

**NV Series**  
**NV3W(-V1)**  
**NV4W**  
**NV3Q**

# **Programmable Terminals**

## **SETUP MANUAL**

**OMRON**

## **NOTE**

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**NV Series**

**NV3W(-V1)**

**NV4W**

**NV3Q**

**Programmable Terminals**

*Revised November 2022*





# Notice


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OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

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

 **WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.

 **Caution** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

## OMRON Product References

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation “Ch,” which appears in some displays and on some OMRON products, often means “word” and is abbreviated “Wd” in documentation in this sense.

The abbreviation “PLC” means Programmable Controller.

The abbreviation “host” means a controller, such as an IBM PC/AT or compatible computer, that controls a PT (Programmable Terminal).

## Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

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<b>Precautions for Safe Use</b>	Indicates precautions on handling the product to ensure that the product is used safely.
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<b>Precautions for Correct Use</b>	Indicates precautions to ensure that product functions and performances are realized, to ensure that the reliability of the product is maintained, and to ensure that the product is otherwise used correctly.
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<b>Note</b>	Indicates information of particular interest for efficient and convenient operation of the product.
<b>Reference</b>	Indicates supplementary information on procedures, descriptions, and settings.
<b>1,2,3...</b>	1. Indicates lists of one sort or another, such as procedures, checklists, etc.
CS1G-CPU□□-V1	Boxes in model numbers indicate variable characters. For example, “CS1G-CPU□□-EV1” indicates the following models: CS1G-CPU42-EV1, CS1G-CPU43-EV1, CS1G-CPU44-EV1, and CS1G-CPU45-EV1.



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# About this Manual

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This manual describes installing and setting up the NV-series PTs and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install or operate an NV-series PT. Be sure to read the precautions provided in the following section.

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## **Precautions**

This section provides general precautions for using the NV-series PTs and related devices.

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## **Section 1 Overview**

This section introduces the NV-series PTs, including the system configuration, available models, and specifications.

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## **Section 2 Part Names, Functions, and Internal Configuration**

This section describes the functions of the various parts of an NV-series PT and how the NV-series PTs operate internally.

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## **Section 3 Preparations for Operation**

This section outlines the steps required to prepare an NV-series PT for operation.

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## **Section 4 Installing and Wiring the PT**

This section describes how to install and wire an NV-series PT and start the PT for the first time.

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## **Section 5 System Menu**

This section describes the operations and settings that can be performed on the System Menu of an NV-series PT.

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## **Section 6 Connecting and Setting PLCs or Temperature Controllers**

This section provides information and procedures required to connect an NV-series PT to an OMRON PLC.

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## **Section 7 Maintenance and Troubleshooting**

This section describes the maintenance and inspections required for NV-series PTs and provides troubleshooting information for when problems occur with NV-series PTs.

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## Related Manuals

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The following manuals are used for NV-series PTs. (The boxes at the end of the catalog numbers indicate the revision code.)

**This  
Manual**

### NV-series PT Setup Manual..... V103-E1-□

This manual describes how to connect an NV-series PT to an OMRON PLC, features and specifications, methods to set up communications and operation, and procedures for maintenance and troubleshooting.

Refer to the *NV-series PT Programming Manual* (V104-E1-□) for more information on PT functions and specific operating procedures.

### NV-series PT Programming Manual..... V104-E1-□

This manual describes the software functionality of NV-series PTs, how to install the NV-Designer, and the features of the NV-Designer.

For more information on NV-Designer operating procedures, refer to the online help in the NV-Designer.

### NV-series PT Host Connection Manual..... V105-E1-□

This manual describes how to connect an NV-series PT to a PLC produced by a manufacturer other than OMRON, including PLC memory area designations, communications settings, and connection methods.

# Terminology

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The following terminology is used in this manual.

PT	In this manual, indicates an NV-series Programmable Terminal.
NV Series	Indicates products in the OMRON NV Series of Programmable Terminals.
PLC	Indicates a Programmable Controller in the OMRON SYSMAC CS/CJ/CP, C, or CVM1/CV Series of Programmable Controllers.
CPU Unit	Indicates a CPU Unit in the OMRON SYSMAC CS/CJ/CP, C, or CVM1/CV Series of Programmable Controllers.
NV-Designer	Indicates the OMRON NV-Designer.
Host	Indicates the PLC, IBM PC/AT or compatible computer, or personal computer functioning as the control device and interfaced with the NV-series PT.

# Introduction

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## ● 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 systems.
- 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 NV-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.

# Safety Precautions

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## 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.

The following notation is used.

## Definition of Precautionary Information

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.
--	--

 <b>Caution</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.
--	--

## Symbols

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### Prohibition

The circle and slash symbol indicates operations that you must not do.

---



The circle and slash symbol indicates operations that you must not do.

The specific operation is shown in the circle and explained in text. This example indicates prohibiting disassembly.

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The triangle symbol indicates precautions (including warnings).

The specific operation is shown in the triangle and explained in text.

This example indicates a precaution for electric shock.

---



The triangle symbol indicates precautions (including warnings).

The specific operation is shown in the triangle and explained in text.

This example indicates a general precaution.

---



The filled circle symbol indicates operations that you must do.

The specific operation is shown in the circle and explained in text.

This example shows a general precaution for something that you must do.

---



The triangle symbol indicates precautions (including warnings).

The specific operation is shown in the triangle and explained in text.

This example indicates a precaution for high temperatures.

---

## Warnings

### WARNING

#### ● During Power Supply

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 NV 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 NV 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 NV Unit. Otherwise it may impair the safety functions.



The NV unit uses an analog touch panel. Never press more than two points on the panel at a time. Otherwise, it may activate a switch somewhere between the two points.



#### ● Security Measures

##### Anti-virus protection

Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.



##### Security measures to prevent unauthorized access

Take the following measures to prevent unauthorized access to our products.

- Install physical controls so that only authorized personnel can access control systems and equipment.
- Reduce connections to control systems and equipment via networks to prevent access from untrusted devices.
- Install firewalls to shut down unused communications ports and limit communications hosts and isolate control systems and equipment from the IT network.
- Use a virtual private network (VPN) for remote access to control systems and equipment.
- Adopt multifactor authentication to devices with remote access to control systems and equipment.
- Set strong passwords and change them frequently.
- Scan virus to ensure safety of USB drives or other external storages before connecting them to control systems and equipment.



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**Data input and output protection**

Validate backups and ranges to cope with unintentional modification of input/output data to control systems and equipment.

- Checking the scope of data
- Checking validity of backups and preparing data for restore in case of falsification and abnormalities
- Safety design, such as emergency shutdown and fail-soft operation in case of data tampering and abnormalities



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**Data recovery**

Backup data and keep the data up-to-date periodically to prepare for data loss.



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When using an intranet environment through a global address, connecting to a SCADA or an unauthorized terminal such as an HMI or to an unauthorized server may result in network security issues such as spoofing and tampering. You must take sufficient measures such as restricting access to the terminal, using a terminal equipped with a secure function, and locking the installation area by yourself.



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When constructing an intranet, communication failure may occur due to cable disconnection or the influence of unauthorized network equipment. Take adequate measures, such as restricting physical access to network devices, by means such as locking the installation area.



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When using a device equipped with the SD Memory Card function, there is a security risk that a third party may acquire, alter, or replace the files and data in the removable media by removing the removable media or unmounting the removable media. Please take sufficient measures, such as restricting physical access to the Controller or taking appropriate management measures for removable media, by means of locking the installation area, entrance management, etc., by yourself.

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## Precautions for Safe Use

1. When unpacking the Units, check carefully for any external scratches or other damage. Also, shake the Units gently and check for any abnormal sound.
2. The PT must be installed in a control panel.
3. The mounting panel must be between 1.6 and 4.8 mm thick. Tighten the Mounting Brackets evenly to a torque of between 0.1 and 0.25 N·m for the NV3W/NV3Q and between 0.2 and 0.3 N·m for the NV3W-V1/NV4W to maintain water and dust resistance. Make sure the panel is not dirty or warped and that it is strong enough to hold the Units.
4. Do not let metal particles enter the Units when preparing the panel.
5. Do not connect an AC power supply to the DC power terminals.
6. Do not perform a dielectric voltage test.
7. Use a DC power supply that will provide a stable output even if the input is momentarily interrupted for 10 ms, and which has reinforced or double insulation.

Model	Rated power supply voltage	Capacity
NV3W-M□20L NV3W-M□20L-V1	5 VDC (allowable range: 4.5 to 5.5 VDC)	1 W min.
NV4W-M□21 NV4W-M□41	24 VDC (allowable range: 21.6 to 26.4 VDC)	1.7 W min.
NV3W-M□20 NV3W-M□40		2 W min.
NV3W-M□20-V1 NV3W-M□40-V1		1.9 W min.
NV3Q-MR□□		2.4 W min.
NV3Q-SW□□		3.6 W min.

8. Use a twisted-pair cable to connect to the power terminals. Tighten the terminal screws to a torque of between 0.22 and 0.30 N·m. Make sure the screws are properly tightened.
9. To prevent malfunctions caused by noise, ground the PT correctly.
10. Do not touch the surface of the circuit boards or the components mounted on them with your bare hands. Discharge any static electricity from your body before handling the boards.
11. Turn OFF the power supply before connecting or disconnecting cables.
12. The maximum tensile load for cables is 30 N. Do not apply loads greater than this.
13. Confirm the safety of the system before turning ON or OFF the power supply.
14. Cycle the power supply after changing the DIP switch settings.
15. Do not perform the following operations while the SD memory card is being accessed (NV4W and NV3Q only):
  - Turning OFF the power supply to the PT
  - Removing the memory card
 Always follow the specified procedure when removing the memory card.
16. Start actual system application only after sufficiently checking screen data and the operation of the program in the PLC (host).
17. Do not press the touch switch with a force greater than 30 N.
18. Do not use a screwdriver or any other tool to press a touch switch.
19. Confirm the safety of the system before pressing any touch switch.
20. Do not accidentally press touch switches when the backlight is not lit or when the display does not appear. Confirm the safety of the system before pressing touch switches.

21. Before initializing screen data, confirm that existing data is backed up at the NV-Designer.
22. When changing the password with the system menu, do not reset or turn OFF the power supply until writing is finished.
23. Before using the SPMA function to change memory values in the PLC or transfer ladder programming, confirm that the PT is operating. The SPMA function cannot be used unless the PT is operating.
24. Dispose of any battery that has been dropped on the floor or otherwise subjected to excessive shock.
25. Dispose of the Units and batteries according to local ordinances as they apply.



廢電池請回收

26. When mounting the Battery, be sure to use the correct Battery and mount it correctly.
27. Do not disassemble or short-circuit the battery.
28. Do not connect a USB connector to any device that is not applicable.
29. Before connecting a USB connector to a device, make sure that the device is free of damage.
30. Do not turn OFF the power supply to the PT while downloading or uploading screen data or the system program. Doing so may corrupt the screen data or system program.
31. Periodically inspect the installation condition of the PT if it is being used in an environment subject to contact with water.
32. The whole system may stop depending on how the power supply is turned ON or OFF. Turn ON or OFF the power supply according to the specified procedure.
33. 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.
34. To use numeric input functions safely, always make maximum and minimum limit settings.
35. Do not use benzene, paint thinner, or other volatile solvents, and do not use chemically treated cloths.
36. The PT uses an analog touch panel. Deterioration over time can cause the touch points to move. Calibrate the touch panel if the touch points move too much.
37. Water resistance will be lost if the front sheet is torn or is peeling off. Do not use the PT if the front sheet is torn or is peeling off.
38. The Rubber Packing will deteriorate, shrink, or harden depending on the operating environment. Inspect and replace the Rubber Packing periodically (approximately once per year).
39. To use the NV3W in an environment with strong noise, connect the following noise filter to the power supply line:  
RSEL-2001W manufactured by TDK-Lambda Corp.
40. A Waterproof Packing cannot be reused. To ensure waterproof performance, replace the Waterproof Packing with a new one each time you reinstall the PT.
41. Screen burn-in will occur if the same pattern is continuously displayed for a long period of time (24 hours or longer, as a guideline). To prevent screen burn-in, use a screen saver or switch displays periodically (NV3W only).

## Precautions for Correct Use

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1. Do not install the PT 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 splashing chemicals or solvents
  - Locations subject to oil splashes
  - Locations subject to continuous water splashing
  - 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
2. 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 electromagnetic or magnetic fields
  - Locations close to power supply lines
  - Locations subject to possible exposure to radioactivity

## Conformance to EC Directives

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This product is 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. However, customers may use a wide variety of equipment and manufacturing installations. Therefore the customer must check whether the Directives are satisfied for the actual system. EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PT is installed. 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 for NV-series PTs are as follows:  
NV3W: EN 61000-6-2, EN 61000-6-4  
NV3W-V1/NV4W or NV3Q: EN 61131-2

### ● Conformance to EC Directives

NV-series PTs conform to EC Directives. To ensure that the machine or device in which the NV-series PT is used complies with EC Directives, the PT must be installed as follows:

- The NV-series PT must be installed in a control panel.
- 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.
- NV-series PTs complying with EC Directives also conform to the Common Emission Standard (EN 61131-2 or EN 61000-6-4). Radiated emission characteristics (10-m 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.
- This is a class A product. It may cause radio interference in residential areas, in which case the user may be required to take adequate measures to reduce interference.

## Conformance to KC Standards

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Observe the following precaution if you use NA-series PTs in Korea.

A 급 기기 (업무용 방송통신기자재)  
이 기기는 업무용(A 급) 전자파적합기기로서  
또는 사용자는 이 점을 주의하시기 바라며,  
지역에서 사용하는 것을 목적으로 합니다.

Class A Device (Broadcasting Communications Device for Business Use)

This device obtained EMC registration for office use (Class A), and it is intended to be used in places other than homes. Sellers and/or users need to take note of this.

# ***Terms and Conditions Agreement***

## ***Warranty, Limitations of Liability***

### **Warranties**

#### **● Exclusive Warranty**

Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

#### **● Limitations**

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right.

#### **● Buyer Remedy**

Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses 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. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

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# ***Application Considerations***

## **Suitability of Use**

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT 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 PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## **Programmable Products**

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

## ***Disclaimers***

### **Performance Data**

Data presented in Omron Company websites, catalogs and other materials 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 user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

### **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 part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

### **Errors and Omissions**

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

# SECTION 1

## Overview

This section introduces the NV-series PTs, including the system configuration, available models, and specifications.

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# 1-1 Features of NV-series PTs

The NV-series Programmable Terminals (PTs) are easy to use and compact.

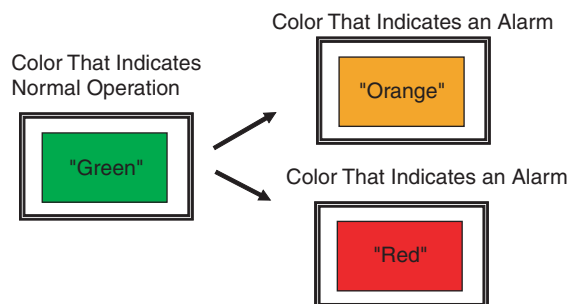
## 1-1-1 Features and Functions of NV-series PTs

### Models Available with Color Backlight or Monochrome Backlight with Switchable Colors

- Switching the backlight of the NV3W(-V1) monochrome, NV4W monochrome, or NV3Q monochrome PTs lets you determine system status from a distance.
- The NV3Q color PTs can display 4,096 colors.

NV Series	Display color	Backlight color
NV3W-MG(-V1) and NV4W-MG(-V1)	Monochrome	Green, orange, or red
NV3W-MR(-V1), NV4W-MR(-V1), and NV3Q monochrome		White, red, and pink
NV3Q color	4,096 colors	---

Application Example That Switches the Backlight Color



### Bright LEDs, Eliminate the need to Replace Backlights

Bright LED are used in the PT, eliminating the need to replace the backlights.

### Each Screen Creation

The screens displayed on an NV-series PT are created on the NV-Designer. Screens can be easily created by simply selecting parts from a library and arranging them.

Parts are available to match the application that is used.

The NV3W is connected using a special RS-232C cable. The NV3W-V1, NV4W or NV3Q is connected using a commercially available USB cable.

### Convert the PT Model for Screen Data

The NV model conversion function enables screen data to be converted and reused from a model with a small screen to one with a large screen.

### Communicate with OMRON PLCs using Host Link

You can connect the PT to an OMRON CP-series, CS/CJ-series, C-series, or CVM1/CV-series PT using the Host Link protocol.

Communications with PLCs is possible using RS-232C or RS-422A connections.

### Multivendor Support with PLC Model Conversion

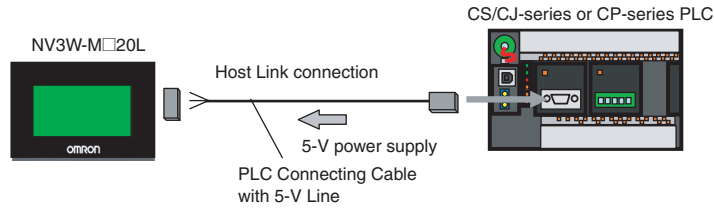
You can connect the PT to OMRON PLC or many other global PLC manufacturers.

Even if you are using different PLCs for different systems, you can easily convert the PLC model in the screen data.

### Supply Power to the PT via the PLC Connecting Cable (NV3W(-V1) Only)

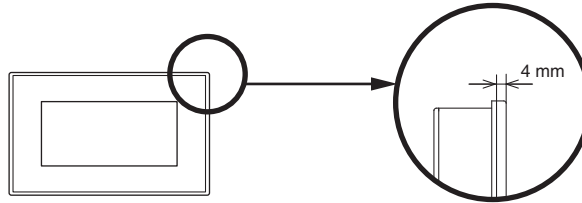
With 5-V NV3W(-V1) models, 5 V can be supplied from the CS/CJ-series or CP-series PLC via the PLC Connecting Cable. This eliminates the need for a power supply for the PT, thereby reducing wiring work.



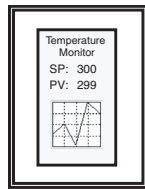


**Space-saving Installation**

The compact size and thin design save space when mounting. With the edge protruding only 4 mm from the panel surface, the PT is also attractive in appearance.



The NV3W(-V1) or NV4W can be installed vertically for vertical screen displays.



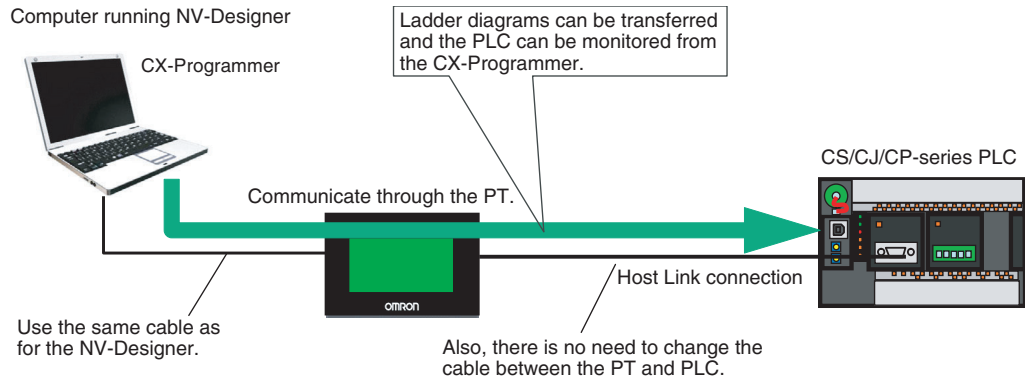
**Construction with Resistance to the Environment**

The NV3W and NV3Q provide IP65 protection against dust and water drops. The NV3W-V1 and NV4W provides IP67 protection.

**Transfer, Monitor, or Debug Ladder Diagrams from the CX-Programmer Connected to the PT**

You can transfer, monitor, or debug ladder diagrams in a PLC from the CX-Programmer running on a computer connected to the PT with the convenient SPMA (Single Port Multiple Access) function while the PLC and PT are communicating with each other.

This function is effective during system installation and debugging.

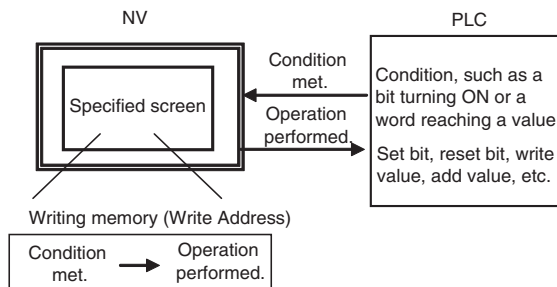


**Note** The CX-Programmer and NV-Designer, however, cannot be connected online at the same time.

**Reduce the Load on the PLC with the Write Address Function**

You can use the Write Address function to execute operations to set or reset bits, set values, perform calculations, and more in PLC memory when conditions in the PLC are met. This reduces the load on the ladder program in the PLC in communicating with the PT.

For example, you can set the Write Bit to write recipes or reset the Data Log/ Alarm History Clear Bit.



Operations are also possible for conditions set for memory in the PT and to manipulate memory in the PT.

**Switch Label Language**

You can register up to 16 languages and corresponding character strings for each part in advance and then change all registered parts at the same time using a function switch or a command from the PLC.

This allows you to switch the language during operation or switch the labels in the same language.

**Backup PLC Data in the PT with the Memory Hold Function (NV4W and NV3Q Only and Only When Battery Is Mounted)**

You can constantly back up specified words from the PLC in SRAM in the PT. This allows you, for example, to back up memory areas that are not held in the PLC when using a CP1E PLC without a battery.

You can also back up the specified data from the internal memory in the PT.

**Data Transfer Security**

You can set a password of up to eight alphanumeric characters for transferring screen data from the NV-Designer to an NV-series PT, to prevent screen data from being transferred when anyone other than the administrator attempts to read PT screen data.

**Operation Security (NV3W-V1/NV4W/NV3Q Only)**

You can set a password for each operation level of a part to restrict displays and operations. Security passwords are managed according to operator level.

**Transferring Screens with an SD Memory Card (NV4W and NV3Q Only)**

The screens can be transferred using an SD memory card even if the PT cannot be connected to the NV-Designer. Project data can be transferred directly by using SD memory cards.

**Communications between OMRON EJ1 Temperature Controllers and a Modbus-RTU Master (NV3W-V1, NV4W and NV3Q Only)**

The NV3W-V1, NV4W or NV3Q can connect an OMRON EJ1 Temperature Controller using Modbus-RTU. The EJ1 Temperature Controllers are connected using RS-485 with the PT as the master. Up to 31 Temperature Controllers can be connected.

**Monochrome Display with Eight Shades of Gray (NV4W Only)**

In addition to the previous monochrome display with two shades of gray, you can now also select a monochrome display with eight shades of gray for improved screen display quality.

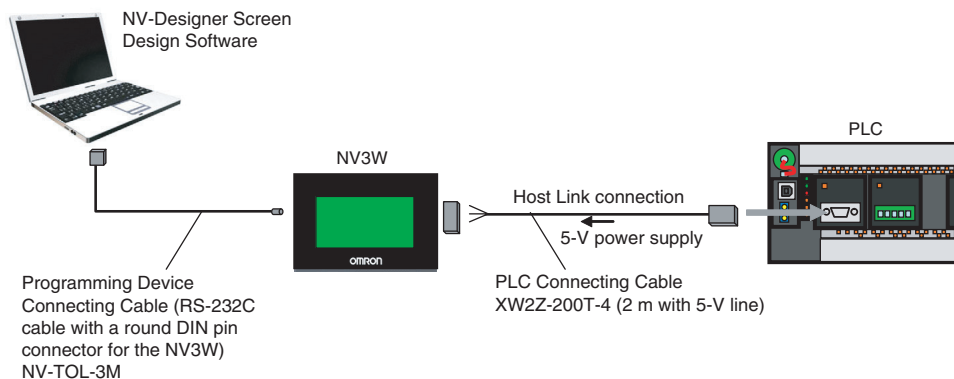
## 1-2 System Configuration

This section describes the types of system configurations in which an NV-series PT can be used.

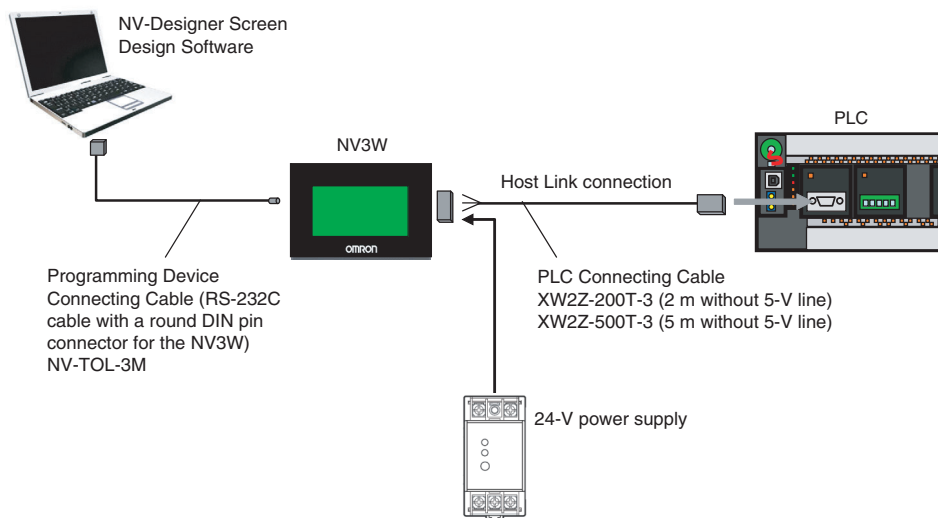
### 1-2-1 System Configuration

#### NV3W System Configuration

##### ■ Using 5-V Power Supplied from the PLC on a Serial Communications Cable

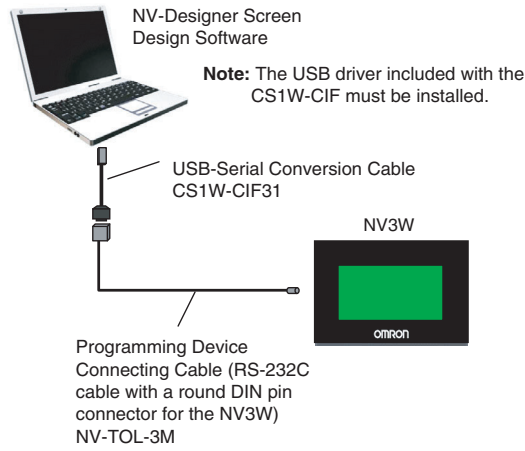


##### ■ Using an External 24-V Power Supply



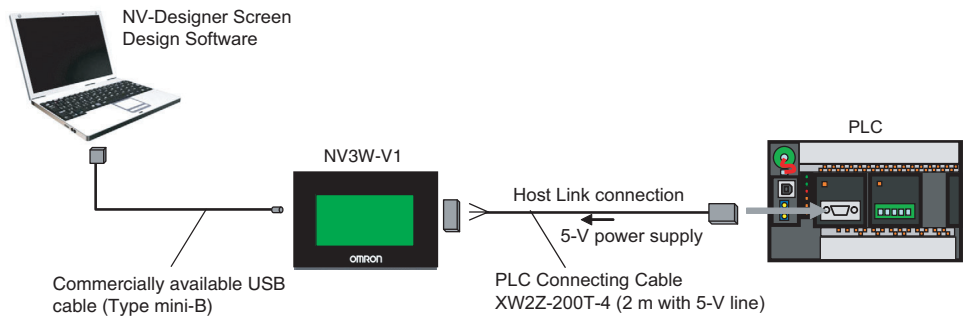
#### Additional Information

To connect to a USB connector on the personal computer, insert a CS1W-CIF31 USB-Serial Conversion Cable as shown below.

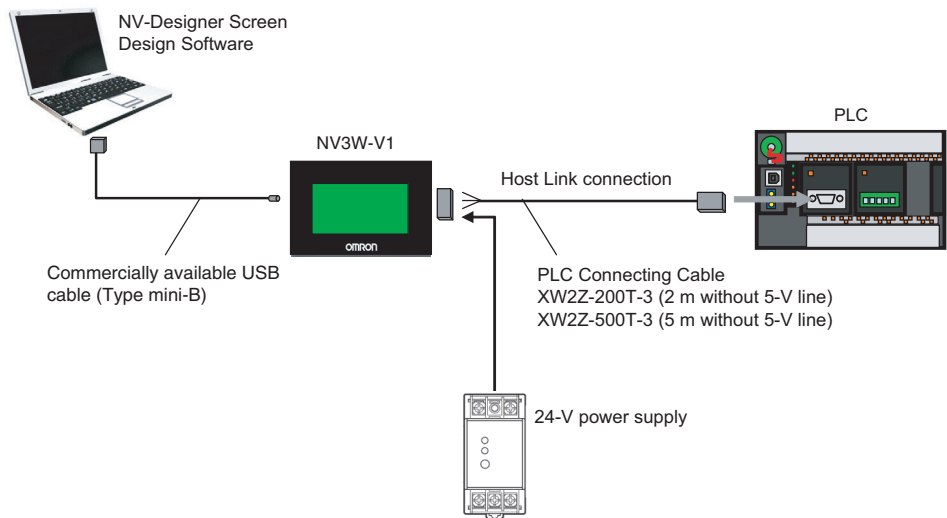


**NV3W-V1 System Configuration**

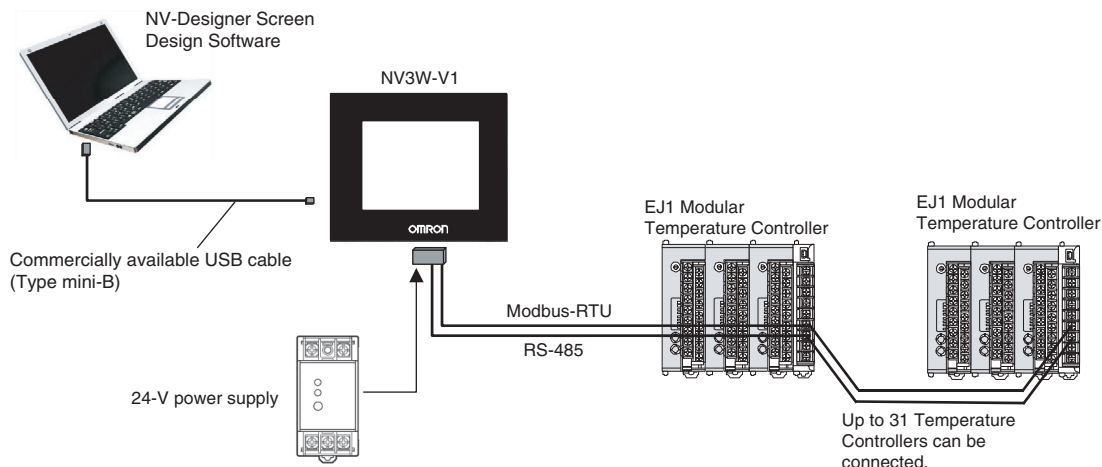
■ **Using 5-V Power Supplied from the PLC on a Serial Communications Cable**



■ **Using an External 24-V Power Supply**

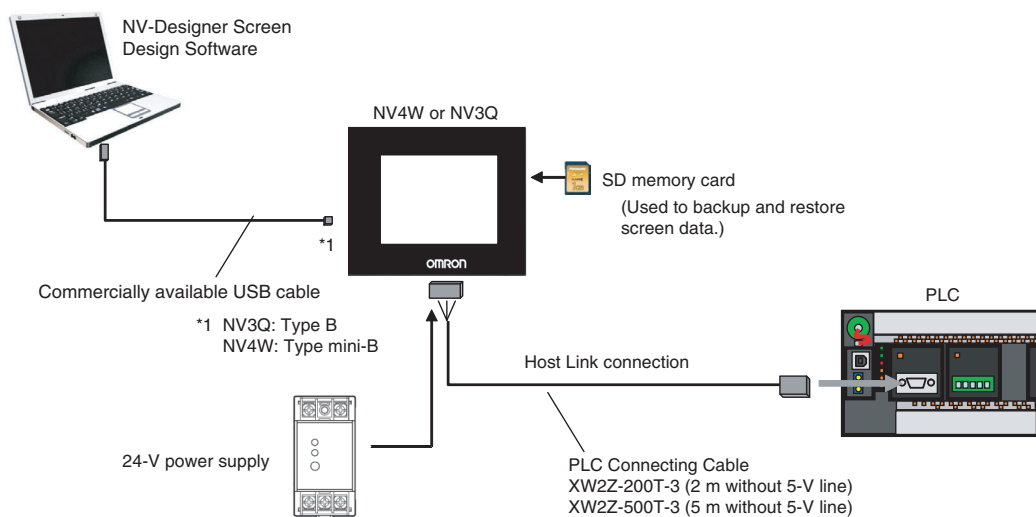


■ Connecting Temperature Controllers

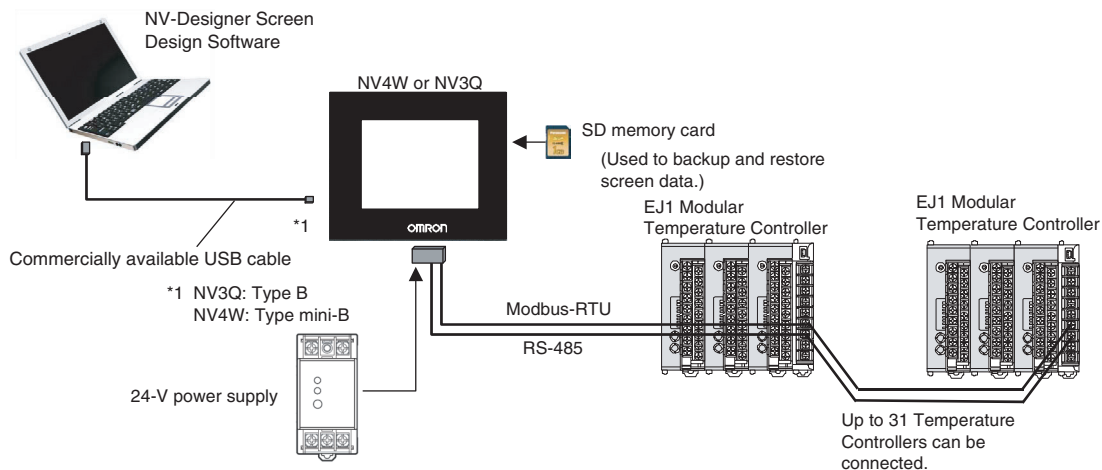


NV4W/NV3Q System Configuration

■ Connecting PLCs



■ Connecting Temperature Controllers



**Additional Information**

NV-series PTs do not support the 1:N NT Link protocol. Modbus-RTU (PLC: Master, PTs: Slaves) is required to connect multiple NV-series PTs to one PLC. (Up to 31 PT can be connected.)

To use Modbus, a communications program for the master is required in the PLC. Also, notification cannot be performed from the PT. Therefore, response and updating may be slow or it may not be possible to read all inputs of touch switches, lamps, and numbers.

For details, refer to the *NV-series Host Connection Manual* (Cat. No. V105).

**1-2-2 Connectable OMRON PLCs**

Series	PLC	Serial communications mode for PT connection
CP Series	N-type CP1E, CP1L (except for 10-point models), and CP1H	Host Link
CS/CJ Series	CS1G/CS1H, CS1G-H/CS1H-H, CS1D, CJ1G, CJ1G-H/CJ1H-H, CJ1M, CJ2H and CJ2M	
C Series* <sup>1</sup>	C200HX/HG/HE(-Z), CQM1H, CPM2A/CPM2C, CPM1/CPM1A, and SRM1-C02-V2	
CVM1/CV Series* <sup>1</sup>	CV500, CV1000, CV2000, and CVM1	

\*1 If the PT is connected to a C-series or CV/CVM1-series PLC, keep the PLC in MONITOR mode. If the PLC is in RUN mode and the PT attempts to write to PLC memory, an error code of ER01 will be displayed and memory will not be written. If the PT is connected to a CP-series or CS/CJ-series PLC, the PLC can be in either RUN or MONITOR mode.

You can connect to the PLC using a built-in serial port on the CPU Unit, a serial port on a Serial Communications Unit (includes serial connection through peripheral port), Serial Communications Board, or Host Link Unit. Use RS-232C or RS-422A to connect to OMRON PLCs. Do not use RS-485.

**1-2-3 Connectable OMRON Temperature Controllers**

Series	Temperature Controllers	Serial communications mode for connecting to NV-series PT
EJ1 Series	EJ1	Modbus-RTU

The NV3W-V1, NV4W or NV3Q can connect to OMRON EJ1 Temperature Controllers using Modbus-RTU. The EJ1 Temperature Controllers are connected using RS-485 with the PT as the master. Up to 31 Temperature Controllers can be connected.

## 1-3 Models

This section provides a list of the models of PTs in the NV Series.

