## **Programmable Terminals** NT11/NT21



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This catalog mainly provides information that is necessary for selecting suitable models, and does not contain precautions for correct use. Always read the precautions and other required information provided in product operation manuals before using the product.

The application examples provided in this catalog are for reference only. Check functions and safety of the equipment before use.
Never use the products for any application requiring special safety requirements, such as nuclear energy control systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, or other application involving serious risk to life or property, without ensuring that the system as a whole has been designed to address the risks, and that the OMRON products are properly rated and installed for the intended use within the overall equipment or system.

#### Note: Do not use this document to operate the Unit.

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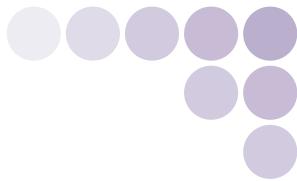
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**OMRON INDUSTRIAL AUTOMATION** 

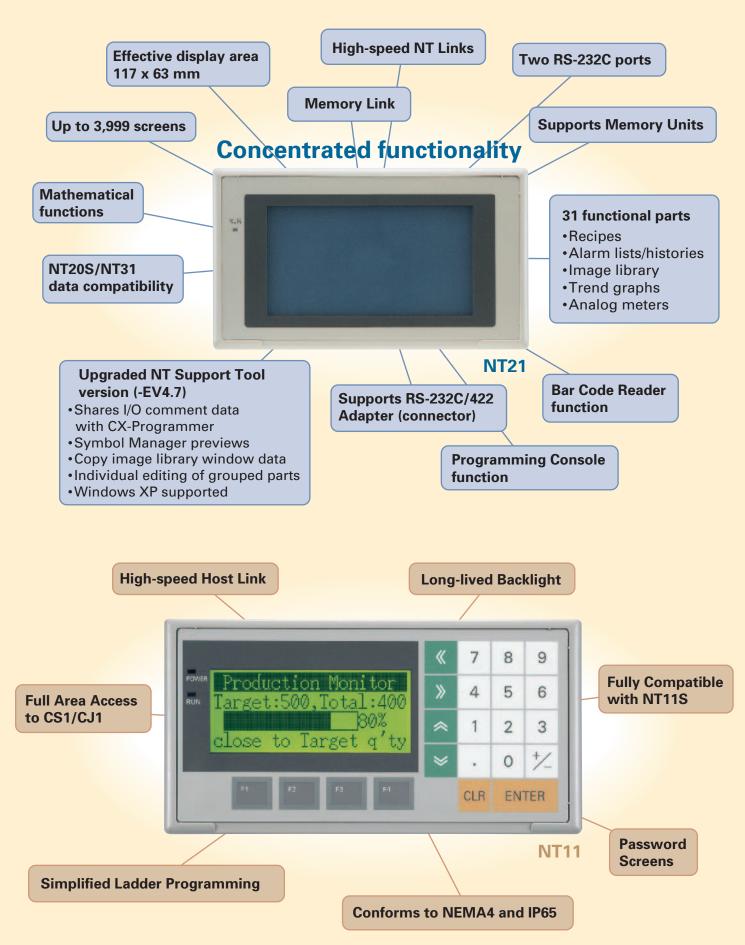
# OMRON





# **Compact Size, High Performance**

Superb functionality with a compact screen size





## **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.)

Plan	Prod.
200	200
150	140
350	350
	200 150



## **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.

## **High-speed Host Link**

Up to 115,200 bps supported between CS1/CJ1 PLCs.

## 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.

Example key titles:

F1 F2 F3 RUN AUT MAN.

## Bar Graphs can be Displayed

Bar graph displays allow the progress of processes to be checked at a glance.

(The bars are oriented horizontally.)



Advantages From the Standpoint of Maintenance,

## **Password Screens for Security**

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.



