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Cat. No. V096-E1-03

NP-series
NP3-MQ000□
NP3-MQ001□
NP5-MQ000□
NP5-MQ001□
NP5-SQ000□
NP5-SQ001□
NP-NPDC0-V1

Programmable Terminal NP-Designer

USER'S MANUAL

OMRON

NP-series
NP3-MQ000□
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NP5-MQ001□
NP5-SQ000□
NP5-SQ001□
NP-NPDC0-V1

Programmable Terminal NP-Designer

User's Manual

Revised April 2009

Introduction

Thank you for purchasing an NP-series Programmable Terminal.

NP-series PTs are designed to transfer data and information in FA production sites.

Please be sure that you understand the functions and performance of the PT before attempting to use it.

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

This manual provides information for connecting and setting up an NP-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.

Read and Understand this Manual

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

Warranty and Limitations of Liability

WARRANTY

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

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

LIMITATIONS OF LIABILITY

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

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

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

Application Considerations

SUITABILITY FOR USE

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

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

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

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

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

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

PROGRAMMABLE PRODUCTS

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

Disclaimers

CHANGE IN SPECIFICATIONS

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

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

DIMENSIONS AND WEIGHTS

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

PERFORMANCE DATA

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

ERRORS AND OMISSIONS

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

Safety Precautions

Notation Used for Safety Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the product.

The safety precautions that are provided are extremely important to safety.

Always read and heed the information provided in all safety precautions.

The following notation is used.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

Precautions for Safe Use Supplementary comments on what to do or avoid doing, to use the product safely.

Precautions for Correct Use Supplementary comments on what to do or avoid doing, to prevent failure to operate, or undesirable effect on product performance.

Symbols

	**Prohibition** Indicates a general prohibition
	**Caution** Indicates general cautionary, warning, or danger level information

⚠ WARNING	
After the NP-series PT has been installed, qualified personnel must confirm the installation, and must conduct test operations and maintenance. The qualified personnel must be qualified and authorized to secure safety at each phases of design, installation, running, maintenance, and disposal of system.	
A qualified person in charge, who is familiar with the machine, must conduct and verify the installation of the NP-series PT.	
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.	
Do not press two or more touch switches at the same time. If doing so, other switch allocated between these switches may be operated.	
Do not dismantle, repair, or modify the product. Doing so may lead to loss of safety functions.	

Precautions for Safe Use

- When unpacking the Units and peripheral devices, check carefully for any external scratches or other damage. Also, shake the products gently and check for any abnormal sound.
- Always install the Unit in the control panel.
- The mounting panel must be between 1.6 and 2.5 mm thick. Tighten the Mounting Brackets evenly to a torque of 0.7 N·m 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.
- Do not let metal particles enter the Units when preparing the panel.
- Do not connect an AC power supply to the DC power terminals.
- Use reinforced insulation or double insulation for the DC power supply with minimal fluctuation voltage to the Unit. Ensure that a stable power output can be provided even if a 10-ms interruption occurs at the input. Tighten the terminal block screws to a torque of 0.51 N·m.
  Rated power supply voltage: 24 VDC (Allowable range: 21.6 to 27.6 VDC)
  Capacity: 12 W minimum
- Do not perform a dielectric voltage test.
- Ground the Unit correctly to prevent malfunctions caused by noise.
- Do not touch the surface of the circuit board or the components mounted on it with your bare hands. Discharge any static electricity from your body before handling the board.
- Confirm that the current capacity of the connected device is 250 mA or less before using 5VDC power supply from the pin 6 of the serial port COM1 connectors. The 5VDC output of the Unit is 250 mA maximum at 5 V ±5%.
- Turn OFF the power supply before connecting or disconnecting cables.
- The tightening torque of the serial port COM1 is 0.6 N·m.
  The tightening torque of the serial port COM2 is 0.2 N·m.
- The maximum tensile load for cables is 30 N. Do not apply loads greater than this.
- Confirm the safety of the system before turning ON or OFF the power supply.
- 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.
- Start actual system application only after sufficiently checking screen data, macros, and the operation of the program in the host.
- To ensure the safety of the system, incorporate a program that can check that the Unit is properly operating.
- Before initializing screen data, confirm that existing data is backed up at a computer.
- To use numeric input functions safely, always make maximum and minimum limit settings.
- An image will be burnt onto the screen if the same pattern is continuously displayed for a long period of time (24 hours or longer as a guideline). To prevent screen burn, use a screen saver or switch displays periodically.
- Commercially available and recommended USB Hubs do not have the same specifications as the NP-series PT. Normal operation may not be possible in environments subject to noise or static electricity. When using USB Hubs, be sure to provide sufficient measures to prevent noise and static electricity, or install in a location that is not subject to noise or static electricity.
- Do not connect the USB connector to any device that is not applicable.
- Before connecting the USB connector to a device, make sure that the device is free of damage.
- Do not press the touch switch with a force greater than 30 N.
- Confirm the safety of the system before pressing touch switches.
- 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.

