OMRON

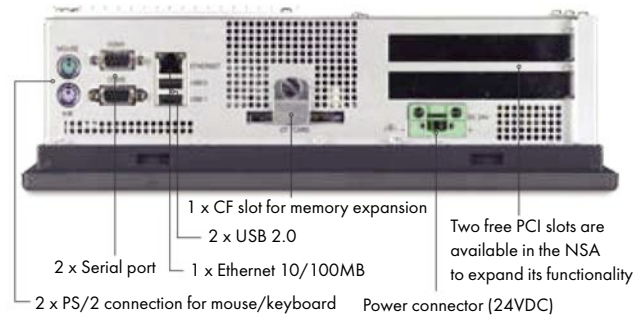## Human Machine Interface Terminals

Improve production agility and operator response with powerful visualization and diagnostics from a single point

Automation…simple…powerful.

NSA-series: Industrial PC with Touch Panel

No moving parts to fail

1 x CF slot for memory expansion
2 x USB 2.0
2 x Serial port
1 x Ethernet 10/100MB
2 x PS/2 connection for mouse/keyboard
Two free PCI slots are available in the NSA to expand its functionality
Power connector (24VDC)

Fewer moving parts mean fewer potential causes of failure and hence a more reliable product. So instead of a hard disk drive, the new NSA IPC series uses a silicon storage module that offers fast access and exceptional ruggedness. And instead of an electric fan to cool the CPU, heat is radiated away by a heavy heatsink with cooling fins.

No hard disk drive

"Disk on Module" is a very reliable silicon storage type with bad sector management and industrial operating temperatures.

No Fan

A fan is a very critical part of a PC. If the fan fails the complete system eventually breaks down. That's why we chose a fan-less concept.

RAS board for continuous monitoring

Inside the NSA IPC series, a separate RAS board, interfaced by embedded RAS utility software, continually monitors the motherboard. Because the RAS board is a stand-alone board, it can gather data from the motherboard no matter what the Operating System or hardware conditions are. RAS stands for Reliability, Availability, Serviceability.

Features

· Tough 12/15-inch TFT touch screen

· Industrial-grade 1.3 GHz Intel Celeron®M CPU

· 2 GB Disk-on-Module silicon storage

· Compact Flash memory for extended storage

· Fan-less heatsink cooling for enhanced reliability

· Two PCI slots

· Embedded RAS utility software

Guaranteed continuity

The NSA IPC is designed to provide exceptional performance operating round-the-clock throughout its lifetime. Besides this, Omron offers you a full 3 year warranty, a minimum of 5 years' delivery of the same product and a guarantee of repair of your NSA IPCs for up to 7 years after purchase. So unlike many office-PC type products that have, for instance, very short life cycles, the NSA is a product with guaranteed continuity.

Ordering Information

Description	Specifications	Model number
NSA Industrial PC 12"	1.3 GHz Celeron M, 512 MB RAM, 2 GB storage, XPe, No Fan, No HDD, black	NSA12-TX01B-E
NSA Industrial PC 12"	1.3 GHz Celeron M, 512 MB RAM, 2 GB storage, XPe, No Fan, No HDD, silver	NSA12-TX01S-E
NSA Industrial PC 15"	1.3 GHz Celeron M, 512 MB RAM, 2 GB storage, XPe, No Fan, No HDD, black	NSA15-TX01B-E
NSA Industrial PC 15"	1.3 GHz Celeron M, 512 MB RAM, 2 GB storage, XPe, No Fan, No HDD, silver	NSA15-TX01S-E
NSA Industrial PC Main board battery	–	NSA-BAT01
NSA Industrial PC RAS board battery	–	NSA-BAT02
CS1G-CPU45H PLC PCI board	CS1G-CPU45H, DeviceNet Master and CF interface	CS1PC-PCI01H-DRM
Interface for CS1 extension backplanes	–	CS1PC-EIC01
Controller Link Support Board for PCI Bus	H-PCF cable optical ring	3G8F7-CLK12-EV1
Controller Link Support Board for PCI Bus	GI cable optical ring	3G8F7-CLK52-EV1
Controller Link Support Board for PCI Bus	Twisted-pair Cable	3G8F7-CLK21-EV1

