NB-series

NB3Q-TW☐☐B
NB5Q-TW☐☐B
NB7W-TW☐☐B
NB10W-TW01B

Programmable Terminals

SETUP MANUAL

OMRON

NB-series
NB3Q-TW☐☐B
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NB10W-TW01B
Programmable Terminals

Setup Manual

Revised August 2012

Introduction

Thank you for purchasing an NB-series Programmable Terminal.

NB-Series Programmable Terminals (PTs) are designed to handle information generated in FA production sites. Be sure to understand the functions and performances etc thoroughly before using PT correctly.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing FA systems into production facilities.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and connecting FA facilities.
- Personnel in charge of managing FA systems and facilities

General Precautions

- The user must operate the product according to the performance specifications described in the operation manuals.
- Do not use the PT touch switch input functions for applications where danger to human life or serious property damage is possible, or for emergency switch applications.
- Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.
- Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.
- This manual provides information for connecting and setting up an NB-Series PT. Be sure to read this manual before attempting to use the PT and keep this manual close at hand for reference during installation and operation.

NB-series Manuals

NB-series manuals are organized in the sections listed in the following tables. Refer to the appropriate section in the manuals as required.

Programmable Terminals Setup Manual (Cat. No. V107) (This Manual)

Section	Contents
Section 1 Part Names and Functions	This section describes the names and functions of the various parts of an NB Unit.
Section 2 Installing the NB Unit and Connecting Peripheral Devices	This section describes the methods used to install the NB Unit and connect peripheral devices.
Section 3 System Setting Mode	This section describes the System Setting Mode.
Section 4 Calibrate Mode	This section describes the Calibrate Mode.
Appendices	The appendices provide information on specifications, dimensions, wirings, and lists of the NB Units, the applicable PLCs and options.

Programmable Terminals NB-Designer Operation Manual (Cat. No. V106)

Section	Contents
Section 1 Introduction	This section provides an outline of the NB-series PTs, including their functions, features, connection types and communication methods.
Section 2 Installation and Startup of NB-Designer	This section describes how to install and start the NB-Designer.
Section 3 Functions of NB-Designer	This section describes the functions of NB-Designer.
Section 4 Functions of NBManager	This section describes the functions of NBManager.
Section 5 Maintenance and Abnormality Handling	This section describes the maintenance and check to prevent the abnormality occurrence and the handling of the abnormalities occurred in NB Unit.
Section 6 Descriptions of New Functions Added into NB□□-TW01B	This section describes the new functions added into NB□□-TW01B, the system attributes and the component attributes.
Appendices	The appendices provide lists of the NB Units, the Communication Units, the applicable PLCs, and the list of NB-Designer functions.

Programmable Terminals Host Connection Manual (Cat. No. V108)

Section	Contents
Section 1 List for All PLCs Supported by NB series	This section lists all PLCs supported by NB Units.
Section 2 Connecting to SIEMENS PLCs	This section describes the connection to SIEMENS PLCs.
Section 3 Connecting to Mitsubishi PLCs	This section describes the connection to Mitsubishi PLCs.
Section 4 Connecting to Schneider PLCs	This section describes the connection to Schneider PLCs.
Section 5 Modbus Connection	This section describes the connection on Modbus protocol.
Section 6 Connecting to Delta PLCs	This section describes the connection to Delta PLCs.
Section 7 Connecting to LG PLCs	This section describes the connection to LG PLCs.
Section 8 Connecting to Panasonic PLCs	This section describes the connection to Panasonic PLCs.
Section 9 Connecting to Allen-Bradley (Rockwell) PLC	This section describes the connection to Allen-Bradley PLC.
Section 10 Connecting to PLC of GE Fanuc Automation Inc.	This section describes the connection to PLC of GE Fanuc Automation Inc.

Programmable Terminals Startup Guide Manual (Cat. No. V109)

Section	Contents
Section 1 NB Overview	This section provide specifications of the NB Unit, describes its names and functions of the various parts.
Section 2 System Design	This section describes the manual structure, takes NB7W as an example to introduce the operation procedures of the NB system.
Section 3 Installation and Wiring	This section describes how to install and wire the NB Unit.
Section 4 Screen Creation	This section describes how to create a demonstration project through NB-Designer.
Section 5 Run	This section describes how to start running at the Host side and prepare to send screen data to NB7W.
Section 6 Maintenance and Troubleshooting	This section describes the maintenance and inspection methods for preventing errors occurring, and troubleshooting measures when errors occur.

⚠ **WARNING**	Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

Manual Structure

Page Structure and Icons

The following page structure and icons are used in this manual.

Level 1 heading

2 Installing the NB Unit and Connecting Peripheral Devices

Level 2 heading

Level 3 heading

Gives the current headings.

Level 3 heading

2-1-2   Installation onto the Operation Panel

Install the NB Unit by embedding it into the operation panel.
Use the metal kit and tool (a crosshead screwdriver) supplied with the Unit for installation.
Proceed the installation following the procedures below.

Step in a procedure

Indicates a step in a procedure.

1 Panel cutout with dimensions is shown below. Fit the NB Unit into the panel from the front side.

Width

Opening dimensions

Height

Page tab

Gives the number of the section.

Models	Opening Dimension (W H mm)
NB3Q-TW00B/TW01B	119.0(+0.5/-0) 93.0(+0.5/-0)
NB5Q-TW00B/TW01B	172.4(+0.5/-0) 131.0(+0.5/-0)
NB7W-TW00B/TW01B	191.0(+0.5/-0) 137.0(+0.5/-0)
NB10W-TW01B	258.0(+0.5/-0) 200.0(+0.5/-0)

2 As follows, insert panel fixators at the locations indicated by red box around the back of the NB Unit. Insert the hooks of positioners into the square holes on the Unit to hold the fixators properly, and tighten the screws firmly with the screwdriver.

NB5Q/NB7W-TW□□B

Special Information
(See below.)

Icons are used to indicate precautions and additional information.

Precautions for Safe Use

• When operating on the operation panel, make sure to keep metal particles from entering the Unit.
The mounting panel must be between 1.6 and 4.8 mm thick. The NB Unit must be installed in a control panel.
For the sake of waterproof and dustproof, all the fixators must be evenly tightened to a torque of 0.5~0.6 Nm. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur.
Make sure that the operation panel is clean, unbent, and strong enough for the installation process.

Manual name

NB-series Programmable Terminals Setup Manual(V107)

2-3

This illustration is provided only as a sample and may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use
Precautions on what to do and what not to do to ensure using the product safely.

Precautions for Correct Use
Precautions on what to do and what not to do to ensure proper operation and performance.

Additional Information
Additional information to increase understanding or make operation easier.

Terminology

The following terminology is used in this manual.

Terms	Descriptions
NB Unit	Indicates the main Unit of the products in the OMRON NB Series of Programmable Terminal.
NB Series	Indicates products in the OMRON NB□□ Series of Programmable Terminal. In this manual, unless otherwise specified, NB□□ Series is taken as the subject concerned.
PLC	Indicates a Programmable Controller.
CP Series	Indicates the following products in the OMRON CP Series of Programmable Controllers: CP1H, CP1L, CP1E
CS/CJ Series	Indicates the following products in the OMRON CS/CJ Series of Programmable Controllers: CS1G, CS1H, CS1G-H, CS1H-H, CJ1G, CJ1M, CJ2M, CJ2H
C Series	Indicates the following products in the OMRON C Series of Programmable Controllers: C200HX(-Z), C200HG(-Z), C200HE(-Z), CQM1, CQM1H, CPM1A, CPM2A, CPM2C
Serial Communication Unit	Indicates a Serial Communication Unit for an OMRON SYSMAC CS/CJ-Series PLC.
Serial Communication Board	Indicates a Serial Communication Board for an OMRON SYSMAC CS/CJ-Series PLC.
Communication Board	Indicates a Communication Board for an OMRON C200HX/HG/HE(-Z) PLC.
CPU Unit	Indicates a CPU Unit in the OMRON CP, CS/CJ or SYSMAC C Series of Programmable Controllers.
NB-Designer	Indicates the OMRON NB-Designer.
Host	Indicates the PLC and other units functioning as the control devices for NB-Series Units.
PT	Indicates an OMRON Programmable Terminal.
HMI	Indicates an OMRON Programmable Terminal.

CONTENTS

Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.
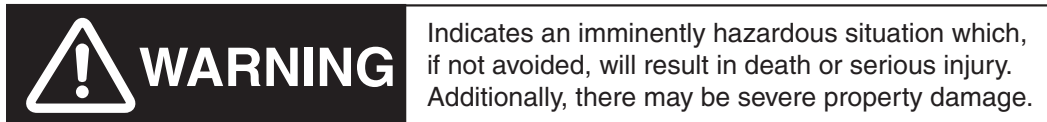
ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

Notation Used for Safety Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the product. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

⚠ WARNING	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.

⬡ Precautions for Safe Use
Indicates precautions on what to do and what not to do to ensure using the product safely.

▯ Precautions for Correct Use
Indicates precautions on what to do and what not to do to ensure proper operation and performance.

Note Indicates suggestive information and precautions on operation of the product.

Symbols

🚫	• Prohibition Indicates a general prohibition.
⚠	• Caution Indicates general cautionary, warning, or danger level information.

⚠ WARNING

Do not attempt to take the product apart and do not touch the product inside while the power is being supplied. Otherwise it may result in electric shock.

Always ensure that the personnel in charge confirm that installation, inspection, and maintenance were properly performed for the NB Unit.

"Personnel in charge" refers to individuals qualified and responsible for ensuring safety during machine design, installation, operation, maintenance, and disposal.

Ensure that installation and post-installation checks are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

Do not use the input functions of the touch switch, etc. of the NB Unit, in applications that involve human life, in applications that may result in serious injury, or for emergency stop switches.

Do not attempt to disassemble, repair, or modify the NB Unit. Otherwise it may impair the safety functions.

Never press more than two points on the touch panel of the NB Unit at a time. Otherwise, it may activate a switch somewhere between the two points.

Precautions for Safe Use

- When unpacking the NB Units and the peripheral devices, check carefully for any external scratches or other damages. Also, shake the Units gently and check for any abnormal sound.
- The NB Unit must be installed in a control panel.
- The mounting panel must be between 1.6 and 4.8 mm thick. Tighten the Mounting Brackets evenly to a torque of between 0.5 and 0.6 N·m to maintain water and dust resistance. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur. What is more, make sure the panel is not dirty or warped and that it is strong enough to hold the Units.
- Do not let metal particles enter the Units when preparing the panel.
- Do not connect an AC power supply to the DC power terminals.
- Use a DC power with a slight voltage fluctuation and that will provide a stable output even if the input is momentarily interrupted for 10 ms.
  Rated Power Supply Voltage: DC 24 V (Allowable range DC 20.4 ~ 27.6 V)
- Do not perform a dielectric voltage test.
- Making the connection by using terminal screws crimping on a twisted-pair cable with a crimping range of 12~26 AWG, and only 6.5 mm of insulation peel of the cable needs to be peeled off. Tighten the terminal screws at a torque of between 0.3 and 0.5 N·m. Make sure the screws are properly tightened.
- To prevent malfunctions caused by noise, ground the Unit correctly.
- Do not touch the packaging part of the circuit board with your bare hands. Discharge any static electricity from your body before handling the board.
- When using the No. 6 pin of the serial communication port COM1 connector for a voltage of DC+5V, make sure the supply equipment's current capacity is below 250mA before using it. The DC+5V voltage output of the NB unit is +5V±5%, and the maximum current is 250mA. (The serial communication port COM1 of NB3Q-TW00B and NB3Q-TW01B is unable to output the current.)
- Turn OFF the power supply before connecting or disconnecting cables.
- Always keep the connector screws firmly tightened after the communication cable is connected.
- The maximum tensile load for cables is 30 N. Do not apply loads greater than this.
- Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.
- The whole system may stop depending on how the power supply is turned ON or OFF. Turn ON/OFF the power supply according to the specified procedure.
- Reset by pressing the reset button, or restart the power supply, once the DIP switch settings are changed.
- To ensure the system's safety, make sure to incorporate a program that can confirm the normal functionality of the NB Unit before running the system.
- Start actual system application only after sufficiently checking screen data, macros and the operation of the program at the host side.
- Do not press the touch panel with a force greater than 30 N.
- Do not use hard or pointed objects to operate or scrub the screen, otherwise, the surface of the screen may be damaged.
- Confirm the safety of the system before pressing the touch panel.
- Signals from the touch switches may not be input if the touch switches are pressed consecutively at high speed. Confirm each input before proceeding to the next one.
- Do not accidentally press the touch panel when the backlight is not lit or when the display does not appear. Make sure of the safety of the system before pressing the touch panel.
- To use numeric input functions safely, always make maximum and minimum limit settings.
- Before initializing screen data, confirm that existing data is backed up at the NB-Designer.

- When changing the password with the screen, do not reset or turn OFF the power supply until writing is finished. Failure to save the password may cause the screen to fail to function.
- When using an equipment monitor, confirm the safety of the system before carrying out the following operations:
    - Changing monitor data.
    - Changing operation mode.
    - Forced setup/reset.
    - Changing the current value or the set value.
- Do not connect a USB connector to any device that is not applicable.
- When connecting the equipment with the USB HOST connector, make sure the supply equipment's current capacity is below 150mA before using it. The DC+5V voltage output of the NB Unit is +5V±5%, and the maximum current is 150mA.
- Before connecting a USB connector to a device, make sure that the device is free of damage.
- Commercially available and the recommended USB HUBs are different from the general specifications of the NB Unit. The unit may not function well in an environment subject to noise, static electricity. Therefore, when using a USB HUB, employ sufficient noise and static electricity insulation measures, or install it at a site free of noise or static electricity.
- While uploading or downloading screen data or system programs, do not perform the following operations that may corrupt the screen data or the system program:
    - Turning OFF the power supply of the NB Unit.
    - Pressing the PT's reset switch.
- Dispose of the Units and batteries according to local ordinances as they apply.

- When exporting products with lithium primary batteries containing perchlorate at 6ppb or above to or delivering them through California, USA, the following precautionary measures have to be publicized. Perchlorate material - applicable through special processing. Refer to http://www.dtsc.ca.gov/hazardouswaste/perchlorate.
  NB-Series products contain lithium primary batteries. When exporting products containing this kind of batteries to or delivering them through California, USA, label all the product packages as well as the appropriate delivery packages.
- Do not use benzene, paint thinner, or other volatile solvents, and do not use chemically treated cloths.
- Do not dispose the Units together with general waste at waste yards. When disposing them, follow the related local ordinances or rules.
- Customers may not replace the backlight lamp inside the NB Unit. Please contact OMRON's customer service center.
- Deterioration over time can cause the touch points to move. Calibrate the touch panel periodically.
- Water and oil resistance will be lost if the front sheet is torn or is peeling off. Do not use the Unit, if the front sheet is torn or is peeling off.
- The rubber packing will deteriorate, shrink, or harden depending on the operating environment. Inspect and replace the rubber packing periodically.
- The communication cables of the COM1 and COM2 connectors are not interchangeable. Confirm the pins of the ports before carrying out communications. (NB3Q-TW00B and NB3Q-TW01B only have COM1.)
- Periodically check the installation conditions in applications where the PT is subject to contact with oil or water.
- Do not perform the following operations during the communication of the USB memory:
    - Turning off the power supply of the NB Unit.
    - Pressing the Reset button on the NB Unit.
    - Removing the USB memory.
- Do not use the USB memory in the environment subject to strong vibration.

Precautions for Correct Use

- Do not install the unit in any of the following locations:
  Locations subject to severe changes in temperature
  Locations subject to temperatures or humidity outside the range specified in the specifications
  Locations subject to condensation as the result of high humidity
  Locations subject to corrosive or flammable gases
  Locations subject to strong shock or vibration
  Locations outdoors subject to direct wind and rain
  Locations subject to strong ultraviolet light
  Locations subject to dust
  Locations subject to direct sunlight
  Locations subject to splashing oil or chemicals

- Take appropriate and sufficient countermeasures when installing systems in the following locations:
  Locations subject to static electricity or other forms of noise
  Locations subject to strong electric field or magnetic field
  Locations close to power supply lines
  Locations subject to possible exposure to radioactivity

- Precautions for software:
  The update, restoration, uninstall and reinstallation of software in running status is prohibited in order to guarantee the correct use of the product.

Conformance to EC Directives

NB-Series Programmable Terminals are EMC compliant.

Concepts

OMRON products are electronic devices that are incorporated in machines and manufacturing installations. OMRON PTs conform to the related EMC Directives (see note) so that the devices and machines into which they are built can more easily conform to EMC Directives. The actual products have been through inspections and are completely in accordance with EMC directives. However, when they are built into customers' systems, whether the systems also comply with these Directives is up to the customers for further inspection.

EMC-related performance of OMRON PTs will vary depending on the configuration, wiring, and other conditions of the OMRON equipment or control panel. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

Note The applicable EMC (Electromagnetic Compatibility) standards are as follows:
EMS (Electromagnetic sensitivity): EN61131-2: 2007
EMI (Electromagnetic Interference): EN61131-2: 2007

Conformance to EC Directives

NB-Series Programmable Terminals are EC compliant. Heed the following precautions in order to ensure that the customer's overall machine and device conform to EC Directives.

1 The PT must be installed in a control panel.

2 You must use reinforced insulation or double insulation for the DC power supply and the DC power supply must have minimal voltage fluctuations and provide a stable output even if the power supply input is interrupted for 10 ms.

3 The PTs conform to the standard EN 61131-2, but radiated emission characteristics (10m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. You must therefore confirm that the overall machine or equipment complies with EC Directives.

4 This is a Class A product (Product for industry purpose). It may cause radio interference in residential areas, in which case the user may be required to take adequate measures to reduce interference.

Related Manuals

The related manuals are as follows:

Devices and Software	Manual Name	Manual No.
NB series	NB Series NB-Designer Operation Manual	V106
	NB Series Setup Manual (This manual)	V107
	NB Series Host Connection Manual	V108
	NB Series Startup Guide	V109
PLC	SYSMAC CP Series CP1L CPU Unit Operation Manual	W462
	SYSMAC CP Series CP1H/L CPU Unit Programming Manual	W451
	SYSMAC CP Series CP1H CPU Unit Operation Manual	W450
	SYSMAC CP Series CP1E CPU Unit Hardware USER'S Manual	W479
	SYSMAC CP Series CP1E CPU Unit Software USER'S Manual	W480
	SYSMAC C200HX/HG/HE(-E/-ZE) Installation Guide	W302
	SYSMAC C200HX/HG/HE Operation Manual	W303
	SYSMAC C200HX/HG/HE(-ZE) Operation Manual	W322
	SYSMAC CPM1A Operation Manual	W317
	SYSMAC CPM2A Operation Manual	W352
	SYSMAC CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programming Manual	W353
	SYSMAC CPM2C Operation Manual	W356
	SYSMAC CS1 Series CS1G/H Operation Manual	W339
	SYSMAC CS/CJ Series Serial Communications Boards and Serial Communications Units Operation Manual	W336
	SYSMAC CJ Series CJ1G/H(-H) CJ1M CJ1G Operation Manual	W393
	SYSMAC CS/CJ Series Programming Manual	W394
	SYSMAC CS/CJ Series INSTRUCTIONS Reference Manual	W340
	SYSMAC CS/CJ Series Programming Consoles Operation Manual	W341
	SYSMAC CS/CJ Series Communications Commands Reference Manual	W342
	SYSMAC CJ Series CJ2 CPU Unit Hardware USER'S Manual	W472
	SYSMAC CJ Series CJ2 CPU Unit Software USER'S Manual	W473
	SYSMAC CS/CJ Series CS1W/CJ1W-ETN21 (100Base-TX) Ethernet Units Operation Manual Construction of Networks	W420
	SYSMAC CS/CJ Series CS1W/CJ1W-ETN21 (100Base-TX) Ethernet Units Operation Manual Construction of Applications	W421
	SYSMAC CS/CJ Series CS1W/CJ1W-EIP21 (100Base-TX) EtherNet/IP Units Operation Manual	W465
	SYSMAC CP Series CP1L-EL/EM CPU Unit Operation Manual	W516
External Tool	CX-Programmer Ver.9.□ Operation Manual	W446

Part Names and Functions

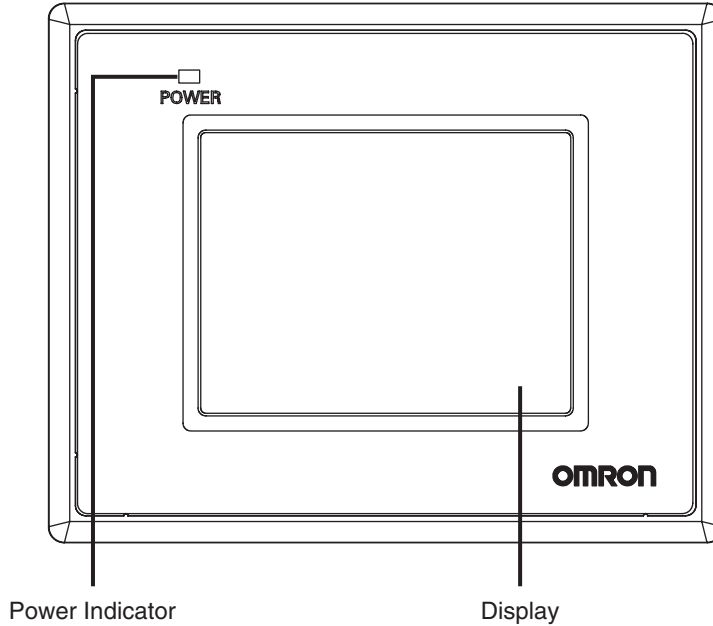This section describes the names and functions of the various parts of an NB Unit.

