

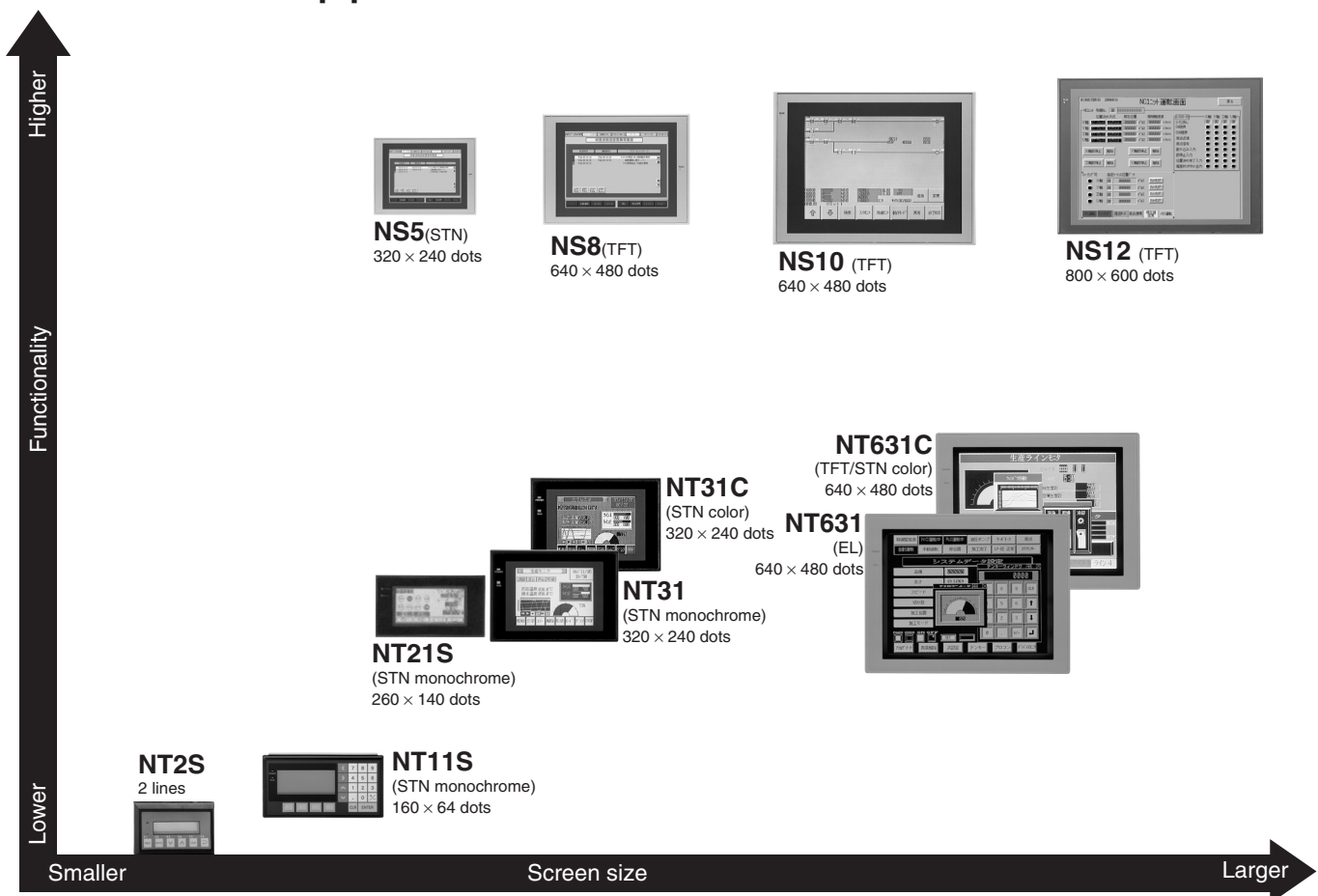
# Programmable Terminals

## As an machine management tool ... as an information terminal ... as a system component

As a global supplier of HMI solutions and high-reliability industrial touch screen technology for over 12 years, Omron has supplied more than 500,000 pieces of HMI through more than 200 world-wide sales and support offices each offering after-sales support, service and training in the local language.

We also understand the changing needs of our customers. As control systems become more complex the HMI is increasingly being used not only as an operator display and data-setting terminal, but also as a maintenance tool for the complete control system. Many HMI applications now contain 100's of screens of maintenance information for the complete control system and Omron's easy software and hardware integration within the control system can greatly reduce programming time needed and also greatly increase the functionality of the maintenance, therefore dramatically reducing the total cost of ownership.

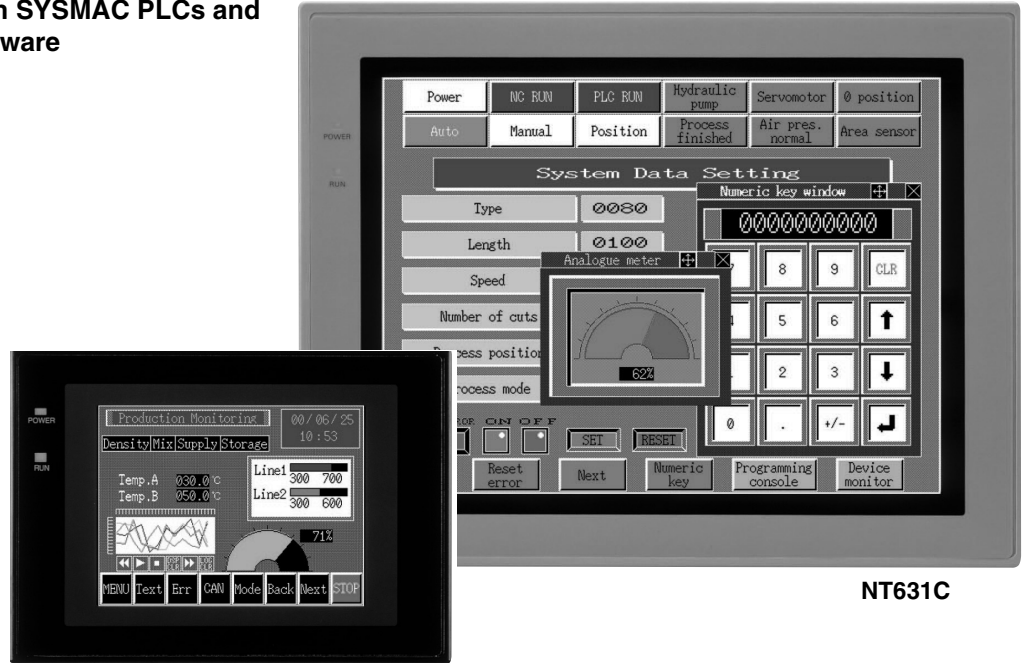
Select by screen size. Select by functions. The wide array of NT- and NS-series PTs suits most applications.



NT631/NT31 V2

# Touch-screen HMI

Greater Compatibility with SYSMAC PLCs and Easy-to-Use Support Software



NT31C

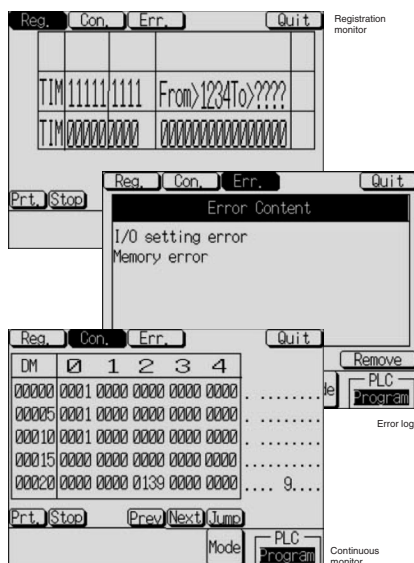
NT631C

Programmable Terminals

## Features for Users

### Device Monitor Function

I/O memory in the PLC can now be directly accessed to read or write data. Continuous portions of PLC areas can be displayed. This greatly increases startup efficiency for setting Special Units or for checking settings. The Device Monitor can be accessed directly from user screens for applications in monitoring and maintenance screens.



## Full Area Access and High-speed NT Links with CS Series

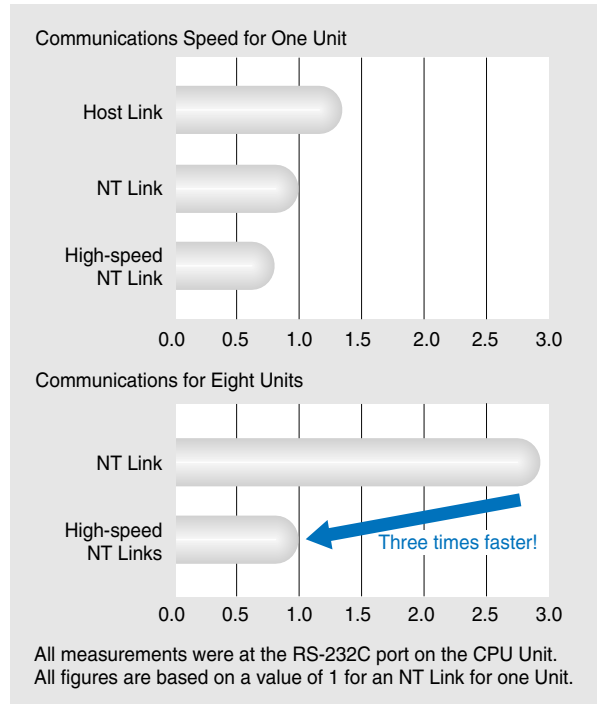
### High-speed Links with CS-series PLCs

- Fastest communications in the industry for serial connection.
- Connect up to 8 PTs to a single port.
- Communicate to a maximum of 500 m.
- Connect up to 8 PTs and still get the same communications speed as 1 PT connected in a standard NT Link.

