
437-439	-	Device memory map 27 Status, error code	
440-442	-	Device memory map 28 Status, error code	
443-445	-	Device memory map 29 Status, error code	
446-448	-	Device memory map 30 Status, error code	
449	-	Device memory map 31 Status	
450	-	Device memory map 31 Error code 1	
451	-	Device memory map 31 Error code 2	
:	:	:	
493	762 (PLC2)*3	Device memory map reading prohibited flag (refer to the X1 Series Reference Manual 2). 0: Periodical reading/synchronized reading executed Other than 0: Periodical reading/synchronized reading stopped	→X1
494	763 (PLC2)*3	Forced execution of the device memory map TRL_READ/TBL_WRITE macro Setting for macro operation when there is a station with a communication error 0: The macro is not executed in relation to any of the stations. Other than 0: The macro is executed in relation to connected stations.	
495	764 (PLC2)*3	Device memory map writing prohibited flag (refer to the X1 Series Reference Manual 2). 0: Periodical writing/synchronized writing executed Other than 0: Periodical writing/synchronized writing stopped	
:	-	:	
500	800 (PLC3)	Device memory for Modbus slave communications Used for setting the number of the reference device memory map and the device memory for referring free area 31.Used for setting the number of the reference device memory map and the device memory for referring free area 31. $Pn500 to 505 are exclusively used for monitoring: $s800 to 805 are used for writing from the Modbus master. Refer to the Modbus Slave Communication Specifications.	→X1
501	801 (PLC3)		
502	802 (PLC3)		
503	803 (PLC3)		
504	804 (PLC3)		
505	805 (PLC3)		
:	:	:	
508	765 (PLC2)	Error response code (page 1-45) If "800BH" (error code received) is stored for the error status ($Pn100 to 355), it is possible to check the error code.	←X1
509	766 (PLC2)		
510	767 (PLC2)		
511	768 (PLC2)		

*1 For PLC1, select [Yes] for [System device ($s) V7 Compatible] under [Detail] on the [PLC Properties] window. The same information is stored in the $P1 and $s.
*2 If designating the relay station number using $s130, select [Yes] for [System device ($s) V7 Compatible] under [Detail] on the [PLC Properties] window for PLC1. $P1: 004 cannot be used in this case.
*3 If executing device memory map control using $s762, $s763 and $s764, select yes for [System device ($s) V7 Compatible] under [Detail] on the [PLC Properties] window for PLC2. Note that $P2: 493/494/495 cannot be used in this case.

Details

$Pn: 10 to 25

The bit corresponding to the station where a link down was detected is set (ON).

0: Normal
1: Down

$Pn: 10

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Station No. 15 … Station No. 0

$Pn: 11

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Station No. 31 … Station No. 16

$Pn: 25

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Station No. 255 … Station No. 240

$Pn:99

The update timing for the link down information stored in $Pn: 010 to 025 and the error status stored in $Pn: 100 to 355 are set here.

0: Always updated with the latest information
Other than 0: Only updated when a communication error occurs

- Example:
  An error has occurred at station No. 18. 2nd bit of $Pn: 011 is set (ON).

Station No. 31 … Station No. 16

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
$Pn: 011	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Station No. 18 Link down

After resetting communications

- If $Pn: 99 = 0, the link down information is updated.

Station No. 31 … Station No. 16

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
$Pn: 011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Station No. 18 Normal communication

- If $Pn: 99 = other than 0, the link down information is not updated.

Station No. 31 … Station No. 16

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
$Pn: 011	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Station No. 18 Link down

$Pn: 100 to 355

The results of communication with each station are stored here. The status codes are shown below.

Code (HEX)	Contents
0000H	Normal
FFFFH	Time-out
8001H	Check code error
8002H	Data error
800BH	Receives the error code from the connected device

Errors other than the above are stored as shown below.

MSB LSB

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
					0		0	0	0	0	0	0	0	0	0

Buffer-full error
Parity error
Overrun error
Framing error
Break detection
Error
0: Bits 0 to 14 are all “0”.
1: Any bit from 0 to 14 is other than “0”.

Error	Details	Solution
Time-out	Although a request to send is given, no answer is returned within the specified time.	Implement solutions 1, 2, and 3.
Check code	The check code of the response is incorrect.	Implement solutions 1 and 3.
Data error	The code of the received data is invalid.	Implement solutions 1, 2, and 3.
Error code received	An error occurred on the connected device.	Refer to the instruction manual for the PLC.
Buffer full	The X1 buffer is full.	Contact your local distributor.
Parity	An error occurred in parity check.	Implement solutions 2 and 3.
Overrun	After receiving one character, the next character was received before internal processing was completed.	Implement solutions 1 and 3.
Framing	Although the stop bit must be “1”, it was detected as “0”.	Implement solutions 1, 2, and 3.
Break detection	The connected device’s SD is remaining at the low level.	Examine the connection with the connected device’s SD and RD.

- Solution

1) Check if the communication settings of the X1 series and the connected device are matched.
2) Check the cable connection.
3) Data may be disrupted because of noise. Fix noise.

If you still cannot solve the error even after following the solutions above, contact your local distributor.

$Pn: 356 to 451

This device memory is valid when an Omron ID controller (V600/620/680) or NITTOKU RFID reader/writer (ITS-HRW110) is connected with [Guarantee synchronism of the data] checked on the [Device Memory Map Setting] dialog.

- Status ($Pn 356, 359, ...)
  The execution status of the device memory map is stored here.
  The bit is set (ON) when reading or writing of the first data in the device memory map is correctly finished.
  When the control device memory (command bit) is set (ON), the bit is reset.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

System reserve

1: ID tag recognized

- Error code 1 ($Pn 357, 360, ...)
  An error code is stored when an error occurs in the reading or writing of data in the device memory map.
  If multiple errors occur in the device memory map, the last error code is stored.
  When the control device memory (command bit) is set (ON), the bit is reset.

Code (HEX)	Contents
FFFFH	Time-out
8001H	Check code error
8002H	Data error
800BH	Receives the error code from the connected device

Errors other than the above are stored as shown below.

MSB LSB

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
					0		0	0	0	0	0	0	0	0	0

Buffer-full error

Parity error

Overrun error

Framing error

Break detection

Error
0: Bits 0 to 14 are all “0”.
1: Any bit from 0 to 14 is other than “0”.

- Error code 2 ($Pn 358, 361, ...)
  The exit code/main response is stored when error code 1 = 800BH.

  For Omron ID Controller (V600/620/680)

Exit Code (HEX)	Contents	
10	Host communication error	Parity error
11		Framing error
12		Overrun error
13		FCS error
14		Format error, execution status error
18		Frame length error
70	Slave communication error	Tag communication error
71		Inconsistency error
72		Tag absence error
76		Copy error
7A		Address error
7C		Antenna disconnection error
7D		Write protect error
75	Tag device memory warning	Data check command Exit code stored when the writing count management command has been successfully processed (without any error)
76		Data check command Exit code stored when the writing count management command has abnormally been processed (comparison error, excessive writing counts)
92	System error	Abnormal mains voltage at antenna
93		Internal device memory error

For NITTOKU RFID Reader/Writer (ITS-HRW 110)

Main response (HEX)	Contents	
00	Command execution success	Success - normal
80		Success - RF power supply OFF/ON control is provided
81		Success - tag no response OK
01	Command execution failure	Command argument - format error
02		Command argument - parameter length error
03		Command argument - parameter error
04		FIFO size error
05		Execution failure
06		Abort (abort with error after execution)
07		Get system info - Retrieve failed (extended Read/Write command system)
08		Get system info - Data error (extended Read/Write command system)
09		Out-of-specification error
0A		System settings update: magic number mismatch
0B		System setting update: incorrect device ID
0C		System setting update: error in writing EEPROM
0D		Fatal error
E0		Protocol mismatch
E1		Mismatch the current settings
FE		Shipping processing mode: Out-of-operating mode
FF		Undefined command
Other than above		Reserved

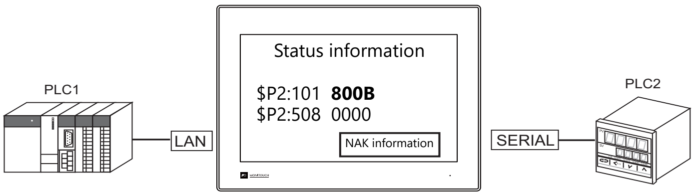
$Pn: 508 to 511

If “800BH” is stored for the error status information ($Pn: 100 to 355), on transferring the data of that station number to any internal device memory address, the reception code will be obtained at $Pn: 508 to 511.

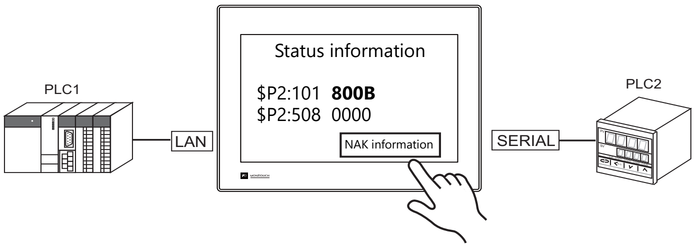
Notes on use • Use $u/$T as the target internal device memory. • Use the macro command MOV (W). MOV (D) cannot be used. • “0” is stored to device memory addresses that have no expansion error code.

- Example PLC2: Fuji Electric PXR station No. 1

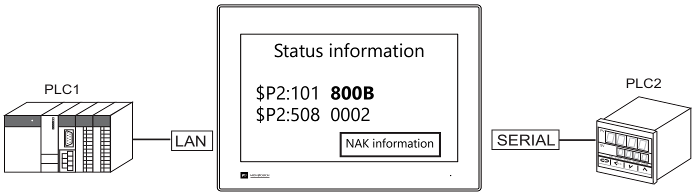
1) On receipt of an error code at station No. 1 of PLC2, “800BH” is stored in $P2:101.



2) The data of $P2: 101 is transferred to $u1000 by a MOV command.
$u1000 = $P2: 101 (W)



3) The reception code is stored in $P2: 508.
$P2:508 = 0002H



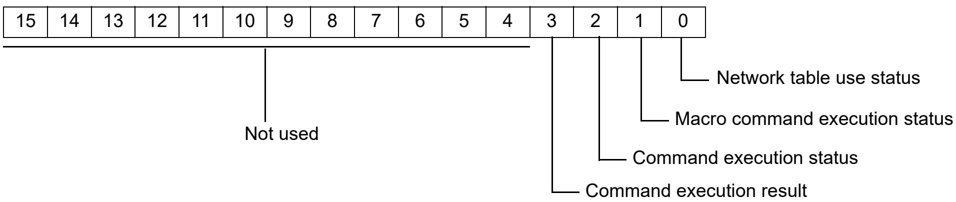
4) The PXR manual shows that code 002H means “device memory address range exceeded”.
Amend the screen program address designation.

1.5.2 $s (Ethernet Status Confirmation)

$s List

$s	Contents	Stored Value
518	Ethernet status (for built-in LAN port)	• [0]: Normal • [801]: Link down error Check the link confirmation LED on the HUB or communication unit. If the LED is not on, check cable connection or the port setting on the network table.
520	Network table 0 status	
521	Network table 1 status	
522	Network table 2 status	
:	:	
617	Network table 97 status	
618	Network table 98 status	
619	Network table 99 status	
:	:	
1400	Network table 100 status	
1401	Network table 101 status	
1402	Network table 102 status	
:	:	
1553	Network table 253 status	
1554	Network table 254 status	
1555	Network table 255 status	
:	:	
1657	Ethernet status (for built-in LAN2 port)	• [0]: Normal • [801]: Link down error Check the link confirmation LED on the HUB or communication unit. If the LED is not on, check cable connection or the port setting on the network table.
1658	Ethernet status (for built-in WLAN port)	
:		

$s520 - 619, 1400 - 1555
Stores the statuses of network table No. 0 to 255.



- Bit 0 (Network table use status)
  0: Not used 1: Used
  For the current station, “0” (not used) is input.
- Bit 1 (Macro command execution status)
  Stores the execution status of MES or Ethernet macros (SEND/EREAD/EWRITE).
  0: Waiting 1: Executing
- Bit 2 (Command execution status)
  Stores the execution status of the command from the server or other station.
  0: Waiting 1: Executing (read/write command)
- Bit 3 (Macro command execution result)
  Stores the execution result of MES or Ethernet macros (SEND/EREAD/EWRITE).
  0: Normal 1: Error
- Bits 4 to 15 (System reserved)
  Not used at present. Always set “0”.

2. SAIA

2.1 PLC Connection

Ethernet Connection

PLC Selection on the Editor	CPU	Unit	TCP/IP	UDP/IP	Port No.	Keep Alive *1
PCD S-BUS (Ethernet)	PCD.M3120 PCD.M3330 PCD.M5340 PCD.M5540 PCD.M6340 PCD.M6540	CPU with built-in Ethernet	×	○	5050	○

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

2.1.1 PCD S-BUS (Ethernet)

Communication Setting

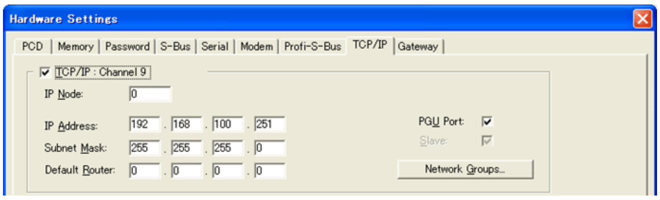
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

PCD S-BUS (Ethernet)



Item	Setting	Remarks
IP Node	Make settings in accordance with the network environment.	For more information, refer to the manual of the PLC.
IP Address	PLC’s IP address	
Subnet Mask	PLC’s subnet mask	
Default Router	Make settings in accordance with the network environment.	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	Double-word
Rfp	(register/floating point)	01H	Double-word
T	(timer)	02H	Double-word
C	(counter)	03H	Double-word
I	(input)	04H	Read only
O	(output)	05H	
F	(flag)	06H	
DB	(DataBlock)	07H	Double-word, *1

*1 The assigned device memory is expressed as shown on the right when editing the screen.

Example: DBxxxxx.yyyyy
Sub address
Block address

Indirect Device Memory Designation

- For DB device memory

	15 MSB 8	7 LSB 0
n + 0	Model	Device type
n + 1	Device No. (Sub address)	
n + 2	Device No. (Block address)	
n + 3	Expansion code	Bit designation
n + 4	00	Station number

3. SAMSUNG

3.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU		Unit/Port	Signal Level	Connection	
					RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
SPC series	SPC-10	SPC-10ADT	RS-232C communication port	RS-232C	Wiring diagram 1 - M2	×
	SPC-100	CPU-10AR				
	SPC-300	CPU-300 CPU-300A CPU-300B CPU-300C	RS-485 communication port	RS-485	Wiring diagram 3 - M4	×
N_plus	N70 plus	CPL9215A CPL9216A	COM1/COM2	RS-232C	Wiring diagram 1 - M2	×
	N700 plus	CPL7215A				
	NX70 plus	NX70-CPU70p1	COM port			
			NX70-CCU+ (CCU)			
		NX70-CPU70p2	COM1/COM2	RS-485	Wiring diagram 1 - M4	×
			NX70-CCU+ (CCU)			
	NX700 plus	NX-CPU700p	COM1/COM2			
			NX-CCU+ (CCU)			
SECNET	N70	CPL9211A	COM port	RS-232C	Wiring diagram 2 - M2	×
				RS-422	×	Wiring diagram 2 - M4
			CPL9462 (CCU)	RS-232C	Wiring diagram 3 - M2	×
	N70α	CPL9210A	COM port	RS-232C	Wiring diagram 4 - M2	×
			CPL9462 (CCU)	RS-232C	Wiring diagram 3 - M2	×
	N700	CPL7210A CPL7211A	COM port	RS-232C	Wiring diagram 2 - M2	×
				RS-422	×	Wiring diagram 2 - M4
			CPL7462 (CCU)	RS-232C	Wiring diagram 3 - M2	×
	N700α	CPL6210A CPL6210B	TOOL port	RS-232C	Wiring diagram 3 - M2	×
			COM port	RS-232C	Wiring diagram 5 - M2	×
			CPL7462 (CCU)	RS-232C	Wiring diagram 3 - M2	×
	N7000	CPL5221B CPL5231	COM port	RS-232C	Wiring diagram 2 - M2	×
				RS-422	×	Wiring diagram 2 - M4
			CPL5462 (CCU)	RS-232C	Wiring diagram 3 - M2	×
	N7000α	CPL4210 CPL4211	COM1	RS-422	×	Wiring diagram 2 - M4
			COM2	RS-232C	Wiring diagram 5 - M2	×
			CPL5462 (CCU)	RS-232C	Wiring diagram 3 - M2	×
	NX70	NX70-CPU70	TOOL port	RS-232C	Wiring diagram 1 - M2	×
			NX70-CCU (CCU)	RS-232C	Wiring diagram 6 - M2	×
		NX70-CPU750	TOOL port	RS-232C	Wiring diagram 1 - M2	×
			COM port	RS-232C	Wiring diagram 6 - M2	×
			NX70-CCU (CCU)	RS-232C	Wiring diagram 6 - M2	×
	NX700	NX-CPU750A NX-CPU750B NX-CPU750C NX-CPU750D	TOOL port	RS-232C	Wiring diagram 1 - M2	×
			COM port	RS-232C	Wiring diagram 6 - M2	×
			NX-CCU (CCU)	RS-232C	Wiring diagram 6 - M2	×
		NX-CPU700	TOOL port	RS-232C	Wiring diagram 1 - M2	×
			NX-CCU (CCU)	RS-232C	Wiring diagram 6 - M2	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

3.1.1 SPC Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	<u>1 : 1</u> / 1 : n	
Signal Level	<u>RS-232C</u> / RS-422/485	
Baud Rate	**9600 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**None**	
Target Port No.	<u>0</u> to 255	

PLC

Communication setting

Baud rate: 9600 bps, data length: 8 bits, stop bit: 1 bit, without parity (fixed)

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(input/output)	00H	
L	(link relay)	01H	
M	(internal relay)	02H	
K	(keep relay)	03H	
F	(special relay)	04H	
W	(word register)	05H	

3.1.2 N_plus

Communication Setting

Editor

Communication setting

(Underlined setting: default)

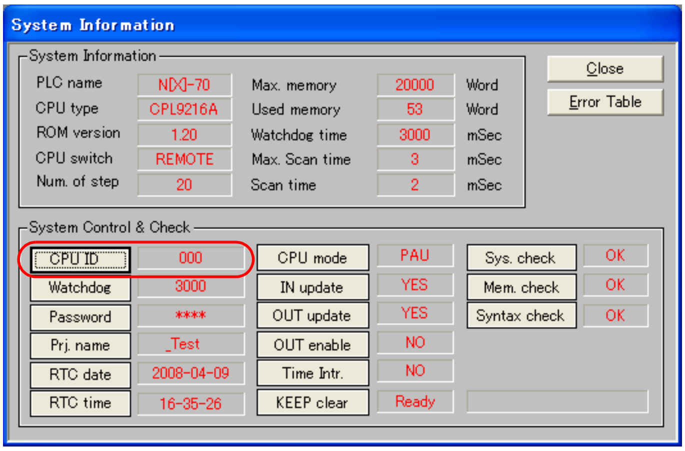
Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	For RS-485 connection, set the transmission delay time to 3 msec or longer.
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**None**	
Target Port No.	0 to 31	

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.

System information

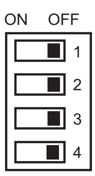
Set a station number for the PLC using the PLC software “WINGPC”. For more information, refer to the PLC manual issued by the manufacturer.



Setting Item	Setting	Remarks
CPU ID	0 to 223, 255	

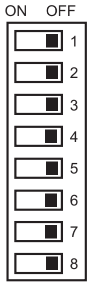
CPL9215A

DIP switches 1

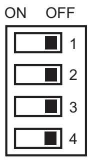
<table>
<tr><th colspan="2">DIPSW1</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="4"></td><td>SW1</td><td>Program write target</td><td>ON: EEPROM
OFF: RAM</td></tr>
<tr><td>SW2</td><td>RS-232C / RS-485 selection</td><td>ON: RS-485
OFF: RS-232C</td></tr>
<tr><td>SW3</td><td rowspan="2">Baud rate selection</td><td rowspan="2"><table><tr><th>SW3</th><th>SW4</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>38400bps</td></tr><tr><td>OFF</td><td>ON</td><td>19200bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW4</td></tr>
</table>

CPL9216A

DIP switches 1

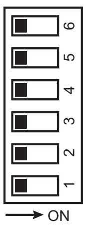
<table>
<tr><th colspan="2">DIPSW1</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8">
</td><td>SW1</td><td rowspan="2">Baud rate selection (COM1)</td><td rowspan="2"><table><tr><th>SW1</th><th>SW2</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>19200bps</td></tr><tr><td>OFF</td><td>ON</td><td>38400bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW2</td></tr>
<tr><td>SW3</td><td rowspan="2">Baud rate selection (COM2)</td><td rowspan="2"><table><tr><th>SW3</th><th>SW4</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>19200bps</td></tr><tr><td>OFF</td><td>ON</td><td>38400bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW4</td></tr>
<tr><td>SW5</td><td>RS-232C / RS-485 selection (COM1)</td><td>ON: RS-485
OFF: RS-232C</td></tr>
<tr><td>SW6</td><td>RS-232C / RS-485 selection (COM2)</td><td>ON: RS-485
OFF: RS-232C</td></tr>
<tr><td>SW7</td><td>Not used</td><td>OFF</td></tr>
<tr><td>SW8</td><td>Program write target</td><td>ON: EEPROM
OFF: RAM</td></tr>
</table>

DIP switches 2

<table>
<tr><th colspan="2">DIPSW2</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="4">
</td><td>SW1</td><td rowspan="2">COM1 terminating resistance
(for RS-485 connection)</td><td rowspan="2"><table><tr><th>SW1</th><th>SW2</th><th>Terminating Resistance</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>ON</td><td>Valid</td></tr></table></td></tr>
<tr><td>SW2</td></tr>
<tr><td>SW3</td><td rowspan="2">COM2 terminating resistance
(for RS-485 connection)</td><td rowspan="2"><table><tr><th>SW3</th><th>SW4</th><th>Terminating Resistance</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>ON</td><td>Valid</td></tr></table></td></tr>
<tr><td>SW4</td></tr>
</table>

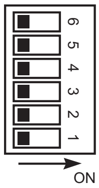
CPL7215A

DIP switches 1

<table>
<tr><th colspan="2">DIPSW1</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="6">
</td><td>SW1</td><td>Baud rate selection (COM1)</td><td>ON: 19200bps
OFF: 9600bps</td></tr>
<tr><td>SW2</td><td rowspan="2">Baud rate selection (COM2)</td><td rowspan="2"><table><tr><th>SW2</th><th>SW3</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>19200bps</td></tr><tr><td>OFF</td><td>ON</td><td>38400bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW3</td></tr>
<tr><td>SW4</td><td>Program write target</td><td>ON: EEPROM
OFF: RAM</td></tr>
<tr><td>SW5</td><td rowspan="2">COM2 terminating resistance
(for RS-485 connection)</td><td rowspan="2"><table><tr><th>SW5</th><th>SW6</th><th>Terminating Resistance</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>ON</td><td>Valid</td></tr></table></td></tr>
<tr><td>SW6</td></tr>
</table>

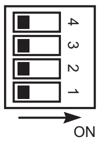
NX70-CPU70p1 (COM Port)

DIP switches

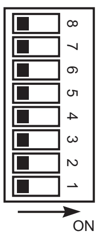
<table>
<tr><th colspan="2">DIPSW</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="6"></td><td>SW1</td><td rowspan="2">Terminating resistance
(for RS-485 connection)</td><td rowspan="2"><table><tr><th>SW1</th><th>SW2</th><th>Terminating Resistance</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>ON</td><td>Valid</td></tr></table></td></tr>
<tr><td>SW2</td></tr>
<tr><td>SW3</td><td>Program write target</td><td>ON: EEPROM
OFF: RAM</td></tr>
<tr><td>SW4</td><td>RS-232C / RS-485 selection</td><td>ON: RS-485
OFF: RS-232C</td></tr>
<tr><td>SW5</td><td rowspan="2">Baud rate selection</td><td rowspan="2"><table><tr><th>SW5</th><th>SW6</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>38400bps</td></tr><tr><td>OFF</td><td>ON</td><td>19200bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW6</td></tr>
</table>

NX70-CPU70p2 (COM Port) / NX-CPU700p (COM Port)

DIP switches 1

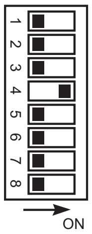
<table>
<tr><th colspan="2">DIPSW1</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="4"></td><td>SW1</td><td rowspan="2">COM1 terminating resistance
(for RS-485 connection)</td><td rowspan="2"><table><tr><th>SW1</th><th>SW2</th><th>Terminating Resistance</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>ON</td><td>Valid</td></tr></table></td></tr>
<tr><td>SW2</td></tr>
<tr><td>SW3</td><td rowspan="2">COM2 terminating resistance
(for RS-485 connection)</td><td rowspan="2"><table><tr><th>SW3</th><th>SW4</th><th>Terminating Resistance</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>ON</td><td>Valid</td></tr></table></td></tr>
<tr><td>SW4</td></tr>
</table>

DIP switches 2

<table>
<tr><th colspan="2">DIPSW2</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8"></td><td>SW1</td><td>Program write target</td><td>ON: EEPROM
OFF: RAM</td></tr>
<tr><td>SW2</td><td>Not used</td><td>OFF</td></tr>
<tr><td>SW3</td><td>RS-232C / RS-485 selection (COM2)</td><td>ON: RS-485
OFF: RS-232C</td></tr>
<tr><td>SW4</td><td>RS-232C / RS-485 selection (COM1)</td><td>ON: RS-485
OFF: RS-232C</td></tr>
<tr><td>SW5</td><td rowspan="2">Baud rate selection (COM1)</td><td rowspan="2"><table><tr><th>SW5</th><th>SW6</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>38400bps</td></tr><tr><td>OFF</td><td>ON</td><td>19200bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW6</td></tr>
<tr><td>SW7</td><td rowspan="2">Baud rate selection (COM2)</td><td rowspan="2"><table><tr><th>SW7</th><th>SW8</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>OFF</td><td>38400bps</td></tr><tr><td>OFF</td><td>ON</td><td>19200bps</td></tr><tr><td>ON</td><td>ON</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW8</td></tr>
</table>

NX-CCU+(CCU) / NX70-CCU+(CCU)

DIP switches

<table>
<tr><th colspan="2">DIPSW</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8"></td><td>SW1</td><td rowspan="3">Baud rate selection</td><td rowspan="3"><table><tr><th>SW1</th><th>SW2</th><th>SW3</th><th>Baud Rate</th></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>38400bps</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>19200bps</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>9600bps</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>4800bps</td></tr></table></td></tr>
<tr><td>SW2</td></tr>
<tr><td>SW3</td></tr>
<tr><td>SW4</td><td>Data length</td><td>ON: 8 bits</td></tr>
<tr><td>SW5</td><td rowspan="2">Parity check</td><td rowspan="2">OFF: None</td></tr>
<tr><td>SW6</td></tr>
<tr><td>SW7</td><td>Stop bit</td><td>OFF: 1 bit</td></tr>
<tr><td>SW8</td><td>Reserved</td><td>OFF</td></tr>
</table>

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(input/output)	00H	
L	(link relay)	01H	
M	(internal relay)	02H	
K	(keep relay)	03H	
F	(special relay)	04H	
W	(word register)	05H	

3.1.3 SECNET

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 76800 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	Only port No. 31 is valid, depending on the CPU model. For connection with a CCU module, select port No. 1.
Header	% (Header) / < (Extension Header)	Models on which "< (Expansion Header)" is available: NX-CPU750A / NX-CPU750B / NX-CPU750C / NX-CPU750D / NX70-CPU750
Monitor Registration	Unchecked / Checked	One X1 unit can be registered as a monitor for one PLC.

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.

Available Device Memory

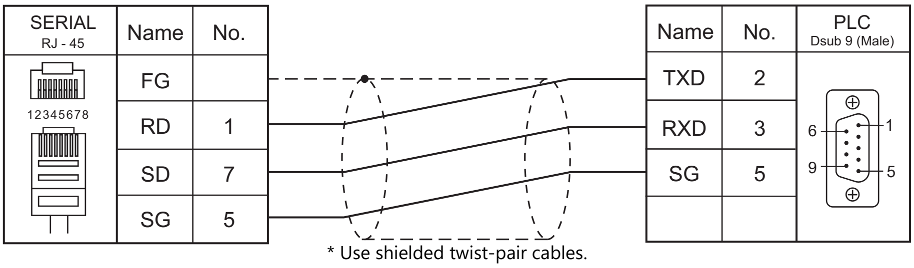
The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DT	(data register)	00H	
X	(external input)	01H	WX as word device, read only
Y	(external output)	02H	WY as word device
R	(internal relay)	03H	WR as word device
L	(link relay)	04H	WL as word device
LD	(link register)	05H	
FL	(file register)	06H	
SV	(timer, counter/set value)	07H	
EV	(timer, counter/elapsed time)	08H	
T	(timer/contact)	09H	Read only
C	(counter/contact)	0AH	Read only

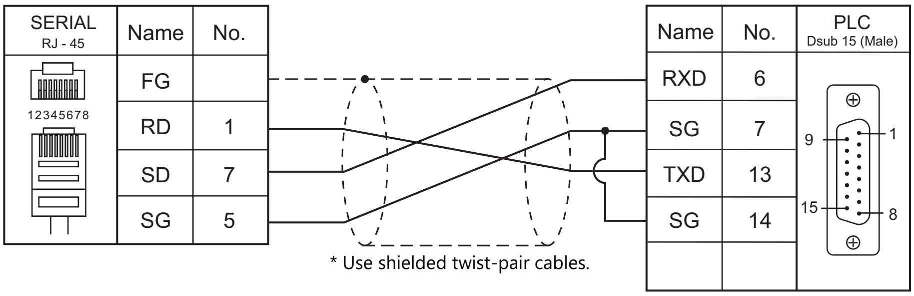
3.1.4 Wiring Diagrams

RS-232C

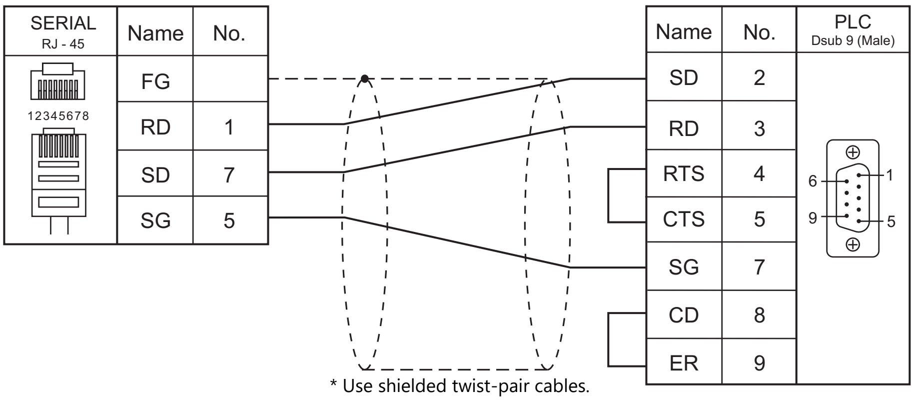
Wiring diagram 1 - M2



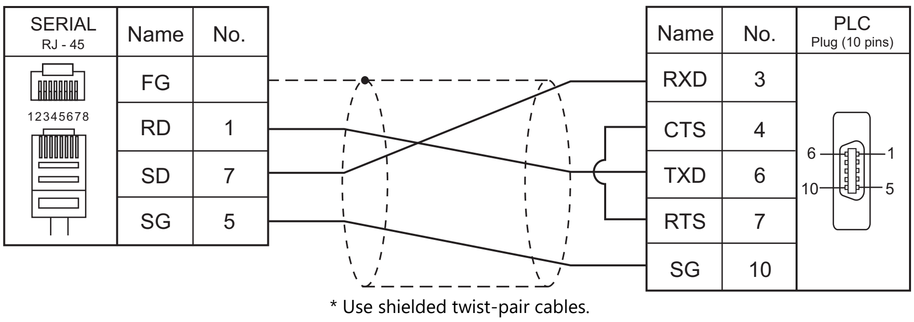
Wiring diagram 2 - M2



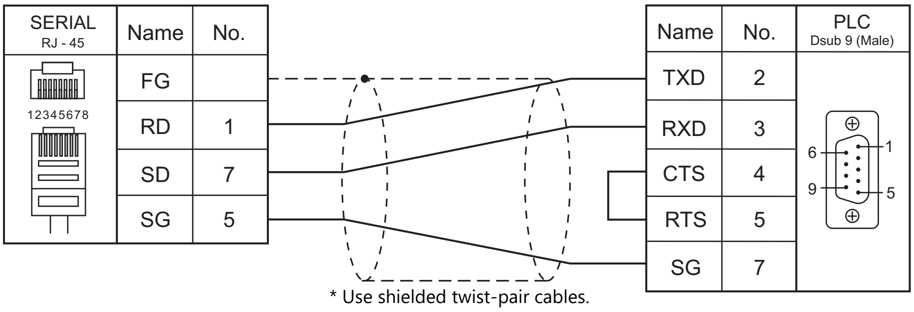
Wiring diagram 3 - M2



Wiring diagram 4 - M2

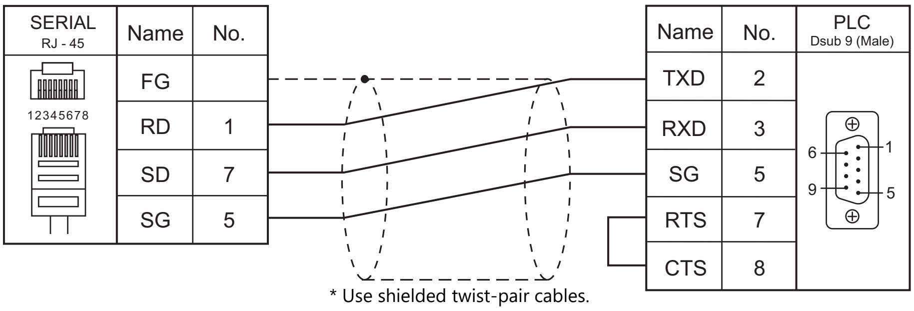


Wiring diagram 5 - M2



* Use shielded twist-pair cables.

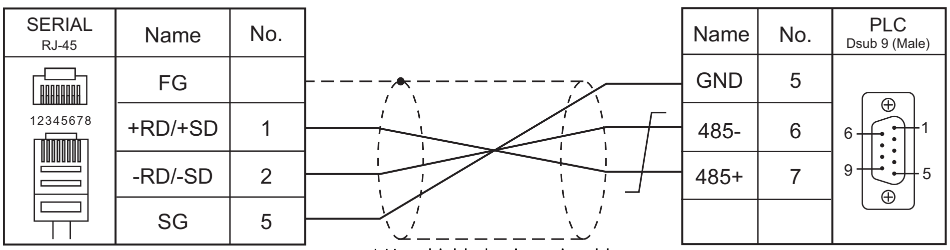
Wiring diagram 6 - M2



* Use shielded twist-pair cables.

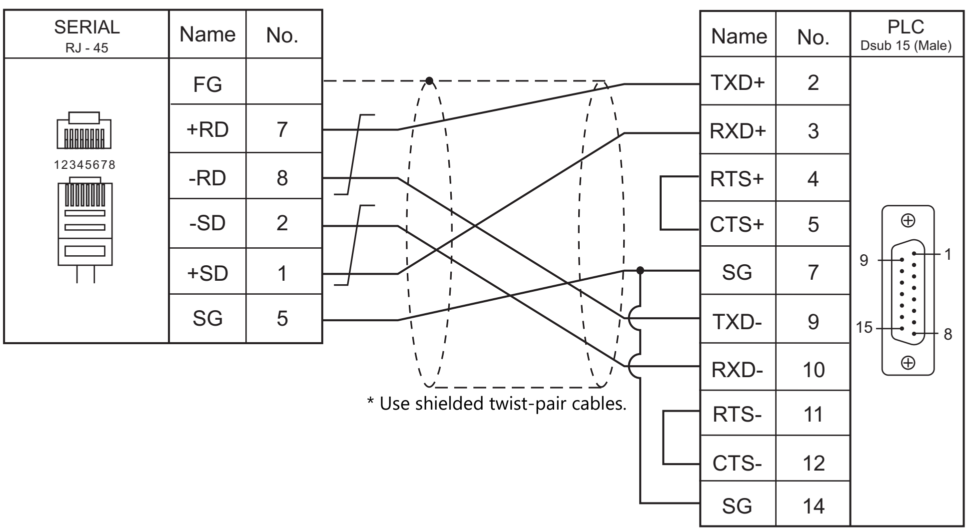
RS-422/RS-485

Wiring diagram 1 - M4



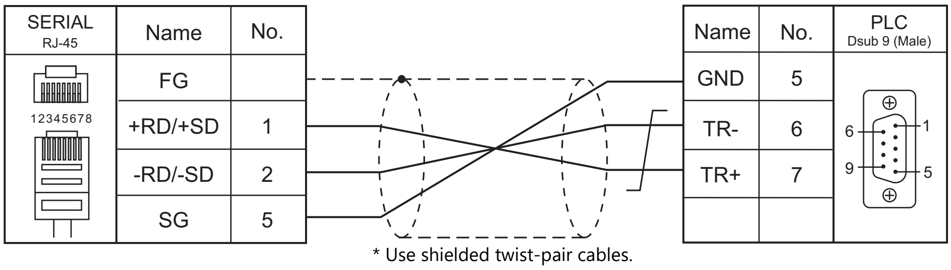
* Use shielded twist-pair cables.

Wiring diagram 2 - M4



* Use shielded twist-pair cables.

Wiring diagram 3 - M4



4. SanRex

4.1 Temperature Controller/Servo/Inverter Connection

Serial Connection

DC Power Supply Unit

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C / RS-485 (2-wire)	RS-422 (4-wire)*1	
DC AUTO (HKD type)	HKD B type	Terminal block	RS-422	×	Wiring diagram 1 - M4	HKD.Lst

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

4.1.1 DC AUTO (HKD type)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	**RS-422/485**	
Baud Rate	**9600 bps**	
Parity	**Even**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Target Port No.	1 to 31	

DC AUTO (Type HKD B)

Item	Setting	Remarks
Communication address	1 to 31	
Baud rate	**9600 BPS**	
Transmission mode	**8E1**	
REMOTE/PANEL key	**REMOTE**	Remote control mode *1

*1 This setting is not provided, depending on the model.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

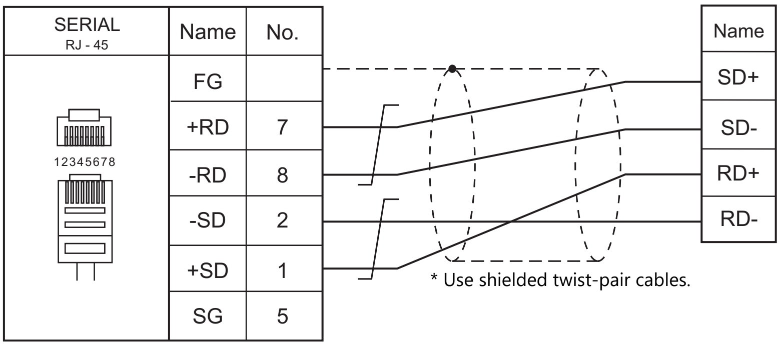
Device Memory		TYPE	Remarks
M	(monitor data)	00H	Read only
MD	(monitor data (4 bytes))	01H	Double-word, read only
S	(setting data)	02H	*1
SD	(setting data (4 bytes))	03H	Double-word

*1 When changing the data setting, press the REMOTE/PANEL key to select the remote mode.

4.1.2 Wiring Diagrams

RS-422/RS-485

Wiring diagram 1 - M4



5. SANMEI

5.1 Temperature Controller/Servo/Inverter Connection

AC Servo Driver

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)*2	
Cuty Axis	QT-0xxAX	CN4	RS-232C	Wiring diagram 1 - M2	×	SanQT.Lst
			RS-422	×	Wiring diagram 1 - M4	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

5.1.1 Cuty Axis

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	**9600 bps (fixed)**	
Data Length	**8 bits (fixed)**	
Stop Bit	**1 bit (fixed)**	
Parity	**Even (fixed)**	
Target Port No.	0 to 9	Set the same number as the axis number of the AC servo driver.

AC Servo Driver

The communication parameters can be set using the MODE key on the built-in digital operator attached to the front of the AC servo driver.
They can also be set by using the software "Cuty Wave" or the ladder program.
For settings using the software or ladder program, refer to the AC servo driver manual issued by the manufacturer.

(Underlined setting: default)

Mode	Parameter No.	Item	Setting	Remarks
Parameter mode (P-)	27	Axis number	0 to 9	Invalid during RS-232C communication

The following settings are fixed; baud rate: 9600 bps, data length: 8 bits, stop bit: 1 bit, and parity: even.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
PRM	(parameter) *1	00H	Double-word
TBL	(point table) *2	01H	Double-word
OPE	(basic operation)	02H	Double-word
MON	(value monitor) *1	03H	Double-word, read only
IO	(I/O monitor) *1	04H	Double-word, read only
ALM	(alarm status) *1	05H	Double-word, read only
S	(servo status)	06H	Double-word, read only
VV	(internal monitor)	07H	Double-word, read only

*1 When using the parameter, value monitor, I/O monitor or alarm status device memory, set the address with the number of digits shown below. For other types of device memory, see "Device Memory Types" described later.

- Parameter, value monitor, I/O monitor: 8 digits
- Alarm status: 4 digits

*2 Address denotations
On the signal name reference list, every point number is designated as "00". To access any point number other than "00", manually input the desired number.

aabb

Point number (00H to 07H)
Address

Device Memory Types

Type	Address	Name	Digits
TBL (Point table)	0	Absolute/relative value	2
	1	Distance of movement	8
	2	Speed	4
	3	Acceleration/deceleration time constant	4
	4	Wait time	4
	5	Continuous motion	2
	6	Branch target point number	2
	7	Acceleration/deceleration ON/OFF at S	2
	8	Expansion (1)	2
	9	Expansion (2)	4
OPE (Basic operation)	0	Write into EEPROM	1
	1	Servo ON	1
	2	Servo OFF	1
	3	Emergency stop ON	1
	4	Emergency stop OFF	1
	5	Alarm reset	1
	6	Start ON	1
	7	Start OFF	1
	8	Zero start ON	1
	9	Zero start OFF	1
	A	Zero deceleration ON	1
	B	Zero deceleration OFF	1
	C	Pause ON	1
	D	Pause OFF	1
	E	Single block ON	1
	F	Single block OFF	1
	10	Point No. designation	2
	11	Log clear	1
	12	Torque peak reset	1
	13	Machine zero point change	8
	14	Reset	1
	15	Normal JOG	1
	16	Reverse JOG	1
	17	JOG stop	1
	18	General-purpose output setting	2
	19	General-purpose output	2
	1A	Smoothing setting	8

Type	Address	Name	Digits
S (Servo status)	0	Servo status	8
	1	Command point	2
	2	Motor type	2
	3	ROM version	4
	4	System data 1	4
	5	System data 2	4
	6	System data 3	2
	7	System data 4	2
Internal monitor (VV)	0	System data 1	2
	1	System data 2	2
	2	System data 3	2
	3	System data 4	2
	4	System data 5	2
	5	System data 6	2
	6	System data 7	2
	7	System data 8	2
	8	Speed [rpm]	8
	9	Torque [%]	8
	A	Torque (+-) peak [%]	8
	B	Current position [pulse]	8
	C	Position command [pulse]	8
	D	Position deviation [pulse]	8
	E	Servo status	8
	F	I/O status	8
	10	System data 9	4
	11	System data 10	4
	12	System data 11	4
	13	Point being executed	2

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Data write of all axes (PRM, OPE)	1 - 8 (PLC1 - 8)	n	Command: 7FH *1	5
		n + 1	Device number 00H: Parameter (PRM) 02H: Basic operation (OPE)	
		n + 2	Address	
		n + 3	Data (lower)	
		n + 4	Data (higher)	
Data write of all axes *2 (TBL)	1 - 8 (PLC1 - 8)	n	Command: 7FH *1	23*3
		n + 1	Device number 01H: Point table (TBL)	
		n + 2	Point number: 0000H to 0007H	
		n + 3 to n + 4	Absolute/relative value: 0 to 1	
		n + 5 to n + 6	Distance of movement: -9999999 to 9999999	
		n + 7 to n + 8	Speed: 1 to 5000	
		n + 9 to n + 10	Acceleration/deceleration time constant: 1 to 9999	
		n + 11 to n + 12	Wait time: 0 to 9999	
		n + 13 to n + 14	Continuous motion: 0 to 1	
		n + 15 to n + 16	Branch target point number: 0 to 107	
		n + 17 to n + 18	S-shaped motion ON/OFF: 0 to 1	
		n + 19 to n + 20	Expansion 1 *3	
		n + 21 to n + 22	Expansion 2 *3	
Data write of each axis (PRM, OPE)	1 - 8 (PLC1 - 8)	n	Station number: 0100H to 0109H	5
		n + 1	Device number 00H: Parameter (PRM) 02H: Basic operation (OPE)	
		n + 2	Address	
		n + 3	Data (lower)	
		n + 4	Data (higher)	
Data write of each axis (TBL)	1 - 8 (PLC1 - 8)	n	Station number: 0100H to 0109H	23*3
		n + 1	Device number 01H: Point table (TBL)	
		n + 2	Point number: 0000H to 0007H	
		n + 3 to n + 4	Absolute/relative value: 0 to 1	
		n + 5 to n + 6	Distance of movement: -9999999 to 9999999	
		n + 7 to n + 8	Speed: 1 to 5000	
		n + 9 to n + 10	Acceleration/deceleration time constant: 1 to 9999	
		n + 11 to n + 12	Wait time: 0 to 9999	
		n + 13 to n + 14	Continuous motion: 0 to 1	
		n + 15 to n + 16	Branch target point number: 0 to 107	
		n + 17 to n + 18	S-shaped motion ON/OFF: 0 to 1	
		n + 19 to n + 20	Expansion 1 *3	
		n + 21 to n + 22	Expansion 2 *3	
Teaching	1 - 8 (PLC1 - 8)	n	Station number: 00H to 09H	2
		n + 1	Command: 0000H	
		n + 2	Data (lower)	
		n + 3	Data (higher)	

Contents	F0	F1 (= $u n)		F2
T waveform monitor sampling	1 - 8 (PLC1 - 8)	n	Station number: 00H to 09H	5
		n + 1	Command: 0001H	
		n + 2	Control code Bit - 7 6 5 4 3 2 1 0 Trigger target 0: Speed 1: Torque 2: Servo status 3: Manual Trigger edge 0: Leading edge in normal turn 1: Trailing edge in normal turn 2: Leading edge in reverse turn 3: Trailing edge in reverse turn Sampling interval 0: 2 ms (50 ms/div) 1: 4 ms (100 ms/div) 2: 8 ms (200 ms/div) 3: 20 ms (500 ms/div) Operation command 0: Stop 1: Run	
		n + 3	Trigger position 00H to 1EH (0FH: Center)	
		n + 4	Servo status bit Bit - 7 6 5 4 3 2 1 0 Positioning	
		n + 5	Servo status	
		n + 6	Torque	
		n + 7	Speed	
		n + 8	Servo status	
		:	:	
		n + 51	Torque	
		n + 52	Speed	
Servo status acquisition	1 - 8 (PLC1 - 8)	n	Station number: 00H to 09H	2
		n + 1	Command: 0002H	
		n + 2 to n + 3	Servo status	
		n + 4 to n + 5	Command point	
		n + 6 to n + 7	Motor type	
		n + 8 to n + 9	ROM version	
		n + 10 to n + 11	System data	
		n + 12 to n + 13	System data	
		n + 14 to n + 15	System data	
		n + 16 to n + 17	System data	

Contents	F0	F1 (= $u n)		F2
Internal monitor	1 - 8 (PLC1 - 8)	n	Station number: 00H to 09H	2
		n + 1	Command: 0003H	
		n + 2 to n + 3	System data	
		n + 4 to n + 5	System data	
		n + 6 to n + 7	System data	
		n + 8 to n + 9	System data	
		n + 10 to n + 11	System data	
		n + 12 to n + 13	System data	
		n + 14 to n + 15	System data	
		n + 16 to n + 17	System data	
		n + 18 to n + 19	Speed [rpm]	
		n + 20 to n + 21	Torque [%]	
		n + 22 to n + 23	Torque (+) peak [%]	
		n + 24 to n + 25	Current position [pulse]	
		n + 26 to n + 27	Position command [pulse]	
		n + 28 to n + 29	Position deviation [pulse]	
		n + 30 to n + 31	Servo status	
		n + 32 to n + 33	I/O status	
		n + 34 to n + 35	System data	
		n + 36 to n + 37	System data	
		n + 38 to n + 39	System data	
		n + 40 to n + 41	Point being executed	

Return data: Data stored from AC servo to X1 series

*1 "FFH" can be set for the command (n) when Cuty Axis of version 2.50 and later is used.

*2 When "01H: point table" is set for the device number (n + 1) of the "data write of all axes" command, the version of all connected Cuty Axis units must be unified into earlier than 2.50 or 2.50 and later.

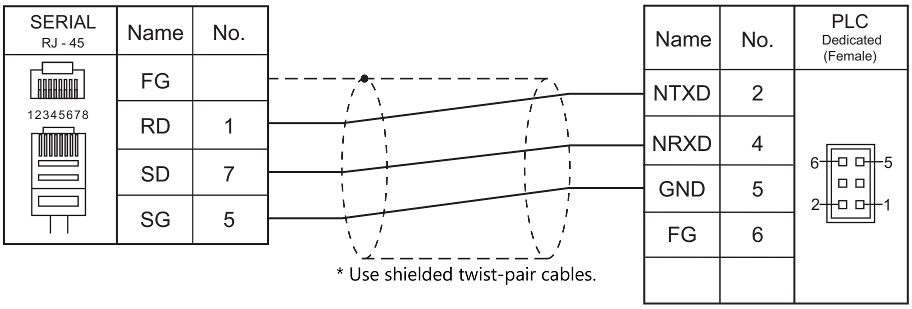
*3 "Expansion 1" and "expansion 2" settings are valid when Cuty Axis of version 2.50 and later is used.

Function	Expansion 1	Expansion 2
None	00	0000
Jump setting for input condition	01	Jump destination Point number: 0000 to 0007 Operation end: 0063 Point number (single block function): 0064 to 0071
Loop setting	Number of loops: 02 to 64	
Torque setting	FF	Torque setting value [%]: 0001 to 0120
Loop counter clear	7F	Counter number to be cleared: 0000 to 0007

5.1.2 Wiring Diagrams

RS-232C

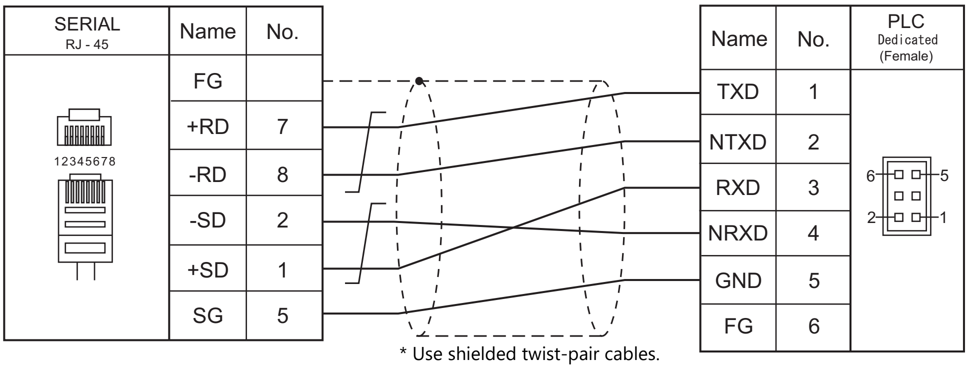
Wiring diagram 1 - M2



* Use shielded twist-pair cables.

RS-422/RS-485

Wiring diagram 1 - M4



* Use shielded twist-pair cables.

6. SHARP

6.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU		Unit/Port	Signal Level	Connection: RS-232C[*1] / RS-485 (2-wire)[*2]	Connection: RS-422 (4-wire)[*2]
JW series	W70H,W100H JW50,JW70,JW100 JW50H,JW70H,JW100H JW-50CU		JW-10CM ZW-10CM	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 [*4]
	JW20,JW20H,JW30H		JW-21CM	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 [*4]
	JW10	JW-1324K JW-1342K JW-1424K JW-1442K JW-1624K JW-1642K	MMI port	RS-422	×	Wiring diagram 3 - M4
			Communication port	RS-422	Wiring diagram 1 - M4	×
	JW30H	JW-32CUH JW-32CUH1 JW-32CUM1 JW-33CUH JW-33CUH1 JW-33CUH2 JW-33CUH3	PG/COMM 1 port	RS-422	×	Wiring diagram 4 - M4
			PG/COMM 2 port	RS-232C	Wiring diagram 1 - M2	×
				RS-422	×	Wiring diagram 4 - M4
	J-board	Z-331J Z-332J	Host communication port T1	RS-422	Wiring diagram 1 - M4	×
JW100/70H COM port	JW70	JW-70CU	Communication port	RS-232C	Wiring diagram 2 - M2	×
	JW100	JW-100CU		RS-422	×	Wiring diagram 5 - M4
	JW70H	JW-70CUH	Communication port	RS-232C	Wiring diagram 2 - M2	×
	JW100H	JW-100CUH		RS-422	×	Wiring diagram 6 - M4
JW20 COM port	JW20H	JW-22CU	Communication port	RS-232C	Wiring diagram 2 - M2	×
				RS-422	×	Wiring diagram 5 - M4
	J-board	Z-311J Z-312J	Host communication port CN3	RS-232C	Wiring diagram 3 - M2	×
			Host communication port TC1	RS-422	×	Wiring diagram 7 - M4
		Z-511J	PG/COMM 1 port PG/COMM 2 port	RS-422	×	Wiring diagram 4 - M4
		Z-512J	PG/COMM 1 port PG/COMM 2 port			
JW300 series	JW300	JW-311CU JW-312CU	PG/COMM 1 port	RS-232C	Wiring diagram 4 - M2	×
				RS-422	×	Wiring diagram 4 - M4
			JW-21CM[*3]	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 [*4]
		JW-321CU JW-322CU JW-331CU JW-332CU JW-341CU JW-342CU JW-352CU JW-362CU	PG/COMM 1 port	RS-232C	Wiring diagram 4 - M2	×
				RS-422	×	Wiring diagram 4 - M4
			PG/COMM 2 port	RS-232C	Wiring diagram 1 - M2	×
				RS-422	×	Wiring diagram 4 - M4
			JW-21CM[*3]	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 [*4]

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).
*3 When using with JW300, be sure to use a JW300-compatible type. A JW300-compatible unit has a 300 mark on its front.
*4 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

Ethernet Connection

PLC Selection on the Editor	CPU		Unit	TCP/IP	UDP/IP	Port No.	Keep Alive*1
JW series (Ethernet)	JW20H JW30H		JW-255CM	×	○	1001 to 65534	○
			JW-25TCM				
	JW50H JW70H JW100H		JW-50CM JW-51CM				
	J-board		Z-339J				
JW311/312/321/322 series (Ethernet)	JW300	JW-311CU JW-312CU JW-321CU JW-322CU	JW-255CM*2				
			JW-25TCM*2				
JW331/332/341/342/352/362 series (Ethernet)	JW300	JW-331CU JW-332CU JW-341CU JW-342CU JW-352CU JW-362CU	JW-255CM*2				
			JW-25TCM*2				

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

*2 When using with JW300, be sure to use a JW300-compatible type. A JW300-compatible unit has a $\boxed{300}$ mark on its front.

6.1.1 JW Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

* For JW10 series with MMI port or communication port, turn off the terminating resistances of the X1 series.
The following switches must be turned off.
RS-422 (4-wire connection): DIP switches 3 and 4
RS-485 (2-wire connection): DIP switch 3

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.

JW-10CM, ZW-10CM, JW-21CM Unit

Switch setting

Switch		Contents	Setting
SW0		Computer link (command mode)	**4**
SW1		Station address Set the number from 01 to 37 in octal notation. SW1 denotes the lower-order digit, and SW2 denotes the higher-order digit.* * Do not set 00, 08, 09, 18, 19, 28, 29 and 40 or greater. When any of these numbers is set, an error will occur.	1
SW2			0
SW3	1	Not used	**OFF**
	2	Communication system (ON: 4-wire system, OFF: 2-wire system)	ON
	3	Not used	**OFF**
	4	Parity (ON: even, OFF: odd)	ON
SW4		Baud rate 0:19200, 1: 9600, 2: 4800	0
SW7		Terminating resistance (ON: provided, OFF: not provided)	**ON**

* The following settings are fixed; data length: 7 bits, and stop bit: 2 bits.

Z-331J, Z-332J

Switch		Contents	Setting
SW0		Command mode	**4**
SW1		Station address Set the number from 01 to 37 in octal notation. SW1 denotes the lower-order digit, and SW2 denotes the higher-order digit.* * Do not set 00, 08, 09, 18, 19, 28, 29 and 40 or greater. When any of these numbers is set, an error will occur.	1
SW2			0
SW3	1	Not used	**OFF**
	2	Communication system (ON: 4-wire system, OFF: 2-wire system)	OFF
	3	Not used	**OFF**
	4	Parity (ON: even, OFF: odd)	ON
SW4		Baud rate 0: 19200, 1: 9600, 2: 4800	0
SW7		Terminating resistance (ON: provided, OFF: not provided)	**ON**

* The following settings are fixed; data length: 7 bits, and stop bit: 2 bits.

JW-10

The settings for communications with the X1 series should be made at the system memory as shown below.

MMI port

System Memory	Contents	Setting Example
#226	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 1 1 0 0 0 0 Baud rate 111: 38400 bps 000: 19200 bps 001: 9600 bps 010: 4800 bps Parity 00: None 01: Odd 10: Even Stop bit 0: 1 bit 1: 2 bits Data length 0: 7 bits 1: 8 bits	30H Data length: 7 bits Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#227	Port number: 001 to 037 (OCT)	01H

* When using the MMI port, only 1 : 1 communication is available.

Communication port

System Memory	Contents	Setting Example
#234	Communication mode: computer link mode	00H
#236	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 1 1 0 0 0 0 Baud rate 111: 38400 bps 000: 19200 bps 001: 9600 bps 010: 4800 bps Parity 00: None 01: Odd 10: Even Stop bit 0: 1 bit 1: 2 bits Data length 0: 7 bits 1: 8 bits	30H Data length: 7 bits Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#237	Port number: 001 to 037 (OCT)	01H

JW-30H

PG/COMM1 port

System Memory	Contents	Setting Example
#234	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 1 1 0 0 0 0 Baud rate 101: 115 kbps*1 110: 57600 bps*1 111: 38400 bps*1 000: 19200 bps 001: 9600 bps 010: 4800 bps Parity 00: None 01: Odd 10: Even Stop bit 0: 1 bit 1: 2 bits	30H Data length: 7 bits (fixed) Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#235	Port number: 001 to 037 (OCT)	01H

*1 Not available for JW-32CUH and JW-33CUH

PG/COMM2 port

System Memory	Contents	Setting Example
#236	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 1 1 0 0 0 0 D5: Stop bit 0: 1 bit 1: 2 bits D4, D3: Parity 00: None 01: Odd 10: Even D2 to D0: Baud rate 101: 115 kbps*1 110: 57600 bps*1 111: 38400 bps*1 000: 19200 bps 001: 9600 bps 010: 4800 bps	30H Data length: 7 bits (fixed) Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#237	Port number: 001 to 037 (OCT)	01H

*1 Not available for JW-32CUH and JW-33CUH

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	*1, *2
Relay	(relay)	01H	□ for word device *1
E	(self diagnosis)	02H	*1
b	(timer, counter/current value)	03H	*1
Fn	(file register)	07H	*1, *3

*1 The addresses are expressed in "bytes". For word designation, specify an even-numbered address.

*2 The assigned device memory is expressed as shown on the right when editing the screen.

Example: x9yyy
- yyy: 0 to 777 (octal)
- x: 0 to 9 (decimal)

*3 The file number is required in addition to the device type and address.
The assigned device memory is expressed as shown on the right when editing the screen.

Example: F1 : 00002
- 00002: Address number
- ":": Colon
- 1: File number

Indirect Device Memory Designation

- For R device memory "x9yyy":
  Specify the value "x" (0 to 9: decimal) for higher bytes (bit 15 to 8).
  Specify a value obtained by dividing "yyy" (000 to 777: octal) by 2 for lower bytes (bit 7 to 0).

  Example: With indirect device memory designation, "086D" (H) is assigned for "R89332".
  89 (ignoring the lower digit of "9") → 8 (DEC) → 08 (HEX)
  332 (OCT) → 218 (DEC) / 2 = 109 (DEC) → 6D (HEX)

- For Fn device memory :
  Specify the file number in the expansion code.

- For a device memory other than "R" or "Fn":
  Example: With indirect device memory designation, "01BF" (H) is assigned for "□ 1576".
  1576 (OCT) → 894 (DEC) / 2 = 447 (DEC) → 01BF (HEX)

6.1.2 JW100/70H COM Port

Communication Setting

Editor

Communication setting

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	7 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.

JW-70CU/JW-100CU, JW-70CUH/JW-100CUH

The settings for communications with the X1 series should be made at the system memory as shown below.

System Memory	Contents	Setting Example
#236	Transmission specification D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 Baud rate 000: 19200 bps 001: 9600 bps 010: 4800 bps Parity 00: None 01: Odd 10: Even Stop bit 0: 1 bit 1: 2 bits	30H Data length: 7 bits (fixed) Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#237	Port number: 001 to 037 (OCT)	01H

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	*1, *2
Relay	(relay)	01H	⊐ for word device *1
E	(self diagnosis)	02H	*1
b	(timer, counter/current value)	03H	*1
Fn	(file register)	07H	*1, *3

*1 The addresses are expressed in "bytes". For word designation, specify an even-numbered address.
*2 The assigned device memory is expressed as shown on the right when editing the screen.

Example: x9yyy
0 to 777 (octal)
0 to 9 (decimal)

*3 The file number is required in addition to the device type and address.
The assigned device memory is expressed as shown on the right when editing the screen.

Example: F1 : 00002
Address number
Colon
File number

Indirect Device Memory Designation

- For R device memory "x9yyy":
  Specify the value "x" (0 to 9: decimal) for higher bytes (bit 15 to 8).
  Specify a value obtained by dividing "yyy" (000 to 777: octal) by 2 for lower bytes (bit 7 to 0).

  Example: With indirect device memory designation, "086D" is assigned for "R89332".
  89 (ignoring the lower digit of "9") → 8 (DEC) → 08 (HEX)
  332 (OCT) → 218 (DEC) / 2 = 109 (DEC) → 6D (HEX)

- For Fn device memory :
  Specify the file number in the expansion code.
- For a device memory other than "R" or "Fn":
  Example: With indirect device memory designation, "01BF" is assigned for "⊐ 1576".
  1576 (OCT) → 894 (DEC) / 2 = 447 (DEC) → 01BF (HEX)

6.1.3 JW20 COM Port

Communication Setting

Editor

Communication setting

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	7 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.

JW-22CU, Z-311J, Z-312J

The settings for communications with the X1 series should be made at the system memory as shown below.

System Memory	Contents	Setting Example
#236	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 1 1 0 0 0 0 Baud rate (D2–D0) 000: 19200 bps 001: 9600 bps 010: 4800 bps Parity (D4–D3) 00: None 01: Odd 10: Even Stop bit (D5) 0: 1 bit 1: 2 bits	30H Data length: 7 bits (fixed) Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#237	Port number: 001 to 037 (OCT)	01H

* The terminating resistance switch (SW1) is provided at the back of the JW-22CU board. Turn this switch off for RS-232C connection.

Z-511J, Z-512J

PG/COMM1 port

System Memory	Contents	Setting Example
#234	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 1 1 0 0 0 0 Baud rate (D2–D0) 000: 19200 bps 001: 9600 bps 010: 4800 bps Parity (D4–D3) 00: None 01: Odd 10: Even Stop bit (D5) 0: 1 bit 1: 2 bits	30H Data length: 7 bits (fixed) Stop bit: 2 bits Parity: even Baud rate: 19200 bps
#235	Port number: 001 to 037 (OCT)	01H

PG/COMM2 port

<table>
<tr><th>System Memory</th><th>Contents</th><th>Setting Example</th></tr>
<tr><td>#236</td><td>Transmission specification

<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
Baud rate
000: 19200 bps
001: 9600 bps
010: 4800 bps

Parity
00: None
01: Odd
10: Even

Stop bit
0: 1 bit
1: 2 bits</td><td>30H

Data length: 7 bits (fixed)
Stop bit: 2 bits
Parity: even
Baud rate: 19200 bps</td></tr>
<tr><td>#237</td><td>Port number: 001 to 037 (OCT)</td><td>01H</td></tr>
</table>

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	*1, *2
Relay	(relay)	01H	⊐ for word device *1
E	(self diagnosis)	02H	*1
b	(timer, counter/current value)	03H	*1
Fn	(file register)	07H	*1, *3

*1 The addresses are expressed in "bytes". For word designation, specify an even-numbered address.

*2 The assigned device memory is expressed as shown on the right when editing the screen.

Example: x9yyy
- 0 to 777 (octal)
- 0 to 9 (decimal)

*3 The file number is required in addition to the device type and address. The assigned device memory is expressed as shown on the right when editing the screen.

Example: F1 : 00002
- Address number
- Colon
- File number

Indirect Device Memory Designation

- For R device memory "x9yyy":
  Specify the value "x" (0 to 9: decimal) for higher bytes (bit 15 to 8).
  Specify a value obtained by dividing "yyy" (000 to 777: octal) by 2 for lower bytes (bit 7 to 0).

  Example: With indirect device memory designation, "086D" is assigned for "R89332".
  89 (ignoring the lower digit of "9") → 8 (DEC) → 08 (HEX)
  332 (OCT) → 218 (DEC) / 2 = 109 (DEC) → 6D (HEX)

- For Fn device memory:
  Specify the file number in the expansion code.
- For a device memory other than "R" or "Fn":
  Example: With indirect device memory designation, "01BF" is assigned for "⊐ 1576".
  1576 (OCT) → 894 (DEC) / 2 = 447 (DEC) → 01BF (HEX)

6.1.4 JW300 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	RS-232C / <u>RS-422/485</u>	
Baud Rate	4800 / 9600 / 19200 / 38400 / <u>115K</u> bps	
Data Length	<u>7</u> / 8 bits	
Stop Bit	1 / <u>2</u> bits	
Parity	None / <u>Odd</u> / Even	
Target Port No.	0 to 31	
Transmission Mode	<u>2-wire</u> / 4-wire	

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.

PG/COMM 1 Port, PG/COMM 2 Port

Make PLC communication settings by using the application software “JW300SP” or writing the setting values directly into the system memory. For more information, refer to the PLC manual issued by the manufacturer.

JW300SP

	Item	Setting	Remarks
Port 1 Port 2	Baud Rate	115200 / 38400 / 19200 / 9600 / 4800	
	Parity	None / Odd / Even	
	Stop Bit	1 / 2	
	Station number	0 to 37 (OCT)	
	Data Length	7 bits / 8 bits	

System memory

PG/COMM 1 port

System Memory	Contents	Setting Example
#234	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 1 1 0 0 Data length (D6): 0: 7 bits, 1: 8 bits Stop bit (D5): 0: 1 bit, 1: 2 bits Parity (D4, D3): 00: None, 01: Odd, 10: Even Baud rate (D2, D1, D0): 100: 115 kbps, 010: 38400 bps, 001: 19200 bps, 000: 9600 bps	0CH Data length: 7 bits Stop bit: 1 bit Parity: Odd Baud rate: 115 kbps
#235	Station number: 001 to 037 (OCT)	01H

PG/COMM 2 port

System Memory	Contents	Setting Example
#236	Transmission specification D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 1 1 0 0 Baud rate 100: 115 kbps 010: 38400 bps 001: 19200 bps 000: 9600 bps Parity 00: None 01: Odd 10: Even Stop bit 0: 1 bit 1: 2 bits Data length 0: 7 bits 1: 8 bits	0CH Data length: 7 bits Stop bit: 1 bit Parity: Odd Baud rate: 115 kbps
#237	Station number: 001 to 037 (OCT)	01H

JW-21CM Unit

Switch setting

Switch		Contents	Setting
SW0		Computer link (command mode)	**4**
SW1		Station address Set the number from 01 to 37 in octal notation. SW1 denotes the lower-order digit, and SW2 denotes the higher-order digit. **Do not set 00, 08, 09, 18, 19, 28, 29 and 40 or greater. When any of these number is set, an error occurs.**	1
SW2			0
SW3	1	Not used	**OFF**
	2	Communication system (ON: 4-wire / OFF: 2-wire)	ON
	3	Not used	**OFF**
	4	Parity (ON: Even / OFF: Odd)	ON
SW4		Baud rate 0: 19200, 1: 9600, 2: 4800	0
SW7		Terminating resistance (ON: Provided / OFF: Not provided)	**ON**

* The following settings are fixed; data length: 7 bits, and stop bit: 2 bits.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	*1, *2
Relay	(relay)	01H	⊐ for word device *1
E	(self diagnosis)	02H	*1
b	(timer, counter/current value)	03H	*1
F1	(file register)	04H	*1, *3

*1 The addresses are expressed in "bytes". For word designation, specify an even-numbered address.
*2 The assigned device memory is expressed as shown on the right when editing the screen.

Example: xx9yyy
- 0 to 777 (octal)
- 0 to 38 (decimal)

*3 The file number is required in addition to the device type and address.
The assigned device memory is expressed as shown on the right when editing the screen.

Example: F1 : 00002
- Address number
- Colon
- File number

Indirect Device Memory Designation

- For R device memory “xx9yyy”:
  Specify the value “xx” (00 to 38: decimal) for higher bytes (bit 15 to 8).
  Specify a value obtained by dividing “yyy” (000 to 777: octal) by 2 for lower bytes (bit 7 to 0).

  Example: With indirect device memory designation, “086D” is assigned for “R89332”.
  089 (ignoring the lower digit of “9”) → 08 (DEC) → 08 (HEX)
  332 (OCT) → 218 (DEC) / 2 = 109 (DEC) → 6D (HEX)

- For Fn device memory:
  Specify the file number in the expansion code.

- For a device memory other than “R” or “Fn”:
  Example: With indirect device memory designation, “01BF” is assigned for “⊐ 1576”.
  1576 (OCT) → 894 (DEC) / 2 = 447 (DEC) → 01BF (HEX)

6.1.5 JW Series (Ethernet)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

JW-255CM, JW-25TCM

Make PLC communication settings by using the application software or entering the setting values directly into the network parameter.
For more information, refer to the PLC manual issued by the manufacturer.

JW300SP (JW25TCM/255CM parameter settings)

Item		Setting	Remarks
IP Address Setting	IP Address	Set the IP address of the PLC.	
	Subnet Mask	Set the subnet mask of the PLC.	
Connection Setting	Open Method	**UDP**	
	Local Port No.	Set the port number of the PLC.	

Network parameter

Parameter Address	Contents	Setting Example
0000 to 0003	IP address at local port (DEC)	IP address: 192.168.1.1 0000: 192 0001: 168 0002: 1 0003: 1
0004 to 0007	Subnet mask (DEC)	Subnet mask: 255.255.255.0 0004: 255 0005: 255 0006: 255 0007: 0
0100 to 0103	Connection 0 setting 0100: Open method **01: UDP** 0101: Fixed to 0 0102: Local port number (lower byte (HEX)) 0103: Local port number (higher byte (HEX))	UDP connection, port number 3000 (= BB8H) 0100: 01H 0101: 00H 0102: B8H 0103: 0BH
0104 to 0107	Connection 1 setting (same as connection 0)	
0110 to 0113	Connection 2 setting (same as connection 0)	
0114 to 0117	Connection 3 setting (same as connection 0)	
0120 to 0123	Connection 4 setting (same as connection 0)	
0124 to 0127	Connection 5 setting (same as connection 0)	
0130 to 0133	Connection 6 setting (same as connection 0)	
0134 to 0137	Connection 7 setting (same as connection 0)	
3777 *	Communication start switch 00H: Communication stop 01H: Parameter check, BCC check, communication start 81H: Parameter check, BCC creation, writing into EEPROM, communication start (changed to 01H after the start of communication)	

* Communication must be stopped before entering values into the network parameter to make the communication setting. Specify 00H at parameter address 3777 at first, and set the IP address, etc.
After settings are made, specify 81H at parameter address 3777. Then settings will be written into EEPROM and communication will start.

JW-50CM, JW-51CM

Make PLC communication settings by using the application software or entering the setting values directly into the network parameter.
For more information, refer to the PLC manual issued by the manufacturer.

JW300SP (parameter settings)

Item		Setting	Remarks
IP Address Setting	IP Address	Set the IP address of the PLC.	
	Subnet Mask	Set the subnet mask of the PLC.	
Connection Setting	Open Method	**UDP**	
	Local Port No.	Set the port number of the PLC.	

Network parameter

Parameter Address	Contents	Setting Example
0000 to 0003	IP address at local port (DEC)	IP address: 192.168.1.1 0000: 192 0001: 168 0002: 1 0003: 1
0004 to 0007	Subnet mask (DEC)	Subnet mask: 255.255.255.0 0004: 255 0005: 255 0006: 255 0007: 0
0100 to 0103	Connection 0 setting 0100: Open method **01: UDP** 0101: Fixed to 0 0102: Local port number (lower byte (HEX)) 0103: Local port number (higher byte (HEX))	UDP connection, port number 3000 (= BB8H) 0100: 01H 0101: 00H 0102: B8H 0103: 0BH
0104 to 0107	Connection 1 setting (same as connection 0)	
0110 to 0113	Connection 2 setting (same as connection 0)	
0114 to 0117	Connection 3 setting (same as connection 0)	
0120 to 0123	Connection 4 setting (same as connection 0)	
0124 to 0127	Connection 5 setting (same as connection 0)	
0130 to 0133	Connection 6 setting (same as connection 0)	
0134 to 0137	Connection 7 setting (same as connection 0)	
3777 *	Communication start switch 00H: Communication stop 01H: Parameter check, BCC check, communication start 81H: Parameter check, BCC creation, writing into EEPROM, communication start (changed to 01H after the start of communication)	

* Communication must be stopped before entering values into the network parameter to make the communication setting. Specify 00H at parameter address 3777 at first, and set the IP address, etc.
After settings are made, specify 81H at parameter address 3777. Then settings will be written into EEPROM and communication will start.

Z-339J

12-VDC Power Input

10BASE5 or 10BASE-T is selected according to the input status of the 12-VDC power supply.

Item		Contents
12-VDC power input	Provided	10BASE5 communication
	Not provided	10BASE-T communication

Network parameter

Parameter Address	Contents	Setting Example
0000 to 0003	IP address at local port (DEC)	IP address: 192.168.1.1 0000: 192 0001: 168 0002: 1 0003: 1
0004 to 0007	Subnet mask (DEC)	Subnet mask: 255.255.255.0 0004: 255 0005: 255 0006: 255 0007: 0
0100 to 0103	Connection 0 setting 0100: Open method **01: UDP** 0101: Fixed to 0 0102: Local port number (lower byte (HEX)) 0103: Local port number (higher byte (HEX))	UDP connection, port number 3000 (= BB8H) 0100: 01H 0101: 00H 0102: B8H 0103: 0BH
0104 to 0107	Connection 1 setting (same as connection 0)	
0110 to 0113	Connection 2 setting (same as connection 0)	
0114 to 0117	Connection 3 setting (same as connection 0)	
0120 to 0123	Connection 4 setting (same as connection 0)	
0124 to 0127	Connection 5 setting (same as connection 0)	
0130 to 0133	Connection 6 setting (same as connection 0)	
0134 to 0137	Connection 7 setting (same as connection 0)	
3777 *	Communication start switch 00H: Communication stop 01H: Parameter check, BCC check, communication start 81H: Parameter check, BCC creation, writing into EEPROM, communication start (changed to 01H after the start of communication)	

* Communication must be stopped before entering values into the network parameter to make the communication setting. Specify 00H at parameter address 3777 at first, and set the IP address, etc.
After settings are made, specify 81H at parameter address 3777. Then settings will be written into EEPROM and communication will start.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	*1, *2
Relay	(relay)	01H	⏋ for word device *1
E	(self diagnosis)	02H	*1
b	(timer, counter/current value)	03H	*1
Fn	(file register)	07H	*1, *3

*1 The addresses are expressed in "bytes". For word designation, specify an even-numbered address.
*2 The assigned device memory is expressed as shown on the right when editing the screen.

Example: x9yyy
- yyy: 0 to 777 (octal)
- 9: 0 to 9 (decimal)

*3 The file number is required in addition to the device type and address.
The assigned device memory is expressed as shown on the right when editing the screen.

Example: F1 : 00002
- 00002: Address number
- ":": Colon
- 1: File number

Indirect Device Memory Designation

- For R device memory “x9yyy”:
  Specify the value “x” (0 to 9: decimal) for higher bytes (bit 15 to 8).
  Specify a value obtained by dividing “yyy” (000 to 777: octal) by 2 for lower bytes (bit 7 to 0).

  Example: With indirect device memory designation, “086D” is assigned for “R89332”.
  89 (ignoring the lower digit of “9”) → 8 (DEC) → 08 (HEX)
  332 (OCT) → 218 (DEC) / 2 = 109 (DEC) → 6D (HEX)

- For Fn device memory:
  Specify the file number in the expansion code.
- For a device memory other than “R” or “Fn”:
  Example: With indirect device memory designation, “01BF” is assigned for “□ 1576”.
  1576 (OCT) → 894 (DEC) / 2 = 447 (DEC) → 01BF (HEX)

6.1.6 JW311/312/321/322 Series (Ethernet)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

JW-255CM, JW-25TCM

Make PLC communication settings by using the application software or entering the setting values directly into the network parameter.
For more information, refer to the PLC manual issued by the manufacturer.

JW300SP (JW25TCM/255CM parameter settings)

Item		Setting	Remarks
IP Address Setting	IP Address	Set the IP address of the PLC.	
	Subnet Mask	Set the subnet mask of the PLC.	
Connection Setting	Open Method	**UDP**	
	Local Port No.	Set the port number of the PLC.	

Network parameter

Parameter Address	Contents	Setting Example
0000 to 0003	IP address at local port (DEC)	IP address: 192.168.1.1 0000: 192 0001: 168 0002: 1 0003: 1
0004 to 0007	Subnet mask (DEC)	Subnet mask: 255.255.255.0 0004: 255 0005: 255 0006: 255 0007: 0
0100 to 0103	Connection 0 setting 0100: Open method **01: UDP** 0101: Fixed to 0 0102: Local port number (lower byte (HEX)) 0103: Local port number (higher byte (HEX))	UDP connection, port number 3000 (= BB8H) 0100: 01H 0101: 00H 0102: B8H 0103: 0BH
0104 to 0107	Connection 1 setting (same as connection 0)	
0110 to 0113	Connection 2 setting (same as connection 0)	
0114 to 0117	Connection 3 setting (same as connection 0)	
0120 to 0123	Connection 4 setting (same as connection 0)	
0124 to 0127	Connection 5 setting (same as connection 0)	
0130 to 0133	Connection 6 setting (same as connection 0)	
0134 to 0137	Connection 7 setting (same as connection 0)	
3777 *	Communication start switch 00H: Communication stop 01H: Parameter check, BCC check, communication start 81H: Parameter check, BCC creation, writing into EEPROM, communication start (changed to 01H after the start of communication)	

* Communication must be stopped before entering values into the network parameter to make the communication setting. Specify 00H at parameter address 3777 at first, and set the IP address, etc.
After settings are made, specify 81H at parameter address 3777. Then settings will be written into EEPROM and communication will start.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(register)	00H	*1, *2
Relay	(relay)	01H	⊐ for word device *1
E	(self diagnosis)	02H	*1
b	(timer, counter/current value)	03H	*1
F1	(file register)	04H	*1, *3

*1 The addresses are expressed in "bytes". For word designation, specify an even-numbered address.
*2 The assigned device memory is expressed as shown on the right when editing the screen.

Example: xx9yyy
- yyy: 0 to 777 (octal)
- xx: 0 to 38 (decimal)

*3 The file number is required in addition to the device type and address.
The assigned device memory is expressed as shown on the right when editing the screen.

Example: F1 : 00002
- 00002: Address number
- ":": Colon
- 1: File number

Indirect Device Memory Designation

- For R device memory "xx9yyy":
  Specify the value "xx" (0 to 38: decimal) for higher bytes (bit 15 to 8).
  Specify a value obtained by dividing "yyy" (000 to 777: octal) by 2 for lower bytes (bit 7 to 0).

  Example: With indirect device memory designation, "086D" is assigned for "R89332".
  089 (ignoring the lower digit of "9") → 08 (DEC) → 08 (HEX)
  332 (OCT) → 218 (DEC) / 2 = 109 (DEC) → 6D (HEX)

- For Fn device memory:
  Specify the file number in the expansion code.
- For a device memory other than "R" or "Fn":
  Example: With indirect device memory designation, "01BF" is assigned for "⊐ 1576".
  1576 (OCT) → 894 (DEC) / 2 = 447 (DEC) → 01BF (HEX)

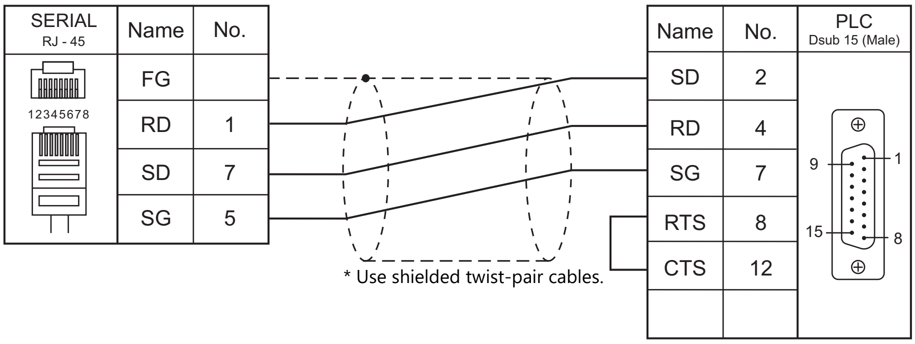
6.1.7 JW331/332/341/342/352/362 Series (Ethernet)

Settings are the same as those described in "6.1.6 JW311/312/321/322 Series (Ethernet)".

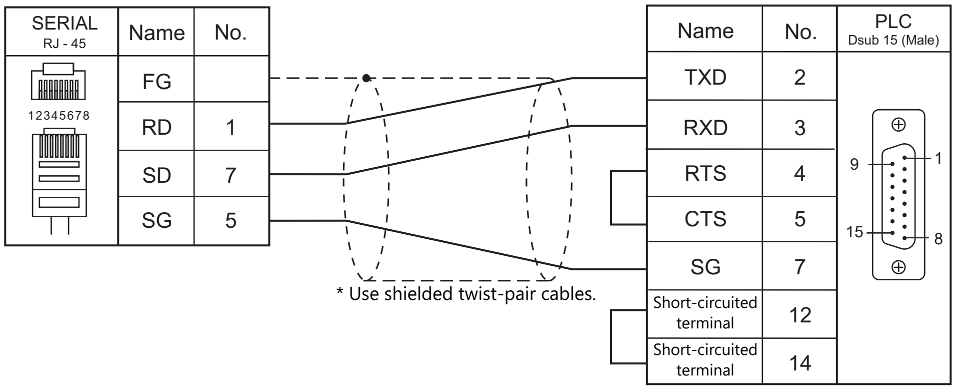
6.1.8 Wiring Diagrams

RS-232C

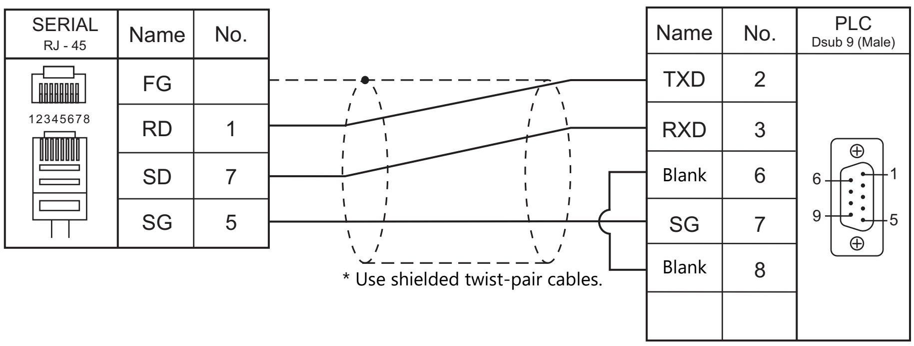
Wiring diagram 1 - M2



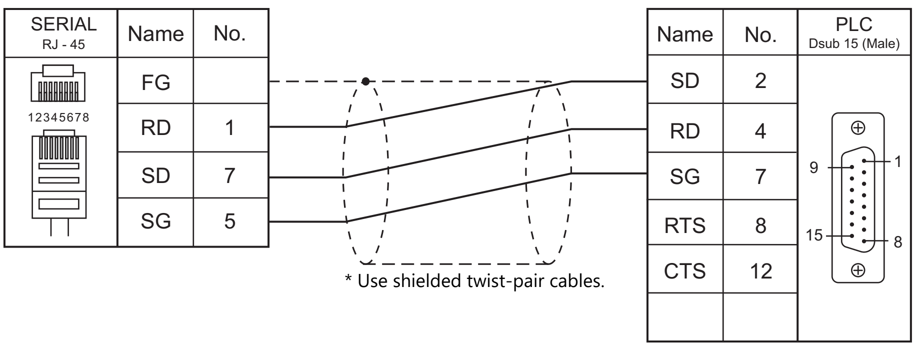
Wiring diagram 2 - M2



Wiring diagram 3 - M2

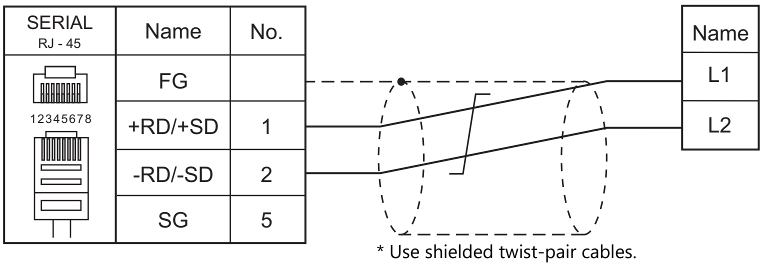


Wiring diagram 4 - M2



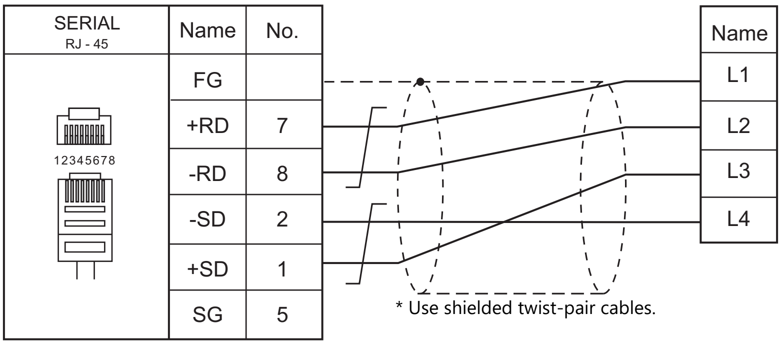
RS-422/RS-485

Wiring diagram 1 - M4



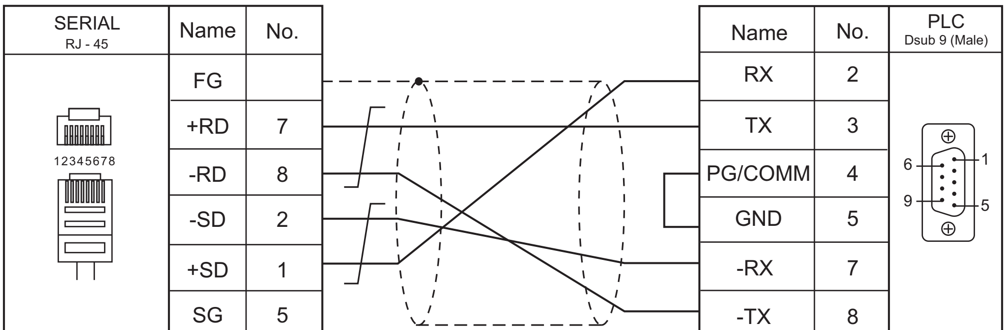
* Use shielded twist-pair cables.

Wiring diagram 2 - M4



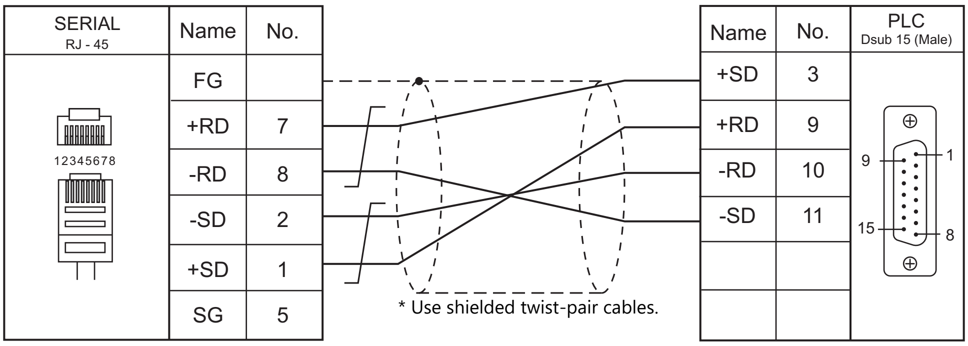
* Use shielded twist-pair cables.

Wiring diagram 3 - M4



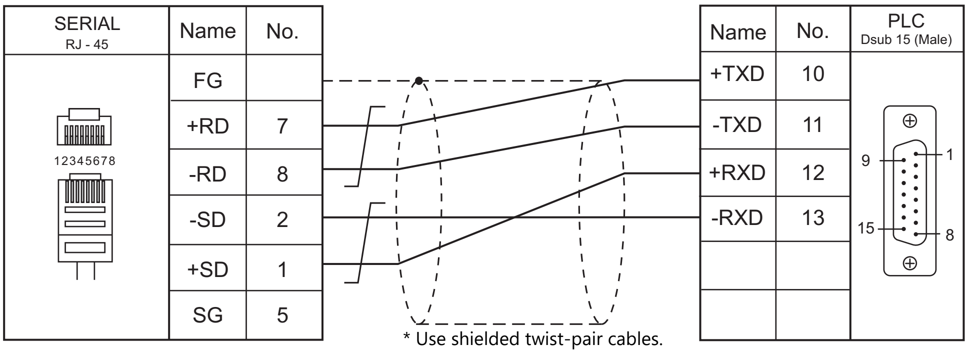
* Use shielded twist-pair cables.

Wiring diagram 4 - M4



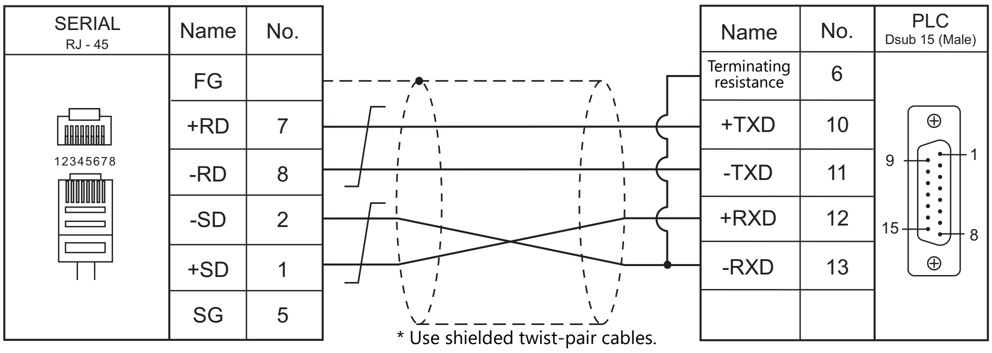
* Use shielded twist-pair cables.

Wiring diagram 5 - M4



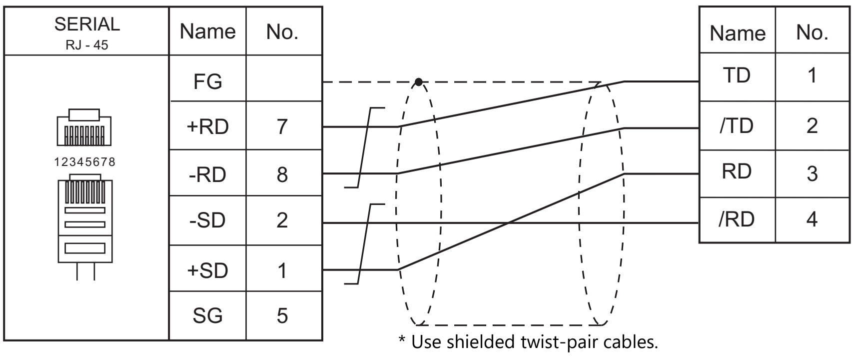
* Use shielded twist-pair cables.

Wiring diagram 6 - M4



* Use shielded twist-pair cables.

Wiring diagram 7 - M4



* Use shielded twist-pair cables.

6.2 Temperature Controller/Servo/Inverter Connection

ID Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2	
DS-30D	DS-30D	Terminal block	RS-232C	Wiring diagram 1 - M2	×	SH-DS30D.Lst
			RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3	
		Connector for host/peripheral equipment	RS-232C	Wiring diagram 2 - M2	×	
			RS-422	×	Wiring diagram 3 - M4	
DS-32D	DS-32D	Host communication port 1	RS-232C	Wiring diagram 1 - M2	×	SH-DS32D.Lst
		Host communication port 2	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3	
		MMI port	RS-232C	Wiring diagram 2 - M2	×	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

6.2.1 DS-30D

Communication Setting

Editor

Communication setting

(Underlined setting: default)

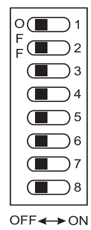
Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	<u>RS-232C</u> / RS-422/485	
Baud Rate	4800 / <u>9600</u> / 19200 bps	
Data Length	<u>7</u> / 8 bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	<u>None</u> / Odd / Even	
Target Port No.	<u>0</u> to 15	

RFID System

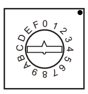
Switch Setting

(Underlined setting: default)

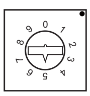
Communication setting

<table>
<tr><th>SW1</th><th>Function</th><th>OFF</th><th>ON</th><th>Setting Example</th></tr>
<tr><td>1</td><td>Data length</td><td><u>7</u></td><td>8</td><td rowspan="8"></td></tr>
<tr><td>2</td><td rowspan="2">Parity</td><td><u>None</u></td><td>Provided</td></tr>
<tr><td>3</td><td><u>Even</u></td><td>Odd</td></tr>
<tr><td>4</td><td>Stop bit</td><td><u>1</u></td><td>2</td></tr>
<tr><td>5</td><td>Connector type</td><td><u>Using the host only</u></td><td>Using the host and hand-held programmer (e.g. JW-12PG) at one time</td></tr>
<tr><td>6</td><td rowspan="2">Communication system (wiring type)</td><td colspan="2" rowspan="2"><table><tr><th>RS-232C</th><th>RS-422 (4-wire system)</th><th>RS-485 (2-wire system)</th></tr><tr><td><u>OFF</u></td><td>ON</td><td>OFF</td></tr><tr><td><u>OFF</u></td><td>OFF</td><td>ON</td></tr></table></td></tr>
<tr><td>7</td></tr>
<tr><td>8</td><td>Mode</td><td><u>High speed</u></td><td>Standard</td></tr>
</table>

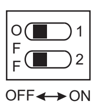
Station number setting

SW2	Contents	Setting Example
	<u>0</u> to F (H) (0 to 15)	0

Baud rate

<table>
<tr><th>SW3</th><th>Setting</th><th>Baud Rate</th><th>Setting Example</th></tr>
<tr><td rowspan="3"></td><td>4</td><td>4800 bps</td><td rowspan="3">5</td></tr>
<tr><td><u>5</u></td><td><u>9600 bps</u></td></tr>
<tr><td>6</td><td>19200 bps</td></tr>
</table>

Terminating resistance

<table>
<tr><th>SW4</th><th>Contents</th><th>Setting Example</th></tr>
<tr><td></td><td><table><tr><th>RS-232C</th><th>RS-422 (4-wire system)</th><th>RS-485 (2-wire system)</th></tr><tr><td><u>OFF</u></td><td>ON</td><td>OFF</td></tr><tr><td><u>OFF</u></td><td>OFF</td><td>ON</td></tr></table></td><td>1: OFF
2: OFF</td></tr>
</table>

Communication Mode Setting

Set a communication mode at the system memory. The selected mode becomes effective when the power is turned off and on again.

Address	Contents	Setting
A008	Communication start method	0: At any time required
A00A	Response transmission method	0: Automatic

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
CMUC	(controller memory 1-byte data)	00H	
CMS	(controller memory 2-byte data)	01H	
CMUT	(controller memory 3-byte data)	02H	
CML	(controller memory 4-byte data)	03H	
IMUC	(ID memory 1-byte data)	04H	
IMS	(ID memory 2-byte data)	05H	
IMUT	(ID memory 3-byte data)	06H	
IML	(ID memory 4-byte data)	07H	
ID	(ID code)	08H	Double-word
TM	(time)	09H	

*1 The CH number is required in addition to the device type and address. The assigned device memory is expressed as shown on the right when editing the screen.

Example: #0: CMUC9000

Address number
Device type
CH number

Indirect Device Memory Designation

Specify the CH number in the expansion code.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)			F2
Plate clear	1 - 8 (PLC1 - 8)	n	Station number		7/9
		n + 1	Command: 0		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Clear data	Designated ID code	
		n + 7	-		
		n + 8	-	Clear data	
Plate initialize	1 - 8 (PLC1 - 8)	n	Station number		4/6
		n + 1	Command: 1		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	-	Designated ID code	
		n + 5	-		
DS-30D clear	1 - 8 (PLC1 - 8)	n	Station number		6
		n + 1	Command: 2		
		n + 2	CH No.		
		n + 3	Address		
		n + 4	Bytes		
		n + 5	Clear data		
DS-30D initialize	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 3		
		n + 2	CH No.		
Log clear (communication time, number of retrials, error log)	1 - 8 (PLC1 - 8)	n	Station number		4
		n + 1	Command: 4		
		n + 2	CH No.		
		n + 3	Area 0: Communication time log 1: Retry count log 2: Error log		
Plate self diagnosis	1 - 8 (PLC1 - 8)	n	Station number		6/8
		n + 1	Command: 5		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Battery use rate	Designated ID code	
		n + 7	-		
		n + 8	-	Battery use rate	
ROM check	1 - 8 (PLC1 - 8)	n	Station number		4/6
		n + 1	Command: 6		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	-	ID code	
		n + 5	-		
RAM check	1 - 8 (PLC1 - 8)	n	Station number		6/8
		n + 1	Command: 7		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	-	Designated ID code	
		n + 7	-		

Contents	F0	F1 (= $u n)			F2
Plate battery service life check	1 - 8 (PLC1 - 8)	n	Station number		4/6
		n + 1	Command: 8		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Battery use rate	Designated ID code	
		n + 5	-		
		n + 6	-	Battery use rate	
DS-30D self diagnosis	1 - 8 (PLC1 - 8)	n	Station number		2
		n + 1	Command: 9		
Block check	1 - 8 (PLC1 - 8)	n	Station number		6/8
		n + 1	Command: 10		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	-	Designated ID code	
		n + 7	-		
Reset	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 11		
		n + 2	CH No. 0: CH No. 0 1: CH No. 1 2: Both		
Output command	1 - 8 (PLC1 - 8)	n	Station number		7
		n + 1	Command: 12		
		n + 2	CH No.		
		n + 3	Output 0		
		n + 4	Output 1		
		n + 5	Output 2		
		n + 6	Output 3		
Status read out	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 13		
		n + 2	CH No.		
		n + 3	Status		
DS-30D read out	1 - 8 (PLC1 - 8)	n	Station number		6
		n + 1	Command: 14		
		n + 2	CH No.		
		n + 3	Address		
		n + 4	Bytes		
		n + 5	Internal device memory address *1		
DS-30D write	1 - 8 (PLC1 - 8)	n	Station number		6
		n + 1	Command: 15		
		n + 2	CH No.		
		n + 3	Address		
		n + 4	Bytes		
		n + 5	Internal device memory address *2		
ID memory read out	1 - 8 (PLC1 - 8)	n	Station number		7/9
		n + 1	Command: 16		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Internal device memory address *1	Designated ID code	
		n + 7	-		
		n + 8	-	Internal device memory address *1	

Contents	F0	F1 (= $u n)			F2
ID memory write	1 - 8 (PLC1 - 8)	n	Station number		7/9
		n + 1	Command: 17		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Internal device memory address *2	Designated ID code	
		n + 7	-		
		n + 8	-	Internal device memory address *2	
ID code read out	1 - 8 (PLC1 - 8)	n	Station number		4/6
		n + 1	Command: 18		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	ID code	Designated ID code	
		n + 5			
		n + 6	-	ID code	
		n + 7	-		
ID code write	1 - 8 (PLC1 - 8)	n	Station number		6/8
		n + 1	Command: 19		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, A, D)	Attribute (1, 2, 4, 5, B, C, E, F)	
		n + 4	ID code	Designated ID code	
		n + 5			
		n + 6	-	ID code	
		n + 7	-		
Time read out	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 20		
		n + 2	CH No.		
		n + 3	Year		
		n + 4	Month		
		n + 5	Day		
		n + 6	Hour		
		n + 7	Minute		
		n + 8	Second		
		n + 9	A day of the week		
Time correction	1 - 8 (PLC1 - 8)	n	Station number		10
		n + 1	Command: 21		
		n + 2	CH No.		
		n + 3	Year		
		n + 4	Month		
		n + 5	Day		
		n + 6	Hour		
		n + 7	Minute		
		n + 8	Second		
		n + 9	A day of the week		

Return data: Data stored from servo to X1 series

*1 Specify the top address of the internal device memory ($u) at which the read data is to be stored.
*2 Specify the top address of the internal device memory ($u) at which data to be written is stored.

6.2.2 DS-32D

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	<u>RS-232C</u> / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 76800 / <u>115K</u> bps	
Data Length	7 / <u>8</u> bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	None / Odd / <u>Even</u>	
Target Port No.	<u>0</u> to 15	

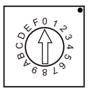
*1 When RS-422 connection is used via the MMI port, the following settings are fixed; baud rate: 115 kbps, data length: 8 bits, stop bit: 1 bit, and parity: even.

RFID System

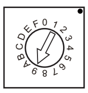
Switch Setting

(Underlined setting: default)

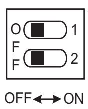
Station number setting

SW1	Contents	Setting Example
	<u>0</u> to F (H) (0 to 15)	0

Baud rate

SW2	Setting	Baud Rate	Setting Example
	4	4800 bps	9
	5	9600 bps	
	6	19200 bps	
	7	38400 bps	
	8	57600 bps	
	<u>9</u>	<u>115 kbps</u>	

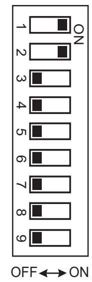
Terminating resistance

SW3	Contents: RS-232C	Contents: RS-422 (4-wire system)	Contents: RS-485 (2-wire system)	Setting Example
	<u>OFF</u>	ON	OFF	1: OFF 2: OFF
	<u>OFF</u>	ON	ON	

Communication setting

SW4	Function	OFF	ON	Setting Example
1	Data length	7	8	
2	Parity	None	Provided	
3		Even	Odd	
4	Stop bit	1	2	
5	**Fixed to OFF**			
6	Communication system (wiring type)			
7				
8	**Fixed to OFF**			
9	**Fixed to OFF**			

RS-232C	RS-422 (4-wire system)	RS-485 (2-wire system)
OFF	ON	OFF
OFF	OFF	ON



Communication Mode Setting

Set a communication mode at the system memory. The selected mode becomes effective when the power is turned off and on again.

Address	Contents	Setting
A008	Communication start method	0: At any time required
A00A	Response transmission method	0: Automatic
A00F	Trigger setting	0: Triggering invalid

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
CMUC	(controller memory 1-byte data)	00H	
CMS	(controller memory 2-byte data)	01H	
CMUT	(controller memory 3-byte data)	02H	
CML	(controller memory 4-byte data)	03H	
IMUC	(ID memory 1-byte data)	04H	
IMS	(ID memory 2-byte data)	05H	
IMUT	(ID memory 3-byte data)	06H	
IML	(ID memory 4-byte data)	07H	
ID	(ID code)	08H	Double-word
TM	(time)	09H	
RWUC	(reader/writer memory 1-byte data)	0AH	
RWS	(reader/writer memory 2-byte data)	0BH	
RWUT	(reader/writer memory 3-byte data)	0CH	
RWL	(reader/writer memory 4-byte data)	0DH	

*1 The CH number is required in addition to the device type and address. The assigned device memory is expressed as shown on the right when editing the screen.

