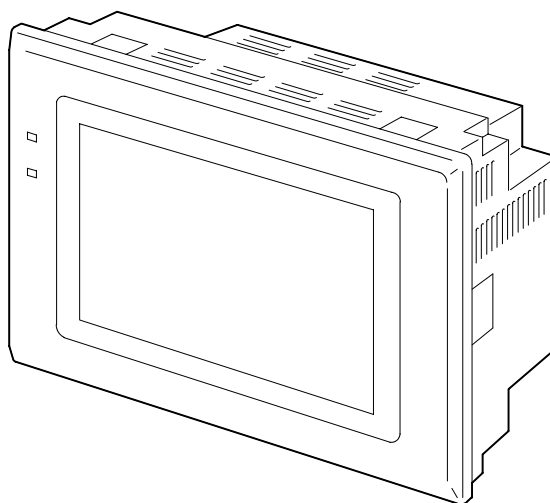# NT30/30C
Programmable Terminal

Operation Manual

Produced November 1997

OMRON Product References

All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation "Ch," which appears in some displays and on some OMRON products, often means "word" and is abbreviated "Wd" in documentation in this sense.

The abbreviation "PC" means Programmable Controller and is not used as an abbreviation for anything else.

The abbreviation "Host" means a controller such as an FA computer which controls a PT (programmable terminal).

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note Indicates information of particular interest for efficient and convenient operation of the product.

1, 2, 3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

TABLE OF CONTENTS

SECTION 4
NT30/30C Functions 125

About this Manual:

This manual describes the basic functions and operation procedures of the NT-series programmable terminal NT30/30C, its operations when connected to a PC or a Host, and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the NT-series programmable terminal NT30/30C.

Section 1 describes the operation functions, system configuration, and the direct connection function of the NT30/30C.

Section 2 describes the hardware settings, installation to an operation panel, connection to optional devices and PC.

Section 3 describes the procedure to follow before using the NT30/30C, installation of optional devices, and convenient functions when using the NT30/30C. Also includes information such as how to check NT30/30C operation.

Section 4 describes the functions of the NT30/30C when it is connected to a PC.

Section 5 describes how to use the NT30/30C when it is connected to the PC using the host link or NT link.

Section 6 describes the corrective action to take when the system does not operate normally, and how to carry out daily maintenance of the NT30/30C.

APPENDIX describes the specifications and the method for making connecting cables, and includes an area list for the PC.

Related Manuals and Their Contents:

The related manuals are listed below.

The □ symbol at the end of the manual number is the revision history number.

[Operating the programmable terminal and communicating with the host]

• NT30/30C Programmable Terminal Operation Manual (V034-E1-□)

.... This manual

This operation manual is the manual for the NT30/30C itself.

This operation manual describes the functions and handling of both the programmable terminal body and the host interface function.

[Creating and transferring screen data]

• NT-series Support Tool Operation Manual (V028-E1-□)

The screens displayed on the NT30/30C are created with the support tool and transferred to the NT30/30C. This manual describes how to create and transfer screen data.

PRECAUTIONS

This section provides general precautions for using the Programmable Terminal.

The information contained in this section is important for the safe and reliable application of the Programmable Terminal. You must read this section and understand the information contained before attempting to set up or operate a Programmable Terminal.

1 Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of installing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of managing FA systems and facilities.

2 General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.

Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

This manual provides information for using the Programmable Terminal. Be sure to read this manual before attempting to use the software and keep this manual close at hand for reference during operation.

⚠ **WARNING** It is extremely important that Programmable Terminals and related devices be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying Programmable Terminals to the abovementioned applications.

⚠ **WARNING** Do not use input functions such as PT touch switches for applications where danger to human life or serious damage is possible, or for emergency switch applications.

3 Safety Precautions

Read these safety precautions carefully and make sure you understand them before using the Programmable Terminal so that you can use it safely and correctly.

Safety Conventions and their Meanings

This operation manual uses the following conventions and symbols to indicate cautions, warnings, and dangers in order to ensure safe use of the PT. The cautions, warnings, and dangers shown here contain important information related to safety. The instructions in these cautions, warnings, and dangers must be observed.

The conventions used and their meanings are presented below.

⚠ **WARNING** Indicates information that, if not heeded, could possibly result in loss of life or serious injury.

⚠ **CAUTION** Indicates information that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

⚠ **WARNING:**

- Never attempt repairs, modification or disassembly. You could sustain an electric shock.

- Danger of electric shock. Switch off the NT30/30C power before changing the backlight.

⚠ **Caution:**

- When disposing of a used backlight, be sure to comply with any local restrictions that apply to its disposal.

- When replacing a battery, ensure that the battery terminal does not touch the board in the NT30/30C.

- If not backed up by the built-in battery, the memory switch settings will all be initialized to the values set with the support tool when the power is turned off. If the message "Battery Lowered" is displayed while the NT30/30C is being used, replace the built-in battery immediately. For details on how to replace the battery, see "Replacing the Battery" (page NO TAG).

- Be sure to switch off the power supply to both the NT30/30C and the B7A interface unit before installing the B7A interface unit, otherwise the units may be damaged.

- Be sure to switch off the power supply to both the NT30/30C and the B7A interface unit before changing DIP switch settings.

- Do not use input functions such as PT touch switches for applications where danger to human life or serious property damage is possible or for emergency switch applications.

- Do not use the input functions of the expanded I/O unit for applications that could involve danger to human life or serious property damage, or for emergency switch functions.

- On unpacking the NT30/30C, check its external appearance and confirm that there is no damage. Also confirm that there is no abnormal noise on shaking the unit lightly. The product may malfunction if it is damaged.

- During work at the panel, take care to ensure that no metal scraps enter the unit. Otherwise, the product may malfunction.

- The thickness of applicable operation panel is 1.6 mm to 4.8 mm. All fittings must be tightened uniformly to a torque of 0.5 to 0.6 N·m in order to ensure water- and dust- resistance. The panel must not be soiled or warped, and must be able to support an installation that will remain secure and strong.

- Carefully check the wiring before switching ON the power.

- Do not apply an AC power supply across the power supply terminals.

- Use a DC power supply with a low voltage fluctuation stipulation

- When complying with EC directives (low voltage directives) use a power supply with reinforced insulation.

- For the connection to the power supply terminal block, twisted wires of 2 mm² or greater cross sectional area and M 3.5 size crimp terminals must be used. Tighten the screws on the terminal block to a torque of 0.8 N·cm. Otherwise fire may occur.

- If the DIP switch settings have been changed when the NT30/30C is powered, reset the power to the NT30/30C. The changes with the DIP switches become effective only after the power supply is reset.
  Before switching on the power for the first time, set DIP switches SW2-6 of the NT30/30C to "ON" (they are set to "OFF" on shipping). If they are left "OFF", messages will not be displayed normally.

- Press the "Abort" touch switch on the NT30/30C when the screen data transmission is completed. Unless this touch switch is pressed, the screen data will not be correctly registered. If the "Abort" touch switch is pressed during transmission, the screen data will not be correctly registered.

- Check the operation of screen data and ladder programs thoroughly before actually using them.

- Press touch switches with a force of no greater than 30 N.
  Applying higher force may cause glass to break, cause injuries, and prevent operation.

- Do not press touch switches carelessly while the backlight is off or while nothing is displayed on the screen. Otherwise the system may operate unpredictably.
  Only press touch switches after confirming system safety.

- If a faulty unit is returned for repairs, write as detailed a description of the fault as possible and send this description together with the unit to the OMRON address indicated on the back cover of this book.

- When disposing of an NT that is no longer required, be sure to comply with any local restrictions that apply to its disposal.

- As far as possible, disconnect all peripheral devices connected to the output terminals before executing the output check. Otherwise, each time an output terminal comes ON during the check operation, a buzzer, or warning lamp, etc. will be activated at a peripheral device.

SECTION 1
Functions of the NT30/30C

This section gives the operation examples and characteristics of the NT30/30C so that you will understand the applications of the NT30/30C.

1-1   Role and Operation of NT30/30C

NT30/30C is a programmable terminal used to display and transmit the information in an FA site. The following gives a general description of the role and operation of the NT30/30C for those who use a programmable terminal (PT) for the first time.

1-1-1   Operation of an NT30/30C at an FA Production Site

Production Line Status Monitoring

The NT30/30C displays real-time information about the system and equipment operating status, etc.

Production Control		1994/1/25
Product	NT30	NT30C
Today's target	560 units	441 units
Current Production	305 units	275 units
% achieved	54.5 %	63.0 %

Messages

The NT30/30C warns of system or equipment failures and prompts the appropriate remedial action.

Assembly line B	–	Positioning pin

is defective.
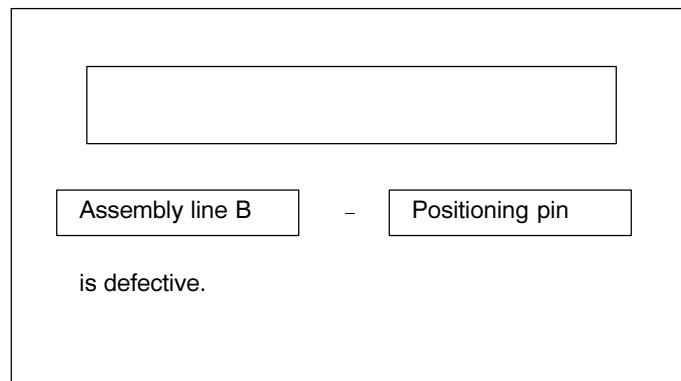
Panel Switch Functions

Setting touch switches on the NT30/30C allows workers to use the NT30/30C as an operating panel. Production data input to the NT30/30C can be transmitted to a PC.

Electroplating Control

Transport

⇑   ⇐   ⇒   ⇓   Clamp   UnClamp
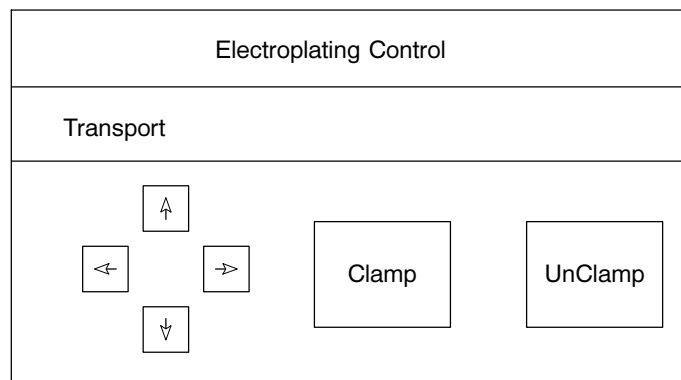
1-1-2   Operations of NT30/30C

Displays Screens   The information to be displayed (screen data) can be created on a computer by using support tools and stored in the NT30/30C. The screen data can be displayed on the NT30/30C in response to the instructions from a PC/Host or touch switch operation.

PC

The screen data designated by instructions from PC/Host or touch switch operation is displayed.
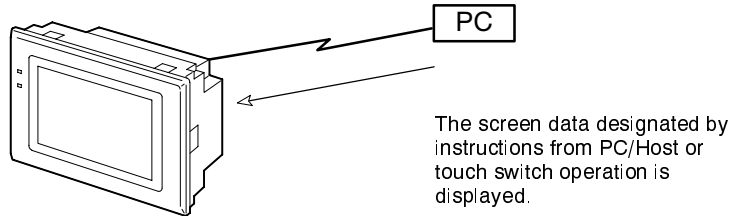
Receives Data from a PC   NT30/30C can be connected to a PC by a host link or NT link and receive necessary data from the PC.

Host link, NT link

PC
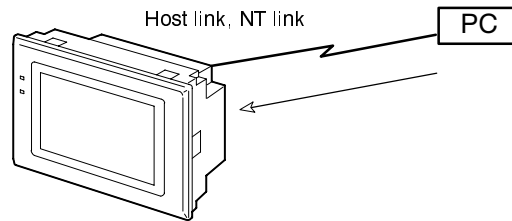
Sends Data to a PC   Data input through a touch panel can be sent to a PC.

Touch panel

PC

ON/OFF information, numeric data, etc.
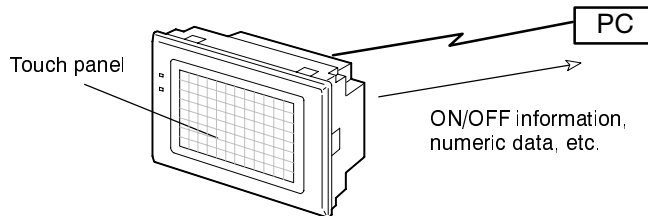
Screen Data   The screen data to be displayed on the NT30/30C can be created by a computer by using support tools. Connect the NT30/30C to a PC/AT with an RS-232C cable so that the screen data are transferred to the NT30/30C.

Create screen data.

RS-232C

PC/AT (support tools)

Screen data

When using RS-232C as the method for connection to the PC, this connection is made only to communicate screen data between the NT30/NT30C and the support tool.
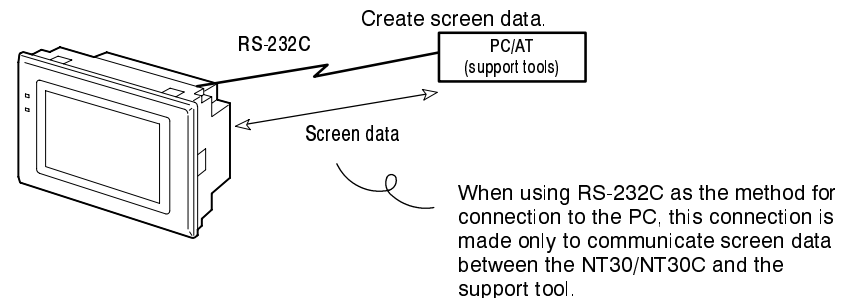
1-2   Functions of NT30/30C

The NT30/30C has the following features;

1-2-1   Features

Downsized Body
- Slim body (50 mm or less in the panel).
- The communication cable connectors are housed in the unit so that they do not protrude from the unit.
- The tool connectors and the PC communication connectors are used in common.

Construction Best Suited to the FA Environment
- Easy-to-read screen even in direct sunlight.
- The panel is a LCD panel with white/red backlight for the NT30, and an STN color LCD panel with backlight for the NT30C.
- Its backlight unit and battery can be replaced at the operation site.
- Waterproofed to a standard equivalent to IP65.
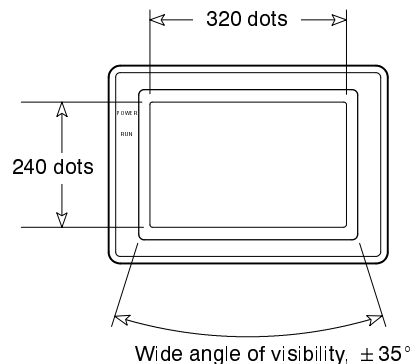
Touch Switch Operation   The System Menu can be displayed by using the touch switches located in four corners of the screen.

Compatibility with NT612G/610C
Existing screen data and user programs are compatible. (Modification required in accordance with screen size.)

1-2-2   Comparison between NT30 and NT30C

Two NT30 models – the NT30, which is capable of versatile graphic displays, and the NT30C, which is also capable of color display – are available. The differences between the NT30 and NT30C are tabled below.

Function	NT30	NT30C
Type	NT30-ST131-E (Beige) NT30-ST131B-E (Black)	NT30C-ST141-E (Beige) NT30C-ST141B-E (Black)
Display panel	Monochrome LCD type (with white/red backlight)	STN color LCD type (with backlight)

1-2-3 Principal Functions of NT30/30C

The following are the principal functions of the NT30/30C:

Functions relating to data display

Character display

Characters of various sizes can be displayed. Characters can be flashed and high-lighted.

Figure display

Solid lines, squares, polygons, circles, circular arcs, fan shapes can be displayed. They can also be painted with various patterns, flashed, or highlighted.

Memory data display

The contents of character-string memory table and of the numeral table can be displayed. The memory table contents can be changed from the PC.

Graph display

Not only bar graphs but also broken line graphs (Note) and trend graphs (Note) can be displayed, using the numeral table.

Lamp display

Lamps can be turned on flashed from the PC.

Alarm list display

In response to the state of PC contact, warning messages are automatically listed, plus when and how many times the messages appeared can also be displayed.

Function relating to data output

Buzzer

A built-in buzzer can be sounded.

Screen printing

A hardcopy of the screen may be printed onto the printer connected to the NT30/30C.

Functions relating to data input

Input by the touch switch

Data can be input by simply touching the screen. There are various touch switch functions such as sending input data to the PC.

Pop-up window function

A window overlaying the currently displayed screen can be alternately opened and closed by pressing a touch switch.
In addition to fixed displays, numeric keys and character keys can be set inside the window. Since the window need only be opened when input is required, the screen can be used effectively.

Numeric value/character-string setting function

Touch switch keys and expanded I/O unit (B7A unit) can be assigned numeric values or character strings so that these values and character strings may be input at the operation site or even written onto the numeric/character-string table and sent to the PC. It is also possible to disable input by control from the PC.

Function relating to communication

Communications with PC

The NT30/30C communicates with PC, through various host I/F units or NT link so that data may be received from PC or information entered from touch switches may be sent to the PC.

Function relating to expanded I/O units

Input and output to and from expanded I/O unit

The NT30/30C receives switching input from expanded I/O unit (B7A units) , and then turns ON/OFF the output.
• The B7A interface unit is required to connect the B7A unit.
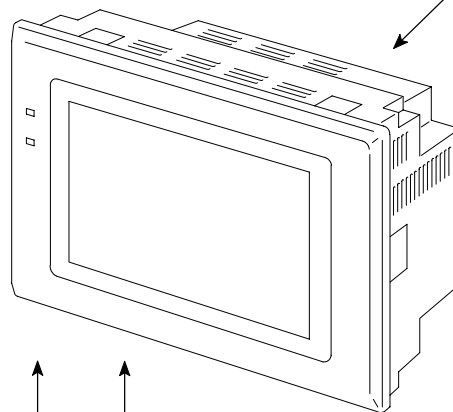
Functions relating to the system

System functions

System settings and maintenance can be performed by selecting from system menus displayed on the screen.

Creation of screen data

Screen data created by using a support tool on a personal computer can be transferred and stored in the built-in image data memory.

1-2-4   Displays

The NT30/30C can display various kinds of elements such as characters, numeric value, lamps, touch switches, and graphs on a screen. The screen data displayed on the NT30/30C are created by using support tools on a computer.
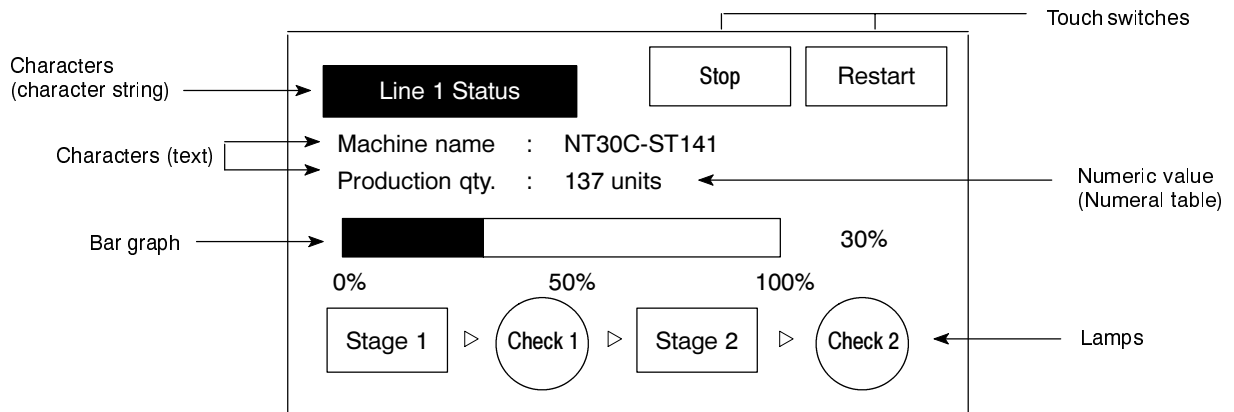
- Characters (text)

  Marks and image data which do not need to be changed can be written directly to the screen.

- Characters (character-string memory table)

  Character-strings stored in the character-string memory tables are displayed. The display characters can be changed by changing the data stored in the character-string memory tables.

- Numeric values (numeral memory tables)

  Numbers stored in the numeral memory tables are displayed. The display numbers can be changed by changing the data stored in the numeral tables. Hexadecimal values can also be displayed.

- Lamps

  Lamps indicate the operating status. Squares, circles, fans and polygons can be used. They are controlled by the PC and can be lit (reversed) or made flash (alternates normal with reversed displays).

- Touch switches

  These switches can be set at any location on the screen. Pressing the part of the screen where a touch switch has been set can have the following effects: notification of the fact that the switch has been pressed to the PC (PC notification function); screen switching; input of a numerical value or character-string (input key function); copying of a numerical value or character-string (copy key function); shifting to another numerical value or character-string input field (cursor moving key function); obtaining a hard copy of the screen (screen print key function). Touch switches are controlled from the PC and can be made to light or flash in the same way as lamps.

- Graphs

  Bar graphs, trend graphs and broken line graphs can be displayed in accordance with the numerical values stored in numeral memory tables. These values can also be represented as percentage values displayed together with the graphs.

1-3 System Configuration

This section gives the basic configuration of a system which uses an NT30/30C. Use an RS-232C cable or an RS-422A cable to connect to a PC. Refer to the manual for individual device for information on the equipment other than the NT30/30C in the system.

OMRON's PC
Controls NT30/30C as required while controlling machines and monitoring the production line.
Host link: C series, CVM1/CV series PC, SRM1
NT30/30C can be connected to CPU units, host link units, and SRM1. However, connection to some models of CPU unit and SRM1 is not possible (see page 29, 42).
NT link: CPM1, CQM1, C200HS, C200HX/HG/HE, CVM1/CV series PC, SRM1
NT30/30C can be connected to CPU units and SRM1. However, connection to some models of CPU unit and SRM1 is not possible (see page 60).

RS-232C cable
(for host link)
(Max. 15 m)
or RS-422A cable
(for host link)
(Max. 500 m)

B7A I/F unit
type NT-B7A16

Support tool

NT30/30C
Gives displays of production line monitoring and instructions to the operation site and notifies the switch ON/OFF status and numeric value inputs to the PC.

Computer (support tool)
Connected to NT30/30C as required and used to transfer the NT30/30C screens and make settings for the NT30/30C.
Computer: IBM PC/AT or compatible
Support tool: NT series support tool type NT-ZA3AT-EV□

B7A unit
A B7A unit can be connected as an expanded I/O unit.

Reference For the setting procedure, refer to Section 3-5 "Setting the Conditions of Communications with the PC by Using the Memory Switches" (page 86). It is impossible to connect a personal computer used to drive the support tool and a PC at the same time (when using the RS232C cable).

Typical option devices for the NT30/30C include the following.

B7A I/F unit	NT-B7A16
Backlight (spare)	NT30-CFL01 (for NT30)
	NT30C-CFL01 (for NT30C)
Protective sheet	NT30-KBA04 (5 sheets/pack)
Battery	C500-BAT08

1-4 Communication Using the Direct Connection Function

1-4-1 Direct Connection Function

The communication method applied between the NT and the PC is either a host link or NT link.

The NT30/30C can be used to refer to the contents necessary for the display information or to allocate the bits and words used for storing the input data to any area in the PC. The NT30/30C can directly write and read such allocated bits and words so as to change the display elements, control the operating status, and notify the status.

This function is called the "direct connection function". The NT30/30C is designed exclusively for use with the direct connection.

The bits and words allocated by the direct connection function are called "allocated bit" and "allocated word" respectively.

This function allows to read the information to be displayed on the NT30/30C from the memory area in the PC and to write it to the memory table in the NT30/30C. Also, the data input on the NT30/30C can be written to the PC's memory area. The NT30/30C screen status can be switched according to the PC's memory area, and the NT30/30C's status data can be written to the PC's memory area.
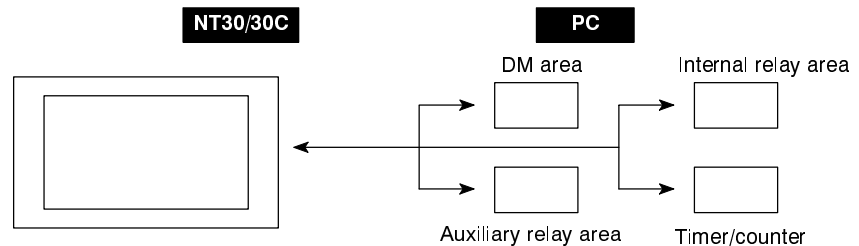
Features of the Direct Connection Function

- The bits and words referring to operating status and work instruction information and those for storing input data can be freely allocated to almost any part of the PC memory. Bits and words in the PC can be referenced from any memory table.

- The NT30/30C can directly refer to PC bit and word data so that it can be connected to a PC without changing the PC program which controls currently running production line.

- The area to control and notify the NT30/30C status, including display screens, display/no display status, and buzzers can be freely allocated to any part of the PC memory.

The direct connection function allows the NT30/30C to directly read and write almost all bits and words in the PC and to automatically change the NT30/30C screen display. This function can reduce the load on the PC so that the program development efficiency of the PC improves.

1-4-2   NT Link

The NT link is a new communication method applied between the NT and a PC.

The NT link uses the direct connection function and can execute high speed communications with a CPU (built-in host link) of the CPM1, CQM1, C200HS, C200HX/HG/HE and CVM1/CV series, SRM1.

Features of the NT Link

• High speed communications with specific types of PCs can be executed.

• Writing in units of bits to the PC memory area is possible. (*)

This enables another bit of a word data to which a touch switch has been allocated to be used for other purpose (e.g., to allocate a lamp).

• This can be used even when the PC is in the RUN mode.

(*) Except a DM area.

The NT link is compatible with the host link. The NT30/30C screen data and the PC programs handled by the host link direct connection can be used with for the NT link as they are.

1-4-3   Functions of the Allocated Bits and Words

Elements displayed on the NT30/30C and the NT30/30C status can be allocated to the bits and words of the PC. By changing the contents of the bits and words, the NT30/30C can be controlled by the PC. It is also possible to send data to the PC by pressing the touch switches on the NT30/30C.

- Controlling the NT30/30C by a PC

  The following NT30/30C functions can be controlled by a PC.

Screens	: Display of designated screens, confirmation of screen numbers, etc.
Memory tables	: Writing to a memory table, copying from a memory table to another memory table, etc.
Lamps and touch switches	: Display instructions, confirmation of display status, etc.
System control	: Buzzer ON/OFF, display/no display status, screen printing, and other NT30/30C statuses

- Notifying from the NT30/30C to a PC

  Data in the NT30/30C is sent to a PC when a touch switch is pressed. The following types of data are sent to a PC.

  - NT30/30C status

  - Touch switch status

  - Numeric values and character-strings input with numeral/character-string setting functions using touch switches.

  - Changes in a memory table after copying between memory tables

Functions of Display Elements

- Lamp (page 167)

  Allocation destination: Bit
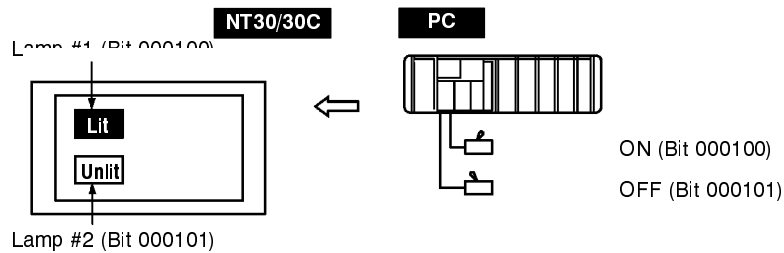
PC's bit status is displayed by the "Lamp" on the NT30/30C.

The lamp comes on (flashes) when the PC's bit status (lamp bit) is ON (1), and goes off when it is OFF (0).

With image and library lamps, the displayed image or library data can be switched in accordance with the ON (1)/OFF (0) status of PC bits (lamp bits).

- Touch switches (page NO TAG)

Allocation destination: Bit
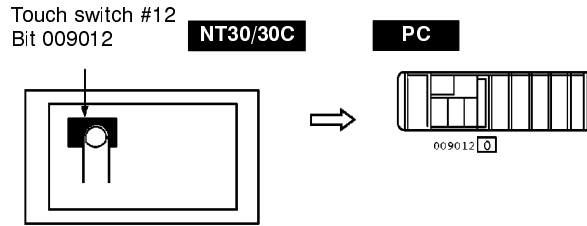
The lamp comes on (flashes) when the PC's control bit (lamp bit) is ON (1) and goes off when it is OFF (0). When the touch switch is pressed, the PC's notification bit comes ON (1), or goes OFF (0).

- Numeral memory table (page 152)

Allocation destination: Word
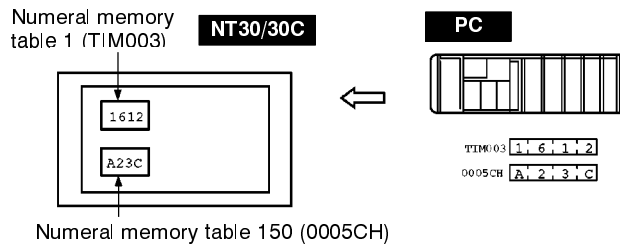
Allocate numeral memory tables to arbitrary words in the PC. If word contents change when corresponding numeral memory table is displayed on the screen, the value on the screen will also change. Monitoring of words can also be made easily.

Reading and writing are executed so that the contents of allocated words are always the same as those of the numeral memory tables.

- Character-string memory table (page 149)

Allocation destination: Word

Character-string memory table 1
Allocated word number: 3ch
First word: DM0100
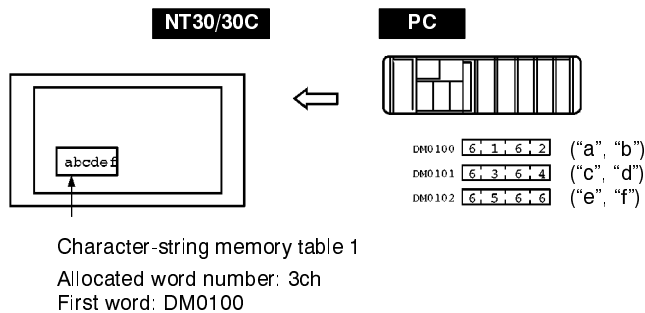
Allocate character-string memory tables to arbitrary words in the PC. If word contents change when corresponding character-string memory table is displayed on the screen, the value on the screen will also change. Messages can be displayed easily.

Reading and writing are executed so that the contents of allocated words are always the same as those of the character-string memory tables.