### Accessible Areas in CS-series PLCs (for 1:N NT Links)

PLC	CS1G or CS1H
CIO Area	00000 to 06143
HR Area	00000 to 00511
AR Area	00448 to 00959
Timer/Counter present values	00000 to 04095
DM Area	00000 to 32767
EM Area (e.g., current EM bank, EM bank 0, or EM bank C)	00000 to 32767
Work Bit Area	00000 to 00511
Task Flags	00000 to 00031
Timer Completion Flags	00000 to 04095
Counter Completion Flags	00000 to 04095

### Faster Access to More Areas (OMRON Comparison)



## Features

### More Processing and Interlock Functions

Numeric processing and interlock features can be built into the screens, greatly reducing the amount of ladder programming required and simplifying program changes, maintenance work, and system upgrading. (The PT now supports up to 5 items of arithmetic and/or logic processing).

### Multi-window Display Allows Optimum Screen Application

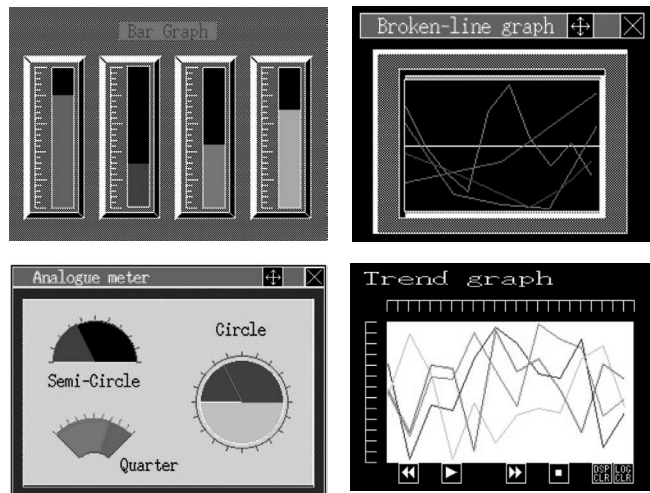
Up to three windows can be displayed simultaneously. A window can be moved with the touch of a finger. Furthermore, windows can be opened and closed from the PLC using operations in the Window Control Area.



### Versatile, Enhanced Display Functions

#### Enhanced Graphs

The enhanced graph function allows precise settings, including indirect settings for analog meters, trend graphs, sequential line graphs, and bar graphs.

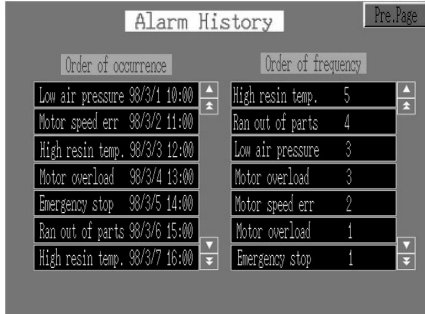


**High-definition Fonts**

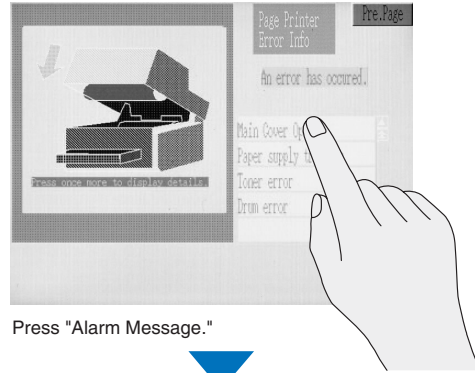
Display text can be set to from 4 to 16 times normal size and still maintain high definition for easy reading.

**Alarm History Helps to Improve Equipment**

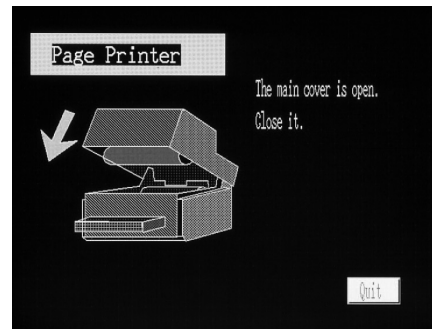
A history of malfunctions displayed on the screen can be arranged in order of occurrence or frequency. The history can be referred to at any time, even during operation, making analyzing machine problems far easier. The history can also be updated to the NT Support Software.



**Alarm List for Realtime Error Displays**



Press "Alarm Message."



A program will start and display the details of the error.

**Features for Maintenance**

**System Program Transfers**

Functions and performance can be upgraded without changing hardware simply by loading a new system program.

**Screen Transfers via Memory Units**

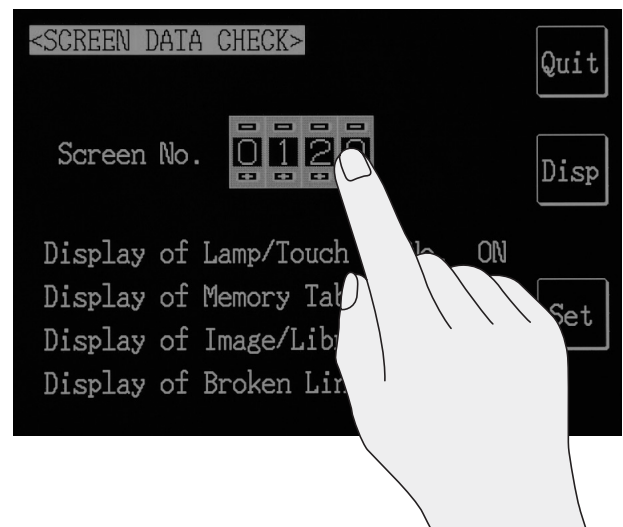
Just save the screens to a Memory Unit and essentially anyone can easily transfer screens. Up to two banks of data can be saved in a Memory Unit, enabling both screen data and the system program to be saved to a single Memory Unit

**Special Screen Transfer Utility**

Essentially anyone can transfer screen data without using the NT Support Tool. The utility is a separate software package and can be set up separately wherever required.

**Screen Verification without PLC Connection**

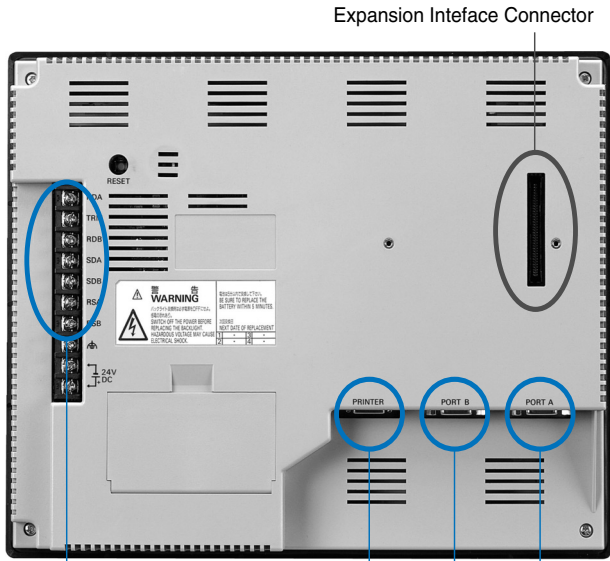
The NT631/NT31 displays screens, such as lamps, touch switches, and memory table numbers, without the PLC connected, to enable efficient debugging.



Other Features

Three Communications Ports for Easier Application

NT631/NT631C

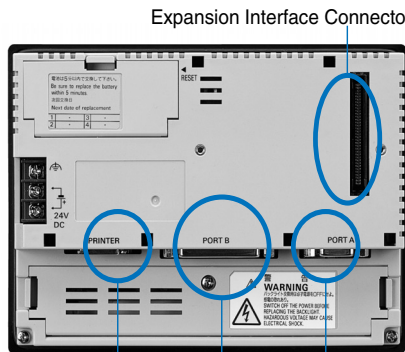


Expansion Interface Connector

**RS-422A Port**  
Easily achieve 1:N RS-422A or RS-485 communications. Long-distance communications are also possible.

**Printer Port**  
**RS-232C Ports**  
Two RS-232C ports are a standard feature. Connect directly to a barcode reader to construct a POP system. Or connect one to the Support Software and one to anyother host to make debugging and maintenance more efficient.

NT31/NT31C



Expansion Interface Connector

**Printer Port**  
**RS-232C Port**  
**RS-232C/RS-422A Port**  
Can be set to RS-232C using a memory switch.

Flat, Thin Body

All models are only 54 mm thick with an essentially flat surface. This makes the PTs fit so much more easily into control panels or machines and contributes to down-sizing.

IP65F Environment Resistance

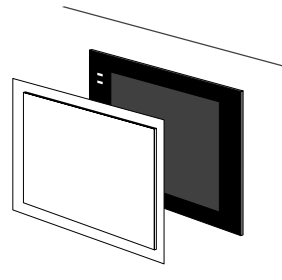
Flush surface construction is used for superior environmental resistance to achieve an enclosure rating for the front of the PT of IP65F. IP → International Protection  
6 → Dust and dirt will not enter interior. (Enclosure protects against foreign objects.)  
5 → There are no adverse effects from a water stream from any direction. (Enclosure protects against water intrusion.)  
F → There are no harmful effects from oil droplets or spray from any direction. (Enclosure protects against oil intrusion.)