Example: #0 : CMUC9000
Address number
Device type
CH number

Indirect Device Memory Designation

Specify the CH number in the expansion code.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)			F2
Tag memory clear	1 - 8 (PLC1 - 8)	n	Station number		7/11
		n + 1	Command: 0		
		n + 2	CH No.		
		n + 3	Attribute (0, 8)	Attribute (1, 2, 9, A)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Clear data	UID (lower)	
		n + 7	-		
		n + 8	-	UID (higher)	
		n + 9	-		
		n + 10	-	Clear data	
Controller clear	1 - 8 (PLC1 - 8)	n	Station number		6
		n + 1	Command: 1		
		n + 2	CH No.		
		n + 3	Address		
		n + 4	Bytes		
		n + 5	Clear data		
Controller initialize	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 2		
		n + 2	CH No.		
Error log clear (communication time, number of retrials)	1 - 8 (PLC1 - 8)	n	Station number		4
		n + 1	Command: 3		
		n + 2	CH No.		
		n + 3	Area 0: Communication time log 1: Retry count log		
Reader/writer memory clear	1 - 8 (PLC1 - 8)	n	Station number		7/9
		n + 1	Command: 4		
		n + 2	CH No.		
		n + 3	Attribute (0, 8)	Attribute (1, 9)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Clear data	Identification sign	
		n + 7	-		
		n + 8	-	Clear data	
Controller self diagnosis	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 5		
		n + 2	CH No.		
Reader/writer self diagnosis	1 - 8 (PLC1 - 8)	n	Station number		4/6
		n + 1	Command: 6		
		n + 2	CH No.		
		n + 3	Attribute (0, 8)	Attribute (1, 9)	
		n + 4	-	Identification sign	
		n + 5	-		
Error reset	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 7		
		n + 2	CH No. 0: CH No. 0 1: CH No. 1		
Output command	1 - 8 (PLC1 - 8)	n	Station number		5
		n + 1	Command: 8		
		n + 2	CH No.		
		n + 3	OUT0 0: OFF 1: ON		
		n + 4	OUT1 0: OFF 1: ON		
Status read out	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 9		
		n + 2	CH No.		
		n + 3	Status		

Contents	F0	F1 (= $u n)			F2
Reader/writer reset	1 - 8 (PLC1 - 8)	n	Station number		4/6
		n + 1	Command: 10		
		n + 2	CH No.		
		n + 3	Attribute (0, 8)	Attribute (1, 9)	
		n + 4	-	Identification sign	
		n + 5	-		
Reader/writer radio wave stop	1 - 8 (PLC1 - 8)	n	Station number		4
		n + 1	Command: 11		
		n + 2	CH No.		
		n + 3	Command to reader/writer 0: Radio wave stop 1: Radio wave emit		
Input check	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 12		
		n + 2	CH No.		
		n + 3	IN0		
		n + 4	IN1		
Controller read out	1 - 8 (PLC1 - 8)	n	Station number		6
		n + 1	Command: 13		
		n + 2	CH No.		
		n + 3	Address		
		n + 4	Bytes		
		n + 5	Internal device memory address *1		
Controller write	1 - 8 (PLC1 - 8)	n	Station number		6
		n + 1	Command: 14		
		n + 2	CH No.		
		n + 3	Address		
		n + 4	Bytes		
		n + 5	Internal device memory address *2		
Tag read out	1 - 8 (PLC1 - 8)	n	Station number		7/11
		n + 1	Command: 15		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, 4, 8, B, C)	Attribute (1, 2, 5, 6, 9, A, D, E)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Internal device memory address *1	UID (lower)	
		n + 7	-		
		n + 8	-	UID (higher)	
		n + 9	-		
		n + 10	-	Internal device memory address *1	
Tag write	1 - 8 (PLC1 - 8)	n	Station number		7/11
		n + 1	Command: 16		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, 4, 8, B, C)	Attribute (1, 2, 5, 6, 9, A, D, E)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Internal device memory address *2	UID (lower)	
		n + 7	-		
		n + 8	-	UID (higher)	
		n + 9	-		
		n + 10	-	Internal device memory address *2	
Tag UID code read out	1 - 8 (PLC1 - 8)	n	Station number		5
		n + 1	Command: 17		
		n + 2	CH No.		
		n + 3	Attribute (0, 3, 4, 8, B, C)		
		n + 4	Internal device memory address *1		

Contents	F0	F1 (= $u n)			F2
Time read out	1 - 8 (PLC1 - 8)	n	Station number		3
		n + 1	Command: 18		
		n + 2	CH No.		
		n + 3	Year		
		n + 4	Month		
		n + 5	Day		
		n + 6	Hour		
		n + 7	Minute		
		n + 8	Second		
		n + 9	A day of the week		
Time setting	1 - 8 (PLC1 - 8)	n	Station number		10
		n + 1	Command: 19		
		n + 2	CH No.		
		n + 3	Year		
		n + 4	Month		
		n + 5	Day		
		n + 6	Hour		
		n + 7	Minute		
		n + 8	Second		
		n + 9	A day of the week		
Reader/writer read out	1 - 8 (PLC1 - 8)	n	Station number		7/9
		n + 1	Command: 20		
		n + 2	CH No.		
		n + 3	Attribute (0, 8)	Attribute (1, 9)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Internal device memory address *1	Identification sign	
		n + 7	-		
		n + 8	-	Internal device memory address *1	
Reader/writer write	1 - 8 (PLC1 - 8)	n	Station number		7/9
		n + 1	Command: 21		
		n + 2	CH No.		
		n + 3	Attribute (0, 8)	Attribute (1, 9)	
		n + 4	Address	Address	
		n + 5	Bytes	Bytes	
		n + 6	Internal device memory address *2	Identification sign	
		n + 7	-		
		n + 8	-	Internal device memory address *2	

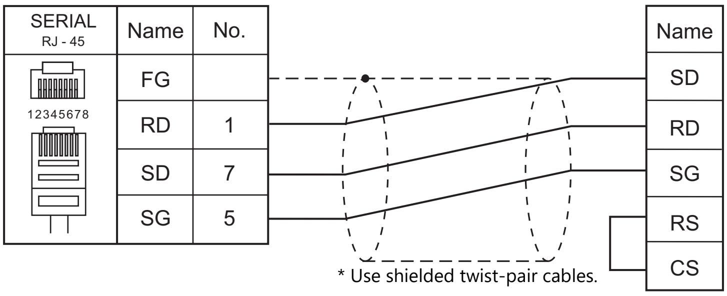
Return data: Data stored from servo to X1 series

*1 Specify the top address of the internal device memory ($u) at which the read data is to be stored.
*2 Specify the top address of the internal device memory ($u) at which data to be written is stored.

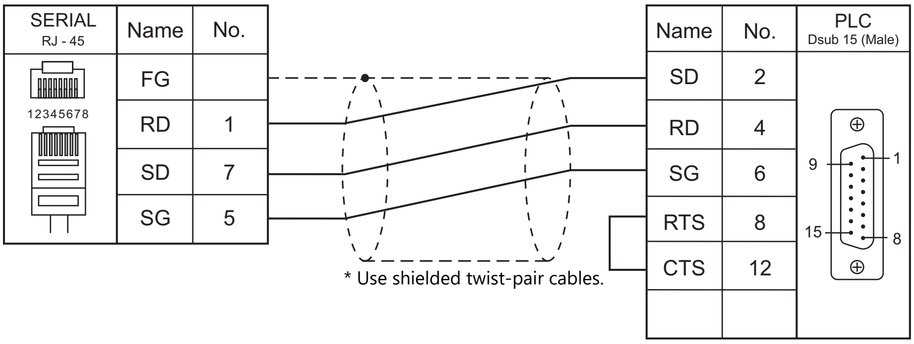
6.2.3 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

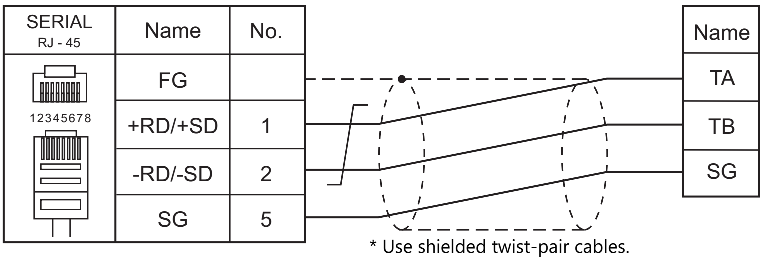


Wiring diagram 2 - M2

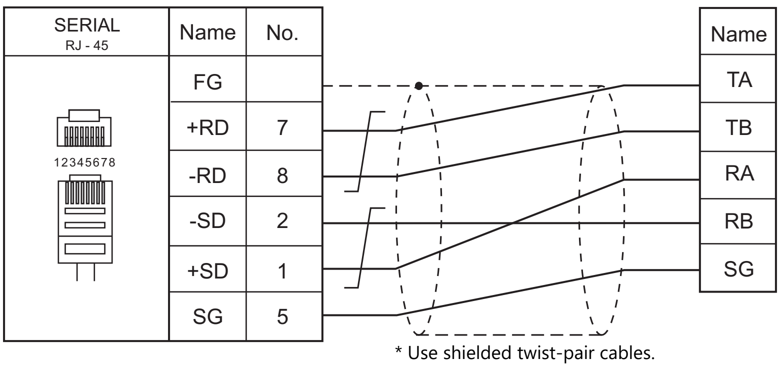


RS-422/RS-485

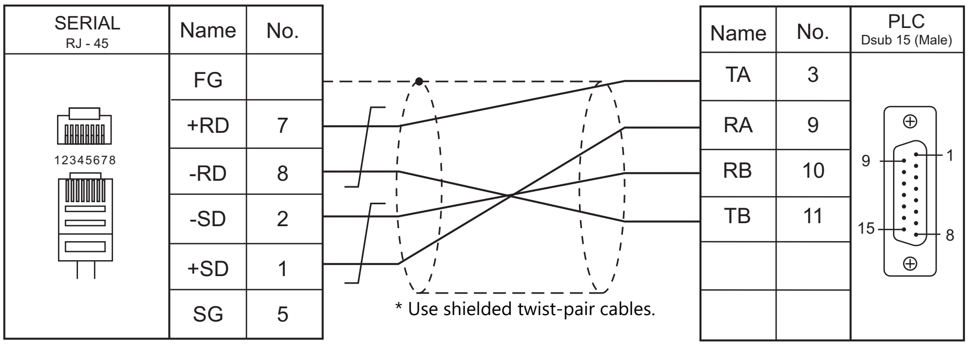
Wiring diagram 1 - M4



Wiring diagram 2 - M4



Wiring diagram 3 - M4



7. SHIMADEN

7.1 Temperature Controller/Servo/Inverter Connection

Controller / Indicator / Servo Controller

<table>
<tr><th rowspan="2">PLC Selection on the Editor</th><th rowspan="2">Model</th><th rowspan="2">Port</th><th rowspan="2">Signal Level</th><th colspan="2">Connection</th><th rowspan="2">Lst File</th></tr>
<tr><th>RS-232C*1 / RS-485 (2-wire)*2</th><th>RS-422 (4-wire)*2</th></tr>
<tr><td rowspan="7">SHIMADEN standard protocol</td><td>SR82-xx-N-xx-xxxx5xx
SR83-xx-x-xx-xxxx5xx
SR84-xx-x-xx-xxxx5xx
SR91-xx-xx-x5x
SR92-xx-x-xx-xx5x
SR93-xx-x-xx-x05x
SR94-xx-x-xx-x05x
SR23-xxxx-xxxxx5x
FP93-xx-xx-xx5x
MR13-xx1-xxxx15x
SD16-xxx-xx5x
EM70-xx-xxx5x</td><td>Terminal block</td><td>RS-485</td><td>Wiring diagram 1 - M4</td><td>×</td><td rowspan="5">Shimaden.List</td></tr>
<tr><td>SR82-xx-N-xx-xxxx7xx
SR83-xx-x-xx-xxxx7xx
SR84-xx-x-xx-xxxx7xx
SR92-xx-x-xx-xx7x
SR93-xx-x-xx-x07x
SR94-xx-x-xx-x07x
SR23-xxxx-xxxxx7x
FP93-xx-xx-xx7x
MR13-xx1-xxxx17x
SD16-xxx-xx7x
EM70-xx-xxx7x</td><td>Terminal block</td><td>RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
<tr><td>SR253-xx-x-xxxxxx5x</td><td>Communication port</td><td>RS-485</td><td>Wiring diagram 2 - M4</td><td>×</td></tr>
<tr><td>SR253-xx-x-xxxxxx6x</td><td>Communication port</td><td>RS-422</td><td>×</td><td>Wiring diagram 3 - M4</td></tr>
<tr><td>SR253-xx-x-xxxxxx7x</td><td>Communication port</td><td>RS-232C</td><td>Wiring diagram 2 - M2</td><td>×</td></tr>
<tr><td>FP23-xxxx-xxxxx5x</td><td>Terminal block</td><td>RS-485</td><td>Wiring diagram 1 - M4</td><td>×</td><td rowspan="2">ShimadenFP23.List</td></tr>
<tr><td>FP23-xxxx-xxxxx7x</td><td>Terminal block</td><td>RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
</table>

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).

7.1.1 SHIMADEN Standard Protocol

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	
Sum Check	Add/ Complement for Adding 2 / Exclusive OR / None	
CR/LF	CR / CR/LF	Only CR supported by the SR90/FP93/SD16 series
Write Data Count Setting	1 to 10	

Controller / Indicator / Servo Controller

Communication parameters can be set by operating the keys on the front of the controller.
Be sure to match the settings to those made under [Communication Setting] of the editor.

SR80 Series / EM70 Series

(Underlined setting: default)

Parameter Display	Item	Setting	Example
Comm	Communication mode *1	LOC: Read only COM: Read/write	COM
AdrS	Communication address	1 to 99	1
bPS	Baud rate	4800 / 9600 / 19200 bps	19200
dAtA	Communication data format	7E1: 7 bits / even parity / 1 bit 7E2: 7 bits / even parity / 2 bits 7N1: 7 bits / none / 1 bit 7N2: 7 bits / none / 2 bits 8E1: 8 bits / even parity / 1 bit 8E2: 8 bits / even parity / 2 bits 8N1: 8 bits / none / 1 bit 8N2: 8 bits / none / 2 bits	7E1
CtrL	Communication control code	1: STX_ETX_CR 2: STX_ETX_CRLF	1
bcc	Communication BCC check	1: ADD (addition) 2: ADD_two's cmp (addition + 2's complement number) 3: XOR (exclusive OR) 4: None	1

*1 The front-mounted key works for switching COM → LOC only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)

SR90 Series

(Underlined setting: default)

Parameter Display	Item	Setting	Example
Comm	Communication mode *1	LOC: Read only COM: Read/write	COM
Prot	Communication protocol	**Shim: SHIMADEN protocol**	Shim
bcc	BCC calculation	1: ADD (addition) 2: ADD_two's cmp (addition + 2's complement number) 3: XOR (exclusive OR) 4: None	1
bPS	Baud rate	4800 / 9600 / 19200 bps	19200
Addr	Communication address	1 to 255	1
dAtA	Communication data format	7E1: 7 bits / even parity / 1 bit 7E2: 7 bits / even parity / 2 bits 7N1: 7 bits / none / 1 bit 7N2: 7 bits / none / 2 bits 8E1: 8 bits / even parity / 1 bit 8E2: 8 bits / even parity / 2 bits 8N1: 8 bits / none / 1 bit 8N2: 8 bits / none / 2 bits	7E1
SchA	Start character	**STX**	STX

*1 The front-mounted key works for switching COM → LOC only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)

SR253 Series

(Underlined setting: default)

Group	Display	Item	Setting	Example
Group 1-2	Operation	Communication mode *1	LOCAL: Read only COMM: Read/write	COMM
Group 5-5A	Add	Machine address	01 to 99	01
	BPS	Baud rate	4800 / 9600 / 19200 bps	19200
	DATA	Communication data format	7E1: 7 bits / even parity / 1 bit 7E2: 7 bits / even parity / 2 bits 7N1: 7 bits / none / 1 bit 7N2: 7 bits / none / 2 bits 8E1: 8 bits / even parity / 1 bit 8E2: 8 bits / even parity / 2 bits 8N1: 8 bits / none / 1 bit 8N2: 8 bits / none / 2 bits	7E1
	Mode	Communication protocol mode	**Standard: Standard protocol**	Standard
Group 5-5B	MEM	Communication memory mode	EEP: EEPROM RAM: RAM	EEP
	CTRL	Control code	STX_ETX_CR STX_ETX_CRLF	STX_ETX_CR
	BCC	Checksum	ADD (addition) ADD_two's cmp (addition + 2's complement number) XOR (exclusive OR) None	ADD
	DELY	Delay time	0 to 99 ms	40

*1 The front-mounted key works for switching COMM → LOCAL only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)

SR23 Series / FP23 Series

(Underlined setting: default)

Parameter Display	Item	Setting	Example
COM	Communication mode *1	LOCAL: Read only COM: Read/write	COM
PORT	Communication protocol mode	**SHIMADEN: SHIMADEN protocol**	SHIMADEN
ADDR	Device address	1 to 98	1
BPS	Baud rate	4800 / 9600 / 19200 bps	19200
MEM	Communication memory mode	EEP: EEPROM RAM: RAM R_E: RAM/EPPROM *2	EEP
DATA	Data length	7 / 8	7
PARI	Parity	EVEN / ODD / NONE	EVEN
STOP	Stop bit	1 / 2	1
DELY	Communication delay time	1 to 50 ms	10
CTRL	Communication control code	STX_ETX_CR STX_ETX_CRLF	STX_ETX_CR
BCC	Communication BCC data calculation	ADD (addition) ADD_two's cmp (addition + 2's complement number) XOR (exclusive OR) None	ADD

*1 The front-mounted key works for switching COM → LOC only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)
*2 Data in SV, OUT, and COM modes will be written to RAM. Other data will be written to EPPROM.

FP93 Series

(Underlined setting: default)

Parameter Display	Item	Setting	Example
Comm	Communication mode *1	LOC: Read only COM: Read/write	COM
Addr	Communication address	1 to 255	1
bPS	Baud Rate	4800 / 9600 / 19200 bps	19200
dAtA	Communication data format	7E1: 7 bits / even parity / 1 bit 8N1: 8 bits / none / 1 bit	7E1
Stx	Start character	**STX**	STX
bCC	Communication calculation	1: Addition 2: Addition + 2's complement number 3: XOR 4: None	1

*1 The front-mounted key works for switching COM → LOC only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)

MR13 Series

(Underlined setting: default)

Parameter Display	Item	Setting	Example
Com	Communication mode *1	LOC: Read only COM: Read/write	COM
Addr	Communication address	1 to 99	1
bPS	Baud rate	4800 / 9600 / 19200 bps	19200
dAtA	Communication data format	7E1: 7 bits / even parity / 1 bit 7E2: 7 bits / even parity / 2 bits 7N1: 7 bits / none / 1 bit 7N2: 7 bits / none / 2 bits 8E1: 8 bits / even parity / 1 bit 8E2: 8 bits / even parity / 2 bits 8N1: 8 bits / none / 1 bit 8N2: 8 bits / none / 2 bits	7E1
mEm	Communication memory mode	EEP: EEPROM RAM: RAM	EEP
CtrL	Communication control code	1: STX_ETX_CR 2: STX_ETX_CRLF	1
bCC	Communication checksum	1: ADD (addition) 2: ADD_two's cmp (addition + 2's complement number) 3: XOR (exclusive OR) 4: None	1

*1 The front-mounted key works for switching COM → LOC only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)

SD16 Series

(Underlined setting: default)

Parameter Display	Item	Setting	Example
Comm	Communication mode *1	LOC: Read only COM: Read/write	COM
Prot	Communication protocol mode	**SHIM: SHIMADEN standard protocol**	SHIM
Addr	Communication address	1 to 100	1
dAtA	Communication data format	7E1: 7 bits / even parity / 1 bit 7E2: 7 bits / even parity / 2 bits 7N1: 7 bits / none / 1 bit 7N2: 7 bits / none / 2 bits 8E1: 8 bits / even parity / 1 bit 8E2: 8 bits / even parity / 2 bits 8N1: 8 bits / none / 1 bit 8N2: 8 bits / none / 2 bits	7E1
SchA	Communication start character	**STX**	STX
bcc	BCC calculation	1: ADD (addition) 2: ADD_two's cmp (addition + 2's complement number) 3: XOR 4: None	1
bPS	Baud rate	4800 / 9600 / 19200 bps	19200

*1 The front-mounted key works for switching COM → LOC only.
When writing from the X1, place "1" (= communication mode: COM) at address "018Cxx (H)". (xx: Subaddress)

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Address denotations

The assigned device memory is expressed as shown below when editing the screen.

```
xxxxyy
 ↑  ↑└ Subaddress      01 to 03*
 └──── Address (HEX)
```

* Specify a channel as a subaddress.

SR23 series / FP23 series	: 01 to 02
MR13 series	: 01 to 03
Other models	: 01 (fixed)

Indirect Device Memory Designation

	15 ... 8	7 ... 0
n+0	Model	Device type
n+1	Address (lower)	Subaddress
n+2	00	Address (higher)
n+3	00	Bit designation
n+4	00	Station number

PLC_CTL

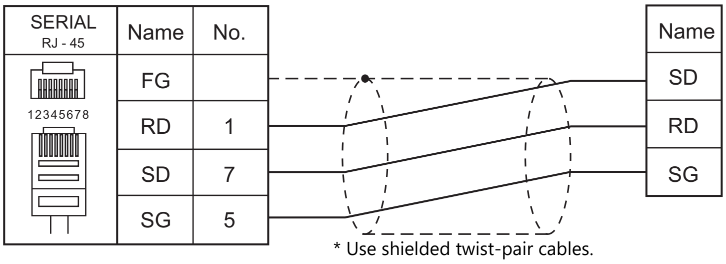
Macro command "PLC_CTL F0 F1 F2"

Contents	F0	F1 (=$u n)		F2
Broadcast	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	4
		n+1	Address (lower) + subaddress	
		n+2	Address (higher)	
		n+3	Write data	

7.1.2 Wiring Diagrams

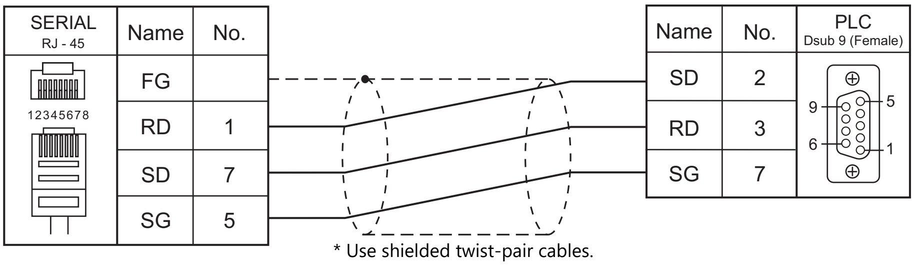
RS-232C

Wiring diagram 1 - M2



* Use shielded twist-pair cables.

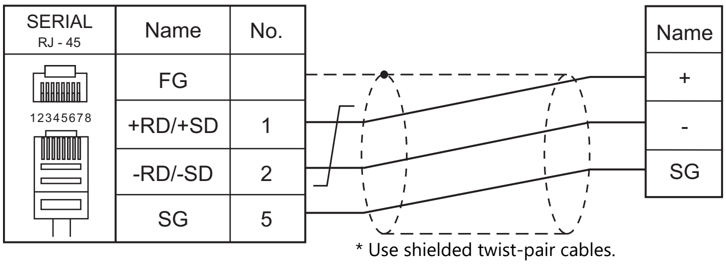
Wiring diagram 2 - M2



* Use shielded twist-pair cables.

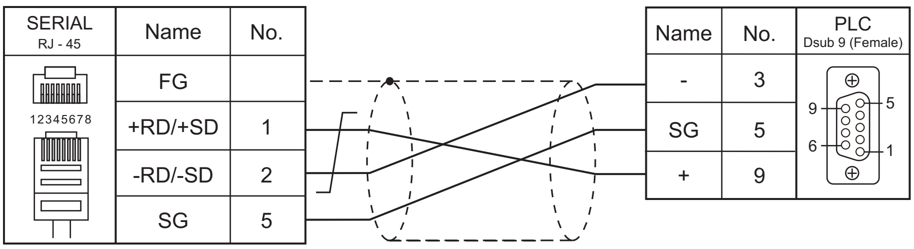
RS-422/RS-485

Wiring diagram 1 - M4



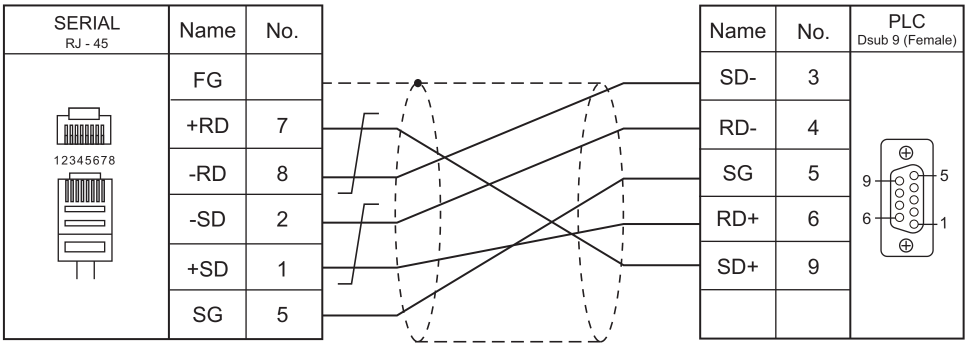
* Use shielded twist-pair cables.

Wiring diagram 2 - M4



* Use shielded twist-pair cables.

Wiring diagram 3 - M4



* Use shielded twist-pair cables.

8. SHINKO TECHNOS

8.1 Temperature Controller/Servo/Inverter Connection

Serial Connection

Multi-point Temperature Control System

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C / RS-485 (2-wire)*1	RS-422 (4-wire)*1	
C Series	CPT-20A	Power source host link unit	RS-485	Wiring diagram 3 - M4	Wiring diagram 4 - M4*2	S-C.Lst

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

Digital Indicating Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)	
FC Series	FCS-23A (C5, C)*2 FCR-13A (C5, C)*2 FCR-23A (C5, C)*2 FCR-15A (C5, C) *2 FCD-13A (C5, C)*2 FCD-15A (C5, C)*2	Terminal block	RS-232C	Wiring diagram 1 - M2	×	S-FC.Lst
			RS-485	Wiring diagram 1 - M4	×	
GC Series	GCS-33x-x/x,C5	Terminal block	RS-485	Wiring diagram 1 - M4	×	S-GC.Lst
JCx-300 Series	JCS-33A-x/xx,C5 JCR-33A-x/xx,C5 JCD-33A-x/xx,C5	Terminal block	RS-485	Wiring diagram 1 - M4	×	S-JC.Lst
ACS-13A	ACS-13A-x/Mx,C5	Terminal block	RS-485	Wiring diagram 1 - M4	×	S-ACS13A. Lst
ACD/ACR Series	ACD-13A-x/Mx,(C5, C)*2 ACR-13A-x/Mx,(C5, C)*2 ACD-15A-R/Mx,(C5, C)*2 ACR-15A-R/Mx,(C5, C)*2	Terminal block	RS-232C	Wiring diagram 1 - M2	×	S-ACDR.Lst
			RS-485	Wiring diagram 1 - M4	×	
WCL-13A	WCL-13A-xx/xxx,C5	RS-485	RS-485	Wiring diagram 2 - M4	×	S-WCL.Lst

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).

DIN-Rail-Mounted Indicating Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C / RS-485 (2-wire)*1	RS-422 (4-wire)	
DCL-33A	DCL-33A-x/xx,C5	RS-485	RS-485	Wiring diagram 2 - M4	×	S-DCL.Lst

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

Program Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)	
PCD-33A	PCD-33A-x/Mx,C5	Terminal block	RS-485	Wiring diagram 1 - M4	×	S-PCD33A. Lst
PC-900	PC-9x5-x/M,(C5, C)*3	Terminal block	RS-232C	Wiring diagram 1 - M2	×	S-PC900.Lst
			RS-485	Wiring diagram 1 - M4	×	
PCA1 Series	PCA1xx0-1xx PCA1xx0-4xx	Terminal block	RS-232C	Wiring diagram 1 - M2	×	PCA1.Lst
			RS-232C	Wiring diagram 2 - M2 + SHINKO TECHNOS's converter "IF-400" + SHINKO TECHNOS's "CDM"	×	
			RS-485	Wiring diagram 1 - M4	×	

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)	
PCB1 Series	PCB1xx0-x1 PCB1xx0-x2 PCB1xx0-x6	Terminal block	RS-232C	Wiring diagram 2 - M2 + SHINKO TECHNOS's converter "IF-400" + SHINKO TECHNOS's "CDM"	×	PCB1.Lst
			RS-485	Wiring diagram 1 - M4	×	
JIR-301-M Series	JIR-301-M1,C5	Terminal block	RS-232C	Wiring diagram 2 - M2 + SHINKO TECHNOS's converter "IF-400" + SHINKO TECHNOS's "CDM"	×	S-JIR-301.Lst*4 S-JIR-301_BRW.Lst*4
			RS-485	Wiring diagram 1 - M4	×	
BCx2 Series	BCS2xx0-x6 BCR2xx0-x6 BCD2xx0-x6	Terminal block	RS-232C	Wiring diagram 2 - M2 + SHINKO TECHNOS's converter "IF-400" + SHINKO TECHNOS's "CDM"	×	S-BCx2.Lst*4 S-BCx2_JC.Lst*4
			RS-485	Wiring diagram 1 - M4	×	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).
*3 Select a model with the option C5 (serial communication RS-485) or C (serial communication RS-232C).
*4 The list file is automatically switched according to the [Transmission Mode] selected in the PLC Properties.

8.1.1 C Series

Communication Setting

Editor

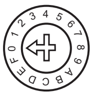
Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	9600 / 19200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 15	

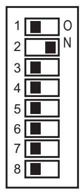
C Series

Device number setting

STATION No.	Setting	Setting Example
	0 to F (H) (0 to 15)	0

Communication setting DIP switch

(Underlined setting: default)

<table>
<tr><th>Switch</th><th>Contents</th><th>OFF</th><th>ON</th><th>Setting Example</th></tr>
<tr><td>1</td><td>Baud rate</td><td>9600 bps</td><td>19200 bps</td><td rowspan="8">
</td></tr>
<tr><td>2</td><td>Terminating resistance</td><td>Without terminating resistance</td><td>With terminating resistance</td></tr>
<tr><td>3</td><td rowspan="4">Communication format</td><td colspan="2" rowspan="4">OFF: Shinko standard protocol</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td rowspan="2">Digital output setting</td><td colspan="2" rowspan="2"><table><tr><th>7</th><th>8</th><th>Contents</th></tr><tr><td>OFF</td><td>OFF</td><td>Turning ON/OFF by communication command *1</td></tr><tr><td>ON</td><td>OFF</td><td>DO1: warning 1, DO2: warning 2, DO3: heater disconnection warning</td></tr><tr><td>OFF</td><td>ON</td><td>DO1: warning 1, DO2: warning 2, DO3: abnormal loop warning</td></tr><tr><td>ON</td><td>ON</td><td>DO1: warning 1, DO2: heater disconnection warning, DO3: abnormal loop warning</td></tr></table>
*1 Works only when the data is sent to the address (digital output [0041xx]) on CPT-20A. For more information, refer to the instruction manual for the temperature controller issued by the manufacturer.</td></tr>
<tr><td>8</td></tr>
</table>

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

Address denotations

- The assigned device memory is expressed as shown below when editing the screen.
  Example: XXXXYY
  Channel number: 00 to 14 (HEX)
  Data item
- On the signal name reference list, every channel number is designated as “00”. To access any channel number other than “00”, manually input the desired number.

8.1.2 FC Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	“95” is used for broadcasting.

FC Series

Auxiliary function setting mode 1

When the [MODE] key is held down for three seconds together with the [▼] key in the PV/SV display mode, the controller enters in “auxiliary function setting mode 1”.

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	Available only with FCS-23A, FCR-13A, FCR-23A and FCD-13A
Device number setting	0 to 94	
Baud rate selection	4800 / 9600 / 19200 bps	

* The following settings are fixed; data length 7, stop bit 1 and even parity.

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

Address denotations

- The assigned device memory is expressed as shown below when editing the screen.
  Example: XXXXYY
  Sub address: 00 to 07 (HEX)
  Data item

- On the signal name reference list, every sub address is designated as “00”. To access any sub address other than “00”, manually input the desired address.

8.1.3 GC Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.

GC Series

Auxiliary function setting mode 1

When the [MODE] key is held down for three seconds together with the [▼] key in the PV/SV display mode, the controller enters in "auxiliary function setting mode 1".

(Underlined setting: default)

Item	Setting	Remarks
Device number setting	0 to 94	
Baud rate selection	4800 / 9600 / 19200 bps	

* The following settings are fixed; data length 7, stop bit 1, even parity.

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

Address denotations

- The assigned device memory is expressed as shown below when editing the screen.

  Example: XXXXYY

  YY — Channel number: 00 (fixed)

  XXXX — Data item

8.1.4 JCx-300 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.

JCx-300 Series

Auxiliary function setting mode 1

When the [MODE] key is held down for three seconds together with the [▼] key in the PV/SV display mode, the controller enters in "auxiliary function setting mode 1".

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	
Communication device number setting	0 to 94	
Baud rate selection	4800 / 9600 / 19200 bps	
Parity selection	**Even**	Cannot be changed when the Shinko standard protocol is selected.
Stop bit selection	**1 bit**	

* The data length setting is fixed to "7".

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.5 ACS-13A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.

ACS-13A

Auxiliary function setting mode

When the [MODE] key is held down for three seconds together with the [▼] key in the PV/SV display mode, the controller enters in "auxiliary function setting mode".

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	
Device number setting	0 to 94	
Baud rate selection	4800 / 9600 / 19200 bps	
Data bit / parity selection	**7 bits / even**	
Stop bit selection	**1 bit**	

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.6 ACD/ACR Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 95	"95" is used for broadcasting.

ACD/ACR Series

Communication parameter setting group

When the [SET] key is pressed four times and the [MODE] key is pressed in the PV/SV display mode, the controller enters in "input parameter group".
In this state, press the [SET] key several times again. The controller enters in "communication parameter setting group".

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	
Device number setting	0 to 94	
Baud rate selection	9600 / 19200 / 38400 bps	
Data bit / parity selection	8 bits / no parity 7 bits / no parity 8 bits / even 7 bits / even 8 bits / odd 7 bits / odd	
Stop bit selection	1 bit 2 bits	

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.7 WCL-13A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.

WCL-13A

Specific function setting group

When the [MODE] key is pressed several times in the PV/SV display mode, the controller enters in "specific function setting group".

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	
Device number setting	0 to 94	
Baud rate selection	9600 / 19200 / 38400 bps	
Data bit / parity selection	**7 bits / even**	
Stop bit selection	**1 bit**	

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.8 DCL-33A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 31	

DCL-33A

Auxiliary function setting mode 1

When the [MODE] key is held down for three seconds together with the [▼] key in the PV/SV display mode, the controller enters in the “auxiliary function setting” mode.

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	
Communication device number setting	0 to 31	
Baud rate selection	4800 / 9600 / 19200 bps	
Parity selection	**Even**	Cannot be changed when the Shinko standard protocol is selected.
Stop bit selection	**1 bit**	

* The data length setting is fixed to “7”.

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.9 PCD-33A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.

PCD-33A

Auxiliary function setting mode 1

When the [MODE] key is held down for three seconds together with the [▼] key in the PV/SV display mode, the controller enters in "auxiliary function setting mode 1".

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Shinko standard**	
Device number setting	0 to 94	
Baud rate selection	4800 / 9600 / 19200 bps	
Parity selection	**Even**	Cannot be changed when the Shinko standard protocol is selected.
Stop bit selection	**1 bit**	

* The data length setting is fixed to "7".

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.10 PC-900

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.

PC-900

Communication parameter

Press the [SET/RST] key in the standby mode or program control execution mode, press the [STOP/MODE] key four times, and then press the [HOLD/ENT] key to select "auxiliary function setting mode". In this state, press the [STOP/MODE] key five times and then press the [HOLD/ENT] key to select "communication parameter". For more information, refer to the instruction manual for the PC-900.

(Underlined setting: default)

Item	Setting	Remarks
Baud rate selection	4800 / 9600 / 19200 bps	
Device number setting	0 to 94	
Communication mode selection	**Serial communication**	

* The following settings are fixed; data length 7, stop bit 1, even parity.

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.11 PCA1 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	“95” is used for broadcasting.

PCA1 series

Communication parameter

Press the [SET/RST] key in the RUN mode, press the [STOP/MODE] key four times, and then press the [HOLD/ENT] key to select “Engineering setting group”. In this state, press the [STOP/MODE] key five times and then press the [HOLD/ENT] key to select “Communication parameter setting group”. For more information, refer to the instruction manual for the PCA1 series.

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Serial communication**	
Device number setting	0 to 94	
Baud rate selection	9600 / 19200 / 38400 bps	

* The following settings are fixed; data length 7, stop bit 1, even parity.

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.12 PCB1 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	When connecting via RS-232C, use Shinko Technos's converter "IF-400".
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 95	"95" is used for broadcasting.

PCB1 series

Communication parameter

Press and hold down [MODE] and [∨] keys together for three seconds in the RUN mode to enter "engineering setting mode 1". For more information, refer to the instruction manual for the PCB1 series.

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	**Serial communication**	
Device number setting	0 to 94	
Baud rate selection	9600 / 19200 / 38400 bps	
Data bit / parity selection	8 bits / no parity 7 bits / no parity 8 bits / even 7 bits / even 8 bits / odd 7 bits / odd	
Stop bit selection	1 bit / 2 bits	

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.13 JIR-301-M Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	When connecting via RS-232C, use Shinko Technos's converter "IF-400".
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 95	"95" is used for broadcasting.
Transmission Mode	Shinko protocol / Shinko protocol (Block read/write available)	The list file switches automatically depending on the transmission mode selected.

JIR-301-M series

Communication parameter

When the [MODE] key is held together with the [∨] key in the PV/SV display mode, the controller enters in "auxiliary function setting mode 1". In this state, press the [Mode] key three times, enters in "Communication protocol". For more information, refer to the instruction manual for the JIR-301-M series.

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	Shinko protocol / Shinko protocol (Block Read/Write available)	
Device number setting	0 to 94	
Baud rate selection	9600 / 19200 / 38400 bps	

* The following settings are fixed; data length 7, stop bit 1, even parity.

Available Device Memory

The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

8.1.14 BCx2 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	When connecting via RS-232C, use Shinko Technos's converter "IF-400".
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 95	"95" is used for broadcasting.
Transmission Mode	Shinko protocol / Shinko protocol (JC command allocated)	The list file switches automatically depending on the transmission mode selected.

BCx2 series

Communication parameter

Press and hold down [MODE] and [∨] keys together for three seconds in the RUN mode to enter "engineering mode 1".
For more information, refer to the instruction manual for the BCx2 series.

(Underlined setting: default)

Item	Setting	Remarks
Communication protocol selection	Shinko protocol / Shinko protocol (JC command allocated)	
Device number setting	0 to 94	
Baud rate selection	9600 / 19200 / 38400 bps	
Data bit / parity selection	8 bits / no parity 7 bits / no parity 8 bits / even 7 bits / even 8 bits / odd 7 bits / odd	
Stop bit selection	1 bit / 2 bits	

Available Device Memory

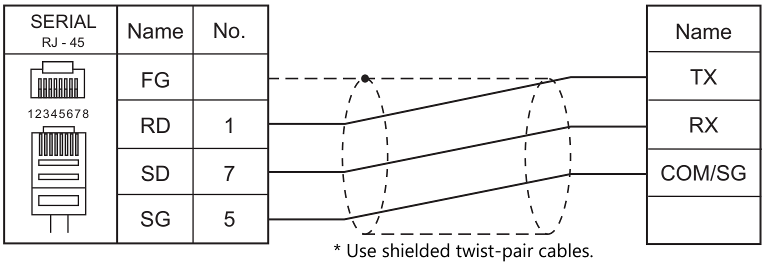
The available setting range of device memory varies depending on the controller model. Be sure to set within the range available for the controller to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	00H	

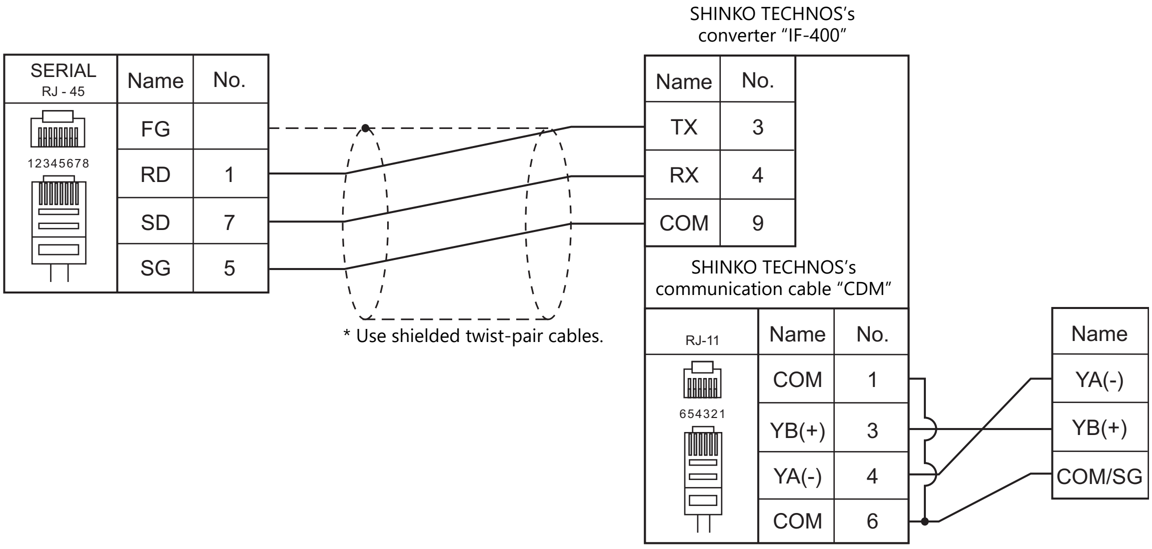
8.1.15 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

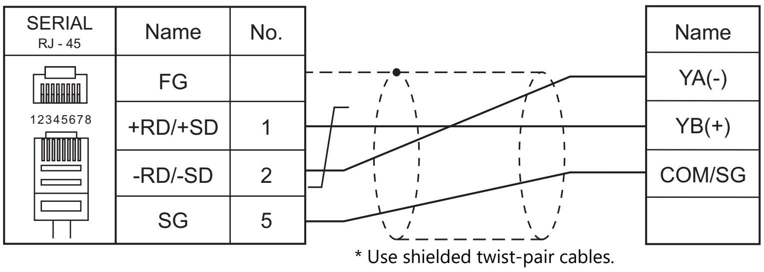


Wiring diagram 2 - M2

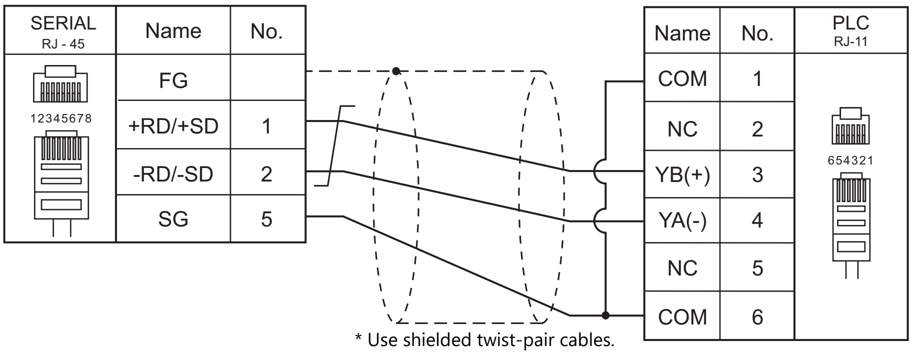


RS-422/RS-485

Wiring diagram 1 - M4

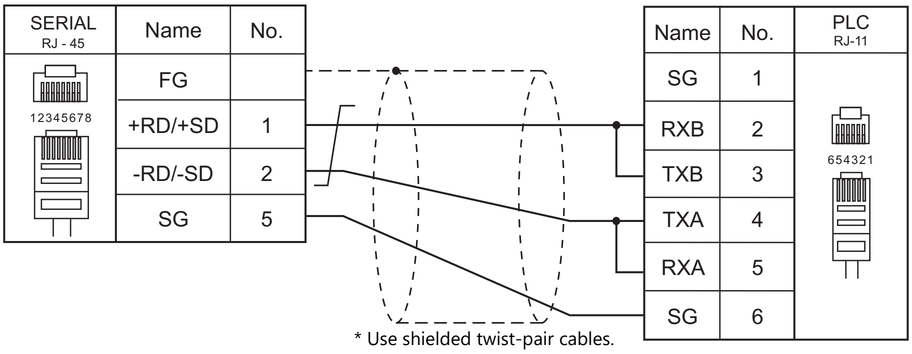


Wiring diagram 2 - M4



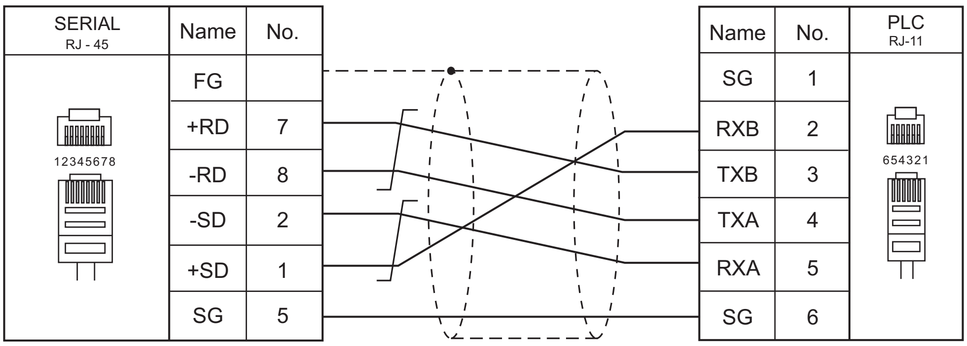
* Use shielded twist-pair cables.

Wiring diagram 3 - M4



* Use shielded twist-pair cables.

Wiring diagram 4 - M4



* Use shielded twist-pair cables.

9. Siemens

9.1 PLC Connection

Serial Connection

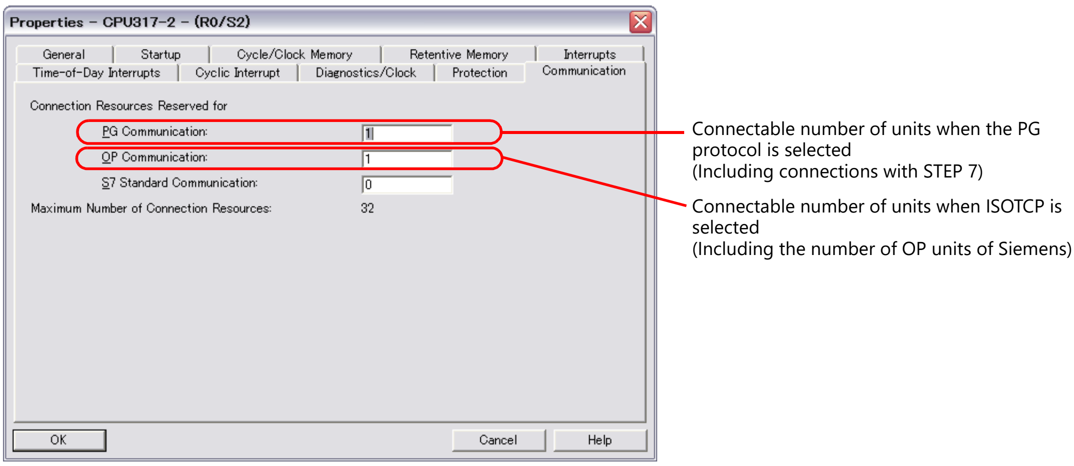
PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
S5 (PG port)	S5-90U S5-95U S5-95F S5-100U S5-115U S5-115H S5-115F	Programming port of CPU	RS-232C	Siemens' "6ES5 734-1BD20" + Wiring diagram 2 - M2	×
S7	S7-300	CP-341 (3964R/RK512)	RS-232C	Wiring diagram 1 - M2	×
			RS-422	×	Wiring diagram 2 - M4
	S7-400	CP-441 (3964R/RK512)	RS-232C	Wiring diagram 1 - M2	×
			RS-422	×	Wiring diagram 2 - M4
TI500/505	TI545-1103	Port2	RS-232C	Wiring diagram 3 - M2	×
	TI545-1101 TI545-1102 TI545-1104 TI545-1111 TI555-1101 TI555-1102 TI555-1103 TI555-1104 TI555-1105 TI555-1106	Port2	RS-232C	Wiring diagram 4 - M2	×
			RS-422	Wiring diagram 1 - M4	Wiring diagram 3 - M4*3
	TI575-2104 TI575-2105 TI575-2106	Port1	RS-232C	Wiring diagram 5 - M2	×
		Port3	RS-422	×	Wiring diagram 4 - M4

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

Ethernet Connection

PLC Selection on the Editor	CPU	Unit	TCP/IP	UDP/IP	Port No.	Keep Alive *1
S7-200 (Ethernet ISOTCP)	CPU222, CPU224 CPU224XP, CPU226	CP243-1 CP243-1 IT	○	×	102 fixed (Max. 8 units)	○
S7-300/400 (Ethernet ISOTCP)	CPU312, CPU312C CPU313, CPU313C-2 DP CPU314, CPU314C-2 DP CPU315-2 DP CPU315-2 PN/DP CPU315F-2 DP CPU317-2 DP CPU317-2 PN/DP CPU317F-2 DP	CP343-1 Lean	○	×	102 (fixed) *2	○
	CPU315-2 PN/DP CPU317-2 PN/DP CPU319-3 PN/DP	Built-in Ethernet port				
	CPU412-1, CPU412-2 CPU414-2, CPU414-3 CPU416-2, CPU416-3 CPU417-4	CP443-1				
S7-300/400 (Ethernet TCP/IP PG protocol)	CPU312, CPU312C CPU313, CPU313C-2 DP CPU314, CPU314C-2 DP CPU315-2 DP CPU315-2 PN/DP CPU315F-2 DP CPU317-2 DP CPU317-2 PN/DP CPU317F-2 DP	CP343-1 Lean	○	×	102 (fixed) *2	○
	CPU315-2 PN/DP CPU317-2 PN/DP CPU319-3 PN/DP	Built-in Ethernet port				
	CPU412-1, CPU412-2 CPU414-2, CPU414-3 CPU416-2, CPU416-3 CPU417-4	CP443-1				
S7-1200/1500 (Ethernet ISOTCP)	CPU1211C, CPU1212C CPU1214C CPU1511, CPU1513 CPU1515, CPU1516 CPU1518	Built-in Ethernet port	○	×	102 (fixed) (Max. 3 units)	○
S7-1200/1500 Tag (Ethernet ISOTCP)	CPU1211C, CPU1212C CPU1214C CPU1511, CPU1513 CPU1515, CPU1516 CPU1518	Built-in Ethernet port	○	×	102 (fixed) (Max. 3 units)	○
LOGO! (Ethernet ISOTCP)	LOGO! xxxxxxCEx*3	Built-in Ethernet port	○	×	Fixed to 102 (Max. 16 units)	○

*1 For KeepAlive functions, see "1.3.2 Ethernet Communication".
*2 In n : 1 connection, the connectable number of X1 units varies depending on the system resource capacity of the PLC.
Check the capacity on [Communication] which is displayed by selecting [STEP7 HW configuration] → [CPU] → [Object Properties].



*3 Base module device series: 0BA7 / 0BA8 / 0BA8. FS4

9.1.1 S5 (PG Port)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	**RS-232C**	
Baud Rate	**9600 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 31	

S5

No particular setting is necessary on S5.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DB	(data block)	00H	*1
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
F	(flag/internal relay)	03H	FW as word device
T	(timer/current value)	04H	
C	(counter/current value)	05H	
AS	(absolute address)	06H	

*1 When these device memory are used, registration is required at the PLC.
For more information, refer to the PLC manual issued by the manufacturer.
The assigned device memory is expressed as shown on the right when editing the screen.
Addresses that can be set on MONITOUCH range from DB000000 to DB255255.

Example: DB001000
- Address No. (0 to 255)
- Block No. (0 to 255)

Indirect Device Memory Designation

	15 8	7 0
n+0	Model	Device type
n+1	Address No. (word designation)	
n+2	00	Bit designation
n+3	00	Station number

- Designation of addresses for byte devices (I, Q, F, AS):
  Specify an address number divided by “2” for “n+1”.

  Example: Indirect device memory designation of “IW00010”
  n+1 = 10 (DEC) ÷ 2 = 5 (DEC)

- Bit designation of addresses for byte devices (I, Q, F, AS):
  - An even address number
    Specify a byte address number divided by “2” for “n+1” and specify a bit number for “n+2”.

    Example: Indirect device memory designation of “I000105”
    n + 1 = 10 ÷ 2 = 5 (DEC)
    n + 2 = 5 (DEC)

  - An odd address number
    Specify a byte address number minus “1”, divided by “2”, for “n+1”. Specify a bit number plus “8” for “n+2”.

    Example: Indirect device memory designation of “I000115”
    n + 1 = (11 – 1) ÷ 2 = 5 (DEC)
    n + 2 = 5 + 8 = 13 (DEC)

- For DB device memory:
  Specify a block number for the higher-order bytes of “n + 1”. Specify an address number divided by “2” for the lower-order bytes.

9.1.2 S7

Communication Setting

Editor

Communication setting

(Underlined setting: default)

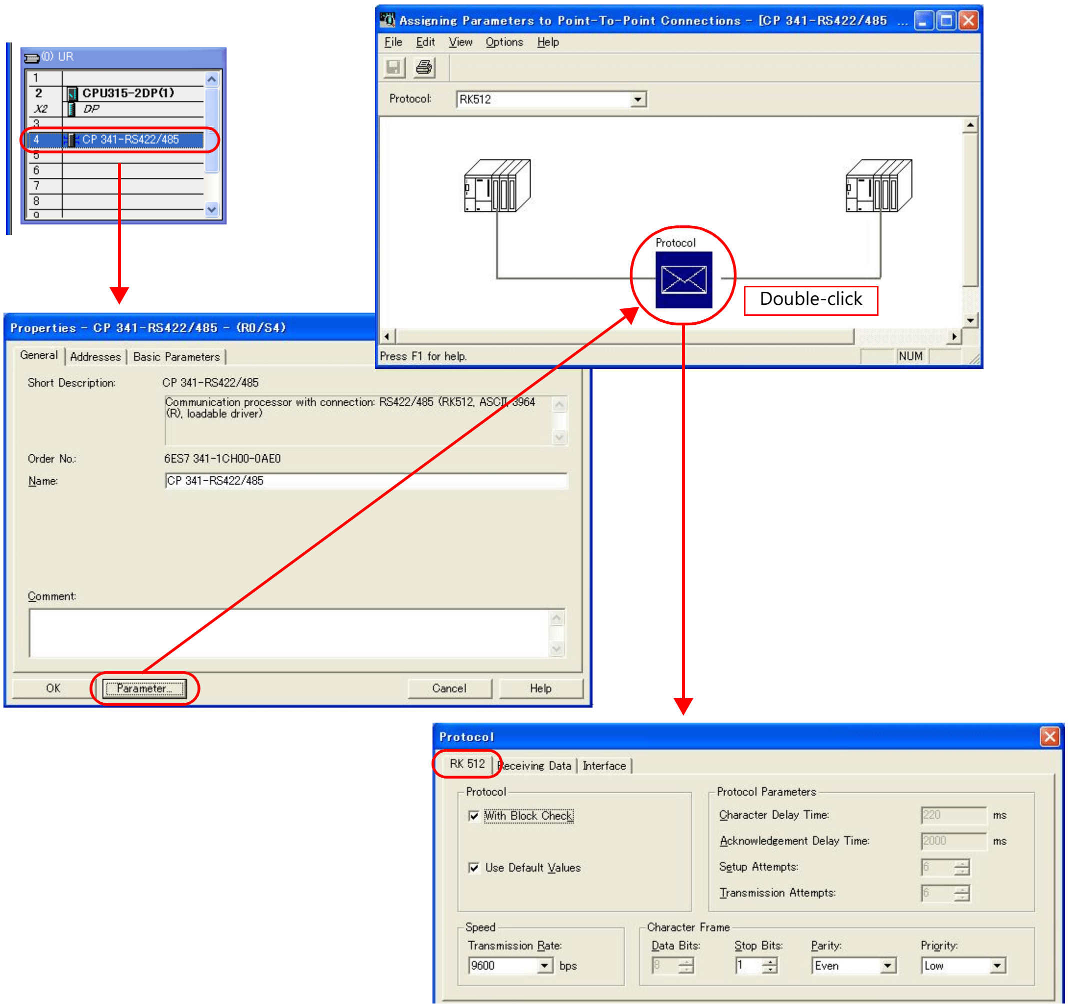
Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 /38400 / 57600 / 76800 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bit	
Parity	None / Odd / Even	

S7

Make the setting for communication using the ladder tool “SIMATIC Manager”. For more information, refer to the PLC manual issued by the manufacturer.

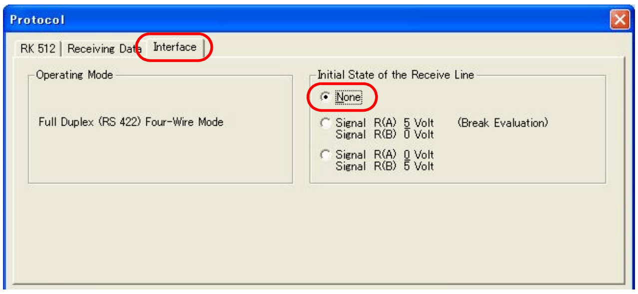
Hardware Configuration ([RK 512] tab window)

Open the [Protocol] dialog and specify the baud rate and the parity, etc. in the [RK 512] tab window.



Hardware Configuration ([Interface] tab window)

Specify “None” for the initial state of the receive line in the [Interface] tab window.



Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DB	(data block)	00H	*1
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
M	(memory word)	03H	MW as word device
T	(timer/current value)	04H	
C	(counter/current value)	05H	

*1 When this device memory is used, a registration is required for the PLC.
For more information, refer to the PLC manual issued by the manufacturer.
The assigned device memory is expressed as shown on the right when editing the screen.
The address range available on MONITOUCH is DB255:0000 to DB255:0510.

Example: DB001 : 0000
Address No. (0 to 510)
Colon
Block No. (1 to 255)

Indirect Device Memory Designation

	15 — 8	7 — 0
n+0	Model	Device memory type
n+1	Address No. (word designation)	
n+2	00	Bit designation
n+3	00	Target Port No.

- Designation of addresses for byte devices (I, Q, M):
  Specify an address number divided by “2” for “n + 1”.

  Example: Indirect device memory designation of “IW00010”
  n + 1 = 10 (DEC) ÷ 2 = 5 (DEC)

- Bit designation of addresses for byte devices (I, Q, M):
  - An even address number
    Specify a byte address number divided by “2” for “n + 1” and specify a bit number for “n + 2”.

    Example: Indirect device memory designation of “I000105”
    n + 1 = 10 ÷ 2 = 5 (DEC)
    n + 2 = 5 (DEC)

  - An odd address number
    Specify a byte address number minus “1”, divided by “2”, for “n + 1”. Specify a bit number plus “8” for “n + 2”.

    Example: Indirect memory designation of “I000115”
    n + 1 = (11 – 1) ÷ 2 = 5 (DEC)
    n + 2 = 5 + 8 = 13 (DEC)

- For DB device memory:
  Specify a block number for the higher-order bytes of “n + 1”. Specify an address number divided by “2” for the lower-order bytes.

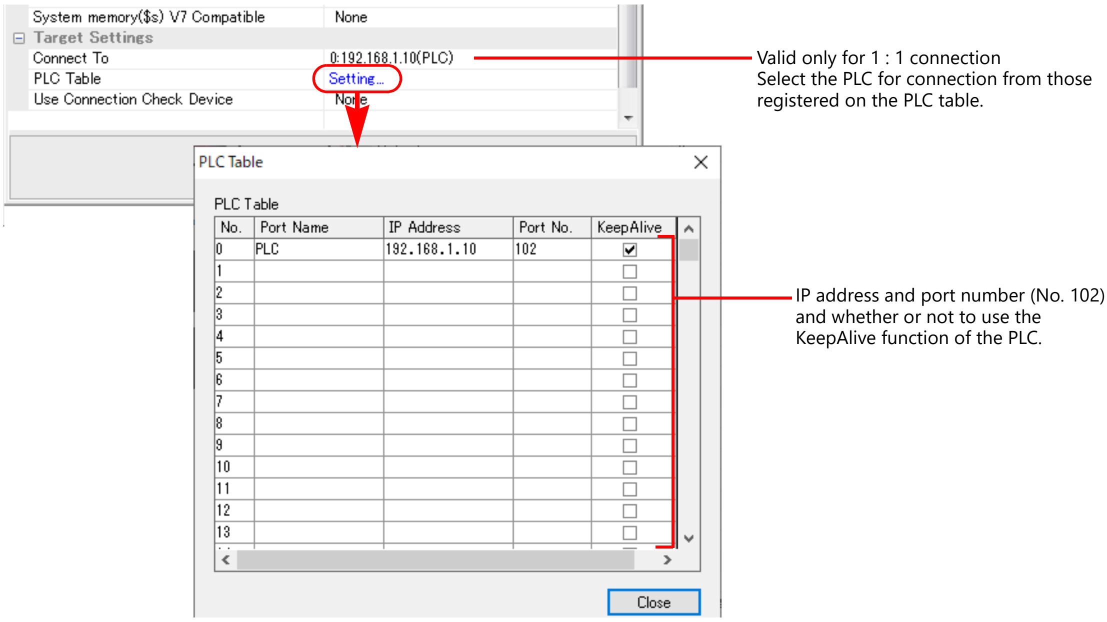
9.1.3 S7-200(Ethernet ISOTCP)

Communication Setting

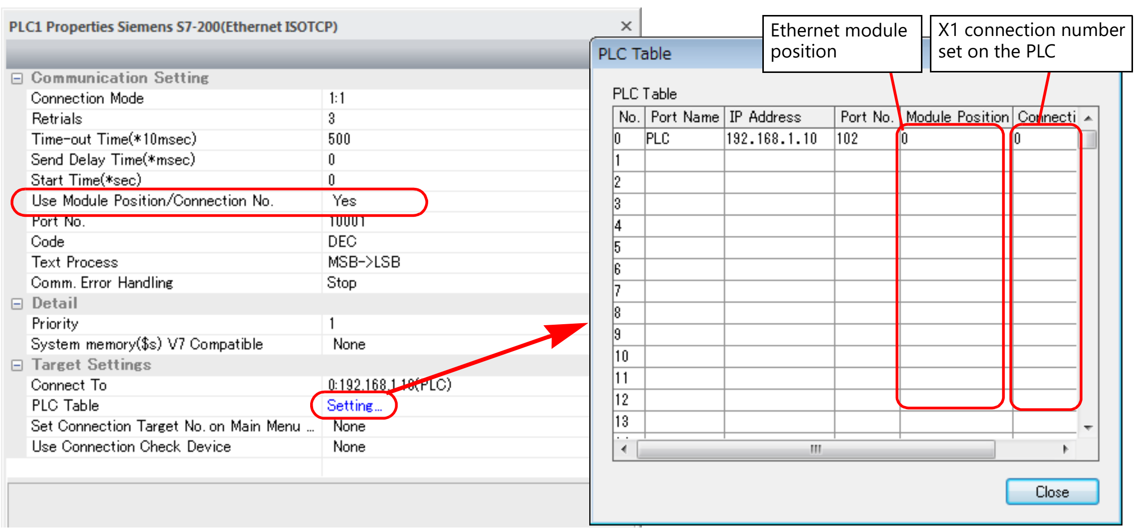
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number (No. 102) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



- Others
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Use Module Position/Connection No.]
  - [Yes] (default)
    Specify the module position and connection number at the [PLC Table] under [Target Settings] on the [PLC Properties] window ([System Setting] → [Hardware Setting]).
    Setting range: [Module Position] 0 to 6, [Connection No.] 0 to 7
  - [None]
    The module position and connection number will automatically be retrieved.

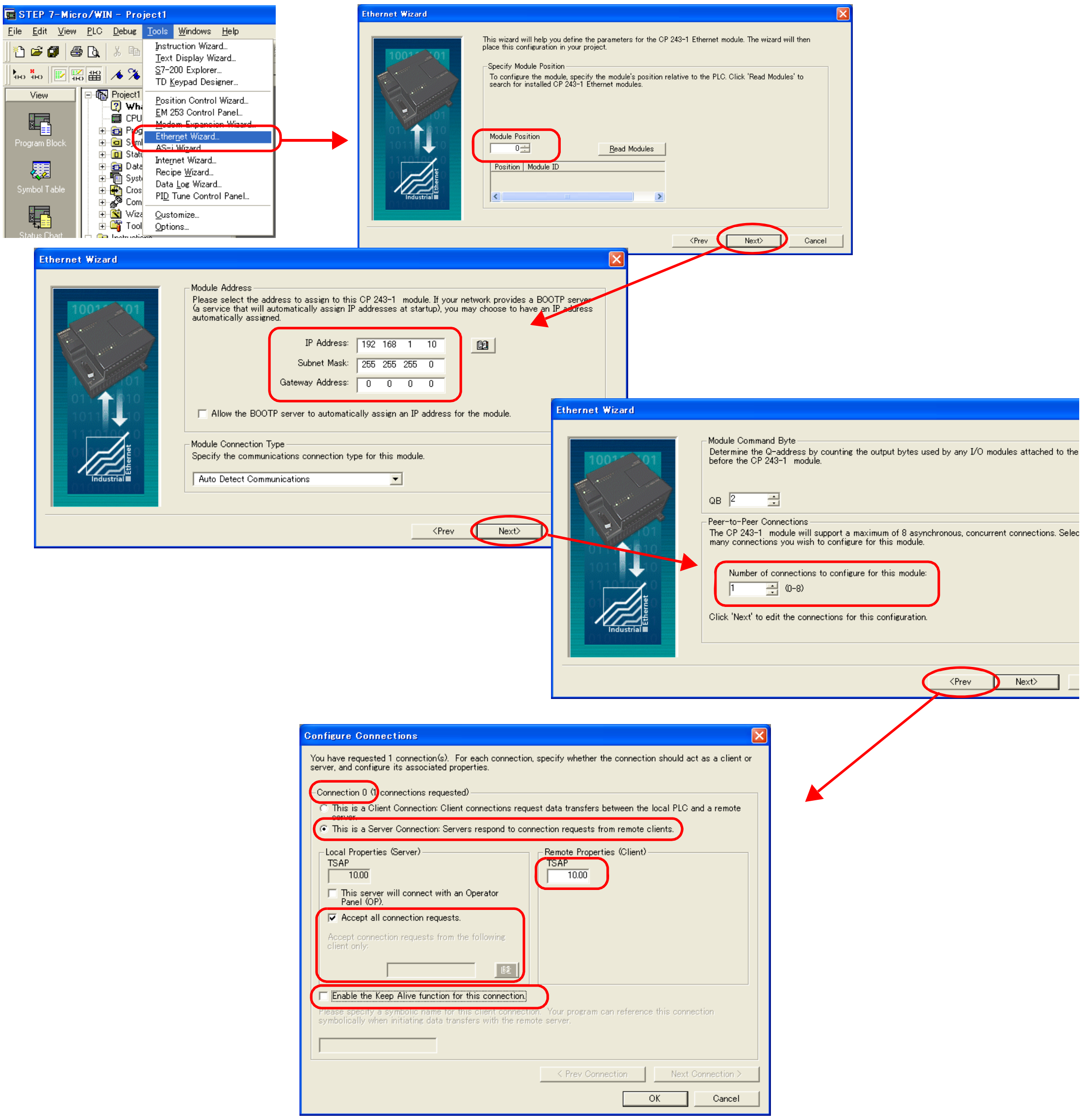


S7-200

Make the following settings in the ladder tool “STEP 7-Micro/WIN”.
“ETH0_CTRL” must be executed in the ladder program at each time of scan. For more information, refer to the PLC manual issued by the manufacturer.

Ethernet Wizard

Set the following items including module position, X1 connection number, IP address, and subnet mask according to the instructions in Ethernet Wizard.



Item		Setting	Remarks
Module Position		0 to 6	Set this value for [Module Position] in V-SFT.
IP Address		Set the IP address of the PLC.	
Subnet Mask		Specify according to the environment.	
Gateway Address			
Number of connections to configure for this module		0 to 8	Number of connecting units
Configure Connections	Connection No.	0 to 7	Automatically displayed according to [Number of connections to configure for this module. Set this value for [Connection No.] in V-SFT.
	This is a Server Connection	**Checked**	
	Accept all connection requests	Checked	Unchecked: Specify the IP address of X1 for [Accept connection requests from the following client only].
	Enable the Keep Alive function for this connection.	**Unchecked**	
	Remote Properties (Client) TSAP	**10.00**	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
V	(data memory)	00H	VW as word device
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
M	(bit memory/internal relay)	03H	MW as word device
T	(timer/current value)	04H	
C	(counter/current value)	05H	

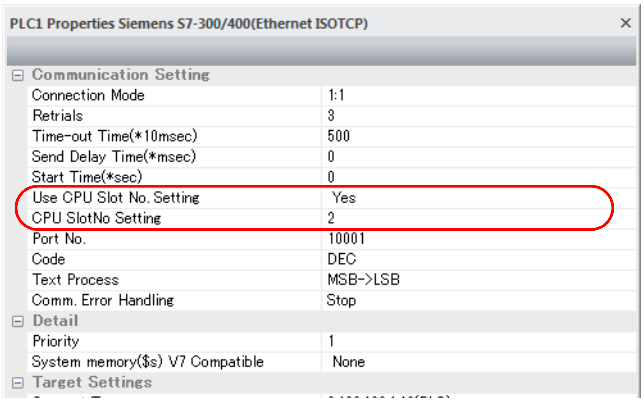
9.1.4 S7-300/400 (Ethernet ISOTCP)

Communication Setting

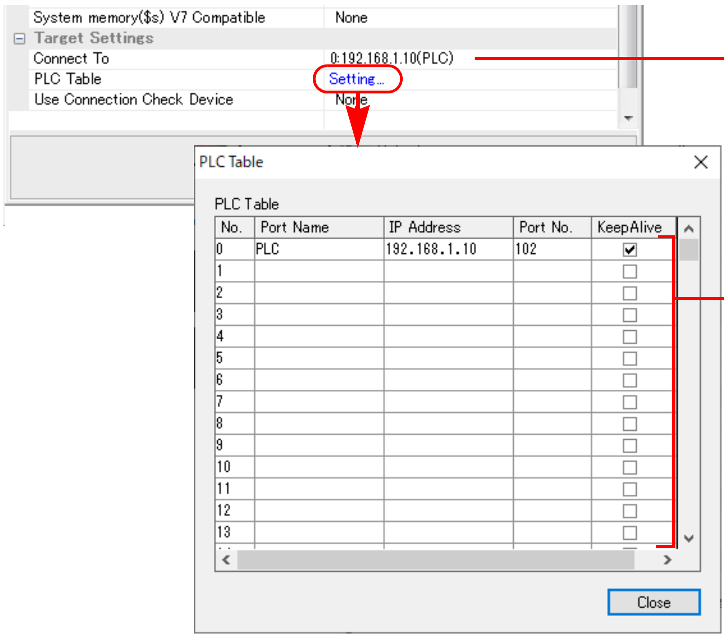
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- Others
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Use CPU Slot No. Setting]
  - [Yes]
    Set the slot number. Setting range: 2 to 18
  - [None]
    The slot number is automatically retrieved.



- IP address and port number (No. 102) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Valid only for 1 : 1 connection
Select the PLC for connection from those registered on the PLC table.

IP address and port number (No. 102) and whether or not to use the KeepAlive function of the PLC.

S7-300/400

Make the communication settings using “SIMATIC Manager”. For more information, refer to the PLC manual issued by the manufacturer.

Hardware configuration

Specify the IP address on the Ethernet interface PN-IO screen.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DB	(data block)	00H	*1
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
M	(memory word)	03H	MW as word device
T	(timer/current value)	04H	
C	(counter/current value)	05H	

*1 When this device memory is used, a registration is required for the PLC.
For more information, refer to the PLC manual issued by the manufacturer.
The assigned device memory is expressed as shown on the right when editing the screen.
The address range available on MONITOUCH is DB0001:0000 to DB4095:8190.

Example: DB0001 : 0000
Address No. (0 to 8190)
Colon
Block No. (1 to 4095)

Indirect Device Memory Designation

- DB device memory
  Specify an address number divided by “2” for “n + 1”.
  Specify a block number for “n + 1” to “n + 2”.

<table>
<tr><td></td><td colspan="2">15</td><td>8 7</td><td>0</td></tr>
<tr><td>n + 0</td><td colspan="2">9x (x = 1 to 8)</td><td colspan="2">00</td></tr>
<tr><td>n + 1</td><td>Block number
(lower 4 bits)</td><td colspan="3">Address number (word designation)</td></tr>
<tr><td>n + 2</td><td colspan="2">00</td><td colspan="2">Block number (higher 8 bits)</td></tr>
<tr><td>n + 3</td><td colspan="2">Expansion code</td><td colspan="2">Bit designation</td></tr>
<tr><td>n + 4</td><td colspan="2">00</td><td colspan="2">Station number</td></tr>
</table>

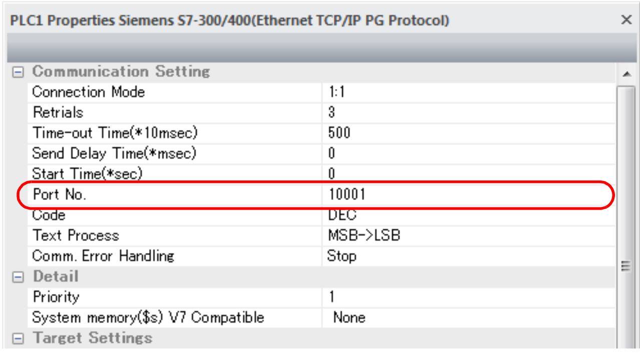
9.1.5 S7-300/400 (Ethernet TCP/IP PG Protocol)

Communication Setting

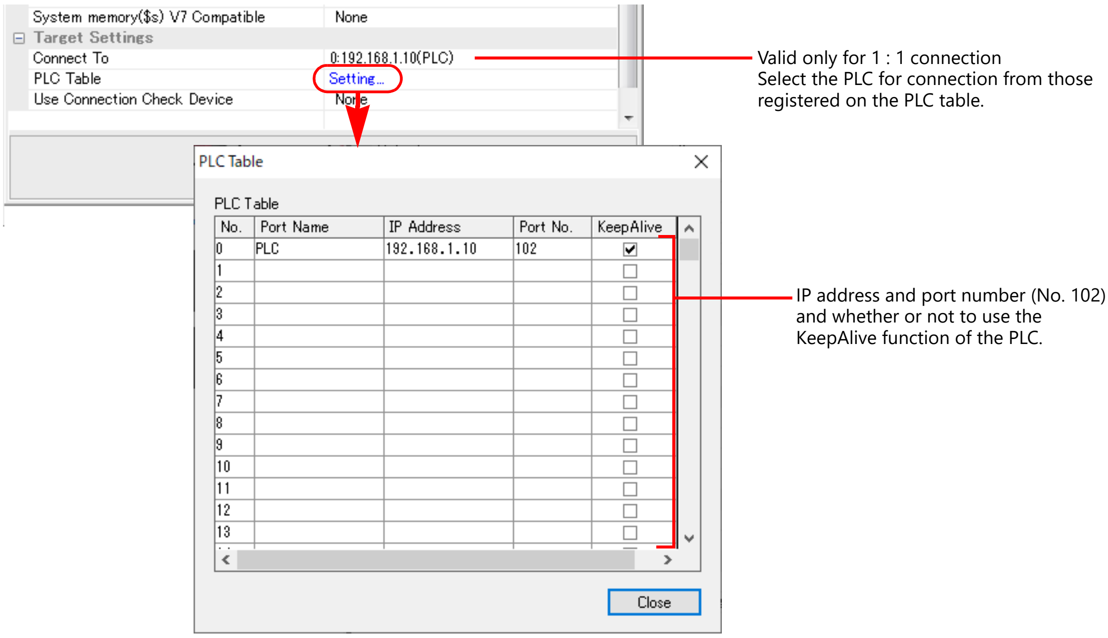
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

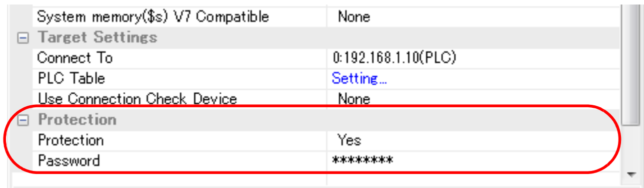
- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]



- IP address and port number (No. 102) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



- Others
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Protection]
  If the protection function is used on STEP7, set a password. Otherwise, a communication error will occur.



S7-300/400

Make the communication settings using “SIMATIC Manager”. For more information, refer to the PLC manual issued by the manufacturer.

Hardware configuration

Specify the IP address on the Ethernet interface PN-IO screen.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DB	(data block)	00H	*1
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
M	(memory word)	03H	MW as word device
T	(timer/current value)	04H	
C	(counter/current value)	05H	

*1 When this device memory is used, a registration is required for the PLC.
For more information, refer to the PLC manual issued by the manufacturer.
The assigned device memory is expressed as shown on the right when editing the screen.
The address range available on MONITOUCH is DB0001:0000 to DB4095:8190.

Example: DB0001 : 0000
- 0000 — Address No. (0 to 8190)
- : — Colon
- 0001 — Block No. (1 to 4095)

Indirect Device Memory Designation

- DB device memory
  Specify an address number divided by “2” for “n + 1”.
  Specify a block number for “n + 1” to “n + 2”.

	15 8	7 0
n + 0	9x (x = 1 to 8)	00
n + 1	Block number (lower 4 bits)	Address number (word designation)
n + 2	00	Block number (higher 8 bits)
n + 3	Expansion code	Bit designation
n + 4	00	Station number

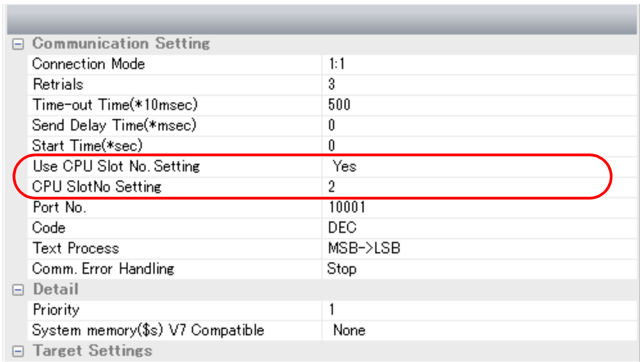
9.1.6 S7-1200/1500 (Ethernet ISOTCP)

Communication Setting

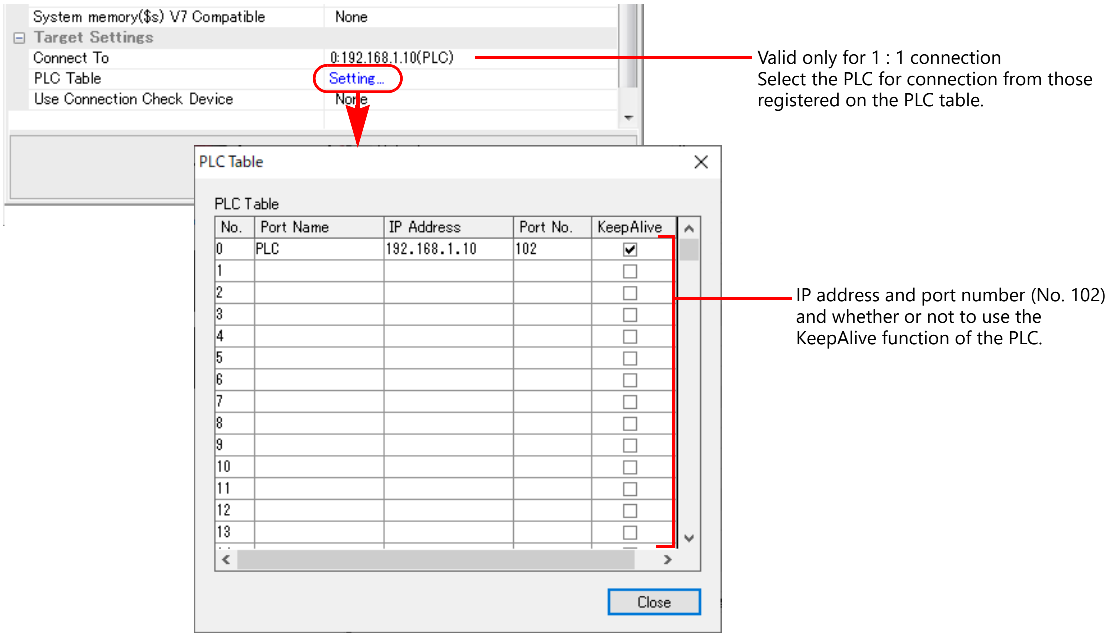
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- Others
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Use CPU Slot No. Setting]
  - [Yes]
    Set the slot number. Setting range: 0 to 18
  - [None]
    The slot number is automatically retrieved.



- IP address and port number (No. 102) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

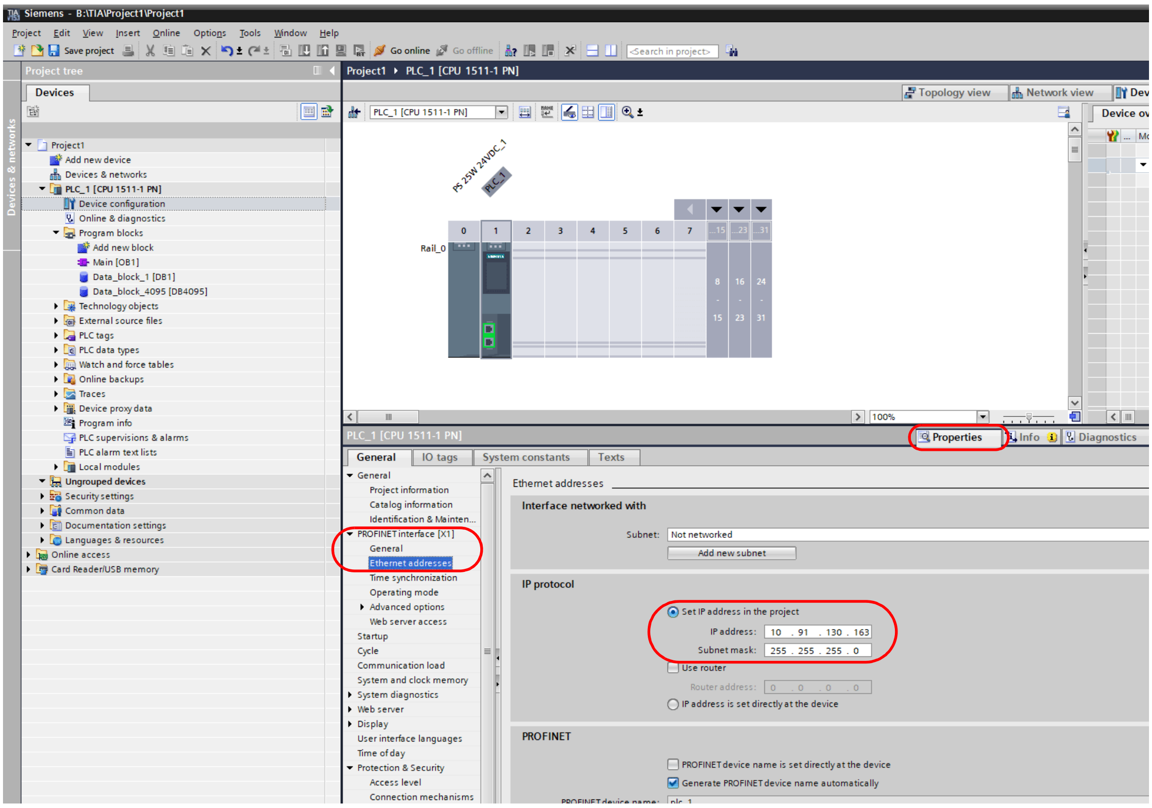


S7-1200

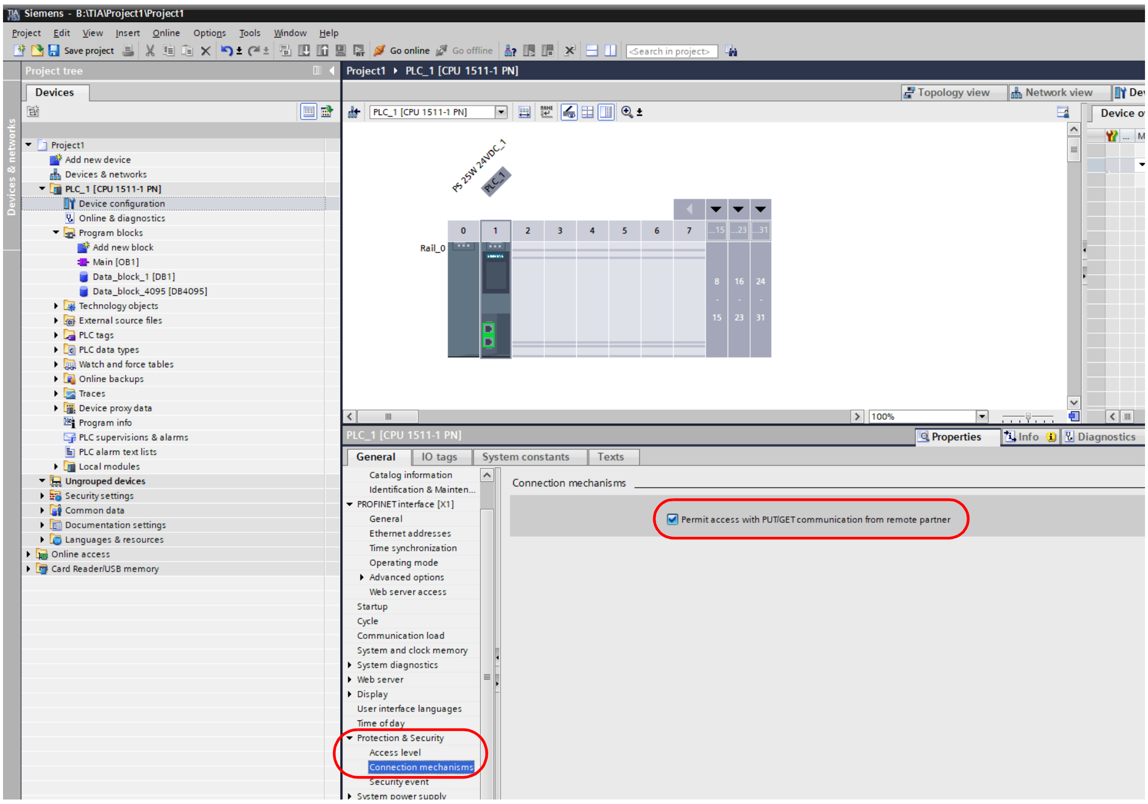
Make the settings using "Totally Integrated Automation Portal" V10 or later. For more information, refer to the PLC manual issued by the manufacturer.

IP address setting

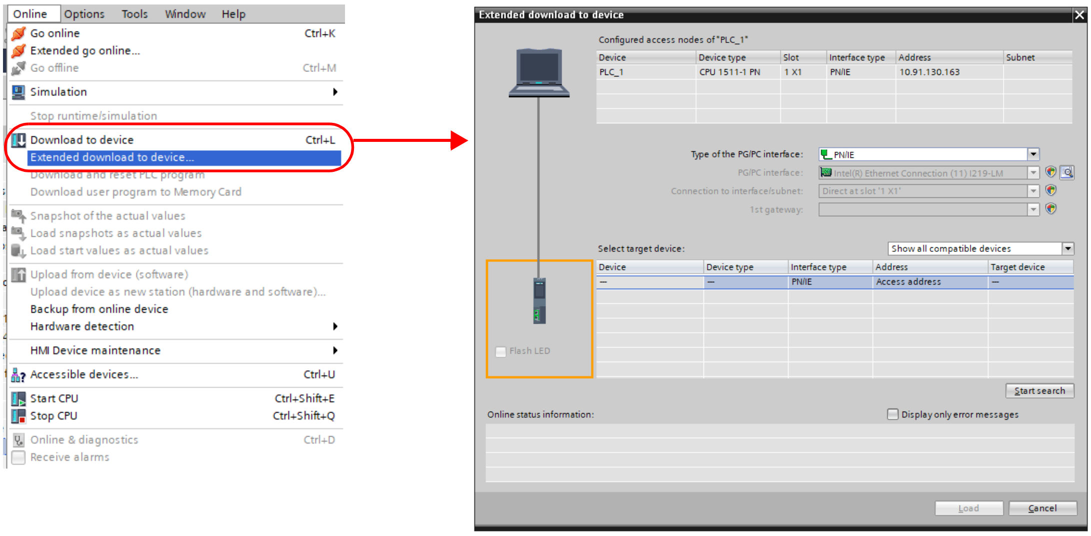
1. Select "PLC_1" in [Network view] or [Device view] in the project.
2. Set the IP address in [Ethernet addresses] ([Properties] → [General]→ [PROFINET interface]).



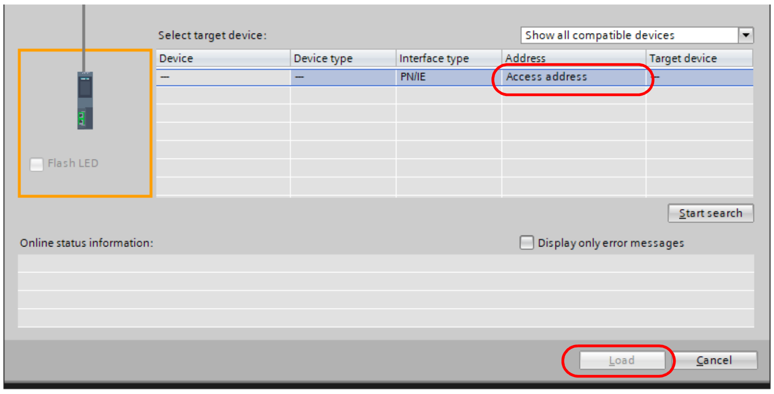
3. Check [Permit access with PUT/GET communication from remote partner]. ([Protection & security] → [Connection mechanisms])



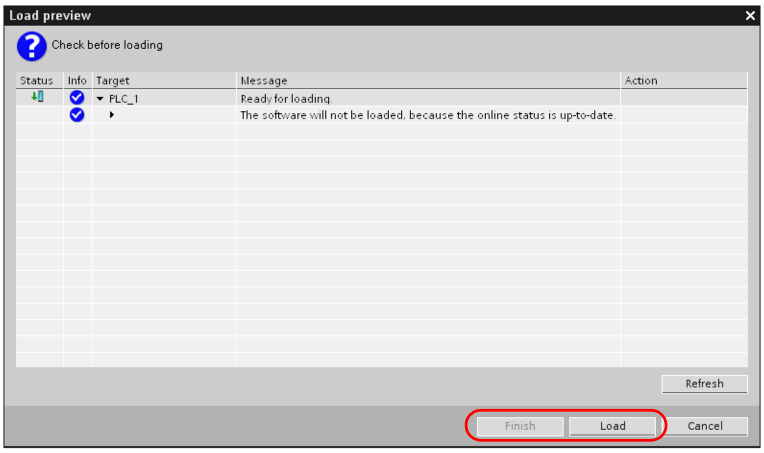
4. Click [Online] → [Download to device] or [Extended Download to device] to display the [Extended download to device] dialog.



5. Select [Access Address] and click [Load].



6. The [Load preview] screen is displayed. Click [Load].

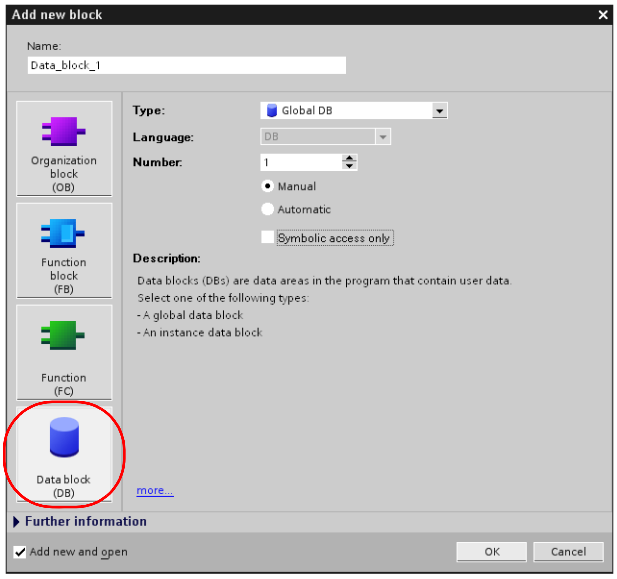


7. Click [Finish]. The IP address setting has been completed.

DB area setting

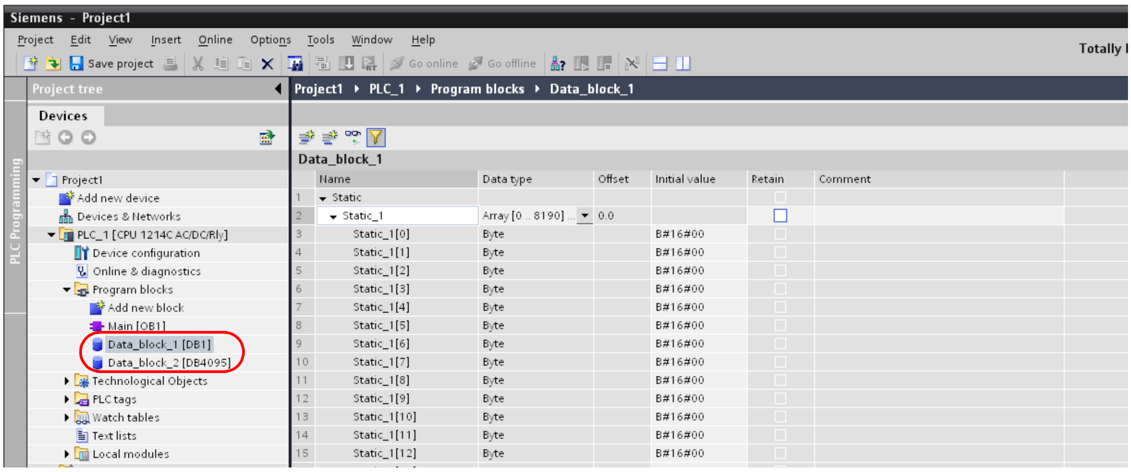
The following settings are required to use the DB device memory.

1. Select [Program blocks] → [Add new block] in the project, and make the following settings.



Item		Setting	Remarks
Data block	Number	Set the block number in the range from 1 to 4095.	Block numbers from 4096 cannot be used with the X1.
	Manual / Automatic	Manual	
	Symbolic access only	Unchecked	This setting is not available on “Totally Integrated Automation Portal” V12 and later.

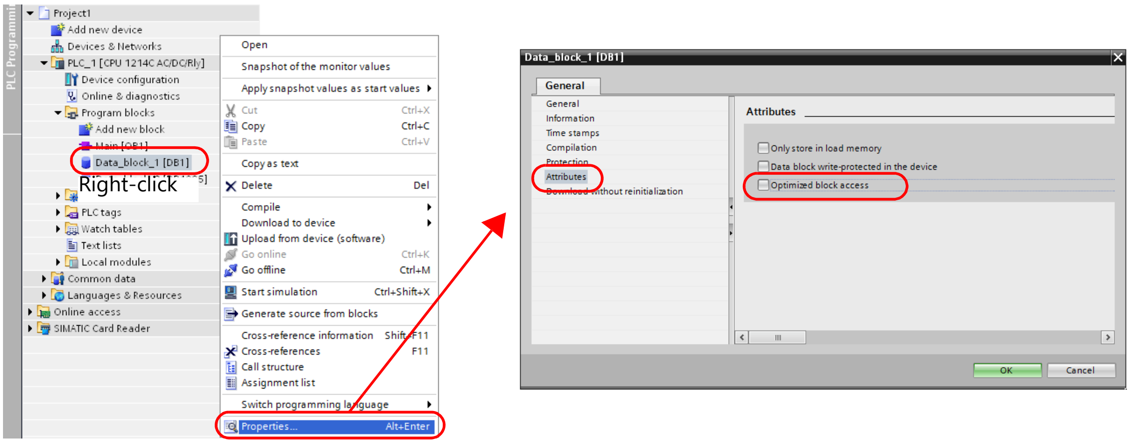
2. The newly created data block is added under [Program blocks] in the project.



- When specifying the byte address in the array format:Select “Array [lo..hi] of type” for “Data type” and enter “lo”, “hi” and “type” (byte).
  Range of “lo” and “hi”: 0 to 8190

  Example: Array [0..1024] of type

3. When using “Totally Integrated Automation Portal” V12 or later, select [Properties] on the right-click menu of the created data block, and deselect [Optimized block access] under [Attributes].



4. From the right-click menu of [Project tree], select [Download to device] → [software] to write the settings into the PLC.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DB	(data block)	00H	*1, *2
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
M	(memory word)	03H	MW as word device

*1 When this device memory is used, a registration is required for the PLC.
For more information, refer to the PLC manual issued by the manufacturer.
The assigned device memory is expressed as shown on the right when editing the screen.
The address range available on MONITOUCH is DB0001:0000 to DB4095:8190.

Example: DB0001 : 0000
Address No. (0 to 8190)
Colon
Block No. (1 to 4095)

*2 When using a DB device with data type: STRING defined as a character display part, set to use the STRING type.
e.g.: [Character Display] part
Check the [Use STRING Type] checkbox in the [Detail] menu.

Indirect Device Memory Designation

- DB device memory
  Specify an address number divided by “2” for “n + 1”.
  Specify a block number for “n + 1” to “n + 2”.

<table>
<tr><td></td><td>15</td><td colspan="2">8 7</td><td>0</td></tr>
<tr><td>n + 0</td><td colspan="2">9x (x = 1 to 8)</td><td colspan="2">00</td></tr>
<tr><td>n + 1</td><td>Block No.
(lower 4 bits)</td><td colspan="3">Address No. (word designation)</td></tr>
<tr><td>n + 2</td><td colspan="2">00</td><td colspan="2">Block No. (higher 8 bits)</td></tr>
<tr><td>n + 3</td><td colspan="2">Expansion code</td><td colspan="2">Bit designation</td></tr>
<tr><td>n + 4</td><td colspan="2">00</td><td colspan="2">Station number</td></tr>
</table>

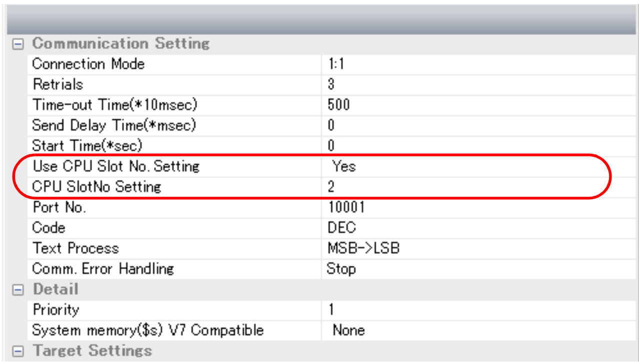
9.1.7 S7-1200/1500 Tag (Ethernet ISOTCP)

Communication Setting

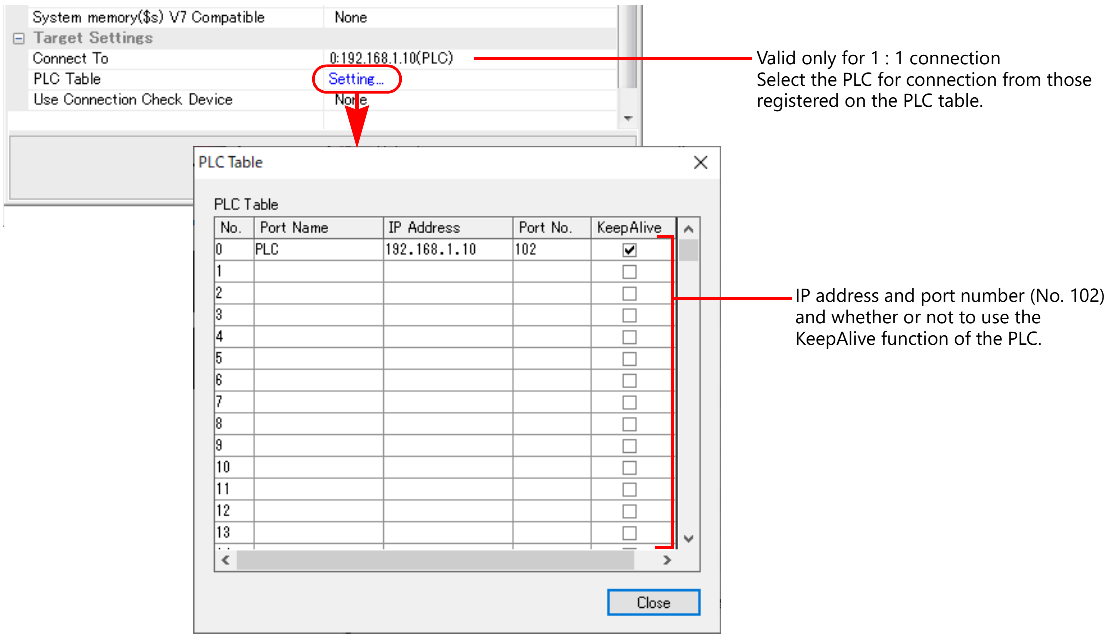
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IPIP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number of the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- Others
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Use CPU Slot No. Setting]
  - [Yes]
    Set the slot number. Setting range: 0 to 18
  - [None]
    The slot number is automatically retrieved.



- IP address and port number (No. 102) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Item	Setting	Remarks
Port Name	Set port name of the PLC.	
IP Address	Set IP address of the PLC.	
Port No.	Set port number of the PLC.	102 fixed
KeepAlive	Check this box when using the Keep Alive function.	This setting is valid when [Disconnect] is selected for [Comm. Error Handling].

PLC

For more information, see IP address setting of “9.1.6 S7-1200/1500 (Ethernet ISOTCP)”.

Available Device Memory

Set the PLC device memory by importing tags created using TIA Portal into V-SFT.
For details on how to import tags, refer to the instruction manual for connection with Siemens S7-1200/1500 Tag (Ethernet ISOTCP).

Data type		Range of Number of Elements for Arrays *1			Remarks
		Index1	Index2	Index3	
BOOL	(1-bit integer)	0 to 65535	0 to 32767	0 to 16383	*2, *3
SINT	(1-byte integer with a sign)	0 to 65535	0 to 32767	0 to 16383	*2, *3, *4
INT	(2-byte integer with a sign)	0 to 65535	0 to 32767	0 to 16383	
DINT	(4-byte integer with a sign)	0 to 65535	0 to 32767	0 to 16383	
REAL	(4-byte floating-point)	0 to 65535	0 to 32767	0 to 16383	
STRING	(character string)	0 to 511	0 to 255	0 to 127	*3, *5
USINT	(1-byte integer without a sign)	0 to 65535	0 to 32767	0 to 16383	*2, *3, *4
UINT	(2-byte integer without a sign)	0 to 65535	0 to 32767	0 to 16383	
UDINT	(4-byte integer without a sign)	0 to 65535	0 to 32767	0 to 16383	
BYTE	(1-byte integer)	0 to 65535	0 to 32767	0 to 16383	*2, *3, *4
WORD	(2-byte integer)	0 to 65535	0 to 32767	0 to 16383	
DWORD	(4-byte integer)	0 to 65535	0 to 32767	0 to 16383	
TIME	(TIME)	0 to 65535	0 to 32767	0 to 16383	*6
TOD	(TIME OF DAY)	0 to 65535	0 to 32767	0 to 16383	*6
DATE	(DATE)	0 to 65535	0 to 32767	0 to 16383	*7
DT	(DATE AND TIME)	0 to 65535	0 to 32767	0 to 16383	*7

*1 The ranges given are based on when a maximum value is specified. The maximum setting is 65335, which is the total number of elements (Index1 × Index2 × Index3).
Ranges differ according to the created tag.

*2 With multi-dimensional arrays, PLC device memory is allocated from lower bits.
When accessing in units of words, such as for numerical data display parts, bits are accessed in accordance with the allocation of PLC device memory.

- BOOL type
  When the tag registration on the PLC is “FLAG[4] [8]”

FLAG (32 bits)																															
3								2								1								0							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

When “FLAG [0] [0]” is specified for a numerical data display part (1 word) on V-SFT, the 16 bits from “FLAG [0] [0]” to “FLAG [1] [7]” are read.

- SINT type
  When the tag registration on the PLC is “DATA[2] [4]”

DATA (8 bytes)							
1				0			
3	2	1	0	3	2	1	0

When “DATA[0][0]” is specified for a numerical data display part (1 word) on V-SFT, the 2 bytes from “DATA[0] [0]” to “DATA[0] [1]” are read.

*3 Only existing data is accessed if the size of the accessed variable is smaller than 2 bytes (1 word) when accessing in units of words such as for numerical data display parts.

Example: SINT type
When the tag registration on the PLC is “DATA [3] [3]”

-	DATA (9 bytes)								
-	2			1			0		
-	2	1	0	2	1	0	2	1	0

When “DATA [2] [2]” is specified for a numerical data display part (1 word) on V-SFT, only the single byte of “DATA [2] [2]” is accessed.

*4 When accessing in units of words, bits 8 to 15 correspond to the next byte device memory.

*5 Set to use STRING type.
e.g.: [Character Display] part
Check the [Use STRING Type] checkbox in the [Detail] menu.

*6 Unit: msec

*7 Unix time is used.
Conversion of Unix time and calendar data is possible by using the macro commands “CLND_TO GRE” and “GRE_TO_CLND”.
For details, refer to the V9 Series Macro Reference Manual.

Address denotations

The assigned device memory is expressed as shown below when editing the screen.

xx : ABCDEFG

Tag

Port number (1:n connection only)

Indirect Device Memory Designation

Not available

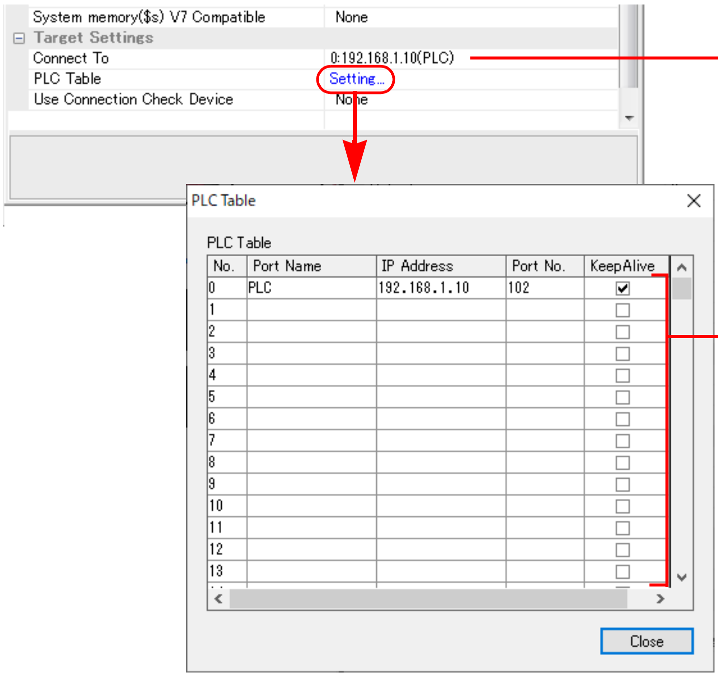
9.1.8 LOGO! (Ethernet ISOTCP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number of the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number (No. 102) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Valid only for 1 : 1 connection
Select the PLC for connection from those registered on the PLC table.