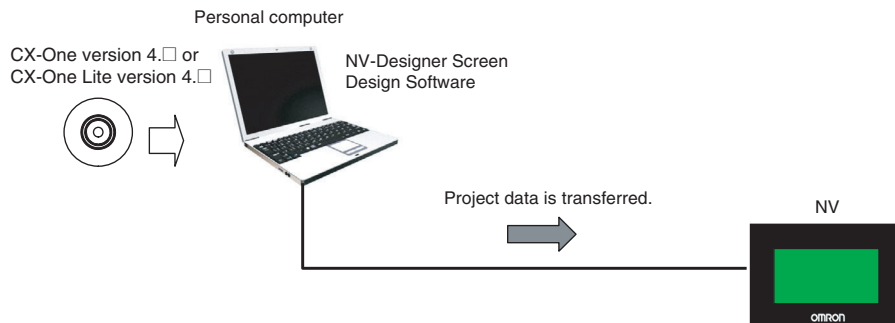
### 1-3-1 NV-series PTs

	Screen size	Number of dots	Backlight	Communications	Power supply voltage	Model
NV3W PT	3.1-in, STN monochrome	128 × 64 dots	LEDs, 3 colors (green, orange, and red)	RS-232C	5 VDC	NV3W-MG20L
					24 VDC	NV3W-MG20
				RS-422A/485	24 VDC	NV3W-MG40
			LEDs, 3 colors (white, pink, and red)	RS-232C	5 VDC	NV3W-MR20L
					24 VDC	NV3W-MR20
				RS-422A/485	24 VDC	NV3W-MR40
NV3W-V1 PT	3.8-in, TFT monochrome	240 × 96 dots	LEDs, 3 colors (green, orange, and red)	RS-232C	5 VDC	NV3W-MG20L-V1
					24 VDC	NV3W-MG20-V1
				RS-422A/485	24 VDC	NV3W-MG40-V1
			LEDs, 3 colors (white, pink and red)	RS-232C	5 VDC	NV3W-MR20L-V1
					24 VDC	NV3W-MR20-V1
				RS-422A/485	24 VDC	NV3W-MR40-V1
NV4W PT	4-in, TFT monochrome	320 × 120 dots	LEDs, 3 colors (green, orange, and red)	RS-232C	24 VDC	NV4W-MG21
				RS-422A/485	24 VDC	NV4W-MG41
			LEDs, 3 colors (white, pink, and red)	RS-232C	24 VDC	NV4W-MR21
				RS-422A/485	24 VDC	NV4W-MR41
NV3Q PT	3.6-in, TFT monochrome	320 × 240 dots (QVGA)	LEDs, 3 colors (white, pink, and red)	RS-232C	24 VDC	NV3Q-MR21
				RS-422A/485	24 VDC	NV3Q-MR41
	White LED		RS-232C	24 VDC	NV3Q-SW21	
			RS-422A/485	24 VDC	NV3Q-SW41	

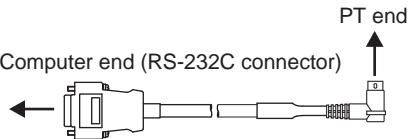
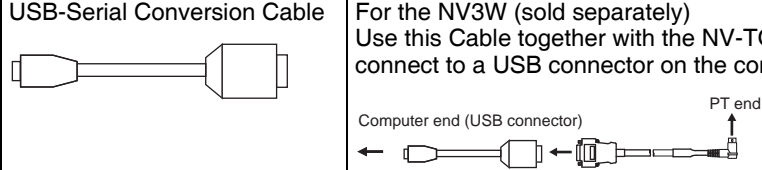
### 1-3-2 Screen Design Software

The NV-Designer is used as the Screen Design Software for the NV-series PTs.

The NV-Designer is included in CX-One version 4.□ or in CX-One Lite version 4.□.


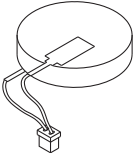
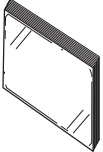
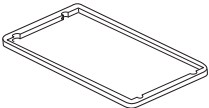


- The NV3W is connected using an NV-TOL-3M RS-232C Cable with a round DIN pin connector on the NV end. To connect to a USB connector on the computer, connect the NV-TOL-3M cable through a CS1W-CIF31 USB-Serial Conversion Cable.
- You can connect to the NV3W-V1, NV4W or NV3Q using a commercially available USB cable.

Name	Description	Model
CX-One version 4.□	Includes the NV-Designer.	CXONE-AL01D-V4
CX-One Lite version 4.□		CXONE-LT01□-V4
Programming Device Connecting Cable for NV3W 	For the NV3W (sold separately) RS-232C cable with a round DIN pin connector on the NV3W end	NV-TOL-3M
USB-Serial Conversion Cable 	For the NV3W (sold separately) Use this Cable together with the NV-TOL-3M to connect to a USB connector on the computer. <b>Note</b> The enclosed USB driver must be installed.	CS1W-CIF31
Programming Device Connecting Cable for NV3W-V1 or NV4W	For the NV3W-V1 or NV4W (sold separately) (USB: Type mini-B)	Commercially available USB cable
Programming Device Connecting Cable for NV3Q	For the NV3Q (sold separately) (USB: Type B)	Commercially available USB cable



### 1-3-3 Other Optional Products

Name	Description	Model	
PLC Connecting Cable 	For the NV3W(-V1) with 5-V power (sold separately)	XW2Z-200T-4 (2 m with 5-V line)	
	For the NV3W(-V1), NV4W, and NV3Q (sold separately)	XW2Z-200T-3 (2 m without 5-V line)	
		XW2Z-500T-3 (5 m without 5-V line)	
Battery 	For the NV4W, and NV3Q (sold separately)	NV-BAT01	
Display Protective Sheets 	For the NV3W, contains 10 sheets (sold separately)	NV3W-KBA04	
	For the NV3W-V1, contains 10 sheets (sold separately)	NV3W-KBA04-V1	
	For the NV4W, contains 10 sheets (sold separately)	NV4W-KBA04	
	For the NV3Q, contains 10 sheets (sold separately)	NV3Q-KBA04	
Waterproof Packings 	For the NV3W, contains 10 packings (sold separately)	NV3W-RP001 <sup>*1</sup>	One Packing is provided on the PT as a standard feature.
	For the NV4W, contains 10 packings (sold separately)	NV4W-RP001	
	For the NV3Q, contains 10 packings (sold separately)	NV3Q-RP001	
SD memory card	For the NV4W/NV3Q Memory capacity: 32 MB to 2 GB For backing up and restoring base screen data for the PT (except for the NV3W(-V1)) and NV-Designer.	Commercially available SD cards Panasonic card with capacity of 32 MB to 2 GB <sup>*2</sup>	

\*1 This does not apply to NV3W-V1.

\*2 The capacity of the SD memory card is 32 MB to 1 GB for system program version 1.0□ of the NV3Q-series PT.

## 1-4 Specifications

### 1-4-1 NV3W

#### General Specifications

Item	Specifications	
Type	24 V	5 V
Model	NV3W-M□20 and NV3W-M□40	NV3W-M□20L
Rated power supply	24 VDC	5 VDC
Operating voltage range	21.6 to 26.4 VDC	4.5 to 5.5 VDC
Power consumption (current consumption)	2 W max. (80 mA max.)	1 W max. (200 mA max.)
Ambient operating temperature	0 to 50°C	
Ambient operating humidity	20% to 85% (with no condensation)	
Ambient storage temperature	-20 to 60°C	
Ambient storage humidity	10% to 85% (with no condensation)	
Dielectric strength	Between the power supply terminals and the case 500 VAC for 1 min with a cutoff current of 10 mA (at initial state)	
Insulation resistance	Between the power supply terminals and the case 100 MΩ (at 500 VDC) (at initial state)	
Vibration resistance	10 to 55 Hz with 0.75-amplitude for 10 min each in X, Y, and Z directions, 1 sweep per min	
Shock resistance	98 m/s <sup>2</sup> 4 times each in X, Y, and Z directions	
Noise immunity	1,000 V <sub>p-p</sub> with pulse widths of 50 ns and 1 μs between power supply terminals (via simulator)	
Resistance to environment	IP65 (at initial state) Dust proof and drip proof only from the front of the panel (using Waterproof Packing at the contact surface with the panel) *Replace the Waterproof Packing each time you reinstall the PT.	
Dimensions	110 × 72 × 28 mm (W × H × D)	
Panel cutout dimensions	105.0 <sup>+1</sup> <sub>0</sub> × 67.0 <sup>+1</sup> <sub>0</sub> mm (H × V), Panel thickness: 1.6 to 4.8 mm	
Degree of protection	Operating section on front panel: IP65	
Safety standards	UL 508, EC Directives and Korea Certification Mark	
Weight	160 g max.	

**Performance Specifications**

Item		Specifications
Type		All NV3W models
Model		NV3W-MG□□(□) and NV3W-MR□□(□)
Display device		TFT monochrome LCD <sup>*1</sup>
Number of dots		128 × 64 dots (H × V)
Effective display size		70 × 35 mm (H × V)
Life expectancy		50,000 hours min. <sup>*2</sup>
Backlights		NV3W-MG: LED backlights, 3 colors (green, orange, and red) NV3W-MR: LED backlights, 3 colors (white, pink, and red)
Touch switches	Method	Analog resistance membrane
	Operating force	0.5 N max.
	Life expectancy	100 million operations min. (at 25°C)
	Switches	50 max. per screen <sup>*3</sup>
	Size	8 dots × 8 dots min. <sup>*4</sup>
External memory		---
Host communications		NV3W-MS□20(□): RS-232C (not isolated), Transmission distance: 15 m, Connector: 8-pin NV3W-M□40: RS-422A/485 (not isolated), Transmission distance: 500 m, Connector: 8-pin
Support Software communications		RS-232C (not isolated) via Mini DIN 5-pin connector
Applicable Support Software		NV-Designer version 1.0 or higher (Included with CX-One version 4.□ or in CX-One Lite version 4.□.)

\*1 The display device for the NV3W-V1 is an STN LCD for lot numbers 160430 and earlier and an TFT LCD for lot numbers 160501 and later.

\*2 This is the estimated time before brightness is reduced by half at room temperature and humidity. It is not a guaranteed value.

\*3 The estimate applies to operation when only custom switches are placed on the screen.

\*4 This is the effective area of a touch switch. It does not include the 1-dot frame line.

**Functional Specifications**

Item	Specifications
Type	All NV3W models
Displayable fonts	Fixed (NV-Designer): Half-size characters (8 × 8 dots) or normal characters (8 × 16 dots) (Magnification is possible on the display to 1×, 2×, and 4×.) True Type (NV-Designer): 10 to 64 dots Windows: 10 to 64 dots
Displayable characters	Japanese, English, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese, Turkish, Russian, and Vietnamese
Maximum number of screens	Approx. 160 screens *The number of screens that can be registered depends on the contents of the screens.
Screen numbers that can be registered	Base screens: 0 to 1,023 Keyboard screens: 0 to 7
Screen types	Base screens (These screens can be switched externally and parts can be pasted on these screens.) Keyboard screens (These screens can be used to directly enter data for data parts.)
Graphics	Straight lines, continuous lines, rectangles, circles, ovals, circular arcs, oval arcs, sectors, oval sectors, rounded rectangles, and bitmaps
Parts	Messages, lamps, switches, data, bar graphs, keyboards, line graphs, and clocks* *Clock parts can access external clock data and display it. There is no clock in the PT itself.
Other functions	Recipes, flowing displays, address writing, and language switching
SPMA functions	Communications with a PLC are possible if the computer running the CX-Programmer is connected to the tool port and a CS/CJ/CP-series PLC is connected to the COM port.

**Memory Specifications**

Item	Type
Type	All NV3W models
Memory type	FROM (built-in Flash Memory)
Memory capacity	384 Kbytes* <sup>1</sup>

\*1 Refer to 1-4-5 *Battery Backup* for the data that is saved in memory.

**Communications Interface Specifications**

PLC/External Device Interface

■ **COM Port**

Item		Specifications	
Type		RS-232C	RS-422A/485
Model		NV3W-M□20(□)	NV3W-M□40
Communications standard		RS-232C (not isolated)	RS-422A/485 (not isolated)*1
Communications conditions for external device	Baud rate (bps)	9,600, 19,200, 38,400, 57,600, 115,200	
	Data length	7 or 8 bits	
	Parity	None, even, or odd	
	Stop bits	1 bit	
Transmission distance (total length)		15 m max. (baud rate: 19,200 bps)	500 m max. (baud rate: 115,200 bps)
Protocols		<ul style="list-style-type: none"> <li>• Host Link (OMRON protocol for PLCs)</li> <li>• Modbus-RTU</li> <li>• Protocols for PLCs from other companies (Refer to the <i>NV-series PT Host Connection Manual</i> (Cat. No. V105) for details.)</li> </ul>	
Connector		8-pin connector*2*3*4	
Applicable cable		PLC Connecting Cable (Without 5-V line: XW2Z-200T-3 (2 m) or XW2Z-500T-3 (5 m), with 5-V line: XW2Z-200T-4 (2 m))	Shielded twisted-pair cable

\*1 The PTs cannot be connected to OMRON PLCs using RS-485 (2-wire) connections and the Host Link protocol.

\*2 “+” and “-” are the power supply pins to drive the PT.

\*3 Be sure to consider the cable length and ensure that the voltage supplied to the PT is within the operating voltage range.

\*4 If power is being supplied from a source other than the PLC for a PT with a 5-VDC power supply, make sure the power supply cable is 10 m or less in length.

**Transfer Interface for Screen Data**

■ **Tool Port**

Item		Specifications	
Communications standard		RS-232C (not isolated)	
Communications conditions for NV-Designer	Baud rate (bps)	Always 115,200	
	Data length	Always 8 bits	
	Parity	Always no parity	
	Stop bits	1 bit	
Protocols		Special protocol for NV-series PTs	
Connector		Mini DIN 5-pin connector	
Applicable cable		NV-TOL-3M	

## 1-4-2 NV3W-V1

**General Specifications**

Item	Specifications	
Type	24 V	5 V
Model	NV3W-M□20-V1 and NV3W-M40-V1	NV3W-M□20L-V1
Rated power supply	24 VDC	5 VDC
Operating voltage range	21.6 to 26.4 VDC	4.5 to 5.5 VDC
Power consumption (current consumption)	1.9 W max. (80 mA max.)	1 W max. (200 mA max.)
Ambient operating temperature	0 to 50°C	
Ambient operating humidity	20% to 85%RH (with no condensation)	
Ambient storage temperature	-20 to 60°C	
Ambient storage humidity	10% to 85%RH (with no condensation)	
Dielectric strength	Between the power supply terminals and the case 500 VAC for 1 min with a cutoff current of 10 mA (at initial state)	
Insulation resistance	Between the power supply terminals and the case 100 MΩ (at 500 VDC) (at initial state)	
Vibration resistance	5 to 8.4 Hz, 3.5 mm single amplitude, 8.4 to 150 Hz, 9.8m/s <sup>2</sup> , 10 times each in x, y, and z directions (1 octave/min)	
Shock resistance	147 m/s <sup>2</sup> min. 3 times each in x, y, and z directions	
Noise immunity	1,000 V <sub>p-p</sub> with pulse widths of 50 ns and 1 μs between power supply terminals (via simulator)	
Resistance to environment	IP67 (at initial state) Dust proof and drip proof only from the front of the panel (using Waterproof Packing at the contact surface with the panel) *Replace the Waterproof Packing each time you reinstall the PT.	
Dimensions	112 × 74 × 27 mm (W × H × D)	
Panel cutout dimensions	105.0 <sup>+1</sup> <sub>0</sub> × 67 <sup>+1</sup> <sub>0</sub> mm (H × V), Panel thickness: 1.6 to 4.8 mm	
Degree of protection	Operating section on front panel: IP67	
Safety standards	UL 508, EC Directives and Korea Certification Mark	
Weight	170 g max.	

**Performance Specifications**

Item		Specifications
Type		All NV3W-V1 models
Model		NV3W-MG□□(L)-V1/NV3W-MR□□(L)-V1
Display device		TFT monochrome LCD <sup>*1</sup>
Number of dots		240 × 96 dots (H × V)
Effective display size		88.5 × 35.4 mm (H × V)
Life expectancy		50,000 hours min. <sup>*2</sup>
Backlights		NV3W-MG□□(L)-V1: LED backlights, 3 colors (green, orange and red) NV3W-MR□□(L)-V1: LED backlights, 3 colors (white, pink and red)
Touch switches	Method	Analog resistance membrane
	Operating force	0.8 N max.
	Life expectancy	100 million operations min. (at 25°C)
	Switches	50 max. per screen <sup>*3</sup>
	Size	8 dots × 8 dots min. <sup>*4</sup>
Host communications		NV3W-M□20(L)-V1: RS-232C (not isolated), Transmission distance: 15 m, Connector: 8-pin NV3W-M□40-V1: RS-422A/485 (not isolated), Transmission distance: 500 m, Connector: 8-pin
Support Software communications		USB 1.1 Mini-B, Transmission distance: 5 m max.
Applicable Support Software		NV-Designer version 2.0 or higher (Included with CX-One version 4.34 or in CX-One Lite version 4.34.)

\*1 The display device for the NV3W-V1 is an STN LCD for lot numbers 161231 and earlier and an TFT LCD for lot numbers 170101 and later.

\*2 This is the estimated time before brightness is reduced by half at room temperature and humidity. It is not a guaranteed value.

\*3 The estimate applies to operation when only custom switches are placed on the screen.

\*4 This is the effective area of a touch switch. It does not include the 1-dot frame line.

**Functional Specifications**

Item	Specifications
Type	All NV3W-V1 models
Displayable fonts	Fixed (NV-Designer): quarter square character (8 × 8 dots), half-size character (8 × 16 dots) or normal characters (16 × 16 dots) (Magnification is possible on the display to 1×, 2×, 4× and 8×.) True Type (NV-Designer): 10 to 96 dots Windows: 10 to 96 dots
Displayable characters	Japanese, English, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese, Turkish, Russian, and Vietnamese
Maximum number of screens	Approx. 250 screens *The number of screens that can be registered depends on the contents of the screens.
Screen numbers that can be registered	Base screens: 0 to 1,023 Keyboard screens: 0 to 7
Screen types	Base screens (These screens can be switched externally and parts can be pasted on these screens.) Keyboard screens (These screens can be used to directly enter data for data parts.)
Graphics	Straight lines, continuous lines, rectangles, circles, ovals, circular arcs, oval arcs, sectors, oval sectors, and rounded rectangles
Parts	Messages, lamps, switches, data, bar graphs, keyboards, line graphs, alarm lists, and clocks* * Clock parts can access external clock data and display it. * The PLC features no function of watch.
Other functions	Recipes, flow displays, address writing, display language switching, alarm lists, passwords, and multifunction
SPMA functions	Communications with a PLC are possible if the computer running the CX-Programmer is connected to the USB port and a CS/CJ/CP-series PLC is connected to the COM port.

**Memory Specifications**

Item	Specifications	
Type	Monochrome	
Model	All the NV3W-V1 models	
Base screen data, keyboard screen data, and flow display data	Memory type	FROM (built-in Flash Memory)
	Memory capacity	2048 Kbytes* <sup>1</sup>
Recipe data	Memory type	FROM (built-in Flash Memory)
	Memory capacity	64 Kbytes* <sup>1</sup>
Write Address	Memory type	FROM (built-in Flash Memory)
	Memory capacity	64 Kbytes* <sup>1</sup>

\*1 Refer to *1-4-5 Battery Backup* for the data that is saved in memory.



**Communications Interface Specifications**

## PLC/External Device Interface

Items		Specifications	
Type		RS-232C	RS-422A/485
Model		NV3W-M□20(□)-V1	NV3W-M□40-V1
Communications standard		RS-232C (not isolated)	RS-422A/485 (not isolated) <sup>*1</sup>
Communications conditions for external device	Baud rate (bps)	9,600, 19,200, 38,400, 57,600, or 115,200	
	Data length	7 or 8 bits	
	Parity	None, even, or odd	
	Stop bits	1 bit	
Transmission distance (total length)		15 m max. (baud rate: 19,200 bps)	500 m max. (baud rate: 115,200 bps)
Protocols		<ul style="list-style-type: none"> <li>• Host Link (OMRON protocol for PLCs)</li> <li>• Modbus-RTU</li> <li>• Protocols for PLCs from other companies (Refer to the <i>NV-series PT Host Connection Manual</i> (Cat. No. V105) for details.)</li> </ul>	
Connector		8-pin connector <sup>*2*3*4</sup>	
Applicable cable		PLC connecting cable for OMRON Host link (Without 5-V line: XW2Z-200T-3(2m) or XW2Z-500T-3(5m), with 5-V line: XW2Z-200T-4 (2 m))	Shielded twisted-pair cable

\*1 The PTs cannot be connected to OMRON PLCs using RS-485 (2-wire) connections and the Host Link protocol.

\*2 “+” and “-” are the power supply pins to drive the PT.

\*3 Be sure to consider the cable length and ensure that the voltage supplied to the PT is within the operating voltage range.

\*4 If power is being supplied from a source other than the PLC for a PT with a 5-VDC power supply, make sure the power supply cable is 10 m or less in length.

**Transfer Interface for Screen Data**

## ■ USB port

Item	Specifications
Type	All the NV3W-V1 models
Communications standard	USB 1.1
Connector type <sup>*1</sup>	USB type mini-B
Number of PTs connected to computer	1
Transmission distance	5 m max.
Protocols	Special protocol for NV-series PTs
Applicable cable	Commercially available USB cable

\*1 Do not subject the metal parts of the connector to excessive static electricity.

## 1-4-3 NV4W

## General Specifications

Item	Specifications
Type	Monochrome
Model	NV4W-M□□1
Rated power supply	24 VDC
Operating voltage range	21.6 to 26.4 VDC
Power consumption (current consumption)	1.7 W max. (70 mA max.)
Power supply section isolation	Transformer
Ambient operating temperature	0 to 50°C
Ambient operating humidity	20% to 85% (with no condensation)
Ambient storage temperature	-20 to 60°C
Ambient storage humidity	10% to 85% (with no condensation)
Dielectric strength* <sup>1</sup>	Between the power supply terminals and the case 500 VAC for 1 min with a cutoff current of 10 mA (at initial state)
Insulation resistance* <sup>1</sup>	Between the power supply terminals and the case 100 MΩ (at 500 VDC) (at initial state)
Vibration resistance	5 to 9 Hz, 3.5-mm single amplitude, 9 to 150 Hz, 9.8 m/s <sup>2</sup> , 10 times each in X, Y, and Z directions (1 octave/min)
Shock resistance	147 m/s <sup>2</sup> 3 times each in X, Y, and Z directions
Noise immunity	1,000 V <sub>p-p</sub> with pulse widths of 50 ns and 1 μs between power supply terminals (via simulator)
Resistance to environment	IP67 (at initial state) Dust proof and drip proof only from the front of the panel (using Waterproof Packing at the contact surface with the panel) *Replace the Waterproof Packing each time you reinstall the PT.
Dimensions	146 × 74 × 30 mm (W × H × D)
Panel cutout dimensions	139 <sup>+1</sup> <sub>0</sub> × 67 <sup>+1</sup> <sub>0</sub> mm (H × V), Panel thickness: 1.6 to 4.8 mm
Degree of protection	Operating section on front panel: IP67
Battery life expectancy	Battery life expectancy: 5 yr (at 25°C)* *The SRAM (internal RAM) is backed up by the battery. If backing up the data is required, purchase a Battery separately. The battery life expectancy is for when no power is supplied. The actual value may be shorter depending on application conditions.
Battery backup	PT clock data, PLC memory hold data, PT internal memory hold data, and alarm history data (if Battery is mounted) *Purchase an NV-BAT01 separately.
Safety standards	UL 508 and EC Directives
Weight	240 g max.

\*1 The USB port and COM port are not isolated from the internal digital circuits.

**Performance Specifications**

Item		Specifications
Model		NV4W-M□□1
Display device		TFT monochrome LCD* <sup>1</sup>
Number of dots		320 × 120 dots (H × V)
Effective display size		109 × 41 mm (H × V)
Life expectancy		50,000 hours min.* <sup>2</sup>
Backlights		NV4W-MG: LED backlight, 3 colors (green, orange, and red) NV4W-MR: LED backlight, 3 colors (white, pink, and red)
Grayscale display		2 shades of gray or 8 shades of gray (selectable using NV-Designer)
Touch switches	Method	Analog resistance membrane
	Operating force	0.8 N max.
	Life expectancy	100 million operations min. (at 25°C)
	Switches	100 max. per screen* <sup>3</sup>
	Size	8 dots × 8 dots min.* <sup>4</sup>
External memory		SD memory card (32 MB to 2 GB) Manufacturers for which operation has been confirmed: Panasonic SD standard* <sup>5</sup>
Host communications	COM Port	NV4W-M□21: RS-232C (not isolated), Transmission distance: 15 m, Connector: 8-pin)
		NV4W-M□41: RS-422/A485 (not isolated), Transmission distance: 500 m, Connector: 8-pin)
Support Software communications		USB 1.1 Mini-B, Transmission distance: 5 m max.
Applicable Support Software		NV-Designer version 1.1 or higher (Included with CX-One version 4.□ or in CX-One Lite version 4.□.)

\*1 The display device for the NV4W is an STN LCD for lot numbers 170221 and earlier and an TFT LCD for lot numbers 170222 and later.

\*2 This is the estimated time before brightness is reduced by half at room temperature and humidity. It is not a guaranteed value.

\*3 The estimate applies to operation when only custom switches are placed on the screen.

\*4 This is the effective area of a touch switch. It does not include the 1-dot frame line.

\*5 Do not reformat the SD memory card using standard Windows functions, such as Windows Explorer.

## Functional Specifications

Item	Specifications
Type	Monochrome
Model	NV4W-M□□1
Displayable fonts	Fixed (NV-Designer): Half-size characters (8 × 8 dots) or normal characters (8 × 16 dots) (Magnification is possible on the display to 1×, 2×, 4× and 8×.) True Type (NV-Designer): 10 to 240 dots Windows: 10 to 240 dots
Displayable characters	Japanese, English, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese, Turkish, Russian, and Vietnamese
Maximum number of screens	2 shades of gray: 250 screens, 8 shades or gray: 200 screens *The number of screens that can be registered depends on the contents of the screens.
Screen numbers that can be registered	Base screens: 0 to 1,023 Keyboard screens: 0 to 7
Screen types	Base screens (These screens can be switched externally and parts can be pasted on these screens.) Keyboard screens (These screens can be used to directly enter data for data parts.)
Graphics	Straight lines, continuous lines, rectangles, circles, ovals, circular arcs, oval arcs, sectors, oval sectors, and rounded rectangles
Parts	Messages, lamps, switches, data, bar graphs, keyboards, line graphs, alarm lists, and clocks* *Clock parts can access external clock data and display it. *Clock accuracy is ±180 s per month.
Other functions	Recipes, flow displays, address writing, display language switching, alarm lists, alarm history, passwords, and Multifunction Objects
SPMA functions	Communications with a PLC are possible if the computer running the CX-Programmer is connected to the USB port and a CS/CJ/CP-series PLC is connected to the COM port.

## Memory Specifications

Item	Specifications	
Type	Monochrome	
Model	NV4W-M□□1	
Base screen data, keyboard screen data, and flow display data	Memory type	FROM (built-in Flash Memory)
	Memory capacity	2,048 Kbytes
Recipe data	Memory type	FROM (built-in Flash Memory)
	Memory capacity	64 Kbytes
Writing memory (Write Address)	Memory type	FROM (built-in Flash Memory)
	Memory capacity	64 Kbytes
PLC memory hold data and PT internal memory hold data	Used memory	SRAM (internal RAM) *The SRAM (internal RAM) is backed up by the battery. If backing up the data is required, purchase an NV-BAT01 Battery separately.
	Memory capacity	PLC/PT Memory Hold Area (24 words max.)

## External Memory Specifications

### SD Memory Card Slot

Item	Specifications
Type	All NV4W models
Supported media	SD memory card (32 MB to 2 GB) Manufacturers for which operation has been confirmed: Panasonic
Applicable format	SD standard compliant

**Note** The SD access indicator will be lit while the SD memory card is being accessed.

**Communications Interface Specifications**

PLC/External Device Interface

■ **COM Port**

Item		Specifications	
Type		RS-232C	RS-422A/485
Model		NV4W-M□21	NV4W-M□41
Communications standard		RS-232C (not isolated)	RS-422A/485 (not isolated) <sup>*1</sup>
Communications conditions for external device	Baud rate (bps)	9,600, 19,200, 38,400, 57,600, or 115,200	
	Data length	7 or 8 bits	
	Parity	None, even, or odd	
	Stop bits	1 bit	
Transmission distance (total length)		15 m max. (baud rate: 115,200 bps)	500 m max. (baud rate: 115,200 bps)
Protocols		Host Link (OMRON protocol for PLCs) Modbus-RTU Protocols for PLCs from other companies (Refer to the <i>NV-series PT Host Connection Manual</i> (Cat. No. V105) for details.)	
Connector		8-pin connector <sup>*2*3</sup>	
Applicable cable		XW2Z-200T-3 (2 m) or XW2Z-500T-3 (5 m) PLC Connecting Cable	Shielded twisted-pair cable

\*1 The PTs cannot be connected to OMRON PLCs using RS-485 (2-wire) connections and the Host Link protocol.

\*2 “+” and “-” are the power supply pins to drive the PT.

\*3 Be sure to consider the cable length and ensure that the voltage supplied to the PT is within the operating voltage range.

**Transfer Interface for Screen Data**■ **USB port**

Item	Specifications
Type	All NV4W models
Communications standard	USB 1.1
Connector type <sup>*1</sup>	USB type mini-B
Number of PTs connected to computer	1
Transmission distance	5 m max.
Protocols	Special protocol for NV-series PTs
Applicable cable	Commercially available USB cable

\*1 Do not subject the metal parts of the connector to excessive static electricity.

## 1-4-4 NV3Q

## General Specifications

Item	Specifications	
Type	Monochrome	Color
Model	NV3Q-MR□1	NV3Q-SW□1
Rated power supply	24 VDC	
Operating voltage range	21.6 to 26.4 VDC	
Power consumption (current consumption)	2.4 W max. (100 mA max.)	3.6 W max. (150 mA max.)
Power supply section isolation	Transformer	
Ambient operating temperature	0 to 50°C	
Ambient operating humidity	20% to 85% (with no condensation)	
Ambient storage temperature	-20 to 60°C	
Ambient storage humidity	10% to 85% (with no condensation)	
Dielectric strength* <sup>1</sup>	Between the power supply terminals and the case 500 VAC for 1 min with a cutoff current of 10 mA (at initial state)	
Insulation resistance* <sup>1</sup>	Between the power supply terminals and the case 100 MΩ (at 500 VDC) (at initial state)	
Vibration resistance	10 to 55 Hz with 0.75-amplitude for 10 min each in X, Y, and Z directions, 1 sweep per min	
Shock resistance	98 m/s <sup>2</sup> 4 times each in X, Y, and Z directions	
Noise immunity	1,000 V <sub>p-p</sub> with pulse widths of 50 ns and 1 μs between power supply terminals (via simulator)	
Resistance to environment	IP65 (at initial state) Dust proof and drip proof only from the front of the panel (using Waterproof Packing at the contact surface with the panel) *Replace the Waterproof Packing each time you reinstall the PT.	
Dimensions	110 × 92.2 × 33.8 mm (W × H × D)	
Panel cutout dimensions	99.2 <sup>+1</sup> <sub>0</sub> × 85.2 <sup>+1</sup> <sub>0</sub> mm (H × V), Panel thickness: 1.6 to 4.8 mm	
Degree of protection	Operating section on front panel: IP65	
Battery life expectancy	Battery life expectancy: 5 yr (at 25°C)*	Battery life expectancy: 3 yr (at 25°C)*
	*The SRAM (internal RAM) is backed up by the battery. If backing up the data is required, purchase a Battery separately. The battery life expectancy is for when no power is supplied. The actual value may be shorter depending on application conditions.	
Battery backup	PT clock data, PLC memory hold data, PT internal memory hold data, and alarm history data (if Battery is mounted) *Purchase an NV-BAT01 separately.	
Safety standards	UL 508 and EC Directives	
Weight	240 g max.	

\*1 The USB port and COM port are not isolated from the internal digital circuits.

**Performance Specifications**

Item		Specifications
Model		NV3Q-MR□1 and NV3Q-SW□1 <sup>*1</sup>
Display device		NV3Q-MR: TFT monochrome LCD NV3Q-SW: TFT color LCD <sup>*2</sup>
Number of dots		320 × 240 dots (H × V)
Effective display size		71 × 53 mm (H × V)
Life expectancy		50,000 hours min. <sup>*3</sup>
Backlights		NV3Q-MR: LED backlights, 3 colors (white, pink, and red) NV3Q-SW: LED backlight, 1 color (white)
Touch switches	Method	Analog resistance membrane
	Operating force	0.8 N max.
	Life expectancy	100 million operations min. (at 25°C)
	Switches	100 max. per screen <sup>*4</sup>
	Size	8 dots × 8 dots min. <sup>*5</sup>
External memory		SD memory card (32 MB to 2 GB) <sup>*6</sup> Manufacturers for which operation has been confirmed: Panasonic SD standard <sup>*6</sup>
Host communica- tions	COM Port	NV3Q-□□21: RS-232C (not isolated), Transmission distance: 15 m, Connector: 8-pin) NV3Q-□□41: RS-422/A485 (not isolated), Transmission distance: 500 m, Connector: 8-pin)
	Tool port	---
Support Software communications	USB port	USB 1.1 type B, Transmission distance: 5 m max.
	Applicable Support Software	

\*1 The display device for the NV3Q-MR is an STN LCD for lot numbers 160430 and earlier and an TFT LCD for lot numbers 160501 and later.

\*2 The display device for the NV3Q-SW is an STN LCD for lot numbers 110999 and earlier and an TFT LCD for lot numbers 111000 and later.

\*3 This is the estimated time before brightness is reduced by half at room temperature and humidity. It is not a guaranteed value.

\*4 The estimate applies to operation when only custom switches are placed on the screen.

\*5 This is the effective area of a touch switch. It does not include the 1-dot frame line.

\*6 The capacity of the SD memory card is 32 MB to 1 GB for PT system program version 1.0□.

\*7 Do not reformat the SD memory card using standard Windows functions, such as that provided in Windows Explorer.

**Functional Specifications**

Item	Specifications	
Type	Monochrome	Color
Model	NV3Q-MR□1	NV3Q-SW□1
Displayable fonts	Fixed (NV-Designer): Half-size characters (8 × 8 dots) or normal characters (8 × 16 dots) (Magnification is possible on the display to 1×, 2×, 4× and 8×.) True Type (NV-Designer): 10 to 240 dots Windows: 10 to 240 dots	
Displayable characters	Japanese, English, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese, Turkish, Russian, and Vietnamese	
Maximum number of screens	Approx. 240 screens	Approx. 180 screens
	*The number of screens that can be registered depends on the contents of the screens.	
Screen numbers that can be registered	Base screens: 0 to 1,023 Keyboard screens: 0 to 7	
Screen types	Base screens (These screens can be switched externally and parts can be pasted on these screens.) Keyboard screens (These screens can be used to directly enter data for data parts.)	
Graphics	Straight lines, continuous lines, rectangles, circles, ovals, circular arcs, oval arcs, sectors, oval sectors, and rounded rectangles	
Parts	Messages, lamps, switches, data, bar graphs, keyboards, line graphs, alarm lists, and clocks* *Clock parts can access external clock data and display it. *Clock accuracy is ±180 s per month.	
Other functions	Recipes, flow displays, address writing, display language switching, alarm lists, alarm history, passwords, and Multifunction Objects	
SPMA functions	Communications with a PLC are possible if the computer running the CX-Programmer is connected to the USB port and a CS/CJ/CP-series PLC is connected to the COM port.	

**Memory Specifications**

Item	Specifications		
Type	Monochrome	Color	
Model	NV3Q-MR□1	NV3Q-SW□1	
Base screen data, keyboard screen data, and flow display data	Memory type	FROM (built-in Flash Memory)	
	Memory capacity	2,048 Kbytes	12,288 Kbytes
Recipe data	Memory type	FROM (built-in Flash Memory)	
	Memory capacity	64 Kbytes	
Writing memory (Write Address)	Memory type	FROM (built-in Flash Memory)	
	Memory capacity	64 Kbytes	
PLC memory hold data and PT internal memory hold data	Used memory	SRAM (internal RAM) *The SRAM (internal RAM) is backed up by the battery. If backing up the data is required, purchase an NV-BAT01 Battery separately.	
	Memory capacity	PLC/PT Memory Hold Area (24 words max.)	



## External Memory Specifications

### SD Memory Card Slot

Item	Specifications
Type	All NV3Q models
Supported media	SD memory card (32 MB to 2 GB) <sup>*1</sup> Manufacturers for which operation has been confirmed: Panasonic
Applicable format	SD standard compliant

\*1 The capacity of the SD memory card is 32 MB to 1 GB for PT system program version 1.0□.

**Note** The SD access indicator will be lit while the SD memory card is being accessed.

## Communications Interface Specifications

### PLC/External Device Interface

#### ■ COM Port

Item	Specifications	
Type	RS-232C	RS-422A/485
Model	NV3Q-M□21	NV3Q-M□41
Communications standard	RS-232C (not isolated)	RS-422A/485 (not isolated) <sup>*1</sup>
Communications conditions for external device	Baud rate (bps)	9,600, 19,200, 38,400, 57,600, or 115,200
	Data length	7 or 8 bits
	Parity	None, even, or odd
	Stop bits	1 bit
Transmission distance (total length)	15 m max. (baud rate: 115,200 bps)	500 m max. (baud rate: 115,200 bps)
Protocols	Host Link (OMRON protocol for PLCs) Protocols for PLCs from other companies (Refer to the <i>NV-series PT Host Connection Manual</i> (Cat. No. V105) for details.)	
Connector	8-pin connector <sup>*2*3</sup>	
Applicable cable	XW2Z-200T-3 (2 m) or XW2Z-500T-3 (5 m) PLC Connecting Cable	Shielded twisted-pair cable

\*1 The PTs cannot be connected to OMRON PLCs using RS-485 (2-wire) connections and the Host Link protocol.