## Long-lived Backlight

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

### **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.

Example printout

No. Time	Screen N	No Screen Comment
1 11/01-10:	00 1	LINE ERROR
2 11/07-15:	33 15	MOTOR ERROR
3 11/11-13:	56 19	COMPRESSER ERROR
4 11/14-09:	12 5	MOTOR ERROR



Versatile I/O and Large-capacity Screen Memory in a Space-saving Size

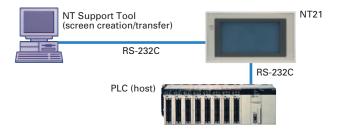
## Small Size, Large Screen

The LCD screen is larger than the OMRON NT20S (increased from 256 x 128 dots to 260 x 140 dots), but the external dimensions and panel cut-out size are the same.



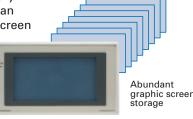
## Two RS-232C Ports

Two RS-232C ports in the NT21 (compared with one in the NT20S) enable simultaneous connection of a PLC, Bar Code Reader, and NT Support Tool (connectable to serial port A only).



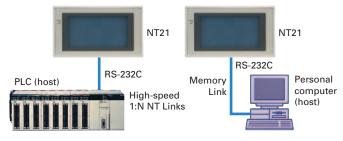
## Plenty of Capacity for Saving Graphic Screens

With 512 Kbytes of memory capacity, there is more than ample space for storing screen data.



## **Versatile Communications**

In addition to the Host Link and 1:1 NT Link communications, the NT21 supports high-speed 1:N NT Links and Memory Link communications.



## **Highly Reliable Hardware**

#### Long, Maintenance-Free Life (50,000 h)

#### **Conforms to International Standards**

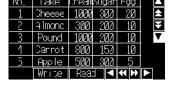
The NT21 conforms to the EC Directives, as well as UL, cULus (Class 1 Div2), and C-Tick. The front panel has an enclosure rating equivalent to IP65F.

## System and screen data can be stored in NT21 Flash Memory.

## Function Support Equivalent to That of a Mid-size Operator Interface

#### **Recipe Function**

Parts tables on the PT screen can be used to set multiple word data in records, which can then be written to the PLC by a



simple PT touch panel operation. For example, the setting parameters for separate models can be edited on the PT, then written to or read from the PLC.

## Alarm List/History(\*)

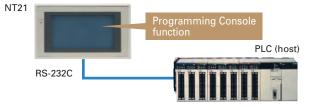
An alarm message can be displayed in response to PLC bit status, and the content and time of the message can be stored as an alarm history.



\*C500-BAT08 Battery (sold separately) required.

#### **Programming Console Function**

The NT21 is equipped with many of the same functions as the SYSMAC PLC Programming Console.



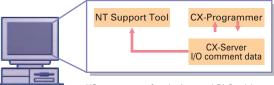
## **Mathematical Functions**

Up to 256 math equations can be stored in the PT processing table to allow automatic PT processing, and the results can be written to the numeral memory table or other destinations. This makes it possible to perform scaling and other mathematical operations automatically in the PT.

## Upgraded NT Support Tool Version (-EV4.7)

## **Enhanced Editing Functions**

•I/O comments in the I/O tables of the CX-Programmer can be used directly.



I/O comments for designated PLC addresses can be used directly, with no need for CSV file conversion.

#### Comparison with the NT11

	Model	NT11	NT11S	NT21	NT20S	
Basic performance	Dimensions	218 x 113 x 38.2	2 mm (H x W x D)	190 x 110 x 5	190 x 110 x 53.5 mm (H x W x D)	
	Resolution	160 x 64 dot	160 x 64 dots (4.24 inches)		256 x 128 dots (4.91 inches)	
	Effective display area	100 x 40 mm		117 x 63 mm	112 x 56 mm	
	Display color	Black & white (with Yellow mode)		Black & whit	Black & white (with blue mode)	
	Panel cut-out size (W x H)	204.2 x	204.2 x 99.8 mm		178.5 x 100.5 mm	
	Max. number of registered screens	:	250	3,999	500	
	Screen data capacity	3	2 KB	512 KB	96 KB	
	Function keys		4	None	None	
	Other Keys	Numeric Keys, Curs	or Keys, Function Keys	None	None	
Display elements	Rectangles, polygons, arcs, sectors	N	None		None	
	Painting out	N	None		None	
	Image/library displays	None		256 positions per screen	None	
	Analog meters	None		50 positions per screen	None	
	Trend graphs	None		1 position per screen	None	
	Broken line graphs	None		1 position per screen	None	
	Alarm lists/histories	None		4 positions per screen	None	
	Recipes	None		1 position per screen	None	
Special functions	Interlocks	N	None		None	
	Mathematical Function	None		Math equations: Max. 256 (arithmetic functions, logic operations, bit manipulations, comparison operations)	None	
	Programming Console function	None		(Executes functions equivalent to C200H-PR027 and CS1 Programming Consoles.)	None	
	High-quality font	N	one	Supported	None	
	Memory Unit	None (Emergene	None (Emergency transfer mode)*		None	
	Backlight service life	50,000 hours min.	50,000 hours min. 10,000 hours min.		10,000 hours min.	
Communications	Memory Links	N	one	Supported	Via RS-232C communications	
	Bar Code Reader connection	N	None		None	
	Host Link Speed	Up to 115,200 9,600/19,200		9,600/19,200	9,600/19,200	