Set the IP address, port number (No. 102) and whether or not to use the KeepAlive function of the PLC.

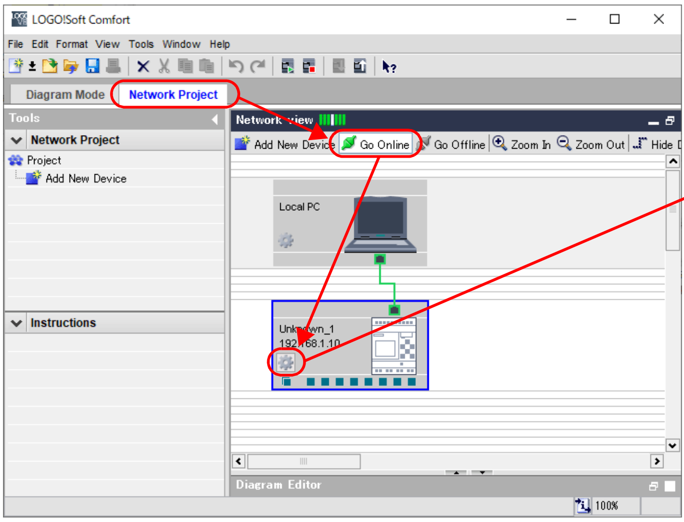
LOGO!

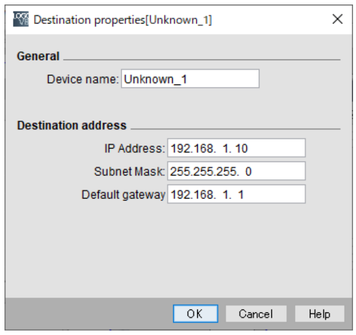
Make communication settings using the ladder tool software “LOGO! Soft Comfort”*. For more information, refer to the PLC manual issued by the manufacturer.

* When using a model equipped with a display unit, settings can also be made on [Network] → [IP Address].

Destination properties

Display the [Destination properties] window and set the IP address, subnet mask, etc. of the PLC.





Item	Setting Value	Remarks
IP Address	Set the IP address of the PLC.	
Subnet Mask	Specify according to the environment.	
Default gateway		

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
V	(data memory)	00H	VW as word device
I	(input)	01H	IW as word device
Q	(output)	02H	QW as word device
M	(bit memory/internal relay)	03H	MW as word device

9.1.9 TI500 / 505

Communication Setting

Editor

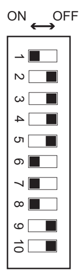
Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	9600 / 19200 / 38400 / 57600 / 115200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

PLC

TI545/TI555

<table>
<tr><th>Item</th><th>No.</th><th></th><th></th><th>Remarks</th></tr>
<tr><td rowspan="4"></td><td>1</td><td>Port 2 signal level</td><td>ON: RS-232C / RS-422
OFF: RS-485</td><td>Only RS-232C supported by 555-1103CPU</td></tr>
<tr><td>6</td><td rowspan="3">Port 2 Baud rate</td><td rowspan="3"><table><tr><th>Baud Rate</th><th>6</th><th>7</th><th>8</th></tr><tr><td>115200 *</td><td>ON</td><td>ON</td><td>OFF</td></tr><tr><td>57600 *</td><td>ON</td><td>OFF</td><td>ON</td></tr><tr><td>38400</td><td>ON</td><td>OFF</td><td>OFF</td></tr><tr><td>19200</td><td>ON</td><td>ON</td><td>ON</td></tr><tr><td>9600</td><td>OFF</td><td>ON</td><td>ON</td></tr></table></td><td rowspan="3">*Supported by 555-1105CPU and 555-1106CPU only</td></tr>
<tr><td>7</td></tr>
<tr><td>8</td></tr>
</table>

TI575

Item	Setting	Remarks
Baud rate	9600	
Data length	7 bits	
Parity	Odd	
Stop bit	1 bit	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
V	(variable memory)	00H	
WX	(word input)	01H	
WY	(word output)	02H	
X	(discrete input)	03H	
Y	(discrete output)	04H	
CR	(control relay)	05H	
TCP	(timer, counter/set value)	06H	
TCC	(timer, counter/current value)	07H	
DCP	(drum count/set value)	08H	
DCC	(drum count/current value)	09H	Read only
DSP	(drum step/set value)	0AH	
DSC	(drum step/current value)	0BH	
K	(constant memory)	0CH	
STW	(system status)	0DH	

Indirect Device Memory Designation

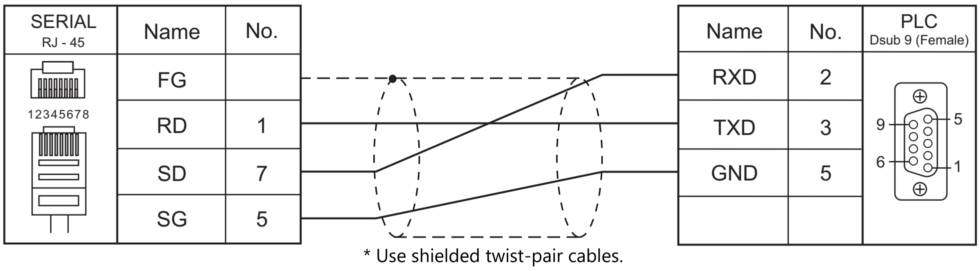
	15 8	7 0
n + 0	Model	Device type
n + 1	Address No. (word designation)	
n + 2	Expansion code	Bit designation
n + 3	00	Station number

- For the device memory address number, specify the value obtained by subtracting “1” from the actual address.
- For the designation of a DCC device memory, specify a drum step number minus “1” for the expansion code.

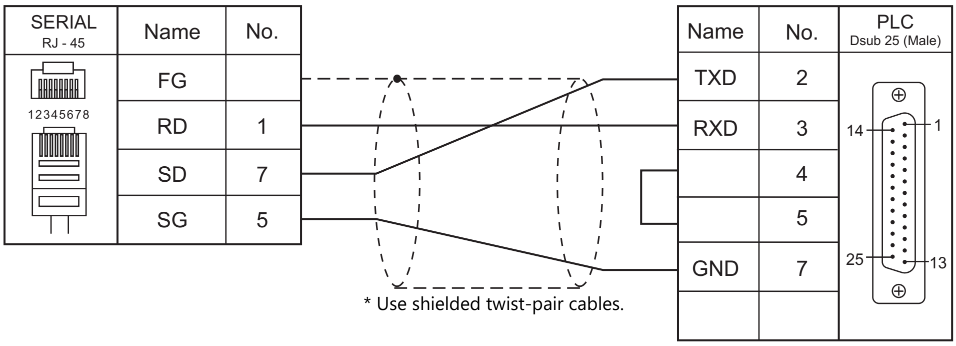
9.1.10 Wiring Diagrams

RS-232C

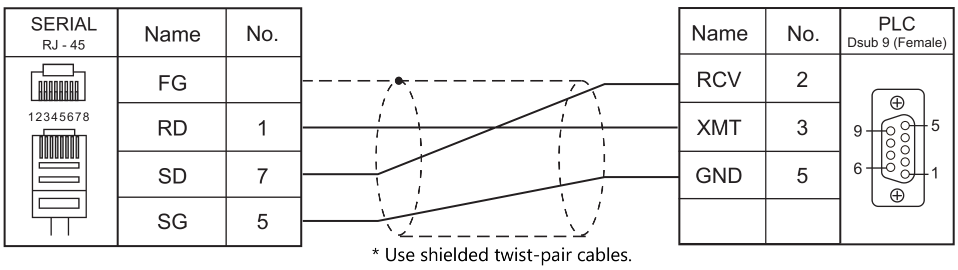
Wiring diagram 1 - M2



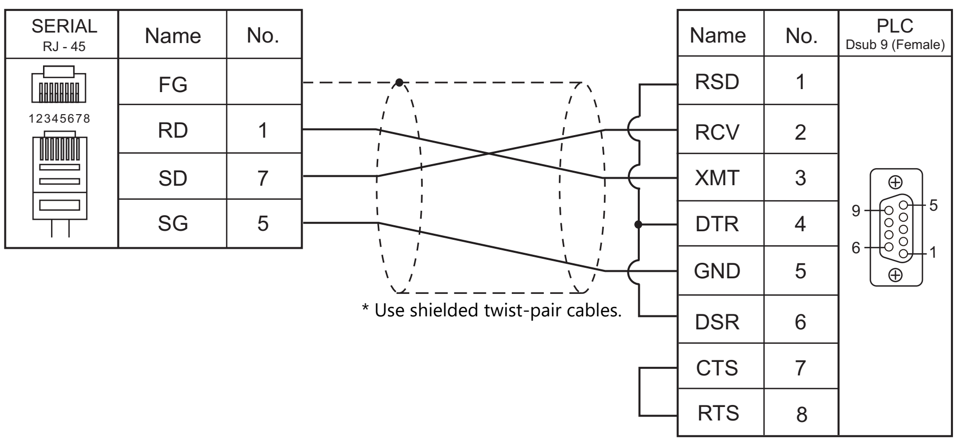
Wiring diagram 2 - M2



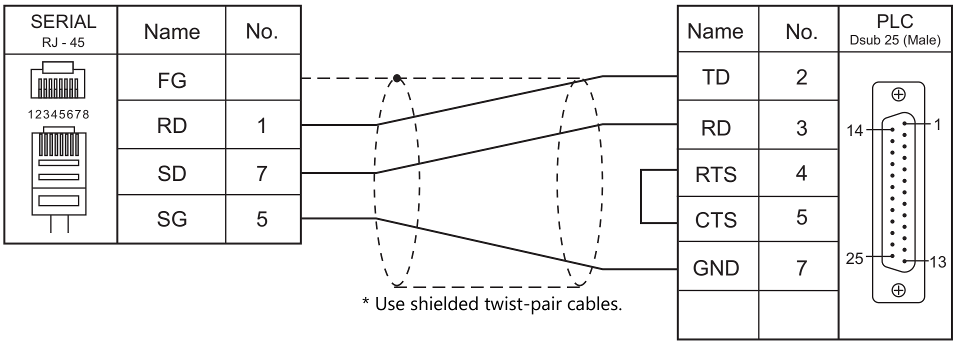
Wiring diagram 3 - M2



Wiring diagram 4 - M2



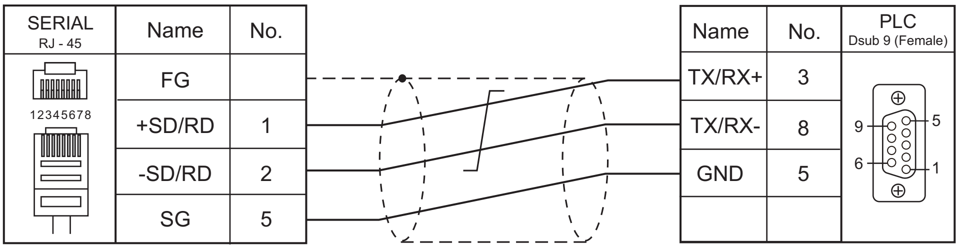
Wiring diagram 5 - M2



* Use shielded twist-pair cables.

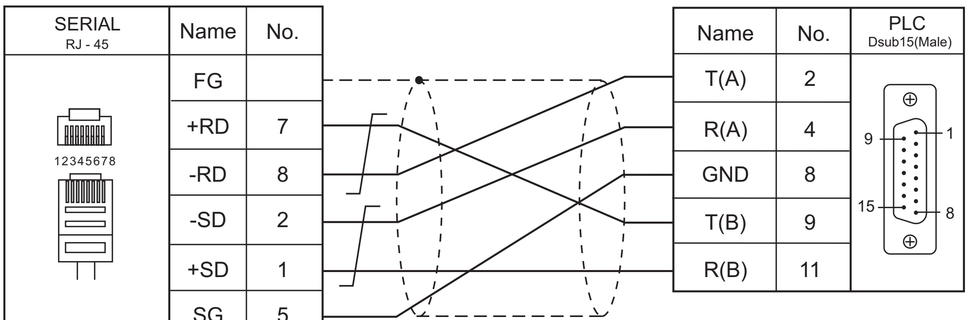
RS-422/RS-485

Wiring diagram 1 - M4



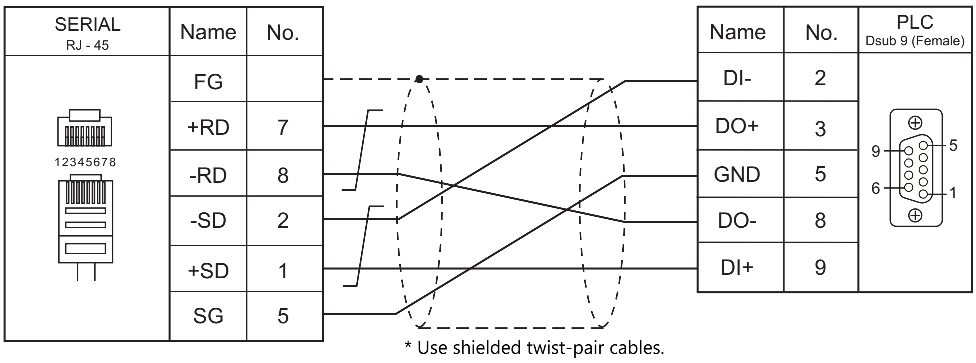
* Use shielded twist-pair cables.

Wiring diagram 2 - M4



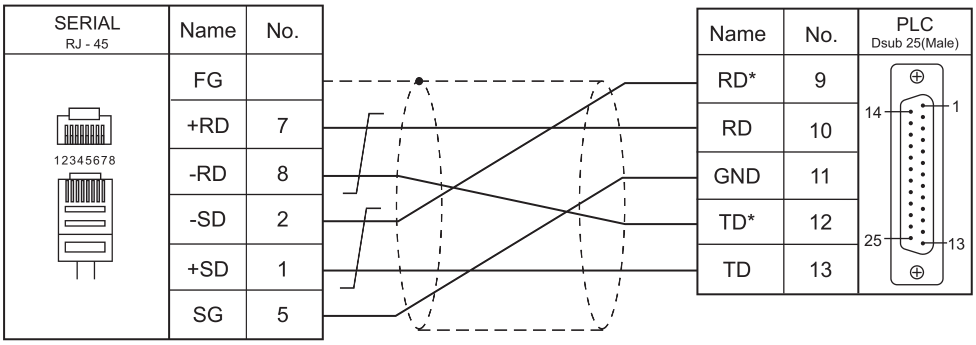
* Use shielded twist-pair cables.

Wiring diagram 3 - M4



* Use shielded twist-pair cables.

Wiring diagram 4 - M4



* Use shielded twist-pair cables.

9.2 Temperature Controller/Servo/Inverter Connection

Ethernet Connection

Controller

PLC Selection on the Editor	CPU	Unit/Port	TCP/IP	UDP/IP	Port No.	Keep Alive *1	Lst File
S120 (Ethernet ISOTCP)	CU310-2 CU320-2	LAN	○	×	102 (Max. 1 unit)	○	SimS120_Eth.Lst

*1 For KeepAlive functions, see "1.3.2 Ethernet Communication".

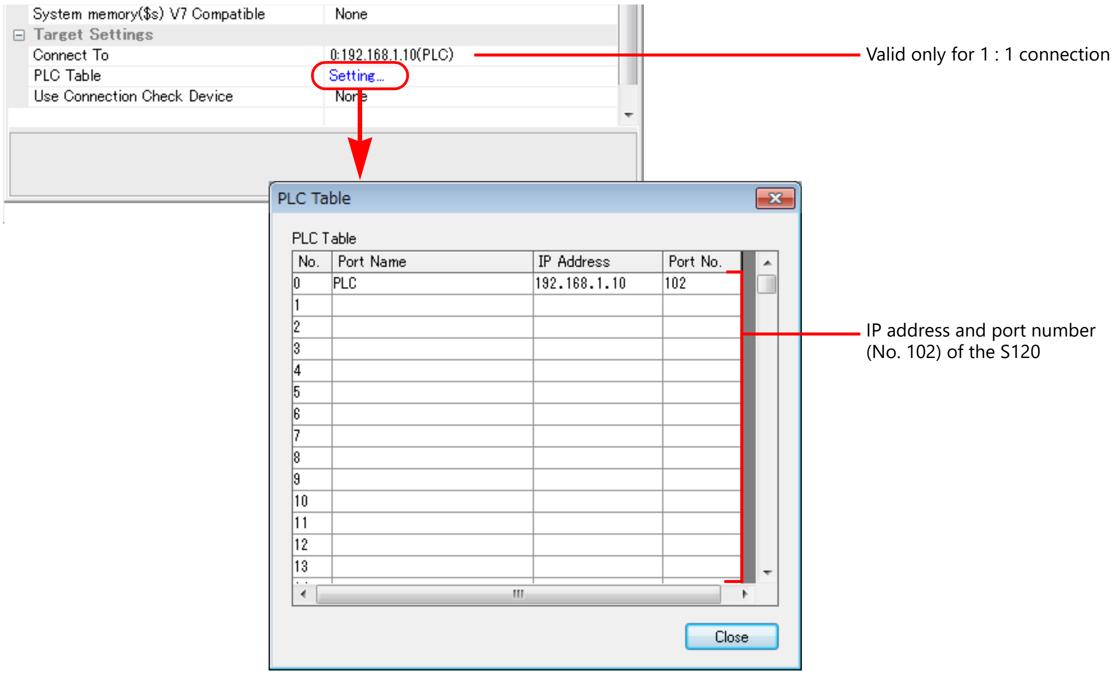
9.2.1 S120 (Ethernet ISOTCP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see IP Address Setting of the X1 Series Unit.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number (No. 102) of the controller
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Controller

Make the following settings using “SIMOTION SCOUT” V4.4. For more information, refer to the instruction manual of the controller issued by the manufacturer.

Expert list

Parameter	Item	Setting	Remarks
p8921	PN IP address of station	Set the IP address of the controller.	Default: 192.168.214.31
p8922	PN Default Gateway of station	Set the default gateway of the controller.	
p8923	PN Subnet Mask of station	Set the subnet mask of the controller.	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
DBW	(data block (WORD))	0DH	
DBD	(data block (DWORD))	0EH	Double-word

* The assigned device memory is expressed as shown on the right when editing the screen program.
The address range available on MONITOUCH is as described below.

Example: DBW00001 : 00000
- Element number in array (0 to 32767)
- Colon
- Block address (1 to 65535)

Indirect Device Memory Designation

<table>
<tr><th></th><th colspan="3">15 … 8</th><th>7 … 0</th></tr>
<tr><td>n + 0</td><td colspan="3">Models (91H to 98H)</td><td>Device type (0DH, 0EH)</td></tr>
<tr><td>n + 1</td><td colspan="2">Block address (lower 4 bits)</td><td colspan="2">Element number in array (lower 12 bits)</td></tr>
<tr><td>n + 2</td><td>0</td><td>Element number in array (higher 3 bits)</td><td colspan="2">Block address (higher 12 bits)</td></tr>
<tr><td>n + 3</td><td colspan="3">Expansion code</td><td>Bit designation</td></tr>
<tr><td>n + 4</td><td colspan="3">00</td><td>Target Port No.</td></tr>
</table>

Example: Indirect device memory designation of “DBW23000 : 10000” of PLC1:
Specify the model and device type.
n + 0 = 910DH

Convert the element number in the array and the block address into hexadecimal notation.
Element number in array 10000 = 2 710 H
Block address 23000 = 59D 8 H

Specify values for “n + 1” and “n + 2”.
n + 1 = 8 710 H
n + 2 = 2 59D H

10. SINFONIA TECHNOLOGY

10.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)
SELMART	SELMART-100 and later	01M2-UCI-6x 01M2-UCI-Ax	RS-232C	Wiring diagram 1 - M2	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

10.1.1 SELMART

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	1 to 8	Set the same number as the one set by the DEV. NO. switch on the PLC.

PLC

An application program is necessary on the PLC to communicate with the X1 series. For more information, refer to the specifications sheet of the PLC.

01M2-UCI-6x

DEV. NO. switch

SW	Setting	Remarks
DEV. NO.	1 to 8	

SELMART SUPPORT SYSTEM

Set desired values for internal addresses in the PLC. For more information, refer to the specifications sheet of the PLC.

Address		Item	Setting	Remarks
C4096 to C4111		Card usage status	X22X (HEX) 1 to 8: DEV. NO. 0: Used 1 to F: Not used	The standard entry table is used. When using an expanded entry table, refer to the specifications sheet of the PLC.
DEV. NO. 1	C4333	Baud rate	4800 / 9600 / 19200	The standard entry table is used. When using an expanded entry table, refer to the specifications sheet of the PLC. Set the address set by the DEV. NO. switch.
	C4334	Communication mode	**0: GD-80**	
DEV. NO. 2	C4341	Baud rate	4800 / 9600 / 19200	
	C4342	Communication mode	**0: GD-80**	
DEV. NO. 3	C4349	Baud rate	4800 / 9600 / 19200	
	C4350	Communication mode	**0: GD-80**	
DEV. NO. 4	C4357	Baud rate	4800 / 9600 / 19200	
	C4358	Communication mode	**0: GD-80**	
DEV. NO. 5	C4365	Baud rate	4800 / 9600 / 19200	
	C4366	Communication mode	**0: GD-80**	
DEV. NO. 6	C4373	Baud rate	4800 / 9600 / 19200	
	C4374	Communication mode	**0: GD-80**	
DEV. NO. 7	C4381	Baud rate	4800 / 9600 / 19200	
	C4382	Communication mode	**0: GD-80**	
DEV. NO. 8	C4389	Baud rate	4800 / 9600 / 19200	
	C4390	Communication mode	**0: GD-80**	

The following settings are fixed; data length: 7 bits, stop bit: 1 bit and parity: even.
Changes take effect when the power is turned off and on again.

*** Be sure to set “mode 0” for the CPU card operation mode.**

01M2-UCI-Ax

DEV. NO. switch (station number)

SW	Setting	Remarks
DEV. NO.	1 to 8	

UC1-HL switch (unit communication function setting)

SW	Setting	Remarks
H	6	UC1-6X (communication for touch panel)
L	0, 1 / 2 / F	

SELMART SUPPORT SYSTEM

Set desired values for internal addresses in the PLC. For more information, refer to the specifications sheet of the PLC.

Address		Item	Setting	Remarks
C4096 to C4111		Card usage status	X22X (HEX) 1 to 8: DEV. NO. 0: Used 1 to F: Not used	The standard entry table is used. When using an expanded entry table, refer to the specifications sheet of the PLC.
DEV. NO. 1	C4333	Baud rate	4800 / 9600 / 19200	The standard entry table is used. When using an expanded entry table, refer to the specifications sheet of the PLC. Set the address set by the DEV. NO. switch.
	C4334	Communication mode	**0: GD-80**	
DEV. NO. 2	C4341	Baud rate	4800 / 9600 / 19200	
	C4342	Communication mode	**0: GD-80**	
DEV. NO. 3	C4349	Baud rate	4800 / 9600 / 19200	
	C4350	Communication mode	**0: GD-80**	
DEV. NO. 4	C4357	Baud rate	4800 / 9600 / 19200	
	C4358	Communication mode	**0: GD-80**	
DEV. NO. 5	C4365	Baud rate	4800 / 9600 / 19200	
	C4366	Communication mode	**0: GD-80**	
DEV. NO. 6	C4373	Baud rate	4800 / 9600 / 19200	
	C4374	Communication mode	**0: GD-80**	
DEV. NO. 7	C4381	Baud rate	4800 / 9600 / 19200	
	C4382	Communication mode	**0: GD-80**	
DEV. NO. 8	C4389	Baud rate	4800 / 9600 / 19200	
	C4390	Communication mode	**0: GD-80**	

The following settings are fixed; data length: 7 bits, stop bit: 1 bit and parity: even.
Changes take effect when the power is turned off and on again.

* **Be sure to set “mode 0” for the CPU card operation mode.**

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

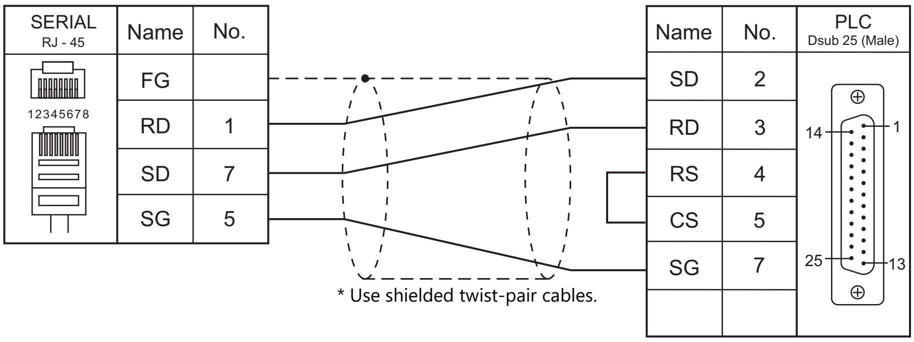
Device Memory		TYPE	Remarks
D	(data register)	00H	D0 to D1023

* **Addresses other than D0 to D1023 can be set on the editor; however it cannot be used actually. If such a address is set, an error code “06” occurs. Do not specify any addresses other than D0 to D1023.**

10.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2



11. SUS

11.1 Temperature Controller/Servo/Inverter Connection

Electric Actuator

PLC Selection on the Editor	Model		Port	Signal Level	Connection		Lst File
					RS-232C[*1] / RS-485 (2-wire)	RS-422 (4-wire)	
XA-A*	XA-A1 XA-A2 XA-A3 XA-A4	XA-20L XA-28L / XA-28H XA-35L / XA-35H XA-42L / XA-42H XA-42D XA-50L / XA-50H XA-E35L	Jog box connector	RS-232C	Wiring diagram 1 - M2 [*2]	×	SUS_XAA .Lst

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 When using a self-made cable, use the cable in a noise-free environment and do not make the cable longer than 10 meters.

11.1.1 XA-A*

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	**RS-232C**	
Baud Rate	**38400 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**None**	

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
RA	(movement completion check)	00H	Read only *1
RH	(origin return completion check)	01H	Read only *1
RC	(read current position)	02H	Read only, double-word
RY	(input reading)	03H	Read only
RWB	(output reading)	04H	

*1 Check which axis is complete by checking the acquired value.

Axis	Value															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Axis 1	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●
Axis 2	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●
Axis 3	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●
Axis 4	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●

Not completed: ○ Completed: ●

RA (movement completion check)

Address	Name	Remarks
0	Checking movement completion of axes 1, 2, 3, and 4	0: currently moving, 1: movement complete

RH (origin return completion check)

Address	Name	Remarks
0	Checking origin return completion of axes 1, 2, 3, and 4	0: not completed, 1: completed

RC (read current position)

Address	Name	Remarks
0	Current position of axis 1	Number of pulses (negative values possible if equipped with encoder function)
1	Current position of axis 2	Number of pulses (negative values possible if equipped with encoder function)
2	Current position of axis 3	Number of pulses (negative values possible if equipped with encoder function)
3	Current position of axis 4	Number of pulses (negative values possible if equipped with encoder function)

RY (input reading)

Address	Bit Values			
	bit0	bit1	bit2	bit3
0	STB	RES	-	-
1	PRG1	PRG2	PRG4	PRG8
2	IN13	IN14	IN15	IN16
3	IN9	IN10	IN11	IN12
4	IN5	IN6	IN7	IN8
5	IN1	IN2	IN3	IN4
6	LS1	LS2	LS3	LS4

RWB (output reading)

Address	Bit Values			
	bit0	bit1	bit2	bit3
0	IN-P	RUN	RDY	ALM
1	OUT13	OUT14	OUT15	OUT16
2	OUT9	OUT10	OUT11	OUT12
3	OUT5	OUT6	OUT7	OUT8
4	OUT1	OUT2	OUT3	OUT4

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (=$u n)		F2
0MP: point movement	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	4
		n + 1	Command: 0	
		n + 2	PNO position number: 0 to 3000	
		n + 3	AX No. axis pattern setting: 1 to 15 *1	
0SP: deceleration stop	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	2
		n + 1	Command: 2	
0RP: movement data reading	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	3
		n + 1	Command: 3	
		n + 2	PNO position number: 1 to 3000	
		n + 3	W (axis 1) X axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 4 to n + 5	Pos (axis 1) X axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 6	W (axis 2) Y axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 7 to n + 8	Pos (axis 2) Y axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 9	W (axis 3) Z axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 10 to n + 11	Pos (axis 3) Z axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 12	W (axis 4) S axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 13 to n + 14	Pos (axis 4) S axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	

Contents	F0	F1 (=$u n)		F2
0MV: Direct movement	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	23
		n + 1	Command: 1	
		n + 2	VEL (axis 1) X axis speed: 1 to max. speed *2	
		n + 3	ACC (axis 1) X axis acceleration/deceleration time (unit: 10 ms): 1 to 200	
		n + 4	W (axis 1) X axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 5 to n + 6	Pos (axis 1) X axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 7	VEL (axis 2) Y axis speed: 1 to max. speed *2	
		n + 8	ACC (axis 2) Y axis acceleration/deceleration time (unit: 10 ms): 1 to 200	
		n + 9	W (axis 2) Y axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 10 to n + 11	Pos axis 2) Y axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 12	VEL (axis 3) Z axis speed: 1 to max. speed *2	
		n + 13	ACC (axis 3) Z axis acceleration/deceleration time (unit: 10 ms): 1 to 200	
		n + 14	W (axis 3) Z axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 15 to n + 16	Pos (axis 3) Z axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 17	VEL (axis 4) S axis speed: 1 to max. speed *2	
		n + 18	ACC (axis 4) S axis acceleration/deceleration time (unit: 10 ms): 1 to 200	
		n + 19	W (axis 4) S axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 20 to n + 21	Pos (axis 4) S axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 22	H interpolation 0: No interpolation 1: With interpolation	
0WP: movement data writing	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	15
		n + 1	Command: 4	
		n + 2	PNO position number: 1 to 3000	
		n + 3	W (axis 1) X axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 4 to n + 5	Pos (axis 1) X axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 6	W (axis 2) Y axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 7 to n + 8	Pos (axis 2) Y axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 9	W (axis 3) Z axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 10 to n + 11	Pos (axis 3) Z axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	
		n + 12	W (axis 4) S axis movement method 0: No movement 1: Origin as reference 2: Current value as reference, positive movement 3: Current position as reference, negative movement	
		n + 13 to n + 14	Pos (axis 4) S axis movement position (number of pulses): 0 to 262143 (3FFFF: HEX)	

Contents	F0	F1 (=$u n)		F2
0WA: position data memory writing	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	4
		n + 1	Command: 5	
		n + 2	Write starting PNO: 1 to 3000 *3	
		n + 3	Write finishing PNO: 1 to 3000 *3	
0WC: position update	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	4
		n + 1	Command: 6	
		n + 2	PNO position number: 1 to 3000	
		n + 3	AX No. axis pattern setting: 1 to 15 *1	
0RV: version information	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	2
		n + 1	Command: 7	
		n + 2 to n + 3	Ver version (characters)	
		n + 4 to n + 5	CPU CPU model type (characters)	
0DM: program execute	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	3
		n + 1	Command: 8	
		n + 2	PRG program number: 1 to 50	
0CV: speed/acceleration time settings	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	4
		n + 1	Command: 9	
		n + 2	VEL speed: 1 to max. speed *2	
		n + 3	ACC acceleration/deceleration time (10 ms): 1 to 200	
0AR: alarm reset	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	2
		n + 1	Command: 10	

Return data: Data stored from controller to X1 series

*1 Axes are validated by the Ax No. setting value according to the following table.

Axis	Value															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Axis 1	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●
Axis 2	○	○	●	●	○	○	●	●	○	○	●	●	○	○	●	●
Axis 3	○	○	○	○	●	●	●	●	○	○	○	○	●	●	●	●
Axis 4	○	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●

Invalid: ○ Valid: ●

*2 The setting range varies depending on the actuator type.

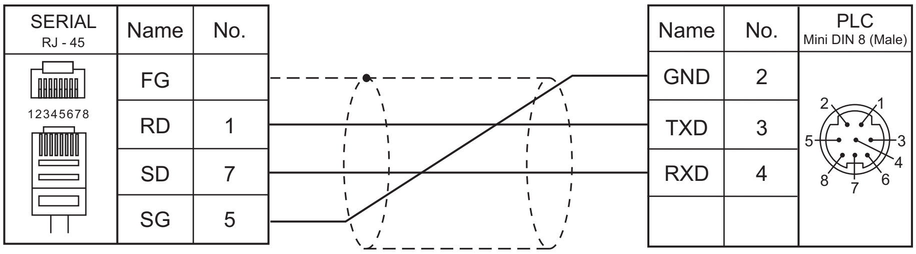
Actuator Type	20L / 28L / 35L / 42L / E35L	50L	28H / 35H	42H	50H	42D
Max. speed (mm/sec)	50	100	150	200	300	400

*3 Do not set a value larger than the write starting PNO for the write finishing PNO.
The screen display is not updated during EEPROM writing since MONITOUCH needs to receive the response. It takes about 3 seconds to write position information. Do not turn off the power or pull out the plug of MONITOUCH.

11.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2



* Use shielded twist-pair cables.

12. TECO

12.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
TP03(MODBUS RTU)	TP03-xxSx-x TP03-xxMx-x	PC/PDA port	RS-232C	TECO TP-302PC + Wiring diagram 1 - M2	×
			RS-422	×	Wiring diagram 2 - M4
		Expansion card	RS-485	Wiring diagram 1 - M4	×
	TP03-xxHx-x	PC/PDA port	RS-232C	TECO TP-302PC + Wiring diagram 1 - M2	×
			RS-422	×	Wiring diagram 2 - M4
		RS-485 port Expansion card	RS-485	Wiring diagram 1 - M4	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

12.1.1 TP03 (MODBUS RTU)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 76800 bps	
Data Length	**8 bits**	
Stop Bit	1 / 2 bits	
Parity	Odd / Even /None	
Target Port No.	1 to 31	

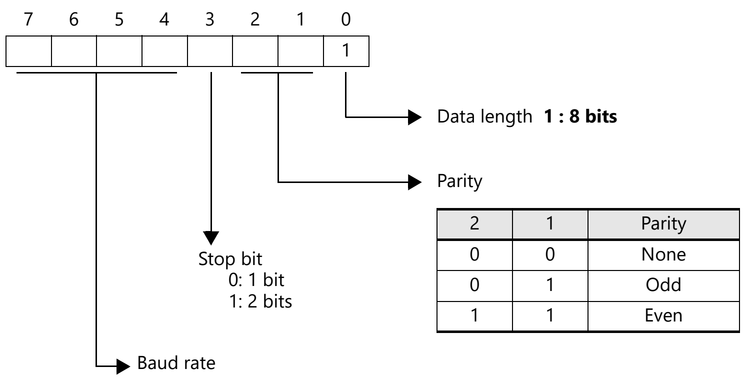
PLC

Be sure to match the settings to those made under [Communication Setting] of the editor.
Set a port number in the communication software. For more information, refer to the PLC manual issued by the manufacturer.

PC/PDA Port

Use bits 0 to 7 at D8321 for the following settings.

Device Memory	Setting
D8321	(see diagram below)



2	1	Parity
0	0	None
0	1	Odd
1	1	Even

7	6	5	4	Baud Rate
0	1	1	1	9600 bps
1	0	0	0	19200 bps
1	0	0	1	38400 bps
1	0	1	0	57600 bps

* If the value specified for any item is outside the allowable range, the item will be assumed to be: data length: 8 bits, parity: none, stop bit: 2 bits, or baud rate: 19200 bps.

RS-485 Port / Expansion Card

Use D8120 for RS-485 port settings and D8320 for expansion card settings.

Device Memory	Setting
D8120 D8320	See below

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0								1

Not used

MODBUS mode
0: MODBUS RTU

Control bit **All 0: NO**

End character **0: NO**

Start character **0: NO**

Data length **1 : 8 bits**

Parity

2	1	Parity
0	0	None
0	1	Odd
1	1	Even

Stop bit
0: 1 bit
1: 2 bits

Baud rate

7	6	5	4	Baud Rate
0	1	1	1	9600 bps
1	0	0	0	19200 bps
1	0	0	1	38400 bps
1	0	1	0	57600 bps

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(Data register)	00H	
X	(Digital I relay)	01H	
Y	(Digital O relay)	02H	
M	(Auxiliary relay)	03H	
CC	(Counter [Coil])	04H	
TC	(Timer [Coil])	05H	
C	(Counter [Current value])	06H	
T	(Timer [Current value])	07H	
CP	(Counter [Preset value])	08H	
TP	(Timer [Preset value])	09H	

Indirect Device Memory Designation

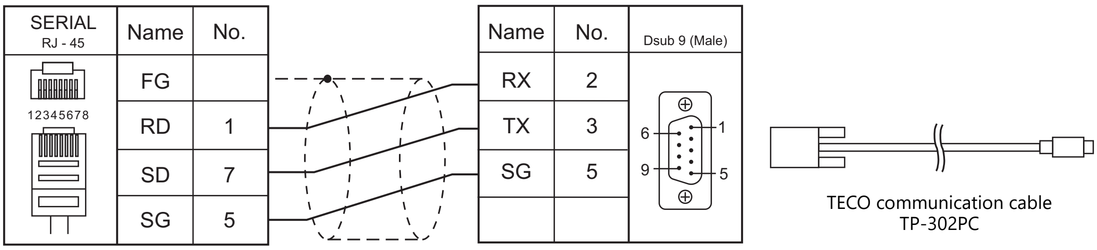
	15 ... 8	7 ... 0
n+0	Model	Device type
n+1	Address No.	
n+2	Expansion code	Bit designation
n+3	00	Station number

- For X/Y device memory
  Assign an actual address number (OCT) converted to HEX as the address number.

12.1.2 Wiring Diagrams

RS-232C

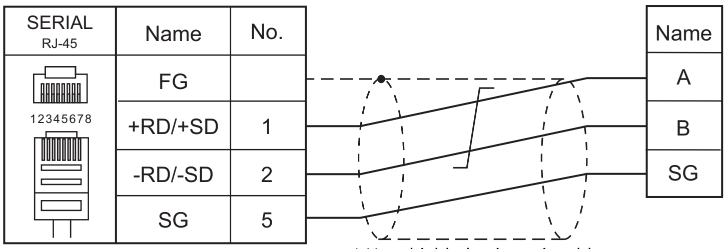
Wiring diagram 1 - M2



* Use shielded twist-pair cables.

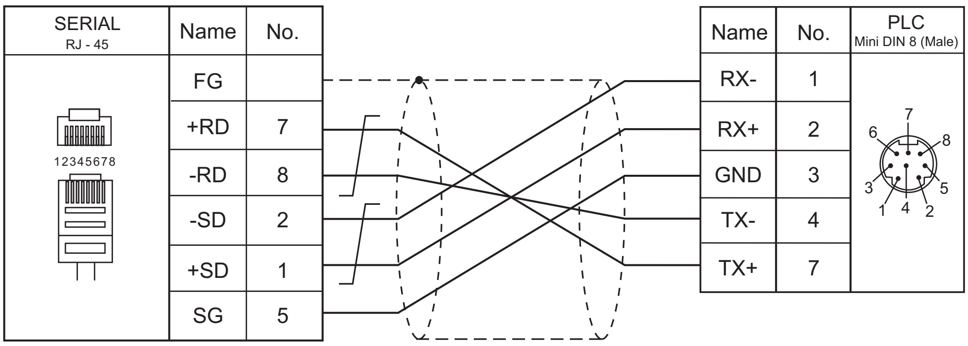
RS-422/RS-485

Wiring diagram 1 - M4



* Use shielded twist-pair cables.

Wiring diagram 2 - M4



* Use shielded twist-pair cables.

13. 3S-Smart Software Solutions

13.1 PLC Connection

Ethernet Connection

PLC Selection on the Editor	CPU	Unit/Port	Port No.	Keep Alive*1
CODESYS V3(Ethernet)	Devices compliant with CODESYS V3	Ethernet port	Default: 11740 (Set the desired number using the application software.)	×

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

13.1.1 CODESYS V3 (Ethernet)

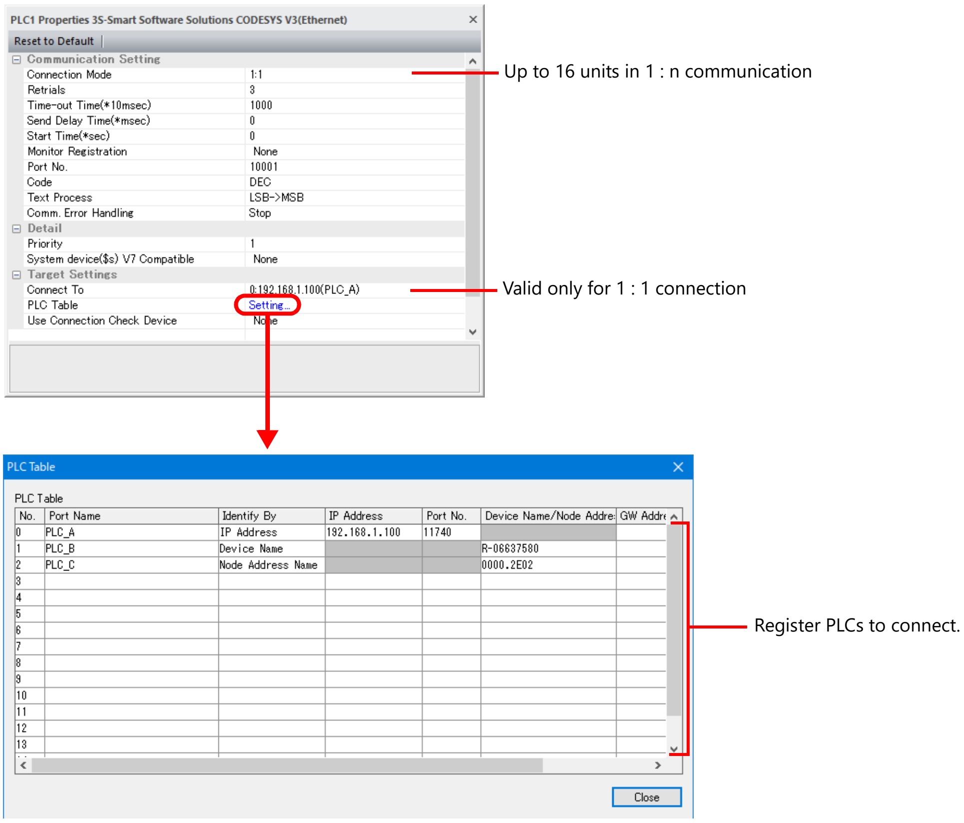
- Only logical port PLC1 can be selected because the tag table is used.

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number of the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- Registration of devices to connect
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Item		Description	Remarks
Port Name		Set the port name of the device to connect.	
Identify By	IP Address	Select this option to establish connection by specifying the IP address.	TCP/IP
	Device Name	Select this option to establish connection by specifying the device name.	Without gateway: UDP/IP With gateway: TCP/IP
	Node Address Name	Select this option to establish connection by specifying the node name.	
IP Address		Set the IP address of the device to connect. * Valid when [IP Address] is selected at [Identify By]	
Port No.		Set the port number of the device to connect. * Valid when [IP Address] is selected at [Identify By]	
Device Name/Node Address Name		Set the device name or node address name of the device to connect. * Valid when [Device Name] or [Node Address Name] is selected at [Identify By]	
GW Address		Set the IP address of the gateway.	If a gateway is not used, leave this field blank.
GW Port No.		Set the port number of the gateway.	

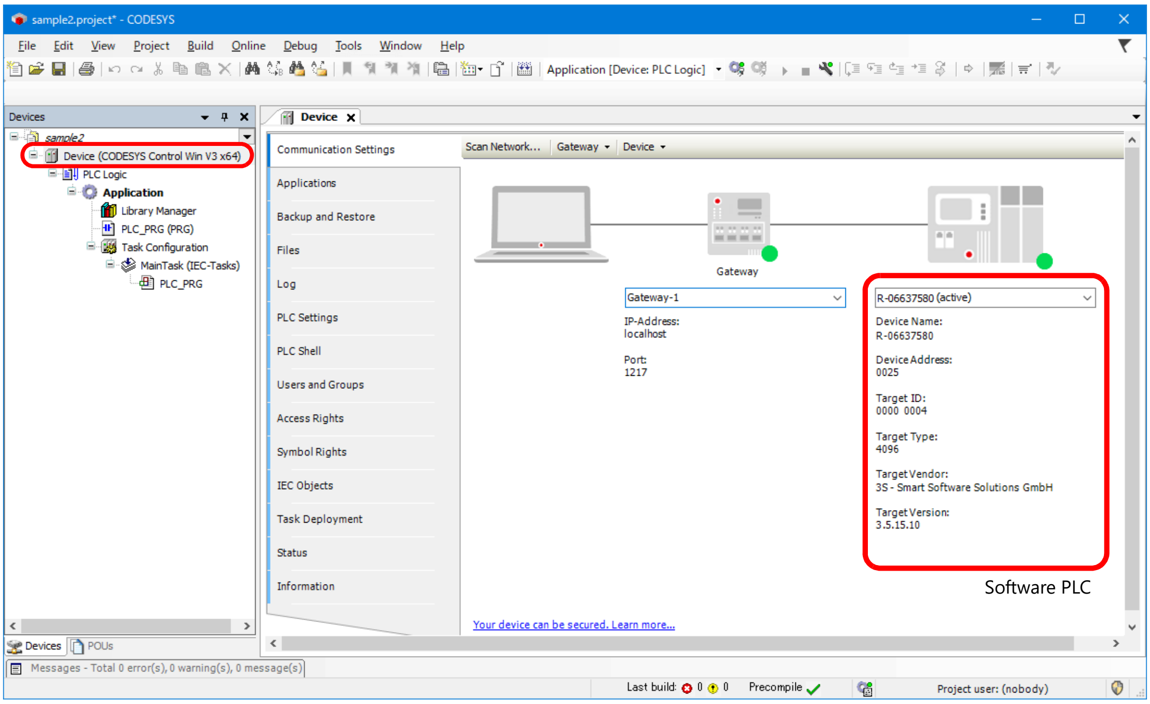
- Others
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]

Item	Description	Remarks
Monitor Registration	Select [Yes] in the case where a monitor registration command is used for communication with the PLC.	
Refresh cycle for monitor reading (msec)	Set the refresh cycle.	

PLC

This section describes the connection settings for the software PLC of CODESYS V3.5.
For details on the actual settings for the device to use, refer to the instruction manual of the relevant device.

Device → Communication Settings



Item		Description	Remarks
Gateway	IP-Address	Displays the IP address of the gateway.	Registered at [GW Address] in the [PLC Table] of V-SFT When “localhost” is displayed, the IP address of the computer is set as the gateway.
	Port	Displays the port number of the gateway.	Registered at [GW Port No.] in the [PLC Table] of V-SFT
Software PLC	Device Name	Set a device name.	Registered at [Device Name] in the [PLC Table] of V-SFT
	Device Address	Displays the device memory address.	Registered at [Node Address Name] in the [PLC Table] of V-SFT

Available Device Memory

Set the PLC device memory by importing variables created using CODESYS V3.5 into V-SFT.
For details on how to import variables, refer to the instruction manual for connection with CODESYS V3-compliant devices.

Data Type		Range of Number of Elements for Arrays *1			Remarks
		Index1	Index2	Index3	
BOOL	(1-bit integer)	0 to 65535	0 to 32767	0 to 16383	*2, *3
SINT	(1-byte integer with a sign)	0 to 65535	0 to 32767	0 to 16383	*2, *3, *4
INT	(2-byte integer with a sign)	0 to 65535	0 to 32767	0 to 16383	
DINT	(4-byte integer with a sign)	0 to 65535	0 to 32767	0 to 16383	
REAL	(4-byte floating-point)	0 to 65535	0 to 32767	0 to 16383	
STRING	(character string)	0 to 511	0 to 255	0 to 127	*3, *5, *6, *7
USINT	(1-byte integer without a sign)	0 to 65535	0 to 32767	0 to 16383	*2, *3, *4
UINT	(2-byte integer without a sign)	0 to 65535	0 to 32767	0 to 16383	
UDINT	(4-byte integer without a sign)	0 to 65535	0 to 32767	0 to 16383	
BYTE	(1-byte integer)	0 to 65535	0 to 32767	0 to 16383	*2, *3, *4
WORD	(2-byte integer)	0 to 65535	0 to 32767	0 to 16383	
DWORD	(4-byte integer)	0 to 65535	0 to 32767	0 to 16383	

*1 The ranges given are based on when a maximum value is specified. The maximum setting is 65335, which is the total number of elements (Index1 × Index2 × Index3).
Ranges differ according to the created tag.

*2 With multi-dimensional arrays, PLC device memory is allocated from lower bits.
For access in units of words, such as for numerical data display parts, access is done in accordance with the allocation of PLC device memory.

- BOOL type
  When the variable registered on the PLC is “FLAG[4][8]”

FLAG (32 bits)																															
3								2								1								0							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

  When “FLAG[0][0]” is specified for a numerical data display part (1 word) on V-SFT, the 16 bits from “FLAG[0][0]” to “FLAG[1][7]” are read.

- SINT type
  When the variable registered on the PLC is “DATA[2][4]”

DATA (8 bytes)							
1				0			
3	2	1	0	3	2	1	0E

  When “DATA[0][0]” is specified for a numerical data display part (1 word) on V-SFT, the 2 bytes from “DATA[0][0]” to “DATA[0][1]” are read.

*3 Only existing data is accessed if the size of the accessed variable is smaller than 2 bytes (1 word) for access in units of words such as for numerical data display parts.
Example: SINT type
When the variable registered on the PLC is “DATA[3][3]”

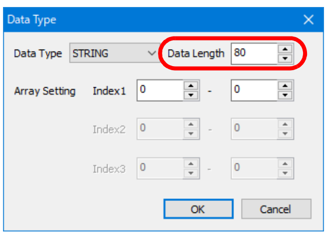
-	DATA (9 bytes)								
-	2			1			0		
-	2	1	0	2	1	0	2	1	0

When “DATA[2][2]” is specified for a numerical data display part (1 word) on V-SFT, only the single byte of “DATA[2][2]” is accessed.

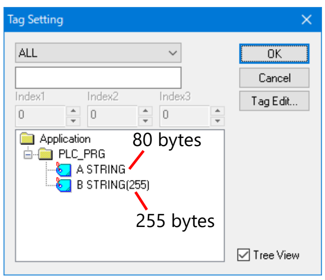
*4 For access in units of words, bits 8 to 15 correspond to the next byte device memory.

*5 When the STRING type is used in arrays, the top element of the address for parts, macro commands, etc. becomes “0”.
Any number other than “0” cannot be specified for the top element.

*6 The number of bytes per address for the STRING type data can be set at [Data Length] in the data type setting window.



Setting range: 1 to 255 bytes (default: 80)
When a value other than the default value (80 bytes) is specified, the specified number of bytes is displayed after the tag name in parentheses.



*7 Set to use STRING type.
e.g.: [Character Display] part
Check the [Use STRING Type] checkbox in the [Detail] menu.

Indirect Device Memory Designation

Not available

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Description	F0	F1 (=$u n)		F2
Acquisition of the ratio of cycle update list update rate to actual operating time *1	1 (PLC1)	n	Target Port No.	2
		n + 1	Command: 0000H	
		n + 2	Ratio (%) (Time required for update / specified update rate) × 100	
		n+3		
Update rate setting of cycle update list *1 *2	1 (PLC1)	n	Target Port No.	3
		n + 1	Command: 0001H	
		n + 2	1 to 65535: Update rate (msec)	
Acquisition of cycle update list update rate *1	1 (PLC1)	n	Target Port No.	2
		n + 1	Command: 0002H	
		n + 2	1 to 65535: Update rate (msec)	
PLC status acquisition by the specified application	1 (PLC1)	n	Target Port No.	3+m
		n + 1	Command: 0003H	
		n + 2	0 to 63: Number of bytes for the application name *3	
		n+3	Application name *4	
		:		
		n+3+m	Status 0: RUN 1: STOP 2: STOP (break point) 255: Status acquisition failure	
PLC status setting by the specified application	1 (PLC1)	n	Target Port No.	4+m
		n + 1	Command: 0004H	
		n + 2	Status 0: RUN 1: STOP	
		n+3	0 to 63: Number of bytes for the application name *3	
		n+4	Application name *4	
		:		
		n+4+(m-1)		
PLC reset by the specified application	1 (PLC1)	n	Target Port No.	4+m
		n + 1	Command: 0005H	
		n + 2	Reset type *5 0: WARM Reset 1: COLD Reset 2: ORIGIN Reset	
		n+3	0 to 63: Number of bytes for the application name *3	
		n+4	Application name *4	
		:		
		n+4+(m-1)		

Return data: Data stored from PLC to X1 series unit

*1 Can be executed only on the screen program for which [Yes] is selected for [Monitor Registration] in the [Hardware Setting] → [PLC Properties] window.
*2 After the macro command is executed, the cycle update list is updated at the specified rate even after the screen is switched over.
*3 When “0” is specified, all applications are targeted.
*4 When the number of bytes for the application name is set to “0”, the setting is not required.
*5 Reset type details

WARM Reset	Stops the project/application and initializes data other than remnant variables and persistent variables.
COLD Reset	Stops the project/application and initializes data including remnant variables.
ORIGIN Reset	Stops the project/application, initializes all variables and deletes the application from the PLC.

14. TOHO

14.1 Temperature Controller/Servo/Inverter Connection

Digital Temperature Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)	
TTM-000	TTM-002-x-x-AM	Terminal block	RS-485	Wiring diagram 5 - M4	×	TTM-000.Lst
	TTM-004-x-x-AM TTM-004S-x-x-AX TTM-X04-x-x-AM TTM-X04S-x-x-AX			Wiring diagram 6 - M4	×	
	TTM-005-x-x-AM TTM-005S-x-x-AX TTM-006-x-x-AM TTM-006S-x-x-AX TTM-009-x-x-AM TTM-009S-x-x-AX			Wiring diagram 2 - M4	×	
	TTM-007-x-x-AM TTM-007S-x-x-AX			Wiring diagram 7 - M4	×	
TTM-00BT	TTM-00BT-0-R-M1 TTM-00BT-1-R-M1	TB3	RS-485	Wiring diagram 1 - M4	×	TTM-00BT.Lst
	TTM-00BT-0-R-M2 TTM-00BT-1-R-M2		RS-232C	Wiring diagram 1 - M2	×	
TTM-200 (MODBUS RTU)	TTM-204	Terminal block	RS-485	Wiring diagram 2 - M4	×	TD_TTM200.Lst
	TTM-205 TTM-209			Wiring diagram 3 - M4	×	
	TTM-207			Wiring diagram 4 - M4	×	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

14.1.1 TTM-000

Communication Setting

Editor

Communication setting

(Underlined setting: default)

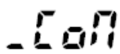
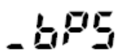
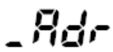
Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	**RS-422/485**	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 32	
BCC Check	Without BCC / With BCC	

Digital Temperature Controller

Communication setting

Make the communication settings in the communication setting mode (SET6) that is selected by the key on the front of the digital temperature controller.

(Underlined setting: default)

Communication Setting	Item	Contents	Setting Example
	Communication protocol	0: TOHO communication protocol * Not necessary for TTM-xxx-x-x-AxxM	0
	Communication parameter	 1: Stop bit 1 2: Stop bit 2 n: No parity o: Odd parity E: Even parity 7: Data length 7 bits 8: Data length 8 bits n: Without BCC check b: With BCC check	b8n2
	Communication setting	4.8: 4800 bps 9.6: 9600 bps 19.2: 19200 bps	9.6
	Communication address	1 to 32	1
	Response delay time	0 to 255 (ms)	0
	Communication mode selection	ro: Read only rw: Read/write	rw

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(monitor data)	00H	
SW	(setting data)	01H	Always set “0” for SW00137 (communication protocol setting).
ST	(character string data)	02H	6-byte character string data

Read-only device memory

The following types of device memory are read-only.

Device Memory	Name	Remarks
MW00000	Measurement value (PV)	When the measurement value exceeds the upper limit, “32767” is displayed. When it falls below the lower limit, “-32768” is displayed.
MW00003	Output status monitoring	
MW00005	DI status monitoring	
SW00041	Input monitoring for event output 1CT	
SW00050	Input monitoring for event output 2CT	
SW00064	Monitoring for remaining time on timer	
ST00000	Measurement value (PV1)	

Write-only device memory

The following type of device memory is write-only.

Device Memory	Name	Remarks
MW00002	Timer start / stop	

Indirect Device Memory Designation

Specify the value obtained by subtracting “1” from the actual station number.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Data save	1 - 8 (PLC1 - 8)	n	Station numbers 0 to 31*	2
		n + 1	Command: 0	

* Specify the value obtained by subtracting “1” from the actual station number.

14.1.2 TTM-00BT

Communication Setting

Editor

Communication setting

(Underlined setting: default)

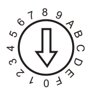
Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	**8 bits**	
Stop Bit	**2 bits**	
Parity	**None**	
Target Port No.	0 to 15	

Digital Temperature Controller

Settings related to communications can be made using switches on the controller. Before changing a setting, be sure to turn off the power to the digital temperature controller.

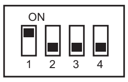
Unit number (station number)

(Underlined setting: default)

SW1	Contents	Setting Example
	0 to F (H) (0 to 15)	0

Baud rate

(Underlined setting: default)

<table>
<tr><th>SW2</th><th>Contents</th><th>Setting Example</th></tr>
<tr><td></td><td>
<table>
<tr><th>DIP Switch</th><th>4800 bps</th><th>9600 bps</th><th>19200 bps</th><th>38400 bps</th></tr>
<tr><td>1</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>2</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>3</td><td colspan="4">OFF (Not used)</td></tr>
<tr><td>4</td><td colspan="4">OFF (Not used)</td></tr>
</table>
</td><td>1: ON
2: OFF
3: OFF
4: OFF

Baud rate: 9600 bps</td></tr>
</table>

The following settings are fixed; data length: 8 bits, stop bit: 2 bits, and parity: none.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(monitor data)	00H	
SW	(setting data)	01H	

* The memory bank number (0 to 8) and channel number (1 to 8) are required in addition to the device type and address. The assigned device memory is expressed as shown on the right when editing the screen.

Example: #2 : SW5134
- Address number
- Channel 1 to 8
- Memory bank number 0 to 8

Address denotations

- To specify the memory bank currently in use, set "0" for the memory bank number.
  When specifying other memory banks, set the corresponding numbers.
- On the signal name reference list, every channel is designated as "0". Manually input the number (1 to 8) of the channel to use.

Read-only device memory

The following types of device memory are read-only.

Device Memory	Name	Remarks
MW000	Measurement value (PV1)	*1
MW003	Control output monitor (OM1)	
SW041	CT measurement value 1 (CM1)	*2
SW050	CT measurement value 2 (CM2)	*2
SW083	CT measurement value 3 (CM3)	*2
SW092	CT measurement value 4 (CM4)	*2
SW101	CT measurement value 5 (CM5)	*2
SW110	CT measurement value 6 (CM6)	*2
SW119	CT measurement value 7 (CM7)	*2
SW130	DI monitor (DIM)	
SW131	Event output monitor 1 to 5 (EMI)	
SW132	Event output monitor 6 to 8 (EM2)	
SW133	Alarm monitor (ALM)	

*1 When the measurement value exceeds the upper limit, "32767" is displayed. When it falls below the lower limit, "-32768" is displayed.
*2 When the measurement value exceeds the upper limit, "32767" is displayed. When it falls below the lower limit or measurement is impossible, "-32768" is displayed.

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model	Device type
n + 1	Address No.	
n + 2	Bank No.	Bit designation
n + 3	00	Station number

- Specify the channel number (1 to 8) and address for the device memory number (address).
  Example: Channel 5, address 134:
  Specify "5134" (DEC) for the device memory number (address).

PLC_CTL

Macro command "PLC_CTL F0 F1 F2"

Contents	F0	F1 (= $u n)		F2
Data save	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0	
		n + 2	Channel (1 - 8)	

14.1.3 TTM-200 (MODBUS RTU)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	**8 bits**	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	

Digital Temperature Controller

Communication setting

Make the communication settings in the communication setting mode (SET17) that is selected by the key on the front of the digital temperature controller.

(Underlined setting: default)

Communication Setting	Item	Contents	Setting Example
PRt	Communication protocol *1	1: MODBUS RTU	1
CoM	Communication parameter	8N1: data length 8, without parity, stop bit 1 8N2: data length 8, without parity, stop bit 2 8o1: data length 8, odd parity, stop bit 1 8o2: data length 8, odd parity, stop bit 2 8E1: data length 8, even parity, stop bit 1 8E2: data length 8, even parity, stop bit 2	8N2
bPS	Communication setting	4.8: 4800 bps 9.6: 9600 bps 19.2: 19200 bps 38.4: 38400 bps	9.6
AdR	Communication address	1 to 31	1
AWt	Communication response delay time	0 to 255 (ms)	0
Mod	Communication switching	0: Writing prohibited 1: Writing enabled 2: Master of simultaneous rise in temperature 3: Slave of simultaneous rise in temperature	1

*1 Select “Modbus RTU” for the communication protocol on the digital temperature controller when connecting with the X1.

Available Device Memory

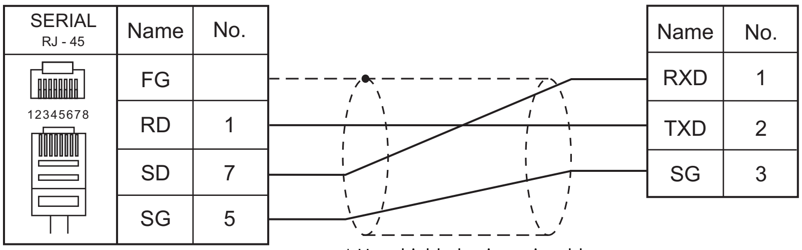
The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
4 (holding register)	00H	No address of even-numbered digits can be specified.

14.1.4 Wiring Diagrams

RS-232C

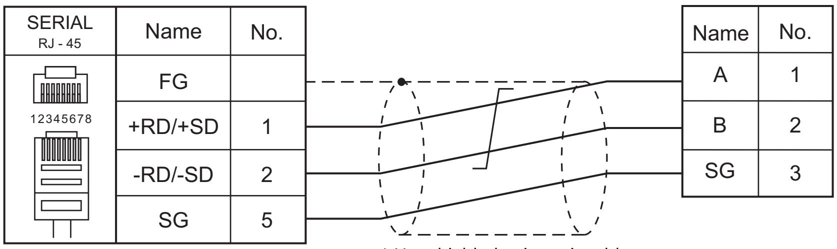
Wiring diagram 1 - M2



* Use shielded twist-pair cables.

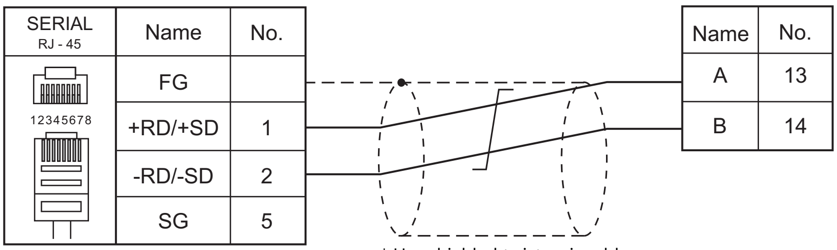
RS-422/RS-485

Wiring diagram 1 - M4



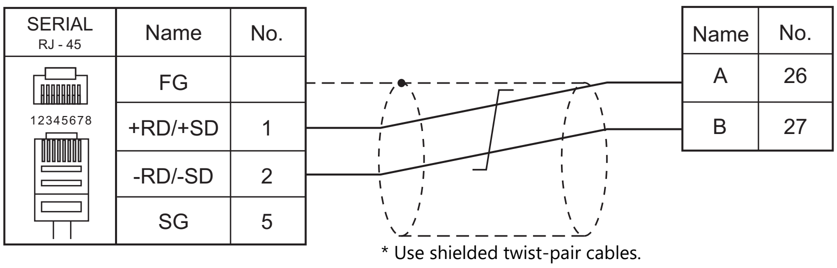
* Use shielded twist-pair cables.

Wiring diagram 2 - M4



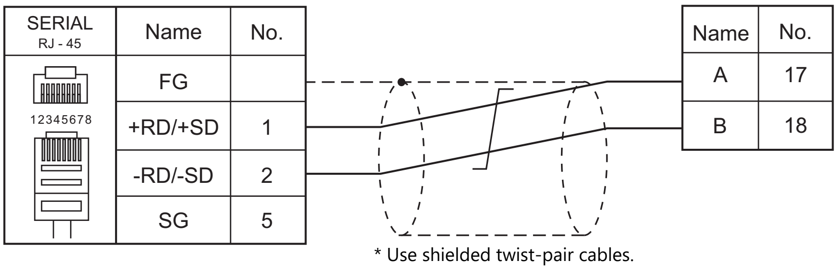
* Use shielded twist-pair cables.

Wiring diagram 3 - M4

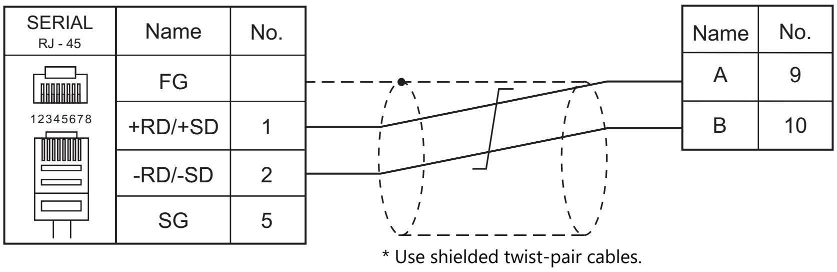


* Use shielded twist-pair cables.

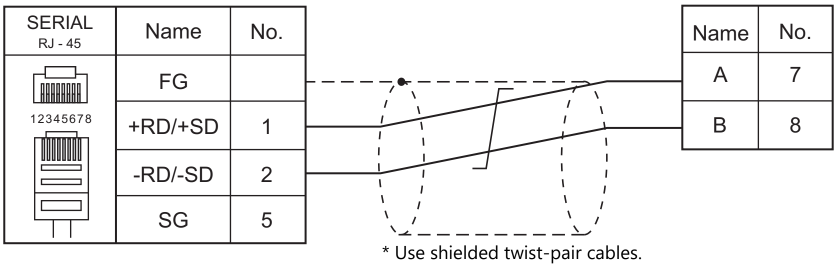
Wiring diagram 4 - M4



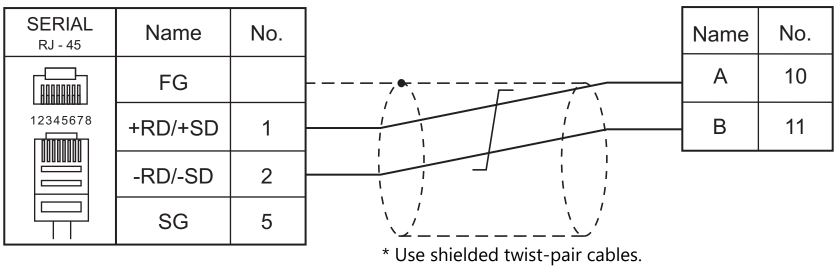
Wiring diagram 5 - M4



Wiring diagram 6 - M4



Wiring diagram 7 - M4



15. Tokyo Chokoku Marking Products

15.1 Temperature Controller/Servo/Inverter Connection

Portable Dot Marker

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)	
MB3315/1010	MB3315 MB1010	RS-232C connector	RS-232C	Wiring diagram 1 - M2	×	TOCHO_MB.Lst

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

15.1.1 MB3315/1010

Communication Setting

Editor

Communication setting

Item	Setting	Remarks
Connection Mode	**1 : 1**	
Signal Level	**RS-232C**	
Baud Rate	**115200 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**None**	

Available Device Memory

There are no device memory.

PLC_CTL

Macro command "PLC_CTL F0 F1 F2"

Contents	F0	F1 (=$u n)		F2
Operation execution command	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	3
		n + 1	Command: 3	
		n + 2	Operation execution command 1: Start marking 2: Pause 3: Abort 4: Alarm reset 5: Origin return	
Status request	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	2
		n + 1	Command: 5	
		n + 2	Status 0: Standby 1: Marking operation in progress 2: Paused 3: Origin return in progress 5: Operating for any other reason 99: Alarm occurring	
File marking data settings	1 to 8 (PLC1 to 8)	n	Station number: 0 (fixed)	5+m
		n + 1	Command: 9	
		n + 2	File number: 1 to 255	
		n + 3	Field number: 1 to 21	
		n + 4	Number of characters in text: 1 to 50	
		n + 5 to n + (4 + m)	Marking data (max. 50 characters) [*1]	

<table>
<tr><th>Contents</th><th>F0</th><th colspan="2">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="8">Marking data settings</td><td rowspan="8">1 to 8
(PLC1 to 8)</td><td>n</td><td>Station number: 0 (fixed)</td><td rowspan="8">7+m</td></tr>
<tr><td>n + 1</td><td>Command: 1</td></tr>
<tr><td>n + 2</td><td>Marking force: 0 to 10</td></tr>
<tr><td>n + 3</td><td>Marking speed: 0 to 10</td></tr>
<tr><td>n + 4</td><td>Serial setting: 0 (not used)</td></tr>
<tr><td>n + 5</td><td>Origin return
0: Origin return after marking (normally used)
1: No origin return after marking</td></tr>
<tr><td>n + 6</td><td>Number of sending fields: 1 to 21</td></tr>
<tr><td>n + 7 to
n + (6 + m)</td><td>Field data
• Character data
<table>
<tr><th colspan="2">Field data</th></tr>
<tr><td>n + 7</td><td>Field number: 1 to 21</td></tr>
<tr><td>n + 8</td><td>Data type *2
0: Fixed characters
1: Calendar
3: Logo
4: Vertical Y axis
5: Vertical X axis
6: Outer arc
7: Inner arc</td></tr>
<tr><td>n + 9</td><td>Fixed to 0</td></tr>
<tr><td>n + 10</td><td>Character height (mm) *3</td></tr>
<tr><td>n + 11</td><td>Character width ratio (%)</td></tr>
<tr><td>n + 12</td><td>Angle (deg)</td></tr>
<tr><td>n + 13</td><td>Character pitch (mm) *3</td></tr>
<tr><td>n + 14</td><td>Start position X (mm) *3</td></tr>
<tr><td>n + 15</td><td>Start position Y (mm) *3</td></tr>
<tr><td>n + 16</td><td>Character (bytes)</td></tr>
<tr><td>n + 17 to
n + (16 + α)</td><td>Marking data (max. 50 characters) *1 *4</td></tr>
<tr><td>n + (17 + α)</td><td>Arc marking radius (mm) *2 *5</td></tr>
</table>
• 2D data (two-dimensional barcode)
<table>
<tr><th colspan="2">Field data</th></tr>
<tr><td>n + 7</td><td>Field number: 21 (fixed)</td></tr>
<tr><td>n + 8</td><td>Data type
0: Fixed characters
1: Calendar</td></tr>
<tr><td>n + 9</td><td>Barcode type
1: QR
2: Data matrix</td></tr>
<tr><td>n + 10</td><td>Barcode marking force: 1 to 10</td></tr>
<tr><td>n + 11</td><td>Barcode marking speed: 1 to 10</td></tr>
<tr><td>n + 12</td><td>Dimension
0: For QR code
1: One-dimensional
2: Two-dimensional</td></tr>
<tr><td>n + 13</td><td>Fixed to 0</td></tr>
<tr><td>n + 14</td><td>Angle (deg)</td></tr>
<tr><td>n + 15</td><td>Matrix size (mm) *3</td></tr>
<tr><td>n + 16</td><td>Start position X (mm) *3</td></tr>
<tr><td>n + 17</td><td>Start position Y (mm) *3</td></tr>
<tr><td>n + 18</td><td>Character (bytes)</td></tr>
<tr><td>n + 17 to
n + (16 + α)</td><td>Marking data (max. 50 characters) *1</td></tr>
</table>
</td></tr>
</table>

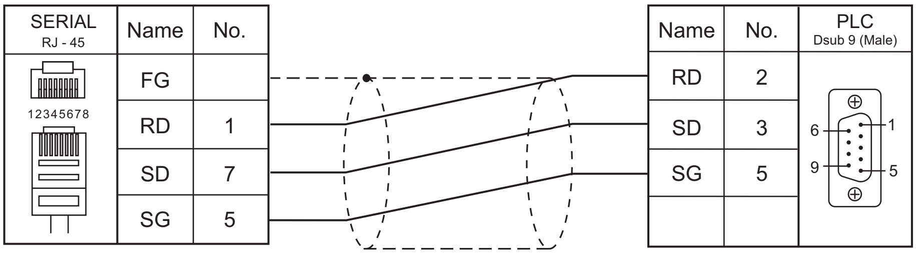
Return data: Data stored from controller to X1 series

*1 Set marking data in ASCII format, and all other items in binary format.
*2 When selecting “6: Outer arc” or “7: Inner arc” as the data type, configure the arc marking radius at “n + (17 + α)”.
For other than “6: Outer arc” or “7: Inner arc”, configuration of “n + (17 + α)” is not necessary.
*3 Include the tenths place in the setting value.
Example: 30 = 3.0 mm
*4 When selecting “3: Logo” as the data type, set a logo number between 1 to 31. Set the logo number with a “$” mark before and after the number, such as “01”.
*5 Set a whole value.
Example: 10 = 10 mm

15.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2



The send/receive wires are crossed inside the device.

* Use shielded twist-pair cables.

16. TOSHIBA

16.1 PLC Connection

Serial Connection

PLC Selection on the Editor	PLC / CPU			Unit/Port	Signal Level	Connection	
						RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)*2
T series/ V series (T compatible)	T series	T1	T1-16 T1-28 T1-40 T1-40S	Programmer port	RS-232C	Wiring diagram 1 - M2	×
				CU111	RS-485	×	Wiring diagram 1 - M4
		T1S	T1-40S	LINK port			
		T2	PU224	LINK port	RS-485		Wiring diagram 2 - M4
		T2E	PU234E	Programmer port	RS-232C	Wiring diagram 2 - M2	×
				CM232E			
				CM231E	RS-485	×	Wiring diagram 1 - M4
		T2N	PU215N PU235N PU245N	Programmer port	RS-232C	Wiring diagram 2 - M2	×
				LINK port	RS-232C		
					RS-485	×	Wiring diagram 3 - M4
		T3	PU315 PU325	LINK port	RS-485	×	Wiring diagram 2 - M4
		T3H	PU325H PU326H				
	V series	S2T	PU672T PU662T	Programmer port	RS-232C	Wiring diagram 2 - M2	×
				LINK port	RS-485	×	Wiring diagram 1 - M4
		S2E	PU612E	Programmer port	RS-232C	Wiring diagram 2 - M2	×
				LINK port	RS-485	×	Wiring diagram 1 - M4
		model 2000	S2PU22A S2PU32A S2PU72A S2PU72D S2PU82	LINK port	RS-485	×	Wiring diagram 1 - M4
		model 3000	S3PU21 S3PU45A S3PU55A S3PU65A				Wiring diagram 2 - M4
EX series	EX100	MPU12A		COMP. LINK	RS-485	×	Wiring diagram 1 - M4
	EX250 EX500			CMP6236A			
	EX2000	MPU-6620		COMP. LINK			

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

Ethernet Connection

PLC Selection on the Editor	PLC / CPU		Unit	TCP/IP	UDP/IP	Port No.	Keep Alive*1
T series/V series (T compatible) (Ethernet UDP/IP)	T2N series	PU235N PU245N	LAN port built into CPU	×	○	1024 to 65535 (Default: 10000)	○
	T3H series	PU325H PU326H	EN311				
	S2T series	PU672T PU662T	EN6**				
	model 2000	S2PU72 S2PU82	EN6**				
	model 3000	S3PU45 S3PU55 S3PU65	EN331 EN7**				
nv series (Ethernet UDP/IP)	nv series *2	PU811 PU866	EN811 FN812				

*1 For KeepAlive functions, see "1.3.2 Ethernet Communication".
*2 Connection via the LAN port built into the CPU is not available. Only the LAN port of the link unit can be used.

16.1.1 T Series / V Series (T Compatible)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Parity	None / Odd / Even	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Target Port No.	1 to 31	

PLC

T1/T1S (Programmer Port)/CU111

System information

(Underlined setting: default)

Item	Setting	Remarks
Operation Mode	Computer link (ASCII)	
Signal Level	Programmer port: RS-232C CU111: RS-485	
Baud Rate	9600 bps (fixed)	
Parity	None / Odd	
Data Length	8 bits (fixed)	
Stop Bit	1 bit (fixed)	
Station No.	1 to 31	

T1S (Link Port)

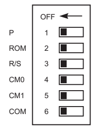
Special register (SW056), system information

(Underlined setting: default)

Item	Link Port	Remarks
Operation Mode	Computer link (ASCII)	Special register SW056 = 0 The setting takes effect when the EEPROM write command is executed and the power is turned off and back on again.
Signal Level	RS-485	
Baud Rate	4800 / 9600 / 19200 bps	
Parity	None / Odd / Even	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Station No.	1 to 31	

T2E/T2N (Programmer Port)

Operation mode setting switch

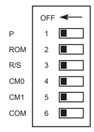
Switch		Contents	Setting	Remarks
	SW6: COM	Programmer port parity setting	OFF: Odd parity ON: Without parity	The setting takes effect when the power is turned off and back on again.

The following settings are fixed; baud rate: 9600 bps, data length: 8 bits, and stop bit: 1 bit.

T2E (Option Card CM231E/CM232E)

Operation mode setting switch

The settings are made by the DIP switch on the front of the CPU module (PU234E).

Switch		Contents	Setting	Remarks
	SW4: CM0	Option communication mode setting Function: computer link	OFF	The settings take effect when the power is turned off and back on again.
	SW5: CM1		OFF	

Transmission parameter setting

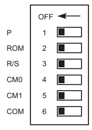
Transmission parameters are set on the system information area of T2E.

(Underlined setting: default)

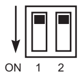
Item	Setting	Remarks
Signal Level	CM231E: RS-485 CM232E: RS-232C	The settings take effect when the EEPROM write command is executed and the power is turned off and back on again.
Baud Rate	4800 / 9600 / 19200 bps	
Parity	None / Odd / Even	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Station No.	1 to 31	

T2N (LINK Port)

Operation mode setting switch

Switch		Contents	Setting	Remarks
	SW4: CM0	Communication mode setting Function: computer link	OFF	The settings take effect when the power is turned off and back on again.
	SW5: CM1		OFF	

Communication port select switch

Switch		Contents	Setting	Remarks
	SW1	Signal Level	OFF: RS-485 ON: RS-232C	

The following settings are fixed; baud rate: 9600 bps, data length: 8 bits, and stop bit: 1 bit.

Transmission parameter setting

Transmission parameters are set on the system information area of T2N.

(Underlined setting: default)

Item	Setting	Remarks
Signal Level	CM231E: RS-485 CM232E: RS-232C	The settings take effect when the EEPROM write command is executed and the power is turned off and back on again.
Baud Rate	4800 / 9600 / 19200 bps	
Parity	None / Odd / Even	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Station No.	1 to 31	

T3/T3H (LINK Port)

Transmission parameter setting

Transmission parameters are set on the system information area.

(Underlined setting: default)

Item	Setting	Remarks
Signal Level	RS-485	The settings take effect when the EEPROM write command is executed and the power is turned off and back on again.
Baud Rate	4800 / 9600 / 19200 bps	
Parity	None / Odd / Even	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Station No.	1 to 31	

S2E/S2T (Programmer Port)

Operation mode setting switch

Switch	Contents	OFF	ON	Remarks
3 : P	Programmer port parity setting	Odd parity	Without parity	

The following settings are fixed; baud rate: 9600 bps, data length: 8 bits, and stop bit: 1 bit.

S2E/S2T (LINK Port)

Set special registers and system information using the engineering tool.
After making settings, execute the ROM write command and turn the power off and back it on again to determine the settings.

Operation mode

Special Register	Setting	Remarks
SW069	0: Computer link (ASCII)	

System information

(Underlined setting: default)

Item		Setting	Remarks
Computer Link Setting	Station No.	1 to 31	
Connection Mode	Baud Rate	4800 / 9600 / 19200 bps	
	Parity	None / Odd / Even	
	Data Length	7 / 8 bits	
	Stop Bit	1 / 2 bits	

model2000/3000

Set module parameters using the engineering tool.

Module parameter

(Underlined setting: default)

Item	Setting	Remarks
RS-485 Station No.	1 to 31	
RS-485 Baud Rate (bit/s)	4800 / 9600 / 19200 / 38400 bps	
RS-485 Parity Setting	None / Odd / Even	
RS-485 Data Length	7 / 8 bits	
RS-485 Stop Bit	1 / 2 bits	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
X	(input)	01H	XW as word device
Y	(output)	02H	YW as word device
R	(auxiliary relay)	05H	RW as word device
L	(link relay)	06H	LW as word device, not available with model2000 and model3000.
W	(link register)	07H	Not available with model2000 and model3000
F	(file register)	08H	
TN	(timer/current value)	09H	Read only, not available with model2000 and model3000
CN	(counter/current value)	0AH	Read only, not available with model2000 and model3000
TS	(timer/contact)	0BH	Read only, not available with model2000 and model3000
CS	(counter/contact)	0CH	Read only, not available with model2000 and model3000

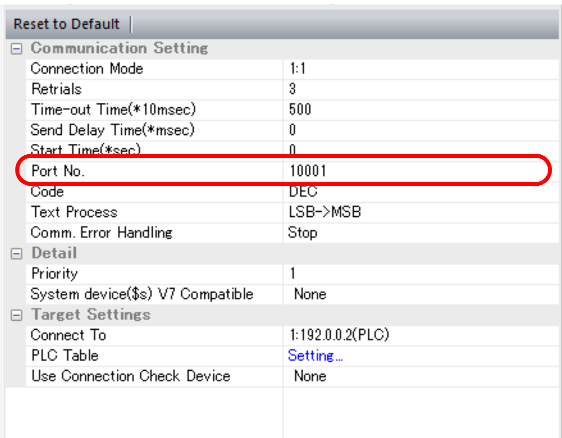
16.1.2 T Series / V Series (T Compatible) (Ethernet UDP/IP)

Communication Setting

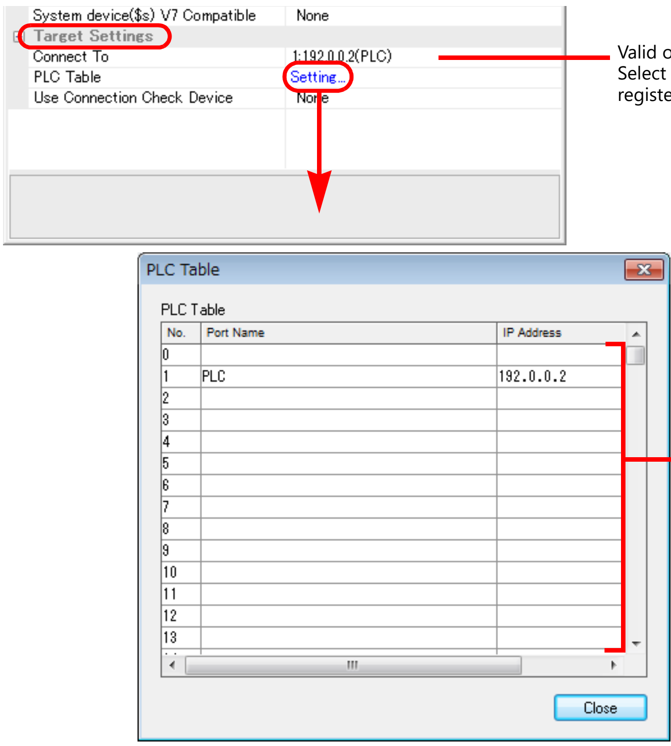
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]



- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Valid only for 1 : 1 connection
Select the PLC for connection from those registered on the PLC table.

Set the IP address, port number and whether or not to use the KeepAlive function for the PLC.

PLC

T2N/T3H/S2N Series

Configure a program with the PLC. For details, refer to the PLC manual issued by the manufacturer.

model 2000/model 3000

Make settings using the PLC tool software.

Item	Setting	Remarks
IP Address Type	CIEMAC_1200 type	
IP Address Primary	Set the IP address of the PLC.	
Subnet Mask Primary	Specify according to the environment.	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
X	(input)	01H	XW as word device
Y	(output)	02H	YW as word device
R	(auxiliary relay)	05H	RW as word device
L	(link relay)	06H	LW as word device, not available with T2N, model 2000 and model 3000.
W	(link register)	07H	Not available with T2N, model 2000 and model 3000
F	(file register)	08H	model 2000: V02.00 or later, model 3000: V02.72 or later only
TN	(timer/current value)	09H	Read only, not available with model 2000 and model 3000
CN	(counter/current value)	0AH	Read only, not available with model 2000 and model 3000
TS	(timer/contact)	0BH	Read only, not available with model 2000 and model 3000
CS	(counter/contact)	0CH	Read only, not available with model 2000 and model 3000

16.1.3 EX Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

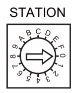
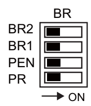
Item	Setting	Remarks
Connection Mode	<u>1 : 1</u> / 1 : n	
Signal Level	RS-232C / <u>RS-422/485</u>	
Baud Rate	4800 / <u>9600</u> bps	
Parity	None / <u>Odd</u> / Even	
Data Length	7 / <u>8</u> bits	
Stop Bit	<u>1</u> / 2 bits	
Target Port No.	0 to 15	For EX200/500: 0 to 7

PLC

EX100

Make settings by using the switches on the CPU module. The following settings are fixed; data length: 8 bits, and stop bit: 1 bit.

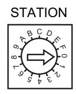
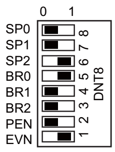
Switch

Switch		Setting	Remarks
Communication switch		LINK: computer link	The settings take effect when the power is turned off and back on again.
Station No.		0 to F (= 0 to 15)	
Baud Rate		9600 bps (BR2: OFF, BR1: OFF) 4800 bps (BR2: OFF, BR1: ON)	
Parity		Odd (PEN: ON, PR: OFF) Even (PEN: ON, PR: ON) None (PEN: OFF, PR: OFF/ON)	

EX250/EX500

Make settings by using the switches on the CPU module. The following settings are fixed; data length: 8 bits, and stop bit: 1 bit.

Switch

<table>
<tr><th colspan="3">Switch</th><th>Setting</th><th>Remarks</th></tr>
<tr><td>Write enable switch</td><td colspan="2"></td><td>ON: Write enabled</td><td rowspan="8"></td></tr>
<tr><td>Station No.</td><td colspan="2"></td><td>0 to 7</td></tr>
<tr><td rowspan="6">DNT8</td><td rowspan="6"></td><td>SP0</td><td>0: EX control command enabled</td></tr>
<tr><td>SP1</td><td>0: Block write command enabled</td></tr>
<tr><td>SP2</td><td>1: ASCII mode</td></tr>
<tr><td>BR</td><td>9600 bps (BR0: 1, BR1: 0, BR2: 0)
4800 bps (BR0: 0, BR1: 1, BR2: 0)</td></tr>
<tr><td>PEN
EVN</td><td>Odd (PEN: 0, EVN: 1)
Even (PEN: 0, EVN: 0)
None (PEN: 1, EVN: 0/1)</td></tr>
</table>

EX2000

Make settings for system information (16. COMPUTER LINK) by using the graphic programmer.

System information

(Underlined setting: default)

Item	Setting	Remarks
STATION No.	1 to 31	
BAUD RATE	4800 / 9600 bps	
PARITY	0: None 1: Odd 2: Even	
DATA LENGTH	8 bits (fixed)	
STOP BIT	1.0: 1 bits 2.0: 2 bits	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
X	(input)	01H	XW as word device
Y	(output)	02H	YW as word device
R	(auxiliary relay)	03H	RW as word device
Z	(link relay)	04H	ZW as word device
TN	(timer/current value)	05H	Read only
CN	(counter/current value)	06H	Read only

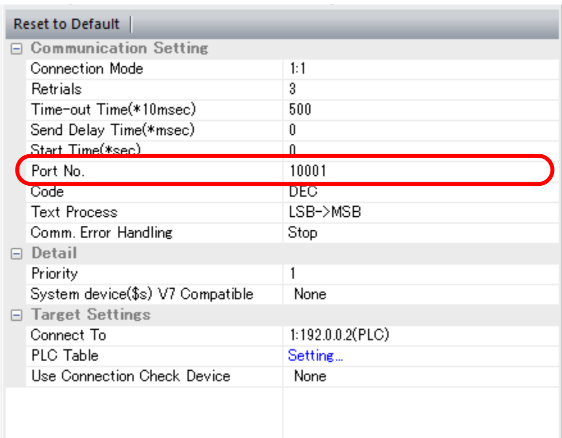
16.1.4 nv Series (Ethernet UDP/IP)

Communication Setting

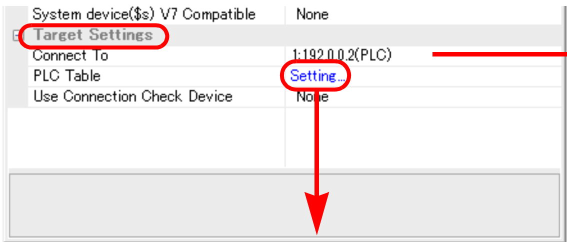
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

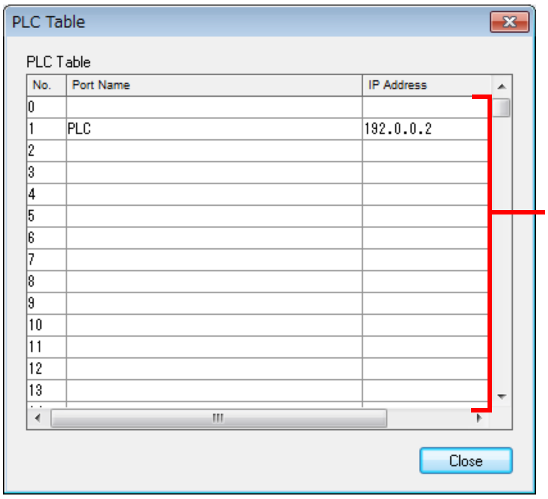
- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]



- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Valid only for 1 : 1 connection
Select the PLC for connection from those registered on the PLC table.

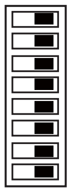


Set the IP address, port number and whether or not to use the KeepAlive function for the PLC.

PLC

EN811/FN812

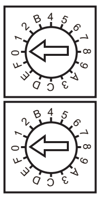
IP address type

MODE	Switch number	Item	Setting
	6	IPF	
	7	IP0	
	8	IP1	

IPF	IP0	IP1	Contents
OFF	OFF	OFF	IP172.16.64.xxx (Class B, least significant byte set by station address)
OFF	OFF	ON	P192.168.0.xxx (Class C, least significant byte set by station address)
ON	ON	ON	Set IP address using PLC tool software.

Station address (IP address)

Set the least significant byte of the IP address.

STN	Setting
	Setting range: 01 to FE (HEX) Example: To set “100” (64 HEX), set H to 6 and L to 4.

Port No.

Make settings using the PLC tool software. Default: 10000

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	DW as word device
%IX	(input)	01H	%IW as word device
%QX	(output)	02H	%QW as word device
S	(system register)	0DH	SW as word device
U	(user register)	0EH	

* Specification by variable names is not possible for %I (input), %Q (output), or U (user register). Specify addresses.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

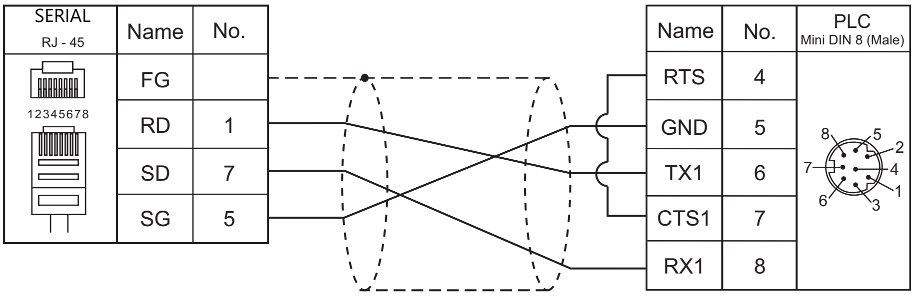
Contents	F0	F1 (=$u n)		F2
Computer status readout	1 to 8 (PLC1 to 8)	n	Station number	2
		n+1	Command: 0 (H)	
		n+2	Bit 0 to 3: Run mode Bits 4 to 11: System reserved Bits 12 to 15: Error information	

Return data: Data stored from PLC to X1 series

16.1.5 Wiring Diagrams

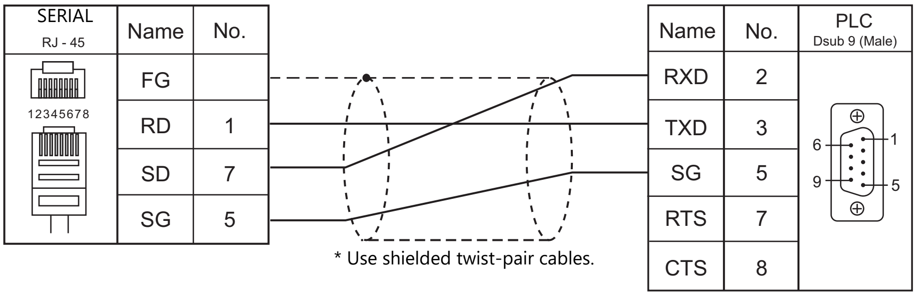
RS-232C

Wiring diagram 1 - M2



* Use shielded twist-pair cables.

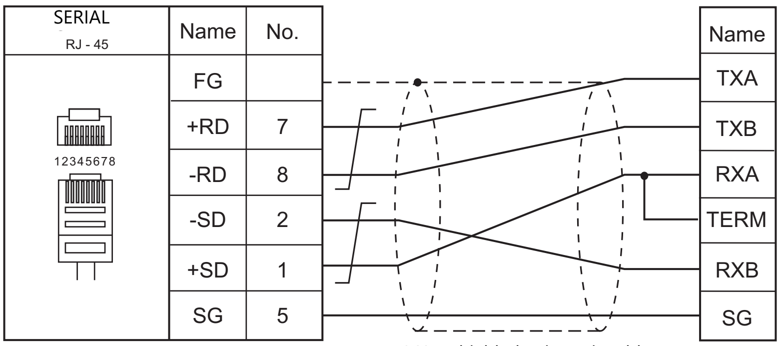
Wiring diagram 2 - M2



* Use shielded twist-pair cables.

RS-422/RS-485

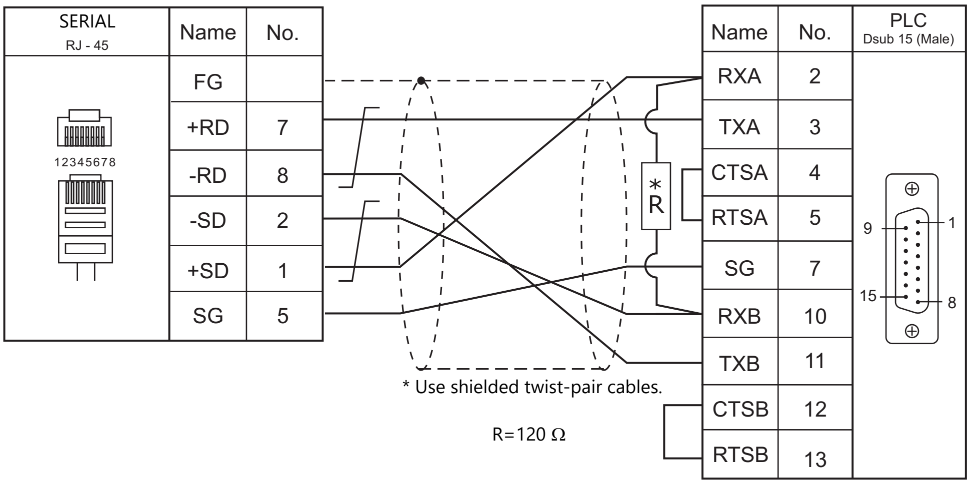
Wiring diagram 1 - M4



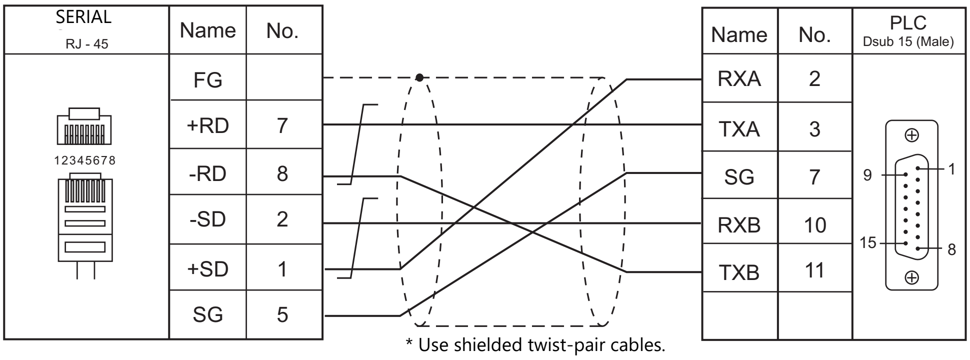
* Use shielded twist-pair cables.

For 1 : 1 connection:
Terminating resistance:
120 Ω with RXA and TERM short-circuited

Wiring diagram 2 - M4



Wiring diagram 3 - M4



16.2 Temperature Controller/Servo/Inverter Connection

Inverter

PLC Selection on the Editor	Model	Unit/Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2	
VF-S7	VF-S7	RS2001Z	RS-232C	Wiring diagram 1 - M2	×	VFS7.Lst
		RS4001Z	RS-485	Wiring diagram 1 - M4	Wiring diagram 4 - M4*3	
VF-S9	VF-S9	RS2001Z	RS-232C	Wiring diagram 1 - M2	×	VFS9.Lst
		RS4001Z	RS-485	Wiring diagram 1 - M4	Wiring diagram 4 - M4*3	
VF-S11	VF-S11	RS2001Z	RS-232C	Wiring diagram 1 - M2	×	VFS11.Lst
		RS20035		Wiring diagram 2 - M2	×	
		RS4001Z	RS-485	Wiring diagram 1 - M4	Wiring diagram 4 - M4*3	
		RS4002Z				
		RS4003Z				
VF-S15	VF-S15	RS-485 connector	RS-485	Wiring diagram 3 - M4	×	VFS15.Lst
VF-A7	VF-A7	RS2001Z	RS-232C	Wiring diagram 1 - M2	×	VFA7.Lst
		RS4001Z	RS-485	Wiring diagram 1 - M4	Wiring diagram 4 - M4*3	
		RS-485 connector	RS-485	Wiring diagram 2 - M4	Wiring diagram 5 - M4*3	
VF-AS1	VF-AS1	2-wire RS-485 connector	RS-485	Wiring diagram 3 - M4	×	VFAS1.Lst
		4-wire RS-485 connector		Wiring diagram 2 - M4	Wiring diagram 5 - M4*3	
VF-P7	VF-P7	RS2001Z	RS-232C	Wiring diagram 1 - M2	×	VFP7.Lst
		RS4001Z	RS-485	Wiring diagram 1 - M4	Wiring diagram 4 - M4*3	
		RS-485 connector	RS-485	Wiring diagram 2 - M4	Wiring diagram 5 - M4*3	
VF-PS1	VF-PS1	2-wire RS-485 connector	RS-485	Wiring diagram 3 - M4	×	VFPS1.Lst
		4-wire RS-485 connector		Wiring diagram 2 - M4	Wiring diagram 5 - M4*3	
VF-FS1	VF-FS1	Communication connector	RS-485	Wiring diagram 3 - M4	×	VFFS1.Lst
VF-MB1	VF-MB1	RS-485 connector	RS-485	Wiring diagram 3 - M4	×	VFMB1.Lst
VF-nC1	VF-nC1	RS2001Z	RS-232C	Wiring diagram 1 - M2	×	VFnC1.Lst
		RS4001Z	RS-485	Wiring diagram 1 - M4	Wiring diagram 4 - M4*3	
		RS4002Z				
VF-nC3	VF-nC3	RS-485 connector	RS-485	Wiring diagram 3 - M4	×	VFnC3.Lst

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

16.2.1 VF-S7

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	RS-232C / <u>RS-422/485</u>	
Baud Rate	4800 / <u>9600</u> bps	
Data Length	<u>8</u> bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	None / Odd / <u>Even</u>	
Target Port No.	<u>0</u> to 31	

Inverter

Communication parameter (group No. 08)

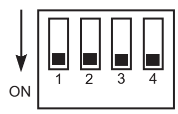
The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	2: 4800 bps <u>3: 9600 bps</u>	3
	F801	Parity	0: None <u>1: Even</u> 2: Odd	1
	F802	Inverter number (station number)	<u>0</u> to 31	0
	F803	Communication error trip time	<u>0: Inactive</u> 1 to 100 seconds	0

The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

RS4001Z: baud rate and terminating resistance setting switch

Switch	Contents	Setting	Setting Example
1, 2	Baud rate *	(see table below)	 Baud rate: 9600 bps Terminating resistance: Provided
3	Terminating resistance on the receiving side	ON: Provided OFF: Not provided	
4	Terminating resistance on the sending side	ON: Provided OFF: Not provided	

	4800	9600
SW1	OFF	ON
SW2	ON	ON

* Set the same baud rate as the one set for the communication parameter “F800” of the inverter.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM + EEPROM

16.2.2 VF-S9

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

Inverter

Communication parameter (group No. 08)

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

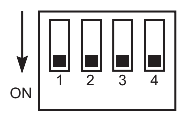
(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	2: 4800 bps 3: 9600 bps 4: 19200 bps	3
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 31	0
	F803	Communication error trip time	0: Inactive 1 to 100 seconds	0
	F805	Transmission latency setting *	0.00: Normal communication 0.01 to 2.00 seconds	0.00

* Necessary for the CPU version V110 and later

The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

RS4001Z: baud rate and terminating resistance setting switch

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th>Setting Example</th></tr>
<tr><td>1, 2</td><td>Baud rate *</td><td><table><tr><th></th><th>4800</th><th>9600</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td></tr><tr><td>SW2</td><td>ON</td><td>ON</td></tr></table></td><td rowspan="3">
Baud rate: 9600 bps
Terminating resistance: Provided</td></tr>
<tr><td>3</td><td>Terminating resistance on the receiving side</td><td>ON: Provided
OFF: Not provided</td></tr>
<tr><td>4</td><td>Terminating resistance on the sending side</td><td>ON: Provided
OFF: Not provided</td></tr>
</table>

* Set the same baud rate as the one set for the communication parameter “F800” of the inverter.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM + EEPROM

16.2.3 VF-S11

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

Inverter

Communication parameter

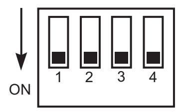
The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	2: 4800 bps 3: 9600 bps 4: 19200 bps	3
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 31	0
	F803	Communication error trip time	0: Inactive 1 to 100 seconds	0
	F805	Transmission latency setting	0.00: Normal communication 0.01 to 2.00 seconds	0.00
	F829	Communication protocol selection	**0: Toshiba inverter protocol**	0

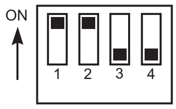
The data length is fixed to "8 bits".
Changes to parameters take effect when the power is turned off and on again.

RS4001Z: baud rate and terminating resistance setting switch

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th>Setting Example</th></tr>
<tr><td>1, 2</td><td>Baud rate *</td><td><table><tr><th></th><th>4800</th><th>9600</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td></tr><tr><td>SW2</td><td>ON</td><td>ON</td></tr></table></td><td rowspan="3">
Baud rate: 9600 bps
Terminating resistance: Provided</td></tr>
<tr><td>3</td><td>Terminating resistance on the receiving side</td><td>ON: Provided
OFF: Not provided</td></tr>
<tr><td>4</td><td>Terminating resistance on the sending side</td><td>ON: Provided
OFF: Not provided</td></tr>
</table>

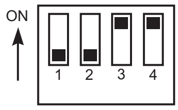
* Set the same baud rate as the one set for the communication parameter "F800" of the inverter.

RS4002Z: baud rate and bit length setting (SW1)

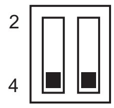
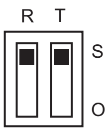
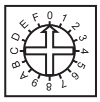
<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th colspan="2">Setting Example</th></tr>
<tr><td>1 to 3</td><td>Baud rate*1</td><td><table><tr><th></th><th>4800</th><th>9600</th><th>19200</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td><td>OFF</td></tr><tr><td>SW2</td><td>ON</td><td>ON</td><td>OFF</td></tr><tr><td>SW3</td><td>OFF</td><td>OFF</td><td>ON</td></tr></table></td><td rowspan="2"></td><td rowspan="2">Baud rate: 9600 bps
Bit length: 12 bits</td></tr>
<tr><td>4</td><td>Bit length *2</td><td>ON: 11 bits
OFF: 12 bits</td></tr>
</table>

*1 Set the same baud rate as the one set for the communication parameter “F800” of the inverter.
*2 When the parity is provided, set 12 bits.

