NT631C/NT631

■ General Specifications

Item			NT631C-ST141(B)-E	NT631C-ST151(B)-E	NT631-ST211(B)-E
Rated power supply voltage			24 VDC		
Allowable power supply voltage range			20.4 to 26.4 VDC (24 VDC $^{-15\%}/_{+10\%}$)		
Power consumption			18 W max.		30 W max.
Ambient operating temperature			0° to 40°C	0° to 50°C	
Ambient storage temperature			–20° to 60°C		
Ambient operating humidity			35 to 85 % RH (with no condensation)		
Ambient operating environment			No corrosive gases		
Noise resistance	Common mode		1,000 Vp-p (between the power supply terminals and panel)		
	Normal mode		300 Vp-p		
	Pulse range		100 ns to 1 μs		
	Rise time		1 ns pulse		
Vibration resistance (when operating)			10 to 57 Hz, amplitude of 0.075 mm 57 to 150 Hz, 1 G {9.8 m/s^2} Acceleration in X, Y, and Z directions for 30 min.		10 to 57 Hz, amplitude of 0.075 mm Acceleration in X,Y, and Z directions for 30 min.
Shock resistance (when operating)			147 m/s^2 (15 G), 3 times each in X, Y, and Z directions		
Weight			2.5 kg max.		
Degree of protection (front panel)			Equivalent to IP65F, NEMA 4 (see note)		
Applicable EC Directives or Standards	EC Directives		EMC Directives: 89/336/EEC, 92/31/EEC Low Voltage Directives: 73/23/EEC		
	Standards	EMI	EN50081-2: 1993		
		EMS	EN61131-2: 1995		
		Electrical Safety	EN61131-2: 1995		

Note: The equipment cannot be used for long periods of time in locations which expose the panel to spills of oil.

■ Display/Panel Specifications

Item			NT631C-ST141(B)-E	NT631C-ST151(B)-E	NT631-ST211(B)-E
Display	Display		Color STN LCD	Color TFT LCD	High-contrast EL
	Number of dots (resolution)		640 dots (horizontal) × 480 dots (vertical)		
	Effective display area		229 × 172 mm (11.3 inches)	211 × 158 mm (10.4 inches)	
	View angle		Up/Down: ±30° Left: 55° Right: 45°	Up: 40° Down: 55° Left: 55° Right: 55°	No restrictions
	Display color		8 colors (intermediate colors can be displayed in tiling patterns)		Black/White (2 colors)
	Life expectancy		50,000 hours (until contrast is reduced by 50%)		30,000 hours (until brightness is reduced by 30%)
	Automatic turn-OFF		1 to 255 minutes/None		
	Contrast adjustment		100 levels of adjustment possible using the front touch panel	---	---
Backlight (cold cathode tube)	Life expectancy (when brightness is set to high)		25,000 hours min. (see note 1)		---
	Replacement		User replacement possible from rear panel		
	Brightness		3 levels of adjustment possible using the front touch panel (see note 2)		
LED	POWER	Green	Lit while power is being supplied		
	RUN	Green	Lit during operation		
		Orange	Lit when the battery voltage is low (when operating)		
		Red	Lit when the battery voltage is low (when stopped)		

Note 1. The time until brightness is reduced by half, under normal temperature and normal humidity.

2. Large changes in brightness adjustment are not possible.

■ Operation Specifications

Item		NT631C-ST141(B)-E/NT631C-ST151(B)-E/NT631-ST211(B)-E
Touch panel	Number of switches	768 (32 × 24)
	Input	Pressure sensitive
	Operating force	1 N (approx. 100 gf) min.
	Life expectancy	1,000,000 operations min.

■ External I/F Specifications

Item		NT631C-ST141(B)-E/NT631C-ST151(B)-E/NT631-ST211(B)-E
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, (RS-422A/485 selectable by memory switch setting) D-sub 9-pin connector (female)
		EIA RS-422A/485, (RS-232C selectable by memory switch setting) Terminal block
Parallel I/F		Conforms to Centronics specifications, 20-pin half-pitch connector
Expansion I/F		Dedicated connector