• Alarm list (bit memory table) (page 154, NO TAG)

Allocation destination: Bit
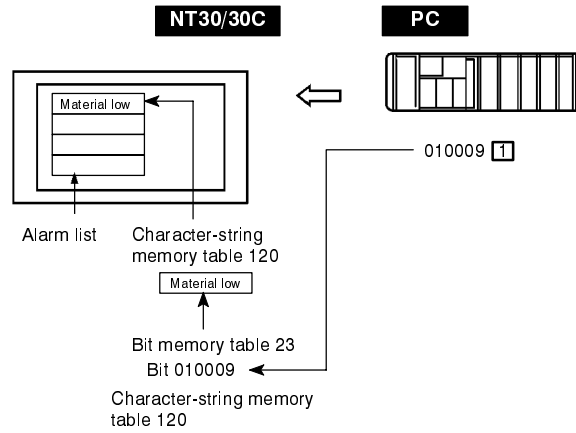
When the PC bit comes ON (1), the contents of the character-string memory table registered for the bit memory table are displayed in the alarm list. When the bit returns to the OFF (0) status, the character-string memory table display is automatically cleared.

Functions of the PT Status Control Area (PC to NT30/30C)

The "PT status control area" is used to control the NT30/30C status. When data is written to this area in the PC, the NT30/30C reads the contents and operates according to the contents.

[Example of the PT status control area application]

When data is written to the PT status control area, the NT30/30C will operate as given below. (page NO TAG)
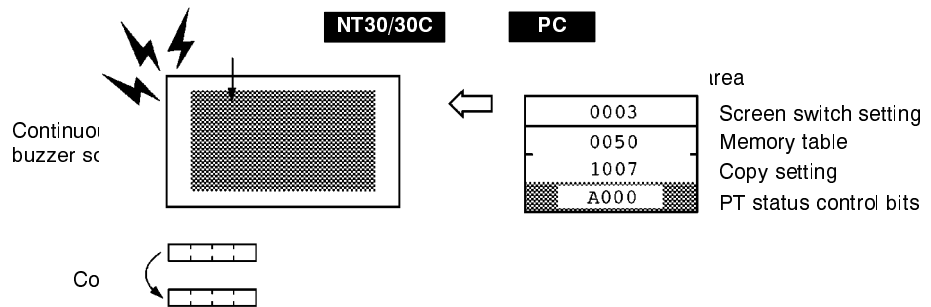
Functions of the PT Status Notify Area (NT30/30C to PC)

The "PT status notify area" is used to notify the changes of the NT30/30C status.

When a change is made in the NT30/30C status, the change is written to this area in the PC. By reading the data from the area, the NT30/30C status can be checked.

[Example of the PT status notify area application]

When a change is made in the NT30/30C status, such change will be notified to the PT status notify area as mentioned below. (page NO TAG)
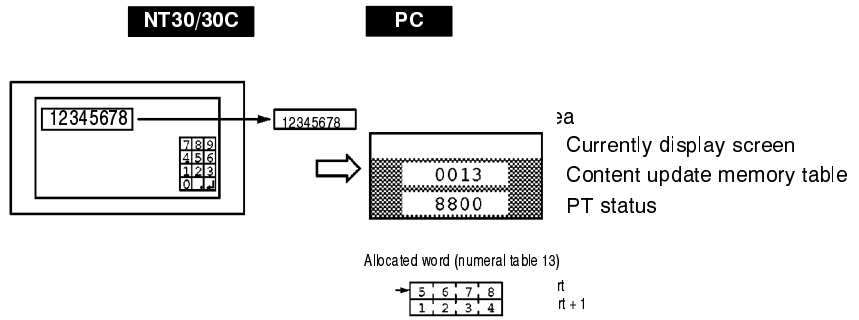
1-5   Before Operating

Follow the procedure given below to start the system of the NT30/30C.

PC	**NT30/30C**	**Support tool**
Check and change the PC settings.	Set the DIP switches.	Install support tools to the computer.
• For the host link, refer to page 33 (RS-232C), page 42 (RS-422A) and the manuals for the host link unit and peripheral tools. • For the NT link, refer to page 60.	(page 22) Install to the operation panel. (page 24) Connect the power supply. (page 26)	(refer to the manuals for the support tools)
Connect to the NT30/30C.	Connect to the PC.	
	• (Host link: page 31 (RS-232C) page 45 (RS-422A)) • (NT link: page 60)	
Create the PC program.	Check the settings and communications.	Create the screens.
	Transfer the screen data. (page 93)	(refer to Section 4 and the manuals for the support tools)
Start operation.		

Reference   Use NT-series support tool Ver.2 (type NT-ZA3AT-EV□).

Refer to the following manuals for the equipment and software.

Equipment or Software	Manual Title	Manual Number
Support tools	NT-series Support Tool Operation Manual	V004-E1-□
PCs	SYSMAC CPM1 Operation Manual	W262-E1-□
	SYSMAC CPM1A Operation Manual	W317-E1-□
	SYSMAC C20H/C28H/C40H/C60H User's Manual (Programming)	W176-E1-□
	SYSMAC C200H User's Manual (Programming)	W130-E1-□
	SYSMAC C200HS Operation Manual	W235-E1-□
	SYSMAC C200HS Installation Guide	W236-E1-□
	SYSMAC C200HX/HG/HE-CPU□□-E/ZE Installation Guide	W302-E1-□
	SYSMAC C200HX/HG/HE Operation Manual	W303-E1-□
	SYSMAC C1000H/C2000H User's Manual (Programming)	W140-E1-□
	SYSMAC CQM1 Reference Manual	W228-E1-□
	SYSMAC CV500/CV1000/CV2000 User's Manual (Ladder) * For a PC of the CVM1 series, refer to the SYSMAC CV500/CV1000/CV2000 User's Manual.	W202-E1-□
CompoBus/S Master Control Unit	SRM1 Operation Manual	W318-E1-□
Peripheral tools	SYSMAC C-series and CVM1 PCs SYSMAC Support Software Operation Manual: C-series PCs	W248-E1-□
	SYSMAC C-series and CVM1 PCs SYSMAC Support Software Operation Manual: CVM1 PCs	W249-E1-□
Host link unit	SYSMAC C Series Host Link Unit User's Manual	W143-E1-□
	SYSMAC CVM1/CV Series Host Link User's Manual	W205-E1-□

SECTION 2
Hardware Settings and Connections

This section describes the settings of the NT30/30C, connections to a PC, and other hardware settings.

2-1 Description of Parts and Settings

Before getting to the operation, confirm the names and functions of parts. Also set the DIP switches on the NT30/30C.

⚠ **Caution** On unpacking the NT30/30C, check its external appearance and confirm that there is no damage. Also confirm that there is no abnormal noise on shaking the unit lightly. The product may malfunction if it is damaged.

2-1-1 Description of Parts

Front View

POWER LED
Lit when the power is supplied.

POWER
RUN

RUN LED
• Lit in green while the unit is in the RUN mode.
• Lit in orange or red when the battery is low (orange in the RUN mode, red in other modes)

Display
The NT30 has a monochrome LCD screen with a white/red backlight, and the NT30C has an STN color LCD screen. The whole area of the screen is a touch panel which works as an input device.
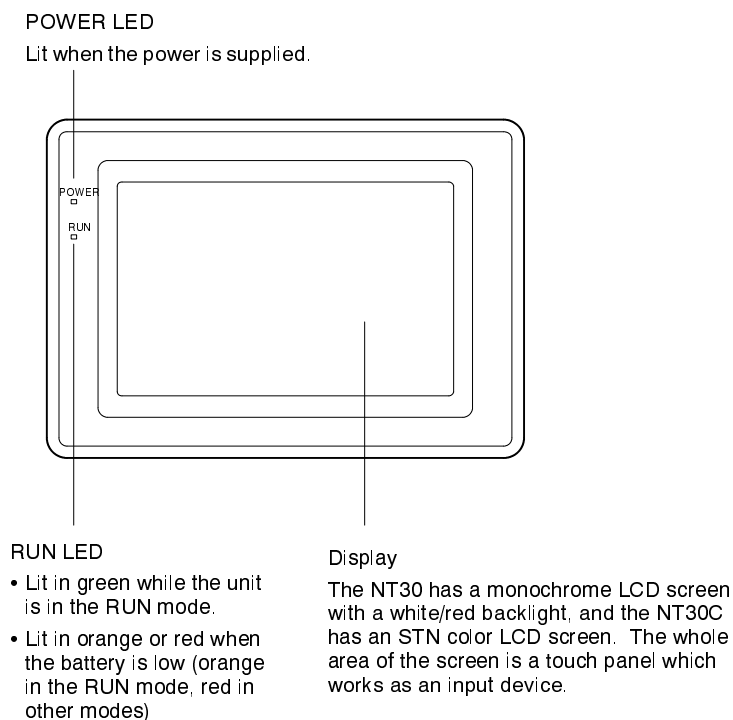
Reference The NT30/30C comes in two body colors.

NT30	NT30C	Body Color
NT30-ST131-E	NT30C-ST141-E	Beige
NT30-ST131B-E	NT30C-ST141B-E	Black

Rear View

DIP switch (SW2)
Set various system statuses
with these switches.

Battery cover
The battery is secured underneath this cover.

Backlight unit
Backlight integrated with a connector.

Warning label

B7A interface connector (under the label)
When using a B7A interface unit, peel off
the label and connect it here.

GR terminal
Grounding terminal to prevent
malfunction due to noise

Power input terminals
Connect the power to the NT30/30C
at these terminals.

RS-422A terminal block
When making the connection to the PC
with RS-422A, connect the cable here.

RS-232C Host I/F tool connector
Connect the cable from a PC or
support tool here.

Contrast control
Use a fine flat-blade screwdriver. Turn
closkwise to increase the brightness.

Reset switch
Used to initialize all the statuses of the NT30/30C.
However, the screen data memory and memory
switches retain their statuses before initialization.

Printer connector
Connect the printer cable here. Output
conforms to Centronics specifications.

2-1-2   DIP Switch Settings

Set the NT30/30C operation status with the DIP switches located in the bottom right corner on the rear side of the body.
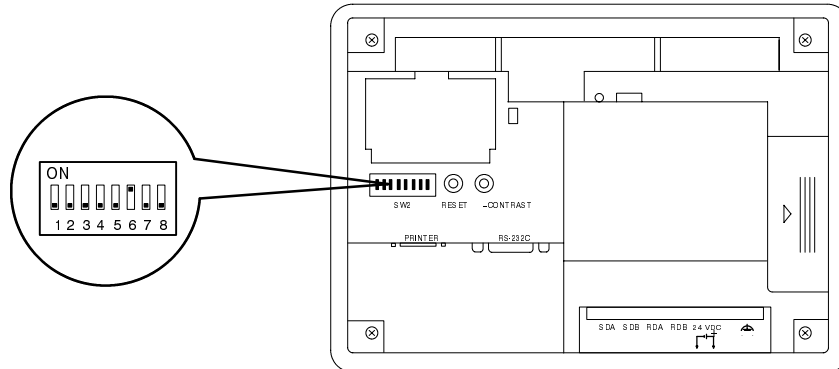
Switch #	Function	
SW2-1	Not used.	
	ON	
	[OFF]	
SW2-2	Memory protect	
	ON	Data cannot be written to the screen data memory, and screen data transmission and initialization of the screen data memory are not possible.
	[OFF]	Screen data transmission and screen data memory initialization are not possible.
SW2-3	Switching to the System Menu enabled/disabled	
	ON	The System Menu cannot be displayed. If an error occurs during a start-up, the System Menu will be automatically displayed. However, "RUN Mode" cannot be entered.
	[OFF]	The System Menu can be displayed.
SW2-4	Screen data initialize effective/ineffective	
	ON	The NT30/30C will start in a special RUN mode in which the screen data memory is initialized. When it is started, the memory initialization menu will be displayed. For the initialization procedure, refer to Section 3-4 "Initializing Memory" (page 80).
	[OFF]	The NT30/30C will start in normal RUN mode.
SW2-5	Not used.	
	ON	
	[OFF]	
SW2-6	[ON]	When you set the Dip switch SW2-7 ON, NT series system Installer messages are displayed in English.
	OFF	Messages are displayed in Japanese
SW2-7	System installation effective/ineffective	
	ON	System program installation is effective (special mode) at the time when the power turn ON.
	[OFF]	Starts normal RUN mode.
SW2-8	Terminator setting when using RS-422A	
	ON	When connecting to the PC with RS-422A
	[OFF]	When connecting to the PC with RS-232C

[ ] indicates factory setting.

⚠️**Caution** If the DIP switch settings have been changed when the NT30/30C is powered, reset the power to the NT30/30C. The changes with the DIP switches become effective only after the power supply is reset.

Before switching on the power for the first time, set DIP switches SW2-6 of the NT30/30C to "ON" (they are set to "OFF" on shipping). If they are left "OFF", messages will not be displayed normally.

Reference In addition to the DIP switches, set also the "Host Comm.", "Port select", "Baud Rate", etc. at the memory switches. For these settings, refer to Section 3-5 "Setting the Conditions of Communications with the PC by Using the Memory Switches" (page 86).

2-2 Installation

Install the NT30/30C to the operation panel and connect the power to the NT30/30C as described below.

Correct use
- Do not install the NT30/30C at sites subject to the following conditions. Otherwise, the product may malfunction.
  - Severe temperature variations
  - Temperatures or humidities outside the ranges stated in the specifications
  - High humidity, condensation
  - Splashing chemical agents
  - Severe oil splashing
  - Corrosive or flammable gases
  - Strong vibrations or shocks
  - Direct exposure to wind and rain (outdoor sites)
  - Strong ultra-violet irradiation
- Take adequate measures to ensure shielding if the NT30/30C is used at a location subject to any of the following conditions. Otherwise, the product may malfunction.
  - Static electricity, or noise from other equipment
  - Strong electromagnetic fields
  - Nearby power cables
  - Potential exposure to radioactivity

2-2-1 Installation to the Operation Panel

The NT30/30C is mounted on an operation panel by embedding it in the panel.

Use the panel fittings and tools included in the product package and follow the procedure below.

⚠ **Caution**
- During work at the panel, take care to ensure that no metal scraps enter the unit. Otherwise, the product may malfunction.
- The thickness of applicable operation panel is 1.6 mm to 4.8 mm. All fittings must be tightened uniformly to a torque of 0.5 to 0.6 N·m in order to ensure water- and dust- resistance. The panel must not be soiled or warped, and must be able to support an installation that will remain secure and strong.

(1) Open a hole, shown below, in the panel and install the NT30/30C from the front side of the panel.

$131.0^{+0.5 \text{ mm}}_{0 \text{ mm}}$

$184.0^{+0.5 \text{ mm}}_{0 \text{ mm}}$
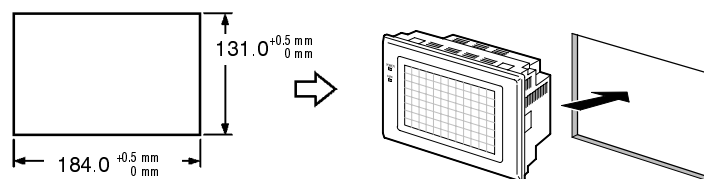
(2) Attach the panel fittings at four positions for the upper/lower sides and at two positions for the right and left sides, shown below, on the rear side of the NT30/30C.

Fit the hook of the fitting in the square hole in the body and tighten the screw with a Phillips head screwdriver while lightly pulling the fitting.
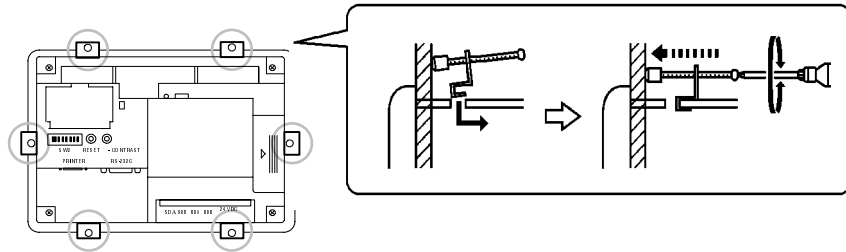
2-2-2   Power Supply Connection

Connect a 24 VDC power supply to the power input terminals.

⚠**Caution** • Do not apply an AC power supply across the power supply terminals.

• Use a DC power supply with a low voltage fluctuation stipulation

• When complying with EC directives (low voltage directives) use a power supply with reinforced insulation.

• Carefully check the wiring before switching ON the power.

24 VDC

Breaker
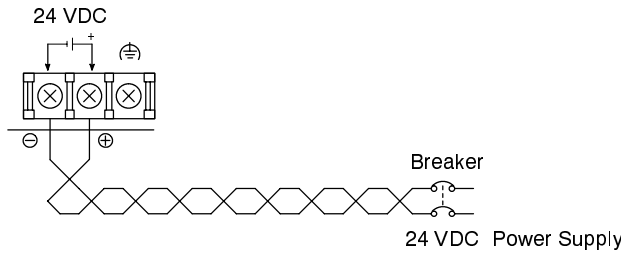
24 VDC Power Supply

• Noise prevention

The NT30/30C has a noise preventive feature against the power supply line noise. To further reduce noise, connect a noise filter to the power line.

• Power supply

In order to comply with EC directives, use a SELV power supply.

Applicable power supply specifications are as follows.

Item	Value
Power supply voltage	24 VDC
Allowable power supply voltage fluctuation range	20.4 VDC to 26.4 VDC (24 VDC −15%, +10%)
Power supply capacity	15 W or over

• Parts used for connection

⚠**Caution** • For the connection to the power supply terminal block, twisted wires of 2 mm^2 or greater cross sectional area and M 3.5 size crimp terminals must be used. Tighten the screws on the terminal block to a torque of 0.8 N·cm. Otherwise fire may occur.

Use crimp terminals to connect the power supply to the power input terminals. Recommended crimp terminals for M3.5 are given below.

Fork type   Round type

7 mm or less   7 mm or less
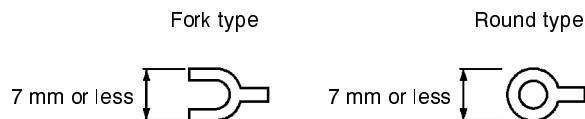
[Recommended terminals]

Maker	Type (fork type)	Type (round type)	Applicable Wire (stranded wire)
Japan Solderless Terminal MFG	2-YS3A	2-3.5	1.04 to 2.63 mm^2
Fuji Terminal	2-YAS3.5	V2-S3.5	1.04 to 2.63 mm^2
Nichifu Terminal	2Y-3.5	2-3.5	

2-3   Connecting to the Support Tool

Connect the NT30/30C to a computer with an RS-232C cable to transfer the screen data created by using a support tool to the NT30/30C.

An NT30/30C cannot be connected to both a personal computer running the support tool and a PC at the same time. Connect the personal computer only when transmitting screen data.
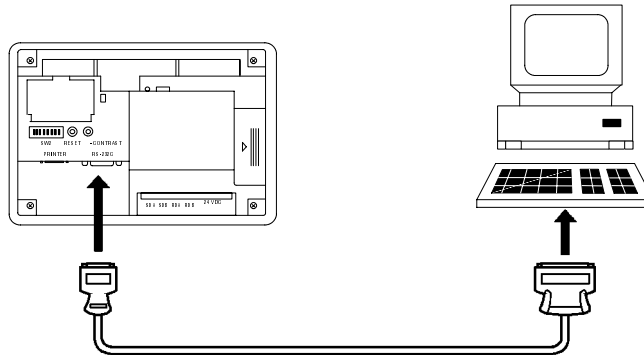
- Communication conditions

  Communication conditions are set when a support tool is started.

- Recommended connecting cable

  Use the cable indicated below.

      CV500-CN228 (length: 2 m), made by OMRON

To make a connector cable, refer to Appendix NO TAG "Connecting Cable Specifications" (page NO TAG).

2-4 Connection to a PC by the Host Link (RS-232C Type)

Connect the NT30/30C to an OMRON PC by using the RS-232C type host link method.

In order to make a connection to the PC using the host link method (RS-232C type), the "Host Comm." memory switch of the NT30/30C must be set to "host link", and the "Port select" memory switch must be set to "RS-232C". For details on memory switch settings, see "Selecting the Host Communication Method" (page 87) and "Selecting the Host Link Communication Port" (page 90).

2-4-1 Compatible PCs

Some models and series of OMRON PCs have the host link function built in. Check the model and series of the PC against the type of host link unit before making the connections.

The compatible PCs are listed in the table below.

PC Series	Units with Built-in Host Link Function		CPU Units Connectable Using Expansion Communication Board	Connectable to
	Host Link Unit	CPU Unit		
C series		C20H/C28H/ C40H/C60H		C□□H
	C120-LK201-V1			C120 C200H C500 (F) C1000H C2000 (H)
	C200H-LK201-V1			C200H
	C200H-LK201-V1	C200HS-CPU21-E C200HS-CPU23-E C200HS-CPU31-E C200HS-CPU33-E		C200HS
	C200H-LK201-V1	C200HE-CPU42-(Z)E	C200HE-CPU32-(Z)E C200HE-CPU42-(Z)E	C200HE
	C200H-LK201-V1	C200HG-CPU43-(Z)E C200HG-CPU63-(Z)E	C200HG-CPU33-(Z)E C200HG-CPU43-(Z)E C200HG-CPU53-(Z)E C200HG-CPU63-(Z)E	C200HG
	C200H-LK201-V1	C200HX-CPU44-(Z)E C200HX-CPU64-(Z)E	C200HX-CPU34-(Z)E C200HX-CPU44-(Z)E C200HX-CPU54-(Z)E C200HX-CPU64-(Z)E	C200HX
	C500-LK201-V1 C500-LK203			C500(F) C1000(F) C2000(H)
		CPM1-10CDR-□ (*1) CPM1-20CDR-□ (*1) CPM1-30CDR-□ (*1) CPM1-30CDR-□-V1 (*1) CPM1A-10CD□-□ (*1) CPM1A-20CD□-□ (*1) CPM1A-30CD□-□ (*1) CPM1A-40CD□-□ (*1)		CPM1

PC Series	Units with Built-in Host Link Function		CPU Units Connectable Using Expansion Communication Board	Connectable to
	Host Link Unit	CPU Unit		
C series		CQM1-CPU21-E CQM1-CPU41-EV1 CQM1-CPU42-EV1 CQM1-CPU43-EV1 CQM1-CPU44-EV1		CQM1
CV series	CV500-LK201	CV500-CPU01-EV1		CV500
	CV500-LK201	CV1000-CPU01-EV1		CV1000
	CV500-LK201	CV2000-CPU01-EV1		CV2000
CVM1 series	CV500-LK201	CVM1-CPU01-EV☐ CVM1-CPU11-EV☐ CVM1-CPU21-EV☐		CVM1
CompoBus/S Master Control Unit		SRM1-C02-V1		SRM1

(*1) An RS-232C adapter (CPM1-CIF01) is required.

2-4-2　Connecting the NT30/30C

Refer to the illustrations below to select the appropriate cable for the unit connectors and connect the NT30/30C to the PC.

To make a connector cable, refer to Appendix NO TAG "Method for Making the Cable for Connection to the PC" (page NO TAG).

Correct use
- After connecting a communication cable, always secure it with the screws. Otherwise the cable may disconnect, causing operation to fail.
- The cable's tensile load is 30 N. Do not subject it to loads greater than this. Otherwise a discontinuity may occur, causing operation to fail.

Connecting to a PC with a 25-pin Connector

Use a connector cable with a 25-pin connector on one end and a 9-pin connector on the other end (NT30/30C side) to connect the NT30/30C to a PC with a 25-pin connector.

NT30/30C　　　　　　　　　Host link unit/CPU unit

SYSMAC C series PC, CVM1/CV series PC

9-pin connector

-pin connector

RS-232C connector cable
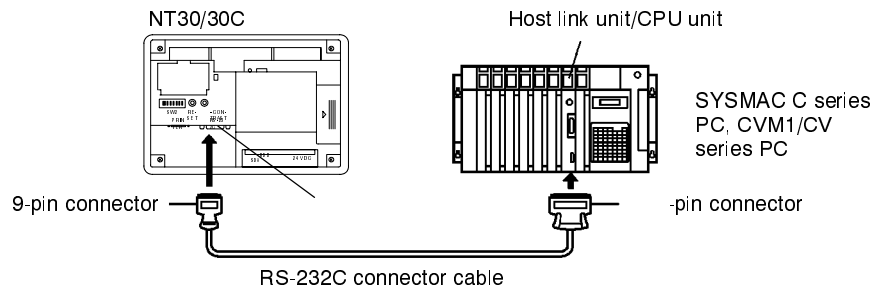
Use the following recommended cables (OMRON);

Connector Specification	Type	Cable Length	Applicable Host Link Unit
25-pin to 9-pin	XW2Z-200S	2m	C500-LK203 C500-LK201-V1 C120-LK201-V1 C200H-LK201 CV500-LK201
	XW2Z-500S	5m	

Connecting to a PC with a 9-pin Connector

Use a connector cable with a 9-pin connector on both ends to connect the NT30/30C to a PC with a 9-pin connector.

NT30/30C　　　　　　　　　Host link unit/CPU unit

SYSMAC C series PC, CVM1/CV series PC

9-pin connector　　　　Host I/F connector (RS-232C 9-pin type)　　　9-pin connector

RS-232C connector cable
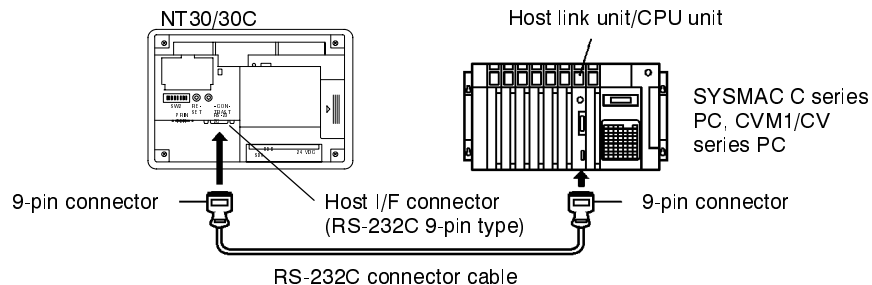
The connector cable wiring for the C series CPU unit (C□□H) is different from that for the other PCs. For details, refer to Appendix NO TAG "Method for Making the Cable for Connection to the PC" (page NO TAG).

Connecting the NT30/30C to a CVM1/CV Series Host Link Unit
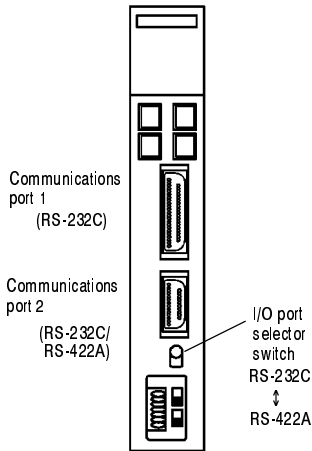
Two types of connectors are provided to CV500-LK201 host link unit. Both of these connector types can connect to the NT30/30C with an RS-232C connector cable. Select the connector cable which matches the connector type.

- To connect to communication port 1

  This is a 25-pin RS-232C connector. Use a connector cable with a 25-pin connector on one end and a 9-pin connector on the other end (NT30/30C side).

- To connect to communication port 2

  This is a 9-pin RS-232C/RS-422A connector. Use a connector cable with a 9-pin connector on both ends.

  Set the I/O port selector switch to the RS-232C side (upper side) to use this port.

Communications port 1 (RS-232C)

Communications port 2 (RS-232C/RS-422A)

I/O port selector switch RS-232C ↕ RS-422A

Connecting the NT30/30C to a C Series CQM1, SRM1 Unit
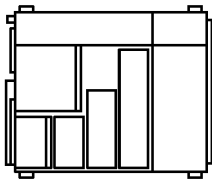
CQM1, SRM1 can connect to the NT30/30C by the RS-232C method. Use an RS-232C 9-pin type connector cable.

- To connect to the RS-232C port

  This is a 9-pin RS-232C connector. Use a connector cable with a 9-pin connector on both ends.

Connecting the NT30/30C to a C Series C200HX/HG/HE

When using a C series C200HX/HG/HE, the NT30/30C can be connected to the standard port of the CPU unit or ports A/B of an expansion communication board. Use a connector cable with a 9-pin RS-232C connector.
For details on the specifications and connecting method for the communication board used for connection, refer to the SYSMAC α communication board OPERATION MANUAL (W304-E1-□).

Connecting the NT30/30C to a C Series CPM1

Connect the CPM1 via an RS-232C adapter (type CPM1-CIF01).
Prepare a connector cable with a 9-pin RS-232C connector.

When a Connector Cable of 5 m or Longer is Required

When a connector cable of 5 m or longer is required, please make the cable. However, note that the maximum transmission distance is 15 m.

To make a connector cable, refer to Appendix NO TAG "Method for Making the Cable for Connection to the PC" (page NO TAG).

2-4-3   PC Switch Settings

When the NT30/30C and PC are connected to each other, set the conditions at the PC host link unit or the CPU as given in the table below.

The following is a general description of switch settings.

Refer to the manual for respective units for the details of the switch settings.

Item	Switch Setting
I/O port	RS-232C
Baud rate	Set the same baud rate as the NT30/30C. (*1)
Transfer code	ASCII 7 data bits, 2 stop bits
Parity	Even
1-to-1/1-to-N	1-to-N (*2)
Instruction level	Level 1, 2, 3
Unit #	00

*1   Set the host link baud rate at 9600 bps or 19200 bps with the memory switch for "Baud Rate". For the details, refer to "Selecting the Host Link Communication Speed" (page 89).

*2   The 1-to-N setting enables BCC (Block Check Character). It is not possible to connect more than one NT30/30C in a single host link.

Correct use   When using the CVM1/CV series, always set CPU execution processing (execution control 2) in the PC system settings to "Simultaneous processing".

Connecting to a Host Link Unit

Two types of host link units are available: a rack-mounting type and a CPU-mounted type. The switch settings differ according to the type of host link unit. Set the switches according to the unit type.

• C200H rack-mounting type: C200H-LK201(-V1)

[Setting the front switches]

Set each switch with a flat blade screwdriver so that the values or symbols in the setting value window agree with the following.
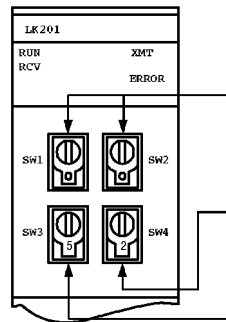
• Unit # (SW1, SW2)
  Set these switches to "0".

• Instruction level, parity, and transfer code (SW4)
  Set this switch to "2".

• Baud rate (SW3)
  Set this switch to "5" to select 9600 bps.
  Set this switch to "6" to select 19200 bps.

[Setting the rear switches]
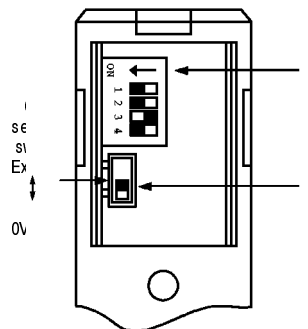
• 1-to-1/1-to-N selection (DIP switch)
  Set #3 to "ON".

• CTS selection (selector switch)
  Set this always to "0V" (ON).