RS4002Z: wiring system and terminating resistance setting (SW2)

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th colspan="2">Setting Example</th></tr>
<tr><td>1, 2</td><td>Wiring system</td><td><table><tr><th></th><th>4-wire system</th><th>2-wire system</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td></tr><tr><td>SW2</td><td>OFF</td><td>ON</td></tr></table></td><td rowspan="3"></td><td rowspan="3">Wiring: 4-wire system
Terminating resistance: Provided</td></tr>
<tr><td>3</td><td>Terminating resistance on the receiving side</td><td>ON: Provided
OFF: Not provided</td></tr>
<tr><td>4</td><td>Terminating resistance on the sending side</td><td>ON: Provided
OFF: Not provided</td></tr>
</table>

RS4003Z: wiring system (SW1), terminating resistance (SW2), and inverter number (SW5) setting

<table>
<tr><th>Switch</th><th colspan="2">Contents</th><th>Setting</th><th colspan="2">Setting Example</th></tr>
<tr><td>SW1</td><td colspan="2">Wiring system *1</td><td>2: 2-wire system
4: 4-wire system</td><td></td><td>Wiring: 4-wire system</td></tr>
<tr><td rowspan="2">SW2</td><td>R</td><td>Terminating resistance on the receiving side</td><td>S: Terminating resistance provided
O: Terminating resistance not provided</td><td rowspan="2"></td><td rowspan="2">Terminating resistance: Provided</td></tr>
<tr><td>T</td><td>Terminating resistance on the sending side</td><td>S: Terminating resistance provided
O: Terminating resistance not provided</td></tr>
<tr><td>SW5</td><td colspan="2">Inverter number *2</td><td>0 to 15</td><td></td><td>Inverter number: 0</td></tr>
</table>

*1 Set the both setting switches in the same positions.
*2 When “0” is selected, the setting of the inverter’s communication parameter “F802” takes effect.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 ... 8	7 ... 0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM + EEPROM

16.2.4 VF-S15

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	9600 / 19200 / 38400 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 63	255: Broadcast

Inverter

Communication parameters

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	3: 9600 bps 4: 19200 bps 5: 38400 bps	4
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 63	0
	F803	Communication timeout detection time	0.0: Inactive 1 to 100.0 seconds	0.0
	F805	Transmission latency setting	0: Off 0.00 to 2.00 seconds	0
	F829	Communication protocol selection	**0: Toshiba inverter protocol**	0

The data length is fixed to "8 bits".
Changes to parameters take effect when the power is turned off and on again.

Available Device Memory

The available setting range of device memory varies depending on the connected device. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage target device memory address on the [Device Input] dialog.
RAM: Store to RAM.
EEPROM: Store to RAM and EEPROM.

Indirect Device Memory Designation

	15　　　　8	7　　　　0
n + 0	Models (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage target device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM+EEPROM

16.2.5 VF-A7

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	Fixed to "1" when 2-wire RS-485 connection is selected and the CPU version is V100 to V305
Parity	None / Odd / Even	
Target Port No.	0 to 31	

Inverter

RS-485 Communication Port

Communication parameter

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 31	0
	F803	Communication timeout time	0: OFF 1 to 100 seconds	0
	F805	Transmission latency setting *1	0.00: Normal communication 0.01 to 2.00 seconds	0.00
	F820	Baud rate (RS-485 communication port)	2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps	3
	F821	Wiring system	0: 2-wire system *2 1: 4-wire system	1
	F825	Transmission latency setting *1	0.00: Normal communication 0.01 to 2.00 seconds	0.00

*1 When the CPU version is V100, make a setting for F805. For any version other than V100, make a setting for F825.
*2 Not available with the CPU version of V300 or earlier. Use a 4-wire system for connection.

The data length is fixed to "8 bits".
Changes to parameters take effect when the power is turned off and on again.

Common Serial Communication Port (RS2001Z / RS4001Z)

When the common serial communication port is used, the communication conversion unit “RS2001Z” or “RS4001Z” is necessary.

Communication parameter

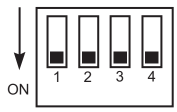
The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate (Common serial)	2: 4800 bps 3: 9600 bps	3
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 31	0
	F803	Communication timeout time	0: OFF 1 to 100 seconds	0
	F805	Transmission latency setting	0.00: Normal communication 0.01 to 2.00 seconds	0.00

The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

RS4001Z: baud rate and terminating resistance setting switch

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th>Setting Example</th></tr>
<tr><td>1, 2</td><td>Baud rate *</td><td><table><tr><td></td><td>4800</td><td>9600</td></tr><tr><td>SW1</td><td>OFF</td><td>ON</td></tr><tr><td>SW2</td><td>ON</td><td>ON</td></tr></table></td><td rowspan="3">

Baud rate: 9600 bps
Terminating resistance: Provided</td></tr>
<tr><td>3</td><td>Terminating resistance on the receiving side</td><td>ON: Provided
OFF: Not provided</td></tr>
<tr><td>4</td><td>Terminating resistance on the sending side</td><td>ON: Provided
OFF: Not provided</td></tr>
</table>

* Set the same baud rate as the one set for the communication parameter “F800” of the inverter.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

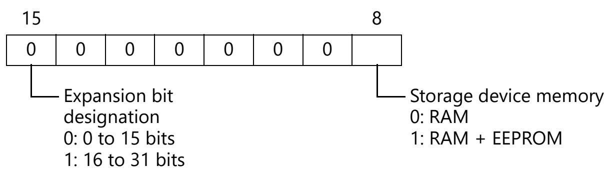
Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* In the expansion code, specify the storage device memory address, and set which word, higher or lower, is to be read when 2-word address is specified (expansion bit designation).



16.2.6 VF-AS1

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	<u>RS-422/485</u>	
Baud Rate	9600 / <u>19200</u> / 38400 bps	
Data Length	<u>8</u> bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	None / Odd / <u>Even</u>	
Target Port No.	<u>0</u> to 31	

Inverter

2-wire RS-485 Communication Port

Communication parameter

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate (2-wire RS-485)	0: 9600 bps <u>1: 19200 bps</u> 2: 38400 bps	1
	F801	Parity (Common to 2-wire and 4-wire)	0: None <u>1: Even</u> 2: Odd	1
	F802	Inverter number (station number)	<u>0</u> to 31	0
	F803	Communication timeout time (Common to 2-wire and 4-wire)	<u>0: OFF</u> 1 to 100 seconds	0
	F805	Transmission latency setting (2-wire RS-485)	<u>0.00: Normal communication</u> 0.01 to 2.00 seconds	0.00
	F807	Communication protocol selection (2-wire RS-485)	**<u>0: Toshiba inverter protocol</u>**	0

The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

4-wire RS-485 Communication Port

Communication parameter

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.
(Underlined setting: default)

RS4001Z: baud rate and terminating resistance setting switch

Parameter	Indication	Item	Setting	Default
Communication	F801	Parity (Common to 2-wire and 4-wire)	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 31	0
	F803	Communication timeout time (Common to 2-wire and 4-wire)	0: OFF 1 to 100 seconds	0
	F820	Baud rate (4-wire RS-485)	0: 9600 bps 1: 19200 bps 2: 38400 bps	1
	F825	Transmission latency setting (4-wire RS-485)	0.00: Normal communication 0.01 to 2.00 seconds	0.00
	F829	Communication protocol selection (4-wire RS-485)	**0: Toshiba inverter protocol**	0

The data length is fixed to "8 bits".
Changes to parameters take effect when the power is turned off and on again.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 　　　　　8	7 　　　　　0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM + EEPROM

16.2.7 VF-P7

Settings are the same as those described in "16.2.5 VF-A7".

16.2.8 VF-PS1

Settings are the same as those described in "16.2.6 VF-AS1".

16.2.9 VF-FS1

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	9600 / 19200 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

Inverter

Communication parameter

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	0: 9600 bps 1: 19200 bps	1
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 31	0
	F803	Communication timeout time	0: OFF 1 to 100 seconds	0
	F805	Transmission latency setting	0.00: Normal communication 0.01 to 2.00 seconds	0.00
	F829	Communication protocol selection	**0: Toshiba inverter protocol**	0

The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM + EEPROM

16.2.10 VF-MB1

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	9600 / 19200 / 38400bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 63	255: Broadcast

Inverter

Communication parameters

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	3: 9600 bps 4: 19200 bps 5: 38400 bps	4
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 63	0
	F803	Communication timeout detection time	0.0: Inactive 1 to 100.0 seconds	0.0
	F805	Transmission latency setting	0: Off 0.00 to 2.00 seconds	0
	F829	Communication protocol selection	**0: Toshiba inverter protocol**	0

The data length is fixed to "8 bits".
Changes to parameters take effect when the power is turned off and on again.

Available Device Memory

The available setting range of device memory varies depending on the connected device. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage target device memory address on the [Device Input] dialog.
RAM: Store to RAM.
EEPROM: Store to RAM and EEPROM.

Indirect Device Memory Designation

	15 8	7 0
n + 0	Models (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage target device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM+EEPROM

16.2.11 VF-nC1

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

Inverter

Communication parameter

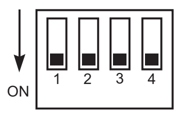
The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

<table>
<tr><th>Parameter</th><th>Indication</th><th>Item</th><th>Setting</th><th>Default</th></tr>
<tr><td rowspan="4">Communication</td><td>F800</td><td>Baud rate</td><td>2: 4800 bps
3: 9600 bps
4: 19200 bps</td><td>3</td></tr>
<tr><td>F801</td><td>Parity</td><td>0: None
1: Even
2: Odd</td><td>1</td></tr>
<tr><td>F802</td><td>Inverter number (station number)</td><td>0 to 31</td><td>0</td></tr>
<tr><td>F803</td><td>Communication timeout time</td><td>0: OFF
1 to 100 seconds</td><td>0</td></tr>
</table>

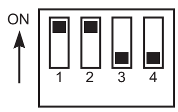
The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

RS4001Z: baud rate and terminating resistance setting switch

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th>Setting Example</th></tr>
<tr><td>1, 2</td><td>Baud rate *</td><td><table><tr><th></th><th>4800</th><th>9600</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td></tr><tr><td>SW2</td><td>ON</td><td>ON</td></tr></table></td><td rowspan="3">
Baud rate: 9600 bps
Terminating resistance: Provided</td></tr>
<tr><td>3</td><td>Terminating resistance on the receiving side</td><td>ON: Provided
OFF: Not provided</td></tr>
<tr><td>4</td><td>Terminating resistance on the sending side</td><td>ON: Provided
OFF: Not provided</td></tr>
</table>

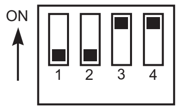
* Set the same baud rate as the one set for the communication parameter “F800” of the inverter.

RS4002Z: baud rate and bit length setting switch

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th>Setting Example</th></tr>
<tr><td>1 to 3</td><td>Baud rate*1</td><td><table><tr><th></th><th>4800</th><th>9600</th><th>19200</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td><td>OFF</td></tr><tr><td>SW2</td><td>ON</td><td>ON</td><td>OFF</td></tr><tr><td>SW3</td><td>OFF</td><td>OFF</td><td>ON</td></tr></table></td><td rowspan="2">
Baud rate: 9600 bps
Bit length: 12 bits</td></tr>
<tr><td>4</td><td>Bit length *2</td><td>ON: 11 bits
OFF: 12 bits</td></tr>
</table>

*1 Set the same baud rate as the one set for the communication parameter “F800” of the inverter.
*2 When the parity is provided, set 12 bits.

RS4002Z: wiring system and terminating resistance setting switch

<table>
<tr><th>Switch</th><th>Contents</th><th>Setting</th><th>Setting Example</th></tr>
<tr><td>1, 2</td><td>Wiring system</td><td><table><tr><th></th><th>4-wire system</th><th>2-wire system</th></tr><tr><td>SW1</td><td>OFF</td><td>ON</td></tr><tr><td>SW2</td><td>OFF</td><td>ON</td></tr></table></td><td rowspan="3">

Wiring: 4-wire system
Terminating resistance: Provided</td></tr>
<tr><td>3</td><td>Terminating resistance on the receiving side</td><td>ON: Provided
OFF: Not provided</td></tr>
<tr><td>4</td><td>Terminating resistance on the sending side</td><td>ON: Provided
OFF: Not provided</td></tr>
</table>

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage device memory address on the [Device Input] dialog.
RAM: Store in RAM
EEPROM: Store in RAM + EEPROM

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage device memory address in the expansion code.

15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM + EEPROM

16.2.12 VF-nC3

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	9600 /19200 / 38400 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 63	255: Broadcast

Inverter

Communication parameters

The communication parameters can be set using keys attached to the inverter.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Indication	Item	Setting	Default
Communication	F800	Baud rate	3: 9600 bps 4: 19200 bps 5: 38400 bps	4
	F801	Parity	0: None 1: Even 2: Odd	1
	F802	Inverter number (station number)	0 to 63	0
	F803	Communication error timeout time detection	0.0: Inactive 1 to 100.0 seconds	0.0
	F805	Transmission latency setting	0: Off 0.00 to 2.00 seconds	0
	F829	Communication protocol selection	**0: Toshiba inverter protocol**	0

The data length is fixed to “8 bits”.
Changes to parameters take effect when the power is turned off and on again.

Available Device Memory

The available setting range of device memory varies depending on the connected device. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
--	00H	

Specify the storage target device memory address on the [Device Input] dialog.
RAM: Store to RAM.
EEPROM: Store to RAM and EEPROM.

Indirect Device Memory Designation

	15 8	7 0
n + 0	Models (11 to 18)	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* Specify the storage target device memory address in the expansion code.

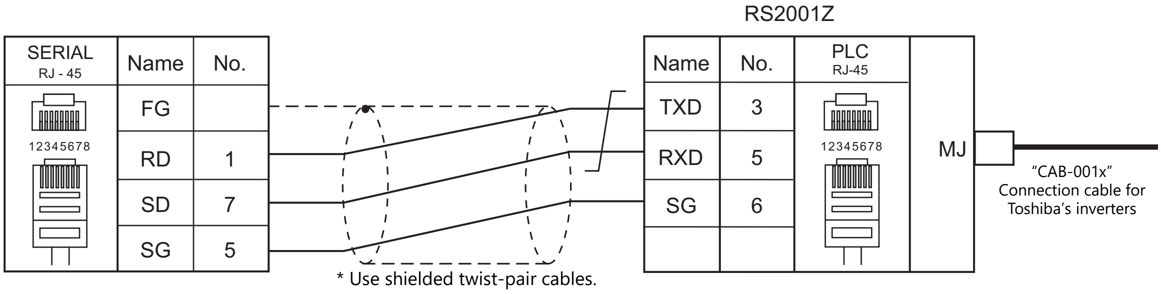
15							8
0	0	0	0	0	0	0	

0: RAM
1: RAM+EEPROM

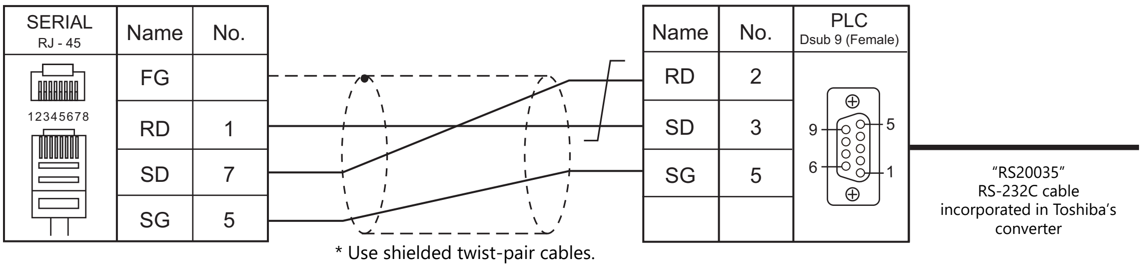
16.2.13 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

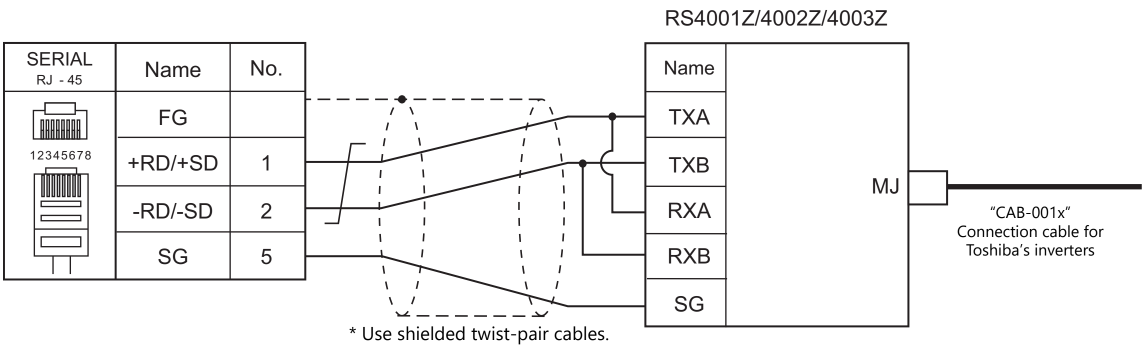


Wiring diagram 2 - M2

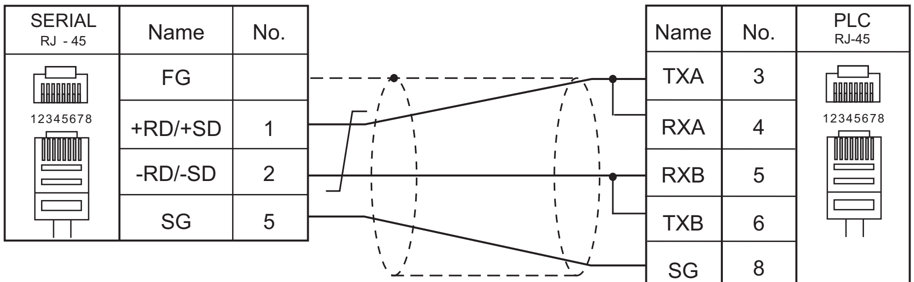


RS-422/RS-485

Wiring diagram 1 - M4

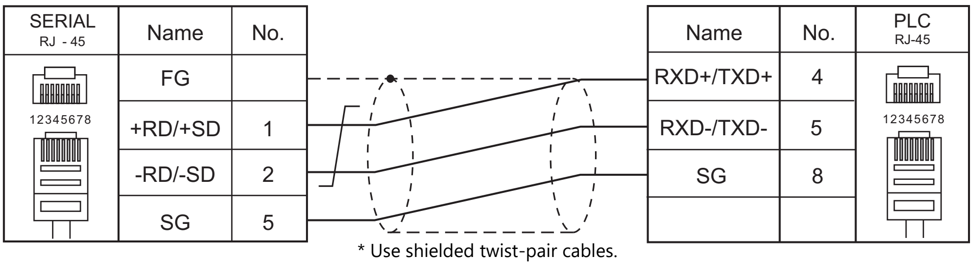


Wiring diagram 2 - M4



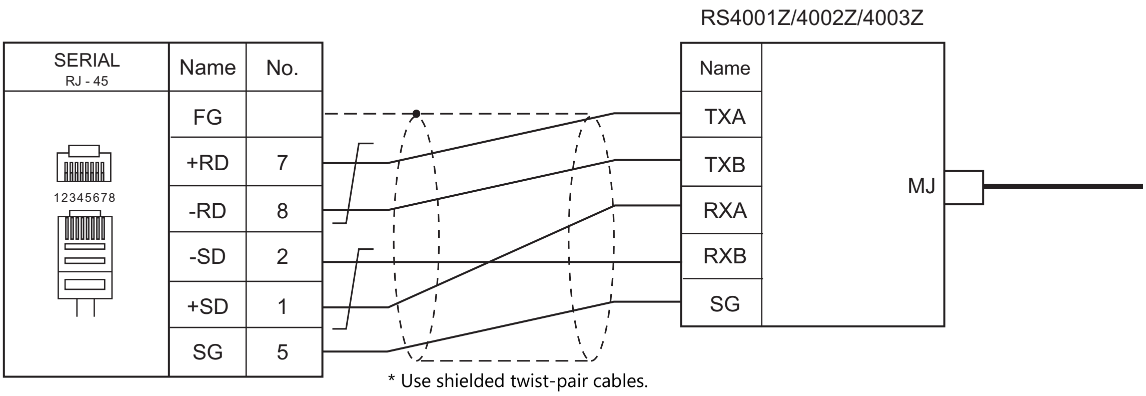
* Use shielded twist-pair cables.

Wiring diagram 3 - M4



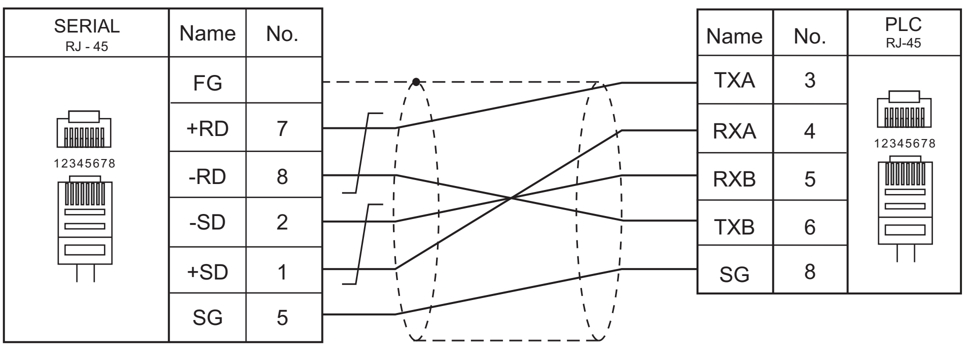
* Use shielded twist-pair cables.

Wiring diagram 4 - M4



* Use shielded twist-pair cables.

Wiring diagram 5 - M4



* Use shielded twist-pair cables.

17. TOSHIBA MACHINE

17.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU		Unit/Port		Signal Level	Connection: RS-232C[*1] / RS-485 (2-wire)[*2]	Connection: RS-422 (4-wire)
TC200	TC200	TCCUH	Port of the CPU	RS-232C port	RS-232C	Wiring diagram 1 - M2	×
			TCCMW TCCMO				
		TCCUHS TCCUHSC TCCUHSAC	Port of the CPU				
			TCCMWA TCCMWS TCCMOA TC232CA				
	TCmini	TC3-01	CN16		RS-232C	Wiring diagram 1 - M2	×
			CN17A CN17B		RS-485 [*3]	Wiring diagram 1 - M4	×
		TC3-02	CN18		RS-232C	Wiring diagram 1 - M2	×
			CN20A CN20B		RS-485 [*4]	Wiring diagram 2 - M4	×
		TC5-02	CN18		RS-232C	Wiring diagram 1 - M2	×
			CN24A CN24B		RS-485	Wiring diagram 3 - M4	×
		TC5-03	CN13		RS-232C	Wiring diagram 1 - M2	×
			CN14 CN18		RS-485	Wiring diagram 2 - M4	×
		TC8-00	CN13		RS-232C	Wiring diagram 1 - M2	×
			CN11		RS-485[*5]	Wiring diagram 4 - M4	×
		TC9-00	CN11		RS-485	Wiring diagram 3 - M4	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 RS-485 is supported with CPU version LT3CU01-D0 or later. Check the CPU version.
*4 RS-485 is supported with CPU version LT3CU02-F0 or later. Check the CPU version.
*5 RS-485 is supported with CPU version LT8CU00-A0 or later. Check the CPU version.

17.1.1 TC200

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	*1
Baud Rate	9600 / 19200 / 38400 / 57600 / 115200 bps	
Parity	**None**	
Data Length	**8 bits**	
Stop Bit	**2 bits**	

*1 For RS-422/485 communications, set a transmission delay time to 4 msec or longer.

TC200

TCCUH

Make the setting for communication using the ladder tool.

(Underlined setting: default)

Item	Setting	Remarks
Baud Rate	9600 / 19200 bps	Set the baud rate in the system flag “A00F” OFF: 9600 bps ON: 19200 bps
Parity	**None**	
Data Length	**8 bits**	
Stop Bit	**2 bit**	
Station Number	**1**	

TCCMW / TCCMO

No particular setting is necessary on the PLC. The PLC always performs communication functions using the following parameters. Be sure to match the settings to those made under [Communication Setting] of the editor.

Item	Setting	Remarks
Baud Rate	**9600 bps**	
Parity	**None**	
Data Length	**8 bits**	
Stop Bit	**2 bit**	
Station Number	**1**	

Function setting switch (MODE)

Switch	Setting		Remarks
3	ON	Link master station	When this switch is OFF, communications between V8 and PLC are not possible.
4	OFF	Link slave station	
5	OFF	Remote master station	
6	OFF	Remote slave station	

TCCUHS / TCCUHSC / TCCUHSAC

Set the communication format in the application software.

(Underlined setting: default)

<table>
<tr><th>Item</th><th>Setting</th><th colspan="4">Remarks</th></tr>
<tr><td rowspan="7">Baud rate</td><td rowspan="7">9600 / 19200 / 38400 / 57600 / 115200 bps</td><td colspan="3">System Flag</td><td rowspan="2">Baud Rate (bps)</td></tr>
<tr><td>A00F</td><td>A154</td><td>A155</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>9600</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>19200</td></tr>
<tr><td rowspan="3">-</td><td>1</td><td>0</td><td>38400</td></tr>
<tr><td>0</td><td>1</td><td>57600</td></tr>
<tr><td>1</td><td>1</td><td>115200</td></tr>
</table>

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)

TCCMWA / TCCMWS / TCCMOA / TC232CA

Be sure to match the settings to those made under [Communication Setting] of the editor.

Item	Setting	Remarks
Baud rate	9600 / 19200 / 38400 / 57600 bps	57600 bps not supported by TC232CA

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)

Function setting switches (MODE)

Switch	ON/OFF	Setting	Remarks
3	ON	Link master station	Communication disabled with this switch set to OFF
4	OFF	Link slave station	
5	OFF	Remote master station	
6	OFF	Remote slave station	

TCmini

TC3-01

CN16

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (4800/9600/19200/38400 bps), no baud rate setting is needed on the PLC.

CN17A/CN17B

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (4800/9600/19200/38400 bps), no baud rate setting is needed on the PLC.

Setting Item	Register	Contents	Setting	Remarks
Software setting	D11F	Mode setting	**4: Host communication mode**	Setting changes take effect when the power is turned off and on again.

<table>
<tr><th>Setting Item</th><th>Jumper</th><th>Item</th><th colspan="2">Setting</th></tr>
<tr><td rowspan="2">Hardware setting</td><td>JP2</td><td>Terminating resistance</td><td>With terminating resistance</td><td>JP2: Jumper</td></tr>
<tr><td>JP3
JP4
JP15</td><td>Half duplex / full duplex selection</td><td>Half duplex</td><td>JP3: Jumper
JP4: Jumper
Jumper across pins 2 and 3 of JP15</td></tr>
</table>

TC3-02

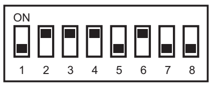
CN18

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (4800/9600/19200/38400 bps), no baud rate setting is needed on the PLC.

CN20A/CN20B

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (4800/9600/19200/38400 bps), no baud rate setting is needed on the PLC.

Setting Item	Register	Contents	Setting	Remarks
Software setting	D26F	Mode setting	**4: Host communication mode**	Setting changes take effect when the power is turned off and on again.

Setting Item	DIP Switch (SW2)		Contents	Setting
Hardware setting		SW2-1 SW2-2 SW2-3 SW2-4 SW2-7	Half duplex / full duplex selection	<table><tr><td></td><td>SW2-1</td><td>SW2-2</td><td>SW2-3</td><td>SW2-4</td><td>SW2-7</td></tr><tr><td>Half duplex</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td></tr></table>
		SW2-6	Terminating resistance	**ON: Provided**

TC5-02

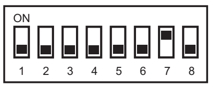
CN18

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (9600/19200/38400 bps), no baud rate setting is needed on the PLC.

CN24A/CN24B

Setting Item	Register	Contents	Setting	Remarks
Software setting	D37E	Baud rate setting	0: 9600 bps 1: 19200 bps 2: 38400 bps	Setting changes take effect when the power is turned off and on again.
	D37F	Mode setting	**3: Host communication mode**	

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)

Setting Item	DIP Switch (SW2)		Contents	Setting
Hardware setting		SW2-7	Terminating resistance	**ON: Provided**

TC5-03

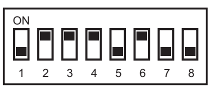
CN13

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (9600/19200/38400 bps), no baud rate setting is needed on the PLC.

CN14/CN18

Setting Item	Register	Contents	Setting	Remarks
Software setting	D37E	Baud rate setting	0: 9600 bps 1: 19200 bps 2: 38400 bps	Setting changes take effect when the power is turned off and on again.
	D37F	Mode setting	**3: Host communication mode**	

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)

Setting Item	DIP Switch (SW1)		Contents	Setting
Hardware setting		SW1-1 SW1-2 SW1-3 SW1-4 SW1-7	Half duplex / full duplex selection	<table><tr><td></td><td>SW1-1</td><td>SW1-2</td><td>SW1-3</td><td>SW1-4</td><td>SW1-7</td></tr><tr><td>Half duplex</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td></tr></table>
		SW1-6	Terminating resistance	**ON: Provided**

TC8-00

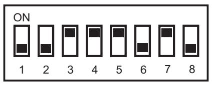
CN13

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (9600/19200/38400 bps), no baud rate setting is needed on the PLC.

CN11

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)
Because of the baud rate auto-detection feature (9600/19200/38400 bps), no baud rate setting is needed on the PLC.

Setting Item	Register	Contents	Setting	Remarks
Software setting	D37F	Mode setting	**8004H: Host communication mode**	Setting changes take effect when the power is turned off and on again.

<table>
<tr><th>Setting Item</th><th colspan="2">DIP Switch (SW5)</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="2">Hardware setting</td><td rowspan="2"></td><td>SW5-1
SW5-2
SW5-3
SW5-4
SW5-5</td><td>Half duplex / full duplex selection</td><td><table><tr><th></th><th>SW5-1</th><th>SW5-2</th><th>SW5-3</th><th>SW5-4</th><th>SW5-5</th></tr><tr><td>Half duplex</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr></table></td></tr>
<tr><td>SW5-7</td><td>Terminating resistance</td><td>ON: Provided</td></tr>
</table>

TC9-00

CN11

Setting Item	Register	Contents	Setting	Remarks
Software setting	D12E	Baud rate setting	0: 9600 bps 1: 19200 bps 2: 38400 bps	Setting changes take effect when the power is turned off and on again.
	D12F	Mode setting	**0: Host communication mode**	

Parity: none, data length: 8 bits, stop bit: 2 bits, station No. 1 (fixed)

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(universal register 1)	00H	
B	(universal register 2)	01H	
X	(input relay)	02H	XW as word device
Y	(output relay)	03H	YW as word device
R	(internal relay)	04H	RW as word device
G	(extension internal relay 1)	05H	GW as word device
H	(extension internal relay 2)	06H	HW as word device
L	(latch relay)	07H	LW as word device
S	(shift register)	08H	SW as word device
E	(edge relay)	09H	EW as word device
P	(timer counter register 1/current value)	0AH	
V	(timer counter register 2/set value)	0BH	
T	(timer/contact)	0CH	TW as word device
C	(counter/contact)	0DH	CW as word device
A	(special auxiliary relay)	0EH	AW as word device
U	(universal register 3)	0FH	TCCMWA / TCCMWS / TCCMOA / TC232CA only
M	(universal register 4)	10H	TCCMWA / TCCMWS / TCCMOA / TC232CA only
Q	(universal register 5)	11H	TCCMWA / TCCMWS / TCCMOA / TC232CA only
I	(input relay 2)	12H	IW as word device; supported by TCCMWA / TCCMWS / TCCMOA / TC232CA only
O	(output relay 2)	13H	OW as word device; supported by TCCMWA / TCCMWS/ TCCMOA / TC232CA only
J	(extension internal relay 3)	14H	JW as word device; supported by TCCMWA / TCCMWS / TCCMOA / TC232CA only
K	(extension internal relay 4)	15H	KW as word device; supported by TCCMWA / TCCMWS / TCCMOA / TC232CA only

Address denotations

Ex.) F70

Word device : register No. (0 to F)
Bit device : terminal No. (0 to F)
Module No. (0 to 7)
Rack No. (0 to F)

Indirect Device Memory Designation

	15 — 8	7 — 0
n+0	Models	Device Type
n+1	Address No. (word designation)	
n+2	00	Bit designation
n+3	00	Station number

Address No. (n+1)

- Word device (D, B, V, P, U, M, Q)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Not used					Rack No.				Module No.			Resister No.			

Ex.) D 052F (Rack No. 5, Module No. 2, Resister No. F)
n+1 = 0000 0010 1010 1111(BIN) = 02AF(HEX)

- Bit device (X, Y, R, G, H, L, S, E, T, C, A, I, O, J, K)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Not used									Rack No.				Module No.		

Ex.) R 0F1A (Rack No. F, Module No. 1, Terminal No. A)
n+1 = 0000 0000 0111 1001(BIN) = 0079(HEX)

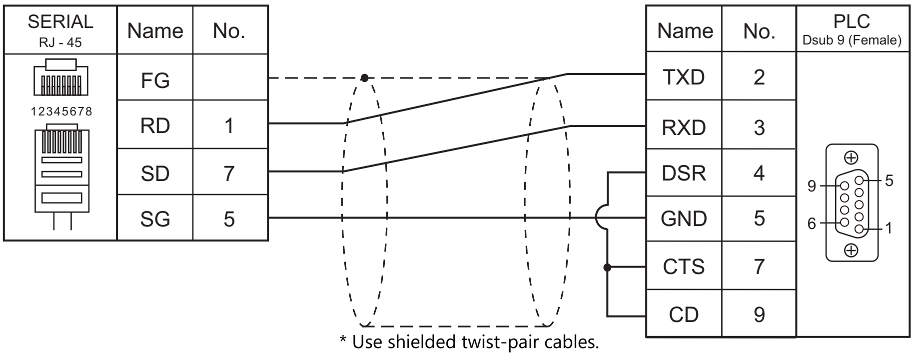
Bit designation (n+2)

- When you use the command of BSET/BCLR/BINV, set the terminal No.
  Ex.) R 0F1A (Rack No. F, Module No. 1, terminal No. A)
  n+2 = 000A(HEX)

17.1.2 Wiring Diagrams

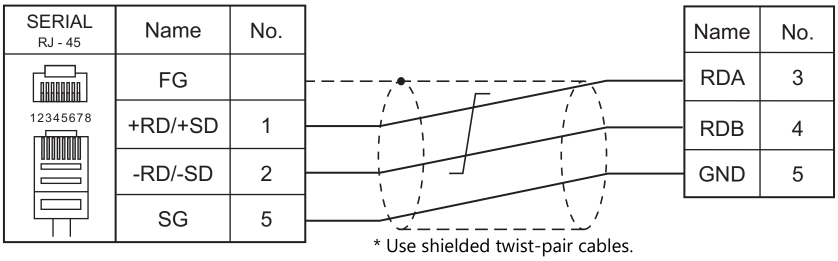
RS-232C

Wiring diagram 1 - M2

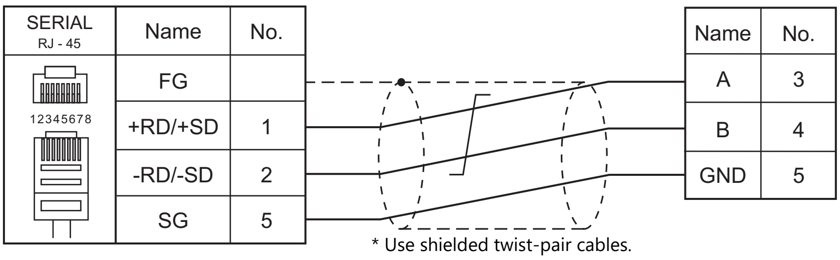


RS-422/RS-485

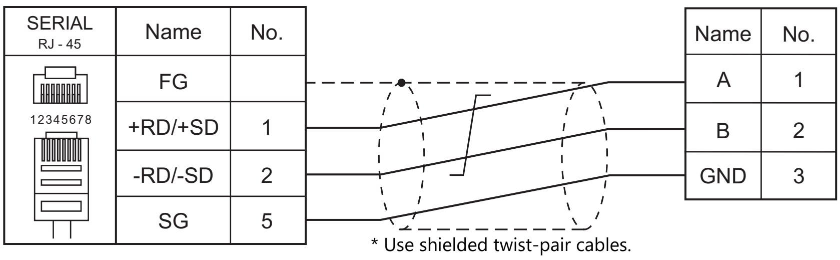
Wiring diagram 1 - M4



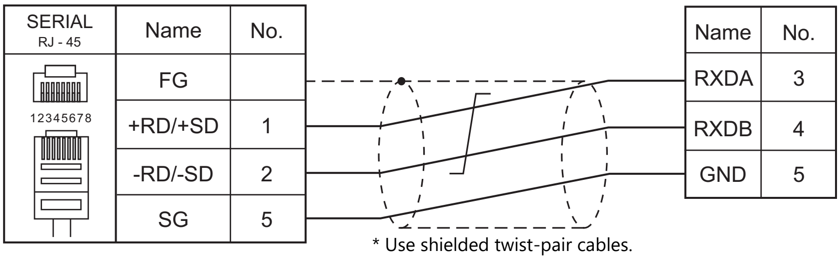
Wiring diagram 2 - M4



Wiring diagram 3 - M4



Wiring diagram 4 - M4



17.2 Temperature Controller/Servo/Inverter Connection

Servo Amplifier

PLC Selection on the Editor	Model		Port	Signal Level	Connection		Lst File
					RS-232C / RS-485 (2-wire)*1	RS-422 (4-wire)*1	
VELCONIC series	NCBOY-80	VLPSX-xxxPx-xRx	CN14	RS-485	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *2	-

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

17.2.1 VELCONIC Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	**1 : n**	
Signal Level	**RS-422/485**	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115K bps	
Parity	None / Odd / Even	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	

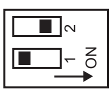
Servo Amplifier

Parameter

The communication parameters can be set using keys attached to the servo amplifier. Set the following parameters under [Communication Setting] of the editor.

Parameter	Item	Setting	Remarks
A.n-	Axis number	0 to 63	The setting takes effect when the power is turned off and back on again.
PP45	Baud rate setting	0: 4800 bps 1: 9600 bps 2: 19.2k bps 3: 38.4k bps 4: 57.6k bps 6: 115.2k bps	
PP48	RS-485 setting	0 0 _ _ Parity 0: None 1: Even 2: Odd Stop bit 0: 1 bit 1: 2 bits	
UP01	Control mode	**23: RS-485 (VLBus-A)**	

Terminating resistance setting (SW1)

<table>
<tr><th colspan="2">SW1</th><th>Item</th><th>Setting</th></tr>
<tr><td></td><td>SW1-1
SW1-2</td><td>Terminating resistance</td><td>
<table>
<tr><th></th><th>When one unit is connected</th><th>When multiple units are connected</th></tr>
<tr><td>SW1-1</td><td>OFF</td><td>ON</td></tr>
<tr><td>SW1-2</td><td>ON</td><td>ON</td></tr>
</table>
</td></tr>
</table>

Available Device Memory

The macro commands “PLC_CTL” is used for reading and writing data.
For more information on the macro command, see “PLC_CTL” (page 17-11).

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

<table>
<tr><th>Contents</th><th>F0</th><th colspan="2">F1 (= $u n)</th><th>F2</th></tr>
<tr><td rowspan="6">Device memory information designation</td><td rowspan="6">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number: 0000 to 003F (H)</td><td rowspan="6">7</td></tr>
<tr><td>n + 1</td><td>Command: 000C (H)</td></tr>
<tr><td>n + 2</td><td>Data to write (D1/D0)
<table>
<tr><td colspan="8">D1</td><td colspan="8">D0</td></tr>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
Bit 0: IN58 : MPGM0 (MPG/step scale factor)
Bit 1: IN59 : MPGM1 (MPG/step scale factor)
Bit 2: IN5A : CCD0 (4-step electric current limitation select)
Bit 3: IN5B : CCD1 (4-step electric current limitation select)
Bit 4: IN5C : ACSEL0 (4-step acceleration/deceleration time select)
Bit 5: IN5D : ACSEL1 (4-step acceleration/deceleration time select)
Bit 6: IN5E : RPAMOD (parameter change mode)
Bit 7: IN5F : RPASTB (parameter change strobe)
Bit 8 to 14: IN50 to IN56 : PNCMD0 to PNCMD6 (point command)
Bit 15: IN57 : –</td></tr>
<tr><td>n + 3</td><td>Data to write (D3/D2)
<table>
<tr><td colspan="8">D3</td><td colspan="8">D2</td></tr>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
Bit 0 to 5, 8 to 15: IN40 to IN4D : OVR0 to OVR13 (override)
Bit 6: IN4E : –
Bit 7: IN4F : DCNT (start signal confirm)</td></tr>
<tr><td>n + 4 to
n + 5</td><td>Data to write (D7/D6/D5/D4)
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td></tr>
<tr><td>31 to 24</td><td>23 to 16</td><td>15 to 8</td><td>7 to 0</td></tr>
</table>
Bit 0 to 31: IN20 to IN3F : PCMD0 to PCMD31 (position command)</td></tr>
<tr><td>n + 6</td><td>Data to write (D9/D8)
<table>
<tr><td colspan="8">D9</td><td colspan="8">D8</td></tr>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
Bit 0: IN18 : TEACH (teaching)
Bit 1: IN19 : MODE0 (operation mode)
Bit 2: IN1A : MODE1 (operation mode)
Bit 3: IN1B : CSEL0 (command select)
Bit 4: IN1C : CSEL1 (command select)
Bit 5: IN1D : FSEL0 (speed select)
Bit 6: IN1E : FSEL1 (speed select)
Bit 7: IN1F : PCLR (current value clear)
Bit 8: IN10 : RUN (running)
Bit 9: IN11 : RESET (reset)
Bit 10: IN12 : START (start)
Bit 11: IN13 : JOGP (jog +)
Bit 12: IN14 : JOGM (jog -)
Bit 13: IN15 : FSTP (temporary stop)
Bit 14: IN16 : LSSEL (LS positioning select)
Bit 15: IN17 : ECLR (deviation counter clear)</td></tr>
</table>

<table>
<tr><th>Contents</th><th>F0</th><th colspan="2">F1 (= $u n)</th><th>F2</th></tr>
<tr><td rowspan="4">Device memory information designation</td><td rowspan="4">1 - 8
(PLC1 - 8)</td><td>n + 7</td><td>Data to read (D1′/D0′) *
<table>
<tr><td colspan="8">D1′</td><td colspan="8">D0′</td></tr>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
Bit 0 to 7: OUT58 to OUT5F : MIN0 to MIN7 (IN0 to IN7: input monitor)
Bit 8 to 14: OUT50 to OUT56 : PN0 to PN6 (point number)
Bit 15: OUT57 : RPAFIN (respond to parameter change)</td><td rowspan="4">7</td></tr>
<tr><td>n + 8</td><td>Data to read (D3′/D2′) *
<table>
<tr><td colspan="8">D3′</td><td colspan="8">D2′</td></tr>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
Bit 0 to 15: OUT40 to OUT4F : FEED0 to FEED15 / CURR0 to CURR15 (number of rotations/current)</td></tr>
<tr><td>n + 9 to n + 10</td><td>Data to read (D7′/D6′/D5′/D4′) *
<table>
<tr><td>D7′</td><td>D6′</td><td>D5′</td><td>D4′</td></tr>
<tr><td>31 to 24</td><td>23 to 16</td><td>15 to 8</td><td>7 to 0</td></tr>
</table>
Bit 0 to 31: OUT20 to OUT3F : POSI0 to POSI31 (current value)</td></tr>
<tr><td>n + 11</td><td>Data to read (D9′/D8′) *
<table>
<tr><td colspan="8">D9′</td><td colspan="8">D8′</td></tr>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
Bit 0: OUT18 : LSALM (LS error)
Bit 1: OUT19 : TENBL (teaching enabled)
Bit 2: OUT1A : BLV (battery voltage drop)
Bit 3: OUT1B : WARN (warning)
Bit 4: OUT1C : POK (positioning OK)
Bit 5: OUT1D : MFEED (rotation monitor)
Bit 6: OUT1E : MCURR (current monitor)
Bit 7: OUT1F : SSTP (stopped due to error)
Bit 8: OUT10 : SST (servo normal output)
Bit 9: OUT11 : SRDY (servo ready)
Bit 10: OUT12 : GRUN (servo locked)
Bit 11: OUT13 : MZM (home position memorize in progress)
Bit 12: OUT14 : HOME (stopped at home position)
Bit 13: OUT15 : DEN (operation finish)
Bit 14: OUT16 : INP (in position)
Bit 15: OUT17 : AFSTP / CLA (temporarily stopped/current control in progress)</td></tr>
</table>

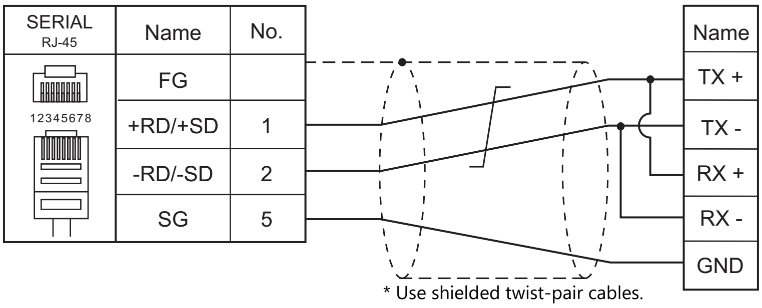
Return data: Data stored from servo amplifier to X1 series

* Data must be written before executing reading of data. Specify control values of the servo amplifier for the device memory address of data to write (n + 2 to n + 6). Then data is stored in the device memory address of data to read (n + 7 to n + 11).

17.2.2 Wiring Diagrams

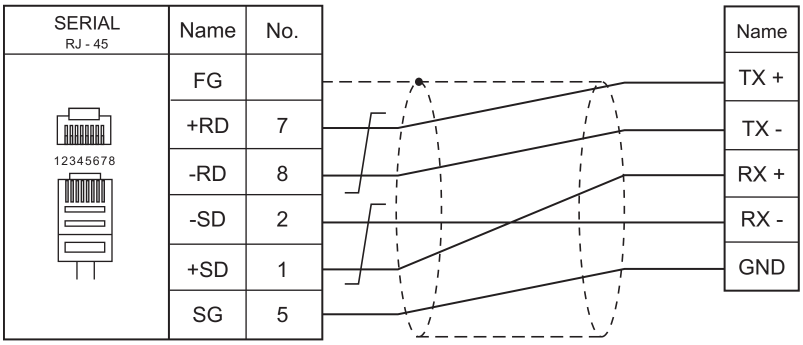
RS-422/RS-485

Wiring diagram 1 - M4



* Use shielded twist-pair cables.

Wiring diagram 2 - M4



* Use shielded twist-pair cables.

18. TOYO DENKI

18.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)*2
μGPCsx series	TD1PS-xx	NP1L-RS1	RS-232C	Wiring diagram 1 - M2	×
			RS-485	×	Wiring diagram 1 - M4
		NP1L-RS2	RS-232C	Wiring diagram 1 - M2	×
		NP1L-RS4	RS-485	×	Wiring diagram 1 - M4
	SHPC-xxx	SHPC-161	RS-232C	Wiring diagram 2 - M2	×
			RS-422	×	Wiring diagram 1 - M4
μGPCsx CPU	TD1PS-xx	CPU port	RS-485	×	Wiring diagram 2 - M4
	SHPC-xxx	CPU port	RS-485	×	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

Ethernet Connection

PLC Selection on the Editor	CPU	Unit	TCP/IP	UDP/IP	Port No.	Keep Alive*1
μGPCsx series (Ethernet)	TD1PS-xx	NP1L-ET1	○	×	Self port standard No. + 251	○
	SHPC-xxx	CPU with built-in Ethernet				

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

18.1.1 μGPCsx Series

Communication Setting

Editor

Communication setting

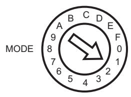
(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	RS-232C / RS-422/485	
Baud Rate	**38400 bps**	Do not change the setting from default.
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 31	

PLC

NP1L-RS1, NP1L-RS2, NP1L-RS4

Mode setting

MODE	Setting	RS1, 2, 4 RS-232C Port	RS-485 Port	Remarks
	0	General equipment	General equipment	
	1	Loader	General equipment	
	2	General equipment	Loader	
	3	Loader	Loader	
	4	General equipment	General equipment	
	5	Not used		
	6	Modem loader 19200 bps	General equipment	
	7	Self-diagnosis mode 1		
	8	Self-diagnosis mode 2		
	9	Modem loader 19200 bps	Loader	
	A	Modem loader 9600 bps	General equipment	
	B	Modem loader 9600 bps	Loader	
	C	Modem loader 38400 bps	General equipment	
	D	Modem loader 38400 bps	Loader	
	E	Modem loader 76800 bps	General equipment	
	F	Modem loader 115200 bps	Modem loader 115200 bps	

* Set the port where the X1 is connected to "loader".
Communication parameters are fixed to 38400 bps (baud rate), 8 bits (data length), 1 bit (stop bit), and even (parity).

* When the PLC is connected with the X1, the station number setting switch for RS-485 is not used.

SHPC-161

Set communication parameters from “IO allocation” of the PLC loader.
Be sure to match the settings to those made under [Communication Setting] of the editor.

Item	Setting	Remarks
Mode	POD	
Baud Rate	38400	
Communication parameters	8-E-1	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
I	(input)	00H	i as word device
O	(output)	01H	o as word device
Z	(announce)	02H	z as word device *1
G	(global)	03H	g as word device *1
gr	(global (real number))	04H	Real number, available only with even-numbered device memory addresses *1
RI	(retain)	05H	ri as word device *1
rr	(retain (real number))	06H	Real number, available only with even-numbered device memory addresses *1

*1 The CPU number is required in addition to the device memory type and address. The assigned device memory is indicated as shown below when editing the screen program.

Example: 1 : i 00000
Address number
Device memory type
CPU No.

Indirect Device Memory Designation

Specify the CPU number in the expansion code.

18.1.2 µGPCsx CPU

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	**RS-422/485**	
Baud Rate	**38400 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 31	

PLC

NP1PS

No particular setting is necessary on the PLC.
Communication parameters are fixed to 38400 bps (baud rate), 8 bits (data length), 1 bit (stop bit), and even (parity).

SHPC-xxx

Set the baud rate under "TOOL I/F defintion" from "IO allocation" of the PLC loader.

Item	Setting Example	Remarks
Baud Rate	38400 bps	

Available Device Memory

The contents of "Available Device Memory" are the same as those described in "18.1.1 µGPCsx Series".

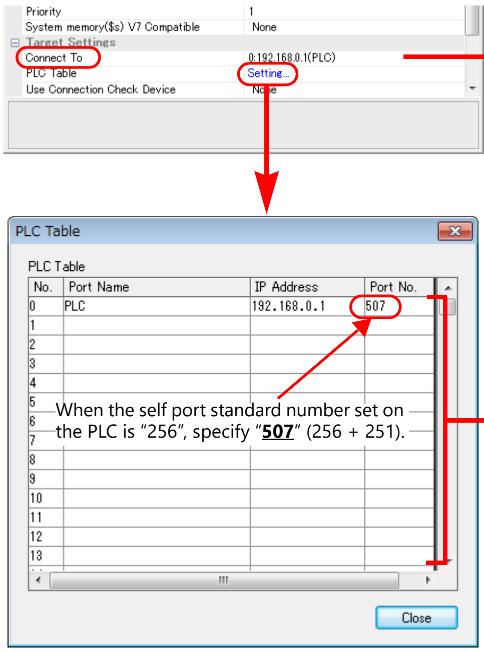
18.1.3 µGPCsx Series (Ethernet)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].
  The PLC port number is "Self port standard No." set on the PLC plus 251.



Valid only for 1 : 1 connection
Select the PLC for connection from those registered on the PLC table.

Set the IP address, port number 507 and whether or not to use the KeepAlive function of the PLC.

PLC

NP1L-ET1

Set parameters for the Ethernet unit in the system definitions of the PLC loader.

Item	Setting Example	Remarks
Local module IP address (HH.HL.LH.LL)	192.168.0.1	
Subnet mask (HH.HL.LH.LL)	255.255.255.0	
Self-port Standard No.	256	

SHPC-xxx

Set Ethernet operation definitions for the CPU from "IO allocation" of the PLC loader.

Item	Setting Example	Remarks
Ethernet definition	**Valid**	
IP address	192.168.0.1	
Subnet mask	255.255.255.0	
PLC command port (num) 1	507	

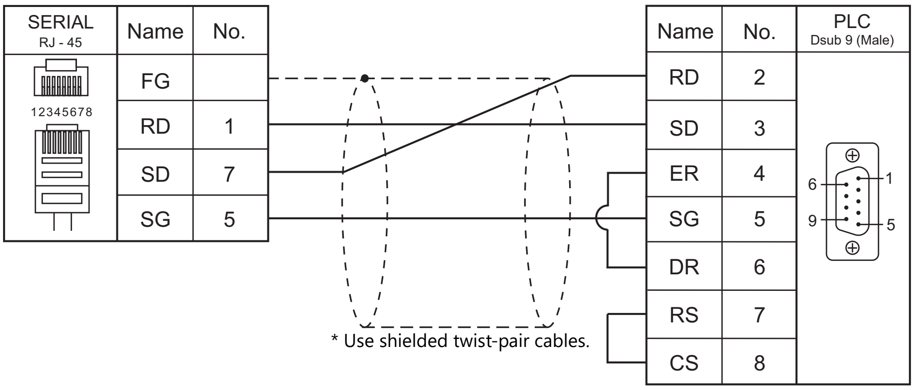
Available Device Memory

The contents of "Available Device Memory" are the same as those described in "18.1.1 μGPCsx Series".

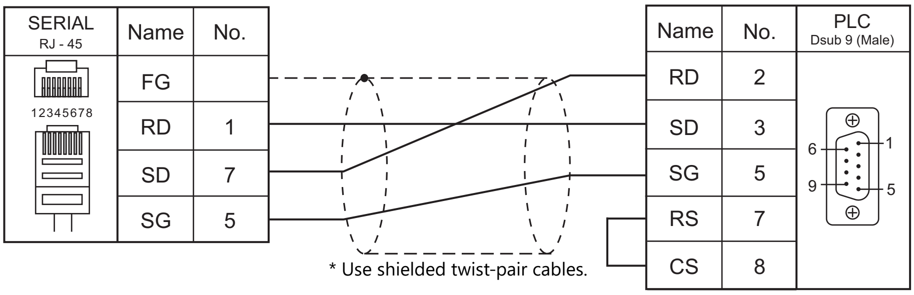
18.1.4 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

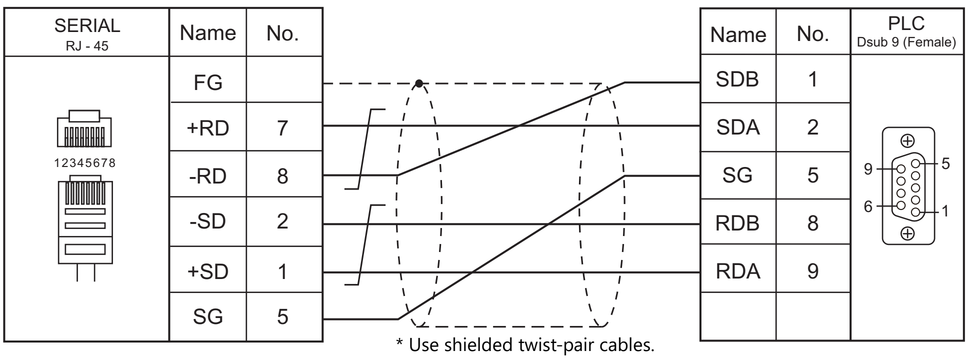


Wiring diagram 2 - M2

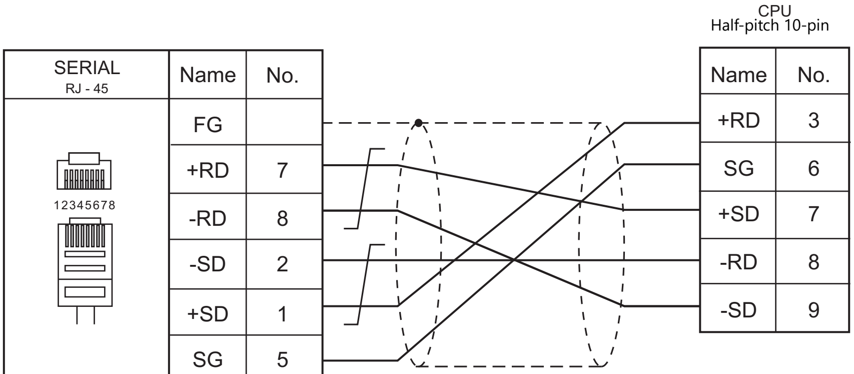


RS-422/485

Wiring diagram 1 - M4



Wiring diagram 2 - M4



* Use shielded twist-pair cables.

19. TURCK

19.1 PLC Connection

Ethernet Connection

PLC Selection on the Editor	CPU	LAN Port	TCP/IP	UDP/IP	Port No.	Keep Alive *1	Lst File
BL Series Distributed I/O (MODBUS TCP/IP)	BL20-GW-EN BL20-PG-EN	10/100 MBit	○	×	502 (Max. 10 units)	○	BL_Mod_Eth. Lst
	BL67-GW-EN BL67-PG-EN	ETHERNET					

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

19.1.1 BL Series Distributed I/O (MODBUS TCP/IP)

Communication Setting

Editor

Communication setting

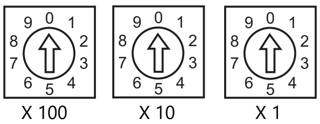
Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

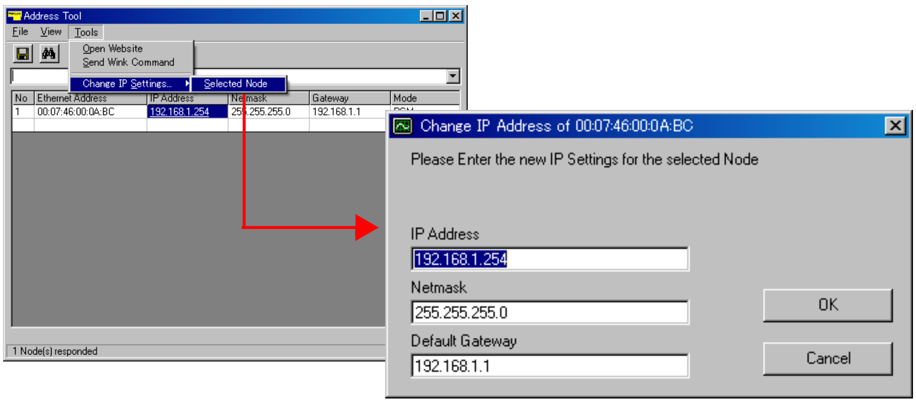
PLC

Configure the IP address using the rotary switch and "I/O Assistant" ladder software.

Rotary switch

SW	Setting	Remarks
IP Address Setting 	000: 192.168.1.254 1 to 254: Specify the least significant byte of the IP address. 500: Specify using I/O Assistant	For 1 to 254, the three high-order bytes enable I/O Assistant settings.

Address tool (I/O Assistant)



Item	Setting	Remarks
IP Address	Set the IP address of the PLC.	
Netmask	Set the subnet mask of the PLC.	
Default Gateway	Specify according to the environment.	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
---	02H	

20. Ultra Instruments

20.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)
UIC CPU (MODBUS ASCII)	UIC-CPU-01	RS-232C communication port	RS-232C	Wiring diagram 1 - M2	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

20.1.1 UIC CPU (MODBUS ASCII)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	**RS-232C**	
Baud Rate	**9600 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**None**	
Target Port No.	**1**	

PLC

For more information, refer to the PLC manual issued by the manufacturer.

Item	Setting	Remarks
Baud Rate	9600	Settings are fixed.
Target Port No.	1	
Data Length	8	
Stop Bit	1	
Parity	None	

Available Device Memory

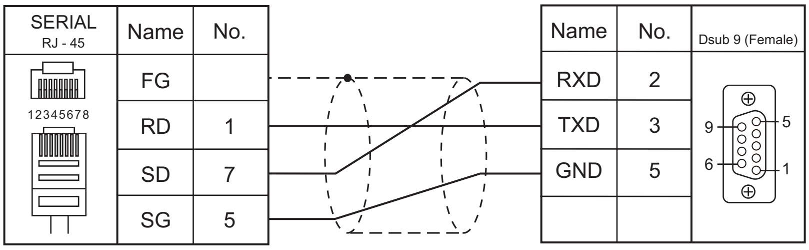
The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data memory)	00H	
I	(input)	01H	Read only
O	(output)	02H	
F	(flag)	03H	
S	(status memory)	04H	

20.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2



* Use shielded twist-pair cables.

21. UNIPULSE

21.1 Temperature Controller/Servo/Inverter Connection

Digital Indicator

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2	
F340A	F340A	Option RS-232C interface	RS-232C	Wiring diagram 1 - M2	×	UP_F340A.Lst
F371	F371	Built-in RS-232C interface	RS-232C	Wiring diagram 2 - M2	×	UP_F371.Lst
		Option RS-485 interface	RS-485	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Load Cell Indicator

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2	
F800	F800	Option RS-232C interface	RS-232C	Wiring diagram 2 - M2	×	UP_F800.Lst
		Option RS-485 interface	RS-485	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3	
F805A	F805A	RS-232C interface	RS-232C	Wiring diagram 2 - M2	×	UP_F805A.Lst
		Option RS-485 interface	RS-485	×	Wiring diagram 2 - M4	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Weighing Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2	
F720A	F720A	Built-in RS-232C interface	RS-232C	Wiring diagram 3 - M2	×	UP_F720A.Lst
		Option RS-485 interface	RS-485	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

21.1.1 F340A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

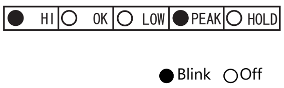
Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	

Digital Indicator

The communication parameters can be set using keys attached to the digital indicator.
Be sure to match the settings to those made under [Communication Setting] of the editor.

Setting mode 4

(Underlined setting: default)

Parameter	Item	Setting	Setting Example
Mode 4 / RS-232C 	Communication mode	**0: Communication mode 0 ***	02000 Communication mode: 0 Baud rate: 9600 bps Character length: 7 bits Parity bit: Odd Stop bit: 1 bit
	Baud rate	2: 4800 bps 3: 9600 bps	
	Character length	0: 7 bits 1: 8 bits	
	Parity bit	0: None 1: Odd 2: Even	
	Stop bit	0: 1 bit 1: 2 bits	

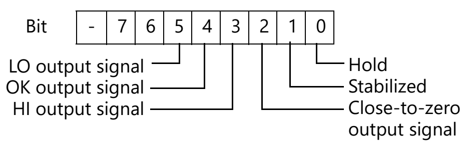
* When establishing a communication with the X1 series, be sure to select "communication mode 0".

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
R (specified value, status read out)	00H	Double-word, read only
W (setting value)	01H	Double-word, W24 and W34: read only

R (Specified Value, Status Read Out)

Address	Name	Remarks
0	Specified value read out	Read only
10	Status read out 	Read only

W (Setting Value)

Address	Name	Remarks
01	Upper limit	*1
02	Lower limit	*1
03	Comparison between upper limit and lower limit	*1
04	Hysteresis	*1
05	Digital offset	*1
06	Close to zero	*1
11	Digital filter	*1
12	Analog filter	*1
13	MD (stabilized time)	*1
14	MD (stabilized width)	*1
15	Zero tracking (time)	*1
16	Zero tracking (width)	*1
17	Hold mode	*1
18	Automatic print	*1
19	Hold value print	*1
21	LOCK	
22	Minimum scale	*2
23	Display count	*2
24	Applied voltage	Read only
31	BCD data update rate	*1
32	RS-232C	*1
33	D/A zero setting	*1
34	D/A full scale setting	Read only

*1 Writing is prohibited when the setting value is “LOCK”. The setting value “LOCK” is specified in “setting mode 3” of F340A.
*2 Writing is prohibited when the calibration value is “LOCK”. The calibration value “LOCK” is specified in “setting mode 3” of F340A.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Hold	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0	
Hold reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 1	
Digital zero *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 2	
Digital zero reset *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 3	
Print command *2	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 4	

*1 Valid only when “1” is set for the calibration value “LOCK”. The calibration value “LOCK” is specified in “setting mode 3” of F340A.
*2 Outputs a print command to SIF.

21.1.2 F371

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	
CR/LF	CR/LF / CR	

Digital Indicator

The communication parameters can be set using keys attached to the digital indicator.
Be sure to match the settings to those made under [Communication Setting] of the editor.

Built-in RS-232C Interface

Communication setting

(Underlined setting: default)

Item	Setting	Setting Example
Communication Mode	**Communication mode 0** *	Communication mode 0
Baud Rate	4800 / 9600 / 19200 bps	9600 bps
Character Length	7 / 8 bits	7 bits
Stop Bit	1 / 2 bits	1 bit
Parity Bit	None / Odd / Even	None
Terminator	CR / CR + LF	CR

* When establishing a communication with the X1 series, be sure to select "communication mode 0".

RS-485 Communication Interface (Option)

Option setting

(Underlined setting: default)

Item	Setting	Setting Example
Communication Mode	**Communication mode 0** *	Communication mode 0
Baud Rate	4800 / 9600 / 19200 bps	9600 bps
Character Length	7 / 8 bits	7 bits
Stop Bit	1 / 2 bits	1 bit
Parity Bit	None / Odd / Even	None
Terminator	CR / CR + LF	CR
ID	0000 to 9999	0000
Terminating Resistance	With terminating resistance / Without terminating resistance	With terminating resistance
Communication Mode	2-wire / 4-wire	2-wire

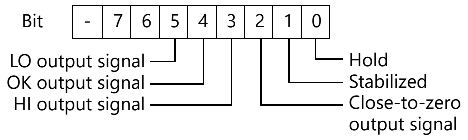
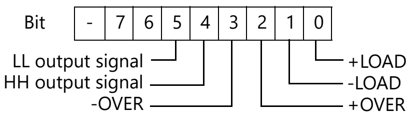
* When establishing a communication with the X1 series, be sure to select "communication mode 0".

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(specified value, status read out)	00H	Double-word, read only
W	(setting value)	01H	Double-word
RG	(waveform data read out)	02H	Double-word, read only

R (Specified Value, Status Read Out)

Address	Name	Remarks
0	Specified value read out	Read only
10	Status read out 	Read only
11	Status read out 	Read only

W (Setting Value)

Address	Name	Remarks
11	Higher-higher limit	*1
12	Higher limit	*1
13	Lower limit	*1
14	Lower-lower limit	*1
15	Hysteresis	*1
48	Digital offset setting	*2
16	Close to zero	*1
21	Hold mode	
81	Hold range setting	
22	Hold time	*1
23	Auto start level	*1
24	Minimum count	
25	Local maximum value detection level	
26	Inflection point judgment value	
27	Detection time A	
28	Detection time B	
31	Graph mode	
32	Interval time	
33	Trigger level	*1
34	Level detection mode	*1
1F	Setting CH	
44	Calibration value select	*2
29	Hold point shift amount	

*1 Writing is prohibited when the setting value is "LOCK". The setting value "LOCK" is specified for "motion setting" of F371.
*2 Writing is prohibited when the calibration value is "LOCK". The calibration value "LOCK" is specified for "motion setting" of F371.

RG (Waveform Data Read Out)

Address	Name	Remarks
0	Waveform data 0	Read only
1	Waveform data 1	Read only
:	:	:
199	Waveform data 199	Read only

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Digital zero	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 2	
Digital zero reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 3	
Print command *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 4	
Waveform hold point data read out *2	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 5	
		n + 2	Data No.	
		n + 3 to n + 4	Data	

Return data: Data stored from controller to X1 series

*1 Outputs a print command to SIF.
*2 Return data is given when “HOLD” is set to ON on the hold screen of F371 and “START” is selected on the graph screen.

21.1.3 F800

Communication Setting

Editor

Communication setting

(Underlined setting: default)

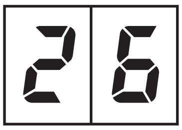
Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	
CR/LF	CR/LF / CR	

Load Cell Indicator

The communication parameters can be set using keys attached to the load cell indicator.
Be sure to match the settings to those made under [Communication Setting] of the editor.

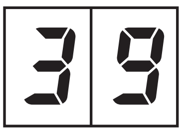
Setting mode 2

(Underlined setting: default)

Parameter	Item	Setting	Setting Example
RS-232C/485 I/F setting 	Baud rate	2: 4800 bps 3: 9600 bps 4: 19200 bps 6: 38400 bps	30101 Baud rate: 9600 bps Character length: 7 bits Parity bit: Odd Stop bit: 1 bit Terminator: CR + LF
	Character length	0: 7 bits 1: 8 bits	
	Parity bit	0: None 1: Odd 2: Even	
	Stop bit	0: 1 bit 1: 2 bits	
	Terminator	0: CR 1: CR + LF	

Setting mode 3 (only for RS-485 communication)

(Underlined setting: default)

Parameter	Item	Setting	Setting Example
ID number 	ID *	0000 to 9999	0001

* When multiple units of F800 are connected, the ID number must be set to a value other than "0000".

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(specified value, status read out)	00H	Double-word, read only
W	(setting value)	01H	Double-word

R (Specified Value, Status Read Out)

Address	Name	Remarks
0000	Total weight read out	Read only
0001	Net weight read out	Read only
0002	Tare read out	Read only
0010	Status read out 1 HOLD	Read only
0011	Status read out 1 Zero error	Read only
0012	Status read out 1 Stabilized	Read only
0013	Status read out 1 Taring	Read only
0014	Status read out 1 Total weight display / net weight display	Read only
0015	Status read out 1 LOCK / terminal at rear	Read only
0020	Status read out 2 Bulk supply	Read only
0021	Status read out 2 Medium supply	Read only
0022	Status read out 2 Fine supply	Read only
0023	Status read out 2 Insufficient	Read only
0024	Status read out 2 Correct amount	Read only
0025	Status read out 2 Excessive amount	Read only
0026	Status read out 2 Finish	Read only
0030	Status read out 3 Close to zero	Read only
0031	Status read out 3 Lower limit	Read only
0032	Status read out 3 Upper limit	Read only
0033	Status read out 3 Discharge	Read only
0040	Status read out 4 Weight error	Read only
0041	Status read out 4 Error	Read only
0042	Status read out 4 Operation mode	Read only
0043	Status read out 4 Weight value overflow	Read only
0044	Status read out 4 Calibration error	Read only
0045	Status read out 4 Sequence error	Read only
0050	Cumulative count read out	Read only
0051	Cumulative value read out	Read only

W (Setting Value)

Address	Name	Remarks
00	Code No.	
10	Bulk supply	*1
11	Below the preset amount	*1
12	Preset amount	*1
13	Excessive amount	*1
14	Insufficient	*1
15	Gap	*1
16	Automatic gap control value	*1, *2
17	Offset supply time	*1, *2
20	Timer	*2
21	Comparison prohibit time	*2
22	Upper limit	*2
23	Lower limit	*2
24	Close to zero	
25	Taring setting	
26	AZ count	*2
27	Judgment count	*2
28	Discharge time	*2
29	Weighing start time	

Address	Name	Remarks
30	Sequence mode	*2
31	Weighing function 1	*2
32	Weighing function 2	*2
33	Weighing function 3	*2
34	Function key prohibited	*2
35	Filter	*2
36	Motion detection	*2
37	Zero tracking	*2
40	Weight value	*2
41	Maximum weighing value	*2
42	Minimum scale	*2
43	Net weight excessive	*2
44	Total weight excessive	*2
45	Function select	*2
46	Gravitational acceleration offset	*2
50	Maximum weight	*1, read only
51	Minimum weight	*1, read only
52	Maximum - minimum	*1, read only
53	Average weight	*1, read only
54	Population standard deviation	*1, read only
55	Sample standard deviation	*1, read only

*1 Set for each code.
*2 Writing is prohibited when “LOCK” is set.
“LOCK” can be set by short-circuiting the LOCK terminal on the terminal block at the rear of F800. For more information, refer to the instruction manual of F800.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Zero calibration *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0	
		n + 2	Error result	
Span calibration *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 1	
		n + 2	Error result	
Switching to total weight display *2	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 2	
Switching to net weight display *2	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 3	
Taring	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 4	
Taring reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 5	
Digital zero	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 6	
Digital zero reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 7	
Totalize command	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 8	
Cumulative data clear	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 9	
Cumulative data all clear	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 10	
Cumulative data read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 11	
		n + 2	Code No.	
		n + 3 - n + 4	Weighing value	
Weighing data read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 12	
		n + 2	Code No.	
		n + 3 - n + 4	Weighing value	

Contents	F0	F1 (= $u n)		F2
Time-out change *3	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 13	
		n + 2	Time-out value (ms)	

Return data: Data stored from controller to X1 series

*1 Calibration is performed based on the value at W40, W41 and W42.
Since a response is given after completion of the calibration on F800, it takes time before the receipt of a response after the calibration command is executed. Before executing the calibration command, execute the time-out change command.

*2 The display cannot be changed when "1: external input mode" is set for "total weight/net weight display change" of extended function 1 in setting mode 4 of F800.

*3 Used to change the time-out time of X1 to apply when the PLC_CTL command is used. It takes time before a response is sent back after the calibration command is executed. Set a time-out time according to your use environment. The default value is "0", and the time set for [Time-out Time] under [Communication Setting] in the [PLC Properties] dialog is applied.

21.1.4 F805A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	
CR/LF	CR/LF / CR	

Load Cell Indicator

The communication parameters can be set using keys attached to the load cell indicator.
Be sure to match the settings to those made under [Communication Setting] of the editor.

Built-in RS-232C Interface

Communication setting

(Underlined setting: default)

Setting Items	Setting	Remarks
Baud rate selection	4800 / 9600 / 19200 bps	
Character length	7 / 8 bits	
Parity bit	None / Odd / Even	
Stop bit	1 / 2 bits	
Terminator	CR / CR + LF	

RS-485 Communication Interface (Option)

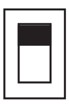
Setting mode 4

(Underlined setting: default)

Item	Setting	Remarks
Baud rate	4800 / 9600 / 19200 bps	
Character length	7 / 8 bits	
Parity bit	None / Odd / Even	
Stop bit	1 / 2 bits	
Terminator	CR / CR + LF	
ID *	0 - 99	

* When multiple units of F805A are connected, the ID number must be set to a value other than "0".

Rt switch

Rt switch	OFF	ON	Remarks
Rt ON OFF 	Terminating resistance OFF	Terminating resistance ON	

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(specified value / status read out)	00H	Double-word, read only
W	(setting value)	01H	Double-word

R (Specified Value / Status Read Out)

Address	Name	Remarks
0000	Total weight read out	Read only
0001	Net weight read out	Read only
0002	Tare read out	Read only
0010	Status read out 1 Hold	Read only
0011	Status read out 1 Zero error	Read only
0012	Status read out 1 Stabilized	Read only
0013	Status read out 1 Taring	Read only
0014	Status read out 1 Weight display	Read only
0015	Status read out 1 LOCK / terminal at rear	Read only
0016	Status read out 1 LOCK (soft)	Read only
0020	Status read out 2 Bulk supply	Read only
0021	Status read out 2 Medium supply	Read only
0022	Status read out 2 Fine supply	Read only
0023	Status read out 2 Insufficient	Read only
0024	Status read out 2 Correct amount	Read only
0025	Status read out 2 Excessive amount	Read only
0026	Status read out 2 Finish	Read only
0030	Status read out 3 Close to zero	Read only
0031	Status read out 3 Lower limit	Read only
0032	Status read out 3 Upper limit	Read only
0033	Status read out 3 Discharge	Read only
0034	Status read out 3 Total final	Read only
0040	Status read out 4 Weight error	Read only
0041	Status read out 4 Error	Read only
0042	Status read out 4 Operation mode	Read only
0043	Status read out 4 Weight value overflow	Read only
0044	Status read out 4 Calibration error	Read only
0045	Status read out 4 Sequence error	Read only
0050	Cumulative count read out	Read only
0051	Cumulative value read out	Read only

W (Setting Value)

Address	Name	Remarks
0000	Code No.	*1
0100	Bulk supply	*1
0110	Below the preset amount	*1
0120	Preset amount	*1
0130	Excessive amount	*1
0140	Insufficient	*1
0150	Gap	*1
0160	Automatic gap control value	*1, *2
0170	Offset supply time	*1, *2
0180	Total comparison selection	*1
0190	Total final	*1
01A0	Total times	*1
0200	With or without upper and lower limit comparison	*2
0210	Comparison between upper limit and lower limit	*2
0220	Upper limit	*2
0230	Lower limit	*2
0240	With or without close to zero comparison	*2

Address	Name	Remarks
0250	Close to zero	*2
0260	With or without comparison between excess and insufficient	*2
0270	Comparison between excess and insufficient mode	*2
0280	Completion signal output mode	*2
0290	Completion output time	*2
02A0	Judgment time	*2
02B0	Comparison prohibit time	*2
02C0	Cut-out control mode	*2
02D0	Automatic gap correction factor	*2
02E0	With or without automatic gap correction	*2
02F0	Average times for automatic gap correction	*2
0300	Display count	*2
0310	Digital filter	*2
0320	Analog filter	*2
0330	Stabilized time filter	*2
0331	MD mode	*2
0340	MD time	*2
0350	MD width	*2
0360	ZT time	*2
0370	ZT width	*2
0380	DZ control value	*2
0400	Sequence mode	*2
0401	Near zero check at start	*2
0402	Weight value check at start	*2
0403	With or without offset supply	*2
0404	Discharge gate control	*2
0410	Judgment count	*2
0420	AZ count	*2
0430	Discharge time	*2
0440	START/STOP key prohibit	*2
0500	Digital taring	*2
0501	G/N display switch	*2
0502	Sign for discharge control	*2
0503	TARE/DZ key prohibit	*2
0504	GROSS/NET key prohibit	*2
0510	Taring setting	*2
0520	Automatic totalize command	*2
0530	Weighing code specification	*2
0540	Setting code specification	*2
0550	Setting per code key prohibit	*2
0600	Weight value	*3
0610	Maximum weighing value	*3
0620	Minimum scale	*3
0630	Net weight excessive	*2
0640	Total weight excessive	*2
0650	Decimal place	*3
0660	Unit setting	*2
0670	1/4 memory	*2
0680	Gravitational acceleration offset	*2
0690	Applied voltage	*3
0700	Graphic mode	*2
0710	Trigger level	*2
0720	X (time) axis end point	*2
0730	Y (weight) axis start point	*2
0740	Z (weight) axis end point	*2
0800	Average weight	Read only
0810	Maximum weight	Read only
0820	Minimum weight	Read only
0830	Population standard deviation	Read only
0840	Sample standard deviation	Read only
0850	Maximum - minimum	Read only
0900	LOCK (soft)	
0910	Language	*2

Address	Name	Remarks
0920	System speed	*2
0930	Backlight ON	*2
0940	Backlight OFF	*2
0A00	Totalize command	*2
0A01	One-touch taring	*2
0A02	Taring range	*2
0A03	Taring display	*2
0A04	Digital taring expansion	*2
0A10	SIFII ID	*2
0A20	Overscale display	*2
0B00	D/A output mode	*2
0B10	D/A zero output	*2
0B20	D/A full scale	*2
0B60	Data update rate	*2
0B70	D/A output ch	*2

*1 Specify for each code.
*2 Writing is prohibited when “LOCK (soft)” is set.
*3 Writing is prohibited when “LOCK (soft, hard)” is set.

Address denotations

The address denotation of the device memory W is shown below.

W0XXY
XX: Setting No.
Y: Data No.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Descriptions	F0	F1 (=$u n)		F2
Zero calibration	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0	
		n + 2	Error result	
Span calibration	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 1	
		n + 2	Error result	
Display change total weight	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 2	
Display change net weight	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 3	
Taring	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 4	
Taring reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 5	
Digital zero	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 6	
Digital zero reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 7	
Totalize command	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 8	
Cumulative data clear	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 9	
Cumulative data all clear	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 10	
Cumulative data read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 11	
		n + 2	Code No.	
		n + 3 - n + 4	Weighing value	

Descriptions	F0	F1 (=$u n)		F2
Weighing data read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 12	
		n + 2	Code No.	
		n + 3 - n + 4	Weighing value	
Time-out change *1	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 13	
		n + 2	Time-out value (ms)	
Backlight ON	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 14	

Return data: Data stored from controller to X1 series

*1 Used to change the time-out time of the X1 to apply when the PLC_CTL command is used. It takes time before a response is sent back after the calibration command is executed. Set a time-out time according to your use environment. The default value is "0", and the value varies according to the time set for [Time-out Time] under [Communication Setting] in the [PLC Properties] dialog.

21.1.5 F720A

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	<u>RS-232C</u> / RS-422/485	
Baud Rate	4800 / <u>9600</u> / 19200 / 38400 bps	
Data Length	<u>7</u> / 8 bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	None / <u>Odd</u> / Even	
Target Port No.	0 to 31	
CR/LF	<u>CR/LF</u> / CR	

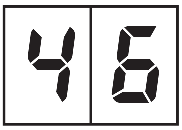
Weighing Controller

The communication parameters can be set using keys attached to the weighing controller.
Be sure to match the settings to those made under [Communication Setting] of the editor.

Built-in RS-232C Interface

Setting mode 4

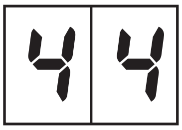
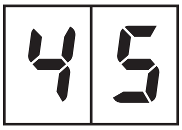
(Underlined setting: default)

Parameter	Item	Setting	Setting Example
RS-232C I/F setting 	Baud rate	2: 4800 bps <u>3: 9600 bps</u> 4: 19200 bps 5: 38400 bps	30101 Baud rate: 9600 bps Character length: 7 bits Parity bit: Odd Stop bit: 1 bit Communication mode: Communication mode 0 (CR + LF)
	Character length	<u>0: 7 bits</u> 1: 8 bits	
	Parity bit	0: None <u>1: Odd</u> 2: Even	
	Stop bit	<u>0: 1 bit</u> 1: 2 bits	
	Communication mode	0: Communication mode 0 (CR) <u>1: Communication mode 0 (CR + LF)</u>	

RS-485 Communication Interface (Option)

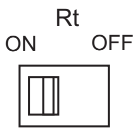
Setting mode 4

(Underlined setting: default)

Parameter	Item	Setting	Setting Example
RS-485 I/F setting 	Baud rate	2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps	30101 Baud rate: 9600 bps Character length: 7 bits Parity bit: Odd Stop bit: 1 bit Terminator: CR + LF
	Character length	0: 7 bits 1: 8 bits	
	Parity bit	0: None 1: Odd 2: Even	
	Stop bit	0: 1 bit 1: 2 bits	
	Terminator	0: CR 1: CR + LF	
ID setting 	ID *	0000 to 9999	0001

* When multiple units of F720A are connected, the ID number must be set to a value other than “0000”.

Rt switch

Rt switch	OFF	ON	Remarks
	Terminating resistance OFF	Terminating resistance ON	

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
R	(specified value, status read out)	00H	Double-word, read only
W	(setting value)	01H	Double-word

R (Specified Value, Status Read Out)

Address	Name	Remarks
0000	Total weight read out	Read only
0001	Net weight read out	Read only
0002	Tare read out	Read only
0010	Status read out 1 Hold	Read only
0011	Status read out 1 Zero error	Read only
0012	Status read out 1 Stabilized	Read only
0013	Status read out 1 Taring	Read only
0014	Status read out 1 Weight display	Read only
0015	Status read out 1 Rear terminal LOCK	Read only
0020	Status read out 2 Bulk supply	Read only
0021	Status read out 2 Medium supply	Read only
0022	Status read out 2 Fine supply	Read only
0023	Status read out 2 Insufficient	Read only
0024	Status read out 2 Correct amount	Read only
0025	Status read out 2 Excessive amount	Read only
0026	Status read out 2 Finish	Read only
0030	Status read out 3 Close to zero	Read only

Address	Name	Remarks
0031	Status read out 3 Lower limit	Read only
0032	Status read out 3 Upper limit	Read only
0040	Status read out 4 Weight error	Read only
0041	Status read out 4 Error	Read only
0042	Status read out 4 Operation mode	Read only
0043	Status read out 4 Weight value overflow	Read only
0044	Status read out 4 Calibration error	Read only
0045	Status read out 4 Sequence error	Read only
0050	Cumulative count read out	Read only
0051	Cumulative value read out	Read only

W (Setting Value)

Address	Name	Remarks
10	Bulk supply	*1
11	Below the preset amount	*1
12	Preset amount	*1
13	Excessive amount	*1
14	Insufficient	*1
15	Gap	*1
16	Automatic gap control value	*2
17	Offset supply time	*2
20	Judgment time	*2
21	Comparison prohibit time	*2
22	Upper limit	*1
23	Lower limit	*1
24	Close to zero	*1
25	Taring setting	*1
26	AZ count	*2
27	Judgment count	*2
28	Completion output time	*2
30	Sequence mode	*2
31	Weighing function 1	*2
32	Weighing function 2	*2
33	Weighing function 3	*2
34	Function key prohibited	*2
35	Analog filter	*2
36	Digital filter	*2
37	Motion detection	*2
38	Zero tracking time	*2
39	Zero tracking width	*2
3A	Setting LOCK	
40	Weight value	*2, *3
41	Maximum weighing value	*2, *3
42	Minimum scale	*2, *3
43	Net weight excessive	*2, *3
44	Total weight excessive	*2, *3
45	Function select	*2
46	Gravitational acceleration offset (area number input)	*2
47	DZ control value	*2, *3
48	Gravitational acceleration offset (acceleration input)	*2
50	Extended function select 1	*2
51	Taring function limitation	*2
52	D/A output mode	*2
53	D/A zero output setting	*2
54	D/A full scale	*2
55	Input select	*2
56	Output select	*2
80	Average weight	Read only
81	Maximum	Read only
82	Minimum	Read only
83	Population standard deviation	Read only

Address	Name	Remarks
84	Sample standard deviation	Read only
85	Maximum - minimum	Read only
86	Cumulative count	Read only
87	Latest cumulative data	Read only

*1 Writing is prohibited when LOCK1 is ON. “LOCK1” can be set at “setting value LOCK” in setting mode 4 of F720A.
*2 Writing is prohibited when LOCK2 is ON. “LOCK2” can be set at “setting value LOCK” in setting mode 4 of F720A.
*3 Writing is prohibited when the LOCK switch is set in the ON position. The LOCK switch is provided at the rear of F720A.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Zero calibration *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0	
		n + 2	Error result	
Span calibration *1	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 1	
		n + 2	Error result	
Switching to total weight display *2	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 2	
Switching to net weight display *2	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 3	
Taring	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 4	
Taring reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 5	
Digital zero	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 6	
Digital zero reset	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 7	
Totalize command	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 8	
Cumulative data clear	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 9	
Cumulative data read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 11	
		n + 2	Fixed value 00	
		n + 3 - n + 4	Weighing value	
Time-out change *3	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 13	
		n + 2	Time-out value (ms)	

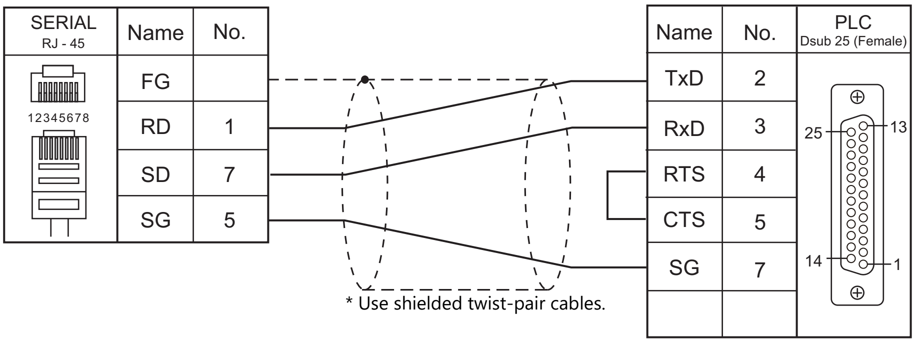
Return data: Data stored from controller to X1 series

*1 Calibration is performed based on the value at W40, W41 and W42.
Since a response is given after completion of the calibration on F720A, it takes time before the receipt of a response after the calibration command is executed. Before executing the calibration command, execute the time-out change command.
*2 The display cannot be changed when “1: external input mode” is set for “total weight/net weight display change” of extended function 1 in setting mode 4 of F720A.
*3 Used to change the time-out time of X1 to apply when the PLC_CTL command is used. It takes time before a response is sent back after the calibration command is executed. Set a time-out time according to your use environment. The default value is “0”, and the value varies according to the time set for [Time-out Time] under [Communication Setting] in the [PLC Properties] dialog.

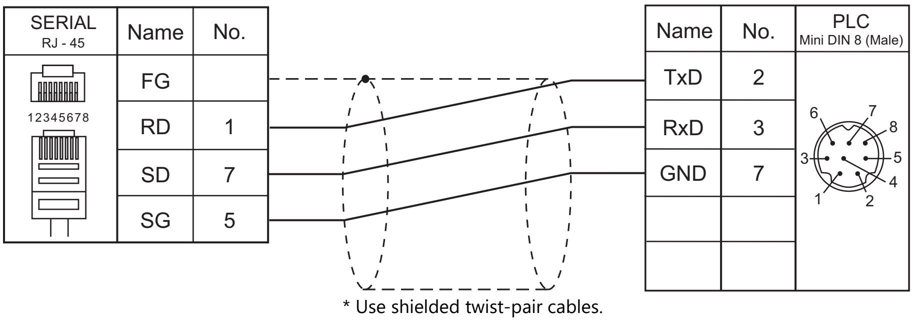
21.1.6 Wiring Diagrams

RS-232C

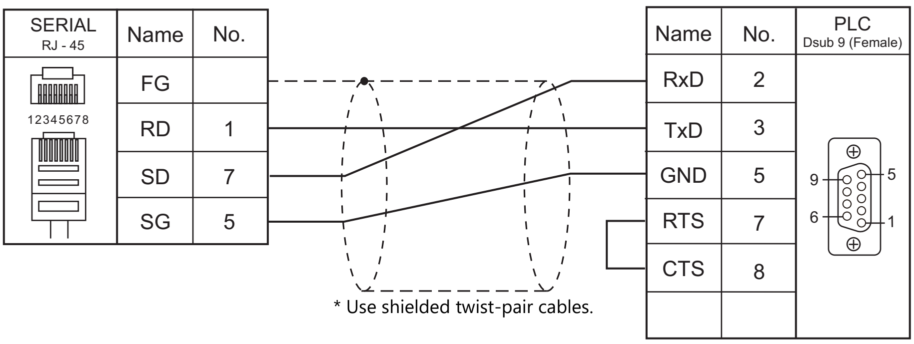
Wiring diagram 1 - M2



Wiring diagram 2 - M2

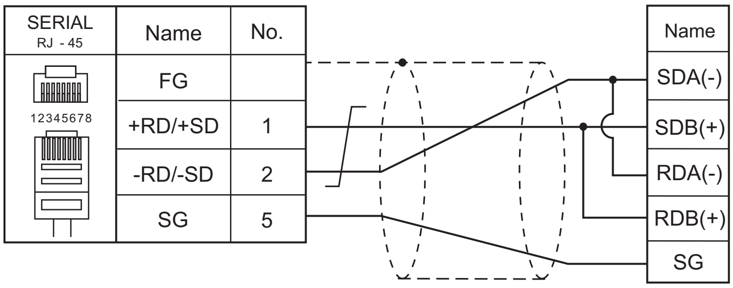


Wiring diagram 3 - M2



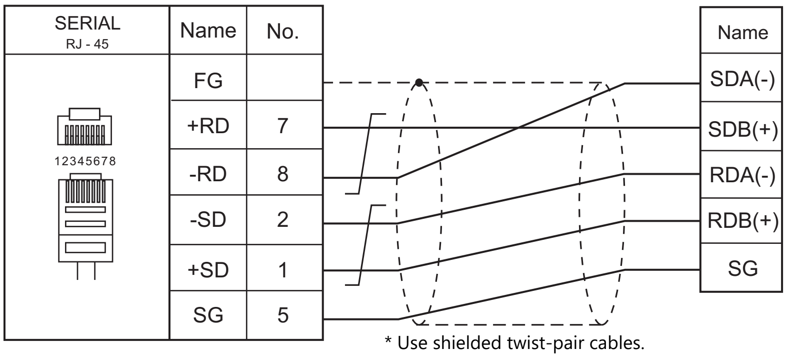
RS-485

Wiring diagram 1 - M4



* Use shielded twist-pair cables.

Wiring diagram 2 - M4



* Use shielded twist-pair cables.

22. UNITRONICS

22.1 PLC Connection

Serial Connection

PLC Selection on the Editor	PLC	Port	Signal Level	Connection	
				RS-232C[*1] / RS-485 (2-wire)[*2]	RS-422 (4-wire)
M90/M91/Vision Series (ASCII)	M90	COM1	RS-232C	Wiring diagram 1 - M2	×
	M91 V130 V350-35-R2	COM1	RS-232C	Wiring diagram 1 - M2	×
			RS-485	Wiring diagram 1 - M4	×
	V230 V260 V280 V290 V530	COM1	RS-232C	Wiring diagram 1 - M2	×
		COM2	RS-232C	Wiring diagram 1 - M2	×
			RS-485	Wiring diagram 1 - M4	×
	V120 V290-19-C30BT/40BT V560 V570 V1040 V1210	COM1/COM2	RS-232C	Wiring diagram 1 - M2	×
			RS-485	Wiring diagram 1 - M4	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

Ethernet Connection

PLC Selection on the Editor	Model	Unit	TCP/IP	UDP/IP	Port No.	Keep Alive[*1]
Vision Series (ASCII Ethernet TCP/IP)	V230 V260 V280 V290 V530 V560 V570 V1040 V1210	V200-19-ET1	○	×	0 to 65535 (Default: 20256) (Max. 4 units)	○
	V130 V350	V100-17-ET2				
	V1040 V1210	Built-in Ethernet port				

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

22.1.1 M90/M91/Vision Series (ASCII)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	<u>RS-232C</u> / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / <u>57600</u> / 115K bps	
Data Length	7 / <u>8</u> bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	<u>None</u> / Odd / Even	
Target Port No.	0 to 31	Specify “0” for RS-422/485 communication. On the PLC side, specify a number from “64” to “127”.

PLC

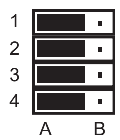
Parameter

Parameters must be set in Information Mode or by creating a ladder program using the software “VisiLogic”. For more information, refer to the instruction manual issued by UNITORONICS.
When using RS-485 communication, be sure to create the ladder program.

M91

RS232/RS485 Jumper Setting

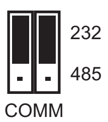
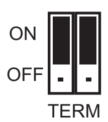
(Underlined setting: default)

<table>
<tr><th colspan="2">Jumper Setting</th><th>Item</th><th>Setting</th><th>Remarks</th></tr>
<tr><td rowspan="2">
</td><td>No. 1
No. 2</td><td>Signal level</td><td><table><tr><th></th><th>No. 1</th><th>No. 2</th></tr><tr><td><u>RS232</u></td><td>A</td><td>A</td></tr><tr><td>RS485</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
<tr><td>No. 3
No. 4</td><td>RS485 terminating resistance</td><td><table><tr><th></th><th>No. 3</th><th>No. 4</th></tr><tr><td><u>Provided</u></td><td>A</td><td>A</td></tr><tr><td>Not provided</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
</table>

V130 / V350-35-R2

RS232 to RS485 Jumper Setting

(Underlined setting: default)

<table>
<tr><th colspan="2">Jumper Setting</th><th>Item</th><th>Setting</th><th>Remarks</th></tr>
<tr><td>
</td><td>COMM</td><td>Signal level</td><td><table><tr><td><u>RS232</u></td><td>232</td><td>232</td></tr><tr><td>RS485</td><td>485</td><td>485</td></tr></table></td><td></td></tr>
<tr><td>
</td><td>TERM</td><td>RS485 terminating resistance</td><td><table><tr><td><u>Provided</u></td><td>ON</td><td>ON</td></tr><tr><td>Not provided</td><td>OFF</td><td>OFF</td></tr></table></td><td></td></tr>
</table>

V230 / V260 / V280 / V290 / V530

RS232/RS485 Jumper Setting

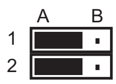
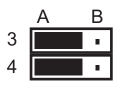
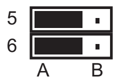
(Underlined setting: default)

<table>
<tr><th colspan="2">Jumper Setting</th><th>Item</th><th>Setting</th><th>Remarks</th></tr>
<tr><td></td><td>No. 1
No. 2
No. 3
No. 4</td><td>Signal level/
RS485 terminating resistance</td><td><table><tr><th></th><th>No. 1</th><th>No. 2</th><th>No. 3</th><th>No. 4</th></tr><tr><td><u>RS232</u></td><td>A</td><td>A</td><td>A</td><td>A</td></tr><tr><td>RS485</td><td>B</td><td>B</td><td>B</td><td>B</td></tr><tr><td>RS485
With resistance</td><td>A</td><td>A</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
</table>

V120

RS232/RS485 Jumper Setting

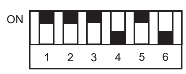
(Underlined setting: default)

<table>
<tr><th colspan="2">Jumper Setting</th><th>Item</th><th>Setting</th><th>Remarks</th></tr>
<tr><td></td><td>No. 1
No. 2</td><td>Signal level
(COM1)</td><td><table><tr><th></th><th>No. 1</th><th>No. 2</th></tr><tr><td><u>RS232</u></td><td>A</td><td>A</td></tr><tr><td>RS485</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
<tr><td></td><td>No. 3
No. 4</td><td>RS485 terminating resistance
(COM1)</td><td><table><tr><th></th><th>No. 3</th><th>No. 4</th></tr><tr><td><u>Provided</u></td><td>A</td><td>A</td></tr><tr><td>Not provided</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
<tr><td></td><td>No. 5
No. 6</td><td>Signal level
(COM2)</td><td><table><tr><th></th><th>No. 5</th><th>No. 6</th></tr><tr><td><u>RS232</u></td><td>A</td><td>A</td></tr><tr><td>RS485</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
<tr><td></td><td>No. 7
No. 8</td><td>RS485 terminating resistance
(COM2)</td><td><table><tr><th></th><th>No. 7</th><th>No. 8</th></tr><tr><td><u>Provided</u></td><td>A</td><td>A</td></tr><tr><td>Not provided</td><td>B</td><td>B</td></tr></table></td><td></td></tr>
</table>

V290-19-C30B/V290-19-T40B/V560/V570/V1040/V1210

RS232/RS485 DIP Switch Settings

(Underlined setting: default)

<table>
<tr><th>Dip SW</th><th>Item</th><th>Setting</th><th>Remarks</th></tr>
<tr><td></td><td>Signal level
RS485 terminating resistance</td><td><table><tr><th></th><th>No. 1</th><th>No. 2</th><th>No. 3</th><th>No. 4</th><th>No. 5</th><th>No. 6</th></tr><tr><td><u>RS232</u></td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr><tr><td>RS485</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr><tr><td>RS485
With resistance</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr></table></td><td>These settings are common to both COM1 and COM2.</td></tr>
</table>

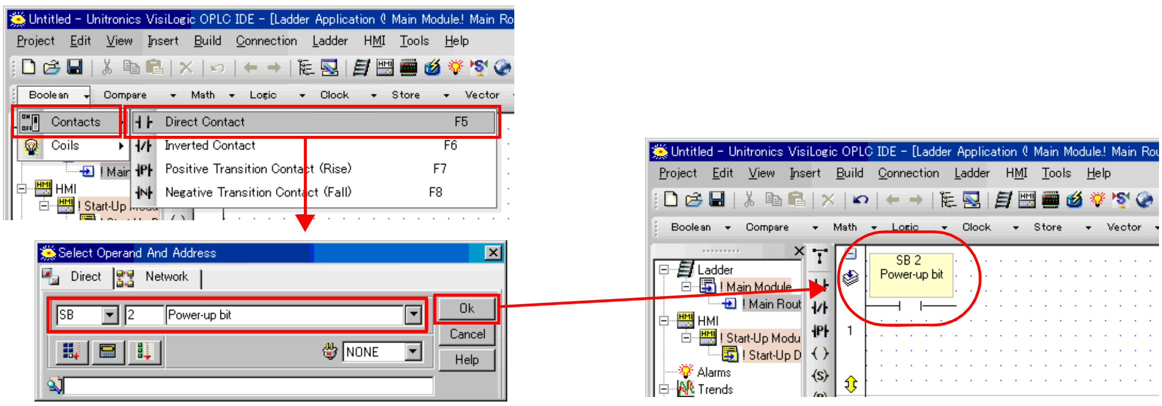
VisiLogic

(Underlined setting: default)

Item		Setting	Remarks
Direct Contact		**SB: 2**	For more information, refer to the VigiLogic instruction manual.
Set PLC Name		Specify a desired name.	
Com Init	Com Port	COM1 / COM2	
	Data Bits	7 / 8	
	Standard	RS232 / RS485	
	Baud Rate	4800 / 9600 / 19200 / 38400 / 54600 / 115200 bps	
	Parity	NONE / EVEN / ODD	
	Stop Bits	1 / 2	

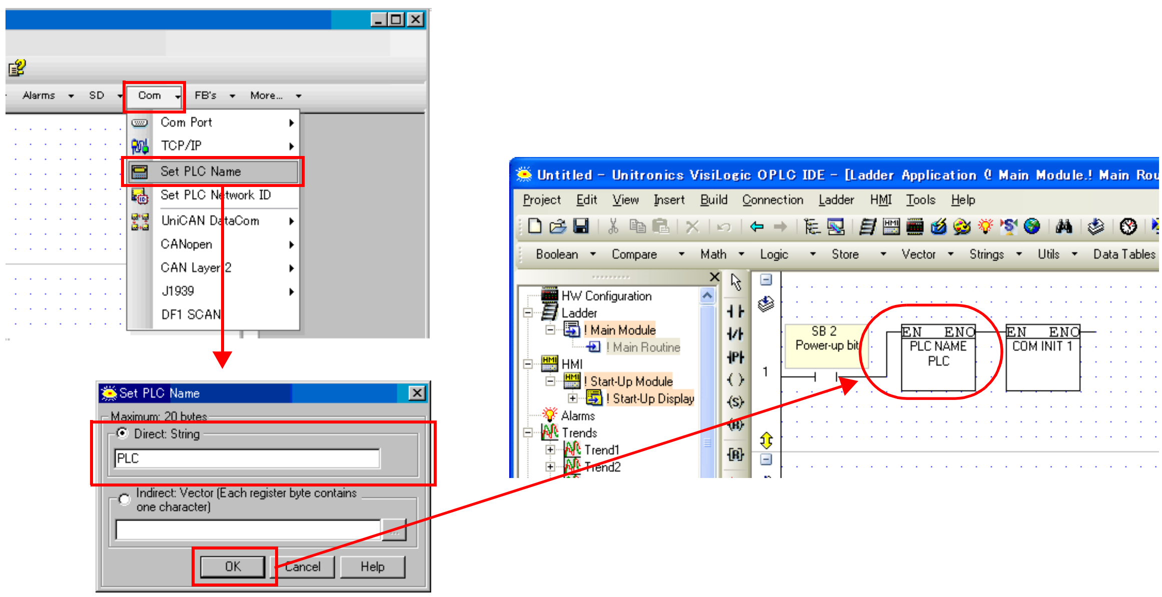
Direct Contact

Specify "2" for the SB address and register it into the ladder program.



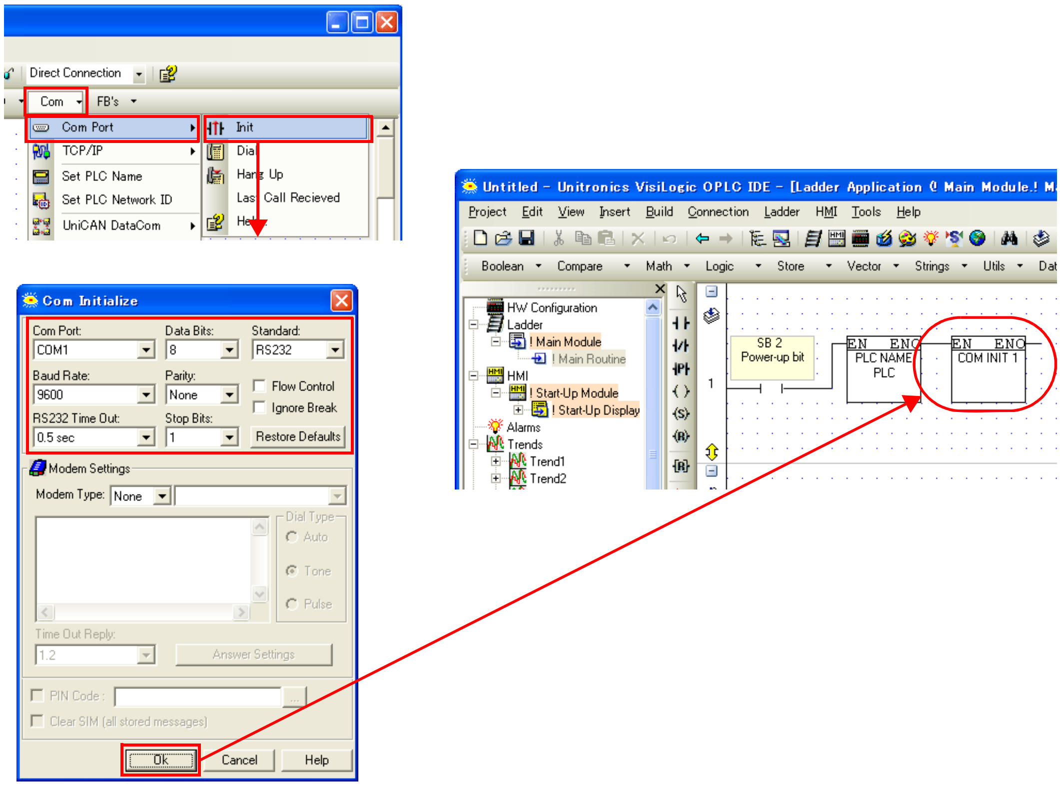
Set PLC Name

Specify a desired PLC name.



Com Init

Make settings for [COM Port], [Data Bits], [Standard], [Baud Rate], [Parity] and [Stop Bits].



Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MB	(Memory bit)	00H	
MI	(Memory int)	01H	
ML	(Memory long)	02H	Double-word
MD	(Memory double)	03H	Double-word
MF	(Memory float)	04H	Real number. Bit designation is not possible.
SB	(System bit)	05H	
SI	(System int)	06H	
SL	(System long)	07H	Double-word
SD	(System double)	08H	Double-word
INP	(Input)	09H	Read only
OUT	(Output)	0AH	
TS	(Timer scan bit)	0BH	Read only
TP	(Timer preset)	0CH	Double-word, read only
TC	(Timer current)	0DH	Double-word, read only
CS	(Counter scan bit)	0EH	Read only
CP	(Counter preset)	0FH	Read only
CC	(Counter current)	10H	Read only

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* In the expansion code, set which word, higher or lower, is to be read when a double-word address is specified (expansion bit designation).