Specifications

Item	Specifications
OS	Preinstalled Windows XP Embedded
Processor	1.3 GHz Intel Celeron®M Processor
Storage device	
Type	DiskOnModule (flash memory)
Capacity	2 GB
Service life (write cycles)	300,000 cycles
Memory	
Main memory	512 Mbyte DDR-SDRWM (No-ECC)
Cache memory	512 Kbyte Level 2 cache memory (built into the CPU)
Display panel	
Type	TFT color LCD
Size	12.1 or 15 inches
Resolution	1024 x 768 dots
Contrast	300 cd/m² (typical) (see note 1)
Viewing angle	130° left to right, 90° up and down
Colors displayed	262,144
Backlight	
Type	2 cold-cathode fluorescent lamps (CCFL) 4 x CCFL for 15"
Contrast adjustment	Three-level software adjustment (see note 2)
Backlight not lit detection	The software reads the lamp burnout detection signal from the inverter (see note 3)
Service life	50,000 hours min. (see note 4)
Touch panel	
Type	Analog resistive type
Effective input area	12": 247 mm x 185.5 mm; 15": 305 mm x 229 mm
Operating service life	10,000,000 operations (with non-stop key stroking using fingers to input) 100,000 characters (with non-stop character entry using a stylus to input)
Interface	
Keyboard	PS/2 keyboard with 6-pin Mini DIN Connector
Mouse	PS/2 mouse with 6-pin Mini DIN connector
Serial ports	2 ports confirming to EIA RS-232C for 9-pin D-SUB female connectors Pin No. 6 output: +5 V (250 mA max.) (see note 5)
Ethernet	One 10-BASE-T/100 BASE-TX port for an RJ45 connector
USB ports	2 USB 2.0/1.1 ports for USB-type A connectors
Memory card	Type I CF Card, 1 slot
Expansion slots	PCI expansion bus, 2 slots
Special RAS board	
External input port	3-pin connector port for the UPS power interruption signal
Status LED indicators	4 (RUN/BATLOW/ERR/DIAG)
RAS functions	
Special RAS board functions	Alive connection monitoring, device restart, timer start, startup and shutdown monitoring, backlight lit time measurement, UPS power interrupt signal output, and logging functions
Motherboard	RAS functions Standard PC RAS info, post error logging, post error retry, CMOS data recovery
POWER indicator	Yes (green)
Service life	50,000 hours at 40°C (see note 6)
Battery life	
Main board	5 years at 25°C (NSA-BAT01)
RAS board	5 years at 25°C (NSA-BAT02)

Note:
1. This contrast value is strictly a reference value at maximum contrast.
2. The contrast cannot be adjusted significantly.
3. It is not the service life, but rather lamp failure due to the hardware problems such as a broken wire that is detected. Backlight not lit detection means both backlight lamps have burnt out.
4. The service life is a guideline for maximum contrast at room temperature with normal humidity and is provided strictly for reference. It varies significantly with the ambient temperature. The service life will be shorter under extreme (high or low) temperature conditions and falls off sharply particularly under low-temperature conditions.
5. Serial ports 1 and 2 cannot output +5 V at the same time.
6. The service life is a guideline that is provided strictly for reference. It varies with factors such as the installation location and operating conditions.

General Specifications

Item	Specifications
Rated supply voltage	24 VDC
Allowable supply voltage range	20.0 VDC to 27.6 VDC (24 VDC ±15%)
Power consumption	12": 80 W max.
	15": 100 W max.
Dimensions (excluding protrusions)	12": 322 mm x 264 mm x 100 mm (W x H x D)
	15": 384 mm x 312 mm x 108 mm (W x H x D)
Weight	12": 5 kg
	15": 7 kg
Degree of protection	Front panel: IP65 or the equivalent (display side only) (see note 3)

Note: For notes see user manual V233-E1-0

NS-Runtime

Machine/Line Monitoring Software

Wide Screen

Computer output can be displayed on another wide-screen monitor.

XGA (1,024 x 768 dots) and up to a a maximum screen size of 3,840 x 2,400 is supported.
Alarms occurring in devices or the line can be monitored.

Monitor output

Note: The resolution that can be displayed depends on the computer. An input function for displaying the computer screen is required at the display monitor.

Recipe Handling

Checking machine data or switching processes from a host computer is easy.

Parameter groups in the PLC can be transferred together to a computer, and the transferred data can be checked and edited in CSV format, e.g., using Excel.
The edited data can then be transferred together back to the PLC.
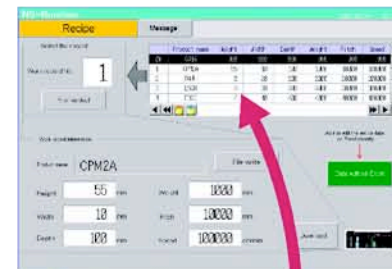
	A	B	C	D	E
1	#COMMENT	DivD	LibraryName	Pressure	Water
2	Object0201 Common	1	Object0201	600	1200
3	Object0602 Change	2	Object0602	700	1201
4	Object1101 Change	3	Object1101	800	1202
5	Object9845 Init	4	Object9845	900	1203

CSV format

Recipe data

1-to-N Connections

A single screen data item can be sent to multiple PLCs with no need for communications programming.

You can communicate with multiple PLCs from a single computer, for smooth monitoring of device and line status.

Ethernet

Easy Installation

After installing the NS-Runtime, just place the screen data in a specified folder and start, that's it.

To get started, just install the NS-Runtime in the computer and place the screen data in the applicable folder. NS/NSJ-series screens and NS-Runtime screens can all be managed using one single tool.

NS-Runtime

Screen data

To PLC

Screen designer: CX-Designer (CX-One)
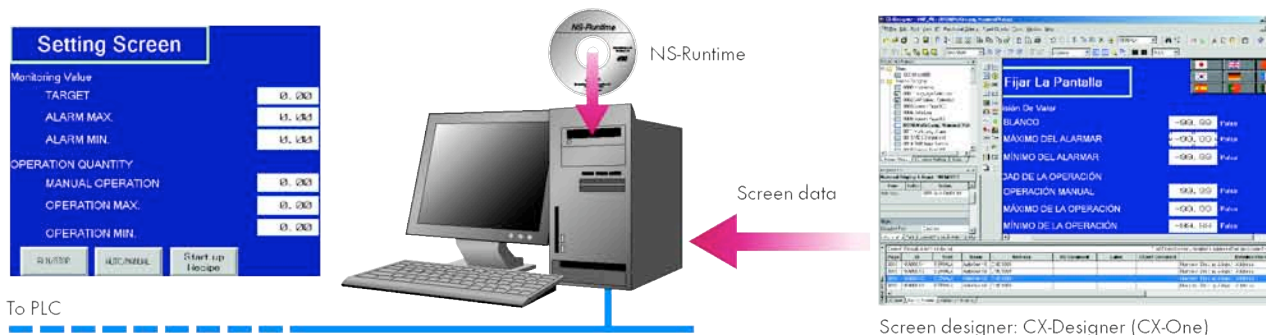
Note: The NS-Runtime will operate in a computer environment even if CX-Designer is not installed.
The hardware key (USB dongle) that is supplied with the NS-Runtime is required for operation.