International Standards

EC Directives, UL, and CSA listings/approvals have all been acquired for each shipping anywhere in the world.



Protective Cover



Model numbers	NT631C-KBA05 (5 Covers) NT31C-KBA05 (5 Covers)
Material	Polyethylene film
Mounting method	Double-sided tape

**Note:** This Protective Cover is designed to protect the screen from the adhesion of oil, dust, finger marks, etc.

Specifications

NT631C/NT631

General Specifications

Item	Specifications	
	NT631C-ST151(B)-EV2	NT631-ST211(B)-EV2
Rated power supply voltage	24 V DC	
Allowable power supply voltage range	20.4 V DC to 26.4 V DC (24 V DC -15% to +10%)	
Power consumption	18 W max.	30 W max.
Operating ambient temperature	0 to 50°C	
Storage ambient temperature	-20 to 60°C35% to 85% (with no condensation)	
Operating ambient humidity		
Operating environment	No corrosive gases	
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)	
Vibration resistance (operating)	Conforms to IEC 60068-2-6, JIS C0040. 10 to 57 Hz with 0.075-mm amplitude, 57 to 150 Hz with 1G {9.8 m/s <sup>2</sup> } acceleration for 30 minutes in each of X, Y, Z directions	Conforms to IEC 60068-2-6, JIS C0040. 10 to 54.8 Hz with 0.075-mm amplitude for 30 minutes in each of X, Y, Z directions
Shock resistance (operating)	Conforms to IEC 60068-2-27, JIS C0041. 147 m/s <sup>2</sup> {15G} 3 times in each of X, Y, and Z directions	
Weight	2.5 kg max.	
Enclosure ratings	Front panel: Equivalent to IP65F (NEMA4)*	

**Note:** The NT631/NT631C may not be used at a location where it is exposed to splashing oil for a long period.

Performance Specifications

Display Specifications

Item	Specifications			
	NT631C-ST151(B)-EV2	NT631-ST211(B)-EV2		
Display panel	Display device	Color TFT LCD	High-contrast EL	
	Number of dots (resolution)	640 dots horizontal × 480 dots vertical		
	Effective display area	211 mm horizontally × 158 mm vertically (10.4")		
	View angle	Up: ±55° Down: 55° Left: 55° Right: 55°	(No restriction)	
	Display colors	8 colors (and intermediate colors can be displayed with tiling patterns)	Black, white (2 colors)	
	Life expectancy	50,000 hours minimum (until brightness reduced by half)	30,000 hours minimum (until brightness reduced by 30%)	
	Automatic turn-off	Can be set to turn off in 1 to 255 minutes, or to remain on		
	Contrast adjustment	(Not provided)	(Not provided)	
Backlight (with cold cathode tube)	Life expectancy (at high brightness)	30,000 hours minimum <sup>1)</sup>	---	
	Replacement	Can be replaced from the rear	---	
	Brightness adjustment	(Not provided)	---	
Indicators	POWER (green LED)	Lit while power is being supplied		
	RUN	Lit green: Running normally, Memory unit automatic transmission done Lit orange: Low battery voltage (during operation) Lit red: Low battery voltage (when NT631/NT631C is stopped)		

**Note: 1.** Time taken for brightness to reduce to half at normal temperature and humidity

Touch Panel Specifications

Number of switches	768 (32 horizontally × 24 vertically)
Input method	Pressure-sensitive type
Operating force	1 N minimum
Life expectancy	One million operations minimum

External Interface Specifications

Item	Specification
Serial communications	Serial port A Conforms to EIA RS-232C D-Sub 9-pin connector (female) +5 V (250 mA max.) output at pin No. 6
	Serial port B connector Switchable between EIA RS-232C and RS-422A/485 (by memory switch setting) RS-232C: D-Sub 9-pin connector (female) RS-422A/485: Terminal block (6 terminals)
Parallel interface	Conforms to Centronics standard, 20-pin half pitch connector
Expansion interface	Dedicated connector

Display Specifications (Same for NT631C/631/31C/31)

Item	Specification	
Display elements	Character displays	65,535 per screen (including marks)
	Fixed displays	
	Character string displays	256 per screen (40 bytes (40 characters) per string)
	Numeral displays	256 per screen, max. 10-digit display
	Bar graph displays	50 per screen with percentage and sign displays
	Analogue meters	50 per screen, with percentage and sign displays
	Trend graphs	1 frame per screen, 50 graphs per screen data file (8 graphs per screen data file with data logging)
	Broken line graphs	1 frame per screen, 256 graphs per frame, 512 points per graph
	Lamps	256 per screen
	Image library data	256 per screen
	Touch switches	256 per screen, 256 mesh overlapping
	Numeric key inputs	256 per screen
	Thumbwheel inputs	
	Character string inputs	256 per screen
	Screen types	Alarm lists
Alarm histories		
Normal screen		The normal screen display
Overlapping screens		A maximum of 8 registered screens can be displayed overlapped with each other.
Screen attributes	Window screens	Up to 3 screens (2 local windows and 1 global window) can be displayed at the same time.
	Display history screens	Order of occurrence (max. 1024 screens), order of frequency (max. 255 times)
Number of screens	Screen attributes	Buzzer, display history, background color, backlight, keyboard screen number
	Max. number of registered screens	3,999 screens
Screen registration method	Screen No.	0:No display 1 to 3999:User registered screens 9000:Initializing system screen 9001:Display history (occurrence) screen 9002:Display history (frequency) screen 9020:Programming Console function screen 9021:Registration monitor screen 9022:Continuous monitor screen 9023:Error Log screen 9030:Brightness/contrast adjustment screen 9999:Return to the previous screen
	Screen registration method	By transmitting screen data created using the Support Software to the PT By transmitting screen data stored in a Memory Unit to the PT (automatic/manual)
	Screen saving method (screen data memory)	Flash memory (screen data memory in the PT)

**Display Element Specifications**

Item	Specification
Display characters	<ul style="list-style-type: none"> <li>Half-size characters (8×8 dots): Alphanumerics and symbols</li> <li>Standard characters (8×16, 16×32 dots): Alphanumerics and symbols</li> <li>Marks (16×16 dots): User-defined pictographs</li> </ul>
Enlargement function	Equal, wide, high, 2×2, 3×3, 4×4, 8×8
Smoothing process	Characters of 2×2 or larger (except marks)
Character display attributes	Standard, flash, inverse flash, transparent
Image data	Variable-size pictographs Size: 8×8 dots min., 640×480 dots max. The size can be set as required in 8-dot units. Enlarged display, smoothing processing, and display attributes such as inverse and flash cannot be set.
Library data	Combinations of any graphics Size: 1×1 dots min., 640×480 dots max. Any size can be set within this range. Enlarged display, smoothing processing, and display attributes such as inverse and flash are implemented according to the setting registered.
Graphics	Polyline, circle, arc, sector, rectangle, polygon
Line type	4 types only for polylines (solid line, broken line, alternate long and short dash, long and two short dashes)
Tiling	10 types
Graphic display attributes	Standard, inverse, flash, inverse flash
Display colors	NT31, NT631: Two colors (black, white) NT31C, NT631C: Eight colors (black, blue, red, magenta, green, cyan, yellow, white)

**Data Capacities**

Data	Capacity
Screen data	1 MB
Numeral memory tables	2 words x 2,000 entries (1,000 entries backed up)
String memory tables	40 characters x 2,000 entries (500 read/write)
Bit memory tables	1 x 1,000 entries
Mark data	224 marks (calculated for 16 x 16-bit marks)
Image data	4,095
Library data	12,288

**NT31C/NT31**

**General Specifications**

Item	Specification
Rated power supply voltage	24 V DC
Allowable power supply voltage range	20.4 V DC to 26.4 V DC (24 V DC -15% to +10%)
Power consumption	15 W max.
Operating ambient temperature	0 to 50°C
Storage ambient temperature	-20 to 60°C
Operating ambient humidity	35% to 85% (with no condensation)
Operating environment	No corrosive gases
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance (operating)	Conforms to IEC 60068-2-6, JIS C0040, 10 to 57 Hz with 0.075-mm amplitude, 57 to 150 Hz with 1G {9.8 m/s <sup>2</sup> } acceleration for 60 minutes in each of X, Y, Z directions
Shock resistance (operating)	Conforms to IEC 60068-2-27, JIS C0041. 147 m/s <sup>2</sup> {15G} 3 times in each of X, Y, and Z directions
Weight	1 kg max.
Enclosure ratings	Front panel: Equivalent to IP65F (NEMA4)*

**Performance Specifications**

**Display Specifications**

Item	Specifications	
	NT31-ST121(B)-EV2	NT31C-ST141
Display device	Monochrome STN LCD	Colour STN LCD
Number of dots (resolution)	320 dots horizontal × 240 dots vertical	
Effective display area	118.2 mm horizontally × 89.4 mm vertically (5.7 inches)	
View angle	Up:20° Down:30° Left/right:±30°	
Display colors	Black, white (2 colors)	8 colors
Life expectancy	50,000 hours minimum (until brightness reduced by half)	
Automatic turn-off	Can be set to turn off in 1 to 255 minutes, or to remain on	
Contrast adjustment	Adjustable in 100 levels by operation at touch panel	
Backlight (white cold cathode tube)	Life expectancy (at high brightness)	25,000 hours minimum (at room temperature, until brightness is reduced to 50%)
	Replacement	Can be replaced from the rear
	Brightness adjustment	Adjustable in 3 levels by at touch panel
Indicators	POWER (green LED)	Lit while power is being supplied
	RUN	Lit green: Running normally, Memory unit automatic transmission done Lit orange: Low battery voltage (during operation) Lit red: Low battery voltage (when stopped)

