Installing a Navigator: A Totally New Concept in Programmable Terminals
Make it More Simple
The NS is moving to the next stage, from a touch screen to an advanced machine management tool.

NS Enters a New Zone
From PLC Memory Allocation to Device Access

Previous PTs shared data that was allocated in advance to specific words in the CPU Unit, and they were used to assist with device operations, and to display error locations, and countermeasures.
We are always trying to provide solutions that will give the highest added value to your system. We strive to solve on-site problems with our solutions instead of just providing touch screen functions. That is what OMRON is focused on.

Turning switches into Touch Screens brings enhancements, such as minimum wiring, space savings, and improved local operation efficiency. Moreover, OMRON works to minimize the customer’s energy expenditure from machine design to troubleshooting.

The NS Series achieves flexible data access to a variety of devices. It enables operators to reach the devices on the network including Special I/O Units, intelligent devices, and PLCs.
With version 1 PTs (V1 suffix in model number), hardware functions are upgraded.

**Device operations**

- Displaying device error locations
- Displaying countermeasures
- Internal device monitoring and resetting (Supporting recovery methods)

### Previous

**PT**

**Personal computer tool**

### NS Series

**NS: Device Navigator**

For years, NS has exchanged preset data with the CPU Unit in a PLC. Was it enough to control complex machine operations? This Series makes a step forward to be a partially software embedded terminal to deliver the needed information. So that's why we call it "Navigator"!

#### High definition

Image data: 32,768 colors

(Previously 256 colors)

#### Image data: Large capacity

Standard 20 MB (See note.)

(Previously 4 MB)

#### Color screen printing to USB-compatible printers

#### Twice as fast as former models

Note: NS5-V1: 4,096 colors

Note: NS8-V1/NS5-V1: 6 MB
Don't you have these problems?

Using all of the device-specific personal computer tools at startup is okay, but using the personal computer tools for error recovery during operation is overly difficult.

Wouldn't it be simpler to use the PT instead?

OMRON ORIGINAL

With the NS, just drag and drop the Smart Active Parts (Device Library) to customize the interface for your machine.

Only with NS!
The NS Series utilizes Smart Active Parts (Device Library) that make it possible to directly access various devices.

Colors and sizes can be changed.

NS Series

Example: RS-232C

Example: Ethernet

Devices accessed without a program.

Example: DeviceNet

Smart Active Parts (Device Library)

PLC System Objects

Previously a CX-Programmer was required.

Position Control Objects

Previously CX-Position was required.

DeviceNet Objects

Previously a DeviceNet Configurator was required.

Controller Link Objects

Previously CX-Net was required.

Note: Contact your OMRON representative for more information on Smart Active Parts including sales and customization services.
When the System is Started

PT used for operation after startup.

Data exchange is the main function.

When an Error Occurs during Operation

An error occurs, and...

There is no way for the PT to recover following an error.
(Creating a screen is quite troublesome.)

- Use a dedicated computer, and you have to wade through functionality that is not being used or that does not need to be reset.
- Recovery can only be performed by a specialist (i.e., an engineer).

With Smart Active Parts...

The PT can be customized according to the specifications of the device manufacturer to optimize operation as a tool. This enables equipment maintenance by personnel other than engineers.

- Minor maintenance can be performed on the PT during operation.
- Smart Active Parts accessed without a program
- Simply attaching a Smart Active Parts, and then making simple settings
- Setting specified parameters and checking status
- Improved efficiency in creating maintenance screen
- Customizing and optimizing PT
- No ladder program

Create a screen like this as a device troubleshooter.

When an error occurs, rapid recovery is critical. With the NS Series, the following type of screen can be easily prepared to guide on-site workers to carry out the operations required for recovery.

- Display explanations of error contents and methods for recovery. (Text file direct specification)
- Use diagrams to show error locations and methods for recovery. (Bit map file direct specification)
- Display only the buttons required for recovery operations.

Error Recovery Screen Example

Text and BMP files can be directly specified, so operations such as correcting contents for recovery and replacing diagrams and photographs can be executed without requiring any special tools. For example, if the recovery operation procedure is changed by system improvements, screens can be changed by simply replacing text and BMP files, allowing for rapid implementation of improvements and countermeasures.

Note: Transfer tools must be used for transfers.

Note: In addition to the Troubleshooter for the machine above, there is a PLC troubleshooter for CS/CJ-series PLCs. Contact your OMRON representative for information on Troubleshooters.
Machine Localization with PTs

A Multi-language Input Environment Using Excel
- No special PT tools are required for translation operations.
- Translations can be requested using e-mail attachments.

Label Switching Function for Up to 16 Languages
- Devices can be started with Japanese-language screens, and then operated with screens in other languages.
- The languages can be switched to the one preferred by the device operators.

You can get multi-language support in Excel. Switching to as many as 16 languages is as easy as switching labels.

Only with NS!

Either a single screen data file was divided between Japanese and English screens, or else multiple screen data files had to be created.

Because multiple labels can be set, screen data needs to be set only once. Multi-language capability is simply a matter of switching labels.

Note: Windows 2000 or XP is required for multi-language support.

Multi-Language PT
- Asian Languages: Japanese, Simplified Chinese (see note 1), Korean, and Traditional Chinese (see note 2)
- European Languages: English, French, German, Italian, Portuguese, Spanish, Swedish, Dutch, Finnish, Norwegian, Basque, Catalan, and Danish

Support for 17 languages
Switching to as many as 16 languages by simply switching the labels

From English to Spanish or Portuguese

Note 1: Simplified Chinese: Chinese with partially simplified characters, mostly used in Mainland China.
Note 2: Traditional Chinese: Chinese with traditional characters, mostly used in Hong Kong and Taiwan.
The 5-inch screen expands your application range.

The NS5 has joined the NS family! It expands your application range.