\*2 “+” and “-” are the power supply pins to drive the PT.

\*3 Be sure to consider the cable length and ensure that the voltage supplied to the PT is within the operating voltage range.

## Transfer Interface for Screen Data

### ■ USB port

Item	Specifications
Type	All NV3Q models
Communications standard	USB 1.1
Connector type <sup>*1</sup>	Type B
Number of PTs connected to computer	1
Transmission distance	5 m max.
Protocols	Special protocol for NV-series PTs
Applicable cable	Commercially available USB cable

\*1 Do not subject the metal parts of the connector to excessive static electricity.

## 1-4-5 Battery Backup

The data in an NV-series PT is backed up using the methods given in the following table.

Backed up data	Location of backup	Battery requirement
Project Data Consists of the following: <ul style="list-style-type: none"> <li>• NV configuration data (NV Configuration)</li> <li>• Base screen data</li> <li>• Keyboard screen data</li> <li>• Recipe data</li> <li>• Write Address data</li> <li>• Flow display data</li> <li>• Passwords (not supported by NV3W)</li> </ul>	PT FROM (built-in Flash Memory)	Not required.
<ul style="list-style-type: none"> <li>• Clock data (not supported by NV3W(-V1))</li> <li>• Alarm history data (not supported by NV3W(-V1))</li> <li>• PLC memory hold data (not supported by NV3W(-V1))</li> <li>• PT internal memory hold data (not supported by NV3W(-V1))</li> </ul>	PT SRAM (internal RAM)	Required (except for the NV3W(-V1))

## 1-5 Functions

Support for the main functions of NV-series PTs is given in this section.

Function	NV3W	NV3W-V1	NV4W	NV3Q
5-V input from PLC	Supported.	Supported.	Not supported.	Not supported.
Vertical display	Supported.	Supported.	Supported.	Not supported.
PT clock	Not supported. (External clock data can be accessed.)	Not supported. (External clock data can be accessed.)	Supported.	Supported.
PLC/PT memory hold function	Not supported.	Not supported.	Supported.	Supported.
Alarm list and history	Not supported.	Supported. (Alarm list only)	Supported.	Supported.
Line graphs	Supported.	Supported.	Supported.	Supported.
Data transfer security	Supported.	Supported.	Supported.	Supported.
Flow displays	Supported.	Supported.	Supported.	Supported.
Writing memory (Write Address)	Supported.	Supported.	Supported.	Supported.
Recipes	Supported.	Supported.	Supported.	Supported.
Operation security	Not supported.	Supported.	Supported.	Supported.
SPMA functions	Supported.	Supported.	Supported.	Supported.
Floating-point support for decimal point scaling data parts	Supported.	Supported.	Supported.	Supported.
Multi-language switching	Supported.	Supported.	Supported.	Supported.
SD memory card functions	Not supported.	Not supported.	Supported.	Supported.
Multifunction Objects	Not supported.	Supported.	Supported.	Supported.
Connection to OMRON EJ1 Temperature Controllers using Modbus-RTU master	Not supported.	Supported.	Supported.	Supported.
Connection to multiple PLCs using Modbus-RTU master	Not supported.	Supported.	Supported.	Supported.

## 1-6 System Versions

The system program version (abbreviated as "system version") in the NV-series PT determines the project system versions that can operate in the NV-series PT.

### 1-6-1 NV-series PT Models and System Versions

The system versions that can be installed depend on the model of the NV-series PT. The following table shows the possible combinations.

#### Applicable Versions for the NV-series PTs

NV Series	NV-Designer System Version
NV3W Series	Version 1.1 or higher
NV3W-V1 Series	Version 2.0 or higher <sup>*1</sup>
NV4W Series	Version 1.1 or higher <sup>*2</sup>
NV3Q Series	Version 1.1 or higher <sup>*3*4</sup>

\*1 Version 2.1 or higher is required for NV3W-V1 PT with lot number 170101 or later.

\*2 Version 2.1 or higher is required for NV4W PT with lot number 170222 or later.

\*3 Version 1.2 or higher is required for NV3Q-SW PT with lot number 111000 or later.

\*4 Version 2.1 or higher is required for NV3Q-MR PT with lot number 160501 or later.

#### Functions and NV System Versions

	NV system version	Vertical displays	Alarm lists and histories	Operation security	Multifunction objects	PLC multiple connections	Continued PT operation for non-fatal errors in OMRON PLCs	Larger SD memory cards (from 1 GB to 2 GB)	NV-Designer version
NV3W	Version 1.1 or higher	Supported.	Not supported.	Not supported.	Not supported.	Not supported.	Supported.	Not supported.	Version 1.1 or higher
	Version 1.0 or higher	Supported.	Not supported.	Not supported.	Not supported.	Not supported.	Not supported.	Not supported.	Version 1.0 or higher
NV3W-V1	Version 2.0 or higher	Supported.	Supported. <sup>*1</sup>	Supported.	Supported.	Supported.	Supported.	Not supported.	Version 2.0 or higher
NV4W	Version 1.1 or higher	Supported.	Supported.	Supported.	Supported.	Supported.	Supported.	Supported.	Version 1.1 or higher
NV3Q	Version 1.1 or higher	Not supported.	Supported.	Supported.	Supported.	Supported.	Supported.	Supported.	Version 1.1 or higher
	Version 1.0 or higher	Not supported.	Supported.	Supported.	Not supported.	Not supported.	Not supported.	Not supported.	Version 1.0 or higher

\*1 The alarm histories are not supported.

The most recent NV system version can be installed using the Support Software.

## 1-6-2 NV System Version Upgrade Procedure

The NV system version must be upgraded to use new features. The most recent firmware is included with the NV-Designer. Upgrade your NV-Designer designer before you attempt to update the system version of your NV-series PTs.

### Upgrading the System Program Version with an SD Memory Card (NV4W/ NV3Q Only)

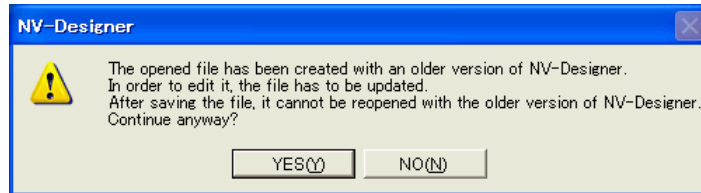
With the NV4W or NV3Q, the version of the system program can be updated using an SD memory card. When saving data to the SD memory card, save the newest version of the system program on the same card. When the data is read by the PT, the firmware and screen data for the newest version will automatically be transferred to the PT.

### Version Upgrades when Transferring Screens

The firmware can be updated when transferring screens from the NV-Designer by selecting the automatic firmware update.

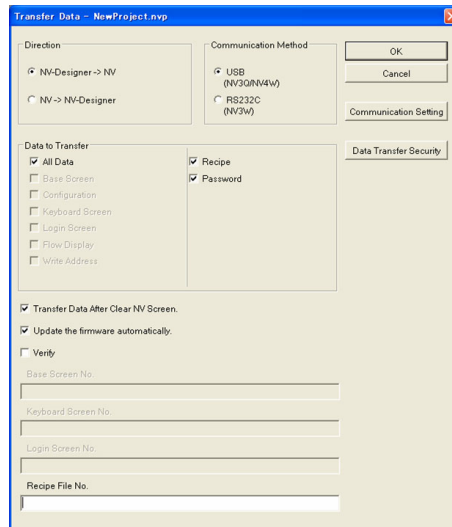
**Note**

- (1) Updating the firmware in the NV-series PT and transferring the project are performed at the same time from the NV-Designer. It is not possible to update only the firmware. (The NV Ver\_UP Tool is required.)
- (2) When screen data that was created on an old version of the NV-Designer is read with the new version of the NV-Designer, the screen data is automatically updated to the new version. (The following confirmation dialog box will be displayed.)



The following dialog box will be displayed when **Transfer** is selected from the PT Menu of the NV-Designer..

#### Transfer Data Dialog Box



Data to Transfer: All Data

Direction: NV-Designer → NV

Select the *Update the firmware automatically* Check Box, and then click the OK Button.

Updating the firmware and transferring the project will start at the same time.

**Note** Automatically updating the firmware is possible only when all data is transferred.

- Note**
- (1) Never turn OFF the power supply to the PT while the version is being upgraded. Also, do not unplug the cable between the computer and the NV-series PT. The PT may not restart if transferring the system fails.
  - (2) The SPMA function cannot be used while the version is being upgraded or screens are being transferred.

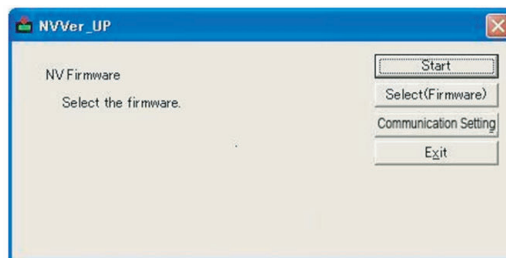
## Version Upgrade Procedure Using NV Ver\_UP Tool

NV Ver\_UP is a special tool to upgrade the firmware version of the PT.

The NV Ver\_UP version upgrade tool is installed at the same time as the NV-Designer.

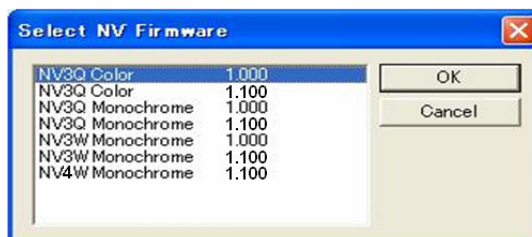
Click the **Start** Button at the bottom left of the window or select **All Programs** from the menu displayed by pressing the **Ctrl** Key and the **Esc** Key, and then select **CX-One - NV-Designer - Tools - NV Ver\_UP** from the OMRON Menu.

NV Ver\_UP Dialog Box



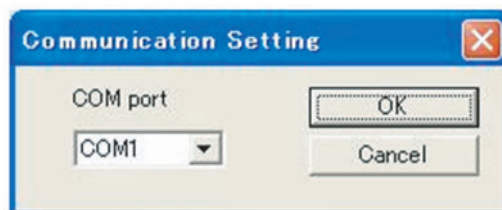
Select the firmware (Select (Firmware) Button) and set the communications conditions (Communication Setting Button). The applicable settings dialog box will be displayed when either of the buttons is clicked.

Select NV Firmware Dialog Box



Select the most recent firmware version (i.e., highest version number) for the model that you are using. Click the OK Button to return to the NV Ver\_UP Dialog Box.

Communication Setting Dialog Box



Make the communications setting, and then click the OK Button to return to the NV Ver\_UP Dialog Box. These selections cannot be made for the NV3W-V1, NV4W or NV3Q.

For the NV3W, select the COM port that you are actually using.

Upgrading the version will start when the Start Button is clicked.

The NV Ver\_UP version upgrade tool will end when the Exit Button is clicked.

### Note

- (1) Never turn OFF the power supply to the PT while the version is being upgraded.
- (2) Do not unplug the cable between the computer and the NV-series PT. Otherwise, the PT may not restart.





## **SECTION 2**

# **Part Names, Functions, and Internal Configuration**

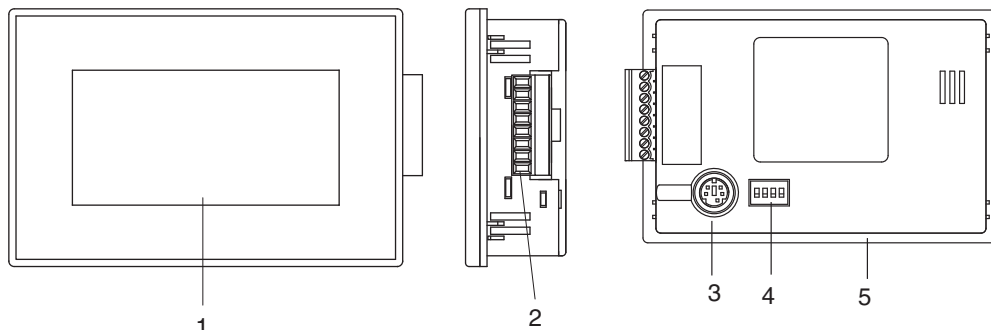
This section describes the functions of the various parts of an NV-series PT and how the NV-series PTs operate internally.

2-1	Part Names and Functions. . . . .	36
2-1-1	NV3W. . . . .	36
2-1-2	NV3W-V1. . . . .	37
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## 2-1 Part Names and Functions

This section describes the part names and functions of NV-series PTs.

### 2-1-1 NV3W



Number	Part name	Description
1	Display area	Various screens are displayed in this area. The entire display surface is a touch panel, which can be used for switch operations and data entry. An optional Protective Sheet is available to protect the display screen from dirt. (Refer to 1-3-3 Other Optional Products.)
2	Communications/power supply connector (Connects to COM port.)	This connector is used to connect serial communications with the PLC and the power supply. Communications are performed using RS-232C or RS-422A/485. Connect the enclosed connector to the COM port on the PT to enable using the communications/power connector.
3	Tool port (NV-Designer connection port)	Connect this port to the computer running the NV-Designer.
4	Operating mode switch	This DIP switch is used to prohibit moving to the System Menu and to clear the FROM. Set the DIP switch before turning ON the power.
5	Waterproof Packings	This Packing maintains waterproof performance from the front of the panel.

\*1 Operating mode switch

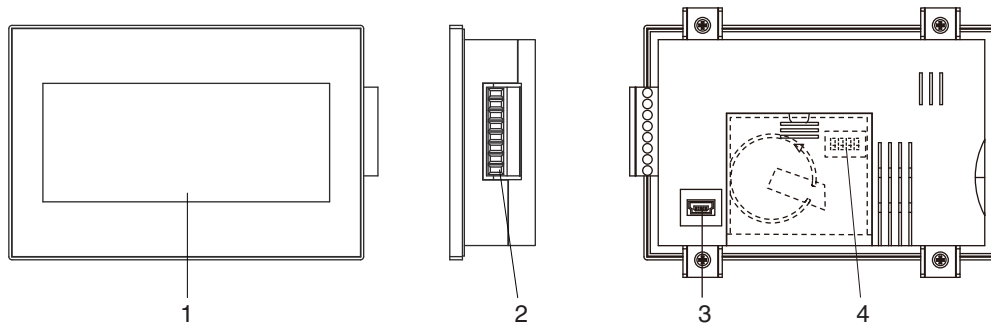
Setting	Normal operation (factory setting)	Prohibiting moving to System Menu	Clearing FROM at startup
	Turn OFF all pins.	Turn ON pin 2.	Turn ON pins 2, 3, and 4.
Pin settings			



#### Precautions for Correct Operation

Do not use any settings other than those given above.

2-1-2 NV3W-V1



Number	Part name	Description
1	Display area	Various screens are displayed in this area. The entire display surface is a touch panel, which can be used for switch operations and data entry. An optional Protective Sheet is available to protect the display screen from dirt. (Refer to 1-3-3 Other Optional Products.)
2	Communications/power supply connector (Connects to COM port.)	This connector is used to connect serial communications with the PLC and the power supply. Communications are performed using RS-232C or RS-422A/485. Connect the enclosed connector to the COM port on the PT to enable using the communications/power connector.
3	USB port (Type mini-B)	Connect this port to the computer running the NV-Designer. You can use a commercially available USB cable (A: Type mini-B)
4	Operating mode switch	This DIP switch is used to prohibit moving to the System Menu and to clear the FROM. Set the DIP switch before turning ON the power.
5	Waterproof Packings	This Packing maintains waterproof performance from the front of the panel.

\*1 Operating mode switch

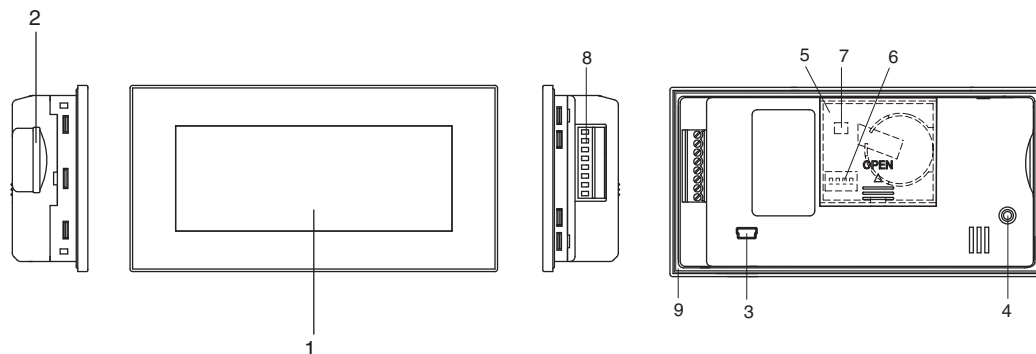
Setting	Normal operation (factory setting)	Prohibiting moving to System Menu	Clearing FROM at startup
	Turn OFF all pins.	Turn ON pin 2.	Turn ON pins 2, 3, and 4.
Pin settings	<p>ON OFF 1 2 3 4</p>	<p>ON OFF 1 2 3 4</p>	<p>ON OFF 1 2 3 4</p>



**Precautions for Correct Operation**

Do not use any settings other than those given above.

2-1-3 NV4W



Number	Part name	Description
1	Display area	Various screens are displayed in this area. The entire display surface is a touch panel, which can be used for switch operations and data entry. An optional Protective Sheet is available to protect the display screen from dirt. (Refer to 1-3-3 Other Optional Products.)
2	SD memory card slot	Insert the SD memory card here. When using an SD memory card from the NV-Designer, use an SD memory card reader/writer and perform operations on the NV-Designer. When using an SD memory card from the PT, use the SD Memory Card Setting Screen from the System Menu to perform operations.
3	USB port (type mini-B)	This port is used to connect to a computer (NV-Designer). A commercially available USB cable (A: type mini-B) can be used.
4	SD memory card access indicator	This indicator lights while the SD memory card is being accessed. Do not remove the SD memory card while the indicator is lit.
5	Battery cover	When using a backup battery (purchased separately), open this battery cover to install it. When a backup battery is installed, clock data, PLC memory hold data, alarm history data, and internal PT memory hold data can be used.
6	Operating mode switch	This DIP switch is used to prohibit moving to the System Menu and to clear the FROM. Set the DIP switch before turning ON the power.*1
7	Battery connector	This is the connector for the backup battery.
8	Communications/power supply connector (Connects to COM port.)	This connector is used to connect serial communications with the PLC and the power supply. Communications are performed using RS-232C or RS-422A/485. Connect the enclosed connector to the COM port on the PT to enable using the communications/power connector.
9	Waterproof Packings	This Packing maintains waterproof performance from the front of the panel.

\*1 Operating mode switch

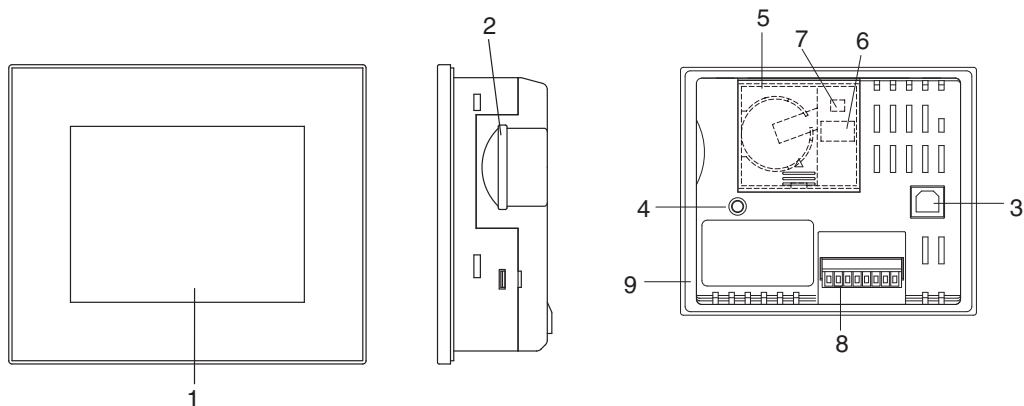
Setting	Normal operation (factory setting)	Prohibiting moving to System Menu	Clearing FROM at startup
	Turn OFF all pins.	Turn ON pin 2.	Turn ON pins 2, 3, and 4.
Pin settings			



**Precautions for Correct Operation**

Do not use any settings other than those given above.

2-1-4 NV3Q



Number	Part name	Description
1	Display area	Various screens are displayed in this area. The entire display surface is a touch panel, which can be used for switch operations and data entry. An optional Protective Sheet is available to protect the display screen from dirt. (Refer to 1-3-3 Other Optional Products.)
2	SD memory card slot	Insert the SD memory card here. When using an SD memory card from the NV-Designer, use an SD memory card reader/writer and perform operations on the NV-Designer. When using an SD memory card from the PT, use the SD Memory Card Setting Screen from the System Menu to perform operations.
3	USB port (type B)	Connect this port to the computer running the NV-Designer. Commercially available USB cable (type AB) can be used.
4	SD memory card access indicator	This indicator lights while the SD memory card is being accessed. Do not remove the SD memory card while the indicator is lit.
5	Battery cover	When using a backup battery (purchased separately), open this battery cover to install it. When a backup battery is installed, clock data, PLC memory hold data, alarm history data, and internal PT memory hold data can be used.
6	Operating mode switch	This DIP switch is used to prohibit moving to the System Menu and to clear the FROM. Set the DIP switch before turning ON the power.*1
7	Battery connector	This is the connector for the backup battery.
8	Communications/power supply connector (Connects to COM port.)	This connector is used to connect serial communications with the PLC and the power supply. Communications are performed using RS-232C or RS-422A/485. Connect the enclosed connector to the COM port on the PT to enable using the communications/power connector.
9	Waterproof Packings	This Packing maintains waterproof performance from the front of the panel.

\*1 Operating mode switch

Setting	Normal operation (factory setting)	Prohibiting moving to System Menu	Clearing FROM at startup
	Turn OFF all pins.	Turn ON pin 2.	Turn ON pins 2, 3, and 4.
Pin settings			



**Precautions for Correct Operation**

Do not use any settings other than those given above.

**Note**

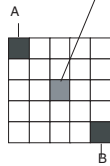
(1) Precaution when Using the NV3W(-V1), NV4W, or NV3Q

The touch switches use analog resistive membranes.

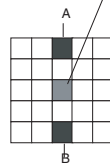
Do not touch more than 1 touch switch at the same time.

If you touch two switches at the same time and there is a switch centered between them, the switch between them will operation, possibly causing damage to facilities or accidents.

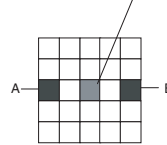
If switches A and B are touched at the same time, this switch will operate.



If switches A and B are touched at the same time, this switch will operate.

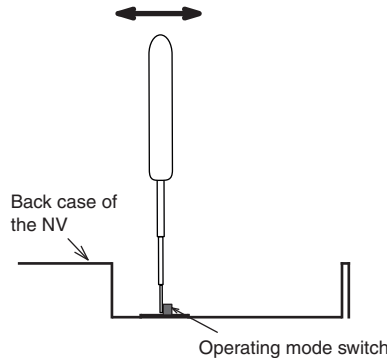


If switches A and B are touched at the same time, this switch will operate.

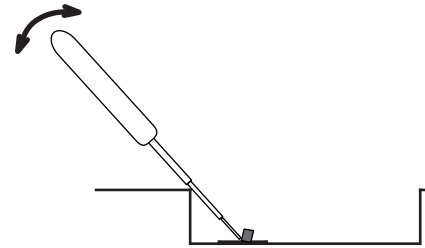


(2) Set the operating mode switch on the NV3W-V1/NV4W as shown below.

**Correct Method**



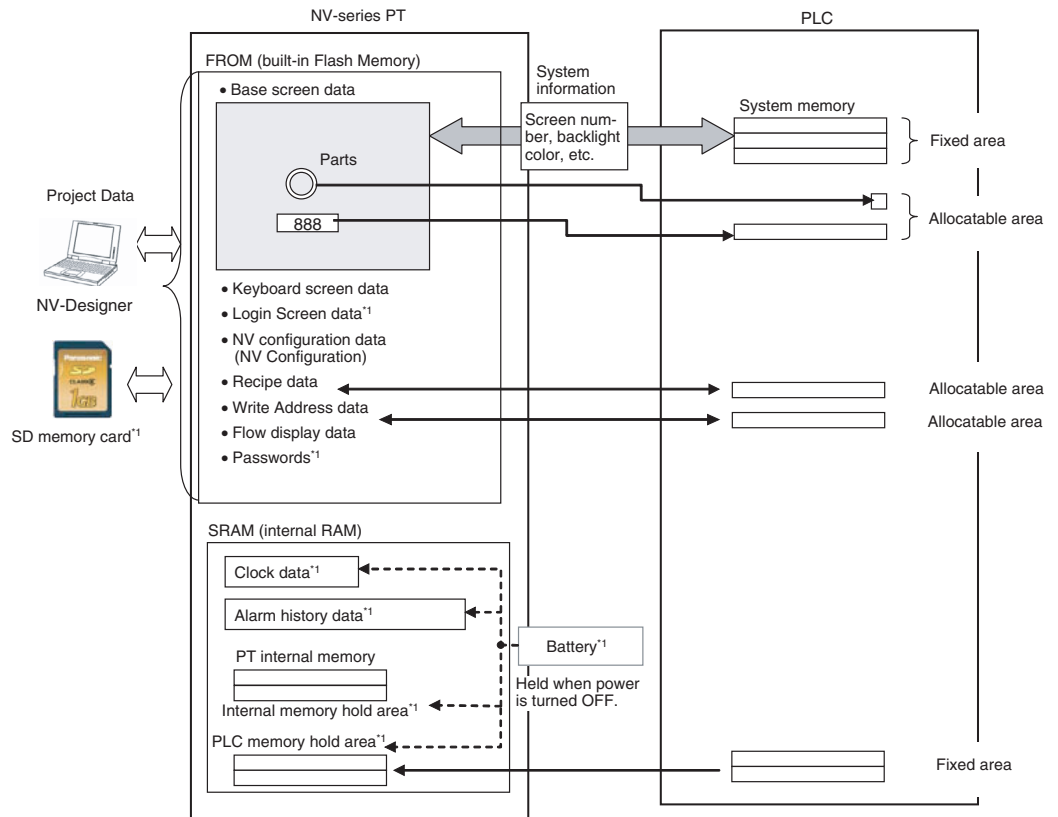
**Wrong Method**



If you attempt to set the switch by using the back case of the NV as a fulcrum, the operating mode switch may break.

## 2-2 Internal Operation

An NV-series PT contains both FROM (internal Flash Memory) and SRAM (internal RAM). These are used for data exchange with the PLC as shown below.



\*1 Not supported by the NV3W.

### ■ FROM (Built-in Flash Memory)

Stores the project data created with the NV-Designer (base screen data, other functional data, PT configuration, etc.)

The project data can be backed up to and restored from SD memory cards.

Data		Description
Screen data	Base screen data	This is the data for screens containing parts selected from the parts library.
	Keyboard screen data	This is the data for screens containing keyboard parts that open when data parts are touched.
	Login screen data	The login screens are used to enter passwords according to the password levels specified for the operation security function. (Not supported for the NV3W)
	NV configuration data (NV Configuration)	These are the initial settings for system memory, the startup screen number, etc.
	Recipe data	This data contains the settings for recipes that enable reading or writing multiple numeric values in PLC memory at the same time.
	Write Address data	This data contains the settings for the conditions and operations to write PLC/PT data according to the status of PLC/PT memory while specified screens are displayed.
	Flow display data	This data contains the settings for the text and display conditions for flow displays that are displayed at the bottom of all screens.
	Passwords	This data contains the settings for passwords that restrict displays and operations according to the part and user. (Not supported for the NV3W)

### ■ SRAM (Internal RAM)

The SRAM stores data collected by the PT, such as the alarm history, PT internal memory values, PT internal clock data, etc.

The data stored in the internal RAM will be lost one minute after the power supply is turned OFF unless a Battery (sold separately) is installed. (A Battery cannot be used with the NV3W(-V1).)

Data	Description
Clock data	This is the clock data for the NV-series PT.
Alarm history data	This data contains a history (including time stamps) of the alarms that have occurred or recovered while monitoring PLC memory status that is defined as alarms.
PT internal memory	PT internal memory Specified contents can be backed up when the power supply is turned OFF.
PLC memory hold	This data contains the data that has been specified for constant reading from PLC memory and holding when the power supply is turned OFF.



# SECTION 3

## Preparations for Operation

This section outlines the steps required to prepare an NV-series PT for operation.

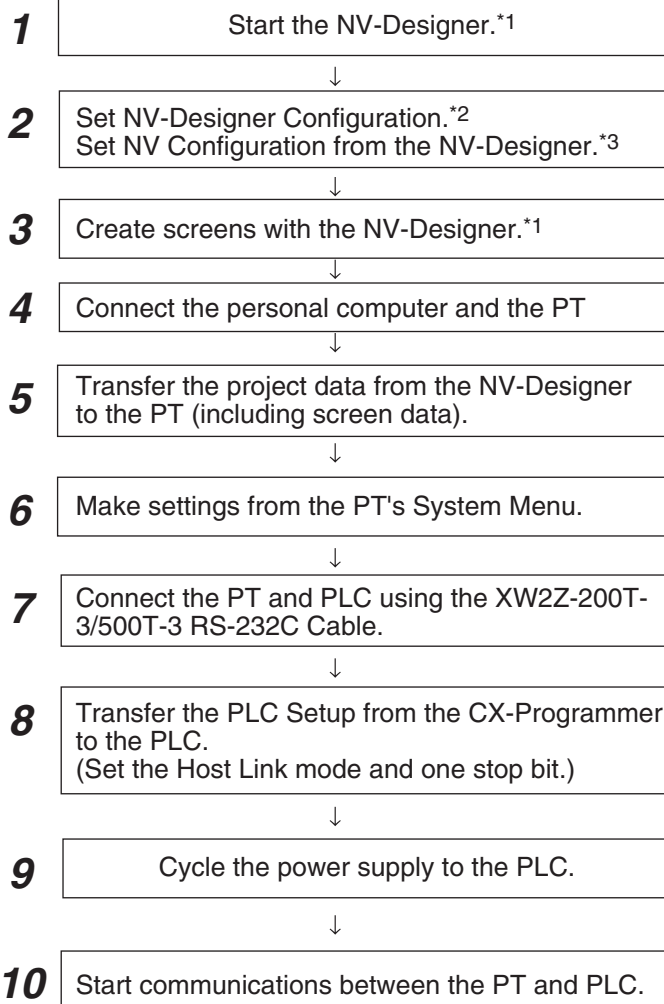
- 3-1 Preparations for Operation . . . . . 44
- 3-1-1 Preparations for Operation . . . . . 44

## 3-1 Preparations for Operation

Use the following procedures to operate the NV-series PT.

### 3-1-1 Preparations for Operation

#### Models with 24-V Power



\*1 For details, refer to *Section 5 Creating and Saving Projects (Including Screen Data)* in the *NV-series Programming Manual* (Cat. No. V104).

\*2 For details, refer to *Section 3 NV-Designer Outline and Configuration* in the *NV-series Programming Manual* (Cat. No. V104).

\*3 For details, refer to *Section 6 NV Configuration* in the *NV-series Programming Manual* (Cat. No. V104).

#### Note

(1) The default language for the System Menu is English.

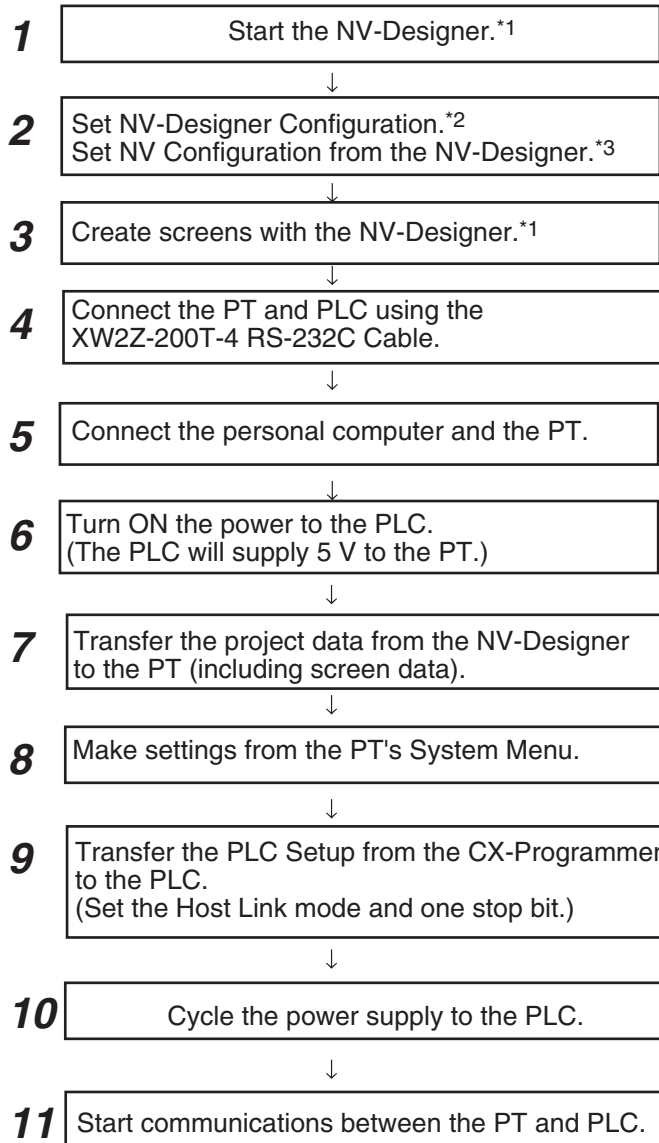
You can use the NV-Designer to set the System Menu language to Japanese, on the Setup 1 Tab Page of the NV Configuration.

With the NV3W-V1, NV4W or NV3Q, the language used to display the System Menu can also be selected from the System Menu.

Refer to *5-1-2 System Menu Language* for details.

(2) If the PT is connected to a C-series or CV/CVM1-series PLC, keep the PLC in MONITOR mode. If the PLC is in RUN mode and the PT attempts to write to PLC memory, an error code of ER01 will be displayed and memory will not be written.

## When Power (5 V) Is Supplied from the PLC (NV3W(-V1) Only)



\*1 For details, refer to *Section 5 Creating and Saving Projects (Including Screen Data)* in the *NV-series Programming Manual* (Cat. No. V104).

\*2 For details, refer to *Section 3 NV-Designer Outline and Configuration* in the *NV-series Programming Manual* (Cat. No. V104).

\*3 For details, refer to *Section 6 NV Configuration* in the *NV-series Programming Manual* (Cat. No. V104).

**Note**

- (1) The default language for the System Menu is English. You can use the NV-Designer to set the System Menu language to Japanese on the Setup 1 Tab Page of the NV Configuration. Refer to *5-1-2 System Menu Language* for details.
- (2) If the PT is connected to a C-series or CV/CVM1-series PLC, keep the PLC in MONITOR mode. If the PLC is in RUN mode and the PT attempts to write to PLC memory, an error code of ER01 will be displayed and memory will not be written.



# SECTION 4

## Installing and Wiring the PT

This section describes how to install and wire an NV-series PT and start the PT for the first time.

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## 4-1 Installing the PT

### 4-1-1 Battery Mounting Procedure (NV4W and NV3Q Only)

To hold the following data in the PT even if the PT power supply is turned OFF for the NV4W or NV3Q, install a Battery before installing the PT.

Internal data to hold in the PT: Clock data, PLC memory hold data, PT internal memory hold data, and alarm history data

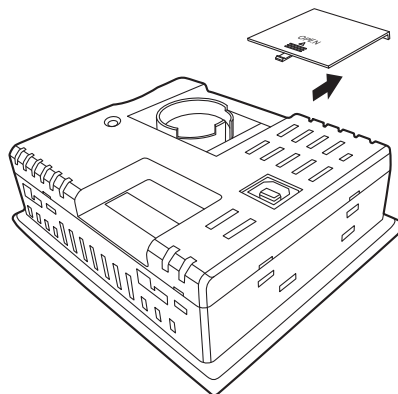
Use the following battery.

PT	Battery specifications	Model
NV4W or NV3Q	Life expectancy NV3Q-SW21 or NV3Q-SW41: Approx. 3 yr NV4W, NV3Q-MR21, or NV3Q-MR41: Approx. 5 yr (The life expectancy is given for room temperature and humidity (25°C and 65% humidity) and a power supply voltage of 24 VDC.	NV-BAT01

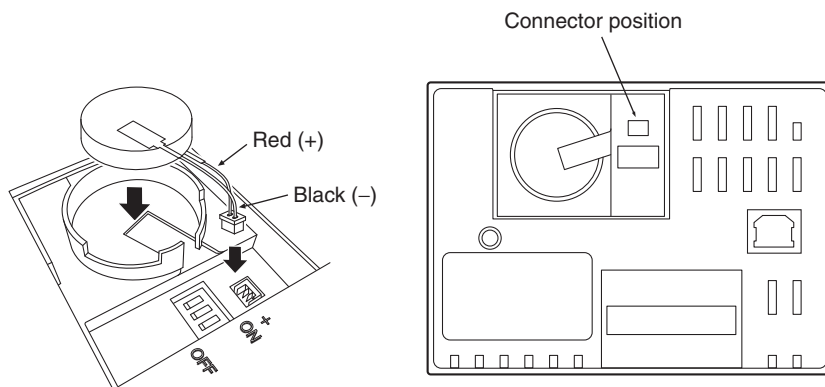
**Note** When using a Battery, mount the Battery before turning ON the power.