**Touch Panel Specifications**

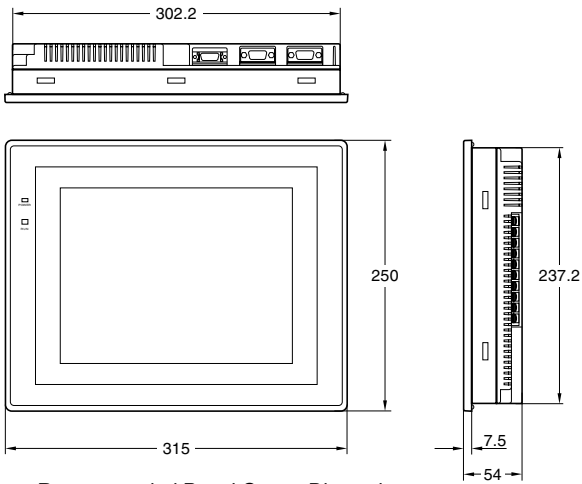
Number of switches	192 (16 horizontally × 12 vertically)
Input method	Pressure-sensitive type
Operating force	1 N minimum
Life expectancy	One million operations minimum

**External Interface Specifications**

Item	Specification
Serial communications	Serial port A Conforms to EIA RS-232C D-Sub 9-pin connector (female) +5 V (250 mA max.) output at pin No. 6
	Serial port B EIA RS-232C or RS-422A/485 (selectable by memory switch setting) D-Sub 25-pin connector (female)
Parallel interface	Conforms to Centronics standard, 20-pin half pitch connector
Expansion interface	Dedicated connector

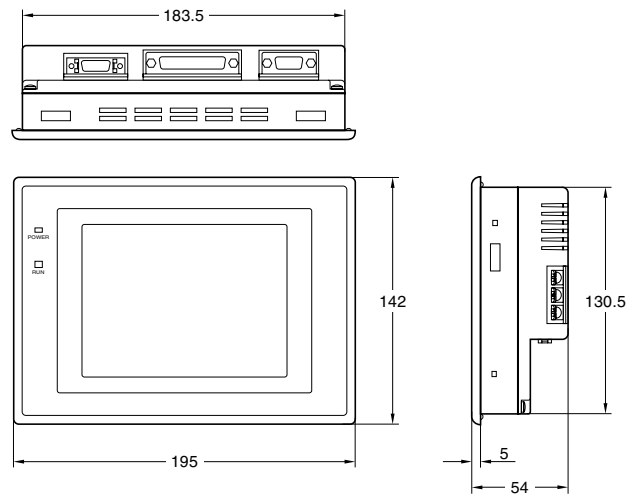
Dimensions

NT631C/NT631



Recommended Panel Cutout Dimensions  
 $238.0^{+0.5}_0 \times 303.0^{+0.5}_0$  mm (vertical x horizontal)

NT31C/NT31



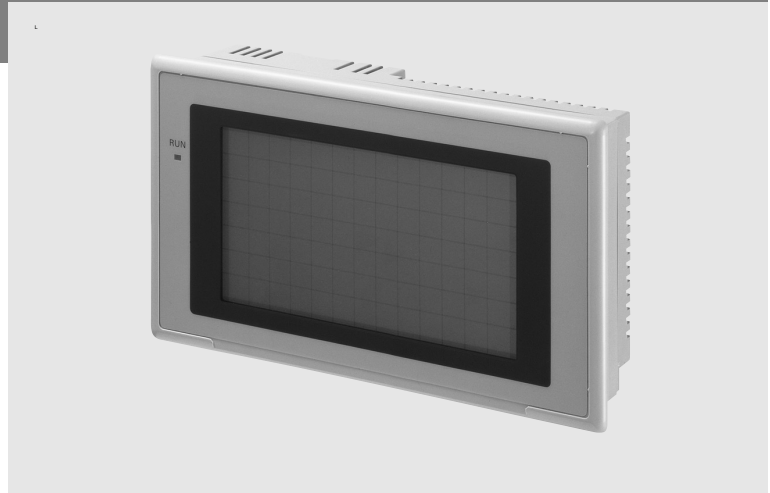
Recommended Panel Cutout Dimensions  
 $131.0^{+0.5}_0 \times 184.0^{+0.5}_0$  mm (vertical x horizontal)



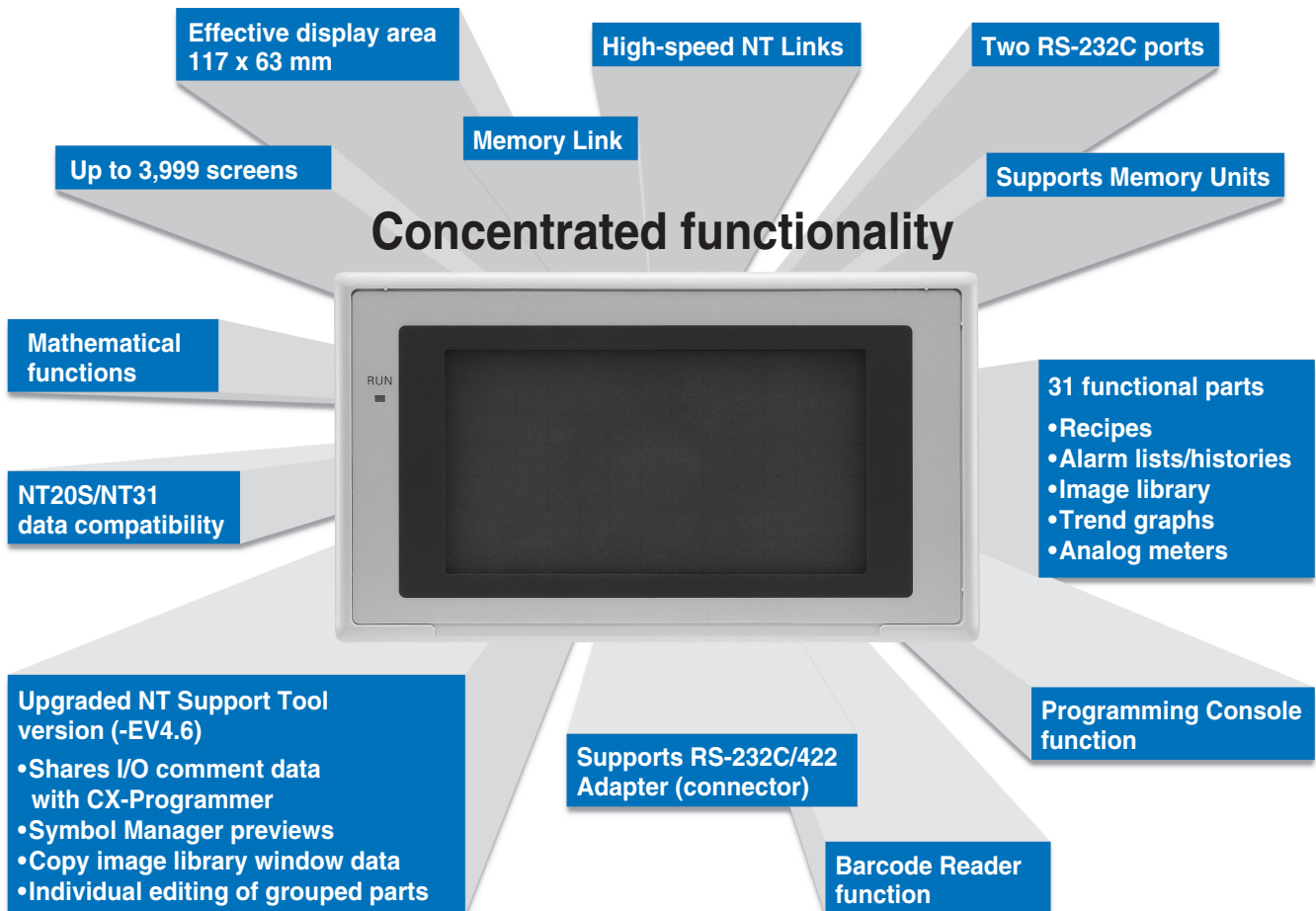
NT21S

# Small touch-screen HMI

Cost effective touch screen terminals to replace function key units and increase the flexibility and operation.



## Features



Connectable PLCs for Direct Access

Communications method	C200H	C200HS	C200HX/HG/HE(-Z)	C1000H/C2000H	CS1/CJ1	CV/CVM1 V1	CQM1H	CPM1(A)	SRM1	Computer/SBC
Host link (RS-232C)	CU	CU/CPU (Note 1)	CU/CPU (Note 4)	CU	CU/CPU	CU/CPU	CPU (Note 2)	CPU (Note 5)	CPU	---
1:1 NT Link	---	CPU (Note 1)	CPU (Note 4)	---	---	CPU	CPU (Note 3)	CPU (Note 5)	CPU	---
Memory Link (NTH protocol)	---	---	---	---	---	---	---	---	---	CPU

CPU: Connected to built-in CPU Unit port, CU: Connected to Communications Unit.