- Do not accidentally press touch switches when the backlight is not lit or when the display does not appear.
- Do not operate the touch switches with tools including screwdriver.
- Touch panel resistance may change over time, causing the touch points to shift. Periodically perform the calibration.
- Do not use benzene, paint thinner, or other volatile solvents, and do not use chemically treated cloths.
- When mounting the Battery, be sure to use the correct Battery and mount it correctly.
- Do not attempt to disassemble or short-circuit the battery.
- Dispose of any battery that has been dropped on the floor or subjected to excessive shock.
- When replacing the battery, always backup data before turning off the power to the Unit. If the battery is removed, the data stored in the Unit will be deleted.
- Dispose of the Units and batteries according to local ordinances as they apply.

廢電池請回收

- The backlight in the Unit contains mercury. Do not dispose of the Unit together with waste to be processed at disposal plants. Dispose of the Unit according to all local laws, regulations, and ordinances.
- The backlights of the Units cannot be replaced by the user. Contact your nearest OMRON representative.
- The Unit may not be usable in locations subject to long-term exposure to oil or water. The gasket will deteriorate after long-time use. Inspect the gasket on a regular basis. If deterioration is found, contact your OMRON representative.

Precautions for Correct Use

- Do not install the Unit in the following places:
  - Locations subject to severe changes in temperature
  - Locations subject to temperatures or humidity outside the range specified in the specifications
  - Locations subject to high humidity that may result in condensation.
  - Locations subject to exposure to chemicals.
  - Locations subject to exposure to oil.
  - Locations subject to corrosive or flammable gases
  - Locations subject to excessive shock or vibration.
  - Locations directly subject to wind or rain.
  - Locations subject to strong ultraviolet light.
- Take appropriate and sufficient countermeasures when installing systems in the following locations:
  - Locations subject to static electricity or other forms of noise from other devices
  - Locations subject to strong electromagnetic fields
  - Locations close to power supplies
  - Locations subject to possible exposure to radiation.

Conforming Directive

The NP-series PTs conform to the EMC Directive.

EMC Directive Conformance

OMRON products are designed as electrical devices for use built into other devices or the overall machine. As individual devices, they comply with the related EMC standards (see note) so that they can more easily be built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards. Whether they conform to the standards in the system used by the customer, however, must be checked by the customer.

EMC-related performance of the OMRON devices will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

Note Applicable EMC (Electromagnetic Compatibility) standards are as follows:

EMS (Electromagnetic Susceptibility): EN 61131-2

EMI (Electromagnetic Interference): EN 61131-2 (Radiated emission: 10-m regulations)

Complying with EC Directives

NP-series PTs comply with EC Directives. Observe the following precautions to ensure that the customer's device and the overall machine also comply with EC Directives.