#### Battery Mounting Procedure

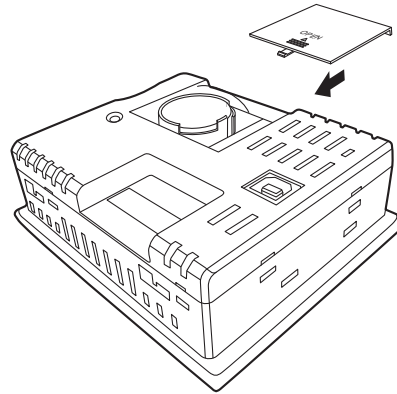
- 1,2,3... 1. Remove the battery cover.



2. Connect the connector so that the red line is connected to the positive terminal, and place the Battery in the round frame.



3. Close the battery cover.



## 4-1-2 Installation Environment

**⚠ WARNING** The person responsible for the system must confirm installation, inspection, and maintenance work done on the PT to confirm that it is performed correctly.

The person responsible for the system must have the qualifications and authority to ensure safety in all stages of machine design, installation, operation, maintenance, and disposal.

**⚠ WARNING** Installation and post-installation of the PT must be checked by the personal responsible for this work, who must have sufficient understanding of the system being installed.

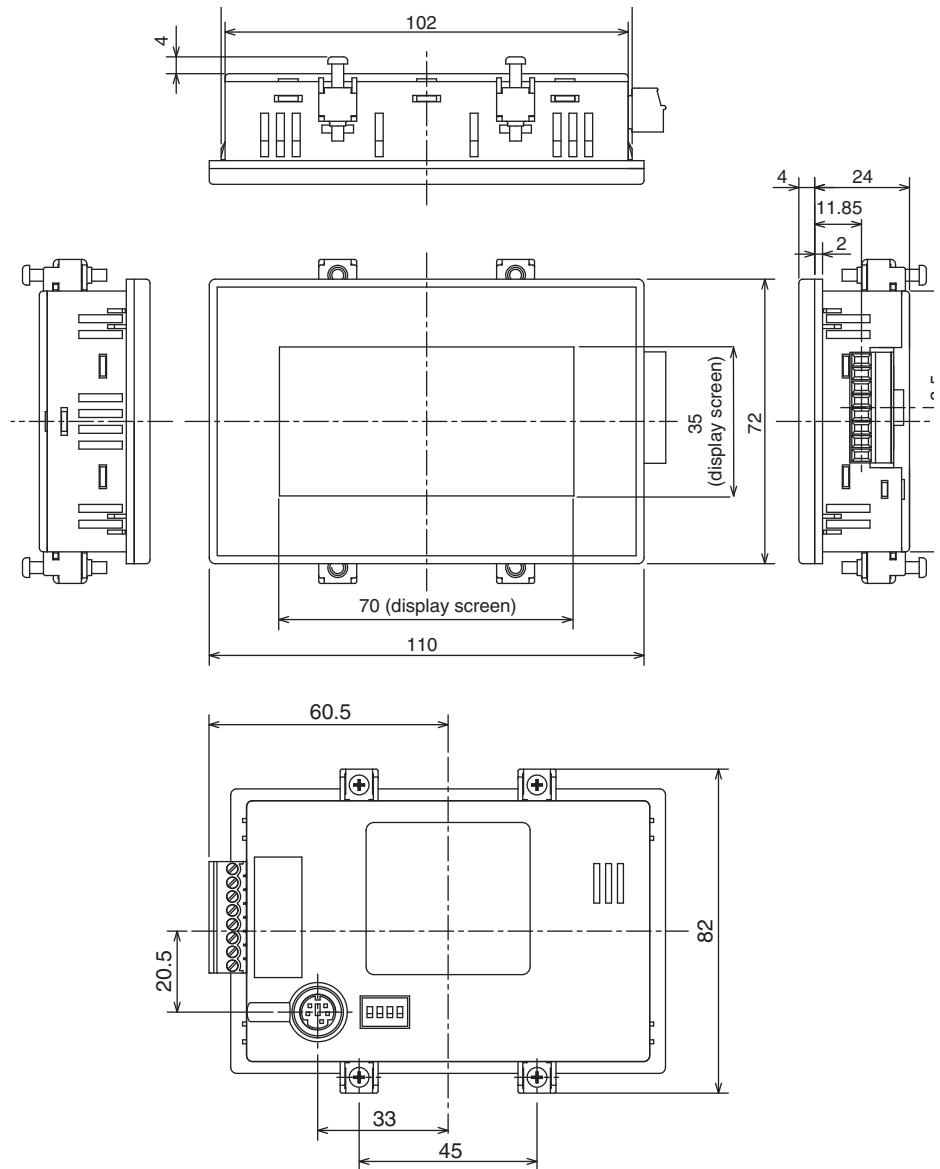
Be careful of the following points when installing the NV-series PT in an operating panel.

- Note**
- (1) Do not install the PT 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
    - Location subject to splashing chemicals or solvents
    - Locations subject to oil splashes
    - Locations subject to continuous water splashing
    - 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
  - (2) 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 electromagnetic or magnetic fields
    - Locations close to power supply lines
    - Locations subject to possible exposure to radioactivity

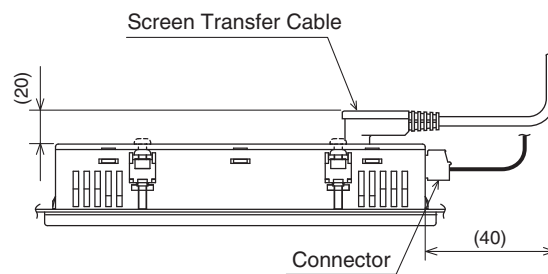
### 4-1-3 Dimensions

NV3W

■ Dimensions

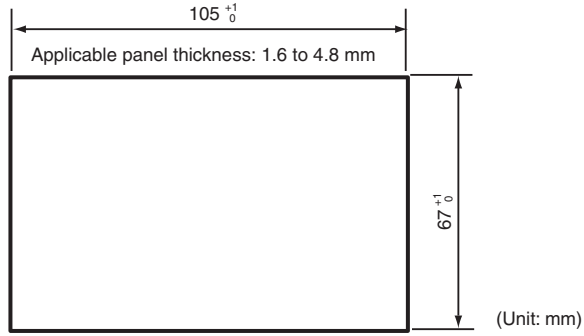


■ Cable Installation Dimensions



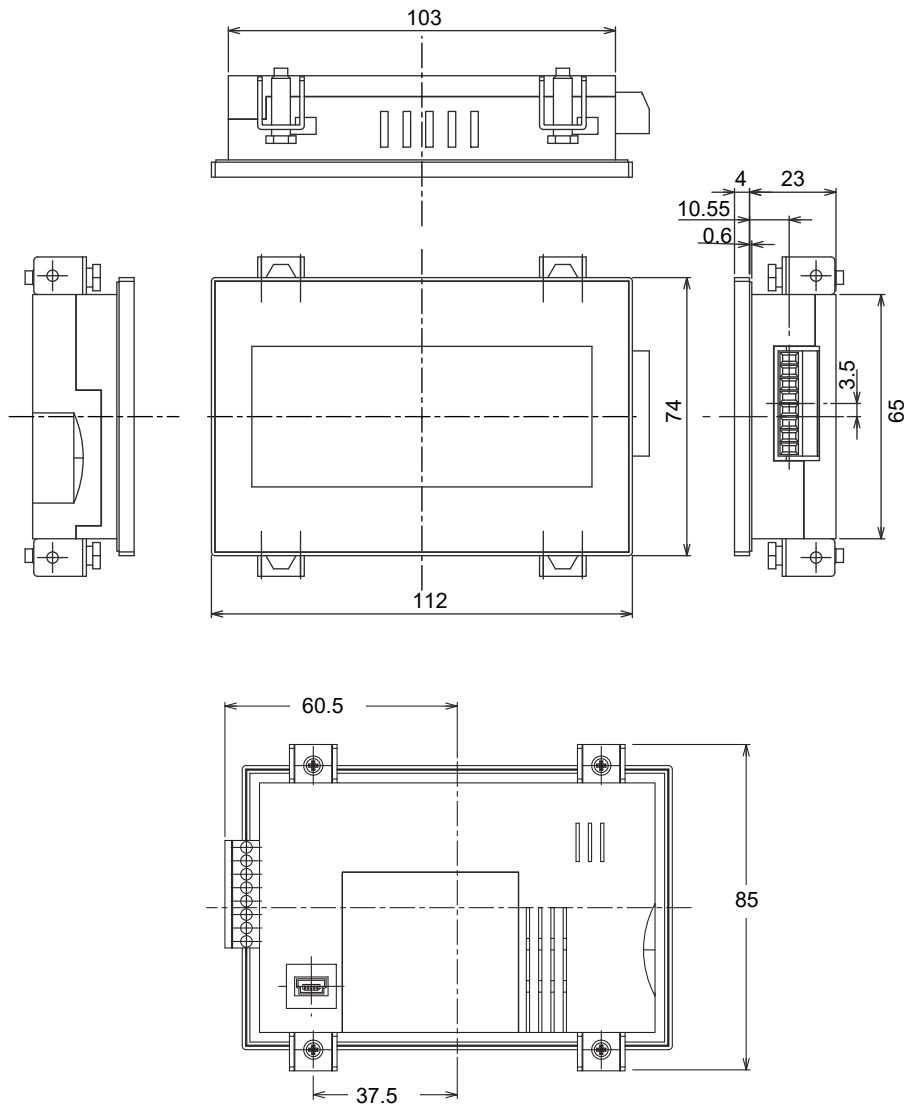


■ Panel Cutout Dimensions

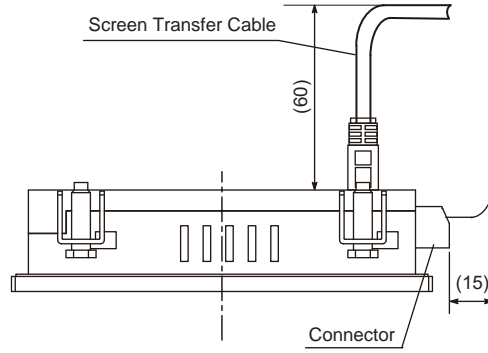


NV3W-V1

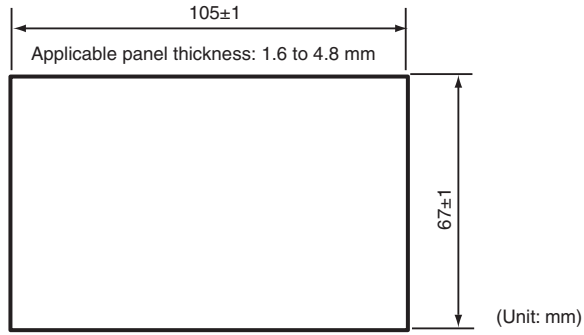
■ Dimensions



■ Cable Installation Dimensions

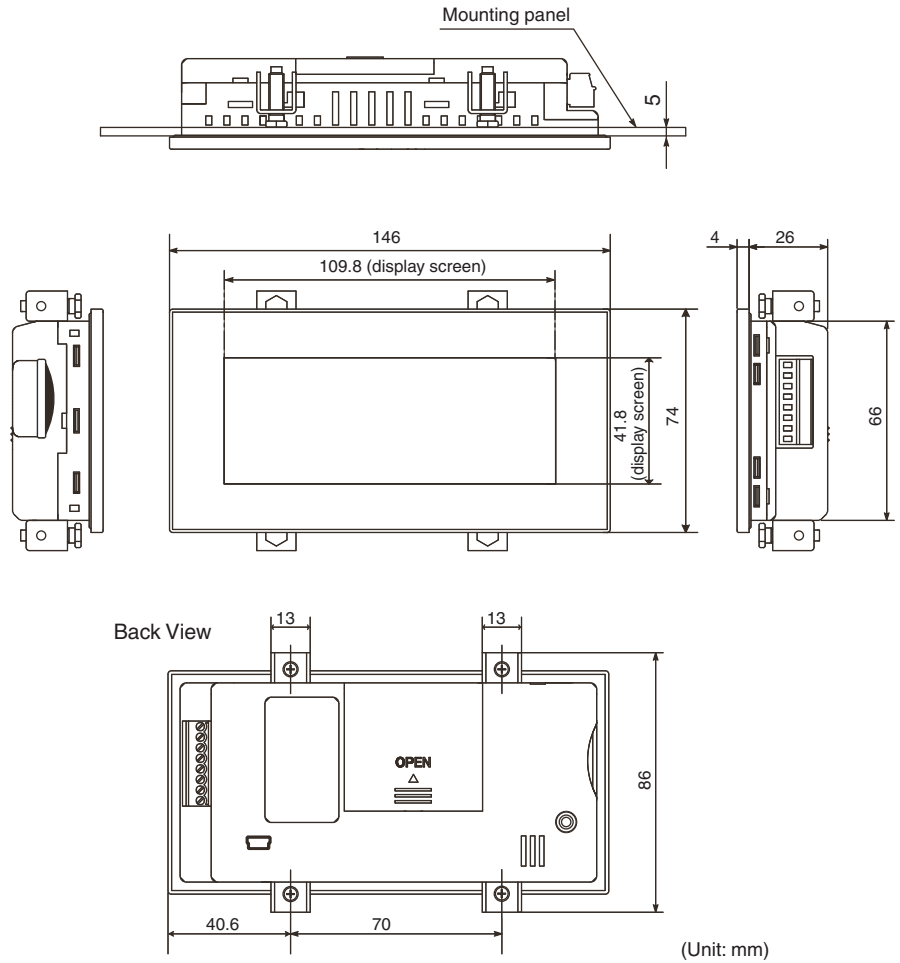


■ Panel Cutout Dimensions

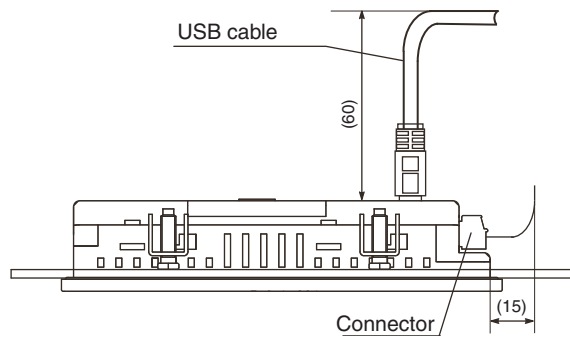


NV4W

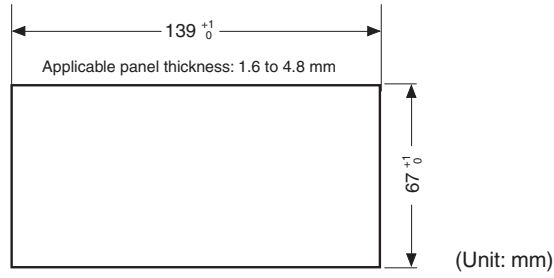
■ Dimensions



■ Cable Installation Dimensions

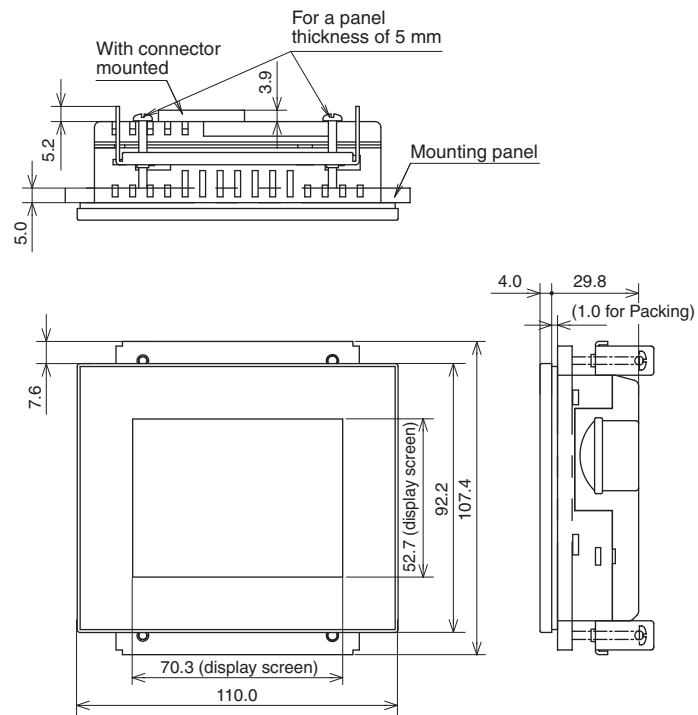


■ Panel Cutout Dimensions

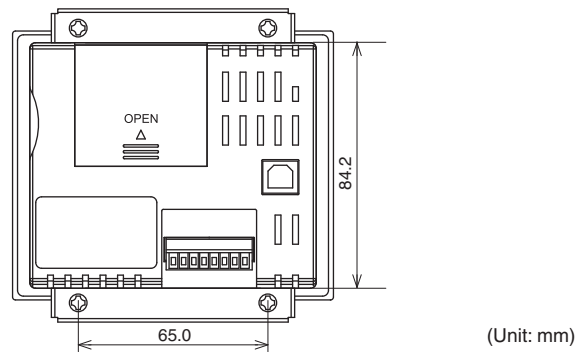


NV3Q

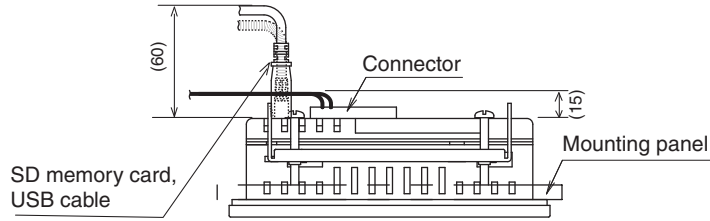
■ Dimensions



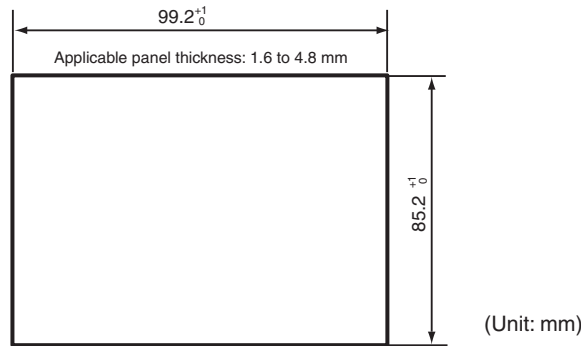
Back View



■ Cable Installation Dimensions



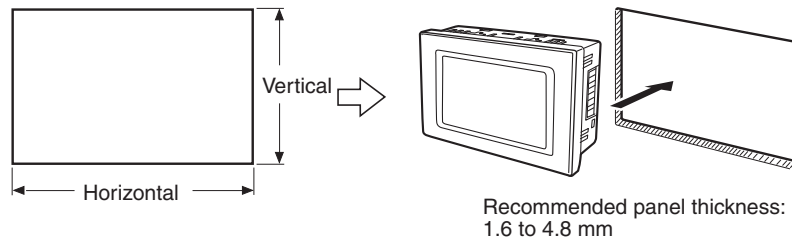
■ Panel Cutout Dimensions



4-1-4 Mounting to a Control Panel

Mount the NV-series PT to a control panel. Use the panel mounting brackets and the tool (flat-blade screwdriver) that came packaged with the PT.

- 1,2,3... 1. Open a hole in the panel as shown below, and insert the PT from the front of the panel.



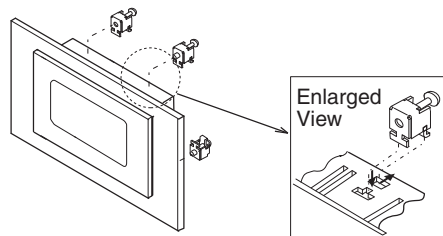
Model	Dimensions
NV3W	105.0 <sup>+1</sup> / <sub>0</sub> × 67.0 <sup>+1</sup> / <sub>0</sub> mm (H × V)
NV3W-V1	105.0 ±1 × 67.0 ±1 mm (H × V)
NV4W	139.0 <sup>+1</sup> / <sub>0</sub> × 67.0 <sup>+1</sup> / <sub>0</sub> mm (H × V)
NV3Q	99.2 <sup>+1</sup> / <sub>0</sub> × 85.2 <sup>+1</sup> / <sub>0</sub> mm (H × V)

2. Attach the panel mounting bracket from the back of the panel. Insert the tabs on the brackets into the square holes of the PT, and use a Phillips screwdriver to secure them in the panel while gently pulling forward.

3. Installing the PT

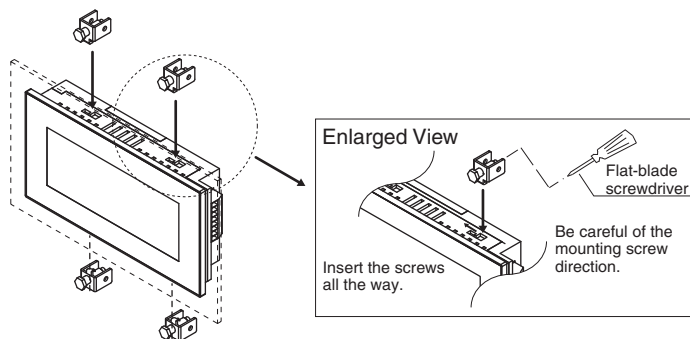
• Installing the NV3W

Used the enclosed mounting brackets (4) and mounting screws (4) to secure the PT to the mounting panel.



• Installing the NV3W-V1/NV4W

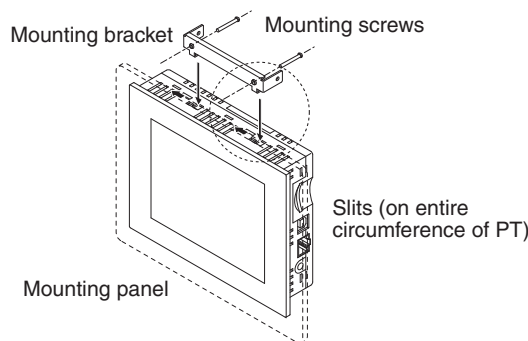
Secure the PT to the panel using the mounting brackets (4) and mounting screws (4) that came with the PT.



**Note** The mounting screws for the NV3W-V1/NV4W are not commercially available. The waterproofing performance may decrease or other problems occur if screws other than the special mounting screws are used.

• Installing the NV3Q

Used the enclosed mounting brackets (2) and mounting screws (4) to secure the PT to the mounting panel.



- Note**
- (1) The PT must be installed in a control panel.
  - (2) When preparing the panel, do not let metal debris enter the PT.
  - (3) The panel on which the PT is installed must have a thickness of 1.6 to 4.8 mm. To maintain waterproof and dust proof performance, the mounting bracket screws must be tightened evenly to an appropriate torque. If the bracket is tightened beyond the specified torque, or if the tightening is not applied evenly, it may cause warping of the front sheet. The panel must also be free of dirt and warping, and must be sufficiently strong enough to support the PT.
  - (4) Always replace the Waterproof Packing when remounting the PT.

**Mounting Space**

**Applicable panel thickness:**

1.6 to 4.8 mm

**Mounting Clearance**

When mounting other components in the panel and wiring cables, leave sufficient clearance so that cables will not be obstructed or damaged. In addition, absolutely do not cover the slits on the PT.

Model	Clearance	Clearance around the screen transfer cable connection surface
NV3W	30 mm or longer (recommending 50 mm or longer)	20 mm
NV3W-V1, NV4W or NV3Q	30 mm or longer (recommending 50 mm or longer) <sup>*1</sup>	60 mm

\*1 40 mm or longer when using an SD memory card.

**Mounting Screws**

Use the enclosed bracket and mounting screws, and secure them to the mounting panel.

Recommended Screws

Item	NV-series PT	Size	Other specifications	Qty
Mounting screws	NV3W	M3 to M20	Material: Phillips machine screws, zinc-plated trivalent chromium (white)	4 screws per PT
	NV3Q	M3 to M3.5		

Securely tighten the screws to a torque of 0.1 to 0.25 N·m for the NV3W/NV3Q and 0.2 to 0.3 N·m for the NV3W-V1 or NV4W. Be sure to tighten the screws correctly.

If the screws are tightened too much, the panel may warp, the touch switches may not operate, and waterproof performance may decrease.

**Note** The mounting screws for the NV3W-V1/NV4W are not commercially available. The waterproofing performance may decrease or other problems occur if screws other than the special mounting screws are used.

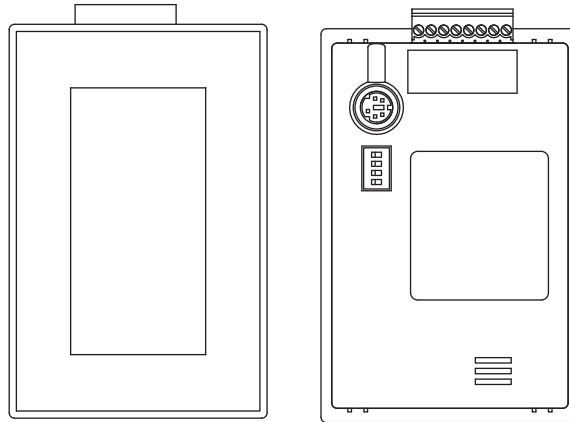
**UL and cUL Certification**

When applying for UL certification for devices connected to the NV-series PT, observe the following precautions.

- When the PT is installed in equipment, it must conform to standards by being included as part of the equipment enclosure.
- The rear panel of the NV-series PT is not certified as an enclosure, so provide a fireproof enclosure (i.e., a metal barrier) so that the rear panel and sides of the PT are covered.

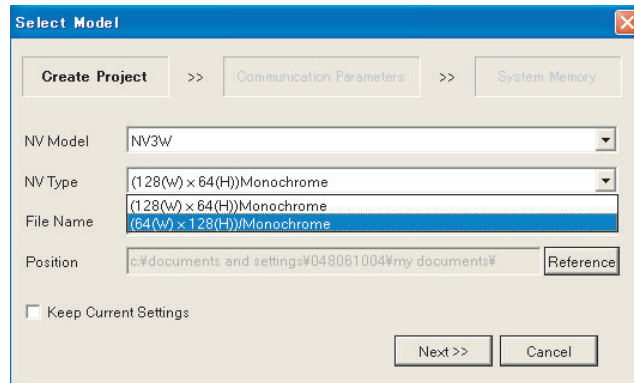
### 4-1-5 Using a Vertically Mounted PT (NV3W(-V1) and NV4W Only)

The NV3W(-V1) or NV4W can be vertically mounted, as shown below. Mount it with the serial communications/power supply connector on top.



#### Precautions for Correct Operation

- When creating screens, select vertical screens on the NV-Designer.

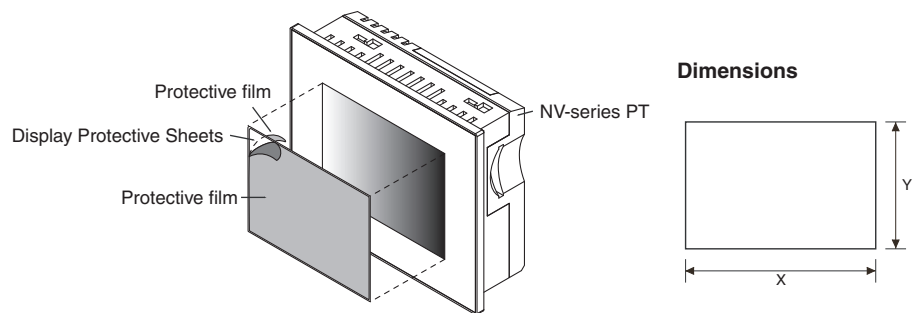




### 4-1-6 Display Protective Sheets

This cover protects the display panel from oil, dust, and soiling by hands. Peel off the seal from the protective sheet, and attach the sheet to the PT.

Applicable PT	Model	Material	Attachment method	Dimensions (unit: mm)	
				X	Y
NV3W	NV3W-KBA04	Polyester film	Self-adhesive resin	74.5	37.7
NV3W-V1	NV3W-KBA04-V1	Polyester film	Self-adhesive resin	90.5	37.4
NV4W	NV4W-KBA04	Polyester film	Self-adhesive resin	109.8	41.8
NV3Q	NV3Q-KBA04	Polyester film	Self-adhesive resin	72.0	54.2



### 4-1-7 Waterproof Packings

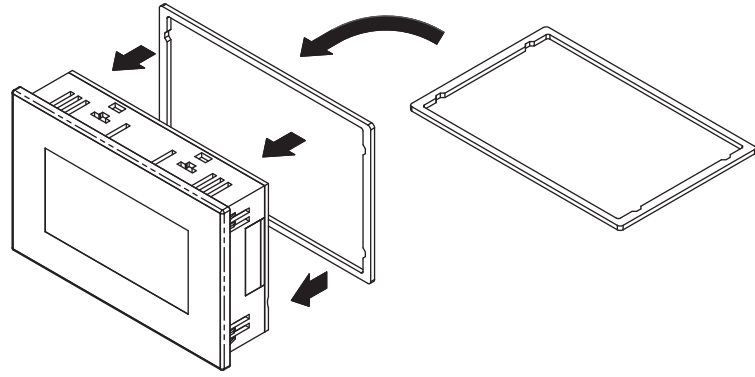
Replace the Waterproof Packing from the front of the panel to ensure waterproofing performance (IP65 for NV3W/NV3Q and IP67 for NV3W-V1/NV4W) if the NV-series PT has been removed from the panel and you are installing it again.

Applicable PT	Model
NV3W	NV3W-RP001*1
NV4W	NV4W-RP001
NV3Q	NV3Q-RP001

\*1 The waterproof packings cannot be used for NV3W-V1.

#### Replacing the Waterproof Packing

- 1,2,3... 1. Remove the old Waterproof Packing from the PT.
2. Attach a new Waterproof Packing.  
 As shown in the diagram, remove the outer edge from the new Waterproof Packing. (The inner edge is not used.)  
 Attach the Waterproof Packing to the front panel, making sure that it does not get twisted.



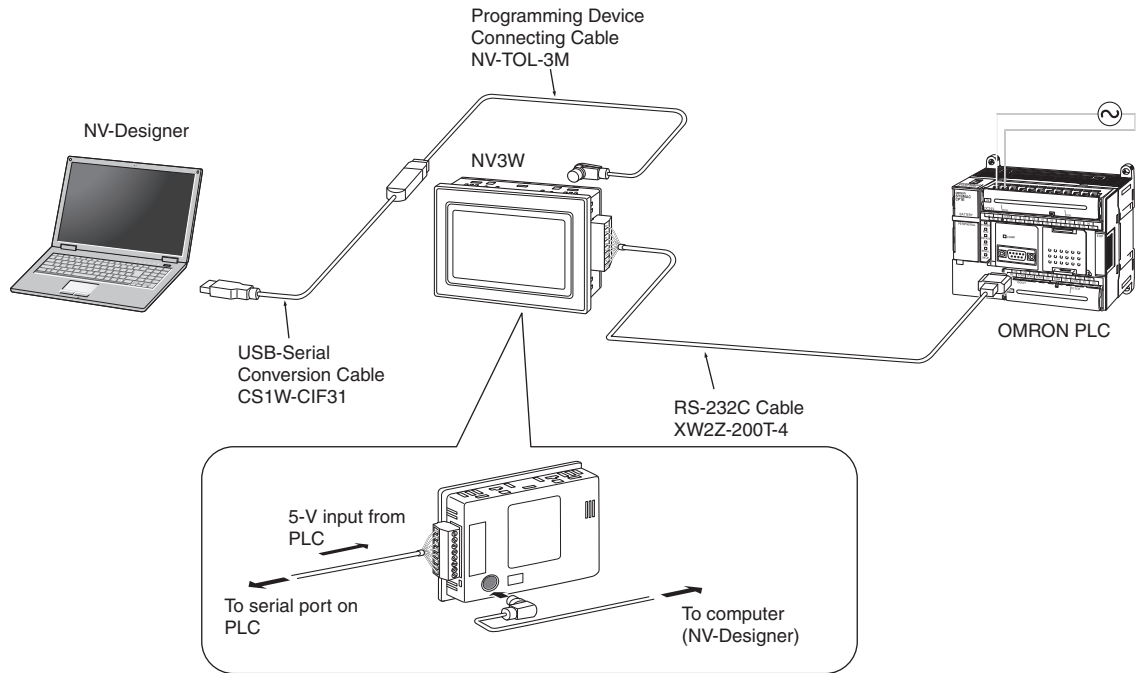
## 4-2 Connection Diagrams

An overview of the connections made to the PT are described in this section.

### NV3W

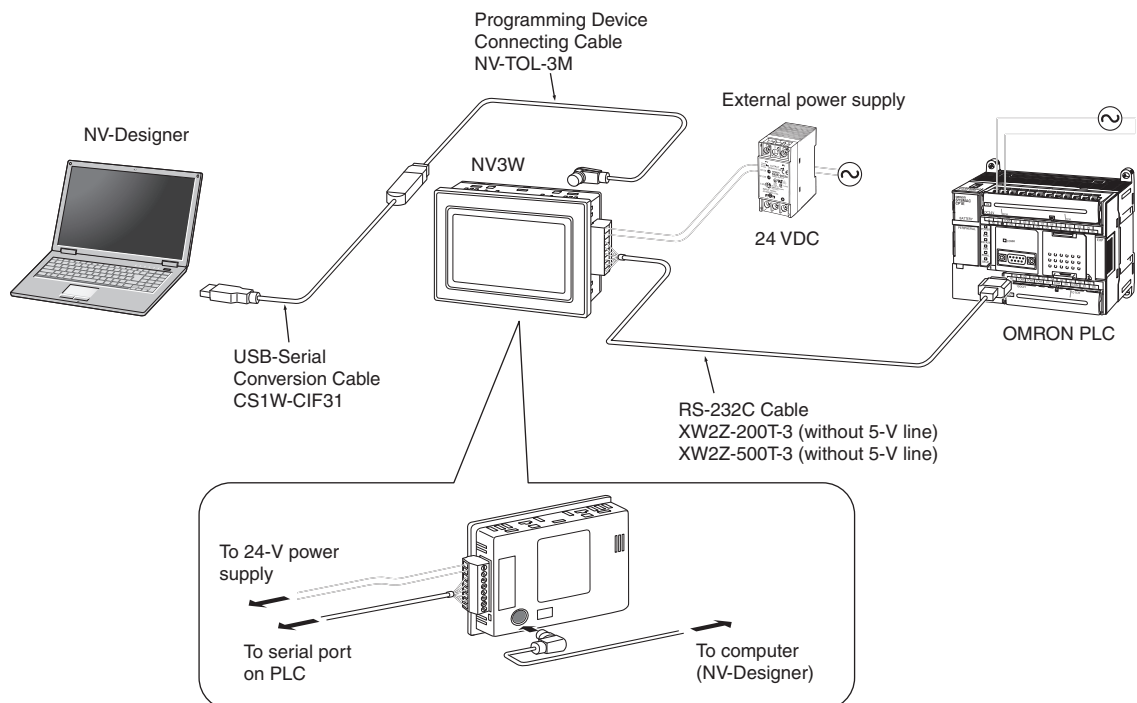
#### ■ Supplying 5 V from the PLC to the PT

Use the XW2Z-200T-4 Cable.



#### ■ Supplying 24 V from an External Supply to the PT

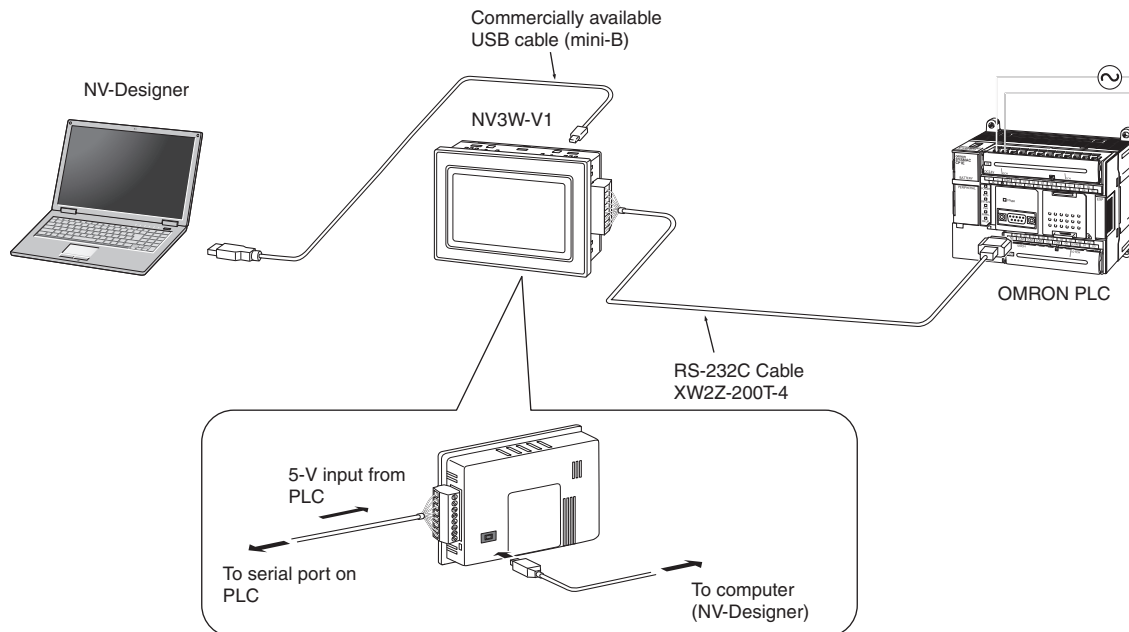
Use the XW2Z-200T-3 or XW2Z-500T-3 Cable.