- Note:**
1. The built-in port can be used on the following CPU Unit: C200HS-CPU2□/3□.
  2. The built-in port can be used on the following CPU Unit: CQM1H-CPU21/4□.
  3. The built-in port can be used on the following CPU Unit: CQM1H-CPU4□.
  4. Connection is also possible to a Communications Board. Refer to the communications methods for individual models for details.
  5. A CPM1-CIF01 RS-232C Adapter must be purchased separately

Specifications

General Specifications

Item	Specification
Power supply voltage	24 V DC
Power consumption	7 W max
Noise resistance	Conforms to IEC61000-4-4, Power supply line 2 kV
Vibration resistance	10 to 57 Hz with 0.075 mm single amplitude, 57 to 150 Hz with 9.8 m/s <sup>2</sup> acceleration, for a total of 60 min. in X, Y, and Z directions.
Shock resistance	Peak acceleration 15 G 3 times each in X, Y, and Z directions
Ambient operating temperature	0 to 50°C (with no icing)
Storage temperature	-20 to 70°C (with no icing)
Ambient operating humidity	35% to 85% (with no condensation)(0 to 40°C) 35% to 55% (with no condensation)(40 to 50°C)
Dimensions	190 x 110 x 53.5 mm (W x H x D) (thickness inside panel: 49.0 mm)
Enclosure ratings	Front panel operating section: Equivalent to IP65F, NEMA 4.*
Weight	0.6 kg max.

\* Usage may not be possible in places where the unit would be exposed to oil for long periods.

Display Capacity

Item	Specification	
Display elements	Fixed displays	A total of 65,535 per screen With overlapping screens, the total is 524,280 per screen
	Fixed character strings	(Graphics: Continuous straight lines, rectangles, circles, polygons, arcs, sectors)
	Graphics	
	Marks	
	Numeral displays	256 positions per screen, max. 10-digit display (2 words)
	Character string displays	256 positions per screen max. 1,024 display elements for overlapping screens
	Graph displays	50 positions per screen, capable of displaying signs and percentages
	Analog meters	50 positions per screen, capable of displaying signs and percentages
	Trend graphs	One frame per screen, 50 items per frame (8 items max. for data logging)
	Broken line graphs	One frame per screen, 256 items per frame, 260 points per item
	Lamps	256 positions per screen
	Image library images	256 positions per screen
	Touch switches	256 positions per screen, max. 256 meshes
	Numeral settings	256 positions per screen (numerical keypad)
	Thumbwheel settings	26 positions per screen
Screen types	Character string settings	256 positions per screen
	Temporary inputs	One position per screen
	Alarm lists/histories	Four groups per screen
	Recipes	One position per screen
	Normal screens	Display screens registered as normal
	Overlapping screens	A maximum of eight screens can be displayed overlapping each other
	Windows	Up to three window screens can be displayed
	Display history screens	Order of occurrence (1,024 screens max.), order of frequency (255 times max.)
	System startup screen	Displayed when powering ON (or resetting) the PT, and when switching to RUN mode
	Programming console screen	Emulates PLC programming Console functions, capable of being called from RUN mode.
Screen attributes	Buzzer, display history, normal background colors, backlight mode, local windows	
	Max. number of registered screens	3,999
Number of screens	Screen number	0: No display 1 to 3999: User registered screens (normal, overlapping, windows) 9000: System startup screen 9001: Display history screens, order of occurrence 9002: Display history screens, order of frequency 9020: Programming console screen 9021 to 9023, 9030: Reserved 9999: Return to previous screen designation
	Screen registration method	By transferring screen data from the NT Support Tool to the PT via serial communications By mounting the Memory Unit and downloading (automatic/manual transfer) data to the PT
	Saving screen data	Flash memory (PT internal image memory)
	Total of 256 positions for both numerical and thumb-wheel settings	

Programmable Terminals

## Display Specifications

Item		Specification
Display Panel	Display device	Monochrome STN LCD
	Number of dots (resolution)	260 dots horizontally x 140 dots vertically
	Effective display area	117 mm horizontally x 63 mm vertically
	Viewing angle	Left/right direction: 30°, up/down: 30°
	Display color	Black & white (with blue mode)
	Service life	50,000 hours min. (until contrast reduced to 50%)
Backlight (white cold cathode tube)	Automatic turn-OFF	Can be set to turn OFF in 1 to 255 min or to remain ON with screen saver
	Service life	50,000 hours min. (at room temperature, until brightness is reduced to 50%)
	Replacement	Non-replaceable

## Panel Specifications

Item		Specification
Touch panel	Number of switches	91 (13 horizontally x 7 vertically)
	Input	Pressure-sensitive
	Threshold force for operation	1 N max.
	Life expectancy	1 million operations min.

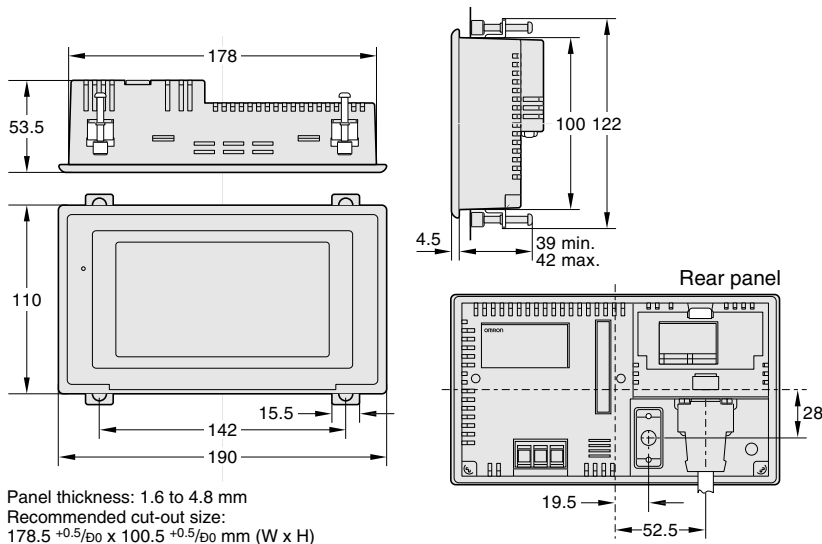
## External Interface Specifications

Communication method	Serial port A	Serial port B
NT support Tool	Supported	Not Supported
PLC	Host Link	Supported
	1:1 NT Link	Supported
	1:N NT Links	Supported
	NT Link, PT Programming Console function	Supported
SBC/personal computer	Memory Links	Supported
Barcode Reader	Supported	Not Supported

## NT21 Standard Models

Product	Specification		Model number	
NT21 Programmable Terminal	Monochrome STN	Frame color: beige	NT21-ST121E	
		Frame color: black	NT21-ST121B-E	
Support Tool	Windows 95, 98, ME, NT, or 2000	CD-ROM	NT-ZJCAT1-EV4	
Cables	For screen transfer		XW2Z-S002	
	For PLC connection	PT: 9-pin PLC: 9-pin	Cable length: 2 m	XW2Z-S200T
			Cable length: 5 m	XW2Z-S500T
	PT: 9-pin PLC: 25-pin	Cable length: 2 m	XW2Z-S200S	
		Cable length: 5 m	XW2Z-S500S	
	PT: 9-pin PLC: Mini-peripheral	Cable length: 2 m	XW2Z-S200T-2	
Cable length: 5 m		XW2Z-S500T-2		
Options	Reflection Protective Sheets	Display area only (5 sheets)	NT20M-KBA04	
	Chemical-resistive Cover	Silicon cover	NT20S-KBA01	
	Battery	For alarm lists/histories	C500-BAT08	
	Memory Unit	For screen and system data transfer	NT-MF161	
	RS-232C/422A Adapter		NS-AL002	
	Connector Kit		XM2S-0911-S003	

## Dimensions



NT11S

# Function-key HMI terminal

**The NT11S, the Slim, Low Cost Operation Terminal that Stands Up Well to Harsh Environments.**

- Long-lived Backlight
- Simplified Ladder Programming
- Password Screens
- Conforms to NEMA4 and IP65



## Main features

### Withstands Water and Oil

- Use in many demanding areas even with oil and water
- The front panel of the terminal withstands water to NEMA4 and IP65 standards, which means that it can be used even in locations where it may be splashed with water or oil.

### Large Keys

- For easy operation by all users
- The numeric keys and function keys have been made a generous size for your convenience. They can be operated even when wearing working gloves.

### Entry of Numerical Values

The numeric key pad integrated with the display allows the entry of numerical values such as temperatures and production quantities.

### Printout of Production Status

Data such as the production status and production results can be printed out, leaving a record on paper which can be used as a daily report. (The NT11S has a printer port. One screen only is printed.)

### “Direct Connection” Communication

- Simplifies Ladder Programming
- The NT11S supports two communication methods: the NT link method, which substantially reduces the size of the program at the host side, and the host link direct connection method.

The “NT link” method features a particularly high response speed.

- NT link method

SYSMAC  
C200HS-CPU3□/2□  
CQM1-CPU4□

- Host link direct connection method

SYSMAC  
C200HS-CPU3□/2□  
C200H-LK201/-V1  
CQM1 (Excludes -CPU11)

### Integral Numeric Key Pad

The display, numeric keys, and function keys are all integrated into the front panel, which is convenient for designers. The key layout is ergonomically designed for ease of use.

### Password Screens for Security

- To limit access to authorized persons only
- Password screens cannot be accessed unless the correct password is entered. This means that the operations that can be performed can be restricted according to the operator.

### Key Titles can be Marked on the Function Key Sheet

Key titles can be marked on the function key sheet in accordance with the applications of the keys: the sheet can be taken out from the side face of the terminal. The front panel of the terminal has a water-withstanding construction.

### Bar Graphs can be Displayed

Bar graph displays allow the progress of processes to be checked at a glance. (The bars are oriented horizontally.)