Application Startup Function

User applications can be started from NS-Runtime.

Applications can be started simply by pressing buttons on the screen.

Started

Start up Recipe
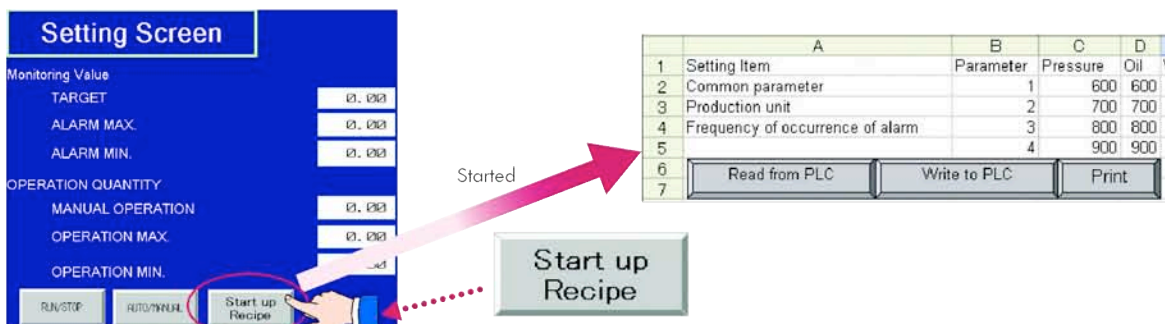
For example, to start an application by pressing a button... Use the EXEC( ) macro.
Example: EXEC("C:ProgramFiles\Micros..\EXCEL.EXEC:\..\TEST2.xls.....);

Note: As much as possible, keep applications closed that are not required for operation.

Alternatives

Just in case the touch panel fails, the NS-Runtime method can be used as a tentative solution to prevent stopping the equipment.
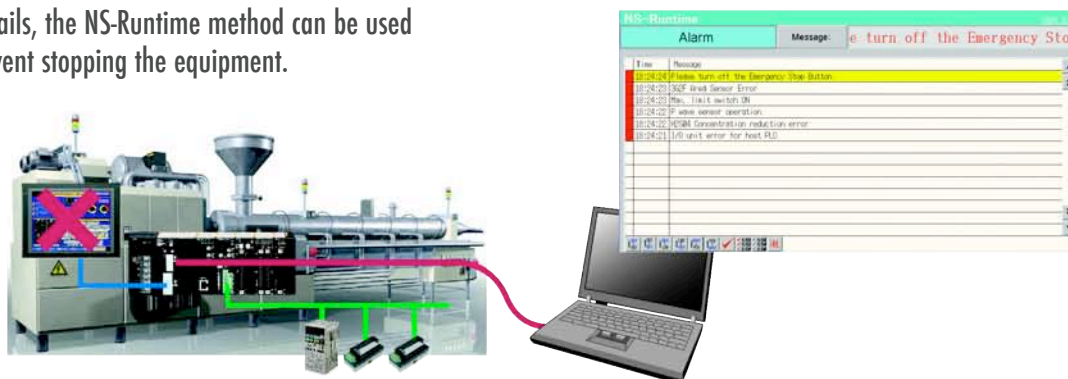
Licenses

The hardware key (USB dongle) that is supplied with the NS-Runtime is required for operation.

· Do not use this product for 24-hour operation in an FA environment.
· Omron shall not be responsible if the computer or application does not operate properly due to problems such as noise.
· Omron shall not be responsible for any problems that may be caused by any applications other than Omron products.

Easy-to-use Software

Save time with simple screen development

CX-Designer Screen Design Software is quick and simple to use without ladder programming or complex screen creation.

All addresses and comments can be managed using a single Symbol Table.

Shows a list of addresses, names, and comments used in project screen data. Addresses, names, and I/O comments for the CX-Programmer can also be imported.

Improved Icons and Help

The project Workspace enables the user to look through the entire project.

· Screens you want to edit can be opened right away.
· Perform screen management, such as copying or deleting screens, by simply right-clicking.
· Reusing screens from other projects is easy with the CX-Designer.
· Settings for alarms, data logs, communications, and other functions can be easily accessed.

Drastically reduce the number of clicks in the project.

Just click on the object once to display or change properties. Multiple objects can be selected to display and change shared properties all at once.

The Output Window shows search results.

In addition to addresses and I/O comments used in screen data, labels can also be used as search strings and the results can be displayed.

Easy-to-use Software

Dramatically reduces the need to manually input data such as addresses and I/O comments.

The symbol table created in the CX-Programmer during ladder programming can be read into the CX-Designer by dragging and dropping, so it isn't necessary to manually input data such as addresses and I/O comments.

CX-Programmer's symbol table

The CX-Programmer's symbol table can be dragged and dropped!