The 8-inch TFT video board in a high-definition model with 640 x 480 dots displays images from digital cameras.

Larger, easy-to-operate, 10-inch model with 20 MB screen data capacity allows variable combinations of object arrangements and expands your application range.

Visualizing large amounts of information, this powerful, 800 x 600-dot, 12-inch-width model allows variable combinations of object arrangements and expands your application range.

5.7-inch high cost-performance model with NS features

### NS-series Lineup

<table>
<thead>
<tr>
<th>Series</th>
<th>NS12</th>
<th>NS10</th>
<th>NS8</th>
<th>NS5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>315 x 241 x 48.5 mm</td>
<td>315 x 241 x 48.5 mm</td>
<td>232 x 177 x 48.5 mm</td>
<td>195 x 142 x 54 mm</td>
</tr>
<tr>
<td>Effective display area</td>
<td>12.1 inch</td>
<td>10.4 inch</td>
<td>8 inch</td>
<td>5.7 inch</td>
</tr>
<tr>
<td>Display device</td>
<td>TFT</td>
<td>TFT</td>
<td>TFT</td>
<td>STN</td>
</tr>
<tr>
<td>Number of dots</td>
<td>800 x 600 dots</td>
<td>640 x 480 dots</td>
<td>640 x 480 dots</td>
<td>320 x 240 dots</td>
</tr>
<tr>
<td>Display colors</td>
<td>Basic colors (objects, background, etc.)</td>
<td>256 colors</td>
<td>256 colors</td>
<td>256 colors</td>
</tr>
<tr>
<td></td>
<td>Image data (BMP or JPG images)</td>
<td>32,768 colors</td>
<td>32,768 colors</td>
<td>32,768 colors</td>
</tr>
<tr>
<td></td>
<td>Images displayed via video input (See note.)</td>
<td>260,000 colors</td>
<td>260,000 colors</td>
<td>260,000 colors</td>
</tr>
<tr>
<td>Screen data capacity</td>
<td>20 Mbytes</td>
<td>20 Mbytes</td>
<td>6 Mbytes</td>
<td>6 Mbytes</td>
</tr>
<tr>
<td>Memory Card</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Ladder Monitor function</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>Video Input Unit support</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>Controller Link Interface Unit support</td>
<td>○</td>
<td>○</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: The video input is not supported by the NS5-V1.
The NS Series is more beautiful and user-friendly.

More beautiful: You can make beautiful screens with simple operations.

- Beautiful BMP Parts Collection has been newly added (ver.5)
- Simply select the desired part, paste it on your screen, and make your screens neat!

- Windows fonts can be used for switches and lamps (ver.5)

- Auto font resizing function (ver.5)
  Automatically resizes fonts to the object size.
  No need to adjust font sizes manually anymore!

More user-friendly
You can partially replace text and pictures from your computer.

- FTP (File Transfer Protocol) has been added!
  Texts, lists, and recipes can be replaced with the put/get command from your computer!
  You can even replace BMP files from your computer easily.

More strength in applications
The NS can be connected to a Board PC. The NS can also be directly connected to an OMRON Temperature Controller.

The following models, which have an RS-485 communications port and support CompoWay/F communications, can be connected to the NS.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Series</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modular Temperature Controllers</td>
<td>ES2N</td>
<td>ES2N-SCT245-500 (terminal unit)</td>
</tr>
<tr>
<td>Digital Temperature Controllers</td>
<td>ESAN</td>
<td>ESAN-500 + E53-AK02</td>
</tr>
<tr>
<td></td>
<td>ESAN</td>
<td>E53-500 + E53-AK02</td>
</tr>
<tr>
<td></td>
<td>ESAN</td>
<td>E53-500 + E53-AK03</td>
</tr>
<tr>
<td></td>
<td>E5CN</td>
<td>E5CN-500 + E53-CN03 or E53-CN03</td>
</tr>
<tr>
<td></td>
<td>E5AN</td>
<td>E5AN-M-500 + E53-AK03</td>
</tr>
<tr>
<td></td>
<td>E5EN</td>
<td>E5EN-M-500 + E53-AK03</td>
</tr>
<tr>
<td></td>
<td>E5GN</td>
<td>E5GN-500 + E53-GN03</td>
</tr>
<tr>
<td></td>
<td>E5CN</td>
<td>E5CN-M-500 + E53-CN03 or E53-CN03</td>
</tr>
<tr>
<td></td>
<td>ESAR</td>
<td>ESAR-GC400-W-FLK</td>
</tr>
<tr>
<td></td>
<td>ESAR</td>
<td>E53-GC400-W-FLK</td>
</tr>
<tr>
<td></td>
<td>E53-GC400-P-FLK</td>
<td>E53-GC400-P-FLK</td>
</tr>
<tr>
<td></td>
<td>E53-GC400-W-FLK</td>
<td>E53-GC400-W-FLK</td>
</tr>
<tr>
<td></td>
<td>E53-GC400-P-FLK</td>
<td>E53-GC400-P-FLK</td>
</tr>
<tr>
<td></td>
<td>E53-GC400-W-FLK</td>
<td>E53-GC400-W-FLK</td>
</tr>
<tr>
<td></td>
<td>E53-GC400-P-FLK</td>
<td>E53-GC400-P-FLK</td>
</tr>
</tbody>
</table>

The NS can be directly connected to the OMRON Temperature Controllers listed on the right.
Upgrade with NS-V1

**Beautiful**

Displays image data (BMP and JPG) beautifully.