1-1   Part Names

● **NB3Q-TW00B/NB3Q-TW01B model**

Front view
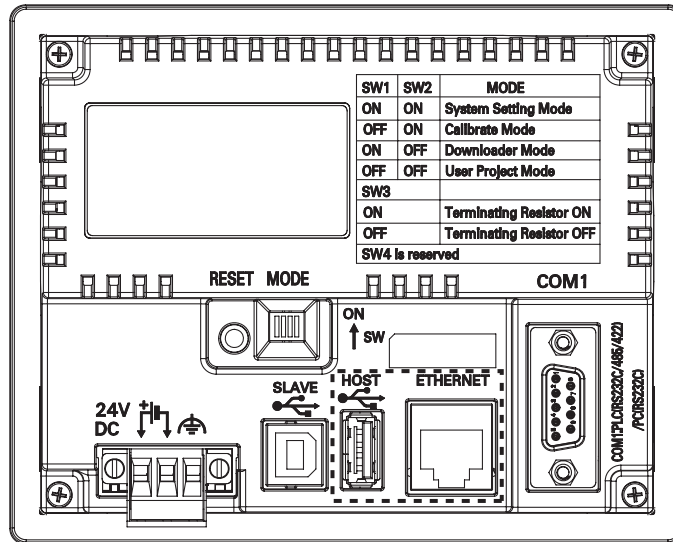
Power Indicator   Display

Back view

| SW1	SW2	MODE
ON	ON	System Setting Mode
OFF	ON	Calibrate Mode
ON	OFF	Downloader Mode
OFF	OFF	User Project Mode
SW3		
ON		Terminating Resistor ON
OFF		Terminating Resistor OFF
SW4 is reserved		

⌐ ¬
└ ┘ : NB□□-TW01B only
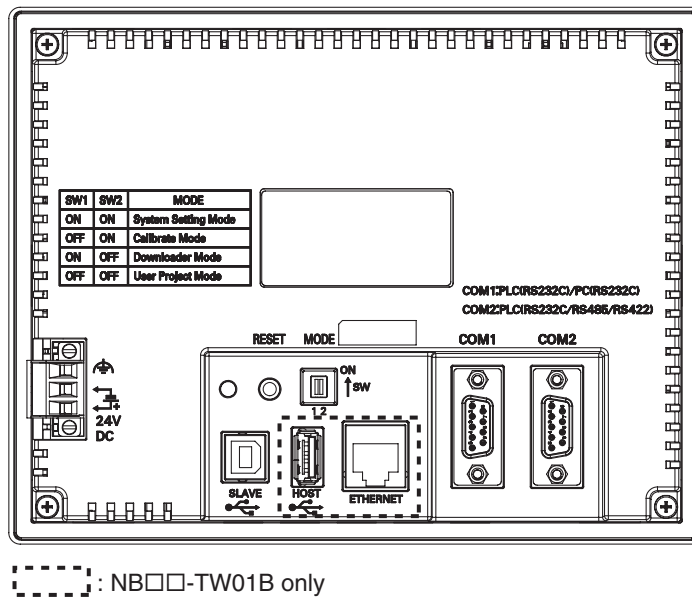
🔊 **Precautions for Safe Use**

Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

● **NB5Q-TW00B/NB5Q-TW01B model**

Front view
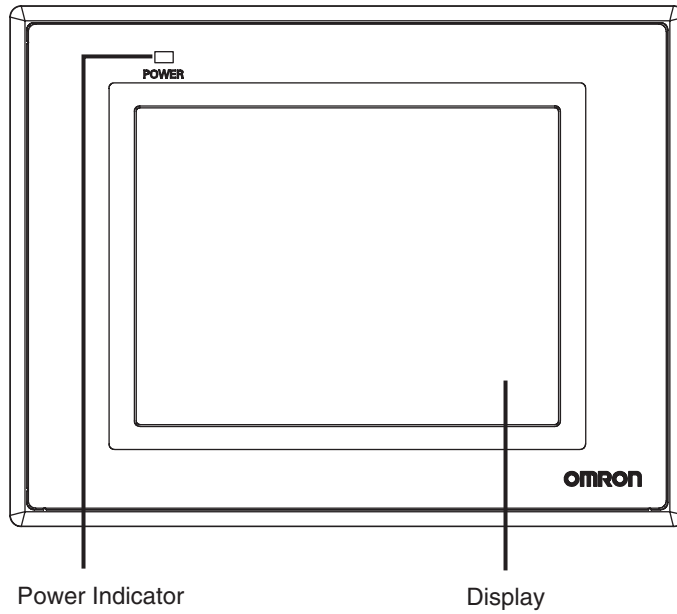
Power Indicator   Display
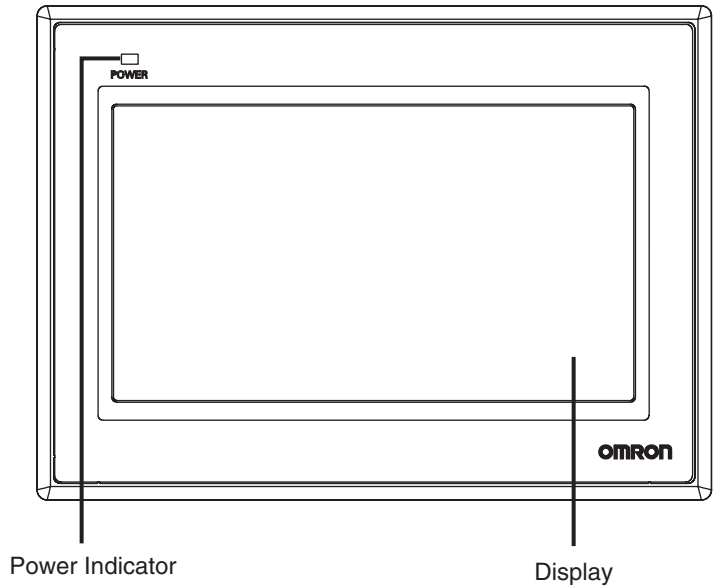
Back view

: NB□□-TW01B only

🔊 **Precautions for Safe Use**

Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

● **NB7W-TW00B/NB7W-TW01B model**

Front view

Power Indicator   Display

Back view

┌ ─ ─ ─ ┐
└ ─ ─ ─ ┘ : NB□□-TW01B only

Precautions for Safe Use

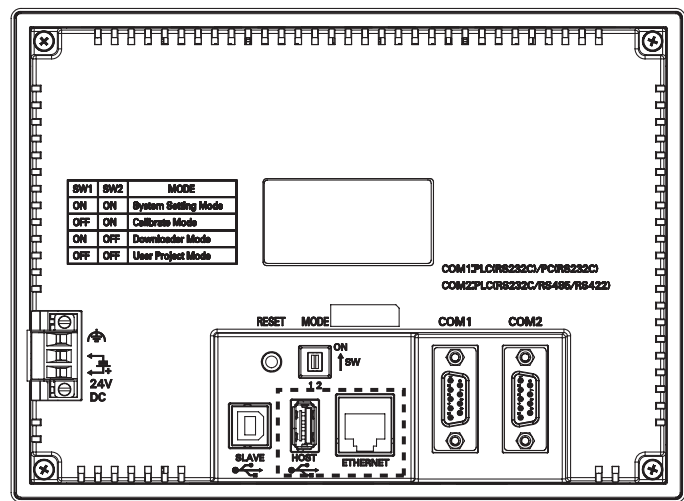Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

● **NB10W-TW01B model**

Front view

Power Indicator   Display

Back view

SW1	SW2	MODE
ON	ON	System Setting Mode
OFF	ON	Calibrate Mode
ON	OFF	Downloader Mode
OFF	OFF	User Project Mode

SW3 SW4 are reserved

COM1:PLC(RS232C)/PC(RS232C)
COM2:PLC(RS232C/RS485/RS422)

RESET   MODE   COM1   COM2

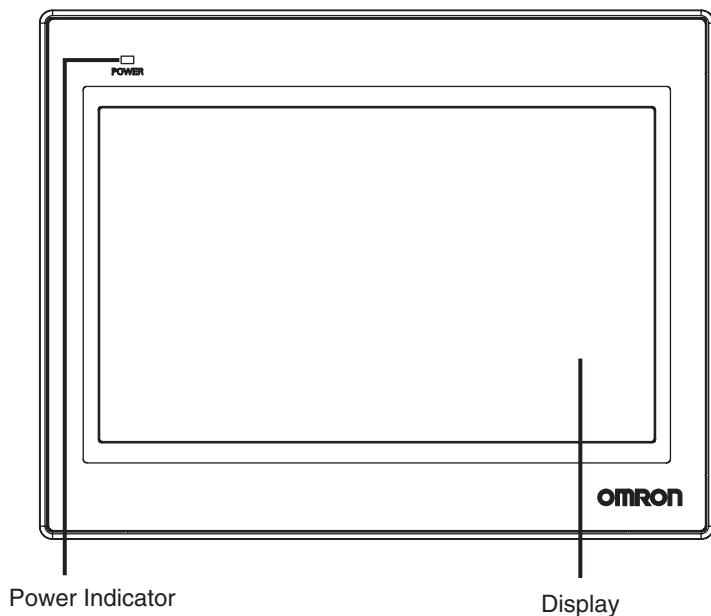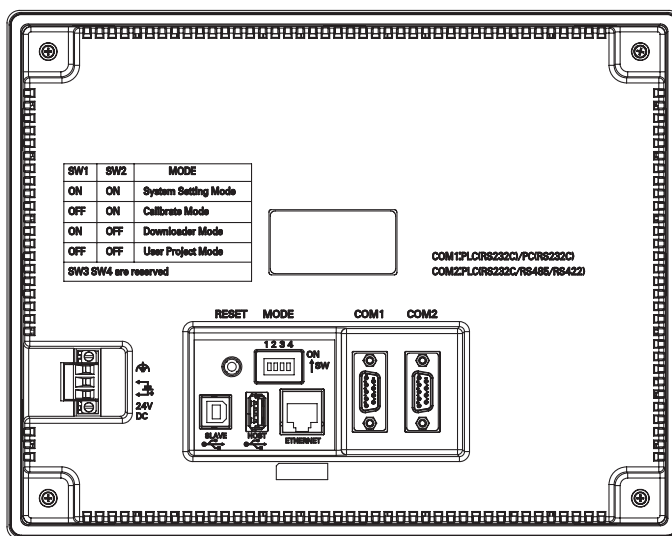**Precautions for Safe Use**

Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

1-2　Part Specifications

● **Touch Panel**

Input operation can be carried out by means of the touch panel. By pressing the touch panel, the screens can be switched, and the contact information can be transmitted to the host.

⚠ WARNING

Do not use the input functions of the touch switch, etc. of the NB Unit, in applications that involve human life, in applications that may result in serious injury, or for emergency stop switches.

Never press more than two points on the touch panel of the NB Unit at a time.
Otherwise, it may activate a switch somewhere between the two points.

Precautions for Safe Use

- Do not press a touch switch with a force greater than 30N.
- Do not accidentally press the touch panel when the backlight is not lit or when the display does not appear. Make sure of the safety of the system before pressing the touch panel.
- Confirm the safety of the system before pressing the touch panel.
- Do not use hard or pointed objects to operate or scrub the screen, or the surface of the screen may be damaged.
- Signals from the touch switches may not be input if the switches are pressed consecutively at high speed. Confirm each input before proceeding to the next one.
- Deterioration over time can cause the touch points to move. Calibrate the touch panel periodically.

● **Serial Port COM1**

- NB5Q/NB7W/NB10W-TW□□B

Serial port COM1 is a 9-pin D-type socket port. This port supports RS-232C communication function, making it connectable to a controller which features RS-232C function, and it can also be used for downloading programs or debugging for the product.

The pins are defined as follows:

Pins	Signals	I/O	Functions
1	NC	-	-
2	SD	O	Sending data
3	RD	I	Receiving data
4	RS(RTS)	O	Request to send*
5	CS(CTS)	I	Clear to send*
6	DC+5V	-	DC+5V output (Max. current: 250mA)
7	NC	-	-
8	NC	-	-
9	SG	-	Signal ground

* Pins 4 and 5 are not used, thus not compliant with RS or CS functions.

Precautions for Safe Use

When using the No. 6 pin of the serial communications port COM1 connector for a voltage of DC+5V, make sure the supply equipment's current capacity is below 250 mA before using it. The DC+5V voltage output of the NB Unit is +5V±5%, and the maximum current is 250 mA.

- NB3Q-TW□□B

NB3Q-TW□□B has only 1 serial port COM1, and this port supports communication based on RS-232C, RS-422 and RS-485, of which only 1 connection mode can be applied at one time. By means of the RS-232C mode (PIN 2~5), it can be connected to a controller based on RS-232C, and can also be used for downloading programs, as well as debugging for the product (connected to a PC). While with the RS-422 or the RS-485 mode (PIN 1, PIN 6~8), only a PLC can be connected.

The pins are defined as follows:

Pins	Signals	I/O	Functions		
			RS-232C	RS-485	RS-422A
1	SDB+	I/O	-	-	Sending data(+)
2	SD	O	PLC Sending data	-	-
3	RD	I	PLC Receiving data	-	-
4	RS(RTS)	O	Request to send*	-	-
5	CS(CTS)	I	Clear to send*	-	-
6	RDB+	I/O	-	RS485B Send/Receive data(+)	Receiving data(+)
7	SDA-	I/O	-	-	Sending data(-)
8	RDA-	I/O	-	RS485A Send/Receive data(-)	Receiving data(-)
9	SG	-	Signal ground		

* Pins 4 and 5 are not used, thus not compliant with RS or CS functions.

● Serial Port COM2

- NB5Q/NB7W/NB10W-TW□□B

Serial port COM2 is a 9-pin D-type socket port. This port supports RS-232C/RS-485/RS-422A communication function.

The pins are defined as follows:

Pins	Signals	I/O	Functions		
			RS-232C	RS-485	RS-422A
1	SDB+	I/O	-	-	Sending data(+)
2	SD	O	Sending data	-	-
3	RD	I	Receiving data	-	-
4	Terminal R1	-	-	Terminal resistor 1	
5	Terminal R2	-	-	Terminal resistor 2	
6	RDB+	I/O	-	Send/Receive data(+)	Receiving data(+)
7	SDA-	I/O	-	-	Sending data(-)
8	RDA-	I/O	-	Send/Receive data(-)	Receiving data(-)
9	SG	-	Signal ground		

● **USB HOST**

NB□□-TW01B is equipped with USB HOST port, which is USB A-type port. Through this port, USB memory can be connected to perform uploading, downloading, project operation and storage of related data. And its pins are defined as follows:
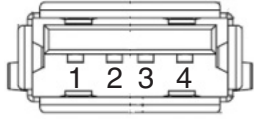
Pins	Signals	Functions
1	Vbus	USB +5V power supply output (Max. current: 150mA)
2	D-	Data -
3	D+	Data +
4	GND	USB power supply ground

Precautions for Safe Use

When connecting the equipment with the USB HOST connector, make sure the supply equipment's current capacity is below 150mA before using it. The DC+5V voltage output of the NB Unit is +5V±5%, and the maximum current is 150mA.

● **USB SLAVE**

USB SLAVE port is USB B-type port, which can connect the USB port on PC side to perform the uploading, downloading and debugging of the programs for the product. And its pins are defined as follows:
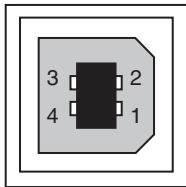
| Pins	Signals	Functions
1	Vbus	USB +5V power supply output
2	D-	Data -
3	D+	Data +
4	GND	USB power supply ground

● **Ethernet Interface**

NB□□-TW01B is equipped with Ethernet Interface, which is adaptive RJ-45 type interface with the transmission rate of 10M/100M. It can be connected with PC to perform the uploading and downloading of the programs and the system refreshing, and can also be used to realize the communication with the controller supporting the Ethernet communication. And its pins are defined as follows:

TOP   Bottom
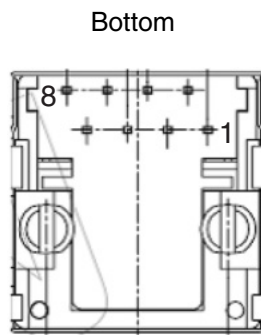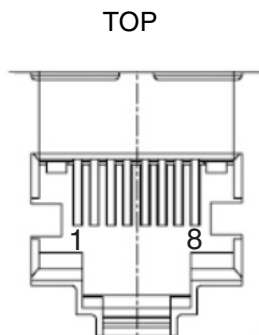
| Pins	Signals	Functions
1	TD+	Sending data +
2	TD-	Sending data -
3	RD+	Receiving data +
4	---	Not used
5	---	Not used
6	RD-	Receiving data -
7	---	Not used
8	---	Not used

● DIP Switch

NB5Q/NB7W only has 2 switches SW1 and SW2, while for the NB3Q and NB10W, there are totally 4 DIP switches, and for all models, SW1 and SW2 feature the same functions. The settings and corresponding operating modes are as follows:
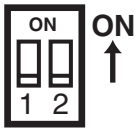
SW1	SW2	Operating modes
ON	ON	System Setting Mode
OFF	ON	Calibrate Mode
ON	OFF	Downloader Mode
OFF	OFF	User Project Mode

- System Setting Mode: The PT will be launched into a built-in system setup screen, and is subject to the user for brightness, system time and buzzer settings.
- Calibrate Mode: When the user touches the panel, a symbol "+" will pop up on the screen, with which the touch control precision level can be calibrated.
- Downloader Mode: This is used for basic operations such as updating the firmware, downloading and uploading the user's engineering documents, etc. and this mode is not intended for general users.
- User Project Mode: This is the User Project Mode of NB-Series PTs. The PT will display the startup screen of the project already downloaded.

As mentioned above, the settings and corresponding operating modes of the switches SW1 and SW2 of NB3Q and NB10W are the same as those of NB5Q/NB7W (see the table above), and the functions of SW3 and SW4 of NB3Q and NB10W are stated as below:
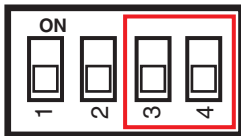
Switch No. (corresponding model(s))	Status	Descriptions of Function
SW3 (NB3Q)	ON	Terminal resistance ON
	OFF	Terminal resistance OFF
SW3 (NB10W)	Reserved	
SW4 (NB3Q/NB10W)	Reserved	

● Reset Switch

When pressing the reset switch located on the back side of the PT, the system will be rebooted.

2

Installing the NB Unit and Connecting Peripheral Devices

This section describes the methods used to install the NB Unit and connect peripheral devices.

2-1   Installing the NB Unit

This section describes the methods used to mount the NB Unit onto an operation panel and connect the power supply.

2-1-1   Installation environment

When mounting the NB Unit onto the operation panel, pay attention to the following precautions.

⚠ **WARNING**

Always ensure that the personnel in charge confirm that installation, inspection, and maintenance were properly performed for the NB Unit.

"Personnel in charge" refers to individuals qualified and responsible for ensuring safety during machine design, installation, operation, maintenance, and disposal.

Ensure that installation and post-installation checks are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

📝 **Precautions for Correct Use**

- Do not install the product in any of the following locations:

   Locations subject to rapid changes in temperature

   Locations subject to temperatures or humidity outside the range specified in the specifications

   Locations subject to condensation as the result of high humidity

   Locations subject to corrosive or flammable gases

   Locations subject to strong shock or vibration

   Locations outdoors subject to direct wind and rain

   Locations subject to strong ultraviolet light

   Locations subject to dust

   Locations subject to direct sunlight

   Locations subject to splashing oil or chemicals

- Take appropriate and sufficient countermeasures when the product is used in the following locations:

   Locations subject to static electricity or other forms of noise

   Locations subject to strong electric field or magnetic field

   Locations close to power supply lines

   Locations subject to possible exposure to radioactivity

🔊 **Precautions for Safe Use**

When unpacking the NB Units and the peripheral devices, check carefully for any external scratches or other damage. Also, shake the Units gently and check for any abnormal sound.
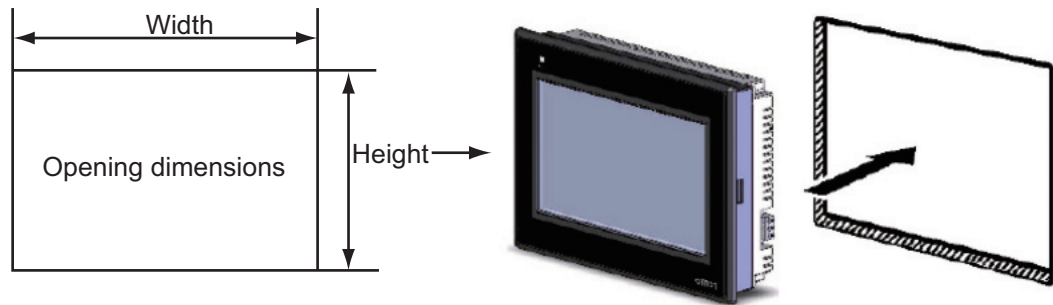
2-1-2   Installation onto the Operation Panel

Install the NB Unit by embedding it into the operation panel.

Use the panel mounting brackets and Phillips screwdriver for installation.

Proceed the installation following the procedures below.

1   Panel cutout with dimensions is shown below. Fit the NB Unit into the panel from the front side.


Models	Opening Dimension (W×H mm)
NB3Q-TW00B/TW01B	119.0(+0.5/-0)×93.0(+0.5/-0)
NB5Q-TW00B/TW01B	172.4(+0.5/-0)×131.0(+0.5/-0)
NB7W-TW00B/TW01B	191.0(+0.5/-0)×137.0(+0.5/-0)
NB10W-TW01B	258.0(+0.5/-0)×200.0(+0.5/-0)

2   As follows, insert the panel mounting brackets at the locations indicated by red box around the back of the NB Unit. Insert the hooks of positioners into the square holes on the Unit to hold the fixators properly, and tighten the screws firmly with the screwdriver.
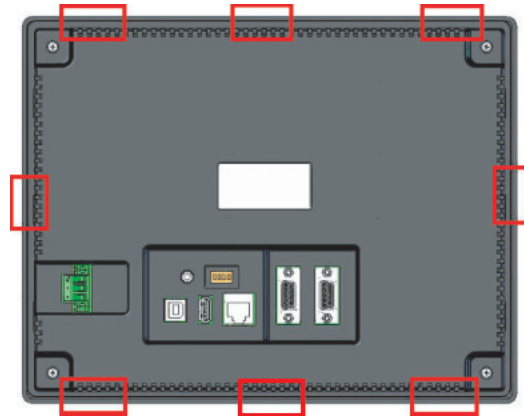
● **NB5Q/NB7W-TW☐☐B**
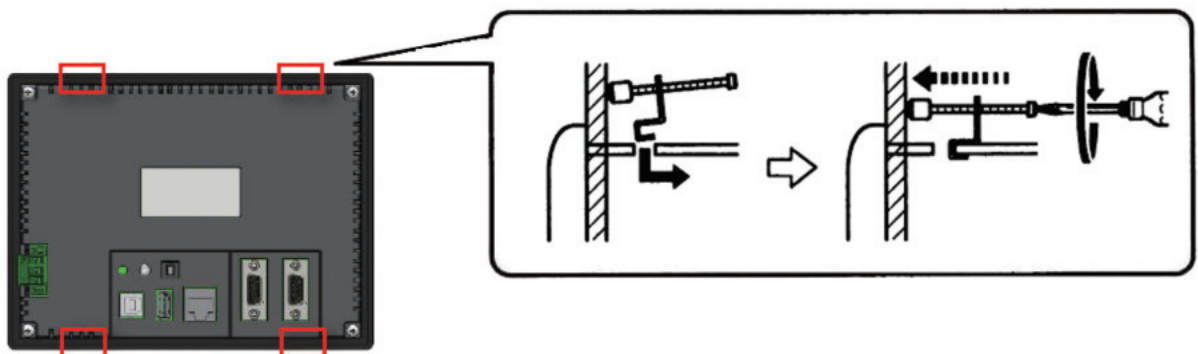
● **The insert positions on the body of NB3Q-TW□□B/NB10W-TW01B (same fixing method as above)**
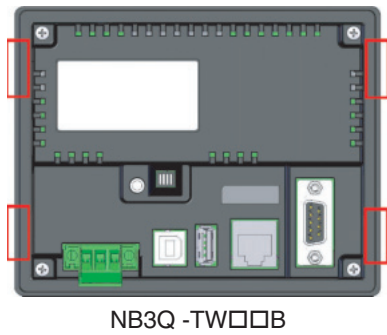
NB3Q -TW□□B

NB10W -TW□□B

🔊 **Precautions for Safe Use**

- Do not let metal particles enter the Units when preparing the panel.
- The mounting panel must be between 1.6 and 4.8 mm thick. Tighten the Mounting Brackets evenly to a torque of between 0.5 and 0.6 N·m to maintain water and dust resistance. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur. What is more, make sure the panel is not dirty or warped and that it is strong enough to hold the Units.

● **Display Mode of NB Series touch panel**

NB Series touch panel has 2 display modes: horizontal and vertical.
The display mode can be selected when dragging a HMI from the Graph element window into the Construct Window.
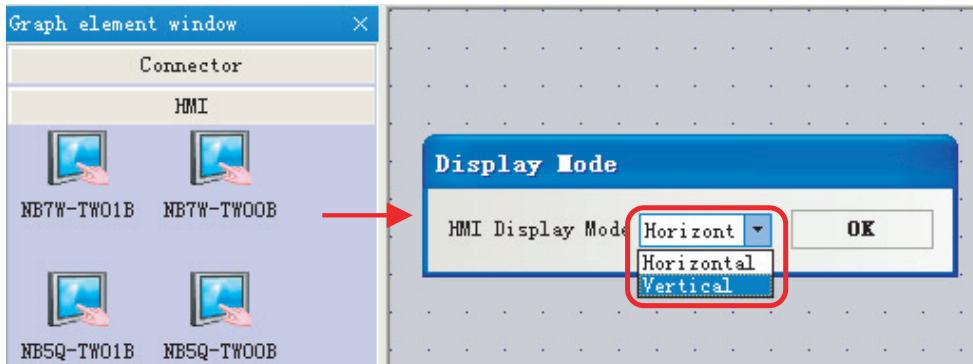
Horizontal display

Vertical display

2-1-3 Connecting the Power Supply
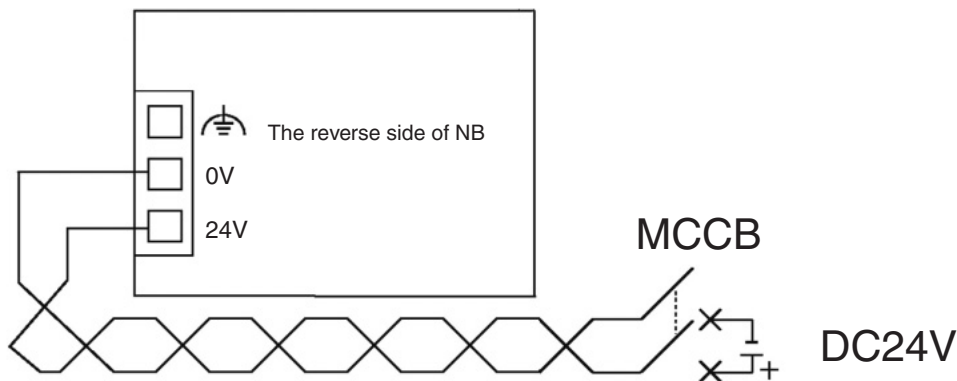
Precautions for Safe Use

- Do not connect an AC power supply to the DC power terminals.
- Use a DC power with a slight voltage fluctuation and that will provide a stable output even if the input is momentarily interrupted for 10 ms.
  Rated Power Supply Voltage: DC 24 V (Allowable range DC 20.4 ~ 27.6 V)

● Power Supply

The connectable power supply specifications are as follows: figure out a suitable power supply specification so as to satisfy the requirement for power supply capacity.