CX-Designer's symbol table
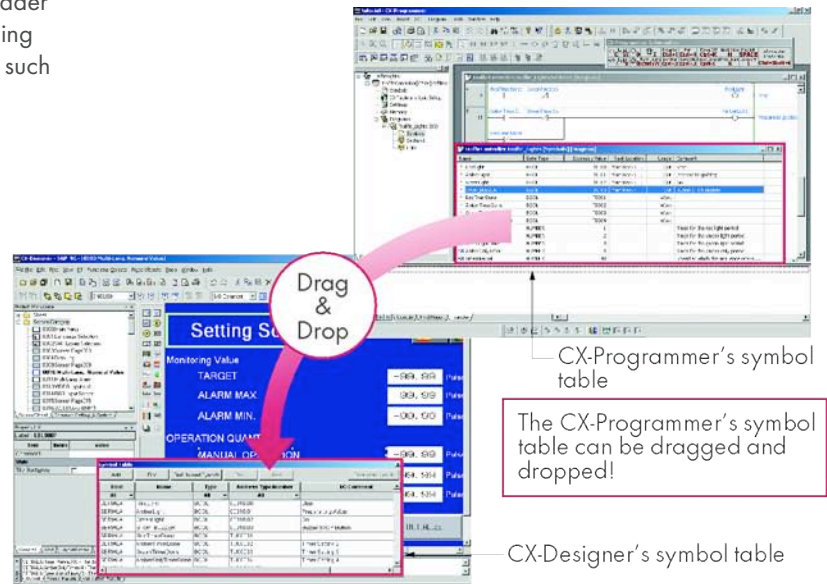
Example of Reading the Symbol Table

The symbol table read from the CX-Programmer can be directly dragged and dropped to the touch switch and lamp.

Example of Easy Address Allocation

(1) Create a switch on the screen.

(2) Check the comment then drag-and-drop the symbol from the symbol table to the property list.

(3) Allocations for buttons and lamps can also be checked on the screen using comments imported from the CX-Programmer.
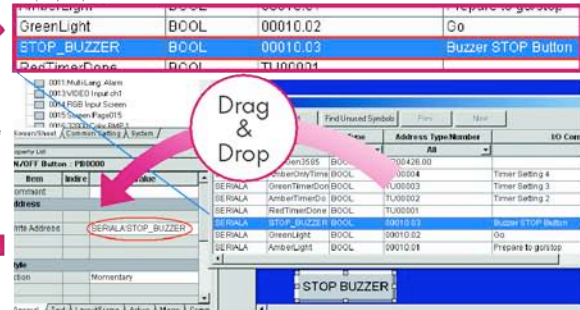
Example of Reading I/O Comments

The I/O comments are automatically used as labels when addresses are dragged and dropped from the symbol table.

The I/O comment is used as the label.
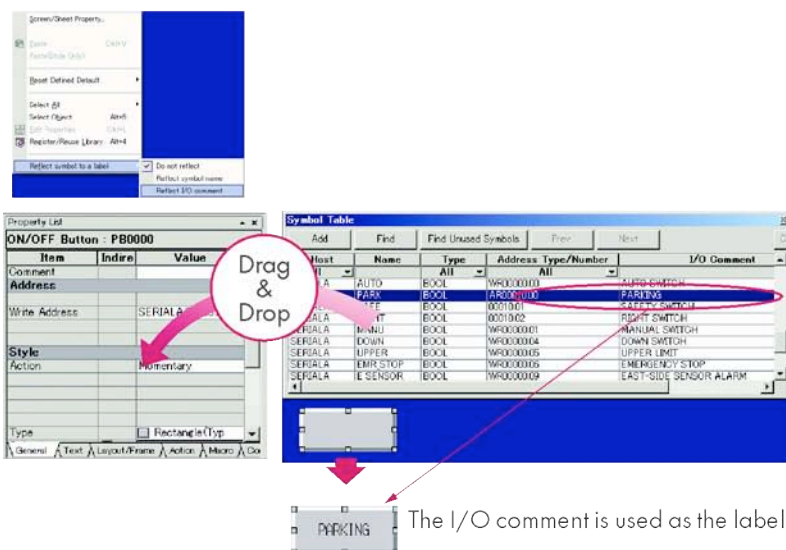
Re-use Another Project's Screens and Objects

Easily reuse screen resources by dragging and dropping them.

Resources from another project can be easily reused by just selecting the screen or objects that you want to read and dragging and dropping it, so screens can be created intuitively.

Example screen 1
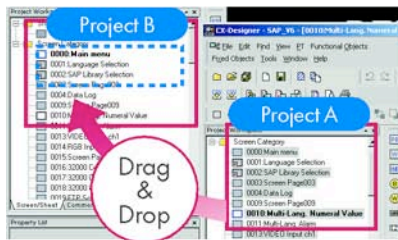
Select the screen that you want to read, drag it to the destination, and drop it.

Example screen 2
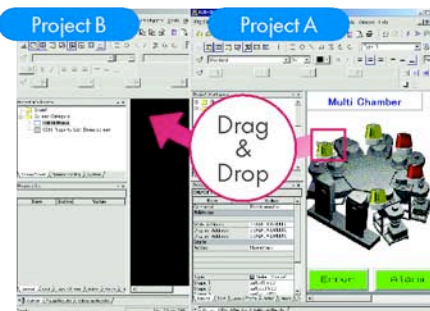
Select the part that you want to read, drag it to the destination, and drop it.

Integrated Simulation with the PLC Ladder Program

The screen data and ladder program can be checked simultaneously in the computer.