NV3W-V1

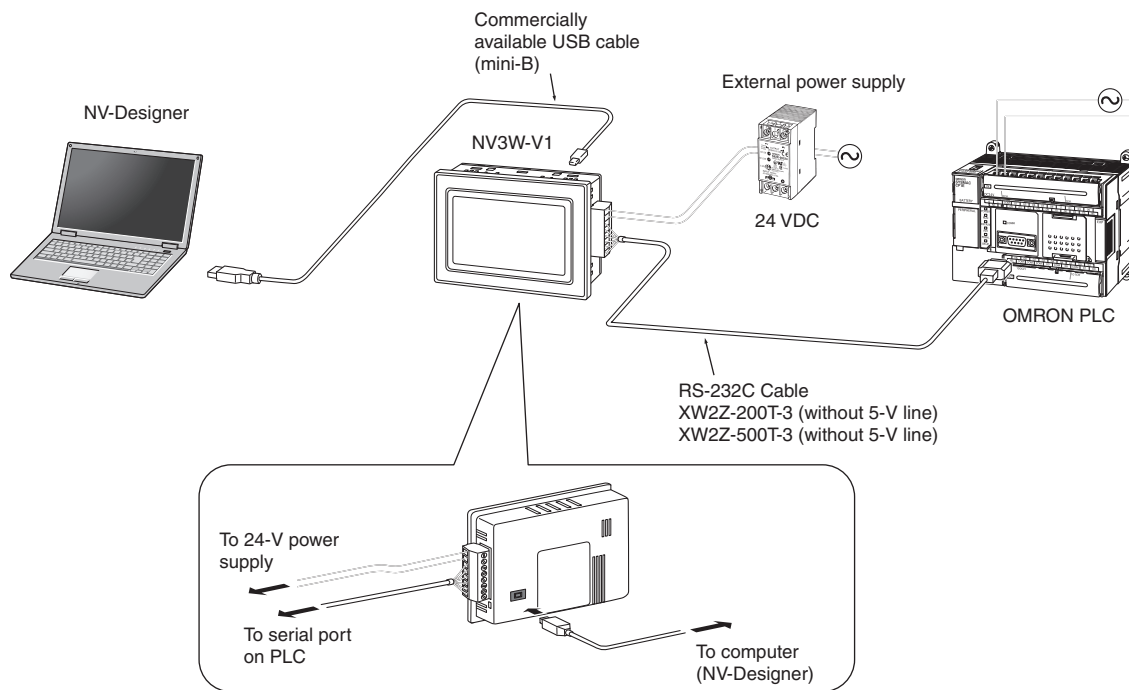
■ Supplying 5 V from the PLC to the PT

Use the XW2Z-200T-4 Cable.



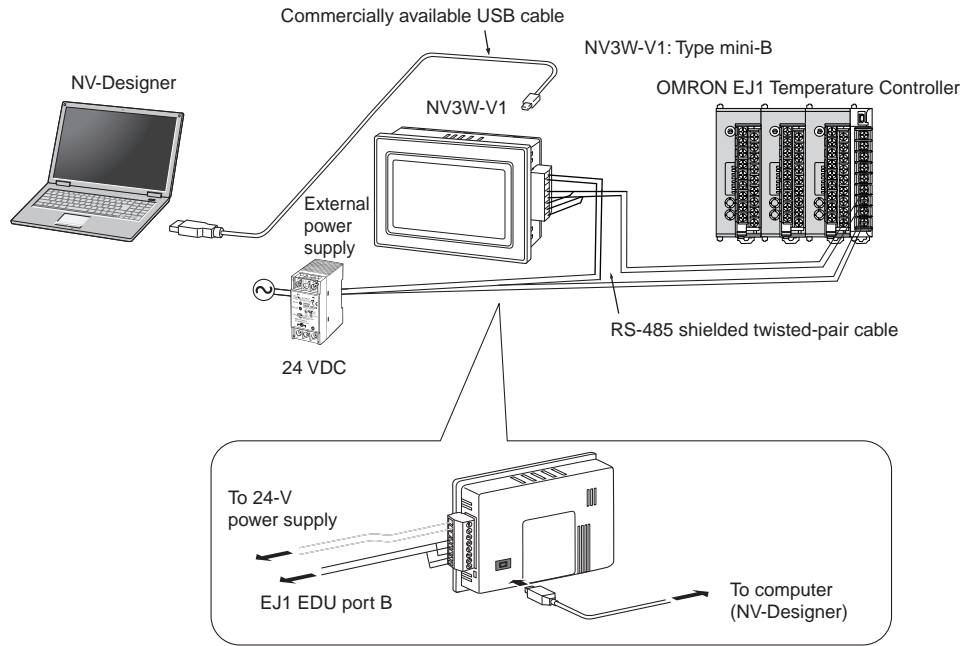
■ Supplying 24 V from an External Supply to the PT

Use the XW2Z-200T-3 or XW2Z-500T-3 Cable.



**Connection with OMRON EJ1 Temperature Controllers**

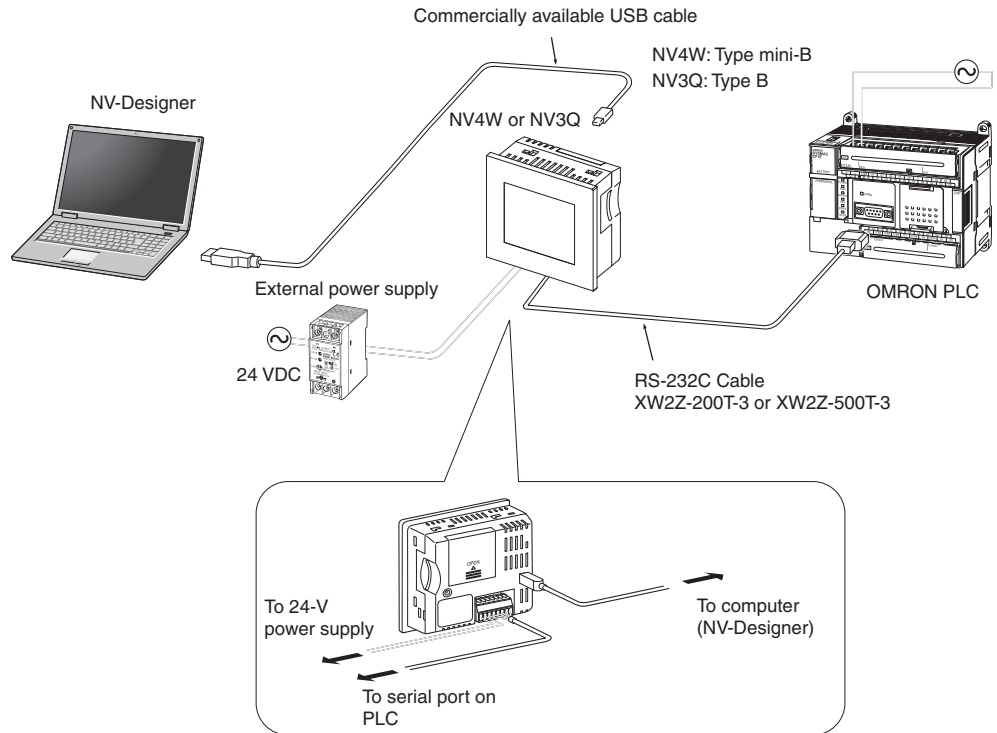
Use RS-485 shielded twisted-pair cable.



■ **NV4W/NV3Q**

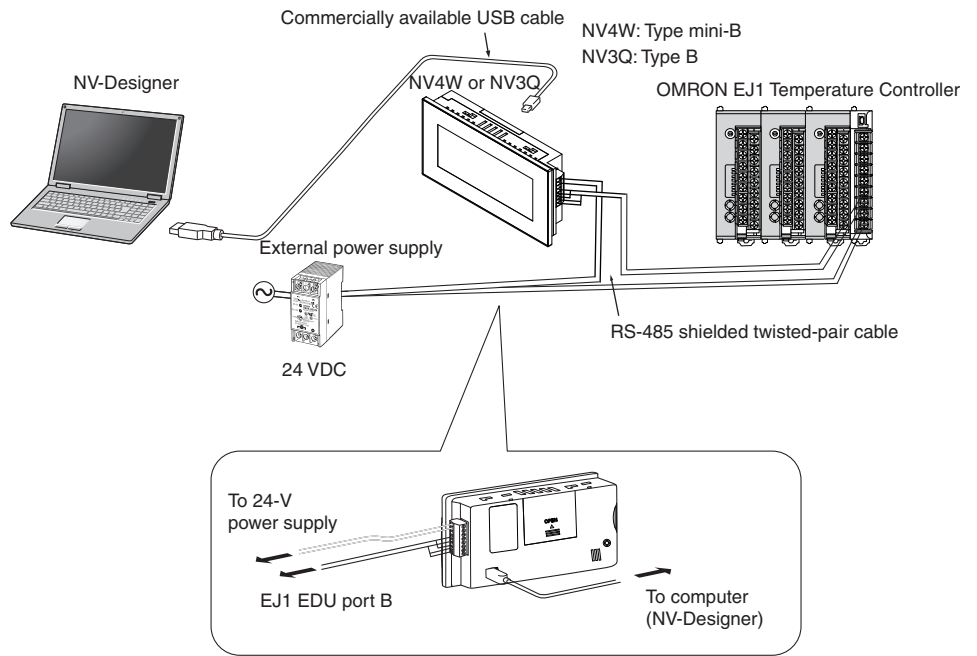
**Connection with OMRON PLCs**

Use the XW2Z-200T-3 or XW2Z-500T-3 Cable.



**Connection with OMRON EJ1 Temperature Controllers**

Use RS-485 shielded twisted-pair cable.

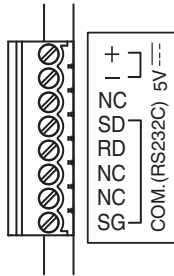


## 4-3 Communications/Power Connector Pin Assignments

The pin assignments for the communications/power supply connector are shown in the following diagram.

### 4-3-1 NV3W

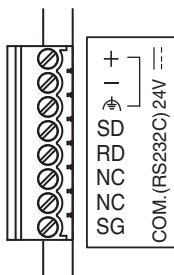
■ Using a 5-V Input and RS-232C Communications (NV3W-MG20L and NV3W-MR20L)



Pin number	Signal name	Symbol	Signal direction
1	+5 V	+	---
2	0 V	-	---
3	Not connected.	NC	---
4	Send data	SD	PT to external device
5	Receive data	RD	External device to PT
6	Not connected.	NC	---
7	Not connected.	NC	---
8	Signal ground	SG	---

**Note** The RS and CS control lines are not used.

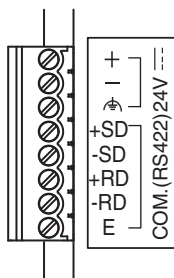
■ Using a 24-V Input and RS-232C Communications (NV3W-MG20 and NV3W-MR20)



Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	SD	PT to external device
5	Receive data	RD	External device to PT
6	Not connected.	NC	---
7	Not connected.	NC	---
8	Signal ground	SG	---

**Note** The RS and CS control lines are not used.

■ Using a 24-V Input and RS-422A or RS-485 Communications (NV3W-MG40 and NV3W-MR40)

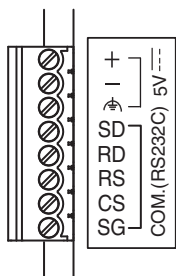


Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	+SD	PT to external device positive terminal
5	Send data	-SD	PT to external device negative terminal
6	Receive data	+RD	External device positive terminal to PT
7	Receive data	-RD	External device negative terminal to PT
8	Terminating resistance	E	---

**Note** (1) The RS and CS control lines are not used.  
 (2) Pin E is used to set the terminating resistance.

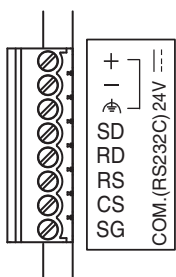
4-3-2 NV3W-V1

■ Using a 5-V Input and RS-232C Communications (NV3W-MG20L-V1 and NV3W-MR20L-V1)



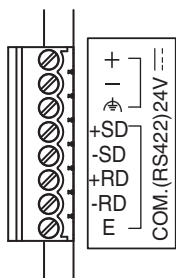
Pin number	Signal name	Symbol	Signal direction
1	+5 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	SD	PT to external device
5	Receive data	RD	External device to PT
6	Request to send	RS	PT to external device
7	Clear to send	CS	External device to PT
8	Signal ground	SG	---

■ Using a 24-V Input and RS-232C Communications (NV3W-MG20-V1 and NV3W-MR20-V1)



Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	SD	PT to external device
5	Receive data	RD	External device to PT
6	Request to send	RS	PT to external device
7	Clear to send	CS	External device to PT
8	Signal ground	SG	---

■ Using a 24-V Input and RS-422A or RS-485 Communications (NV3W-MG40-V1 and NV3W-MR40-V1)



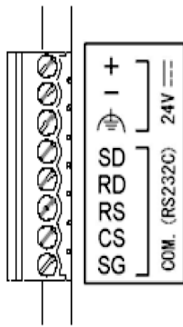
Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	+SD	PT to external device positive terminal
5	Send data	-SD	PT to external device negative terminal
6	Receive data	+RD	External device positive terminal to PT
7	Receive data	-RD	External device negative terminal to PT
8	Terminating resistance	E	---

**Note** Pin E is used to set the terminating resistance.



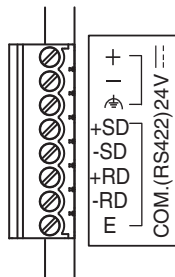
4-3-3 NV4W

■ Using a 24-V Input and RS-232C Communications (NV4W-MG21 and NV4W-MR21)



Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	SD	PT to external device
5	Receive data	RD	External device to PT
6	Request to send	RS	PT to external device
7	Clear to send	CS	External device to PT
8	Signal ground	SG	---

■ Using a 24-V Input and RS-422A or RS-485 Communications (NV4W-MG41 and NV4W-MR41)

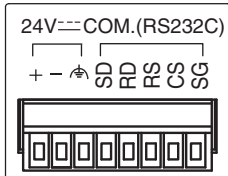


Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	+SD	PT to external device
5	Send data	-SD	PT to external device
6	Receive data	+RD	External device to PT
7	Receive data	-RD	External device to PT
8	Terminating resistance	E	---

- Note**
- (1) The RS and CS control lines are not used.
  - (2) Pin E is used to set the terminating resistance.

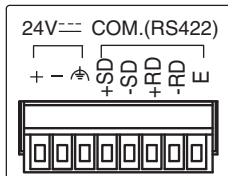
4-3-4 NV3Q

■ Using a 24-V Input and RS-232C Communications (NV3Q-MR21 and NV3Q-SW21)



Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	SD	PT to external device
5	Receive data	RD	External device to PT
6	Request to send	RS	PT to external device
7	Clear to send	CS	External device to PT
8	Signal ground	SG	---

■ Using a 24-V Input and RS-422A or RS-485 Communications (NV3Q-MR41 and NV3Q-SW41)



Pin number	Signal name	Symbol	Signal direction
1	+24 V	+	---
2	0 V	-	---
3	Functional ground	FG	---
4	Send data	+SD	PT to external device
5	Send data	-SD	PT to external device
6	Receive data	+RD	External device to PT
7	Receive data	-RD	External device to PT
8	Terminating resistance	E	---

- Note**
- (1) The RS and CS control lines are not used.
  - (2) Pin E is used to set the terminating resistance.

## 4-4 Wiring the Power Supply and Serial Communications

This section describes how to connect the NV-series PT power supply and serial communications.

### 4-4-1 Power Supply Connections

- Power to the PT is supplied from the serial communications/power supply connector that comes with the PT.
- The serial communications/power supply connector is a screw terminal block (8 pins) used to connect PLC serial communications and the power supply.
- Use the following wire (stranded wire) for the power supply line to minimize the influence of noise.

Applicable Wire (Stranded Wire)

Size	Conductor cross-sectional area
AWG #28 to 16	0.08 to 1.25 mm <sup>2</sup>

#### Power Supply Specifications

Model	Power supply voltage specification	Operating power supply voltage range	Power consumption (current consumption)	Power supply method	Communications
NV3W-MG20L	5 VDC	4.5 to 5.5 VDC	1 W max. (200 mA max.)	From external power supply or PLC*1	RS-232C
NV3W-MG20L-V1					
NV3W-MR20L					
NV3W-MR20L-V1					
NV4W-MG21	24 VDC	21.6 to 26.4 VDC	1.7 W max. (70 mA max.)	From external power supply	RS-232C
NV4W-MG41			RS-422A/485		
NV4W-MR21					RS-232C
NV4W-MR41					
NV3W-MG20					2 W max. (80 mA max.)
NV3W-MG40			RS-422A/485		
NV3W-MR20					RS-232C
NV3W-MR40			RS-422A/485		
NV3W-MG20-V1			1.9 W max. (80 mA max.)		RS-232C
NV3W-MG40-V1			RS-422A/485		
NV3W-MR20-V1					RS-232C
NV3W-MR40-V1			RS-422A/485		
NV3Q-MR21			2.4 W max. (100 mA max.)		RS-232C
NV3Q-MR21			RS-422A/485		
NV3Q-SW21					RS-232C
NV3Q-SW21			3.6 W max. (15 mA max.)		RS-422A/485

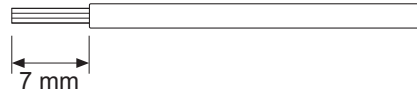
\*1 If the XW2Z-200T-4 Cable is used with the NV3W(-V1), 5 V can be supplied from the PLC instead of from an external power supply. In that case, the power consumption or current consumption shown in the above table will be provided from the PLC power supply, so be sure to calculate the entire 5-V current consumption at the PLC and to stay within that range.

**■ Wiring Procedure**

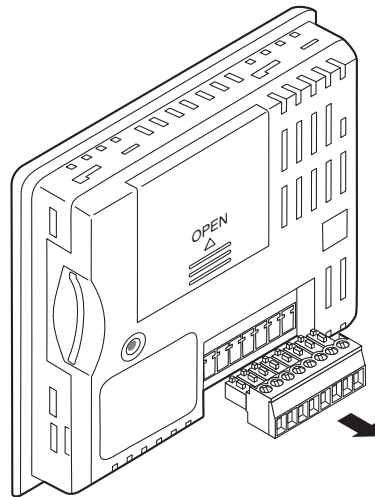
Use the following procedure to connect the power supply.

1,2,3...

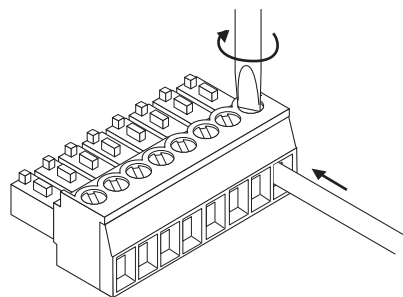
1. Strip the power supply cable.



2. Remove the communications/power connector from the PT. (NV3Q only)



3. Insert the wire into the terminal block until it stops, and secure it by tightening the screw clockwise. Using a small flat-blade screwdriver, tighten the screws to a torque of 0.22 to 0.3 N·m.

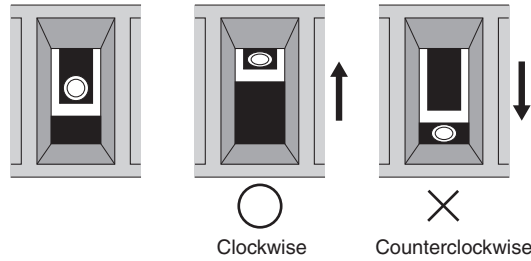


4. Attach the communications/power connector to the PT.

**Note** Observe the following points to avoid disconnections.

- Be careful not to cut the wire when stripping off the sheath.
- Connect the conductor without twisting the wires.
- Connect the conductor without soldering the wires. Wires can become disconnected due to vibration.
- Do not apply stress to the cable after the wires have been connected.

- A wire may have a faulty connection if the screw is tightened counter-clockwise. Pull the wire out, check the terminal hole, and then connect the wire again.



- Note**
- (1) When using the PT in environments where strong noise is present, connect the following noise filter to the power supply line.  
Manufacturer: TDK-Lambda Corp., Model: RSEL-2001W
  - (2) Do not connect the DC power supply terminals to an AC power supply.
  - (3) Do not perform dielectric strength tests on the PT
  - (4) To protect the PT from abnormal voltages on the power line, the DC power supply must maintain a stable output even if the input power is interrupted for 10 ms, and must have reinforced or double insulation.
  - (5) A built-in non-isolated regulator is used for the NV3W.  
Be careful not to create an unwanted current path with the ground connection. For example, the power supply to the NV may be short-circuited by functional grounding the NV.
  - (6) When using a power supply without a built-in protective circuit, be sure to supply power to the PT through a protective element, such as a fuse.

### 4-4-2 Precautions When Supplying Power (5 V) from the PLC (NV3W(-V1) Only)

If the XW2Z-200T-4 PLC Connecting Cable (2 m with 5-V line) is used, 5 V can be supplied from the PLC instead of from an external power supply.

#### Specifications for 5-V Power Supply to NV3W

NV-series PT model number	Power supply voltage specification	Operating power supply voltage range	Power consumption (current consumption)	Power supply method	Communications
NV3W-M□20L(-V1)	5 VDC	4.5 to 5.5 VDC	1 W max. (200 mA max.)	From PLC or external supply	RS-232C

#### PLC Restrictions When Supplying 5 V from the PLC to the PT

##### ■ CS/CJ-series PLCs

The current consumption of the NV3W-M□20L(-V1) given below is treated in the same way as the current consumption of Units in the PLC. Make sure that the current consumption of the CPU Unit for the entire system is within ratings.

Unit name	Model	Current consumption	
		5 VDC	24 VDC
Programmable Terminals	NV3W-M□20L(-V1)	0.200 A	---

**■ CP-series PLCs****■ CP1E CPU Units with 20 Points**

There are no specific restrictions.

**■ CP1E CPU Units with 30 or 40 Points**

Normally, only one device can be connected to pin 6 (5-V power supply) on the connector for the built-in RS-232C port or the connector for the CP1W-CIF01 RS-232C Option Board of a CP1E CPU Unit. If two devices are connected to one CPU Unit, a maximum of two Expansion Units can be connected.

If only one device is connected to one CPU Unit, the normal number of CP-series Expansion I/O Units and Expansion Units can be connected. For CP1E CPU Units with AC power supply, however, it may not be possible to use the external power supply up to 300 mA. If Expansion I/O Units and Expansion Units are not connected, the external power supply can be used up to 300 mA.

For details, refer to the manual for the PLC.

**■ CP1H CPU Units**

Before performing operation, check that the current consumption for the entire system is within the specified range for the CPU Unit.

**■ CP1L CPU Units with 14, 20, 30, 40, or 60 Points**

All CP-series Expansion I/O Units and Expansion Units can be connected. For CP1L CPU Units with AC power supply, however, it may not be possible to use the external power supply up to 200 mA.

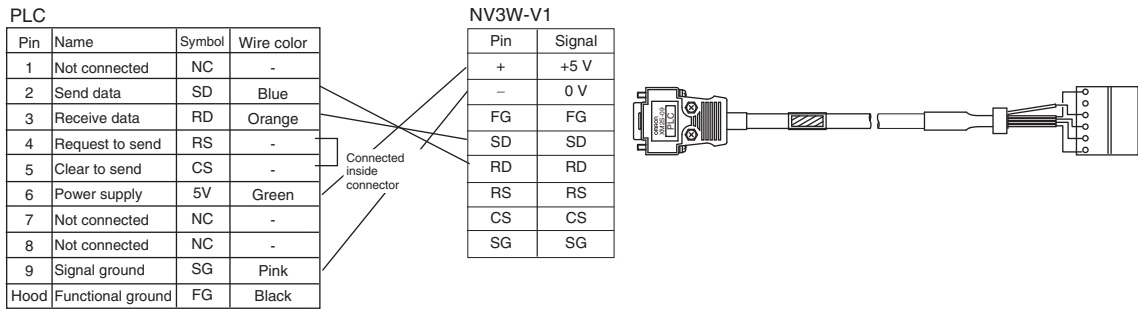
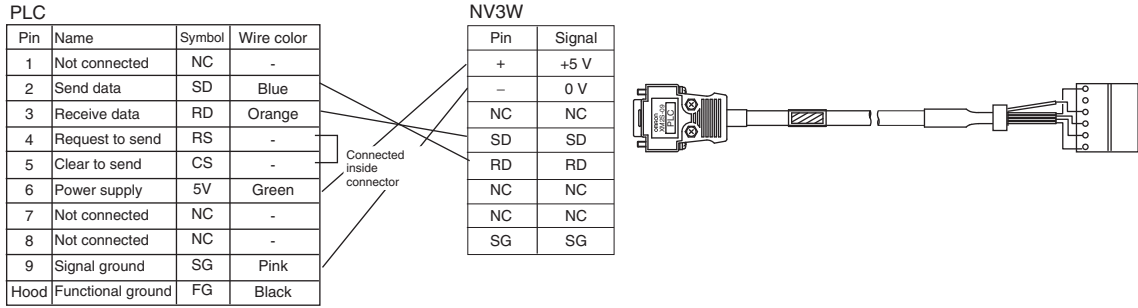
If Expansion I/O Units and Expansion Units are not connected, the external power supply can be used up to 200 mA.

For details, refer to the manual for the PLC.

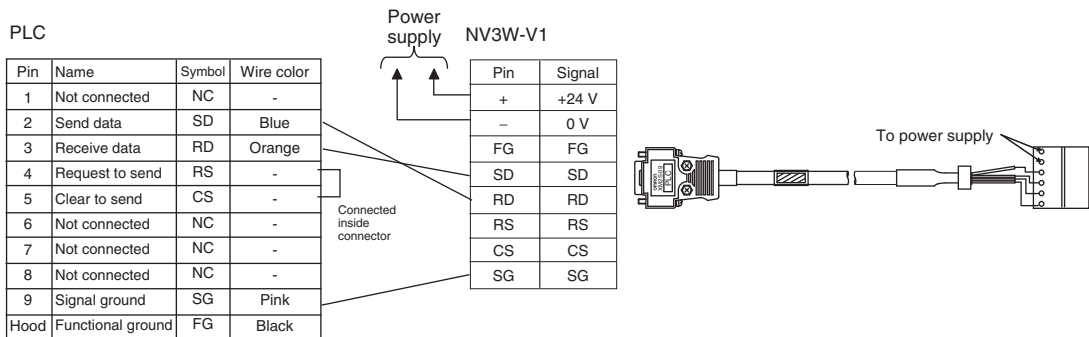
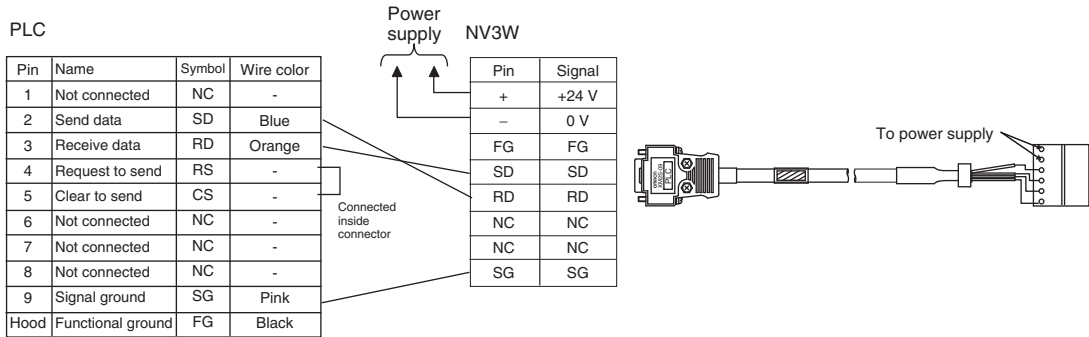
### 4-4-3 Wiring Serial Communications

#### RS-232C Connections

##### ■ XW2Z-200T-4 (with 2-m, 5-V Line)



##### ■ XW2Z-200T-3 (without 2-m, 5-V Line) or XW2Z-500T-3 (without 2-m, 5-V Line)



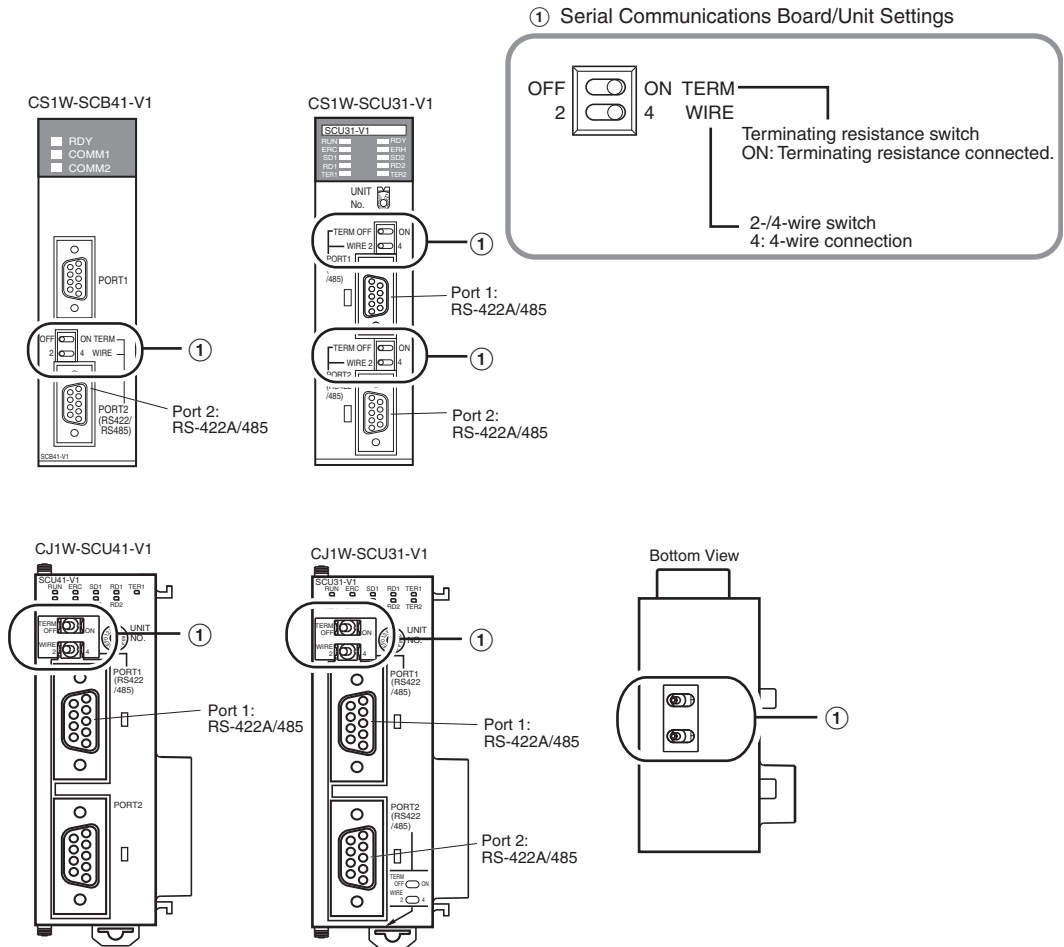
### 4-4-4 Connecting via Serial (RS-422A/485)

#### RS-422A Connections

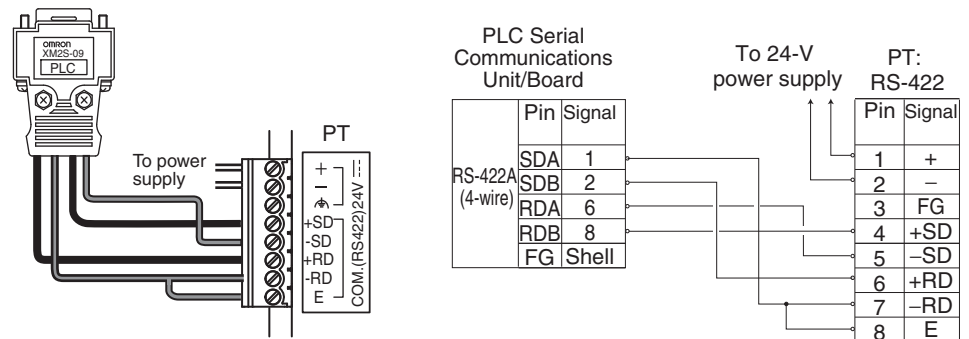
##### ■ Setting

Set RS-422A/485 to 4-wire communications on the PLC.  
Turn ON the terminating resistance.

When connecting to a Serial Communications Board/Unit with RS-422A, set the switches on the front of the Unit/Board as shown below.



##### ■ Connections



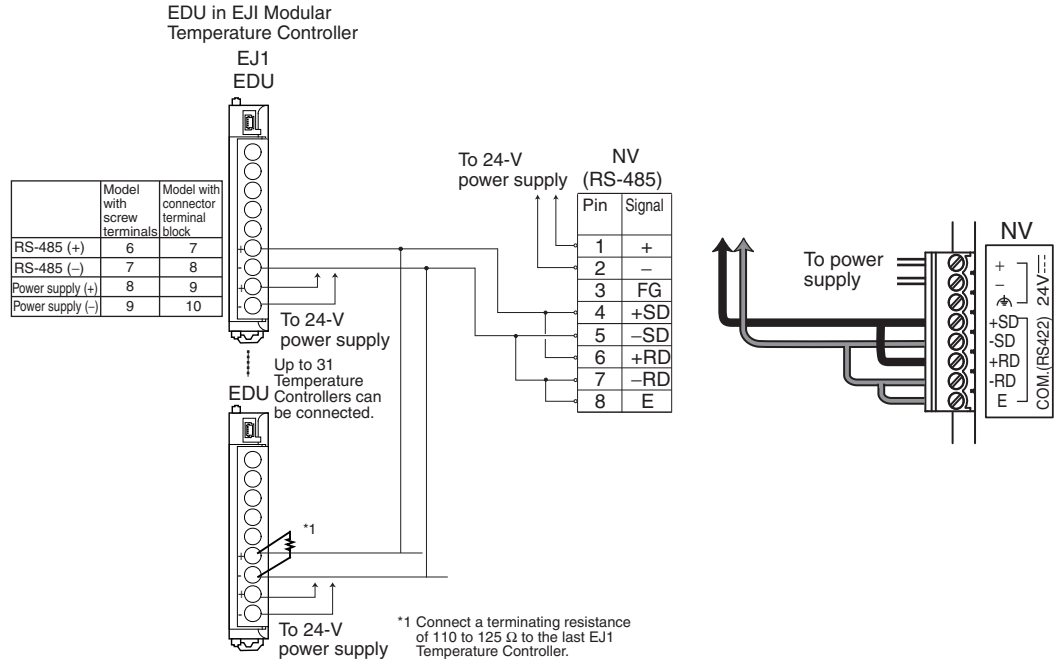
**Note** A PLC cannot be connected to multiple OMRON PLC using the Host Link protocol.



RS-485 Connections

Note RS-485 (2-wire) cannot be used to connect to a Serial Communications Board/Unit using the Host Link protocol. Use RS-422A (4-wire).

■ Connecting to EJ1 Temperature Controllers Using RS-485



### 4-4-5 Making RS-422A/485 Connecting Cable

#### Wiring Cables (RS-422A or RS-485)

■ **Recommended Cable**

Use shielded twisted-pair cables for communications cables.

Recommended RS-442A/485 Cables

Model	Manufacturer	Restriction
CO-HC-ESV-3P×7/0.2	Hirakawa Hewtech Corporation	Total length: 500 m max., T-brand drop line length: 10 m max.

■ **Grounding**

Connect the shield wire from the Communications Cable to the shell (FG) on the RS-422A/485 connector on the Serial Communications Board/Unit.

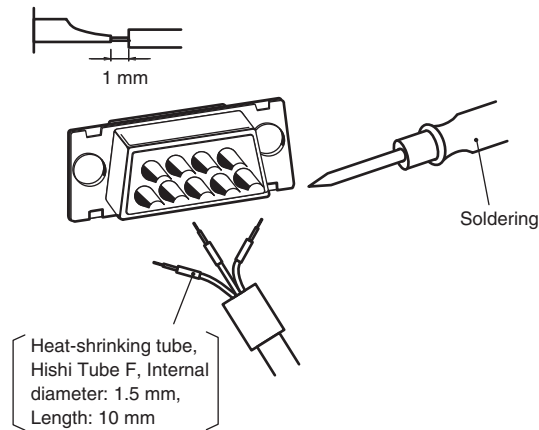
At the same time, ground to 100 Ω or less the ground terminal on the Power Supply Unit on the CPU Rack or the Expansion Rack.

**Note**

- (1) Use shielded cables for wiring.
- (2) Use only one type of transmission cable. Do not use two different types of cable together.
- (3) When cross-connecting lines and using a shielded cable for the RS-485 transmission path, ground only one end of the line. Do not connect it at both ends. If the line is grounded at both ends, it may cause damage due to the electric potential between the ground points.