Models	Rated Voltage	Allowable Voltage Range	Power
NB3Q-TW00B	DC24V	DC20.4V to 27.6V	5W
NB3Q-TW01B			9W
NB5Q-TW00B			6W
NB5Q-TW01B			10W
NB7W-TW00B			7W
NB7W-TW01B			11W
NB10W-TW01B			14W

● NB5Q/NB7W/NB10W-TW☐☐B

● NB3Q -TW☐☐B
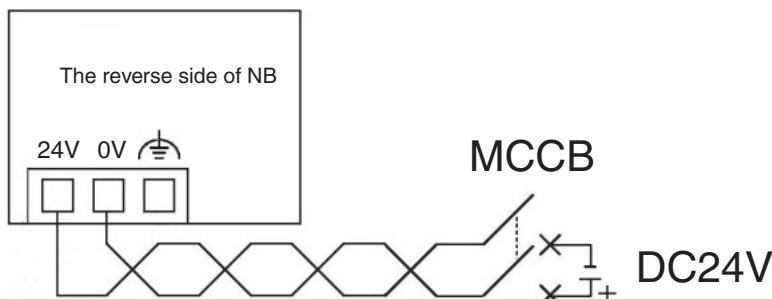
Precautions for Safe Use

- Making the connection by using terminal screws crimping on a twisted-pair cable with a crimping range of 12~26 AWG, and only 6.5 mm of insulation peel of the cable needs to be peeled off. Tighten the terminal screws at a torque of between 0.3 and 0.5 N·m. Make sure the screws are properly tightened.

2-1-4   Grounding Wiring

The NB Unit has a functional grounding terminal (⏚).

Arrange the wiring according to the following conditions.

1   When a potential difference occurs between the NB Unit and the host, arrange the grounding as illustrated. If the distance is too long to realize a single-point grounding, do not ground the ⏚ of the NB Unit.

2   When the NB Unit, and noise source equipment such as motors and inverters, etc. are installed on the same panel, do not ground the ⏚ of the NB Unit.

```
┌──────────┐      ┌──────────┐
│          │      │          │
│  NB Unit │      │   Host   │
│          │      │          │
└────○─────┘      └────○─────┘
      \                /
       \  Single-point/
        \ grounding   /
         \           /
            ⏚
```
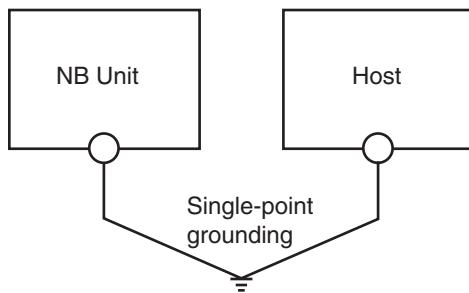
Precautions for Safe Use

To prevent malfunctions caused by noise, ground the Unit correctly.

2-2   Start of NB Series

Confirm the hardware are all correctly connected, turn on the power supply, and start the NB-Series.

This part describes the operations of the NB Series when it starts.

● When starting the NB Unit for the first time

(1)   Confirm that the DIP switches SW1 and SW2 on the back side are both ON.

(2)   Turn on the power supply of the NB Unit, and with the POWER LED on the front side turning green, the NB Unit starts, entering into the System Setting Mode.

(3)   Through the System Setup screen, the system time, starting window No., screen saving time, buzzer and the screen brightness can be set. When the setup is finished, turn OFF the power supply, turn OFF both of the DIP switches, SW1 and SW2, and then switch on the power supply again.

● When starting the NB Unit after downloading the screen data to it.

(1)   Confirm that the DIP switches SW1 and SW2 on the back side are both OFF.

(2)   Turn on the power supply of the NB Unit, and with the POWER LED on the front side turning green, the NB Unit starts.

(3)   The starting screen of the screen data downloaded to the NB Unit will be shown.

● Entering into Calibrate Mode

(1)   Confirm that the DIP switches SW1 and SW2 on the back side are respectively OFF and ON.

(2)   Turn on the power supply of the NB Unit, and with the POWER LED on the front side turning green, the NB Unit starts.

(3)   When the user touches the panel, a symbol "+" will pop up on the screen, with which the touch control precision level can be calibrated.

Precautions for Safe Use

Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.

2-3   Connecting of NB-series with PC

In order to transmit the screen data established by the NB-Designer to the NB Unit, the NB Unit needs to be connected to a PC with a RS-232C, USB or Ethernet cable.

2-3-1   Connecting by RS-232C

Take NB5Q/NB7W-TW01B as example:

Connect the RS-232C cable at the PC side to the serial port COM1 of the NB Unit.
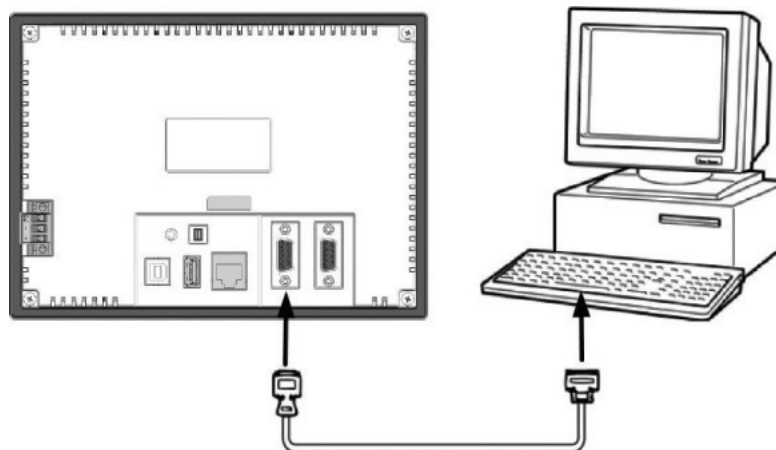
● **Communication conditions**

Select the downloader mode through the tool menu of the NB-Designer. For details, refer to *3-15 Download* in the *NB-Designer Operation Manual*.

● **Communication cable**

Users can make connection cables by themselves. For details, refer to *A-4 Fabrication of the Connection Cable* in the *NB Series Setup Manual*.

2-3-2   Connecting by USB

Use the USB transmission cable to connect the USB A-type port on PC side with the USB SLAVE B-type port on NB Unit. As to the USB connection, there are some preparations and restrictions that need to be done or heeded. Refer to the following content to ensure a correct connection.

Take NB5Q/NB7W-TW01B as example:

Connect the USB port at the PC side and the USB slave connector of the NB Unit.
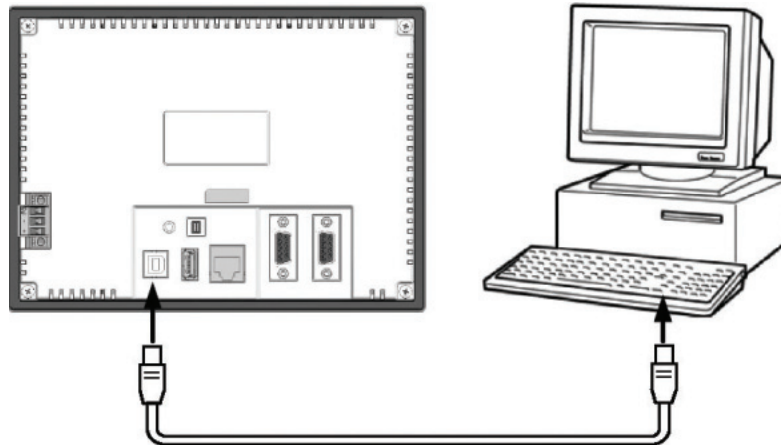

● USB driver for the NB-Designer

A USB driver needs to be installed in the PC for the purpose of transmitting screen data through USB.

The USB driver should be installed at the first time when connecting the NB Unit to a PC.

Please refer to *2-4 Installation of USB-Driver for NB* in the *NB-Designer Operation Manual* for details on the USB driver.

> **Precautions for Safe Use**
>
> - Commercially available and the recommended USB HUBs are different from the general specifications of the NB Unit. The Unit may not function well in an environment subject to noise, static electricity. Therefore, when using a USB HUB, employ sufficient noise and static electricity insulation measures, or install it at a site free of noise or static electricity.
> - Do not connect a USB connector to any device that is not applicable.
> - Before connecting a USB connector to a device, make sure that the device is free of damage.

2-3-3   Connecting by Ethernet

HMI with model number of NB□□-TW01B (other than NB□□-TW00B) can perform the uploading & downloading of data (such as user project and recipe etc.) and the refreshing of HMI firmware through connecting the Ethernet cable with RJ45 connectors on both ends and the network interface on PC side.

Ethernet Cable
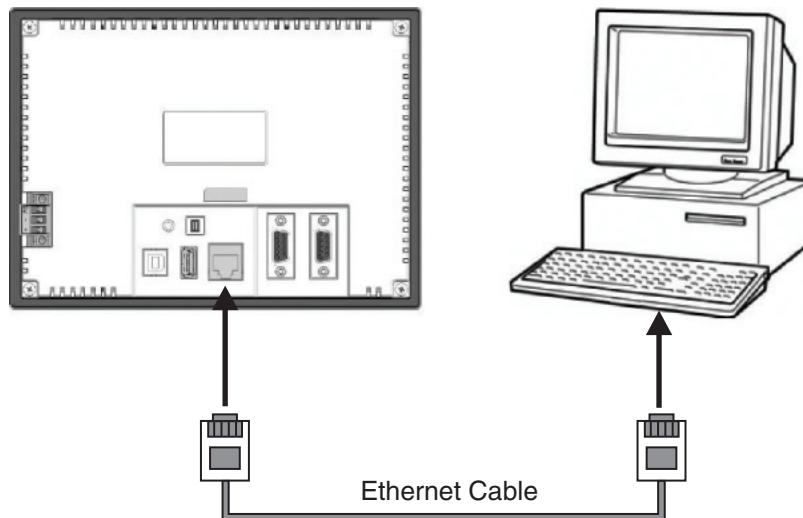
● **Communication conditions**

Select the corresponding download method by clicking the Download Way option in Tools menu of the NB-Designer. For details, refer to *3-15 Download* in the *NB-Designer Operation Manual*.

2-4   Serial Communication Connection

2-4-1   Host Link Connection Method

Host Link is a connection method in which one PLC is connected to one NB Unit. There are 2 kinds of connection methods: RS-232C and RS-422A.
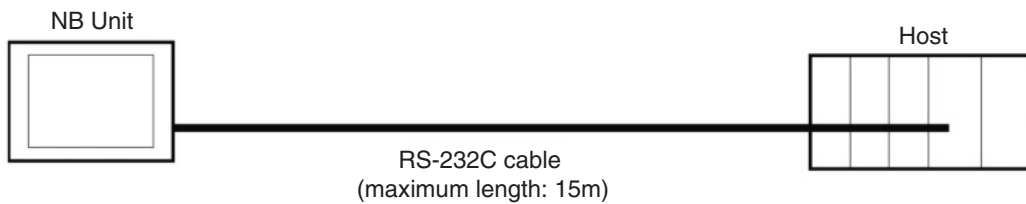
● The RS-232C connection method using serial ports COM1/COM2

This is the simplest and most feasible method.

The following cables are recommended.

XW2Z-200T (Cable length: 2m) by OMRON

XW2Z-500T (Cable length: 5m) by OMRON

● The RS-422A connection method using the serial port COM2

With this method, the communication distance can be extended to a maximum of 500m.
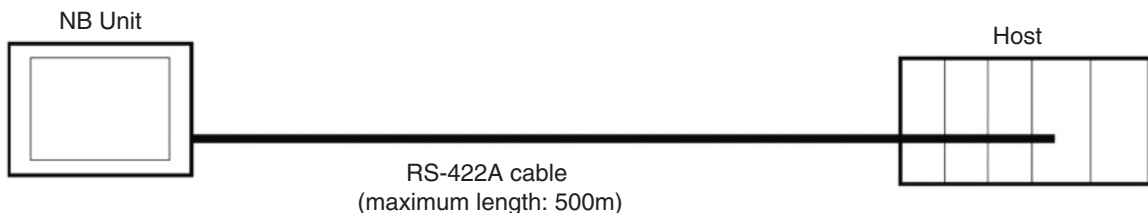
The following cables are recommended.

NB-RSEXT-2M (Cable length: 2m) by OMRON

Note please adopt 4-wire RS-422A connection, and Host Link does not support 2-wire RS-485 connection.

● Connectable Units at the host side

When using OMRON PLCs, the Units with built-in Host Link function vary depending on models and series. There is also the CPU Unit connected in a Host Link method through adding the serial communication board or communication board.

When connecting, confirm the connected PLC's series, model and the models of the installed circuit board/Unit.

As to the Units at the host side which can be connected to NB series Unit by RS-232C or RS-422A through a Host Link, refer to *A-5 List of Models* in the *NB Series Setup Manual*.

● **Communication setting**

The communication settings need to be set as following values before carrying out communications in the Use Host link.

Items	Settings
Data bit	7bit
Stop bit	2bit
Parity check	Even
Communication speed	Any value, but the values for the NB Unit and the host must be the same.
Connected Unit No.	00

At the NB Unit side, these settings are made through the PT menu of the NB-Designer. For details, refer to *3-10-8 COM1/COM2 Setting* in the *NB-Designer Operation Manual*.

For communication settings at the host side, refer to the related PLC manuals as needed.

2-4-2   Connecting more than one PLC

Select the RS-232C method for COM1, and one from RS-232C, RS-422A and RS-485 for COM2 (NB3Q-TW□□B is not equipped with serial port COM2.).

PT with the model number of NB□□-TW01B, which supports Ethernet, can connect single PLC or multiple PLCs simultaneously through the Ethernet (through the router). When connecting with multiple PLCs, it can connect the Host manufactured by the same manufacture or different manufactures simultaneously. (Note: At a certain time, only one from RS-232C, RS-422A and RS-485 can be designated for COM2 to perform communications.)

The example of NB5Q/NB7W/NB10W-TW01B connecting with 3 PLCs simultaneously is as shown below:
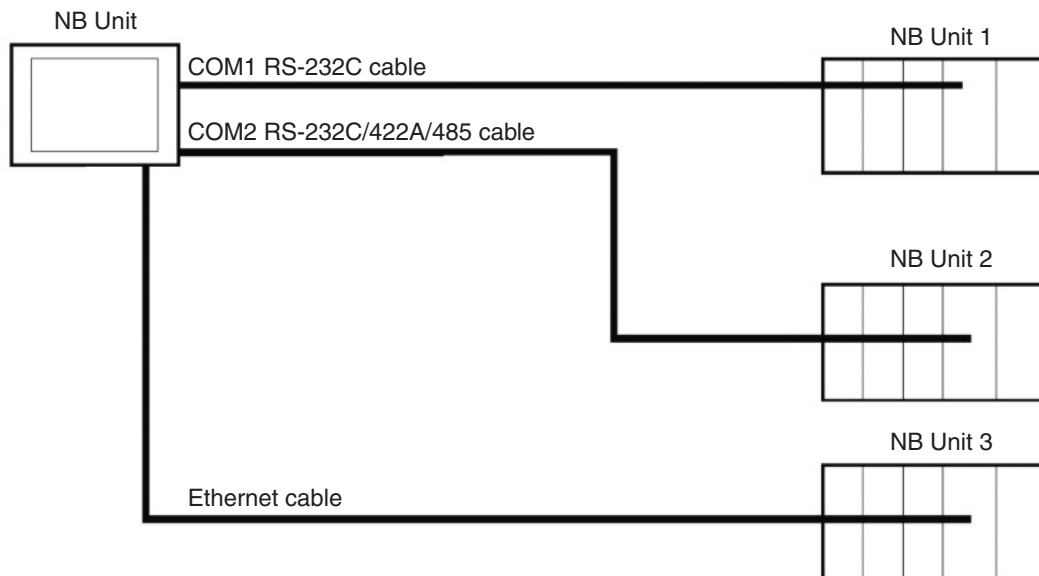
Precautions for Safe Use

- Always keep the connector screws firmly tightened after the communication cable is connected.
- The maximum tensile load for cables is 30N. Do not apply loads greater than this.
- The communication cables of the COM1 and COM2 connectors are not interchangeable. Confirm the pins of the ports before carrying out communications.

2-4-3   Settings for each Unit

When connecting with the serial communication ports, the settings for each Unit are as follows:

When connecting to CP-Series Units

CP1L-L14/L20/M30/M40/M60 models

CP1H-X40/XA40/Y20 models

CP1E-N14/N20 models

CP1E-N30/N40/N60/NA20 models

CP1E-EL20/EM30/EM40 models

● PLC System Settings Area

Write settings directly into the [PLC System Settings Area] with a peripheral tool (CX-Programmer, etc.) based on the model and port of the host.

Host model and Port No.	Channel No. (*1)	Write Value	Setting
CP1L-M30/M40/M60, serial port 1 CP1H-X40/XA40/Y20, serial port 1 CP1L-EM30/EM40, serial port 1	144	8000	Use Host Link
	145	0000~000A(*2)	Communication speed
	147	0000~001F	Unit number
CP1L-L14/L20, serial port 1 CP1L-M30/M40/M60, serial port 2 CP1H-X40/XA40/Y20, serial port 2 CP1L-EL20, serial port 1 CP1L-EM30/EM40, serial port 2	160	8000	Use Host Link
	161	0000~000A(*2)	Communication speed
	163	0000~001F	Unit number

Host model and Port No.	Channel No.	Write Value	Setting
CP1E-N14/N20, serial port 1 CP1E-N30/N40/N60/NA20, serial port 1	A617.15~12	0	Use Host Link
	A617.11~08	0, 3~A(*2)	Communication speed
	A617.07~00	00	7 data bits, 2 stop bits, Even
CP1E-N30/N40/N60/NA20, serial port 2	A618.15~12	0	Use Host Link
	A618.11~08	0, 3~A(*2)	Communication speed
	A618.07~00	00	7 data bits, 2 stop bits, Even

*1   The channel No. of CP1L/H is PLC Setup area.
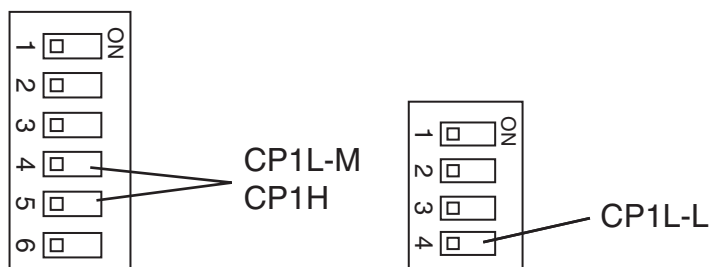
*2   The communication speed should be set to the same value as that of the NB Unit.

● Settings for the front-side DIP Switches

Set the front-side DIP switches so as to validate the settings for [PLC System Settings Area].

Set the SW4 to OFF when serial port 1 is used, set SW5 to OFF when serial port 2 is used. As the CP1L-L has only one serial port, it has no DIP switch SW5.

When connecting to C-Series CPU Units

C200HX/HG/HE(-Z), CPM1□, CPM2□, CQM1H type CPU Units

● Connection Methods

The connection methods for the CPU Units of different PLC models.

PLC Models	RS-232C connection	RS-422A connection
C200HX/HG/HE(-Z)	• Connect to the RS-232C port built in the CPU Unit • Connect to the RS-232C port (Ports A, B) of the serial communication board	• Connect to the RS-422A port (port A) of the serial communication board
CPM1A	• Connect to the peripheral port with a dedicated RS-232C adaptor (CPM1-CIF01).	• Connect to the peripheral port with a dedicated RS-422A adaptor (CPM1-CIF11 type).
CPM2A	• Connect to the RS-232C port built in the CPU Unit • Connect to the peripheral port with a dedicated RS-232C adaptor (CPM1-CIF01).	• Connect to the peripheral port with a dedicated RS-422A adaptor (CPM1-CIF11 type).
CPM2C	• Connect to the RS-232C port built in the CPU Unit or the peripheral port with a dedicated conversion cable (CPM2C-CN111 type, CS1W-CN118 type and CS1W-CN114 type) (CPM2C-CN111 type is a cable that divides the Unit port into the RS-232C port built in the CPU Unit and the peripheral port. When connecting to the peripheral port, a RS-232C adaptor (CPM1-CIF01 type) is also needed to be connected.)	• Connect to the peripheral port with a dedicated conversion cable (CPM2C-CN111 type or CS1W-CN114 type) and a RS-422A adaptor (CPM1-CIF11 type) (CPM2C-CN111 type is a cable that divides the Unit port into the RS-232C port built in the CPU Unit and the peripheral port).
CQM1H	• Connect to the RS-232C port built in the CPU Unit • Connect to the peripheral port with a conversion cable (CS1W-CN118 type) Connect to the RS-232C port (Port 1) of the serial communication board	• Connect to the RS-422A port (Port 2) of the serial communication board

● PLC System Settings Area

Write settings directly into the [PLC System Settings Area] (Data memory) with a peripheral tool (CX-Programmer, etc.) based on the model and port of the host.

For RS-232C

Host Model	Channel No.	Write Value	Setting
The RS-232C port built in C200HX/HG/HE(-Z), CPM2A, CPM2C, CQM1H	DM6645	0001	Use Host Link
	DM6646	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6648	0000	Unit No. 00
CPM1A	DM6650	0001	Use Host Link
	DM6651	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6653	0000	Unit No. 00
Port A of C200HX/HG/HE(-Z) (*1) Port 1 of CQM1H (*2)	DM6555	0001	Use Host Link
	DM6556	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6558	0000	Unit No. 00
Port B of C200HX/HG/HE(-Z) (*1)	DM6550	0001	Use Host Link
	DM6551	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6553	0000	Unit No. 00

*1   The RS-232C port of the Communication Board.

*2   The RS-232C port of the Serial Communication Board.

*3   □□ is the set value of the communication speed. Set the communication speed to the same value as that of the NB Unit.

*4   Standard settings of the Communication conditions are as follows:
Start bit: 1 bit, Data bit: 7 bit, Stop bit: 2 bit, parity check: even

For RS-422A

Host Model	Channel No.	Write Value	Setting
Port A of C200HX/HG/HE (-Z) (*1)	DM6555	0001	Use Host Link
	DM6556	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6558	0000	Unit No. 00
Port 2 of CQM1H (*2)	DM6550	0001	Use Host Link
	DM6551	03□□(*3)	Communication conditions are standard settings. (*4)
	DM6553	0000	Unit No. 00

*1   The RS-422A port of the Communication Board

*2   The RS-422A port of the Serial Communication Board

*3   □□ is the set value of the communication speed. Set the communication speed to the same value as that of the NB Unit.

*4   Standard settings of the Communication conditions are as follows:
Start bit: 1 bit, Data bit: 7 bit, Stop bit: 2 bit, parity check: even

For operations on [PLC System Settings Area], refer to the manual of the PLC employed.

● **Connection methods for CPM2C**

CPM2C only has a connector with the same shape of the CS-Series' peripheral port, but the signal cables inside are classified as used for the RS-232C port built in the CPU Unit and for the peripheral port. Therefore, when using CPM2C, differentiate between the settings for the RS-232C port built in the CPU and for the peripheral port based on the conversion cable and port employed to ensure correct use. Besides, when using a simple communication device (CPM2C-CIF21 type), connect to the RS-232C port. For details, refer to the *CPM2C Operation Manual* (W356).