• C500/C1000H rack-mounting type: C500-LK201-V1

[Setting the front switches]
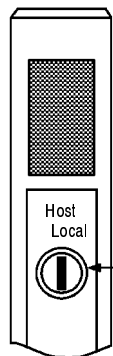
• Mode control (key switch)
  Set this to "host link".

[Setting the rear switches]

- I/O port selection (selector switch)
  Set this to "RS-232C".

- Unit # (DIP SW1)
  Set SW1-1 to SW1-5 to "OFF" ("0").

- Synchronization (selector switch)
  Set this to "Internal".

- Baud rate (DIP SW2-1 to SW2-4)
  Set these switches to "1010" to select 9600 bps.
  Set these switches to "0010" to select 19200 bps.
                              (0: OFF 1: ON)

- 1-to-1/1-to-N selection (DIP SW2-6)
  Set SW2-6 to "OFF" ("0") (1-to-N).

- Instruction level (DIP SW2-7, SW2-8)
  Set these switches to "ON" ("1").
  (Levels 1, 2, and 3 are enabled.)

- CTS selection (selector switch)
  Set this always to "0V" (ON).

• C500/C1000H rack-mounting type: C500-LK203

[Setting the rear switches]
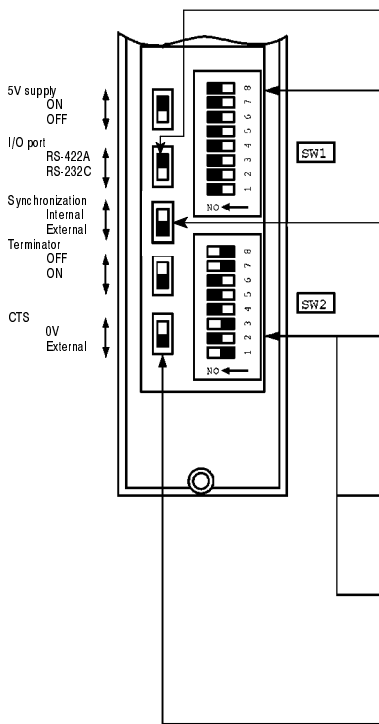
• I/O port selection (selector switch)
 Set this to "RS-232C".

• Unit #, parity, and transfer code (DIP SW1-1 to SW1-7)
 Set SW1-1 to SW1-7 to "OFF" ("0").

• Synchronization (selector switch)
 Set this to "Internal".

• Baud rate (DIP SW2-1 to SW2-4)
 Set these switches to "1010" to select 9600 bps.
 Set these switches to "0010" to select 19200 bps.
 (0: OFF 1: ON)

• 1-to-1/1-to-N selection (DIP SW2-6)
 Set SW2-6 to "OFF" ("0") (1-to-N).

• Instruction level (DIP SW2-7, SW2-8)
 Set these switches to "ON" ("1").
 (Levels 1, 2, and 3 are enabled.)

• CTS selection (selector switch)
 Set this always to "0V" (ON).

- CPU-mounted type: C120-LK201-V1

[Setting the rear switches]
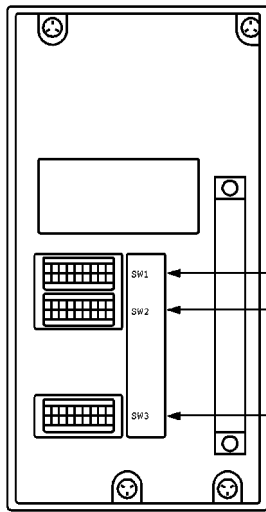
- Unit #, parity, and transfer code (DIP SW1-1 to SW1-5)
  Set SW1-1 to SW1-5 to "OFF" ("0").
  * Parity is fixed at Even Parity. Transfer code is fixed at ASCII 7 data bits and 2 stop bits.

- Baud rate (DIP SW2-1 to SW2-4)
  Set these switches to "1010" to select 9600 bps.
  Set these switches to "0010" to select 19200 bps.
                                    (0: OFF 1: ON)

- 1-to-1/1-to-N selection (DIP SW2-6)
  Set SW2-6 to "OFF" ("0") (1-to-N).

- Instruction level (DIP SW2-7, SW2-8)
  Set these switches to "ON" ("1").
  (Levels 1, 2, and 3 are enabled.)

- CTS selection (DIP SW3-1 and SW3-2)
  Set SW3-1 to "ON" (1) and SW3-2 to "OFF" (0). (Set this always to "0V".)

- Synchronization (DIP SW3-3 to SW3-6)
  Set SW3-3, SW3-5, and SW3-6 to "ON" (1), and SW3-4 to "OFF" (0). (Set these to "Internal".)

- CVM1/CV series backplate mounted type: CV500-LK201

[Setting the front switches]

Set the operating conditions with the CPU Bus Unit setting functions when a CVM1/CV series host link unit is connected to the NT30/30C. The CPU Bus Unit setting can be made directly from the peripheral tool (LSS etc.) or the CPU Bus Unit setting information created with a peripheral tool can be transferred to the CPU.

The following describes the switch settings so as to enable the CPU Bus Unit setting. For the details of the CPU Bus Unit setting, refer to the "SYSMAC CVMI/CV Series Host Link User's Manual" (W205-E1-☐).

Communications
port 1
(RS-232C)

Communications
port 2
(RS-232C/
RS-422A)

I/O port
selector
switch
RS-232C
↕
RS-422A

- Unit # (SW3 and SW4)
  When using communications port 2, set both SW3 and SW4 to "0".

- Setting of I/O port selector switch (selector switch)
  Set this to "RS-232C".

- CTS selection (DIP SW2 and SW3)
  Set SW2 or SW3 to "ON". (Normally, this is set to "0V fixed".)
  To use communication port 1, set SW2. To use communication port 2, set SW3.

- Communications condition setting (DIP SW1)
  Set SW1 to "OFF".

  Communications are performed on the basis of the CPU Bus Unit system settings of the PLC.
  The defaults for the system setting are as follows.
  Baud rate: 9600bps
  Parity: Even
  Xon/Xoff control: Not performed
  Communications method: Full duplex
  Stop bit: 2
  Data length: 7 bits

Connecting to a CPU

• C-series C☐☐H, CVM1/CV-series (-EV☐)

Set the operating conditions with the PC System Setting functions when a C ☐☐ H, CVM1/CV-series host link unit is connected to the NT30/30C. The PC system settings can be made directly from the peripheral tool (LSS etc.) or the PC system setting information created with a peripheral tool can be transferred to the CPU.

The following describes the switch settings so as to enable the PC system settings. For the details of the PC system settings, refer to the "SYSMAC C☐☐H User's Manual (Programming)" (W176-E1-☐) and the "SYSMAC CV500/CV1000/CV2000 User's Manual (Ladder)" (W202-E1-☐)

(1) C-series C☐☐H   : C20H/C28H/C40H/C60H

No switch settings are required when connecting to a C-series C☐☐H CPU.

(2) CVM1/CV-series   : CV500-CPU01-EV1
                                CV1000-CPU01-EV1
                                CVM1-CPU01-EV☐
                                CVM1-CPU11-EV☐
                                CVM1-CPU21-EV☐

Only the CVM1/CV-series CPUs of the "-EV1" or later version can be connected to the NT30/30C.

When connecting to a CVM1/CV-series CPU, set the switches as given below.

[Setting the front switches]
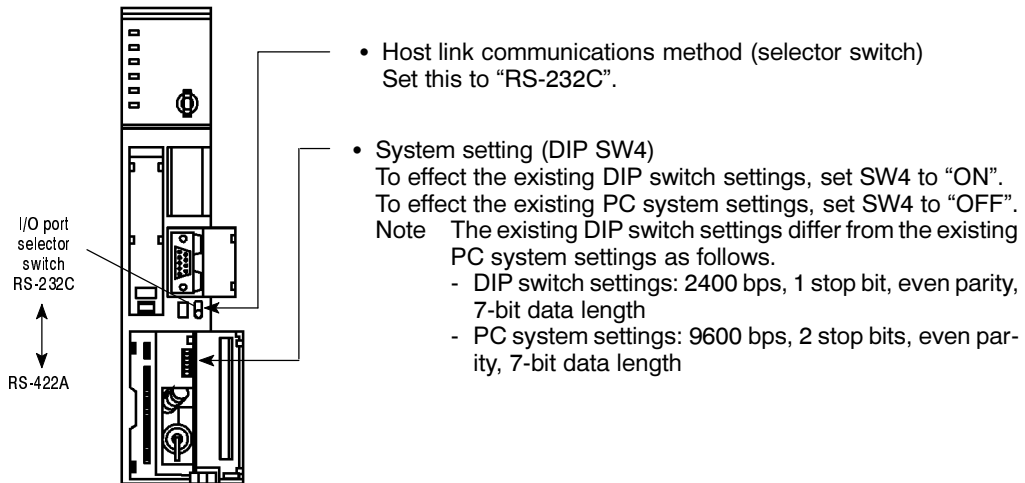
I/O port
selector
switch
RS-232C

↕

RS-422A

• Host link communications method (selector switch)
  Set this to "RS-232C".

• System setting (DIP SW4)
  To effect the existing DIP switch settings, set SW4 to "ON".
  To effect the existing PC system settings, set SW4 to "OFF".
  Note   The existing DIP switch settings differ from the existing
         PC system settings as follows.
         - DIP switch settings: 2400 bps, 1 stop bit, even parity,
           7-bit data length
         - PC system settings: 9600 bps, 2 stop bits, even par-
           ity, 7-bit data length

[Making the PC system settings]

The possible settings and existing settings which can be set by the PC system setting are as given below.

Item	Possible Setting	Existing Setting
Baud rate	1200/2400/4800/9600/19200 bps	9600 bps
Stop bit	1 or 2 stop bits	2 stop bits
Parity	Even/odd/non-parity	Even parity
Data length	ASCII 7 bits	ASCII 7 bits
Unit #	00 to 31	Unit #00

• C-series C200HS, C200HX/HG/HE, CQM1, CPM1, SRM1

Set the operating conditions to the PC system setting area when a C200HS or CQM1 CPU is connected to the NT30/30C. The PC system setting area (data memory) can be directly accessed from the peripheral tool (LSS etc.).

The following describes the switch settings so as to enable the PC system settings. For the details of the operation with the PC system setting area, refer to the "SYSMAC CQM1 Reference Manual" (W228-E1-□).

[Switch setting] (C200HX/HG/HE, CQM1)

DIP switch setting (SW5)

OFF
ON

ON 1 2 3 4 5 6

RS232C port communication condition setting
Set SW5 to "OFF" to make the settings made in PC system setting effective.
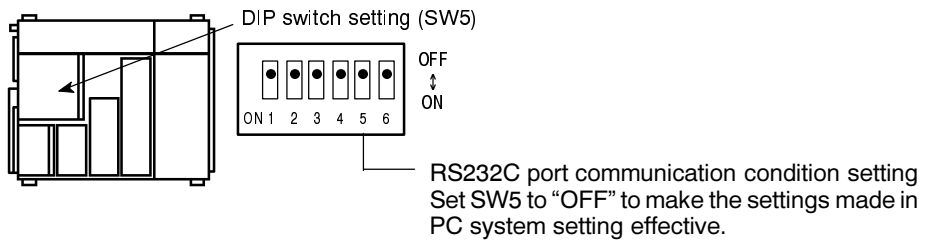
[Switch setting] (CPM1)

• Set the mode setting switch to "HOST" (upper position).
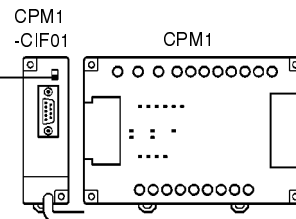
CPM1
-CIF01   CPM1

[PC system setting area settings]

Write settings to the PC system setting area (data memory) according to the CPU unit or SRM1 port used to connect to the NT30/30C.

• When using the RS-232C port of a C200HX/HG/HE, CQM1, or SRM1

Channel #	Writing Value	Settings
DM6645	0001	Host link mode Conditions set by the contents of DM.
DM6646	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6648	0000	Unit No. 0

• When using port A of C200HX/HG/HE

Channel #	Writing Value	Settings
DM6555	0001	Host link mode Conditions set by the contents of DM.
DM6556	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6558	0000	Unit No. 0

• When using port B of C200HX/HG/HE

Channel #	Writing Value	Settings
DM6550	0001	Host link mode Conditions set by the contents of DM.
DM6551	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6553	0000	Unit No. 0

• When using CPM1

Channel #	Writing Value	Settings
DM6650	0001	Host link mode Conditions set by the contents of DM.
DM6651	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6653	0000	Unit No. 0

2-5   Connection to a PC by the Host Link (RS-422A Type)

Connect the NT30/30C to an OMRON PC by using the RS-422A type host link method.

If the distance between the NT30/30C and the PC is greater than 15 m, this method should be used. The maximum distance over which a connection can be made is 500 m.

When using the RS-422A method, the host computer and PC are usually connected in a 1 to N ratio (more than one PC), but in the special case of the connection between the NT30/30C and PC, the ratio is 1 to 1.

In order to make a connection to the PC using the host link method (RS-422A type), the "Host Comm." memory switch of the NT30/30C must be set to "host link", and the "Port select" memory switch must be set to "RS-422A". For details on memory switch settings, see "Selecting the Host Communication Method" (page 87) and "Selecting the Host Link Communication Port" (page 90).

2-5-1   Compatible PCs

Some models and series of OMRON PCs have the host link function built in. Check the model and series of the PC against the type of host link unit before making the connections.

The compatible PCs are listed in the table below.

PC Series	Units with Built-in Host Link Function		Connectable to
	Host Link Unit	CPU Unit	
C series		CPM1-10CDR-□ (*1) CPM1-20CDR-□ (*1) CPM1-30CDR-□ (*1) CPM1-30CDR-□-V1 (*1) CPM1A-10CD□-□ (*1) CPM1A-20CD□-□ (*1) CPM1A-30CD□-□ (*1) CPM1A-40CD□-□ (*1)	CPM1
	C120-LK202-V1		C120 C200H C500 (F) C1000H C2000 (H)
	C200H-LK202-V1		C200H C200HS
	C500-LK201-V1 C500-LK203		C500 (F) C1000 (F) C2000 (H)
	C200H-LK202-V1	C200HE-CPU32-(Z)E (*2) C200HE-CPU42-(Z)E (*2)	C200HE
	C200H-LK202-V1	C200HG-CPU33-(Z)E (*2) C200HG-CPU43-(Z)E (*2) C200HG-CPU53-(Z)E (*2) C200HG-CPU63-(Z)E (*2)	C200HG
	C200H-LK202-V1	C200HX-CPU34-(Z)E (*2) C200HX-CPU44-(Z)E (*2) C200HX-CPU54-(Z)E (*2) C200HX-CPU64-(Z)E (*2)	C200HX
CV series (*3)	CV500-LK201	CV500-CPU01-EV1	CV500
	CV500-LK201	CV1000-CPU01-EV1	CV1000
	CV500-LK201	CV2000-CPU01-EV1	CV2000
CVM1 series (*3)	CV500-LK201	CVM1-CPU01-EV□ CVM1-CPU11-EV□ CVM1-CPU21-EV□	CVM1

(*1)   A type CPM1-CIF11 RS-422A adapter is required.

(*2)   A C200HW-COM03 or C200HW-COM06 communication board is required.

(*3)   Connection to CVM1/CV series PC CPU units which are not suffixed "-V□" is not possible. In the case of these CPU units, make the connection to the NT30/30C by using a host link unit.

2-5-2 Parts Required for Connection

The RS-422A cable used for RS-422A communications is not supplied by OMRON. Make this cable in accordance with the environment (PC used and transmission distance between the NT30/30C and PC).

Two connectors, two connector covers and one cable are required to make up a connecting cable. One connector and one connector cover is supplied with the PC. However, a cable of the type recommended by OMRON must be prepared.

For details on making the cable, refer to "Making the Cable" in the appendix (page NO TAG). The table below lists the components supplied with each unit and the recommended cables.

Name	Model	Remarks
Connector	XM2A-0901	9-pin, mannfactured by OMRON - Delivered with C series CQM1 and CVm1/CV series CPU unit. - Delivered with the following host link units: C200H-LK202-V1 C500-LK203 CV500-LK201
	DE-9P	9-pin, mannfactured by JAE - Delivered with the following host link units: C200H-LK202-V1 C500-LK201-V1
Connector cover	XM2S-0911	9-pin, manufactured by OMRON - Delivered with C series CQM1 and CVm1/CV series CPU unit. - Delivered with the following host link units: C200H-LK202-V1 C500-LK203 CV500-LK201
	DE-CI-J6	9-pin, mannfactured by JAE - Delivered with the following host link units: C200H-LK202-V1 C500-LK201-V1
Cable	H-9293A (CO-HC-ESV-3P×7/0.2)	For RS-422A, manufactured by Hirakawa Hewtech Corp.

2-5-3   Method for Connection

For RS-422A type communication, an RS-422A cable is used as the transmission channel connecting the NT30/30C and PC.

As shown in the figure below, the RS-422A cable is connected directly to the NT30/30C.

RS-422A connector cable
(max. cable length: 500 m)
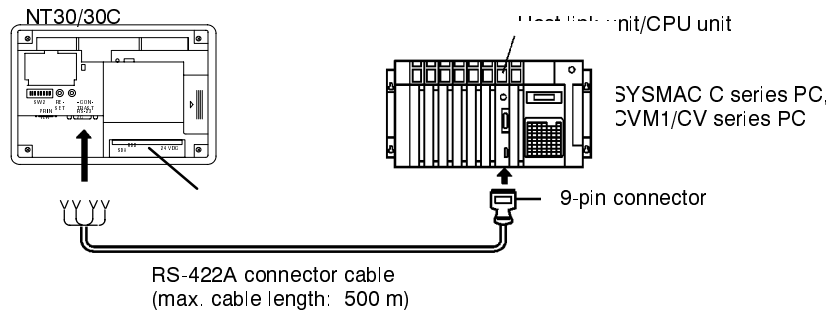
Correct use
- Carry out class 3 grounding at the FG terminal of the PC. For details, refer to the manual for the PC.
- Switch off the NT30/30C power supply before connecting or disconnecting a connector.
- After connecting the connector cable, be sure to secure the connector with screws.

2-5-4   Connector Specifications and Wiring for Each Unit

The combination of pin numbers to which the connecting wires are connected differs according to the connector specifications for each unit. Check the connector specifications of the unit to be connected and make the wiring connections by referring to the relevant connection combination among those indicated below.

For details on making the cable, see "Making the Cable" (page NO TAG).

[NT30/30C RS-422A terminal block specifications]

- Connected terminal block :   RS-422A terminal block (M3.5 screws

- Electrical characteristics :   Conform to EIA RS-422A

- Signal direction   :   Signal input and output is relative to the NT30/30C.

SDA SDB RDA RDB
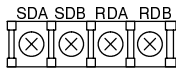
Signal Name	Abbreviation	Signal Direction	
		Input	Output
Send data A	SDA (SD−)		◯
Send data B	SDB (SD+)		◯
Recive data A	RDA (RD−)	◯	
Recive data B	RDB (RD+)	◯	

• Connecting an NT30/30C to a C-series host link unit

[C-series host link connector specifications]

- Applicable host link units: C200H-LK202-V1
                                          C500-LK202-V1
                                          C120-LK202-V1

- Electrical characteristics: Conform to EIA RS-422A

- Signal direction: Signal input and output is relative to the host link unit.

Connector Pin No.	Signal Name	Abbreviation	Signal Direction	
			Input	Output
1	Receive data B	RDB	○	
3	Signal ground	SG	–	–
5	Send data B	SDB		○
6	Receive data A	RDA	○	
7	Frame ground	FG	–	–
9	Send data A	SDA		○

[Wiring connections]
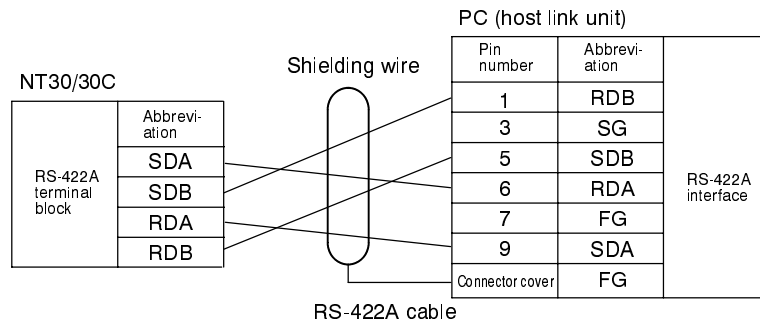
• Connecting an NT30/30C to a C-series host link unit (insulated type)

[C-series host link connector specifications]

- Applicable host link units: C500-LK203 (insulated type)
- Electrical characteristics: Conform to EIA RS-422A
- Signal direction: Signal input and output is relative to the host link unit.
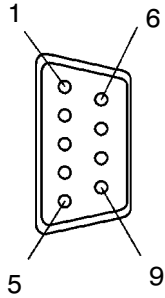
Connector Pin No.	Signal Name	Abbreviation	Signal Direction	
			Input	Output
Connector cover	Frame ground	FG	–	–
1	Receive data B	RDB	○	
5	Send data B	SDB		○
6	Receive data A	RDA	○	
7	Frame ground	FG	–	–
9	Send data A	SDA		○

[Wiring connections]

Connect the shielding wire for the cable to pin No. 7 of the connector at the host link unit side only.
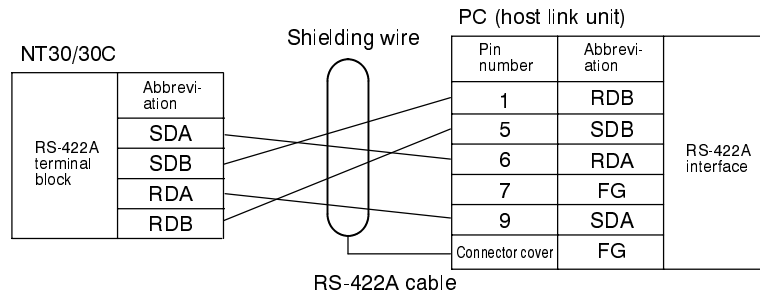
• Connecting an NT30/30C to a CVM1/CV-series host link unit

   [CVM1/CV-series host link unit connector specifications]

    - Applicable host link units: CV500-LK201 (communication port 2)

    - Electrical characteristics: Conform to EIA RS-422A

    - Signal direction: Signal input and output is relative to the host link unit.
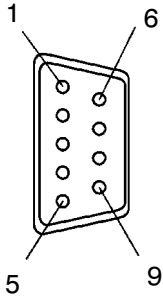
Connector Pin No.	Signal Name	Abbreviation	Signal Direction	
			Input	Output
Connector cover	Frame ground	FG	–	–
1	Send data A	SDA (SD–)		○
2	Send data B	SDB (SD+)		○
6	Receive data A	RDA (RD–)	○	
8	Receive data B	RDB (RD+)	○	

[Wiring connections]
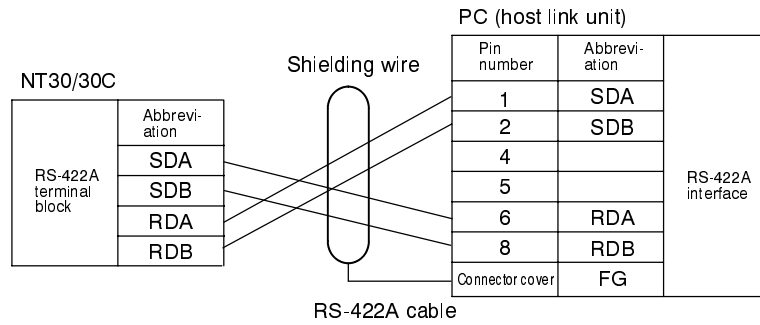
- Connecting an NT30/30C to a CVM1/CV-series CPU unit

    [CVM1/CV-series CPU unit connector specifications]

    - Applicable host link units: CV500-CPU01-EV1
      CV1000-CPU01-EV1
      CV2000-CPU01-EV1
      CVM1-CPU01-EV□
      CVM1-CPU11-EV□
      CVM1-CPU21-EV□

      Only the CVM1/CV-series CPUs of the "-EV1" or later version can be connected to the NT30/30C.

    - Electrical characteristics: Conform to EIA RS-422A
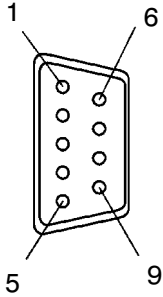   - Signal direction: Signal input and output is relative to the PC.
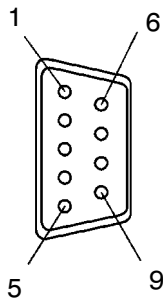
Connector Pin No.	Signal Name	Abbreviation	Signal Direction	
			Input	Output
Connector cover	Frame ground	FG	–	–
1	Send data A	SDA (SD–)		○
2	Send data B	SDB (SD+)		○
4	Request to send	RS		○
5	Clear to send	CS	○	
6	Receive data A	RDA (RD–)	○	
8	Receive data B	RDB (RD+)	○	

[Wiring connections]

Short pin No. 4 (RS) with pin No. 5 (CS) at the CPU unit side.
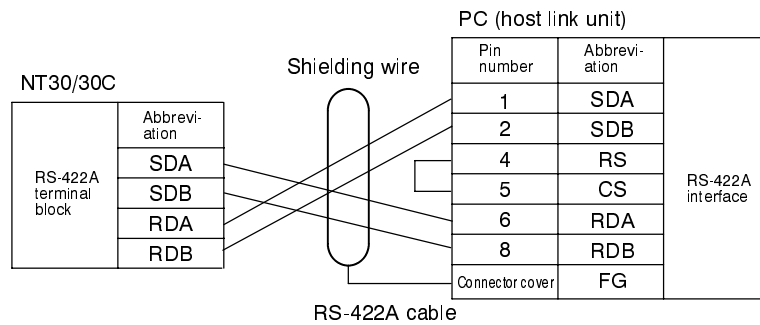
2-5-5   PC Switch Settings

When the NT30/30C and PC are connected to each other, set the conditions at the PC host link unit or the CPU as given in the table below.

The following is a general description of switch settings.

Refer to the manual for respective units for the details of the switch settings.

Item	Switch Setting
I/O port	RS-422A
Baud rate	Set the same baud rate as the NT30/30C.
Transfer code	ASCII 7 data bits, 2 stop bits
Parity	Even
1-to-1/1-to-N	1-to-N (*1)
Instruction level	Level 1, 2, 3
Unit #	00

*1   The 1-to-N setting enables BCC (Block Check Character). It is not possible to connect more than one NT30/30C in a single host link.

Correct use   When using the CVM1/CV series, always set CPU execution processing (execution control 2) in the PC system settings to "Simultaneous processing".

Connecting to a Host Link Unit

Two types of host link units are available: a rack-mounting type and a CPU-mounted type. The switch settings differ according to the type of host link unit. Set the switches according to the unit type.

• C200H rack-mounting type: C200H-LK202-V1

[Setting the front switches]

Set each switch with a flat blade screwdriver so that the values or symbols in the setting value window agree with the switch settings indicated in the table above.
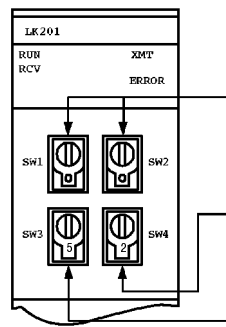
• Unit # (SW1, SW2)
Set these switches to "0".

• Instruction level, parity, and transfer code (SW4)
Set this switch to "2".

• Baud rate (SW3)
Set this switch to "5" to select 9600 bps.
Set this switch to "6" to select 19200 bps.

C200H-LK202-V1

This type has an RS-422A connector.

CTS
selector
switch
External
(ON)
↕
Unavailable
(OFF)

1–to–1
protocol
(ON)
↕
1–to–N
protocol
(OFF)
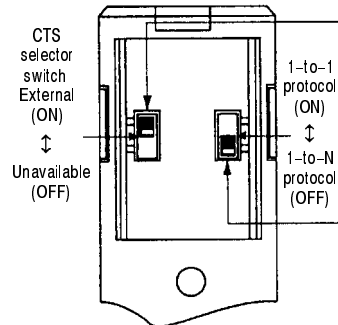
- Terminator setting (selector switch)
  Set this switch to "ON".
  Note: Set the link adapter to "ON" also.

- 1-to-1/1-to-N protocol selection (selector switch)
  Set this switch to "1-to-N (OFF)"

- C500/C1000H rack-mounting type: C500-LK201-V1
                                    C500-LK203

[Setting the front switches]

- C500-LK201-V1

   Set the control mode to the host link mode. (page 34)

[Setting the rear switches]

- C500-LK201-V1

- I/O port selection (selector switch)
   - If connecting to an RS-232C connector, set this to "RS-232C".
   - If connecting to an RS-422A connector, set this to "RS-422A".
- Unit # (DIP SW1)
   Set SW1-1 to SW1-5 to "OFF" ("0").

- Synchronization (selector switch)
   Set this to "Internal".

- Baud rate (DIP SW2-1 to SW2-4)
   Set these switches to "1010" to select 9600 bps.
   Set these switches to "0010" to select 19200 bps.
                                    (0: OFF 1: ON)

- 1-to-1/1-to-N selection (DIP SW2-6)
   Set SW2-6 to "OFF" ("0") (1-to-N).

- Instruction level (DIP SW2-7, SW2-8)
   Set these switches to "ON" ("1").
   (Levels 1, 2, and 3 are enabled.)

- CTS selection (selector switch)
   Set this always to "0V" (ON).

- Terminator setting (selector switch)
   When using an RS-422A cable, set this to "ON".
   Note: Set the link adapter to "ON" also.

[Setting the rear switches]

- C500-LK203

5V supply
ON
OFF

I/O port
RS-422A
RS-232C

Synchronization
Internal
External

Termination
resistance
OFF
ON

CTS
0V
External

SW1

SW2

NO

- I/O port selection (selector switch)
  - If connecting to an RS-232C connector, set this to "RS-232C".
  - If connecting to an RS-422A connector, set this to "RS-422A".

- Machine No., parity, transfer code settings
  (DIP SW1-1 to SW1-7)
  Set SW1-1 to SW1-7 to "OFF" ("0").

- Synchronization (selector switch)
  Set this to "Internal".

- Baud rate (DIP SW2-1 to SW2-4)
  Set these switches to "1010" to select 9600 bps.
  Set these switches to "0010" to select 19200 bps.
  (0: OFF 1: ON)

- 1-to-1/1-to-N selection (DIP SW2-6)
  Set SW2-6 to "OFF" ("0") (1-to-N).

- Instruction level (DIP SW2-7, SW2-8)
  Set these switches to "ON" ("1").
  (Levels 1, 2, and 3 are enabled.)

- CTS selection (selector switch)
  Set this always to "0V" (ON).

- Terminator setting (selector switch)
  When using an RS-422A cable, set this to "ON".
  Note: Set the link adapter to "ON" also.