■ **Wiring the Connector**

To connect the cable to the Serial Communications Unit/Board, use the (XM3A-0921 or the equivalent model) Plug and (XM2S-0911-E or the equivalent model) Hood included with each port on the Unit/Board and solder the wires to the connector.



Refer to the manual for the Serial Communications Board/Unit (Cat. No. W336) for details on wiring the connector.

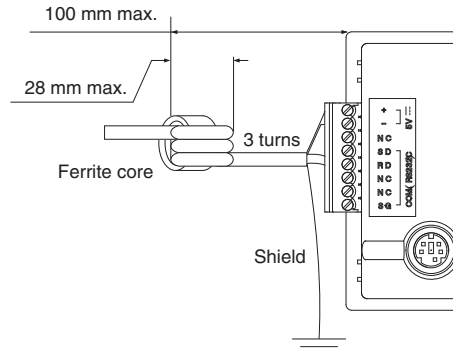
### 4-4-6 Precautions in Wiring Serial Communications

There are precautions related to the communications specifications that must be observed when wiring the serial communications/power connector and power terminals. Wire according to the following information.

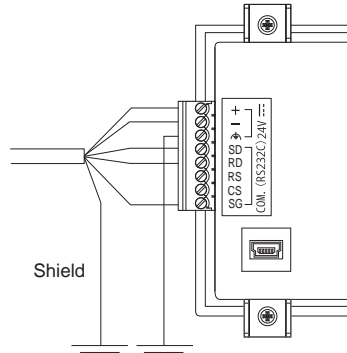
#### Wiring the NV3W(-V1) for a 5-V Input and RS-232C Communications

#### Applicable models: NV3W-MG20L(-V1) and NV3W-MR20L(-V1)

- Route the cables so that noise does not enter the system through them.
- Use shielded cables for wiring.
- Conforms to CE Marking, provided that the cable shield is grounded to 100 Ω or less, as shown below.
- NV3W



- NV3W-V1



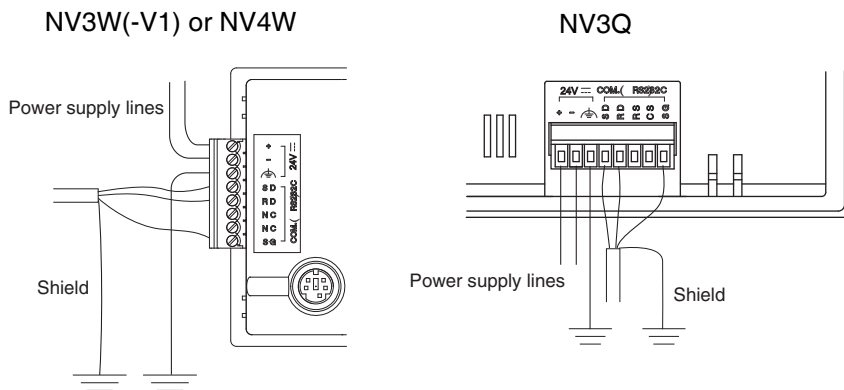
#### Wiring the NV3W(-V1), NV4W, or NV3Q for a 24-V Input and RS-232C Communications

#### Applicable models: NV3W-MG20(-V1), NV3W-MR20(-V1), NV4W-MG21, MV4W-MR21, NV3Q-MR21, and NV3Q-SW21

- The NV3W does not have RS and CS control lines.
- Route the cables so that noise does not enter the system through them.
- Use shielded cables for wiring.
- The PTs are certified for CE Marking under the condition that the following wiring is used.

1,2,3...

1. The cable shield must be grounded to 100 Ω or less.
2. Ground the FG (functional ground) terminal to 100 Ω or less.



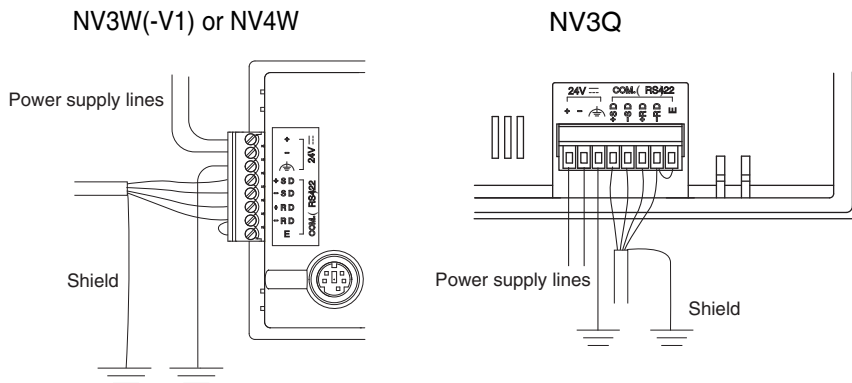
Wiring the NV3W(-V1), NV4W, or NV3Q for a 24-V Input and RS-422A or RS-485 Communications

Applicable models: NV3W-MG40(-V1), NV3W-MR40(-V1), NV4W-MG41, NV4W-MR41, NV3Q-MR41, and NV3Q-SW41

- There are no RS and CS control lines.
- Route the cables so that noise does not enter the system through them.
- Use shielded cables for wiring.
- Pin E is used to set the terminating resistance.
- The PTs are certified for CE Marking under the condition that the following wiring is used.

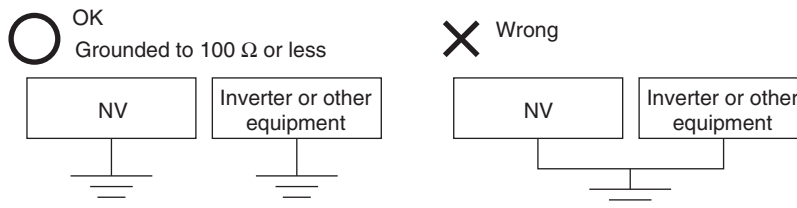
1,2,3...

1. The cable shield must be grounded to 100 Ω or less.
2. Ground the FG (functional ground) terminal to 100 Ω or less.



## 4-5 Precautions When Grounding (24-V Models Only)

- The noise immunity is sufficient for a normal environment. If there is an especially large amount of noise, then ground accordingly.
- The PT must have an independent ground. If the ground is shared with other devices, it could increase problems with noise



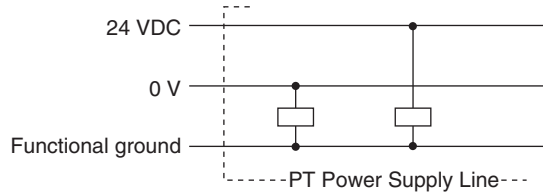
- Use wire of at least 2 mm<sup>2</sup>, and ground to 100 Ω or less.
- Shorten the ground line by grounding as close as possible to the PT.



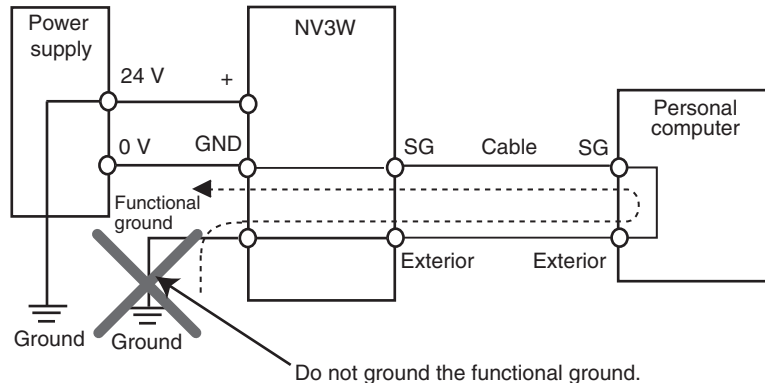
**Precautions for Correct Operation**

Depending on the operating environment, grounding may actually cause problems.

Example: The power supply line for the PT is connected to a functional ground through electronic components. If there is abnormal electric potential between the power supply line and the ground, the electronic components may be damaged.



- With the NV3W, do not ground the functional ground terminal on the PT if the positive (+) terminal of the 24-V power supply on the PT is grounded. Depending on the model of the personal computer, the 24-V power supply may be short-circuited and the PT may be damaged. This is because, depending on the model of the personal computer connecting to PT, the SG terminal of the RS-232C port may be connected to the exterior of the connector. In addition, there is no isolation between the exterior of the NV tool port and the functional ground. They are connected. Therefore, when you connect a personal computer, you have in essence connected the NV GND terminal to the functional ground terminal. When the positive side of the 24-V power supply to the PT is grounded, grounding the functional ground terminal will cause short-circuiting and damage as shown below.

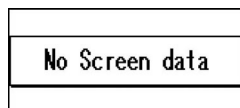


## 4-6 Starting an NV-series PT

Make sure that hardware connections are correct before turning ON the power supply and starting the PT. This section describes the initial operation of the PT.

### 4-6-1 Starting the PT for the First Time

The following screen will be displayed when the PT is turned ON for the first time.



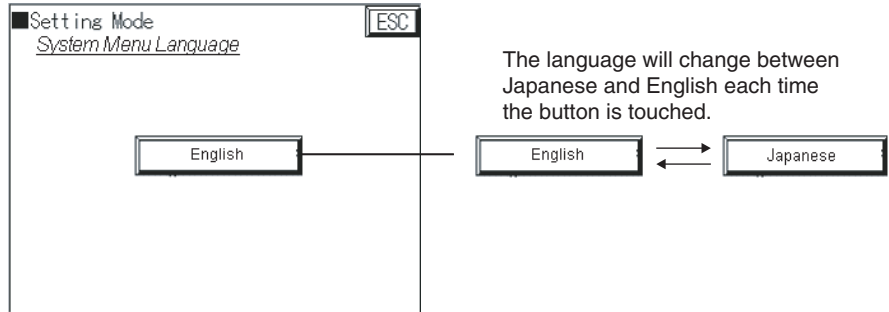
Transfer the base screen data from the NV-Designer.

### 4-6-2 Starting an NV3W-V1/NV4W/NV3Q PT for the First Time

When you turn ON the NV3W-V1, NV4W or NV3Q for the first time after purchasing it, make the following settings as required from the System Menu.

#### Language

Sets the language for the System Menu and error messages. The default language is English. To change to another language, select Language from the System Menu and change the language on the following screen.



#### Date and Time (NV4W and NV3Q only)

If the optional Battery is mounted in the PT, you must set the date and time in the PT. Refer to 5-1-5 *Setting Mode* for details on setting the clock.

# SECTION 5

## System Menu

This section describes the operations and settings that can be performed on the System Menu of an NV-series PT.

5-1	Configuration Settings from the System Menu. . . . .	82
5-1-1	Accessing the System Menu. . . . .	82
5-1-2	System Menu Language . . . . .	83
5-1-3	Prohibiting Displaying the System Menu. . . . .	84
5-1-4	Items That Can Be Set from the System Menu . . . . .	84
5-1-5	Setting Mode. . . . .	85
5-2	Self-diagnosis from the System Menu . . . . .	95
5-2-1	Items That Can Be Tested from the System Menu . . . . .	95

## 5-1 Configuration Settings from the System Menu

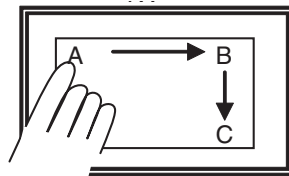
The System Menu on the PT is used to configure the PT. The following settings can be made: communications, PT clock, LCD contrast, etc. Not all of the settings in the PT Configuration can be set from the System Menu. The System Menu is operated using the touch switches on the front panel of the PT.

Refer to the *NV-series Programming Manual* (Cat. No. V104) when setting the NV Configuration of a NV-series PT from the NV-Designer.

### 5-1-1 Accessing the System Menu

Use the following procedure to access the System Menu.

- 1,2,3... 1. Touch the touch panel on the PT as shown below.



Touch A for 2 s and then B and C in order.

1. Touch the upper left corner (A) for at least 2 seconds.
2. Then immediately touch the upper right corner (B) and lower right corner (C) in order.

**Note**

- (1) If you are using vertical displays, touch the upper left, upper right, and then lower right corners in the same way with the PT oriented vertically.
- (2) The System Menu cannot be displayed vertically. It will always be display horizontally.



**Precautions for Correct Operation**

Touch points A, B, and C one at a time in order. Do not press these switches at the same time. They must be pressed in order.

2. The startup screen of the System Menu will be displayed. The System Menu depends on the model of PT and the registered screens.

The default System Menu for the NV3W is used here.



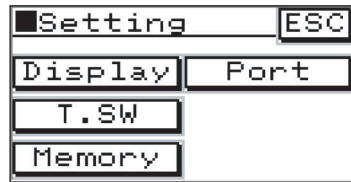
The initial screen of the PT's System Menu will be displayed. The next screen will be displayed if you touch the Setting or Test Key. To return to normal operating status, touch the ESC Key.

The system version is the version of the system ROM in the PT.



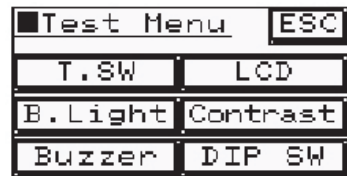
3. Select the mode.

Initial Setting Mode Screen



The contrast, clock, memory, and other configuration settings can be made from this screen. The specific settings that can be made are listed later in this section.

Initial Test Mode Screen



The touch switches, backlight, buzzer, LCD, contrast, memory, and other items can be tested from this screen.

## 5-1-2 System Menu Language

The default language for the System Menu is English.

### Changing the System Menu Language Using the PT Configuration from the NV-Designer

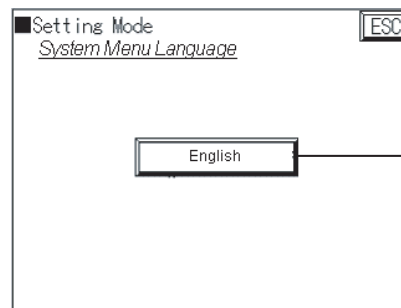
You can change the language used by the System Menu Language by setting it on the Setup 1 Tab Page of the PT Configuration from the NV-Designer and then transferring the PT Configuration to the PT.

Japanese or English

### Setting the System Menu Language from the System Menu (NV3W-V1, NV4W and NV3Q Only)

With the NV3W-V1, NV4W or NV3Q, the following procedure can be used to set the language used by the System Menu to Japanese or English.

- 1,2,3... 1. Touch Language on the Setting Menu under the System Menu.
2. Select English or Japanese for the System Menu Language.



The language will change between Japanese and English each time the button is touched.



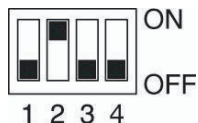
3. Touch the ESC Key to change the language for the System Menu.

**Note** With the NV3W(-V1), user memory will be allocated whenever the language for the System Menu is changed from English to any other language. This memory will remain allocated even if the language is later returned to English. To free the allocated menu, specify deleting screen data before transfer when transferring the project data to the PT.

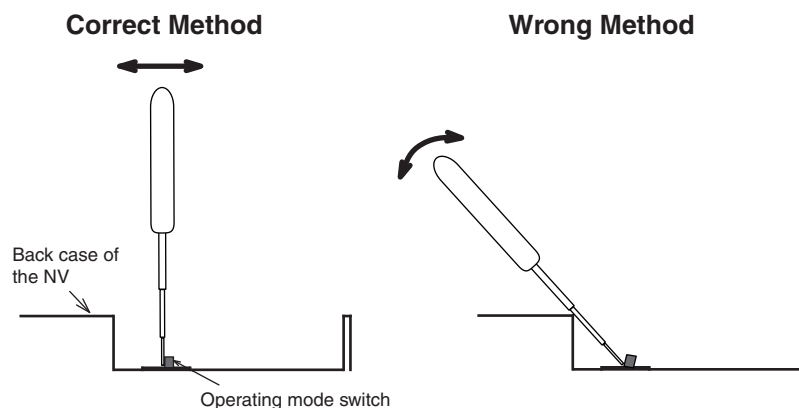
### 5-1-3 Prohibiting Displaying the System Menu

You can use a DIP switch setting to prevent anyone other than the system administrator from changing PT Configuration settings by prohibiting anyone from displaying the System Menu.

Operating Mode Switch      Turn ON pin 2 of the DIP switch as shown on the left to prohibit moving to the System Menu



**Note** Set the operating mode switch on the NV3W-V1/NV4W as shown below.



If you attempt to set the switch by using the back case of the NV4W as a fulcrum, the operating mode switch may break.

### 5-1-4 Items That Can Be Set from the System Menu

Item	System Menu		PT				Set PT configuration from the NV-Designer.	
			○: Supported. ×: Not supported.					
			NV3W	NV3W-V1	NV4W	NV3Q		
Contrast	Setting Mode	Display	Contrast	○	×	×	×	▲ (Only by transferring settings)
Backlight			Brightness	○	○	○	○	▲ (Only by transferring settings)
Communications conditions and COM port		Port	Com port	○	○	○	○	Supported.
Touch switch adjustment		T.SW		○	○	○	○	Not supported.
Clock		Clock		×	×	○	○	Not supported.
Initializing SRAM		Memory	SRAM	○	○	○	○	Not supported.
Initializing FRAM			FROM	○	○	○	○	Not supported.
SD memory card			SD Memory Card	×	×	○	○	Supported.
System Menu Language		Language		×	○	○	○	Supported.

## 5-1-5 Setting Mode

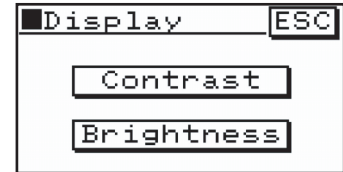
### Display, or Contrast and Brightness

To display the Display Screen, touch “Setting” from the Startup Screen of the System Menu and then touch “Display” (for the NV3W) or “Contrast&Brightness” (for the NV3W-V1, NV4W or NV3Q) on the Setting Screen.

Display Screen: Contrast and Brightness Adjustment

#### Accessing Screens

Startup Screen  
↓  
[Setting]  
↓  
[Display]



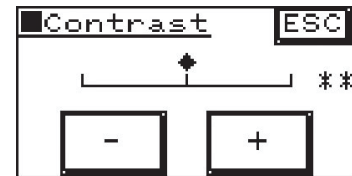
### Contrast Adjustment

Touch “Contrast” on the Display Screen to access the Contrast Screen. The Contrast Screen is used to adjust the contrast of the LCD of the PT.

#### Contrast Screen

##### Accessing Screens

Display Screen  
↓  
[Display]  
↓  
[Contrast]



◆ Touch Panel Operation

#### Adjustment

The value can be set to between 0 and 14. The contrast will increase if the + Key is touched and decrease if the – Key is touched. The number and diamond mark show the setting. The standard setting is 7, for which the diamond mark will be in the center.

#### Returning

After completing the setting, touch the ESC Key to return to the previous screen.

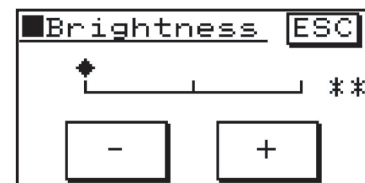
### Brightness Screen

Touch “Brightness” on the Display Screen to access the Brightness Screen. The Brightness Screen is used to adjust the brightness of the backlight in the PT.

#### Backlight Screen

##### Accessing Screens

Display Screen  
↓  
[Display]  
↓  
[Brightness]





◆ Touch Panel Operation

**Adjustment**

The value can be set to between 0 and 14. The brightness will increase if the + Key is touched and decrease if the – Key is touched. The number and diamond mark show the setting. The standard setting is 14, for which the diamond mark will be all the way to the right.

**Returning**

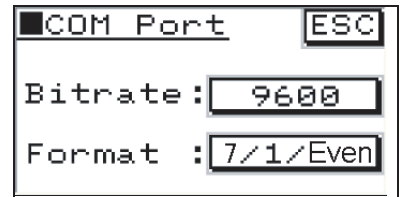
After completing the setting, touch the ESC Key to return to the previous screen.

**Port Communications Settings (COM Port)**

To display the Port Screen, touch “Setting” from the Startup Screen of the System Menu and then touch “Port” on the Setting Screen. Then touch COM. Port to display the COM Port Screen. Here you can set the communications settings for communications with the PLC connected to the PT.

**Setting COM Port Communications Conditions (PLC Communications Conditions)**

- Accessing Screens
- Startup Screen
- ↓
- [Setting]
- ↓
- [Port]
- ↓
- [COM Port]



**Bit Rate: PLC Baud Rate**

Set the baud rate to use in communicating with the external device (PLC) connected to the PT. The setting will scroll through the following settings as the function key is presses: 9,600, 19,200, 38,400, 57,600, and 115,200. Set the baud rate (“bit rate”) to the same value as the PLC that is connected.

**Format: Transmission Format**

Set the transmission format to use in communicating with the external device (PLC) connected to the PT, including the character length, number of stop bits, and parity. The setting will scroll through the following settings as the function key is presses: 7/1/None, 7/1/Odd, 7/1/Even, 8/1/None, 8/1/Odd, and 8/1/Even. Set the same format as the PLC that is connected.



◆ Touch Panel Operation

**Returning**

After completing the setting, touch the ESC Key to return to the previous screen.



**Description of Function**

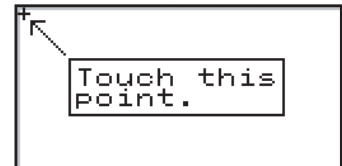
The default communications settings for the COM port are 9,600 and 8/1/Odd. There is always only one stop bit.

**Touch Switch Adjustment**

To display the Touch Switch Adjustment Screen, touch “Setting” from the Startup Screen of the System Menu and then touch “T.SW” (for the NV3W) or “Touch SW” (for the NV3W-V1, NV4W or NV3Q) on the Setting Screen. The locations of the touch switches on the PT can be adjusted here. Adjust the locations as required if the touch switches become offset.

**Touch Switch Adjustment**

Accessing Screens  
 Startup Screen  
 ↓  
 [Setting]  
 ↓  
 [Touch SW]



**Touch Panel Operation**

**Adjustment**

Use an object with a soft pointed tip to touch the + marks on the screen. Touch the screen three times according to on-screen instructions. If the locations of the touch switches are too offset, you may have to repeat the operation. This setting is saved even if the power supply is turned OFF. It is initialized if the internal Flash Memory is initialized.

**Returning**

The previous screen will not return until the adjustment is complete.

**Note**

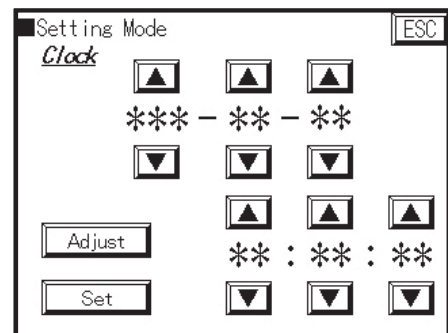
The NV-series PTs use analog touch panels. As the panels age, the positions of the touch switches can change. Calibrate the touch switches if the positions of the touch switches change too much.

**Clock Settings (NV4W and NV3Q Only)**

Touch “Clock” from the Setting Menu of the System Menu to access the Clock Screen. The time of the clock in the PT can be set here.

**Clock Setting Screen**

Accessing Screens  
 Startup Screen  
 ↓  
 [Clock]



The current PT clock time will be displayed on the screen. Touch the Up and Down Keys to change the values of the items to be changed (year, month, day, hour, minutes, seconds).



◆ Touch Panel Operation

**Adjustment**

The value will increase if the Up Key is touched and decrease if the Down Key is touched.

**Setting**

Touch the Set Key to update the set value and restart the clock. Touch the Adjust Key to set the seconds value to 0 s. The seconds will be round down for values from 0 to 29 and round up for values from 30 to 59.

Example 12:35:29 will be set to 12:35:00  
 12:35:30 will be set to 12:36:00

**Returning**

After completing the setting, touch the ESC Key to return to the previous screen.



**Description of Function**

Setting the Day of the Week

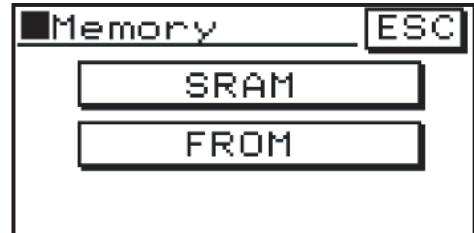
The day of the week will be set automatically, based on the year, month, and day.

**Memory Initialization: Clear SRAM/Clear FROM**

To display the Memory Screen, touch “Setting” from the Startup Screen of the System Menu and then touch “Memory” (for the NV3W) or “Clear Memory” (for the NV3W-V1, NV4W or NV3Q) on the Setting Screen. Use this screen to initialize the user memory in the PT.

**Memory Screen**

Accessing Screens  
 Startup Screen  
 ↓  
 [Setting]  
 ↓  
 [Memory]



**SRAM**

Touch this key to initialize the line graph data stored in SRAM. (Line graph data is also initialized by cycling the power.) PLC memory hold data, the alarm history, and PT internal memory data will also be initialized.

**FROM**

Touch this key to delete the screen data and PT Configuration stored in user memory (FROM) in the PT.

When either of the above keys is touched, a message will be displayed asking for confirmation. To clear the memory, touch the Clear OK? Key. A buzzer will sound, memory will begin to be cleared, and Now Working will be displayed. When the memory has been cleared, Cleared will be displayed. Do not turn OFF the power supply while “Now Working” is being displayed. If the power is inadvertently turned OFF, then clear the memory again.



◆ Touch Panel Operation

**Returning**

After completing the setting, touch the ESC Key to return to the previous screen.



**Precautions for Correct Operation**

When SRAM is initialized, the line graph data stored in SRAM will be deleted. Line graph data and other data is not backed up. It will be initialized when the power is turned OFF.

- With FROM initialization, the following data stored in Flash Memory will be deleted.
  - Base screen data
  - PT Configuration data (This data is returned to the default settings.)
  - Contrast adjustment settings data (This data is returned to the default settings.)

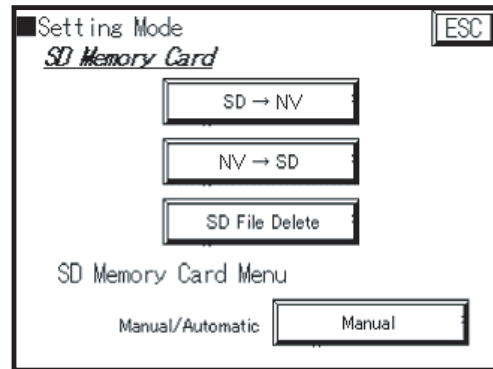
Before initializing, be sure to use the NV-Designer to save the screen data in the computer.

**SD Memory Card Operations (NV4W and NV3Q)**

Touch the SD Memory Card Key in the Setting Menu to display the SD Memory Card Screen. Touch the various keys on this screen to display the corresponding setting screens.

**SD Memory Card Screen**

Startup Screen  
↓  
[Setting Menu]  
↓  
[SD Memory Card]



**SD → NV**

Copies screen data from the SD memory card to the PT.

**Note** If the firmware version of the screen data saved on the SD memory card differs from that of the PT, then the data will be changed to the firm version that was set when the screen data was created.

**NV → SD**

Copies screen data from the PT to the SD memory card.

**SD File Delete**

Deletes the screen files saved in the SD memory card.

**SD Memory Card Menu**

**Manual/Automatic**

Used to set the screen settings for when an SD memory card is inserted in the SD memory card slot.



**Precautions for Correct Operation**

Up to 16 data items can be saved.

**Precautions when Handling SD Memory Cards**

It is recommended that data always be backed up by saving it on other media. Never remove the SD memory card or turn OFF power to the PT while the SD memory card access indicator is lit (i.e., while data is being read from or written to the card). Doing so may cause data to be corrupted.

Data stored on the SD memory card may be lost in the following cases. OMRON accepts no responsibility for any data that is lost.

The user or a third party use the SD memory card incorrectly.  
 The SD memory card is subjected to static electricity or electrical noise.  
 The SD memory card is removed or the power to the accessing device is turned OFF while the card is being accessed for saving or deleting data.



**See Also**

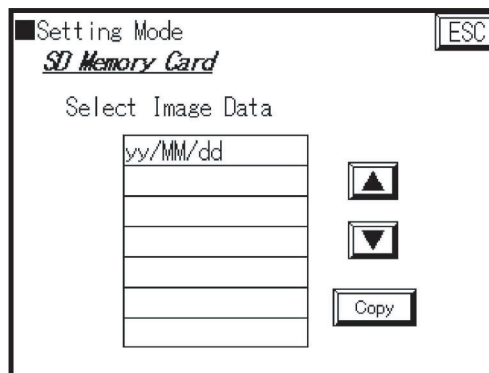
For details on SD memory cards, refer to 9-2 Using SD Memory Cards for Transferring or Copying Data (NV4W and NV3Q), NV-series PT Programming Manual (Cat. No. V104).

**SD → NV**

Touch the SD → NV Key to display the SD Memory Card Select Image Data Screen. Use the Up and Down Keys to select the file.

**Select Image Data Screen**

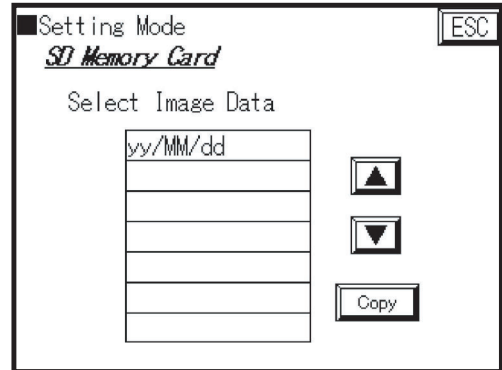
[SD→NV]



When you touch the Copy Key, a confirmation screen will be displayed.

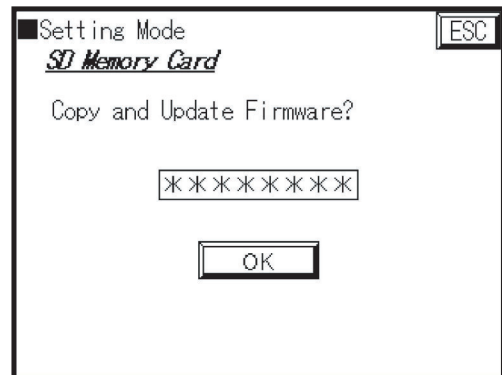


Transfer Confirmation Screen When Firmware Versions Are the Same



Transfer Confirmation Screen When Firmware Versions Are Different

**Note** The version will be changed to the transferred screen data firmware version.



◆ Touch Panel Operation

**Selecting** A file name can be selected by touching it. You can also select a file name by touching the Up Key to move up or touching the Down Key to move down.

**Returning** After completing the setting, touch the ESC Key to return to the previous screen.

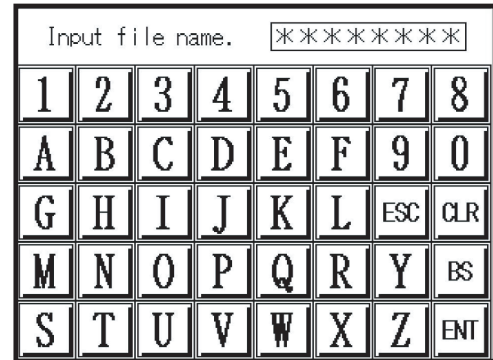
**NV → SD**

Touch the NV → SD Key to display the Input File Name Screen for saving PT screen data to the SD memory card. Enter the file name and touch the ENT Key.

**Note** Up to 8 alphanumeric characters can be used when entering the file name.

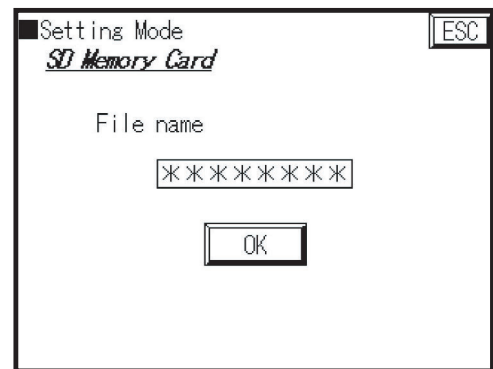
**File Name Entry Screen**

[NV→SD]



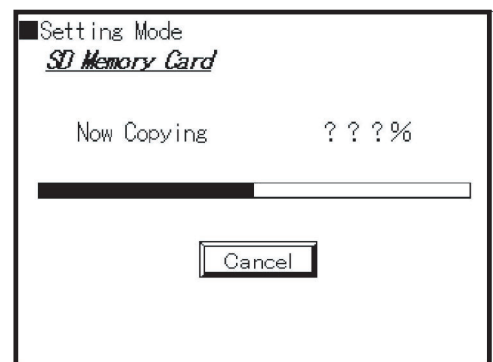
The File Name Confirmation Screen will be displayed. Check the file name and then touch the OK Key. (The File Name Confirmation Screen will be displayed when “File Name” is touched.)

**File Name Confirmation Screen**



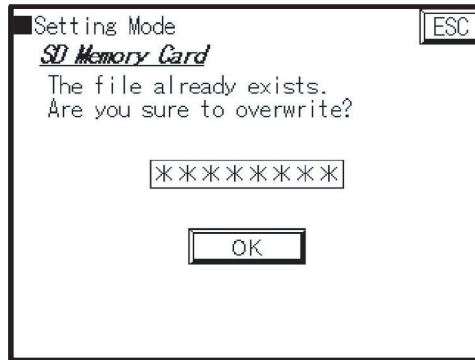
The SD Card Now Copying Screen will be displayed.

**Write SD Card Screen**



If the same file name already exists, the Overwrite Confirmation Screen will be displayed. Touch the OK Key after the data has been saved to return to the SD Card Menu Screen.

### Overwrite Confirmation Screen



◆ Touch Panel Operation

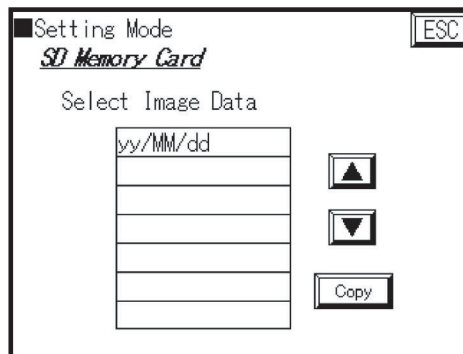
**Returning** After completing the setting, touch the ESC Key to return to the previous screen.

### SD File Delete

NV4W or NV3Q screen data saved in the SD memory card can be deleted. Touch the SD File Delete Key to display the Select Image Data Screen. Use the Up and Down Keys to select the file.

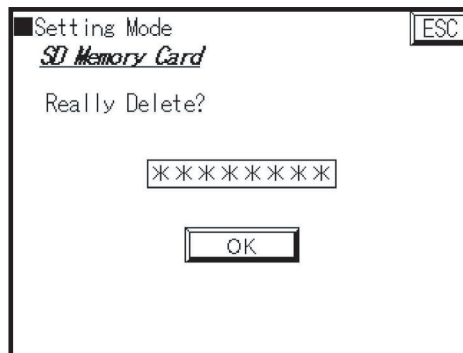
### Select Image Data Screen

[SD File Delete]



When the Delete Key is pressed, a screen will be displayed asking for confirmation. Confirm by touching the OK Button. Touch the OK Key after the data has been deleted to return to the SD Card Menu Screen.

[Delete]



**SD Card Menu**

The SD Card Menu Screen can be set to be displayed when an SD memory card is inserted.

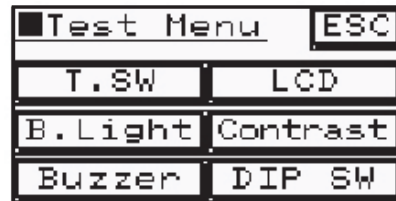
- **Automatic:** The SD Card Menu will be displayed automatically when an SD memory card is inserted.
- **Manual:** The SD Card Menu will not be displayed when an SD memory card is inserted. (Move to the SD Card Menu from the System Menu.) Select one of the above options. (Default: Automatic)

## 5-2 Self-diagnosis from the System Menu

Touch “Test” from the Startup Screen of the System Menu to access the Test Screen. This screen can be used to check hardware items, such as PT memory or buzzers.

### Test Screen

Accessing Screens  
Startup Screen  
↓  
Test Key



### 5-2-1 Items That Can Be Tested from the System Menu

Item	System Menu			PT		
				○: Supported. ×: Not supported.		
			NV3W(-V1)	NV4W	NV3Q	
Touch switches	Test Mode	Test	T.SW	○	○	○
DIP switch			DIP SW	○	○	○
Backlight color			Back Light	○	○	○
Buzzer			Buzzer	○	○	○
LCD			LCD	○	○	○
Contrast			Contrast	×	×	×
SD			SD	×	○	○

#### Touch SW

You can check the operation of the touch switches.

#### DIP SW

You can check the operation of the DIP switch.

#### Back Light

The backlight color changes at intervals of 1 second.

3-color LED (green, red, and orange) backlight	Green to red to orange, in order
White LED backlight	Lit to unlit to lit (weak), in order
3-color LED (white, red, and pink) back-light	White, red, and pink, in order

#### Buzzer

Used to check buzzer operation.

#### LCD

Used to display patterns and check DIP switch operation.

#### Contrast

Changes in contrast can be checked by touching the + and – Keys.

#### SD

Used to check SD memory card read operation.



◆ Touch Panel Operation

#### Returning

To return to the previous screen, touch either the ESC Key or the Initial Startup Screen at the top of the screen.



**Description of Function**

Test (Self-diagnosis) Screen

The names of the items that were checked by the NV3W are displayed in inverse video on the Test Screen. A check mark is displayed to the left of the key switch for each item that was checked by the NV3W-V1, NV4W or NV3Q. (The check marks will be cleared when returning to the startup screen of the System Menu.)