Use a self-made connection cable to connect the NB Unit and CPM2C. Connect to CPM2C's built-in RS-232C port instead of the peripheral port.

Port connected to the PT	PLC System Settings
CS1W-CN118 type port(D-Sub 9-pin)	Carry out settings for the built-in RS-232C port
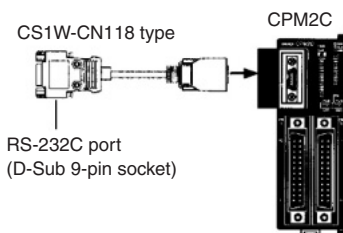
When using a simple communication device (CPM2C-CIF21 type), connect to the RS-232C port directly.
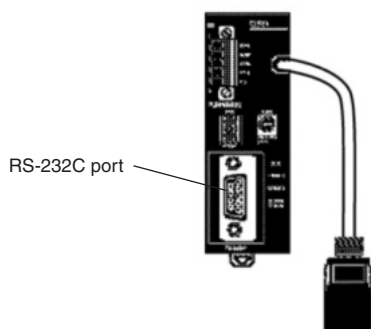
● **Settings for the front-side DIP Switches**

To activate the settings of [PLC System Settings Area] (Data memory), set as follows according to the PLC:

- For C200HX/HG/HE (-Z) and RS-232C of CQM1H

For C200HX/HG/HE(-Z)　　　　　　　　　　**For CQM1H**
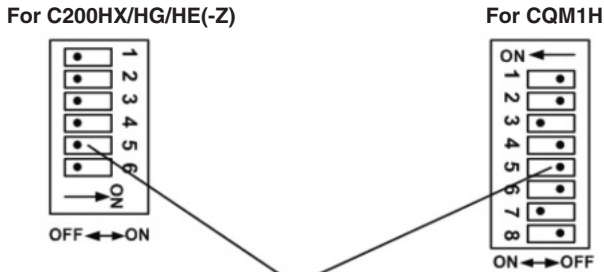
Communication condition setting for the RS-232C port
Set the DIP switch 5 to OF, and activate the "settings" in
PLC system settings.

- For CPM2A

Set the communication condition setting switch to [OFF] (downwards).
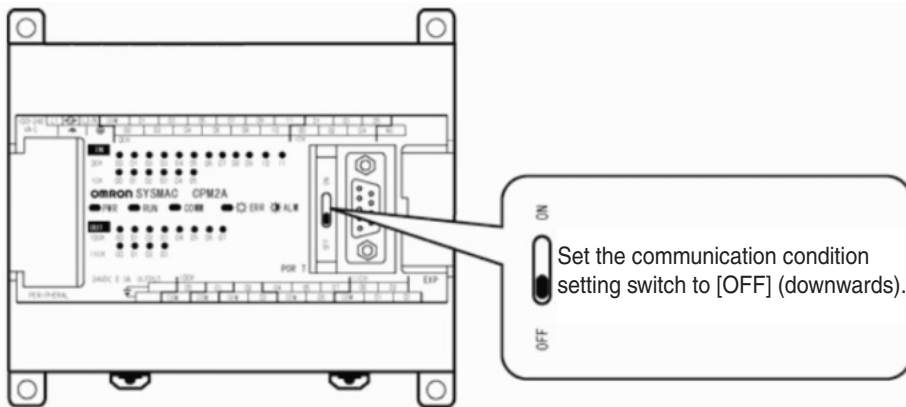
- For CPM2C (Only the RS-232C port can be connected)

Carry out settings according to the using conditions of the peripheral port and built-in RS-232C port.

• When connecting the PT to the built-in RS-232C port (connect the device that needs to perform communications other than that within the standard setting range)

Set SW1 to OFF
Set SW2 to ON

• When connecting the PT to the built-in RS-232C port (connect a programming console to the peripheral port)

Set SW1 to OFF
Set SW2 to ON

● **Setting methods for communication board switches (For RS-422A)**

• For C200HX/HG/HE (-Z)

Switch 1: 4 Side (4-wire = RS-422A)

Switch 2: ON side (terminal resistance ON = Terminal resistance activated)

• For CQM1H

2-wire/4-wire switch (WIRE): 4 side (4 wire = RS-422A)

Terminal resistance ON/OFF switch (TERM): ON side (terminal resistance ON = Terminal resistance activated)

Serial Communication Board
(Lining Board Slot 1)

Set the terminal resistance
ON/OFF switch to ON(right side)

2-wire/4-wire Selector Switch
RS-422A: [4](4-wire) (right side)
RS-485: [z](2-wire) (left side)
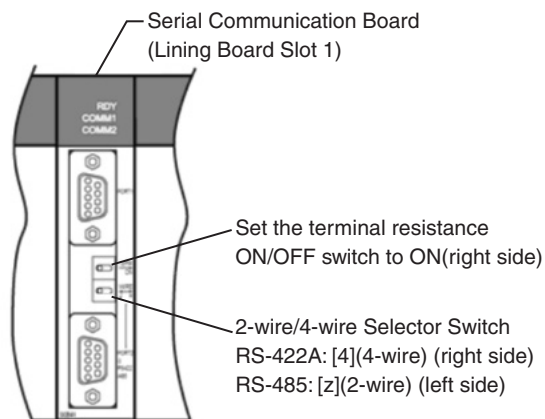
● **Settings for the communication adaptor switch**

• For RS-232C adaptor (CPM1-CIF01 type)

Set the mode setting switch to [HOST] (Up side).
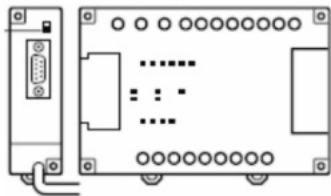
• For RS-422A adaptor (CPM1-CIF11 type)

Set the terminal resistance switch to ON (Up side)
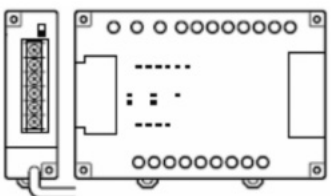
When connecting to CS-Series CPU Units

For CS1G/H-CPU□□ (-V1) types and CS1G/H-CPU□□H types

● Connection Methods

Connect to the RS-232C port built in the CPU Unit or the RS-232C port of the communication board. When connecting to the peripheral port, a connection cable dedicated for the peripheral port is needed (CS1W-CN118 type).

Only RS-232C can be used for connection.

● PLC System Settings Area

When connecting to CS-Series CPU Unit, refer to the following table and set the communication conditions as follows in [PLC System Settings] based on the communication port in use.

| Connection Methods	Channel No.	Write Value	Setting
Use the RS-232C port built in CS1G/H, CS1G/H-H	160	8000	Use Host Link
	161	0000~000A(*1)	Communication speed
	163	0000	Unit No. 00
Use the peripheral port of CS1G/H, CS1G/H-H	144	8000	Use Host Link
	145	0000~000A(*1)	Communication speed
	147	0000	Unit No. 00

*1   The communication speed should be set to the same value as that of the NB Unit.

[PLC System Settings] can be directly set with a peripheral tool (programming console), or it can be set by transmitting the [PLC System Settings] set up by a peripheral tool (CX-Programmer) to the CPU Unit.

For details about the [PLC System Settings], refer to *SYSMAC CS Series Operation Manual* (W339).

● Settings for the front-side Switches

Set the DIP switches 4 or 5 as follows according to the NB-Series' port connected.

DIP Switch (in the battery jar)
• When connecting a NB-Series Unit to a peripheral port, set SW4 to [ON] (communications carried out according to the PLC system settings).
• When connecting a NB-Series Unit to a RS-232C port, set SW5 to [OFF] (communications carried out according to the PLC system settings).

Peripheral Port
Mainly used for connecting peripheral tools, ect.
(also used for connecting RS-232C devices)

RS-232C Port
Mainly used for connecting RS-232C devices
(also used for connecting CX-Programmer)

When connecting to CJ1-Series CPU Units

For CJ1G-CPU☐☐ type, CJ1G/H-CPU☐☐H types and CJ1M-CPU☐☐ type

● Connection Methods

Connect to the RS-232C port built in the CPU Unit or the RS-232C port of the communication board. When connecting to the peripheral port, a connection cable dedicated for the peripheral port is needed (CS1W-CN118 type). Only RS-232C can be used for connection.

● PLC System Settings Area (for RS-232C)

When connecting to the CJ-Series CPU Unit, refer to the following table and set the communication conditions as follows in [PLC System Settings] based on the communication port in use.

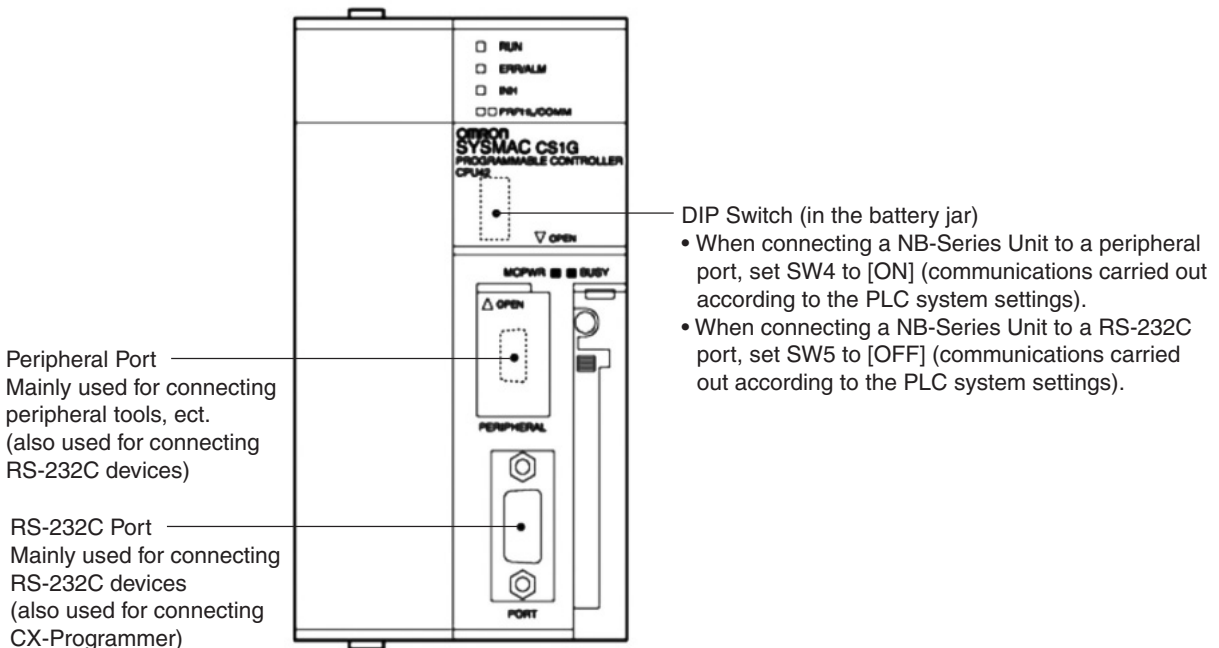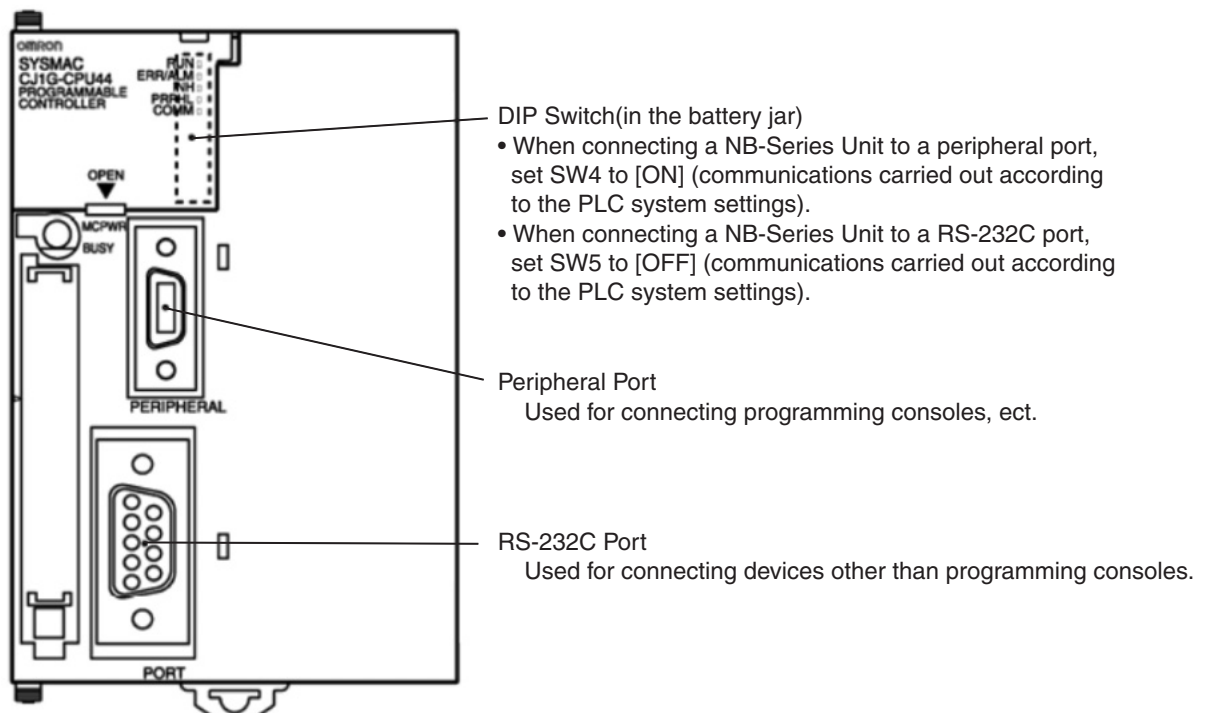| Connection Methods	Channel No.	Write Value	Setting
Use the RS-232C port built in CJ1G-CPU☐☐ type, CJ1G/H-CPU☐☐H types, CJ1M-CPU☐☐ types	160	8000	Use Host Link
	161	0000~000A(*1)	Communication speed
	163	0000	Unit No. 00
Use the peripheral port of CJ1G-CPU☐☐ type, CJ1G/H-CPU☐☐H types, CJ1M-CPU☐☐ type	144	8000	Use Host Link
	145	0000~000A(*1)	Communication speed
	147	0000	Unit No. 00

*1   The communication speed should be set to the same value as that of the NB Unit.

[PLC System Settings] can be directly set with a peripheral tool (Programming console), or it can be set by transmitting the [PLC System Settings] set up by a peripheral tool (CX-Programmer) to the CPU Unit.

For details about the [PLC System Settings], refer to *SYSMAC CJ Series Operation Manual* (W393).

● Settings for the front-side Switches

Set the DIP switches 4 or 5 as follows according to the NB-Series' port connected.

DIP Switch(in the battery jar)
• When connecting a NB-Series Unit to a peripheral port, set SW4 to [ON] (communications carried out according to the PLC system settings).
• When connecting a NB-Series Unit to a RS-232C port, set SW5 to [OFF] (communications carried out according to the PLC system settings).

Peripheral Port
    Used for connecting programming consoles, ect.

RS-232C Port
    Used for connecting devices other than programming consoles.

When connecting to CJ2-Series CPU Units

For CJ2M-CPU3□ type, CJ2M-CPU1□ type and CJ2H-CPU6□(-EIP) type

● Connection Methods

Connect to the RS-232C port built in the CPU Unit or the RS-232C port of the communication board.

● PLC System Settings Area (for RS-232C)

Carry out setting by transmitting the [PLC System Settings] set up by a peripheral tool (CX-Programmer) to the CPU Unit. On the [Serial Port] options page of [PLC System Settings], set the connection mode to Host Link: 7 Data Bits, 2 Stop Bits, Even. And set the communication speed to the same as that of the NB Unit.

For details about the [PLC System Settings], refer to *SYSMAC CJ2 Series Software User's Manual* (W473).

● Settings for the front-side Switches

Set the DIP switch 5 of the CPU Unit as follows according to the NB-Series' port connected.

Turn DIP SW5 OFF for serial communications.
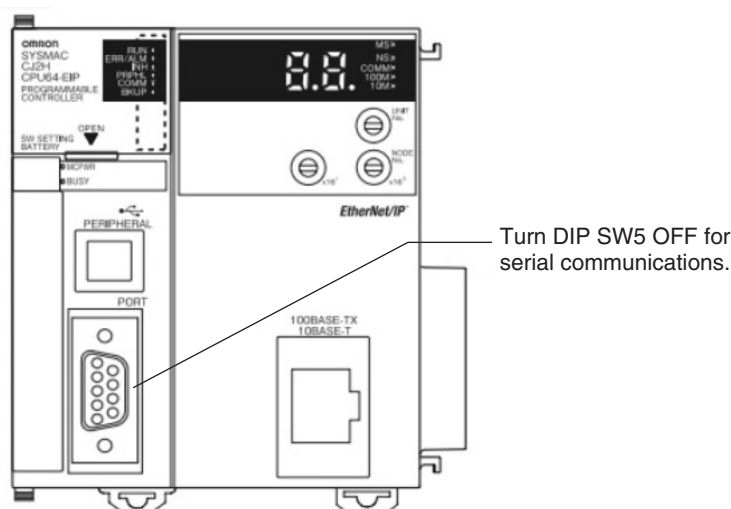
When connecting to Host Link Units of C-Series

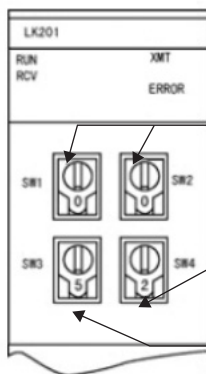Base-mounted type for C200HE(-Z) / C200HG(-Z) / C200HX(-Z) models

C200H-LK201/LK202-V1 model

● Settings for the Switches

- For C200H-LK201-V1 (RS-232C)

[Front-side switches]

Each switch is a rotary switch. Use a straight screwdriver set the switches as follows to display the numbers and symbols shown in the table.

- Set unit number (SW1, SW2)
  SW1 and SW2 set to [0]

- Command level, parity check, transmit code setting (SW4)
  SW4 set to [2]

- Communication speed setting (SW3)
  4,800Bit/s: Set SW3 to [4]
  9,600Bit/s: Set SW3 to [5]
  19,200Bit/s: Set SW3 to [6]

[Back-side switches]

- Link Type switch
  Set SW3 to [ON] "1 to 1"

- CTS switch setting
  Default set to [0V] (ON)
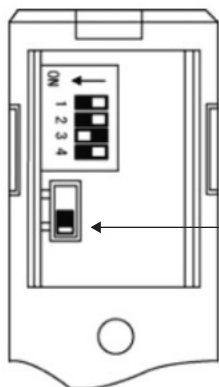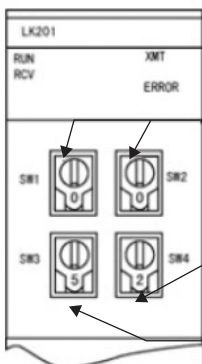
- For C200H-LK202-V1(RS-422A)

[Front-side switches]

Each switch is a rotary switch. Use a straight screwdriver set the switches as follows to display the numbers and symbols shown in the table.

- Unit number settings (SW1, SW2)
  Both of SW1 and SW2 are set to [0].

- Settings of insrruction levels, parity check and transmission codes (SW4)
  SW4 is set to [2]

- Settings of communication speed (SW3)
  4,800Bit/s: SW3 is set to [4]
  9,600Bit/s: SW3 is set to [5]
  19,200Bit/s: SW3 is set to [6]

[Back-side switches]
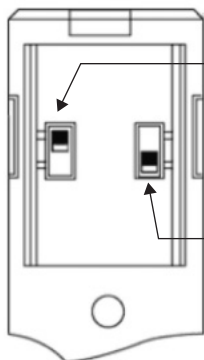
- Settings of the terminal resistance (selector switch)
  Set it to [ON] upwards.

- Selection of Link Type (DIP switch)
  Set it to [1 for 1 (ON)] upwards.

When connecting to a CS-Series Serial Communication Board

For CS1W-SCB21 type (Both of port 1 and 2 are RS-232C ports)

For CS1W-SCB41 type (Port 1 is RS-232C port and Port 2 is RS-422A/485 port.)

(Serial Communication Board for CS-Series CPU Units with RS-232C port, RS-422A port.)

● Settings for the DM Fixed Allocation Area of the CPU Unit

Write settings directly to the [DM Fixed Allocation Area] of the CPU Unit (System Settings Area) with a peripheral tool (programming console or CX-Programmer). After finishing the write-in, the settings can be activated through any of the methods of reconnecting the power supply, restarting the Unit, reactivating the communication port, executing the STUP instruction.
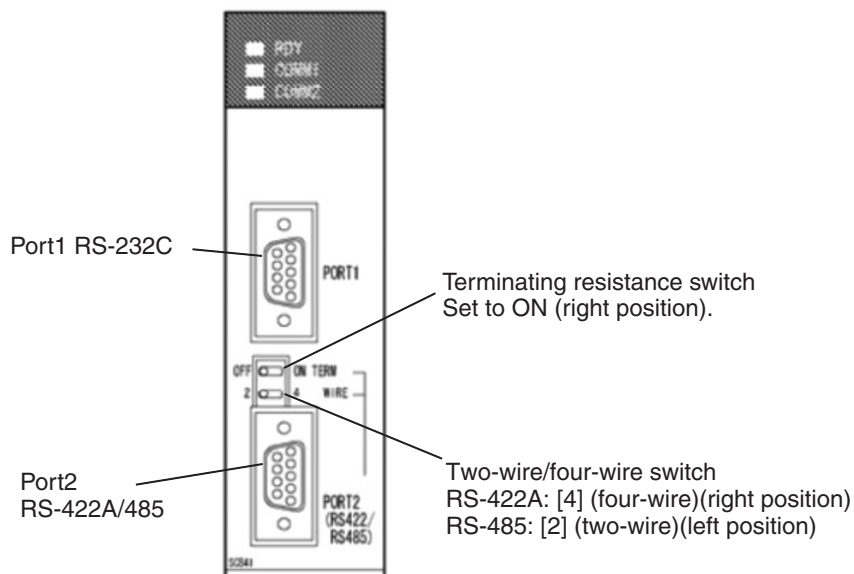
The followings are the Channel Nos. and settings of the DM Fixed Allocation Area.

It is the same when using RS-232C, RS-422A (port 2 of the CS1W-SCB41 type).

DM Fixed Allocation Area (CH)		Write Value	Setting
Port 1	Port 2		
DM32000	DM32010	8000	Use Host Link
DM32001	DM32011	0000~000A (*1)	Communication speed
DM32003	DM32013	0000	Unit No. 00

*1 The communication speed should be set to the same value as that of the NB Unit.

● Settings for front-side switches (For RS-422A)

Port1 RS-232C

Terminating resistance switch
Set to ON (right position).

Port2
RS-422A/485

Two-wire/four-wire switch
RS-422A: [4] (four-wire)(right position)
RS-485: [2] (two-wire)(left position)

When connecting to a CS-Series Serial Communication Unit

For CS1W-SCU21 type (Both of port 1 and 2 are RS-232C ports)

For CS1W-SCU31 type (Both of port 1 and 2 are RS-422A/485 ports) (Unit version1.3)

● Settings for the DM Fixed Allocation Area of the CPU Unit

Write settings directly to the [DM Fixed Allocation Area] of the CPU Unit (System Settings Area) with a peripheral tool (programming console or CX-Programmer). After finishing the write-in, the settings can be activated through any of the methods of reconnecting the power supply, restarting the Unit, reactivating the communication port, executing the STUP instruction.

The followings are the Channel Nos. and settings of the DM Fixed Allocation Area.

m = DM30000 + 100 × Unit No. (CH)

DM Fixed Allocation Area (CH)		Write Value	Setting
Port 1	Port 2		
m	m+10	8000	Use Host Link
m+1	m+11	0000~000A (*1)	Communication speed
m+3	m+13	0000	Unit No. 00

*1   The communication speed should be set to the same value as that of the NB Unit.