The CX-Designer and CX-Programmer interconnects the test functions in the computer through the CX-Simulator. The screens and ladder program checks are performed simultaneously, which significantly increases debugging efficiency.

Ladder Program Window

One Click simulation
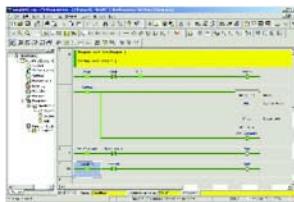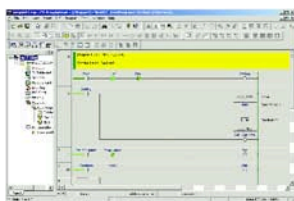
Touch Panel Screen

CX-One Version 2.0 on computer

Interactive

Easy-to-use Software

Editing of Multiple Objects

Objects can be edited very efficiently in a list!

Addresses and other settings, such as labels and colors, can be set together in a list, making editing operations much more efficient.

The attributes of multiple parts can be edited together, too.

When the common attributes (such as background color and text color) of multiple parts are being changed, the attributes can be changed together using the property list.

Example screen 1
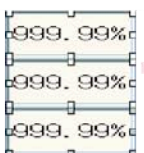
After editing the settings in the list, press the OK Button to make the new settings effective immediately.

Example screen 2
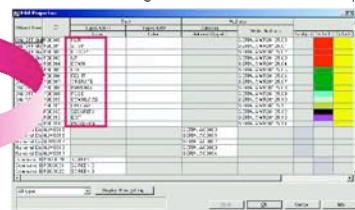
If the background color is changed from white to gray in the property list, the background color is changed for all of the selected objects.
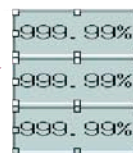
Editing of Overlapping Objects

The Select Object command and filter function are the solution for overlapping objects!

The Select Object command is a powerful tool when you want to edit an object hidden by overlapping. A filter function can also be used to aid editing by displaying only the objects to be edited.

Object Selection Window

Right-click and select Select Part to display the objects (all types) on the screen.

Filter Function

Use the Select Part command's filter function to select the objects (ON/OFF Button) that you want to edit.

Only the edited object is displayed and it can be edited easily.

Programming with Symbols

Screens can be created even when addresses are unknown.

Screens can be created even if the addresses have not been determined. Addresses can be input as either names or actual addresses and the addresses can be input from the symbol table after the addresses are determined.

Symbols input for addresses, which have not yet been determined.

Addresses input as addresses because they have been determined.

Inputting from the Symbol Table

Addresses are input in the symbol table after the addresses are determined.

Many Basic Functions

Multi-language Support

There are 41 languages supported and useful label switch functions are also built into the HMI.

Unicode is supported and 41 European and Asian languages can be combined in screens. Also, NS HMIs let you switch between up to 16 labels using the label switching function, so it is possible to support up to 16 languages in a single screen just by specifying the language to be displayed in each label.

The labels' text attributes can also be reflected when importing.

When screen data is imported, text attributes can be applied to the specified labels and attributes such as the font and text color can be reflected to other languages labels.

NS Series

Support for 41 International Languages

Multi-language CSV data
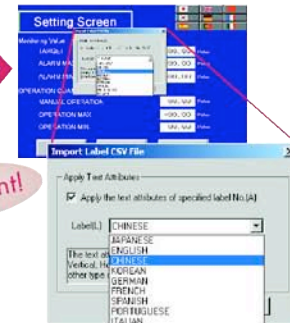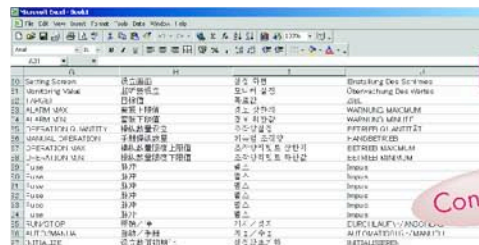
Import

Convenient!

Multi-language conversion has become much easier.

The screen data in the source language is exported to a CSV file and sent to a translation agency by e-mail for translation. Later, the translated CSV file is just imported to easily provide multi-language support.

Language A screen data

NS project

Language A Excel data

CSV

CSV Attachment

Dual-language input in Excel by translation companies and local companies

Dual-language screen data

NS project

Language A and B Excel data

CSV or Unicode text

CSV Attachment
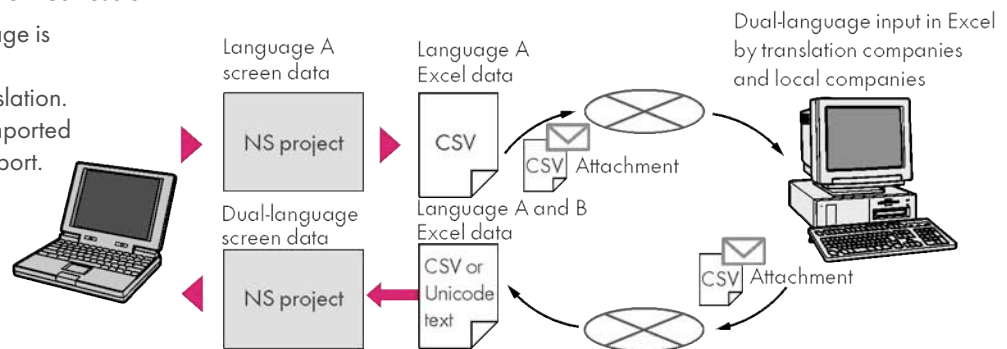
FTP Function

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.