• CPU-mounted type: C120-LK201-V1
                       C120-LK202-V1

[Setting the rear switches]
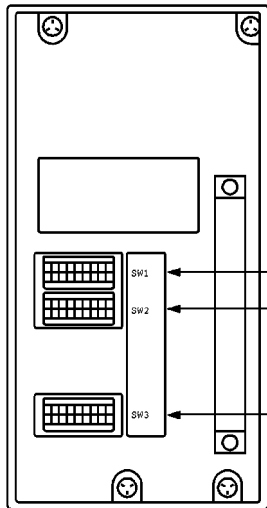
• Unit #, parity, and transfer code (DIP SW1-1 to SW1-5)
  Set SW1-1 to SW1-5 to "OFF" ("0").
  * Parity is fixed at Even Parity. Transfer code is fixed
    at ASCII 7 data bits and 2 stop bits.

• Baud rate (DIP SW2-1 to SW2-4)
  Set these switches to "1010" to select 9600 bps.
  Set these switches to "0010" to select 19200 bps.
                                (0: OFF 1: ON)

• 1-to-1/1-to-N selection (DIP SW2-6)
  Set SW2-6 to "OFF" ("0") (1-to-N).

• Instruction level (C120-LK201-V1 only) (DIP SW2-7, SW2-8)
  Set these switches to "ON" ("1").
  (Levels 1, 2, and 3 are enabled.)

• CTS selection (C120-LK201-V1 only)
  (DIP SW3-1 and SW3-2)
  Set SW3-1 to "ON" (1) and SW3-2 to "OFF" (0).
  (Set this always to "0V".)

• Synchronization (C120-LK201-V1 only)
  (DIP SW3-3 to SW3-6)
  Set SW3-3, SW3-5 to "ON" (1) and SW3-4,
  SW3-6 to "OFF" (0).
  Set this to "Internal".

• Terminator setting (C120-LK202-V1 only)
  (DIP SW3-1 to SW3-6)
  When using an RS-422A cable, set SW3-1, SW3-3, and SW3-5 to
  "ON" (1), and set SW3-2, SW3-4, and SW3-6 to "OFF" (0).
  (Set this to "Terminated".)
  Note: Set the link adapter to "Terminated", too.

- CVM1/CV series rack-mounting type: CV500-LK201

[Setting the front switches]

Set the operating conditions with the CPU Bus Unit setting functions when an NT30/30C and a CVM1/CV series host link unit is connected to the NT30/30C. The CPU Bus Unit setting can be made directly from the peripheral tool (LSS etc.) or the CPU Bus Unit setting information created with a peripheral tool can be transferred to the CPU.

The following describes the switch settings so as to enable the CPU Bus Unit setting. For the details of the CPU Bus Unit setting, refer to the "SYSMAC CVMI/CV Series Host LInk User's Manual" (W205-E1-□).

Communications port 1 (RS-232C)

Communications port 2 (RS-232C/ RS-422A)

I/O port selector switch RS-232C ↕ RS-422A

Terminator ON ↕ OFF

- Unit # (SW3 and SW4)
  Set these switches to "0".
  (when using communications port 2)

- Setting of I/O port selector switch (selector switch)
  Set this to "RS-422A".

- CTS selection (DIP SW2 and SW3)
  Set SW2 or SW3 to "ON". (Set this always to "0V fixed".)
  To use communication port 1, set SW2. To use communication port 2, set SW3.

- Communications condition setting (DIP SW1)
  Set SW1 to "OFF".

  Communications are performed on the basis of the CPU Bus Unit system settings of the PLC.
  The defaults for the system setting are as follows.
  Baud rate: 9600bps
  Parity: Even
  Xon/Xoff control: Not performed
  Communications method: Full duplex
  Stop bit: 2
  Data length: 7 bits

- Terminator setting (selector switch)
  When using an RS-422A cable, set this to "ON".

Connecting to a CPU

Set the communication conditions with the PC System Setting functions when a CVM1/CV-series host link unit is connected to the NT30/30C. The PC system settings can be made directly from the peripheral tool (LSS etc.) or the PC system setting information created with a peripheral tool can be transferred to the CPU.

The following describes the switch settings so as to enable the PC system settings. For the details of the PC system settings, refer to the "SYSMAC C20H/C28H/C40H/C60H User's Manual (Programming)" (W176-E1-☐) and the "SYSMAC C-series and CVM1 PCs SYSMAC Support Software Operation Manual: CVM1 PCs" (W249-E1-☐).

CVM1/CV-series:　　CV500-CPU01-EV1
　　　　　　　　　　　CV1000-CPU01-EV1
　　　　　　　　　　　CVM1-CPU01-EV☐
　　　　　　　　　　　CVM1-CPU11-EV☐
　　　　　　　　　　　CVM1-CPU21-EV☐

Only the CVM1/CV-series CPUs of the "-EV1" or later version can be connected to the NT30/30C.

[Setting the front switches]

- Host link communications method (selector switch)
  - If connecting to an RS-232C connector, set this to "RS-232C".
  - If connecting to an RS-422A connector, set this to "RS-422A".

- Host link default value setting (DIP SW4)
  To effect the existing DIP switch settings, set SW4 to "ON".
  To effect the existing PC system settings, set SW4 to "OFF".
  Note: The existing DIP switch settings differ from the existing PC system settings as follows.
  - DIP switch settings: 2400 bps, 1 stop bit, even parity, 7-bit data length
  - PC system settings: 9600 bps, 2 stop bits, even parity, 7-bit data length

- Terminator setting (DIP SW6)
  When using an RS-422A cable, set SW6 to "ON".
  (Set this this "Terminated".)
  Note: Set the link adapter to "ON" also.

I/O port selector switch
RS-232C
↕
RS-422A

[Making the PC system settings]

The possible settings and existing settings which can be set by the PC system setting are given below.

| Item	Possible Setting	Existing Setting
Baud rate	1200/2400/4800/9600/19200 bps	9600 bps
Stop bit	1 or 2 stop bits	2 stop bits
Parity	Even/odd/non-parity	Even parity
Data length	ASCII 7 bits or JIS 8 bits	ASCII 7 bits
Unit #	00 to 31	Unit #00

• C-series C200HX/HG/HE

Set the communication conditions in the PC system setting area when a C200HX/HG/HE communication board is connected to the NT30/NT30C. The PC system setting area (data memory) can be directly accessed from the peripheral tool (SYSMAC support software, etc.).
The following describes the switch settings that enable the "PC system settings". For details of the operation with the PC system setting area, refer to the "SYSMAC C200HX/HG/HE OPERATION MANUAL" (W303-E1-□).

[Switch setting]

These are the settings of the DIP switches on the CPU unit.
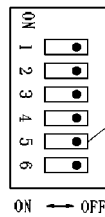
RS-232C port communication condition setting
Set SW5 to "OFF" to make the settings made in the PC system settings effective.

Communication board DIP switch settings

DIP switch 1 : ☐4 (4 wire type)

DIP switch 2 : ON (terminator ON)

[PC system setting area settings]

Write settings to the PC system setting area (data memory) according to the port used to connect to the NT30/NT30C.

• When port A is used

Channel #	Writing Value	Settings
DM6555	0001	Host link mode Conditions set by the contents of DM.
DM6556	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6558	0000	Unit No. 0

• When using port B

Channel #	Writing Value	Settings
DM6550	0001	Host link mode Conditions set by the contents of DM.
DM6551	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6553	0000	Unit No. 0

• C series CPM1

Set the communication conditions in the PC system setting area when a CPM1 is connected to the NT30/NT30C. The PC system setting area (data memory) can be directly accessed from the peripheral tool (SYSMAC support software, etc.).
For details of the operation with the PC system setting area, refer to the "SYSMAC CPM1 OPERATION MANUAL" (W252-E1-□).

[Switch setting] (CPM1)

• Set the terminal resistor selection switch to ON (upper position).

[PC system setting area settings]

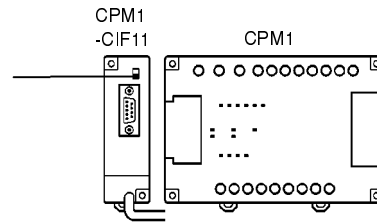| Channel #	Writing Value	Settings
DM6650	0001	Host link mode Conditions set by the contents of DM.
DM6651	0303	Data length: 7 bits, 2 stop bits, even parity, baud rate: 9600 bps
	0304	Data length: 7 bits, 2 stop bits, even parity, baud rate: 19200 bps
DM6653	0000	Unit No. 0

2-6   Connection to a PC by the NT Link

Connect the NT30/30C to an OMRON PC by the NT link method.

To connect an NT30/30C to a PC by the NT link method, the "Comm.Method" memory switch of the NT30/30C must be set to "NT link". For details on the "Comm.Method" memory switch setting, refer to "Selecting of the Host Communication Method" (page 87).

2-6-1   Compatible PCs

Some models and series of OMRON PCs have the host link function built in. Check the model and series of the PC against the type of host link unit before making the connections.

The compatible PCs are listed in the table below.

| PC Series	CPU Unit with Built-in Host Link Function	CPU Unit Connectable with Expansion Communication Board	Connectable to
C series	CPM1-10CDR-□ CPM1-20CDR-□ CPM1-30CDR-□ CPM1-30CDR-□-V1 CPM1A-10CD□-□ CPM1A-20CD□-□ CPM1A-30CD□-□ CPM1A-40CD□-□		CPM1
	CQM1-CPU41-EV1 CQM1-CPU42-EV1 CQM1-CPU43-EV1 CQM1-CPU44-EV1		CQM1
	C200HS-CPU21-E C200HS-CPU23-E C200HS-CPU31-E C200HS-CPU33-E		C200HS
	C200HE-CPU42-(Z)E	C200HE-CPU32-(Z)E C200HE-CPU42-(Z)E	C200HE
	C200HG-CPU43-(Z)E C200HG-CPU63-(Z)E	C200HG-CPU33-(Z)E C200HG-CPU43-(Z)E C200HG-CPU53-(Z)E C200HG-CPU63-(Z)E	C200HG
	C200HX-CPU44-(Z)E C200HX-CPU64-(Z)E	C200HX-CPU34-(Z)E C200HX-CPU44-(Z)E C200HX-CPU54-(Z)E C200HX-CPU64-(Z)E	C200HX
CV series	CV500-CPU01-EV1		CV500
	CV1000-CPU01-EV1		CV1000
	CV2000-CPU01-EV1		CV2000
CVM1 series	CVM1-CPU01-EV□ CVM1-CPU11-EV□ CVM1-CPU21-EV□		CVM1
CompoBus/S Master Control Unit	SRM1-C02-V1		SRM1

2-6-2   Connecting the NT30/30C

Refer to the illustrations below to select the appropriate cable for the unit connectors and connect the NT30/30C to the PC.

A host link connector cable can also be used. To make a connector cable, refer to Appendix NO TAG "Method for Making the Cable for Connection to the PC" (page NO TAG).

Correct use
- After connecting a communication cable, always secure it with the screws. Otherwise the cable may disconnect, causing operation to fail.
- The cable's tensile load is 30 N. Do not subject it to loads greater than this. Otherwise a discontinuity may occur, causing operation to fail.

Use a connector cable with a 9-pin connector on both ends to connect the NT30/30C to a PC with a 9-pin connector.
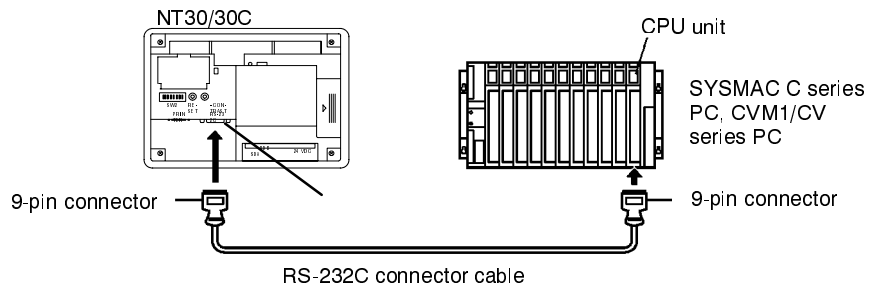
The following are recommended cables (manufactured by OMRON)

Connector Specification	Model	Cable Length
9-pin ↔ 9-pin	XW2Z-200T	2 m
	XW2Z-500T	5 m

When a Connector Cable of 5 m or Longer is Required

When a connector cable of 5 m or longer is required, please make the cable. However, note that the maximum transmission distance is 15 m.

To make a connector cable, refer to Appendix NO TAG "Method for Making the Cable for Connection to the PC" (page NO TAG).

2-6-3   PC Switch Settings

When the NT30/30C and PC are connected to each other, set the conditions at the PC CPU so as to enable the NT link communications.

The following is a general description of switch settings.

- C-series C200HS, C200HX/HG/HE, CQM1, CPM1, SRM1

Set the operating conditions to the PC system setting area when a C200HS, C200HX/HG/HE or CQM1, CPM1 CPU or SRM1 is connected to the NT30/30C. The PC system setting area (data memory) can be directly accessed from the peripheral tool (LSS etc.).

The following describes the switch settings so as to enable the PC system settings. For the details of the operation with the PC system setting area, refer to the "SYSMAC CQM1 Reference Manual" (W228-E1-□).

[Switch setting] (C200HX/HG/HE, CQM1)
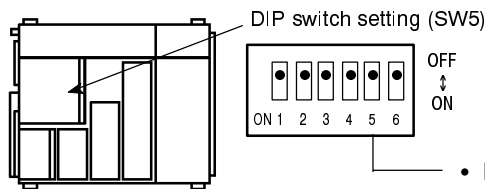
- RS-232C port communication conditions
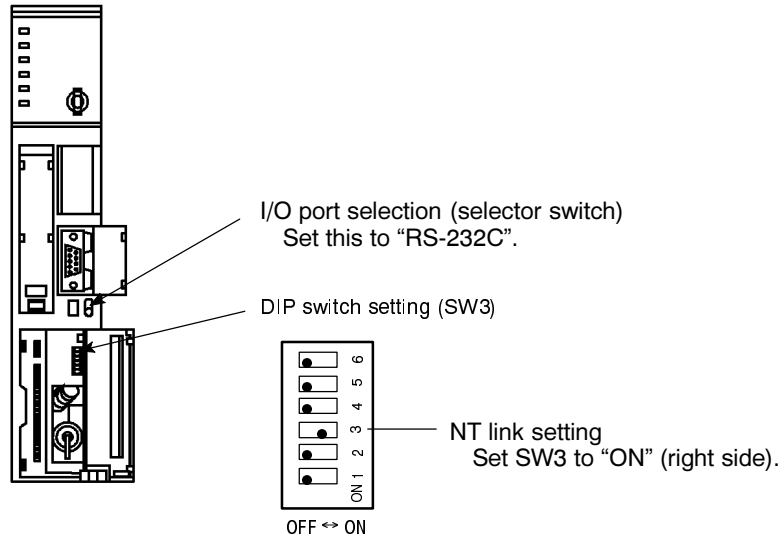 Set SW5 to "OFF" to effect the existing settings of the PC system setting area.

[PC system setting area settings]

Write settings to the PC system setting area (data memory).

PC	Channel #	Writing Value	Settings
RS-232C port of C200HX/HG/HE, CQM1, SRM1	DM6645	4000	NT link is used.
Port A of C200HX/HG/HE	DM6555		
Port B of C200HX/HG/HE	DM6550		
CPM1	DM6550		

- CVM1/CV-series (-EV□)

When connecting to a CVM1/CV-series (-EV□) CPU, set the switches as given below.

I/O port selection (selector switch)
Set this to "RS-232C".

DIP switch setting (SW3)

NT link setting
Set SW3 to "ON" (right side).

OFF ↔ ON

Correct use   When using the CVM1/CV series, always set CPU execution processing (execution control 2) in the PC system settings to "Simultaneous processing".

- RS-232C/RS-422 converter unit (type NT-AL001)

When using the NT30/30C in a 1:1 RS-422A type connection, make the following DIP switch settings at the RS-232C/RS-422 converter unit (type NT-AL001) used for relay purposes.

ON

1 2 3 4 5 6

Setting for built-in terminal resistor
(DIP switch SW1-2)
Set SW1-2 to "ON".
(This sets the built-in terminal resistor).

2-wire type/4-wire type selection
(DIP switches SW1-3, SW1-4)
Set both SW1-3 and SW1-4 to "OFF".
(This sets "4-wire type").

RS-422A transmission mode selection
(DIP switches SW1-5, SW1-6)
Set SW1-5 to "OFF" and SW1-6 to "ON".
(This sets RS control to RS-232C.)
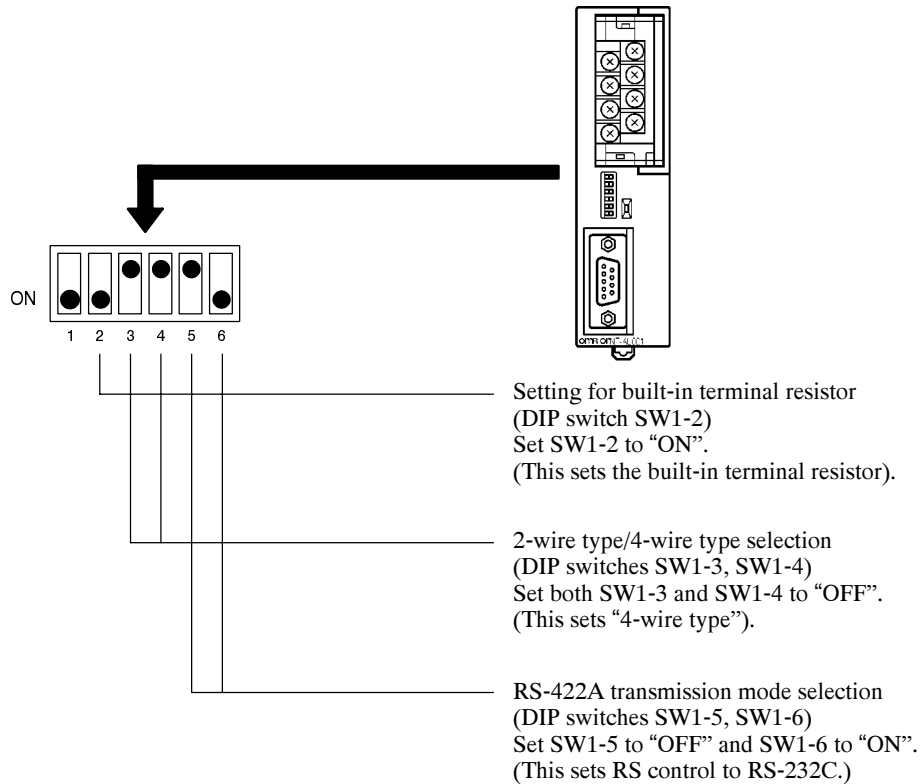
2-7   Connecting a Printer

Hardcopies of screens can be printed (printing of screen images) onto a printer connected to the NT30/30C.

In order to make a hard copy at a printer connected to the NT30/30C, it is necessary either to create a screen print key as a touch switch on the screen to be printed during screen creation, or to issue a print instruction from the PC. For details, see NO TAG "Touch Switches" (page NO TAG), and NO TAG "NT30/30C Status Control" (page NO TAG).

How to Connect

Connect the printer to the NT30/30C with a Centronics cable. The length of the cable should not exceed 3 meters.

Reference   If the connection cable is connected or disconnected while the power of the printer is on, the NT30/30C may malfunction. Make sure to turn off the power of the printer before connecting or disconnecting the connection cable.

EPSON ESC/P
Color Printer (24-pin),
Monochrome Printer (24-pin)
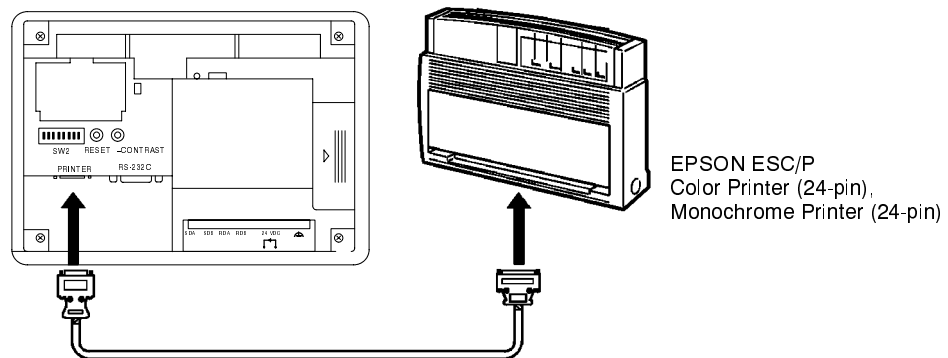
• Recommended connection cable

The following connection cable is recommended.

NT-CNT121 connection cable (1.5 m, 20-pin to 36-pin)

• Recommended printer

EPSON ESC/P Printer (24-pin), Color or Monochrome

If using other printer, such printer should conform to ESC/P 24-J81 (monochrome), ESC/P 24-J83C (color), which is the printer control standard of Epson.

When using a monochrome printer with an NT30/30C, set "TONE." with the NT30/30C memory switches (see page 106).

2-8   Connection of Expanded I/O

To provide expanded I/O for the NT30/30C, the B7A unit can be connected. In order to enable the B7A unit to be connected, the optional B7A interface unit (NT-B7A16) must be installed on the NT30/30C.

This section explains how to use the B7A interface unit and how to connect the B7A unit.

2-8-1   Connectable B7A Units

I/O Classification	Wiring Type	Transmission Delay Time	I/O Format		+ – Terminal Configuration		Model
16 input points	Screw terminal	Standard (Typ. 19.2 ms)	NPN input		– only		B7A-T6A1
					Alternate + and –		B7A-T6B1
			PNP input		Alternate + and –		B7A-T6C1
		High speed (Typ. 3 ms)	NPN input		– only		B7A-T6A6
					Alternate + and –		B7A-T6B6
			PNP input		Alternate + and –		B7A-T6C6
	Module	Standard (Typ. 19.2 ms)	TTL input		–		B7A-T6D2
		High speed (Typ. 3 ms)			–		B7A-T6D7
16 output points	Screw terminal	Standard (Typ. 19.2 ms)	NPN open collector 100 mA/point		+ only		B7A-R6B11
							B7A-R6B31
			PNP open collector 100 mA/point		– only		B7A-R6F11
							B7A-R6F31
		High speed (Typ. 3 ms)	NPN open collector 100 mA/point		+ only		B7A-R6B16
							B7A-R6B36
			PNP open collector 100 mA/point		– only		B7A-R6F16
							B7A-R6F36
	Module	Standard (Typ. 19.2 ms)	NPN open collector 50 mA/point		–		B7A-R6A52
		High speed (Typ. 3 ms)			–		B7A-R6A57
16 input points	Screw terminal	Standard (Typ. 19.2 ms)	NPN input		– common		B7AS-T6B1
		High speed (Typ. 3 ms)					B7AS-T6B6
16 output points	Screw terminal	Standard (Typ. 19.2 ms)	NPN open collector 100 mA/point		+ common		B7AS-R6B11
							B7AS-R6B31
		High speed (Typ. 3 ms)					B7AS-R6B16
							B7AS-R6B36
8 input points/ 8 output points	Screw terminal	Standard (Typ. 19.2 ms)	Input: Output:	NPN input NPN open collector 100 mA/point	Input: Output:	– common + common	B7AM-8B11
							B7AM-8B31
		High speed (Typ. 3 ms)					B7AM-8B16
							B7AM-8B36
		Standard (Typ. 19.2 ms)	Input: Output:	PNP input PNP open collector 100 mA/point	Input: Output:	– common + common	B7AM-8F31

2-8-2   B7A Interface Unit Specifications

Model	NT-B7A16
Number of I/O points	Input: 8 points/16 points Output: 8 points/16 points (total I/O = 32 points)
Processing on error occurrence	LOAD OFF (clear)/HOLD (latch) Set with DIP switch SW1-1
LED display	Lit in green: Operating Lit in orange: Transmission error
Transmission method	Unidirectional time-sharing multiplex transmission
Transmission distance	Standard: Max. 500 m (100 m with common power supply) High speed: Max. 100 m (*1) (50 m with common power supply) (*1)
Transmission cable	VCTF 0.75 mm^2 or greater
Transmission delay time	Standard (Typ. 19.2 ms)/High speed (Typ. 3 ms) (Set with DIP SW1-2)
Least input time (*2)	Standard: 16 ms High speed: 2.4 ms
Power supply voltage	21.6 to 26.4 V (24 VDC $\pm$10%)
Insulation resistance	100 MΩ or greater between all terminals together and external reference (500 V)
Dielectric strength	1,000 VAC, 50/60 Hz, 1min. between all terminals together and external reference
Noise resistance (*3)	Noise level: 1.5 kV, Pulse width: 100 ns, 1 μs
Vibration resistance	10 to 22 Hz with 0.075 mm single amplitude for a total of 30 min. in X.Y. and Z direction.
	22 to 500 Hz with 1.0G {9.8m/s^2} acceleration in X.Y. and Z directions
Shock resistance	15G, 3 times each in X.Y. and Z directions
Operating ambient temperature	0 to 50°C
Operating ambient humidity	35 to 85%RH (with no condensation)
Storage ambient temperature	−20 to 70°C
Weight	100 g max.

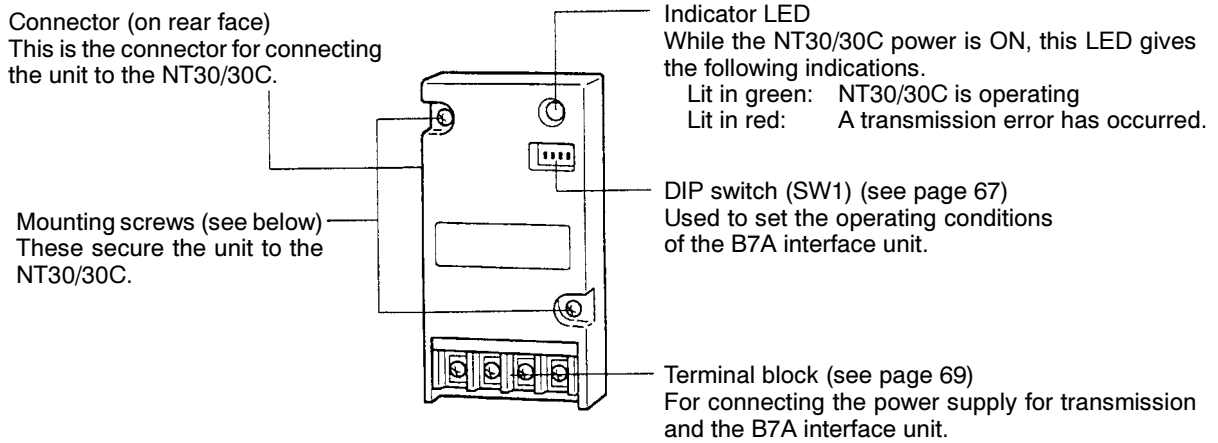(*1) This is the value when a shielding wire is used. If no shielding wire is used, the maximum transmission distance will be 10 m, regardless of the method used to supply power.

(*2) The least input time is the least time required for the B7A interface unit to read an input signal.

(*3) This is induced noise due to coupling with the transmission line. For high-speed transmission, this is the value when the shielding wire is not grounded.

2-8-3   B7A Interface Unit Part Names and Settings

The function of each part of the B7A interface unit is indicated below.

Connector (on rear face)
This is the connector for connecting
the unit to the NT30/30C.

Mounting screws (see below)
These secure the unit to the
NT30/30C.

Indicator LED
While the NT30/30C power is ON, this LED gives
the following indications.
    Lit in green: NT30/30C is operating
    Lit in red: A transmission error has occurred.

DIP switch (SW1) (see page 67)
Used to set the operating conditions
of the B7A interface unit.

Terminal block (see page 69)
For connecting the power supply for transmission
and the B7A interface unit.

2-8-4   Installing the B7A Interface Unit

⚠ Caution Be sure to switch off the power supply to both the NT30/30C and the B7A interface
unit before installing the B7A interface unit, otherwise the units may be damaged.

Reference When the B7A interface unit is installed, the depth of the NT30/30C is increased
by 20 mm to 76 mm. Before installing the B7A unit, check that there is sufficient
space inside the operation panel to accommodate this extra depth.

(1) Peel off the label on the right side of the rear face of the NT30/30C. Under-
neath the label are the connector and screw holes for installing the B7A inter-
face unit.

(2) As shown in the figure below, install the NT30/30C on the rear face of the
NT30/30C, and secure it with the two mounting screws.

Mounting screws
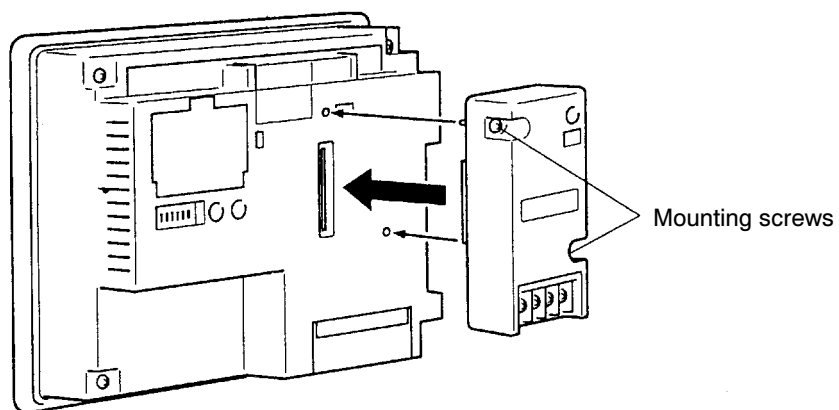
2-8-5   B7A Interface Unit Settings

Set the operating conditions of the B7A interface unit as shown below.
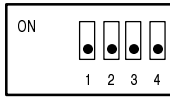
		SW1-1	SW1-2	SW1-3	SW1-4
	Function	Processing on transmission error	Transmission delay time	ERR LED status	Not used
	ON	LOAD OFF (clear)	High speed (3 ms)	LED comes ON	–
	OFF	HOLD	Standard (19.2 ms)	LED does not come ON	Setting fixed as OFF

⚠ **Caution** Be sure to switch off the power supply to both the NT30/30C and the B7A interface unit before changing DIP switch settings.

2-8-6   Connecting the B7A Unit to the B7A Interface Unit

The connection method for each B7A unit I/O type is shown in the following pages.

Use the cable indicated below for the connection:

VCTF0.75 mm^2 or greater transmission cable

• Power supply method

A 24 VDC power supply for communication must be supplied to the B7A interface unit and the B7A unit. The connection method differs depending on the method used to supply power to the units.

• Setting the transmission delay time

When the setting for transmission delay time is "high speed", use a shielding wire. If no shielding wire is used, the maximum transmission distance will be 10 m regardless of the method used to supply power.