● Settings for the front-side Switches (Take CS1W-SCU21 as an example)

Set the Unit No. of the serial communication Unit by the rotary switch on the front side of the Unit. Use a straight screwdriver set the switches as follows to display the numbers and symbols shown in the table.
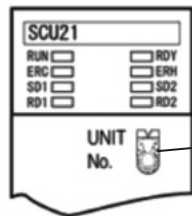
• Unit number settings
  Set it to [0] ~ [F] in order to avoid duplicating other Units.

When connecting to a CJ1-Series Serial Communication Unit

For CJ1W-SCU21 type (Both of port 1 and 2 are RS-232C ports)

For CJ1W-SCU31 type (Both of port 1 and 2 are RS-422A/485 ports) (Unit version1.3)

For CJ1W-SCU41 type (Port 1 is RS-422A/485 port and Port 2 is RS-232C port.)

● Settings for the DM Fixed Allocation Area of the CPU Unit

Write settings directly to the [DM Fixed Allocation Area] of the CPU Unit (System Settings Area) with a peripheral tool (programming console or CX-Programmer). After finishing the write-in, the settings can be activated through any of the methods of reconnecting the power supply, restarting the Unit, reactivating the communication port, executing the STUP instruction.

The followings are the Channel Nos. and settings of the DM Fixed Allocation Area.
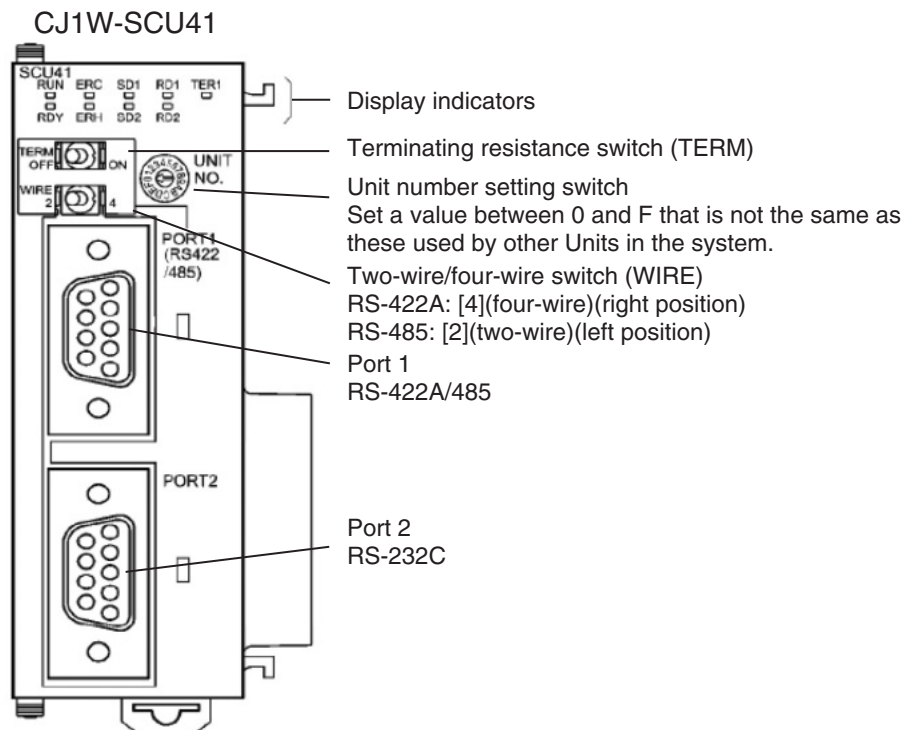
It is the same when using RS-232C, RS-422A.

$m = DM30000 + 100 \times$ Unit No. (CH)

DM Fixed Allocation Area (CH)		Write Value	Setting
Port 1	Port 2		
m	m+10	8000	Use Host Link
m+1	m+11	0000~000A (*1)	Communication speed
m+3	m+13	0000	Unit No. 00

*1   The communication speed should be set to the same value as that of the NB Unit.

● Settings for the front-side Switches (Take CJ1W-SCU41 as an example)

CJ1W-SCU41

Display indicators

Terminating resistance switch (TERM)

Unit number setting switch
Set a value between 0 and F that is not the same as these used by other Units in the system.

Two-wire/four-wire switch (WIRE)
RS-422A: [4](four-wire)(right position)
RS-485: [2](two-wire)(left position)

Port 1
RS-422A/485

Port 2
RS-232C

2-5   FINS/UDP Communication Connection

This section describes how to connect the PT with the Host through the FINS/UDP protocol.

Note OMRON Ethernet UDP communication protocol, both CJ/CS Series and CP Series, are FINS/UDP protocol. The difference between these two protocols is only in the address range of the channel.

2-5-1   Connecting to Host Via Ethernet

To connect to the network using Ethernet, the network number, node number, and IP address must be set. Use the NB-Designer to set the settings. (The default IP address of HMI Unit is 192.168.250.1.)
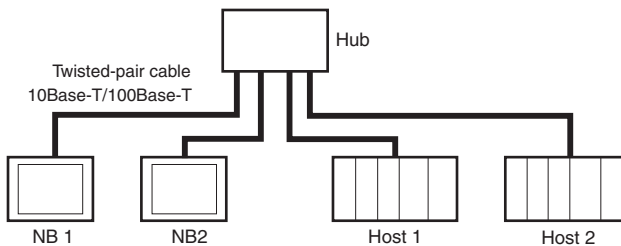
● **Connecting PT Directly to the Host**

Connect the NB to the host using twisted-pair cable.
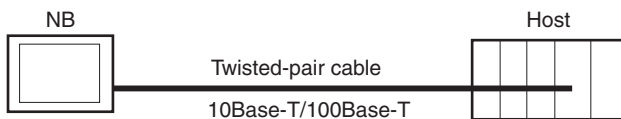
● **Connecting PT to Host with a Hub**

Multiple NBs and hosts can be connected using twisted-pair cable and a hub.

● **The Ethernet FINS communication for NB series products is only limited the local network, but the Ethernet communication cross the network segment is allowable with the prerequisite of using the router. That's to say, the supported FINS network is only limited to the local network, but the various devices in the network can be cross the network segment. Please take the following architecture as reference.**
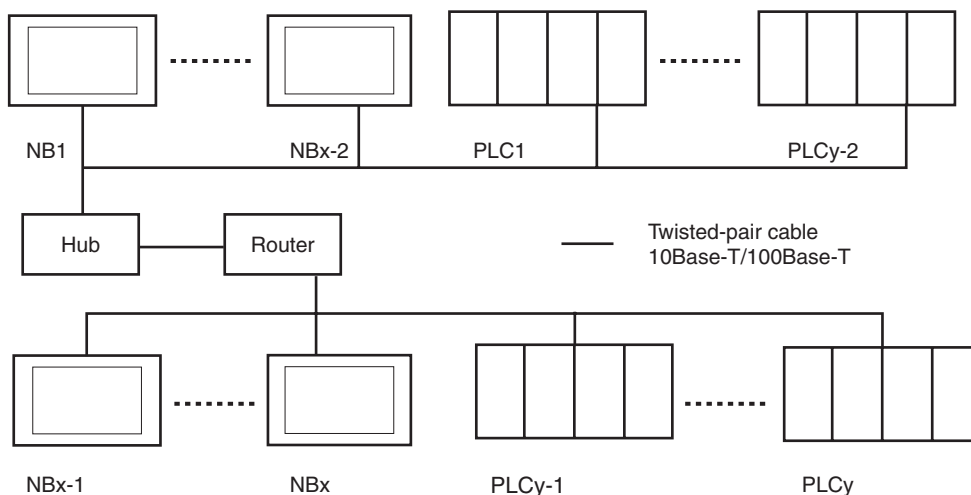
X represents the amount of NB series products, and y represents the amount of PLC. The relationship between x and y must meet the following conditions:

- $x \geq 1$
- $y \geq 1$
- $x + y \leq 33$

In this system architecture, the system has only one network number. And the unique ID, i.e. Node ID, is assigned to both NB and PLC in the system.

When the actual amount of configured devices (NB series products + PLC) is greater than 33, the customer can create a new NB-Designer project to handle this problem.

● Recommended Network Configuration Devices

The following products are recommended for configuring the network when an Ethernet Unit is used.

Part	Maker	Model number	Specifications	Inquires
Hub	100BASE-TX			
	OMRON	W4S1-03B	10/100 Mbit/s 3-port hub	
	OMRON	W4S1-05B(C)	10/100 Mbit/s 5-port hub	
	Phoenix Contact	SWITCH5TX	10/100 Mbit/s 5-port hub	
	10BASE-T			
	AlliedTelesis	MR820TLX	9-port hub with 10Base-5backbone port	Allied Telesis(0120) 86-0442(in Japan only)
Twisted-pair cable	100BASE-TX			
	Fujikura	F-LINK-E0.5mm x 4P	STP (shielded twisted-pair) cable: Category 5, 5e Note: Impedance is limited to 100.	---
	Fujikura	CTP-LAN50.5mm x 4P	UTP (unshielded twisted-pair) cable: Category 5, 5e	
	10BASE-T			
	Fujikura	F-LINK-E0.5mm x 4P	STP (shielded twisted-pair) cable: Category 3, 4, 5, 5e Note: Impedance is limited to 100.	
	Fujikura	CTP-LAN50.5mm x 4P	UTP (unshielded twisted-pair) cable: Category 3, 4, 5, 5e	
Connectors(Modular plug)	STP Plug			
	Panduit Corp	MPS588	---	
	UTP Plug			
	Panduit Corp	MP588-C	---	

Precautions on Laying Twisted-pair Cable

● Basic Precautions

- Press the cable connector in firmly until it locks into place at both the hub and the PLC.
- After laying the twisted-pair cable, check the connection with a 10Base-T cable tester.

● Environment Precautions

- The UTP cable is not shielded, and the hub is designed for use in OA environments. In environments subject to noise, construct a system with shielded twisted-pair (STP) cable and hubs suitable for an FA environment.
- Do not lay the twisted-pair cable together with high-voltage lines.
- Do not lay the twisted-pair cable near devices that generate noise.
- Do not lay the twisted-pair cable in locations subject to high temperature or high humidity.
- Do not lay the twisted-pair cable in locations subject to excessive dirt and dust or to oil mist or other contaminants.

● Hub Installation Environment Precautions

- Do not install the hub near devices that generate noise.
- Do not install the hub in locations subject to high temperature or high humidity.
- Do not install the hub in locations subject to excessive dirt and dust or to oil mist or other contaminants.

Connecting the Cable

Note 1   Turn OFF the PLC's power supply before connection or disconnecting twisted-pair cable.
    2   Allow enough space for the bending radius of the twisted-pair cable.

1   Lay the twisted-pair cable.

2   Connect the cable to the hub. Be sure to press in the cable until it locks into place.
Request cable installation from a qualified professional.

3   Connect the cable to the connector on the PLC. Be sure to press in the cable until it locks into place.

2-5-2 Parameter Settings for FINS/UDP at NB Side

After placing the desired HMI and PLC into the Construct Window, select [Network Device Setting] in the [Option] menu, and then click the "Add" button after the "Network Device Setting" dialog box pops up.

After selecting the Device Type and the related FINS/UDP protocol, you can make settings of IP Address, Node ID and Network No. and etc. for the HMI.

Note When there is CP1E PLC in the FINS/UDP network architecture, the Network No. should be 0. Otherwise, the communications through the FINS/UDP protocol between the NB and CP1E in this architecture will be impossible.

The settings of IP Address, Node ID and related communication parameters for PLC can be made.

Note The settings of communication parameters should be the same as that of the actual PLC.

Take the communication between single HMI and the PLC of Omron CJ2M-CPU33 (hereinafter abbreviated as "PLC0") as example:
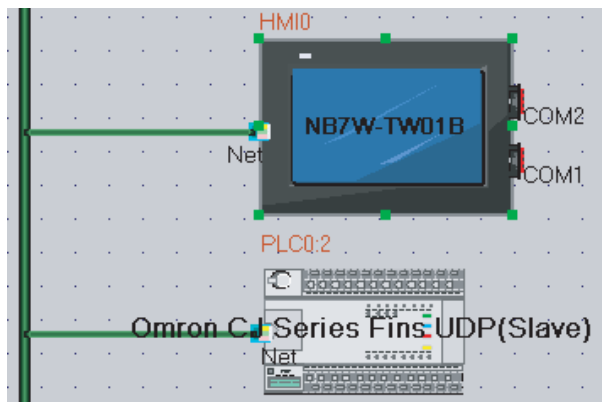
Configure the devices and set the communication parameters in the Construct Window, then click [Add] in [HMI Attribute] - [HMI] - [Network Device Setting] to set parameters for HMI network-interface communication.

● **HMI settings (sample)**

Device Type	Device No.	IP Address	Port Number	Communication Protocol	Mater/Slave	Station No. / Node Number
HMI	HMI0	192.168.250.1	9600	Omron CJ Series Fins UDP	M(Master)	1
PLC	PLC0	192.168.250.2	9600	Omron CJ Series Fins UDP (Slave)	S(Slave)	2

Please note that the IP address set here should be same as the actual IP address of PLC during the configuration. The result is shown as below:
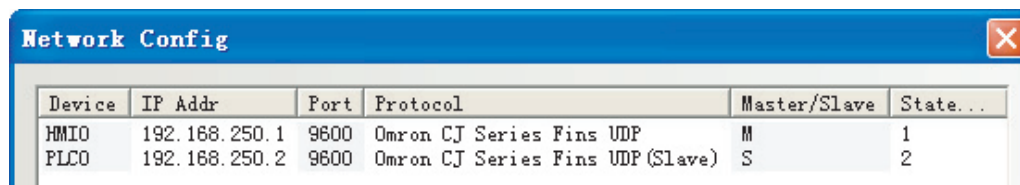
2-5-3   Host Types and Settings of Ethernet Unit

Units that are used for Ethernet communications vary according to the type and series of OMRON PLC used.

When connecting an Ethernet Unit, check the series and type of the PLC that it will be connected to and the model of the Unit that is mounted to the PLC.

NB-series PTs and the following Controllers can be connected with Ethernet units.

Series name	Using the built-in board	Using an Ethernet Unit	Ethernet Unit
CS Series	—	CS1G/H-CPU□□(-V1)	CS1W-ETN21
		CS1G/H-CPU□□H	
		CS1D-CPU□□H	CS1W-ETN21
CJ Series	—	CJ1G/H-CPU□□H	CJ1W-ETN21
		CJ1M-CPU□□(-ETN)	
	CJ1M-CPU□□-ETN	—	—
	—	CJ2H-CPU□□(-EIP)	CJ1W-ETN21
		CJ2M-CPU□□	
CP1H Series	—	CP1H-Y	CJ1W-ETN21
		CP1H-XA	CP1W-CIF41
		CP1H-X	
CP1L Series	—	CP1L-L14/20	CP1W-CIF41
		CP1L-M30/40/60	
	CP1L-EL20	—	—
	CP1L-EM30/40		
CP1E Series	—	CP1E-N30	CP1W-CIF41
		CP1E-N40	
		CP1E-N60	
		CP1E-NA20	

For details on the hosts that can be connected to NB-series PTs via the Ethernet, refer to *A-5 List of Models.*

● Host Settings

The types of hosts that can be connected to NB-series PTs with the Ethernet and the host settings are as follows. The following settings must be set at the host.

Item	Host Settings
Number of nodes	33 (See note 1)
Network number	0 to 127 (See note 2)
UDP port number	1024 to 65535, default is 9600.
IP address	0.0.0.0 to 255.255.255.255
Subnet mask	0.0.0.0 to 255.255.255.255
Default gateway	0.0.0.0 to 255.255.255.255
Node number	0 to 254 (See note 3)

Note 1 The max total number of registered nodes by NB-Designer in the network is 33, at least 1 NB-series PT and 1 host included.

   2 If there is CP1E PLC in the actual network architecture, the Network No. must be set to 0.
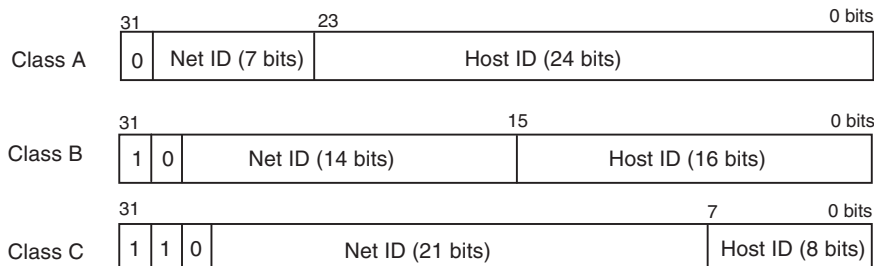
   3 The Node ID of 0 is equivalent to that of 1 (default).

For the limitations to the Host parameters' setting, refer to *2-5-5 Parameter Settings for FINS/UDP at Host Side*.

IP Address Configuration

The IP address is comprised of 32 bits of binary data, consisting of the net ID and host ID. The net ID is the address that identifies the network, and the host ID is the ID that identifies the host (node).

The IP address is divided into class A, B, and C. Select the address system from among the classes according to the network configuration.

	31		23		0 bits
Class A	0	Net ID (7 bits)		Host ID (24 bits)	

	31			15		0 bits
Class B	1	0	Net ID (14 bits)		Host ID (16 bits)	

	31				7	0 bits
Class C	1	1	0	Net ID (21 bits)		Host ID (8 bits)

The number of networks and hosts that can be identified depends on the class used.

Class	Network scope	Number of hosts
Class A	Small	2^{24} - 2 max. (16,777,214 max.)
Class B	Medium	2^{16} - 2 max. (65,534 max.)
Class C	Large	2^{8} - 2 max. (254 max.)

The IP address is a 32-bit value divided into four 8-bit fields. Each octet is expressed as a decimal and is separated by a period.

Example: 10000010 00111010 00010001 00100000 $\rightarrow$130.58.17.32

Additional Information

- Set the same net ID for all nodes in the same network.
- The net ID of the IP address is the value that identifies the Ethernet network (IP network segment). The net ID is not the same as the network address used for FINS communications.
- The IP network segment is the logical network unit that is configured by the nodes that have the same net ID.

IP Address Allocation

The IP addresses are allocated so that they are unique for each node in the network (or between two or more networks). If two or more nodes are allocated the same IP address, the remote nodes with the same IP address will also malfunction.

IP (Internet Protocol) is a communications protocol that conforms to international standards. Therefore, to connect to the Internet, always obtain IP addresses that have been allocated by a public organization (i.e., the NIC in the country of use, such as the JPNIC in Japan). Using IP addresses that are not recognized by the NIC (JPNIC) to connect to the Internet could have unforeseen social consequences, such as causing the networks of another organizations to malfunction unexpectedly.

Local IP Address

The local IP address indicates the IP address of the Ethernet Unit that is used to set the settings.

The following IP address settings are not possible.

> Net ID with all bits set to 0 or 1.
>
> Host ID with all bits set to 0 or 1.
>
> Subnet ID with all bits set to 1.
>
> IP addresses that begin with 127 (7F Hex) (e.g., 127.35.21.16).

Subnet Mask

When more than one node is connected to the network, network operation and management can be difficult. Therefore, for convenience, configure the system by dividing a single network into multiple sub-networks. The system operates internally as multiple networks, but externally appears as a single network.

To operate a system in this way, divide the host ID field of the IP address into a subnet ID field and a host ID field.

The subnet ID field is identified by the information in the subnet mask. The subnet mask is a bit mask in which the net ID and subnet ID fields are 1 and the host ID field is 0.

> Example: 11111111 11111111 11111111 00000000 → FFFFFF00

The subnet mask must have a value that is common to all nodes on the same sub-network.

Setting the subnet mask is not required if sub-networks are not used. The system recognizes subnet masks without a subnet ID field (i.e., subnet masks with net ID and host ID fields only).

The methods for setting each Unit are described next.

CS-series PLCs

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CS-series Ethernet Units:

CS1W-ETN21

● Setting the Front Panel Switches

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the CPU Unit are all unique.

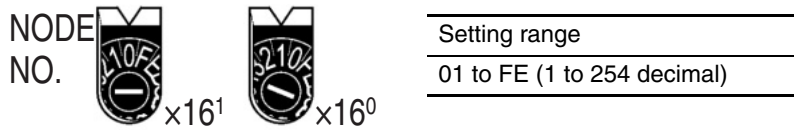Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

UNIT NO.

Setting range
0 to F

Setting Node Numbers

| Setting range |
|---|
| 01 to FE (1 to 254 decimal) |

Set the upper digit using the left rotary switch and the lower digit using the right rotary switch.

The factory setting is 01. The Node ID of the dip switch here must be consistent with that of PLC in the "Network Device Setting" dialog box for the actual project created in the NB-Designer.

● **Setting the Rear Panel Switches**

Setting Local IP Addresses

Set the local IP address for the Ethernet Unit using the eight hexadecimal rotary switches (local IP address setting switches), expressing each 4-bit value as a single hexadecimal digit. Set the IP address as a hexadecimal using the eight switches combining SW1 and SW2, SW3 and SW4, SW5 and SW6, and SW7 and SW8, as shown in the following diagram.

Setting range for each switch
0 to F
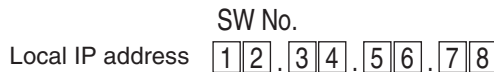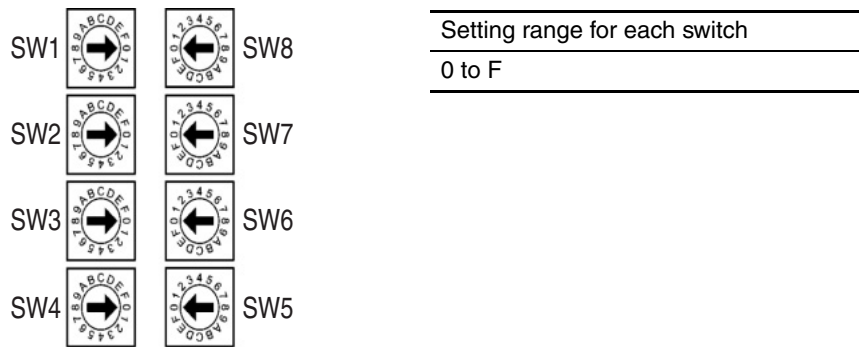
Example: Setting 130.58.17.32 (Decimal)

This address will be 82.3A.11.20 in hexadecimal, so the switch would be set as shown in the following table.

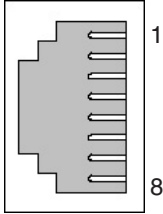| Switch Setting	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
	8	2	3	A	1	1	2	0
Local IP address in hexadecimal	82		3A		11		20	
Local IP address in decimal	130		58		17		32	

Additional Information

- When converting the data by "automatic generation" method (default method), please set the node numbers to be consistent with the values of local IP address setting switches SW7 and SW8, and set ID thresholds for other Hosts to 0. If the Host ID value corresponding to the IP address is not consistent with the node number, the ERC indicator will flash.
- Please use the CX-Programmer to set the subnet mask for the CPU Bus Unit Setup Area.

● **Ethernet Connectors**

CS1W-ETN21

This is the connector used to connect the twisted-pair cable to the Ethernet.

• Electrical characteristics: Conforms to IEEE802.3 standards.

• Connector structure: RJ45 8-pin modular connector (conforms to ISO8877).

Connector Pin	Signal name	Abbreviation	Signal direction
1	Send data +	TD+	Output
2	Send data -	TD-	Output
3	Receive data +	RD+	Input
4	Not used.	-	-
5	Not used.	-	-
6	Receive data -	RD-	Input
7	Not used.	-	-
8	Not used.	-	-

CJ-series PLCs

Note 1   Always turn OFF the power to the PLC before setting the rotary switches.

2   Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CJ-series Ethernet Units:

CJ1W-ETN21

● **Setting the Front Panel Switches**

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the same CPU Unit are all unique.

Use a small screwdriver to set the rotary switches, being careful not to damage them.
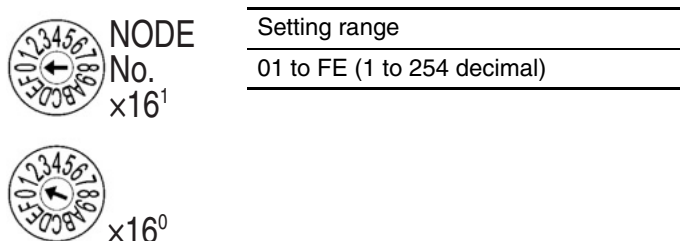
The factory setting is 0.