<table>
<thead>
<tr>
<th>Model</th>
<th>Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS5</td>
<td>4,096 colors</td>
</tr>
<tr>
<td>NS8</td>
<td>32,768 colors</td>
</tr>
<tr>
<td>NS10</td>
<td>32,768 colors</td>
</tr>
<tr>
<td>NS12</td>
<td>32,768 colors</td>
</tr>
</tbody>
</table>

Previous: 256 colors

NS-V1: 32,000 colors

**Large**

Five times the standard for image data capacity

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS5</td>
<td>6 MB</td>
</tr>
<tr>
<td>NS8</td>
<td>6 MB</td>
</tr>
<tr>
<td>NS10</td>
<td>20 MB</td>
</tr>
<tr>
<td>NS12</td>
<td>20 MB</td>
</tr>
</tbody>
</table>

Previous screen data capacity

Expansion Memory

<table>
<thead>
<tr>
<th>Capacity</th>
<th>4 MB standard + 16 MB</th>
</tr>
</thead>
</table>

NS-V1 screen data capacity

20 MB standard (See note.)

**Printer Support**

Hard copies of screens can be printed out in color by USB-compatible printers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS5</td>
<td>See note.</td>
</tr>
<tr>
<td>NS8</td>
<td>Supported</td>
</tr>
<tr>
<td>NS10</td>
<td>Supported</td>
</tr>
<tr>
<td>NS12</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Note: Supporting a printer connection by mounting a USB interface is planned for the future.

- Manufacturer: EPSON or Canon
- Recommended models
  - EPSON: PM-2200C, PM-930C, PM-870C, PM-740C
  - Canon: BJ-M70, Pixus50i, 550i

**Faster**

Twice as fast as former models

<table>
<thead>
<tr>
<th>Model</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS5</td>
<td>See note.</td>
</tr>
<tr>
<td>NS8</td>
<td>Yes</td>
</tr>
<tr>
<td>NS10</td>
<td>Yes</td>
</tr>
<tr>
<td>NS12</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: The NS5 uses a different graphic controller from other models.

Faster drawing speed made possible by new hardware.

- 200-MHz RISC CPU
- High-speed graphics controller
System Configurations

Various connections, such as 1:1, 1:2, 1:N, and M:N, are supported with Ethernet or serial connections.

**PT:PLC = 1:1**

- NS-series PT
- PLC
- RS-232C
- Communications without programming
  (1:1 NT Link or 1:N NT Link)

**PT:PLC = 1:2**

- NS-series PT
- CS/CJ-series PLC
- C200HX/HG/HE PLC
- RS-232C
- Communications without programming

**PT:PLC = 1:N**

- NS-series PT
- PLC
- NS-AL002 Converter
  (Converts between RS-232C and RS-422A.)
- Communications without programming
  (1:N NT Link)

**PT:PLC = M:N**

- NS-series PT
- Ethernet Unit
- CS/CJ-series PLC
- Ethernet

**Host Registration Function**

It is possible to register two or more PLCs as hosts and communicate with the PLCs by specifying the host ID and address.
**Powerful networking**

### Exchanging Data with a PLC over a Network (Multihost)

**Communicating with a PLC via NT Link, using Ethernet without Special PLC Programming**

**Ethernet Communications without Programming**

NS-series PTs can communicate with a CS/CJ-series PLC (equipped with an Ethernet Unit) through "program-free" communications just like NT Link communications. Data is transferred through Ethernet through a simple PLC address and initial communications setup.

**Using Data Links between the PT and the PLC**

**Controller Link Interface Unit**

The Controller Link is an FA network that can send and receive large data packets flexibly and easily among OMRON PLCs and IBM PC/AT or compatible computers. The NS12 and NS10 PTs can be connected to the Controller Link network easily via a Controller Link Interface Unit. When a Controller Link network is used, data can be transferred between multiple PLCs and NS12/NS10 PTs without writing ladder programming to manage the communications.

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**Ethernet**

- CS/CJ-series PLC
- Direct access
- NS-series PT
- Direct access
- CS/CJ-series PLC
- Direct access
- NS-series PT
- Controller Link Interface Unit

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**Controller Link**

- Direct access
- NS-series PT
- Direct access
- CS/CJ-series PLC
- Direct access
- NS-series PT

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**SPMA (Single Port Multi Access) Function**

When transferring screen data from the NS-Designer to the NS-series PT, the data can be transferred through a PLC as long as the PT is connected to the PLC by a serial connection or network connection. Also, when monitoring/transporting a PLC ladder program from the CX-Programmer, the PLC ladder program can be monitored/transported through an NS-series PT as long as the PT is connected to the PLC by a serial connection or network connection.

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**CX-Programmer**

- Computer
- Direct access
- NS-series PT
- Direct access
- CS/CJ-series PLC
- Direct access
- NS-series PT

---

**PLC series**

<table>
<thead>
<tr>
<th>PLC series</th>
<th>CPU model</th>
<th>Lot number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS Series</td>
<td>CJ1H-CPU64H</td>
<td>030201</td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1H-CPU68H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1G-CPU42H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1H-CPU4H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1G-CPU44H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1G-CPU48H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1M-CPU11</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1M-CPU12</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1M-CPU13</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1M-CPU22</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CJ1M-CPU23</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1H-CPU63H</td>
<td>030201</td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1H-CPU64H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1H-CPU68H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1H-CPU7H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1G-CPU42H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1G-CPU43H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1G-CPU44H</td>
<td></td>
</tr>
<tr>
<td>CS Series</td>
<td>CS1G-CPU48H</td>
<td></td>
</tr>
</tbody>
</table>

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* To use the SPMA function through the PLC, the following software and hardware versions are required.
  - NS-series PT: System version 3.0 or higher
  - NS-Designer: Version 3.0 or higher
  - CX-Programmer: Version 3.1 or higher
  - PLC: Lot No. 030201 and later (Refer to the following table.)