Ground the shielding to earth. Do not ground it to the minus terminal of the power supply.
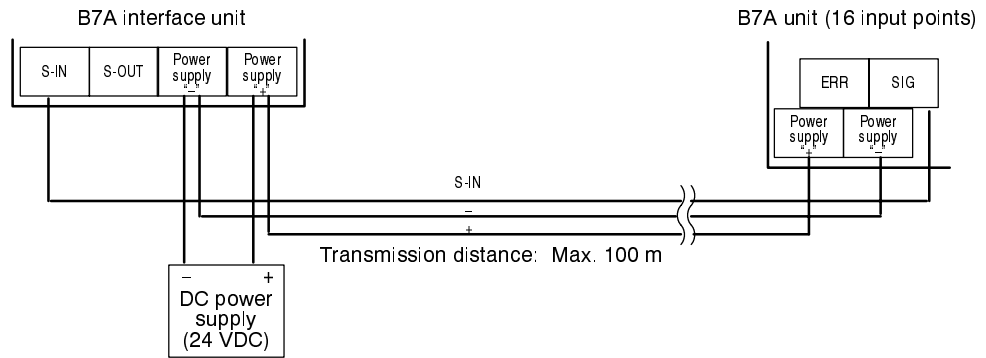
Connecting a B7A Unit with 16 Input Points

- When separate power supplies are provided (DIP SW1-2 setting: "Standard")
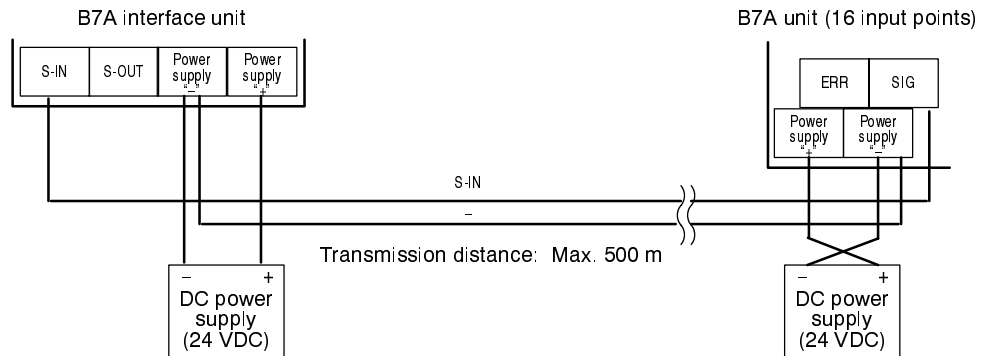
- When using a common power supply (DIP SW1-2 setting: "Standard")

- When separate power supplies are provided (DIP SW1-2 setting: "High speed")

- When using a common power supply (DIP SW1-2 setting: "High speed")

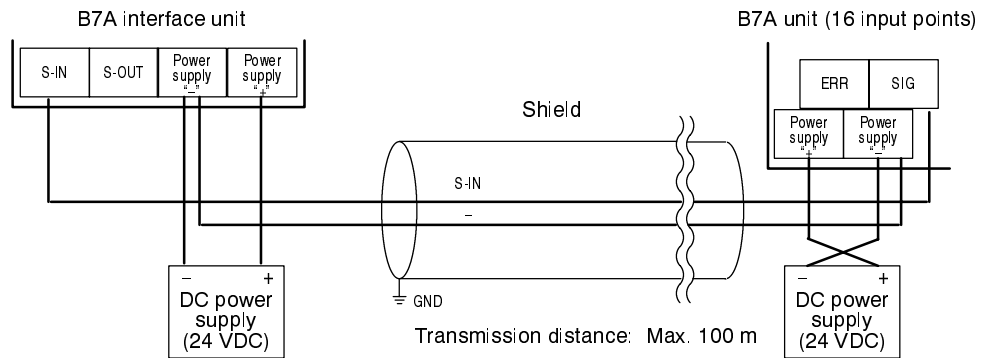**Connecting a B7A Unit with 16 Output Points**

- When separate power supplies are provided (DIP SW1-2 setting: "Standard")

- When using a common power supply (DIP SW1-2 setting: "Standard")

- When separate power supplies are provided (DIP SW1-2 setting: "High speed")

- When using a common power supply (DIP SW1-2 setting: "High speed")
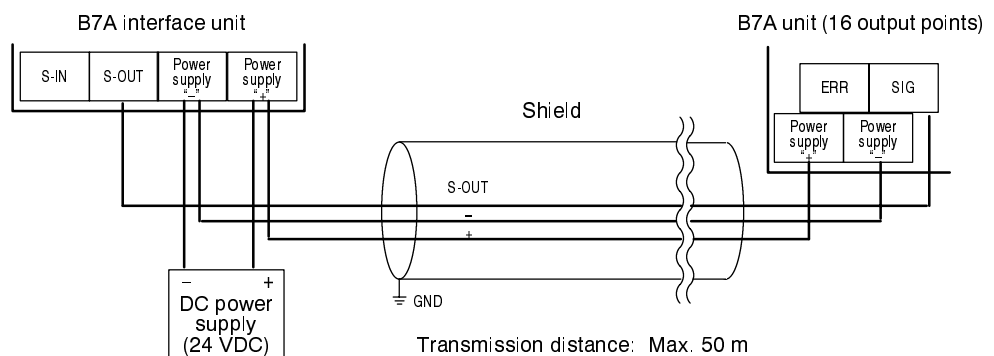
Connecting a B7A Unit with 8 Input Points and 8 Output Points

- When separate power supplies are provided (DIP SW1-2 setting: "Standard")
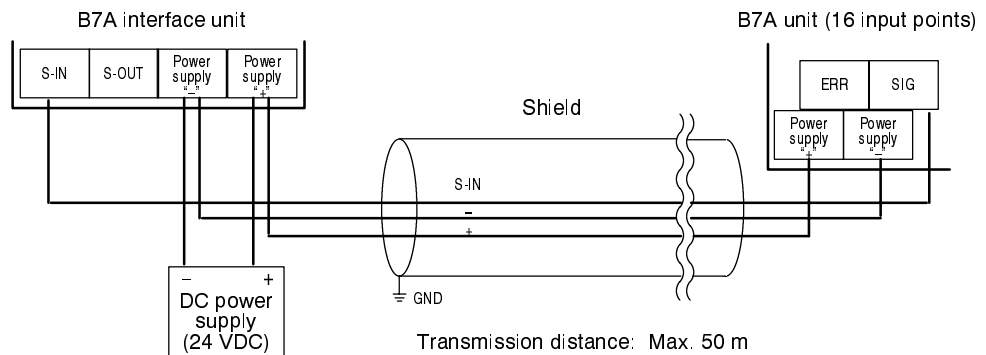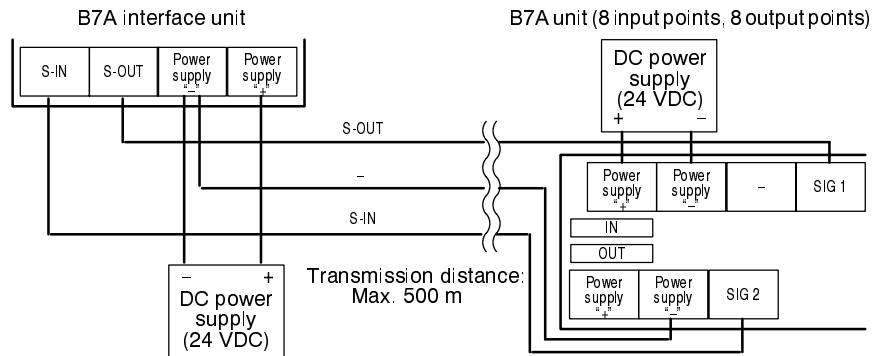

- When using a common power supply (DIP SW1-2 setting: "Standard")

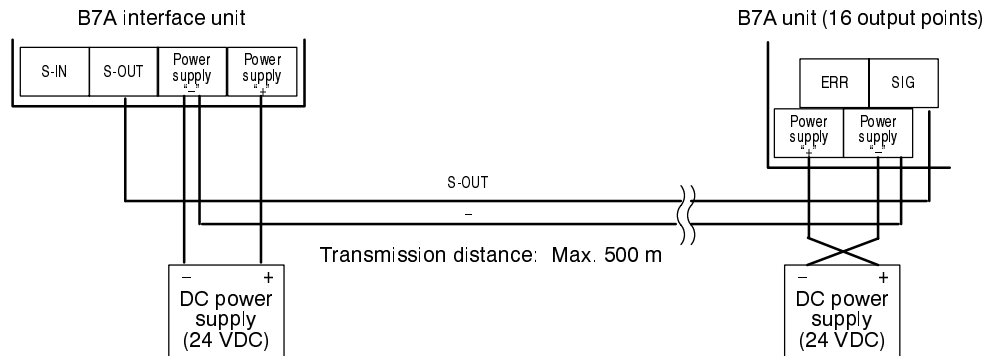- When separate power supplies are provided (DIP SW1-2 setting: "High speed")

- When using a common power supply (DIP SW1-2 setting: "High speed")
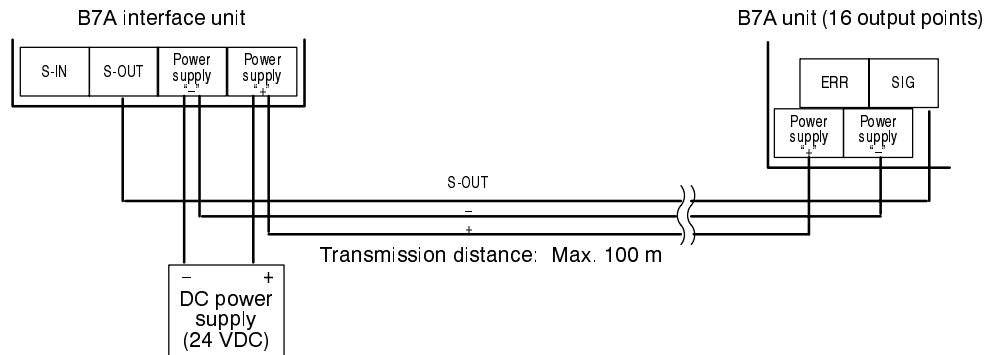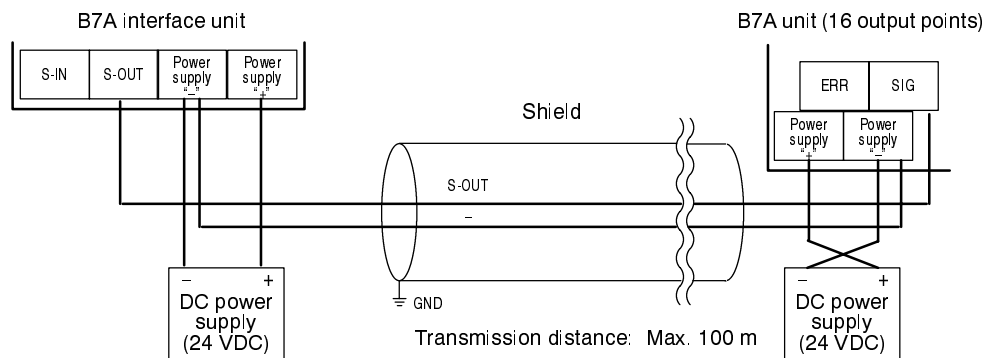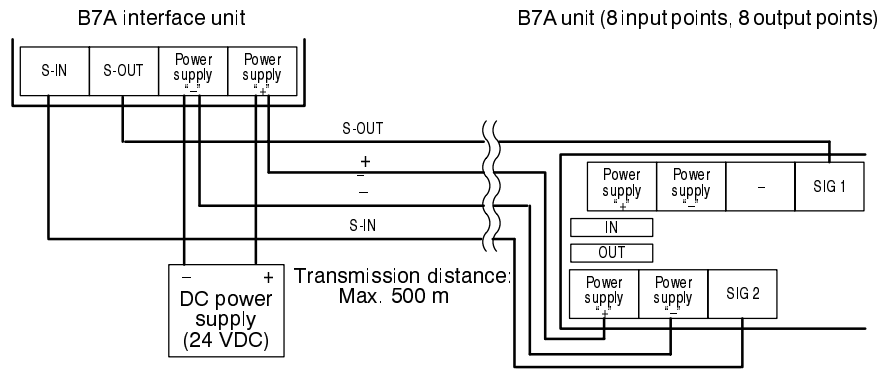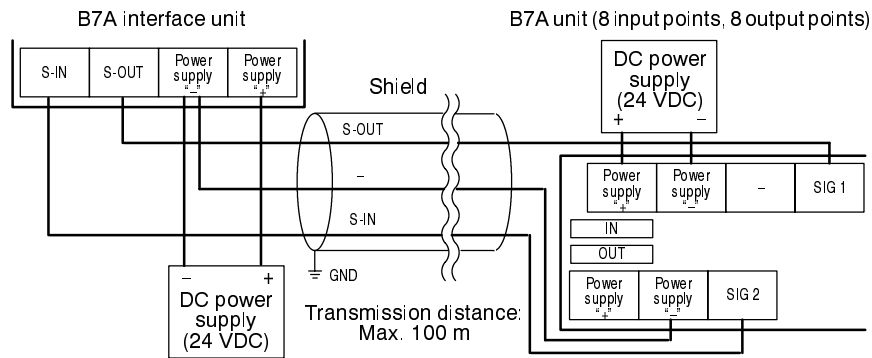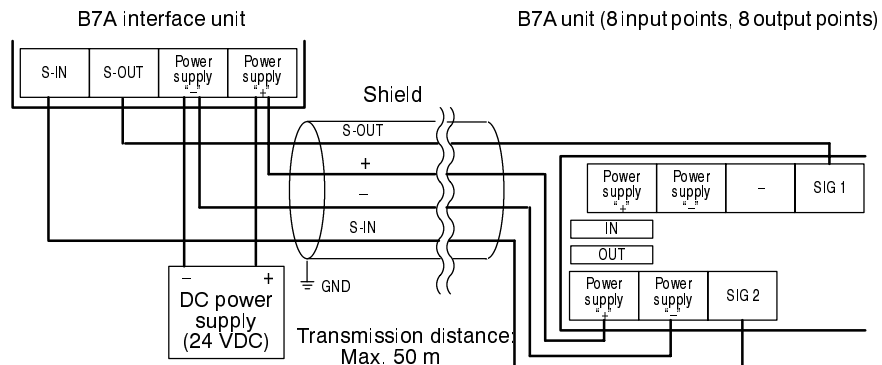
This section describes the operation of the System Menu focusing on the procedure to start up the NT30/30C.

Functions which will be convenient to use the NT30/30C and those which are useful for the system maintenance are also explained here.

3-1　Operation Flow by the System Menu

Follow the procedure below when using the NT30/30C for the first time or when changing the system.

System Program Installation　When using the NT30/30C for the first time, erase the system program loaded on shipping, and transfer the new system program to the NT30/30C by using the NT series system installer (NT-ZS3AT).

Create the Screen Data　Create the screen data to be displayed on the NT30/30C by using a support tool.

For the screen data creation, refer to the "NT-series Support Tool Operation Manual" (V028-E1-☐).

Start Up the NT30/30C (Display the System Menu.) (page 75)

Turn ON the power to the NT30/30C.

When no screen data has been registered, the "SYSTEM MENU" will be displayed. If the NT30/30C enters the RUN mode, press appropriate touch switches to display the System Menu.

Initialize Memory (page 80)　Select a System Menu and initialize the NT30/30C unit memory.

Memory Switch Setting (page 86)

Select the System Menu and set the conditions for communications with the PC using the memory switch.

Transfer the Screen Data (page 93)

Connect a support tool to the NT30/30C and transfer the screen data from the support tool to the NT30/30C.

For the connection of a support tool, refer to Section 2-3 "Connecting to the Support Tool". (page 28)

Start the Operation (page 97)

Connect to the PC and start the operation.

System Maintenance (page 107)

If an error has occurred during operation, check the I/Os, settings, etc. referring to this guide.

3-2   Starting the NT30/30C

When the NT30/30C is started, it will enter the RUN mode if system settings and screen data registration have been completed. If no screen data has been registered or the screen data are destroyed, the System Menu will be displayed.

Before turning ON the power, check the following DIP switch settings on the NT30/30C.

- SW2-3 "Switch to the System Menu enabled/disabled" is set to OFF (enabled).

- SW2-1 "Screen data forced initialize Yes/No" is set to No (ineffective).

For the DIP switch settings of the unit, refer to the "DIP switch settings" (page 22).

3-2-1   Changing the System Settings etc.

Follow the procedure below to change the system settings or screen data contents.

Procedure   1.   Turn ON the power to the NT30/30C.

The NT30/30C will enter the RUN mode and the start-up screen will be displayed. The start-up screen varies according to registered screen data.

2.   Press appropriate touch switches to display the System Menu, and change system settings. For the method for calling the System Menu, refer to the "Operations with the System Menu" (page 78).

If the NT30/30C has failed to start up normally; an error message is displayed or no screen is displayed, memory needs to be initialized.

For the memory initializing procedure, refer to Section 3-4 "Initializing memory" (page 80).

3-3 Operation Modes and the System Menu

The NT30/30C operates in either "RUN", "Transmit", or "Maintenance" mode. The operation modes can be switched by using the System Menu.

3-3-1 System Menu and the Operation Modes

Select an operation mode by pressing the corresponding touch switch in the System Menu. The operation modes with respect to the System Menu are related to each other as shown below.

For the operations with the System Menu, refer to the "Operations with the System Menu" (page 78).

RUN Mode

The NT30/30C runs in this state. Controls from the PC are enabled and various indications and I/O operations are made.

To change system settings or screen data contents

When system settings and screen data registration have been completed

Power ON

[SYSTEM MENU]
Quit
Transmit Mode
Maintenance Mode

Transmit Mode

Screen data and other data are transmitted between the NT30/30C and a support tool.

Maintenance Mode

The NT30/30C maintenance operations such as memory initialize and setting check are executed.

3-3-2   Menu Tree

The System Menu allows to effect various NT30/30C functions by using the touch switches. The NT30/30C's functions with respect to the System Menu are related as shown below.

For the operations with the System Menu, refer to the "Operations with the System Menu" (page 78).

SYSTEM MENU
— Quit
— Transmit Mode (page 94)
— Maintenance Mode

MAINTENANCE MENU
— Quit
— Display History
— I/O Check
— PT Settings (page 123)
— Init. Memory
— Memory Switch

DISPLAY HISTORY MENU
— Quit
— Occurrence (page 109)
— Frequency (page 109)

I/O CHECK MENU
— Quit
— Exp. I/O Unit (page 111)
— Touch Switch (page 112)
— Commnucation
— LCD Display (page 115)
— Buzzer (page 116)
— LED (page 117)
— Calendar (page 118)
— Battery (page 119)
— Printer (page 120)
— Backlight (page 121)

COMMUNICATION CHECK MENU
— Quit
— RS232C (page 114)
— RS422 (page 114)

INITIALIZE MEMORY MENU
— Quit
— Screen Memory (page 80)
— Memory Table (page 83)
— History Date (page 84)

MEMORY SWITCH MENU
— Key Press Sound (page 99)
— Buzzer Sound (page 100)
— Screen Saver (page 102)
— Resume Memory Table (page 103)
— Printer (page 105)
— Comm. Port (page 90)
— Comm. Method (page 87)
— Baud Rate (page 89)
— Automatic Reset (page 91)

3-3-3 Operations with the System Menu

The following gives the procedure to call the System Menu, select the menu items, and other operations with the System Menu.

Make sure that DIP SW2-3 "Switch to the System Menu enabled/disabled" is set to OFF (enabled). If the setting is ON (disabled), the System Menu will not be displayed by following the procedure given below.

Displaying the System Menu

Press appropriate touch switches to display the System Menu as mentioned below. The "RUN" LED goes off when the System Menu is displayed.

The NT30/30C display screen has four touch switches to display the System Menu in the four corners (about 7.2 mm x 7.2 mm size). Press any two of these switches at the same time to call the System Menu screen.
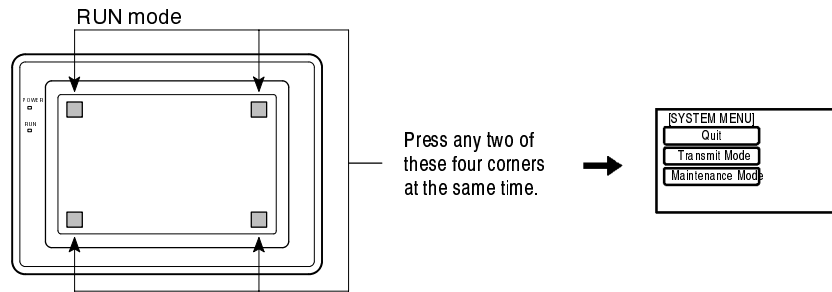
Note that the touch switches used to call the System Menu are not displayed on the screen. If a touch switch displayed in a corner is pressed first, the touch switch will function and the System Menu will not be displayed. To successfully call the System Menu, first press a corner where no touch key is displayed, and then, press any other corner regardless of the presence of a touch key.

If a screen has the touch switches registered at all of the four corners, it is impossible to call the System Menu from the screen.

A "system key" function can be assigned to a touch switch. Pressing the touch switch so assigned on the screen can easily display the System Menu. For the relationship between the system key and the touch switch, refer to the "System key functions" (page NO TAG).

Selecting the Menu Items   Press (touch) a menu item on the screen to select the item.

Menu items allow to make the ON/OFF selection or to call subsequent menu or screen.

Example 1

To call the "MAINTENANCE MENU" by pressing the "Maintenance Mode" on the SYSTEM MENU screen:

[SYSTEM MENU]   Select "Maintenance Mode".

Quit

Transmit Mode

Maintenance Mode

[MAINTENANCE MENU]

Quit   Memory Switch

Display History

I/O Check

PT Settings

Init. Memory
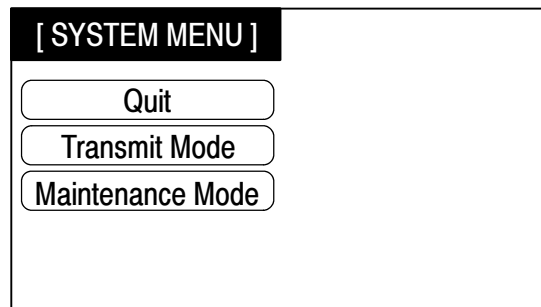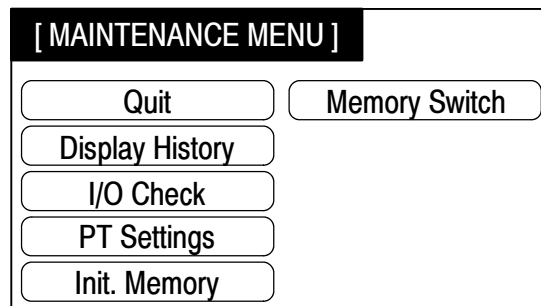
System Menu Items   The SYSTEM MENU items and the functions are as given below.

Menu Item	Function
Quit	The System Menu screen is cleared and the NT30/30C will return to the RUN mode.
Transmit Mode	The Transmit Mode screen will be displayed to allow the transmission of the screen data between the NT30/30C and the support tool. For the transmission of the screen data, refer to Section 3-6 "Registering the Screen Data" (page 93).
Maintenance Mode	The Maintenance Mode menu will be displayed to allow the maintenance of the NT30/30C system.

Switching from the System Menu to the RUN Mode

The NT30/30C will exit the System Menu and switch to the RUN mode in the cases mentioned below.

• Selecting "Quit" in the System Menu.

• The screen (touch switches) is not pressed for over 10 seconds.

3-4   Initializing Memory

If the NT30/30C is used for the first time or if the screen data is ruined and the NT30/30C cannot be normally started, the memory needs to be initialized.

The memory initialization is required in the cases mentioned below.

- When the NT30/30C is used for the first time or when an error message indicating that the screen data is ruined etc. when the NT30/30C is started.

  ➡ Use the "Maintenance Mode" – "Init. Memory" in the System Menu.

- When the NT30/30C has made a buzzer sound and the screen has disappeared during the start-up or operation.

  ➡ Use the NT30/30C DIP SW2-4 "Screen data forced initialize effective/ineffective".

When an error has occurred, the error messages such as "Screen data corrupted" will be displayed. For the error messages displayed on the screen, refer to Section NO TAG "Responding to Displayed Error Messages" (page NO TAG).

Reference   Initializing the screen data memory will erase entire screen data registered in the NT30/30C. Make sure that there are backup copies of the screen data on floppy disks before starting the initialization.

The following memory data can be initialized.

- Image data memory
- Memory tables
- Display history

The screen data is initialized regardless of the setting for the resume function (see page 103).

3-4-1   Initialization of the Screen Data

The screen data can be initialized by either of the following two methods.

- Initialization by using the System Menu
- Initialization by using the DIP switch (forced initialization)

Initialization by Using the SYSTEM MENU

Initialize the image data memory by following the procedure given below.
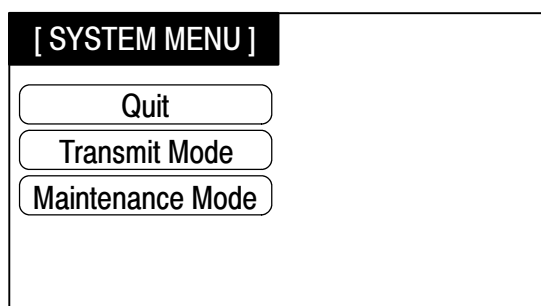
Select "Maintenance Mode".

```
[ SYSTEM MENU ]

  (      Quit      )
  ( Transmit Mode  )
  (Maintenance Mode)


```

⬇

[MAINTENANCE MENU]

| Quit | Memory Switch |

Display History

I/O Check

PT Settings

Init. Memory

Select "Init. Memory".

[INITIALIZE MEMORY MENU]

Quit

Screen Memory

Memory Table

History Data

Select "Screen Memory".

Initialize Screen Memory?

Yes   No

Select "Yes".

The screen data memory is initialized. During the initialization, the "Initializing" message will be displayed.

- If "No" is selected, the memory initialization will be canceled and the NT30/30C returns to the "INITIALIZE MEMORY MENU".

Upon completion of the screen data memory initialization, the NT30/30C returns to the "INITIALIZE MEMORY MENU".

After the screen data memory has been initialized, if an attempt is made to set the NT30/30C to the RUN mode before screen data has been transferred from the support tool, the error message "No direct information is set!!" will be displayed.

Initialization by Using the DIP Switch (Forced Initialization)

Note   Be sure to turn the power OFF before setting the NT30/30C DIP switch.

Set the DIP switch as follows to initialize the screen data memory.

Operation   **1**   Set DIP SW2-4 on the NT30/30C to ON and turn the power ON.
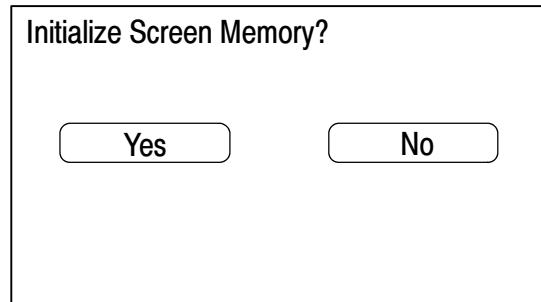
Initialize Screen Memory?

Yes   No

Select "Yes". The screen data memory is initialized. During the initialization, the "Initializing" message will be displayed.

- If "No" is selected, the memory will not be initialized.

Screen Memory Initialized

Turn OFF the DIP switch 2-4 and push the Reset switch, then return to RUN mode.
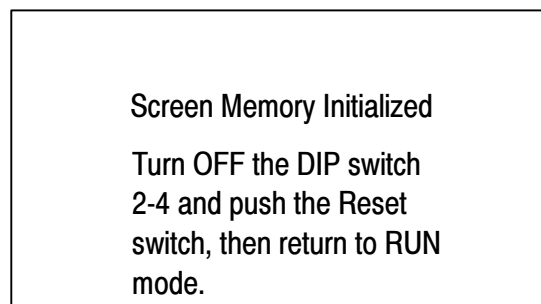
2   Turn the NT30/30C power to OFF.

3   Set NT30/30C DIP SW2-4 to OFF and turn the power ON.

Reference   • The NT30/30C DIP SW2-4 is used to set "Screen data forced initialize effective/ ineffective". Setting this to ON selects "effective", and OFF "ineffective".

• Regardless of whether initialization is executed or not, on completion of the operation, switch DIP SW2-4 OFF while the power to the NT30/30C is OFF, then start up the NT30/30C again.

3-4-2   Initialization of the Memory Tables

It is possible to initialize the numeral memory tables and character-string memory tables in the NT30/30C. When these tables are initialized, the values are returned to those set by the support tool.

When memory table initialization is executed in the maintenance mode, the memory tables are initialized regardless of the resume function setting (see page 103).

Reference If "OFF" is set for the "Resume Function" memory switch, the memory tables can be initialized just by switching the NT30/30C power off and back on again, or by resetting it (see page 103).

Using the SYSTEM MENU, initialize the memory tables by following the procedure given below.

[SYSTEM MENU]

Quit

Transmit Mode

Maintenance Mode

Select "Maintenance Mode".

⬇

[MAINTENANCE MENU]

Quit   Memory Switch

Display History

I/O Check

PT Settings

Init. Memory

Select "Init. Memory".

⬇

[INITIALIZE MEMORY MENU]

Quit

Screen Memory

Memory Table

History Data

Select "Memory Table".

⬇

Initialize Memory Table?