### Display History Record Helps in Analysis of Machine Faults

When the display history record function is set as a screen attribute, the time, the screen number, and a comment are recorded in the terminal's memory every time the relevant screen is displayed. This display history can be printed by issuing a print instruction from the host, and is useful for machine fault analysis.

### Screen Operations are Easy

Using the support software, screens to be displayed by the terminal can be created as easily as if using a word processing program. This software can be run on an IBM PC/AT or compatible. It contains the system program transfer tool that downloads the system program to the flash ROM.

Main functions

- Fixed displays, numeral display, character display
- Character inversion, flashing, double-width. Character copy, move, delete.
- 8 x 16 dot mark registration (max. 64 marks can be registered)
- Horizontal bar graphs
- Numeral setting
- Password

## Easy to Order

Since the communication interface, image memory, and flash ROM that downloads the system program are incorporated in the NT11S body, placing orders is a simple matter.

## The front panel is available in beige or black

## Long-lived Backlight

Since LEDs are used for the backlight, it is very long-lived and rarely needs to be changed.

## Specifications

### General Specifications

Power supply voltage	24 V DC
Allowable power supply voltage range	20.4 to 26.4 V DC (24 V DC -15 %, +10 %)
Power consumption	15 W max.
Noise resistance	Common mode (between power supply and panel): 1000 Vp-p Normal mode: 300 Vp-p Pulse width: 100 ns to 1 ms Pulse rise time: 1 ns
Vibration resistance	10 to 22 Hz with 1.5 mm double amplitude in X, Y, and Z directions. 22 to 500 Hz with 1.5 G {14.7 m/s <sup>2</sup> } acceleration for a total of 30min. in X, Y, and Z directions.
Shock resistance	20 G {196 m/s <sup>2</sup> } 3 times each in X, Y, and Z directions.
Ambient operating temperature	0 to +50 °C
Ambient operating humidity	35 to 85 % RH (with no condensation)
Operating environment	No corrosive gases.
Storage temperature	-20 to +70 °C (with no freezing)
Enclosure ratings	Front panel: Equivalent to IP65, NEMA4
Weight	1.0 kg max.

### Display/Panel Specifications

**Note:** In order to improve the performance of displays, liquid crystal devices may be changed without notice.

Display screen	Dot matrix of STN liquid crystal display panel - Number of dots: 160x64 - Effective display area: 100 40 mm - Life expectancy: 50,000 hours minimum - View angle (left/right direction): ±20°	Backlight - LED - Life expectancy: 10,000 hours minimum (average: 30,000 hours) - Automatic turn-off: can be set to turn off in 10 minutes or 1 hour, or to remain on.
Indicators	- POWER indicator (Green LED): Lit while power is being supplied. - RUN indicator (Green LED): Lit during operation	
Switch	- 22 switches - Life expectancy: 1 million operations minimum	

### Display Capacity

**Note:** Note: In order to improve the performance of displays, liquid crystal devices may be changed without notice.

Display characters	Normal characters (8 16 dots): Alphanumerics and symbols Marks (8 16 dots): User-defined, 64 max.	
Number of characters	displayed Normal-size: 20 horizontally 4 lines vertically max.	
Enlargement function	Double width	
Display elements	Character string displays	8 positions per screen
	Numeral displays	8 positions per screen
	Graph displays	4 positions per screen
	Numeral settings	8 positions per screen
Screen attributes	Display history	Order of frequency, 256 screens
	Password screen	Ensures security: screens for which this attribute is set can only be displayed if the correct password is input.
	Menu screen	Four items per screen
Screen types	Normal screen: Displays screen registered as normal.	
Max. number of registered screens	250	
Screen registration method	Transfer screen data created using an IBM PC/AT personal computer to the PT.	
Screen saving method	Saved to flash memory: 32KB (downloading method)	

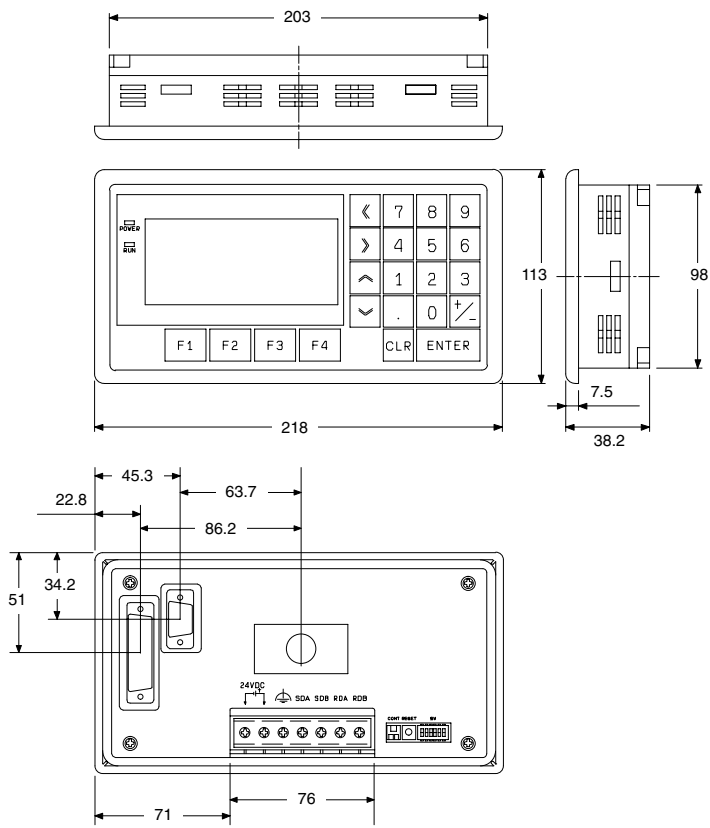
## Special Features

Printing function	Printing of display history data Printing of daily reports (printing format registered by the users)
Maintenance functions	Self-test for memory, switches, etc. Status setting confirmation for communications and other conditions. Simple communications confirmation

## Ordering Information

Product	Specification	Model	
Programmable Terminal	Host link direct connection,	Ten-key type (frame color: beige)	NT11S-SF121
	NT link method	Ten-key type (frame color: black)	NT11S-SF121B
Support Software	3.5" FD (for IBM PC/AT)	NT11S-ZA3AT-EV1	

Dimensions



Programmable  
Terminals

NT2S

# Small Function Key Terminals

The NT2S series Terminals are designed as a human machine interface for simple control tasks. Their small dimensions and low installation depths ensure that they will fit into any machine. Of the six NT2S types, four can be connected directly to the peripheral port and two can be connected to OMRON PLCs via an RS-232C port.

- Easy programming
- Small size and installation depth
- IP65 protection
- Real-time clock
- Printer connection
- Excellent value for money



## Performance Data (Max. Values)

	NT2S-SF121B-EV2	NT2S-SF125B-E	NT2S-SF122B-EV2	NT2S-SF126B-E	NT2S-SF123B-EV2	NT2S-SF127B-E
<b>Programmable</b>	Yes	Yes	Yes	Yes	No (PLC controlled)	No (PLC controlled)
<b>Terminal size (W,H,D)</b>	109x60x36 mm	107x107x36	109x60x36 mm	107x107x36	109x60x36 mm	107x107x36
<b>Display size</b>	56x11 mm	56x11 mm	56x11 mm	56x11 mm	56x11 mm	56x11 mm
<b>Number of screen pixels</b>	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character
<b>Number of lines/characters</b>	2/16	2/16	2/16	2/16	2/16	2/16
<b>Number of function/control keys</b>	6	20	6	20	6	20
<b>Memory</b>	24 kB for applications	24 kB for applications	24 kB for applications	24 kB for applications	PLC memory is used	PLC memory is used
<b>Max. screen pages</b>	250	250	250	250	Depending on PLC memory	Depending on PLC memory
<b>Number input</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Bar graph</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Trend/line diagram</b>	-	-	-	-	-	-
<b>Alarm handling</b>	-	-	-	-	-	-
<b>Real-time clock/date</b>	Yes	Yes	-	-	-	-
<b>Printer interface</b>	Yes	Yes	Yes	Yes	-	-

## Communication

Host Link	Yes (RS-232C)	Yes (RS-232C)	Yes (peripheral port)	Yes (peripheral port)	Yes (peripheral port)	Yes (peripheral port)
<b>1:1 NT Link</b>	-	-	-	-	-	-
<b>1:n NT Link</b>	-	-	-	-	-	-
<b>ASCII protocol</b>	-	-	-	-	-	-

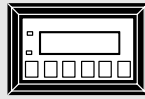
**System Configuration**

**Host Link**

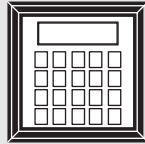
Data is exchanged quickly between the Control Terminal and an OMRON PLC using the Host Link protocol.