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**When transferring screen data from the NS-Designer to the NS-series PT, the data can be transferred through a PLC as long as the PT is connected to the PLC by a serial connection or network connection.**

**CX-Programmer, the PLC ladder program can be monitored/transported through an NS-series PT as long as the PT is connected to the PLC by a serial connection or network connection.**
Integrating Special Unit Functions or Component Peripheral Tool Functions into PTs

Smart Active Parts (Device Libraries)
The Smart Active Parts with the following functionality are installed as a standard feature in NS-Designer version 4 or higher.

- CJ1M
  - Built-in I/O settings and origin search/return settings
- DRT2
  - ID16/ID16S/ID08/HD16C/OD16/OD08/OD08C
- DeviceNet E5ZN
  - PID settings, operation commands, target settings, setting area 0 settings, faceplates
- Network monitoring
  - Monitoring Controller Link and DeviceNet networks

Multiple Language Support

Switching Error Messages between English and Japanese

A Dual-language (English/Japanese) System Program
With an NS-series PT, the display language for the system menu and error messages can be switched between English and Japanese with the System Menu’s Select Language function. Like the Label Switching function, the Dual-language setting is useful for exported products because the language can be set to English for normal operation and switched to Japanese when Japanese staff need to operate the equipment or perform maintenance.

Making Multiple Language Versions with a Single Screen Data File

Label Switching Function
Up to 16 groups of labels (labels 0 to 15) can be registered for functional objects such as buttons, lamps, labels, and alarm settings. (Each label can correspond to a different language, for example, label 0 = Japanese, label 1 = Simplified Chinese, label 2 = Korean, label 3 = English, etc.) Once all of the labels have been input in each language with the multilingual input function, all of the labels can be switched to a different language at once just by specifying the corresponding label number from the PLC.

Creating Chinese, Korean, or Other Language Screens in Any Language Version of Windows

Multi-language Input (When Windows 2000 or XP is Used)
When Windows 2000 or XP is being used, Simplified Chinese (see note), Traditional Chinese (see note), Korean, and other language text can be input in NS-Designer. Select the desired language with Global IME to input a different language.

CSV File Input/Output
The property settings for each functional object can be exported in CSV format. The settings data can be imported again after it has been edited with a program such as Excel.

Having a Japanese Label Converted into Multiple Languages by a Translation Company

Note: Simplified Chinese: Chinese with partially simplified characters, mostly used in Mainland China.
Traditional Chinese: Chinese with traditional characters, mostly used in Hong Kong and Taiwan.
The NS monitors machine status for who and how machines are managed to help speed recover from problems.

### Monitoring and Setting PLC Data

#### For Operators

- **Display machine status simply.**
  - Do not want to be aware of ladder programs and PLC memory areas.
  - Only want to display I/O comments and I/O status.

- **Display PLC memory areas without using tools.**
  - Want to display and change the PLC memory areas without showing the PLC program.

- **Display program without using tools**
  - Want to identify the fault location by checking the actual PLC program.
  - Want to change part of the program, a timer/counter, without connecting tools.

#### For Experts

- **Solve with the Switch Box function**
  - Easily Displaying the Status of Particular Bits in Ladder Programs when Errors Occur

- **Solve with the Device Monitor function**
  - Monitoring PLC I/O Data for the Purpose of Device Debugging and Maintenance

- **Solve with the Ladder Monitor function**
  - Monitoring Execution of the PLC’s Ladder Program

#### Using Video Inputs

- **Capturing Moving Images from a Video Camera and Image Outputs from a Vision Sensor, and Doing Layout on a PT Screen**
- **Saving Displayed Video Images to a Memory Card in BMP Format**

**Video Input Interface**

(Supported by the NS12-V1/NS10-V1/NS8-V1)

Four video input interfaces are provided, so four video or CCD cameras can be connected. Up to four images can be displayed simultaneously if the image size is 320x240 pixels.

**Image Capture Function**

When necessary, the displayed image can be captured and saved in a Memory Card in BMP format. The saved image can then be uploaded from remote personal computer via Ethernet or Serial connection.

The number of images that can be saved depends on the capacity of Memory Card. As an example, about 50 images from a 640x480 display (about 600 Kbytes each) can be saved in a 30-Mbyte Memory Card.
Using General Software

Creating System-related Documents
Data such as screen information and object information can be output in an RTF file. The RTF file can be read into Word Processor to produce a system manual.

Setting Functional Object Properties in Excel
CSV File Input/Output
The property settings for each functional object can be exported in CSV format. The settings data can be imported again after it has been edited with a program such as Excel.

Using Excel to Analyze Data, Such as the Alarm/Event History, Operation Log, and Error Log, and to Create Daily Reports

Memory Card: Data Logging Function
Logging data (trend data, up to 1000 points with a sampling cycle of 1 to 86,400 s/group) can be stored in the Memory Card in CSV format.

Using Excel to Analyze Time-series Data and to Create Daily Reports

Memory Card: History Storage Function
The following data can be saved to the Memory Card in CSV format.
- Alarm/Event History (Alarm/Event history data)
- Operation Log (Screen operation history data)
- Error Log (Error log data recorded during macro program execution)
High-reliability and Advanced Functions in the Industry’s Slimmest PT

■ Super-thin 48.5-mm Body for a Slimmer Control Panel
This thin-profile model has few protrusions so it can be incorporated easily into a panel or machine. The PT can help save space when space is at a premium.

● NS12, NS10

- Power Supply (24 VDC)
- USB HOST
- Ethernet (10Base-T or 100Base-TX)
- USB SLAVE (Not used)
- A bar code reader can be connected to the serial port.
  Recommended bar code reader: V520-RH21-6

● NS8

- Power Supply (24 VDC)
- USB HOST
- USB SLAVE (Not used)
- A bar code reader can be connected to the serial port.
  Recommended bar code reader: V520-RH21-6

■ Built-in Expansion Interface
The NS-series PTs have a built-in Expansion Interface for future expandability.

■ USB Ports
A printer can be connected to the USB HOST port. Be sure to use USB cables made by OMRON (NS-US52/NS-US22). Refer to Printer Support on page 10 for recommended printers.