Yes	No
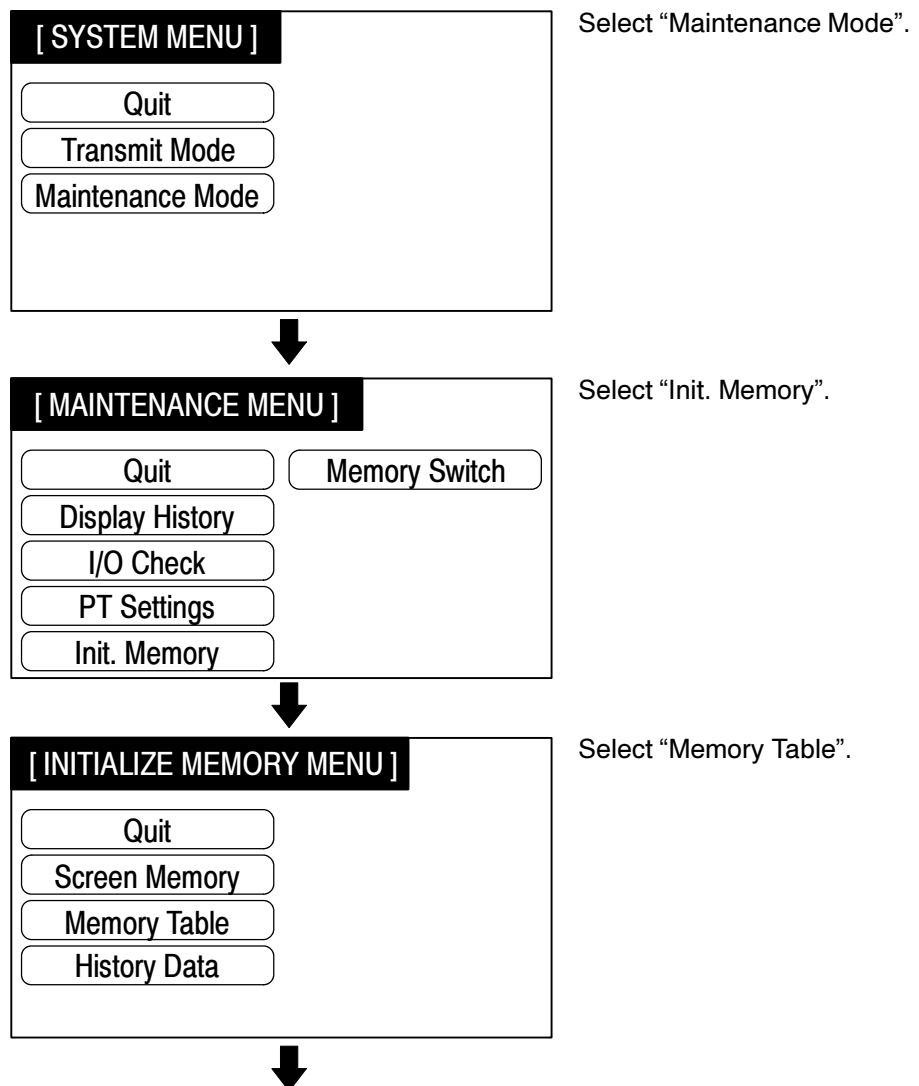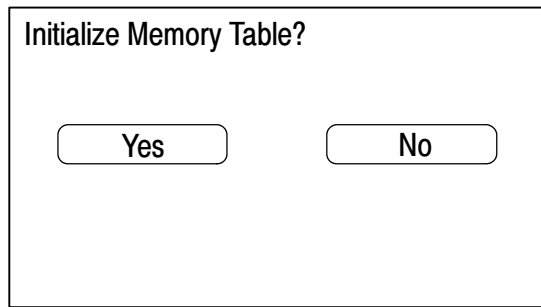
Select "Yes".

The memory table is initialized.

- If "No" is selected instead of "Yes", the NT30/30C returns to the "INITIALIZE MEMORY MENU" without initializing the memory.

Upon completion of memory table initialization, the NT30/30C returns to the "INITIALIZE MEMORY MENU".

3-4-3   Initialization of the Display History Data Memory

The display history function is a function whereby the display of each screen displayed during operation is recorded in order of display occurrence and order of display frequency. Since no more than 1023 records can be stored, the records must be periodically initialized (deleted).

The display history data memory can be initialized by a command given from the PC (page NO TAG).

Using the SYSTEM MENU, initialize the display history data memory by following the procedure given below.
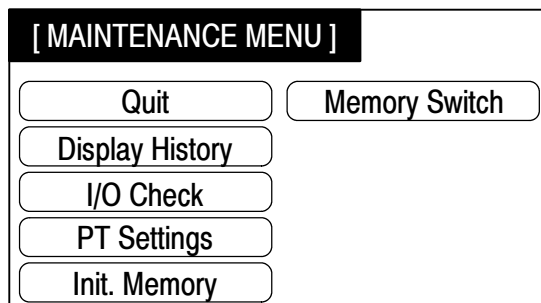
[SYSTEM MENU]

Quit

Transmit Mode

Maintenance Mode

Select "Maintenance Mode".

↓

[MAINTENANCE MENU]

| Quit | Memory Switch |

Display History

I/O Check

PT Settings

Init. Memory

Select "Init. Memory".

↓

[INITIALIZE MEMORY MENU]

> Quit

> Screen Memory

> Memory Table

> History Data

Select "History Data".

Initialize History Data?

> Yes   No

Select "Yes".

The display history data memory is initialized.

- If "No" is selected instead of "Yes", the NT30/30C returns to the "INITIALIZE MEMORY MENU" without initializing the memory.

Upon completion of display history data initialization, the NT30/30C returns to the "INITIALIZE MEMORY MENU".

3-5　Setting the Conditions of Communications with the PC by Using the Memory Switches

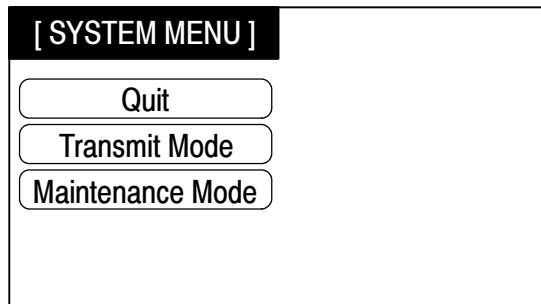The NT30/30C can be connected to a PC by the host link or NT link. The link can be selected by setting the memory switch. Also, the host link baud rate, automatic reset function, RS-232C communication conditions, etc. are set with the memory switches.

This section describes the communications condition settings by using the memory switches.

Memory Switches

The NT30/30C has the memory areas used to store the PC connection method, communications conditions, system settings, etc. which can be used as the switches and called the "memory switches". Since the memory switch settings are backed up by battery, they are not lost when the power is turned OFF.

Reference　If the memory switch data is not backed up by the built-in battery, it will all be initialized to the values set with the support tool when the NT30/30C is switched OFF. If the message "Battery Lowered" is displayed while the NT30/30C is operating, replace the built-in battery immediately. For details on how to replace the battery, see "Replacing the Battery" (page NO TAG).

Setting Functions and the Memory Switch Menu

The memory switches can be set easily by using the memory switch menu in the System Menu.

The memory switches can also be set by selecting "In.Scr" [F8] on the "File Selection" screen of the support tool. The settings made using the support tool are written to the NT30/30C on screen data registration. For details, refer to the NT-series Support Tool Operation Manual (V028-E1-□).

The following settings can be made with the memory switches. Refer to the subsequent pages and Section 3-8 "Various System Settings" (page 98) for the details of each setting and function.

[Previous]　　　　　　　　　　　　　　　　　　　　[Next]

```
< MEMORY SWITCH >        [ Next ] [ Quit ]
  [ Key Press Sound ]      ON
  [ Buzzer Sound ]         ON
  [ Screen Saver ]         10min
  [ Resume Memory Table ]  NONE
  [ Printer ]              ESC/P MONO.
```

```
< MEMORY SWITCH >        [ Prev. ] [ Quit ]
  [ Comm. Port ]           RS232C
  [ Comm. Method ]         Host Link
  [ Baud Rate ]            9600
  [ Automatic Reset ]      None
```

- Key Press Sound   3-8 Various System Settings (page 99)

- Buzzer Sound   3-8 Various System Settings (page 100)

- Screen Saver   3-8 Various System Settings (page 102)

- Resume Memory
  Table   3-8 Various System Settings (page 103)

- Printer   3-8 Various System Settings (page 105)

- Comm. Port   Selecting the Host Link Communication Port (page 90)

- Comm. Method   Selecting the Host Communication Method (page 87)

- Baud Rate   Selecting the Host Link Communication Speed (page 89)

- Automatic Reset   Selecting the Automatic Reset Function (page 91)

"Comm. Method", "Baud Rate" and "Comm. Port" can only be set from the memory switch menu called from the system menu.

In addition, the following settings can only be set from the support tool.

- Number of numeral memory tables   Numeral Memory Table (page 152)

- Number of character-string memory tables   Character-String Memory Table (page 149)

- Alarm FIFO   Displaying the Alarm History (page NO TAG)

3-5-1   Selecting the Host Communication Method

The NT30/30C can be connected to a PC by the host link or NT link. Either link can be selected by setting the "Comm. Method" memory switch. The factory setting has been made to the "Host link". Select the communication method that is supported by the PC to be connected.

Select the host communication method by the menu operation from the SYSTEM MENU shown below.

Select "Maintenance Mode".

```
[ SYSTEM MENU ]

      Quit
  Transmit Mode
 Maintenance Mode
```

⬇

[MAINTENANCE MENU]

| Quit | Memory Switch |

Display History

I/O Check

PT Settings

Init. Memory

Select "Memory Switch".

↓

< MEMORY SWITCH > | Next | Quit |

Key Press Sound	ON
Buzzer Sound	ON
Screen Saver	10min
Resume Memory Table	None
Printer	ESC/P MONO.

Select "Next".

↓

< MEMORY SWITCH > | Prev. | Quit |

Comm. Port	RS232C
Comm. Method	Host Link
Baud Rate	9600
Automatic Reset	None

Each time the "Comm. Method" touch switch is pressed, the setting option changes to the next item in the sequence "Host Link" or "NT Link".

To set and quit the menu, press the "Quit" touch switch. The settings made last will be set and the display will return to the "MAINTENANCE MENU".

3-5-2   Selecting the Host Link Communication Speed

When the host link is used, the baud rate of the communications with the PC can be set. Use the "Baud Rate" switch and select 9600 bps or 19200 bps.

If the NT link has been selected, the host link baud rate setting does not have any effect.

The factory setting has been made at 19200 bps.

Select the baud rate of the communication with the PC by the menu operation from the SYSTEM MENU shown below.

[SYSTEM MENU]

Quit

Transmit Mode

Maintenance Mode

Select "Maintenance Mode".

[MAINTENANCE MENU]

Quit   Memory Switch

Display History

I/O Check

PT Settings

Init. Memory

Select "Memory Switch".

< MEMORY SWITCH >   Next   Quit

Key Press Sound   ON

Buzzer Sound   ON

Screen Saver   10min

Resume Memory Table   None

Printer   ESC/P MONO.

Select "Next".

```
< MEMORY SWITCH >        [ Prev. ] [ Quit ]

  ( Comm. Port )      RS232C
  ( Comm. Method )    Host Link
  ( Baud Rate )       9600
  ( Automatic Reset ) None
```

Each time the "Baud Rate" touch switch is pressed, the setting option "9600 bps" alternates with "19200 bps".

To set and quit the menu, press the "Quit" touch switch. The settings made last will be set and the display will return to the "MAINTENANCE MENU".

3-5-3   Selecting the Host Link Communication Port

When using the NT30/30C with the host link, the port for communication with the PC (communication type) can be selected. Select either "RS232C" or "RS422" by using the "Comm. Port" memory switch.

The factory setting is "RS232C".

Reference   When using NT link as the communication method, you must set "RS232C".

Select the communication port for communication with the PC by the menu operation from the SYSTEM MENU shown below.

```
[ SYSTEM MENU ]

  ( Quit )
  ( Transmit Mode )
  ( Maintenance Mode )
```

Select "Maintenance Mode"

```
[ MAINTENANCE MENU ]

  ( Quit )           ( Memory Switch )
  ( Display History )
  ( I/O Check )
  ( PT Settings )
  ( Init. Memory )
```

Select "Memory Switch".

```
< MEMORY SWITCH >        [ Next ] [ Quit ]

( Key Press Sound )      ON
(  Buzzer Sound   )      ON
(  Screen Saver   )      10min
( Resume Memory Table )  None
(     Printer     )      ESC/P MONO.
```

Select "Next".

⬇

```
< MEMORY SWITCH >        [ Previous ] [ Quit ]

(   Comm. Port   )       RS232C
(  Comm. Method  )       Host Link
(   Baud Rate    )       9600
( Automatic Reset )      None
```
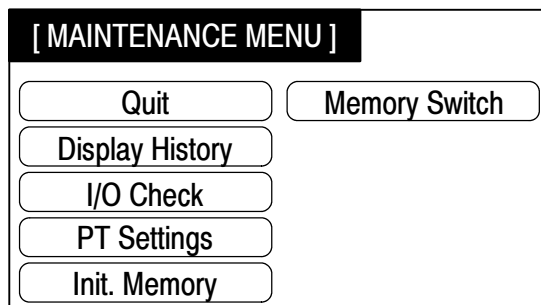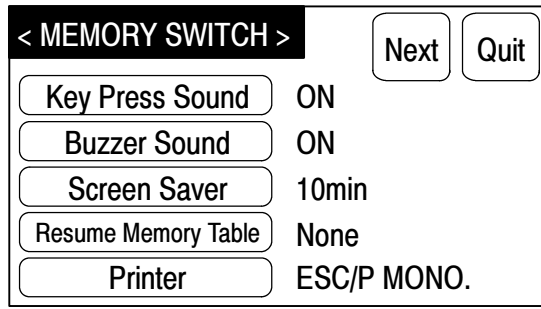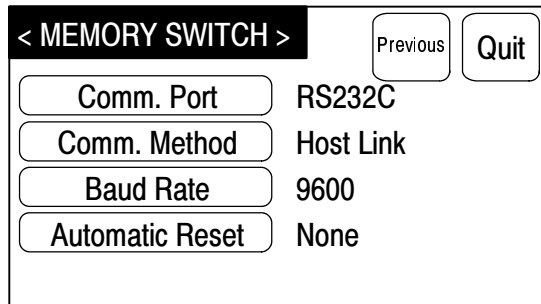
Each time the "Comm. Port" touch switch is pressed, the setting to its right changes between "RS232C" and "RS422".

To set and quit the menu, press the "Quit" touch switch. The settings made last will be set and the display will return to the "MAINTENANCE MENU".
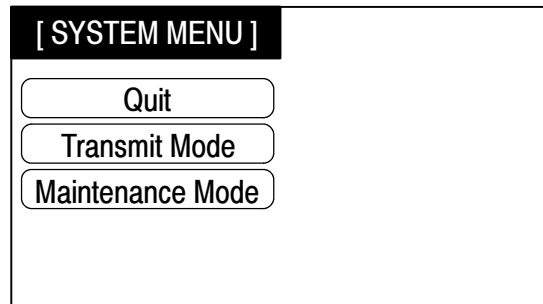
3-5-4   Selecting the Automatic Reset Function

The "Automatic Reset" memory switch is used to set whether or not the communication is automatically reset after the occurrence of a communication error.
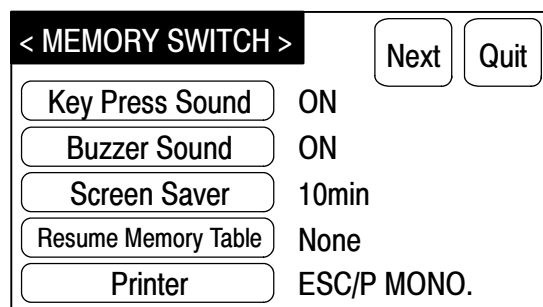
The factory setting has been made at "Exist".

Select the baud rate of the communication with the PC by the menu operation from the SYSTEM MENU shown below.
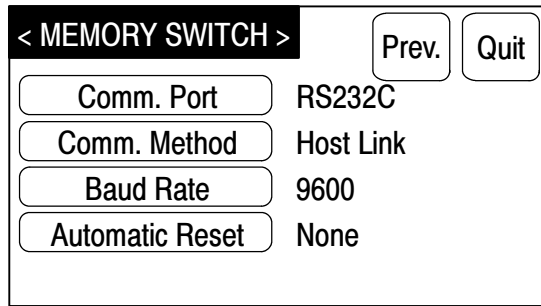
```
[ SYSTEM MENU ]

(       Quit       )
(  Transmit Mode   )
( Maintenance Mode )
```

Select "Maintenance Mode".

⬇

91

[MAINTENANCE MENU]

Quit   Memory Switch
Display History
I/O Check
PT Settings
Init. Memory

Select "Memory Switch".

< MEMORY SWITCH >   Next   Quit

Key Press Sound   ON
Buzzer Sound   ON
Screen Saver   10min
Resume Memory Table   None
Printer   ESC/P MONO.

Select "Next".

< MEMORY SWITCH >   Prev.   Quit

Comm. Port   RS232C
Comm. Method   Host Link
Baud Rate   9600
Automatic Reset   None

Each time the "Automatic Reset" touch switch is pressed, the setting option "Exist" alternates with "None".

To set and quit the menu, press the "Quit" touch switch. The settings made last will be set and the display will return to the "MAINTENANCE MENU".
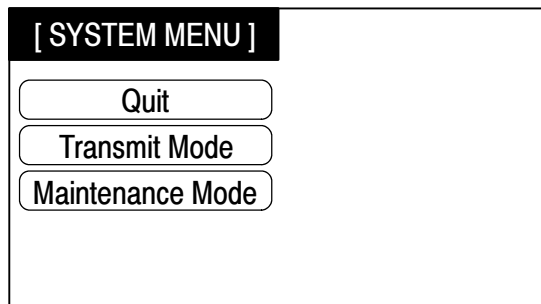
• "None":   If a communication error has occurred, corresponding error message is displayed and the operation stops.

• "Exist":   If a communication error has occurred, corresponding error message will not be displayed and the operation will be automatically reset. However, the message "Connecting To Host" may be displayed.

3-6   Registering the Screen Data

The screen data is created by using the support tool and registered to the NT30/30C screen data memory. This section describes the procedure to register the screen data to the NT30/30C. For the screen data creation and the support tool operation, refer to the NT-series Support Tool Operation Manual (V028-E1-1).

Transmission – Transmission in File Units

The NT30/30C uses several screens which are switched on its display. The screen data of one NT30/30C unit corresponds to the files created by using the support tool. Select a file which contains the screen data to be transmitted when selecting the screen data to be transmitted to the NT30/30C so that the required screen data can be transmitted to the NT30/30C.

Screen data file		NT30/30C
Screen 1		Screen 1
Screen 2		Screen 2
:		:
Screen N	All screen data are transmitted by one operation.	Screen N
Memory table		Memory table
Mark data		Mark data
Image data		Image data
Library data		Library data
System memory		System memory
Direct information		Direct information
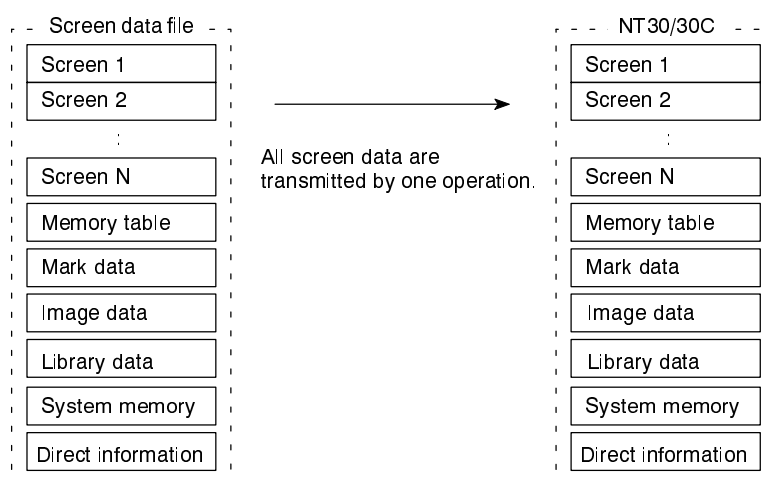
When the screen data is transmitted from the support tool to the NT30/30C, the screen data already existing in the NT30/30C will be erased. The NT30/30C cannot transmit the screen data in units of screens.

If an error message and the System Menu are displayed immediately after the NT30/30C has been started, the screen data memory needs to be initialized.

Transmitting the Screen Data from the Support Tool

To transmit the screen data from the support tool to the NT30/30C, connect the NT30/30C to the computer on which the support tool is being used, and follow the procedure below.

Reference
- When screen data transmission is performed, the NT30/30C screen data memory is automatically initialized before the new screen data is transmitted. There is therefore no need to initialize the screen data memory using menu operations before transmitting the screen data.
- The NT30/30C uses the same connector for screen data transfer and RS-232C type connection to the PC. If this connector is currently being used for RS-232C connection to the PC, disconnect the cable from the PC, connect it to the support tool (personal computer), then transmit the screen data.

Operation
1 Connect the NT30/30C to the computer on which the support tool is being used, and turn ON the NT30/30C.

2 Turn ON the computer and start up the support tool.

3 Enter the "Transmit Mode" by operating the menu of the NT30/30C shown below.

```
[ SYSTEM MENU ]

  (    Quit    )
  ( Transmit Mode )
  ( Maintenance Mode )
```
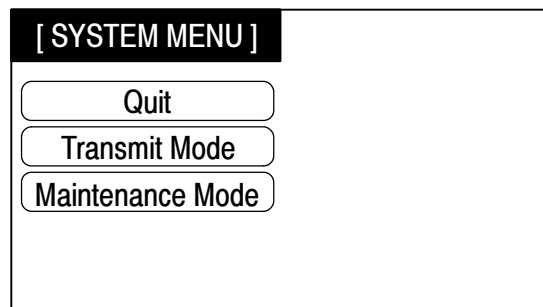
Select "Transmit Mode".

```
[ TRANSMIT MODE ]




  (  Abort  )
```
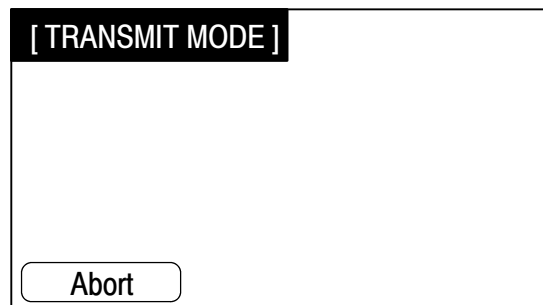
4 Select a screen data to be transmitted to the NT30/30C in the File Selection screen of the support tool, and press the Send key.

5 The NT30/30C will display the following screen when the screen data is being transmitted.

```
[ TRANSMIT MODE ]


Tool → PT
Screen Data


┌─────────┐
│  Abort  │
└─────────┘
```
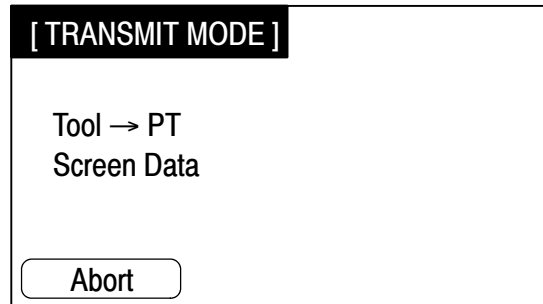
6 When the screen data transmission is completed, the support tool will display the following screen.

```
– – – – – Help Message – – – – –


Data successfuly transmitted

(Hit any key to continue)
```
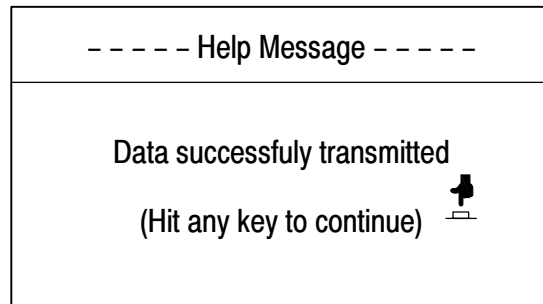
7 Press any key on the support tool to return to the File List screen.

8 Pressing the "Abort" touch switch in the Transmit Mode screen of the NT30/30C will exit the Transmit Mode and enter the SYSTEM MENU Mode.

⚠ **Caution** Press the "Abort" touch switch on the NT30/30C when the screen data transmission is completed. Unless this touch switch is pressed, the screen data will not be correctly registered. If the "Abort" touch switch is pressed during transmission, the screen data will not be correctly registered.

If screen data cannot be transmitted from the support tool properly, check whether communication between the NT30/30C and support tool (personal computer) is normal.

Precautions to be Observed During the Screen Data Transmission

When any of the following or a system error occurs during the screen data transmission, the transmitted screen data will not be registered correctly to the NT30/30C. If an error message is displayed and the Run Mode cannot be selected, the screen data memory needs to be initialized.

- The power to the NT30/30C is interrupted or the NT30/30C is reset.

- The power to the computer on which the support tool is running is interrupted or the computer is reset.

- The cable connecting the NT30/30C to the computer on which the support tool is running is disconnected or has a broken wire.

- The Cancel touch switch on the NT30/30C screen is pressed to end the transmission during screen data transfer.

- The ESC key on the support tool is pressed to end the transmission.

When the power to the NT30/30C is turned ON or reset, the screen data is checked. However, if any of the above occurs during the screen data transmission, the screen may disappear and other unexpected problems may occur.

In the case of such problems, set DIP SW2-4 to ON to initialize the memory.

For the memory initialization by using the DIP switch, refer to the "Initialization by using the DIP switch" (page 82).

3-7 Starting the Operation

After completing the screen data transmission, and setting the communication conditions, connect the NT30/30C to the PC and start the operation.

⚠ **Caution** Check the operation of screen data and ladder programs thoroughly before actually using them.

Switching to the RUN Mode Press the Quit touch switch in the System Menu. The start-up screen in the RUN mode will be displayed.

If the NT30/30C has failed to start correctly; e.g., the start-up screen is not displayed, an error message is displayed, or the screen is not displayed at all, refer to Section NO TAG "Responding to Displayed Error Messages" (page NO TAG) and take appropriate action.

Reference The start-up screen is the screen whose screen number is set for the screen switching specification in the PT status control area. If no screen data has been registered at screen number, the "Screen not registered." error message will be displayed. For the screen number setting, refer to Section 4-3 "Screen Display" (page 144).

Confirming the Communications between the NT30/30C and the PC

Execute the PC program and confirm that the following operations are normally performed.

- Confirm that the NT30/30C screens switch according to the PC program execution.

  If the screens do not switch correctly, check the connection between the NT30/30C and the PC and also check the settings.

  Refer to Section 2 "Hardware Settings and Connections".

- Confirm that the information selected by the NT30/30C touch switches has been set in the PC by displaying the contents of the words and bits using a peripheral tool (LSS etc.) or at the Host. If the information sent from the NT30/30C has not been correctly received by the PC, check the screen data settings (specifically the switch settings).

  For the details of the screen data creation, refer to the "NT-series Support Tool Operation Manual" (V028-E1-1).

3-8   Various System Settings

The NT30/30C can set a variety of functions to the memory switches which are convenient during the operation. This section describes the memory switch settings related to the operation environment.

The memory switches can also be set by selecting "In.Scr" [F8] on the "File Selection" screen of the support tool. The settings made using the support tool are written to the NT30/30C on screen data registration. For details, refer to the NT-series Support Tool Operation Manual (V028-E1-1).

Since the memory switch data are backed up by the battery in the NT30/30C, they are not cleared when the power is switched OFF.

Reference If the memory switch data is not backed up by the built-in battery, it will all be initialized to the values set with the support tool when the NT30S/30C is switched OFF. If the message "Battery Lowered" is displayed while the NT30S/30C is operating, replace the built-in battery immediately. For details on how to replace the battery, see "Replacing the Battery" (page NO TAG).

3-8-1 Setting the Key Press Sound

It is possible to set whether or not the key sound is sounded when a touch switch on the NT30/30C screen is pressed or an expanded I/O input comes on by using the "Key Press Sound" memory switch.

The factory setting for this memory switch is "ON", which means that the key sound will sound in these cases.

Set the key press sound by the menu operation from the SYSTEM MENU shown below.

<table>
<tr><td>

[SYSTEM MENU]

Quit

Transmit Mode

Maintenance Mode

</td><td>Select "Maintenance Mode".</td></tr>
</table>

<table>
<tr><td>

[MAINTENANCE MENU]

Quit   Memory Switch

Display History

I/O Check

PT Settings

Init. Memory

</td><td>Select "Memory Switch".</td></tr>
</table>
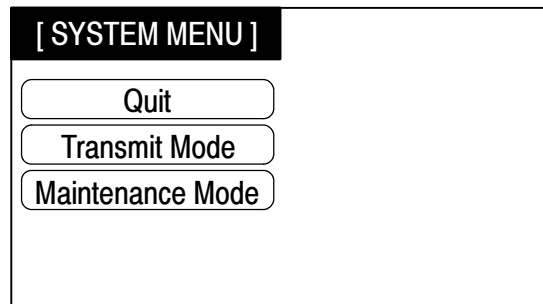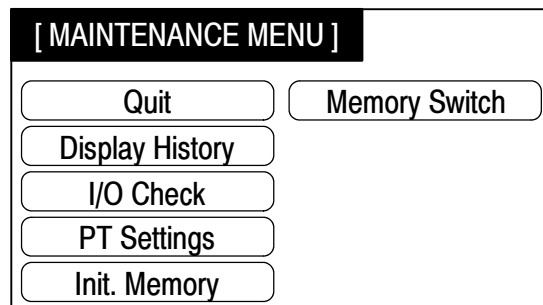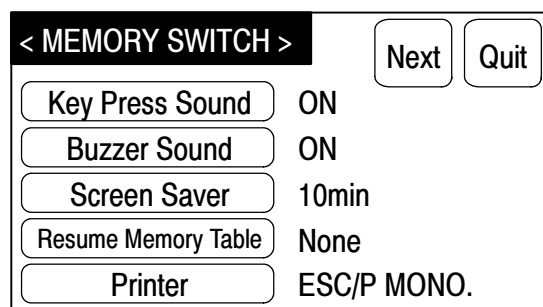
<table>
<tr><td>

< MEMORY SWITCH >   Next   Quit

Key Press Sound   ON

Buzzer Sound   ON

Screen Saver   10min

Resume Memory Table   None

Printer   ESC/P MONO.

</td><td>Each time the "Key Press Sound" touch switch is pressed, the setting option "ON" alternates with "OFF".</td></tr>
</table>

To set and quit the menu, press the "Quit" touch switch. The settings made last will be set and the display will return to the "MAINTENANCE MENU".

• ON: The key press sound will be given for 0.2 second when a touch switch is pressed.

• OFF: The key press sound will not be given when a touch key is pressed.

3-8-2 Using the Buzzer

The NT30/30C can set a buzzer to indicate the occurrence of an emergency or an NT30/30C error.

Setting the Buzzer

Except when the buzzer has been set so as not to sound at all, the buzzer will sound when an error occurs. To set the buzzer to sound in other cases, the following two procedures can be used.

• Controlled by the PC

It is possible to control the NT30/30C from the PC to sound the buzzer during the operation.

Refer to Section NO TAG "NT30/30C Status Control" (page NO TAG).

• Set the buzzer as a screen data attribute by using the support tool.

When creating the screen data by using the support tool, set the buzzer as a screen attribute so that the buzzer will sound. When the screen in which this attribute has been set is displayed, the NT30/30C will give the buzzer sound.

If the control by the PC and the display of the screen in which the buzzer attribute has been set are executed simultaneously, the priority is given to the control by the PC. Refer to the "NT-series Support Tool Operation Manual" (V028-E1-1).

To Stop the Buzzer Sound

The buzzer sound can be stopped by the following operation.

• Control by the PC

• Switch the screen to a screen which does not have a buzzer attribute.

• Press the touch switch to which the buzzer stop attribute has been set.

If a buzzer stop attribute has been set to a touch switch created on the screen in which the buzzer attribute has been set, such touch switch can be used to stop the buzzer sound. To set a buzzer stop attribute to a touch switch, set the 🔊 control key function for the touch switch by using the input key function.