■ Display Capacity

Item		NT631C-ST141(B)-E/NT631C-ST151(B)-E/NT631-ST211(B)-E
Display elements	Character displays (fixed display)	Fixed character data (character strings registered for each screen) Maximum combined total with other fixed display elements of 65,535 per screen (maximum of 524,280 for an overlapping screen)
	Character string displays	Up to 256 per screen (1,024 for an overlapping screen) (40 bytes per string)
	Numeral displays	Up to 256 per screen (1,024 for an overlapping screen), max. 10-digit display
	Bar graph displays	Up to 50 per screen (400 for an overlapping screen), percentage display and sign display are possible
	Mark displays (fixed display)	Up to 65,535 per screen (52,480 for an overlapping screen)
	Trend graphs	One frame per screen (max. of 8 frames on an overlapping screen) Without the data logging function: 50 graphs per screen data file With the data logging function: 8 graphs per screen data file
	Broken line graphs	One frame per screen (max. of 8 frames on an overlapping screen), 256 graphs per frame, 512 points per graph
	Graphic displays (fixed display)	Can be displayed wherever required. Maximum combined total with other fixed display elements of 65,535 per screen (maximum of 524,280 for an overlapping screen)
	Lamps	Up to 256 per screen (1,024 for an overlapping screen)
	Touch switches	Up to 256 per screen
	Image data	Combined total, with library data, of 256 per screen (1,024 for an overlapping screen)
	Library data	Combined total, with image data, of 256 per screen (256 for an overlapping screen also)
	Numeral inputs	Combined total, with thumbwheel switches, of 256 per screen (Can only be registered on one child screen of an overlapping screen.)
	Character string inputs	Up to 256 per screen (Can only be registered on one child screen of an overlapping screen.)
	Alarm lists	Up to 4 groups per screen (32 groups for an overlapping screen) (For alarm histories, 1 group each in occurance order and frequency order on normal screens/child screens) (see note)
	Alarm histories	
	Clock display	Time display of the built-in clock using the numeral display function
Screen types	Normal screen	The normal screen display
	Overlapping screens	A maximum of 8 registered screens can be displayed overlapped with each other.
	Window screens (keyboard screens)	Only one screen can be displayed at one time. Fixed display elements, touch switches, and numeral/character string input fields can be registered.
	Display history screens	Order of occurrence (max. 1,024 screens), order of frequency (max. 255 times)
Screen attributes		Buzzer, display history, background color (NT631C only), backlight, keyboard screen number
Number of screens	Max. number of registered screens	3,999 screens
	Screen No.	0: No display 1 to 3999: User-registered screens 9000: “Initializing system” screen 9001: Display history (occurance order) screen 9002: Display history (frequency order) screen 9020: Programming Console function screen 9999: Return to the previous screen

Item	NT631C-ST141(B)-E/NT631C-ST151(B)-E/NT631-ST211(B)-E
Screen registration method	By transmitting screen data created using the Support Tool to the NT631/NT631C
	By transmitting screen data stored in a memory unit to the NT631/NT631C (automatic/manual)
Screen saving method (screen data memory)	Flash memory (screen data memory in the PT)

Note: When displaying image/library data, the restrictions on image and library data must be observed.

■ Display Element Specifications

Item	NT631C-ST141(B)-E	NT631C-ST151(B)-E	NT631-ST211(B)-E
Display characters	Half-size characters (8 × 8 dots): Alphanumerics and symbols Normal-size characters (8 × 16 dots): Alphanumerics and symbols Mark data (16 × 16 dots): User defined picture characters		
Enlargement function	Normal size, double width, double height, and magnifications of 4×, 9×, 16×, 64×		
Smoothing processing	Available for enlarged characters with magnification of 4× or greater (excluding mark data)		
Character display attribute	Normal, flashing, reverse flashing, transparent		
Image data	Variable-size pictograph Size: Min. 8 × 8 dots, Max. 640 × 480 dots The size can be set in 8-dot units. It is not possible to set enlarged display, smoothing processing, or display attributes such as reverse/flashing.		
Library data	Combination of any characters and graphics Size: Min. 1 × 1 dots, Max. 640 × 480 dots Any size can be set. Enlarged display, smoothing processing, and display attributes such as reverse/flashing are displayed according to the setting registered.		
Graphics	Polyline, circle, arc, fan, square, polygon		
Line type	4 types only for polyline (solid line, broken line, alternate long and short dash, long and two short dashes)		
Tiling	10 types		
Graphic display attribute	Normal, flashing, reverse, reverse flashing		
Display colors	8 colors (black/blue/red/purple/green/light blue/yellow/white)		2 colors (black/white)
Color specification	Foreground color, background color, boundary color (line color)		