1. The PT is designed for installation inside a control panel. The PT must be installed within a control panel.
2. Use reinforced insulation or double insulation for the DC power supply to the PT. Ensure that a stable power output can be provided even if a 10-ms interruption occurs at the input.
3. The PT conforms to the EN 61131-2, but the 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.
4. The NP-series PTs are Class A products. It may cause radio interference in residential areas, in which case the user may be required to take adequate measures to reduce interference.

Notation and Terminology

The following notation and terminology are used in this manual.

Notation

Reference	Indicates additional information on operation, descriptions or settings.
CS1G-CPU□□-VI	□ used in this manual indicates one character. For example, “CS1G-CPU□□-VI” indicates CS1G-CPU42-VI, CS1G-CPU43-VI, CS1G-CPU44-VI and CS1G-CPU45-VI.

Terminology

PT	In this manual, indicates an NP-series Programmable Terminal.
NP Series	Indicates products in the OMRON NP□□ Series of Programmable Terminals, unless otherwise specified.
PLC	Indicates a Programmable Controller in the OMRON SYSMAC CP, CS/CJ, C, or CVM1/CV Series of Programmable Controllers.
CP Series	Indicates products in the OMRON SYSMAC CP Series of Programmable Controllers: CP1L and CP1H.
CS/CJ Series	Indicates Programmable Controllers in the OMRON SYSMAC CS/CJ Series of Programmable Controllers: CS1G, CS1H, CS1G-H, CS1H-H, CJ1G, CJ1M.
C Series	Indicates products in the OMRON SYSMAC C Series of Programmable Controllers: C200HX(-Z), C200HG(-Z), C200HE(-Z), CQM1, CQM1H, CPM1A, CPM2A, CPM2C.
CVM1/CV Series	Indicates products in the OMRON SYSMAC CVM1/ CV Series of Programmable Controllers: CV500, CV1000, CV2000, CVM1
Serial Communications Unit	Indicates a Serial Communications Unit for an OMRON CS/CJ-series PLC.
Serial Communications Board	Indicates a Serial Communications Board for an OMRON CS/CJ-series or CQM1H PLC.
Communications Board	Indicates a Communications Board for an OMRON C200HX/HG/HE(-Z) PLC.
CPU Unit	Indicates a CPU Unit in the OMRON SYSMAC CP, CS/CJ, C, or CVM1/ CV Series of Programmable Controllers.
NP-Designer	Indicates the OMRON CP-Designer (NP-NPDC0-V□).
Host	Indicates a device such as PLC functioning as the control device and interfaced with the NP-series PT.

About this Manual:

Section 1 Overview
This section provides an overview of the NP-series PTs, including functions, features, connection types, and communications methods.

Section 2 Part Name and Functions
This section describes the part names and functions of the PT.

Section 3 Installing the PT and Connecting Peripheral Devices
This section describes the methods used to install the PT and connect peripheral devices.

Section 4 System Menu
This section describes the methods used to set and check various settings in the system menu of the PT.

Section 5 Installing and Starting the NP-Designer
The software “NP-Designer” is required to create screen data for the PT. This section describes the methods for installing and starting the NP-Designer.

Section 6 NP-Designer Functions
This section describes functions of the NP-Designer.

Section 7 Maintenance and Troubleshooting
This section describes the maintenance and inspection methods for preventing errors occurring, and troubleshooting measures when errors occur in the PT.

Appendices
This section describes hardware specifications and methods for preparing connections cables, and provides lists of standard products.

Related Manuals

The following table lists the device and software manuals used for reference.