UNIT
No.

Setting range
0 to F

Setting Node Numbers

Set the node numbers as hexadecimal values with the node number setting switch. Always set the node numbers so that other Ethernet Units connected to the same Ethernet network all have unique addresses. As long as the addresses are unique, they can be set between 01 and FE (1 to 254 decimal).

$NODE$
$No.$
$\times 16^1$

$\times 16^0$

Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the top rotary switch and the lower digit using the bottom rotary switch.

The factory setting is 01.

● Setting Local IP Addresses

For CJ-series Ethernet Units, set the local IP address from the CX-Programmer or other Support Software for the CPU Unit. Refer to the SYSMAC CS/CJ Series Ethernet Unit Operation Manual (Cat. No. W343) for details on setting methods.

● Ethernet Connectors

CS1W-ETN21

This is the connector used to connect the twisted-pair cable to the Ethernet.
- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877).

Additional Information

- CX-Programmer version 8.1 or higher is required when CP1W-CIF41 is used.

CP-series PLCs

CP-series Ethernet Option Board

CP1W-CIF41

● Setting Node Numbers

Set the node number to a unique value. Do not set it to the same value as any other Ethernet node on the same Ethernet network. Refer to the following manuals for the setting procedures.

CP1H: SYSMAC CP Series CP1H CPU Unit Operation Manual (Cat. No. W450)

CP1L: SYSMAC CP Series CP1L CPU Unit Operation Manual (Cat. No. W462)

CP1E: SYSMAC CP Series CP1E CPU Unit Software User's Manual (Cat. No. W480)

● **Setting Local IP Addresses**

Use a Web browser to set the local IP address of the CP-series Ethernet Option Board.

Refer to the following manuals for the setting procedures.

CP1H: SYSMAC CP Series CP1H CPU Unit Operation Manual (Cat. No. W450)

CP1L: SYSMAC CP Series CP1L CPU Unit Operation Manual (Cat. No. W462)

CP1E: SYSMAC CP Series CP1E CPU Unit Software User's Manual (Cat. No. W480)

● **Ethernet Connector**

CP1W-CIF41

This is the connector used to connect the twisted-pair cable to the Ethernet.

• Electrical Characteristics: Conform to the IEEE 802.3 standard.
• Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877.)

CP1L-EL/EM

● **Setting Node Numbers**

Set the node number to a unique value from the CX-Programmer or other Support Software. Do not set it to the same value as any other Ethernet node on the same Ethernet network. Refer to the following manuals for the setting procedures.

CP1L-EL/EM: SYSMAC CP Series CP1L-EL/EM CPU Unit Operation Manual (Cat. No. W516)

● **Setting Local IP Addresses**

Set the local IP address from the CX-Programmer or other Support Software for the CP1L-EL/EM series CPU Unit.

Refer to the following manuals for the setting procedures.

CP1L-EL/EM: SYSMAC CP Series CP1L-EL/EM CPU Unit Operation Manual (Cat. No. W516)

● **Ethernet Connector**

CP1L-ETN21

This is the connector used to connect the twisted-pair cable to the Ethernet.

• Electrical Characteristics: Conform to the IEEE 802.3 standard.
• Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877.)

2-5-4   Host Types and Settings of Ethernet/IP Unit

NB-series PTs can communicate with CS/CJ-series Ethernet/IP Units and CJ2H-CPU□□-EIP, CJ2M-CPU3□.

Units that are used for Ethernet/IP communications vary according to the type and series of OMRON PLC used.

When connecting an Ethernet/IP Unit, check the series and type of the PLC that it will be connected to and the model of the Unit that is mounted to the PLC.

NB-series PTs and the following Controllers can be connected with Ethernet/IP units.

Series name	Using the built-in board	Using an Ethernet Unit	Ethernet Unit
CS Series	—	CS1G/H-CPU□□(-V1) CS1G/H-CPU□□H CS1D-CPU□□H	CS1W-EIP21
CJ Series	—	CJ1G/H-CPU□□H CJ1M-CPU□□(-ETN)	CJ1W-EIP21
	CJ2H-CPU□□-EIP	—	—
	CJ2M-CPU3□	—	—
	—	CJ2H-CPU□□(-EIP) CJ2M-CPU□□	CJ1W-EIP21
CP Series	—	CP1H	CJ1W-EIP21

Note Ethernet/IP Unit: Unit version 2.1 or later, the CJ2H-CPU□□-EIP and CJ2M-CPU3□ CPU Units have a built-in Ethernet connector.

For details on the hosts that can be connected to NB-series PTs via the Ethernet/IP, refer to *A-5 List of Models*.

Refer to the following manual for host parameter settings:

SYSMAC CS/CJ-series Ethernet/IP Units Operation Manual (Cat. No. W465),

SYSMAC CJ-series CJ2 CPU Units Operation Manual (Cat. No. W472).

For the limitations to the Host parameters' setting, refer to *2-5-5 Parameter Settings for FINS/UDP at Host Side*.

Connecting to a CJ-series CPU Unit

Note 1 Always turn OFF the power to the PLC before setting the rotary switches.

2 Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CJ-series CPU Unit (Built-in EtherNet/IP Port):

CJ2H-CPU□□-EIP

CJ2M-CPU3□

● Setting Local IP Addresses

Set the local IP address with the CX-Programmer or other Support Software.

Refer to the *SYSMAC CS/CJ Series Ethernet/IP Units Operation Manual* (Cat. No. W465) for details on setting methods.

● **Setting the Front Panel Switches**

Setting the Unit Numbers

Set a unique unit number for the CJ2 CPU Unit built-in Ethernet/IP port. The same unit number cannot be used by any other CPU Bus Unit connected to the CJ2 CPU Unit.

Use a small screwdriver to make the setting, and be sure not to damage the rotary switch. The unit number is factory-set to 0.

UNIT No.

Setting range
0 to F
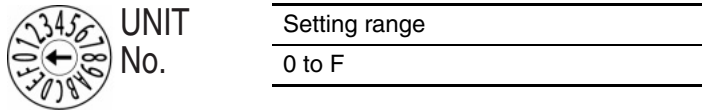
Setting Node Numbers

Set a FINS address for the built-in Ethernet/IP port. With the FINS communications service, multiple Ethernet/IP Units (including the CJ2 Unit built-in Ethernet/IP port) connected by Ethernet are identified by their node addresses. Using the node address switches, set a unique node address in hexadecimal. The same node address cannot be used by any other Ethernet/IP Unit or Ethernet Unit connected on the same Ethernet network.

As long as it does not duplicate any other address, the node address can be set from 01 to FE (1 to 254 in decimal).

$\times 16^1$ NODE No. $\times 16^0$

Setting range
01 to FE hex (1 to 254 decimal)
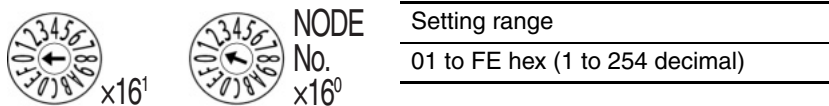
Note The node address is factory-set to 01. With the default setting, the values set on these switches become the last two digits of the built-in Ethernet/IP port's IP address.
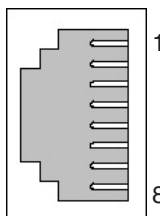
The default IP address is 192.168.250.node_address. With the factory-set node address of 01, the default IP address is 192.168.250.1.

The Node ID of the dip switch here must be consistent with that of PLC in the "Network Device Setting" dialog box for the actual project created in the NB-Designer.

● **Ethernet Connectors**

This is the connector used to connect the twisted-pair cable to the Ethernet.
- Electrical Characteristics: Conforms to IEEE802.3 standards.
- Connector Layout: RJ45 8-pin modular connector (conforms to ISO 8877).

Connector Pin	Signal name	Abbreviation	Signal direction
1	Send data	TD+	Output
2	Send data -	TD-	Output
3	Receive data +	RD+	Input
4	Not used.	-	-
5	Not used.	-	-
6	Receive data -	RD-	Input
7	Not used.	-	-
8	Not used.	-	-

Connecting to a CS-series Ethernet/IP Unit

Note 1   Always turn OFF the power to the PLC before setting the rotary switches.

2   Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.
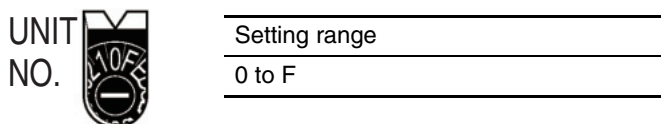
CS-series EtherNet/IP Unit:

CS1W-EIP21

● Setting the Front Panel Switches

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the same CPU Unit are all unique.
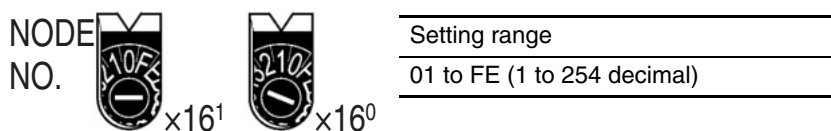
Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

UNIT NO.

Setting range
0 to F

Setting Node Numbers

Use the node address switches to set the node address to a unique hexadecimal value. Do not set it to the same value as any other Ethernet/IP Unit or built-in port on the same Ethernet/IP network. As long as it does not duplicate the address of any other Ethernet/IP Unit or built-in port, the node address can be set from 01 to FE hex (1 to 254 decimal).

NODE NO. $\times 16^1$ $\times 16^0$

Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the left rotary switch and the lower digit using the right rotary switch.

The factory setting is 01. The Node ID of the dip switch here must be consistent with that of PLC in the "Network Device Setting" dialog box for the actual project created in the NB-Designer.

● Setting Local IP Addresses

Set the local IP address with the CX-Programmer or other Support Software.

For the setting procedure, refer to the *SYSMAC CS/CJ-series Ethernet/IP Units Operation Manual* (Cat. No. W465).

● Ethernet Connectors

This is the connector used to connect the twisted-pair cable to the Ethernet.

• Electrical Characteristics: Conforms to IEEE802.3 standards.
• Connector Layout: RJ45 8-pin modular connector (conforms to ISO 8877).

Connecting to a CJ-series Ethernet/IP Unit

Note 1   Always turn OFF the power to the PLC before setting the rotary switches.

2   Create I/O tables for the CPU Unit when setting the unit number for the first time or changing settings.

CJ-series EtherNet/IP Unit:

CJ1W-EIP21

● Setting the Front Panel Switches

Setting Unit Numbers

Always set the unit numbers so that the unit numbers of other CPU Bus Units mounted to the same CPU Unit are all unique.

Use a small screwdriver to set the rotary switches, being careful not to damage them.

The factory setting is 0.

UNIT No.

Setting range
0 to F

Setting Node Numbers

Use the node address switches to set the node address to a unique hexadecimal value. Do not set it to the same value as any other Ethernet/IP Unit or built-in port on the same Ethernet/IP network. As long as it does not duplicate the address of any other Ethernet/IP Unit or built-in port, the node address can be set from 01 to FE hex (1 to 254 decimal).

NODE No.
$\times 16^1$ $\times 16^0$

Setting range
01 to FE (1 to 254 decimal)

Set the upper digit using the left rotary switch and the lower digit using the right rotary switch.

The factory setting is 01. The Node ID of the dip switch here must be consistent with that of PLC in the "Network Device Setting" dialog box for the actual project created in the NB-Designer.

● Setting Local IP Addresses

Set the local IP address with the CX-Programmer or other computer support software. Refer to the *Ethernet/IP Unit Operation Manual* (Cat. No. W465) for details on setting methods.

● Ethernet Connectors

This is the connector used to connect the twisted-pair cable to the Ethernet.
• Electrical Characteristics: Conforms to IEEE802.3 standards.
• Connector Layout: RJ45 8-pin modular connector (conforms to ISO8877).

2-5-5   Parameter Settings for FINS/UDP at Host Side

Because the port number of NB is dynamic, the user doesn't need to set it during the communications through the FINS/UDP protocol. But user needs to set the UDP parameters at the Host side of OMRON PLC in the CX-Programmer referring to the following limitations.

Take the settings of CJ1W-ETN21 as example:
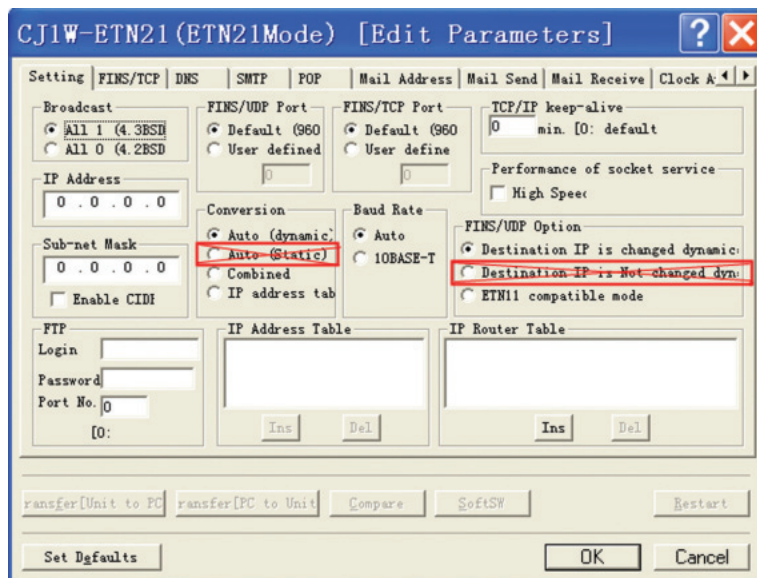
The limitations are as follows:

1. Do not check the "Auto (Static)" option in the [Conversion] check box.

2. Do not check the "Destination IP is Not changed dyn:" in the [FINS/UDP Option] check box.

3. Only the "Destination IP is changed dynamic:" can be checked in the [FINS/UDP Option] check box after either of "Auto (dynamic)", "Combined" and "IP address table" is checked in the [Conversion] check box. When insert the IP address into the [IP Address Table] after the "IP address table" or "Combined" is checked, do not make the Node ID of NB into it. *1

*1 If the Node ID of NB is placed into the [IP Address Table], the system will require the NB to use the same port with the PLC, and "PLC response error" information will appear on NB.

The prompts for possible errors occurred to NB when FINS/UDP protocol is adopted are described as follows:

 "PLC Response Error": Response to the abnormal information caused by the Read/Write command to PLC.

 "PLC No Response: xx-xx-x": No response is made by PLC and xx-xx-x represents HMI No.-Node ID of PLC-Port Number.

3

System Setting Mode

This section describes the System Setting Mode

3-1   Display Method of System Setting Mode

Enter the System Setting Mode following the procedures below.

(1) Set both the DIP switches SW1 and SW2 on the back side to ON.

(2) Press the Reset switch, restart the NB Unit, and then it enters into the System Setting Mode.

3-2   Functions of System Setting Mode

The following items can be set in System Setting Mode:

(1) Time calibration: check whether the year, month, day, hour, minute and second are the current time values, and if not, rectify them manually.

(2) IP Address (Only supported by NB□□-TW01B): Sets the IP address for HMI.

Port (Only supported by NB□□-TW01B): Sets the port number.

Subnet Mask (Only supported by NB□□-TW01B): Sets the subnet mask.

Gateway (Only supported by NB□□-TW01B): Sets the gateway.

(3) Startup Window No.: the window displayed after launching the NB Unit. The default is window 0.

(4) Backlight Saver Time: time to activate the screen saver, and the Unit is minute. The default is 10 minutes. The screen saver is not brought into effect when the set value is 0.

(5) Mute Enabled/Disabled: ON/OFF of the buzzer.

(6) Brightness Up/Down: with this, brightness of the screen can be adjusted, bringing the screen to its best visual effect.

(7) Export/Import (Only supported by NB□□-TW01B):

USB←HMI: Uploads the user project file (.pkg) required by the HMI operation to the USB memory. And the upload password is required during the export. If the upload password is not set, it needs to use the default password of 888888.

USB→HMI: Downloads the user project file (.pkg) in USB memory to HMI.

RCP←HMI: Uploads the recipe data file (.rcp) in HMI to the USB memory.

RCP→HMI: Downloads the recipe data file (.rcp) in USB memory to HMI.

The System Setting Mode screen of the NB7W-TW01B is as follows:
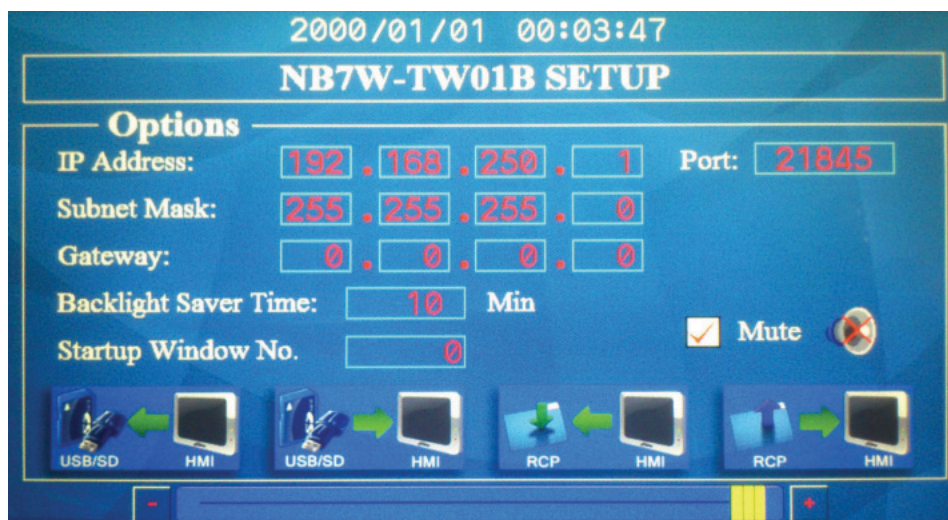
The System Setting Mode screen of the NB7W-TW00B is as follows:
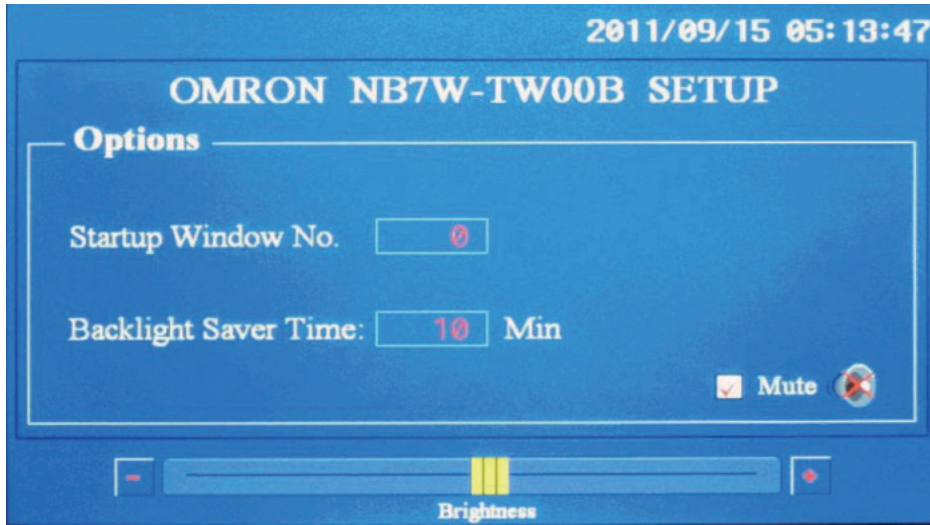
If you want to change the month, click where the month is (eg. 09), and a digit input keyboard will pop up. Input the month value, and click the Enter button to confirm the change.

4

Calibrate Mode

This section describes the Calibrate Mode.

4-1   Display Method of Calibrate Mode

There are 2 methods for entering into Calibrate Mode.

(1)   Set the DIP switches SW1 and SW2 on the back side respectively to OFF and ON.

Press the Reset switch, restart the NB Unit, and then it enters into the Calibrate Mode.

(2)   Place a "Function Key" component in the window, and set its function to "Touch Calibration".

Click this icon to start Calibrate Mode.

4-2   Functions of Calibrate Mode

Procedures to carry out Calibrate Mode:

Track and touch the "+" displayed on the screen and you will hear a "click". Carry on with this, until the "+" disappear followed by a "TP Adjust Success!" turning up on the screen. Set both of the DIP switches SW1 and SW2 to OFF, press the Reset switch again.

4-3   On-line Touch-control Calibration Function

Besides using the DIP switches, Touch-control Calibration can also be achieved with a function key while the software is running, thus sparing the time of equipment adjustment and the trouble of opening the control panel. For details, refer to *3-7-2 Function Key* in the *NB-Designer Operation Manual*.