NT31C/NT31

■ General Specifications

Item				NT31C-ST141(B)-E/NT31-ST121(B)-E
Rated power supply voltage				24 VDC
Allowable power supply voltage range				20.4 to 26.4 VDC (24 VDC $^{-15\%}/_{+10\%}$)
Power consumption				15 W max.
Ambient operating temperature				0° to 50°C
Ambient storage temperature				–20° to 60°C
Ambient operating humidity				35 to 85 % RH (with no condensation)
Ambient operating environment				No corrosive gases
Noise resistance	Common mode			1,000 Vp-p (between the power supply terminals and panel)
	Normal mode			300 Vp-p
	Pulse range			100 ns to 1 μs
	Rise time			1 ns pulse
Vibration resistance (when operating)				10 to 57 Hz, amplitude of 0.075 mm 57 to 150 Hz, 1 G (9.8 m/s^2) Acceleration in X, Y, and Z directions for 60 min.
Shock resistance (when operating)				147 m/s^2 (15 G), 3 times each in X, Y, and Z directions
Weight				1 kg max.
Degree of protection (front panel)				Equivalent to IP65F, NEMA 4
Applicable EC Directives or Standards	EC Directives			EMC Directives: 89/336/EEC, 92/31/EEC Low Voltage Directives: 73/23/EEC
		Standards	EMI	EN50081-2: 1993
			EMS	EN61131-2: 1995
			Electrical Safety	EN61131-2: 1995

■ Display/Panel Specifications

Item			NT31C-ST141(B)-E	NT31-ST121(B)-E
Display	Display		Color STN LCD (with backlight)	Monochrome STN LCD
	Number of dots (resolution)		320 dots (horizontal) × 240 dots (vertical)	
	Effective display area		118.2 × 89.4 mm (5.7 inches)	
	View angle		Up: 45° Down: 60° Left/Right: ±50°	Up: 20° Down: 30° Left/Right: ±30°
	Display color		8 colors (intermediate colors can be displayed in tiling patterns)	Black/White (2 colors)
	Life expectancy		50,000 hours (until contrast is reduced by 50%)	
	Automatic turn-OFF		1 to 255 minutes/None	
	Contrast adjustment		100 levels of adjustment possible using the front touch panel	
Backlight (cold cathode tube)	Life expectancy (low, medium brightness)		25,000 hours min. (See note.)	
	Replacement		User replacement possible from rear panel	
	Brightness adjustment		3 levels of adjustment possible using the front touch panel	
LED	POWER	Green	Lit while power is being supplied	
	RUN	Green	Lit during operation	
		Orange	Lit when the battery voltage is low (when operating)	
		Red	Lit when the battery voltage is low (when stopped)	

Note: The time until brightness is reduced by half, under normal temperature and normal humidity.

■ Operation Specifications

Item		NT31C-ST141(B)-E/NT31-ST121(B)-E
Touch panel	Number of switches	192 (16 × 12)
	Input	Pressure sensitive
	Operating force	1 N (approx. 100 gf) min.
	Life expectancy	1,000,000 operations min.

■ External I/F Specifications

Item		NT31C-ST141(B)-E/NT31-ST121(B)-E
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 (RS-422A/485 selectable by memory switch setting) D-sub 25-pin connector (female)
Parallel I/F		Conforms to Centronics specifications, 20-pin half pitch connector
Expansion I/F		Dedicated connector

■ Display Capacity

Item		NT31C-ST141(B)-E/NT31-ST121(B)-E
Display elements	Character displays (fixed display)	Fixed character data (character strings registered for each screen) Maximum combined total with other fixed display elements of 65,535 per screen (maximum of 524,280 for an overlapping screen)
	Character string displays	Up to 256 per screen (1,024 for an overlapping screen) (40 bytes per string)
	Numeral displays	Up to 256 per screen (1,024 for an overlapping screen), max. 10-digit display
	Bar graph displays	Up to 50 per screen (400 for an overlapping screen), percentage display and sign display are possible
	Mark displays (fixed display)	Up to 65,535 per screen (52,480 for an overlapping screen)
	Trend graphs	One frame per screen (max. of 8 frames on an overlapping screen) Without the data logging function: 50 graphs per screen data file With the data logging function: 8 graphs per screen data file
	Broken line graphs	One frame per screen (max. of 8 frames on an overlapping screen), 256 graphs per frame, 320 points per graph
	Graphic displays (fixed display)	Can be displayed wherever required. Maximum combined total with other fixed display elements of 65,535 per screen (maximum of 524,280 for an overlapping screen)
	Lamps	Up to 256 per screen (1,024 for an overlapping screen)
	Touch switches	Up to 256 per screen (same restriction applies to overlapping screens)
	Image data	Combined total, with library data, of 256 per screen (1,024 for an overlapping screen)
	Library data	Combined total, with image data, of 256 per screen (same restriction applies to overlapping screens)
	Numeral inputs	Numeric key type: Up to 256 per screen (Can only be registered on one child screen of an overlapping screen.) Thumbwheel type: Up to 64 per screen (Can only be registered on one child screen of an overlapping screen.)
	Character string inputs	Up to 256 per screen (Can only be registered on one child screen of an overlapping screen.)
	Alarm lists	Up to 4 groups per screen (32 groups for an overlapping screen) (For alarm histories, 1 group each in occurance order and frequency order on normal screens/child screens)
	Alarm histories	
	Clock display	Time display of the built-in clock using the numeral display function
Screen types	Normal screen	The normal screen display
	Overlapping screens	A maximum of 8 registered screens can be displayed overlapped with each other.
	Window screens (keyboard screens)	Only one screen can be displayed at one time. Fixed display elements, touch switches, and numeral/character string input fields can be registered.
	Display history screens	Order of occurrence (max. 1,024 screens), order of frequency (max. 255 times)
Screen attributes		Buzzer, display history, background color (NT31C only), backlight, keyboard screen number
Number of screens	Max. number of registered screens	3,999 screens
	Screen No.	0: No display 1 to 3999: User-registered screens 9000: “Initializing system” screen 9001: Display history (occurance order) screen 9002: Display history (frequency order) screen 9020: Programming Console function screen 9999: Return to the previous screen