Screens, bitmaps, text, recipe data

If(Date=0526)
FTP 192.xxxx
xxxx
mput *.bmp

.bmp file

.bmp file

Replace the wafer.

.txt file Replace the wafer.

.txt file Handle the wafer with gloves on.
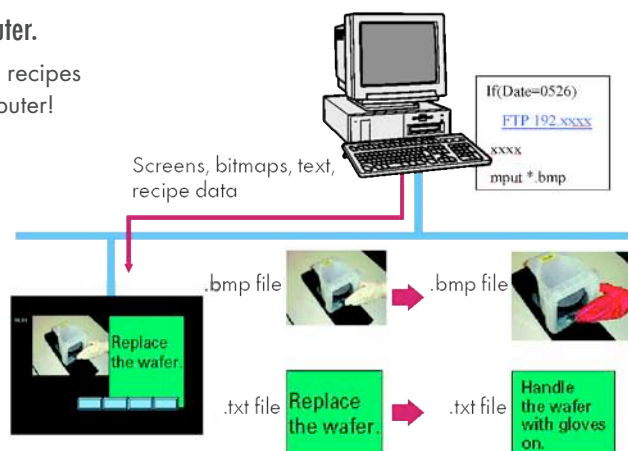
Many Basic Functions

Graph Display Options

A device's operation is easier to understand when presented visually.

A variety of graphing functions are built into the HMIs, such as the trend graph, which can log data over a long term, and the line graph, which can display overlapping graphs. A device's operation is easier to understand when presented visually.

Long-term data logging and storage are also easily achieved.

Trend Graph (Data Log) Function

Logging data is stored as a CSV file in the Memory Card mounted in the NS-series HMI. The data stored in the Memory Card can be read or deleted from the screen.
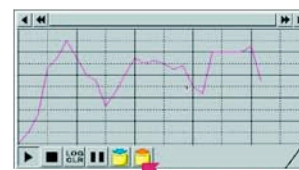
The log data files in the Memory Card appear as shown below when the read file button is pressed.

Show the current logging graph
Trd0004.csv 04/08/23 21:16
Trd0003.csv 04/08/23 21:15
Trd0002.csv 04/08/23 21:14
Trd0001.csv 04/08/23 21:13

Read file button
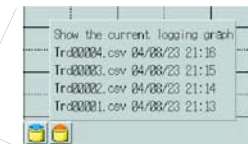
A log can be saved automatically, without any programming, just by selecting the "Save the data periodically" option in the Data Log Setting Window.

Automatically saved

Memory Card

LOG001.CSV 04/06/04 10:00
LOG002.CSV 04/06/05 10:00
LOG003.CSV 04/06/06 10:00
LOG004.CSV 04/06/07 10:00
LOG005.CSV 04/06/08 10:00
LOG006.CSV 04/06/09 10:00
LOG007.CSV 04/06/10 10:00

It is possible to make a one-week log by automatically saving the data seven times.

Logging data for each day (43,200 points) is saved in the Memory Card in CSV format.

Suffixes are automatically added to file names set in the CX-Designer.

Line Graph Function

The data logged by the PLC can be displayed in overlapping graphs, so a device's operation can be compared for evaluation and analysis. In addition, up to 1,000 words of consecutive data can be displayed as a line graph, data can be displayed together, and any region can be magnified.

(1) Graphs can be superimposed.

(2) The display can be magnified.
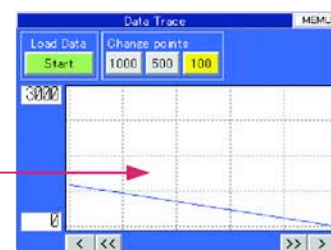
Any position from the host (PLC) can be plotted as a graph.

Continuous Line Function

A graph can be plotted in any position by specifying the X and Y coordinates of the vertices. Also, the graph can be moved on the screen by specifying the movements from the PLC.

PLC

D0000 X1
D0001 Y1
D0002 X2
Y2
X3
Y3

$(X1, Y1)$ $(X2, Y2)$ $(X3, Y3)$
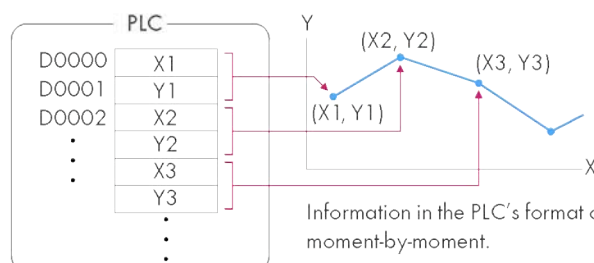
Information in the PLC's format can be plotted moment-by-moment.

Many Basic Functions

Connect. Expand. Feel the NS-series, the power of networking.

Omron's HMIs provide serial NT Link communications supporting both 1:1 and 1:N connections. The NT Link has more efficient communications than Host Link and its capabilities are especially apparent in applications with multiple HMIs connect to the PLC. The NS-series HMIs can also support communications with multiple PLCs and multiple NS-series HMIs through Controller Link and Ethernet connections, so the network can be configured freely to match the requirements and scale of the application. In addition, using the NS-Runtime makes it possible to monitor machine status and log data from the host.

NS-series Network Configuration Example

Software for Machine Monitoring and Data Logging

NS-Runtime (sold separately)
For details, refer to page 22.