A*pp*

Appendices

App

A-1   Specifications

A-1-1   General Specifications

Items	Specifications						
Model	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Rated power supply voltage	DC24V±15%(DC20.4~27.6V)						
Power consumption	5W	9W	6W	10W	7W	11W	14W
Ambient operating temperature	0°C~50°C						
Ambient storage temperature	-20°C~60°C						
Ambient operating humidity	10%~90% RH (without condensation)						
Ambient storage humidity	10%~90% RH (without condensation)						
Operating environment	No corrosive gases						
Noise Immunity	Compliant with IEC61000-4-4, 2KV (Power cable)						
Vibration resistance (During operation)	10 to 57Hz with a 0.075mm amplitude, 57 to 150Hz 9.8m/s^2 for 30 min each in X, Y and Z directions						
Shock resistance (During operation)	147m/s^2 for 3 times each in X, Y and Z directions, with each time lasting for 11 ms						
Dimensions W×H×D(mm)	129.8×103.8×52.8		184.0×142.0×46.0		202.0×148.0×46.0		268.8×210.8×54.0
Panel opening dimension W×H(mm)	119.0×93.0		172.4×131.0		191.0×137.0		258.0×200.0
Panel thickness range	1.6~4.8 mm						
Weight	310g	315g	620g	625g	710g	715g	1545g
Degree of protection	Front operation part: IP65 (Dust proof and drip proof only from the front of the panel)						
Battery life	5 years (at 25 °C)						
Applicable standards	EC Directives, KC, cULus508						

A-1-2   Performance Specifications

● Display specifications

Items		Specifications						
		NB3Q		NB5Q		NB7W		NB10W
		TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Display panel	Display device	3.5"TFT LCD		5.6"TFT LCD		7"TFT LCD		10.1"TFT LCD
	Resolution	320×240		320×234		800×480		800×480
	Display color	65536 colors						
	Valid display area W×H(mm)	71×53		113×85		154×85		221×133
Backlight	Life	50,000 hours (Typ) of operating time at the normal temperature (25 °C) with 40% brightness						
Front-side LED		ON: power connected OFF: power disconnected						

● **Operation part specifications**

Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Touch panel	Type: resistance type						
	Operation force: 0.5~0.8 N						
	Press endurance: min. 1,000,000 times (at 25 °C)						

● **External I/F specifications**

Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
USB Slave	1 port (for screen data transmission with a PC)						
	Equivalent of USB 2.0 Full speed						
USB Host	-	1 port	-	1 port	-	1 port	1 port
		Equivalent of USB 2.0 Full speed		Equivalent of USB 2.0 Full speed		Equivalent of USB 2.0 Full speed	Equivalent of USB 2.0 Full speed

● **Programmer (a software for making screen data, and "✓" mark means support.)**

Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
Name/Version	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
NB-Designer version 1.0X	-	-	✓	-	✓	-	-
NB-Designer version 1.1X	-	-	✓	✓	✓	✓	-
NB-Designer version 1.2X	✓	✓	✓	✓	✓	✓	✓

A-1-3 Communication Specifications

● Host Link communication specifications

| Items	Specifications						
	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
COM1	Compliant with EIA RS-232C/422A/485 D-sub, 9-pin connector socket At one point, only one from RS-232C, RS-422A and RS-485 can be designated to perform communications Communication cable length: Max.15m (RS-232C) Max. 500m (RS-422A/485)		Compliant with EIA RS-232C D-sub, 9-pin connector socket Pin 6 DC +5V output (Max. current: 250mA) Communication cable length: Max.15m				
COM2	-		Compliant with EIA RS-232C/422A/485 D-sub, 9-pin connector socket At one point, only one from RS-232C, RS-422A and RS-485 can be designated to perform communications Communication cable length: Max.15m (RS-232C) Max. 500m (RS-422A/485)				

● Ethernet communication specifications

**Note** The HMI of the NB□□-TW01B has the Ethernet connection function.

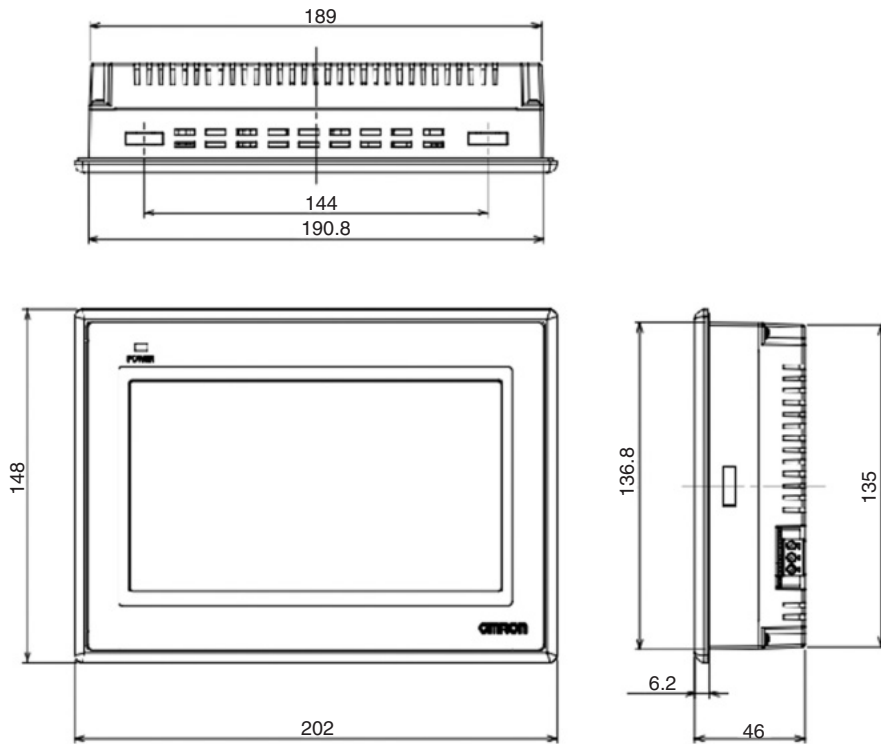| Items	Specifications
Conformance standards	Conforms to IEEE 802.3 / Ethernet (10/100Base-T)
Transmission medium	2 pair Cat 3 UTP 22 to 26AWG, Cat 5, Cat 5e, Cat 6
Transmission distance	100 m (node-to-hub and hub-to-hub)
Connector	8-pin modular connector

A-2　External Dimensions

● **NB3Q-TW00B/NB3Q-TW01B model**
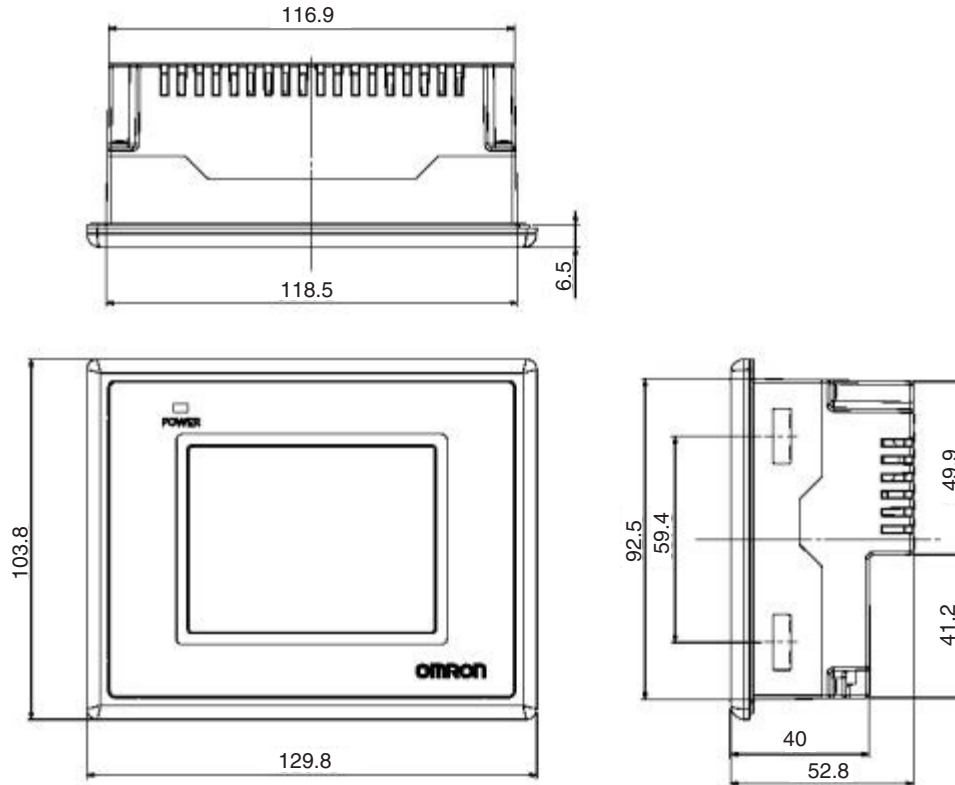
● **NB5Q-TW00B/NB5Q-TW01B model**
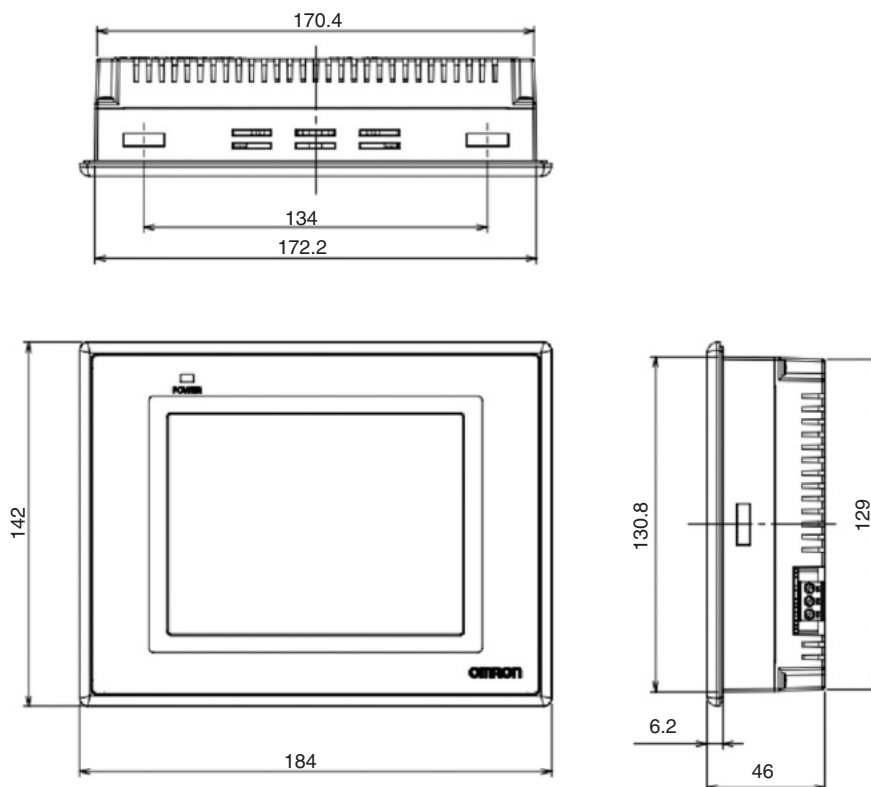
● **NB7W-TW00B/NB7W-TW01B model**

● **NB10W-TW01B model**
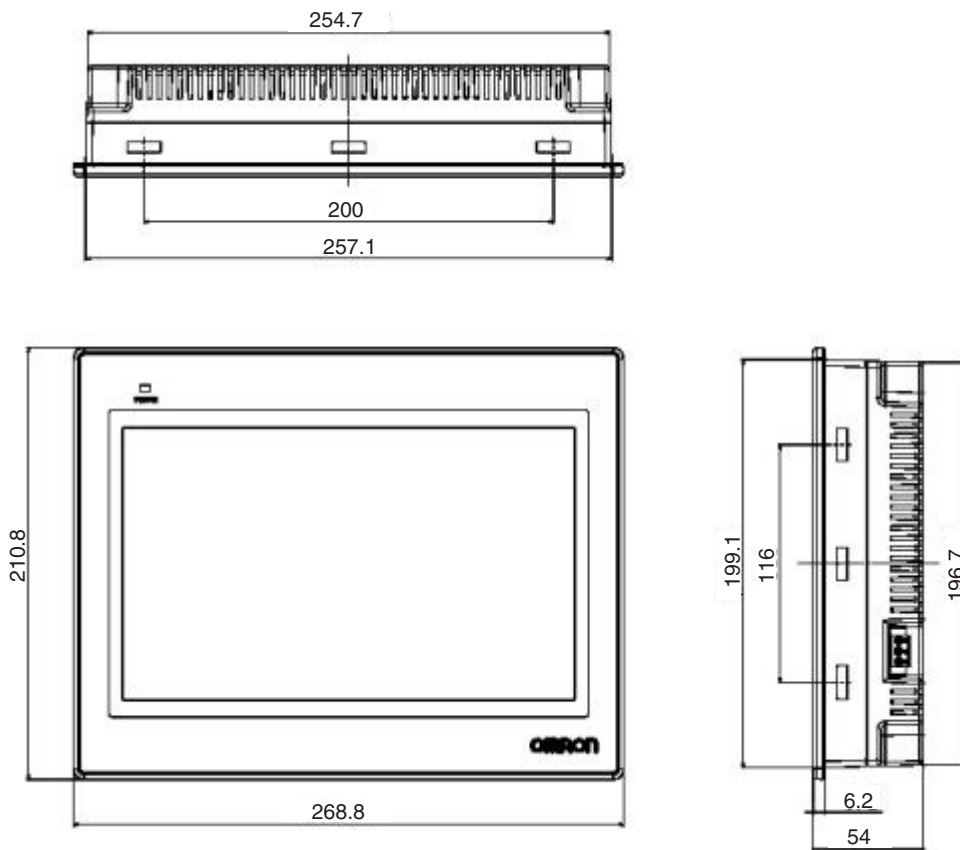
A-3   RS-422A/485 Connections

A-3-1   Grounding and Shielding of the Cables

When performing communications using RS-422A/485, carry out the connections, shielding and grounding as follows:

● **Grounding wiring**

The NB Unit has a functional grounding terminal (FG: ⏚).

> (1) Generally, make the grounding according to Fig. (a).
> - Connect the grounding terminals (GR) of the devices and the functional grounding terminal
>   (⏚), at only one point make a D-type grounding (Max. grounding resistance 100Ω).
> - Short-circuit the LG terminal and GR terminal of the PLC.
> - Use a cable with a minimum of 2 mm^2 for the grounding cable.
> - For details about the connection methods, refer to the related communication Unit manuals.
>
> (2) As shown in Fig. (b), when the NB Unit, and noise source equipments such as motors and inverters, etc. are installed on the same panel, do not ground the NB Unit's functional grounding terminal (⏚).

● **Shielding of RS-422A/485 Cables**

Be sure to shield the RS-422A/485 cables. Connect the grounding terminals (GR) of the devices and the functional grounding terminals (⏚), at only one point make a D-type grounding (Max. grounding resistance 100Ω), carry out a single-end shielding according to Fig. (a).

If grounding is not done to the functional grounding terminal (⏚) of the NB Unit, shield both ends as shown in Fig. (b).

Note In order to avoid malfunctions caused by interferences, shield the cables properly.

Figure(a)

CPU Rack

CPU Unit or Communi-cation Unit

Power supply Unit

LG
GR

RS-422A/485

Signal line

PT

FG

PT

FG

PT

FG

Figure(b)

CPU Rack

CPU Unit or Communi-cation Unit

Power supply Unit

LG
GR

RS-422A/485

Signal line

PT

FG

PT

FG

PT

FG
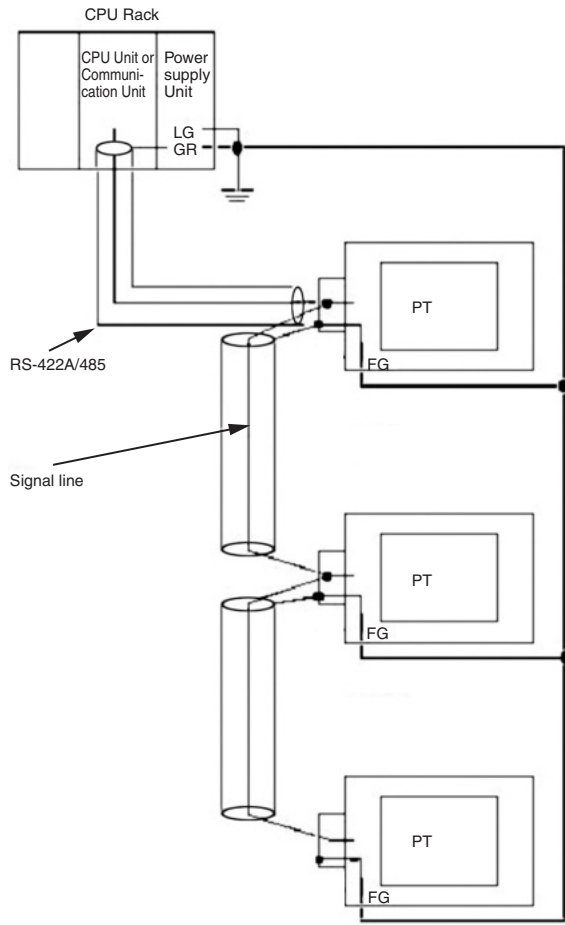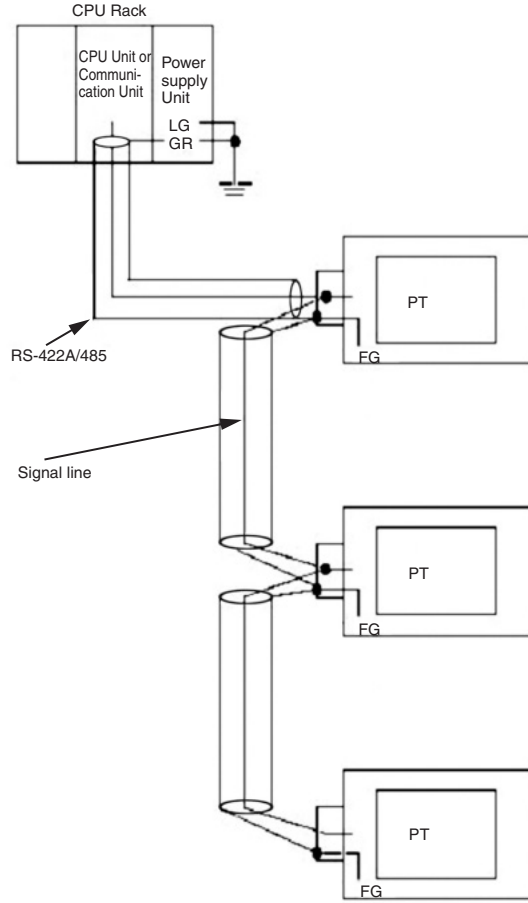
A-4   Fabrication of the Connection Cable

Fabricate the connection cable following the procedures below.

A-4-1   Cable Processing

1 Cut the cable to the required length.

**2** Use a tool like a razor, etc. to cut off the ethylene peel of the cable. Be care not to damage the shielding layer (for grouping purpose)

3 Use a pair of scissors to snip off the shielding layer.

4 Bring out the core of each wire using a wire stripper.

5 Fold back the shielding layer.

6 Wrap the folded part of the shielding layer with aluminum foil tape.

①

②

40 (RS-232C)
25 (RS-422A/RS485)

③

10

④

5

⑤

⑥

(Unit mm)

Aluminum foil tape
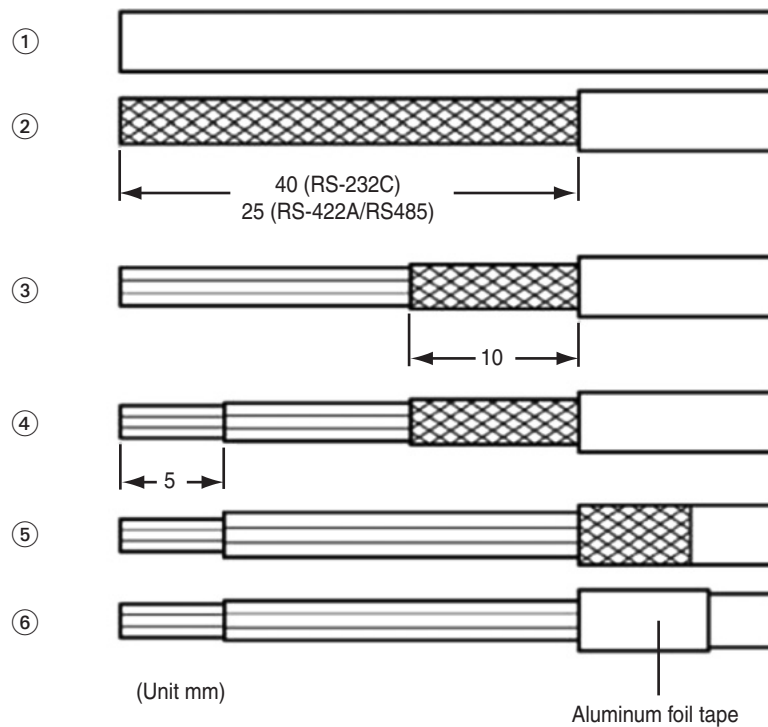
A-4-2   Soldering

1 Sheathe each wire with a heat shrinkable tube.

2 Place some standby soldering tin on each wire and each pin of the connector.

3 Solder each wire and each pin of the connector.

1mm

Soldering iron

Heat-shrinkable tube
Inside diameter:1.5
Length=10
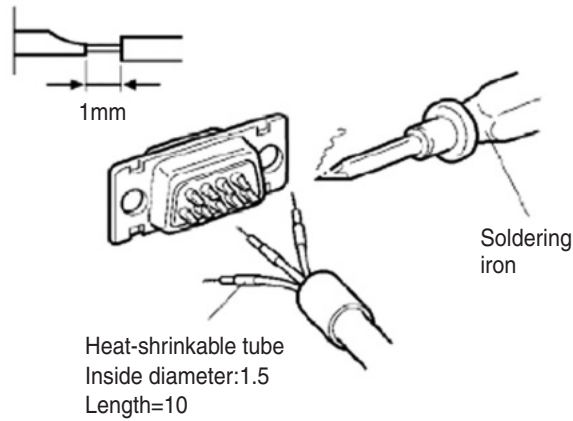
4 Pull the heat shrinkable tubes back to the soldering parts, heat them with a heat shrinking gun to make them shrink.

Heat-shrinkable tube
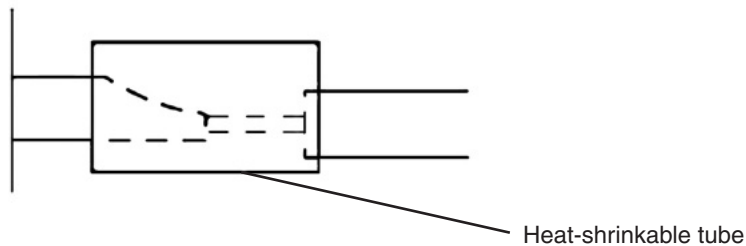
A-4-3   Shield Assembly

Assemble the connector shield as shown below.

The end connected
to the connector

Aluminum
Foil Tape

The end not connected
to the connector

NB-series Programmable Terminals Setup Manual(V107)

A-4-4　Method for Fabricating the Cable for Connection to OMRON PLC
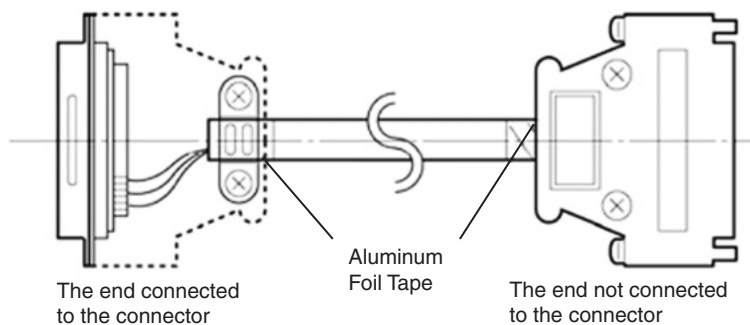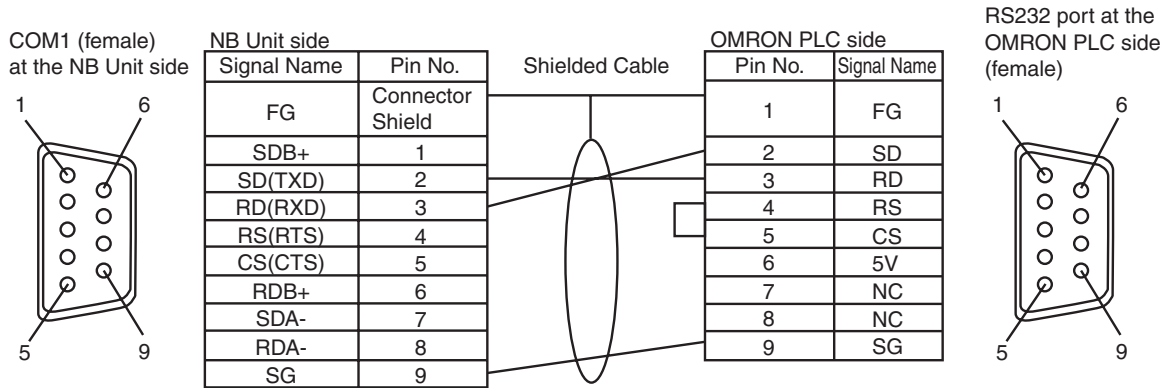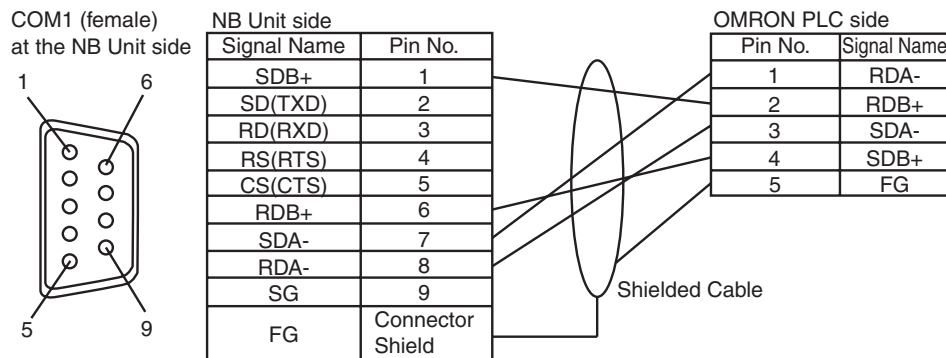
When fabricating the cable for connecting the NB Unit and OMRON PLC, refer to the following methods:

COM1

● **The cable for connecting the NB3Q Unit serial port COM1 to OMRON PLC (RS-232C)**
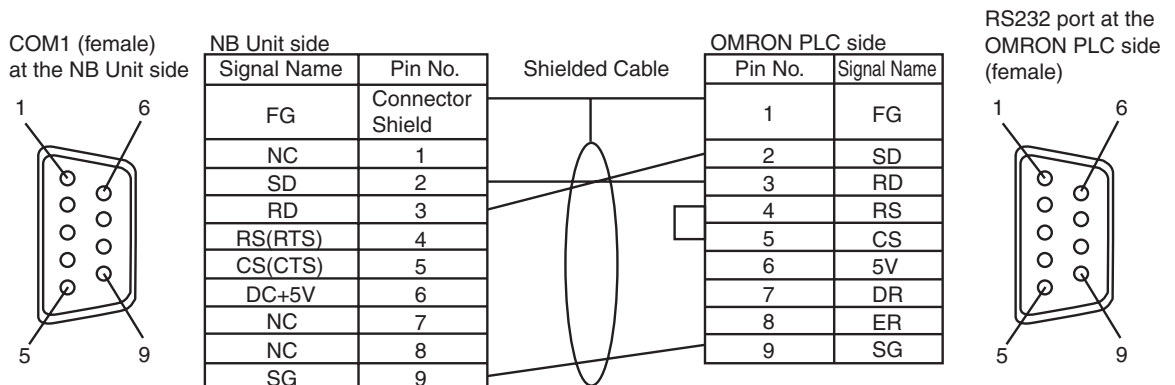
COM1 (female) at the NB Unit side

NB Unit side			OMRON PLC side	
Signal Name	Pin No.	Shielded Cable	Pin No.	Signal Name
FG	Connector Shield		1	FG
SDB+	1		2	SD
SD(TXD)	2		3	RD
RD(RXD)	3		4	RS
RS(RTS)	4		5	CS
CS(CTS)	5		6	5V
RDB+	6		7	NC
SDA-	7		8	NC
RDA-	8		9	SG
SG	9			

RS232 port at the OMRON PLC side (female)

● **The cable for connecting the NB3Q Unit serial port COM1 to OMRON PLC (RS-422A)**

COM1 (female) at the NB Unit side

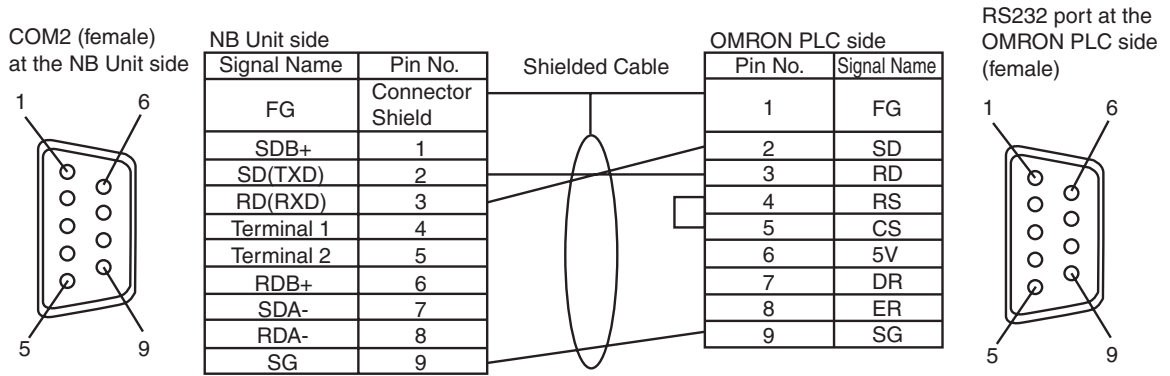| NB Unit side		OMRON PLC side	
Signal Name	Pin No.	Pin No.	Signal Name
SDB+	1	1	RDA-
SD(TXD)	2	2	RDB+
RD(RXD)	3	3	SDA-
RS(RTS)	4	4	SDB+
CS(CTS)	5	5	FG
RDB+	6		
SDA-	7		
RDA-	8		
SG	9		
FG	Connector Shield		

Shielded Cable

Note If the RS-485 connection is adopted, all needed to do is to connect the No.6 and No.8 pins and the shielded cable to the corresponding pins on the PLC side.