Item	NT31C-ST141(B)-E/NT31-ST121(B)-E
Screen registration method	By transmitting screen data created using the Support Tool to the NT31/NT31C
	By transmitting screen data stored in a memory unit to the NT31/NT31C (automatic/manual)
Screen saving method (screen data memory)	Flash memory (screen data memory in the PT)

■ Display Element Specifications

Item	NT31C-ST141(B)-E	NT31-ST121(B)-E
Display characters	Half-size characters (8 × 8 dots): Alphanumerics and symbols Normal-size characters (8 × 16 dots): Alphanumerics and symbols Full-size characters (16 × 16 dots): Japanese (JIS 1,2) Mark data (16 × 16 dots): User defined picture characters	
Enlargement function	Normal size, double width, double height, and magnification of 4×, 9×, 16×, 64×	
Smoothing processing	Available for enlarged characters with magnification of 4× or greater	
Character display attribute	Normal, reverse, flashing reverse and flashing, transparent	
Image data	Variable-size pictograph Size: Min. 8 × 8 dots, Max. 320 × 240 dots The size can be set in 8-dot units. It is not possible to set enlarged display, smoothing processing, or display attributes such as reverse/flashing.	
Library data	Combination of any characters and graphics Size: Min. 1 × 1 dots, Max. 320 × 240 dots Any size can be set. Enlarged display, smoothing processing, and display attributes such as reverse/flashing are displayed according to the setting registered.	
Graphics	Polyline, circle, arc, fan, square, polygon	
Line type	4 types only for polyline (solid line, broken line, alternate long and short dash, long and two short dashes)	
Tiling	10 types	
Graphic display attributes	Normal, flashing, reverse, reverse flashing	
Display colors	8 colors (black/blue/red/purple/green/light blue/yellow/white)	2 colors (black/white)
Color specification	Foreground color, background color, boundary color (line color)	

■ NT631/NT31 Standard Models

Item	Specification		Model
NT631	TFT color	Frame color: beige	NT631C-ST151-E
		Frame color: black	NT631C-ST151B-E
	STN color	Frame color: beige	NT631C-ST141-E
		Frame color: black	NT631C-ST141B-E
	EL	Frame color: beige	NT631-ST211-E
		Frame color: black	NT631-ST211B-E
NT31	STN color	Frame color: beige	NT31C-ST141-E
		Frame color: black	NT31C-ST141B-E
	STN monochrome	Frame color: beige	NT31-ST121-E
		Frame color: black	NT31-ST121B-E
Support Software	Japanese	Windows 95, FD PC/AT	NT-ZJ3AT1-EV2
		Windows 95, CD-ROM	NT-ZJCAT1-EV2
	Screen Transfer Unit	NT631□/NT31□ (common)	NT-MF261
Cable	Printer	For hardcopies of screens	NT-CNT121
Option	Protective sheet	Display section only NT631C/631 (5 sheets)	NT610C-KBA04
		Display section only NT31C/31 (5 sheets)	NT30-KBA04
	Chemical resistant cover	Silicon cover for NT631C/ NT631	NT625-KBA01
		Silicon cover for NT31C/ NT31	NT30-KBA01
	Backlight	NT631C-ST151□	NT631C-CFL01
		NT631C-ST141□	NT631C-CFL02
		NT31C/31	NT31C-CFL01