**SECTION 6**  
**Operation Security (NV3W-V1, NV4W and NV3Q Only)**

**Operation Security  
(NV3W-V1, NV4W and  
NV3Q Only)**

Passwords can be changed from the PT.



**Additional Information**

A switch must be created using a function switch or customer switch to go to the Password Change Screen or the Password Management Screen by a function switch or custom switch.

**Note** Passwords cannot be set from the System Menu.

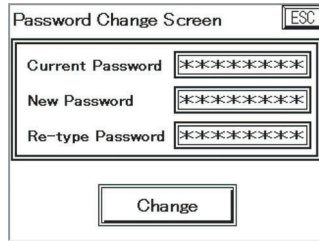


**See Also**

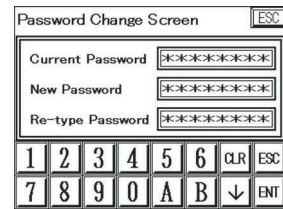
For details on settings on the Password Change Screen and the Password Management Screen, refer to the *8-6 Security Function, NV-series PT Programming Manual*.

**Password Change Screen**

Use this screen to change the password for the security level of the screen being created.



Screen When an Entry Field Has Been Touched



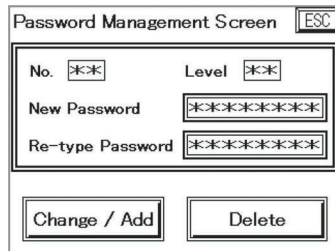
If the password entry field is selected, a keyboard will be displayed. Enter the passwords and then press the ENT Key.

- Current Password: Enter the current password.
- New Password: Enter the new password.
- Re-type Password: Enter the new password again.

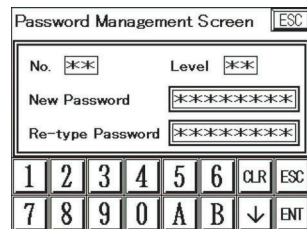
Touch “Change” to complete changing the password.  
Touch the ESC Key to return to the previous screen.

**Password Management Screen (Level 15 Only)**

At level 15, you can change the settings for all levels.



Screen When an Entry Field Has Been Touched



- No.: Enter the password number.
- Level: When the password is entered, the level will be displayed if it has already been set. If it has not been set, then this box will be blank.
- New Password: Enter the new password.
- Re-type Password: Enter the new password again.



Changing or Adding: Touch Change/Add to complete changing or adding a password.

Deleting: Press "Delete" to delete the password. (There is no need to enter a password.)

Touch the ESC Key to return to the previous screen.



◆ Touch Panel Operation

**Setting**

Up to 8 alphanumeric characters can be used when setting a password.



# SECTION 7

## Connecting and Setting PLCs or Temperature Controllers

This section provides information and procedures required to connect an NV-series PT to an OMRON PLC.

7-1	Connecting and Setting an OMRON PLC . . . . .	102
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7-5-2	Temperature Controller Settings. . . . .	115

## 7-1 Connecting and Setting an OMRON PLC

### 7-1-1 Overview

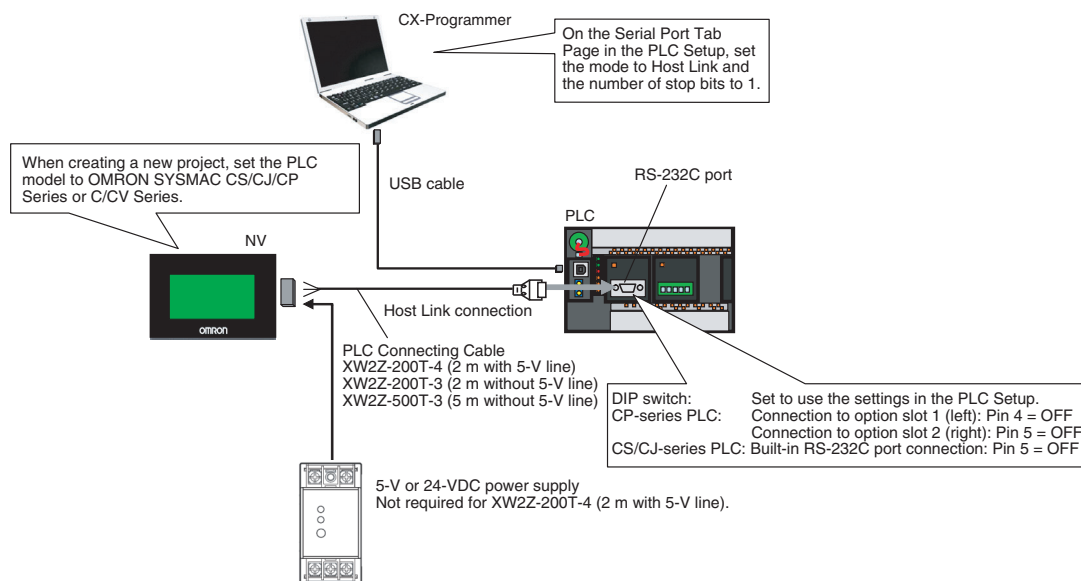
When the PT is connected to an OMRON PLC, the following settings must be made.

#### PT Settings

The settings at the PT are made in the NV Configuration and the model selection when creating a new project.

#### PLC Settings

The settings at the PLC are made in the PLC Setup and with the DIP switch on the front of the CPU Unit.



Connect the PT to an OMRON PLC using the Host Link protocol.

**Note** It is not possible to connect using the NT Link protocol.

### 7-1-2 Connectable OMRON PLCs

The following table shows the OMRON PLCs that can be connected to the PT using Host Link.

Series	PLC	Serial communications mode for PT connection
CP Series	N-type CP1E, CP1L (except for 10-point models), and CP1H	Host Link
CS/CJ Series	CS1G/CS1H, CS1G-H/CS1H-H, CJ1G, CJ1G-H/CJ1H-H, CJ1M, CJ2H and CJ2M	
C Series	C200HX/HG/HE(-Z), CQM1H, CPM2A/CPM2C, CPM1/CPM1A, and SRM1-C02-V2	
CVM1/CV Series	CV500, CV1000, CV2000, and CVM1	

\*1 If the PT is connected to a C-series or CV/CVM1-series PLC, keep the PLC in MONITOR mode. If the PLC is in RUN mode and the PT attempts to write to PLC memory, an error code of ER01 will be displayed and memory will not be written. If the PT is connected to a CP-series or CS/CJ-series PLC, the PLC can be in either RUN or MONITOR mode.

You can connect to the PLC using a built-in serial port on the CPU Unit, a serial port on a Serial Communication Unit (includes serial connection through peripheral port), Serial Communications Board, or Host Link Unit.

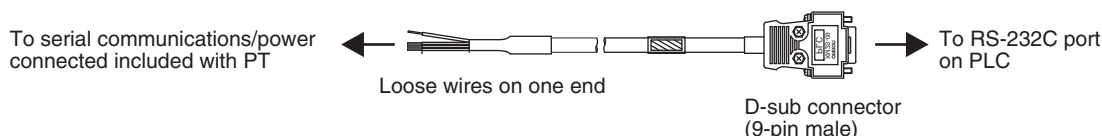
**Note** The SPMA function can be used only with CP-series and CS/CJ-series PLCs.

### 7-1-3 Cables Required for Connection

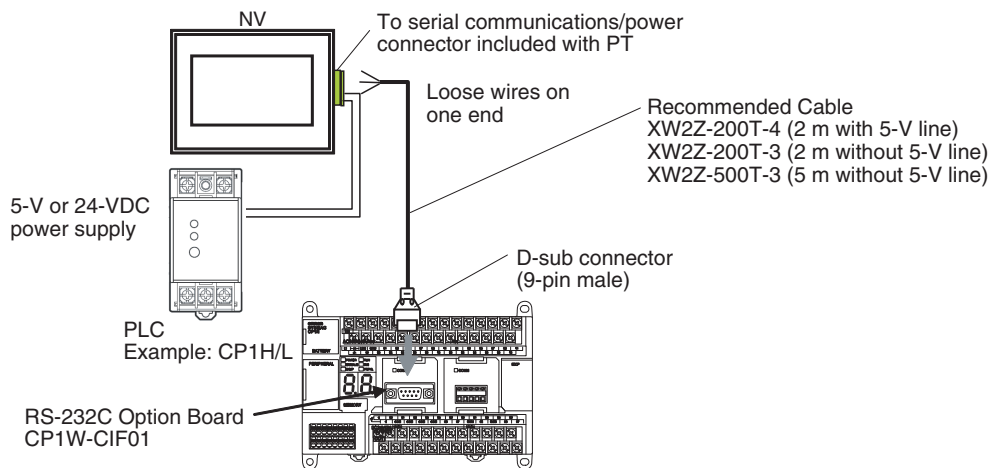
Use one of the following cables to connect the PT to an OMRON PLC.

#### RS-232C Connections

Name	Model	Specifications
PLC Connecting Cable	XW2Z-200T-4	For the 5-V NV3W(-V1) models 2 m with 5-V line
	XW2Z-200T-3	For the 24-V NV3W(-V1) models and NV4W or NV3Q 2 m without 5-V line
	XW2Z-500T-3	For the 24-V NV3W(-V1) models and NV4W or NV3Q 5 m without 5-V line



Insert the loose wires at the PT directly into the serial communications/power supply connector that comes with the PT, and tighten the screws. At the PLC, connect the cable just as it is to the D-sub 9-pin connector.



#### RS-422 or RS-485 Connections

To connect the cable to the Serial Communications Unit/Board, use the (XM3A-0921 or the equivalent model) Plug and (XM2S-0911-E or the equivalent model) Hood included with each port on the Unit/Board and solder the following cable to the connector.

**Recommended RS-442A/485 Cables**

Model	Manufacturer	Restriction
CO-HC-ESV-3P×7/0.2	Hirakawa Hewtech Corporation	Total length: 500 m max., T-brand drop line length: 10 m max.

- Note**
- (1) RS-485 (2-wire) cannot be used to connect to a Serial Communications Board/Unit using the Host Link protocol. Use RS-422A (4-wire).
  - (2) Multiple NV-series PTs cannot be connected to one PLC using the Host Link protocol.

**7-1-4 Wiring Procedure**

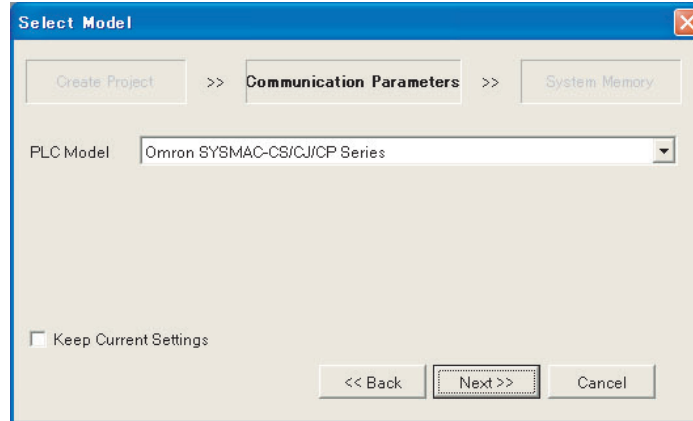
The wiring between the PT and an OMRON PLC and the power supply wiring to the PT are performed together. For details on wiring, refer to *SECTION 4 Installing and Wiring the PT*.

## 7-2 PT Settings

### 7-2-1 Selecting the Models

Set the model selection as follows when creating a new project.

#### Selecting the Models



Item	Settings	Default	Remarks
PLC Model	OMRON SYSMAC-CS/CJ/CP Series or SYSMAC-C/CV Series Modbus (RTU mode   Temperature Controller) <sup>*1</sup> Modbus (RTU Mode) <sup>*2</sup> Modbus slave (RTU Mode) <sup>*3</sup> , etc.	OMRON SYSMAC-CS/CJ/CP Series	

\*1 Select this when connecting to an OMRON EJ1 Temperature Controller via Modbus using the NV-series PT as the master.

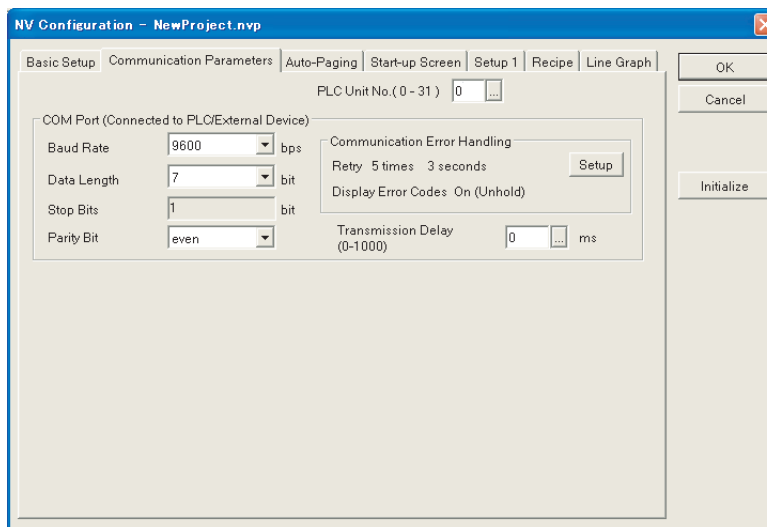
\*2 Select this when connecting to a PLC via Modbus using the NV-series PT as the master.

\*3 Select this when connecting to a PLC via Modbus using the NV-series PT as a slave.

### 7-2-2 NV Configuration

Set the NV Configuration as shown below.

#### NV Configuration



Item		Settings	Default	Remarks	
COM port (Connected to PLC/ External Device)	Bit Rate	9,600, 9,200, 38,400, 7,600, or 115,200 bps	9,600 bps	These set- tings must be the same as the com- munications conditions set at the PLC.	
	Data Length	7 or 8 bits	7 bits		
	Stop Bits	Always 1 bit	Always 1 bit		
	Parity Bit	Even, Odd, or none	Even		
	Communica- tions Error Handling	Retry	Number of times and number of seconds	5 times, 3 seconds	
		Display Error Codes	OFF, ON (held), or ON (not held)	On (Not held)	
		Transmis- sion Delay	0 to 1,000 ms	0 ms	

**Note** When connecting to an OMRON EJ1 Temperature Controller using Modbus-RTU, set a transmission delay of at least 5 ms in the communications parameters in the NV Configuration of the PT. Communications may not be performed correctly if a transmission delay of 4 ms or less is set. Use a value of the least 5 ms (default) for the port B send wait time in the EJ1. Communications may not be performed correctly if a send wait time of 4 ms or less is set.



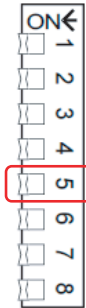
## 7-3 PLC Settings

### 7-3-1 Connecting to the Built-in RS-232C Port of the CPU Unit

#### Front Panel DIP Switch Settings

Set the DIP switch on the front of the CPU Unit to use the serial port communications settings in the PLC Setup.

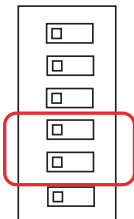
#### DIP Switch



#### CS/CJ-series PLCs

No.	Item	Settings		Remarks
Pin 5	Built-in RS-232C port connection	Pin 5 = OFF	According to PLC Setup	If pin 5 is turned ON, the toolbus protocol will be used, enabling you to connect the CX-Programmer and other CX-One software. Communications with the PT, however, will not be possible.

#### CP1H/CP1L PLCs



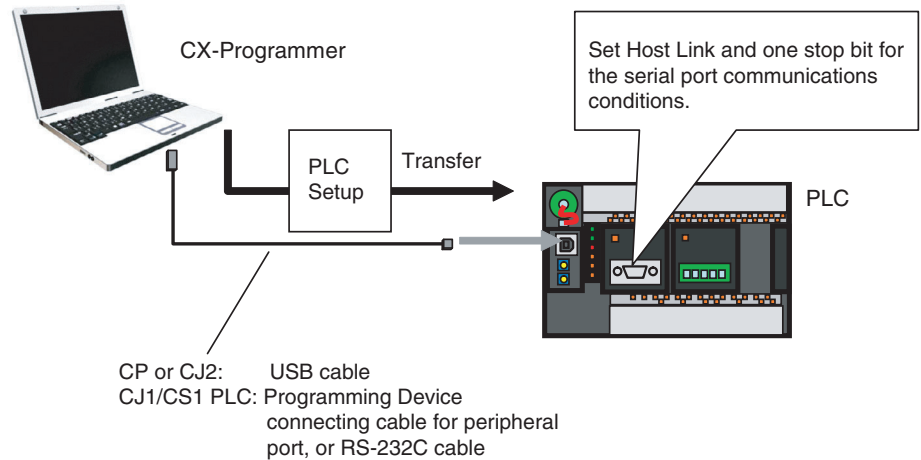
No.	Item	Settings		Remarks
Pin 4	Connection to option slot 1 (left)	Pin 4 = OFF	According to PLC Setup	If pin 4 is turned ON, the toolbus protocol will be used, enabling you to connect the CX-Programmer and other CX-One software. Communications with the PT, however, will not be possible.
Pin 5	Connection to option slot 2 (right)	Pin 5 = OFF	According to PLC Setup	If pin 5 is turned ON, the toolbus protocol will be used, enabling you to connect the CX-Programmer and other CX-One software. Communications with the PT, however, will not be possible.

**Note** No special settings are required for a CP1E CPU Unit. If the PLC Setup is changed, however, the power to the CPU Unit must be cycled to enable using the new settings.

#### Using the CX-Programmer for Settings and to Transfer Settings

Set the Host Link protocol and one stop bit in the serial port communications settings in the PLC Setup.

**Note** The number of stop bits set at the PT for serial communications is always one. Therefore the number of stop bits set for serial communications in the PLC Setup must be changed to 1 bit from the default of 2 bits.

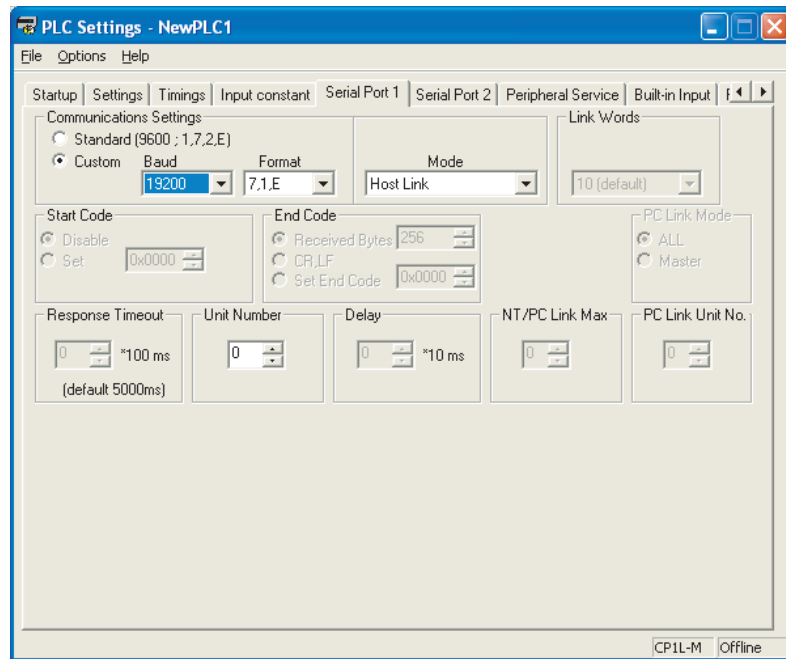


**PLC Setup**

Item	Item	Settings	
Serial Port Tab Page	Baud rate	9,600, 19,200, 38,400, 57,600, or 115,200 bps	
	Data length	7 or 8 bits	
	Stop bits	1 bit	Must be set to 1 bit.
	Parity	Even or odd	
	Unit No.		Set to 0.

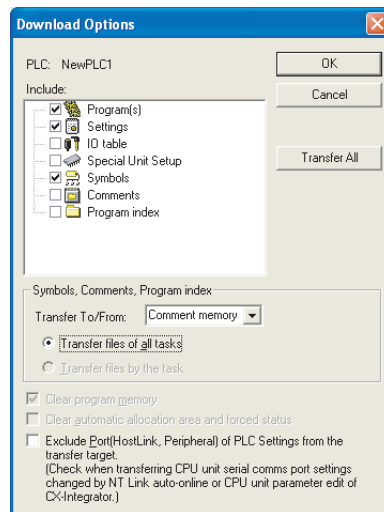
Use the following procedure.

- 1,2,3...**
1. Start the CX-Programmer, and then open the PLC Setup Dialog Box by double-clicking PLC Settings in the project tree.
  2. Click the Serial Port Tab.
  3. Make the following settings in the Communications Settings Area.
    - Select the Custom Option. (The default is Standard.)
    - Set the baud rate. (The default is 9,600.)
    - Format = 7,1,E (7-bit data, 1 stop bit, and even parity)  
Format = 7,2,E (7-bit data, 2 stop bits, and even parity)
    - Select Host Link Mode (the default) as the mode.



**Note** The standard setting in the PLC Setup is Host Link, but the default format is “7, 2, E,” which does not match the settings at the PT. It is therefore necessary to change the format setting “7, 1, E” so that it matches the settings at the PT.

4. Connect the CX-Programmer online by, for example, selecting Auto Online from the PLC Menu, and then set the PLC into PROGRAM mode.
5. With the CX-Programmer, select Transfer – To PLC from the PLC Menu. Select the PLC Setup Check Box and then click the OK Button.



6. A dialog box will be displayed for confirmation. Click the Yes Button. The transfer will start. When the transfer has been completed, click the OK Button.

### 7-3-2 Connecting to a Serial Communications Board/Unit

This section describes the settings for connecting to the following Serial Communications Board/Units.

Board/Unit name	Model
Serial Communications Board	CS1W-SCB□□-V1
Serial Communications Unit	CS1W-SCU□□-V1, CJ1W-SCU□□-V1

#### Front Panel Switch Settings

For a Serial Communications Unit, set the unit number. The first address for that Unit in the DM Area will be determined as follows:

$$m = D30000 + 100 \times \text{unit number}$$

#### Words Allocated in the DM Area

Set the data in the DM Area as shown in the following table.

Words				Bit	Settings
CS-series Serial Communications Board		CS/CJ-series Serial Communications Unit			
Port 1	Port 1	Port 1	Port 1		
D32000	D32010	m	m+10	15	1: Custom
				12 to 14	Reserved.
				08 to 11	5 hex: Host Link
				05 to 07	Reserved.
				04	Either 0 or 1 can be set.
				03	0: 7 or 1: 8 bits
				02	1: 1 stop bit
				01	Parity 0: Parity, 1: No parity
D32001	D32011	m+1	m+11	04 to 15	Reserved.
				00 to 03	Baud rate 0 hex: Default (9,600) 6 hex: 9,600 7 hex: 19,200 8 hex: 38,400 9 hex: 57,600 A hex: 115,200

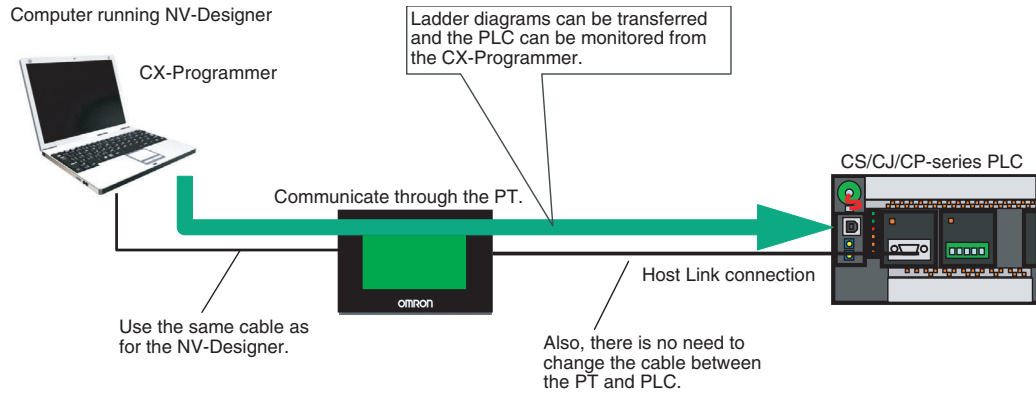
Example: When Host Link, 7-bit Data, 1 Stop Bit, Even Parity, and a Baud Rate of 19,200 bps Are Set

Words				Setting
CS-series Serial Communications Board		CS/CJ-series Serial Communications Unit		
Port 1	Port 1	Port 1	Port 1	
D32000	D32010	m	m+10	8504 hex
D32001	D32011	m+1	m+11	0007 hex

## 7-4 SPMA (Single Port Multiple Access)

### 7-4-1 What Is SPMA?

When the connections and setup are completed between the computer, PT, and PLC, the PLC can be accessed from the computer (e.g., the CX-Programmer) using serial communications and communicating through the PT. The ladder programs can be transferred and monitored. This function is called SPMA (Single Port Multiple Access). It is supported only for CP-series and CS/CJ-series PLCs.



This makes it possible to transfer and monitor ladder programs using the CX-Programmer, with no need to change cable connections between the PT and the computer running the NV-Designer.

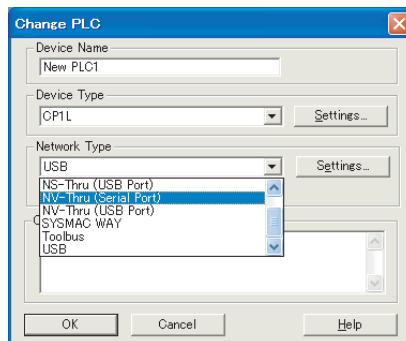
- Note**
- (1) SPMA cannot be used only with CP-series and CS/CJ-series PLCs. It cannot be used with the C-series or CVM1/CV-series PLCs.
  - (2) To use SPMA, use the following CX-Programmer versions:  
CX-One version 3.2 or higher (CX-Programmer version 8.21 or higher)

### 7-4-2 Using SPMA

No special SPMA settings are required at the PT. The PT is always ready.

#### Connecting Online Manually

Make the selection under Network Type in the CX-Programmer's Change PLC Dialog Box.



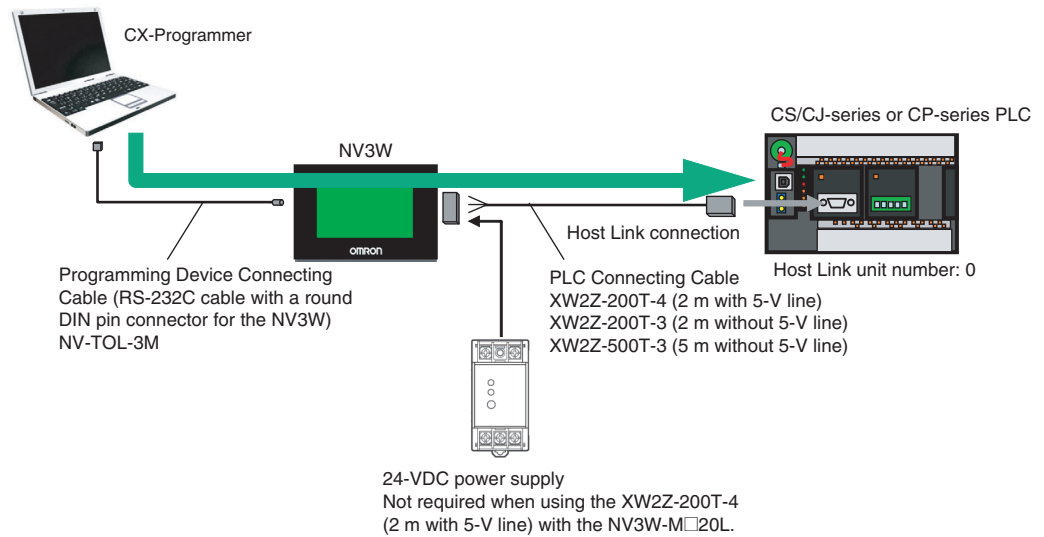
- Note** To display the above items when connected to a CJ2 CPU Unit, select Display All for the network type.

#### Example for the NV3W

Set the Host Link unit number at the PLC to 0.

- 1,2,3...**
1. Under Network Type in the Change PLC Dialog Box, select "NV-Thru (Serial Port)" for the network type.

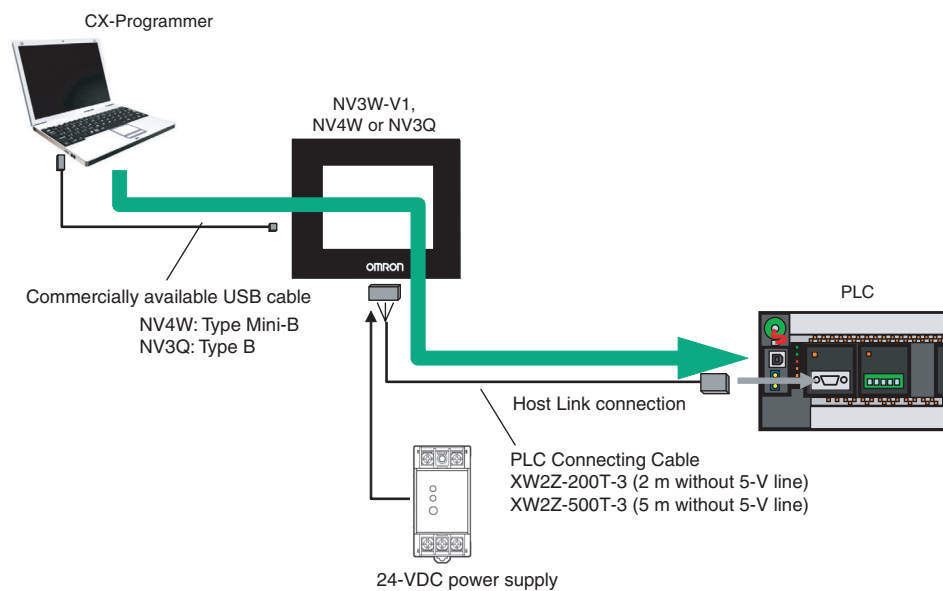
2. Click the Set Button and set the Host Link Unit No. to 0.
3. Connect online.



**Note** With NS3W system program version 1.0□, connection cannot be performed using the SPMA function if the Host Link unit number of the CPU Unit is not 0. With PT system program version 1.1 or higher, SPMA connections are possible even if the Host Link unit number that is set in the CPU Unit is not 0. In that case, set the same Host Link unit number as the CPU Unit.

**Example for the NV3W-V1/  
 NV4W/NV3Q**

- 1,2,3...**
1. Select “NV-Thru (USB Port)” for the network type.
  2. Connect online.



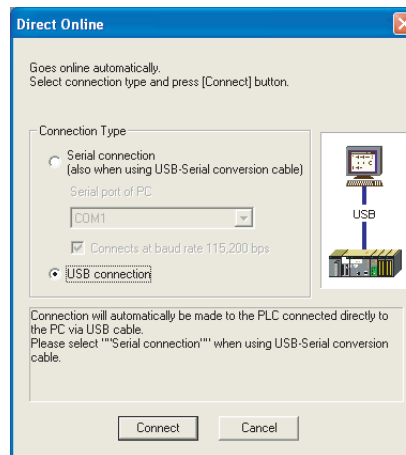
Communications between the PT and PLC will continue during PLC monitoring or while a ladder program is being transferred from the computer via the PT. Communications between the PT and PLC will stop, however, while screens are being transferred to the PT from the NV-Designer (just as with ordinary screen transfers).

- Note**
- (1) The same serial port is used for the CX-Programmer and the NV-Designer, and only one of these can be online with the PT at the same time. For example, an error message will be displayed if an attempt is made to transfer screens from the NV-Designer while the CX-Programmer is connected online.
  - (2) Do not use SPMA during recipe operations.
  - (3) SPMA can be used even when Auto Online - Direct Connection is selected from the CX-Programmer's PLC Menu.

### Connecting Online Automatically

With an automatic online connection, the computer can be connected to the PT using a USB or serial cable, and there is no need to make a setting in the Change PLC Dialog Box.

- 1,2,3...**
1. Start the CX-Programmer. Select Auto Online – Direct Connection from the PLC Menu.
  2. In the Direct Online Dialog Box, select one of the following connection methods depending on the PT model, and then click the Connect Button.
    - NV3W: Serial Connection
    - NV3W-V1, NV4W or NV3Q: USB Connection



3. The online connection will be made, and the ladder program or other data can be transferred.

# 7-5 Connecting to EJ1 Temperature Controllers Using Modbus-RTU

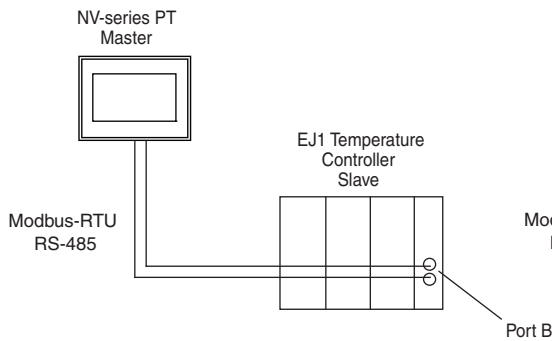
## 7-5-1 NV-series PT Settings

### Model Selection in the NV-Designer

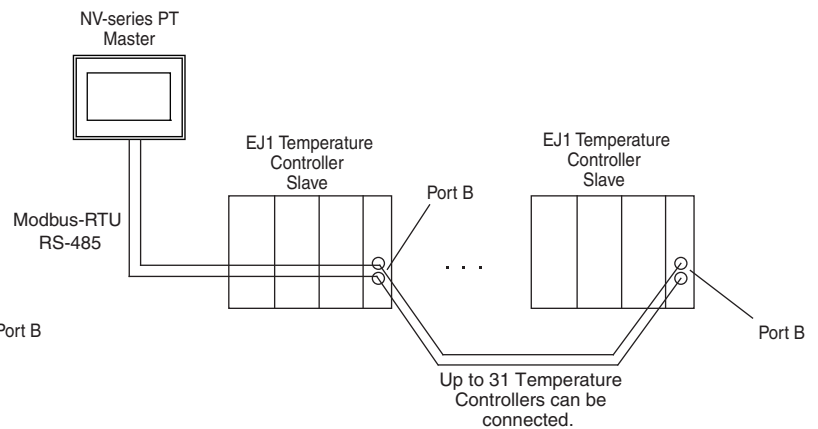
Select Modbus (RTU Mode | Temperature Controller) for the model selection when creating a new NV-Designer file.

An EJ1 Temperature Controller can be connected using Modbus-RTU with the NV-series PT as the master. When performing communications using Modbus-RTU, use port B of the EJ1 EDU.

1:1 Connection



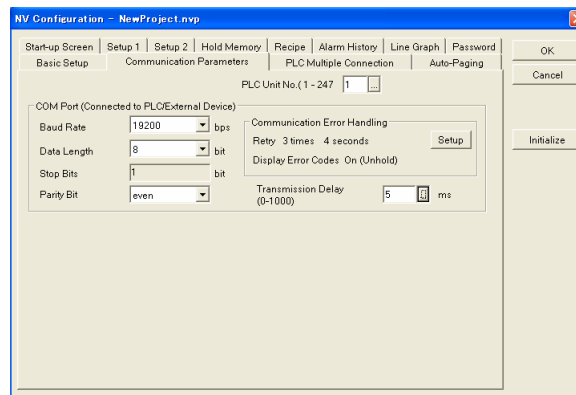
1:N Connections



### NV Configuration on NV-Designer

The following settings can be made from the Communication Parameters Tab in the Configuration Dialog Box. Set the baud rate and parity to match the settings at the EJ1.

#### NV Configuration





Item		Settings	Remarks	
COM port (for connection with PLC and external devices)	Bit Rate	9,600, 19,200, 38,400, 57,600, or 115,200 bps	These settings must be the same as the communications parameter set for the EJ1 Temperature Controller.	
	Data Length	8 bits		
	Stop Bits	Always 1 bit		
	Parity Bit	Even, Odd, or none		
	Communications Error Handling	Retry		Number of times and number of seconds
		Display Error Codes		OFF, ON (held), or ON (not held)
Transmission Delay		5 to 1,000 ms		

**Note** When connecting to OMRON EJ1 Temperature Controllers using Modbus-RTU, set a transmission delay of at least 5 ms in the communications parameters in the NV Configuration of the PT. Communications may not be performed correctly if a transmission delay of 4 ms or less is set. Use a value of the least 5 ms (default) for the port B send wait time in the EJ1. Communications may not be performed correctly if a send wait time of 4 ms or less is set.

### 7-5-2 Temperature Controller Settings

#### Setting and Transfer Procedures with CX-Thermo or EJ1 Front-panel DIP Switch Settings

Use the CX-Thermo Support Software to set the communications protocol, baud rate, communications data length, communications parity, and sent wait time.

Changes in these set values will not be valid the Temperature Controller is reset or the power supply is cycled.

#### ■ EJ1 System Settings

Item	Parameter	Setting
Serial Port Tab Page	Baud Rate	Set to 9,600, 19,200, 38,400, 57,600, or 115,200 bps.
	Parity	Even or odd. (Do not select "none.")
	Communications Unit No.	Set to 1 to 63.*1
	Communications Protocol	Set to Modbus-RTU.
	Send Wait Time	0 to 99 ms

\*1 The communications unit number can be set to between 1 and 63 for the NV4W or NV3Q.

It is not necessary to set the communications data length and stop bits for port B.