The RS-232C communication method can be used. The following OMRON PLC systems feature the Host Link protocol:

- CPM1 family
- CPM2 family
- CQM1 family
- CJ1
- CS1



NT2S-SF121B



NT2S-SF125B

**Miniature Peripheral port**



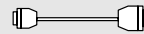
NT2S-CN223-V1  
for CS1, CJ1, CQM1H

**RS232C port**

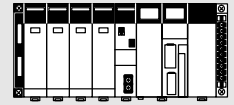


RS-232C cable  
for CPM1A, CPM2C  
(CIF adapter required)

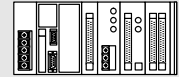
**Peripheral port**



NT2S-CN212/215  
for CPM1A, CPM2A



CS1



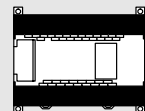
CJ1



CQM1H



CPM2C

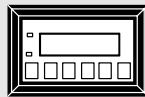


CPM2A

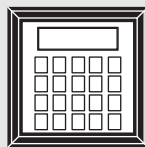


CPM1A

Power supply: 24 VDC, external



NT2S-SF122B  
NT2S-SF123B



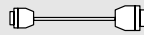
NT2S-SF126B  
NT2S-SF127B

**Miniature peripheral port**

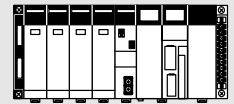


NT2S-CN224-V1

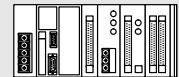
**Peripheral port**



NT2S-CN222-V1  
NT2S-CN225-V1



CS1



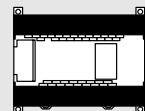
CJ1



CQM1H



CPM2C



CPM2A



CPM1A

Power supply: from the PLC, via port connection



Product Overview

Model code	NT2S-SF121B-EV2	NT2S-SF125B-E	NT2S-SF122B-EV2	NT2S-SF126B-E	NT2S-SF123B-EV2	NT2S-SF127B-E
	- Programmable using software - Real-time clock - Printer port - PLC connection via RS-232C port - Supply voltage 24 V		- Programmable using software - Printer port - PLC connection via peripheral port - Supply voltage connection via peripheral port		- Functions are controlled using the PLC - PLC connection via peripheral port - Supply voltage connection via peripheral port	
Display size (WxHxD)	108x60x43 mm	108x108x43 mm	108x60x43 mm	108x108x43 mm	108x60x43 mm	108x108x43 mm
Number of screen pixels	5x7 pixel/character					
Number of lines/characters	2/16	2/16	2/16	2/16	2/16	2/16
Number of function/control keys	6	20	6	20	6	20
Memory	24 kB Flash memory for applications				PLC memory is used	
Supply voltage	24 V DC	24 V DC	---			
Degree of protection	IP65F (front side)					

Specifications

Model code	NT2S-SF121B-EV2	NT2S-SF125B-E	NT2S-SF122B-EV2	NT2S-SF126B-E	NT2S-SF123B-EV2	NT2S-SF127B-E
<b>Function keys</b>						
Key type	Membrane keyboard					
Key function	As well as fixed or system functions, functions can be assigned dynamically using software (Softkeys), while global, i.e. screen-independent, keys can also be defined					
<b>Display elements</b>						
Characters	5x7 pixel/character					
Image colours	Monochrome					
Character display attributes	Normal, flashing (entire screen)					
<b>Display specification</b>						
Display	- LED backlit LCD Module, 2x16 characters, 5x7 pixel/character - Character size 4.35 mm - Extended ASCII character set (semi-graphic)					
Function displays	2 status LEDs <sup>1</sup> , programmable via PLC					
<b>Display capacity</b>						
String display	Entire display area can be used					
Numeric display	Entire display area can be used					
Bar graph display	Entire display area can be used					
Character string input	-					
Alarm list	-					
Time display	Either by output from Controller real-time clock or output from Terminal's integrated real-time clock		From Controller			
<b>Screen page</b>						
Number of stored screen pages	Max. 250		-			
Screen page numbers	1..250		-			
Storing of screen pages	Transfer of data from a PC to the Terminal				All programming in the PLC	
<b>General</b>						
Battery backup	Data backup in EEPROM				-	
Supply voltage	10..30 V DC		via PLC			
Power consumption	approx. 1.5 W		-			
Immunity	Between power supply and panel: 1700 Vss Normal: 480 Vss Pulse width: 100 ns..1 µs Pulse rise time: 1 ns					
Vibration resistance (in operation)	10..61.2 Hz with 0.1 mm amplitude 61.2..150 Hz with an acceleration of 1.5 g in X, Y and Z directions 4 times for 8 minutes each					
Shock resistance (in operation)	147 m/s <sup>2</sup> , 3x in X, Y and Z directions					
Ambient temperature	0 °C..50 °C					
Ambient humidity	35%..85%					
Operating environment	No corrosive gases					
Storage temperature	-20 °C..60 °C					
Degree of protection	Front side: IP65F, Rear side: IP20					
Approvals	CE, c-UL					
Weight	150 g	230 g	135 g	205 g	130 g	200 g
<b>Host Link Direct communication</b>						
Communication method	RS-232C or Peripheral port		Peripheral port			
Communication protocol	C series SYSWAY (1:1)					
Communication settings	Start/stop synchronisation Communication speed: 9600 bps Data length: 7 bits Stop bit: 2 bits Parity: even					
Connection	1 x 9-pin D-Sub female for PLC 1 x 9-pin D-Sub female for PC/Printer, SW download/printer		1 x 9-pin D-Sub male for PLC 1 x 9-pin D-Sub female for PC/Printer		1x9-pin D-sub male for PLC	
Number of devices	1					
<b>Printer</b>						
Communication method	ASCII protocol printer				No	
Connection	Serial RS-232C port				No	

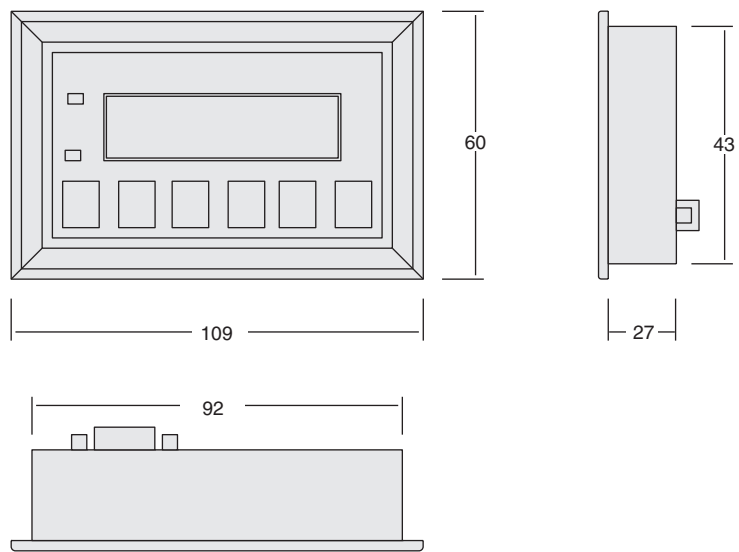
1. The NT2S-SF125/126/127B-E do not have status LEDs

**Programming and Accessories**

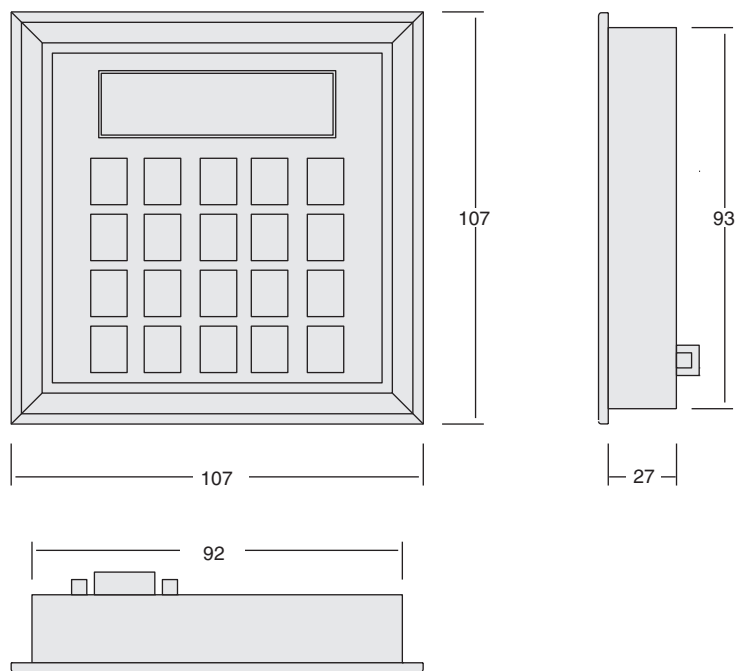
	Description	Cable length	Model code
<b>Programming</b>	NT Shell. Programming software for Control Terminals. For WINDOWS 95/98/ME/2000/NT4.0-SP5 see page 454	-	NT Shell
<b>Accessories, cables etc.</b>	Connecting cable, NT2S SF121B / SF125B <-> PLC (peripheral port)	2 m 5 m	NT2S-CN212 NT2S-CN215
	Connecting cable, NT2S SF122B / SF123B / SF126B / SF127B <-> PLC (peripheral port)	2 m 5 m	NT2S-CN222-V1 NT2S-CN225-V1
	Connecting cable, NT2S-SF121B / SF125B <-> PLC (miniature peripheral port)	2 m	NT2S-CN223-V1
	Connecting cable, NT2S-SF122 / SF123B / SF126B / SF127B <-> PLC (miniature peripheral port)	2 m	NT2S-CN224-V1
	Adapter cable, miniature peripheral port <-> PLC (peripheral port)	2 m	CS1W-CN114

**Dimensions (mm)**

NT2S-SF121B-EV2  
NT2S-SF122B-EV2  
NT2S-SF123B-EV2



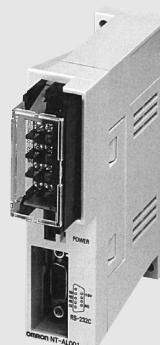
NT2S-SF125B-E  
NT2S-SF126B-E  
NT2S-SF127B-E



NT-AL001

# RS-232C/RS-422A Adapter

The NT-AL001 converts signals between RS-232C and RS-422A. Use the NT-AL001 to connect 1:N NT Link communications, to connect to multivendor communications, or anytime signal conversion is required.