15							8
0	0	0	0	0	0	0	

Expansion bit designation
0: 0 to 15 bits
1: 16 to 31 bits

PLC_CTL

Macro command "PLC_CTL F0 F1 F2"

Contents	F0	F1 (=$u n)		F2
PLC operation status setting	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0000H	
		n + 2	PLC status 0: Run 1: Stop 2: Memory init and reset 3: Reset 4: Switch to BootStrap *1	
Sending key data from remote unit *2	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0001H	
		n + 2	Key data	
Unit ID read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0002H	
		n + 2	Unit ID	
Unit ID setting	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0003H	
		n + 2	Unit ID	
Version acquisition	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0004H	
		n + 2 to n + 29	Version, model type (CHAR data)	

Return data: Data stored from PLC to X1 series

*1 After the setting is made, the PLC must be shut off and restarted.
*2 This command is used when a password is entered into the PLC from the X1 series. Since the password consists of four digits, the command must be executed four times.
Detail of the key data:
40 to 49: "0" to "9"

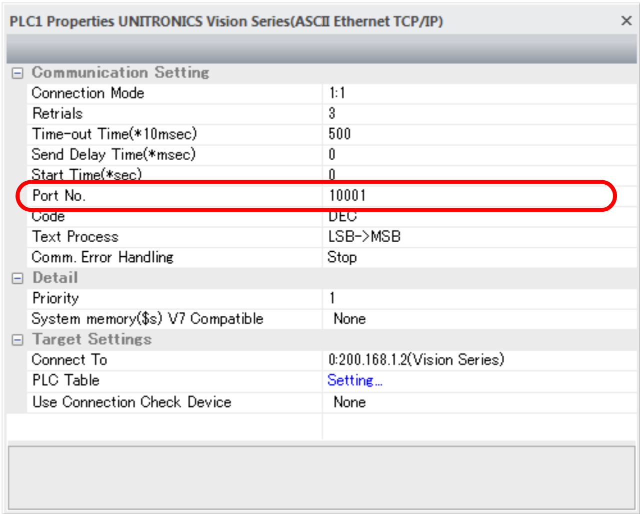
22.1.2 Vision Series (ASCII Ethernet TCP/IP)

Communication Setting

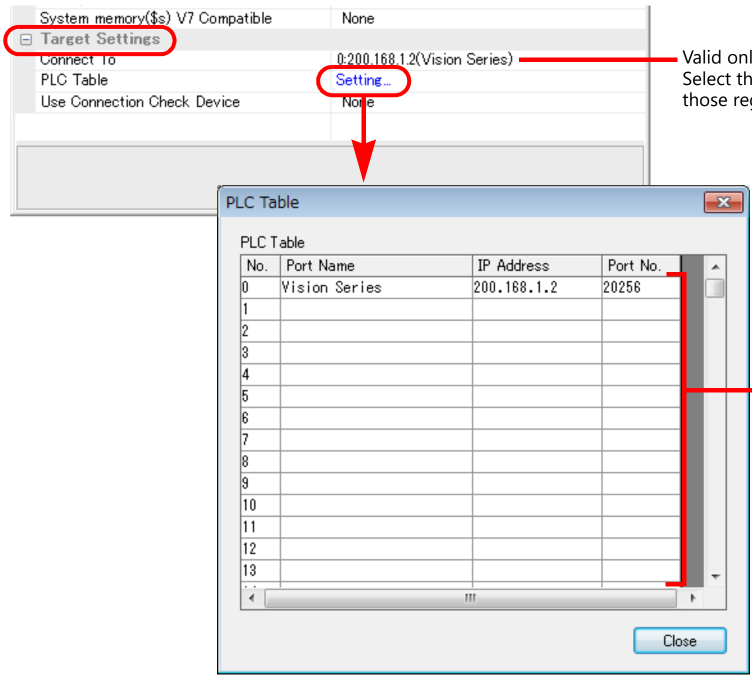
Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]



- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].



Valid only for 1 : 1 connection
Select the PLC for connection from those registered on the PLC table.

Set the IP address, port number and whether or not to use the KeepAlive function of the PLC.

PLC

Parameter

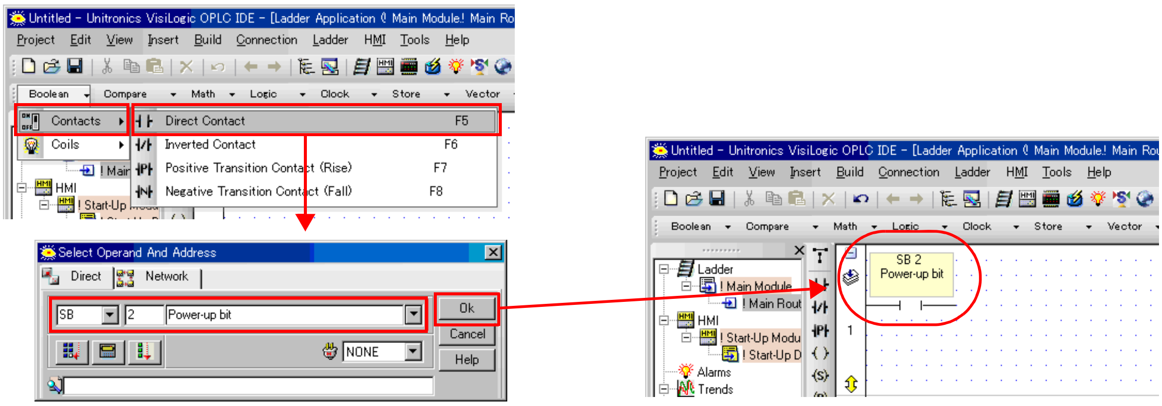
Parameters must be set in Information Mode or by creating a ladder program using the software “VisiLogic”. For more information, refer to the instruction manual issued by UNITORONICS.

VisiLogic

Item		Setting	Remarks
Direct Contact		**SB: 2**	For more information, refer to the VigiLogic instruction manual.
Set PLC Name		Specify a desired name.	
Com Init	IP Address	IP address of the Vision Series	
	Subnet Mask	Specify according to the environment.	
	Default Gateway	Specify according to the environment.	
Socket Init	Socket	Socket1	
	Protocol	**TCP**	
	Local Port	0 to 65535 (default: 20256)	
	Master/Slave	**Slave**	

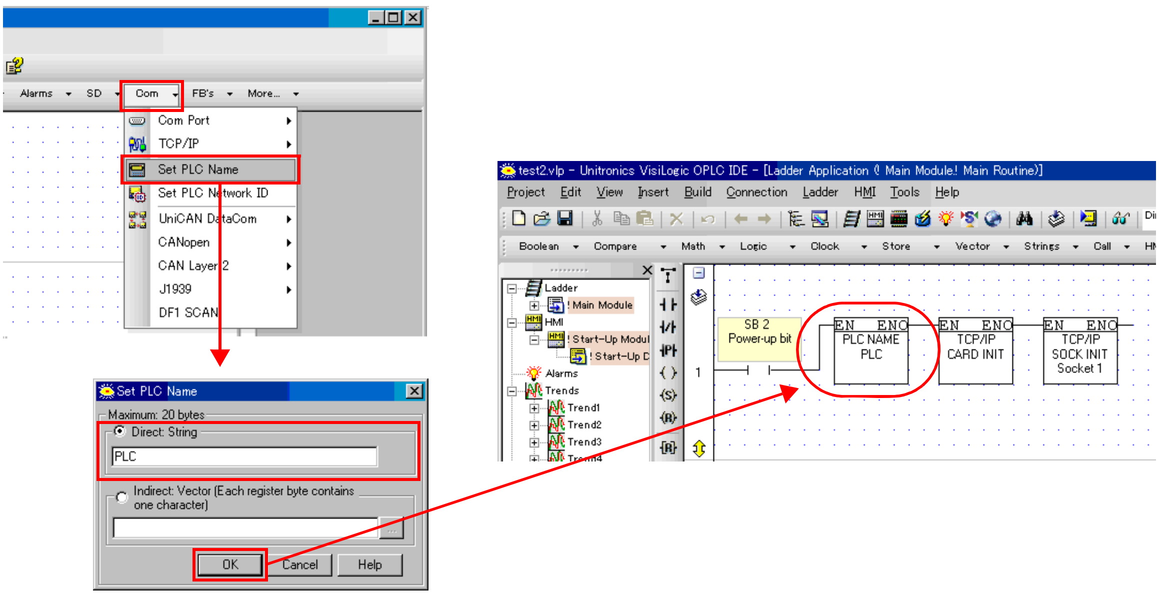
Direct Contact

Specify “2” for the SB address and register it into the ladder program.



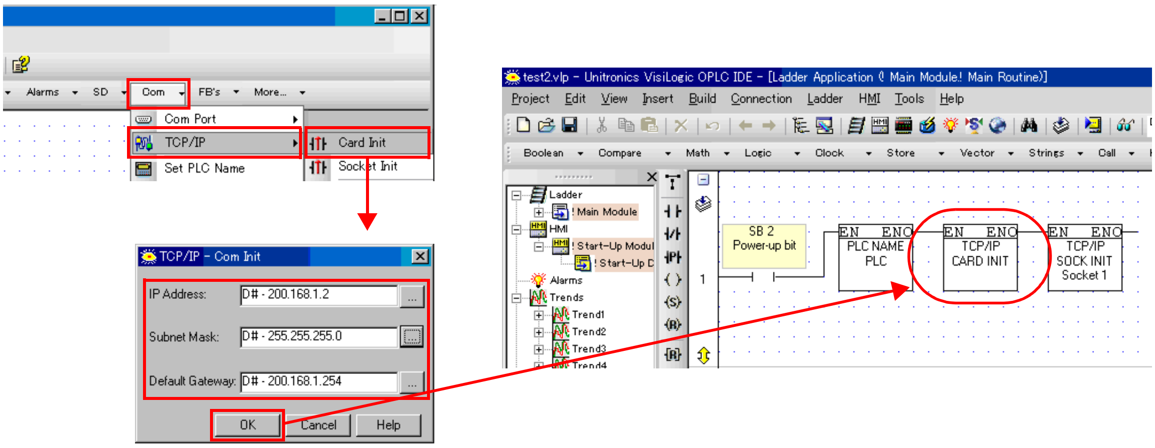
Set PLC Name

Specify a desired PLC name.



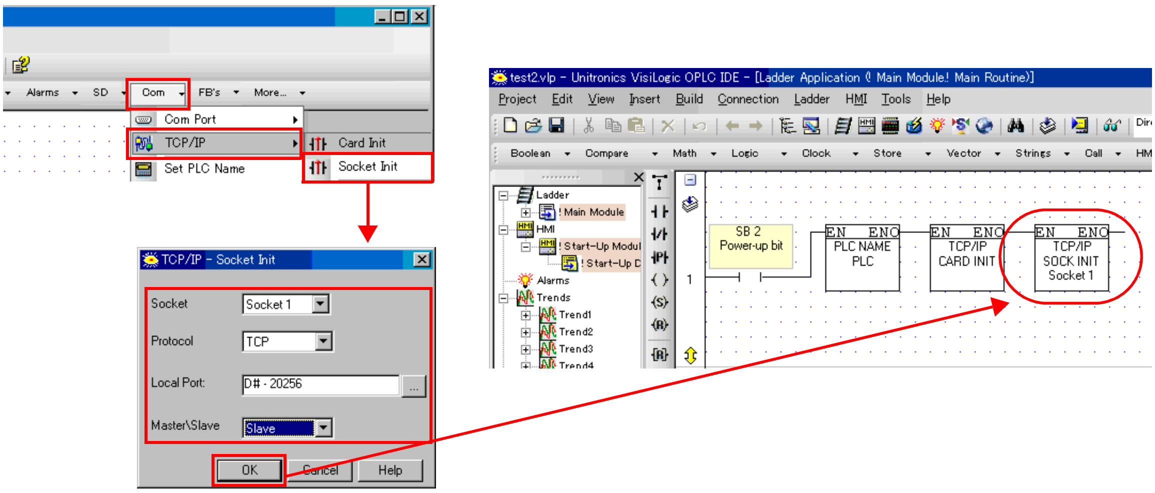
Com Init

Specify the IP address, subnet mask and default gateway.



Socket Init

Make settings for [Socket], [Protocol], [Local Port], and [Master/Slave].



Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MB	(Memory bit)	00H	
MI	(Memory int)	01H	
ML	(Memory long)	02H	Double-word
MD	(Memory double)	03H	Double-word
MF	(Memory float)	04H	Real number. Bit designation is not possible.
SB	(System bit)	05H	
SI	(System int)	06H	
SL	(System long)	07H	Double-word
SD	(System double)	08H	Double-word
INP	(Input)	09H	Read only
OUT	(Output)	0AH	
TS	(Timer scan bit)	0BH	Read only
TP	(Timer preset)	0CH	Double-word, read only
TC	(Timer current)	0DH	Double-word, read only
CS	(Counter scan bit)	0EH	Read only
CP	(Counter preset)	0FH	Read only
CC	(Counter current)	10H	Read only

Indirect Device Memory Designation

	15 … 8	7 … 0
n + 0	Model	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* In the expansion code, set which word, higher or lower, is to be read when a double-word address is specified (expansion bit designation).

15							8
0	0	0	0	0	0	0	

Expansion bit designation
0: 0 to 15 bits
1: 16 to 31 bits

PLC_CTL

Macro command "PLC_CTL F0 F1 F2"

Contents	F0	F1 (=$u n)		F2
PLC operation status setting	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0000H	
		n + 2	PLC status 0: Run 1: Stop 2: Memory init and reset 3: Reset 4: Switch to BootStrap *1	
Sending key data from remote unit *2	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0001H	
		n + 2	Key data	
Unit ID read out	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0002H	
		n + 2	Unit ID	
Unit ID setting	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0003H	
		n + 2	Unit ID	
Version data acquisition	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 0004H	
		n + 2 to n + 29	Version, model type (CHAR data)	

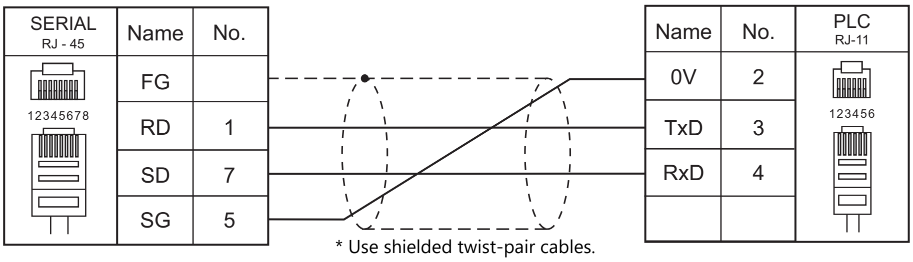
Return data: Data stored from PLC to X1 series

*1 After the setting is made, the PLC must be shut off and restarted.
*2 This command is used when a password is entered into the PLC from the X1 series. Since the password consists of four digits, the command must be executed four times.
Detail of the key data:
40 to 49: "0" to "9"

22.1.3 Wiring Diagrams

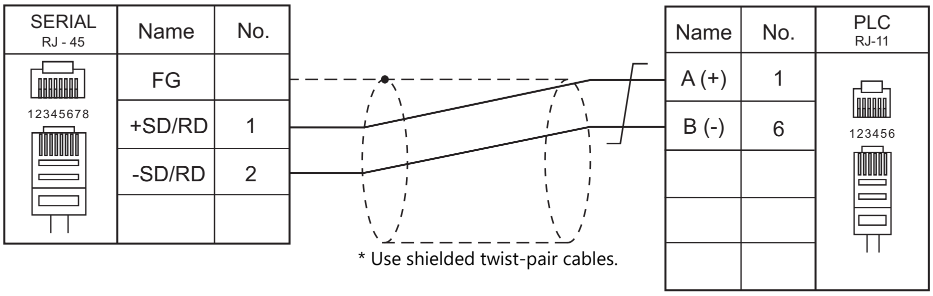
RS-232C

Wiring diagram 1 - M2



RS-422/RS-485

Wiring diagram 1 - M4



23. ULVAC

23.1 Temperature Controller/Servo/Inverter Connection

Vacuum Gauge

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)	
G-TRAN series	SH2-2	Serial communication port	RS-232C	Wiring diagram 1 - M2	×	UL_GT.Lst
			RS-485	Wiring diagram 1 - M4	×	
	SW1-2	Serial communication port	RS-232C	Wiring diagram 2 - M2	×	
			RS-485	Wiring diagram 1 - M4	×	

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).

23.1.1 G-TRAN Series

Communication Setting

Editor

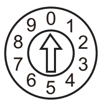
Communication setting

(Underlined setting: default)

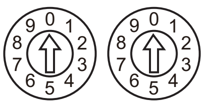
Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	<u>RS-232C</u> / RS-422/485	
Baud Rate	<u>9600</u> / 19200 / 38400 bps	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**None**	
Target Port No.	0 to 99	

SH2

Baud rate

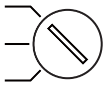
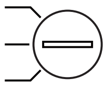
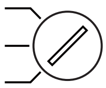
bps	Setting	Baud Rate	Remarks
	0	9600 bps	
	1	19200 bps	
	2	38400 bps	

Station number

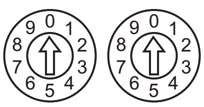
MSD / LSD	Setting	Remarks
	0 to 99	MSD: tens place, LSD: ones place "00" may be allocated to the host for RS-485 communication.

SW1

Baud rate

bps	Baud Rate	Remarks
	9600 bps	
	19200 bps	
	38400 bps	

Station number

MSD / LSD	Setting	Remarks
	0 to 99	MSD: tens place, LSD: ones place "00" may be allocated to the host for RS-485 communication.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
S	(status)	00H	
FIL	(filament current check)	01H	Read only, available only for SH2 models
T	(model, software version acquisition)	02H	Read only
ERR	(error details check)	03H	Read only, available only for SH2 models *1

*1 Use a character display part.

S (status)

Address	Name	Remarks
0	Status	

FIL (filament current check)

Address	Name	Remarks
0	Filament current value	

T (model, software version acquisition)

Address	Name	Remarks
0	1st and 2nd bytes of model and software version	
1	3rd and 4th bytes of model and software version	
2	5th and 6th bytes of model and software version	
3	7th byte of model and software version	

ERR (error details check)

Address	Name	Remarks
0	Error details	Character string data

PLC_CTL

Macro command "PLC_CTL F0 F1 F2"

Contents	F0	F1 (=$u n)		F2
Measurement value and status reading	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 0	
		n + 2	Measured pressure (significand) *1	
		n + 3	Measured pressure (power of ten) *1	
		n + 4	Status	
Zero point adjustment *2	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 1	
Atmospheric pressure adjustment	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 2	
Zero point, atmospheric pressure adjustment reset *2	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 3	
Set point 1 setting value reading	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 4	
		n + 2	Setting value (significand) *1	
		n + 3	Setting value (power of ten) *1	
Set point 2 setting value reading	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 5	
		n + 2	Setting value (significand) *1	
		n + 3	Setting value (power of ten) *1	

Contents	F0	F1 (=$u n)		F2
Set point 1 setting value writing	1 to 8 (PLC1 to 8)	n	Station number	4
		n + 1	Command: 6	
		n + 2	Setting value (significand) *1	
		n + 3	Setting value (power of ten) *1	
Set point 2 setting value writing	1 to 8 (PLC1 to 8)	n	Station number	4
		n + 1	Command: 7	
		n + 2	Setting value (significand) *1	
		n + 3	Setting value (power of ten) *1	

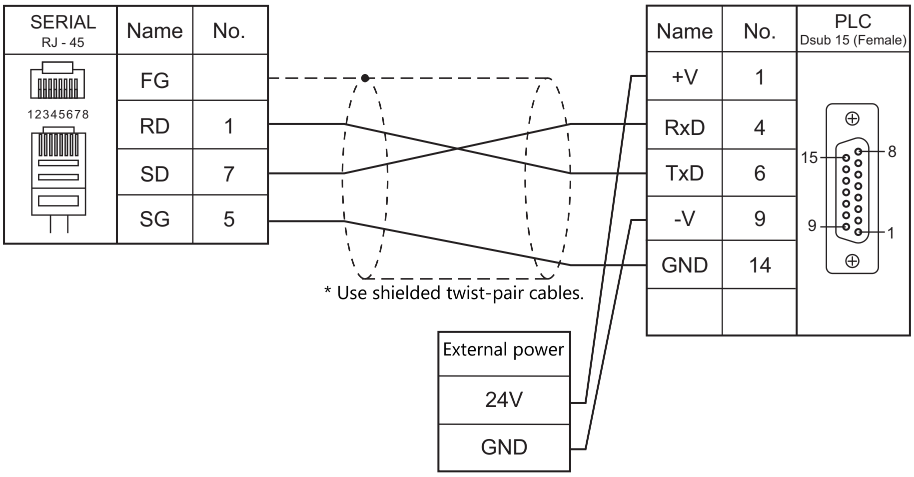
Return data: Data stored from controller to X1 series

*1 To read/write the cube of 5.00*10, store “5” (5.00) for “n + 2 (significand)” and “3” for “n + 3 (power of ten)”.
Enable 2 decimal places for data display parts to show significands.
*2 Available only for SW1 models

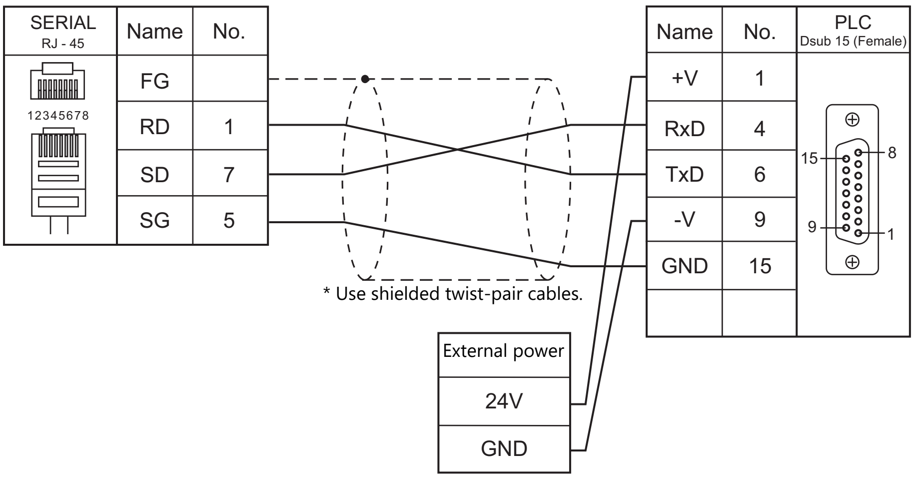
23.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

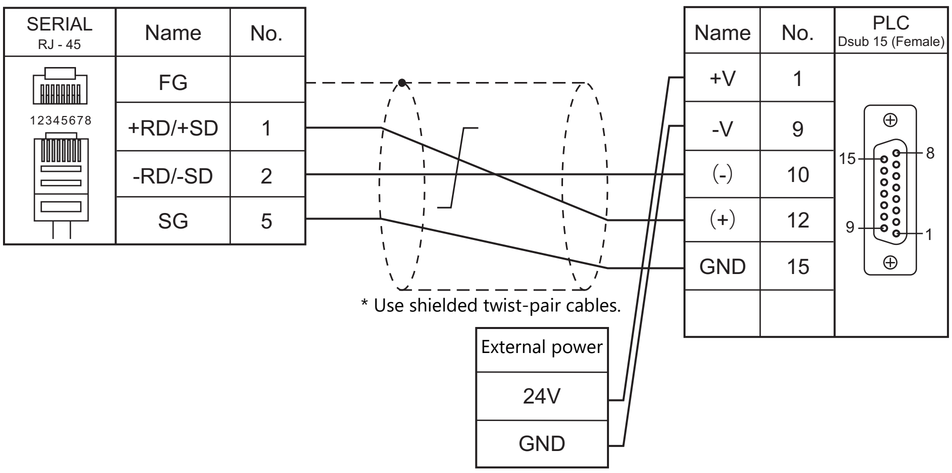


Wiring diagram 2 - M2



RS-422/485

Wiring diagram 1 - M4



24. VIGOR

24.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port		Signal Level	Connection	
					RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
M series	M1-CPU1	COM PORT	M-232R	RS-232C	Wiring diagram 1 - M2	×
			M-485R	RS-422/485	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

24.1.1 M Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400bps	
Data Length	**7 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 255	

PLC

Make PLC settings using the application software “Ladder Master”. For more information, refer to the PLC manual issued by the manufacturer.

M-232R / M-485R

(Underlined setting: default)

Item		Setting	Remarks
Application		**Computer Link**	
Computer Link Detail	Station Number	0 to 255	
	Baud Rate	4800 / 9600 / 19200 / 38400bps	38400 bps supported by M-485R only

Available Device Memory

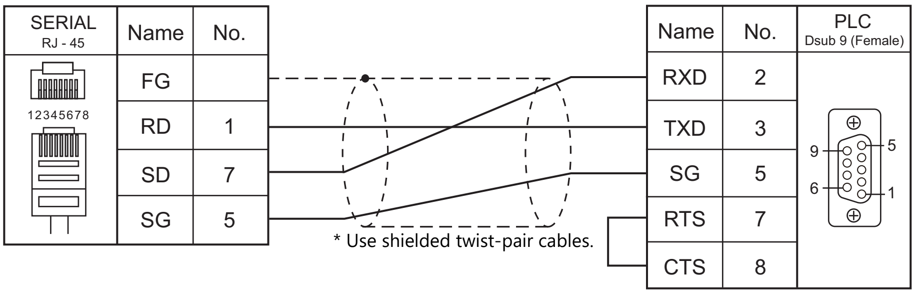
The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(Data register / Special register)	00H	D0 to D8191, D9000 to D9255
X	(Input relay)	01H	
Y	(Output relay)	02H	
M	(Internal relay / Special relay)	03H	M0 to M5119, M9000 to M9255
S	(Internal relay / Step relay)	04H	
T	(Timer / Current value)	05H	
C	(Counter / Current value)	06H	
32C	(High-speed counter / Current value)	07H	Double-word
TS	(Timer / Contact)	08H	
CS	(Counter / Contact)	09H	
TC	(Timer / Coil)	0AH	
CC	(Counter / Coil)	0BH	

24.1.2 Wiring Diagrams

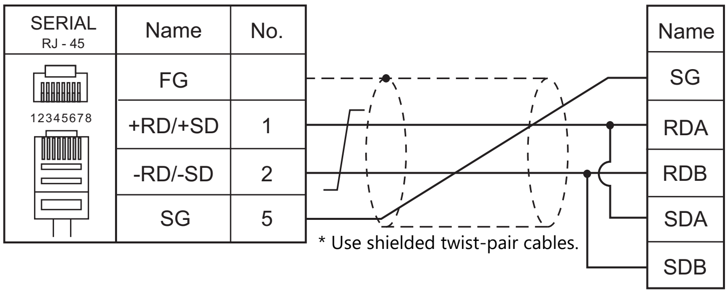
RS-232C

Wiring diagram 1 - M2

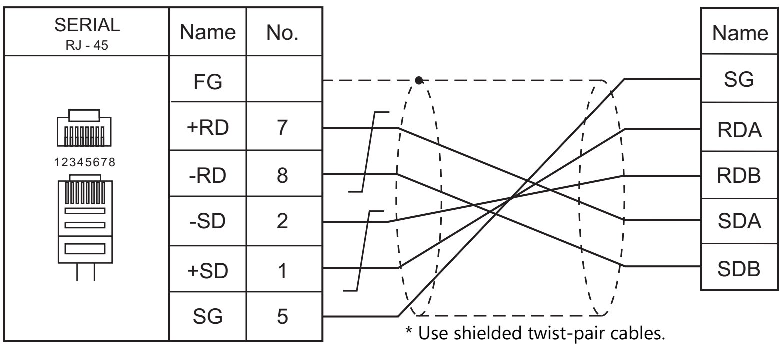


RS-422/RS-485

Wiring diagram 1 - M4



Wiring diagram 2 - M4



25. WAGO

25.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
750 series (MODBUS RTU)	750-314 750-316 750-814 750-816 750-873	Fieldbus connector	RS-232C	Wiring diagram 1 - M2	×
	750-312 750-315 750-812 750-815		RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *3

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Ethernet Connection

PLC Selection on the Editor	CPU	Unit	TCP/IP	UDP/IP	Port No.	Keep Alive *1
750 series (MODBUS Ethernet)	750-341 750-342 750-841 750-842 750-871 750-873	CPU with built-in Ethernet	○	○	502 (fixed) *2	○

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.
*2 A maximum of 15 units including the ladder tool can be connected.

25.1.1 750 Series (MODBUS RTU)

Communication Setting

Editor

Communication setting

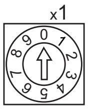
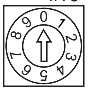
(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115K bps	Up to 19200 bps is available on 750-312, 750-314, 750-812 and 750-814. 4800 and 38400 bps are not available on 750-873.
Data Length	**8 bits**	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 255	Select station No. 0 for a broadcast command.

Bus Coupler / Bus Controller

750-312 / 750-314 / 750-315 / 750-316

Node address rotary switch

Address	Contents	Setting Example
x1  x10 	1 to 99	1

DIP switch FR

(Underlined setting: default)

DIP Switch FR	Contents	Setting Example
FR1 FR2 FR3	see table below	 Baud rate: 9600 bps Parity: None Data length: 8 bits Stop bit: 1 bit

FR1 / FR2 / FR3:

Baud Rate	FR1	FR2	FR3
4800 bps	ON	OFF	ON
9600 bps	OFF	ON	ON
19200 bps	ON	ON	ON
38400 bps*	OFF	OFF	OFF
57600 bps*	ON	OFF	OFF
115 kbps*	OFF	ON	OFF

* Available only on 750-315 and 750-316.

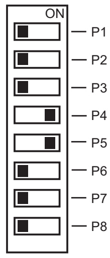
FR4 / FR5 / FR6:

Parity	Data Length	Stop Bit	FR4	FR5	FR6
None	8 bits	1 bit	OFF	OFF	OFF
Even			ON	OFF	OFF
Odd			OFF	ON	OFF
None		2 bits	ON	ON	OFF

* Before making settings on the DIP switch FR, be sure to turn off the power to the bus coupler.

DIP switch P

(Underlined setting: default)

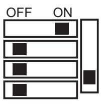
<table>
<tr><th>DIP Switch P</th><th>Contents</th><th>OFF</th><th>ON</th><th>Setting Example</th></tr>
<tr><td>P1
P2
P3</td><td>End of communication frame data</td><td colspan="2">
<table>
<tr><th>End of Data</th><th>P1</th><th>P2</th><th>P3</th></tr>
<tr><td><u>Three frames</u></td><td><u>OFF</u></td><td><u>OFF</u></td><td><u>OFF</u></td></tr>
<tr><td>100 msec</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>200 msec</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>500 msec</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>1 sec.</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>1 msec</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>10 msec</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>50 msec</td><td>ON</td><td>ON</td><td>ON</td></tr>
</table>
</td><td rowspan="6">
</td></tr>
<tr><td>P4</td><td>Data transfer mode</td><td>ASCII mode</td><td><u>RTU mode</u></td></tr>
<tr><td>P5</td><td>Error check code</td><td>Ignored</td><td><u>Executed</u></td></tr>
<tr><td>P6</td><td rowspan="3">Others</td><td colspan="2" rowspan="3"><u>OFF</u></td></tr>
<tr><td>P7</td></tr>
<tr><td>P8</td></tr>
</table>

* Before making settings on the DIP switch P, be sure to turn off the power to the bus coupler.

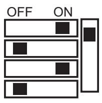
Terminating resistance

Make settings only when 750-312 or 750-315 is used.

- For 2-wire system

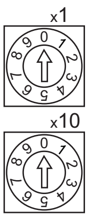


- For 4-wire system



750-812 / 750-814 / 750-815 / 750-816

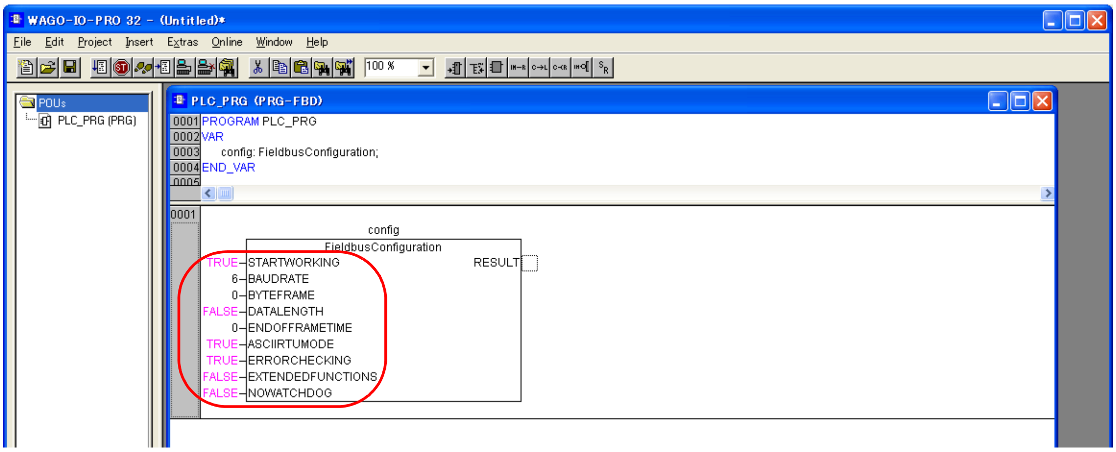
Node address rotary switch

Address	Contents	Setting Example
	1 to 99	1

PLC-PRG (PRG-FBD)

Set communication parameters using the ladder tool “WAGO-I/O-PRO 32” or “WAGO-I/O-PRO CAA”. For more information, refer to the PLC manual issued by the manufacturer.

* When setting the communication parameters, set the node address rotary switch to “0” and the operation mode switch in the upper (“run”) or center (“stop”) position.



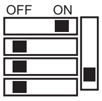
(Underlined setting: default)

<table>
<tr><th>Setting Items</th><th>Contents</th><th>Setting Example</th></tr>
<tr><td>STARTWORKING</td><td>TRUE</td><td>TRUE</td></tr>
<tr><td>BAUDRATE</td><td><table><tr><th>Baud rate</th><th>Value</th></tr><tr><td>4800 bps</td><td>5</td></tr><tr><td>9600 bps</td><td>6</td></tr><tr><td>19200 bps</td><td>7</td></tr><tr><td>38400 bps</td><td>0*</td></tr><tr><td>57600 bps</td><td>1*</td></tr><tr><td>115 kbps</td><td>2*</td></tr></table>* Available only on 750-815 and 750-816.</td><td>6</td></tr>
<tr><td>BYTEFRAME</td><td><table><tr><th>Parity</th><th>Stop Bits</th><th>Value</th></tr><tr><td>No</td><td rowspan="3">1</td><td>0</td></tr><tr><td>Even</td><td>1</td></tr><tr><td>Odd</td><td>2</td></tr><tr><td>No</td><td>2</td><td>3</td></tr></table></td><td>0</td></tr>
<tr><td>DATALENGTH</td><td>8: FALSE</td><td>FALSE</td></tr>
<tr><td>ENDOFFRAMETIME</td><td><table><tr><th>End of Frame Time</th><th>Value</th></tr><tr><td>3 x Frame Time</td><td>0</td></tr><tr><td>100 ms</td><td>1</td></tr><tr><td>200 ms</td><td>2</td></tr><tr><td>500 ms</td><td>3</td></tr><tr><td>1s</td><td>4</td></tr><tr><td>1 ms</td><td>5</td></tr><tr><td>10 ms</td><td>6</td></tr><tr><td>50 ms</td><td>7</td></tr></table></td><td>0</td></tr>
<tr><td>ASCIIRTUMODE</td><td>RTU: TRUE</td><td>TRUE</td></tr>
<tr><td>ERRORCHECKING</td><td><table><tr><th>Error Check</th><th>Value</th></tr><tr><td>ignored</td><td>FALSE</td></tr><tr><td>being processed</td><td>TRUE</td></tr></table></td><td>TRUE</td></tr>
<tr><td>EXTENDEDFUNCTIONS</td><td><table><tr><th>Extended Functions</th><th>Value</th></tr><tr><td>without</td><td>FALSE</td></tr><tr><td>available</td><td>TRUE</td></tr></table></td><td>FALSE</td></tr>
<tr><td>NOWATCHDOG</td><td><table><tr><th>Watchdog</th><th>Value</th></tr><tr><td>switched on</td><td>FALSE</td></tr><tr><td>switched off</td><td>TRUE</td></tr></table></td><td>FALSE</td></tr>
</table>

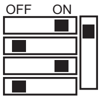
Terminating resistance

Make settings only when 750-812 or 750-815 is used.

- For 2-wire system

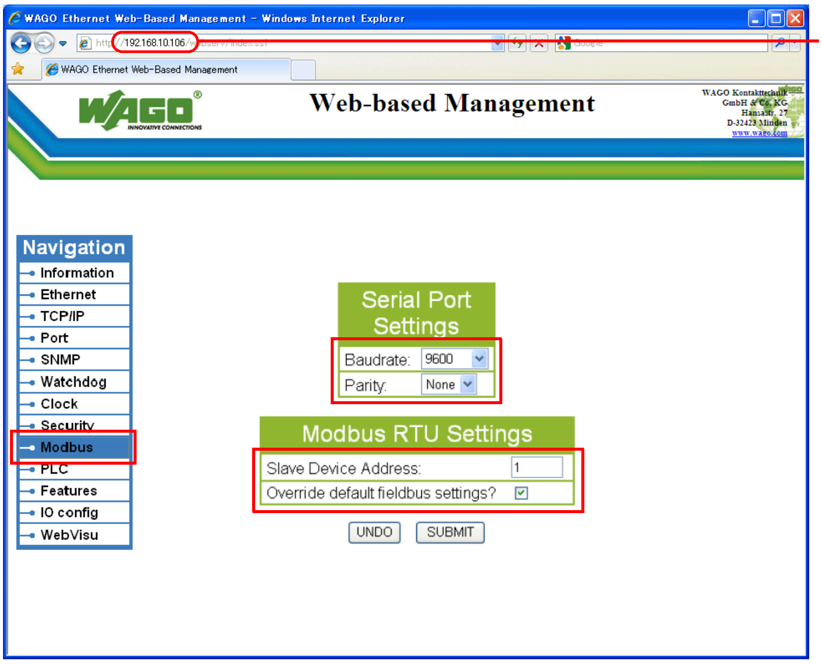


- For 4-wire system



750-873

Connect the computer to 750-873 and start the web browser.
Click [Modbus] on the browser menu. The password entry dialog appears. To log on as an administrator, enter “admin” for the user name and “wago” for the password, and click [OK].
Make settings for [Serial Port Settings] and [Modbus RTU Settings] on the screen. For more information, refer to the PLC manual issued by the manufacturer.



Enter the IP address of the bus coupler or bus controller on Internet Explorer, and press the [Enter] key to display the browser menu.

(Underlined setting: default)

Item		Setting	Remarks
Serial Port Settings	Baudrate	<u>9600</u> / 19200 / 57600 / 115K bps	
	Parity	<u>None</u> / Odd / Even	
Modbus RTU Settings	Slave Device Address	1 to 255	
	Override default fieldbus settings?	**Checked**	

* After settings are made, click [SUBMIT], and turn the power off and back on again.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
%MX (internal contact point)	00H	%MW as word device
%IX (input variable)	01H	%IW as word device
%QX (output variable)	02H	%QW as word device

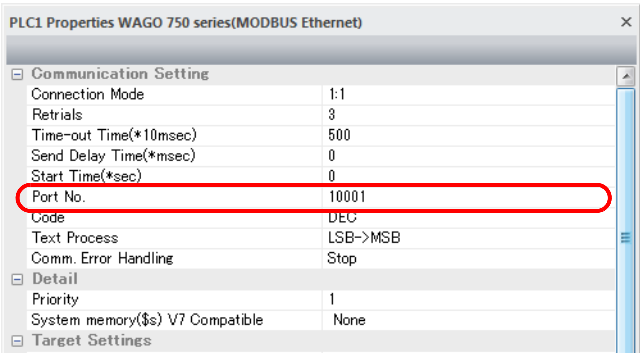
25.1.2 750 Series (MODBUS Ethernet)

Communication Setting

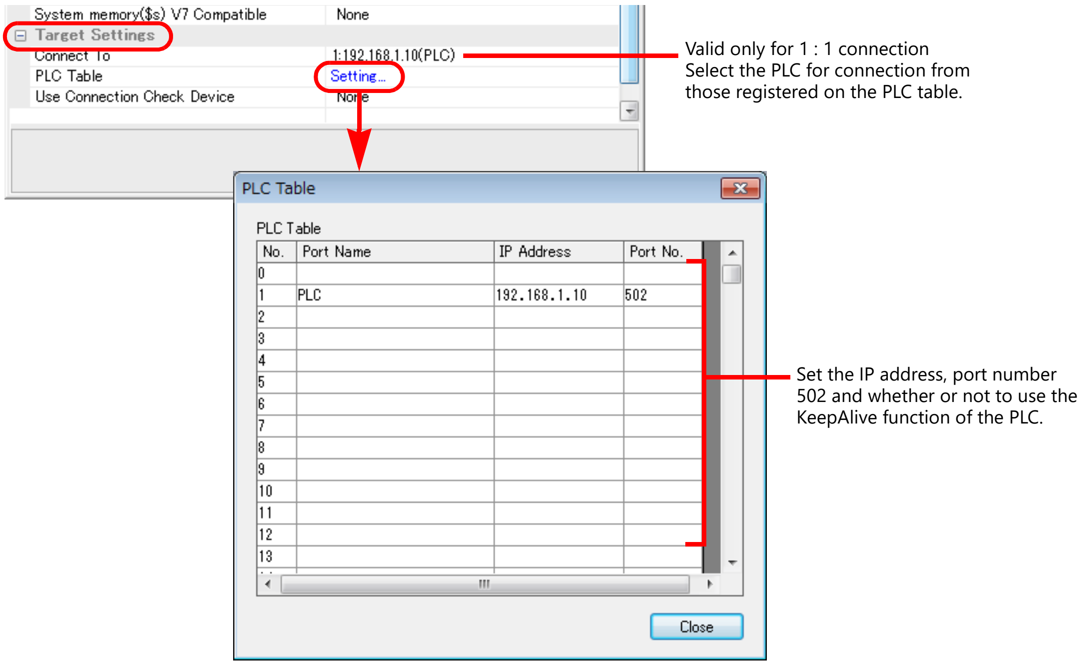
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Connection port on the X1 series unit
  [System Setting] → [Hardware Setting] → [Connection Device Selection] → [Target Port No.]
  - When using TCP/IP:
    Select [LAN (TCP)] or [LAN2 (TCP)].
  - When using UDP/IP:
    Select [LAN (UDP)] or [LAN2 (UDP)].
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]



- IP address and port number (No. 502) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

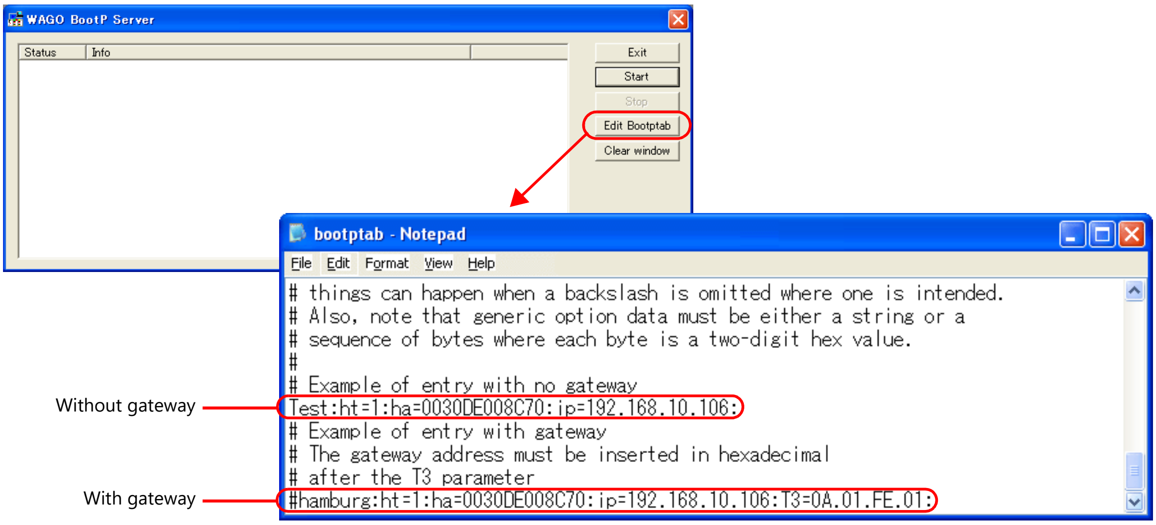


Bus Coupler / Bus Controller

Make PLC settings by using "WAGO BootP Server" or "WAGO Ethernet Settings". For more information, refer to the PLC manual issued by the manufacturer.

* For 750-342 and 750-842, only "WAGO BootP Server" can be used.

WAGO BootP Server



Example: Test:ht=1:ha:0030DE008C70:ip=192.168.10.106:

Node name, Hardware type, MAC address, IP address

* When setting the subnet mask (sm) and gateway (gw), make settings following the IP address as shown below:
Example: Test:ht=1:ha=003-DE000002:ip=192.168.10.106:sm=255.255.255.0:T3=0A:01:FE:01:

Node name, Hardware type, MAC address, IP address, Subnet mask, Gateway (HEX)

Contents	Setting
Node name	Use one-byte alphanumeric characters.
Hardware type	**ht=1**
MAC address	**ha**=MAC address (shown on the bus coupler or bus controller)
IP address table	**ip**=IP address of the PLC
Subnet mask	**sm**=subnet mask
Gateway	**T3**=gateway address (HEX) * To be set when the bus coupler or bus controller lies beyond the gateway

* When making settings for 750-871, set all DIP switches in the OFF positions.
* The port number is fixed to "502".

Delete either "#" mark at the beginning of "with gateway" or "without gateway" and save the text file. The setting with no "#" mark will take effect.

Notes on setting the IP address using "BootP Server"

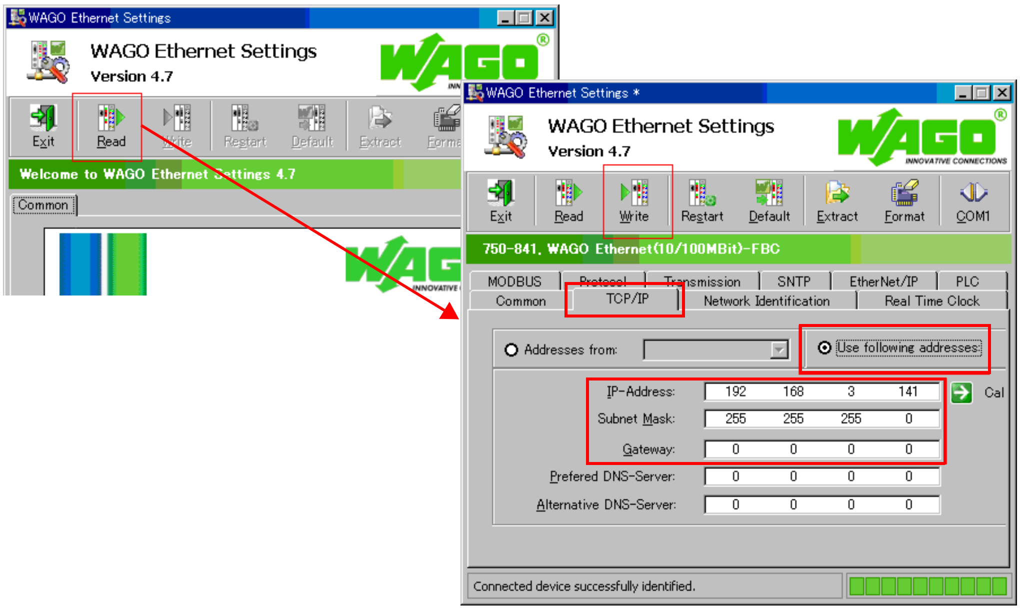
In the initial condition, the IP address set on "BootP Server" is cleared when the power is turned off and back on again. To retain the IP address even when the power has been turned off and back on again, the BootP protocol must be disabled after the IP address is set.

Connect the computer to the bus coupler or bus controller, and start the web browser. Remove the check mark from [BootP] for [Port] on the browser menu.

Click [SUBMIT] and turn the power off and back it on again. The BootP protocol becomes disabled.

* When [Port] is clicked, the password may be required. For more information, see "Enabling Modbus UDP and Modbus TCP protocols" (page 25-8).

WAGO Ethernet Settings ([TCP/IP] tab window)



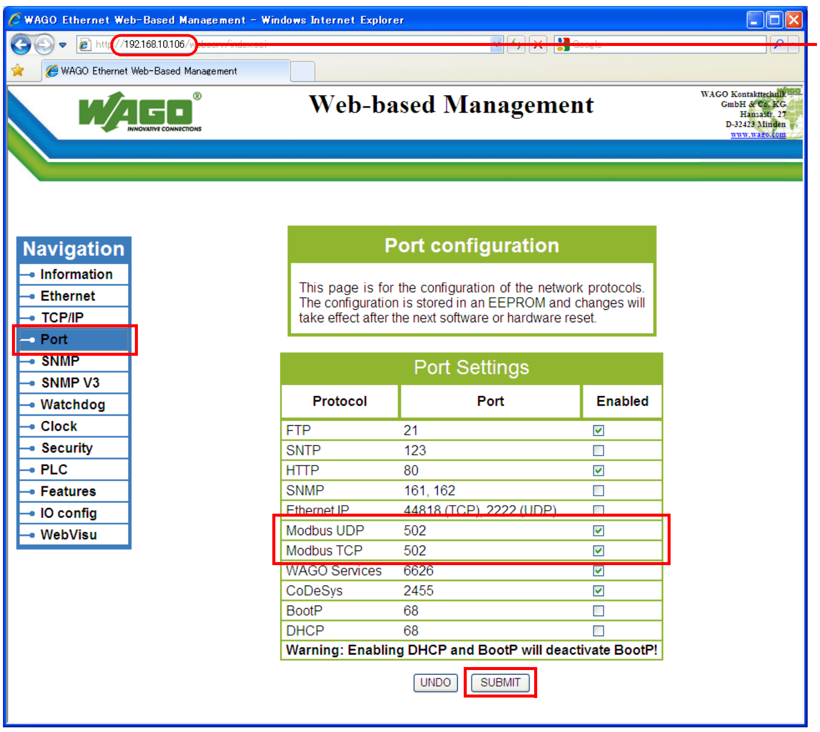
Contents	Setting	Remarks
IP-Address	Make settings in accordance with the network environment.	
Subnet Mask		
Gateway		

* When making settings for 750-871, set all DIP switches in the OFF positions.
* The port number is fixed to "502".

Enabling Modbus UDP and Modbus TCP protocols

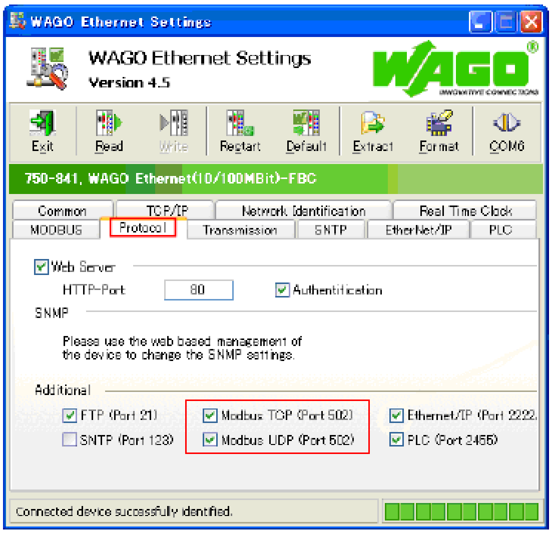
When both Modbus UDP and Modbus TCP protocols are checked (enabled), communication using either protocol becomes possible without selecting a communication protocol on the bus coupler or bus controller. For more information, refer to the PLC manual issued by the manufacturer.

- Setting on the web browser
  Connect the computer to the bus coupler or bus controller, and start the web browser.
  Click [Port] on the browser menu. The password entry dialog appears. To log on as an administrator, enter "admin" for the user name and "wago" for the password, and click [OK].
  Check both [Modbus UDP] and [Modbus TCP]. Click [SUBMIT], and turn the power off and back on again.
  * In the initial condition, both Modbus UDP and Modbus TCP are enabled (checked).



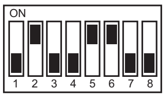
Enter the IP address of the bus coupler or bus controller on Internet Explorer, and press the [Enter] key to display the browser menu.

- Setting on the [WAGO Ethernet Settings] window ([Protocol] tab window)
  *"WAGO Ethernet Settings" cannot be used with 750-342 or 750-842.
  Check [☐ Modbus TCP (Port 502)] and [☐ Modbus UDP (Port 502)] in the [Protocol] tab window and write the settings into the bus coupler or bus controller.



750-871

The least significant byte of the IP address can be set by the DIP switch.
Note that the IP address must be set on "WAGO BootP Server" or "WAGO Ethernet Settings" in advance.
When any of the DIP switches is set in the ON position upon power-on, the IP address set by the DIP switch will take effect.

DIP Switch	Setting Example	Remarks
	50 [DEC] (00110010 BIN)	Set the least significant byte of the IP address (1 to 254). Switch 1 = LSB, switch 8 = MSB

750-873

Connect the computer to the bus coupler or bus controller, and start the web browser. Be sure to uncheck [Override default fieldbus settings?] for [Modbus RTU Settings] in the [Modbus] browser menu.

* When [Modbus] is clicked, the password may be required. For more information, see "750-873" (page 25-5).
* In the initial condition, [Override default fieldbus settings?] is unchecked.

Available Device Memory

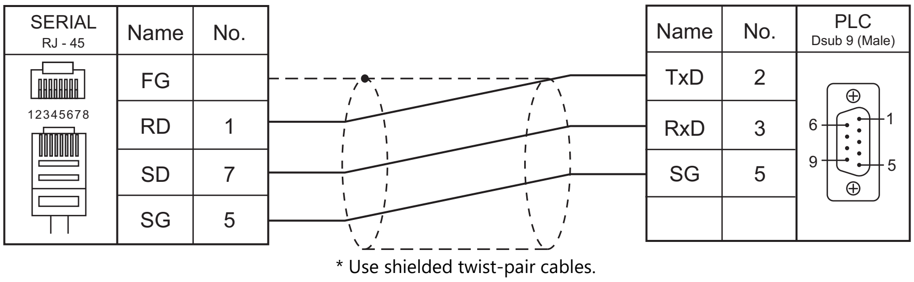
The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
%MX	(internal contact point)	00H	%MW as word device
%IX	(input variable)	01H	%IW as word device
%QX	(output variable)	02H	%QW as word device

25.1.3 Wiring Diagrams

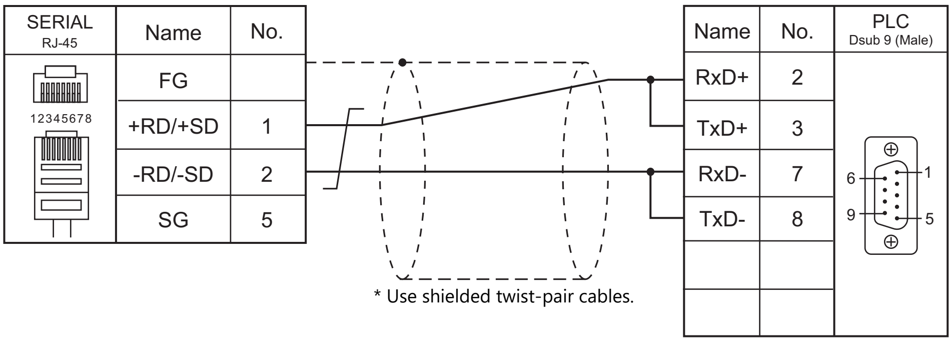
RS-232C

Wiring diagram 1 - M2

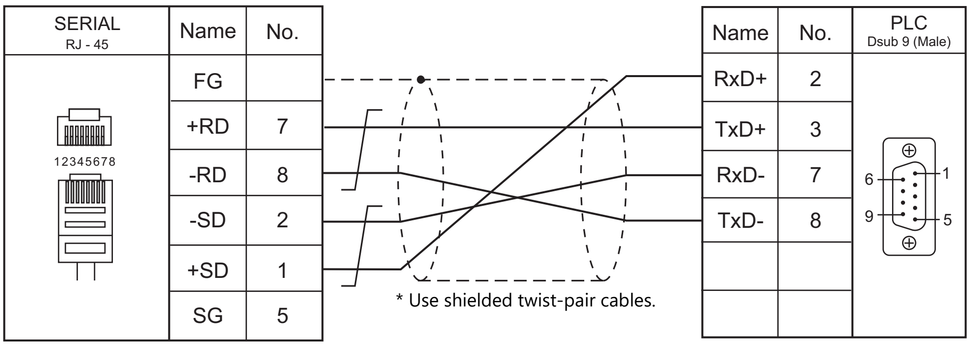


RS-422/RS-485

Wiring diagram 1 - M4



Wiring diagram 2 - M4



26. XINJE

26.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port		Signal Level	Connection	
					RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)
XC Series (MODBUS RTU)	XC2 XC3 XC5 XCM	COM1 (Mini-DIN 8-pin)		RS-232C	Wiring diagram 1 - M2	×
		COM2 (Mini-DIN 8-pin)				
		COM2 (terminal block)		RS-485	Wiring diagram 1 - M4	×
		XC-COM-BD	COM3	RS-232C	Wiring diagram 2 - M2	×
				RS-485	Wiring diagram 1 - M4	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to ”1.2.1 SERIAL” (page 1-4).

26.1.1 XC Series (MODBUS RTU)

Communication Setting

Editor

Communication setting

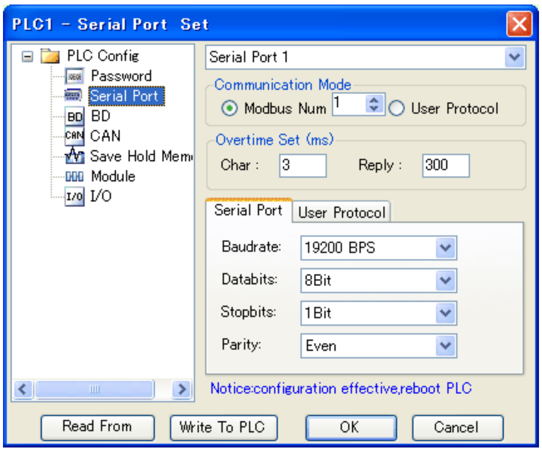
(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115200 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 254	0: Broadcast

PLC

Make communication settings by using the application software “XCPPro” or writing the setting values directly into the FD address.
For more information, refer to the PLC manual issued by the manufacturer.

PLC Config



(Underlined setting: default)

Item			Setting	Remarks
Serial Port	Serial Port 1 - 3		Select a COM port to which the X1 is connected.	
	Communication Mode	Modbus Num	1 to 254	Changes can be made to the FD address. Of the settings made with the application software and FD address, the one made last will be used.
	Serial Port	Baudrate	4800 / 9600 / 19200 / 38400 / 57600 / 115200 Bps	
		Databits	7 / 8 Bits	
		Stopbits	1 / 2 Bits	
		Parity	None / Odd / Even	
BD	BD Config		BD Serial Port	This setting is used when using “XC-COM-BD”.

After writing the settings, turn the PLC power off and on again.

FD address

<table>
<tr><th>Port</th><th>FD</th><th>Setting</th><th>Remarks</th></tr>
<tr><td rowspan="2">COM1</td><td>FD8210</td><td>Communication mode: Station number setting</td><td rowspan="6">Changes can be made using the application software.
Of the settings made with the application software and FD address, the one made last will be used.</td></tr>
<tr><td>FD8211</td><td>Communication format: Baud rate, data length, stop bit, parity settings

bit 15 14 13 12 | 11 10 9 8 | 7 6 5 4 | 3 2 1 0

Parity (bits 15–12)
0: None
1: Odd
2: Even

Stopbits (bits 11–8)
0: 2 Bits
2: 1 Bit

Databits (bits 7–4)
0: 8 Bits
1: 7 Bits

Baudrate (bits 3–0)
4: 4800 BPS
5: 9600 BPS
6: 19200 BPS
7: 38400 BPS
8: 57600 BPS
9: 115200 BPS</td></tr>
<tr><td rowspan="2">COM2</td><td>FD8220</td><td rowspan="2">Same as COM1</td></tr>
<tr><td>FD8221</td></tr>
<tr><td rowspan="2">COM3</td><td>FD8230</td><td rowspan="2">Same as COM1</td></tr>
<tr><td>FD8231</td></tr>
</table>

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
M	(auxiliary relays)	01H	
X	(input relay)	02H	
Y	(output relay)	03H	
S	(status relays)	04H	
T	(timer)	05H	
TD	(timer data)	06H	
C	(counter)	07H	
CD	(counter data)	08H	
FD	(flashROM register)	09H	

Indirect Device Memory Designation

	15 8	7 0
n + 0	Model	Device type
n + 1	Address No.	
n + 2	Expansion code	Bit designation
n + 3	00	Station number

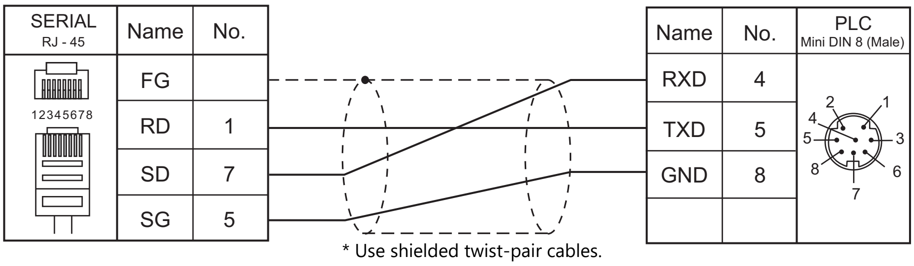
- For X or Y device memory:
  Convert the address from octal notation (OCT) to decimal (DEC) and divide by 16. Specify the quotient as the address number. Specify the remainder for bit designation.

  Example: Indirect device memory designation of "X31"
  31 (OCT) → 25 (DEC) ÷ 16 = 1 remainder 9
  Specify "1" (DEC) for the address number, and "9" (DEC) for the bit designation.

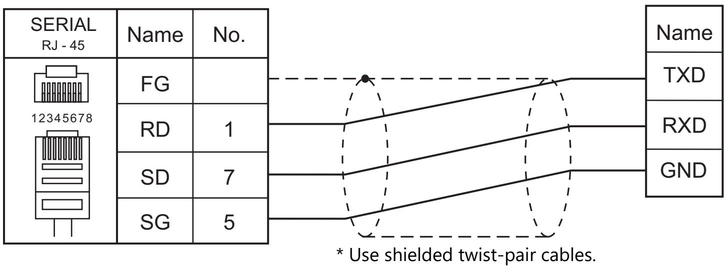
26.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

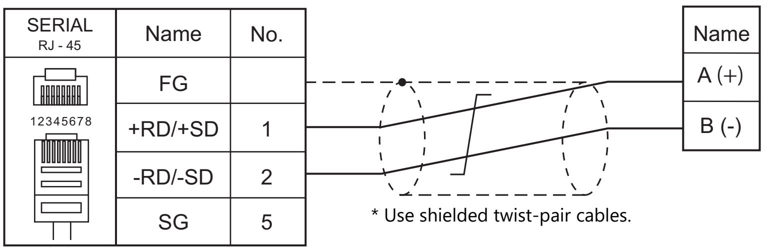


Wiring diagram 2 - M2



RS-422/RS-485

Wiring diagram 1 - M4



27. YAMAHA

27.1 Temperature Controller/Servo/Inverter Connection

Serial Connection

Robot Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C*1 / RS-485 (2-wire)	RS-422 (4-wire)	
RCX142	RCX142	COM	RS-232C	Wiring diagram 1 - M2	×	Y_RCX142.lst
	RCX222					
	RCX240					

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

27.1.1 RCX142

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1	
Signal Level	**RS-232C**	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 bps	
Data Length	7 / 8 bits	
Stop Bit	**1 bit**	
Parity	None / Odd / Even	
CR/LF	CR / CR/LF	

Robot Controller

RCX142/RCX240

Set communication parameters using the MPB programming box (RPB programming box for RCX240). For more information, refer to the instruction manual for the robot controller issued by the manufacturer.

(Underlined setting: default)

Mode	Sub Menu	Item	Setting	Remarks
SYSTEM	CMU	1. CMU mode	**ONLINE**	
		2. Data bits*1	7 / 8 bits	
		3. Baud rate	4800 / 9600 / 19200 / 38400 / 57600 bps	
		4. Stop bit	1 / 2 bits	
		5. Parity	NON / ODD / EVEN	
		6. Termination code	CR / CRLF	
		7. XON/XOFF control *2	**NO**	
		8. RTS/CTS control *2	**NO**	

*1 If Japanese is selected for the interface language, set the data bit to “8”.

RCX222

Set communication parameters using the RPB programming box. For more information, refer to the instruction manual for the robot controller issued by the manufacturer.

(Underlined setting: default)

Mode	Sub Menu	Item	Setting	Remarks
SYSTEM	CMU	1. CMU mode	**ONLINE**	
		2. Data bits*1	7 / 8 bits	
		3. Baud rate	4800 / 9600 / 19200 / 38400 / 57600 bps	
		4. Stop bit	1 / 2 bits	
		5. Parity	NON / ODD / EVEN	
		6. Termination code	CR / CRLF	
		7. Flow control	**NO**	

*1 If Japanese is selected for the interface language, set the data bit to “8”.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
LANG	(interface language)	00H	
ACSL	(access level)	01H	
ARM1	(arm status (main robot))	02H	
ARM2	(arm status (sub robot))	03H	
BRKP	(break point)	04H	
EXEL	(execution level)	05H	
MODS	(mode status)	06H	
ORIG	(origin return status)	07H	Read only
ABSR	(absolute reset status)	08H	Double-word, read only
SERV	(servo status)	09H	Double-word, read only
SEQE	(sequence program execution status)	0AH	
UNIT	(point unit coordinate system)	0BH	
VERS	(version)	0CH	Read only
WHR1	(current position in pulse coordinate system (main group))	0DH	Double-word, read only
WHR2	(current position in pulse coordinate system (sub group))	0EH	Double-word, read only
WXY1	(current position in XY coordinate system (main group))	0FH	Double-word, read only
WXY2	(current position in XY coordinate system (sub group))	10H	Double-word, read only
SIFT	(shift status)	11H	Read only
HAND	(hand status)	12H	Read only
MEMR	(remaining memory capacity)	13H	Double-word, read only
EMGS	(emergency stop status)	14H	Read only
SELF	(error status in self-diagnosis)	15H	Read only
OPTS	(option slot status)	16H	Read only
PRGS	(program execution status)	17H	Read only
TSKS	(running or suspended status of task)	18H	Read only
TSKM	(task operation status)	19H	Read only

LANG (interface language)

Address	Name	Setting Range
0	Interface language	0: Japanese 1: English

ACSL (access level)

Address	Name	Setting Range
0	Access level	0 to 3

ARM1 (arm status (main robot))

Address	Name	Setting Range
0	Current arm setting	0: Right-hand system 1: Left-hand system
1	Arm setting at the time of program reset	0: Right-hand system 1: Left-hand system

ARM2 (arm status (sub robot))

Address	Name	Setting Range
0	Current arm setting	0: Right-hand system 1: Left-hand system
1	Arm setting at the time of program reset	0: Right-hand system 1: Left-hand system

BRKP (break point)

Address	Name	Setting Range
0	Line number of break point 1	0 to 19999
1	Line number of break point 2	0 to 19999
2	Line number of break point 3	0 to 19999
3	Line number of break point 4	0 to 19999

EXEL (execution level)

Address	Name	Setting Range
0	Execution level	0 to 8

MODS (mode status)

Address	Name	Setting Range
0	Mode status	0: AUTO 1: PROGRAM 2: MANUAL 3: SYSTEM

ORIG (origin return status)

Address	Name	Setting Range
0	Origin return status	0: Completed 1: Not completed

ABSR (absolute reset status)

Address	Name	Setting Range
0	Completed or not completed	0: Completed 1: Not completed
1	Status of each axis (output only when address 0 is set to “1” (absolute reset not completed))	00000000 to 99999999 XXXXXXXX Axis 1 0: Not completed : 1: Completed Axis 8 9: Not applicable

SERV (servo status)

Address	Name	Setting Range
0	Motor power ON/OFF status	0: Motor power ON 1: Motor power OFF
1	Status of each axis	00000000 to 99999999 XXXXXXXX Axis 1 0: Mechanical brake ON + dynamic brake ON : 1: Servo ON Axis 8 2: Mechanical brake OFF + dynamic brake OFF 9: Not applicable

SEQE (sequence program execution status)

Address	Name	Setting Range
0	Availability	0: Disabled 1: Enabled 3: Enabled, and output cleared at the time of emergency stop
1	Execution status	0: Stopped 1: In progress

UNIT (point unit coordinate system)

Address	Name	Setting Range
0	Point unit coordinate system	0: Joint coordinates in units of pulse 1: Cartesian coordinates in units of mm or deg.

VERS (version)

Address	Name	Setting Range
0	Host version	
1	Host revision	
2	MPB/RPB version	
3	Driver version 1	
4	Driver version 2	
5	Driver version 3	
6	Driver version 4	
7	Driver version 5	
8	Driver version 6	
9	Driver version 7	
10	Driver version 8	
11	Option unit version	

WHR1 (current position in pulse coordinate system (main group))

Address	Name	Setting Range
0	Current position of axis 1 in the pulse coordinate system (main group)	-999999 to 999999
1	Current position of axis 2 in the pulse coordinate system (main group)	-999999 to 999999
2	Current position of axis 3 in the pulse coordinate system (main group)	-999999 to 999999
3	Current position of axis 4 in the pulse coordinate system (main group)	-999999 to 999999
4	Current position of axis 5 in the pulse coordinate system (main group)	-999999 to 999999
5	Current position of axis 6 in the pulse coordinate system (main group)	-999999 to 999999

WHR2 (current position in pulse coordinate system (sub group))

Address	Name	Setting Range
0	Current position of axis 1 in the pulse coordinate system (sub group)	-999999 to 999999
1	Current position of axis 2 in the pulse coordinate system (sub group)	-999999 to 999999
2	Current position of axis 3 in the pulse coordinate system (sub group)	-999999 to 999999
3	Current position of axis 4 in the pulse coordinate system (sub group)	-999999 to 999999
4	Current position of axis 5 in the pulse coordinate system (sub group)	-999999 to 999999
5	Current position of axis 6 in the pulse coordinate system (sub group)	-999999 to 999999

WXY1 (current position in XY coordinate system (main group))

Address	Name	Setting Range
0	Current position of axis 1 in units of “mm” (main group)	-999999 to 999999
1	Current position of axis 2 in units of “mm” (main group)	-999999 to 999999
2	Current position of axis 3 in units of “mm” (main group)	-999999 to 999999
3	Current position of axis 4 in units of “mm” (main group)	-999999 to 999999
4	Current position of axis 5 in units of “mm” (main group)	-999999 to 999999
5	Current position of axis 6 in units of “mm” (main group)	-999999 to 999999

WXY2 (current position in XY coordinate system (sub group))

Address	Name	Setting Range
0	Current position of axis 1 in units of “mm” (sub group)	-999999 to 999999
1	Current position of axis 2 in units of “mm” (sub group)	-999999 to 999999
2	Current position of axis 3 in units of “mm” (sub group)	-999999 to 999999
3	Current position of axis 4 in units of “mm” (sub group)	-999999 to 999999
4	Current position of axis 5 in units of “mm” (sub group)	-999999 to 999999
5	Current position of axis 6 in units of “mm” (sub group)	-999999 to 999999

SIFT (shift status)

Address	Name	Setting Range
0	Shift number selected for main robot	0 to 9
1	Shift number selected for sub robot	0 to 9

HAND (hand status)

Address	Name	Setting Range
0	Hand number selected for main robot	0 to 3
1	Hand number selected for sub robot	4 to 7

MEMR (remaining memory capacity)

Address	Name	Setting Range
0	Remaining source area (unit: byte)	
1	Remaining object area (unit: byte)	

EMGS (emergency stop status)

Address	Name	Setting Range
0	Emergency stop status	0: Normal 1: Emergency stop

SELF (error status in self-diagnosis)

Address	Name	Setting Range
0 to 49	Error status 1	[Error group No.] . [Error category No.] : [Error message] (CHAR)
50 to 99	Error status 2	
100 to 149	Error status 3	
150 to 199	Error status 4	
200 to 249	Error status 5	

OPTS (option slot status)

Address	Name	Setting Range
0 to 49	Option slot status 1	Option board name (CHAR)
50 to 99	Option slot status 2	
100 to 149	Option slot status 3	
150 to 199	Option slot status 4	

PRGS (program execution status)

Address	Name	Setting Range
0 to 49	Name of currently selected program	Program name (CHAR)
50	Current task number	1 to 8
51	Line number of current program	1 to 9999
52	Priority of current task	17 to 47

TSKS (running or suspended status of task)

Address	Name	Setting Range
0	Number of task currently running or suspended (No. 1)	1 to 8
1	Number of task currently running or suspended (No. 2)	1 to 8
2	Number of task currently running or suspended (No. 3)	1 to 8
3	Number of task currently running or suspended (No. 4)	1 to 8
4	Number of task currently running or suspended (No. 5)	1 to 8
5	Number of task currently running or suspended (No. 6)	1 to 8
6	Number of task currently running or suspended (No. 7)	1 to 8
7	Number of task currently running or suspended (No. 8)	1 to 8

TSKM (task operation status)

Address	Name	Setting Range
0	Number of line being executed in task (No. 1)	1 to 9999
1	Task status (No. 1)	0: In progress 1: Suspended 2: Stopped
2	Priority (No. 1)	17 to 47
3	Number of line being executed in task (No. 2)	1 to 9999
4	Task status (No. 2)	0: In progress 1: Suspended 2: Stopped
5	Priority of task (No. 2)	17 to 47
6	Number of line being executed in task (No. 3)	1 to 9999
7	Task status (No. 3)	0: In progress 1: Suspended 2: Stopped
8	Priority of task (No. 3)	17 to 47
9	Number of line being executed in task (No. 4)	1 to 9999
10	Task status (No. 4)	0: In progress 1: Suspended 2: Stopped
11	Priority of task (No. 4)	17 to 47
12	Number of line being executed in task (No. 5)	1 to 9999
13	Task status (No. 5)	0: In progress 1: Suspended 2: Stopped
14	Priority of task (No. 5)	17 to 47
15	Number of line being executed in task (No. 6)	1 to 9999
16	Task status (No. 6)	0: In progress 1: Suspended 2: Stopped
17	Priority of task (No. 6)	17 to 47
18	Number of line being executed in task (No. 7)	1 to 9999
19	Task status (No. 7)	0: In progress 1: Suspended 2: Stopped
20	Priority of task (No. 7)	17 to 47
21	Number of line being executed in task (No. 8)	1 to 9999
22	Task status (No. 8)	0: In progress 1: Suspended 2: Stopped
23	Priority of task (No. 8)	17 to 47

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
Program operation	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 0	
		n + 2	0: RESET 1: RUN 2: STEP 3: SKIP 4: NEXT 5: STOP	
Switching of execution task	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 1	
Manual speed change	1 - 8 (PLC1 - 8)	n	Station number	4
		n + 1	Command: 2	
		n + 2	0: Main robot 1: Sub robot	
		n + 3	Manual movement speed: 1 to 100	
Moving to absolute reset position	1 - 8 (PLC1 - 8)	n	Station number	5
		n + 1	Command: 3	
		n + 2	0: Main robot 1: Sub robot	
		n + 3	Designated axis: 1 to 6	
		n + 4	Direction of movement 0: Positive direction 1: Negative direction	
Absolute reset for each axis	1 - 8 (PLC1 - 8)	n	Station number	4
		n + 1	Command: 4	
		n + 2	0: Main robot 1: Sub robot	
		n + 3	Designated axis: 1 to 6	
Memory area initialization	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 5	
		n + 2	0: Program data 1: Point data 2: Shift data 3: Hand data 4: Pallet data 5: Point comment data 6: All of above data (program, point, shift, hand, pallet and point comment) 7: Parameter data 8: All data	
Communication port initialization	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 6	
Error log initialization	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 7	
Resetting of internal emergency stop flag	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 8	
Acquisition of controller configuration status	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 9	
		n + 2 to n + 3	Acquired text	
Acquisition of message line information displayed on MPB/RPB	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 10	
		n + 2 to n + 3	Acquired text	
Acquisition of error message	1 - 8 (PLC1 - 8)	n	Station number	4
		n + 1	Command: 11	
		n + 2	Top number of acquired data: 1 to 500	
		n + 3	Last number of acquired data: 1 to 500	
		n + 4 - n + 5	Acquired text	

Contents	F0	F1 (= $u n)		F2
Acquisition of speed setting status	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 12	
		n + 2	Setting for automatic movement speed (main group): 1 to 100	
		n + 3	Setting for manual movement speed (main group): 1 to 100	
		n + 4	Setting for automatic movement speed (sub group): 1 to 100	
		n + 5	Setting for manual movement speed (sub group): 1 to 100	
Command execution interruption	1 - 8 (PLC1 - 8)	n	Station number	2
		n + 1	Command: 13	
Reading of point data	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 14	
		n + 2	Point number: 0 to 9999	
		n + 3	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 4 to n + 5	Point data 1	
		n + 6 to n + 7	Point data 2	
		n + 8 to n + 9	Point data 3	
		n + 10 to n + 11	Point data 4	
		n + 12 to n + 13	Point data 5	
		n + 14 to n + 15	Point data 6	
		n + 16	Extended hand system flag setting 0: No setting 1: Right-hand system 2: Left-hand system	
Writing of point data	1 - 8 (PLC1 - 8)	n	Station number	17
		n + 1	Command: 15	
		n + 2	Point number: 0 to 9999	
		n + 3	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 4 to n + 5	Point data 1	
		n + 6 to n + 7	Point data 2	
		n + 8 to n + 9	Point data 3	
		n + 10 to n + 11	Point data 4	
		n + 12 to n + 13	Point data 5	
		n + 14 to n + 15	Point data 6	
		n + 16	Extended hand system flag setting 0: No setting 1: Right-hand system 2: Left-hand system	
Reading of parameter (controller)	1 - 8 (PLC1 - 8)	n	Station number	5
		n + 1	Command: 16	
		n + 2 to n + 4	Parameter label (six alphabetical characters)	
		n + 5	Type 0: Entire controller	
		n + 6 to n + 7	Parameter data	
		n + 8 to n + 9	Comment	
Reading of parameter (main robot / main robot + sub robot)	1 - 8 (PLC1 - 8)	n	Station number	5
		n + 1	Command: 16	
		n + 2 to n + 4	Parameter label (six alphabetical characters)	
		n + 5	Type 1: Main robot 2: Main robot + sub robot	
		n + 6 to n + 7	Parameter data (main robot)	
		n + 8 to n + 9	Parameter data (sub robot)	
		n + 10 to n + 11	Comment	

Contents	F0	F1 (= $u n)		F2
Reading of parameter (4-axis/8-axis)	1 - 8 (PLC1 - 8)	n	Station number	5
		n + 1	Command: 16	
		n + 2 to n + 4	Parameter label (six alphabetical characters)	
		n + 5	Type 3: 4-axis 4: 8-axis	
		n + 6 to n + 7	Parameter data (axis 1)	
		n + 8 to n + 9	Parameter data (axis 2)	
		n + 10 to n + 11	Parameter data (axis 3)	
		n + 12 to n + 13	Parameter data (axis 4)	
		n + 14 to n + 15	Parameter data (axis 5)	
		n + 16 to n + 17	Parameter data (axis 6)	
		n + 18 to n + 19	Parameter data (axis 7)	
		n + 20 to n + 21	Parameter data (axis 8)	
		n + 22 to n + 23	Comment	
Writing of parameter (controller)	1 - 8 (PLC1 - 8)	n	Station number	8 + (m + 1) / 2
		n + 1	Command: 17	
		n + 2 to n + 4	Parameter label (six alphabetical characters)	
		n + 5	Type 0: Entire controller	
		n + 6 to n + 7	Parameter data	
		n + 8 -	Comment: m	
Writing of parameter (main robot / main robot + sub robot)	1 - 8 (PLC1 - 8)	n	Station number	10 + (m + 1) / 2
		n + 1	Command: 17	
		n + 2 to n + 4	Parameter label (six alphabetical characters)	
		n + 5	Type 1: Main robot 2: Main robot + sub robot	
		n + 6 to n + 7	Parameter data (main robot)	
		n + 8 to n + 9	Parameter data (sub robot)	
		n + 10 -	Comment: m	
Writing of parameter (4-axis/8-axis)	1 - 8 (PLC1 - 8)	n	Station number	22 + (m + 1) / 2
		n + 1	Command: 17	
		n + 2 to n + 4	Parameter label (six alphabetical characters)	
		n + 5	Type 3: 4-axis 4: 8-axis	
		n + 6 to n + 7	Parameter data (axis 1)	
		n + 8 to n + 9	Parameter data (axis 2)	
		n + 10 to n + 11	Parameter data (axis 3)	
		n + 12 to n + 13	Parameter data (axis 4)	
		n + 14 to n + 15	Parameter data (axis 5)	
		n + 16 to n + 17	Parameter data (axis 6)	
		n + 18 to n + 19	Parameter data (axis 7)	
		n + 20 to n + 21	Parameter data (axis 8)	
		n + 22 -	Comment: m	
Reading of shift coordinate value definition	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 18	
		n + 2	Shift coordinate number: 0 to 9	
		n + 3	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 4 to n + 5	Shift coordinate 1 (S)	
		n + 6 to n + 7	Shift coordinate 2 (S)	
		n + 8 to n + 9	Shift coordinate 3 (S)	
		n + 10 to n + 11	Shift coordinate 4 (S)	
		n + 12 to n + 13	Shift coordinate 1 (SP)	
		n + 14 to n + 15	Shift coordinate 2 (SP)	
		n + 16 to n + 17	Shift coordinate 3 (SP)	
		n + 18 to n + 19	Shift coordinate 4 (SP)	
		n + 20 to n + 21	Shift coordinate 1 (SM)	
		n + 22 to n + 23	Shift coordinate 2 (SM)	
		n + 24 to n + 25	Shift coordinate 3 (SM)	
		n + 26 to n + 27	Shift coordinate 4 (SM)	

Contents	F0	F1 (= $u n)		F2
Writing of shift coordinate value definition	1 - 8 (PLC1 - 8)	n	Station number	28
		n + 1	Command: 19	
		n + 2	Shift coordinate number: 0 to 9	
		n + 3	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 4 to n + 5	Shift coordinate 1 (S)	
		n + 6 to n + 7	Shift coordinate 2 (S)	
		n + 8 to n + 9	Shift coordinate 3 (S)	
		n + 10 to n + 11	Shift coordinate 4 (S)	
		n + 12 to n + 13	Shift coordinate 1 (SP)	
		n + 14 to n + 15	Shift coordinate 2 (SP)	
		n + 16 to n + 17	Shift coordinate 3 (SP)	
		n + 18 to n + 19	Shift coordinate 4 (SP)	
		n + 20 to n + 21	Shift coordinate 1 (SM)	
		n + 22 to n + 23	Shift coordinate 2 (SM)	
		n + 24 to n + 25	Shift coordinate 3 (SM)	
		n + 26 to n + 27	Shift coordinate 4 (SM)	
Reading of hand definition	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 20	
		n + 2	Hand number: 0 to 7	
		n + 3	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 4 to n + 5	Hand 1	
		n + 6 to n + 7	Hand 2	
		n + 8 to n + 9	Hand 3	
		n + 10	Hand attachment to R axis 0: None 1: Attached	
Writing of hand definition	1 - 8 (PLC1 - 8)	n	Station number	11
		n + 1	Command: 21	
		n + 2	Hand number: 0 to 7	
		n + 3	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 4 to n + 5	Hand 1	
		n + 6 to n + 7	Hand 2	
		n + 8 to n + 9	Hand 3	
		n + 10	Hand attachment to R axis 0: None 1: Attached	

Contents	F0	F1 (= $u n)		F2
Reading of pallet definition	1 - 8 (PLC1 - 8)	n	Station number	3
		n + 1	Command: 22	
		n + 2	Pallet number: 0 to 19	
		n + 3	NX	
		n + 4	NY	
		n + 5	NZ	
		n + 6	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 7 to n + 8	Coordinate data 1 for P [1]	
		n + 9 to n + 10	Coordinate data 2 for P [1]	
		n + 11 to n + 12	Coordinate data 3 for P [1]	
		n + 13 to n + 14	Coordinate data 4 for P [1]	
		n + 15 to n + 16	Coordinate data 5 for P [1]	
		n + 17 to n + 18	Coordinate data 6 for P [1]	
		n + 19 to n + 20	Coordinate data 1 for P [2]	
		n + 21 to n + 22	Coordinate data 2 for P [2]	
		n + 23 to n + 24	Coordinate data 3 for P [2]	
		n + 25 to n + 26	Coordinate data 4 for P [2]	
		n + 27 to n + 28	Coordinate data 5 for P [2]	
		n + 29 to n + 30	Coordinate data 6 for P [2]	
		n + 31 to n + 32	Coordinate data 1 for P [3]	
		n + 33 to n + 34	Coordinate data 2 for P [3]	
		n + 35 to n + 36	Coordinate data 3 for P [3]	
		n + 37 to n + 38	Coordinate data 4 for P [3]	
		n + 39 to n + 40	Coordinate data 5 for P [3]	
		n + 41 to n + 42	Coordinate data 6 for P [3]	
		n + 43 to n + 44	Coordinate data 1 for P [4]	
		n + 45 to n + 46	Coordinate data 2 for P [4]	
		n + 47 to n + 48	Coordinate data 3 for P [4]	
		n + 49 to n + 50	Coordinate data 4 for P [4]	
		n + 51 to n + 52	Coordinate data 5 for P [4]	
		n + 53 to n + 54	Coordinate data 6 for P [4]	
		n + 55 to n + 56	Coordinate data 1 for P [5]	
		n + 57 to n + 58	Coordinate data 2 for P [5]	
		n + 59 to n + 60	Coordinate data 3 for P [5]	
		n + 61 to n + 62	Coordinate data 4 for P [5]	
		n + 63 to n + 64	Coordinate data 5 for P [5]	
		n + 65 to n + 66	Coordinate data 6 for P [5]	

Contents	F0	F1 (= $u n)		F2
Writing of pallet definition	1 - 8 (PLC1 - 8)	n	Station number	67
		n + 1	Command: 23	
		n + 2	Pallet number: 0 to 19	
		n + 3	NX	
		n + 4	NY	
		n + 5	NZ	
		n + 6	Coordinate system 0: Pulse (integer) 1 or greater: mm (decimal places)	
		n + 7 to n + 8	Coordinate data 1 for P [1]	
		n + 9 to n + 10	Coordinate data 2 for P [1]	
		n + 11 to n + 12	Coordinate data 3 for P [1]	
		n + 13 to n + 14	Coordinate data 4 for P [1]	
		n + 15 to n + 16	Coordinate data 5 for P [1]	
		n + 17 to n + 18	Coordinate data 6 for P [1]	
		n + 19 to n + 20	Coordinate data 1 for P [2]	
		n + 21 to n + 22	Coordinate data 2 for P [2]	
		n + 23 to n + 24	Coordinate data 3 for P [2]	
		n + 25 to n + 26	Coordinate data 4 for P [2]	
		n + 27 to n + 28	Coordinate data 5 for P [2]	
		n + 29 to n + 30	Coordinate data 6 for P [2]	
		n + 31 to n + 32	Coordinate data 1 for P [3]	
		n + 33 to n + 34	Coordinate data 2 for P [3]	
		n + 35 to n + 36	Coordinate data 3 for P [3]	
		n + 37 to n + 38	Coordinate data 4 for P [3]	
		n + 39 to n + 40	Coordinate data 5 for P [3]	
		n + 41 to n + 42	Coordinate data 6 for P [3]	
		n + 43 to n + 44	Coordinate data 1 for P [4]	
		n + 45 to n + 46	Coordinate data 2 for P [4]	
		n + 47 to n + 48	Coordinate data 3 for P [4]	
		n + 49 to n + 50	Coordinate data 4 for P [4]	
		n + 51 to n + 52	Coordinate data 5 for P [4]	
		n + 53 to n + 54	Coordinate data 6 for P [4]	
		n + 55 to n + 56	Coordinate data 1 for P [5]	
		n + 57 to n + 58	Coordinate data 2 for P [5]	
		n + 59 to n + 60	Coordinate data 3 for P [5]	
		n + 61 to n + 62	Coordinate data 4 for P [5]	
		n + 63 to n + 64	Coordinate data 5 for P [5]	
		n + 65 to n + 66	Coordinate data 6 for P [5]	
Reading of device port	1 - 8 (PLC1 - 8)	n	Station number	4
		n + 1	Command: 24	
		n + 2	Device port 0: DI port 1: DO port 2: MO port 3: TO port 4: LO port 5: SI port 6: SO port	
		n + 3	Port number: 0 to 7, 10 to 17, 20 to 27	
		n + 4	Point data	
Writing of device port	1 - 8 (PLC1 - 8)	n	Station number	5
		n + 1	Command: 25	
		n + 2	Device port 1: DO port 2: MO port 3: TO port 4: LO port 6: SO port	
		n + 3	Port number: 0 to 7, 10 to 17, 20 to 27	
		n + 4	Point data	

Contents	F0	F1 (= $u n)		F2
Reading of dynamic variable (Data type: integer/real number)	1 - 8 (PLC1 - 8)	n	Station number	15
		n + 1	Command: 26	
		n + 2 to n + 9	Variable name (max. 16 characters)	
		n + 10	Variable type 0: Simple variable 1: One-dimensional array variable 2: Two-dimensional array variable 3: Three-dimensional array variable	
		n + 11	Subscript for one dimension *1	
		n + 12	Subscript for two dimensions *2	
		n + 13	Subscript for three dimensions *3	
		n + 14	Data type 0: Integer 1: Real number	
		n + 15 to n + 16	Data	
Reading of dynamic variable (Data type: text)	1 - 8 (PLC1 - 8)	n	Station number	15
		n + 1	Command: 26	
		n + 2 to n + 9	Variable name (max. 16 characters)	
		n + 10	Variable type 0: Simple variable 1: One-dimensional array variable 2: Two-dimensional array variable 3: Three-dimensional array variable	
		n + 11	Subscript for one dimension *1	
		n + 12	Subscript for two dimensions *2	
		n + 13	Subscript for three dimensions *3	
		n + 14	Data type 2: Text	
		n + 15 -	Data (max. 70 characters)	
Writing of dynamic variable (Data type: integer/real number)	1 - 8 (PLC1 - 8)	n	Station number	17
		n + 1	Command: 27	
		n + 2 to n + 9	Variable name (max. 16 characters)	
		n + 10	Variable type 0: Simple variable 1: One-dimensional array variable 2: Two-dimensional array variable 3: Three-dimensional array variable	
		n + 11	Subscript for one dimension *1	
		n + 12	Subscript for two dimensions *2	
		n + 13	Subscript for three dimensions *3	
		n + 14	Data type 0: Integer 1: Real number	
		n + 15 to n + 16	Data	
Writing of dynamic variable (Data type: text)	1 - 8 (PLC1 - 8)	n	Station number	15 + (m + 1) / 2
		n + 1	Command: 27	
		n + 2 to n + 9	Variable name (max. 16 characters)	
		n + 10	Variable type 0: Simple variable 1: One-dimensional array variable 2: Two-dimensional array variable 3: Three-dimensional array variable	
		n + 11	Subscript for one dimension *1	
		n + 12	Subscript for two dimensions *2	
		n + 13	Subscript for three dimensions *3	
		n + 14	Data type 2: Text	
		n + 15 -	Data (max. 70 characters): m	
Robot language execution	1 - 8 (PLC1 - 8)	n	Station number	2 + (m + 1) / 2
		n + 1	Command: 28	
		n + 2 -	Command text: m	

<table>
<tr><th>Contents</th><th>F0</th><th colspan="2">F1 (= $u n)</th><th>F2</th></tr>
<tr><td rowspan="5">Inching</td><td rowspan="5">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number</td><td rowspan="5">5</td></tr>
<tr><td>n + 1</td><td>Command: 29</td></tr>
<tr><td>n + 2</td><td>0: Main robot
1: Sub robot</td></tr>
<tr><td>n + 3</td><td>Specified axis
1: X axis
2: Y axis
3: Z axis
4: R axis
5: A axis
6: B axis</td></tr>
<tr><td>n + 4</td><td>Direction of movement
0: Positive direction
1: Negative direction</td></tr>
<tr><td rowspan="5">JOG</td><td rowspan="5">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number</td><td rowspan="5">5</td></tr>
<tr><td>n + 1</td><td>Command: 30</td></tr>
<tr><td>n + 2</td><td>0: Main robot
1: Sub robot</td></tr>
<tr><td>n + 3</td><td>Specified axis
1: X axis
2: Y axis
3: Z axis
4: R axis
5: A axis
6: B axis</td></tr>
<tr><td>n + 4</td><td>Direction of movement
0: Positive direction
1: Negative direction</td></tr>
<tr><td rowspan="4">Origin return</td><td rowspan="4">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number</td><td rowspan="4">4</td></tr>
<tr><td>n + 1</td><td>Command: 31</td></tr>
<tr><td>n + 2</td><td>0: Main robot
1: Sub robot</td></tr>
<tr><td>n + 3</td><td>Specified axis
1: X axis
2: Y axis
3: Z axis
4: R axis
5: A axis
6: B axis</td></tr>
<tr><td rowspan="4">Teaching</td><td rowspan="4">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number</td><td rowspan="4">4</td></tr>
<tr><td>n + 1</td><td>Command: 32</td></tr>
<tr><td>n + 2</td><td>0: Main robot
1: Sub robot</td></tr>
<tr><td>n + 3</td><td>Point number: 0 to 9999</td></tr>
<tr><td rowspan="5">Reading of static variable</td><td rowspan="5">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number</td><td rowspan="5">4</td></tr>
<tr><td>n + 1</td><td>Command: 34</td></tr>
<tr><td>n + 2</td><td>Data type
0: Integer (SGI)
1: Real number (SGR)</td></tr>
<tr><td>n + 3</td><td>Variable number: 0 to 7</td></tr>
<tr><td>n + 4 to n + 5</td><td>Data</td></tr>
<tr><td rowspan="5">Writing of static variable</td><td rowspan="5">1 - 8
(PLC1 - 8)</td><td>n</td><td>Station number</td><td rowspan="5">6</td></tr>
<tr><td>n + 1</td><td>Command: 35</td></tr>
<tr><td>n + 2</td><td>Data type
0: Integer (SGI)
1: Real number (SGR)</td></tr>
<tr><td>n + 3</td><td>Variable number: 0 to 7</td></tr>
<tr><td>n + 4 to n + 5</td><td>Data</td></tr>
</table>

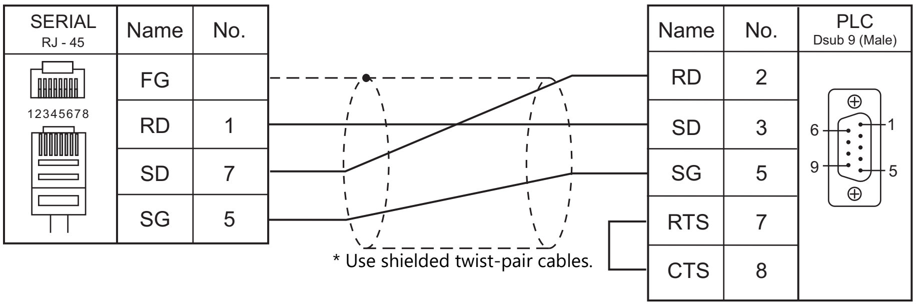
Return data: Data stored from controller to X1 series

*1 Valid in the case where a number other than “0” (simple variable) is specified for the variable type.
*2 Valid in the case where “2” (two-dimensional array variable) or “3” (three-dimensional array variable) is specified for the variable type.
*3 Valid in the case where “3” (three-dimensional array variable) is specified for the variable type.

27.1.2 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2



28. Yaskawa Electric

28.1 PLC Connection

Serial Connection

<table>
<tr><th rowspan="2">PLC Selection on the Editor</th><th rowspan="2">CPU</th><th rowspan="2" colspan="2">Unit/Port</th><th rowspan="2">Signal Level</th><th colspan="2">Connection</th></tr>
<tr><th>RS-232C*1 / RS-485 (2-wire)*2</th><th>RS-422 (4-wire)*2</th></tr>
<tr><td rowspan="5">Memobus</td><td rowspan="2">GL60 series</td><td colspan="2">JAMSC-IF60
JAMSC-IF61
JAMSC-IF611</td><td>RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
<tr><td colspan="2">JAMSC-IF612
JAMSC-IF613</td><td>RS-422</td><td>Wiring diagram 1 - M4</td><td>Wiring diagram 6 - M4 *3</td></tr>
<tr><td rowspan="2">GL120
GL130 series</td><td colspan="2">Memobus port on the CPU module</td><td>RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
<tr><td colspan="2">JAMSC-120NOM
27100</td><td>RS-422</td><td>Wiring diagram 2 - M4</td><td>Wiring diagram 7 - M4 *3</td></tr>
<tr><td>PROGIC-8</td><td colspan="2">PORT2 on the CPU unit</td><td>RS-232C</td><td>Wiring diagram 2 - M2</td><td>×</td></tr>
<tr><td rowspan="8">CP9200SH/
MP900</td><td rowspan="3">CP9200SH</td><td rowspan="3">CP-217IF</td><td>CN1</td><td rowspan="2">RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
<tr><td>CN2</td><td>Wiring diagram 3 - M2</td><td>×</td></tr>
<tr><td>CN3</td><td>RS-422</td><td>Wiring diagram 3 - M4</td><td>Wiring diagram 8 - M4 *3</td></tr>
<tr><td rowspan="3">MP920
MP930</td><td colspan="2">Memobus port on the CPU module</td><td>RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
<tr><td rowspan="2">217IF</td><td>CN1
CN2</td><td>RS-232C</td><td>Wiring diagram 1 - M2</td><td>×</td></tr>
<tr><td>CN3</td><td>RS-422</td><td>Wiring diagram 4 - M4</td><td>Wiring diagram 9 - M4 *3</td></tr>
<tr><td rowspan="2">MP2200
MP2300
MP2300S</td><td>217IF-01
218IF-01</td><td>PORT</td><td>RS-232C</td><td>Wiring diagram 4 - M2</td><td>×</td></tr>
<tr><td>217IF-01</td><td>RS422/485</td><td>RS-422</td><td>Wiring diagram 5 - M4</td><td>Wiring diagram 10 - M4 *3</td></tr>
<tr><td rowspan="2">MP2000 series</td><td rowspan="2">MP2200
MP2300
MP2300S</td><td>217IF-01
218IF-01
218IF-02
260IF-01
261IF-01
215AIF-01</td><td>PORT</td><td>RS-232C</td><td>Wiring diagram 4 - M2</td><td>×</td></tr>
<tr><td>217IF-01</td><td>RS422/485</td><td>RS-422</td><td>Wiring diagram 5 - M4</td><td>Wiring diagram 10 - M4 *3</td></tr>
<tr><td rowspan="2">MP3000 series</td><td rowspan="2">MP3200
MP3300</td><td>217IF-01
218IF-01
218IF-02
260IF-01
261IF-01
215AIF-01</td><td>PORT</td><td>RS-232C</td><td>Wiring diagram 4 - M2</td><td>×</td></tr>
<tr><td>217IF-01</td><td>RS422/485</td><td>RS-422</td><td>Wiring diagram 5 - M4</td><td>Wiring diagram 10 - M4 *3</td></tr>
</table>

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Ethernet Connection

To speed up communications, we recommend you to select “CP/MP Expansion Memobus (UDP/IP)”.

PLC Selection on the Editor	CPU	Unit	TCP/IP	UDP/IP	Port No.	Keep Alive *1
MP2300 (MODBUS TCP/IP)	MP2300S MP2400	218IFA (built-in LAN port)	○	×	Set the desired number using the tool.	○
	MP2200 MP2300 MP2300S	218IF-01				
CP/MP Expansion Memobus (UDP/IP)	MP2300S MP2400	218IFA (built-in LAN port)	×	○		
	MP2200 MP2300 MP2300S	218IF-01				
MP2000 series (UDP/IP)	MP2200 (CPU-03) MP2310 MP2300S MP2400	218IFA (Built-in LAN port)	×	○	Default 9999	
	MP2200 (CPU-04)	218IFC (Built-in LAN port)				
	MP2200 (CPU-01/02/03/04) MP2300 MP2310 MP2300S	218IF-01			Default 10000	
		218IF-02 263IF-01			Default 9999	
MP3000 Series (Ethernet UDP/IP)	MP3200 MP3300	218IFD (Built-in LAN port)	×	○	Default 9999	
		218IF-01			Default 10000	
		218IF-02 263IF-01			Default 9999	
MP3000 Series Expansion Memobus (Ethernet)	MP3200 MP3300	218IFD (Built-in LAN port) 218IF-01 218IF-02	○	○	Set the desired number using the tool.	

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.

28.1.1 Memobus

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	
Transmission Mode	Type 1 / Type 2	For GL60 series or PROGIC-8: Type 1: special binary code For GL120/130 series: Type 2: standard binary code

PLC

Be sure to match the settings to those made under [Communication Setting] of the editor. For more information, refer to the PLC manual issued by the manufacturer.

Item	Setting	Remarks
Signal Level	RS-232C / RS-422	
Baud Rate	4800 / 9600 / 19200 bps	
Data Length	**8 bits**	RTU mode
Stop Bit	1 bit	
Parity	Even	
Station No.	1 to 31	
Error Check	**CRC**	
Port Delay Timer	**0**	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
4	(holding register)	00H	
3	(input register)	01H	Including constant register, read only
R	(link register)	02H	
A	(extension register)	03H	
0	(coil)	04H	
D	(link coil)	05H	
1	(input relay)	06H	Read only
7	(constant register)	07H	

28.1.2 CP9200SH/MP900

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 76800 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	

PLC

CP-217IF

Be sure to match the settings to those made under [Communication Setting] of the editor.
For more information on communication settings, refer to the PLC manual issued by the manufacturer.

Memobus Port on the CPU Module (MP920, MP930) / 217IF

Module configuration

Item	Setting	Remarks
Transmission Protocol	**Memobus**	
Master/Slave	**Slave**	
Device Address	1 to 31	
Serial I/F	RS-232	
Transmission Mode	**RTU**	
Data Length	**8 bits**	
Parity Bit	Even	
Stop Bit	1 stop	
Baud Rate	19.2K	For connection via RS-422 on “217IF”, 76800 bps can also be selected. For more information, refer to the PLC manual issued by the manufacturer.

217IF-01, 218IF-01

Module configuration

Item	Setting	Remarks
Transmission Protocol	**Memobus**	
Master/Slave	**Slave**	
Device Address	1	
Serial I/F	RS-232 / RS-485	
Transmission Mode	**RTU**	
Data Length	**8 bits**	
Parity Bit	Even	
Stop Bit	1 stop	
Baud Rate	19.2K	The maximum baud rate available is 76.8 kbps.
Automatic Reception	Specified / Not Specified	To speed up communications, select [Not Specified]. When [Not Specified] is selected, the MSG-RCV function is required. For more information, refer to the PLC manual issued by the manufacturer.
Automatic Reception Setting	As desired	Make the setting when [Specified] is selected for [Automatic Reception].

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device, read only
MB	(coil)	04H	MW as word device
IB	(input relay)	06H	IW as word device, read only

When setting device memory MB/IB, set the bit numbers in the hexadecimal notation.

MBxxxx □

DEC

Bit No.: HEX

28.1.3 MP2300 (MODBUS TCP/IP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

218IFA (Built-in LAN Port)

Module configuration

Item	Setting	Remarks
IP Address	Set the IP address of "218IFA".	
Subnet Mask	Set the subnet mask of "218IFA".	
Local Port	256 to 65535	Cannot set the same number as the one set for another connection number.
Target IP Address	**000.000.000.000**	Connected in the "Unpassive open" mode *
Target Port	**0000**	
Connection Type	**TCP**	
Protocol Type	**MODBUS TCP/IP**	
Code	**BIN**	
Automatic Reception	**Valid**	When "Valid" is checked, the operation equivalent to the MSG-RCV function is automatically performed.

* Gives a response to the connection request issued by the station whose address is within the range specified by the subnet mask regardless of its IP address setting.

218IF-01 (MP2200, MP2300)

Make the settings as shown below and create a program of the MSG-RCV function. For more information, refer to the PLC manual issued by the manufacturer.

Module configuration

Item	Setting	Remarks
IP Address	Set the IP address of "218IF-01".	
Local Port	256 to 65534	Cannot set the same number as the one set for another connection number.
Target IP Address	**000.000.000.000**	Connected in the "Unpassive open" mode *
Target Port	**0000**	
Connection Type	**TCP**	
Protocol Type	**MODBUS TCP/IP**	
Code	**BIN**	

* Gives a response to the connection request issued by the station whose address is within the range specified by the subnet mask regardless of its IP address setting.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device, read only
MB	(coil)	04H	MW as word device
IB	(input relay)	06H	IW as word device, read only

When setting device memory MB/IB, set the bit numbers in the hexadecimal notation.

MBxxxx □
DEC
Bit number: HEX

28.1.4 CP/MP Expansion Memobus (UDP/IP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

218IFA (Built-in LAN Port)

Module configuration

Item	Setting	Remarks
IP Address	Set the IP address of "218IFA".	
Subnet Mask	Set the subnet mask of "218IFA".	
Local Port	256 to 65535	Except 9998 and 10000. Cannot set the same number as the one set for another connection number.
Target IP Address	Set the IP address of the X1 series.	
Target Port	Set the port number of the X1 series.	
Connection Type	**UDP**	
Protocol Type	**Extension Memobus**	
Code	**BIN**	
Automatic Reception	**Valid**	When "Valid" is checked, the operation equivalent to the MSG-RCV function is automatically performed.

218IF-01

Make the settings as shown below and create a program of the MSG-RCV function. For more information, refer to the PLC manual issued by the manufacturer.