Personal computer

3 Ethernet

CS/CJ-series PLC

NS-series HMI

2 Controller Link **1** Serial connection

4 Connections across network levels

NS-series HMI

CS/CJ-series PLC

NS-series HMI

NS-series HMI

CS/CJ-series PLC

CS/CJ-series PLC

NS-series HMI

1 Serial connection
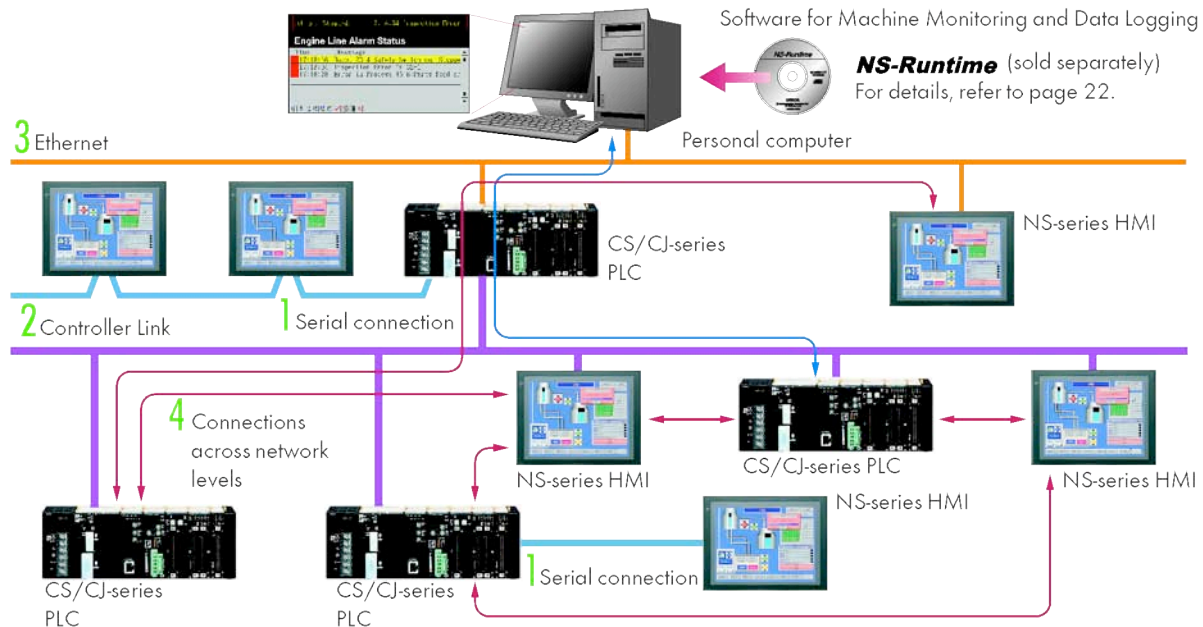
1 Serial Connection

1:1 NT Link or Host Link

NS:PLC = 1:1
Connecting with the PLC through port A or port B

NS:PLC = 1:2

NS-series HMI

PLC

NS-series HMI

PLC

PLC

1:N NT Link

NS:PLC ratio = 8:1 max.   Up to 8 NS-series HMIs can be connected to each of the PLC's RS-232C/RS-422A ports.

NS-series HMI

NS-series HMI

NS-series HMI

PLC

NS-AL002 Converter
(Converts between RS-232C and RS-422A.)

NS-series HMI

NS-series HMI

NS-series HMI
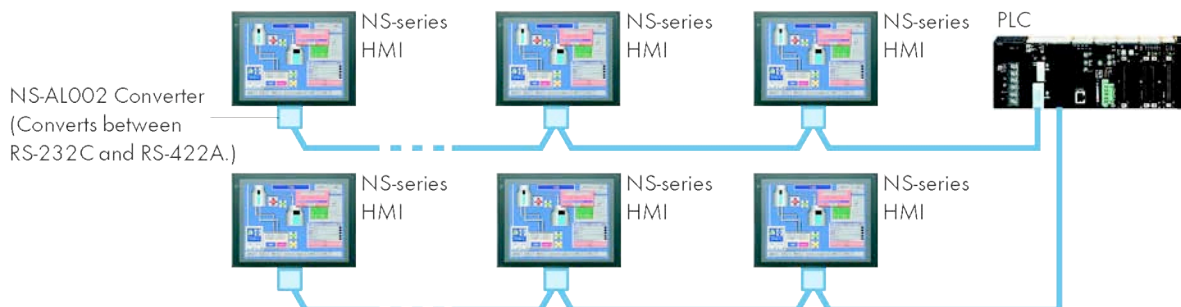
2 Controller Link Connection

The HMI can be connected to an Omron Controller Link network by mounting a Controller Link Interface Unit.

NS-CLK21

NS-series HMI   PLC   PLC   PLC
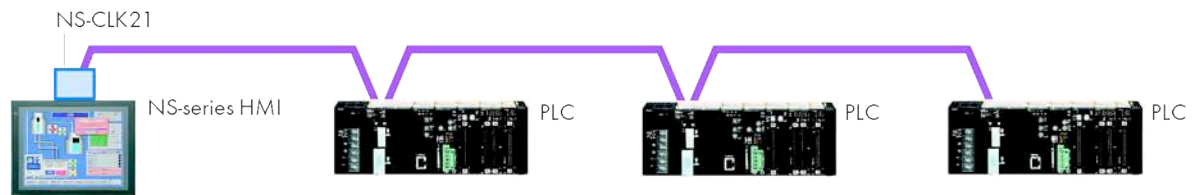
If a Controller Link connection is used, data links can be set between PLCs and multiple PLCs can be monitored/set from the NS-series HMI's screen.