■ NS-series PTs have backlights with the longest life expectancy in the industry.
At room temperature, the average life expectancy is 50,000 hours min. for the NS12, NS10 and NS5, 40,000 hours min. for the NS8.

Note: Colors shown in photographs and product names may differ from actual colors and names.
Optional Products

- Ladder Monitor program
- Video Input Unit (with Cover)
- Controller Link Interface Unit (with Cover)
- Memory Card
- Memory Card Adapter
- RS-422A Adapter
- Protective Cover/Anti-reflection Sheet for NS-series PT
- Communications Cable
- USB Serial Conversion Cable

Note: Colors shown in photographs and product names may differ from actual colors and names.
Dimensions

**NS12/10 PT**
Units: mm

**NS8 PT**
Units: mm

**NS5 PT**
Units: mm

**NS-CA001**
Video Input Unit
Units: mm

**NS-CLK21**
Controller Link Interface Unit
Units: mm

---

*Slavehost DC 24V Reset SW Ethernet Port A Port B*
### General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power supply voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Allowable voltage range</td>
<td>20.4 to 27.6 VDC (24 VDC ±1.5%)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>25 W max.</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0 to 50°C (See notes 1 and 4.)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>–20 to 60°C (See note 2.)</td>
</tr>
<tr>
<td>Ambient operating humidity</td>
<td>35% to 90% (0 to 40°C) with no condensation, 35% to 60% (40 to 50°C) with no condensation</td>
</tr>
</tbody>
</table>

### Mounting Angle

- **NS8-V1/NS10-V1/NS5-V1**: Mounting angle of 30 to 90° if PT is used at low temperatures. For example, using the PT at temperatures of 0°C and humidity. It is not a guaranteed value. The service life will be drastically shortened.
- **Note 1**: Indicates that all backlights (2) are OFF.
- **Note 2**: This function does not indicate that the service life has been reached. It detects when brightness is reduced by half at room temperature; this is the estimated time before brightness is reduced by half at room temperature and humidity. It is not a guaranteed value. The service life will be drastically shortened if PT is used at low temperatures. For example, using the PT at temperatures of 0°C and humidity. It is not a guaranteed value. The service life will be drastically shortened.

### Operating Environment

- **No NO gases.**
- **Noise immunity**: Conforms to ECE61000-4-4, 2 kV (power lines)
- **Vibration resistance (during operation)**: Conforms to JIS C0040.
- **Shock resistance (during operation)**: 147 m/s² times each in direction of X, Y, and Z.
- **Weight**: NS12: 2.5 kg max.; NS10: 2.3 kg max.; NS8: 2.0 kg max.; NS5: 1.0 kg max.
- **Enclosure rating**: Front operating panel: IP65F and NEMA4 compliant (see note 3.)
- **Battery life**: 5 years (at 25°C). Replace battery within 5 days after the battery runs low (indicator lights orange).
- **Applicable standards**: cULus and EC directives

### Characteristics

#### Display Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display device</td>
<td>NS12-V1</td>
</tr>
<tr>
<td>Number of dots</td>
<td>800 dot horizontal x 640 dot vertical</td>
</tr>
<tr>
<td>Display color</td>
<td>256 colors</td>
</tr>
<tr>
<td>Effective display area</td>
<td>Width 240 mm x height 184.4 mm (9.5 inches)</td>
</tr>
<tr>
<td>Field of view</td>
<td>Left margin top: 40%, bottom: 60% Left margin: 171.7 mm (6.8 inches)</td>
</tr>
<tr>
<td>Service life</td>
<td>50,000 hours min. (See note 1.)</td>
</tr>
<tr>
<td>Brightness adjustment</td>
<td>There are 3 levels that can be set with the touch panel. (See note 2.)</td>
</tr>
</tbody>
</table>

**Note 1:** The display is a liquid crystal display; therefore, brightness may be reduced by half at full room temperature and humidity. It is not a guaranteed value. The service life will be drastically shortened if PT is used at low temperatures. For example, using the PT at temperatures of 0°C and humidity. It is not a guaranteed value. The service life will be drastically shortened.

**Note 2:** The brightness cannot be adjusted.

**Note 3:** The service life is determined automatically; therefore, the backlight indicator flashes as notification. (See note 2.)

#### Operating Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>Resistive membrane</td>
</tr>
<tr>
<td>Touch panel (Matrix type)</td>
<td>NS12-V1: 960 (50 horizontal x 38 vertical) x 16 x 16 dots for each switch. NS12-V1: 1,200 (40 horizontal x 30 vertical) x 16 x 16 dots for each switch. NS10-V1: 768 (32 horizontal x 24 vertical) x 20 x 20 dots for each switch. NS8-V1: 576 (24 horizontal x 24 vertical) x 20 x 20 dots for each switch. NS5-V1: 300 (20 horizontal x 15 vertical) x 16 x 16 dots for each switch.</td>
</tr>
<tr>
<td>Input</td>
<td>Pressure-sensitive</td>
</tr>
<tr>
<td>Service life</td>
<td>1,000,000 touch operations.</td>
</tr>
</tbody>
</table>

#### Data Capacity Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard screen data capacity</td>
<td>20MB</td>
</tr>
</tbody>
</table>

### Communications Specifications

#### External Interface Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory card interface</td>
<td>One ATA-Compact Flash interface slot. Used to transfer and store screen data and to store history data.</td>
</tr>
<tr>
<td>Expansion interface</td>
<td>For Expansion Interface Units Used to install various Interface Units that are currently in development.</td>
</tr>
</tbody>
</table>