Module configuration

Item	Setting	Remarks
IP Address	Set the IP address of "218IF-01".	
Local Port	255 to 65535	Cannot set the same number as the one set for another connection number.
Target IP Address	Set the IP address of the X1 series.	
Target Port	Set the port number of the X1 series.	
Connection Type	**UDP**	
Protocol Type	**Extension Memobus**	
Code	**BIN**	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device, read only
MB	(coil)	04H	MW as word device
IB	(input relay)	06H	IW as word device, read only

When setting device memory MB/IB, set the bit numbers in the hexadecimal notation.

MBxxxx □
DEC
Bit number: HEX

28.1.5 MP2000 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 76800 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	

PLC

217IF-01, 218IF-01, 218IF-02, 260IF-01, 261IF-01, 215AIF-01

Module configuration

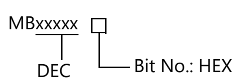
Item	Setting	Remarks
Transmission Protocol	**Memobus**	
Master/Slave	**Slave**	
Device Address	1	
Serial I/F	RS-232/RS-485	
Transmission Mode	**RTU**	
Data Length	**8Bit**	
Parity Bit	even	
Stop Bit	1Stop	
Baud Rate	19.2K	The maximum baud rate available is 76.8 kbps.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device
MB	(coil)	04H	MW as word device, *1
IB	(input relay)	06H	IW as word device
SW	(system register)	08H	SB as bit device
SB	(system)	09H	SW as word device, *1
OW	(output register)	0AH	OB as bit device
OB	(output)	0BH	OW as word device

*1 When setting device memory MB/SB, set the bit numbers in the hexadecimal notation.



28.1.6 MP2000 Series (UDP/IP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Module configuration

Item	Setting	Remarks
IP Address	Set the IP address.	
Subnet Mask	Set the subnet mask.	
System Port (engineering port)	256 to 65535	Default 9999: 218IFA / 218IF-02 / 2613IF-01 10000: 218IF-01

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device
MB	(coil)	04H	MW as word device, *1
IB	(input relay)	06H	IW as word device
SW	(system register)	08H	SB as bit device
SB	(system)	09H	SW as word device, *1
OW	(output register)	0AH	OB as bit device
OB	(output)	0BH	OW as word device

*1 When setting device memory MB/SB, set the bit numbers in the hexadecimal notation.

MBxxxxx □
DEC
Bit No.: HEX

28.1.7 MP3000 Series

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	9600 / 19200 / 38400 / 57600 / 76800 bps	
Data Length	**8 bits**	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 63	

PLC

217IF-01, 218IF-01, 218IF-02, 260IF-01, 261IF-01, 215AIF-01

Module configuration

Item	Setting	Remarks
Transmission Protocol	**Memobus**	
Master/Slave	**Slave**	
Device Address	1	
Serial I/F	RS-232/RS-485	
Transmission Mode	**RTU**	
Data Length	**8 bits**	
Parity Bit	even	
Stop Bit	1 Stop	
Baud Rate	19.2 K	The maximum baud rate available is 76.8 kbps.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device
MB	(coil)	04H	MW as word device, *1
IB	(input relay)	06H	IW as word device
SW	(system register)	08H	SB as bit device
SB	(system)	09H	SW as word device, *1
OW	(output register)	0AH	OB as bit device
OB	(output)	0BH	OW as word device
GW	(data relay register)	0CH	GB as bit device
GB	(data relay)	0DH	GW as word device, *1

*1 When setting device memory MB/SB/GB, set the bit numbers in hexadecimal notation.

MBxxxxx □

DEC

Bit No.: HEX

28.1.8 MP3000 Series (Ethernet UDP/IP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Module configuration

Item	Setting	Remarks
IP address	Set the IP address.	
Subnet mask	Set the subnet mask.	
Gateway IP Address	Specify according to the environment.	
Engineering Port (system port)	256 to 65535	Default 9999 : 218IFD / 218IF-02 / 263IF-01 10000: 218IF-01 * 9998 and 10000 cannot be set for "218IFD".

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device
MB	(coil)	04H	MW as word device, *1
IB	(input relay)	06H	IW as word device
SW	(system register)	08H	SB as bit device
SB	(system)	09H	SW as word device, *1
OW	(output register)	0AH	OB as bit device
OB	(output)	0BH	OW as word device
GW	(data relay register)	0CH	GB as bit device
GB	(data relay)	0DH	GW as word device, *1

*1 When setting device memory MB/SB/GB, set the bit numbers in hexadecimal notation.

MBxxxxx □
DEC
Bit No.: HEX

28.1.9 MP3000 Series Expansion Memobus (Ethernet)

Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

218IFD (Built-in LAN Port)

Module configuration

Item	Setting	Remarks
IP address	Set the IP address of "218IFD".	
Subnet mask	Set the subnet mask of "218IFD".	
Gateway IP Address	Set the gateway IP address of "218IFD".	
Local Port	256 to 65535	Except 9998 and 10000. Cannot set the same number as the one set for another connection number.
Target IP Address	Set the IP address of the X1 series.	
Target Port	Set the port number of the X1 series.	
Connection Type	TCP/UDP	
Protocol Type	**Extension Memobus**	
Code	**BIN**	
Automatic Reception	**Valid**	When "Valid" is checked, the operation equivalent to the MSG-RCV function is automatically performed.

218IF-01, 218IF-02

Make the settings as shown below and create a program of the MSG-RCV function. For more information, refer to the PLC manual issued by the manufacturer.

Module configuration

Item	Setting	Remarks
IP address	Set the IP address of “218IF-01”.	
Local Port	255 to 65535	Cannot set the same number as the one set for another connection number.
Target IP Address	Set the IP address of the X1 series.	
Target Port	Set the port number of the X1 series.	
Connection Type	TCP/UDP	
Protocol Type	**Extension Memobus**	
Code	**BIN**	

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MW	(holding register)	00H	MB as bit device
IW	(input register)	01H	IB as bit device, read only
MB	(coil)	04H	MW as word device, *1
IB	(input relay)	06H	IW as word device
SW	(system register)	08H	SB as bit device
SB	(system)	09H	SW as word device, *1
OW	(output register)	0AH	OB as bit device
OB	(output)	0BH	OW as word device
GW	(data relay register)	0CH	GB as bit device
GB	(data relay)	0DH	GW as word device, *1

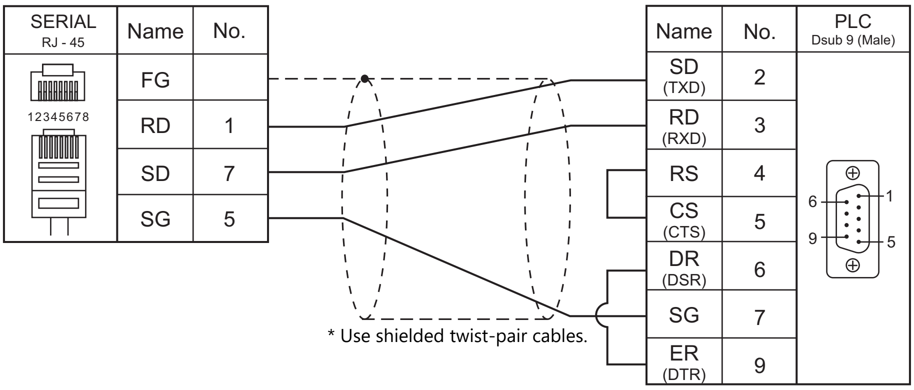
*1 When setting device memory MB/IB/GB, set the bit numbers in hexadecimal notation.

MBxxxx □
DEC
Bit No.: HEX

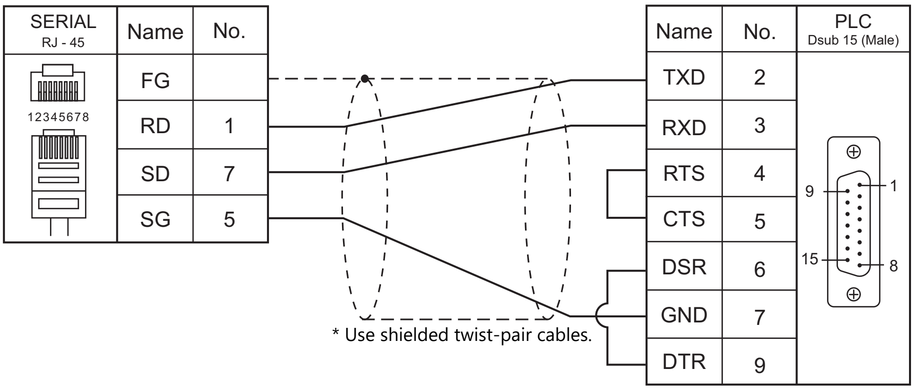
28.1.10 Wiring Diagrams

RS-232C

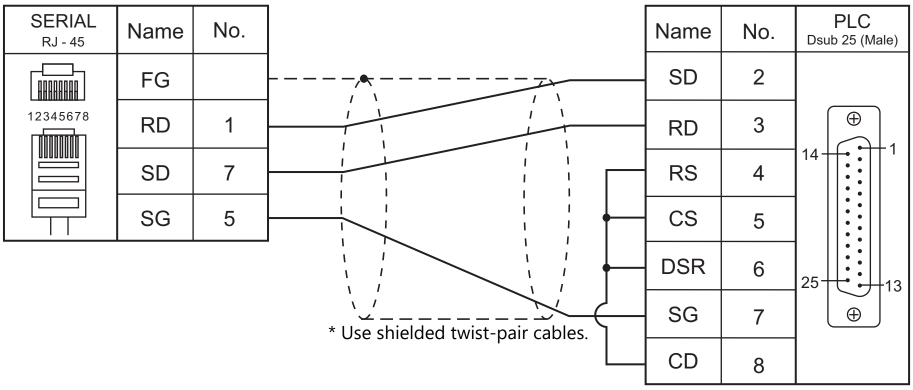
Wiring diagram 1 - M2



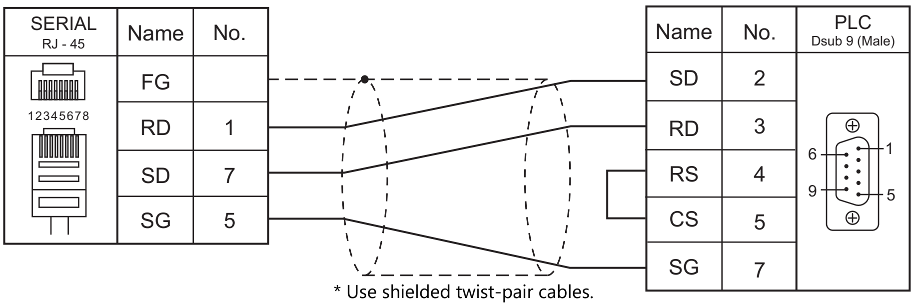
Wiring diagram 2 - M2



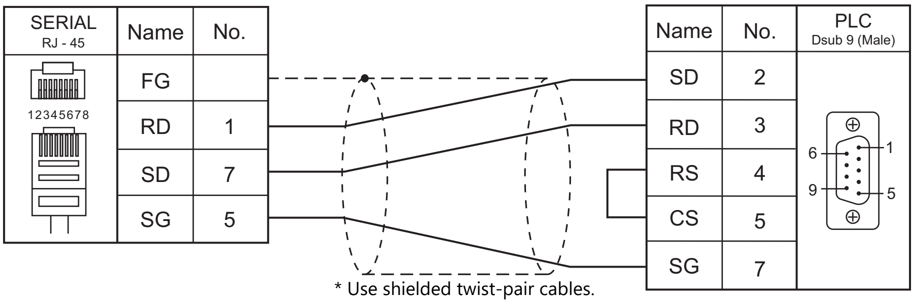
Wiring diagram 3 - M2



Wiring diagram 4 - M2

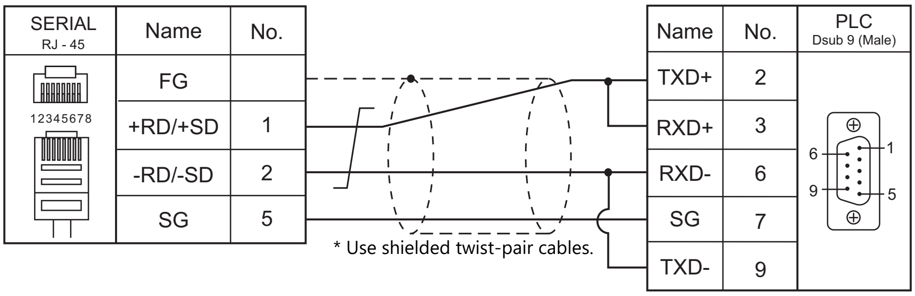


Wiring diagram 5 - M2

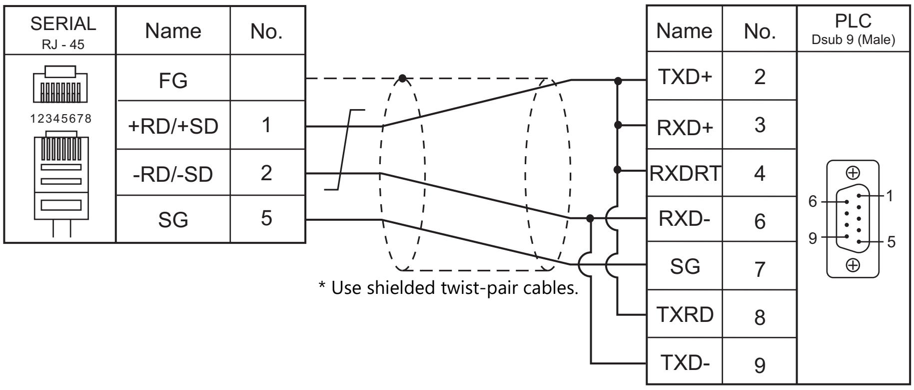


RS-422/RS-485

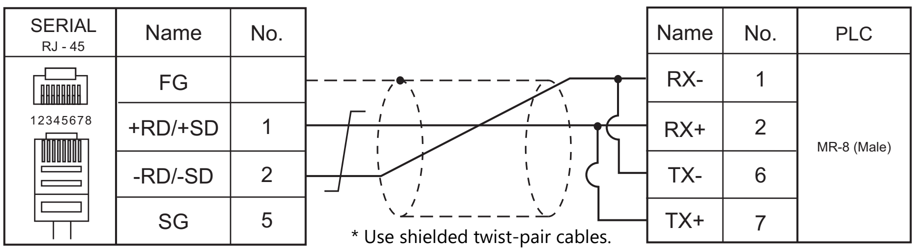
Wiring diagram 1 - M4



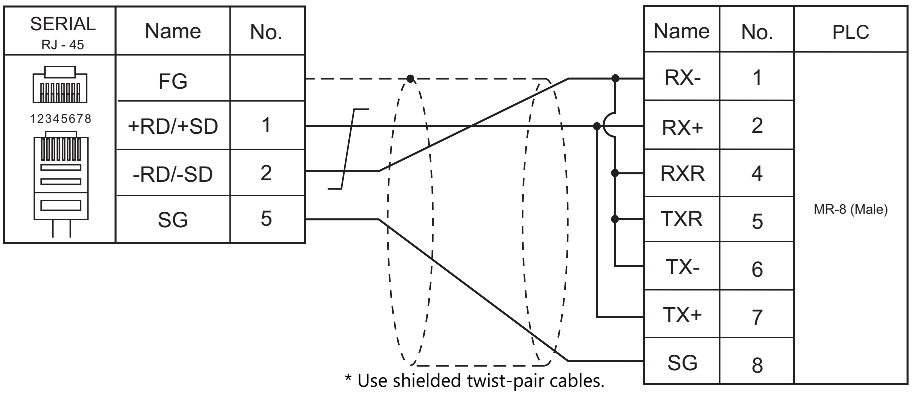
Wiring diagram 2 - M4



Wiring diagram 3 - M4

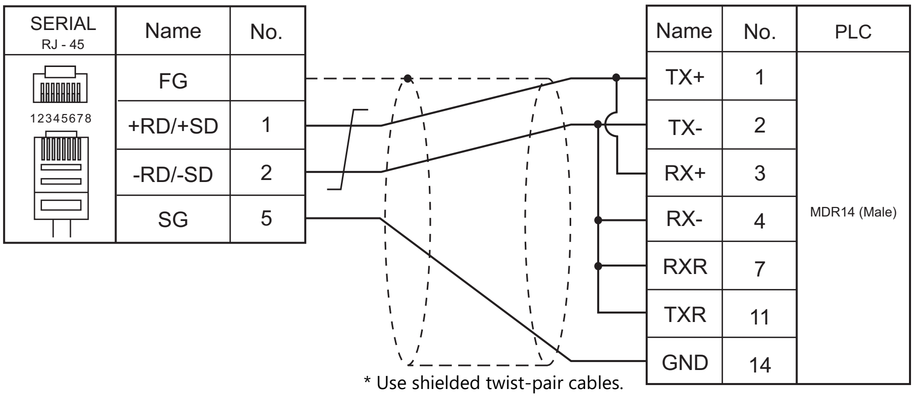


Wiring diagram 4 - M4



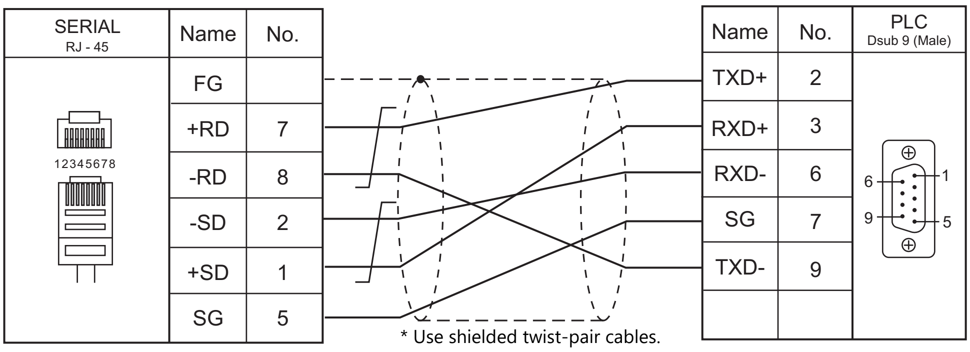
* Use shielded twist-pair cables.

Wiring diagram 5 - M4



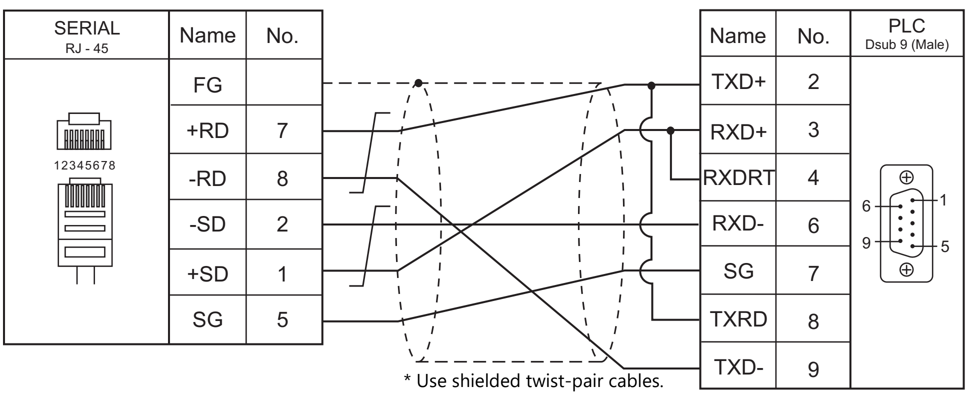
* Use shielded twist-pair cables.

Wiring diagram 6 - M4



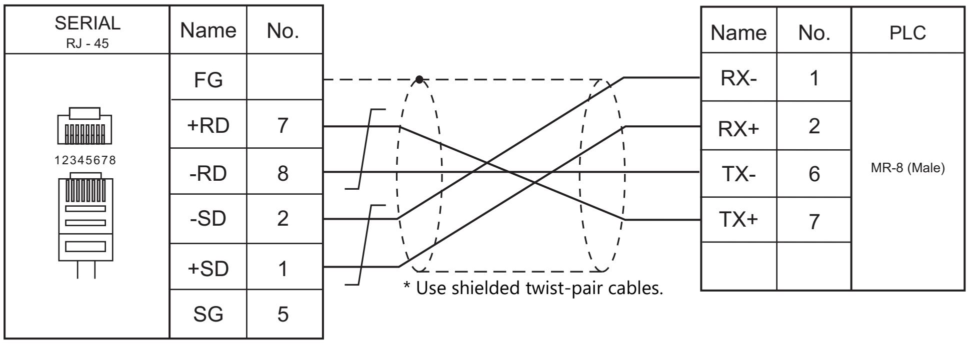
* Use shielded twist-pair cables.

Wiring diagram 7 - M4

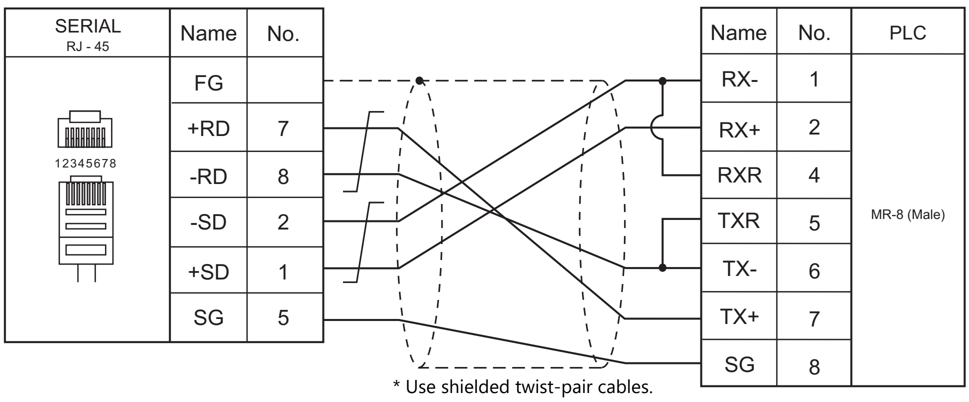


* Use shielded twist-pair cables.

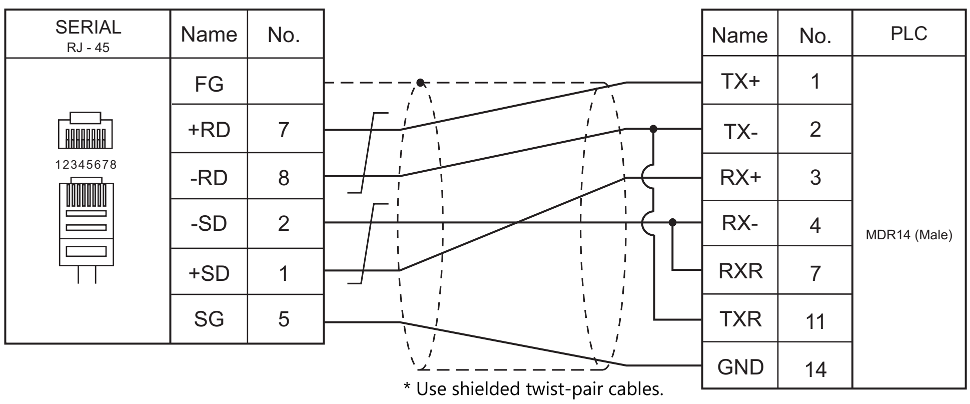
Wiring diagram 8 - M4



Wiring diagram 9 - M4



Wiring diagram 10 - M4



28.2 Temperature Controller/Servo/Inverter Connection

Ethernet Connection

PLC Selection on the Editor	CPU	Unit/Port	TCP/IP	UDP/IP	Port No.	Keep Alive*1	Lst File
DX200 (high-speed Ethernet)	FS100	LAN	×	○	10040 (Max. 16 units)	○	DX200Eth.Lst
	FS100L	LAN					
	DX100	LAN					
	DX200	LAN					
	YRC1000	LAN2 (CN106) LAN3 (CN107)					

*1 For KeepAlive functions, see "1.3.2 Ethernet Communication".

28.2.1 DX200 (High-speed Ethernet)

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number (No. 10040) of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

Controller

LAN interface setting

Item	Setting	Remarks
IP Address (LAN2)/(LAN3)	**Set manually.**	
IP address	Set the IP address.	
Subnet mask	Set the subnet mask.	

Transmission parameter setting

Item		Setting	Remarks
RS022	Instance 0 permission	**1: Instance 0 permitted**	
RS029	Loading permission of job/variable during playback	**1: Valid**	
RS034	Timer A: Sequence monitoring timer For control of invalid responses and non-responses	**200**	
RS035	Timer B: Text reception monitoring timer For control of cases where the text termination character is not received	**200**	

Available Device Memory

The available setting range of device memory varies depending on the connected device. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
IO	(IO data)	00H	Specify an odd-numbered address.
RD	(register data)	01H	
B	(byte type variables)	02H	Specify an even-numbered address.
I	(integer type variables)	03H	
D	(double-precision integer type variables)	04H	Double-word
R	(real number type variables)	05H	Real number
S	(32-byte character type variables)	06H	
P	(robot position type variables)	07H	Double-word
BP	(base position type variables)	08H	Double-word
EX	(external axis type variables)	09H	Double-word
7201	(status information read (data 1))	0AH	Double-word, read only
7202	(status information read (data 2))	0BH	Double-word, read only
S7301	(executing job information read (job name))	0CH	Read only
7302	(executing job information read (line number))	0DH	Double-word, read only
7303	(executing job information read (step number))	0FH	Double-word, read only
7304	(executing job information read (speed override value))	10H	Double-word, read only
S74	(axis configuration information read)	11H	Read only *1
76	(position deviation read)	12H	Double-word, read only *1
77	(torque data read)	13H	Double-word, read only *1
S8801	(management time acquisition (operation start time))	14H	Read only
S8802	(management time acquisition (elapsed time))	15H	Read only

*1 Specify the element number and the array number for data as shown to the right.

S74XXX : YYYYY

Element number

Data array number

Indirect Device Memory Designation

	15 ... 8	7 ... 0
n + 0	Models (11 to 18)	Device memory type
n + 1	Address No.	
n + 2	00	Bit
n + 3	00	Target Port No.

- For IO device memory
  - Word designation
    Specify an odd-numbered address for "n + 1".
  - Bit designation
    For an odd-numbered byte address:
      Specify the byte address for "n + 1" and the bit number for "n + 2".
    For an even-numbered byte address:
      Specify the byte address minus "1" for "n + 1" and specify the bit number plus "8" for "n + 2".
- For B device memory
  - Word designation
    Specify an even-numbered address for "n + 1".
  - Bit designation
    For an even-numbered byte address:
      Specify the byte address for "n + 1" and the bit number for "n + 2".
    For an odd-numbered byte address:
      Specify the byte address minus "1" for "n + 1" and specify the bit number plus "8" for "n + 2".
- For S74, 76, and 77 device memory
  Specify the data array number for "n + 1" and the element number for "n + 2".

	15 ... 8	7 ... 0
n + 0	Models (91 to 98)	Device type (11H, 12H, 13H)
n + 1	Data array	
n + 2	Element number	
n + 3	00	Bit
n + 4	00	Target Port No.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (=$u n)		F2
Alarm data read command (alarm code)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 1	
		n + 2	Data array number	
		n + 3	Alarm code	
		n + 4		
Alarm data read command (alarm data)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 2	
		n + 2	Data array number	
		n + 3	Alarm data	
		n + 4		
Alarm data read command (alarm type)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 3	
		n + 2	Data array number	
		n + 3	Alarm type	
		n + 4		
Alarm data read command (time of alarm occurrence)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 4	
		n + 2	Data array number	
		n + 3	Time of alarm occurrence (string of 16 characters)	
		:		
		n+10		
Alarm data read command (alarm character string name)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 5	
		n + 2	Data array number	
		n + 3	Alarm character string name (string of 32 characters)	
		:		
		n + 18		
Alarm data read command (sub code data additional information character string)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 6	
		n + 2	Data array number	
		n + 3	Sub code data additional information character string (string of 16 characters)	
		:		
		n + 10		
Alarm data read command (sub code data character string)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 7	
		n + 2	Data array number	
		n + 3	Sub code data character string (string of 96 characters)	
		:		
		n + 50		
Alarm data read command (sub code data character string reverse display information)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 8	
		n + 2	Data array number	
		n + 3	Sub code data character string reverse display information (string of 96 characters)	
		:		
		n+50		
Alarm history read command (alarm code)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 9	
		n + 2	Data array number	
		n + 3	Alarm code	
		n + 4		
Alarm history read command (alarm data)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 10	
		n + 2	Data array number	
		n + 3	Alarm data	
		n + 4		

Contents	F0	F1 (=$u n)		F2
Alarm history read command (alarm type)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 11	
		n + 2	Data array number	
		n + 3	Alarm type	
		n + 4		
Alarm history read command (time of alarm occurrence)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 12	
		n + 2	Data array number	
		n + 3	Time of alarm occurrence (string of 16 characters)	
		:		
		n + 10		
Alarm history read command (alarm character string name)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 13	
		n + 2	Data array number	
		n + 3	Alarm character string name (string of 32 characters)	
		:		
		n + 18		
Alarm history read command (sub code data additional information character string)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 14	
		n + 2	Data array number	
		n + 3	Sub code data additional information character string (string of 16 characters)	
		:		
		n + 10		
Alarm history read command (sub code data character string)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 15	
		n + 2	Data array number	
		n + 3	Sub code data character string (string of 96 characters)	
		:		
		n + 50		
Alarm history read command (sub code data character string reverse display information)	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 16	
		n + 2	Data array number	
		n + 3	Sub code data character string reverse display information (string of 96 characters)	
		:		
		n + 50		
Robot position data read command	1 to 8 (PLC1 to 8)	n	Target Port No.	4
		n + 1	Command: 17	
		n + 2	Data array number	
		n + 3	Element number	
		n + 4	Data specified with elements	
		n + 5		
Alarm reset / error cancel command	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 18	
		n + 2	Data array number	
Hold stop / servo on/off command	1 to 8 (PLC1 to 8)	n	Target Port No.	5
		n + 1	Command: 19	
		n + 2	Data array number	
		n + 3	1: On 2: Off	
		n + 4		
Step/cycle/continuous switching command	1 to 8 (PLC1 to 8)	n	Target Port No.	5
		n + 1	Command: 20	
		n + 2	Data array number	
		n + 3	Data 1	
		n + 4		
Character string display command to the programming pendant	1 to 8 (PLC1 to 8)	n	Target Port No.	18
		n + 1	Command: 21	
		n + 2	Message to display	
		:		
		n + 17		
Start-up (job start) command	1 to 8 (PLC1 to 8)	n	Target Port No.	2
		n + 1	Command: 22	

Contents	F0	F1 (=$u n)		F2
Job selection command	1 to 8 (PLC1 to 8)	n	Target Port No.	21
		n + 1	Command: 23	
		n + 2	Data array number	
		n + 3	Job name (string of 32 characters)	
		:		
		n + 18		
		n + 19	Line number (0 to 9999)	
		n + 20		
System information acquisition command	1 to 8 (PLC1 to 8)	n	Target Port No.	3
		n + 1	Command: 24	
		n + 2	Data array number	
		n + 3	System software version (string of 24 characters)	
		:		
		n + 14		
		n + 15	Model name / application name (string of 16 characters)	
		:		
		n + 22		
		n + 23	Parameter version (string of 8 characters)	
		:		
		n + 26		
Move instruction command (Cartesian coordinate type)	1 to 8 (PLC1 to 8)	n	Target Port No.	53
		n + 1	Command: 25	
		n + 2	Data array number	
		n + 3	Control group specification (robot)	
		n + 4		
		n + 5	Control group specification (station)	
		n + 6		
		n + 7	Speed classification	
		n + 8		
		n + 9	Speed specification	
		n + 10		
		n + 11	Specification of coordinate to operate	
		n + 12		
		n + 13	X coordinate value (unit: μm)	
		n + 14		
		n + 15	Y coordinate value (unit: μm)	
		n + 16		
		n + 17	Z coordinate value (unit: μm)	
		n + 18		
		n + 19	Tx coordinate value (unit: 0.0001 degrees)	
		n + 20		
		n + 21	Ty coordinate value (unit: 0.0001 degrees)	
		n + 22		
		n + 23	Tz coordinate value (unit: 0.0001 degrees)	
		n + 24		
		n + 25	Reserved	
		n + 26		
		n + 27	Form	
		n + 28		
		n + 29	Extended form	
		n + 30		
		n + 31	Tool number (0 to 63)	
		n + 32		
		n + 33	User coordinate specification (1 to 63)	
		n + 34		
		n + 35	Base axis 1 position (unit: μm)	
		n + 36		
		n + 37	Base axis 2 position (unit: μm)	
		n + 38		
		n + 39	Base axis 3 position (unit: μm)	
		n + 40		

Contents	F0	F1 (=$u n)		F2
Move instruction command (Cartesian coordinate type)	1 to 8 (PLC1 to 8)	n + 41	Station axis 1 position (pulse value)	53
		n + 42		
		n + 43	Station axis 2 position (pulse value)	
		n + 44		
		n + 45	Station axis 3 position (pulse value)	
		n + 46		
		n + 47	Station axis 4 position (pulse value)	
		n + 48		
		n + 49	Station axis 5 position (pulse value)	
		n + 50		
		n + 51	Station axis 6 position (pulse value)	
		n + 52		
Move instruction command (pulse type)	1 to 8 (PLC1 to 8)	n	Target Port No.	45
		n + 1	Command: 26	
		n + 2	Data array number	
		n + 3	Control group specification (robot)	
		n + 4		
		n + 5	Control group specification (station)	
		n + 6		
		n + 7	Speed classification	
		n + 8		
		n + 9	Speed specification	
		n + 10		
		n + 11	Robot axis 1 pulse value	
		n + 12		
		n + 13	Robot axis 2 pulse value	
		n + 14		
		n + 15	Robot axis 3 pulse value	
		n + 16		
		n + 17	Robot axis 4 pulse value	
		n + 18		
		n + 19	Robot axis 5 pulse value	
		n + 20		
		n + 21	Robot axis 6 pulse value	
		n + 22		
		n + 23	Tool number (0 to 63)	
		n + 24		
		n + 25	User coordinate specification (1 to 63)	
		n + 26		
		n + 27	Base axis 1 position (unit: μm)	
		n + 28		
		n + 29	Base axis 2 position (unit: μm)	
		n + 30		
		n + 31	Base axis 3 position (unit: μm)	
		n + 32		
		n + 33	Station axis 1 position (pulse value)	
		n + 34		
		n + 35	Station axis 2 position (pulse value)	
		n + 36		
		n + 37	Station axis 3 position (pulse value)	
		n + 38		
		n + 39	Station axis 4 position (pulse value)	
		n + 40		
		n + 41	Station axis 5 position (pulse value)	
		n + 42		
		n + 43	Station axis 6 position (pulse value)	
		n + 44		

Contents	F0	F1 (=$u n)		F2
General commands (read commands)	1 to 8 (PLC1 to 8)	n	Target Port No.	8
		n + 1	Command: 27	
		n + 2	Command number	
		n + 3	Data array number	
		n + 4	Element number	
		n + 5	Processing	
		n + 6	Processing classification	
		n + 7	Answer data size	
		n + 8	Answer data	
		:		
		n + m		
General commands (write commands)	1 to 8 (PLC1 to 8)	n	Target Port No.	8 + m
		n + 1	Command: 28	
		n + 2	Command number	
		n + 3	Data array number	
		n + 4	Element number	
		n + 5	Processing	
		n + 6	Processing classification	
		n + 7	Request data size	
		n + 8	Request data	
		:		
		n + m		
File list acquiring command	1 to 8 (PLC1 to 8)	n	Target Port No.	7
		n + 1	Command: 29	
		n + 2	Extension of the acquired file	
		n + 3	Output address ($u)	
		n + 4	Starting line number	
		n + 5	Output count	
		n + 6	Bytes	
		n + 7	Total file number	
File delete command	1 to 8 (PLC1 to 8)	n	Target Port No.	18
		n + 1	Command: 30	
		n + 2	File name (Specify it including its extension.)	
		:		
		n + 17		
Executing Job Information reading command	1 to 8 (PLC1 to 8)	n	Target Port No.	22
		n + 1	Command: 31	
		n + 2	File name (Specify it including its extension ".JBI".)	
		:		
		n + 17		
		n +18	Output address ($u)	
		n + 19	Start line number	
		n + 20	Reading line count	
		n + 21	Bytes	
		n + 22	Total line number	
		n + 23	Controlled group	
		n + 24		
		n + 25	Tool number currently selected	
Concurrent I/O comment reading command	1 to 8 (PLC1 to 8)	n	Target Port No.	7
		n + 1	Command: 32	
		n + 2	Comment type	
		n + 3	Output address ($u)	
		n + 4	Starting comment number (1 to 2048)	
		n + 5	Comment read count (1 to 2048)	
		n + 6	Bytes	
Safety circuit status reading command	1 to 8 (PLC1 to 8)	n	Target Port No.	5
		n + 1	Command: 33	
		n + 2	Output address ($u)	
		n + 3	Safety circuit number	
		n + 4	Reading circuit count	

Contents	F0	F1 (=$u n)		F2
Alarm history reading command (mode)	1 to 8 (PLC1 to 8)	n	Target Port No.	5
		n + 1	Command: 34	
		n + 2	Output address ($u)	
		n + 3	Array number of the data	
		n + 4	Bytes	
Logging information reading command (event list)	1 to 8 (PLC1 to 8)	n	Target Port No.	5
		n + 1	Command: 35	
		n + 2	Output address ($u)	
		n + 3	Log data number	
		n + 4	Event read count	
Logging information reading command (event details)	1 to 8 (PLC1 to 8)	n	Target Port No.	6
		n + 1	Command: 36	
		n + 2	Output address ($u)	
		n + 3	Log data number	
		n + 4	Reading line count	
		n + 5	Bytes	
General file saving command	1 to 8 (PLC1 to 8)	n	Target Port No.	21
		n + 1	Command: 37	
		n + 2	File name	
		:		
		n + 17		
		n +18	File extension	
		n + 19	Output address ($u)	
		n + 20	Usable capacity of $u	
		n + 21	File size	
General file load command	1 to 8 (PLC1 to 8)	n	Target Port No.	21
		n + 1	Command: 38	
		n + 2	File name	
		:		
		n + 17		
		n +18	File extension	
		n + 19	Output address ($u)	
		n + 20	File size	
Register name reading command	1 to 8 (PLC1 to 8)	n	Target Port No.	6
		n + 1	Command: 39	
		n + 2	Output address ($u)	
		n + 3	register number	
		n + 4	Reading register name count	
		n + 5	Bytes	
Version information reading command	1 to 8 (PLC1 to 8)	n	Target Port No.	7
		n + 1	Command: 40	
		n + 2	Output address ($u)	
		n + 3	Bytes (purpose)	
		n + 4	Bytes (language)	
		n + 5	Reading line count (Revision)	
		n + 6	Bytes (Revision)	

Return data: Data stored from controller to X1 series

29. Yokogawa Electric

29.1 PLC Connection

Serial Connection

PLC Selection on the Editor	CPU	Unit/Port	Signal Level	Connection	
				RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
FA-M3	F3SP21-0N F3SP25-2N F3SP35-5N	PROGRAMMER port	RS-232C	Yokogawa's "KM11-xT" + Wiring diagram 2 - M2	×
	F3SP20-0N F3SP21-0N F3SP25-2N F3SP35-5N	F3LC01-1N*3	RS-232C	Wiring diagram 1 - M2	×
		F3LC11-1N			
		F3LC11-2N	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *4
FA-M3R	F3SP28-3N/3S F3SP38-6N/6S F3SP53-4H/4S F3SP58-6H/6S F3SP59-7S	PROGRAMMER port	RS-232C	Yokogawa's "KM11-xT" + Wiring diagram 2 - M2	×
	F3SP28-3N/3S F3SP38-6N/6S F3SP53-4H/4S F3SP58-6H/6S F3SP59-7S F3SP66-4S F3SP67-6S F3SP71-4N/4S F3SP76-7N/7S	F3LC11-1N F3LC11-1F F3LC12-1F	RS-232C	Wiring diagram 1 - M2	×
		F3LC11-2N F3LC11-2F	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *4
	F3SP66-4S F3SP67-6S	SIO port	RS-232C	Yokogawa's "KM21-2T" + Wiring diagram 2 - M2	×
FA-M3V	F3SP71-4N/4S F3SP76-7N/7S	F3LC11-1N F3LC11-1F F3LC12-1F	RS-232C	Wiring diagram 1 - M2	×
		F3LC11-2N F3LC11-2F	RS-422	Wiring diagram 1 - M4	Wiring diagram 2 - M4 *4

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to "1.2.1 SERIAL" (page 1-4).
*3 When the link unit "F3LC01-1N" is used, the communication settings and available device memory are the same as those for "FA-500". However, "B" (common register) cannot be used.
*4 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

Ethernet Connection

PLC Selection on the Editor	CPU	Unit/Port	TCP/IP	UDP/IP	Port No.	Keep Alive*1
FA-M3/FA-M3R (Ethernet UDP/IP)	FA-M3/FA-M3R	F3LE01-5T	×	○	12289	○
		F3LE11-0T F3LE12-0T			12289 12291	
	F3SP66-4S F3SP67-6S F3SP71-4N F3SP76-7N	T/TX				
FA-M3/FA-M3R (Ethernet UDP/IP ASCII)	FA-M3/FA-M3R	F3LE01-5T			12289	
		F3LE11-0T F3LE12-0T			12289 12291	
	F3SP66-4S F3SP67-6S	T/TX				
	F3SP71-4N/4S F3SP76-7N/7S	10BASE-T/ 100BASE-TX				
FA-M3/FA-M3R (Ethernet TCP/IP)	FA-M3/FA-M3R	F3LE01-5T	○	×	12289 *2	
		F3LE11-0T F3LE12-0T			12289 12291 *2	
	F3SP66-4S F3SP67-6S	T/TX				
	F3SP71-4N/4S F3SP76-7N/7S	10BASE-T/ 100BASE-TX				
FA-M3/FA-M3R (Ethernet TCP/IP ASCII)	FA-M3/FA-M3R	F3LE01-5T			12289 *2	
		F3LE11-0T F3LE12-0T			12289 12291 *2	
	F3SP66-4S F3SP67-6S	T/TX				
	F3SP71-4N/4S F3SP76-7N/7S	10BASE-T/ 100BASE-TX				
FA-M3V (Ethernet)	F3SP71-4N/4S F3SP76-7N/7S	F3LE01-5T	○	○	12289 *2	
		F3LE11-0T F3LE12-0T			12289 12291 *2	
		10BASE-T/ 100BASE-TX				
FA-M3V (Ethernet ASCII)	F3SP71-4N/4S F3SP76-7N/7S	F3LE01-5T			12289 *2	
		F3LE11-0T F3LE12-0T			12289 12291 *2	
		10BASE-T/ 100BASE-TX				

*1 For KeepAlive functions, see “1.3.2 Ethernet Communication”.
*2 For TCP/IP connection, the number of X1 series units that can be connected to one port is limited.
3LE01-5T/F3LE11-0T/CPU built-in LAN port: Max. 8 units
F3LE12-0T: Max. 9 units

29.1.1 FA-M3/FA-M3R

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 /57600 / 76800 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	
Transmission Mode	With Sum Check / Without Sum Check	

PLC

CPU Programmer Port / SIO Port

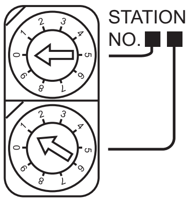
(Underlined setting: default)

Item	Programmer port	SIO Port
Communication Mode	9600 bps, even parity 9600 bps, no parity 19200 bps, even parity 19200 bps, no parity 38400 bps, even parity 38400 bps, no parity 57600 bps, even parity 57600 bps, no parity 115200 bps, even parity 115200 bps, no parity	9600 bps, even parity 9600 bps, no parity 19200 bps, even parity 19200 bps, no parity 38400 bps, even parity 38400 bps, no parity 57600 bps, even parity 57600 bps, no parity 115200 bps, even parity 115200 bps, no parity
PC Link Function	**Use**	
Sum check	Provided / Not provided	
Terminal Character	**None**	
Protection Function	**None**	
Data Length	**8**	

PC Link Module

Station number setting

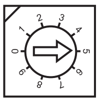
(Underlined setting: default)

Station Number Setting	Setting	Setting Example
	01 to 32	01

Baud rate setting switch

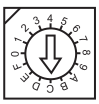
F3LC01-1N / F3LC11-1N / F3LC11-2N

(Underlined setting: default)

Baud Rate Setting Switch	Setting	Baud Rate	Remarks
	4	4800 bps	
	5	9600 bps	
	6	19200 bps	

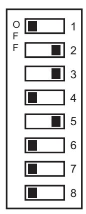
F3LC11-1F / F3LC12-1F / F3LC11-2F

(Underlined setting: default)

Baud Rate Setting Switch	Setting	Baud Rate	Remarks
	4	4800 bps	
	5	9600 bps	
	7	19200 bps	
	9	38400 bps	
	A	57.6 kbps	
	B	76.8 kbps	
	C	115.2 kbps	

Data format setting switch

(Underlined setting: default)

Switch	Functions	OFF	ON	Setting Example	
1	Data length	7	8		7 bits Even 1 bit Sum check
2	Parity	Not provided	Provided		
3		Odd	Even		
4	Stop bit	1	2		
5	Sum check	Not provided	Provided		
6	Terminal character	**Not provided**	Provided		
7	Protection function	**Not provided**	Provided		
8	-	-	-		

Function setting switch

All OFF

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
R	(common register)	01H	
V	(index register)	02H	
W	(link register)	03H	
Z	(special register)	04H	
TP	(count-down timer/current value)	05H	
TS	(timer/set value)	06H	Read only
CP	(count-down counter/current value)	07H	
CS	(counter/set value)	08H	Read only
X	(input relay)	09H	
Y	(output relay)	0AH	
I	(internal relay)	0BH	
E	(common relay)	0CH	
L	(link relay)	0DH	
M	(special relay)	0EH	
B	(file register)	0FH	
SW	(special module register)	10H	
SL	(special module register)	11H	Double-word
F	(cache register)	12H	Available only with F3SP71-4N/4S and F3SP76-7N/7S CPU.

* The CPU number is required in addition to the device type and address. The assigned device memory is expressed as shown on the right when editing the screen.

Example: 1 : D00001
- 00001: Address
- D: Device type
- 1: CPU number

SW/SL device memory

The SW or SL device memory is used to read/write data from/into the data position number of the specified special module.
For more information, refer to the PLC manual issued by the manufacturer.
The address denotation of the SW or SL device memory is shown below.

a : bb : c : SW0001
- 0001: Data position number
- SW: Device type
- c: CPU number (1 to 4H)
- bb: Slot number (1 to 10H)
- a: Unit number (0 to 7H)

Indirect Device Memory Designation

- For X/Y device memory

	15	8 7 0
n + 0	Model	Device type
n + 1	Address No.	
n + 2	Expansion code *	Bit designation
n + 3	00	Station number

* For the expansion code, specify the value obtained by subtracting "1" from the actual CPU number.

Example: When specifying "X935" by indirect device memory designation

935
BB
A

Converting "A" into a binary number
9 (DEC) = 1001 (BIN)

09	08	07	06	05	04	03	02	01	00
0	0	0	0	0	0	1	0	0	1

Z X

Converting "BB" into a binary number
35 (DEC) = 100011 (BIN)

07	06	05	04	03	02	01	00
0	0	1	0	0	0	1	1

Y
Bit No.
Obtained by subtracting "1" from this value.

Arranging the values X, Y and Z in the following order

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0

X Z Fixed to 0 Y

0000100100000010 (BIN) = 902 (HEX): Address No.
0011 (BIN) = 3 (HEX) - 1 = 2 (HEX): Bit No.

Example: When specifying "X76705" by indirect device memory designation

76705
BB
AAA

Converting "AAA" into a binary number
767 (DEC) = 1011111111 (BIN)

09	08	07	06	05	04	03	02	01	00
1	0	1	1	1	1	1	1	1	1

Z X

Converting "BB" into a binary number
05 (DEC) = 101 (BIN)

07	06	05	04	03	02	01	00
0	0	0	0	0	1	0	1

Y
Bit No.
Obtained by subtracting "1" from this value.

Arranging the values X, Y and Z in the following order

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0

X Z Fixed to 0 Y

1111111110000000 (BIN) = FF80 (HEX): Address No.
0101 (BIN) = 5 (HEX) - 1 = 4 (HEX): Bit No.

- For SW/SL device memory

	15 … 8	7 … 0
n + 0	Model	Device type
n + 1	Address No. *1	
n + 2	Unit number (0 to 7H)	Slot number (1 to 10H)
n + 3	Expansion code *2	Bit designation
n + 4	00	Station number

*1Specify the data position for the address number. The value to specify is obtained by subtracting "1" from the actual data position.
*2Specify the expansion bit and the CPU number in the expansion code.

15							8
	0	0	0	0	0		

Expansion bit designation
0: 0 to 15 bits
1: 16 to 31 bits

CPU No.: 0 to 3
(Specify the value obtained by subtracting "1" from the actual CPU number.)

- Other than X/Y/SW/SL device memory
  For the device memory address number, specify the value obtained by subtracting "1" from the actual address.
  For the expansion code, specify the value obtained by subtracting "1" from the actual CPU number.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

Contents	F0	F1 (= $u n)		F2
User log registration number read	1 - 8 (PLC1 - 8)	n	CPU No. + station No. 0001H Station No.: 01 to 1F CPU No. CPU No. 1: 00 CPU No. 2: 01 CPU No. 3: 02 CPU No. 4: 03	2
		n + 1	Command: FFFFH	
		n + 2	Registration number (Stores the same number as the one stored in special register Z105.)	
Latest user log read	1 - 8 (PLC1 - 8)	n	CPU No. + station No. 0001H Station No.: 01 to 1F CPU No. CPU No. 1: 00 CPU No. 2: 01 CPU No. 3: 02 CPU No. 4: 03	2
		n + 1	Command: 0000H	
		n + 2	Header 0: Normal –1: Error (data not exist/communication error)	
		n + 3	Year (ASCII)	
		n + 4	Month (ASCII)	
		n + 5	Day (ASCII)	
		n + 6	Hour (ASCII)	
		n + 7	Minute (ASCII)	
		n + 8	Second (ASCII)	
		n + 9	Main code (DEC)	
		n + 10	Sub code (DEC)	
“n”th user log read	1 - 8 (PLC1 - 8)	n	CPU No. + station No. 0001H Station No.: 01 to 1F CPU No. CPU No. 1: 00 CPU No. 2: 01 CPU No. 3: 02 CPU No. 4: 03	2
		n + 1	Command: 0001H to 003FH	
		n + 2	Header 0: Normal –1: Error (data not exist/communication error)	
		n + 3	Year (ASCII)	
		n + 4	Month (ASCII)	
		n + 5	Day (ASCII)	
		n + 6	Hour (ASCII)	
		n + 7	Minute (ASCII)	
		n + 8	Second (ASCII)	
		n + 9	Main code (DEC)	
		n + 10	Sub code (DEC)	

Contents	F0	F1 (= $u n)		F2
Latest system log read	1 - 8 (PLC1 - 8)	n	CPU No. + station No. 0001H Station No.: 01 to 1F CPU No. CPU No. 1: 00 CPU No. 2: 01 CPU No. 3: 02 CPU No. 4: 03	2
		n + 1	Command: 0100H	
		n + 2	Error type 0: System error 1: Basic error 2: Sequence error 3: I/O error	
		n + 3	Error code	
		n + 4	Year (ASCII)	
		n + 5	Month (ASCII)	
		n + 6	Day (ASCII)	
		n + 7	Hour (ASCII)	
		n + 8	Minute (ASCII)	
		n + 9	Second (ASCII)	
		n + 10 -	Additional information (max. 11 words) *1	
"n"th system log read	1 - 8 (PLC1 - 8)	n	CPU No. + station No. 0001H Station No.: 01 to 1F CPU No. CPU No. 1: 00 CPU No. 2: 01 CPU No. 3: 02 CPU No. 4: 03	2
		n + 1	Command: 0101H to 017FH	
		n + 2	Error type 0: System error 1: Basic error 2: Sequence error 3: I/O error	
		n + 3	Error code	
		n + 4	Year (ASCII)	
		n + 5	Month (ASCII)	
		n + 6	Day (ASCII)	
		n + 7	Hour (ASCII)	
		n + 8	Minute (ASCII)	
		n + 9	Second (ASCII)	
		n + 10 -	Additional information (max. 11 words) *1	
Alarm information clear	1 - 8 (PLC1 - 8)	n	CPU No. + station No. 0001H Station No.: 01 to 1F CPU No. CPU No. 1: 00 CPU No. 2: 01 CPU No. 3: 02 CPU No. 4: 03	2
		n + 1	Command: FFFEH	

<table>
<tr><th>Contents</th><th>F0</th><th colspan="3">F1 (= $u n)</th><th>F2</th></tr>
<tr><td rowspan="14">Mounted module name readout</td><td rowspan="14">1 - 8
(PLC1 - 8)</td><td>n</td><td colspan="2">CPU No. + station No.
0001H
Station No.: 01 to 1F
CPU No.
CPU No. 1: 00
CPU No. 2: 01
CPU No. 3: 02
CPU No. 4: 03</td><td rowspan="14">3</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: FFFDH</td></tr>
<tr><td>n + 2</td><td colspan="2">Unit No.: 0 to 7</td></tr>
<tr><td>n + 3 to n + 4</td><td rowspan="3">Module information of slot 1 *2</td><td>Module name (ASCII)</td></tr>
<tr><td>n + 5</td><td>I/O type (DEC)
0: Without I/O relay
1: Input relay only
2: Output relay only
3: With both input and output</td></tr>
<tr><td>n + 6</td><td>Number of I/O relays (DEC)</td></tr>
<tr><td>n + 7 to n + 8</td><td rowspan="3">Module information of slot 2 *2</td><td>Module name (ASCII)</td></tr>
<tr><td>n + 9</td><td>I/O type (DEC)
0: Without I/O relay
1: Input relay only
2: Output relay only
3: With both input and output</td></tr>
<tr><td>n + 10</td><td>Number of I/O relays (DEC)</td></tr>
<tr><td>:</td><td>:</td><td>:</td></tr>
<tr><td>n + 63 to n + 64</td><td rowspan="3">Module information of slot 16 *2</td><td>Module name (ASCII)</td></tr>
<tr><td>n + 65</td><td>I/O type (DEC)
0: Without I/O relay
1: Input relay only
2: Output relay only
3: With both input and output</td></tr>
<tr><td>n + 66</td><td>Number of I/O relays (DEC)</td></tr>
</table>

Return data: Data stored from PLC to X1 series

*1 Additional information (max. 11 words)

- For “system error”
  No additional information
- For “sequence error”

n + 10 to n + 13	Block name (8 bytes)
n + 14 to n + 16	Command number: 5-digit string pattern in decimal notation (5 bytes)

- For “basic error”

n + 10 to n + 13	Program name (8 bytes)
n + 14 to n + 17	Subprogram name (8 bytes)
n + 18 to n + 20	Row number: 5 digits in decimal notation (5 bytes)

- For “I/O error”

n + 10 to n + 11	Slot number (4 bytes)
n + 12 to n + 13	Detailed error (4 bytes)

*2 When no module is mounted, “(space)” is assigned for the module name and “0” is assigned for the I/O type and the number of I/O relays.

29.1.2 FA-M3/FA-M3R (Ethernet UDP/IP)

Communication Setting

Editor

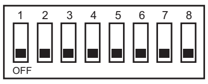
Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Ethernet Module

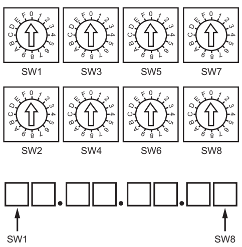
Condition setting switch

<table>
<tr><th>SW9</th><th>BIT</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8">
</td><td>1</td><td>Data format setting</td><td>F3LE01-5T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr></table>F3LE11-0T/F3LE12-0T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr><tr><td>12291</td><td>Binary</td><td>ASCII</td></tr></table></td></tr>
<tr><td>2</td><td>Write protection</td><td>OFF: not protected</td></tr>
<tr><td>3</td><td rowspan="4">System reserved</td><td rowspan="4">OFF</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Line handling at TCP time-out*1</td><td>OFF: close</td></tr>
<tr><td>8</td><td>Operation mode</td><td>OFF: normal</td></tr>
</table>

*1 F3LE01-5T only
*2 Port number: 12289

IP address setting switch

(Underlined setting: default)

<table>
<tr><th>IP Address Setting Switch</th><th>Setting</th><th>Remarks</th></tr>
<tr><td>
</td><td><u>0.0.0.0</u> to 255.255.255.255</td><td>Set in hexadecimal notation.
Example
HEX C0.A8.FA.D2
↓
DEC 192.168.250.210</td></tr>
</table>

T/TX, 10BASE-T/100BASE-TX Ports

CPU properties

Setting	Setting Items	Setting	Remarks
NETWORK	NETWORK_SELECT	1	
ETHERNET	ETHER_MY_IPADDRESS	0.0.0.0 - 255.255.255.255	IP address
	ETHER_SUBNET_MASK	0.0.0.0 - 255.255.255.255	Subnet mask
HIGHER-LEVEL_LINK_SERVICE	HLLINK_PROTOCOL_A	**1: UDP/IP**	Port 12289
	HLLINK_DATA_FORMAT_A	**1: binary code**	
	HLLINK_PROTOCOL_B	**1: UDP/IP**	Port 12291
	HLLINK_DATA_FORMAT_B	**1: binary code**	
	HLLINK_PROTECT	0: write enabled	

Available Device Memory

The contents of "Available Device Memory" are the same as those described in "29.1.1 FA-M3/FA-M3R".

PLC_CTL

The contents of "PLC_CTL" are the same as those described in "29.1.1 FA-M3/FA-M3R".

* The station number can be specified in the range from 0 to FFH.
For the station number, specify the PLC table number set for [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

29.1.3 FA-M3/FA-M3R (Ethernet UDP/IP ASCII)

Communication Setting

Editor

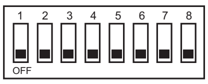
Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Ethernet Module

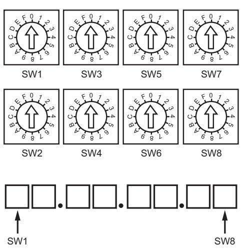
Condition setting switch

<table>
<tr><th>SW9</th><th>BIT</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8">
</td><td>1</td><td>Data format setting</td><td>F3LE01-5T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr></table>F3LE11-0T/F3LE12-0T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr><tr><td>12291</td><td>Binary</td><td>ASCII</td></tr></table></td></tr>
<tr><td>2</td><td>Write protection</td><td>OFF: not protected</td></tr>
<tr><td>3</td><td rowspan="4">System reserved</td><td rowspan="4">OFF</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Line handling at TCP time-out*1</td><td>OFF: close</td></tr>
<tr><td>8</td><td>Operation mode</td><td>OFF: normal</td></tr>
</table>

*1 F3LE01-5T only

IP address setting switch

(Underlined setting: default)

<table>
<tr><th>IP Address Setting Switch</th><th>Setting</th><th>Remarks</th></tr>
<tr><td>
</td><td><u>0.0.0.0</u> to 255.255.255.255</td><td>Set in hexadecimal notation.
Example
HEX C0.A8.FA.D2
↓
DEC 192.168.250.210</td></tr>
</table>

T/TX, 10BASE-T/100BASE-TX Ports

CPU properties

Setting	Setting Items	Setting	Remarks
NETWORK	NETWORK_SELECT	1	
ETHERNET	ETHER_MY_IPADDRESS	0.0.0.0 to 255.255.255.255	IP address
	ETHER_SUBNET_MASK	0.0.0.0 to 255.255.255.255	Subnet mask
HIGHER-LEVEL_LINK_SERVICE	HLLINK_PROTOCOL_A	**1: UDP/IP**	Port 12289
	HLLINK_DATA_FORMAT_A	**0: ASCII format**	
	HLLINK_PROTOCOL_B	**1: UDP/IP**	Port 12291
	HLLINK_DATA_FORMAT_B	**0: ASCII format**	
	HLLINK_PROTECT	0: write enabled	

Available Device Memory

The contents of “Available Device Memory” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

PLC_CTL

The contents of “PLC_CTL” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

* The station number can be specified in the range from 0 to FFH.
For the station number, specify the PLC table number set for [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

29.1.4 FA-M3/FA-M3R (Ethernet TCP/IP)

Communication Setting

Editor

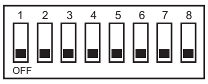
Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

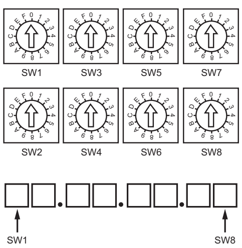
Ethernet Module

Condition setting switch

<table>
<tr><th>SW9</th><th>BIT</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8">
</td><td>1</td><td>Data format setting</td><td>F3LE01-5T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr></table>F3LE11-0T/F3LE12-0T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr><tr><td>12291</td><td>Binary</td><td>ASCII</td></tr></table></td></tr>
<tr><td>2</td><td>Write protection</td><td>OFF: not protected</td></tr>
<tr><td>3</td><td rowspan="4">System reserved</td><td rowspan="4">OFF</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Line handling at TCP time-out *1</td><td>OFF: close</td></tr>
<tr><td>8</td><td>Operation mode</td><td>OFF: normal</td></tr>
</table>

*1 F3LE01-5T only
*2 Port number: 12289

IP address setting switch

<table>
<tr><th>IP Address Setting Switch</th><th>Setting</th><th>Remarks</th></tr>
<tr><td>
</td><td><u>0.0.0.0</u> to 255.255.255.255</td><td>Set in hexadecimal notation.

Example

HEX C0.A8.FA.D2
↓
DEC 192.168.250.210</td></tr>
</table>

T/TX, 10BASE-T/100BASE-TX Ports

CPU properties

Setting	Setting Items	Setting	Remarks
NETWORK	NETWORK_SELECT	1	
ETHERNET	ETHER_MY_IPADDRESS	0.0.0.0 - 255.255.255.255	IP address
	ETHER_SUBNET_MASK	0.0.0.0 - 255.255.255.255	Subnet mask
HIGHER-LEVEL_LINK_SERVICE	HLLINK_PROTOCOL_A	**0: TCP/IP**	Port 12289
	HLLINK_DATA_FORMAT_A	**1: binary code**	
	HLLINK_PROTOCOL_B	**0: TCP/IP**	Port 12291
	HLLINK_DATA_FORMAT_B	**1: binary code**	
	HLLINK_PROTECT	0: write enabled	

Available Device Memory

The contents of "Available Device Memory" are the same as those described in "29.1.1 FA-M3/FA-M3R".

PLC_CTL

The contents of "PLC_CTL" are the same as those described in "29.1.1 FA-M3/FA-M3R".

* The station number can be specified in the range from 0 to FFH.
For the station number, specify the PLC table number set for [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

29.1.5 FA-M3/FA-M3R (Ethernet TCP/IP ASCII)

Communication Setting

Editor

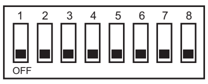
Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Ethernet Module

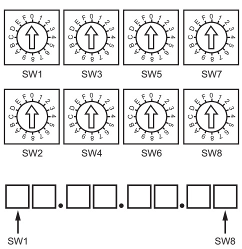
Condition setting switch

<table>
<tr><th>SW9</th><th>BIT</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8"></td><td>1</td><td>Data format setting</td><td>F3LE01-5T<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr></table>F3LE11-0T/F3LE12-0T<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr><tr><td>12291</td><td>Binary</td><td>ASCII</td></tr></table></td></tr>
<tr><td>2</td><td>Write protection</td><td>OFF: not protected</td></tr>
<tr><td>3</td><td rowspan="4">System reserved</td><td rowspan="4">OFF</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Line handling at TCP time-out*1</td><td>OFF: close</td></tr>
<tr><td>8</td><td>Operation mode</td><td>OFF: normal</td></tr>
</table>

*1 F3LE01-5T only

IP address setting switch

(Underlined setting: default)

IP Address Setting Switch	Setting	Remarks
	<u>0.0.0.0</u> to 255.255.255.255	Set in hexadecimal notation. Example HEX C0.A8.FA.D2 ↓ DEC 192.168.250.210

T/TX, 10BASE-T/100BASE-TX Ports

CPU properties

Setting	Setting Items	Setting	Remarks
NETWORK	NETWORK_SELECT	1	
ETHERNET	ETHER_MY_IPADDRESS	0.0.0.0 to 255.255.255.255	IP address
	ETHER_SUBNET_MASK	0.0.0.0 to 255.255.255.255	Subnet mask
HIGHER-LEVEL_LINK_SERVICE	HLLINK_PROTOCOL_A	**0: TCP/IP**	Port 12289
	HLLINK_DATA_FORMAT_A	**0: ASCII format**	
	HLLINK_PROTOCOL_B	**0: TCP/IP**	Port 12291
	HLLINK_DATA_FORMAT_B	**0: ASCII format**	
	HLLINK_PROTECT	0: write enabled	

Available Device Memory

The contents of “Available Device Memory” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

PLC_CTL

The contents of “PLC_CTL” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

* The station number can be specified in the range from 0 to FFH.
For the station number, specify the PLC table number set for [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

29.1.6 FA-M3V

Communication Setting

Editor

Communication setting

(Underlined setting: default)

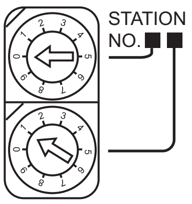
Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 76800 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 31	
Transmission Mode	With Sum Check / Without Sum Check	

PLC

PC Link Module

Station number setting

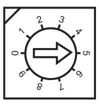
(Underlined setting: default)

Station No.	Setting	Example
	01 to 32	01

Baud rate setting switch

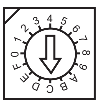
F3LC11-1N / F3LC11-2N

(Underlined setting: default)

Baud Rate Setting Switch	Setting	Baud Rate	Remarks
	4	4800 bps	
	5	9600 bps	
	6	19200 bps	

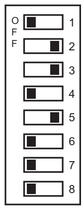
F3LC11-1F / F3LC12-1F / F3LC11-2F

(Underlined setting: default)

Baud Rate Setting Switch	Setting	Baud Rate	Remarks
	4	4800 bps	
	5	9600 bps	
	7	19200 bps	
	9	38400 bps	
	A	57.6 Kbps	
	B	76.8 Kbps	
	C	115.2 Kbps	

Data format setting switch

(Underlined setting: default)

Switches	Function	OFF	ON	Example
1	Data length	7	8	
2	Parity	Not provided	Provided	
3		Odd	Even	
4	Stop bit	1	2	
5	Checksum	Not provided	Provided	
6	Terminal character	**Not provided**	Provided	
7	Protection function	**Not provided**	Provided	
8	-	-	-	

Function setting switch

All OFF

Available Device Memory

The contents of “Available Device Memory” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

PLC_CTL

The contents of “PLC_CTL” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

29.1.7 FA-M3V (Ethernet)

Communication Setting

Editor

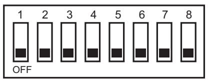
Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see "IP Address Setting of the X1 Series Unit".
- Connection port on the X1 series unit
  [System Setting] → [Hardware Setting] → [Connection Device Selection] → [Target Port No.]
  - When using TCP/IP:
    Select [LAN (TCP)] or [LAN2 (TCP)].
  - When using UDP/IP:
    Select [LAN (UDP)] or [LAN2 (UDP)].
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Ethernet Module

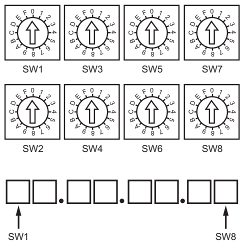
Condition setting switch

<table>
<tr><th>SW9</th><th>BIT</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8"></td><td>1</td><td>Data format setting</td><td>F3LE01-5T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr></table>
F3LE11-0T/F3LE12-0T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr><tr><td>12291</td><td>Binary</td><td>ASCII</td></tr></table></td></tr>
<tr><td>2</td><td>Write protection</td><td>OFF: not protected</td></tr>
<tr><td>3</td><td rowspan="4">System reserve</td><td rowspan="4">OFF</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Line handling at TCP time-out*1</td><td>OFF: close</td></tr>
<tr><td>8</td><td>Operation mode</td><td>OFF: normal</td></tr>
</table>

*1 F3LE01-5T only

IP address setting switch

(Underlined setting: default)

IP Address Setting Switch	Setting	Remarks
	0.0.0.0 to 255.255.255.255	Set in hexadecimal notation. Example: HEX C0.A8.FA.D2 ↓ DEC 192.168.250.210

10BASE-T/100BASE-TX Ports

CPU properties

Setting	Setting Items	Setting Values	Remarks
NETWORK	NETWORK_SELECT	1	
ETHERNET	ETHER_MY_IPADDRESS	0.0.0.0 to 255.255.255.255	IP address
	ETHER_SUBNET_MASK	0.0.0.0 to 255.255.255.255	Subnet mask
HIGHER-LEVEL_LINK_SERVICE	HLLINK_PROTOCOL_A	0: TCP/IP 1: UDP/IP	Port 12289
	HLLINK_DATA_FORMAT_A	**1: binary code**	
	HLLINK_PROTOCOL_B	0: TCP/IP 1: UDP/IP	Port 12291
	HLLINK_DATA_FORMAT_B	**1: binary code**	
	HLLINK_PROTECT	0: write enabled	

Available Device Memory

The contents of “Available Device Memory” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

PLC_CTL

The contents of “PLC_CTL” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

* The station number can be specified in the range from 0 to FFH.
For the station number, specify the PLC table number set for [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

29.1.8 FA-M3V (Ethernet ASCII)

Communication Setting

Editor

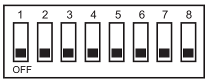
Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Connection port on the X1 series unit
  [System Setting] → [Hardware Setting] → [Connection Device Selection] → [Target Port No.]
  - When using TCP/IP:
    Select [LAN (TCP)] or [LAN2 (TCP)].
  - When using UDP/IP:
    Select [LAN (UDP)] or [LAN2 (UDP)].
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

PLC

Ethernet Module

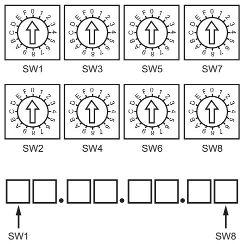
Condition setting switch

<table>
<tr><th>SW9</th><th>Bits</th><th>Contents</th><th>Setting</th></tr>
<tr><td rowspan="8">
</td><td>1</td><td>Data format setting</td><td>F3LE01-5T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr></table>
F3LE11-0T/F3LE12-0T
<table><tr><th>Port No.</th><th>OFF</th><th>ON</th></tr><tr><td>12289</td><td>ASCII</td><td>Binary</td></tr><tr><td>12291</td><td>Binary</td><td>ASCII</td></tr></table></td></tr>
<tr><td>2</td><td>Write protection</td><td>OFF: not protected</td></tr>
<tr><td>3</td><td rowspan="4">System reserve</td><td rowspan="4">OFF</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Line handling at TCP time-out*1</td><td>OFF: close</td></tr>
<tr><td>8</td><td>Operation mode</td><td>OFF: normal</td></tr>
</table>

*1 F3LE01-5T only

IP address setting switch

(Underlined setting: default)

IP Address Setting Switch	Setting	Remarks
	0.0.0.0 to 255.255.255.255	Set in hexadecimal notation. Example: HEX C0.A8.FA.D2 ↓ DEC 192.168.250.210

10BASE-T/100BASE-TX Ports

CPU properties

Setting	Setting Items	Setting Values	Remarks
NETWORK	NETWORK_SELECT	1	
ETHERNET	ETHER_MY_IPADDRESS	0.0.0.0 to 255.255.255.255	IP address
	ETHER_SUBNET_MASK	0.0.0.0 to 255.255.255.255	Subnet mask
HIGHER-LEVEL_LINK_SERVICE	HLLINK_PROTOCOL_A	0: TCP/IP 1: UDP/IP	Port 12289
	HLLINK_DATA_FORMAT_A	**0: ASCII format**	
	HLLINK_PROTOCOL_B	0: TCP/IP 1: UDP/IP	Port 12291
	HLLINK_DATA_FORMAT_B	**0: ASCII format**	
	HLLINK_PROTECT	0: write enabled	

Available Device Memory

The contents of “Available Device Memory” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

PLC_CTL

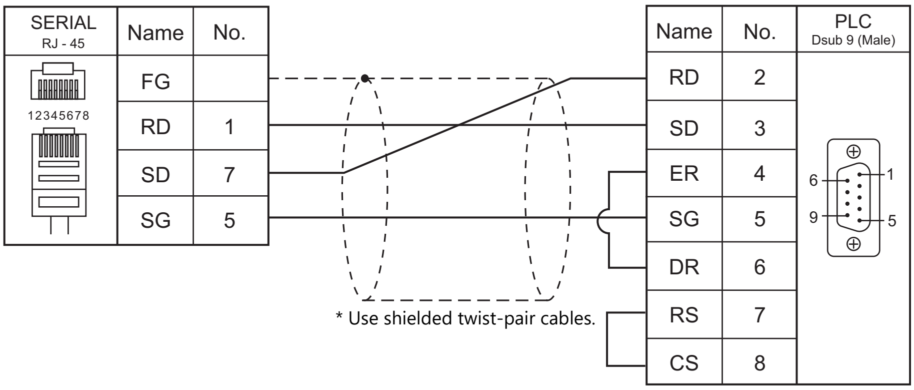
The contents of “PLC_CTL” are the same as those described in “29.1.1 FA-M3/FA-M3R”.

* The station number can be specified in the range from 0 to FFH.
For the station number, specify the PLC table number set for [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

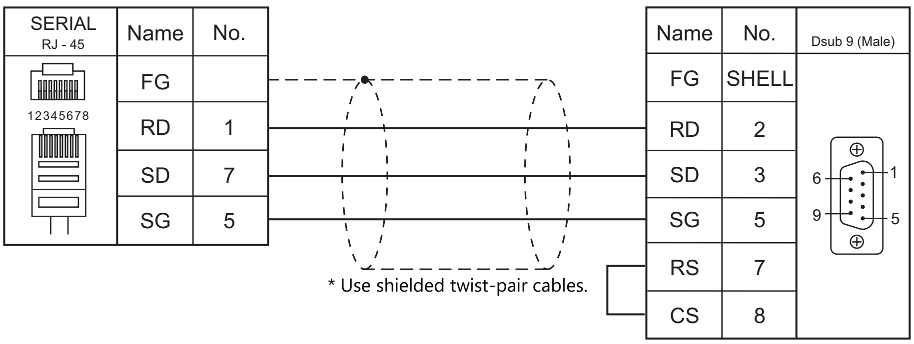
29.1.9 Wiring Diagrams

RS-232C

Wiring diagram 1 - M2

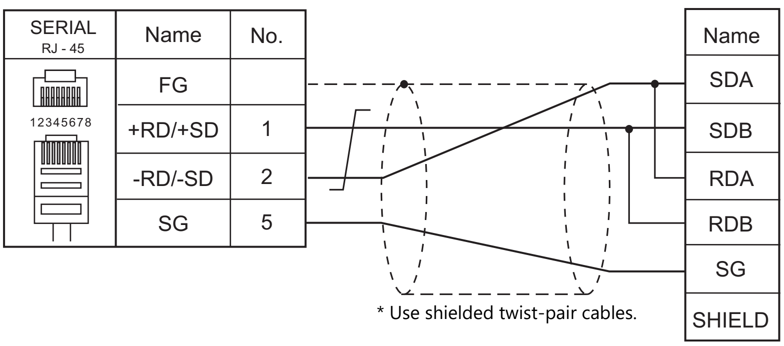


Wiring diagram 2 - M2

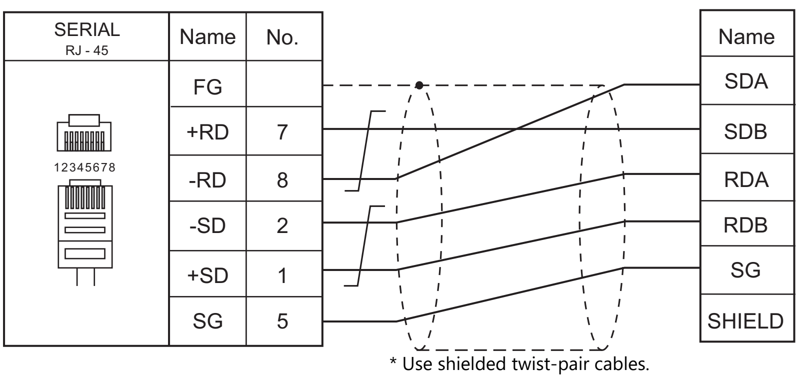


RS-422/RS-485

Wiring diagram 1 - M4



Wiring diagram 2 - M4



29.2 Temperature Controller/Servo/Inverter Connection

Temperature Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C / RS-485 (2-wire)*1	RS-422 (4-wire)	
UT100	UT130-xx/RS UT150-xx/RS UT152-xx/RS UT155-xx/RS	RS-485 port	RS-485	Wiring diagram 2 - M4	×	UT100.Lst

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Digital Indicating Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C / RS-485 (2-wire)*1	RS-422 (4-wire)*1	
UT750	UT750-01 UT750-11 UT750-51	RS-485 port	RS-485	Wiring diagram 1 - M4	Wiring diagram 3 - M4 *2	UT750.Lst
		High speed RS-485 port	RS-485	Wiring diagram 2 - M4	×	
UT550	UT550-01, 02 UT550-11, 12 UT550-21, 22 UT550-31, 32 UT550-41, 42	RS-485 port	RS-485	Wiring diagram 1 - M4	Wiring diagram 3 - M4 *2	UT550.Lst
UT520	UT520-07	RS-485 port	RS-485			
UT350	UT350-01 UT350-21 UT350-31	RS-485 port	RS-485			UT350.Lst
UT320	UT320-01 UT320-21 UT320-31	RS-485 port	RS-485			
UT450	UT450-01, 02 UT450-11, 12 UT450-21, 22 UT450-31, 32 UT450-41, 42	RS-485 port	RS-485			UT450.Lst
UT32A/35A (MODBUS RTU)	UT32A-x10-0x-00 UT32A-NNN-0x-xx/CH1 UT35A-xx1-0x-00 UT35A-NNN-0x-xx/CH3	Terminal block	RS-485	Wiring diagram 1 - M4	Wiring diagram 3 - M4 *2	YOKOGAWA UT30A (MODBUS RTU).Lst
	UT32A-x10-0x-00/LP UT32A-NNN-0x-xN/LCH1			Wiring diagram 2 - M4	×	
UT52A/55A (MODBUS RTU)	UT52A-NNN-0x-xx/CH1 UT55A-x10-0x-00 UT55A-x2x-0x-00 UT55A-xx1-0x-00 UT55A-x2x-01-00/MDL UT55A-NNN-0x-xx/CH3 UT55A-NNN-0x-xx/C4	Terminal block	RS-485	Wiring diagram 1 - M4	Wiring diagram 3 - M4 *2	YOKOGAWA UT50A (MODBUS RTU).Lst
	UT52A-x10-0x-00 UT52A-010-01-00/MDL UT52A-NNN-0x-xx/RCH1 UT52A-NNN-0x-xN/LCH1 UT55A-x10-0x-00/LP UT55A-x2x-0x-00/LP UT55A-x2x-01-00/LP/MDL UT55A-NNN-0x-xx/AC4 UT55A-NNN-0x-xx/LC4			Wiring diagram 2 - M4	×	
UT75A (MODBUS RTU)	UT75A-xx1-0x-00	Terminal block	RS-485	Wiring diagram 1 - M4	Wiring diagram 3 - M4 *2	YOKOGAWA UT75A (MODBUS RTU).Lst
	UT75A-x1x-0x-00 UT75A-x2x-0x-00			Wiring diagram 2 - M4	×	

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Multi-point Temperature Controller

PLC Selection on the Editor	Model	Port	Signal Level	Connection		Lst File
				RS-232C / RS-485 (2-wire)	RS-422 (4-wire)*1	
UT2400/2800	UT2400-1, 1/HB UT2400-2, 2/HB UT2400-3, 3/HB UT2400-4, 4/HB UT2800-1, 1/HB UT2800-2, 2/HB UT2800-3, 3/HB UT2800-4, 4/HB	RS-485 port	RS-422	×	Wiring diagram 4 - M4	UT2000.Lst

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

Chart Recorder

PLC Selection on the Editor	CPU	Unit/Port	TCP/IP	UDP/IP	Port No.	Keep Alive*1	Lst File
µR10000/20000 (Ethernet TCP/IP)	436101-x/C7 436102-x/C7 436103-x/C7 436104-x/C7 436106-x/C7	Ethernet port	○	×	34260 (Max. 3 units: 1 for administrator and 2 for users)	○	µR10000_Eth.Lst
	437101-x/C7 437102-x/C7 437103-x/C7 437104-x/C7 437106-x/C7 437112-x/C7 437118-x/C7 437124-x/C7						

*1 For KeepAlive functions, see "1.3.2 Ethernet Communication".

29.2.1 UT100

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	4800 / 9600 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	
Sum Check	Provided / Not provided	Make the same setting as PSL (communication protocol selection) of the temperature controller.

* Select "Without Sum Check" for the transmission mode on the editor when "1: PC link communication (with checksum)" is specified for P.SL (Protocol selection) on the controller.

Temperature Controller

The communication parameters can be set using keys attached to the temperature controller.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Display	Item	Setting	Example
Communication	PSL	Protocol selection	0: PC link communication 1: PC link communication (with checksum)	0
	ADR	Communication address	1 to 31	1
	BPS	Baud rate	4.8: 4800 bps 9.6: 9600 bps	9.6
	PRI	Parity	NON: None EVN: Even ODD: Odd	EVN
	STP	Stop bit	1 / 2 bits	1
	DLN	Data length	7 / 8 bits	8

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
I	(input relay)	01H	

Indirect Device Memory Designation

For the device memory address number, specify the value obtained by subtracting "1" from the actual address.

29.2.2 UT750

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 31	
Sum Check	Provided / Not provided	Make the same setting as PSL (communication protocol selection) of the temperature controller.

Digital Indicating Controller

The communication parameters can be set using keys attached to the digital indicating controller.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Parameter	Port	Indication	Item	Setting	Example
Communication	RS-485 port	PSL1	Protocol selection 1	0: Personal computer link communication 1: Personal computer link communication (with sum check)	0
		BPS1	Baud rate 1	3: 4800 bps 4: 9600 bps	4
		PRI1	Parity 1	0: None 1: Even 2: Odd	1
		STP1	Stop bit 1	1 / 2 bits	1
		DLN1	Data length 1	7 / 8 bits	8
		ADR1	Address 1	1 to 31	1
	High-speed RS-485 port	PSL2	Protocol selection 2	0: Personal computer link communication 1: Personal computer link communication (with sum check)	0
		BPS2	Baud rate 2	3: 4800 bps 4: 9600 bps 5: 19200 bps 6: 38400 bps	4
		PRI2	Parity 2	0: None 1: Even 2: Odd	1
		STP2	Stop bit 2	1 / 2 bits	1
		DLN2	Data length 2	7 / 8 bits	8
		ADR2	Address 2	1 to 31	1

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
D	(data register)	00H	
I	(input relay)	01H	

Indirect Device Memory Designation

For the device memory address number, specify the value obtained by subtracting “1” from the actual address.

29.2.3 UT550

Settings are the same as those described in “29.2.1 UT100”.

29.2.4 UT520

Settings are the same as those described in “29.2.1 UT100”.

29.2.5 UT350

Settings are the same as those described in “29.2.1 UT100”.

29.2.6 UT320

Settings are the same as those described in “29.2.1 UT100”.

29.2.7 UT450

Settings are the same as those described in “29.2.1 UT100”.

29.2.8 UT32A/35A (MODBUS RTU)

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 99	0: Broadcast address for Modbus device 249: Broadcast address for UT Advanced device

Digital Indicating Controller

The communication parameters can be set using keys attached to the digital indicating controller.
Be sure to match the settings to those made under [Communication Setting] of the editor.

(Underlined setting: default)

Menu	Parameter	Name	Setting
RS-485	PSL	Protocol selection	**MBRTU (8): Modbus communication (RTU)**
	BPS	Baud Rate	4800 (3): 4800bps 9600 (4): 9600 bps 19200 (5): 19200 bps 38400 (6): 38400 bps
	PRI	Parity	NONE (0): None EVEN (1): Even ODD (2): Odd
	STP	Stop Bit	1 (1): 1 bit 2 (2): 2 bits
	DLN	Data Length	**8bit (8): 8 bits**
	ADR	Address	1 to 99

Available Device Memory

The available setting range of device memory varies depending on the connected device. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
D (D Register)	00H	
I (I Relay)	01H	

Indirect Device Memory Designation

For the device memory address number, specify the value obtained by subtracting “1” from the actual address.

29.2.9 UT52A/55A (MODBUS RTU)

Settings are the same as those described in “29.2.8 UT32A/35A (MODBUS RTU)”.
Note however, for UT52A, a baud rate of “38400 bps” is available only with standard models for which the Type 2 suffix code is “1”.
For UT55A, a baud rate of “38400 bps” is available only with standard models for which the Type 3 suffix code is “1”.

29.2.10 UT75A (MODBUS RTU)

Settings are the same as those described in “29.2.8 UT32A/35A (MODBUS RTU)”.
Note however, a baud rate of “38400 bps” is available only with standard models for which the Type 3 suffix code is “1”.

29.2.11 UT2400/2800

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-422/485	
Baud Rate	4800 / 9600 bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	1 to 16	
CR	Checked / Unchecked	
CPU No. *	01 / 02	01: 1 to 4CH 02: 5 to 8CH (available only with UT2800)

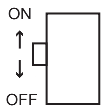
* Set the CPU number on the [Device Input] dialog.
"CPU No. 2" is not provided for UT2400. It can be specified only when UT2800 is used.

Multi-point Temperature Controller

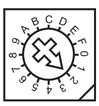
Be sure to match the settings to those made under [Communication Setting] of the editor.

Communication mode selector switch

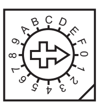
(Underlined setting: default)

Communication Mode Selector Switch	OFF	ON	Remarks
	Ladder communication mode	Personal computer link communication mode	

Communication condition setting switch

Communication Condition Setting Switch	Setting	Baud Rate	Parity	Data Length	Stop Bit	Setting Example
	0	9600 bps	None	8	1	2: 9600 bps Even 8 bits 1 bit
	1		Odd			
	2		Even			
	3	4800 bps	None			
	4		Odd			
	5		Even			

Unit No. selector switch

Unit No. Selector Switch	Setting	Station Number	Setting Example
	0 to F	1 to 16	0: Station number 1

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available for the model to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory	TYPE	Remarks
D (data register)	00H	
I (input relay)	01H	

* The CPU number is required in addition to the device type and address. The assigned device memory is expressed as shown on the right when editing the screen.

Example: 1 : D00001

Address number
Device type
CPU number

Indirect Device Memory Designation

For the device memory address number, specify the value obtained by subtracting "1" from the actual address.
Specify the CPU number in the expansion code.

29.2.12 µR10000/20000 (Ethernet TCP/IP)

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 series unit
  Set the IP address using System Configurator. For details, see “IP Address Setting of the X1 Series Unit”.
- Port number for the X1 series unit (for communication with PLC)
  [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting]
- IP address and port number of the PLC
  Register on the [PLC Table] in [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Settings].

Chart Recorder

Make the following settings.
After turning on the chart recorder, hold down the [MENU] key for 3 seconds to change to the Setting mode. Then switch to the Basic Setting mode by holding down the [DISP] and [FUNC] keys for 3 seconds. Display the Ethernet menu by pressing the [DISP] key several times.

Basic Setting Mode	Item	Indication	Remarks
Ethernet	IP address	A	IP address
		M	Subnet mask
		G	Gateway

Login

For communication with the chart recorder, login is required.
Log in using the PLC_CTL macro command (command: 67).

Limitations

The X1 series can only access the server for settings and measurement. Access to servers for maintenance and diagnosis as well as device information is not available.

Available Device Memory

The available setting range of device memory varies depending on the connected device. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
SN	(unit setting)	00H	
SC	(chart speed setting)	01H	
VT	(recording interval setting)	02H	
SZ	(zone recording setting)	03H	
ST	(tag setting)	04H	
SG	(message setting)	05H	
SE	(secondary chart speed setting)	06H	
SV	(moving average setting)	07H	
SF	(input filter setting)	08H	
BD	(alarm delay duration setting)	09H	
VF	(display (VFD) and internal light brightness setting)	0AH	
SJ	(timer settings for TLOG calculations)	0BH	
FR	(interval setting for FIFO buffer writing)	0CH	
VP	(start/end printout ON/OFF setting)	0DH	
XI	(integration time setting for A/D converter)	0FH	
XB	(burnout detection setting)	10H	
UC	(dot color change)	11H	
UO	(pen offset compensation setting)	12H	
UM	(report data type setting for periodic printing)	13H	
UB	(bar graph display mode setting)	14H	
UI	(moving average ON/OFF setting)	15H	
UJ	(input filter ON/OFF setting)	16H	
UK	(partial expanded recording ON/OFF setting)	17H	
UL	(display/printout language setting)	18H	
XN	(date format setting)	19H	
UT	(time printout format setting)	1AH	
XR	(remote control input setting)	1BH	
UN	(recording pen channel assignment change)	1DH	
US	(calculation error data setting)	1EH	
YB	(host and domain name setting)	1FH	
YA	(IP address setting)	20H	
YD	(login function ON/OFF setting)	21H	The login function cannot be used.
YK	(KeepAlive setting)	22H	
UQ	(calibration correction setting mode, correction points setting)	23H	
UH	([FUNC] key menu selection setting)	24H	

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

<table>
<tr><th>Description</th><th>F0</th><th colspan="3">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="7">Input range setting
(SR)
Measurement mode:
SKIP,
VOLT/TC/RTD/DI</td><td rowspan="7">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="7">4/7</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 0</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td>Measurement mode
0: SKIP</td><td>Measurement mode
1: VOLT
2: TC
3: RTD
4: DI</td></tr>
<tr><td>n + 4</td><td>-</td><td>Range *1</td></tr>
<tr><td>n + 5</td><td>-</td><td>Span left end value</td></tr>
<tr><td>n + 6</td><td>-</td><td>Span right end value</td></tr>
</table>

<table>
<tr><th>Description</th><th>F0</th><th colspan="3">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="10">Input range setting (SR)
Measurement mode:
1-5V, DELTA</td><td rowspan="10">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="10">10/7</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 0</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td>Measurement mode
5: 1-5V</td><td>Measurement mode
6: DELTA</td></tr>
<tr><td>n + 4</td><td>Span left end value</td><td>Standard channel</td></tr>
<tr><td>n + 5</td><td>Span right end value</td><td>Span left end value</td></tr>
<tr><td>n + 6</td><td>Scaling left end value</td><td>Span right end value</td></tr>
<tr><td>n + 7</td><td>Scaling right end value</td><td>-</td></tr>
<tr><td>n + 8</td><td>Scaling decimal place</td><td>-</td></tr>
<tr><td>n + 9</td><td>1-5V low-cut ON/OFF
0: Off
1: On</td><td>-</td></tr>
<tr><td rowspan="12">Input range setting (SR)
Measurement mode:
SCALE, SQRT</td><td rowspan="12">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="12">11/12</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 0</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td>Measurement mode
7: SCALE</td><td>Measurement mode
8: SQRT</td></tr>
<tr><td>n + 4</td><td>Input type
1: VOLT
2: TC
3: RTD
4: DI</td><td>Range *1</td></tr>
<tr><td>n + 5</td><td>Range *1</td><td>Span left end value</td></tr>
<tr><td>n + 6</td><td>Span left end value</td><td>Span right end value</td></tr>
<tr><td>n + 7</td><td>Span right end value</td><td>Scaling left end value</td></tr>
<tr><td>n + 8</td><td>Scaling left end value</td><td>Scaling right end value</td></tr>
<tr><td>n + 9</td><td>Scaling right end value</td><td>Scaling decimal place</td></tr>
<tr><td>n + 10</td><td>Scaling decimal place</td><td>Low-cut
0: Off
1: On</td></tr>
<tr><td>n + 11</td><td>-</td><td>Low-cut value (n + 10 = 1)</td></tr>
<tr><td rowspan="8">Acquisition of input range setting (SR)
Measurement mode:
SKIP, VOLT/TC/RTD/DI</td><td rowspan="8">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="8">3</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 1</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 4</td><td>Measurement mode
0: SKIP</td><td>Measurement mode
1: VOLT
2: TC
3: RTD
4: DI</td></tr>
<tr><td>n + 5</td><td>-</td><td>Range *1</td></tr>
<tr><td>n + 6</td><td>-</td><td>Span left end value</td></tr>
<tr><td>n + 7</td><td>-</td><td>Span right end value</td></tr>
<tr><td rowspan="11">Acquisition of input range setting (SR)
Measurement mode:
1-5V, DELTA</td><td rowspan="11">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="11">3</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 1</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 4</td><td>Measurement mode
5: 1-5V</td><td>Measurement mode
6: DELTA</td></tr>
<tr><td>n + 5</td><td>Span left end value</td><td>Standard channel</td></tr>
<tr><td>n + 6</td><td>Span right end value</td><td>Span left end value</td></tr>
<tr><td>n + 7</td><td>Scaling left end value</td><td>Span right end value</td></tr>
<tr><td>n + 8</td><td>Scaling right end value</td><td>-</td></tr>
<tr><td>n + 9</td><td>Scaling decimal place</td><td>-</td></tr>
<tr><td>n + 10</td><td>1-5V low-cut ON/OFF
0: Off
1: On</td><td>-</td></tr>
</table>

Description	F0	F1 (=$u n)			F2
Acquisition of input range setting (SR) Measurement mode: SCALE, SQRT	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 1		
		n + 2	CH No.		
		n + 3	CH No.		
		n + 4	Measurement mode 7: SCALE	Measurement mode 8: SQRT	
		n + 5	Input type 1: VOLT 2: TC 3: RTD 4: DI	Range *1	
		n + 6	Range *1	Span left end value	
		n + 7	Span left end value	Span right end value	
		n + 8	Span right end value	Scaling left end value	
		n + 9	Scaling left end value	Scaling right end value	
		n + 10	Scaling right end value	Scaling decimal place	
		n + 11	Scaling decimal place	Low-cut 0: Off 1: On	
		n + 12	-	Low-cut value	
Calibration correction setting (VL)	1 to 8 (PLC1 to 8)	n	Station number		5+2m
		n + 1	Command: 2		
		n + 2	CH No.		
		n + 3	Calibration correction function 0: Off 1: On		
		n + 4	Number of settings (both correction point and value): 1 to 16		
		n + 5	Correction point 1 (m = 1)		
		n + 6	Correction value 1 (m = 1)		
		n + 7	Correction point 2 (m = 2)		
		n + 8	Correction value 2 (m = 2)		
		:	:		
Acquisition of calibration correction setting (VL)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 3		
		n + 2	CH No.		
		n + 3	CH No.		
		n + 4	Calibration correction function 0: Off 1: On		
		n + 5	Number of settings (both correction point and value): 1 to 16		
		n + 6	Correction point 1		
		n + 7	Correction value 1		
		n + 8	Correction point 2		
		n + 9	Correction value 2		
		:	:		
Alarm setting (SA)	1 to 8 (PLC1 to 8)	n	Station number		5/9
		n + 1	Command: 4		
		n + 2	CH No.		
		n + 3	Alarm number		
		n + 4	Alarm ON/OFF 0: Off	Alarm ON/OFF 1: On	
		n + 5	-	Alarm type 1: H (upper limit) 2: L (lower limit) 3: h (difference upper limit) 4: l (difference lower limit) 5: R (change rate upper limit) 6: r (change rate lower limit) 7: T (delay upper limit) 8: t (delay lower limit)	
		n + 6	-	Alarm value	
		n + 7	-	Relay output 0: No relay output 1: Output relay	
		n + 8	-	Relay number (n + 7 = 1)	

<table>
<tr><th>Description</th><th>F0</th><th colspan="3">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="11">Acquisition of alarm setting (SA)</td><td rowspan="11">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="11">4</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 5</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td colspan="2">Alarm number</td></tr>
<tr><td>n + 4</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 5</td><td colspan="2">Alarm number</td></tr>
<tr><td>n + 6</td><td>Alarm ON/OFF
0: Off</td><td>Alarm ON/OFF
1: On</td></tr>
<tr><td>n + 7</td><td>-</td><td>Alarm type
1: H (upper limit)
2: L (lower limit)
3: h (difference upper limit)
4: l (difference lower limit)
5: R (change rate upper limit)
6: r (change rate lower limit)
7: T (delay upper limit)
8: t (delay lower limit)</td></tr>
<tr><td>n + 8</td><td>-</td><td>Alarm value</td></tr>
<tr><td>n + 9</td><td>-</td><td>Relay output
0: No relay output
1: Output relay</td></tr>
<tr><td>n + 10</td><td>-</td><td>Relay number</td></tr>
<tr><td rowspan="6">Channel recording ON/OFF settings (VR)</td><td rowspan="6">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="6">5/6</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 6</td></tr>
<tr><td>n + 2</td><td>Model
0: Pen</td><td>Model
1: Dot</td></tr>
<tr><td>n + 3</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 4</td><td>Periodic printing ON/OFF
0: Off
1: On</td><td>Analog recording ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 5</td><td>-</td><td>Periodic printing ON/OFF
0: Off
1: On</td></tr>
<tr><td rowspan="7">Acquisition of channel recording ON/OFF settings (VR)</td><td rowspan="7">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="7">4</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 7</td></tr>
<tr><td>n + 2</td><td>Model
0: Pen</td><td>Model
1: Dot</td></tr>
<tr><td>n + 3</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 4</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 5</td><td>Periodic printing ON/OFF
0: Off
1: On</td><td>Analog recording ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 6</td><td>-</td><td>Periodic printing ON/OFF
0: Off
1: On</td></tr>
<tr><td rowspan="8">Batch and lot number settings (VH)
Batch</td><td rowspan="8">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="8">5+m</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 8</td></tr>
<tr><td>n + 2</td><td colspan="2">Subcommand
0: Batch</td></tr>
<tr><td>n + 3</td><td colspan="2">Item
0: Batch</td></tr>
<tr><td>n + 4</td><td colspan="2">No. of characters</td></tr>
<tr><td>n + 5</td><td colspan="2">Batch number (m = 1)</td></tr>
<tr><td>n + 6</td><td colspan="2">Batch number (m = 2)</td></tr>
<tr><td>:</td><td colspan="2">:</td></tr>
<tr><td rowspan="6">Batch and lot number settings (VH)
Lot number</td><td rowspan="6">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="6">5/6</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 8</td></tr>
<tr><td>n + 2</td><td>Subcommand
1: Lot (4 digits)</td><td>Subcommand
2: Lot (6 digits)</td></tr>
<tr><td>n + 3</td><td colspan="2">Item
1: Lot</td></tr>
<tr><td>n + 4</td><td>Lot number</td><td>Lot number (lower word)</td></tr>
<tr><td>n + 5</td><td>-</td><td>Lot number (higher word)</td></tr>
</table>

<table>
<tr><th>Description</th><th>F0</th><th colspan="4">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="9">Acquisition of batch and lot number settings (VH)</td><td rowspan="9">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="3">Station number</td><td rowspan="9">4</td></tr>
<tr><td>n + 1</td><td colspan="3">Command: 9</td></tr>
<tr><td>n + 2</td><td>Subcommand
0: Batch</td><td>Subcommand
1: Lot (4 digits)</td><td>Subcommand
2: Lot (6 digits)</td></tr>
<tr><td>n + 3</td><td>Item
0: Batch</td><td>Item
1: Lot</td><td>Item
1: Lot</td></tr>
<tr><td>n + 4</td><td>Item
0: Batch</td><td>Lot number</td><td>Lot number
(lower word)</td></tr>
<tr><td>n + 5</td><td>No. of characters</td><td>-</td><td>Lot number
(higher word)</td></tr>
<tr><td>n + 6</td><td>Batch number</td><td>-</td><td>-</td></tr>
<tr><td>n + 7</td><td>Batch number</td><td>-</td><td>-</td></tr>
<tr><td>:</td><td>:</td><td>-</td><td>-</td></tr>
<tr><td rowspan="8">Batch comment settings (VC)</td><td rowspan="8">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="3">Station number</td><td rowspan="8">5+m</td></tr>
<tr><td>n + 1</td><td colspan="3">Command: 10</td></tr>
<tr><td>n + 2</td><td colspan="3">Mode
0: Start printout
1: End printout
2: Start printout 2
3: End printout 2</td></tr>
<tr><td>n + 3</td><td colspan="3">Line number</td></tr>
<tr><td>n + 4</td><td colspan="3">No. of characters</td></tr>
<tr><td>n + 5</td><td colspan="3">Batch comment (m = 1)</td></tr>
<tr><td>n + 6</td><td colspan="3">Batch comment (m = 2)</td></tr>
<tr><td>:</td><td colspan="3">:</td></tr>
<tr><td rowspan="9">Acquisition of batch comment settings (VC)</td><td rowspan="9">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="3">Station number</td><td rowspan="9">4</td></tr>
<tr><td>n + 1</td><td colspan="3">Command: 11</td></tr>
<tr><td>n + 2</td><td colspan="3">Mode
0: Start printout
1: End printout
2: Start printout 2
3: End printout 2</td></tr>
<tr><td>n + 3</td><td colspan="3">Line number</td></tr>
<tr><td>n + 4</td><td colspan="3">Mode
0: Start printout
1: End printout
2: Start printout 2
3: End printout 2</td></tr>
<tr><td>n + 5</td><td colspan="3">Line number</td></tr>
<tr><td>n + 6</td><td colspan="3">Batch comment</td></tr>
<tr><td>n + 7</td><td colspan="3">Batch comment</td></tr>
<tr><td>:</td><td colspan="3">:</td></tr>
<tr><td rowspan="7">Start/end printout action settings (VA)</td><td rowspan="7">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="3">Station number</td><td rowspan="7">4/7</td></tr>
<tr><td>n + 1</td><td colspan="3">Command: 12</td></tr>
<tr><td>n + 2</td><td>Mode
0: Start
2: Start2</td><td colspan="2">Mode
1: End
3: End2</td></tr>
<tr><td>n + 3</td><td>Chart speed before start printout</td><td colspan="2">Chart speed after end printout</td></tr>
<tr><td>n + 4</td><td>-</td><td colspan="2">Lot number automatic update ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 5</td><td>-</td><td colspan="2">Offset compensation record output ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 6</td><td>-</td><td colspan="2">Chart speed for offset compensation record output
0: C.Speed
1: 450 mm/h</td></tr>
</table>

Description	F0	F1 (=$u n)			F2
Acquisition of start/end printout action settings (VA)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 13		
		n + 2	Mode 0: Start 1: End 2: Start2 3: End2		
		n + 3	Mode 0: Start 2: Start2	Mode 1: End 3: End2	
		n + 4	Chart speed before start printout	Chart speed after end printout	
		n + 5	-	Lot number automatic update ON/OFF 0: Off 1: On	
		n + 6	-	Offset compensation record output ON/OFF 0: Off 1: On	
		n + 7	-	Chart speed for offset compensation record output 0: C.Speed 1: 450 mm/h	
Alarm-related settings (XA)	1 to 8 (PLC1 to 8)	n	Station number		Variable *3
		n + 1	Command: 14		
		n + 2	Diagnosis output ON/OFF 0: Off 1: On		
		n + 3	Reflash alarm operation 0: Off 1: On		
		n + 4	AND logic relay *2		
		n + 5	Relay energized/de-energized operation 0: Energize 1: De_energize		
		n + 6	Relay hold/non-hold operation 0: Hold 1: Nonhold		
		n + 7	Alarm status display hold/non-hold operation 0: Hold 1: Nonhold		
		n + 8	Interval for change rate upper limit alarm		
		n + 9	Interval for change rate lower limit alarm		
		n + 10	Measurement channel alarm hysteresis 0: Off 1 to 10: 0.1 to 1.0		
		n + 11	Computation channel alarm hysteresis 0: Off 1 to 10: 0.1 to 1.0		
Acquisition of alarm-related settings (XA)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 15		
		n + 2	Diagnosis output ON/OFF 0: Off 1: On		
		n + 3	Reflash alarm operation 0: Off 1: On		
		n + 4	AND logic relay *2		
		n + 5	Relay energized/de-energized operation 0: Energize 1: De_energize		
		n + 6	Relay hold/non-hold operation 0: Hold 1: Nonhold		
		n + 7	Alarm status display hold/non-hold operation 0: Hold 1: Nonhold		
		n + 8	Interval for change rate upper limit alarm		
		n + 9	Interval for change rate lower limit alarm		
		n + 10	Measurement channel alarm hysteresis 0: Off 1 to 10: 0.1 to 1.0		
		n + 11	Computation channel alarm hysteresis 0: Off 1 to 10: 0.1 to 1.0		

<table>
<tr><th>Description</th><th>F0</th><th colspan="3">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="5">Compensation setting of standard setting (XJ)</td><td rowspan="5">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="5">4/5</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 16</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td>Compensation setting of standard setting
0: Internal</td><td>Compensation setting of standard setting
1: External</td></tr>
<tr><td>n + 4</td><td>-</td><td>Compensation voltage</td></tr>
<tr><td rowspan="6">Acquisition of standard setting compensation setting (XJ)</td><td rowspan="6">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="6">3</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 17</td></tr>
<tr><td>n + 2</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 3</td><td colspan="2">CH No.</td></tr>
<tr><td>n + 4</td><td>Compensation setting of standard setting
0: Internal</td><td>Compensation setting of standard setting
1: External</td></tr>
<tr><td>n + 5</td><td>-</td><td>Compensation voltage</td></tr>
<tr><td rowspan="9">Items-to-print setting (UP)</td><td rowspan="9">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="9">9</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 18</td></tr>
<tr><td>n + 2</td><td>Model
0: Pen</td><td>Model
1: Dot</td></tr>
<tr><td>n + 3</td><td colspan="2">Channel number / tag selection
0: CH
1: Tag</td></tr>
<tr><td>n + 4</td><td>Alarm printing setting
0: Off
1: On1
2: On2</td><td>Channel printing next to analog recording ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 5</td><td>Recording start printout ON/OFF
0: Off
1: On</td><td>Alarm printing setting
0: Off
1: On1
2: On2</td></tr>
<tr><td>n + 6</td><td>New chart speed printout ON/OFF
0: Off
1: On</td><td>Recording start printout ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 7</td><td>Scaling printout ON/OFF
0: Off
1: On</td><td>New chart speed printout ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 8</td><td>Recording color printing ON/OFF
0: Off
1: On</td><td>Scaling printout ON/OFF
0: Off
1: On</td></tr>
<tr><td rowspan="9">Acquisition of items-to-print setting (UP)</td><td rowspan="9">1 to 8
(PLC1 to 8)</td><td>n</td><td colspan="2">Station number</td><td rowspan="9">3</td></tr>
<tr><td>n + 1</td><td colspan="2">Command: 19</td></tr>
<tr><td>n + 2</td><td colspan="2">Model
0: Pen
1: Dot</td></tr>
<tr><td>n + 3</td><td>Channel number / tag selection
0: CH</td><td>Channel number / tag selection
1: Tag</td></tr>
<tr><td>n + 4</td><td>Alarm printing setting
0: Off
1: On1
2: On2</td><td>Channel printing next to analog recording ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 5</td><td>Recording start printout ON/OFF
0: Off
1: On</td><td>Alarm printing setting
0: Off
1: On1
2: On2</td></tr>
<tr><td>n + 6</td><td>New chart speed printout ON/OFF
0: Off
1: On</td><td>Recording start printout ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 7</td><td>Scaling printout ON/OFF
0: Off
1: On</td><td>New chart speed printout ON/OFF
0: Off
1: On</td></tr>
<tr><td>n + 8</td><td>Recording color printing ON/OFF
0: Off
1: On</td><td>Scaling printout ON/OFF
0: Off
1: On</td></tr>
</table>