● **The cable for connecting the NB5Q/NB7W/NB10W Unit serial port COM1 to OMRON PLC (RS-232C)**

COM1 (female) at the NB Unit side

NB Unit side			OMRON PLC side	
Signal Name	Pin No.	Shielded Cable	Pin No.	Signal Name
FG	Connector Shield		1	FG
NC	1		2	SD
SD	2		3	RD
RD	3		4	RS
RS(RTS)	4		5	CS
CS(CTS)	5		6	5V
DC+5V	6		7	DR
NC	7		8	ER
NC	8		9	SG
SG	9			

RS232 port at the OMRON PLC side (female)

COM2

● **The cable for connecting the NB5Q/NB7W/NB10W Unit serial port COM2 to OMRON PLC (RS-232C)**

RS232 port at the OMRON PLC side (female)

COM2 (female) at the NB Unit side

NB Unit side

Shielded Cable

OMRON PLC side

Signal Name	Pin No.
FG	Connector Shield
SDB+	1
SD(TXD)	2
RD(RXD)	3
Terminal 1	4
Terminal 2	5
RDB+	6
SDA-	7
RDA-	8
SG	9

Pin No.	Signal Name
1	FG
2	SD
3	RD
4	RS
5	CS
6	5V
7	DR
8	ER
9	SG

● **The cable for connecting the NB5Q/NB7W/NB10W Unit serial port COM2 to OMRON PLC (RS-422A)**

COM2 (female) at the NB Unit side

NB Unit side

OMRON PLC side

Signal Name	Pin No.
SDB+	1
SD(TXD)	2
RD(RXD)	3
Terminal 1	4
Terminal 2	5
RDB+	6
SDA-	7
RDA-	8
SG	9
FG	Connector Shield

| Pin No.	Signal Name
1	RDA-
2	RDB+
3	SDA-
4	SDB+
5	FG
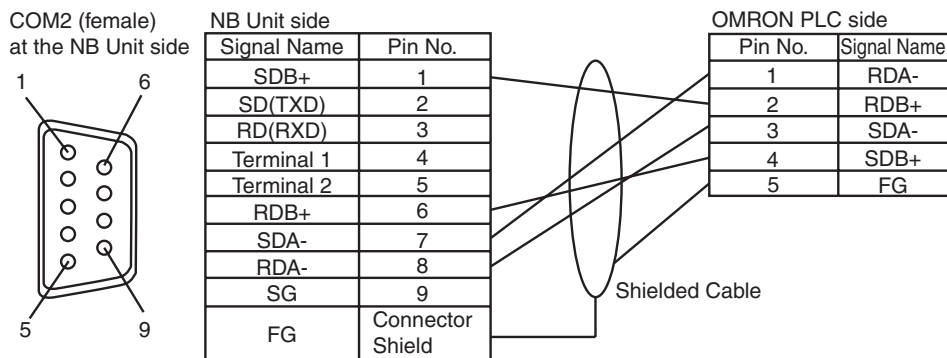
Shielded Cable

Note If the RS-485 connection is adopted, all needed to do is to connect the No.6 and No.8 pins and the shielded cable to the corresponding pins on the PLC side.

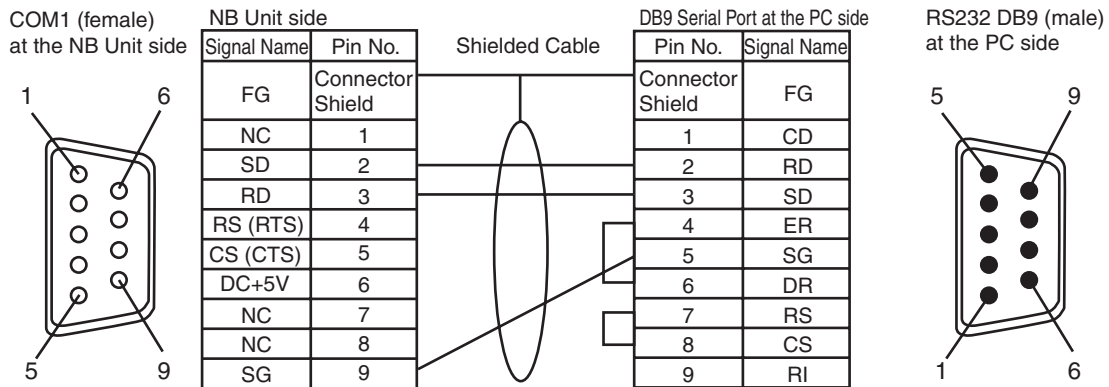## A-4-5　Method for fabricating the cable for connection to PC

When fabricating the cable for connecting with NB-Designer, refer to the following methods:

Depending on the type of the RS-232C connector compatible with PCs according to DOS/V, deploy the wiring as shown below:

25-pin Connector
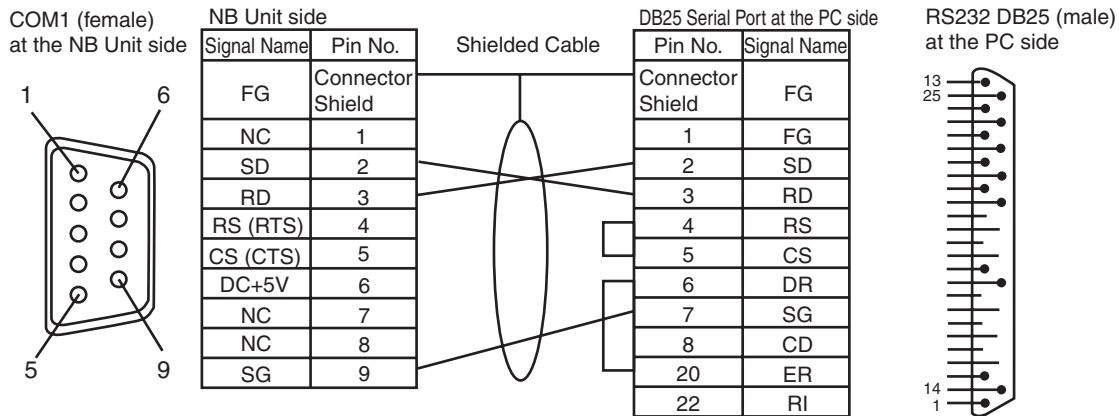
9-pin Connector

Note As to the 2 connection methods introduced above, the No.2, 3 and 9 pins of COM1 on the NB3Q unit side have the same definitions as those described in the above diagram, and the method for connection to a PC is also the same as above.

A-4 Fabrication of the Connection Cable

App

A-4-5 Method for fabricating the cable for connection to PC

A-5   List of Models

● NB Unit

Models	Resolution	Size	Communication	USB (Equivalent of USB 2.0 Full Speed)
NB3Q-TW00B	QVGA 320×240	3.5 inches	COM1	Slave
NB3Q-TW01B	QVGA 320×240	3.5 inches	COM1, Ethernet	Host, Slave
NB5Q-TW00B	QVGA 320×234	5.6 inches	COM1, COM2	Slave
NB5Q-TW01B	QVGA 320×234	5.6 inches	COM1, COM2, Ethernet	Host, Slave
NB7W-TW00B	WVGA 800×480	7 inches	COM1, COM2	Slave
NB7W-TW01B	WVGA 800×480	7 inches	COM1, COM2, Ethernet	Host, Slave
NB10W-TW01B	WVGA 800×480	10.1 inches	COM1, COM2, Ethernet	Host, Slave

● Serial Communication Unit

Models	Specifications	Applicable PLCs
CS1W-SCU21	• RS-232C (2 ports)	CS series CS1G/H, CS1G/H-H
CS1W-SCU31	• RS-422A/485 (2 ports)	CS series CS1G/H, CS1G/H-H
CJ1W-SCU21	• RS-232C (2 ports)	CJ1 series CJ1G/H-H, CJ1M
CJ1W-SCU31	• RS-422A (2 ports)	CJ1 series CJ1G/H-H, CJ1M
CJ1W-SCU41	• RS-232C (1 port) • RS-422A (1 port)	CJ1 series CJ1G/H-H, CJ1M

● Ethernet Communication Unit

Models	Specifications	Applicable PLCs
CS1W-ETN21	• 100Base-TX, 10Base-T	CS series CS1G/H, CS1G/H-H
CS1W-EIP21	• 100Base-TX, 10Base-T	CS series CS1G/H, CS1G/H-H
CJ1W-ETN21	• 100Base-TX, 10Base-T	CJ1 series CJ1G/H-H, CJ1M
CJ1W-EIP21	• 100Base-TX, 10Base-T	CJ1 series CJ1G/H-H, CJ1M
CJ1W-CIF41	• 100Base-TX, 10Base-T	CP1H, CP1L, CP1E

PLC Series Connectable to NB Series through Host Link

PLC Series	Specifications
CP Series	Connecting through the RS-232C optional communication board (CP1W-CIF01) with a RS-232C cable
C200HE/HG/HX Series	With a connector for RS-232C connection (switch/9-pin type)
CQM1H Series	With a connector for RS-232C connection (9-pin type)
CPM1A Series	Connecting through the RS-232C adaptor (CP1W-CIF01) with a RS-232C cable
CPM2A Series	With a connector for RS-232C connection (9-pin type)
CPM2C Series	Connect to the branched RS-232C connector through a conversion cable (CPM2C-CN111 type)
CS Series	With a connector for RS-232C connection (9-pin type)
CJ1/CJ2 Series	With a connector for RS-232C connection (9-pin type)

PLC Series connectable to NB Series through the Ethernet Unit

PLC Series	Specifications
CP Series	Connecting through the Ethernet optional communication board CJ1W-CIF41
CS Series	Connecting through the Ethernet Unit CS1W-ETN21 or CS1W-EIP21
CJ1 Series	Connecting through the Ethernet Unit CJ1W-ETN21 or CJ1W-EIP21
CJ2 Series	Connecting through the Ethernet Unit CJ1W-ETN21 or CJ1W-EIP21

A-5 List of Models

App

A-4-5 Method for fabricating the cable for connection to PC

● **Units at the host side which can be connected using the serial port of the NB Unit in the RS-232C mode through Host Link**

PLC Series	CPU Unit with built-in Host Link function	CPU Unit that can be connected through adding Host Link Units/communication boards	Options required for connection
CP Series		CP1L-L14/L20/M30/M40/M60	CP1W-CIF01
		CP1H-X40/XA40/Y20	CP1W-CIF01
	CP1E-N14/N20		
	CP1E-N30/N40/N60/NA20	CP1E-N30/N40/N60/NA20	CP1W-CIF01
		CP1L-EL20/EM30/EM40	CP1W-CIF01
C Series		C200HE-CPU11/32/42 C200HE-CPU11/32/42-Z C200HG-CPU33/43/53/63 C200HG-CPU33/43/53/63-Z C200HX-CPU34/44/54/64 C200HX-CPU34/44/54/64/65/85-Z	C200H-LK201-V1
	C200HE-CPU42 C200HE-CPU42-Z	C200HE-CPU32/42 C200HE-CPU32/42-Z	C200HW-COM02/04/05/06-V1
	C200HG-CPU43/63 C200HG-CPU43/63-Z	C200HG-CPU33/43/53/63 C200HG-CPU33/43/53/63-Z	C200HW-COM02/04/05/06-V1
	C200HX-CPU44/64 C200HX-CPU44/64/65/85-Z	C200HX-CPU34/44/54/64 C200HX-CPU34/44/54/64/65/85-Z	C200HW-COM02/04/05/06-V1
	CPM1-10/20CDR-□ +CPM1-CIF01		
	CPM1A-10/20/30/40CD□-□ +CPM1-CIF01		
	CPM2A-30/40/60CD□□-□ +CPM1-CIF01 (When a peripheral port is connected)		
	CPM2C-10/20□□□□□□-□ (*1)		
	CQM1H-CPU11/21/51/61 (*2)	CQM1H-CPU51/61	CQM1H-SCB41
CS Series	CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1W-SCU21(-V1) CS1W-SCB21/41(-V1)
	CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1W-SCU21(-V1) CS1W-SCB21/41(-V1)
CJ1 Series	CJ1G-CPU44/CPU45	CJ1G-CPU44/CPU45	CJ1W-SCU21/41/-V1
	CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/66H/67H	CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/66H/67H	CJ1W-SCU21/41/-V1
	CJ1M-CPU11/12/13/21/22/23	CJ1M-CPU11/12/13/21/22/23	CJ1W-SCU21/41/-V1
CJ2 Series	CJ2M-CPU31/32/33/34/35		CP1W-CIF01
	CJ2M-CPU11/12/13/14/15		
	CJ2H-CPU64/65/66/67/68(-EIP)		

*1: Connect using conversion cables (CPM2C-CN111 type or CS1W-CN114/118 type), the RS-232C adaptor (CPM1-CIF01 type) or the RS-422A adaptor (CPM1-CIF11 type).

*2: The CQM1H-CPU11 model does not have the RS-232C port built in the CPU, therefore it requires a peripheral port to be connected to a PT through a conversion cable (CS1W-CN118 type).

● **Units at the host side which can be connected using the serial port of the NB Unit in the RS-422A mode through Host Link**

PLC Series	CPU Unit with built-in Host Link function	CPU Unit that can be connected through adding Host Link Units/communication boards	Options required for connection
CP Series	CP1L-L14/L20/M30/M40/M60	CP1L-L14/L20/M30/M40/M60	CP1W-CIF11/CIF12
	CP1H-X40/XA40/Y20	CP1H-X40/XA40/Y20	CP1W-CIF11/CIF12
	CP1E-N30/N40/N60/NA20	CP1E-N30/N40/N60/NA20	CP1W-CIF11/CIF12
		CP1L-EL20/EM30/EM40	CP1W-CIF11/CIF12
C Series		C200HE-CPU11/32/42 C200HE-CPU11/32/42-Z C200HG-CPU33/43/53/63 C200HG-CPU33/43/53/63-Z C200HX-CPU34/44/54/64 C200HX-CPU34/44/54/64/65/85-Z	C200H-LK202-V1
		C200HE-CPU32/42 C200HE-CPU32/42-Z	C200HW-COM03/06-V1
		C200HG-CPU33/43/53/63 C200HG-CPU33/43/53/63-Z	C200HW-COM03/06-V1
		C200HX-CPU34/44/54/64 C200HX-CPU34/44/54/64/65/85-Z	C200HW-COM03/06-V1
	CPM1-10/20CDR-□ +CPM1-CIF11		
	CPM1A-10/20/30/40CD□-□ +CPM1-CIF11		
	CPM2A-30/40/60CD□□-□ +CPM1-CIF11 (When a peripheral port is connected)		
	CPM2C-10/20□□□□□□-□ (*1)		
		CQM1H-CPU51/61	CQM1H-SCB41
CS Series		CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1W-SCB41(-V1) CS1W-SCU31(-V1)
		CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1W-SCB41(-V1) CS1W-SCU31(-V1)
CJ1 Series		CJ1G-CPU44/45	CJ1W-SCU31/41-V1
		CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/66H/67H	CJ1W-SCU31/41-V1
		CJ1M-CPU11/12/13/21/22/23	CJ1W-SCU31/41-V1
CJ2 Series	CJ2M-CPU31/32/33/34/35		CP1W-CIF11/CIF12
	CJ2M-CPU11/12/13/14/15		
	CJ2H-CPU64/65/66/67/68 (-EIP)		

*1: Connect using conversion cables (CPM2C-CN111 type or CS1W-CN114/118 type), the RS-232C adaptor (CPM1-CIF01 type) or the RS-422A adaptor (CPM1-CIF11 type).

● **Units at the host side which can be connected using the Ethernet port of the NB Unit**

PLC Series	CPU Unit with built-in Ethernet communication function	CPU Unit that can be connected through adding Ethernet Communication Unit/optional communication board	Options required for connection
CP Series		CP1L-L14/L20/M30/M40/M60	CP1W-CIF41
		CP1H-X40/XA40/Y20	CP1W-CIF41
		CP1E-N30/N40/N60/NA20	CP1W-CIF41
	CP1L-EL20/EM30/EM40		
CS Series		CS1G-CPU42/43/44/45(-V1) CS1H-CPU63/64/65/66/67(-V1)	CS1W-ETN21 CS1W-EIP21
		CS1G-CPU42H/43H/44H/45H CS1H-CPU63H/64H/65H/66H/67H	CS1W-ETN21 CS1W-EIP21
		CS1H-CPU63/64/65/66/67(-V1)	CS1W-ETN21 CS1W-EIP21
		CS1H-CPU63H/64H/65H/66H/67H	CS1W-ETN21 CS1W-EIP21
CJ1 Series		CJ1G-CPU42H/43H/44H/45H CJ1H-CPU65H/CPU66H	CJ1W-ETN21 CJ1W-EIP21
		CJ1M-CPU11/12/13/21/22/23	CJ1W-ETN21 CJ1W-EIP21
		CJ1H-CPU65H-R/66H-R/67H-R CJ1H-CPU65H/CPU66H	CJ1W-ETN21 CJ1W-EIP21
CJ2 Series	CJ2M-CPU31/32/33/34/35		
		CJ2M-CPU11/12/13/14/15	CJ1W-ETN21 CJ1W-EIP21
	CJ2H-CPU64/65/66/67/68(-EIP)		

● **Software related to the NB Unit**

Name	Version	Release Time	Descriptions	Remarks
NB-Designer	V1.0X	February 2012	HMI with model number of NB5Q-TW00B and NB7W-TW00B supported	OS: Windows XP (SP1 or higher) Windows Vista/Windows 7 (32/64-bit) The NB-Designer incorporates a transmission program and a standard system program specified for the NB-Series Units. For download the application programs, please access your local Omron website, If local site cannot be found, please access Omron IA global site "http://www.ia.omron.com/ " at first and select the area where you are.
	V1.1X	June 2012	HMI with model number of NB5Q-TW01B and NB7W-TW01B added	
	V1.2X	August 2012	HMI with model number of NB3Q-TW00B/TW01B and NB10W-TW01B added	

● **Related connecting objects**

Cable with connectors (NB Unit ↔ PLC)

Models	Cable Length	Object Unit	Communications methods	Specifications
XW2Z-200T	2m	Units with 9-pin connectors by OMRON	Host Link (RS-232C)	9-pin ↔9-pin
XW2Z-500T	5m			
NB-RSEXT-2M	2m	RS-422/485 Communication Units by PLC manufacturers	Host Link (RS-422/485)	9-pin ↔5-wire

A-6   List of Options

● **Anti-reflection Film**

It adheres to the display preventing reflection and also dirt from sticking to the display. It is colorless and transparent, with 1 set containing 5 pieces.

NB Unit Models	Models	Specifications
NB3Q-TW☐☐B	NB3Q-KBA04	5 pieces
NB5Q-TW☐☐B	NB5Q-KBA04	
NB7W-TW☐☐B	NB7W-KBA04	
NB10W-TW01B	NB10W-KBA04	

● **Installation fittings**

Models	Descriptions
NB5Q-ATT01	When HMI users switch from the NT31/C or NQ5 Series to HMI of NB5Q Series, due to the difference of the unit size, installation fittings can be utilized to guarantee the process quick and smooth.
NB10W-ATT01	When HMI users switch from the NB10W-TW00B-Z Series to HMI of NB10W-TW01B Series, due to the difference of the unit size, installation fittings can be utilized to guarantee the process quick and smooth.

A-6 List of Options

App

A-4-5 Method for fabricating the cable for connection to PC

● RS-422A/RS-485 Communication Cable

Models	Descriptions
NB-RSEXT-2M	Only applies to the COM2 port of the NB series product, when performing communications using RS-422A/RS485, can be equipped with this communication cable. Conform to UL2464, AWG28 Instruction: When users need to carry out long-distance signal transmission, can connect with terminal matching resistance. How to use: When using NB5Q/NB7W/NB10W-TW□□B Unit, open RS-422A/RS-485 communication cable RS232C Connector, use short wire to connect PIN4 and PIN5, pay attention to wiring, do not short-circuit with other pins except PIN4 and PIN5, when connection finished please assembled well RS232C Connector. When using NB3Q-TW□□B Unit, turn the DIP switch SW3 of the unit to ON. By default, RS-422A/RS-485 communication cable do not connect terminal resistance.

● USB Memory

It can be connected to the USB HOST port on the back of PT to perform the uploading, downloading, project operation and storage of related data.

Recommended Purchasing Model	Descriptions
FZ-MEM2G	USB disk with 2GB capacity manufactured by OMRON
FZ-MEM8G	USB disk with 8GB capacity manufactured by OMRON

Revision History

A manual revision code appears as a suffix to the Catalog number on the front cover of the manual.

Cat. No. V107-E1-□

Revision code

Revision code	Date	Revised content
01	October 2011	Original production
02	February 2012	• Adding optional RS-422A / RS485 communication cable in Appendix-6. • Correcting the descriptions of the battery.
03	April 2012	Adding descriptions and new functions of NB5Q/NB7W-TW01B model.
04	August 2012	Adding descriptions and new functions of NB3Q-TW00B/TW01B and NB10W-TW01B models.

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