For the touch switch setting, refer to Section NO TAG "Touch Switches" (page NO TAG).

Types of the Buzzer Sounds

The following buzzer sounds can be set.

• Continuous sound: The buzzer continues to sound.

• Short intermittent sound: The buzzer sounds intermittently at 0.5 second intervals.

• Long intermittent sound: The buzzer sounds intermittently at 1 second intervals.

If two or more buzzer sound specifications are made from the PC at the same time, the order of priority that determines which buzzer sound will be used is as follows: (1) continuous sound → (2) short intermittent sound → (3) long intermittent sound. If the continuous sound and short intermittent sound are specified at the same time, the continuous sound takes priority.

Setting the Buzzer

Use the memory switches to set whether or not the buzzer sounds when the buzzer sound has been instructed by the PC or with a screen attribute or when an error has occurred.

The factory setting is "ON", which means that the buzzer will sound when a command is received from the PC, when a screen for which the buzzer attributes is set is displayed, and when errors occur.

Set the buzzer sound by the menu operation from the SYSTEM MENU shown below.

```
[ SYSTEM MENU ]

      Quit
   Transmit Mode
  Maintenance Mode
```

Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

      Quit          Memory Switch
  Display History
     I/O Check
    PT Settings
   Init. Memory
```

Select "Memory Switch".

```
< MEMORY SWITCH >          Next   Quit

  Key Press Sound    ON
   Buzzer Sound      ON
   Screen Saver      10min
 Resume Memory Table None
     Printer         ESC/P MONO.
```
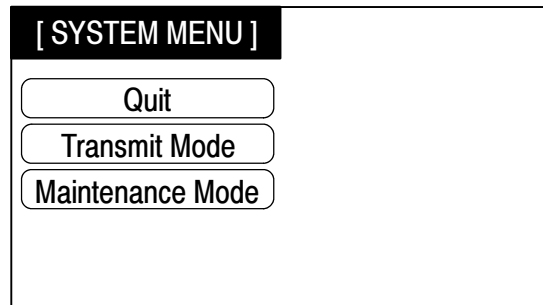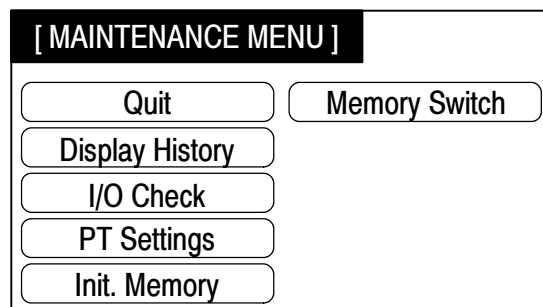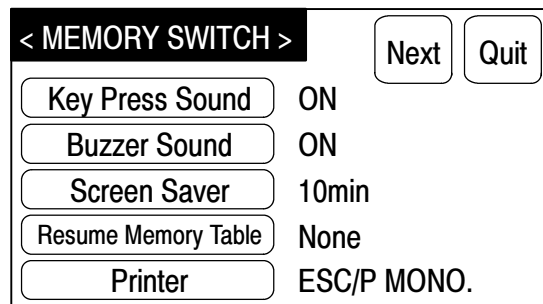
Each time the "Buzzer Sound" touch switch is pressed, the setting option "ON" alternates with "ERR ON" , "OFF".

To set and quit the menu, press the "Quit" touch switch. The setting made last will be set and the display will return to the "MAINTENANCE MENU".

- OFF: The buzzer will not sound at all during the operation.

- ON: The buzzer will sound when a command from the PC is given, the screen attribute has been set, or an error has occurred.

- ERR ON: The buzzer will sound only when an error has occurred.

Reference The buzzer will sound when "Buzzer check" is selected in the Maintenance Mode regardless of the buzzer setting.

3-8-3   Screen Saver Function

The NT30/30C has a function that turns off the screen display if no operation is performed for a certain period of time to maximize the service life of the backlight and prevent the formation of an afterimage on the screen. (the backlight is also switched off at the same time).

• Redisplaying a screen that has been turned off

After the screen has been turned off by the screen saver function it will be redisplayed if a touch switch is pressed, or if an instruction to switch the screen or redisplay the same screen is received from the PC (the backlight will also be turned back on at the same time). Changes in numerals or character-strings displayed on the screen will not cause the screen to be redisplayed.

• Setting the screen saver function

Use the memory switches to set whether or not the screen saver function is used, and the length of time that the screen is turned off if it is used.

The factory setting specifies that the backlight will turn off if no operation is performed for 10 minutes.

Reference   When terminals to which numeric key functions or standalone function keys are allocated are turned ON while the backlight is off, the key function will not be executed by canceling the backlight off status. However, in the case of input communication keys, notification will be sent to the PLC regardless of whether or not there is a backlight off function releasing attribute.

[SYSTEM MENU]

> Quit
> Transmit Mode
> Maintenance Mode

Select "Maintenance Mode".

[MAINTENANCE MENU]

> Quit   Memory Switch
> Display History
> I/O Check
> PT Settings
> Init. Memory

Select "Memory Switch".

< MEMORY SWITCH >   [Next] [Quit]

(Key Press Sound)   ON
(Buzzer Sound)   ON
(Screen Saver)   10min
(Resume Memory Table)   None
(Printer)   ESC/P MONO.
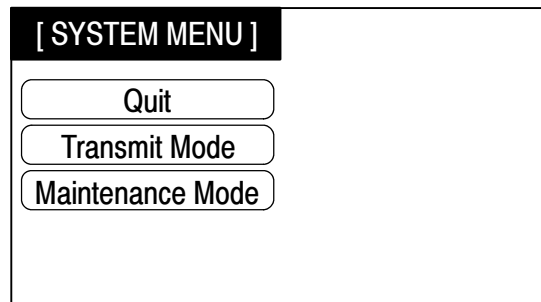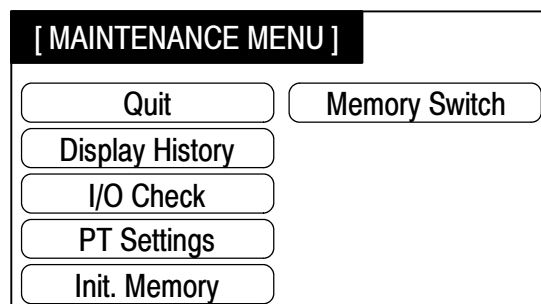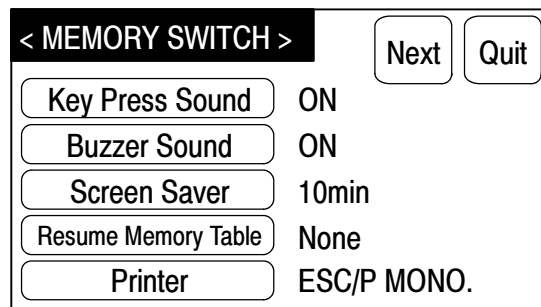
Each time the "Screen Saver" touch switch is pressed, the setting option will switch among "10min", "1hour", and "None".

To set and quit the menu, press the "Quit" touch switch. The setting made last will be set and the display will return to the "MAINTENANCE MENU".

• None: The screen OFF function is not used. As long as no operation is performed, the same screen remains to be displayed.

• 10min: The screen will be turned off when no operation has been performed for 10 minutes.

• 1hour: The backlight or the EL screen will be turned off when no operation has been performed for 1 hour.

⚠ **Caution** Do not press touch switches carelessly while the backlight is off or while nothing is displayed on the screen. Otherwise the system may operate unpredictably. Only press touch switches after confirming system safety.

Correct use After images may remain if the same pattern is displayed for a long period (approx. 1 hour).
To prevent the formation of an afterimage, either use the screen saver function or periodically switch screens.

3-8-4   Resume Function

The NT30/30C has a function to protect the contents of the memory table (value setting key input, data from the PC, etc.) from being erased even if the power to the NT30/30C is shut off during operation. This function is called the resume function. Setting the resume function protects the memory table from being initialized even when the power is turned on or reset or when the mode is switched to the "RUN" mode by the System Menu operation.

The screen displayed before the power is turned off will be displayed again when the NT30/30C is started next time.

If the "Memory Table." is selected in "INITIALIZE MEMORY MENU" from the Maintenance Mode Menu, the memory table will be initialized regardless of whether or not the resume function is set to ON or NONE. For the memory table initialization, refer to "Initialization of the Memory Tables" (page 83).

Reference If the voltage of the battery in the NT30/30C gets too low, the contents of the memory tables cannot be saved even if the resume function is effective.

Use the memory switches to set whether or not the resume function is used. The factory setting is "ON", which means that the resume function is effective.

Set the resume function by using the menu operation from the SYSTEM MENU shown below.

```
[ SYSTEM MENU ]

    Quit
  Transmit Mode
 Maintenance Mode
```

Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

    Quit           Memory Switch
 Display History
  I/O Check
  PT Settings
  Init. Memory
```

Select "Memory Switch".

```
< MEMORY SWITCH >        Next   Quit

 Key Press Sound    ON
  Buzzer Sound      ON
  Screen Saver      10min
 Resume Memory Table None
     Printer         ESC/P MONO.
```
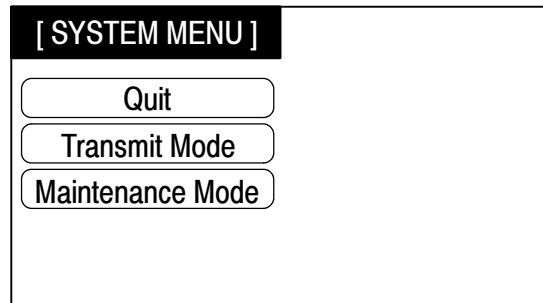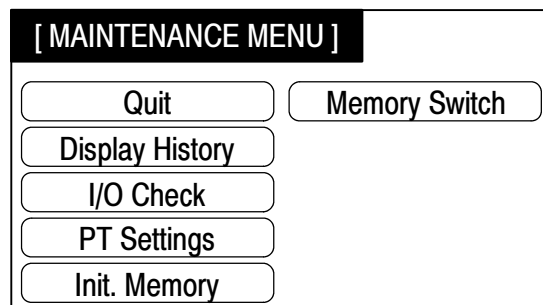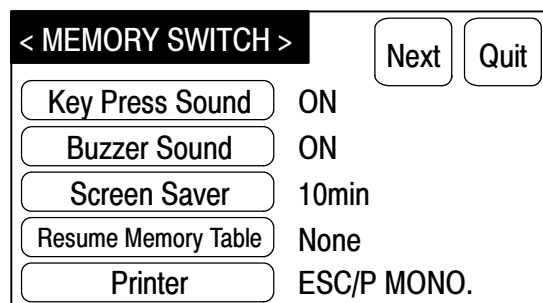
Each time the "Resume Function" touch switch is pressed, the setting option "ON" alternates with "None".

To set and quit the menu, press the "Quit" touch switch. The setting made last will be set and the display will return to the "MAINTENANCE MENU".

• NONE: The resume function will be disabled and the memory table will be initialized when the power to the NT30/30C is turned on or reset or when the mode is switched to the "RUN" mode.

• ON: The resume function will be enabled and the memory table will not be initialized. When the NT30/30C starts operation, the contents of the memory tables are written to the allocated words in the PC.

3-8-5   Screen Printing Function

The NT30/30C can print a hardcopy of the displayed screens onto a printer connected to the NT30/30C. This function is called the screen printing function. The NT30/30C will continue operating even when such a hardcopy is being printed.

However, since the screen print function shares the NT30/30C memory with the pop-up window function (page NO TAG), hard copies cannot be printed while a pop-up window is displayed.

For printer connection, refer to Section 2-7 "Connecting a Printer" (page 64).

Printing Screens   Screen printing can be performed by using a touch switch for which screen printing/interruption function is set or by giving a screen printing command from the PC.

- Using the touch switch

  When creating screen data with the support tool, set the screen printing function to a touch switch. For details, refer to "NT-series Support Tool Operation Manual" (V028-E1-□).

  Pressing the touch switch so set as to start hardcopy printing prints a hardcopy of the screen displayed. To interrupt the printing, press the touch switch to which hardcopy printing interruption is set.

- Giving instruction from the PC

  Set up a PT status control area (PC → PT) and then start printing the screen.

  For details, refer to Section NO TAG "NT30/30C Status Control" (page NO TAG).

  However, printing of screen hardcopies may not be interrupted from the PC.

Setting Screen Printing   Set the type of the printer and a way of printing in the MEMORY SWITCH MENU.

The factory setting is "ESC/P COL." (if using an NT30, monochrome printing will be executed on color printers).

Screen printing by using the menu operation from the SYSTEM MENU shown below.

[SYSTEM MENU]   Select "Maintenance Mode".

    Quit
    Transmit Mode
    Maintenance Mode

[MAINTENANCE MENU]   Select "Memory Switch".

    Quit   Memory Switch
    Display History
    I/O Check
    PT Settings
    Init. Memory
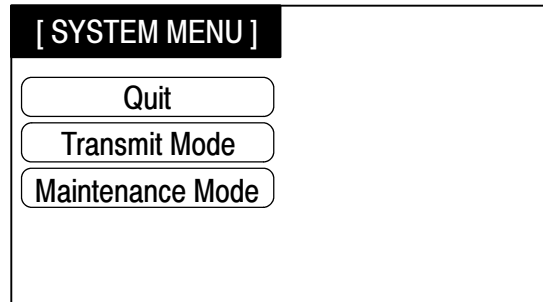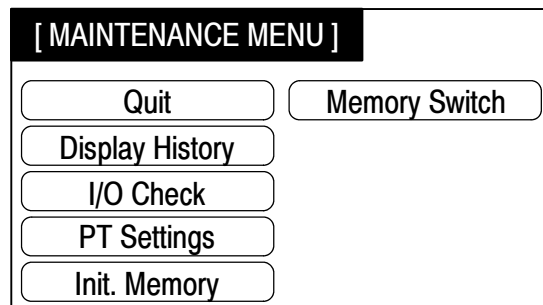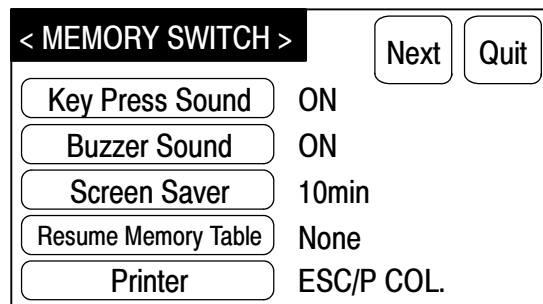
< MEMORY SWITCH >   Next   Quit   Each time the "Printer" touch switch is pressed, the next item in the applicable cycle of options below is selected:

    Key Press Sound   ON
    Buzzer Sound   ON   "ESC/P COL."
    Screen Saver   10min   "ESC/P MONO."
    Resume Memory Table None   "PR201H COL."
    Printer   ESC/P COL.   "PR201H TONE."

To set and quit the menu, press the "Quit" touch switch. The setting made last will be set and the display will return to the "MAINTENANCE MENU".

ESC/P COL.:   Specify this for a printer, such as the EPSON ESC/P Printer (24-pin), that conforms to the printer control standard ESC/P24-J83C. Hardcopies will be made in colors.

ESC/P MONO.:   Specify this for a printer, such as the EPSON ESC/P Printer (24-pin), that conforms to the printer control standard ESC/P24-J81. Hardcopies will be made in monochrome with colors expressed by gray scale levels.

3-9   System Maintenance

The NT30/30C has self-maintenance functions, such as display history recording, I/O check and PT setting display.

3-9-1   Using the Display History Recording Function

The display history recording function is used to record the display sequence and frequency of screens during operation. The data recorded can be displayed and confirmed on the system screen.

Recording Display History   Display history is recorded in the following procedure:

Setting screen attributes

To create a screen, of which display history will be recorded, on the support tool, set display history recording attributes to it. Register a message describing display history with not more than 16 characters (note that although 24 characters can be input using the support tool, only the first 16 are valid).
The display history can be recorded if the display history recording attributes for the screen have been set. For further information, refer to "NT-series Support Tool Operation Manual" (V028-E1-01).

Initializing memory for display history recording

Prior to recording, initialize the memory for display history recording (refer to page 84).

Recording display history

When the screen with display history recording attributes requested from the PC appears during operation, the display history will be recorded in the system.

Display History Recording Format

Display history includes the following items related to the screen displayed:

- Screen number

- Date and time of display

- Message outlining screen data

Maximum Number of Screens to be Recorded

Up to 1023 screens can be recorded. The maximum number of recording times per screen is 255.

Since the data recorded is retained by the battery, it will not be lost even if the power to the system is turned off.

Confirming Screen Data Recorded

There are two ways to confirm screen data recorded: by the maintenance mode, and by displaying the screen by the screen data recording function during operation.

Recorded data can be displayed in order of occurrence or frequency.

- In order of "occurrence"

  Recorded data is displayed in order of occurrence.

Screen#	(Y/	M/	D	H: Mi)	(X)	Message	
1	(93/	5/	30	23: 30)	( )		
2	(93/	5/	31	02: 17)	( )		Quit
8	(93/	5/	31	11: 05)	( )		
2 000	(93/	5/	31	21: 48)	( )		⬆
							⬇

- In order of "frequency"

  Recorded data is displayed in order of display frequency with the accumulated number of times each screen has been displayed.

Screen#	(Y/	M/	D	H: Mi)	(X)	Message	
8	(/	/		:)	(255)		
2	(/	/		:)	(20)		Quit
1	(/	/		:)	(3)		
2 000	(/	/		:)	(1)		⬆
							⬇

In either case, the system screen shows up to 14 screen numbers and their data at a time.

To take a look at data that is not on the display, press the ⬆ or ⬇ key on the touch panel.

When no screen data is recorded, the message "History Record Not Found" appears, and the screen returns to the "History Record" after about two seconds.

- Confirming recorded screen data by operation from the SYSTEM MENU as described below.

Confirm the recorded screen data by the operation from the SYSTEM MENU shown below.

[SYSTEM MENU]

Quit
Transmit Mode
Maintenance Mode

Select "Maintenance Mode".

[MAINTENANCE MENU]

Quit   Memory Switch
Display History
I/O Check
PT Settings
Init. Memory
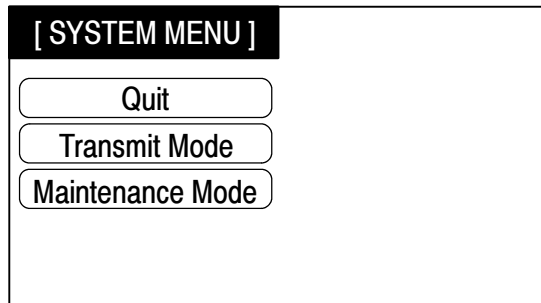
Select "Display History".
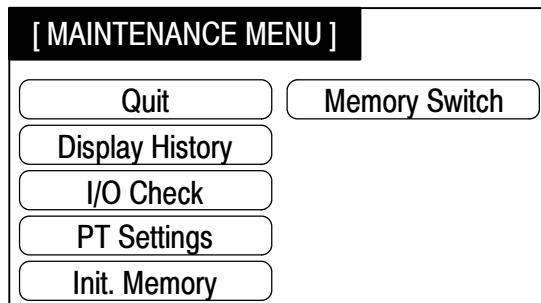
[History Record]

Quit
Occurrence
Frequency
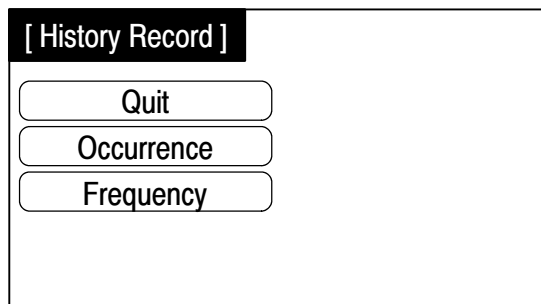
Select "Occurrence" or "Frequency".

The recorded data will be displayed in accordance with the selected method.

To quit confirmation, press the "Quit" touch switch. The History Record menu will be redisplayed.

- Confirming recorded screen data during operation

Screens No. 1997 and No. 1998 are for displaying recorded screen data.

Either screen will be displayed according to the data display order selected.

Screen No. 1997: In order of occurrence
Screen No. 1998: In order of frequency

Reference   • When the direct connection system is used, screens No. 1997 and No.1998 are reserved for recorded screen data display. They are unavailable for any other purpose.

• If the screen attribute (numeral setting attribute) for screen numbers 1997 and 1998 is "user", the touch switches used to scroll the screen do not appear when the display history is displayed during operation. In this case, create touch switches – such as the ⬆ and ⬇ touch switches shown in the figure below – in advance at the right edge of the screen. The size of the switches should not exceed 40 dots (two regular touch switch widths). When using an NT30C, select "white" as the background color for the screen.
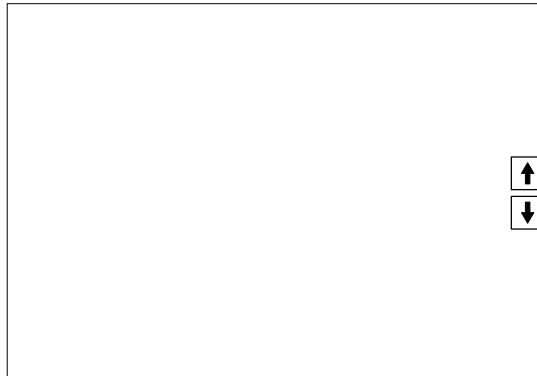
3-9-2 I/O Check

The I/O operations for the following items of the NT30/30C are checked by the I/O check function.

- Expanded I/O unit
- Touch Switch
- Communication Check
- LCD Display
- Backlight

- Buzzer Check
- LED Check
- Calendar & Clock
- Battery Voltage
- Printer Check

Checking the Expanded I/O   Check the expanded I/O unit (B7A unit) by using the menu operation from the SYSTEM MENU shown below.

[SYSTEM MENU]

Quit
Transmit Mode
Maintenance Mode

Select "Maintenance Mode".

[MAINTENANCE MENU]

Quit   Memory Switch
Display History
I/O Check
PT Settings
Init. Memory

Select "I/O Check".

[I/O CHECK MENU]   Next

Quit   Buzzer
Exp. I/O Unit   LED
Touch Switch   Calendar
Communication   Battery
LCD Display   Printer
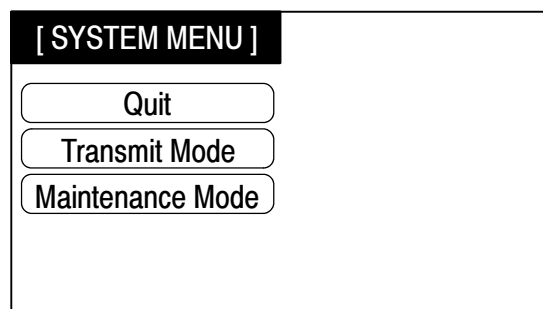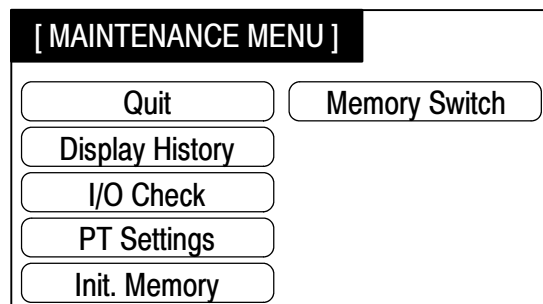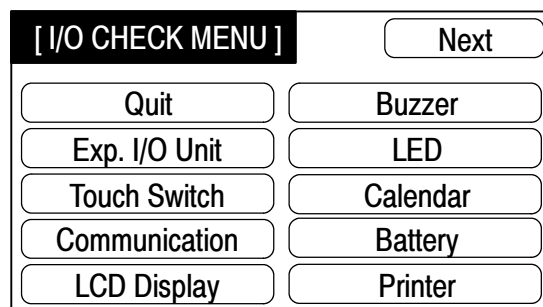
Select "Exp. I/O Unit (B7A unit)".

111

```
[ EXP. I/O UNIT CHECK ]                      End

 IN    IN    IN    IN    IN    IN    IN    IN
 00    01    02    03    04    05    06    07

 IN    IN    IN    IN    IN    IN    IN    IN
 08    09    10    11    12    13    14    15

OUT   OUT   OUT   OUT   OUT   OUT   OUT   OUT
00    01    02    03    04    05    06    07

OUT   OUT   OUT   OUT   OUT   OUT   OUT   OUT
08    09    10    11    12    13    14    15
```
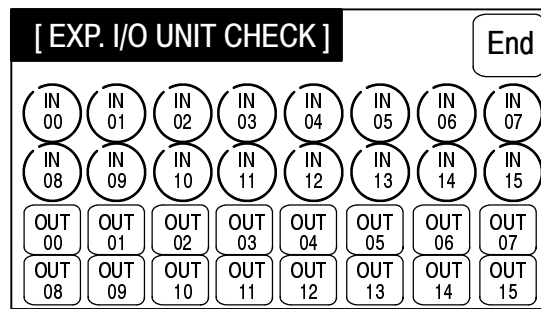
- Input check

  The two rows of round lamps IN00 to IN15 in the upper part of the screen corre-
  spond to expanded I/O input bits 0 to 15. When a touch switch is pressed, the
  corresponding input bit is ON while it is being pressed.

- Output check

  The two rows of square touch switches OUT00 to OUT15 in the lower part of the
  screen correspond to expanded I/O output bits 0 to 15. When a touch switch is
  pressed, the corresponding output bit is ON while it is being pressed.

⚠ **Caution** As far as possible, disconnect all peripheral devices connected to the output ter-
minals before executing the output check. Otherwise, each time an output termi-
nal comes ON during the check operation, a buzzer, or warning lamp, etc. will be
activated at a peripheral device.

- When the check is finished, press the "End" touch switch. The I/O check menu
  will be redisplayed.

Reference   If the key press sound is set to "ON" with the memory switches, it will sound when
an expanded I/O input bit comes ON.

The statuses of the expansion I/O inputs are not notified to the PC during the I/O
check.

Checking the Touch Switches

Execute a touch switch check by the menu operation from the SYSTEM MENU
shown below.

```
[ SYSTEM MENU ]

       Quit
   Transmit Mode
  Maintenance Mode
```

Select "Maintenance Mode".

[MAINTENANCE MENU]

Quit	Memory Switch
Display History	
I/O Check	
PT Settings	
Init. Memory	

Select "I/O Check".

[I/O CHECK MENU]   Next

Quit	Buzzer
Exp. I/O Unit	LED
Touch Switch	Calendar
Communication	Battery
LCD Display	Printer
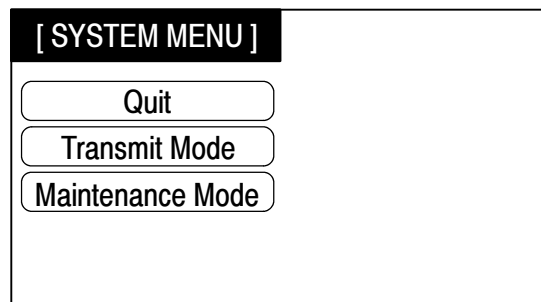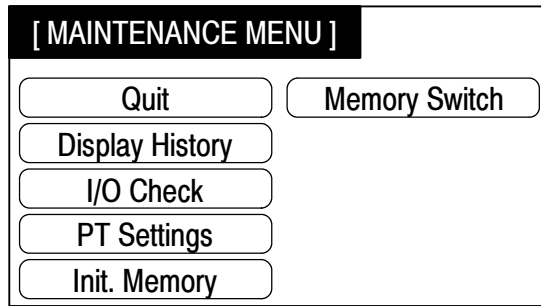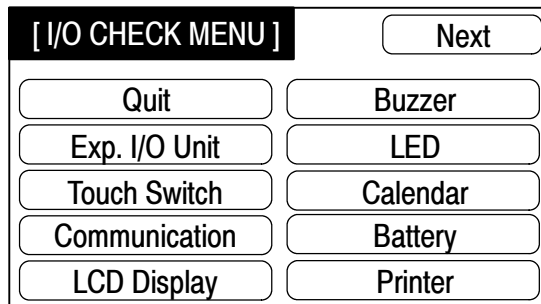
Select "Touch Switch".
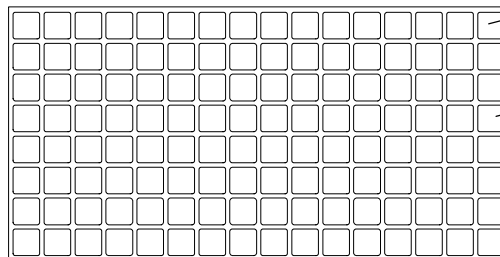
This touch switch is to exit the touch switch checking screen. Its color is different from that of the other switches.

The touch switch is normal if it is highlighted while it is pressed.

- Press a touch switch on the screen. If the touch switch is highlighted while it is pressed, the touch switch is normally functioning.

- When the check is finished, press the 1x1 touch switch at the top right corner of the screen. The I/O check menu will be redisplayed.

Reference   If memory switch setting for the key press sound has been made for ON, the key press sound will be made when a touch switch is pressed. The number of pressed touch switch will not be notified to the PC.

Checking the Communications with PC

Execute a NT30/30C-to-PC communication check by the menu operation from the SYSTEM MENU shown below.

The NT30/30C uses the same connector for connection to the support tool and RS-232C type connection to the PC. To establish an RS-232C type connection with the PC, disconnect the cable from the support tool and connect it to the PC: the communication check can then be performed.

```
[ SYSTEM MENU ]

    Quit
  Transmit Mode
  Maintenance Mode
```
Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

    Quit           Memory Switch
  Display History
    I/O Check
  PT Settings
  Init. Memory
```
Select "I/O Check".