Device/Software	Manual name	Catalog No.
NP Series	User's Manual (This manual)	V096
	Host Connection Manual	V102
PLC	SYSMAC CP Series CP1L CPU Unit Operation Manual	W462
	SYSMAC CP Series CP1L CPU Unit Programming Manual	W451
	SYSMAC C200HX/HG/HE(-Z) Installation Guide	W302
	SYSMAC C200HX/HG/HE Operation Manual	W303
	SYSMAC C200HX/HG/HE(-ZE) Operation Manual	W322
	SYSMAC CQM1 Operation Manual	W226
	SYSMAC CQM1H Operation Manual	W363
	SYSMAC CV Series CV500/CV1000/CV2000/CVM1 Programming Manual: Ladder Diagrams	W202
	SYSMAC CPM1A Operation Manual	W317
	SYSMAC CPM2A Operation Manual	W352
	SYSMAC CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programming Manual	W353
	SYSMAC CPM2C Operation Manual	W356
	SYSMAC CS Series CS1G/H-CPU□□ Operation Manual	W339
	SYSMAC CS/CJ Series Serial Communications Boards and Serial Communications Units Operation Manual	W336
	SYSMAC CJ Series Operation Manual	W393
	SYSMAC CS/CJ Series Programming Manual	W394
	SYSMAC CS/CJ Series Instruction Reference Manual	W340
	SYSMAC CS/CJ Series Programming Console Operation Manual	W341
	SYSMAC CS/CJ Series Communications Command Reference Manual	W342
Programming Devices/ Software	SYSMAC Support Software Operation Manual: C-series PLCs	W248
	SYSMAC Support Software Operation Manual: CVM1 PLCs	W249
	SYSMAC CPT Operation Manual	W333
	CX-Programmer User Manual	W437
	EJ1 Modular Temperature Controller User's Manual	H142

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SECTION 1
Overview

This section provides an overview of the NP-series PTs, including functions, features, connection types, and communications methods.

1-1 NP-series PT Functions and Operations

The NP Series offers advanced operator interfaces called Programmable Terminals that can be used to display required information and provide operating capabilities for FA manufacturing sites. This section describes the role and functions of the NP-series PTs for first-time users of Programmable Terminals.

1-1-1 PT Functions for FA Manufacturing Sites

Line Operating Status Monitor Display

NP-series PTs can be used to display information such as the operating status of the system and the devices. Graphs and other indicators can be used to better represent the information and make it easy to understand.

Directions for FA Site Operators

The PTs can be used to inform the operators of system and device errors and assist them in taking appropriate measures.

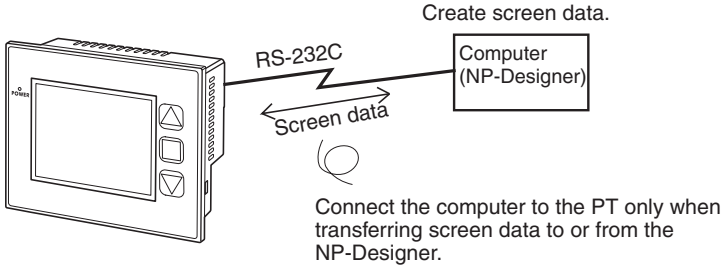
Control Panel Switches

The NP-series PTs allow the user to create various on-screen switches. By using touch switch inputs, operating results can be sent to the host.

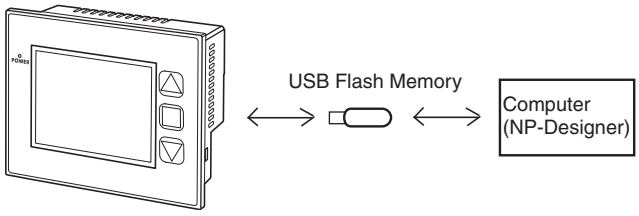
1-1-2 NP-series PT Operating System

Transferring Screen Data

The screen data displayed on NP-series PTs is created using the NP-Designer on a computer and transferred to the PT through RS-232C or USB communications.

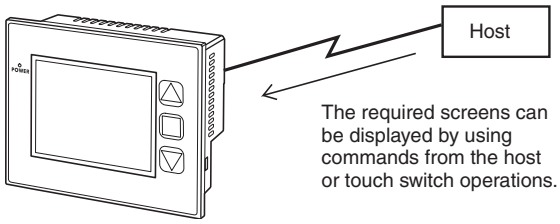


Screen data can also be transferred at high speed using a USB flash memory.