Description	F0	F1 (=$u n)			F2
Periodic printing interval setting (UR)	1 to 8 (PLC1 to 8)	n	Station number		5/6
		n + 1	Command: 20		
		n + 2	Decision of printing interval 0: Auto	Decision of printing interval 1: Manual	
		n + 3	Standard time		
		n + 4	Periodic printing mode 0: No periodic printing 1: Print instantaneous values 2: Print report data between intervals	Interval 0: 10 minutes 1: 12 minutes 2: 25 minutes 3: 20 minutes 4: 30 minutes 5: 1 hour 6: 2 hours 7: 3 hours 8: 4 hours 9: 6 hours 10: 8 hours 11: 12 hours 12: 24 hours	
		n + 5	-	Periodic printing mode 0: No periodic printing 1: Print instantaneous values 2: Print report data between intervals	
Acquisition of periodic printing interval setting (UR)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 21		
		n + 2	Decision of printing interval 0: Auto	Decision of printing interval 1: Manual	
		n + 3	Standard time		
		n + 4	Periodic printing mode 0: No periodic printing 1: Print instantaneous values 2: Print report data between intervals	Interval 0: 10 minutes 1: 12 minutes 2: 25 minutes 3: 20 minutes 4: 30 minutes 5: 1 hour 6: 2 hours 7: 3 hours 8: 4 hours 9: 6 hours 10: 8 hours 11: 12 hours 12: 24 hours	
		n + 5	-	Periodic printing mode 0: No periodic printing 1: Print instantaneous values 2: Print report data between intervals	
Personalize function ON/OFF setting (UF)	1 to 8 (PLC1 to 8)	n	Station number		Variable *3
		n + 1	Command: 22		
		n + 2	Bias function 0: Not 1: Use		
		n + 3	Square root computation low-cut function 0: Not 1: Use		
		n + 4	1-5V input low-cut function 0: Not 1: Use		
		n + 5	Alarm delay function 0: Not 1: Use		
		n + 6	Calibration function 0: Not 1: Use		

Description	F0	F1 (=$u n)				F2
Acquisition of personalize function ON/OFF setting (UF)	1 to 8 (PLC1 to 8)	n	Station number			2
		n + 1	Command: 23			
		n + 2	Bias function 0: Not 1: Use			
		n + 3	Square root computation low-cut function 0: Not 1: Use			
		n + 4	1-5V input low-cut function 0: Not 1: Use			
		n + 5	Alarm delay function 0: Not 1: Use			
		n + 6	Calibration function 0: Not 1: Use			
TLOG timer setting (XQ)	1 to 8 (PLC1 to 8)	n	Station number			4/8
		n + 1	Command: 24			
		n + 2	Timer No.			
		n + 3	Timer type 0: Off	Timer type 1: Absolute	Timer type 2: Relative	
		n + 4	-	Interval 0: 10 minutes 1: 12 minutes 2: 25 minutes 3: 20 minutes 4: 30 minutes 5: 1 hour 6: 2 hours 7: 3 hours 8: 4 hours 9: 6 hours 10: 8 hours 11: 12 hours 12: 24 hours	Interval (hours)	
		n + 5	-	Standard time	Interval (minutes)	
		n + 6	-	Timeout reset ON/OFF 0: Off 1: On		
		n + 7	-	Printout ON/OFF 0: Off 1: On		
Acquisition of TLOG timer setting (XQ)	1 to 8 (PLC1 to 8)	n	Station number			3
		n + 1	Command: 25			
		n + 2	Timer No.			
		n + 3	Timer No.			
		n + 4	Timer type 0: Off	Timer type 1: Absolute	Timer type 2: Relative	
		n + 5	-	Interval 0: 10 minutes 1: 12 minutes 2: 25 minutes 3: 20 minutes 4: 30 minutes 5: 1 hour 6: 2 hours 7: 3 hours 8: 4 hours 9: 6 hours 10: 8 hours 11: 12 hours 12: 24 hours	Interval (hours)	
		n + 6	-	Standard time	Interval (minutes)	
		n + 7	-	Timeout reset ON/OFF 0: Off 1: On		
		n + 8	-	Printout ON/OFF 0: Off 1: On		
DNS setting (XJ) DNS: off	1 to 8 (PLC1 to 8)	n	Station number			3
		n + 1	Command: 26			
		n + 2	DNS ON/OFF 0: Off			

Description	F0	F1 (=$u n)			F2
DNS setting (XJ) DNS: on	1 to 8 (PLC1 to 8)	n	Station number		Variable
		n + 1	Command: 26		
		n + 2	DNS ON/OFF 1: On		
		n + 3	Primary DNS server address (first digit (left-most))		
		n + 4	Primary DNS server address (second digit)		
		n + 5	Primary DNS server address (third digit)		
		n + 6	Primary DNS server address (fourth digit (right-most))		
		n + 7	Secondary DNS server address (first digit (left-most))		
		n + 8	Secondary DNS server address (second digit)		
		n + 9	Secondary DNS server address (third digit)		
		n + 10	Secondary DNS server address (fourth digit (right-most))		
		n + 11	Domain suffix 1 Number of characters *4		
		n + 12	Domain suffix 2 Number of characters *4		
		n + 13	Domain suffix 1		
		:	:		
		n + 44	Domain suffix 1		
		n + 45	Domain suffix 2		
		:	:		
		n + 76	Domain suffix 2		
Acquisition of DNS setting (XJ)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 27		
		n + 2	DNS ON/OFF 0: Off	DNS ON/OFF 1: On	
		n + 3	-	Primary DNS server address (first digit (left-most))	
		n + 4	-	Primary DNS server address (second digit)	
		n + 5	-	Primary DNS server address (third digit)	
		n + 6	-	Primary DNS server address (fourth digit (right-most))	
		n + 7	-	Secondary DNS server address (first digit (left-most))	
		n + 8	-	Secondary DNS server address (second digit)	
		n + 9	-	Secondary DNS server address (third digit)	
		n + 10	-	Secondary DNS server address (fourth digit (right-most))	
		n + 11	-	Domain suffix 1	
		:	-	:	
		n + 42	-	Domain suffix 1	
		n + 43	-	Domain suffix 2	
		:	-	:	
		n + 74	-	Domain suffix 2	
Communication timeout setting (YQ)	1 to 8 (PLC1 to 8)	n	Station number		3/4
		n + 1	Command: 28		
		n + 2	Communication timeout ON/OFF 0: Off	Communication timeout ON/OFF 1: On	
		n + 3	-	Time-out Time	
Acquisition of communication timeout setting (YQ)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 29		
		n + 2	Communication timeout ON/OFF 0: Off	Communication timeout ON/OFF 1: On	
		n + 3	-	Time-out Time	
Printing position adjustment (UA)	1 to 8 (PLC1 to 8)	n	Station number		6/5
		n + 1	Command: 30		
		n + 2	Model 0: Pen	Model 1: Dot	
		n + 3	Printing position 0: Zero (0 % position) 1: Full (100 % position)	Printing position 0: Zero (0 % position) 1: Full (100 % position) 2: Hysteresis (difference of printing position)	
		n + 4	Pen No.: 1 to 4	Adjustment value	
		n + 5	Adjustment value	-	

Description	F0	F1 (=$u n)		F2
Setting mode menu selection (UG)	1 to 8 (PLC1 to 8)	n	Station number	Variable *3
		n + 1	Command: 31	
		n + 2	Range 0: Off 1: On	
		n + 3	Bias 0: Off 1: On	
		n + 4	Alarm 0: Off 1: On	
		n + 5	Unit 0: Off 1: On	
		n + 6	Chart speed 0: Off 1: On	
		n + 7	Other Notes 0: Off 1: On	
		n + 8	Calibration correction 0: Off 1: On	
		n + 9	Operation 0: Off 1: On	
		n + 10	Batch name 0: Off 1: On	
		n + 11	Batch details 0: Off 1: On	
Acquisition of Setting mode menu selection (UG)	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 32	
		n + 2	Range 0: Off 1: On	
		n + 3	Bias 0: Off 1: On	
		n + 4	Alarm 0: Off 1: On	
		n + 5	Unit 0: Off 1: On	
		n + 6	Chart speed 0: Off 1: On	
		n + 7	Other Notes 0: Off 1: On	
		n + 8	Calibration correction 0: Off 1: On	
		n + 9	Operation 0: Off 1: On	
		n + 10	Batch name 0: Off 1: On	
		n + 11	Batch details 0: Off 1: On	

Description	F0	F1 (=$u n)			F2
Start/end printout and message format ON/OFF setting (UE)	1 to 8 (PLC1 to 8)	n	Station number		4/6
		n + 1	Command: 33		
		n + 2	Start/end printout ON/OFF 0: Not	Start/end printout ON/OFF 1: Use	
		n + 3	Message format ON/OFF 0: Not 1: Use	Lot number digits 0: Not 4: 4 digits 6: 6 digits	
		n + 4	-	Start2/end2 printout ON/OFF 0: Not 1: Use	
		n + 5	-	Message format ON/OFF 0: Not 1: Use	
Acquisition of start/end printout and message format ON/OFF setting (UE)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 34		
		n + 2	Start/end printout ON/OFF 0: Not	Start/end printout ON/OFF 1: Use	
		n + 3	Message format ON/OFF 0: Not 1: Use	Lot number digits 0: Not 4: 4 digits 6: 6 digits	
		n + 4	-	Start2/end2 printout ON/OFF 0: Not 1: Use	
		n + 5	-	Message format ON/OFF 0: Not 1: Use	
Basic Setting mode exit (YE)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 35		
		n + 2	Settings ON/OFF 0: Store (settings enabled) 1: Abort (settings disabled)		
Basic Setting mode exit (XE)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 36		
		n + 2	Settings ON/OFF 0: Store (settings enabled) 1: Abort (settings disabled)		
Operation mode change (DS)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 37		
		n + 2	Mode type 0: Operation mode 1: Basic Setting mode		
Recording start/stop (PS)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 38		
		n + 2	Recording start/stop 0: Start 1: Stop		
Screen/channel switching (UD)	1 to 8 (PLC1 to 8)	n	Station number		3/4
		n + 1	Command: 39		
		n + 2	Command 0: Return to data display screen 2: Change displayed channel	Command 1: Change to data display screen 2	
		n + 3	-	Screen No.: 1 to 15	
Alarm acknowledgement operation (alarm ACK) (AK)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 40		
		n + 2	0 fixed		
Computation start/stop/reset (TL)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 41		
		n + 2	Operation type 0: Math start 1: Math stop 2: Math reset		
Manual printout start/stop (MP)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 42		
		n + 2	Operation type 0: Printout start 1: Printout stop		
List 1 (settings) printout start/stop (LS)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 43		
		n + 2	Recording start/stop 0: Start 1: Stop		

Description	F0	F1 (=$u n)		F2
List 2 (basic settings) printout start/stop (SU)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 44	
		n + 2	Recording start/stop 0: Start 1: Stop	
Message printout (MS)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 45	
		n + 2	Message No.: 1 to 5	
Alarm printout buffer clear (AC)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 46	
		n + 2	0 fixed	
Message printout buffer clear (MC)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 47	
		n + 2	0 fixed	
Periodic printing report data reset (VG)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 48	
		n + 2	Fixed to 2	
Settings initialization (YC)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 49	
		n + 2	Initialization type 0: Initialization of Setting mode and Basic Setting mode settings 1: Initialization of Setting mode settings	
Stop printing position adjustment (UY)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 50	
		n + 2	0 fixed	
Acquisition of printing position adjustment status (UY)	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 51	
		n + 2	Execution status 0: Stopped 1: In execution	
Byte output order setting (BO)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 52	
		n + 2	Byte order 0: MSB 1: LSB	
Acquisition of byte output order setting (BO)	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 53	
		n + 2	Byte order 0: MSB 1: LSB	
Status filter setting (IF)	1 to 8 (PLC1 to 8)	n	Station number	6
		n + 1	Command: 56	
		n + 2	Status information filter 1: 0 to 255	
		n + 3	Status information filter 2: 0 to 255	
		n + 4	Status information filter 3: 0 to 255	
		n + 5	Status information filter 4: 0 to 255	
Acquisition of status filter setting (IF)	1 to 8 (PLC1 to 8)	n	Station number	2
		n + 1	Command: 57	
		n + 2	Status information filter 1: 0 to 255	
		n + 3	Status information filter 2: 0 to 255	
		n + 4	Status information filter 3: 0 to 255	
		n + 5	Status information filter 4: 0 to 255	
Ethernet disconnection (CC)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 58	
		n + 2	0 fixed	
Output of decimal point position, unit information, setting data (FE)	1 to 8 (PLC1 to 8)	n	Station number	6
		n + 1	Command: 59	
		n + 2	Address *5	
		n + 3	Output data type: 1 (decimal point position, unit information)	
		n + 4	First channel for output	
		n + 5	Last channel for output	
		n + 6 and up	Receive data *6	

Description	F0	F1 (=$u n)			F2
Output latest measurement/ calculation data (FD)	1 to 8 (PLC1 to 8)	n	Station number		5
		n + 1	Command: 60		
		n + 2	Address *5		
		n + 3	First channel for output		
		n + 4	Last channel for output		
		n + 5 and up	Receive data *6		
Output statistical calculation results (FY)	1 to 8 (PLC1 to 8)	n	Station number		6
		n + 1	Command: 61		
		n + 2	Address *5		
		n + 3	Output data type 0: Inst 1: Report 2: Tlog1 3: Tlog2		
		n + 4	First channel for output		
		n + 5	Last channel for output		
		n + 6 and up	Receive data *6		
FIFO data output (FF)	1 to 8 (PLC1 to 8)	n	Station number		7/4
		n + 1	Command: 62		
		n + 2	Address *5		
		n + 3	Operation type 0: Get 3: Get_new	Operation type 1: Resend 2: Reset	
		n + 4	First channel for output	Receive data *6	
		n + 5	Last channel for output		
		n + 6	Blocks to output 0: All blocks Other than 0: The specified number		
		n + 7 and up	Receive data *6		
Status information output (IS)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 63		
		n + 2	Status information 1: 0 to 255		
		n + 3	Status information 2: 0 to 255		
		n + 4	Status information 3: 0 to 255		
		n + 5	Status information 4: 0 to 255		
User information output (FU)	1 to 8 (PLC1 to 8)	n	Station number		2
		n + 1	Command: 64		
		n + 2	Physical layer		
		n + 3	User level		
		n + 4 to n + 11	User name		
Login	1 to 8 (PLC1 to 8)	n	Station number		4
		n + 1	Command: 67		
		n + 2	Login function: 0 (not use)		
		n + 3	Login level 0: Admin (administrator) 1: User		
Bias setting (VB)	1 to 8 (PLC1 to 8)	n	Station number		4/5
		n + 1	Command: 70		
		n + 2	CH No.		
		n + 3	Bias ON/OFF 0: Off	Bias ON/OFF 1: On	
		n + 4	-	Bias value	
Acquisition of bias setting (VB)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 71		
		n + 2	CH No.		
		n + 3	CH No.		
		n + 4	Bias ON/OFF 0: Off	Bias ON/OFF 1: On	
		n + 5	-	Bias value	

Description	F0	F1 (=$u n)		F2
Partial expanded recording setting (SP)	1 to 8 (PLC1 to 8)	n	Station number		4/6
		n + 1	Command: 72		
		n + 2	CH No.		
		n + 3	Partial expanded recording setting ON/OFF 0: Off	Partial expanded recording setting ON/OFF 1: On	
		n + 4	-	Boundary position	
		n + 5	-	Boundary value	
Acquisition of partial expanded recording setting (SP)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 73		
		n + 2	CH No.		
		n + 3	CH No.		
		n + 4	Partial expanded recording setting ON/OFF 0: Off	Partial expanded recording setting ON/OFF 1: On	
		n + 5	-	Boundary position	
		n + 6	-	Boundary value	
Computing equation setting (SO)	1 to 8 (PLC1 to 8)	n	Station number		4/Variable
		n + 1	Command: 74		
		n + 2	Computation channel No. *7		
		n + 3	Computing equation ON/OFF 0: Off	Computing equation ON/OFF 1: On	
		n + 4	-	No. of characters	
		n + 5 to n + 124	-	Computing equation *8	
		n + 125	-	Span left end value (lower word)	
		n + 126	-	Span left end value (higher word)	
		n + 127	-	Span right end value (lower word)	
		n + 128	-	Span right end value (higher word)	
		n + 129	-	Span decimal place	
Acquisition of computing equation setting (SO)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 75		
		n + 2	Computation channel No. *7		
		n + 3	Computation channel No. *7		
		n + 4	Computing equation ON/OFF 0: Off	Computing equation ON/OFF 1: On	
		n + 5 to n + 124	-	Computing equation *8	
		n + 125	-	Span left end value (lower word)	
		n + 126	-	Span left end value (higher word)	
		n + 127	-	Span right end value (lower word)	
		n + 128	-	Span right end value (higher word)	
		n + 129	-	Span decimal place	
Computing equation constant setting (SK)	1 to 8 (PLC1 to 8)	n	Station number		9
		n + 1	Command: 76		
		n + 2	Constant number: 1 to 30		
		n + 3	Constant sign (+, -)		
		n + 4	Constant significand (characteristic) (lower word)		
		n + 5	Constant significand (characteristic) (higher word)		
		n + 6	Constant significand (mantissa) (lower word)		
		n + 7	Constant significand (mantissa) (higher word)		
		n + 8	Constant exponent (0 if not necessary)		
Acquisition of computing equation constant setting (SK)	1 to 8 (PLC1 to 8)	n	Station number		3
		n + 1	Command: 77		
		n + 2	Constant number: 1 to 30		
		n + 3	Constant number		
		n + 4	Constant sign (+, -)		
		n + 5	Constant significand (characteristic) (lower word)		
		n + 6	Constant significand (characteristic) (higher word)		
		n + 7	Constant significand (mantissa) (lower word)		
		n + 8	Constant significand (mantissa) (higher word)		
		n + 9	Constant exponent		

Description	F0	F1 (=$u n)		F2
Communication input data setting (CM)	1 to 8 (PLC1 to 8)	n	Station number	9
		n + 1	Command: 78	
		n + 2	Communication input data No.	
		n + 3	Communication input data sign (+, -)	
		n + 4	Communication input data significand (characteristic) (lower word)	
		n + 5	Communication input data significand (characteristic) (higher word)	
		n + 6	Communication input data significand (mantissa) (lower word)	
		n + 7	Communication input data significand (mantissa) (higher word)	
		n + 8	Communication input data exponent (0 if not necessary)	
Acquisition of communication input data setting (CM)	1 to 8 (PLC1 to 8)	n	Station number	3
		n + 1	Command: 79	
		n + 2	Communication input data No.	
		n + 3	Communication input data No.	
		n + 4	Communication input data No. sign (+, -)	
		n + 5	Communication input data No. significand (characteristic) (lower word)	
		n + 6	Communication input data No. significand (characteristic) (higher word)	
		n + 7	Communication input data No. significand (mantissa) (lower word)	
		n + 8	Communication input data No. significand (mantissa) (higher word)	
		n + 9	Communication input data No. exponent	

Return data: Data stored from chart recorder to X1 series

Command parameters

The available number of parameters for each command varies depending on the device used (model and specifications).
If a parameter is unavailable, subsequent parameters are moved up. Be sure to modify the number of words to be transferred in PLC_CTL [F2] according to the actual parameters.
For more information, refer to the manual issued by the manufacturer.

*1 Available range setting values vary depending on the setting mode. Set the following values for range settings.

Measurement mode	Range Type	Value
VOLT, SQRT, DELTA	20mV	0
	60mV	1
	200mV	2
	2V	3
	6V	4
	20V	5
	50V	6
1-5V	1-5V	0
TC	R	0
	S	1
	B	2
	K	3
	E	4
	J	5
	T	6
	N	7
	W	8
	L	9
	U	10
	Wre	11
RTD	Pt100	0
	JPt100	1
DI	Voltage	0
	Contact	1

*2 Set AND logic relays as shown below.

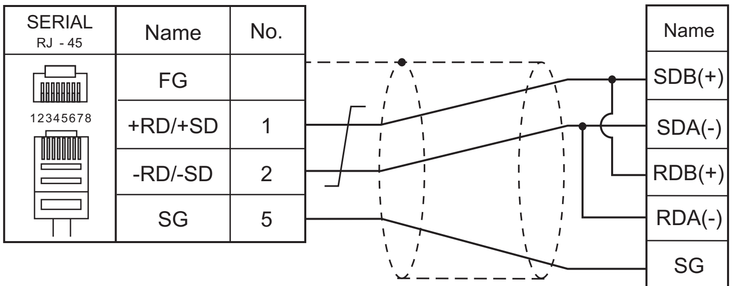
Measurement mode	Value
NONE	0
I01	1
I01-I02	2
I01-I03	3
I01-I04	4
I01-I05	5
I01-I06	6
I01-I11	7
I01-I12	8
I01-I13	9
I01-I14	10
I01-I15	11
I01-I16	12
I01-I21	13
I01-I22	14
I01-I23	15
I01-I24	16
I01-I25	17
I01-I26	18
I01-I31	19
I01-I32	20
I01-I33	21
I01-I34	22
I01-I35	23
I01-I36	24

*3 The number of parameters for each command varies depending on the device used (special specifications).
*4 When "0" is specified for the number of characters, subsequent strings can be omitted. Input the second data in the next place.
*5 Specify the $u device memory address for storing received data.
*6 For information on receive data formats, refer to the manual issued by the manufacturer.
*7 Set computation channel numbers as shown below.
0A: 31, 0B: 32, 0C: 33, ---, 1P: 54
*8 When a computating equation is shorter than "n + 124", set the next parameter in the next space.

29.2.13 Wiring Diagrams

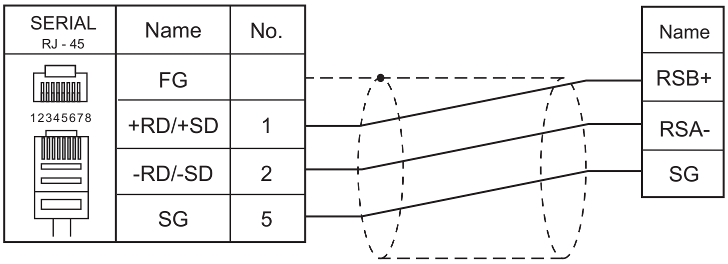
RS-422/RS-485

Wiring diagram 1 - M4



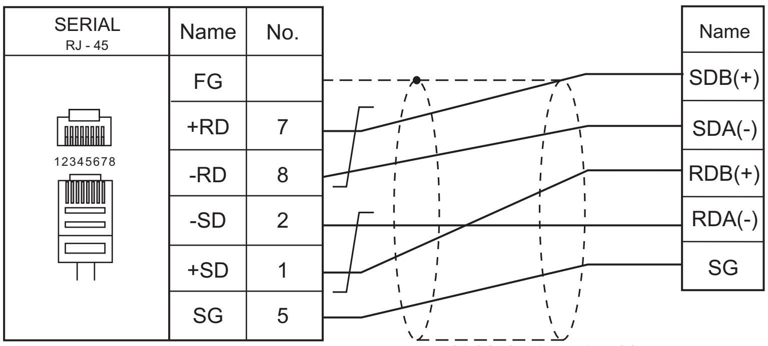
* Use shielded twist-pair cables.

Wiring diagram 2 - M4



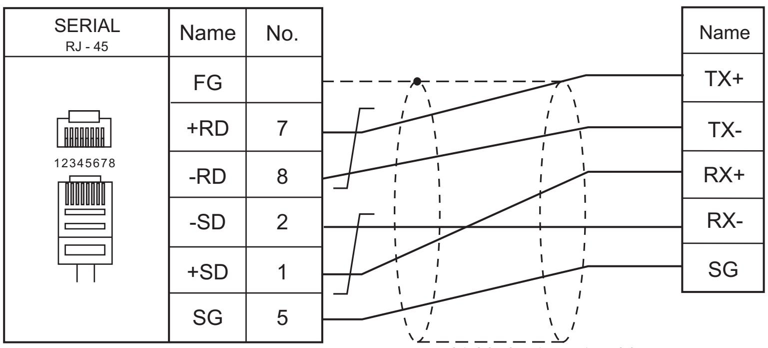
* Use shielded twist-pair cables.

Wiring diagram 3 - M4



* Use shielded twist-pair cables.

Wiring diagram 4 - M4



* Use shielded twist-pair cables.

30. MODBUS

30.1 PLC Connection

Serial Connection

The X1 series works as the Modbus RTU master station. It can be connected with devices that support Modbus RTU communication.

PLC Selection on the Editor	Applicable Devices	Signal Level	Connection	
			RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
MODBUS RTU	Modbus RTU slave device	RS-232C	Wiring diagram 1 - M2	×
		RS-422	×	Wiring diagram 2 - M4 *3
		RS-485	Wiring diagram 1 - M4	×
MODBUS RTU extended format	Modbus RTU slave device	RS-232C	Wiring diagram 1 - M2	×
		RS-422	×	Wiring diagram 2 - M4 *3
		RS-485	Wiring diagram 1 - M4	×
MODBUS ASCII	MODBUS ASCII slave device	RS-232C	Wiring diagram 1 - M2	×
		RS-422	×	Wiring diagram 2 - M4 *3
		RS-485	Wiring diagram 1 - M4	×

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Ethernet Connection

The X1 series works as the Modbus TCP/IP master station. It can be connected with devices that support Modbus TCP/IP slave communication.

PLC Selection on the Editor	Applicable Device	TCP/IP	UDP/IP	Port No.
MODBUS TCP/IP (Ethernet)	Modbus TCP/IP slave device	○	×	502 *
MODBUS TCP/IP (Ethernet) Sub Station	Modbus TCP/IP slave device			
MODBUS TCP/IP (Ethernet) EXT Format	Modbus TCP/IP slave device			

* Depending on the device specification, an arbitrary port number can be specified.

30.1.1 MODBUS RTU

Communication Setting

Editor

Communication setting

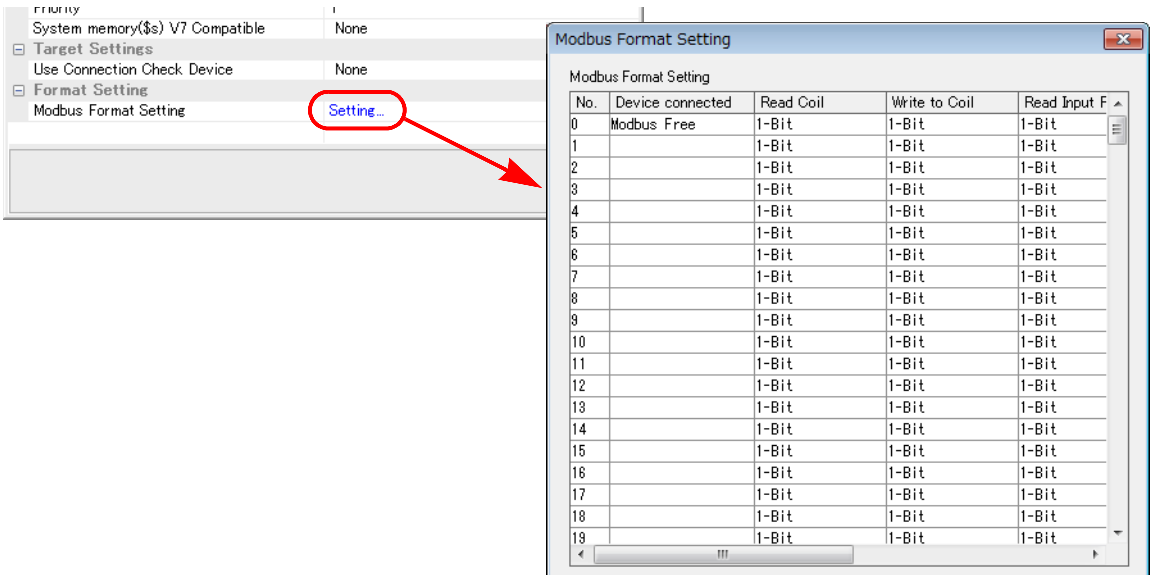
(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / <u>1 : n</u>	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / <u>9600</u> / 19200 / 38400 / 57600 / 115K bps	
Data Length	8 bits	
Stop Bit	<u>1</u> / 2 bits	
Parity	None / <u>Odd</u> / Even	
Target Port No.	0 to 255	0: Broadcast

Modbus format setting

Make communication format settings for each connected device.

* **If the maximum number of words to be read or written varies among the address ranges, select [MODBUS RTU EXT Format] for [Model] in the connection device selection dialog and make the extended format setting. For more information, see page 30-4.**



No. 1 to 255	Port number of the connected device
Read Coil Write to Coil Read Input Relay Read Holding Register Write Holding Register Read Input Register	Format setting Set the number of words to be read or written at one time of communication for each device. For details on the maximum value that can be set on V-SFT, see the table shown below.*1 The format setting also serves as the function code*1 setting used for Modbus communication. The available function codes vary depending on the device. Refer to the instruction manual of the connected device as well as the table shown below*1, and set the options on the dialog correctly.

*1 Format setting on V-SFT and function code for the Modbus communication

V-SFT Format Setting			Modbus Communication Function Code
Operation		Maximum Setting	
Read Coil		992 bits	01H
Write to Coil	1 bit	1 word	05H
	16 bits or more	992 bits	0FH
Read Input Relay		992 bits	02H
Read Holding Register		62 words	03H
Write Holding Register	1 word	1 word	06H
	2 words or more	62 words	10H
Read Input Register		62 words	04H

PLC

Make communication settings of the connected device according to the settings made for the X1 series. For more information on settings, refer to the instruction manual issued by the manufacturer.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
0	(output coil)	00H	
1	(input relay)	01H	
4	(holding register)	02H	
3	(input register)	03H	

Notes on Creating Screen Programs

On the editor, the device memory address is specified in decimal notation. Thus, when the address of a connected device is expressed in hexadecimal notation, convert the address into decimal one and add “1”.

Setting example

- When specifying the PV (current value) RAM address “3814H” for Modbus RTU connection with Azbil’s “SDC35”:
  1) Convert the hexadecimal address into the decimal one.
     3814HEX → 14356DEC
  2) Add “1” to the decimal address.
     14356 + 1 = 14357DEC
  3) On the editor, specify “14357” for the holding register (4).

30.1.2 MODBUS RTU EXT Format

In the case with some Modbus RTU devices, the function code to be used or the maximum value to be read or written at one time varies depending on the address range even in the same device memory.
When [MODBUS RTU EXT Format] is selected, the address range as well as the communication format can be set as desired according to the specifications of the connected device. With [MODBUS RTU EXT Format] selected, since access will not be made to any address other than those specified in the format setting, communication can be performed effectively.

Communication Setting

Editor

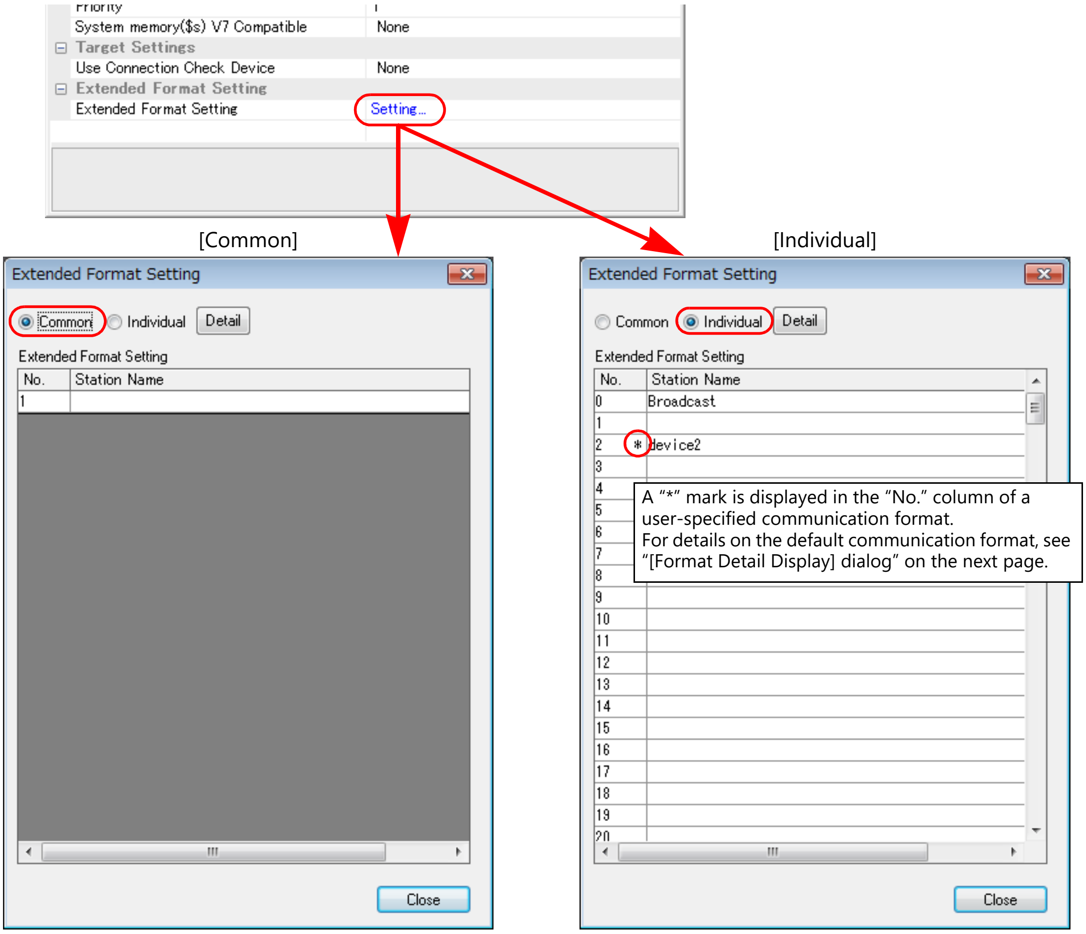
Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115K bps	
Data Length	8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 255	0: Broadcast

Extended format setting

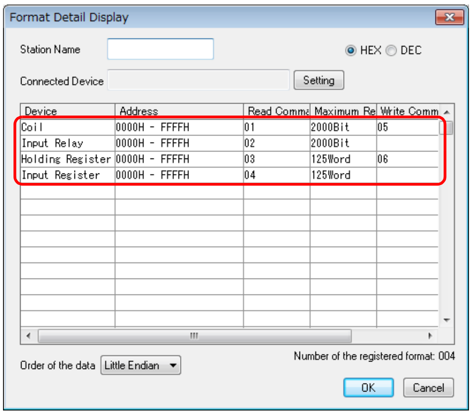
Make communication format settings for the connected device.



Common	Used to set the communication format commonly to all station numbers.
Discrete	Used to set a communication format for respective station numbers.
Detail	Displays the [Format Detail Display] dialog.
No.	Displays the station number of the connected device.
Station Name	Sets and displays the station name of the connected device.

[Format Detail Display] dialog

Register the communication format for each of the specified address range. Make the setting according to the device specification.



Four types of communication formats shown to the left have been registered by default.

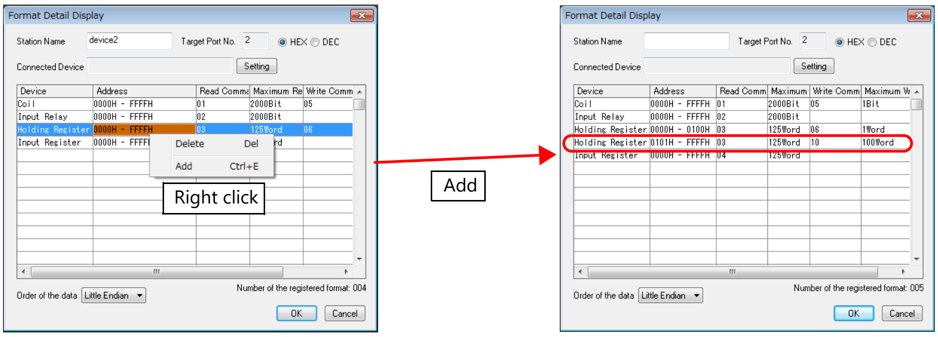
Station Name	Register a desired station name.
Target Port No.	When [Discrete] is selected, the number of the selected station is automatically displayed.
HEX/DEC	Select the address notation. HEX / DEC
Device	Displays the currently registered device memory name. Coil / Input Relay / Holding Register / Input Register (default settings: one each, deletion impossible)
Address	Specify the address range for each device memory. HEX: 0000 to FFFF DEC: 1 to 65536 * **The address range must not be duplicated.**
Read Command Maximum Read Value Write Command Maximum Write Value	Set the communication format used for reading from or writing into the specified address range. • [Read Command] / [Write Command] Specify the function code*1 to use for Modbus communication. The available function codes vary depending on the device. Refer to the instruction manual of the connected device as well as the table shown below*1, and set the options on the dialog correctly. • [Maximum Read Value] / [Maximum Write Value] Set the maximum value to be read or written at one time. Make the setting according to the device specification. For details on the maximum value that can be set for each device memory by using V-SFT, see the table shown below.*1
Order of the data	Specify the ordering of data. Little Endian / Big Endian
Number of the registered format	Displays the number of currently registered formats. Default: 4 (deletion impossible) Max.: 255

*1 Device memory setting on V-SFT and function code for the Modbus communication

V-SFT Format Setting				Modbus Communication Function Code
Operation			Max. Read/Write Value	
Coil	Read		2000 bits	01H
	Write	1 bit	1 bit	05H
		2 bits or more	800 bits	0FH
Input Relay	Read		2000 bits	02H
Holding Register	Read		125 words	03H
	Write	1 word	1 word	06H
		2 words or more	100 words	10H
Input Register	Read		125 words	04H

Adding a format

To add a format, select a device memory, right-click on the selected device memory and select [Add].



Setting example

When connecting a device which has the following specifications to station number 1:

Function Code	Operation	Max. Communication Points	Available Address		Example
01H	Read coil	4000	HEX: 0000 to 00FF	DEC: 1 to 256	(1)
			HEX: 2EE0 to 4E1F	DEC: 12001 to 20000	(2)
05H	Write single coil	1	HEX: 0000 to 00FF	DEC: 1 to 256	(1)
0FH	Write multiple coils	1000	HEX: 2EE0 to 4E1F	DEC: 12001 to 20000	(2)
03H	Read holding register	200	HEX: 0000 to 103F	DEC: 1 to 8000	(3)
			HEX: 2EE0 to 2FDF	DEC: 12001 to 12256	(4)
06H	Write single holding register	1	HEX: 2EE0 to 2FDF	DEC: 12001 to 12256	(4)
10H	Write multiple holding registers	50	HEX: 0000 to 1F3F	DEC: 1 to 8000	(3)

- Read/write coil

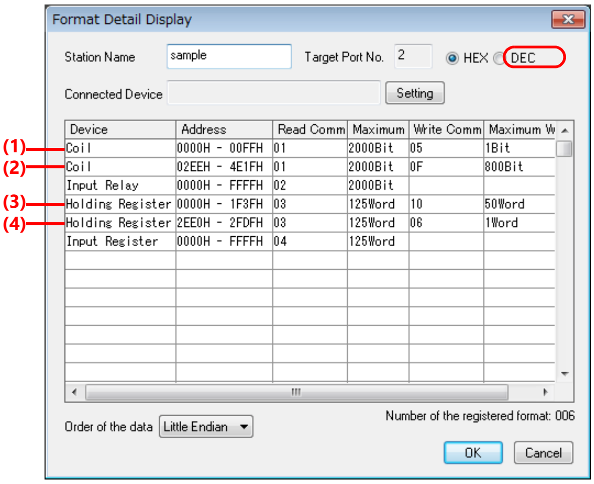
  (1) 0000 to 00FF (HEX)
  - Register "01H" (function code for reading) to [Read Command] or "05H" (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 4000. Accordingly, register "2000 bits" for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 1. Accordingly, register "1 bit" for [Maximum Write Value] on V-SFT.

  (2) 2EE0 to 4E1F (HEX)
  - Register "01H" (function code for reading) to [Read Command] or "0FH" (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 4000. Accordingly, register "2000 bits" for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 1000. Accordingly, register "800 bits" for [Maximum Write Value] on V-SFT.

- Read/write holding register

  (3) 0000 to 1F3F (HEX)
  - Register "03H" (function code for reading) to [Read Command] or "10H" (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 200. Accordingly, register "125 words" for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 50. Accordingly, register "50 words" for [Maximum Write Value] on V-SFT.

  (4) 2EE0 to 2FDF (HEX)
  - Register "03H" (function code for reading) to [Read Command] or "06H" (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 200. Accordingly, register "125 words" for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 1. Accordingly, register "1 word" for [Maximum Write Value] on V-SFT.



Access will not be made to any addresses other than those not registered on the dialog shown on the left.

- Coil: 0100 to 2EDF, 4E20 to FFFF
- Holding register: 1040 to 2EDF, 2FE0 to FFFF

PLC

Make communication settings of the connected device according to the settings made for the X1 series. For more information on settings, refer to the instruction manual issued by the manufacturer.

Available Device Memory

The contents of "Available Device Memory" are the same as those described in "30.1.1 MODBUS RTU".

30.1.3 MODBUS ASCII

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting	Remarks
Connection Mode	1 : 1 / 1 : n	
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Target Port No.	0 to 255	0: Broadcast

Format setting

Make communication format settings for each connected device. (See page 30-2.)

PLC

Make communication settings of the connected device according to the settings made for the X1 series. For more information on settings, refer to the instruction manual issued by the manufacturer.

Available Device Memory

The contents of “Available Device Memory” are the same as those described in “30.1.1 MODBUS RTU”.

30.1.4 MODBUS TCP/IP (Ethernet)

Communication Setting

Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 unit
- Port number for the X1 unit at [Communication Setting] in the [PLC Properties] window ([Hardware Setting])
- PLC’s IP address and port number for [PLC Table] under [Target Settings] in the [PLC Properties] window ([Hardware Setting])
- [Format Setting] in the [PLC Properties] window ([Hardware Setting])

Format setting

Make communication format settings for each connected device. (See page 30-2.)

* **If the maximum number of words to be read or written varies among the address ranges, select [MODBUS TCP/IP (Ethernet) EXT Format] for [Series] in the [Connection Device Selection] dialog and make extended format settings. For more information, see page 30-10.**

PLC

Make communication settings of the connected device according to the settings made for the X1 series. For more information on settings, refer to the instruction manual issued by the manufacturer.

Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
0	(output coil)	00H	
1	(input relay)	01H	
4	(holding register)	02H	
3	(input register)	03H	

Notes on Creating Screen Program

On the editor, the device memory address is specified in decimal notation. Thus, when the address of a connected device is expressed in hexadecimal notation, convert the address into decimal one and add “1”. (See page 30-3.)

30.1.5 MODBUS TCP/IP (Ethernet) EXT Format

In the case with some Modbus TCP/IP (Ethernet) devices, the function code to be used or the maximum value to be read or written at one time varies depending on the address range even in the same device memory.
When [MODBUS TCP/IP (Ethernet) EXT Format] is selected, the address range as well as the communication format can be set as desired according to the specifications of the connected device. With [MODBUS TCP/IP (Ethernet) EXT Format] selected, since access will not be made to any address other than those specified in the format setting, communication can be performed effectively.

Communication Setting

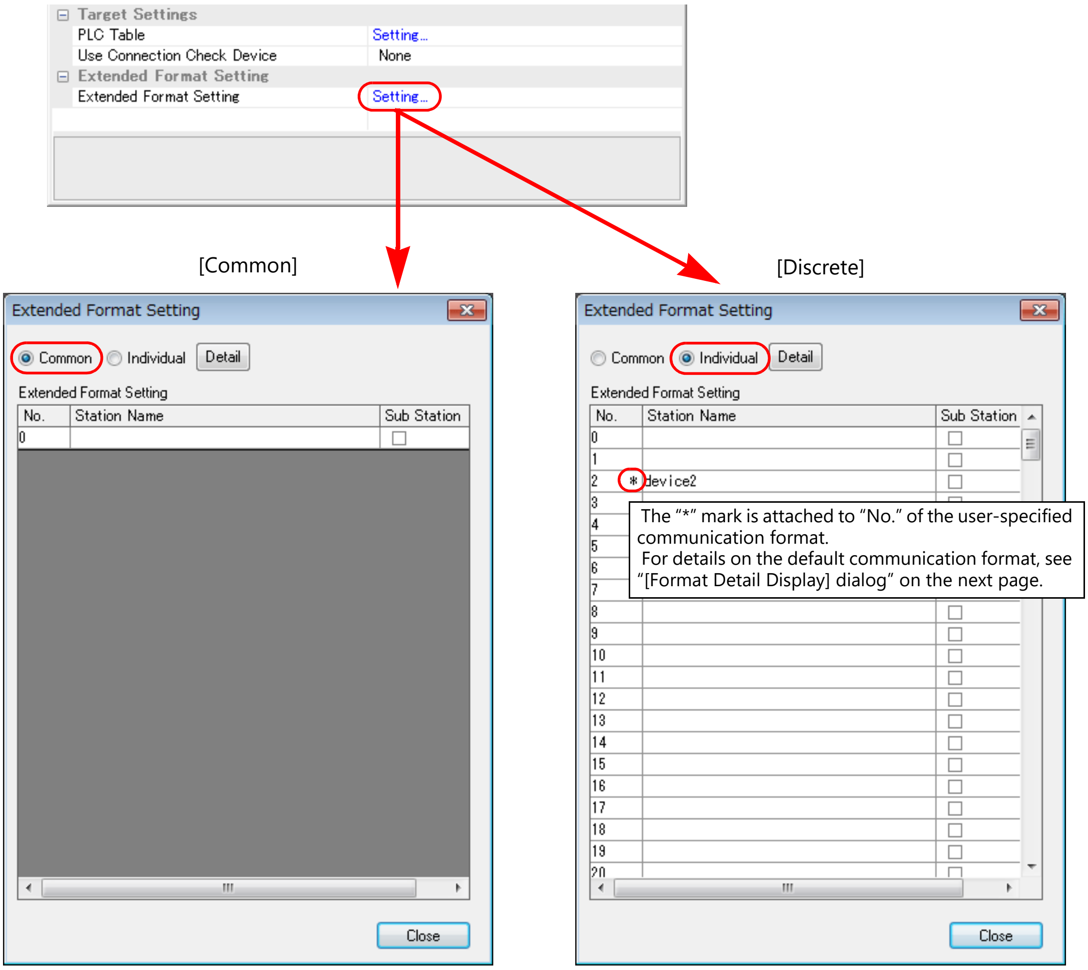
Editor

Make the following settings on the editor. For more information, see “1.3.2 Ethernet Communication”.

- IP address for the X1 unit
- Port number for the X1 unit at [Communication Setting] in the [PLC Properties] window ([Hardware Setting])
- PLC’s IP address and port number for [PLC Table] under [Target Settings] in the [PLC Properties] window ([Hardware Setting])
- [Extended Format Setting] in the [PLC Properties] window ([Hardware Setting])

Extended format setting

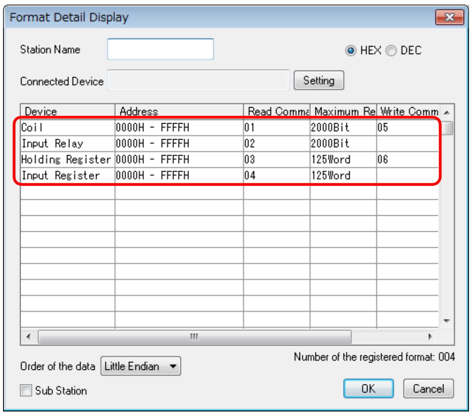
Make communication format settings for the connected device.



Common	Used to set the communication format commonly to all station numbers.
Discrete	Used to set a communication format for respective station numbers.
Detail	Displays the [Format Detail Display] dialog.
No.	Displays the station number of the connected device.
Station Name	Sets and displays the station name of the connected device.
Sub Station	Check the box when Modbus TCP/IP communication is to be performed with a device requiring a unit ID specification. When this box is checked, the unit ID can be specified when setting the device memory address. (Without check: The unit ID is fixed to “FFH”.)

[Format Detail Display] dialog

Register the communication format for each of the specified address range. Make the setting according to the device specification.



Four types of communication formats shown to the left have been registered by default.

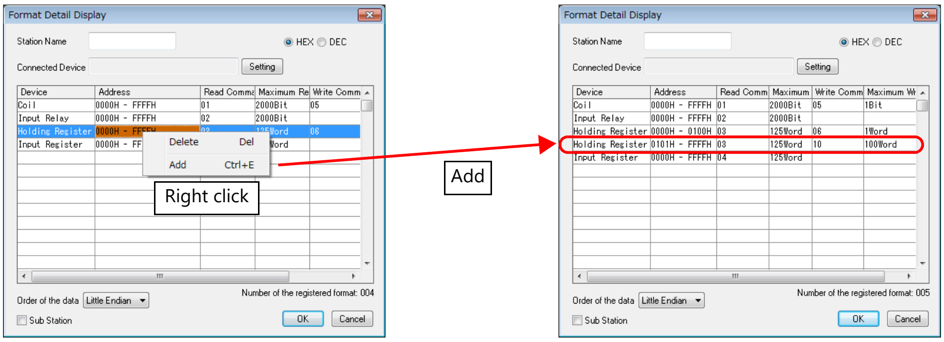
Station Name	Register a desired station name.
Target Port No.	When [Discrete] is selected, the number of the selected station is automatically displayed.
HEX/DEC	Select the address notation. HEX / DEC
Device	Displays the currently registered device memory name. Coil / Input Relay / Holding Register / Input Register (default settings: one each, deletion impossible)
Address	Specify the address range for each device memory. HEX: 0000 to FFFF DEC: 1 to 65536 * **The address range must not be duplicated.**
Read Command Maximum Read Value Write Command Maximum Write Value	Set the communication format used for reading from or writing into the specified address range. • [Read Command] / [Write Command] Specify the function code*1 to use for Modbus communication. The available function codes vary depending on the device. Refer to the instruction manual of the connected device as well as the table shown below*1, and set the options on the dialog correctly. • [Maximum Read Value] / [Maximum Write Value] Set the maximum value to be read or written at one time. Make the setting according to the device specification. For details on the maximum value that can be set for each device memory by using V-SFT, see the table shown below.*1
Order of the data	Specify the ordering of data. Little Endian / Big Endian
☐ Sub Station	Check this box when using the sub station function.
Number of the registered format	Displays the number of currently registered formats. Default: 4 (deletion impossible) Max.: 255

*1 Device memory setting on V-SFT and function code for the Modbus communication

V-SFT Format Setting				Modbus Communication Function Code
Operation			Max. Read/Write Value	
Coil	Read		2000 bits	01H
	Write	1 bit	1 bit	05H
		2 bits or more	800 bits	0FH
Input Relay	Read		2000 bits	02H
Holding Register	Read		125 words	03H
	Write	1 word	1 word	06H
		2 words or more	100 words	10H
Input Register	Read		125 words	04H

Adding a format

To add a format, select a device memory, right-click on the selected device memory and select [Add].



Example

When connecting a device which has the following specifications to station number 1:

Function Code	Operation	Max. Communication Points	Available Address		Example
01H	Read coil	4000	HEX: 0000 to 00FF	DEC: 1 to 256	(1)
			HEX: 2EE0 to 4E1F	DEC: 12001 to 20000	(2)
05H	Write single coil	1	HEX: 0000 to 00FF	DEC: 1 to 256	(1)
0FH	Write multiple coils	1000	HEX: 2EE0 to 4E1F	DEC: 12001 to 20000	(2)
03H	Read holding register	200	HEX: 0000 to 103F	DEC: 1 to 8000	(3)
			HEX: 2EE0 to 2FDF	DEC: 12001 to 12256	(4)
06H	Write single holding register	1	HEX: 2EE0 to 2FDF	DEC: 12001 to 12256	(4)
10H	Write multiple holding registers	50	HEX: 0000 to 1F3F	DEC: 1 to 8000	(3)

- Read/write coil

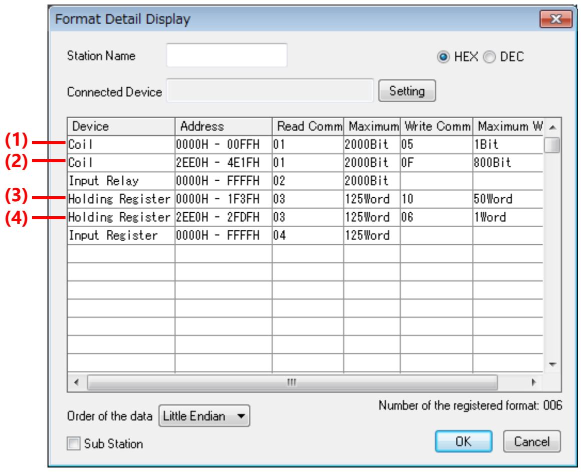
  (1) 0000 to 00FF (HEX)
  - Register “01H” (function code for reading) to [Read Command] or “05H” (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 4000. Accordingly, register “2000 bits” for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 1. Accordingly, register “1 bit” for [Maximum Write Value] on V-SFT.

  (2) 2EE0 to 4E1F (HEX)
  - Register “01H” (function code for reading) to [Read Command] or “0FH” (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 4000. Accordingly, register “2000 bits” for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 1000. Accordingly, register “800 bits” for [Maximum Write Value] on V-SFT.

- Read/write holding register

  (3) 0000 to 1F3F (HEX)
  - Register “03H” (function code for reading) to [Read Command] or “10H” (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 200. Accordingly, register “125 words” for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 50. Accordingly, register “50 words” for [Maximum Write Value] on V-SFT.

  (4) 2EE0 to 2FDF (HEX)
  - Register “03H” (function code for reading) to [Read Command] or “06H” (function code for writing) to [Write Command].
  - The maximum number of communication points to be read is 200. Accordingly, register “125 words” for [Maximum Read Value] on V-SFT.
  - The maximum number of communication points to be written is 1. Accordingly, register “1 word” for [Maximum Write Value] on V-SFT.



Access will not be made to any addresses other than those not registered on the dialog shown on the left.

- Coil: 0100 to 2EDF, 4E20 to FFFF
- Holding register: 1040 to 2EDF, 2FE0 to FFFF

PLC

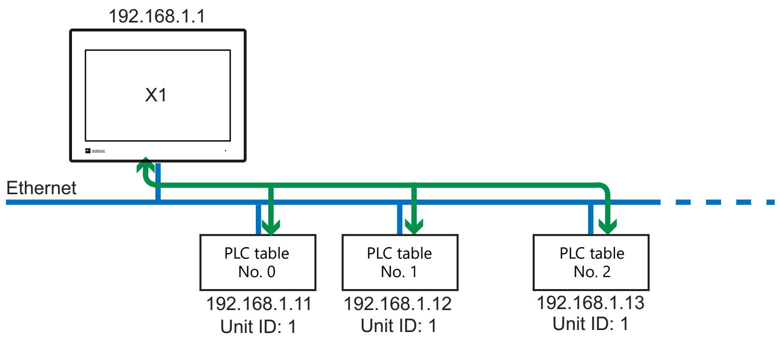
Make communication settings of the connected device according to the settings made for the X1 series. For more information on settings, refer to the instruction manual issued by the manufacturer.

Available Device Memory

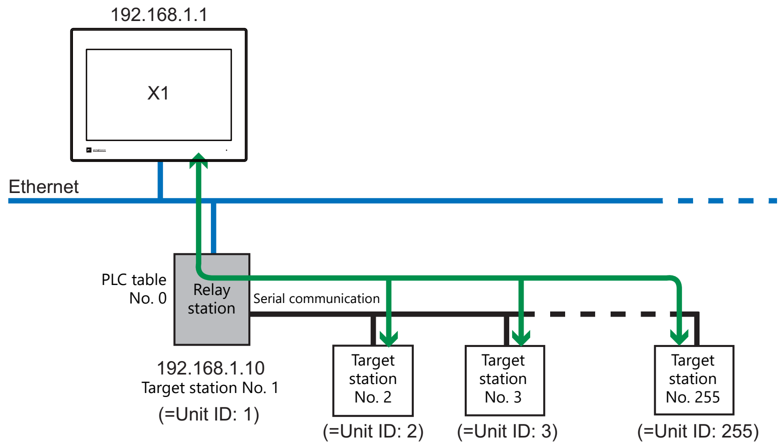
The contents of “Available Device Memory” are the same as those described in “30.1.4 MODBUS TCP/IP (Ethernet)”.

30.1.6 MODBUS TCP/IP (Ethernet) Sub Station

- Modbus TCP/IP (Ethernet) communication with devices which require unit ID specifications
  - [Connection Mode]: "1 : n"



- Serial communication with Modbus devices via relay station
  - [Connection Mode]: "1 : 1"



Communication Setting

Editor

Make the following settings on the editor. For more information, see "1.3.2 Ethernet Communication".

- IP address for the X1 unit
- Port number for the X1 unit at [Communication Setting] in the [PLC Properties] window ([Hardware Setting])
- PLC's IP address and port number for [PLC Table] under [Target Settings] in the [PLC Properties] window ([Hardware Setting])
- [Format Setting] in the [PLC Properties] window ([Hardware Setting])

Modbus format setting

Make communication format settings for each connected device. (See page 30-2.)

PLC

Make communication settings of the connected device according to the settings made for the X1 series. For more information on settings, refer to the instruction manual issued by the manufacturer.

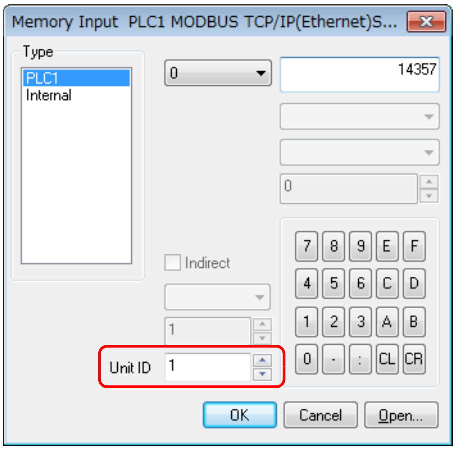
Available Device Memory

The available setting range of device memory varies depending on the PLC model. Be sure to set within the range available for the PLC to be used. Use [TYPE] when assigning indirect device memory for macro programs.

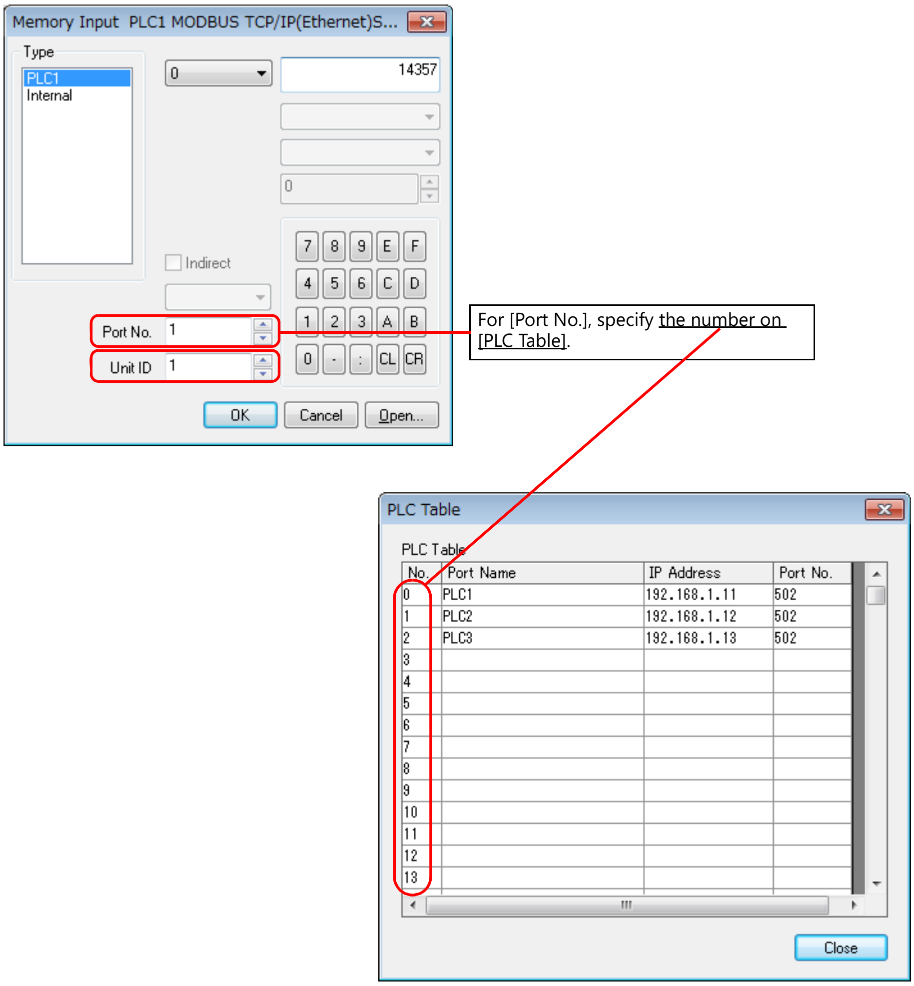
Device Memory		TYPE	Remarks
0	(output coil)	00H	
1	(input relay)	01H	
4	(holding register)	02H	
3	(input register)	03H	

Notes on Creating Screen Programs

- On the editor, the device memory address is specified in decimal notation. Thus, when the address of a connected device is expressed in hexadecimal notation, convert the address into decimal one and add “1”. (See page 30-3.)
- Set the unit ID when specifying the device memory address.
  - [Connection Mode]: “1 : 1”



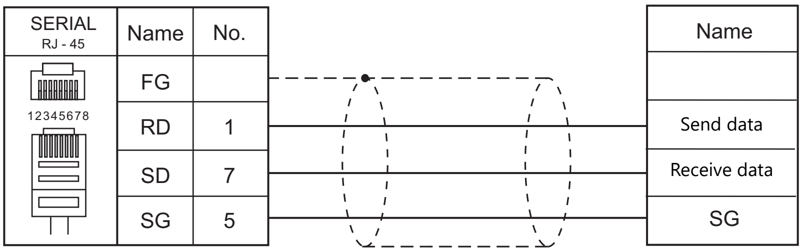
  - [Connection Mode]: “1 : n”



30.1.7 Wiring Diagrams

RS-232C

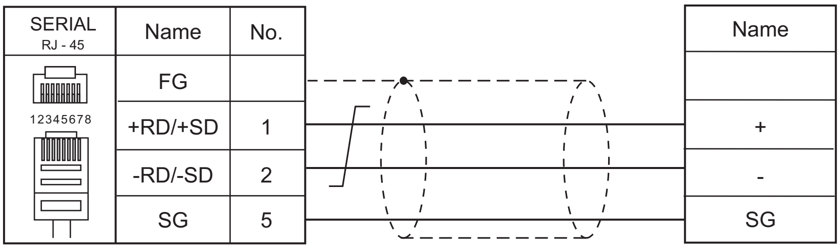
Wiring diagram 1 - M2



* Use shielded twist-pair cables.

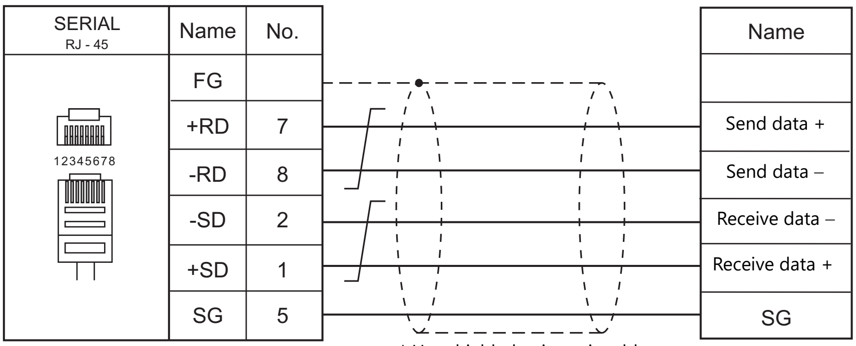
RS-422/RS-485

Wiring diagram 1 - M4



* Use shielded twist-pair cables.

Wiring diagram 2 - M4



* Use shielded twist-pair cables.

31. General AE-LINK

31.1 Temperature Controller/Servo/Inverter Connection

Serial Connection

The X1 series unit operates as an AE-LINK master device and can be connected with AE-LINK slave devices.

PLC Selection on the Editor	Applicable Devices	Signal Level	Connection	
			RS-232C / RS-485 (2-wire)*1	RS-422 (4-wire)
General AE-LINK	AE-LINK slave device	RS-485	Wiring diagram 1 - M4	×

*1 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

31.1.1 General AE-LINK

Communication Setting

Editor

Communication setting

(Underlined setting: default)

Item	Setting Value	Remarks
Connection Mode	1:1 / 1:n	
Signal Level	**RS-422/485**	
Baud Rate	**38400 bps**	
Data Length	**8 bits**	
Stop Bit	**1 bit**	
Parity	**Even**	
Target Port No.	0 to 31	

AE-LINK Devices

Make communication settings of the connected device according to those of the X1 series unit. For more information on settings, refer to the instruction manual issued by the manufacturer.

Available Device Memory

The available setting range of device memory varies depending on the model. Be sure to set within the range available with the device to be used. Use [TYPE] when assigning indirect device memory for macro programs.

Device Memory		TYPE	Remarks
MS	(device status)	00H	Read only
PD	(polling data)	01H	Double-word, read only
AI	(ASCII-ID)	02H	Read only
BI	(binary ID)	03H	Read only
RE	(reset)	07H	Write only
IN	(initialize)	08H	Write only

Indirect Device Memory Designation

For the device memory number (address), specify the value obtained by subtracting “1” from the actual address.

PLC_CTL

Macro command “PLC_CTL F0 F1 F2”

<table>
<tr><th>Description</th><th>F0</th><th colspan="2">F1 (=$u n)</th><th>F2</th></tr>
<tr><td rowspan="4">AE-LINK general-purpose command
(for read command)</td><td rowspan="4">1 to 8
(PLC1 to 8)</td><td>n</td><td>Target Port No.</td><td rowspan="4">3</td></tr>
<tr><td>n + 1</td><td>Command: 0</td></tr>
<tr><td>n + 2</td><td>AE-LINK command number *1</td></tr>
<tr><td>n+3 ~</td><td>Receive data (to be allocated by the number of bytes of data to receive)</td></tr>
<tr><td rowspan="5">AE-LINK general-purpose command
(for write command)</td><td rowspan="5">1 to 8
(PLC1 to 8)</td><td>n</td><td>Target Port No.</td><td rowspan="5">4 + (m/2) *4</td></tr>
<tr><td>n + 1</td><td>Command: 1</td></tr>
<tr><td>n + 2</td><td>AE-LINK command number *1</td></tr>
<tr><td>n+3</td><td>Number of bytes of send data m *2 *3</td></tr>
<tr><td>n+4 ~</td><td>Send data (to be allocated according to the number of bytes of data to write)</td></tr>
</table>

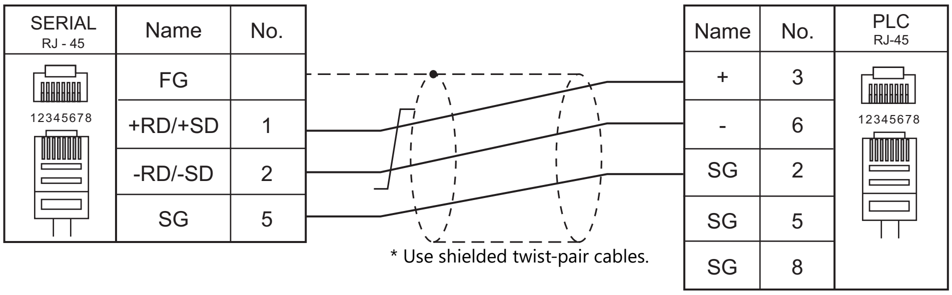
Return data: Data stored from the device to the X1 series unit

*1 For details on AE-LINK command numbers, refer to the specifications sheet of the relevant AE-LINK device.
*2 For details on the number of bytes of send data, refer to the specifications sheet of the relevant AE-LINK device.
*3 When “0” is specified for the number of bytes of send data, no setting is required for the send data.
*4 When an odd number is specified for the number of bytes of send data, specify “4 + (m / 2) + 1”.

31.1.2 Wiring Diagrams

RS-422/RS-485

Wiring diagram 1 - M4



32. RFID controller

32.1 RFID controller connection

Serial Connection

PLC Selection on the Editor	Port	Signal Level	Connection	
			RS-232C*1 / RS-485 (2-wire)*2	RS-422 (4-wire)*2
RFID controller (Stepless protocol)	Serial connection port	RS-232C	Wiring diagram 1 - M2	×
		RS-485	Wiring diagram 1 - M4	Wiring diagram 2 - M4*3

*1 Select RS-232C in the screen program or in Local mode on the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
*2 Select RS-422/485 in the screen program or in Local mode on the X1 series unit. For details, refer to “1.2.1 SERIAL” (page 1-4).
*3 The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

Match the communication settings of the RFID controller with the communication settings of X1. For the setting method, refer to the specifications of the RFID controller to be connected.

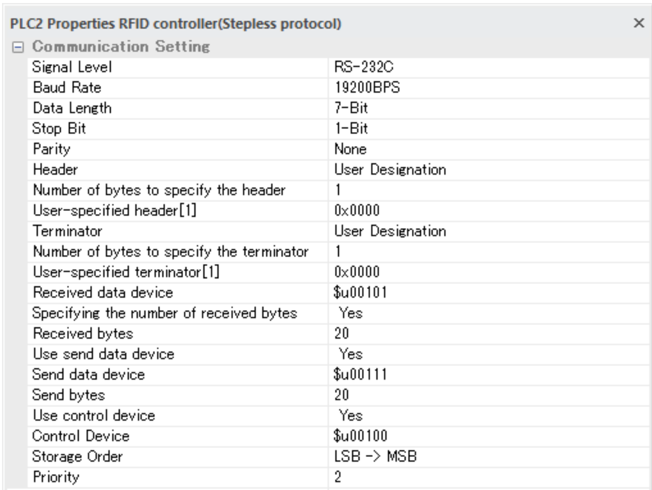
32.1.1 Communication Setting

Editor

Device selection

Select [RFID controller] at [Connected Device] for the logical ports PLC2 to 8. [RFID controller] cannot be selected for PLC1.

Communication setting



PLC2 Properties RFID controller(Stepless protocol)

Communication Setting	
Signal Level	RS-232C
Baud Rate	19200BPS
Data Length	7-Bit
Stop Bit	1-Bit
Parity	None
Header	User Designation
Number of bytes to specify the header	1
User-specified header[1]	0x0000
Terminator	User Designation
Number of bytes to specify the terminator	1
User-specified terminator[1]	0x0000
Received data device	$u00101
Specifying the number of received bytes	Yes
Received bytes	20
Use send data device	Yes
Send data device	$u00111
Send bytes	20
Use control device	Yes
Control Device	$u00100
Storage Order	LSB -> MSB
Priority	2

(Underlined setting: default)

Item	Setting	Remarks
Signal Level	RS-232C / RS-422/485	
Baud Rate	4800 / 9600 / 19200 / 38400 / 57600 / 115K bps	
Data Length	7 / 8 bits	
Stop Bit	1 / 2 bits	
Parity	None / Odd / Even	
Header	STX / ENQ / None / User Designation	
Number of bytes to specify the header	1 to 4	Valid when [User Designation] is selected for [Header].
User-specified header [1] to [4]	0000 to 00FF	Set as many as the [Number of bytes to specify the header].
Terminator	ETX / CR+LF / CR only / LF only / None / User Designation	
Number of bytes to specify the terminator	1 to 4	Valid when [User Designation] is selected for [Terminator].
User-specified terminator [1] to [4]	0000 to 00FF	Set as many as the [Number of bytes to specify the terminator].
Received data device	Refer to “Received Data Device” (page 32-3).	
Specifying the number of received bytes	Yes / None	
Received bytes	0 to 5000	Valid when [Yes] is selected for [Specifying the number of received bytes]. Default: 20
Use send data device	Yes / None	
Send data device	Refer to “Send Data Device” (page 32-3).	Valid when [Yes] is selected for [Use send data device].
Send bytes	0 to 5000	Valid when [Yes] is selected for [Use send data device]. Default: 20
Use control device	Yes / None	When [Yes] is selected for [Use send data device], [Control Device] must be used.
Control device	Refer to “Control Device” (page 32-4).	Valid when [Yes] is selected for [Use control device].
Storage Order	LSB → MSB / MSB → LSB	Set the order which data is stored when specified by the user and the order which data is stored on [Received data device].

32.1.2 Received Data Device

This device memory store the data which received from the RFID controller.
When [Received bytes] is specified, the specified number of bytes will be received.

<table>
<tr><th>Device</th><th>Contents</th><th>Device Type</th></tr>
<tr><td>n</td><td>Reception complete/ Communication error flag
Communication error : Turns ON when data cannot be received normally.
<table>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td></tr>
</table>
Not used (always set to "0")
1: Reception complete
1: Communication error
* The user must clear data in the device memory.</td><td>←X1</td></tr>
<tr><td>n+1</td><td>The number of received data (byte) Maximum 5000 bytes</td><td>←X1</td></tr>
<tr><td>n+2
:
n+m</td><td>Received data (ASCII)
* "0" (null code) is attached to the last.</td><td>←X1</td></tr>
</table>

32.1.3 Send Data Device

Used to send a request command to the RFID controller.
Be sure to use in conjunction with [Control Device].

<table>
<tr><th>Device</th><th>Contents</th><th>Device Type</th></tr>
<tr><td>n</td><td>Transmission complete / Transmission error flag
Transmission error : Turns ON when data is transmitted with n+1 (the number of send data) set to 0.
<table>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td></tr>
</table>
Not used (always set to "0")
1: Transmission complete
1: Transmission error
* The user must clear data in the device memory.</td><td>←X1</td></tr>
<tr><td>n+1</td><td>The number of send data (byte)</td><td>→X1</td></tr>
<tr><td>n+2
:
n+m</td><td>Send data (ASCII)
* Store [Send bytes] / 2 words in the order of LSB to MSB.</td><td>→X1</td></tr>
</table>

32.1.4 Control Device

The 0th bit (permission bit) of [Control Device] can be used to control transmission and reception to and from the RFID controller.
When [Yes] is selected for [Use send data device], be sure to use [Control Device].

Control Device

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Bits 15–1: Not used (always set to "0")

Bit 0: Enable bit
0: Disabled
1: Enabled

When using [Control Device]

The operation differs depending on whether [Send data device] is used or not.

- When using a [Send data device].
  Be sure to use [Control Device].
  The 0th bit (permission bit) of [Control Device] is used to switch between starting and stopping send and receive with the RFID controller.
  When the 0th bit (permission bit) of [Control Device] is turnd ON, the data transmission and reception starts. When the 0th bit (transmission complete flag) of [Send data device] n is turned ON, the data transmission and reception stops.
  If there is no response from the RFID controller, retry (500ms cycle) is repeated until a response is returned. Then, when the 0th bit (permission bit) of [Control Device] is turned off, it stops transmission and reception.

- When not using [Send data device].
  The 0th bit (permission bit) of [Control Device] can be used to switch between storing the received data in [Received data device] and not storing it.

When not using [Control Device]

It always waits to receive data from the RFID controller and stores the received data in [Received data device].

Usage example

When there is no need to send a request command to the RFID controller (no handshaking)

Set the [Received data device] only.

When there is need to send a request command to the RFID controller

Use [Received data device], [Send data device], and [Control Device].

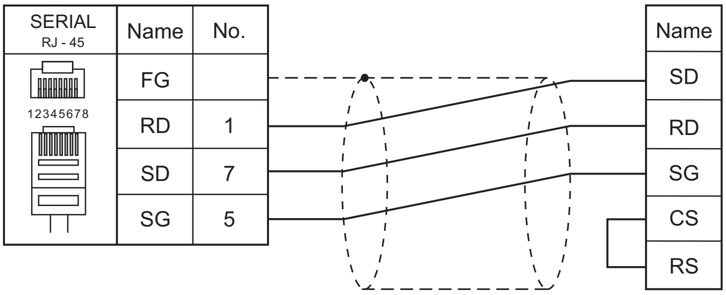
1. Turns OFF the 0th bit (transmission complete flag) of [Send data device].
2. Stores the send data (request command) in [Send data device] n+2 and later.
3. Stores the number of send data (byte) in [Send data device] n+1.
4. When the 0th bit (permission bit) of [Control Device] is turned ON, the data transmission and reception starts.
5. After transmission is completed, the 0th bit (transmission complete flag) of [Send data device] n turns ON, and the response from the RFID controller is stored in [Received data device].
   * If there is no response from the RFID controller, retry (500msec cycle) is repeated until a response is returned. Then, when the 0th bit (permission bit) of [Control Device] is turned off, it stops sending and receiving.
6. When changing the transmit data (request command), turn off the 0th bit (permission bit) of [Control Device] and the 0th bit (transmission completion flag) of [Send data device] n, and then change the contents of [Send data device] n+2 and later.
   After that, go on steps 3 through 5.

32.1.5 Wiring Diagrams

CAUTION	Refer to the manual of the RFID controller to be connected, and connect the wires.

RS-232C

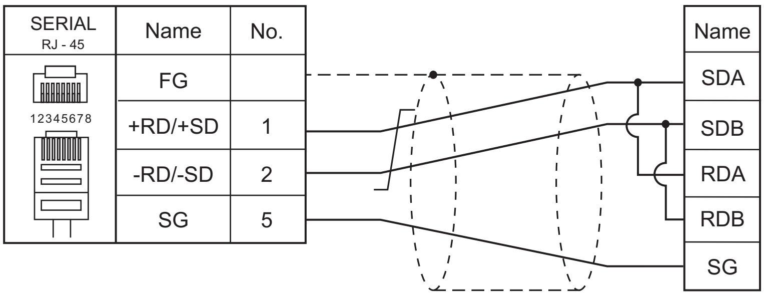
Wiring diagram 1 - M2



* Use shielded twist-pair cables.

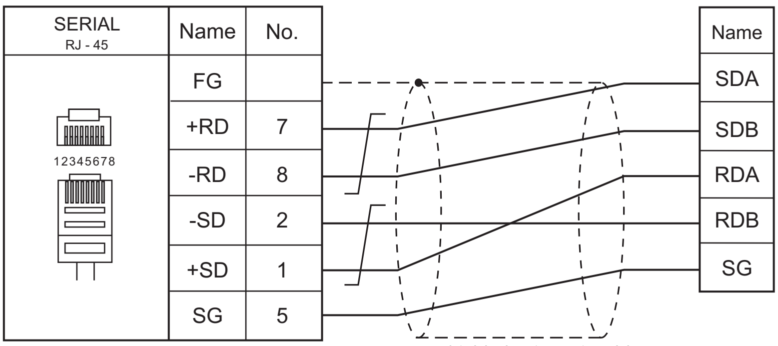
RS-422/RS-485

Wiring diagram 1 - M4



* Use shielded twist-pair cables.

Wiring diagram 2 - M4



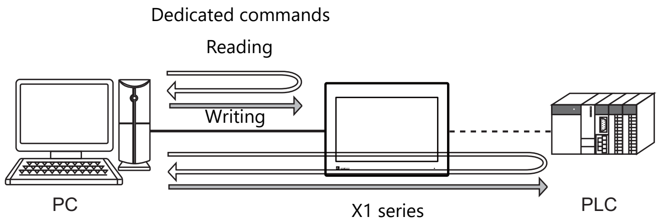
* Use shielded twist-pair cables.

33. Slave Communication Function

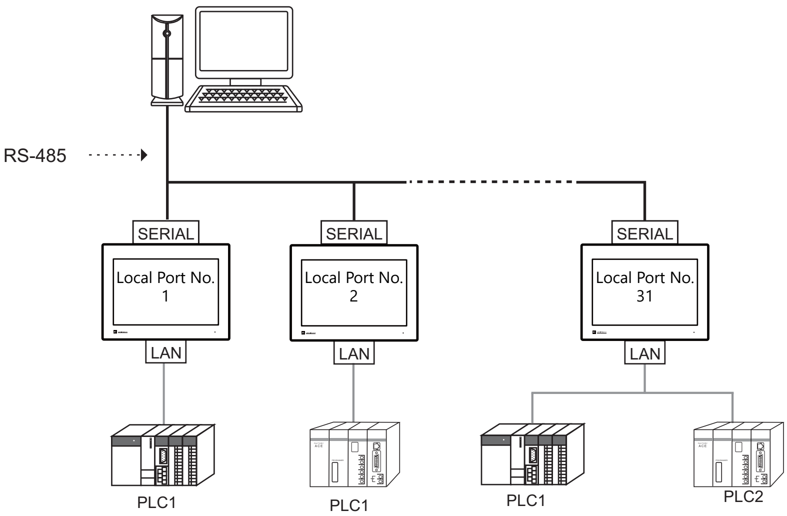
33.1 V-Link

33.1.1 Overview

- "V-Link" is the network where the PC reads from and writes to the internal device memory of the X1 series unit or the device memory of PLC1 to PLC8 using a dedicated protocol.



- Use CN1, MJ1 or MJ2 for connection with a general-purpose computer.
- Data of the connected devices can be collected through communications with the X1 series. Data collection is available even between devices of different manufacturers.
- Either signal level RS-232C or RS-485 can be selected.
  With RS-232C, one X1 series unit can be connected; with RS-485, a maximum of 31 X1 series units can be connected.
  - RS-485 connection

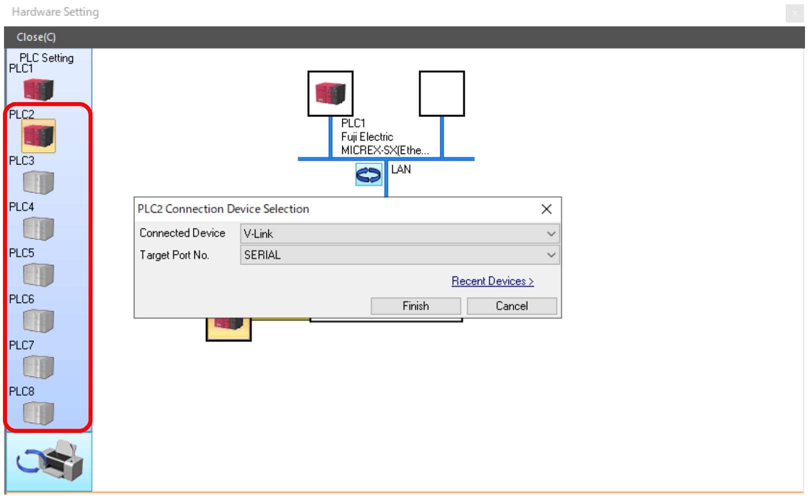


33.1.2 Communication Setting

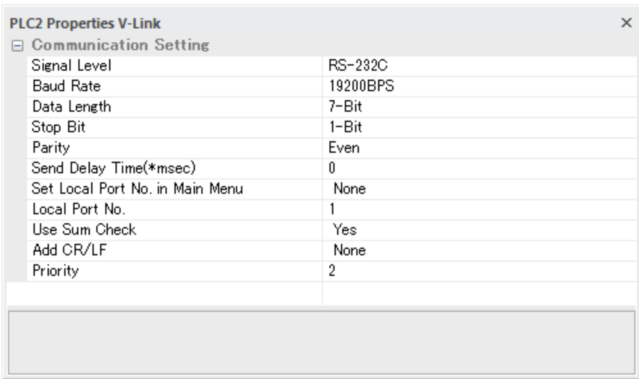
Editor

Device selection

Select [V-Link] at [Connected Device] for the logical ports PLC2 to 8. [V-Link] cannot be selected for PLC1.



Communication setting



(Underlined setting: default)

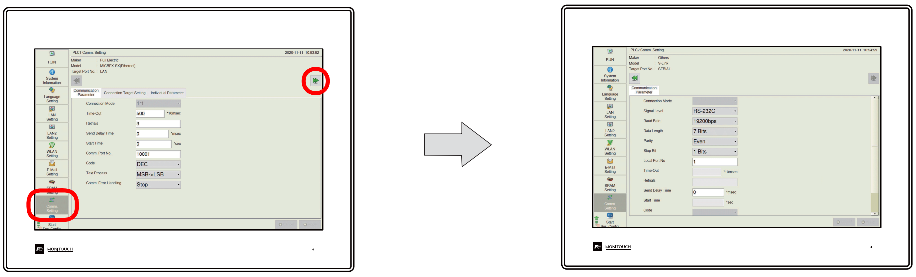
Item	Setting
Signal Level	<u>RS-232C</u> / RS-485
Baud Rate	4800 / 9600 / <u>19200</u> / 38400 / 57600 / 115 Kbps
Data Length	<u>7</u> / 8 bits
Stop Bit	<u>1</u> / 2 bits
Parity	None / Odd / <u>Even</u>
Send Delay Time	<u>0</u> to 255 msec
Local Port No.	<u>1</u> to 254 (Maximum connectable units: 31)
Use Sum Check	<u>Yes</u> / None
Add CR/LF	Yes / <u>None</u>

MONITOUCH

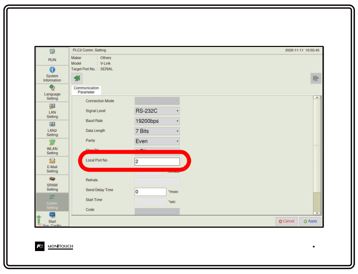
Local port setting (Local mode)

The local port can be set on the X1 series unit in Local mode.

1. Transfer the screen program.
2. Press any of the four corners of the screen for more than two seconds and then press any of the remaining corners for more than two seconds to display the system menu.
3. Switch to Local mode on MONITOUCH.
4. Press [Communication Setting] to display the Communication Setting screen, and then select the communication setting for “V-Link”.



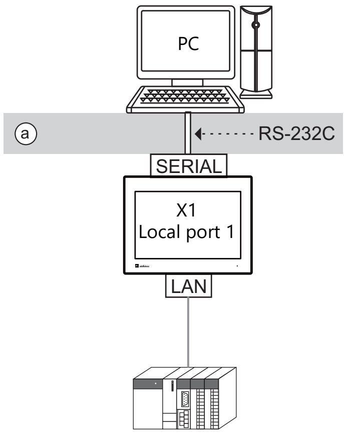
5. Configure [Local Port No] and press the [Apply] switch.



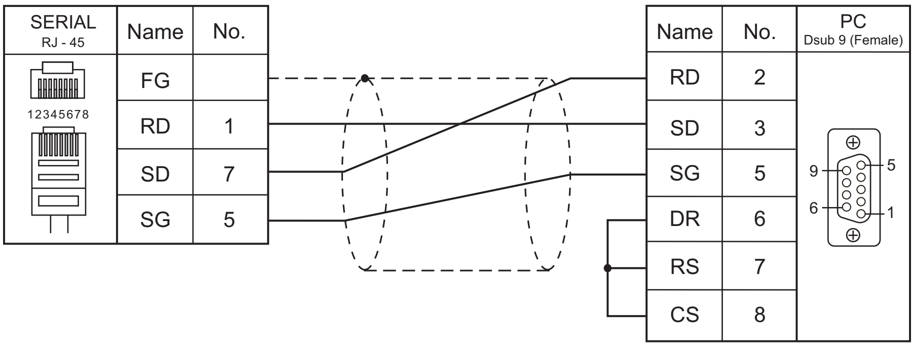
33.1.3 Wiring Diagrams

When Connected at CN1:

RS-232C

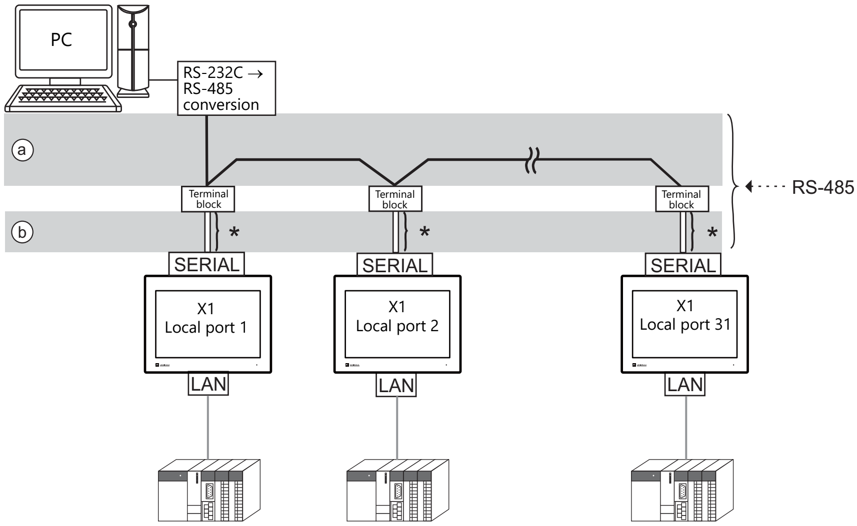


- Wiring example of above (a)



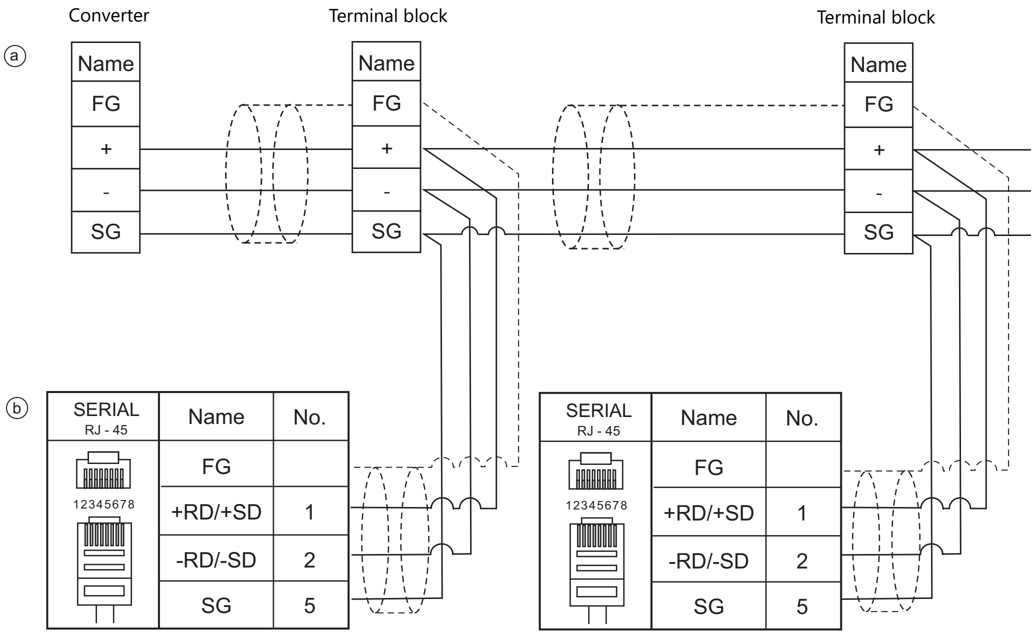
* Select RS-232C in the screen program or on the Local mode screen of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

RS-485 (X1 Series: Max. 31 Units)



* 0.5 m recommended (1.0 m maximum)

- Wiring example of above (a) and (b)



* Select RS-422/485 in the screen program or on the Local mode screen of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

33.1.4 Protocol

Read (with Sum Check and CR/LF)

Read command

Command

STX	Local port No.	Read command	Number of words to read	* Read target device memory setting	ETX	SUM	CR	LF	
1	2	2	2	18	1	2	1	1	Bytes

Response

(Normal communication)

STX	Local port No.	ACK	Device memory data 0	…	Device memory data n	ETX	SUM	CR	LF	
1	2	2	4		4	1	2	1	1	Bytes

(When an error occurs)

STX	Local port No.	NAK	ETX	SUM	CR	LF	
1	2	2	1	2	1	1	Bytes

*** Read target device memory setting**

Internal device memory

Model	Type	Address	Reserved for system
2	2	4	10

PLC device memory within 16 bits

Model	Type	Address	Expansion code	Reserved for system	Target Port No.	Reserved for system
2	2	4	2	2	2	4

PLC device memory over 16 bits

Model	Type	Address	Expansion code	Reserved for system	Target Port No.
2	2	8	2	2	2

Memory card

Model	File No.	Record No.	Address	Reserved for system	
2	2	4	4	6	Bytes

e.g. Reads the 2-word data, "ABCD" starting with the address $u0020(0014H) on the X1 of the local port number 1.

Command

STX	Local port No.	Read command	Number of words to read	Model	Type	Address	Reserved for system	ETX	SUM	CR	LF
	01H	20H	02H	00H	00H	0014H	0000000000H		8FH		
02H	30H31H	32H30H	30H32H	30H30H	30H30H	30H30H31H34H	30H30H30H30H30H30H30H30H30H30H	03H	38H46H	0DH	0AH

Response

(Normal communication)

STX	Local port No.	ACK	Data				ETX	SUM	CR	LF
			B	A	D	C				
			42H	41H	44H	43H				
	01H	00H						60H		
02H	30H31H	30H30H	34H32H	34H31H	34H34H	34H33H	03H	36H30H	0DH	0AH

Write (with Sum Check and CR/LF)

Write command

Command

STX	Local port No.	Write command	Number of words to write	* Write target device memory setting	Device memory data 0	…	Device memory data n	ETX	SUM	CR	LF	
1	2	2	2	18	4		4	1	2	1	1	Bytes

Response

(Normal communication)

STX	Local port No.	ACK	ETX	SUM	CR	LF	
1	2	2	1	2	1	1	Bytes

(When an error occurs)

STX	Local port No.	NAK	ETX	SUM	CR	LF	
1	2	2	1	2	1	1	Bytes

* Write target device memory setting

Internal device memory

Model	Type	Address	Reserved for system
2	2	4	10

PLC device memory within 16 bits

Model	Type	Address	Expansion code	Reserved for system	Target Port No.	Reserved for system
2	2	4	2	2	2	4

PLC device memory over 16 bits

Model	Type	Address	Expansion code	Reserved for system	Target Port No.
2	2	8	2	2	2

Memory card

Model	File No.	Record No.	Address	Reserved for system	
2	2	4	4	6	Bytes

e.g. Writes "AB12" to the addresses D0100 to 101(0064 to 0065H) on the PLC connected to the X1 of the local port number 1.

Command

STX	Local port No.	Write command	Number of words to write	Model	Type	Address	Expansion code	Reserved for system	Target Port No.	Reserved for system	Data B	Data A	Data 2	Data 1	ETX	SUM	CR	LF
	01H	21H	02H	01H	00H	0064H	00H	00H	00H	0000H	42H	41H	32H	31H		2AH		
02H	30H31H	32H31H	30H32H	30H31H	30H30H	30H30H36H34H	30H30H	30H30H	30H30H	30H30H	34H32H	34H31H	33H32H	33H31H	03H	32H41H	0DH	0AH

Response

(Normal communication)

STX	Local port No.	ACK	ETX	SUM	CR	LF
	01H	00H		C6H		
02H	30H31H	30H30H	03H	43H36H	0DH	0AH

Items for Protocols

Transmission control code: 1 byte

Signal Name	Code (Hexadecimal)	Content
STX	02H	Start of transmission block
ETX	03H	End of transmission block
CR	0DH	Carriage return
LF	0AH	Line feed

Local port number: 2 bytes

Local port numbers are used so that the host computer can identify each X1 series for access.
The data range is from 01H to 1FH (1 to 31). Convert into ASCII codes before use.
Set the X1 series' local port number for [Local Port No.] on the editor. See page 33-2.

Command: 2 bytes

Available commands are shown below. Convert into ASCII codes before use.

Name	Code (Hexadecimal)	ASCII	Content
Read	20H	32 30	Read from device memory
Write	21H	32 31	Write to device memory

The number of words to be read or written: 2 bytes

Set the number of words to be read or written by one command.
The data range is from 01H to FFH (1 to 255). Convert into ASCII codes before use.

Device Memory address to be read or written: 18 bytes

Specify the device memory address to be accessed.
Set the following code in the format as shown for "Read target device memory setting" on page 33-6 and "Write target device memory setting" on page 33-7.
Convert into ASCII codes before use.

- Model

Device Memory	Word Address		Double-word Address	
	Code (Hexadecimal)	ASCII	Code (Hexadecimal)	ASCII
Internal device memory	00H	3030	80H	3830
PLC1 device memory	11H	3131	91H	3931
PLC2 device memory	12H	3132	92H	3932
PLC3 device memory	13H	3133	93H	3933
PLC4 device memory	14H	3134	94H	3934
PLC5 device memory	15H	3135	95H	3935
PLC6 device memory	16H	3136	96H	3936
PLC7 device memory	17H	3137	97H	3937
PLC8 device memory	18H	3138	98H	3938

- Type

	Type	Code (Hexadecimal)	ASCII
Internal device memory	$u (user device memory)	00H	3030
	$s (system device memory)	01H	3031
	$L (non-volatile word device memory)	02H	3032
	$LD (non-volatile double-word device memory)	03H	3033
	$T (temporary user device memory)	04H	3034
	$P (device memory for 8-way communication)	05H	3035
PLC1-to-8 device memory	Depends on the PLC to be used. Set [TYPE No.] of the device memory used for each device memory.		

- Address
  Specify the device memory address to be accessed.

- Expansion code
  When accessing to the device memory shown below, set the expansion code in addition to the type and address.

Model	Expansion Code
$P	PLC 1 to 8
Fuji Electric PLC	File No. of the MICREX-F series, CPU No. of MICREX-SX series
JTEKT PLC	PRG No.
MITSUBISHI ELECTRIC PLC	Unit No. of SPU device memory
OMRON PLC	Bank No.
SHARP PLC	File No. of Fn device memory
Yokogawa Electric PLC	CPU No.

* If there is no need to set the expansion code, set “00” (= 3030 in the ASCII code).

- Port number
  Set the port number used for 1 : n connection (multi-drop)
  For 1 : 1 connection, the port number is not used. Set “00” (= 3030 in ASCII).

- System reserved
  Enter “0” (= 30 in the ASCII code) for the number of bytes.
  The number of bytes for “system reserved” varies depending on the model.
  Example:

Model	Bytes	Code (Hexadecimal)	ASCII
X1 internal device memory	10	0000000000H	30303030303030303030

Sum Check Code (SUM): 2 Bytes

Data is added up (SUM), and the lower one byte (8 bits) of the sum is converted into a two-digit ASCII code (hexadecimal).
A sum check code is shown below.
Example: Transmission mode: without CR/LF, with sum check
Command: 20 (data read)
Address: 10 words from $u1000 (03E8H)
When reading, a sum check will be performed as shown below.

STX	Port No.	Command	Read words	Device model	Device type	Address	System reserved	ETX	SUM
	01H	20H	0AH	00H	00H	03E8H	0 0 0 0 0 0 0 0 0 0H		B9H
02H	30H31H	32H30H	30H41H	30H30H	30H30H	30H 33H 45H 38H	30H 30H 30H 30H 30H 30H 30H 30H 30H 30H	03H	42H39H

02H + 30H + 31H + 32H + 30H + 30H + 41H + 30H + 30H + 30H + 30H + 30H + 33H + 45H + 38H

+ 30H + 30H + 30H + 30H + 30H + 30H + 30H + 30H + 30H + 30H + 03H = 4B9H

Response Code: 2 Bytes

"ACK" code is received at normal termination, and "NAK" code at abnormal termination. These are converted to ASCII codes and received. The following table shows the details of each code.

Signal Name	Code (Hexadecimal)	ASCII	Contents
ACK	00H	30 30	Normal termination
NAK	02H	30 32	Overrun/Framing error An overrun or framing error is detected in the received data. Send the command again.
	03H	30 33	Parity error A parity error is detected in the received data. Send the command again.
	04H	30 34	Sum check error A sum error occurs with the received data.
	06H	30 36	Count error The device memory read/write count is "0".
	0FH	30 46	ETX error No ETX code is found.
	11H	31 31	Character error A character not used in the received data is found (other than 0 to F). Check the character and send the command again.
	12H	31 32	Command error An invalid command is given.
	13H	31 33	Device Memory setting error The address or device memory number is invalid.

33.1.5 1-byte Character Code List

Upper

Lower

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	’	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	¥	l	|								
D			−	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	■								

33.2 Modbus RTU Slave Communication

For details on Modbus RTU slave communication, refer to the Modbus Slave Communication Specifications manual provided separately.

33.3 Modbus TCP/IP Slave Communication

For details on Modbus TCP/IP slave communication, refer to the Modbus Slave Communication Specifications manual provided separately.

33.4 Modbus ASCII Slave Communication

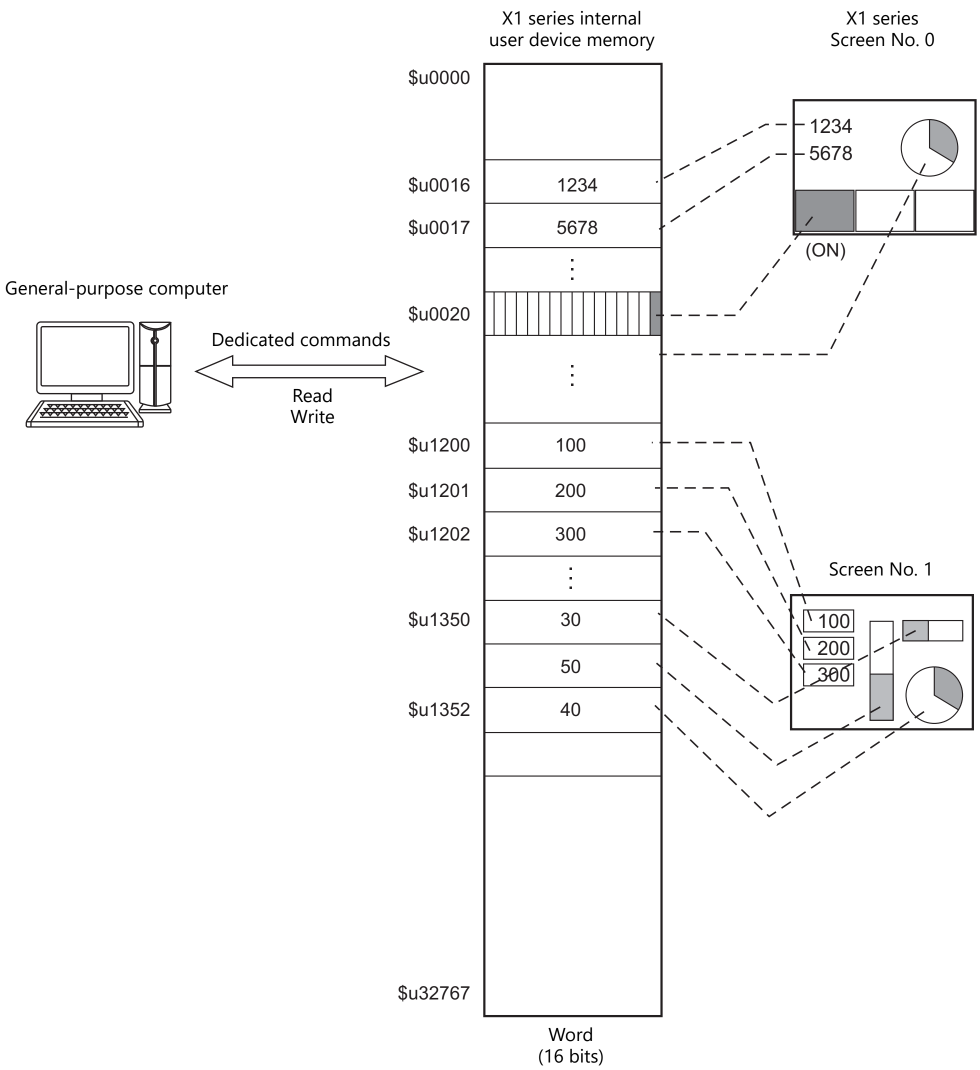
For details on Modbus ASCII slave communication, refer to the Modbus Slave Communication Specifications manual provided separately.

34. Universal Serial Communication

34.1 Overview

Overview of Communication

- As shown in the diagram below, when a general-purpose computer communicates with the X1 series, the general-purpose computer acts as the host and the X1 series acts as the slave.
- Switch, lamp, data display, etc., are allocated within the internal user device memory ($u0 to 32767). Assign device memory addresses for system, lamp, data display, and mode within this range.
- When a screen number is specified from the host, a write action takes place to the internal device memory address specified for the screen. When a screen is changed internally by a switch, etc., the changed screen number is read, and written in the internal device memory address specified for the screen.



Differences between Connecting to General-purpose Computer and Connecting to PLC

- Input format (code)
  The input format used for screen number, block number, message number, etc, is fixed in [DEC].
- Write area
  When connecting to the PLC, only the three words shaded in the diagram below are used, but when connecting to a general-purpose computer, all 16 words shown below are used.