\*Emergency transfer mode: When power to the NT11 is turned ON with DIP switch pin 3 turned ON, data transfer mode can be entered directly without any other operation.

- •Symbol Manager previews are supported.
- This function makes it possible to preview symbols (parts created from graphics data).
- •Parts can be copied by drag & drop operations of image, library, or mark data.
- The properties of grouped parts can be edited without having to ungroup them.
  Because NT20S and NT31
- •Because N1205 and N131 screen data is compatible



- with the NT21, existing software assets can be utilized to greatly reduce the number of design steps.
- **Note:** Some data revisions may be required due to size differences.
- Windows XP supported.





#### ■NT11 General Specifications

ltem	Specification
Power supply voltage	24 VDC
Allowable power supply voltage range	20.4 to 27.6 VDC (24 VDC -15%, +15%)
Power consumption	10 W max.
Noise resistance	Conforms to IEC61000-4-4, 2K (power lines)
Vibration resistance	10 to 57 Hz with 0.075 mm amplitude and 57 to 150 Hz with 9.8 m/s² acceleration for 30 min in each of X, Y, and Z directions
Shock resistance	147 m/s² 3 times in each of 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 gasses.
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 ch anged without notice.

ltem	Specification		
Display screen	Dot matrix of STN liquid crystal display panel • Number of dots: 160 x 64 • Effective display area: 100 x 40 mm • Life expectancy: 50,000 hours minimum • View angle (left/right direction): ±20°	Backlight • LED • Life expectancy: 50,000 hours minimum • 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	<ul> <li>22 switches</li> <li>Life expectancy: 1 million operations minimum</li> </ul>		

#### Display Capacity

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

lte	em	Specification	
Display cha	aracters	Normal characters (8 x 16 dots): Alphanumerics and symbols Marks (8 x 16 dots): User-defined, 64 max.	
Number of characters	-	Normal-size: 20 horizontally x 4 lines vertically max.	
Enlargeme	ent function	Double width	
	Character string displays	8 positions per screen	
Display elements	Numeral displays	8 positions per screen	
elements	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 typ	es	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 sav	/ing	Saved to flash memory: 32 KB (downloading method)	

#### ■Special Features

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

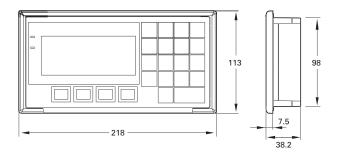
#### ■NT11 Product Configurations

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Product		Specification	Model	
Programmable	Host link direct	Ten-key type (frame color: beige)	NT11-SF121-EV1	
Terminal*	connection, NT link method	Ten-key type (frame color: black)	NT11-SF121B-EV1	
Support Software		CD-ROM (for Windows 95, 98, Me, XP, NT, 2000)	NT-ZJCAT1-EV4	
Function key sheet		10 sheets for replacement for beige		
		10 sheets for replacement for black	NT11-CKF01B	

\*The PT body incorporated the communication interface, screen memory, and a flash ROM that downloads the system program.
 \*Connecting cables with the PLC and NTST are the same as those for the NT21. Please refer to the next page.