## Specifications

### General Specifications

Item	Specification
Model number	NT-AL001
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (with no condensation)
Rated power supply voltage	+5 V $\pm$ 10% (supplied from pin 6 of RS-232C connector)
Rated power supply current	150 mA max.
Surge current	0.8 mA max.
Insulation resistance	20 M $\Omega$ min. (at 500 V DC) between RS-422A signal lines and functional ground terminal
Dielectric strength	1,500 V AC between RS-422A signal lines and functional ground terminal for 1 min, leakage current: 10 mA max.
Operating environment	No corrosive gases
Ambient storage temperature	-20 to 75°C
Vibration resistance	Conforms to JISC 0911, 80 min each in X, Y, and Z directions
Shock resistance	Conforms to JISC 0912, 15G for 3 times each in X, Y, and Z directions
Weight	200 g

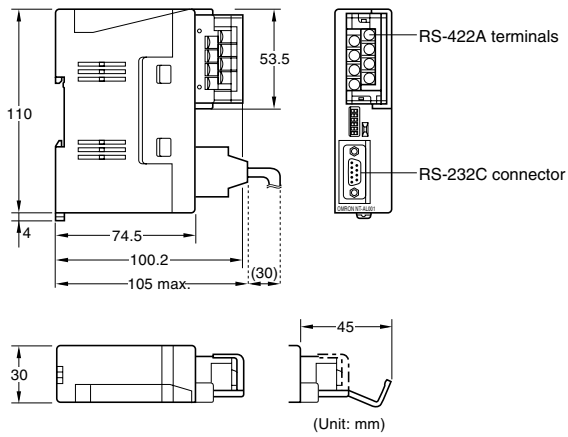
### RS-232C Interface

Item	Specification
Baud rate	64 kbps max.
Transmission distance	2 m max.
Connector	D-Sub, 9-pin connector (female)

### RS-422A Interface

Item	Specification
Baud rate	64 kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminals	8-terminal removable terminal block, M3.0 terminals

Dimensions



30 x 114 x 100.2 mm (W x H x D) with RS-422A terminal cover removed.  
 30 x 114 x 119.5 mm (W x H x D) with RS-422A terminal cover in place.

# Ordering Information

## PTs

### NS Series

Name	Specifications	Model	
NS12	TFT, 12", 800 x 600 dots	Without Ethernet	Frame color: Beige NS12-TS00
		With Ethernet	Frame color: Black NS12-TS00B
			Frame color: Beige NS12-TS01
		Frame color: Black NS12-TS01B	
NS10	TFT, 10", 640 x 480 dots	Without Ethernet	Frame color: Beige NS10-TV00
		With Ethernet	Frame color: Black NS10-TV00B
			Frame color: Beige NS10-TV01
		Frame color: Black NS10-TV01B	
NS8	TFT, 8", 640 x 480 dots	Without Ethernet	Frame color: Beige NS8-TV00
		With Ethernet	Frame color: Black NS8-TV00B
			Frame color: Beige NS8-TV01
		Frame color: Black NS8-TV01B	
NS5	STN, 5.7", 320 x 240 dots	Without Ethernet	Frame color: Beige NS5-SV00
		With Ethernet	Frame color: Black NS5-SV00B
			Frame color: Beige NS5-SV01
		Frame color: Black NS5-SV01B	

### NT Series

Name	Specifications	Model	
NT631	TFT color	Frame color: Beige NT631C-ST151	
		Frame color: Black NT631C-ST151B	
	EL	Frame color: Beige NT631-ST211	
		Frame color: Black NT631-ST211B	
NT31	STN color	Frame color: Beige NT31C-ST141	
		Frame color: Black NT31C-ST141B	
	STN monochrome	Frame color: Beige NT31-ST121	
		Frame color: Black NT31-ST121B	
NT21S	STN monochrome	Frame color: Beige NT21-ST121E	
		Frame color: Black NT21-ST121B	
NT11	STN monochrome	Ten-key type Frame color: Beige NT11S-SF121	
		Frame color: Black NT11S-SF121B	
NT2S	LCD monochrome	Programmable	6-key type, Frame color: Black NT2S-SF121B
			NT2S-SF122B
		PLC controlled	NT2S-SF123B
		Programmable	20-key type, Frame color: Black NT2S-SF125B
			NT2S-SF126B
		PLC controlled	NT2S-SF127B

## Support Software

### NS-series PTs

Name	Specifications	Model
NS-series Screen Design Software for Windows	For NS-series PTs Windows 95, 98, Me, 2000, XP, or NT 4.0	NS-NSDC1
Cable to transfer screens	IBM PC/AT or compatible	XW2Z-S00S

### NT-series PTs

Name	Specifications	Model
NT-series Support Software for Windows	For NT-series PTs Windows 95, 98, Me, 2000 or NT 4.0	NT-Shell
Memory Unit to transfer screens	For NT31, NT31C, NT631, or NT631C	NT-MF261
Printer cable for NT Series	To print hardcopies of screens	NT-CNT121

Options

Name		Specifications		Model
Ladder Monitor Software	1 CD-ROM Ladder Monitor applications (See note 1.) and I/O Comment File Creation Tool (See note 2.)	For NS Series	A Memory Card must be purchased separately to operation on the NS-series PT. A HMC-AP001 Memory Card Adapter is required to write data from the CD-ROM to a Memory Card on a personal computer.	NS-EXT01
				NS-EXT01-L03 (3 licenses)
				NS-EXT01-L10 (10 licenses)
				NS-EXT01-HMC (with 48-MB Memory Card)
RS-232C/RS-422A Adapter		For NS Series		NS-AL002
Reflective Protective Sheets (front only, 5 sheets in a set)		For NS10/NS12		NS12-KBA04
		For NS7		NS7-KBA04
Protective Covers (5 covers in a set)		For NS10/NS12		NS12-KBA05
		For NS7		NS7-KBA05
Memory Cards	8 MB	For NS Series		HMC-EF861
	15 MB			HMC-EF171
	30 MB			HMC-EF371
	48 MB			HMC-EF571
Memory Card Adapter		For NS Series		HMC-AP001
Battery		For NS10/NS12		C500-BAT08
		For NS7		CPM2A-BAT01
DeviceNet Interface Unit		For NT631/NT31		NT-DRT21
Reflective Protective Sheets (front only, 5 sheets in a set)		For NT631C/NT631		NT610C-KBA04
		For NT31C/NT31		NT30-KBA04
		For NT20S		NT20M-KBA04
Protective Covers (5 covers in a set)		For NT631C/NT631		NT631C-KBA05
		For NT31C/NT31		NT31C-KBA05
Chemically Resistive Covers (5 covers in a set)		For NT631C/NT631		NT625-KBA01
		For NT31C/NT31		NT30-KBA01
Replacement Backlights		For NT631C-ST151(B)-EV2		NT631C-CFL01
		For NT631C-ST141(B)-EV2		NT631C-CFL02
		For NT31C/NT31		NT31C-CFL01
		For NT20S		NT20S-CFL01
Barcode Reader		Refer to the Barcode Reader catalog for details.		V520-RH21-6
RS-232C/RS-422A Adapter		For CV-series, C200HS, C1000H, and C500 PLCs		NT-AL001

- Note:** 1. This application for the NS-series PT enables monitoring ladder programs in SYSMAC CS/CJ-series PLCs on the PT.  
 2. This software extracts I/O comment data from CXT files from the CX-Programmer and converts them for ladder monitoring.

PT-PLC Connecting Cables

Communications method	Cable	SYSMAC PLC connector	PT connector	Cable length	Model
Host Link, 1:1 NT Link (D-Sub, 9-pin; D-Sub, 25-pin; or peripheral)	Host Link Cable	D-Sub, 9-pin	D-Sub, 9-pin	2 m	XW2Z-200T
			D-Sub, 25-pin	2 m	XW2Z-200S
				5 m	XW2Z-500S
		D-Sub, 25-pin	D-Sub, 9-pin	2 m	XW2Z-200P
			D-Sub, 9-pin	5 m	XW2Z-500P
				2 m	XW2Z-200T-2
1:N NT Link for connection of multiple PTs	NT-A001-to-PT Cable	D-Sub, 9-pin (on NT-AL001)	D-Sub, 9-pin	70 cm	XW2Z-070T-1
			D-Sub, 9-pin	2 m	XW2Z-200T-1
NT2S-SF121 and 125 to CPM1A, CPM2A PLC peripheral port	Host link to NT2 connecting cables	peripheral port	NT2S SF121B / SF125B	2 m	NT2S-CN212
NT2S-SF122, 123, 126 and 127 to CPM1A, CPM2A PLC peripheral port.	Host link to NT2 connecting cables	peripheral port	NT2S SF122B / SF123B / SF126B / SF127B	2 m	NT2S-CN222-V1
				5 m	NT2S-CN225-V1
NT2S-SF121 and 125 to CJ1, CS1, CQM1H, PLC peripheral port.	Connecting cable	miniature peripheral port	NT2S-SF121B / SF125B	2 m	NT2S-CN223-V1
NT2S-SF122, 123, 126 and 127 to CJ1, CS1, CQM1H, PLC peripheral port.	Host link to NT2 connecting cables	miniature peripheral port	NT2S-SF122 / SF123B / SF126B / SF127B	2 m	NT2S-CN224-V1
Adapter	Adapter cable	peripheral port	miniature peripheral port	2 m	CS1W-CN114

**Note:** Refer to the product manuals for cables other than those listed above.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.  
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.