Baud rate
2 Mbps (500 m max.)
1 Mbps (800 m max.)
500 kbps (1 km max.)
Max. number of nodes: 32 nodes

3 Ethernet Connection

An Ethernet-compatible NS-series HMI can connect easily to a PLC.

NS-series HMI   Personal computer   NS-series HMI

PLC   PLC   PLC
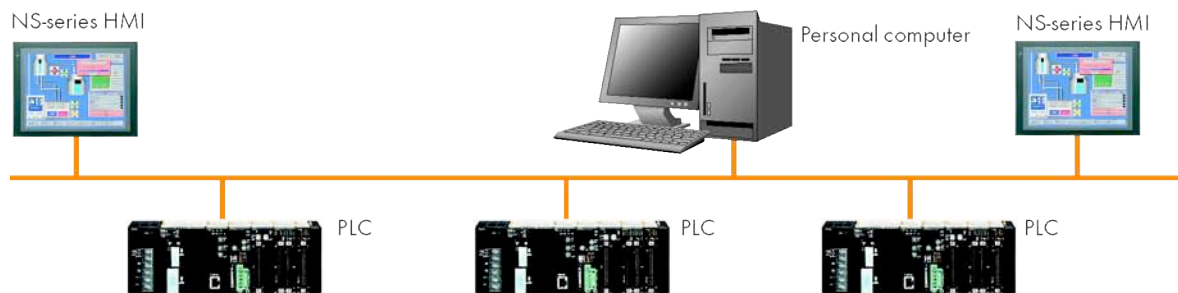
4 Connections Over Network Levels

The NS-series HMIs can connect to a variety of devices in the network, through as many as 3 network levels. For example, if SAP (Smart Active Parts) are being used, an NS-series HMI connected by Ethernet can be used to monitor the information in a PLC connected through Controller Link as well as the information in the DeviceNet Slaves connected to that PLC.

NS-series HMI   NS-series HMI

Ethernet

PLC

Seamless and Program-less

Seamless and Program-less

Controller Link

PLC   PLC

DeviceNet
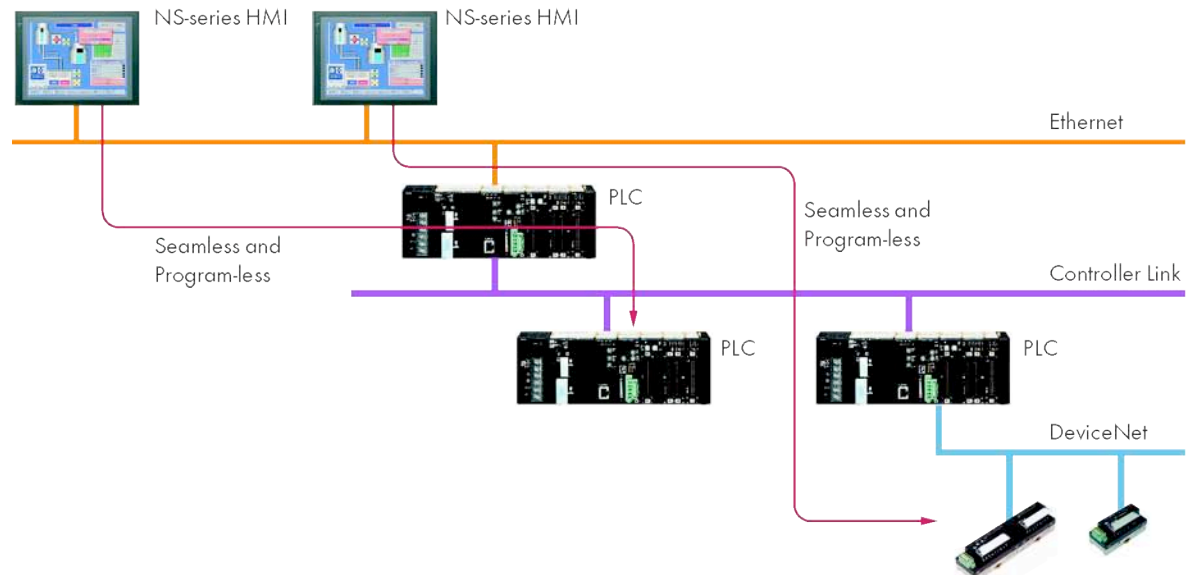
Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron 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.
2. **Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
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 Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than $200 net billing.
6. **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 Products.
7. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron 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, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products 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.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **Force Majeure.** Omron 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.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
    a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
    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 Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. **Warranties.** (a) 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. (b) 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. (c) 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. See http://www.omron247.com or contact your Omron representative for published information.
14. **Limitation on Liability; Etc.** OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. **Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their 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 Omron 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 Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. **Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) Waiver. No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) Assignment. Buyer may not assign its rights hereunder without Omron's written consent. (c) Law. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) Amendment. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) Definitions. As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

1. **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 but the following is a non-exhaustive list of applications for which particular attention must be given: (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document. (ii) Use in consumer products or any use in significant quantities. (iii) 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. (iv) Systems, machines and equipment that could present a risk to life or property. Please 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 OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **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.
4. **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.
5. **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.

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