#### Serial Communications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port A</td>
<td>Conforms to EIA RS-232C. D-Sub female 9-pin connector 5-V output (250 mA max.) through pin 6. (See note.)</td>
</tr>
<tr>
<td>Port B</td>
<td>Conforms to EIA RS-232C. D-Sub female 9-pin connector 5-V output (250 mA max.) through pin 6. (See note.)</td>
</tr>
</tbody>
</table>

**Note:** The 5-V outputs of serial ports A and B cannot be used at the same time.

#### Controller Link (Wired-type) Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud rate</td>
<td>2M/1M/500K</td>
</tr>
<tr>
<td>Transmission path</td>
<td>Shielded twisted-pair cable (special cable)</td>
</tr>
</tbody>
</table>

#### Ethernet Specifications (NS12-TS01(B) and NS10/8-TV01(B) only)

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conforms to</td>
<td>Conforms to IEEE 802.3/Ethernet (10Base-T/100Base-TX).</td>
</tr>
</tbody>
</table>

#### Video Input Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>320 x 240, 640 x 480, or 800 x 600 dots</td>
</tr>
<tr>
<td>Input signal</td>
<td>NTSC composite video or PAL</td>
</tr>
<tr>
<td>Cameras</td>
<td>Number of cameras: 4 max.</td>
</tr>
</tbody>
</table>

#### USB Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB rating</td>
<td>USB1.1</td>
</tr>
<tr>
<td>Connector</td>
<td>Type A (Host), Type B (Slave)</td>
</tr>
</tbody>
</table>

#### Display Element Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raster font</td>
<td>Alphanumeric characters or Japanese katakana</td>
</tr>
<tr>
<td>Font size</td>
<td>8 x 8</td>
</tr>
<tr>
<td>Display text</td>
<td>8 x 16</td>
</tr>
<tr>
<td>Vector font</td>
<td>1,1, 1, 2, 2, 3, 3, 4, 4, 5, 5, 6, 6, 7, 7, 8, 8</td>
</tr>
<tr>
<td>Text attributes</td>
<td>256 colors</td>
</tr>
<tr>
<td>Horizontal alignment</td>
<td>Top, center, or bottom</td>
</tr>
<tr>
<td>Vertical alignment</td>
<td>Top, center, or bottom</td>
</tr>
<tr>
<td>Fixed objects</td>
<td>Select from 3 types. The flicker speed and flicker range can be set.</td>
</tr>
</tbody>
</table>

### NS-Designer Operating Environment

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended CPU</td>
<td>Intel Core2040 400 MHz min.</td>
</tr>
<tr>
<td>Recommended memory</td>
<td>23 Mbytes min.</td>
</tr>
<tr>
<td>Hard disk free space</td>
<td>20 Gbytes are required at setup.</td>
</tr>
<tr>
<td>CD-ROM drive</td>
<td>Required for installation.</td>
</tr>
<tr>
<td>Display</td>
<td>A minimum resolution of 800 x 600 pixels is recommended.</td>
</tr>
<tr>
<td>Compatible OS</td>
<td>Microsoft Windows 95, Windows 98, Windows NT 4.0 (service pack 3 or higher), Windows ME, or Windows 2000 or Windows XP</td>
</tr>
</tbody>
</table>
## Macro Processing List

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conditional judgments</strong></td>
<td>IF ELSEIF ELSE ENDIF</td>
</tr>
<tr>
<td><strong>Conditional expressions</strong></td>
<td>A == B, A &gt; B, A &gt;= B, A AND B, A OR B, etc.</td>
</tr>
<tr>
<td><strong>Basic arithmetic instructions</strong></td>
<td>Assignment, addition, subtraction, multiplication, division, remainder, logical OR, logical AND, negation (NOT), logical exclusive OR, T's complement, bit shift (left), bit shift (right), etc.</td>
</tr>
<tr>
<td><strong>Conditional judgments</strong></td>
<td>BCD --&gt; Binary conversion</td>
</tr>
<tr>
<td><strong>Conditional expressions</strong></td>
<td>Convert multibyte string to Unicode string. Convert Unicode string to multibyte string.</td>
</tr>
<tr>
<td><strong>Alarm/event history</strong></td>
<td>Clear the alarm/event counter to 0.</td>
</tr>
<tr>
<td><strong>HM1 (user interface) instructions</strong></td>
<td>Read numeral write value or numeral change value. Switch screen Move object display area</td>
</tr>
<tr>
<td><strong>Communications</strong></td>
<td>Read data from the specified address. Write data to the specified address.</td>
</tr>
<tr>
<td><strong>Exit processing</strong></td>
<td>Exit macro program.</td>
</tr>
</tbody>
</table>

### Functions

- **Copy string**
- **Convert multibyte string to Unicode string.**
- **Convert Unicode string to multibyte string.**
- **Clear the alarm/event counter to 0.**
- **Read numeral write value or numeral change value.**
- **Switch screen Move object display area**
- **Get object's display shape.**
- **Move pop-up window screen.**
- **Move pop-up window screen up.**
- **Move pop-up window screen down.**
- **Move pop-up window screen left.**
- **Move pop-up window screen right.**
- **Close pop-up window screen.**

### Note

Macro execution conditions:
- Registration to the project when the project is loaded, alarm/event goes ON, or alarm event goes OFF.
- Registration to screen when screen is loaded or unloaded.
- Registration to functional object when an object is touched to turn it ON, a value is changed, just before Numeral or String Input start, just before Numeral or String Input write, list selection, etc.