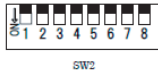
Make the following settings on in NV-series PT.

Parameter	Setting
Data Length	8 bits
Stop Bits	1 bit (Cannot be changed.)

With EJ1 version 1.2 or higher, the communications protocol and baud rate can be set using DIP switch SW2.

■ DIP Switch

EJ1



Pin	Parameter	Settings		Remarks
3	Serial port connection	3 = ON	Modbus	
4 and 5	Communications baud rate setting	4 = OFF, 5 = OFF	Uses the baud rate setting for port B (default: 9,600 bps).	Set the same baud rate as for the COM port in the NV-series PT configuration.
		4 = ON, 5 = OFF	19,200 bps	
		4 = OFF, 5 = ON	38,400 bps	
		4 = ON, 5 = ON	115,200 bps	

For details on settings for the EJ1 Temperature Controllers, refer to the *EJ1 Modular Temperature Controller User's Manual* (Cat. No. H142).

For information on how to specify addresses, refer to the *NV-series Programming Manual* (Cat. No. V104).

# SECTION 8


## Maintenance and Troubleshooting

This section describes the maintenance and inspections required for NV-series PTs and provides troubleshooting information for when problems occur with NV-series PTs.

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## 8-1 Maintenance

Perform maintenance to keep the NV-series PT in proper working condition.

 **WARNING** Do not disassemble the PT or touch any internal components while power is being supplied. Doing so may result in electric shock.

**Backing Up Project Data** If the PT should have to be sent out for repairs, it may have to be replaced. Be sure to back up project data and store it in a safe location.

**Keeping a Spare PT** It is recommended that a spare PT be kept on hand so that the system can be quickly restored in case of PT failure or if the backlight reaches the end of its service life.

**Replacing the Battery (NV4W and NV3Q Only)** To hold internal data in the PT even if the PT power supply is turned OFF for the PT, install a Battery before installing the PT.

Data in internal memory in PT:


Clock data, PLC memory hold data, PT internal memory hold data, and alarm history data

### Battery Models

Mount the following backup Battery.

PT	Backup battery specifications	Model
NV4W Series NV3Q Series	Life expectancy NV3Q-SW: Approx. 3 yr NV4W or NV3Q-MR: Approx. 5 yr (The life expectancy is given for room temperature and humidity (25°C and 65% humidity) and a power supply voltage of 24 VDC.	NV-BAT01

### Low Battery Indicator

If the battery voltage drops, a battery symbol () will be displayed in the lower right corner of the PT screen.

The low battery indicator can be enabled or disabled in the NV-Designer Configuration. (Refer to the *NV-series PT Programming Manual* (Cat. No. V104).)

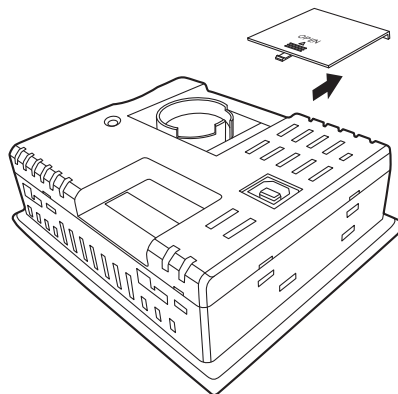
**Note** The Battery Low Flag in system memory will turn ON if the Battery's voltage falls. The Battery Low Flag in system memory will turn ON if the Battery is disconnected or exhausted. These flags will turn ON once when the power to the PT is turned ON for the first time after purchase. The flags will operate regardless of whether the low battery indicator is enabled or disabled.

### Battery Replacement Procedure

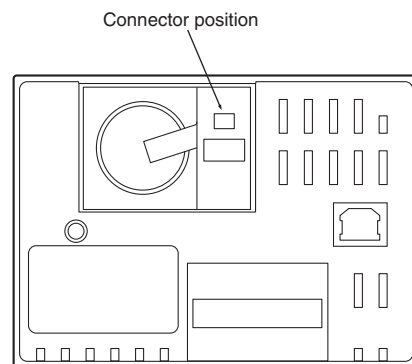
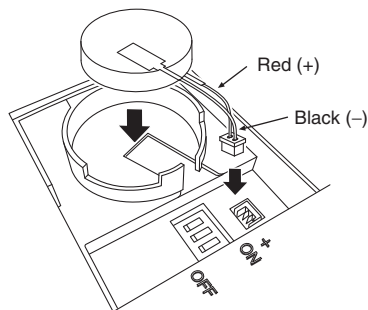
When replacing the battery, leave the power ON for at least one minute before turning it OFF. Replace the battery within one minute after turning OFF the power.

**Note** Be sure to replace the battery within one minute after turning OFF the power. If the new battery is not installed within one minute, data that has been saved will be lost.

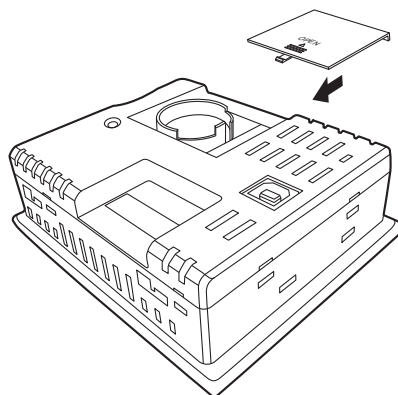
- 1,2,3... 1. Remove the battery cover.



2. Remove the battery connector from the connector mounting position, and take out the Battery.  
 3. Connect the connector so that the red line is connected to the positive terminal, and place the new Battery in the round frame.



4. Close the battery cover.



**Installing the New Battery**

Replace the Waterproof Packing from the front of the panel to ensure waterproofing performance (IP65 for NV3W/NV3Q and IP67 for NV3W-V1 or NV4W) if the NV-series PT has been removed from the panel and you are installing it again. Refer to 4-1-7 *Waterproof Packings* for information on waterproof packing and how to replace it.

## 8-2 Inspection and Cleaning

Perform periodic cleaning and inspection to keep the PT in proper working condition.

### Cleaning

Screen visibility will be impaired if the display becomes dirty. Clean the display periodically as described below.

- For daily cleaning, wipe with a soft, dry cloth. Attempting to remove heavy dirt with the cloth may scratch the front panel sheet. First wipe the surface with a damp cloth to remove dirt.
- If dirt cannot be removed using a dry cloth, dampen the cloth sufficiently with a neutral cleaning solution (approx. 2%), squeeze the cloth out, and then wipe the surface.
- If material such as rubber, vinyl, or tape is left in contact with the PT for a long time, it may leave residue. If residue adheres to the PT, remove it when cleaning.

**Note** Do not use benzene, thinners, or other volatile solvents, or chemically treated cloths on the PT.

### Inspection

Inspect the PT once every six months to one year. Shorten the interval between inspections when using the PT in harsh conditions, such as high temperatures, high humidity, or environments subject to large amounts of dust.

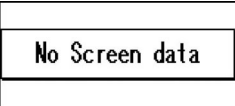
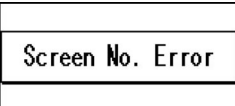
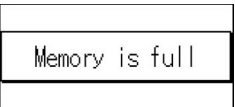
#### ■ Inspection Items

Inspect the PT for the following items to check whether it is operating within the specified criteria. If the PT is operating outside the standards, take measures such as tightening screws or improving the operating environment to conform to the standards.

Inspection Items	Inspection contents	Criteria	Means of inspection
Supply voltage	Power terminal voltage fluctuation	Allowable voltage range (24 VDC±10% or 5 VDC±10%)	Tester
Ambient environment	Ambient temperature inside control panel	0 to 50°C	Thermometer
	Ambient humidity inside control panel	35% to 85%	Hygrometer
	Presence of dust	No dust accumulated	Visual
	Presence of oil	No oil between front panel sheet and molding	Visual
Mounting conditions	Looseness of mounting bracket	Must be tightened to specified torque.	Phillips screwdriver
	Looseness of external wiring screws	There must be no looseness.	Phillips screwdriver and DIN screwdriver
	Status of external Connecting Cables	No breaks or other abnormalities	Visual, tester
Parts with limited service life	Battery	NV3Q-SW: Approx. 3 yr (at 25°C) NV4W or NV3Q-MR: Approx. 5 yr (at 25°C)	Replace every 5 years.

- Note**
- (1) Do not disassemble, repair, or modify the PT.
  - (2) When disposing of the PT or Batteries, obey all local ordinances as they apply.

### 8-3 Troubleshooting the NV3W

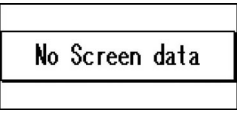
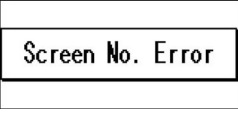
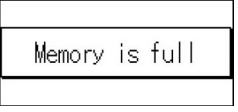
Error	Cause	Countermeasure
Nothing is displayed on the screen.	No power is being supplied.	Make sure that the power supply is within specifications.
	If there are only lamp and message parts on a base screen, the replacement address is not valid (i.e., it points to nonexistent data).	Check the replacement address in the custom part and the communications address at the PLC.
An error code ("ERxx") is displayed at the top right of the screen.	An error occurred during communications between the PT and the external device (e.g., PLC).	Refer to <i>8-5 Error Codes and Countermeasures</i> .
<p>"No Screen data" is displayed on the screen.</p> 	There is no base screen data in the PT. (This display appears even when there is NV Configuration data.)	Transfer the base screen data from the NV-Designer.
<p>"Screen No. Error" is displayed on the screen.</p> 	A screen that is not registered was specified from the PLC or for screen switching from a switch part or for automatic paging.	Either create a screen with the specified number or correct the screen number.
	The keyboard screen that is not registered was specified when calling a keyboard screen for data entry.	Either create a keyboard screen with the specified number or correct the screen number.
	The PT contains NV Configuration data and keyboard screen data, but it does not contain base screen data.	Transfer the base screen data from the NV-Designer.
<p>"Memory is Full" is displayed on the screen.</p> 	The size of the base screen data that was transferred exceeds the capacity of the PT.	Delete some of the base screen data or otherwise reduce the size of the data. The size of the data can be checked by selecting Resource Report from the Tool Menu on the NV-Designer. If the data size is not too large, there may be some invalid data left in the PT. Use the option to transfer data after deleting previous screens and try transferring the data gain.
The wrong screen was displayed or an error occurred when switching the screen.	A screen specification from the PLC or for screen switching from a switch part or for automatic paging was not correct.	Specify the correct screen number.
	A startup screen is specified in the NV Configuration made from the NV-Designer.	Check the startup screen setting in the NV Configuration from the NV-Designer. If the setting is not necessary, delete it and transfer the NV Configuration to the PT again.
	An incorrect address or value is specified for the first word of the Word Area in system memory.	Check the contents of the first word of the Word Area in system memory in the PLC. Set hexadecimal values in the system memory. Example: 00A = screen 10 (Do not use the system memory for any purpose other than communicating with the PT.)
The screen does not change.	The number of the screen to switch to is not written in the first word of the Word Area in system memory in the PLC.	Specify the correct screen number.
	The number of the screen to switch to is already written in the first word of the Word Area in system memory in the PLC.	Refer to <i>2-2-2 Switching Screens</i> and <i>6-2-3 System Memory</i> in the <i>NV-series PT Programming Manual</i> (Cat. No. V104).

Error	Cause	Countermeasure
The screen is too dark.	The voltage of the power supply may be low.	Check to see if the capacity of the power supply is sufficient for the power consumption of the PT.
	The contrast has been adjusted to a high setting.	Adjust the contrast from the System Menu.
	The backlight brightness has been adjusted to a dark setting.	Adjust the backlight brightness from the System Menu.
	The backlight is turning OFF because it has been set to turn OFF automatically in the NV Configuration from the NV-Designer.	The backlight will turn ON if you touch the screen. When you touch the screen to turn ON the backlight, the switch parts are disabled. Change the setting in the NV Configuration if necessary.
The backlight goes out immediately.	The backlight automatically turns OFF too quickly.	Change the setting in the NV Configuration.
The date and time displays are wrong.	The clock data in the PLC that is being accessed is wrong.	Correct the setting of the clock in the PLC.
The touch switches do not work.	A validation condition has been set for a switch part and the condition has not been met.	Check the status of PLC memory to see if the validation condition has been met.
There is no sound when I touch a touch switch.	The switch buzzer setting in the option settings in the switch part attributes has been set to disable the buzzer.	Enable the switch buzzer if necessary.
	The touch switch buzzer has been disabled in the settings in the NV Configuration from the NV-Designer.	Enable the touch switch buzzer if necessary.
The PT does not work for about 10 seconds after turning ON the power supply.	The same communications settings are not being used by the COM port on the PT and the PLC.	Check the communications settings on the PT and PLC and make sure they are the same.
The buzzer does not turn OFF.	Bit 15 in the first word of the Bit Area in system memory is ON.	Turn OFF bit 15 from the PLC. (Do not use the system memory for any purpose other than communicating with the PT.)
The color of the backlight changes or the backlight flashes.	Bits 10, 11, and 13 (Backlight Color) in the first word of the Bit Area in system memory are ON. OR bits 12 and 13 (Backlight Flashing) are ON.	Manipulate the bits correctly from the PLC. (Do not use the system memory for any purpose other than communicating with the PT.)
Data cannot be transferred from the NV-Designer.	The screen transfer cable is not connected.	Make sure that the screen transfer cable is correctly wired and securely connected.
	The computer is connected to the COM port on the PT.	Connect to the tool port with the screen transfer cable.
	The communications method for data transfer is set to USB.	Set the communications method for data transfer to RS-232C.
	The COM port to which the Serial-USB Conversion Cable is connected is different from the port set for transferring data.	Use the device manager in the control panel of the computer or other method and check the COM port being used by the Conversion Cable.



Error	Cause	Countermeasure
<ul style="list-style-type: none"> <li>• Nothing is displayed (and the above power supply and replacement setting problems do not exist).</li> <li>• The screen display is not correct (and the above message and date/time problems do not exist), excluding error codes.</li> <li>• Switches do not work (and the above grid and enable setting problems do not exist).</li> <li>• The buzzer does not turn OFF.</li> </ul>	<p>There is an error in the system.</p>	<ol style="list-style-type: none"> <li>1. Check the controlled system to be sure it is safe to do so, and then cycle the power supply. The CPU in the PT will be reset.</li> <li>2. If the problem is not fixed by performing the countermeasure given above, initialize the built-in Flash Memory from the System Menu and then transfer the data to the PT again from the NV-Designer.</li> </ol> <p><b>Note</b> When memory is initialized, all base screen data, PT setting data, and keyboard screen data will be lost. Be sure to backup this data in advance.</p> <ol style="list-style-type: none"> <li>3. If the problem is not fixed by performing the countermeasures given above, turn ON pins 2, 3, and 4 on the DIP switch on the back of the PT and cycle the power. After the PT has been reset, return the DIP switch to the previous settings and cycle the power again.</li> </ol> <p><b>Note</b> This operation will return the PT to the default settings and clear the memory in the PT. Be sure to back up any required data in advance.</p>
	<p>The power supply to the PT was turned OFF while updating the firmware.</p>	<p>If normal operation is not recovered after performing the above three countermeasures, contact your OMRON representative.</p>

## 8-4 Troubleshooting the NV3W-V1, NV4W or NV3Q

Error	Cause	Countermeasure
Nothing is displayed on the screen.	No power is being supplied.	Make sure that the power supply is within specifications.
	If there are only lamp and message parts on a base screen, the replacement address is not valid (i.e., it points to nonexistent data).	Check the replacement address in the custom part and the communications address at the PLC.
An error code ("ERxxxx") is displayed at the top right of the screen.	An error occurred during communications between the PT and the external device (e.g., PLC).	Refer to <i>8-5 Error Codes and Countermeasures</i> .
"No Screen data" is displayed on the screen. 	There is no base screen data in the PT. (This display appears even when there is PT Configuration data.)	Transfer the base screen data from the NV-Designer.
"Screen No. Error" is displayed on the screen. 	A screen that is not registered was specified from the PLC or for screen switching from a switch part or for automatic paging.	Either create a screen with the specified number or correct the screen number.
	The keyboard screen that is not registered was specified when calling a keyboard screen for data entry.	Either create a keyboard screen with the specified number or correct the screen number.
	The PT contains PT Configuration setting data and keyboard screen data, but it does not contain base screen data.	Transfer the base screen data from the NV-Designer.
"Memory is Full" is displayed on the screen. 	The size of the base screen data that was transferred exceeds the memory capacity of the PT.	Delete some of the base screen data or otherwise reduce the size of the data. The size of the data can be checked by selecting Resource Report from the Tool Menu on the NV-Designer. If the data size is not too large, there may be some invalid data left in the PT. Use the option to transfer data after deleting previous screens and try transferring the data gain.
The wrong screen was displayed or an error occurred when switching the screen.	A screen specification from the PLC or for screen switching from a switch part or for automatic paging was not correct.	Specify the correct screen number.
	A startup screen is specified in the PT Configuration made from the NV-Designer.	Check the startup screen setting in the PT Configuration from the NV-Designer. If the setting is not necessary, delete it and transfer the PT Configuration to the PT again.
	An incorrect address or value is specified for the first word of the Word Area in system memory.	Check the address of the first word of the Word Area in system memory in the PLC. Set hexadecimal values in the system memory. Example: 0010 = screen 16 (Do not use the system memory for any purpose other than communicating with the PT.)
The screen does not change.	The number of the screen to switch to is not written in the first word of the Word Area in system memory in the PLC.	Specify the correct screen number.
	The number of the screen to switch to is already written in the first word of the Word Area in system memory in the PLC.	Refer to <i>2-2-2 Switching Screens</i> and <i>6-2-3 System Memory</i> in the <i>NV-series PT Programming Manual</i> (Cat. No. V104).

Error	Cause	Countermeasure
The screen is too dark.	The voltage of the power supply may be low.	Check to see if the capacity of the power supply is sufficient for the power consumption of the PT.
	The contrast has been adjusted to a high setting.	Adjust the contrast from the System Menu.
	The backlight is turning OFF because it has been set to turn OFF automatically in the PT Configuration from the NV-Designer.	The backlight will turn ON if you touch the screen. When you touch the screen to turn ON the backlight, the switch parts are disabled. Change the setting in the PT Configuration if necessary.
The backlight goes out immediately.	The backlight automatically turns OFF too quickly.	Change the setting in the PT Configuration.
The date and time displays are wrong (when the PT clock is used).	The PT built-in clock is wrong.	Adjust the clock from the System Menu.
	There is no battery installed.	Purchase a Battery and connect it.
	The battery has exceeded its service life.	Replace the Battery.
The date and time displays are wrong (when the PT calendar timer is used).	The clock time in the PLC that is being accessed for the time is wrong.	Correct the setting of the clock in the PLC.
The contents of the PLC memory hold data are not saved.	There is no battery installed.	Purchase a Battery and connect it.
	The battery has exceeded its service life.	Replace the Battery.
The date and time displays are wrong.	The clock time in the PLC that is being accessed for the time is wrong.	Correct the setting of the clock in the PLC.
The touch switches do not work.	A validation condition has been set for a switch part and the condition has not been met.	Check the status of PLC address to see if the validation condition has been met.
There is no sound when I touch a touch switch.	The switch buzzer setting in the option settings in the switch part attributes has been set to disable the buzzer.	Enable the switch buzzer if necessary.
	The touch switch buzzer has been disabled in the settings in the PT Configuration from the NV-Designer.	Enable the touch switch buzzer if necessary.
The PT will not work for about 10 seconds after turning ON the power supply.	The same communications settings are not being used by the COM port on the PT and the PLC.	Check the communications settings on the PT and PLC and make sure they are the same.
The buzzer will not turn OFF.	Bit 15 in the first word of the Bit Area in system memory is ON.	Turn OFF bit 15 from the PLC. (Do not use the system memory for any purpose other than communicating with the PT.)
The color of the backlight changes or the backlight flashes.	Bits 10 to 13 (Backlight Control Bits) in the first word of the Bit Area in system memory are not set correctly.	Manipulate the bits correctly from the PLC. (Do not use the system memory for any purpose other than communicating with the PT.) Refer to the <i>NV-series PT Programming Manual</i> (Cat. No. V104) for information on controlling the backlight from the Bit Area of system memory.
Data cannot be transferred from the NV-Designer.	The USB cable is not connected.	Make sure that the screen transfer cable is correctly wired and securely connected.
	The computer is connected to the COM port on the PT.	Connect the USB cable correctly.
	The communications method for data transfer is set to RS-232C.	Set the communications method for data transfer to USB.

Error	Cause	Countermeasure
<ul style="list-style-type: none"> <li>• Nothing is displayed (and the above power supply and replacement setting problems do not exist).</li> <li>• The screen display is not correct (and the above message and date/time problems do not exist), excluding error codes.</li> <li>• Switches do not work (and the above grid and enable setting problems do not exist).</li> <li>• The buzzer does not turn OFF.</li> </ul>	There is an error in the system.	<ol style="list-style-type: none"> <li>1. Check the controlled system to be sure it is safe to do so, and then cycle the power supply. The CPU in the PT will be reset.</li> <li>2. If the problem is not fixed by performing the countermeasure given above, initialize the built-in Flash Memory from the System Menu and then transfer the data to the PT again from the NV-Designer.</li> </ol> <p><b>Note</b> When memory is initialized, all base screen data, PT setting data, and keyboard screen data will be lost. Be sure to backup this data in advance.</p> <ol style="list-style-type: none"> <li>3. If the problem is not fixed by performing the countermeasures given above, turn ON pins 2, 3, and 4 on the DIP switch on the back of the PT and cycle the power. After the PT has been reset, return the DIP switch to the previous settings and cycle the power again.</li> </ol> <p><b>Note</b> This operation will return the PT to the default settings and clear the memory in the PT. Be sure to back up any required data in advance.</p>
	The power supply to the PT was turned OFF while updating the firmware.	If normal operation is not recovered after performing the above three countermeasures, contact your OMRON representative.

**Operation Security (Passwords) (NV3W-V1, NV4W and NV3Q Only)**

Message	Cause	Countermeasure
“Incorrect password” was displayed on the Login Screen.	The password that was entered is not registered.	Enter the correct password.
“Incorrect password” was displayed on the Password Change Screen.	An incorrect password was entered for the current password.	Enter the correct password.
“Please verify your password again” was displayed on the Password Change Screen.	The new password and retyped password are not the same.	Enter the same password for the new password and the retyped password.
“Use another password” was displayed on the Password Change Screen.	An attempt was made to register a password that was already registered.	Enter the new password that is not registered.
“Password setting incomplete” was displayed in the Password Change Screen.	An item has not been set.	Enter all of the items.
“Your password cannot be deleted” was displayed on the Password Change Screen.	You tried to delete your own password.	Your password cannot be deleted. Passwords can be deleted using the Password command from the NV-Designer.
“Your level cannot be changed” was displayed on the Password Change Screen.	You tried to change your own level.	Your security level cannot be changed. Passwords can be changed using the Password menu command from the NV-Designer.



Refer to the NV-series PT Programming Manual (Cat. No. V104).

## 8-5 Error Codes and Countermeasures

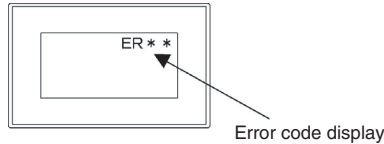
### Error Codes

The error code is displayed in the upper right corner of the PT screen when an error occurs. Two types of error codes are provided: Error codes that show the causes of errors in the NV-series PT, and error codes in communications responses from the PLC.

Both types of error codes may be provided, so always check both of them.

NV3W error codes are displayed as "ER" followed by the two-digit code.

NV3W-V1, NV4W and NV3Q error codes are displayed as "ER" followed by the four-digit error code. (The first two digits are the sub-response code and the last two digits are the main response code.)



### PT Error Codes

The following error codes may be displayed at the PT.

#### NV3W

Code number	Description	Countermeasure
ERFE	PT error: An error was detected in the PT.	If the error is still displayed even after cycling power to the PT or initializing SRAM/FROM, contact your OMRON representative.
ERFF	Timeout error: The PLC did not return a response.	<ol style="list-style-type: none"> <li>1. The PLC Connecting Cable is disconnected. Check the Connecting Cable to see if it is wired and connected correctly.</li> <li>2. Temporary error caused by noise or other factor. Cycle the power to the PLC and PT.</li> <li>3. This error will be displayed once at start-up. If operation after that is normal, the PT may have automatically adjusted its baud rate because it was different from the baud rate of the host.</li> </ol>
ER21	Data error: An error occurred in the data during communications.	<ol style="list-style-type: none"> <li>1. There is an incorrect setting for the communications conditions. Check the baud rate and transfer format for the PLC and the PT.</li> <li>2. A temporary error occurred due to a factor such as noise. Cycle the power supply for the PLC and the PT.</li> </ol>
ER22	Overrun error: The PT cannot receive data.	Overflow has occurred in the PT reception buffer. A PLC error has occurred.

## NV3W-V1, NV4W or NV3Q

Code number	Description	Countermeasure
**00FF	Timeout error	<ol style="list-style-type: none"> <li>1. The PLC Connecting Cable is disconnected. Check the Connecting Cable to see if it is wired and connected correctly.</li> <li>2. Temporary error caused by noise or other factor. Cycle the power to the PLC and PT.</li> <li>3. This error will be displayed once at startup. If operation after that is normal, the PT may have automatically adjusted its baud rate because it was different from the baud rate of the host.</li> </ol>
ER0100	Error in number of digits in keyboard screen data part	Check whether the number of digits for the data part on the Keyboard Screen is set correctly.
ER0101	Alarm history error	When updating the alarm history display is stopped, the alarm history data displayed on the PT screen is updated in memory. When updating the display is enabled, new data will be displayed.
ER0500	Software setting error	An address that cannot be used for the data is set. Check the addresses that are used to see if there is an error. (For example, a word address is set in a bit area.)
ER1000	No SD memory card	The SD memory card is not correctly inserted in the SD memory card slot. Check the SD memory card slot.
ER1001	SD memory card write error	I cannot write to an SD memory card. Check whether the SD memory card is write-protected.
ER1002	SD memory card memory is full.	It is not possible to write to the SD memory card because the memory is full. Delete the data on the SD memory card, or prepare a new SD memory card.
ER1003	SD memory card read error	Data in the SD memory card cannot be read. Check at the personal computer to see whether the data saved on the SD memory card has been corrupted.
ER1005	SD memory card saved file name error	The name of a file saved from the PT to the SD memory card is incorrect. Correct the file name.
ER1006	SD memory card recognition error	The SD memory card cannot be recognized. Check the SD memory card that are used.
ER1103	PLC address setting error	A memory address that does not exist in the PLC was specified in the settings to transfer external clock data. Set the correct memory address.
ERF0000	User memory error	The memory in which screen data is saved may be damaged. Contact an OMRON representative.

**OMRON PLC Error Codes**

This section describes the error codes that are included in responses to communications commands. The sub-response code from the FINS command end code in communications responses from PLCs is displayed.

For details, refer to information on FINS commands in the *CS/CJ/CP Series Communications Commands Reference Manual* (Cat. No. W342).

**OMRON SYSMAC CS/CJ/CP-series PLCs**

NV3W error codes are displayed as "ER" followed by the two-digit code.

NV3W-V1, NV4W and NV3Q error codes are displayed as "ER" followed by the four-digit error code. (The first two digits are the sub-response code and the last two digits are the main response code.)

Code number		Description	Countermeasure
NV3W	PTs except NV3W		
ER00	ER0000	Timeout error: No response was received from the PLC.	The PLC model is incorrect, the cable is disconnected, the communications parameters do not match, the power is not turned ON to the PLC, there is too much noise, etc. Check for these problems and then cycle the power to the PT.
ER01	ER0001	PLC's data link service was canceled.	Check the PLC to see if the data link service is operating properly.
	ER0301	Communications controller error	An error occurred in the communications controller in the PLC.
	ER0401	Undefined command	An undefined command was received by the PLC (possibly caused by noise).
	ER1001	Command too long	The command received by the PLC is longer than the maximum permissible length (possibly caused by noise).
	ER1101	No such area	The specified word does not exist in the memory areas of the PLC. Set the correct memory address area. Or, noise may have caused the data to be corrupted, resulting in an illegal memory area specification.
	ER4001	Service aborted	Service was aborted with ABORT command. Check for problems in the communications path and peripheral system communications. If there is nothing abnormal, cycle the power supply.
ER02	ER0202	Unit missing	The unit address setting is incorrect or the data was corrupted by noise.
	ER0302	CPU Unit error	Check the CPU Unit and cycle the power supply.
	ER0402	Not supported by model/version	The PLC could not detect correct model data (possibly caused by noise).
	ER1002	Command too short	The command received by the PLC is shorter than the minimum permissible length (possibly caused by noise).
	ER1102	Access size error	The PLC detected an access size error (possibly caused by noise).
	ER2502	Memory error	There is an error in PLC memory. Check the PLC.

Code number		Description	Countermeasure
NV3W	PTs except NV3W		
ER03	ER0103	Retries failed	The PLC could not send the data within the specified number of retries (possibly caused by noise).
	ER0303	Controller error	Check the status of the Communications Unit.
	ER1003	Elements/data don't match	The number of elements or data does not match (possibly caused by noise).
	ER1103	Address range error	An address specified in the screen data is beyond the range supported by the PLC. Check the manuals for your PLC and specify an address within the supported range.
	ER2503	I/O setting error	Correct the I/O tables in the PLC.
ER04	ER0304	Unit number error	Check the unit number setting.
	ER1004	Command format error	The data does not match the expected command format (possibly caused by noise).
	ER1104	Address range exceeded	The end address (specified address plus number of accessed words) in the screen data is beyond the accessible range in the PLC. Check address allocations in the screen data.
	ER2504	Too many I/O points	There are too many I/O points registered in the PLC. Correct the settings in the PLC.
ER05	ER0205	Response time-out	The response waiting time at the PLC expired (possibly caused by noise).
	ER1005	Header error	There is an error in the communications header information at the PLC (possibly caused by noise).
	ER2505	CPU bus error	Check the connection between the CPU Unit and CPU Bus Unit in the PLC and then cycle the power supply.
ER06	ER2506	I/O duplication	Correct the I/O Unit settings in the PLC.
ER07	ER2507	I/O bus error	Check the status of the I/O Units in the PLC.
ER09	ER2609	Necessary items not set	There is an error in the communications data at the PLC (possibly caused by noise).
ER0A	ER250A	CPU Bus Unit error	Check the status of the CPU Bus Units in the PLC.
ER0B	ER110B	Response too long	The response at the PLC is longer than the maximum permissible length (possibly caused by noise).
ER0C	ER110C	Parameter error	There is an error in the communications data at the PLC (possibly caused by noise).
ER0F	ER250F	Memory error	There is an error in PLC memory. Check the PLC.



Code number		Description	Countermeasure
NV3W	PTs except NV3W		
ER10	ER0010	Data error	An error occurred in the data during communications. Check the communications parameter settings for errors.
ER12	ER0012	Overrun error	The PT cannot receive the data. The PT detected an error (overrun) in the communications data. If this error recurs frequently, check for noise or for errors in the PLC or PT.
ER4*	ER004*	Header error ("*" will be replaced by a number between 0 and F.)	<ol style="list-style-type: none"> <li>1. A command with a header that is not recognized was received at the host in C/CV Mode. The connected PLC may be a SYSMAC C/CV-series PLC.</li> <li>2. The corresponding address type does not exist in the PLC, e.g., the LR Area was specified when connected to a CP1E PLC. Specify the correct address type.</li> </ol>
Other error codes		Wrong PLC model	A PLC from a manufacturer other than OMRON may have been connected. This may cause error codes for irregular contents that depend on the communications contents of the specific PLC manufacturer to be displayed. Check to see if the communications driver in the PT is the correct one for the connected PLC.

**OMRON SYSMAC C/CV-series PLCs**

NV3W error codes are displayed as "ER" followed by the two-digit code.

NV3W-V1, NV4W and NV3Q error codes are displayed as "ER00" followed by the two-digit error code.

The notation for the NV3W is used in the following table. When using other model "00" will be displayed after "ER."

Code number	Description	Countermeasure
ER00	Timeout error	No response was received from the PLC. The cable is disconnected, the communications parameters do not match, the power is not turned ON to the PLC, there is too much noise, etc. Check for these problems and then cycle the power to the PT.
ER01 <sup>*1</sup>	RUN mode, execution not possible (The PLC received a command that cannot be executed because the CPU Unit is in RUN mode.)	Change the CPU Unit to MONITOR mode.
ER10	Data error	An error occurred in the data during communications. Check the communications parameter settings for errors.
ER12	Overrun error	The PT cannot receive the data. The PT detected an error (overrun) in the communications data. If this error recurs frequently, check for noise or for errors in the PLC or PT.

<b>Code number</b>	<b>Description</b>	<b>Countermeasure</b>
ER13	FCS error	The FCS value does not match the checksum in the command (possibly caused by noise). If this error recurs frequently, check for noise on the communications path.
ER14	Format error	The data does not match the expected command format (possibly caused by noise). If this error recurs frequently, check for noise on the communications path.
ER15	Numeric data error	Specifications for read/write areas are incorrect. Make sure that the communications addresses set for system memory and parts are in read/write areas.
ER18	Maximum frame length error	The data exceeded the frame length (possibly caused by noise). If this error recurs frequently, check for noise on the communications path.
ER21	CPU error in CPU Unit, execution not possible (Occurs only when communicating with Serial Communications Board/Unit.)	Cycle the power supply to the CPU Unit.
ERA3	Aborted, FCS error in send data during processing	The FCS value does not match the checksum in the command in a frame other than the first frame (possibly caused by noise). If this error recurs frequently, check for noise on the communications path.
ERA4	Aborted, format error in send data during processing	The data does not match the expected frame format (possibly caused by noise). If this error recurs frequently, check for noise on the communications path.
ERA5	Aborted, numeric data error in send data during processing	The range of PLC address assigned in the screen project are incorrect. Check the manuals for your PLC and specify an address within the supported range.
ERA8	Aborted, maximum frame length error in send data during processing	The data exceeded the frame length in a frame other than the first frame (possibly caused by noise). If this error recurs frequently, check for noise on the communications path.
Other error codes	The model of the PLC is wrong.	A PLC from a manufacturer other than OMRON may have been connected. This may cause error codes for irregular contents that depend on the communications contents of the specific PLC manufacturer to be displayed. Check to see if the communications driver in the PT is the correct one for the connected PLC.

\*1 When connected to a C-series or CVM1/CV-series PLC, keep the operating mode of the CPU Unit set to MONITOR mode. If a C-series or CVM1/CV-series CPU Unit is in RUN mode, and error code of "ER01" will be displayed when attempting to write from the PT to the PLC and writing will not be possible.

**Error Codes for Modbus Connections**

**NV3W**

Code number	Description	Countermeasure
ERFF	Timeout error No response was received from the PLC.	1. The PLC Connecting Cable is disconnected. Check the wiring or the Connecting Cable and see if it is disconnected. 2. The error may be temporary, e.g., caused by noise. Cycle the power supply to the PT and CPU Unit.
ERFE	Response error No response was received from the remote device.	Check the data returned by the remote device.

**NV3W-V1, NV4W or NV3Q**

Code number	Description	Countermeasure
ER0001	Timeout error No response was received from the PLC.	1. The PLC Connecting Cable is disconnected. Check the wiring or the Connecting Cable and see if it is disconnected. 2. The error may be temporary, e.g., caused by noise. Cycle the power supply to the PT and CPU Unit.
ERFFFE	Response error No response was received from the remote device.	Check the data returned by the remote device.

**Modbus Connections to OMRON EJ1 Temperature Controller**

NV3W error codes are displayed as "ER" followed by the two-digit code.

NV3W-V1, NV4W and NV3Q error codes are displayed as "ER00" followed by the two-digit error code.

The notation for the NV3W is used in the following table. When using other model "00" will be displayed after "ER."

Code number	Description	Countermeasure
ER01	Function code error	The function code is not supported.
ER02	Variable address error	1. There is an error in the write start address. 2. There is an error in the read start address.
ER03	Variable data error	1. The command is too short. 2. The command is too long. 3. The number of elements exceeds the maximum value. 4. The number of elements and data do not match. 5. The number of elements times two does not match the byte count. 6. The write data is outside the setting range. 7. An attempt was made to write to a read-only variable.
ER04	Operation error	1. The operation command could not be received and was not executed. 2. The operation was not executed because data was being backed up. 3. The operation was not executed because a reset was being processed (including when starting). 4. The operation was not executed because the Controller was in Tuning Mode.



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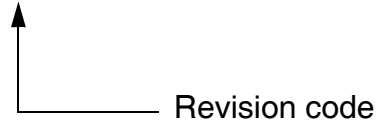
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## Revision History

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

Cat. No. V103-E1-10



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

Revision code	Date	Revised content
01	June 2009	Original production
02	December 2009	Made revisions accompanying version upgrade and the addition of the NV4W.
03	October 2010	Changed information on supported operating systems.
04	October 2011	Made changes related to a change in the NV3Q-SW LCD.
05	September 2013	Changed information on supported operating systems.
06	May 2015	Made revisions accompanying version upgrade and the addition of the NV3W-V1.
07	May 2016	Changed model numbers of CX-One. Made changes related to a change in the NV3Q-MR LCD.
08	December 2016	Changed for corrections.
09	February 2017	Made changes related to a change in the NV4W LCD.
10	November 2022	Revisions for adding safety precautions regarding security.

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*Revision History*

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