#### ■Outside Dimensions

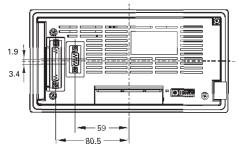




■Panel Plate thickness: 1.6 to 4.8 mm Recommended panel cutout:



#### ■Rear face



#### NT21 General Specifications

ltem	Specification
Power supply voltage	24 VDC ±15%
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 poss	ible in places where the unit would be exposed to oil for long periods.

#### Display Capacity

	ltem		ification	
	Fixed displays	A total of 65,535 per screen (Graphics:	With overlapping screens, the total is	
	Fixed character strings	Continuous straight lines,	524,280 per screen	
	Graphics	rectangles, circles,		
	Marks	polygons, arcs, sectors)		
	Numeral displays	· · ·	ax. 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	
Display	Trend graphs	One frame per screen, 50 it (8 items max. for data loggi		
elements	Broken line graphs	One frame per screen, 256 i 260 points per item	tems per frame,	
	Lamps	256 positions per screen		
	Image library images	256 positions per screen		
	Touch switches	256 positions per screen, m	ax. 256 meshes	
	Numeral settings	256 positions per screen (numerical key pad)	Total of 256 positions for both numerical and	
	Thumbwheel settings	26 positions per screen	thumbwheel settings	
	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	Displays screens registered as normal		
	Overlapping screens	A maximum of eight screens can be displayed overlapping each oth		
Screen	Windows	Up to three window screens can be displayed.		
types	Display history screens	Order of occurrence (1,024 screens max.), order of frequency (255 times		
	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, nor backlight mode, local windo		
	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 occurrenc 9002: Display history screens, order of frequency 9020: Programming Console screen 9021 to 9023, 9030: Reserved 99999: Return to previous screen designation		
Screen	registration	By transferring screen data to the PT via serial commun		
method	b	By mounting the Memory Unit and downloading (automatic/manual transfer) data to the PT		
Saving	screen data	Flash memory (PT internal i	mage memory)	

#### ■Display Specifications

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

#### ■Panel Specifications

ltem		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**

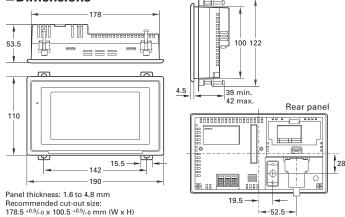
Communications method			Serial port A	Serial port B
NT Support Tool			Supported	Not supported
PLC	Host Link		Supported	Supported
	1:1 NT Link		Supported	Supported
	1:N NT Links		Supported	Supported
	NT Link, PT Programming Console function		Supported	Supported
SBC/personal computer Memory Links			Supported	Supported
Bar Code Reader			Supported	Not supported

\*Connection via RS-422A/485 is possible using the NS-AL002 RS-232C/422A Adapter (connector), which can be connected only to serial port B. (RS-485 connections must use 1:N NT Links.)

#### ■NT21 Standard Models

Product		Model number				
NT21	Monochrome STN			Frame color: beige		NT21-ST121-E
Programmable Terminal				Frame color: black		NT21-ST121B-E
Support Tool Windows 95, 98, Me,			2000 CD-ROM		D-ROM	NT-ZJCAT1-EV4
	For screen transfer					XW2Z-S002
		PT: 9-pin PLC: 9-pin			Cable length: 2 m	XW2Z-200T
	For PLC connection				Cable length: 5 m	XW2Z-500T
Cables		PT: 9-pin PLC: 25-pin			Cable length: 2 m	XW2Z-200S
				ſ	Cable length: 5 m	XW2Z-500S
		PT: 9-pin			Cable length: 2 m	XW2Z-200T-2
		PLC: Mini-pe	eriphera	١	Cable length: 5 m	XW2Z-500T-2
	Reflection Prot	Display area only (5 sheets)		area only (5 sheets)	NT20M-KBA04	
	Chemical-resistive Cover		Silicon cover		cover	NT20S-KBA01
0	Battery		For alarm lists/histories		m lists/histories	C500-BAT08
Options	Memory Unit		For screen and system data transfer			NT-MF161
	RS-232C/422A Adapter				NS-AL002	
	Connector Kit					XM2S-0911-S003

#### Dimensions



Cat. No. V071-E1-02

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