### Communications

- **Read data from the specified address.**
- **Write data to the specified address.**

### Exit processing

- **Exit macro program.**

---

## Compatible OMRON PLCs

### CPU Units (1:1 NT Link Connection)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Specifications</th>
<th>PLC model name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CQM1-CPU41-V1/CPU42-V1/CPU43-V1/CPU44-V1</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CQM1</td>
</tr>
<tr>
<td>CQM1H-CPU21/CPU51/CPU61</td>
<td></td>
<td>C-series CQM1H</td>
</tr>
<tr>
<td>CM1-10/20/30/40CDR</td>
<td>Connect to peripheral port.</td>
<td>C-series CM1</td>
</tr>
<tr>
<td>CM1A-10/20/30/40CDR</td>
<td>Connect to peripheral port.</td>
<td>C-series CM1A</td>
</tr>
<tr>
<td>CM2A-30/40/60CDR</td>
<td>Connect to RS-232C or peripheral port.</td>
<td>C-series CM2A</td>
</tr>
<tr>
<td>CM2C-10/20/30/40CDR</td>
<td>Connect to peripheral port.</td>
<td>C-series CM2C</td>
</tr>
<tr>
<td>CM2H-CPU21/CPU2/CPU3/CPU43</td>
<td>Connect to peripheral port.</td>
<td>C-series CM2H</td>
</tr>
<tr>
<td>CM20H-CPU32I</td>
<td>See note 2)</td>
<td>C-series CM20HI</td>
</tr>
<tr>
<td>CM20HG-CPU32I</td>
<td>See note 2)</td>
<td>C-series CM20HG</td>
</tr>
<tr>
<td>CM20HX-CPU32I</td>
<td>See note 2)</td>
<td>C-series CM20HX</td>
</tr>
<tr>
<td>CV500/1000/2000/CPU01-V1</td>
<td>With RS-232C connector (9-pin type)</td>
<td>CV-series CM500/CV1000/CV2000</td>
</tr>
<tr>
<td>CM1/CPU01/V2/CPU11-V2/CPU21-V2</td>
<td>With RS-232C connector (9-pin type)</td>
<td>CV-series CM1/CV500/CV1000/CV2000</td>
</tr>
</tbody>
</table>

### CPU Units (1:N NT Link Connection)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Specifications</th>
<th>PLC model name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C51G-CPU42H/CPU43H/CPU44H/CPU45H</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CS1G</td>
</tr>
<tr>
<td>C51H-CPU63H/CPU64H/CPU65H/CPU66H</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CS1H</td>
</tr>
<tr>
<td>C51D-CPU69H</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CS1D</td>
</tr>
<tr>
<td>C71G-CPU42H/CPU43H/CPU44H/CPU45H</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CJ1G</td>
</tr>
<tr>
<td>C71H-CPU69H</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CJ1H</td>
</tr>
<tr>
<td>CDM1H-CPU6151</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series CDM1H</td>
</tr>
<tr>
<td>C200H-CPU42Z (See note 2)</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series C200H1</td>
</tr>
<tr>
<td>C200HG-CPU33I (See note 2)</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series C200H2</td>
</tr>
<tr>
<td>C200HX-CPU34Z (See note 2)</td>
<td>With RS-232C connector (9-pin type)</td>
<td>C-series C200H3</td>
</tr>
</tbody>
</table>

### Note

1. Use an Adapter Cable (CPM2C-CN111 or CS1N-CN114/118), CPM1-CIF01 RS-232C Adapter, or CPM1-CIF1 RS-422A Adapter to connect.
2. A C200HW-COM02-V1, C200HW-COM04-V1, C200HW-COM05-V1, or C200HW-COM06-V1 Communications Board is required.

---

### CPU Units (1:1 NT Link Connection)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Specifications</th>
<th>PLC model name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS1G-CPU42H/CPU43H/CPU44H/CPU45H</td>
<td>C-series CS1G</td>
<td></td>
</tr>
<tr>
<td>CS1H-CPU63H/CPU64H/CPU65H/CPU66H</td>
<td>C-series CS1H</td>
<td></td>
</tr>
<tr>
<td>CS1D-CPU69H</td>
<td>C-series CS1D</td>
<td></td>
</tr>
<tr>
<td>C71G-CPU42H/CPU43H/CPU44H/CPU45H</td>
<td>C-series CJ1G</td>
<td></td>
</tr>
<tr>
<td>C71H-CPU69H</td>
<td>C-series CJ1H</td>
<td></td>
</tr>
<tr>
<td>C71M-CPU132/CPU132/CPU22/CPU23/CPU112/CPU21</td>
<td>C-series CJ1M</td>
<td></td>
</tr>
<tr>
<td>CDM1H-CPU6151</td>
<td>C-series CDM1H</td>
<td></td>
</tr>
<tr>
<td>C200H-CPU42Z (See note 2)</td>
<td>C-series C200H1</td>
<td></td>
</tr>
<tr>
<td>C200HG-CPU33I (See note 2)</td>
<td>C-series C200H2</td>
<td></td>
</tr>
<tr>
<td>C200HX-CPU34Z (See note 2)</td>
<td>C-series C200H3</td>
<td></td>
</tr>
</tbody>
</table>

### Note

1. The C/1W/ECU41 Serial Communications Unit can also be connected.
2. A C200HW-COM02/COM04/COM05/COM06-V1 Communications Board is required.
Superior environmental resistance meets IP65F standards.
Flush surface construction is used for superior environmental resistance and the enclosure rating for the front of the PT is IP65F compliant.

- **6**: Dust and dirt will not enter interior.
- **5**: There are no adverse effects from a water stream from any direction.
- **F**: There are no harmful effects from oil droplets or spray from any direction.

Note: May not be applicable in environments with long-term exposure to water or oil.

Meets International Standards and Exports are Not Restricted
The PTs conform to UL standards (cULus) and EC Directives. In addition, there are no export restrictions on the PTs.
WS02-NSFC1-E Face Plate Auto-Builder for NS

Significantly reduces the engineering time required by combining LCB/LCU and the NS Series.

- Automatic generation of control screens and tuning screens.
- Automatic generation of NS screen data by the software from tag information created with CX-Process Tool.
- NS communications address allocation, ladder programs, etc., are completely unnecessary.
- Data that has been generated can be freely edited and processed by NS-Designer (NS screen creation software).