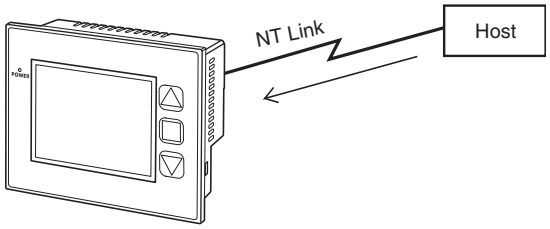
Displaying Screens

The information displayed on the screens is created using the NP-Designer on a computer and transferred to the PT. The required screens can be displayed by using commands from the host or touch switch operations.



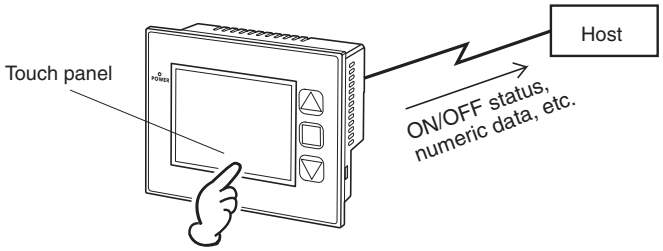
Reading Data from the Host

A communications method such as NT Link is used to connect the host, and the required data is automatically read from the host.



Sending Data to the Host

Data input using touch switches (button ON/OFF status, numerals, and character strings) is sent to the host.

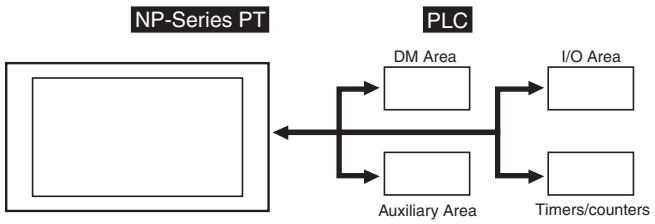


1-2 Communications with the Host

NP-series PTs allow the user to allocate words and bits in any PLC area for use in accessing the required display contents and storing input data.

Operations that can be performed include reading and writing allocated word contents and bit status directly, changing the display status of objects on the PT screen, and controlling and providing notification of the PT status.

The NP-series PTs also enable communications with more than one PLC. A host name is registered for each PLC connected, allowing access to any PLC areas by specifying the host name and address.



When using NP-series PTs, the host can be connected using any of the following methods.

- 1:1 NT Link
- 1:N NT Link (normal or high-speed)
- Host Link

1-2-1 What is an NT Link?

An NT Link is a method for high-speed communications between an OMRON PLC and an OMRON Programmable Terminal (PT) using a special protocol.

One NP-series PT can be connected to each host. More than one NP-series PT cannot be connected to the same host. Also, if an NP-series PT is connected, then a PT that supports 1:N NT Links and PLC slaves that support Serial PLC Links cannot be connected.

NP-series PTs can be connected to a host using either the 1:1 NT Link protocol or the 1:N NT Link protocol.

CS/CJ-series and CP-series PLCs can also be connected using high-speed 1:N NT Link communications. For details on the PLCs that support high-speed 1:N NT Link communications, refer to *Appendix E Standard Models*.

In the rest of this manual, “NT Link” refers to NT Link communications in general, “1:1 NT Link” refers to an NT Link in a 1:1 configuration only, and “1:N NT Links” refers to NT Links in a 1:N configuration only. Where necessary, “normal 1:N NT Links” and “high-speed 1:N NT Links” are used. When “1:N NT Links” is used alone, it refers to both normal and high-speed communications.

1-2-2 Host Link

Host Link is a serial communications protocol for connecting an OMRON PT 1:1 to an OMRON host (a PLC) to read and write bits and words from the host. Host Link communications connect a PT to many different PLCs.

1-2-3 Connecting to a Temperature Controller

OMRON EJ1 Modular Temperature Controllers can be connected with an RS-485 connection.

Use serial port COM2.