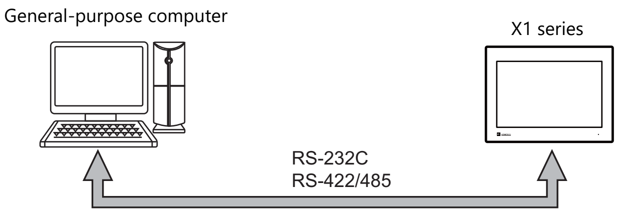
Address	Name	Contents
n + 0	CFMDAT	Sub command/data
n + 1	SCRN_COM	Screen status
n + 2	SCRN_No	Displayed screen
n + 3	SW0	No. 0 switch data
n + 4	SW1	No. 1 switch data
n + 5	ENT0	Entry information 0
n + 6	ENT1	Entry information 1
n + 7	ENT2	Entry information 2
n + 8	GREPNS	Global response
n + 9 • • n + 15		Reserved (7 words)

System Configuration

1 : 1 connection

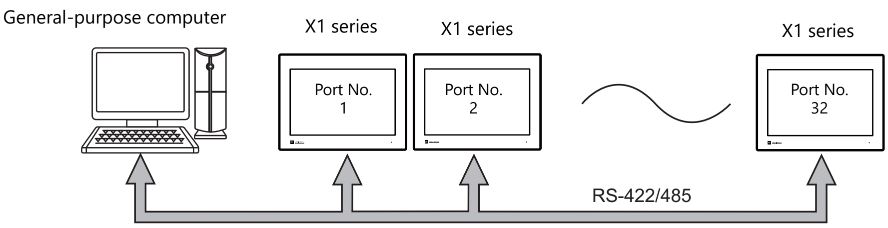
- The transmission distance available via RS-232C is 15 m and RS-422/485 is 500 m at the maximum.
- It is possible to use an interrupt* when connecting a computer to a X1 series in a 1 : 1 connection.

  * For RS-485 (2-wire connection), interrupts cannot be used. For details on interrupts, see page 34-31.



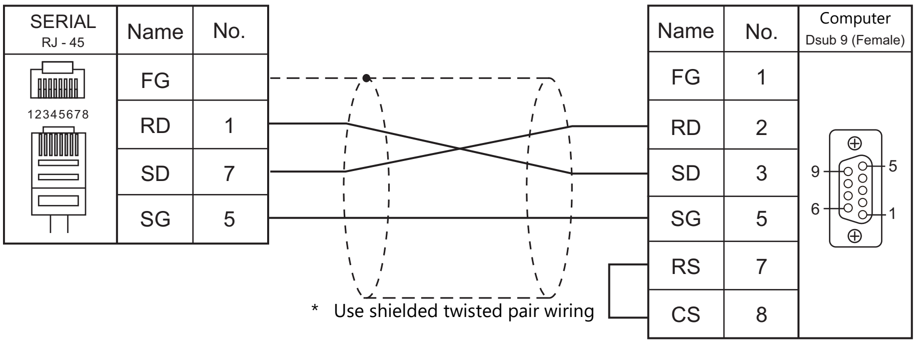
1 : n connection

- 1 : n connection is available via RS-422/485. A maximum of 32 X1 series units can be connected.
- The transmission distance available is 500 m at the maximum.
- For 1 : n connection, interrupts cannot be used.



34.2 Wiring Diagrams

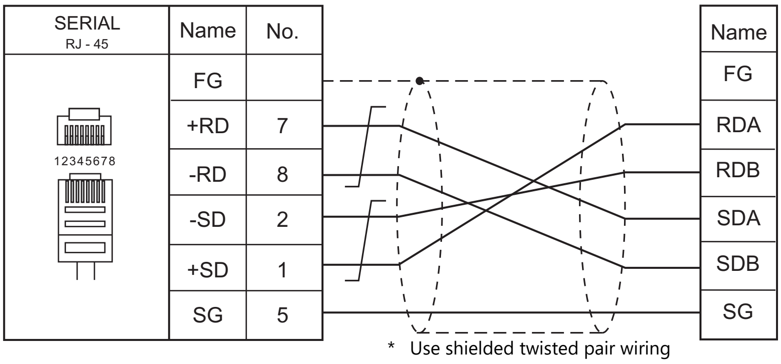
RS-232C



* Select RS-232C in the screen program or on the Local mode screen of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

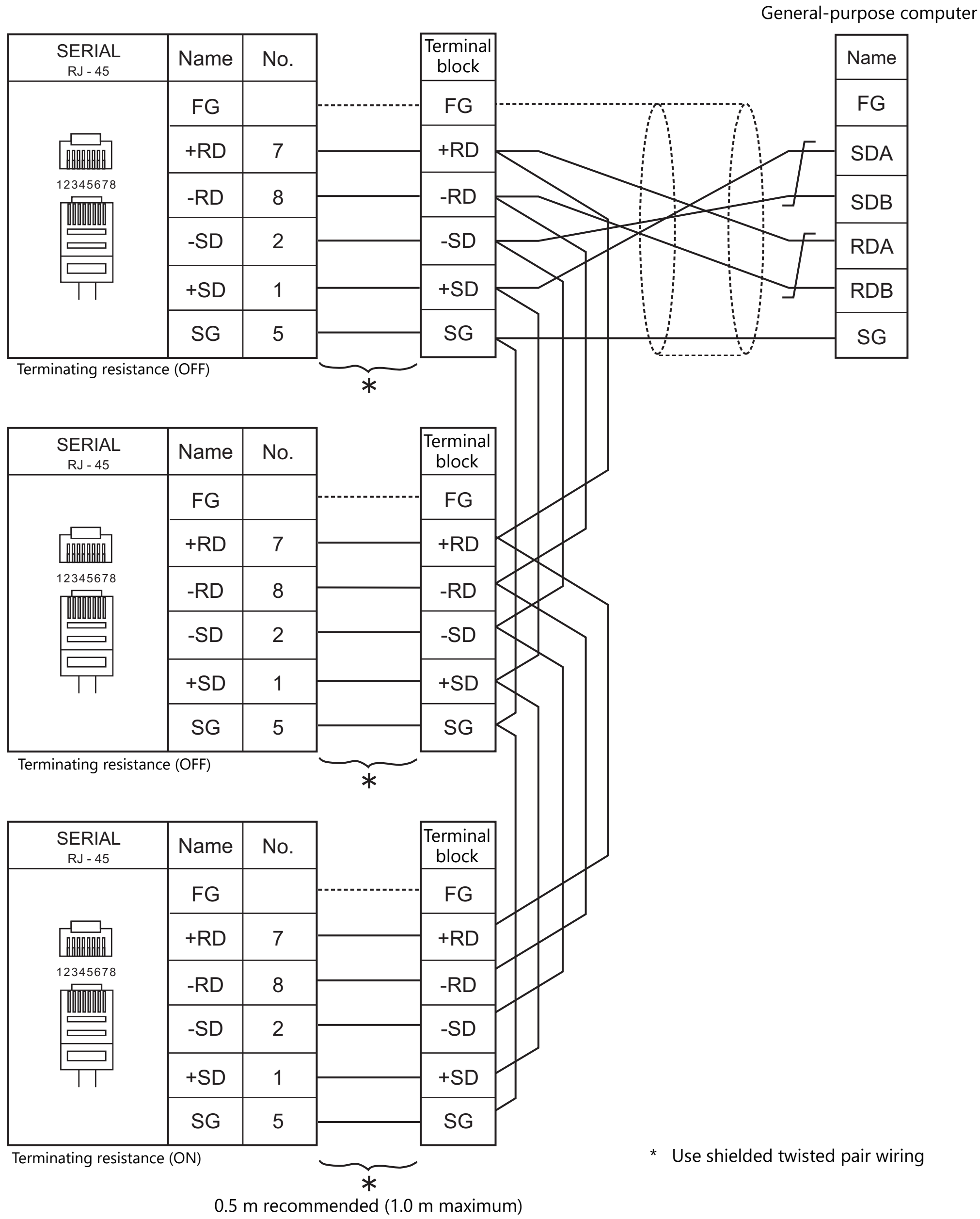
RS-422

1 : 1 connection



* Select RS-422/485 in the screen program or on the Local mode screen of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).
* The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

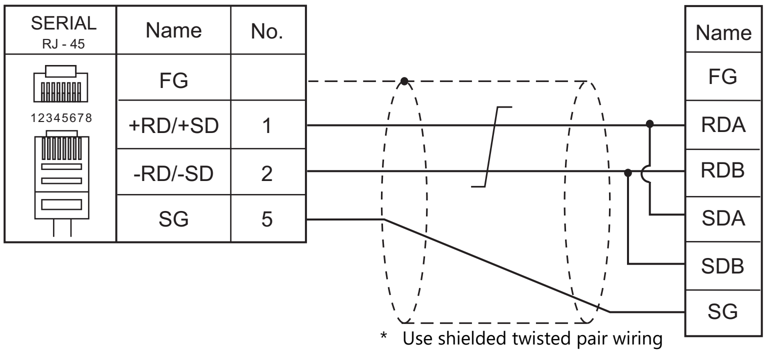
1 : n connection



* Select RS-422/485 in the screen program or on the Local mode screen of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).
* The signal level must be selected on the Serial Setting screen in Local mode of the X1 series unit. For details, see "1.2.1 SERIAL" (page 1-4).

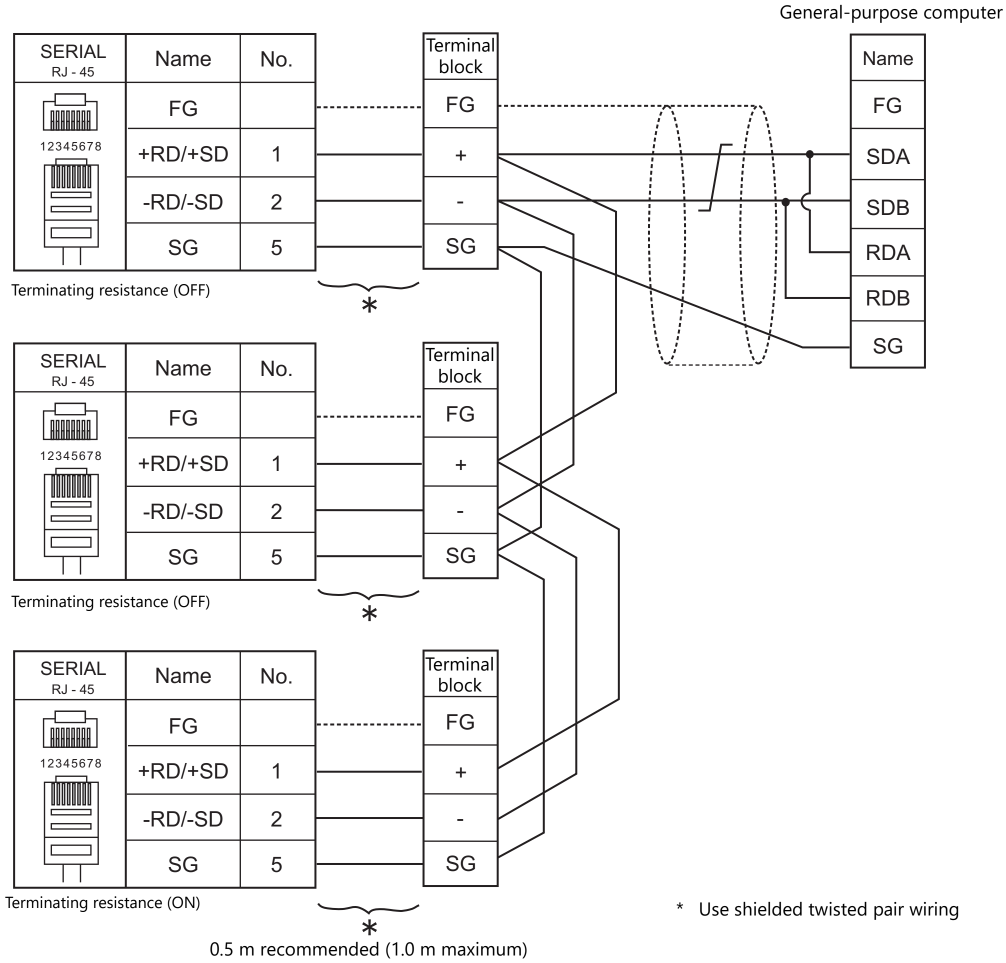
RS-485

1 : 1 connection



* Select RS-422/485 in the screen program or on the Local mode screen of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

1 : n connection

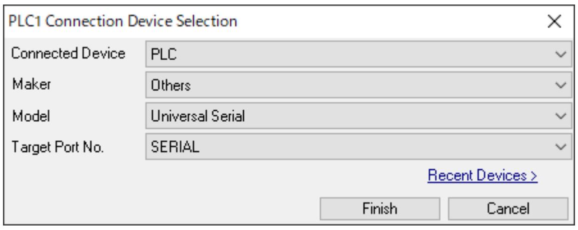


* Select RS-422/485 in the screen program or on the Local mode screen of the X1 series unit. For details, see “1.2.1 SERIAL” (page 1-4).

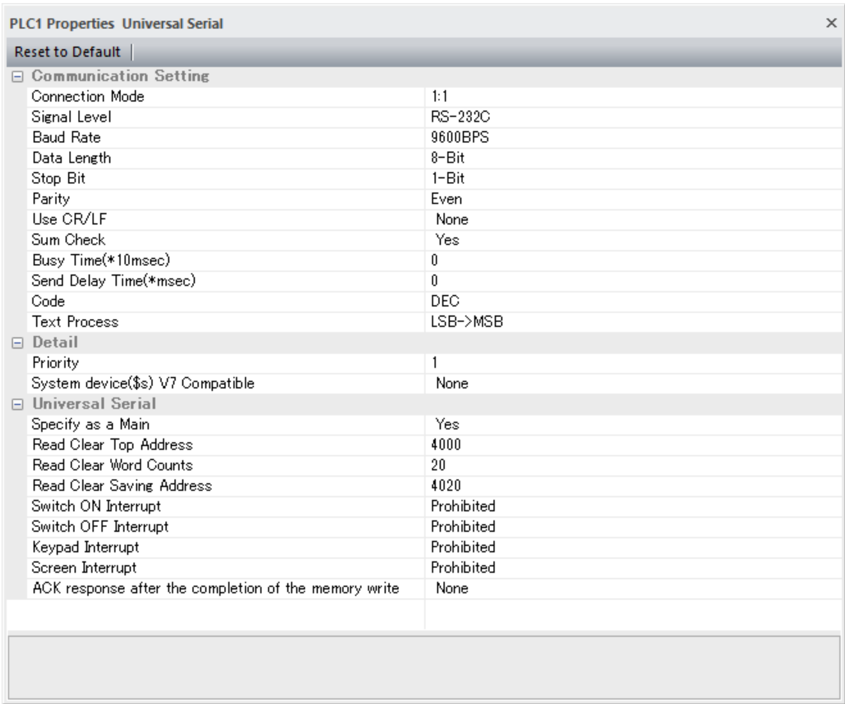
34.3 Hardware Settings

PLC Settings

Connecting Device Selection



PLC Properties

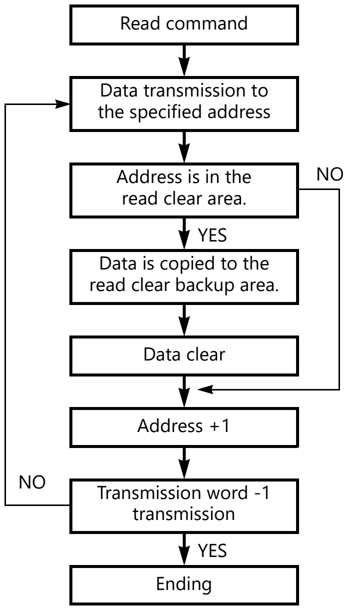


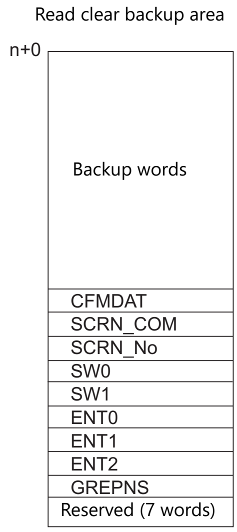
Item		Contents
Communication Setting	Connection Mode	Set the connection method for the X1 series and host. 1 : 1 Select when connecting one X1 series unit to one host. 1 : n Select when connecting multiple X1 series units to one host.
	Signal Level	Set the signal level used for communication between the host and the X1 series. RS-232C/RS-422/485
	Baud Rate	Set the communication speed between the host and the X1 series. 4800/9600/19200/38400/57600/76800/115K bps
	Data Length	8 bits (fixed)
	Stop Bit	Select a stop bit. 1 bit / 2 bits
	Parity	Select an option for parity bit. None / Odd / Even
	Local Port No.	This option is valid when 1 : n connection is used. Set the port number of the X1 series.
	Use CR/LF	Set whether or not to use a CR/LF code at the end of transmission data.
	Sum Check	Set whether or not to add a sum check code at the end of transmission data.
	Busy Time	Refer to page 34-23.
	Send Delay Time	Set the time for X1 series to send a response to a host after receiving a command from a host.
	Code	DEC (fixed)

Item		Contents
Communication Setting	Text Process	When using text process, choose either [LSB → MSB] or [MSB → LSB] in order to make arrangements for the order of the first and the second bytes in one word. [LSB → MSB] 15 | MSB | LSB | 0 — MSB: 2nd byte, LSB: 1st byte [MSB → LSB] 15 | MSB | LSB | 0 — MSB: 1st byte, LSB: 2nd byte
Universal Serial	Specify as a Main	Specify which connection to use as the main connection when multiple universal serial connections are made at PLCs 1 to 8. This is set to [Yes] when there is only one universal serial connection. * When [None] is selected, the following limitations apply. • The following interruption communications occur simultaneously when the connection specified as the main interrupts. - Interruption function of a switch - Interruption function of a "Write" switch on the keypad or on the keyboard - Interruption function of screen internal switching • Responses to commands for global stations cannot be output. • The read clear functions are not available. • $s111 cannot be used. The contents of the connection specified as the main are displayed.
	Read Clear Top Address*2	This setting is available when [Specify as a Main] is set to [Yes]. Set the top address number of the read clear area. The read clear area is the starting area from which the X1 series clears data that was previously read. Due to the fact that it is cleared to "0", once this area is read, the data remains at "0" even if you attempt to read again when a read response error occurs.
	Read Clear Word Counts*2	This setting is available when [Specify as a Main] is set to [Yes]. Set the number of words that will be used for clearing the read area.
	Read Clear Saving Address*2	This setting is available when [Specify as a Main] is set to [Yes]. Set the top address for the read clear backup area. The area size will be the same as the previously described read clear area. The number of words written in the read clear backup area is the same as the number specified for the read clear area.
	Switch ON Interrupt*1	Select whether or not to enable or disable an interrupt when the switch changes from OFF to ON.
	Switch OFF Interrupt*1	Select whether or not to enable or disable an interrupt when the switch changes from ON to OFF.
	Keypad Interrupt*1	Select whether or not to enable or disable an interrupt when the "Write" switch on the keypad or on the keyboard is pressed and it changes from OFF to ON.
	Screen Interrupt*1	Select whether or not to enable or disable an interrupt when the screen change switch is pressed.
	Output OFF	This option is valid only for 1 : 1 communication via RS-422 using 4-wire connection. Normally, X1 series uses the same cables to send or receive data regardless of 4-wire of 2-wire connections. For this reason, send output remains OFF (High impedance) except for sending signals from X1 series. However, depending on the host specifications, send output OFF operation from the X1 series is not required. In this case, specify [None].
	2-Wire System	Select [Yes] for 1 : 1 communication via RS-422/485 using 2-wire connection. Interruptions are disabled.
	ACK response after the completion of memory write	To send an ACK response upon receiving the initial write request of a write command (WM, WC), specify [None]. To send an ACK response after completing command processing, specify [Yes].
	Clear the receive buffer at the start of communication	Select [Yes] to clear the commands accumulated in the receive buffer at the start of communication.

*1 Interruption settings can be changed from the host using the [WI] command during communication.
For details on interruption, refer to "34.4.4 Interrupt (ENQ)".

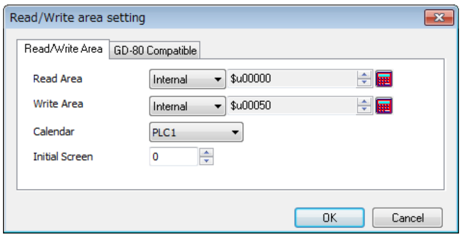
*2 Read clear and read clear backup action
The action that occurs when a read command from the host tries to access to the read clear area is shown in the following diagram.
Backup data of the write area in the system device memory is allocated following the read clear backup area.





Control Device Memory

Read/Write Area



Read Area

This device memory area is necessary to change the screen display status by giving a command from the host. Be sure to set the $u device memory. Address allocation is shown in the table below. For more information, see "1.4.2 Unit Settings" (page 1-32).

Address	Name	Contents
n + 0	RCVDAT	Sub command/data
n + 1	SCRN_COM	Screen status command
n + 2	SCRN_No	External screen command

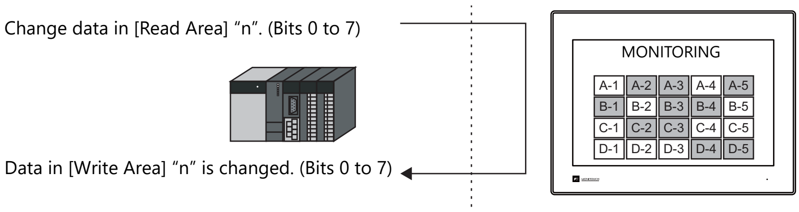
Read area "n" (sub command/data)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	0											

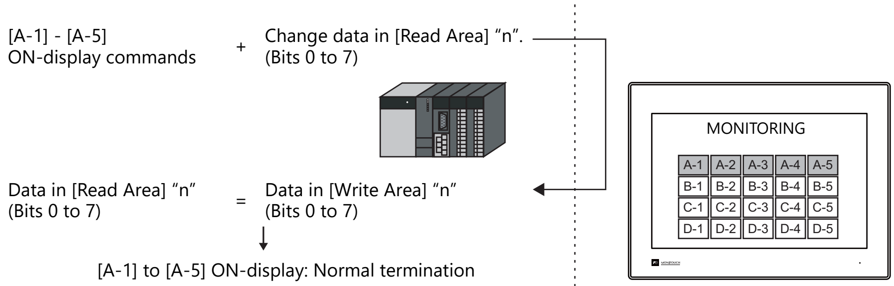
(1) Free
(2) BZ0 [0 → 1] (leading edge)
(3) BZ1 [0 → 1] (leading edge)
(4) BZ2 [1] (level)
(5) System reserved

(1) Free	When data is saved in this area, the same data is written to [Write Area] "n" after the screen has been displayed. Utilizing this operation, these bits can be used for watchdog monitoring *1 or display scanning *2.
(2) BZ0	A beep (peep) sounds at the leading edge [0 → 1].
(3) BZ1	An error buzzer (peep-peep) sounds at the leading edge [0 → 1].
(4) BZ2	A buzzer (ffeee) sounds continuously while the bit remains [1]. When setting this bit, check [Use Continuous Buzzer Sound] ([System Setting] → [Unit Setting] → [General Setting])
(5) System reserve	This bit is reserved by the system. This bit must be "0".

*1 Watchdog
When the host is communicating with MONITOUCH, there is no means for the host to know whether or not MONITOUCH is doing operations correctly.
To solve this one-way communication, forcibly change data in bits 0 to 7 in [Read Area] "n" and check that the same data is saved in bits 0 to 7 in [Write Area] "n". This proves that the X1 series is correctly doing operations through communications with the host. This verification is called "watchdog".



*2 Display scanning
This operation can be utilized for display scanning. Change data in bits 0 to 7 in [Read Area] “n” when giving a graphic change command and check that the same data is saved in bits 0 to 7 in [Write Area] “n”. This can prove that the graphic change command is received and executed correctly.



*3 If this bit is used during constant sampling, data sampling timing may be shifted. If this bit is set during constant sampling, we recommend you to reset the sampling as well.

Read area “n + 1” (screen status command)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
			0					0	0	0	0				

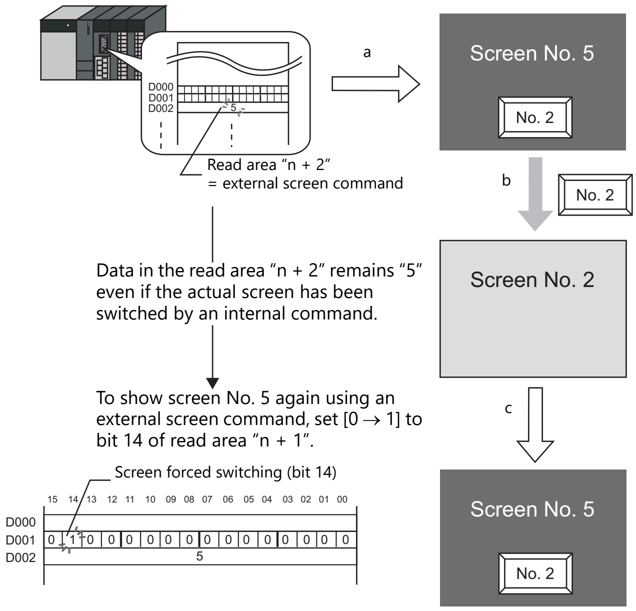
- Bit 00: (1) Overlap 0
- Bit 01: (2) Overlap 1
- Bit 02: (3) Overlap 2
- Bit 03: (4) Overlap 3
- Bits 04–07: (5) System reserved
- Bit 08: (6) Global macro execution [0 → 1] (leading edge)
- Bit 09: (7) Data sheet output [0 → 1] (leading edge)
- Bit 10: (8) Screen image output [0 → 1] (leading edge)
- Bit 11: (9) Backlight (level)
- Bit 12: (10) System reserved
- Bit 13: (11) Screen internal switching (level)
- Bit 14: (12) Screen forced switching [0 → 1] (leading edge)
- Bit 15: (13) Data read refresh [0 → 1] (leading edge)

(1) Overlap 0 (2) Overlap 1 (3) Overlap 2	These bits are used for controlling show/hide operations of overlaps. • Normal overlap or call-overlap [0 → 1] (leading edge *1): Show [1 → 0] (leading edge *1): Hide • Multi-overlap [0] (level *2): Hide [1] (level *2): Show It is necessary to specify a library number from No. 0 to 9999 for [Device for Overlap Library No. to Display] for a multi-overlap display.
(4) Overlap 3	This bit is used for controlling show/hide operations of the global overlap screen. [0 → 1]: Show [1 → 0]: Hide It is necessary to specify a library number from No. 0 to 9999 for [Device for Overlap Library No. to Display] in the [Global Overlap Setting] window.
(5) System reserve	This bit is reserved by the system. This bit must be “0”.
(6) Global macro execution	The macro set for [Macro Block] is executed once at [0 → 1] (leading edge). The macro block number should be specified for [Global Macro Device] in the window that is displayed by selecting [System Setting] → [Macro Setting]. For details, refer to the V9 Series Macro Reference Manual.
(7) Data sheet output	The data sheet is printed out at [0 → 1] (leading edge). This bit becomes valid when the data sheet function is set.
(8) Screen data output	The X1 series screen image is printed out at [0 → 1] (leading edge). This bit becomes valid when a printer is connected. It is also possible to make a screen hard copy using an internal switch [Function: Hard Copy].
(9) Backlight	This bit becomes valid when an option other than [Always ON] is selected in the [Backlight] tab window that is displayed by selecting [System Setting] → [Unit Setting]. [0] (level): OFF when the conditions are satisfied [1] (level): ON

(10) System reserved	This bit is reserved for the system. This bit must be "0".
(11) Screen internal switching	This bit controls screen switching by internal switches. [0]: Screen switching by internal switches is enabled. [1]: Screen switching by internal switches is disabled. * An "internal switch" means a switch you can create for internal processing within MONITOUCH by selecting [Screen] or [Return] for [Function:] of the switch.
(12) Screen forced switching	This bit is used for switching the screen using the read area "n + 2" when the required screen number has already been specified in "n + 2". *3
(13) Data read refresh	All the data display items on the screen are refreshed at [0 → 1] (leading edge). This is applied to every data display item regardless of the setting for [Process Cycle].

*1 It is possible to make this function work with the bit in the level. For more information, refer to the X1 Series Reference Manual.
*2 As an exception, a multi-overlap may appear/disappear at the edge. For more information, refer to the X1 Series Reference Manual.

*3 Usage Example
Step a: Screen change according to read area "n + 2"
Step b: Screen change with an internal switch
Step c: Screen change to the same screen number as step a according to read area "n + 2"
In this case, however, the same value is stored in read area "n + 2" so the command is not valid. In such a case, it is possible to forcibly switch the screen to the screen number contained in read area "n + 2" at the leading edge [0 → 1] of bit 14.



Reset this bit (OFF) after checking that bit 14 of write area "n + 1" is ON, or the value stored in write area "n + 2" is the same as the value in read area "n + 2".

Read area “n + 2” (screen number command)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00

(1) Screen number

(1) Screen number command	0 - 9999 These bits are used for switching the screen by an external command. When a screen number is specified in these bits, the screen is displayed. Even if the screen has been switched using an internal switch, it is possible to switch the screen using an external command from the host. External commands have priority over internal switches. The screen number to be displayed when the power is turned on is specified in [Initial Screen].

Write Area

This device memory area is used to store information regarding screen number, overlap display, and entry mode when the screen display status is changed by a command received from the host. Be sure to set the $u device memory.
Address allocation is shown in the table below.

Address	Name	Contents
n + 0	CFMDAT	Sub command/data
n + 1	SCRN_COM	Screen status
n + 2	SCRN_No	Displayed screen
n + 3	SW0	No. 0 switch data
n + 4	SW1	No. 1 switch data
n + 5	ENT0	Entry information 0
n + 6	ENT1	Entry information 1
n + 7	ENT2	Entry information 2
n + 8	GREPNS	Global response
n + 9 : n + 15		Reserved (7 words)

n + 0 - n + 2

Write Area “n” (output of read area “n”)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	0											

(1) Free
(2) BZ0
(3) BZ1
(4) BZ2
(5) System reserved

(1) Free	These bits reflect the data in read area “n” at the time MONITOUCH has finished display processing.
(2) BZ0	
(3) BZ1	
(4) BZ2	
(5) System reserve	Always “0”

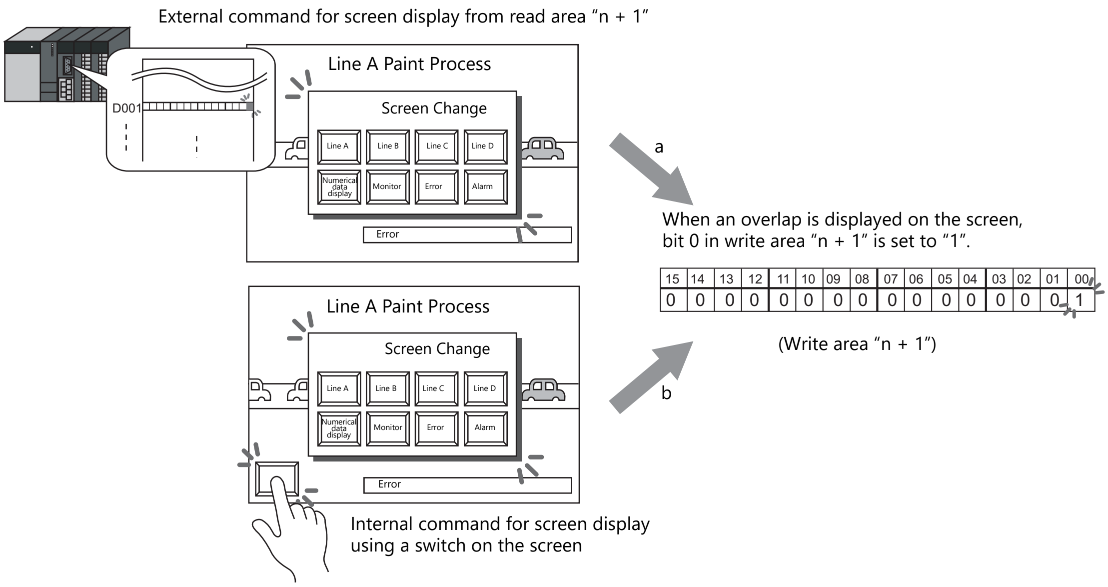
Write area “n + 1” (screen status)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
			0					0	0	0	0				

- 00: (1) Overlap 0
- 01: (2) Overlap 1
- 02: (3) Overlap 2
- 03: (4) Overlap 3
- 07–04: (5) System reserved
- 08: (6) Global macro execution
- 09: (7) Printer busy
- 10: (8) Print data transferring
- 11: (9) Backlight
- 12: (10) System reserved
- 13: (11) Screen internal switching
- 14: (12) Screen forced switching
- 15: (13) Data read refresh

(1) Overlap 0 (2) Overlap 1 (3) Overlap 2 (4) Overlap 3	Overlap status *1 [0]: Hide [1]: Show
(5) System reserve	Always “0”
(6) Global macro execution	This bit reflects the data in bit 8 of read area “n + 1”.
(7) Printer	Printer status *2 [0]: Not busy [1]: Busy
(8) Print data transferring	Print data transferring status when a print command (hard copy, sample print or data sheet) is executed *2 [0 → 1]: Print data transferring start [1 → 0]: Print data transferring end
(9) Backlight	Backlight ON/OFF status *3 [0]: OFF [1]: ON * Even if bit 11 (backlight) in read area “n + 1” is reset (0: OFF), this bit shows “1” if the backlight is on.
(10) System reserved	Always “0”
(11) Screen internal switching	This bit reflects the data in bit 13 of read area “n + 1”.
(12) Screen forced switching	This bit reflects the data in bit 14 of read area “n + 1”.
(13) Data read refresh	This bit reflects the data in bit 15 of read area “n + 1”.

*1 Example:
a. Display overlap No. 0 from read area (n + 1) using an external command.
b. Display overlap No. 0 internally using the [Function: Overlap = ON] switch.
In either case (a or b), bit 0 of write area “n + 1” is set (ON).
In the case of b, the bit in read area “n + 1” remains “0”.



*2 Data of bits 9 and 10 is output to internal device memory address $s16. For more information on the internal device memory ($s), refer to the X1 Series Reference Manual.
*3 Data of bit 11 is output to internal device memory address $s17. For more information on the internal device memory ($s), refer to the X1 Series Reference Manual.

Write area “n + 2” (displayed screen number)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00

(1) Screen number

(1) Screen number	0 - 9999 Screen number currently displayed

n + 3 (SW0) switch data No. 0, n + 4 (SW1) switch data No. 1

When a switch, for which [Output Action] is set to [Momentary/Momentary W] and [Output Device] is set in location from $s0080 to 0095, is pressed, the status and the number of the switch is stored.

n + 3, n + 4 (SW0/SW1)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
	0	0	0	0	0	0	0								

Switch status
0: OFF
1: ON

Switch number

For the relationship between the switch output device memory and the switch number, see page 34-35.

n + 5 (ENT0) entry information 0, n + 6 (ENT1) entry information 1

The same contents as n + 0 and n + 1 of the [Info. Output Device] that is set in the entry mode are written. Write operation occurs when the key whose function is set to “Write” is pressed in the entry mode.
When the entry selection has changed, write operation will not occur.
When (n + 5) entry information 0 is read by the host, the writing completed bit (bit 15) is reset.
Data is written in the backup (escape) area before it is read (see page 34-8).

n + 7 (ENT2) entry information 2

The entry mode window number where a write operation was executed is written.
The relationship between the window number and base and the window number and overlap is shown in the following table.

Window No.	Contents
0	Base entry mode
1	Overlap 0 entry mode
2	Overlap 1 entry mode
3	Overlap 2 entry mode

- In case of using the entry mode for the table data display
  When the bit No. 12 of “Command Device” in the [Entry] dialog is ON [1], the line number and the column number will be output to the address n + 1 and the block number to the address n + 2 of the “Info. Output Device”. Note that therefore, in only this case the window number cannot be referred because the block number is output to the address n + 7 (ENT2) of the write area.

n + 8 (GREPNS) global response

A response is written when a global port number is used in 1 : n communication. The contents of a response are shown in the following table.
For details on the global port number, see page 34-21.

Device Contents	Description
0000	Global command not received
0100	ACK
Others	Identical to NAK code (see page 34-22).

n + 9 to n + 15

System reserved

Initial Screen

Set the number of the screen to be displayed when power to the X1 series is turned on.

GD-80 Compatible

This setting is not valid because the GD-80 series cannot be used for universal serial communication.

34.4 Standard Type Protocol

34.4.1 Standard Type Protocol

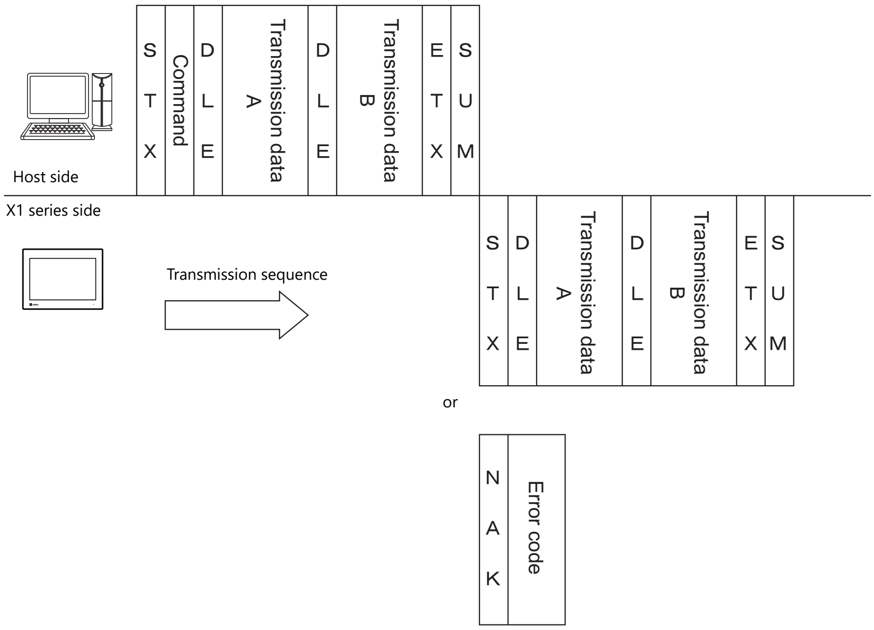
The connection mode and transmission mode are set under [System Setting] → [Communication Setting]. The mode contents are as follows.

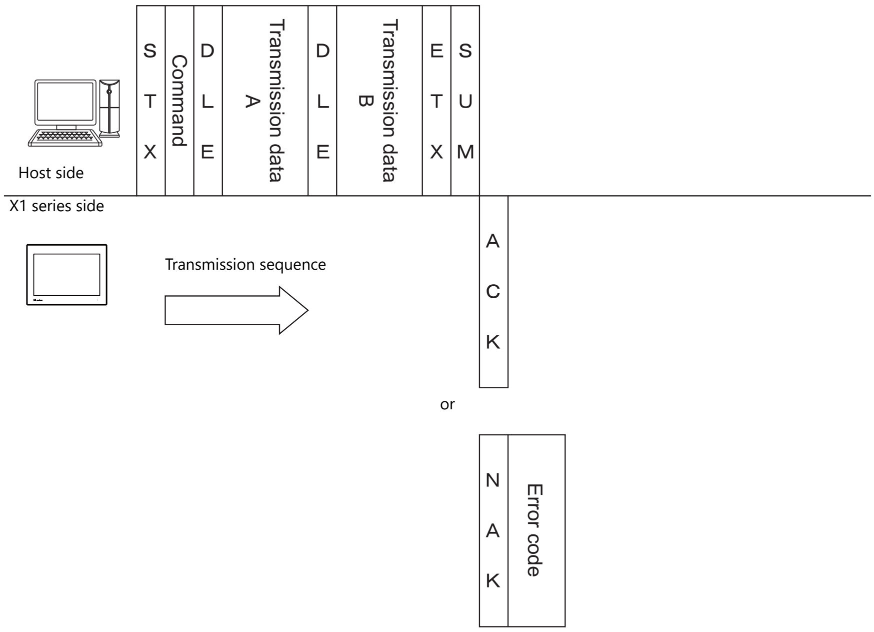
- Connection mode
  1 : 1: Select it when connecting one X1 series unit to one host.
  1 : n: Select it when connecting multiple X1 series units to one host. A maximum of 32 units can be connected. (Multi-drop specifications)
- Transmission mode
  There are four transmission modes, depending on whether or not a sum check or CR/LF code is attached to the end of transmission and received data, as shown below.

Transmission Mode	Sum Check	CR/LF
1	Not provided	Not provided
2	Provided	Not provided
3	Not provided	Provided
4	Provided	Provided

Connection (1 : 1), Transmission Mode (with Sum Check)

This protocol is used when one host communicates with one X1 series unit (1 : 1).

<table>
<tr><th>Contents</th><th>Protocol</th></tr>
<tr><td>Reading the X1 series data at the host side</td><td>


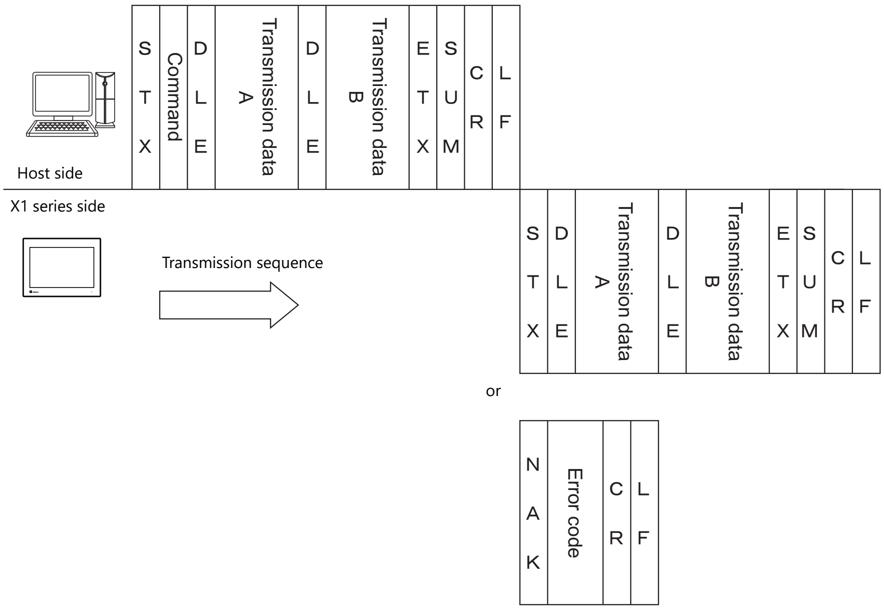
</td></tr>
<tr><td>Writing data from the host to the X1 series</td><td>


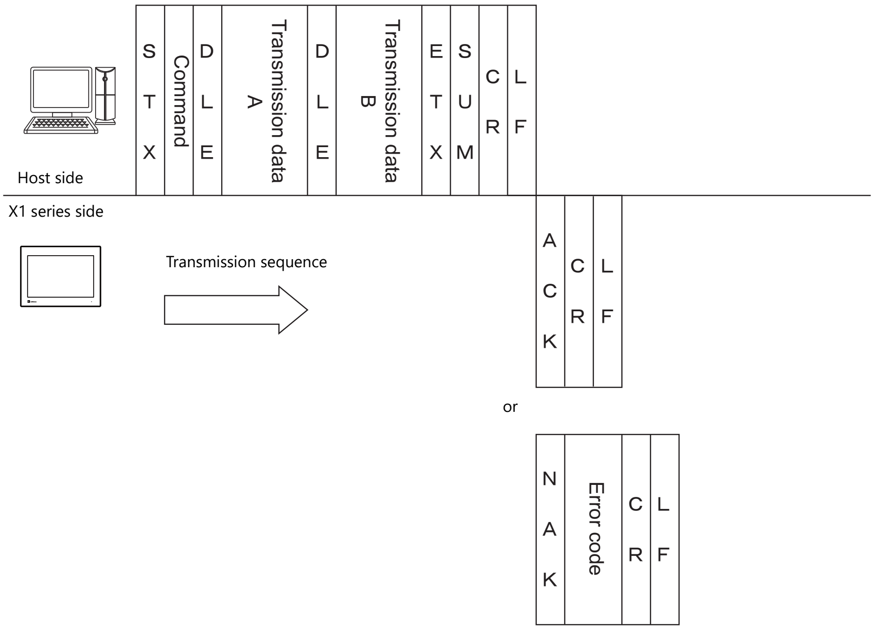
</td></tr>
</table>

- When 1 : 1 connection is used, an interrupt can be used. For more information, see page 34-31.

Connection (1 : 1), Transmission Mode (with Sum Check and CR/LF)

This protocol is used when one host communicates with one X1 series unit (1 : 1).

<table>
<tr><th>Contents</th><th>Protocol</th></tr>
<tr><td>Reading the X1 series data at the host side</td><td>


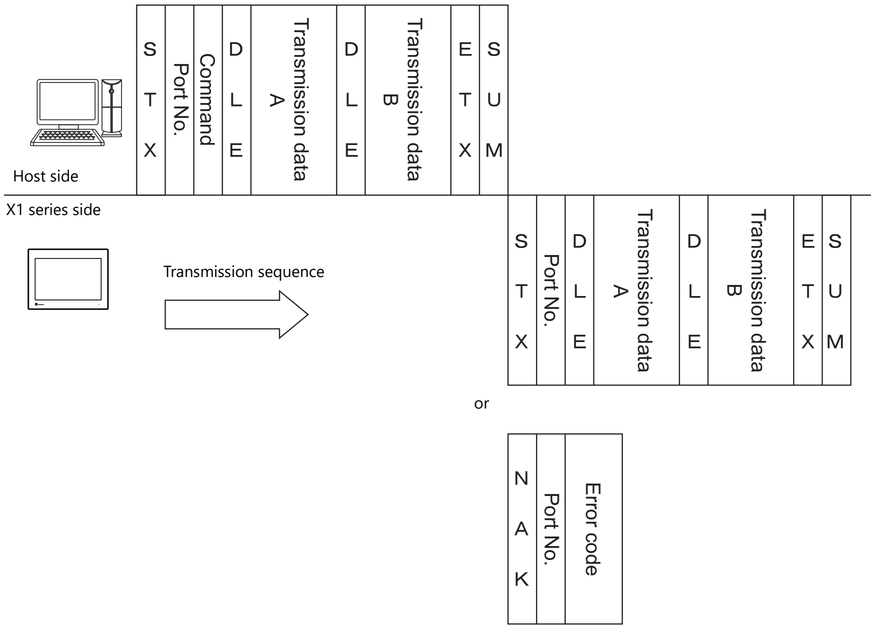
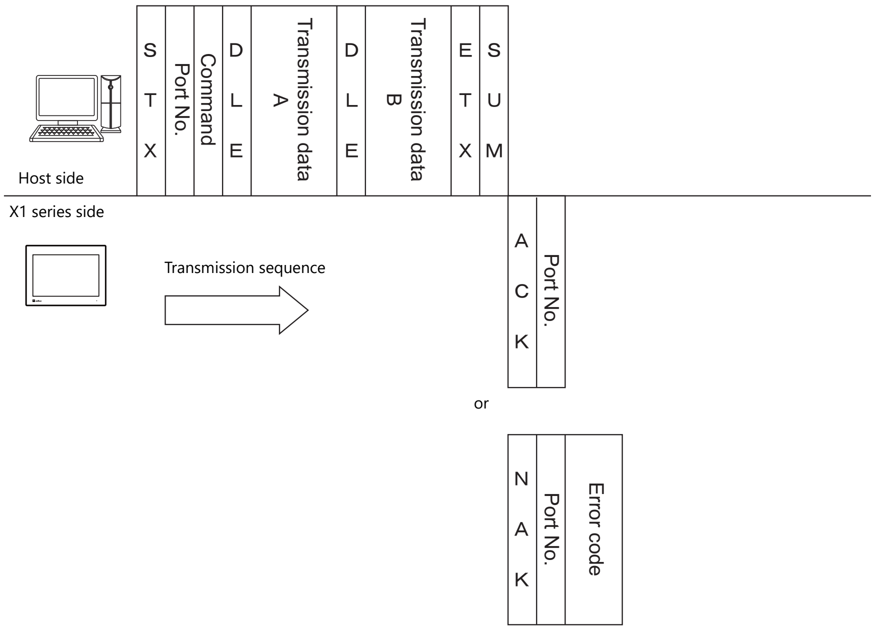
</td></tr>
<tr><td>Writing data from the host to the X1 series</td><td>


</td></tr>
</table>

- When 1 : 1 connection is used, an interrupt can be used. For more information, see page 34-31.

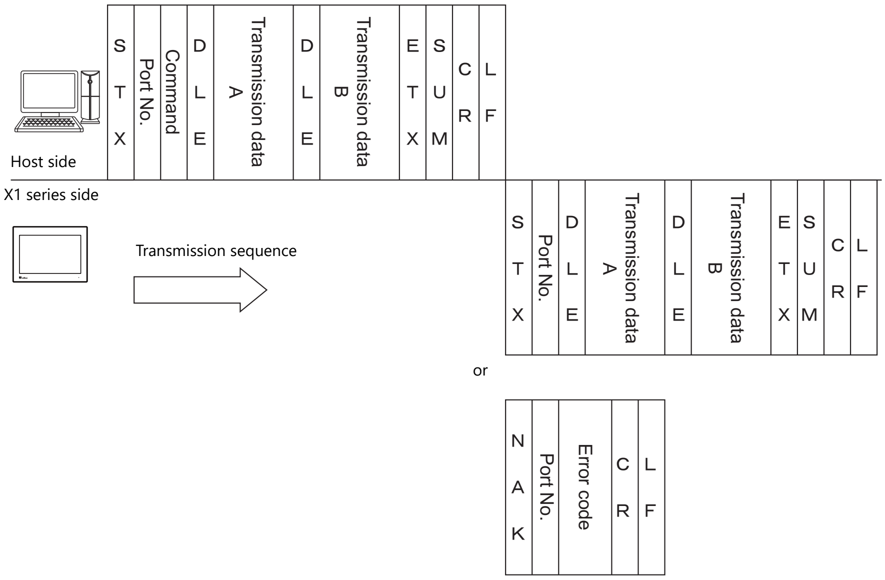
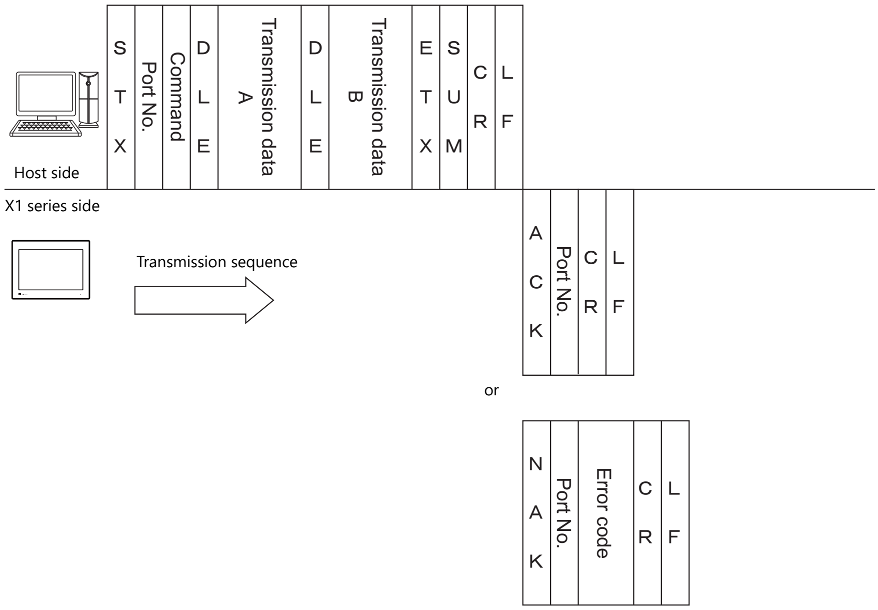
Connection (1 : n), Transmission Mode (with Sum Check)

It is possible to connect as many as 32 X1 series units to one host.
(For information on the global command, see page 34-24.)

Contents	Protocol
Reading the X1 series data at the host side	
Writing data from the host to the X1 series	

Connection (1 : n), Transmission Mode (with Sum Check and CR/LF)

It is possible to connect as many as 32 X1 series units to one host.
(For information on the global command, see page 34-24.)

<table>
<tr><th>Contents</th><th>Protocol</th></tr>
<tr><td>Reading the X1 series data at the host side</td><td>
</td></tr>
<tr><td>Writing data from the host to the X1 series</td><td>
</td></tr>
</table>

34.4.2 Protocol Contents

Transmission Control Code

The transmission control codes are shown in the table below.

Signal Name	Code (Hexadecimal)	Contents
STX	02H	Start of transmission block
ETX	03H	End of transmission block
ENQ	05H	Interrupt
ACK	06H	Positive acknowledge
CR	0DH	Carriage return
DLE	10H	Change contents within a block
NAK	15H	Negative acknowledge
LF	0AH	Line feed

Port Number

Port numbers can be set for connection mode "1 : n".
They are used so that the host computer can identify each X1 series for access.
The data range is from 00H to 1FH (0 to 31) and is converted into a two-digit ASCII code (HEX) before use. Set port numbers of the X1 series at [Local Port No.] under [Communication Setting].

Global port number (FFH)

When the global port number [FFH] is set, commands are send to all X1 series units at one time.

Commands for which global port numbers are active are shown below. If commands other than these are used, a command error will occur.

Signal Name	Name	Contents
WM	Write	Write data device memory
WC	Write CHR	Write data device memory as characters

Responses to global port numbers are not transmitted to the host. However, responses are written in write area n + 8.

Device Contents	Description
0000H	Global command not received
0100H	ACK
Others	Identical to NAK code (see page 34-22.)

Command

Available commands are shown below. The details on commands are described on pages shown at "Refer to:".

Signal Name	Name	Contents	Refer to:
RM	Read	Read data device memory	page 34-25
WM	Write	Write data device memory (1024 words maximum)	page 34-27
TR	Retry	Retry when NAK [01] is BUSY	page 34-28
WI	Interrupt Setting	Allow interrupt (Connection mode 1 : 1)	page 34-29
RI	Read interrupt status	Read interrupt setting status (Connection mode 1 : 1)	page 34-30
RC	Read CHR	Read data device memory as characters	page 34-24
WC	Write CHR	Write data device memory as characters (2048 bytes maximum)	page 34-26

Sum Check Code (SUM)

Data is added up (SUM), and the lower one byte (8 bits) of the sum is converted into a two-digit ASCII code (HEX).

Example:

Transmission mode: without CR/LF, with sum check
The sum check code is added as shown below when data “3882” (OF2AH) is transmitted to the address “$u1453” (05ADH) using the command [WM] (data writing).

STX	Command	DLE	Address	Count	Device memory data	ETX	SUM
	"W" "M"		"0" "5" "A" "D"	"0" "0" "0" "1"	"0" "F" "2" "A"		"4" "D"
02H	57H 4DH	10H	30H 35H 41H 44H	30H 30H 30H 31H	30H 46H 32H 41H	03H	34H 44H

02H + 57H + 4DH + 10H + 30H + 35H + 41H + 44H + 30H + 30H + 30H + 31H
+ 30H + 46H + 32H + 41H + 03H = 34DH

* In the case of an interrupt, data from ENQ to ETX is subject to a sum check.

Error Codes

An error code is sent along with an NAK response as a two-digit ASCII code (HEX).

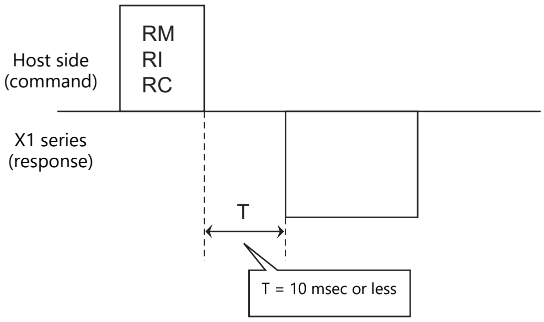
Error Codes	Contents
01H	The X1 series is currently engaged in display processing. The received command is on standby due to display processing. Wait a few moments and re-transmit the command.
02H	Overrun/Framing error An overrun or framing error is detected in the received data. Send the command again.
03H	Parity error A parity error is detected in the received data. Send the command again.
04H	Sum check error A sum error occurs with the received data.
05H	Address error The address specified by the device memory read/write command is incorrect. Check the address or counter and re-transmit the command.
06H	Count error The device memory read/write count is “0”.
07H	Screen error The data to be written in read area n + 2 (screen status command), as specified by a write command, is not registered on the screen. Check the screen number and re-transmit the data.
08H	Format error The number of DLEs is 0 or greater than 6.
09H	Received data over The number of write command data received from the host exceeded that of data shown below. • Write memory command = 1024 words • Write CHR command = 2048 bytes
0BH	Retry command error When a retry command is received, there is no BUSY status (NAK [01]) command.
0FH	ETX error No ETX code is found.
10H	DLE error No DLE code is found.
11H	Character error A character not used in the received data is found (other than 0 to F). Check the character and send the command again.
12H	Command error An invalid command is given.

Response Time and BUSY

Response time varies depending on the type of command.

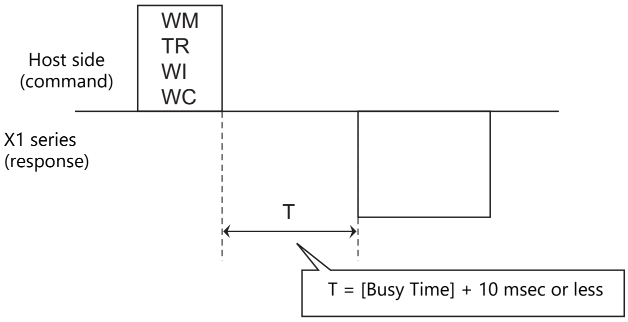
RM / RI / RC

These commands immediately send a response once receipt of data is complete.
No NAK [01] (BUSY) signal is given.



WM / TR / WI / WC

Once receipt of data is complete, these commands first check the display status. If the display status is found to be complete, a response is sent and a command is executed.
If the status is BUSY and the display is completed within the time set in [Busy Time], a response is sent.
If the display is not completed within the specified time, an NAK [01] (BUSY) signal is sent. In this case, it is necessary to retransmit the command.
When [Busy Time] is set as [0], the machine waits until the display is complete, and then a response is transmitted after a command is executed.



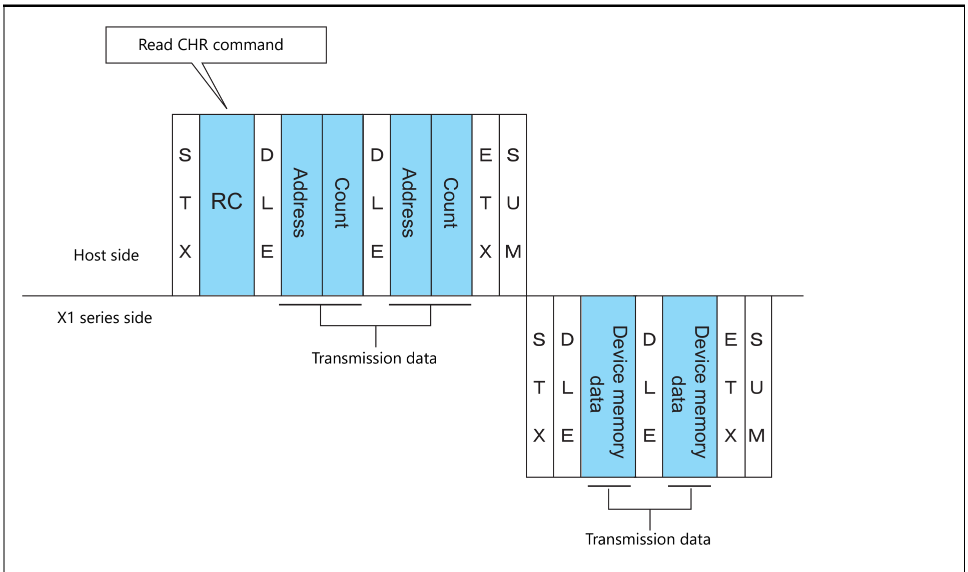
34.4.3 Command

RC: Read CHR

This command is used to read data in device memory as characters.

* When character data is sent, 1 character (1 byte) is converted into a two-byte ASCII code and transmitted by the read memory command. When the read CHR command is given, character data is not converted into the ASCII code before transmission, and thus, the transmission time is decreased by approximately 1/2.

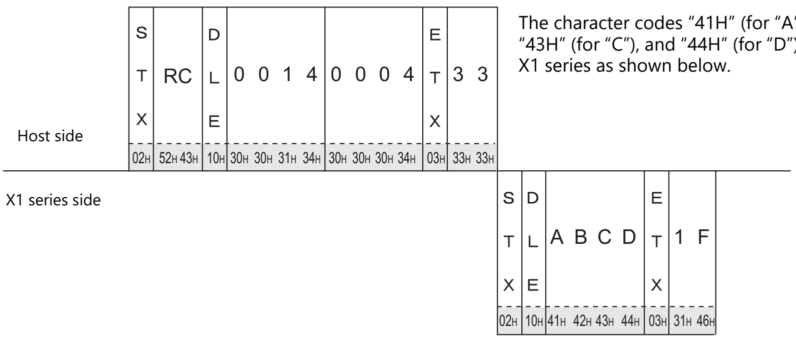
Details of read CHR



- Host side
  DLE: When the data to be read is not continuous, "DLE" is inserted as a delimiter between the breaks. There should be no more than 5 DLEs.
  Address: Top address of device memory for data to be read (HEX ASCII)
  Count: Number of characters to be read (HEX ASCII)
- X1 series side
  Address and count are omitted and DLE and data are transmitted. The read sequence is the same as the command sequence (HEX ASCII).

Example:

Call up 4 characters that are written at the top of the address $u0020 (0014H).



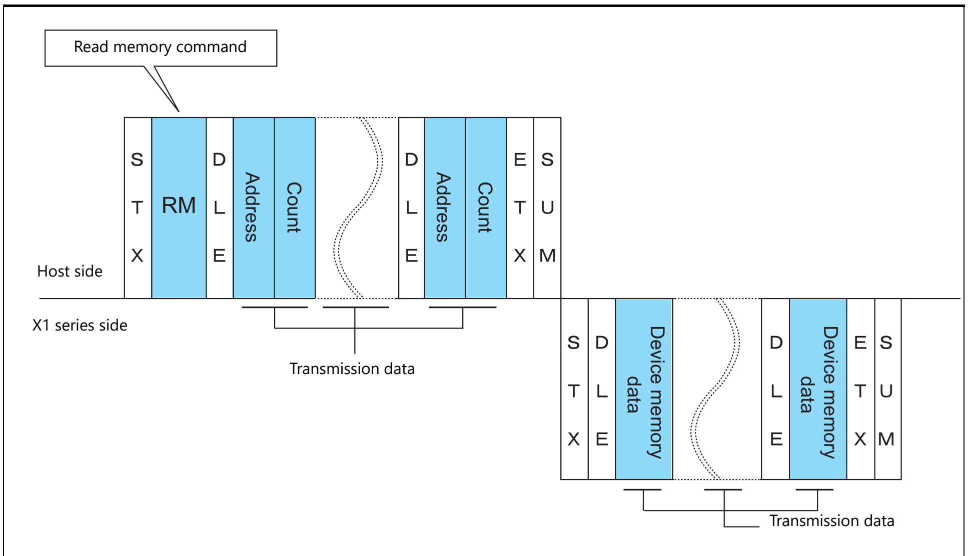
The character codes "41H" (for "A"), "42H" (for "B"), "43H" (for "C"), and "44H" (for "D") are sent from the X1 series as shown below.

RM: Read Memory

This command is used to read data in device memory.

* Communication speed is increased when you use the read CHR command to read characters.

Details of read memory

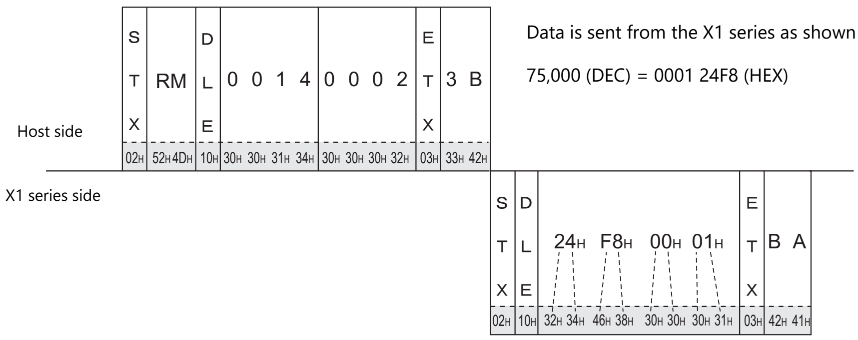


- Host side
  DLE: When the data to be read is not continuous, "DLE" is inserted as a delimiter between the breaks. There should be no more than 5 DLEs.
  Address: Top address of device memory to be read from (HEX ASCII)
  Count: Number of words to be read (HEX ASCII)

- X1 series side
  Address and count are omitted and DLE and data are transmitted.The read sequence is the same as the command sequence (HEX ASCII).

Example:

Read the double-word data "75,000" (DEC) contained in the address $u0020 (0014H).



Data is sent from the X1 series as shown below.

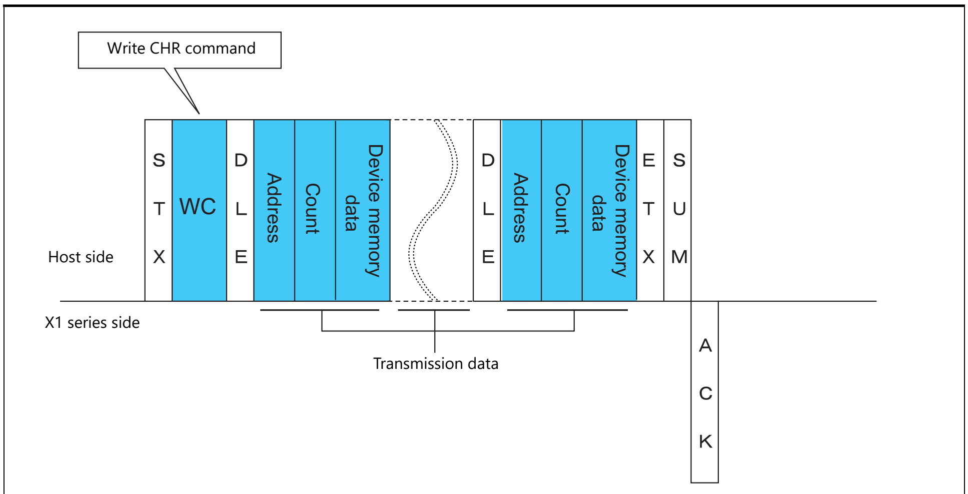
75,000 (DEC) = 0001 24F8 (HEX)

WC: Write CHR

This command is used to write data to device memory as characters.

* When character data is sent, 1 character (1 byte) is converted into a two-byte ASCII code and transmitted by the write memory command. When the write CHR command is given, character data is not converted into the ASCII code before transmission, and thus, the transmission time is decreased by approximately 1/2. (Character codes from 00 to 1F cannot be used.)

Details of write CHR

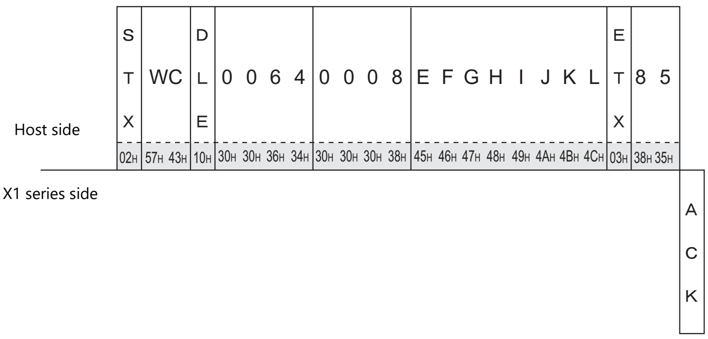


- Host side
  - DLE: When the data to be written is not continuous, "DLE" is inserted as a delimiter between the breaks. There should be no more than 5 DLEs.
  - Address: Top address of the device memory to be written to (HEX ASCII)
  - Count: Number of write characters (HEX ASCII)
  - Device memory data: Data to be written

Example:

Send data to display the following characters on the X1 series.

$u0100 (0064H), EF
$u0101 (0065H), GH
$u0102 (0066H), IJ
$u0103 (0067H), KL

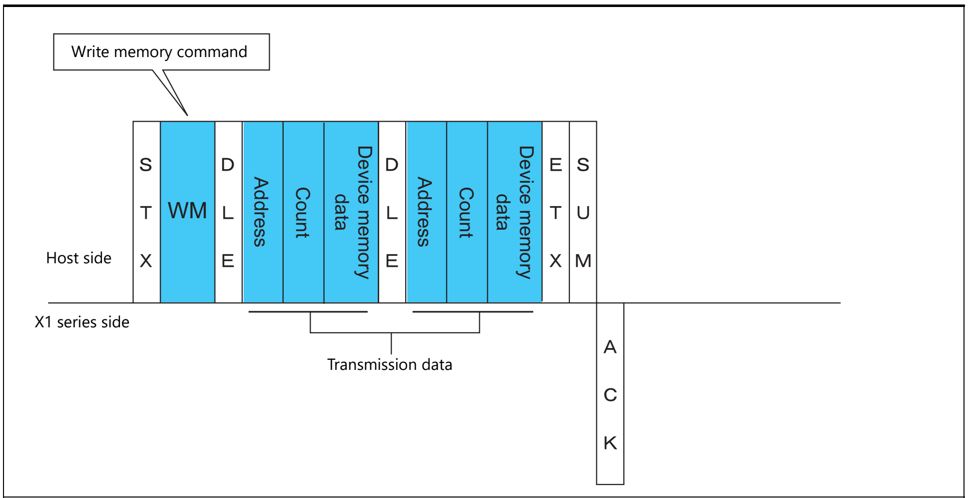


WM: Write Memory

This command is used to write data to device memory.

* Communication speed is increased when you use the write CHR command to write characters.

Details of write memory

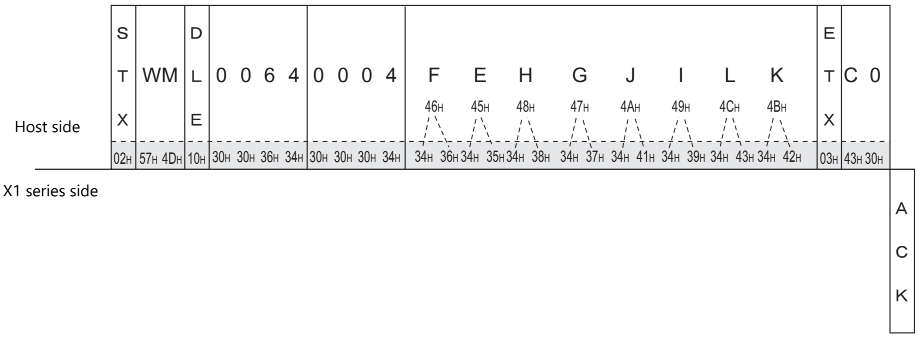


- Host side
  - DLE: When the data to be written is not continuous, "DLE" is inserted as a delimiter between the breaks. There should be no more than 5 DLEs.
  - Address: Top address of the device memory to be written to (HEX ASCII)
  - Count: Number of words to be written (HEX ASCII)

Example:

Send data to display the following characters on the X1 series.

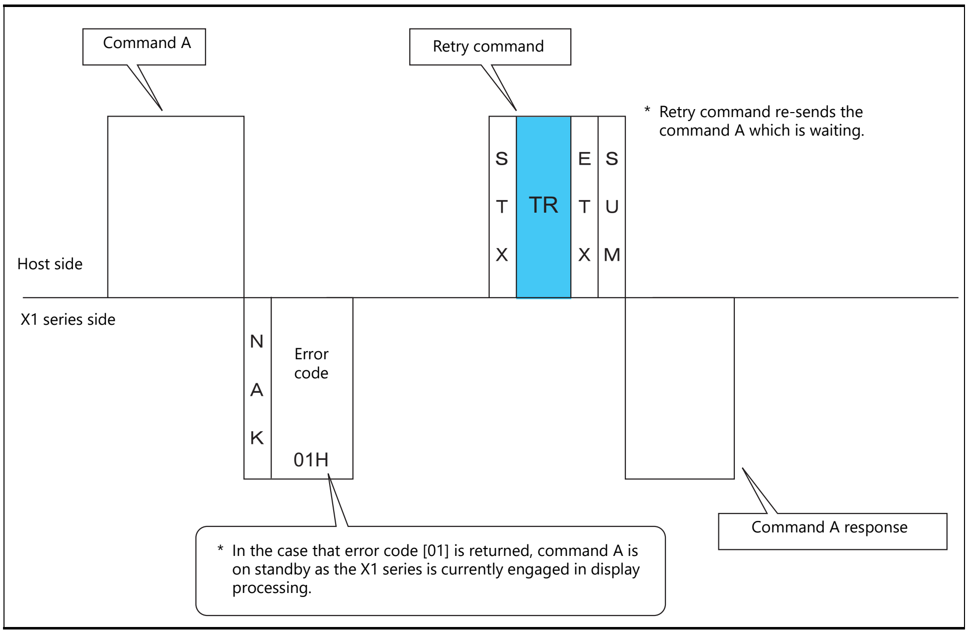
$u0100 (0064H), EF (= 4645 H)
$u0101 (0065H), GH (= 4847 H)
$u0102 (0066H), IJ (= 4A49 H)
$u0103 (0067H), KL (= 4C4B H)



TR: Retry Command

This command is used to re-send a write command/write CHR command when an NAK error code [01] is returned.

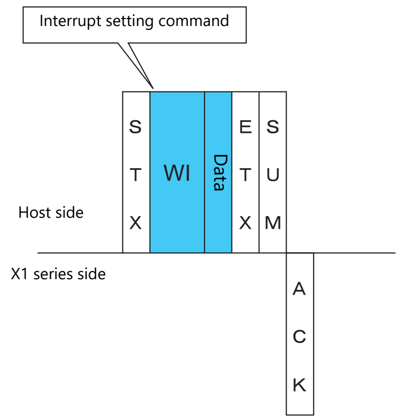
Details of retry



WI: Interrupt Setting Command

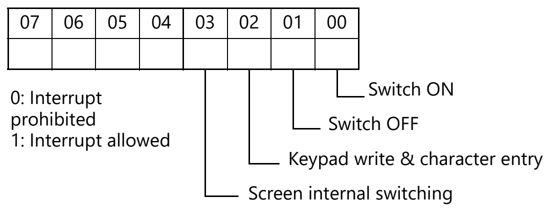
This command is used to send interrupt conditions. It can be used for 1 : 1 connection.

Details of interrupt setting command



- Host side
  Data: Interrupt conditions is specified when the interrupt data bit is set. (HEX ASCII)

  Interrupt conditions

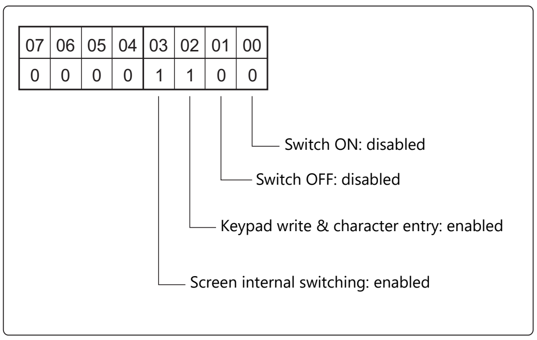


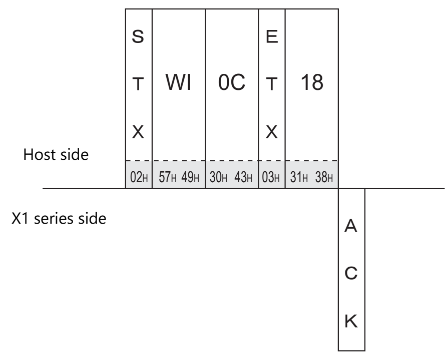
Switch ON	Interrupt when the switch changes from OFF to ON Valid only when [Action] of the switch is [Normal], [Block], [+Block], [–Block] or [Mode]
Switch OFF	Interrupt when the switch changes from ON to OFF Valid only when [Action] of the switch is [Normal], [Block], [+Block], [–Block] or [Mode]
Keypad write	Interrupt when the [ENTER] switch on the keypad is pressed
Screen internal switching	Interrupt when the screen changes based on an internal switch

* Macro (OUT_ENQ): Interrupt enabled all the time

Example:

Interrupt settings are as shown below.

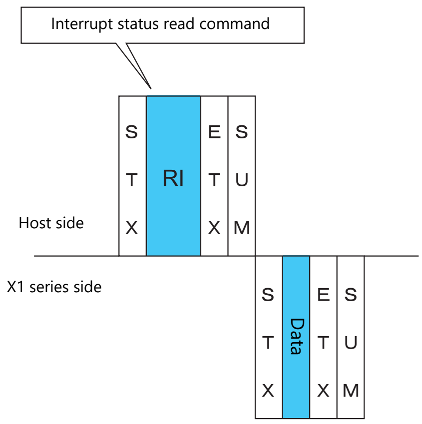




RI: Interrupt Status Read Command

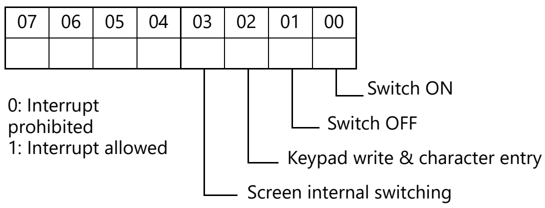
This command is used to read interrupt setting status. It can be used for 1 : 1 connection.

Details of interrupt status read command



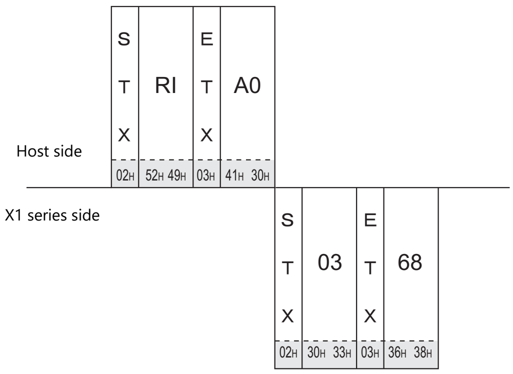
- Host side
  Interrupt status is read.(HEX ASCII)

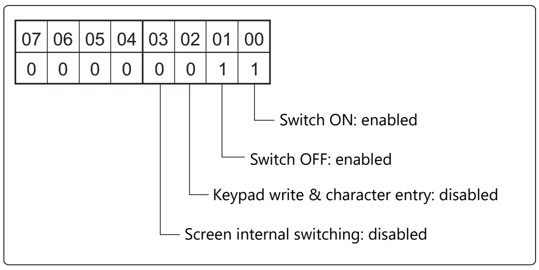
  Interrupt conditions



Example:

Interrupt status is read.





34.4.4 Interrupt (ENQ)

The interrupt command can be used for 1 : 1 connection.* Interrupt data becomes the contents of write areas n + 2 to n + 7. (See page 34-12.)

* For RS-485 (2-wire connection), interrupts cannot be used.

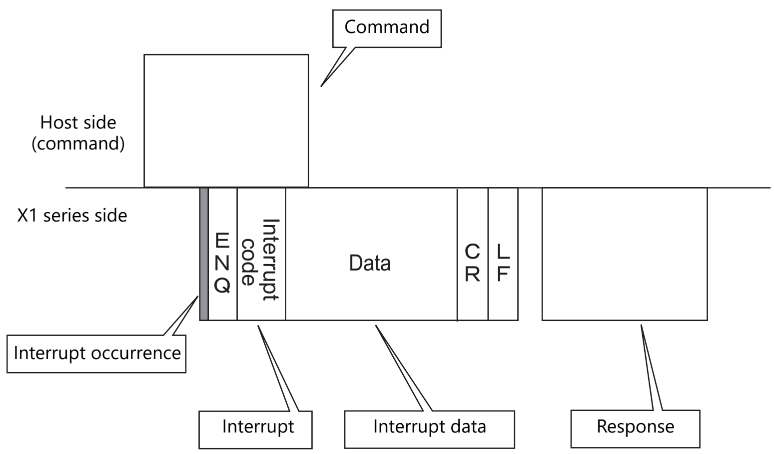
Interrupt codes and conditions

An interrupt code is sent to the host for the following actions.

Interrupt Codes	Interrupt Conditions
00H	The regular switch is changed from ON to OFF or OFF to ON when it is pressed. * When universal serial connection is made at multiple ports, all ports are interrupted at the same time.
01H	The “Write” switch on the keypad or on the keyboard is changed from OFF to ON when it is pressed. * If [Control Prohibition/Enabled of Write Key] is checked, the write enable bit must be set in order to send an interrupt code. * When universal serial connection is made at multiple ports, all ports are interrupted at the same time.
02H	The screen is switched by an internal switch. * When universal serial connection is made at multiple ports, all ports are interrupted at the same time.
10H to 2FH	The macro command [OUT_ENQ] is executed (for PLC1). The macro command [OUT_ENQ_EX] is executed (PLC1 to 8 selected by user).
30H to 3FH	The macro command [OUT_ENQ] is executed (for PLC2).
40H to 4FH	The macro command [OUT_ENQ] is executed (for PLC3).
50H to 5FH	The macro command [OUT_ENQ] is executed (for PLC4).
60H to 6FH	The macro command [OUT_ENQ] is executed (for PLC5).
70H to 7FH	The macro command [OUT_ENQ] is executed (for PLC6).
80H to 8FH	The macro command [OUT_ENQ] is executed (for PLC7).
90H to 9FH	The macro command [OUT_ENQ] is executed (for PLC8).

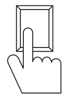
Interrupt timing

When an interrupt condition occurs while the host is transmitting a command or before the X1 series transmits a response, the interrupt code will be transmitted before the response is transmitted.
To use an interrupt, it is necessary to enable interrupt code detection when a response is received on the host program.



Interrupt Data

When a regular switch is pressed



X1 series side

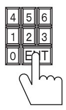
ENQ	00	Screen No. WORD	SW0 WORD	SW1 WORD	ENT0 WORD	ENT1 WORD	ENT2 WORD	ETX	SUM

A “regular switch” means a switch for which [Momentary] is selected for [Output Action] and $s0080 to 0095 is set for [Output Device]. When this switch is pressed, the following actions take place.
Output device memory is set (0 → 1) while the switch is held down, and is reset (1 → 0) when the switch is released.
At the same time, the switch number that corresponds to the output device memory is written in write areas n + 3 and n + 4.
For details on the output device memory and the switch number, see page 34-36.

Normally, [1-Output] is set for the switch. Thus, the switch number and switch information is written in write area n + 3.
However, when the switch as well as a function switch is pressed simultaneously (2-Output), the switch number and switch information is written in write areas n + 3 and n + 4.

When the “Write” switch on the keypad is pressed:

When the [ENT] switch on the keypad is pressed

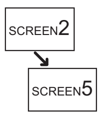


X1 series side

ENQ	01	Screen No. WORD	SW0 WORD	SW1 WORD	ENT0 WORD	ENT1 WORD	ENT2 WORD	ETX	SUM

ENT0/1/2 is the same as the write area in system device memory (n + 5, n + 6, n + 7).

When the screen is internally changed:

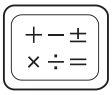


X1 series side

ENQ	02	Screen No. WORD	SW0 WORD	SW1 WORD	ENT0 WORD	ENT1 WORD	ENT2 WORD	ETX	SUM

When a macro command (OUT_ENQ) is executed:

With an OUT_ENQ command, you can either convert the data into HEX code and transmit it (word transmission), or you can transmit the data just as it is without converting it (character transmission).
For more information on “OUT_ENQ”, refer to the Macro Reference manual.



Word transmission

X1 series side

E N Q	XX	00	Device memory address for transfer WORD	Number of transmission words WORD	Word data	E T X	S U M

Transmission format: word transmission

Interrupt code (10H to 2FH)

Character transmission

X1 series side

E N Q	XX	01	Device memory address for transfer WORD	Number of transmission characters WORD	Word data	E T X	S U M

Transmission format: character transmission

Interrupt code (10H to 2FH)

1-byte Character Code List

Upper

Lower

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	’	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			’	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	¥	l										
D			−	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	■								

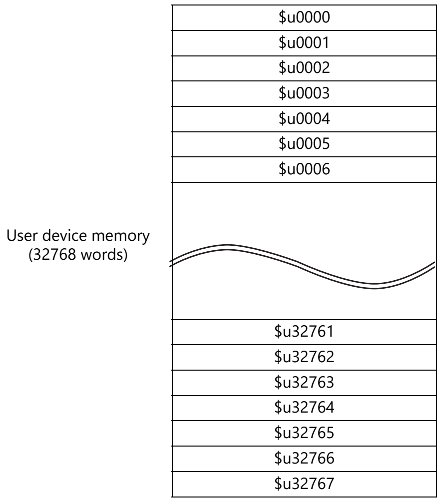
34.5 Device Memory Map

Device Memory

Inside the X1 series, there is internal device memory necessary for screen display called “user device memory ($u)”, as well as device memory that the X1 series uses for the system called “system device memory ($s)”.

User Device Memory ($u)

32768 words are available for user device memory. This area is usable as desired for screen programs. Also the host computer can write to and read from the area.
The device memory map is as shown below.



System Device Memory ($s)

2048 words are available for system device memory. The system device memory is used to write the operation status of the X1 series unit in RUN mode. Statuses of overlap displays, logging/alarm blocks, printers, the backlight, slave station in multi-drop connection mode etc. are written. In the table below, a small part ($s80 to 95) of system device memory is extracted. For other device memory addresses, refer to the X1 Series Reference Manual.

* System device memory cannot be read or written from the host computer.

Address $s0080 to 95

Set [Output Device] in location ($s0080 to 95) of system device memory, and select [Momentary] for [Output Action] of a switch. When the switch is pressed, output device memory is set (0 → 1) and the corresponding switch number is written in system setting areas n + 3 and n + 4. (See page 34-14.)

The relationship between the output device memory and the switch number is shown in the following diagram.
For details about the output of a switch, see page 34-33.

Address	Contents																
:																	
$s80	Universal serial switch output 0 Switch No. 0 to 15																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
$s81	Universal serial switch output 1 Switch No. 16 to 31																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
$s82	Universal serial switch output 2 Switch No. 32 to 47																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
$s83	Universal serial switch output 3 Switch No. 48 to 63																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
$s84	Universal serial switch output 4 Switch No. 64 to 79																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
$s85	Universal serial switch output 5 Switch No. 80 to 95																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
$s86	Universal serial switch output 6 Switch No. 96 to 111																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
$s87	Universal serial switch output 7 Switch No. 112 to 127																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
$s88	Universal serial switch output 8 Switch No. 128 to 143																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128

Address	Contents																
$s89	Universal serial switch output 9 Switch No. 144 to 159																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
$s90	Universal serial switch output 10 Switch No. 160 to 175																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
$s91	Universal serial switch output 11 Switch No. 176 to 191																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
$s92	Universal serial switch output 12 Switch No. 192 to 207																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
$s93	Universal serial switch output 13 Switch No. 208 to 223																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
$s94	Universal serial switch output 14 Switch No. 224 to 239																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
$s95	Universal serial switch output 15 Switch No. 240 to 255																
		MSB															LSB
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	No.	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240
:																	

Address $s0111

This address stores the local port number.

* The local port number specified for [Specify as a Main] in the [PLC Properties] window is stored.

Connection Compatibility List

June, 2022

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
A&D	AD4402 (MODBUS RTU)	○	○
	AD4404 (MODBUS RTU)	○	○
Agilent	4263 series	○	
Allen-Bradley	PLC-5	○	○
	PLC-5 (Ethernet)	○	○
	Control Logix / Compact Logix	○	
	Control Logix / Compact Logix Tag	○	
	Control Logix / Compact Logix (Ethernet)	○	○
	Control Logix / Compact Logix Tag (Ethernet TCP/IP)	○	○
	SLC500	○	○
	SLC500 (Ethernet TCP/IP)	○	○
	NET-ENI (SLC500 Ethernet TCP/IP)	○	○
	NET-ENI (MicroLogix Ethernet TCP/IP)	○	○
	Micro Logix	○	○
	Micro Logix (Ethernet TCP/IP)	○	○
	Micro800 Controllers	○	
	Micro800 Controllers Tag	○	
	Micro800 Controllers (Ethernet TCP/IP)	○	○
	Micro800 Controllers Tag (Ethernet TCP/IP)	○	○
Automationdirect	Direct LOGIC (K-Sequence)	○	
	Direct LOGIC (Ethernet UDP/IP)	○	○
	Direct LOGIC (MODBUS RTU)	○	○
Azbil	MX series	○	○
	SDC10	○	○
	SDC15	○	○
	SDC20	○	○
	SDC21	○	○
	SDC25/26	○	○
	SDC30/31	○	○
	SDC35/36	○	○
	SDC45/46	○	○
	SDC40A	○	○
	SDC40G	○	○
	DMC10	○	○
	DMC50(COM)	○	○
	AHC2001	○	○
	AHC2001+DCP31/32	○	○
	DCP31/32	○	○
	NX(CPL)	○	○
	NX(CPL) (Ethernet TCP/IP)	○	○
	NX(MODBUS RTU)	○	○
	NX(MODBUS TCP/IP)	○	○
Banner	PresencePLUS (Ethernet/IP (TCP/IP))	○	○
Baumuller	BMx-x-PLC	○	
BECKHOFF	ADS protocol (Ethernet)	○	○
	Tag ADS protocol (Ethernet)	○	○
Bosch Rexroth	IndraDrive		○
CHINO	LT400 Series (MODBUS RTU)	○	○
	DP1000	○	○
	DB100B (MODBUS RTU)	○	○
	KR2000 (MODBUS RTU)	○	○
	LT230 (MODBUS RTU)	○	○
	LT300 (MODBUS RTU)	○	○
	LT830 (MODBUS RTU)	○	○
CIMON	BP series	○	
	CP series	○	
	XP series	○	
	S series	○	○
	S series (Ethernet)	○	○
	CP3E	○	

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
DELTA	DVP series	○	○
	DVP-SE (MODBUS ASCII)	○	○
	DVP-SE (MODBUS TCP/IP)	○	○
DELTA TAU DATA SYSTEMS	PMAC	○	
	PMAC(Ethernet TCP/IP)	○	○
EATON Cutler-Hammer	ELC	○	○
EMERSON	EC10/20/20H (MODBUS RTU)	○	○
FANUC	Power Mate	○	
FATEK AUTOMATION	FACON FB Series	○	○
	FACON FBs Series (Ethernet)	○	○
FESTO	FEC	○	
FUFENG	APC Series Controller	○	○
Fuji Electric	MICREX-F series	○	○
	MICREX-F series V4-compatible	○	○
	SPB (N mode) & FLEX-PC series	○	○
	SPB (N mode) & FLEX-PC CPU	○	
	MICREX-SX SPH/SPB/SPM/SPE/SPF series	○	
	MICREX-SX SPH/SPB/SPM/SPE/SPF CPU	○	
	MICREX-SX (Ethernet)	○	○
	PYX (MODBUS RTU)	○	○
	PXR (MODBUS RTU)	○	○
	PXF (MODBUS RTU)	○	○
	PXG (MODBUS RTU)	○	○
	PXH (MODBUS RTU)	○	○
	PUM (MODBUS RTU)	○	○
	F-MPC04P (loader)	○	○
	F-MPC series / FePSU	○	○
	FVR-E11S	○	○
	FVR-E11S (MODBUS RTU)	○	○
	FVR-C11S (MODBUS RTU)	○	○
	FRENIC5000 G11S/P11S	○	○
	FRENIC5000 G11S/P11S (MODBUS RTU)	○	○
	FRENIC5000 VG7S (MODBUS RTU)	○	○
	FRENIC-Ace (MODBUS RTU)	○	○
	FRENIC-HVAC/AQUA (MODBUS RTU)	○	○
	FRENIC-Mini (MODBUS RTU)	○	○
	FRENIC-Eco (MODBUS RTU)	○	○
	FRENIC-Multi (MODBUS RTU)	○	○
	FRENIC-MEGA (MODBUS RTU)	○	○
	FRENIC-MEGA SERVO(MODBUS RTU)	○	○
	FRENIC-VG1(MODBUS RTU)	○	○
	FRENIC series (loader)	○	○
	HFR-C9K	○	○
	HFR-C11K	○	○
	HFR-K1K	○	○
	PPMC (MODBUS RTU)	○	○
	FALDIC-α series	○	○
	FALDIC-W series	○	○
	PH series	○	○
	PHR (MODBUS RTU)	○	○
	WA5000	○	○
	APR-N (MODBUS RTU)	○	○
	ALPHA5 (MODBUS RTU)	○	○
	ALPHA5 Smart (MODBUS RTU)	○	○
	ALPHA7 (MODBUS RTU)	○	○
	WE1MA (Ver. A)(MODBUS RTU)	○	○
	WE1MA (Ver. B)(MODBUS RTU)	○	○
	WSZ series	○	○
	WSZ series (Ethernet)	○	○
Gammaflux	TTC2100	○	○
	G24 (Ethernet TCP/IP)	○	○
GE Fanuc	90 series	○	○
	90 series (SNP-X)	○	
	90 series (SNP)	○	○
	90 series (Ethernet TCP/IP)	○	○
	RX3i (Ethernet TCP/IP)	○	○

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
High-Pressure Gas Industry	R-BLT	○	
Hitachi	HIDIC-S10/2α, S10mini	○	
	HIDIC-S10/2α, S10mini (Ethernet)	○	○
	HIDIC-S10/4α	○	
	HIDIC-S10/ABS	○	○
	HIDIC-S10V	○	
	HIDIC-S10V (Ethernet)	○	○
Hitachi Industrial Equipment Systems	HIDIC-H	○	○
	HIDIC-H (Ethernet)	○	○
	HIDIC-EHV	○	○
	HIDIC-EHV (Ethernet)	○	○
	SJ300 series	○	○
	SJ700 series	○	○
	SJ series P1 (MODBUS RTU)	○	○
HYUNDAI	Hi5 Robot (MODBUS RTU)	○	○
	Hi4 Robot (MODBUS RTU)	○	○
IAI	X-SEL controller	○	○
	ROBO CYLINDER (RCP2/ERC)	○	○
	ROBO CYLINDER (RCS/E-CON)	○	○
	PCON/ACON/SCON (MODBUS RTU)	○	○
IDEC	MICRO 3	○	○
	MICRO Smart	○	○
	MICRO Smart pentra	○	○
	MICRO Smart (Ethernet TCP/IP)	○	○
JTEKT	TOYOPUC	○	○
	TOYOPUC (Ethernet)	○	○
	TOYOPUC (Ethernet PC10 mode)	○	○
	TOYOPUC-Plus	○	○
	TOYOPUC-Plus (Ethernet)	○	○
	TOYOPUC-Nano (Ethernet)	○	○
KEYENCE	KZ Series Link	○	○
	KZ/KV series CPU	○	
	KZ24/300 CPU	○	
	KV10/24 CPU	○	
	KV-700	○	
	KV-700 (Ethernet TCP/IP)	○	○
	KV-1000	○	
	KV-1000 (Ethernet TCP/IP)	○	○
	KV-3000/5000	○	
	KV-3000/5000 (Ethernet TCP/IP)	○	○
	KV-7000/8000 (Ethernet TCP/IP)	○	○
	KV Nano	○	
	KV Nano (Ethernet TCP/IP)	○	○
	DL-RS1A (SK-1000)	○	
KOGANEI	IBFL-TC	○	○
KOYO ELECTRONICS	SU/SG	○	○
	SR-T (K protocol)	○	
	SU/SG (K-Sequence)	○	
	SU/SG (Modbus RTU)	○	○
Lenze	ServoDrive9400 (Ethernet TCP/IP)	○	○
LS	MASTER-KxxxS	○	
	MASTER-KxxxS CNET	○	○
	MASTER-K series (Ethernet)	○	○
	GLOFA CNET	○	○
	GLOFA GM7 CNET	○	○
	GLOFA GM series CPU	○	
	GLOFA GM series (Ethernet UDP/IP)	○	○
	XGT/XGK series CNET	○	○
	XGT/XGK series CPU	○	
	XGT/XGK series (Ethernet)	○	○
	XGT/XGI series CNET	○	○
	XGT/XGI series CPU	○	
	XGT/XGI series (Ethernet)	○	○

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
MITSUBISHI ELECTRIC	A series link	○	○
	QnA series link	○	○
	QnA series (Ethernet)	○	○
	QnH (Q) series link	○	○
	QnH (Q) series CPU	○	
	QnU series CPU	○	
	Q00J/00/01CPU	○	
	QnH (Q) series (Ethernet)	○	○
	QnH (Q) series link (Multi CPU)	○	○
	QnH (Q) series (Multi CPU) (Ethernet)	○	○
	QnH (Q) series CPU (Multi CPU)	○	
	QnH (Q) series (Ethernet ASCII)	○	○
	QnH (Q) series (Multi CPU) (Ethernet ASCII)	○	○
	QnU series (Built-in Ethernet)	○	○
	QnU series (Multi CPU) (Built-in Ethernet)	○	○
	QnU series (Built-in Ethernet ASCII)	○	○
	L series link	○	○
	L series (Built-in Ethernet)	○	○
	L series CPU	○	
	FX series CPU	○	
	FX2N/1N series CPU	○	
	FX1S series CPU	○	
	FX series link (A protocol)	○	○
	FX-3U/3UC/3G series CPU	○	
	FX-3U/3GE series (Ethernet)	○	○
	FX3U/3UC/3UG series link(A protocol)	○	○
	FX-5U/5UC series	○	○
	FX-5U/5UC series (Ethernet)	○	○
	A-Link + Net10		○
	Q170MCPU (Multi CPU)	○	
	Q170 series (Multi CPU) (Built-in Ethernet)	○	○
	Q170 series (Multi CPU) (Ethernet)	○	○
	iQ-R series (Built-in Ethernet)	○	○
	iQ-R series link	○	○
	iQ-R series (Ethernet)	○	○
	FR-*500	○	○
	FR-V500	○	○
	MR-J2S-*A	○	○
	MR-J2S-*CL	○	○
	MR-J3-*A	○	○
	MR-J3-*T	○	○
	MR-J4-*A	○	○
	FR-E700	○	○
MODICON	Modbus RTU	○	
MOELLER	PS4	○	
MOOG	J124-04x	○	○
M-SYSTEM	R1M series (MODBUS RTU)	○	○
NITTOKU	ITS-HRW110	○	○
OMRON	SYSMAC C	○	○
	SYSMAC CV	○	○
	SYSMAC CS1/CJ1/CJ2	○	○
	SYSMAC CS1/CJ1/CJ2 DNA	○	○
	SYSMAC CS1/CJ1/CJ2/CP series (Ethernet)	○	○
	SYSMAC CS1/CJ1/CJ2/CP series (Ethernet Auto)	○	○
	SYSMAC CS1/CJ1/CJ2/CP series DNA (Ethernet)	○	○
	NJ Series (EtherNet/IP)	○	○
	E5AK	○	○
	E5AK-T	○	○
	E5AN/E5EN/E5CN/E5GN	○	○
	E5AR/E5ER	○	○
	E5CC/E5EC/E5AC/E5DC/E5GC	○	○
	E5CK	○	○
	E5CK-T	○	○
	E5CN-HT	○	○
	E5EK	○	○
	E5ZD	○	○

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
OMRON	E5ZE	○	○
	E5ZN	○	○
	V600/620/680	○	○
	KM20	○	○
	KM100	○	○
	V680S (Ethernet TCP/IP)	○	○
	EJ1	○	○
Oriental Motor	High-efficiency AR series (MODBUS RTU)	○	○
	CRK series (MODBUS RTU)	○	○
Panasonic	FP Series (RS232C/422)	○	○
	FP Series (TCP/IP)	○	○
	FP Series (UDP/IP)	○	○
	FP-X (TCP/IP)	○	○
	FP7 Series (RS232C/422)	○	○
	FP7 Series (Ethernet)	○	○
	LP-400	○	
	KW Series	○	○
	MINAS A4 series	○	○
	LP-RF series	○	
	LP-RF series (Ethernet)	○	○
RKC	SR-Mini (MODBUS RTU)	○	○
	CB100/CB400/CB500/CB700/CB900 (MODBUS RTU)	○	○
	SR-Mini (Standard Protocol)	○	○
	REX-F400/F700/F900(Standard Protocol)	○	○
	REX-F9000 (Standard Protocol)	○	○
	SRV (MODBUS RTU)	○	○
	MA900/MA901 (MODBUS RTU)	○	○
	SRZ (MODBUS RTU)	○	○
	FB100/FB400/FB900 (MODBUS RTU)	○	○
RS Automation	NX7/NX Plus Series (70P/700P/CCU+)	○	○
	N7/NX Series (70/700/750/CCU)	○	○
	NX700 Series (Ethernet)	○	○
	X8 Series	○	○
	X8 Series (Ethernet)	○	○
	CSD5 (MODBUS RTU)	○	○
	Moscon-F50 (MODBUS RTU)	○	○
SAIA	PCD S-BUS (Ethernet)	○	○
SAMSUNG	SPC series	○	○
	N_plus	○	○
	SECNET	○	○
SANMEI	Cuty Axis	○	○
SanRex	DC AUTO (HKD type)	○	○
SHARP	JW series	○	○
	JW100/70H COM port	○	○
	JW20 COM port	○	○
	JW series (Ethernet)	○	○
	JW300 series	○	○
	JW311/312/321/322 series (Ethernet)	○	○
	JW331/332/341/342/352/362 series (Ethernet)	○	○
	DS-30D	○	○
	DS-32D	○	○
SHIMADEN	SHIMADEN standard protocol	○	○
SHINKO TECHNOS	C Series	○	○
	FC Series	○	○
	GC Series	○	○
	DCL-33A	○	○
	JCx-300 Series	○	○
	PC-900	○	○
	PCD-33A	○	○
	ACS-13A	○	○
	ACD/ACR Series	○	○
	WCL-13A	○	○
	PCA1 Series	○	○
	PCB1 Series	○	○
	JIR-301-M Series	○	○
	BCx2 Series	○	○

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
Siemens	S5 PG port	○	○
	S7	○	
	S7-200 (Ethernet ISOTCP)	○	○
	S7-300/400 (Ethernet ISOTCP)	○	○
	S7-300/400 (Ethernet TCP/IP PG protocol)	○	○
	S7-1200/1500 (Ethernet ISOTCP)	○	○
	S7-1200/1500 Tag (Ethernet ISOTCP)	○	○
	LOGO! (Ethernet ISOTCP)	○	○
	TI500/505	○	○
	TI500/505 V4-compatible	○	○
	S120(Ethernet ISOTCP)	○	○
SINFONIA TECHNOLOGY	SELMART	○	○
SUS	XA-A*	○	
TECO	TP-03 (MODBUS RTU)	○	○
3S-Smart Software Solutions	CODESYS V3 (Ethernet)	○	○
TOHO	TTM-000	○	○
	TTM-00BT	○	○
	TTM-200	○	○
Tokyo Chokoku Marking Products	MB3315/1010	○	
TOSHIBA	T series / V series (T compatible)	○	○
	T series / V series (T compatible) (Ethernet UDP/IP)	○	○
	EX series	○	○
	nv series (Ethernet UDP/IP)	○	○
	VF-S7	○	○
	VF-S9	○	○
	VF-S11	○	○
	VF-S15	○	○
	VF-A7	○	○
	VF-AS1	○	○
	VF-P7	○	○
	VF-PS1	○	○
	VF-FS1	○	○
	VF-MB1	○	○
	VF-nC1	○	○
	VF-nC3	○	○
TOSHIBA MACHINE	TC200	○	○
	VELCONIC series		○
TOYO DENKI	μGPCsx series	○	
	μGPCsx CPU	○	
	μGPCsx series (Ethernet)	○	○
TURCK	BL Series Distributed I/O (MODBUS TCP/IP)	○	○
Ultra Instruments	UICCPU (MODBUS RTU)	○	
ULVAC	G-TRAN series	○	○
UNIPULSE	F340A	○	○
	F371	○	○
	F800	○	○
	F805A	○	○
	F720A	○	○
UNITRONICS	M90/M91/Vision Series (ASCII)	○	○
	Vision Series (ASCII Ethernet TCP/IP)	○	○
VIGOR	M series	○	○
WAGO	750 series (MODBUS RTU)	○	○
	750 series (MODBUS ETHERNET)	○	○
XINJE	XC Series (MODBUS RTU)	○	○
YAMAHA	RCX142	○	
Yaskawa Electric	Memobus	○	○
	CP9200SH/MP900	○	○
	MP2000 series	○	○
	MP2300 (MODBUS TCP/IP)	○	○
	CP MP expansion memobus (UDP/IP)	○	○
	MP2000 series (UDP/IP)	○	○
	MP3000 Series	○	○
	MP3000 series (Ethernet UDP/IP)	○	○
	MP3000 series expansion memobus (Ethernet)	○	○
	DX200 (high-speed Ethernet)	○	○

Manufacturer	Models	Applicable Connection Mode	
		1 : 1	1 : n Multi-drop
Yokogawa Electric	FA-M3	○	○
	FA-M3R	○	○
	FA-M3/FA-M3R (Ethernet UDP/IP)	○	○
	FA-M3/FA-M3R (Ethernet UDP/IP ASCII)	○	○
	FA-M3/FA-M3R (Ethernet TCP/IP)	○	○
	FA-M3/FA-M3R (Ethernet TCP/IP ASCII)	○	○
	FA-M3V	○	○
	FA-M3V (Ethernet)	○	○
	FA-M3V(Ethernet ASCII)	○	○
	UT100	○	○
	UT750	○	○
	UT550	○	○
	UT520	○	○
	UT350	○	○
	UT320	○	○
	UT2400/2800	○	○
	UT450	○	○
	UT32A/35A (MODBUS RTU)	○	○
	UT52A/55A (MODBUS RTU)	○	○
	UT75A (MODBUS RTU)	○	○
	μR10000/20000 (Ethernet TCP/IP)	○	○
None	Universal serial	○	○
	General AE-LINK	○	○
	Without PLC Connection		
	MODBUS RTU	○	○
	MODBUS RTU EXT Format	○	○
	MODBUS TCP/IP (Ethernet)	○	○
	MODBUS TCP/IP (Ethernet) Sub Station	○	○
	MODBUS TCP/IP (Ethernet) EXT Format	○	○
	MODBUS ASCII	○	○
	RFID controller (Stepless protocol)	○	
	OPC UA server TCP/IP (Ethernet)	○	

Slave Communication

Manufacturer	Models	Setting	Remarks
None	Universal serial	○	
	V-Link	○	
	Modbus slave (RTU)	○	
	Modbus slave (TCP/IP)	○	
	Modbus slave (ASCII)	○	

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