Related Products

Automatic generation of control screens and tuning screens, and automatic generation of NS screen data by the software from tag information created with CX-Process Tool, and NS communications address allocation, ladder programs, etc., are completely unnecessary. Data that has been generated can be freely edited and processed by NS-Designer (NS screen creation software).

Created screens are easily transferred to the NS by means of a Memory Card or over the network.

---

**Specifications**

<table>
<thead>
<tr>
<th>Product name</th>
<th>Specifications</th>
<th>Model number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face Plate Auto-Builder for NS</td>
<td>CSV tag files for LCB/LCU used in Face Plate Auto-Builder for NS</td>
<td>WS02-NSFC1-E</td>
</tr>
</tbody>
</table>
Read and Understand this Catalog

Please read and understand this catalog before purchasing 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 the product in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

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 IS 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. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

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 catalog 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.
Certain Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these “Terms”) are deemed part of all catalogs, manuals or other documents, whether electronic or in writing, relating to the sale of goods or services (collectively, the “Goods”) by Omron Corporation and its subsidiaries (collectively referred to herein as “Seller”). Seller hereby objects to any terms or conditions proposed in Buyer’s purchase order or other documents which are inconsistent with, or in addition to, these Terms. Please contact your Omron representative to confirm any additional terms for sales from your Omron company.

2. Prices. All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at time of shipment.

3. Discounts. Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Seller’s payment terms and (ii) Buyer has no past due amounts owing to Seller.

4. Orders. Seller will accept no order less than $200 net billing.

5. Governmental Approvals. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Goods.

6. Taxes. All taxes, duties and other governmental charges (other than general property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Goods sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.

7. Financial. Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Goods sold hereunder and stop any Goods in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.

8. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless and until approved by Seller.

9. Force Majeure. Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.

10. Shipping; Delivery. Unless otherwise expressly agreed in writing by Seller:
   a. Shipments shall be by a carrier selected by Seller;
   b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
   c. All sales and shipments of Goods shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Goods shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Goods until the full purchase price is paid by Buyer;
   d. Delivery and shipping dates are estimates only.
   e. Seller will package Goods as it deems proper for protection against normal handling and extra charges apply to special conditions.

11. Claims. Any claim by Buyer against Seller for shortage or damage to the Goods occurring before delivery to the carrier must be presented in writing to Seller within 10 days of receipt of shipping advice or other shipment notification or adjustment bill signed by the carrier noting that the carrier received the Goods from Seller in the condition claimed.

12. Warranties. (a) Exclusive Warranty. Seller’s exclusive warranty is that the Goods shall be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). Seller shall not be responsible for the user’s proper handling, installation and in addition to other remedies) cancel any unshipped portion of Goods sold hereunder and stop any Goods in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.

13. Damages; Etc. SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTIVE TIME ARISING IN ANY WAY CONNECTED WITH THE GOODS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Seller exceed the individual price of the Good on which liability is asserted.

14. Indemnities. Buyer is indemnified and holds harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney’s fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer’s acts or omissions under these Terms or in any way with respect to the Goods. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller to the extent that it is based on a claim that Buyer is liable to Seller or any third party.

15. Property; Confidentiality. The intellectual property embodied in the Goods is the exclusive property of Seller and its affiliates and Buyer shall not attempt to duplicate it in any way without the written permission of Seller. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Seller. All information and materials supplied by Seller to Buyer relating to the Goods are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.

16. Miscellaneous. (a) Waiver. No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller. (b) Assignment. Buyer may not assign its rights hereunder without Seller’s written consent. (c) Amendment. These Terms constitute the entire agreement between the parties and supersede all prior agreements (written or oral) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer’s acts or omissions under these Terms or in any way with respect to the Goods. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller to the extent that it is based on a claim that Buyer is liable to Seller or any third party.

17. Governing Law. These Terms, the Goods, and the relationship between Seller and Buyer shall be governed by the laws of the state of Japan, excluding its conflict of law rules.

18. Non-US Government. Government agencies and others are subject to the special conditions of sale and terms and conditions of sale for non-US government agencies. The terms and conditions of sale for non-US government agencies are contained in the catalog, manuals, or other documents which are inconsistent with, or in addition to, these Terms. These Terms shall not supersede any such inconsistent terms and conditions.

19. Export Control. Buyer agrees not to export the Goods, or any part of the Goods, or to reexport the Goods, or any part of the Goods, to any country or any person or entity except as permitted under the laws and regulations of the United States and the laws and regulations of the country or countries to which the Goods are being exported, including but not limited to the United States Export Administration Regulations and any other relevant laws and regulations.

20. Further Assurances. Buyer will execute and deliver such additional documents and other instruments as Seller may reasonably request, and will take such actions as Seller may reasonably request, in order to confirm the validity of the sale and to give effect to the terms hereof.

Certain Precautions on Specifications and Use

1. Suitability of Use. Buyer shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Good in the Buyer’s application or use of the Good. At Buyer’s request, Seller will provide applicable third-party certification and identify safety and limitations of use which apply to the Good. This information by itself is not sufficient for a complete determination of the suitability of the Good 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:
   (i) Outdoor use, uses involving potential chemical contamination or electrical connection therewith.

2. Programmable Products. Seller shall not be responsible for the user’s programming of a programmable Good, or any consequence thereof.

3. Performance Data. Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty.

4. Change in Specifications. Seller’s exclusive warranty is that the Goods shall be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). Seller shall not be responsible for any delay or failure in delivery arising from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.

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

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM Includes the use of the Good, some examples of applications for which particular attention must be given.

THE SELLER’S PRODUCT IS PROPERLY RATED AND INSTALLED FOR END USE IN COMPLIANCE WITH THE REQUIREMENTS OF THE OVERALL EQUIPMENT OR SYSTEM.