```
[ I/O CHECK MENU ]          Next

    Quit              Buzzer
  Exp. I/O Unit        LED
  Touch Switch       Calendar
  Communication      Battery
   LCD Display        Printer
```
Select "Communication".

[COMMUNICATION CHECK MENU]

> Quit

> RS232C

> RS422

Set up the PLC of "host link", "9600 bps", "2 stop bits", and "even parity"

Select "RS232C" or "RS422 ".

< RS232C, CHECK >   End

Transmit Data
  40 30 30 4D 4D 34 30 2A 0D
Reception Data
  40 30 30 4D 4D 30 30 31 32 34 33
 2A 0D

> Start

Example: "RS232C" selected

Select "Start".

- The data required to check communication will be sent to the PC, and will be displayed at "Transmit Data" in hexadecimal. If communication is normal, the response from the PC will be displayed immediately at "Reception Data". If there is no response from the PC and nothing is displayed at "Reception Data", an error has occurred and the communication cable and setting conditions must be checked.

- When the check is finished, press the "End" touch switch. The "COMMUNICATION CHECK MENU" will be redisplayed.

Checking the LCD Display Check the NT30/30C LCD display by using the menu operation from the SYSTEM MENU shown below.

[SYSTEM MENU]

> Quit

> Transmit Mode

> Maintenance Mode

Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

   Quit              Memory Switch
  Display History
  I/O Check
  PT Settings
  Init. Memory
```

Select "I/O Check".

```
[ I/O CHECK MENU ]         Next

   Quit                 Buzzer
  Exp. I/O Unit          LED
  Touch Switch         Calendar
  Communication        Battery
  LCD Display          Printer
```
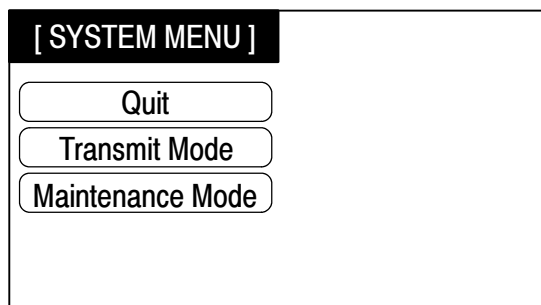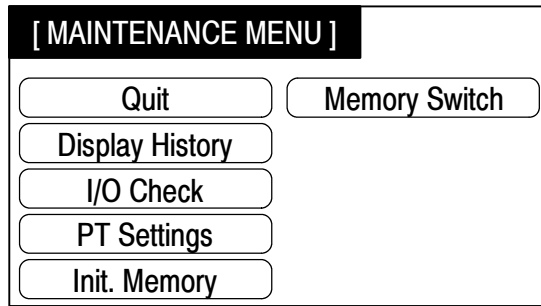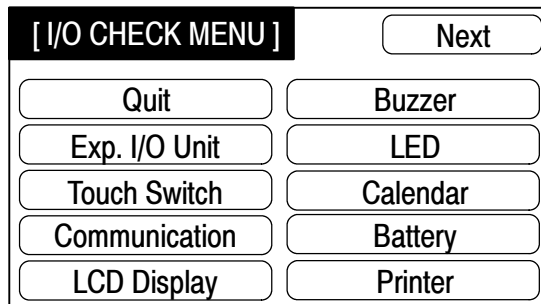
Select "LCD Display".

• Dots (the points that make up the screen) are displayed one by one starting at the top left of the screen. In the case of the NT30C, the check is performed for each color (in the order black → blue → magenta → white → yellow → green → black). If all the dots are displayed successfully, the display is cleared and the "I/O CHECK MENU" is redisplayed.

• To discontinue a screen display check, press the touch switch at the top right corner of the screen. The "I/O CHECK MENU" will be redisplayed.

Checking the Buzzer   Check the NT30/30C buzzer by using the menu operation from the SYSTEM MENU shown below.

```
[ SYSTEM MENU ]

   Quit
  Transmit Mode
  Maintenance Mode
```

Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

   Quit            Memory Switch
   Display History
   I/O Check
   PT Settings
   Init. Memory
```

Select "I/O Check".

```
[ I/O CHECK MENU ]        Next

   Quit              Buzzer
   Exp. I/O Unit     LED
   Touch Switch      Calendar
   Communication     Battery
   LCD Display       Printer
```
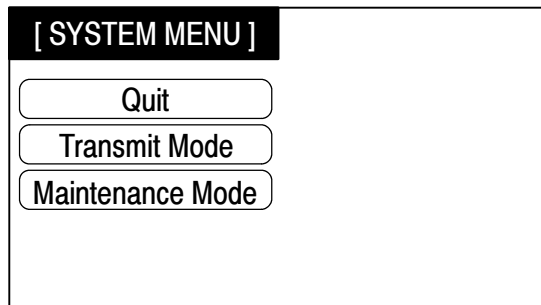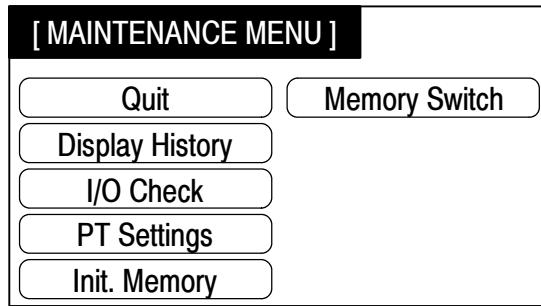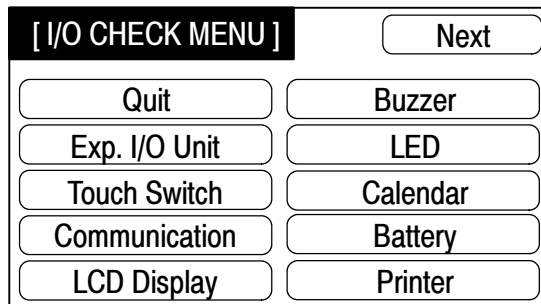
Select "Buzzer".

- If the buzzer function is normal, the continuous buzzer sound will be made.

- To stop the buzzer sounding, press the "Buzzer" touch switch again.

Reference Though memory switch setting for the buzzer has been made for OFF, the buzzer will sound when the buzzer check is executed.

Checking the LED Check the LED by using the menu operation from the SYSTEM MENU shown below.

```
[ SYSTEM MENU ]

   Quit
   Transmit Mode
   Maintenance Mode
```

Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

   Quit            Memory Switch
   Display History
   I/O Check
   PT Settings
   Init. Memory
```

Select "I/O Check".

117

```
[ I/O CHECK MENU ]          Next
     Quit               Buzzer
  Exp. I/O Unit           LED
  Touch Switch          Calendar
  Communication          Battery
   LCD Display           Printer
```
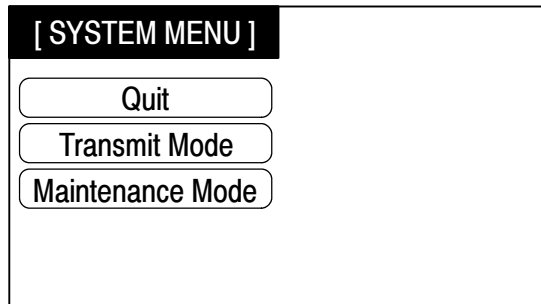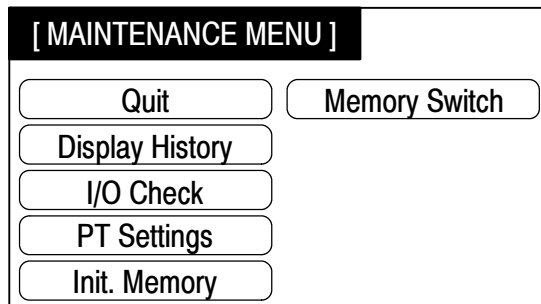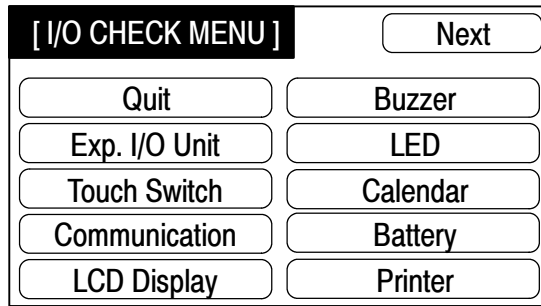
Select "LED".

The "RUN" LED on the front face of the NT30/30C will flash alternately green and red. The "POWER" LED remains lit.

• To quit the LED check, press the "LED Check" touch switch again.

Checking the Calendar and Time

Check the setting of the internal clock function by using the menu operation from the SYSTEM MENU shown below.
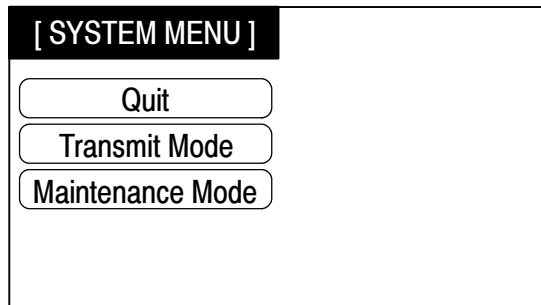
```
[ SYSTEM MENU ]

     Quit
  Transmit Mode
  Maintenance Mode
```

Select "Maintenance Mode".

↓

```
[ MAINTENANCE MENU ]

     Quit          Memory Switch
  Display History
   I/O Check
  PT Settings
  Init. Memory
```

Select "I/O Check".

↓

```
[ I/O CHECK MENU ]          Next
     Quit               Buzzer
  Exp. I/O Unit           LED
  Touch Switch          Calendar
  Communication          Battery
   LCD Display           Printer
```

Select "Calendar".

↓

```
┌──────────────────────────────────────────┐
│ < CALENDAR CHECK >           ┌──────┐     │
│                              │ Quit │     │
│                              └──────┘     │
│                                           │
│    04/15/95      14 : 39 : 07             │
│                                           │
│                                           │
└──────────────────────────────────────────┘
```
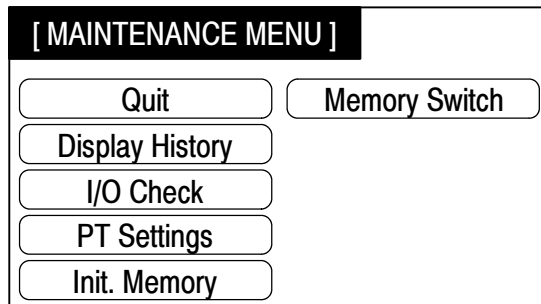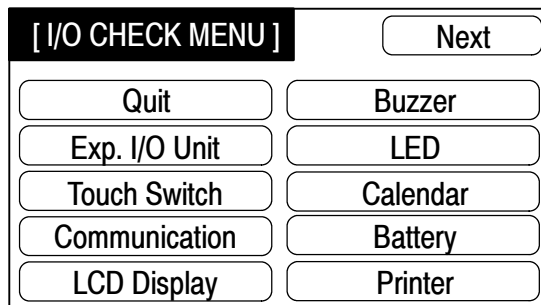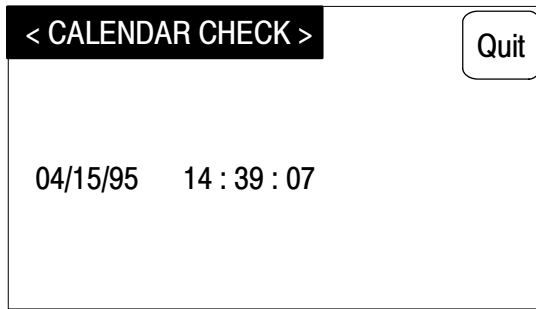
• When the check is finished, press the "Quit" touch switch. The "I/O CHECK MENU" will be redisplayed.

• Calendar and clock setting can also be executed by operation from the Tool Settings screen of the support tool, or by using numeral memory table operations. For details on the setting procedure when using the support tool, refer to the NT-series Support Tool Operation Manual (V028-E1-1), and for details on the setting procedure using numeral memory tables, refer to NO TAG "Clock Function" (page NO TAG).

Checking the Battery Voltage

Check the battery voltage by using the menu operation from the SYSTEM MENU shown below.

```
┌──────────────────────────────────────────┐
│ [ SYSTEM MENU ]                           │
│   ┌────────────────────────┐              │
│   │        Quit            │              │
│   └────────────────────────┘              │
│   ┌────────────────────────┐              │
│   │    Transmit Mode       │              │
│   └────────────────────────┘              │
│   ┌────────────────────────┐              │
│   │   Maintenance Mode     │              │
│   └────────────────────────┘              │
│                                           │
└──────────────────────────────────────────┘
```

Select "Maintenance Mode".

```
┌──────────────────────────────────────────┐
│ [ MAINTENANCE MENU ]                      │
│  ┌──────────────┐    ┌─────────────────┐  │
│  │     Quit     │    │  Memory Switch  │  │
│  └──────────────┘    └─────────────────┘  │
│  ┌──────────────┐                         │
│  │Display History│                        │
│  └──────────────┘                         │
│  ┌──────────────┐                         │
│  │   I/O Check  │                         │
│  └──────────────┘                         │
│  ┌──────────────┐                         │
│  │  PT Settings │                         │
│  └──────────────┘                         │
│  ┌──────────────┐                         │
│  │  Init. Memory│                         │
│  └──────────────┘                         │
└──────────────────────────────────────────┘
```
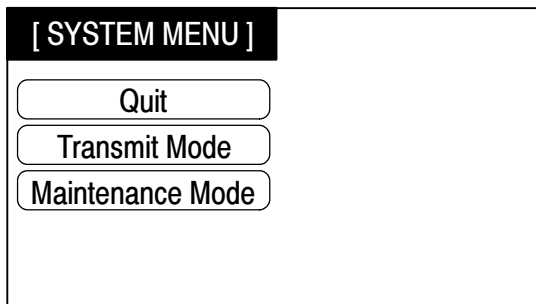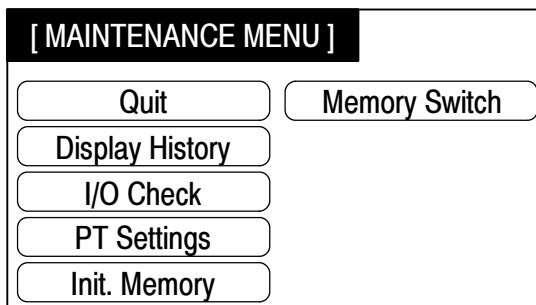
Select "I/O Check".

Select "Battery".

```
[ I/O CHECK MENU ]          Next

    Quit              Buzzer
  Exp. I/O Unit         LED
  Touch Switch        Calendar
  Communication       Battery
   LCD Display         Printer
```

```
< BATTERY CHECK >          Quit



              Normal


```
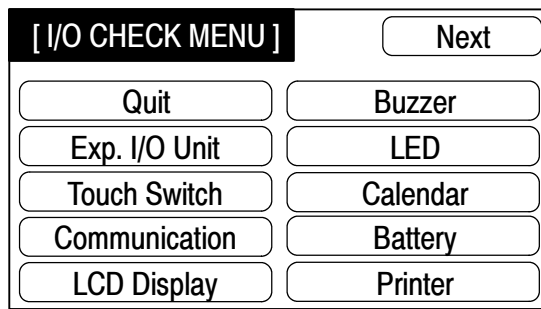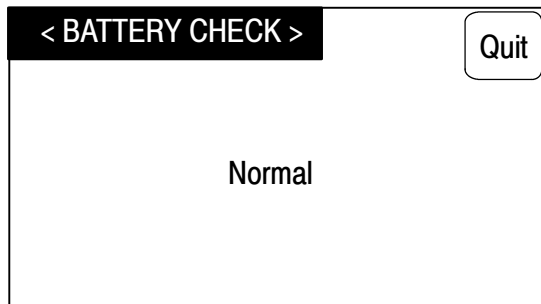
• After checking the screen message, press the "Quit" touch switch. The "I/O CHECK MENU" will be redisplayed.

Checking the Printer

Check communication with the printer by using the menu operation from the SYSTEM MENU shown below.

```
[ SYSTEM MENU ]

     Quit
  Transmit Mode
 Maintenance Mode


```

Select "Maintenance Mode".

```
[ MAINTENANCE MENU ]

    Quit          Memory Switch
 Display History
   I/O Check
  PT Settings
  Init. Memory
```

Select "I/O Check".

[I/O CHECK MENU]   Next   Select "Printer".

Quit   Buzzer

Exp. I/O Unit   LED

Touch Switch   Calendar

Communication   Battery

LCD Display   Printer
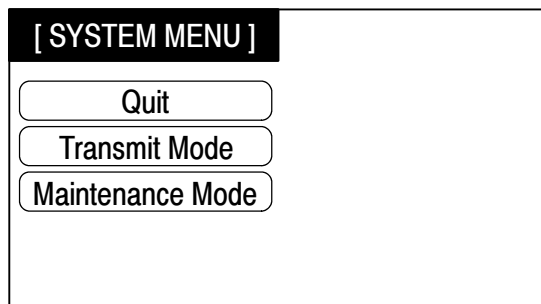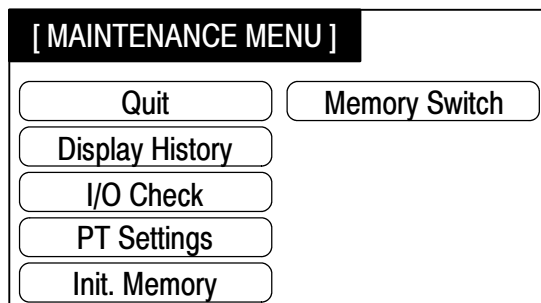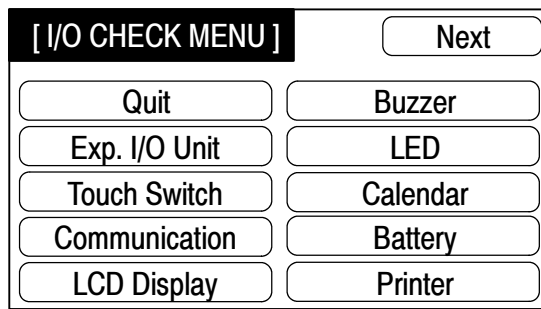
< PRINTER CHECK >   Quit   Press "Start".
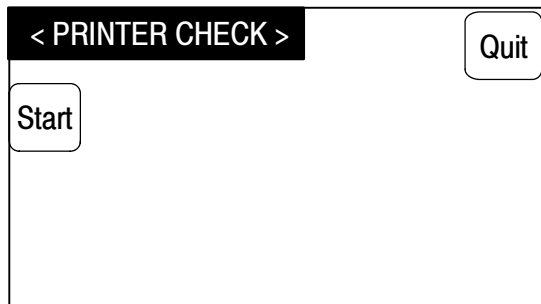
Start   "PRINTER CHECK" will be
                                             printed out at the connected
                                             printer.

- On completion of the check, the message "Finish Check" will be displayed.

- On confirming the result, press the "Quit" touch switch. The "I/O CHECK MENU"
  will be redisplayed.

Checking the Backlight

Check the Backlight by using the menu operation from the SYSTEM MENU shown
below.
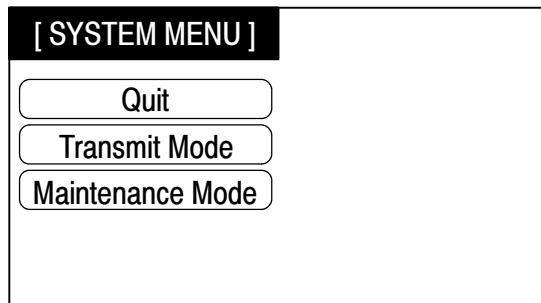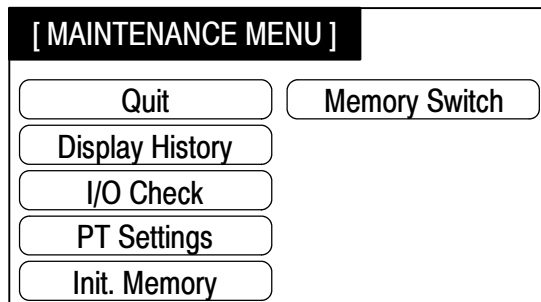
[SYSTEM MENU]   Select "Maintenance Mode".

Quit

Transmit Mode

Maintenance Mode

[MAINTENANCE MENU]   Select "I/O Check".

Quit   Memory Switch

Display History

I/O Check

PT Settings

Init. Memory

```
[ I/O CHECK MENU ]          Next              Select "Next".

     Quit              Buzzer
  Exp. I/O Unit          LED
  Touch Switch         Calendar
 Communication         Battery
   LCD Display          Printer
```

⬇

```
[ I/O CHECK MENU ]          Prev.             Select "Backlight".

     Quit
   Backlight
```

- When "Backlight" is selected, the backlight will start flashing. The NT30 has two backlight colors and this flashing follows the sequence shown below in the case of the NT30:

      Red only lights → red off → white only lights → white off → ...

- To stop the backlight flashing, press the "Backlight" touch switch again.

3-9-3   Checking the PT Setting Status

Checking the PT Setting Status

Display the NT30/30C settings by using the menu operation from the SYSTEM MENU shown below.

[SYSTEM MENU]

Quit

Transmit Mode

Maintenance Mode

Select "Maintenance Mode".

[MAINTENANCE MENU]

Quit   Memory Switch

Display History

I/O Check

PT Settings

Init. Memory

Select "PT Settings".

< PT SETTINGS >   Quit

Screen Memory Size	512k
PT Control Area	DM0100
PT Notify Area	DM0200
SW2-1 System Reserved	ON ☐■ OFF
SW2-2 ON:Memory Protect	☐■
SW2-3 ON:Not Display System Menu	☐■
SW2-4 ON:Init. Screen Memory	☐■
SW2-5 System Reserved	☐■
SW2-6 System Reserved	■☐
SW2-7 ON:Erase System Program	☐■
SW2-8 For the Terminater Valid, Turn ON	
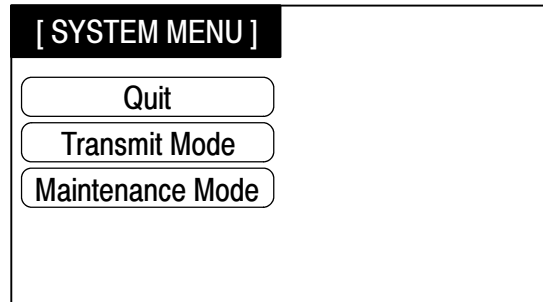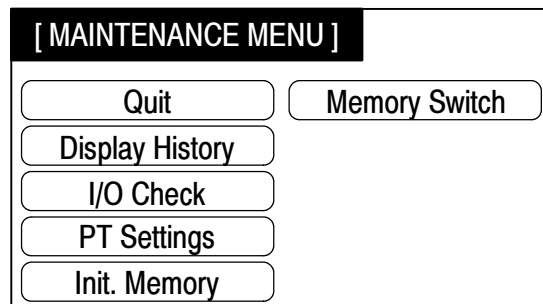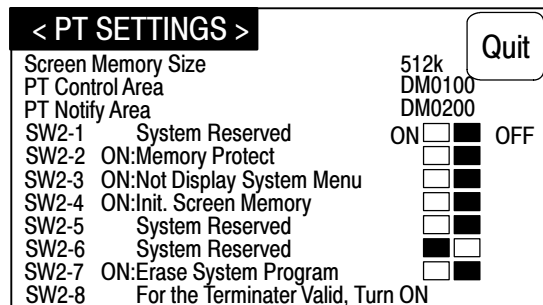
- The current NT30/30C setting status will be displayed.

- Pressing the "Quit" touch switch will exit the "PT Settings" display and cause the NT30/30C to return to the "MAINTENANCE MENU".

Reference SW2-6 is factory-set to OFF. Since it is not possible to display English with this setting, it must be set to ON before installing the system program. (Use the installer.)

This section describes the functions of the NT30/30C.

4-1 Creating and Transmitting Screen Data

This section describes briefly the support tool settings required for creating screen data and the screen data creation procedure.

For the details of the support tool and screen data creation, refer to the "NT-series Support Tool Operation Manual" (V028-E1-1).

4-1-1 Setting the Support Tool for Use with the NT30/30C

To create the screen data for the NT30/30C, make settings with the support tool for use with the NT30/30C.

```
                      NT series
              Support Tool Version. 2.0
              ──────────────────────────

                     Edit Screen
                     Tool Settings
                         Exit


              (C) OMRON Corporation 1995
                  All Rights Reserved
```

Select "Tool Settings".

```
                        Tool Settings
──────────────────────────────────────────────────────────
⊠PT Type           □ NT20M(NT20S-ST121/124)        □ NT20S
                   □ NT600M      □ NT600S           ▣ NT610G
                   □ NT610C      □ NT30             □ NT30C
□Memory Size       □ 32KB      □ 64KB      □ 96KB      □ 128KB
                   □ 512KB     ▣ 1024KB
□Direct Access     ▣ Ver3    □ Ver4    □ Ver5
□Direct Macn Type  □ NONE   ▣ OMRON   □ MEL-A  □ MEL-Fx
□Printer           ▣ HP Laser      □ Epson Dot Matrix
□Sheet Feeder      □ Yes           ▣ No
□Mouse Use         □ Auto movemnt  ▣ No AutoMvmnt  □ Not used

□Communication Port  ▣ COM1        □ COM2
□Communication Mode  ▣ Standard    □ Hispeed
□Work Directory      \
□Data Directory      \

GUIDE:  To specify the type as the model, press f1    [ Exec ]  [ Abrt ]
 1 TypSel 2       3 Time 4 Edit  5     6     7     8     9     0
```

To create the NT30/30C screen data, make settings in the "Tool Settings" screen as follows.

NT30

PT Type	:	NT30
Memory Size	:	512 KB
Direct Access	:	Ver4
Direct Macn Type	:	OMRON

NT30C

PT Type	:	NT30C
Memory Size	:	512 KB
Direct Access	:	Ver4
Direct Macn Type	:	OMRON

4-1-2   Creating Screen Data

Screen Data Creation Method

The screen data is created by using the support tool. The support tool registers the screen data used with one NT30/30C to one file.

Screen data can be created by one of the following three methods:

• creating a new file;

• editing an existing file;

• reading and editing selected screens from an existing file.

Screen Data Creation Procedure

The following gives the basic screen data creation procedure. Required settings and reference pages are given for each step of the procedure.
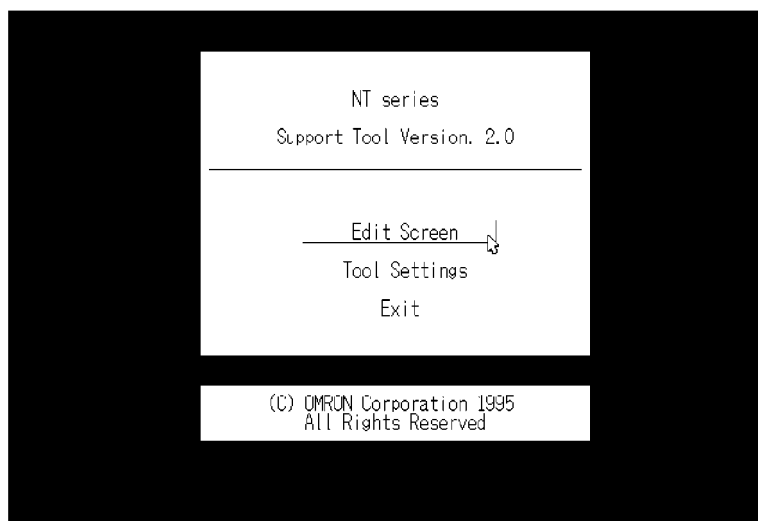
➡ Select "Tool Settings" in the Main Menu to display the "Tool Settings" screen. Settings of NT model, memory size, and direct setting are made in this screen. Refer to "Setting the support tool for use with the NT30/30C" on the previous page.

127

Select "Edit Screen".

```
┌─────────────────────────────────────────────────────────────┐
│ ┌──────────────────────────┐ ┌──────────────────────────┐  │
│ │ File List    NT30C-V4-0  512KB│ ──── File Selection ──── │  │
│ ├──────────────────────────┤ ├──────────────────────────┤  │
│ │ FileName│ Title    1/ 11 PaDn PaUp│ ──── Help Message ──── │  │
│ ├──────────────────────────┤ │                          │  │
│ │ NEW_FILE│Creation of New File   │                       │  │
│ │ INPT_SCR│For Line Input    ▶     │ Esc│Exit to Main Menu │  │
│ │ PROC_B  │Process control backup │                       │  │
│ │ PROC_C  │Production Qty Check   │                       │  │
│ │ SAMPLE  │                       │                       │  │
│ │ A       │A                      │                       │  │
│ │ INPT_SCR│For Line Input         │                       │  │
│ │ PROC_B  │Process control backup │ NT30C      Ver 4.0    │  │
│ │ PROC_C  │Production Qty Check   │ Direct     OMRON      │  │
│ │ PROC_CTL│For process A          │ Num.Mem.Tabls  1000   │  │
│ │         │      ]                │ Str.Mem.Tabls  1000   │  │
│ │         │                       │ DAC func.             │  │
│ │         │                       │          0.00KB       │  │
│ └──────────────────────────┘ └──────────────────────────┘  │
│ 1 Copy 2Delete3Print 4ToolS  5Hist. 6 Tmx. 7 Rcv. 8In.Scr 9Title 0 Next│
└─────────────────────────────────────────────────────────────┘
```

➡ Select a file used for storing the screen data for the NT30/30C in the "File List" screen.

    To create a new file, select "New File".

    To edit an existing file, select a file to edit.

Select "New File" and press [Enter]. Enter filename on completion of creation.

⬇   Select "Screen Creation".

```
┌─────────────────────────────────────────────────────────────┐
│ ┌──────────────────────────┐ ┌──────────────────────────┐  │
│ │[NEW_FILE] Scr list NT30C-V4-0  512KB│──── Screen Selection ────│ │
│ ├──────────────────────────┤ ├──────────────────────────┤  │
│ │ No. │ Status │ Comment  PaDn PaUp│ ──── Help Message ──── │  │
│ ├──────────────────────────┤ │                          │  │
│ │  1  │        │         ▶  │                             │  │
│ │  2  │        │           │ Tab│Specified Page          │  │
│ │  3  │        │           │                             │  │
│ │  4  │        │           │ Space│Mark/Unmark          │  │
│ │  5  │        │           │                             │  │
│ │  6  │        │           │ Home│Unmark All            │  │
│ │  7  │        │           │                             │  │
│ │  8  │        │           │ Shft│Mark/Unmark All        │  │
│ │  9  │        │           │ Home                        │  │
│ │ 10  │        │           │ Esc│Select File            │  │
│ │ 11  │        │           │                             │  │
│ │ 12  │        │           │ Hist. [              ]      │  │
│ │ 13  │        │           │                             │  │
│ │ 14  │        │           │                             │  │
│ │ 15  │        │           │                             │  │
│ │ 16  │        │           │          0Byte              │  │
│ └──────────────────────────┘ └──────────────────────────┘  │
│ 1 Copy 2Delete3Print 4Attrib 5 Read 6Commnt 7Image 8Co/Ovl 9 Mark 0 Next│
│                                          &Lib                 │
└─────────────────────────────────────────────────────────────┘
```

Select a screen number to edit in the selected file in the "Screen List" screen.

Note that the PT status control area and PT status notify area must be set as described below before selecting the screen number.

To read the screen data from other file, press the [F5] (Read) function key.

➡ While in the "Screen List" screen, press the [F10] (Next page) key, and then, the [F4] (Direct) key to display the "Direct Connection Data Setting" window in which the head words in the PC used to allocate the following areas.

- PT status control area: Section NO TAG "NT30/30C Status Control" (page NO TAG)

- PT status notify area: Section NO TAG "Notification of the Operating Status to the PC" (page NO TAG)

- Numeral memory table: "Numeral Memory Table" (page 152)

- Character-string memory table: "Character-string Memory Table" (page 149)

- Expanded I/O: Section NO TAG "Operation of Expanded I/O Unit" (page NO TAG)
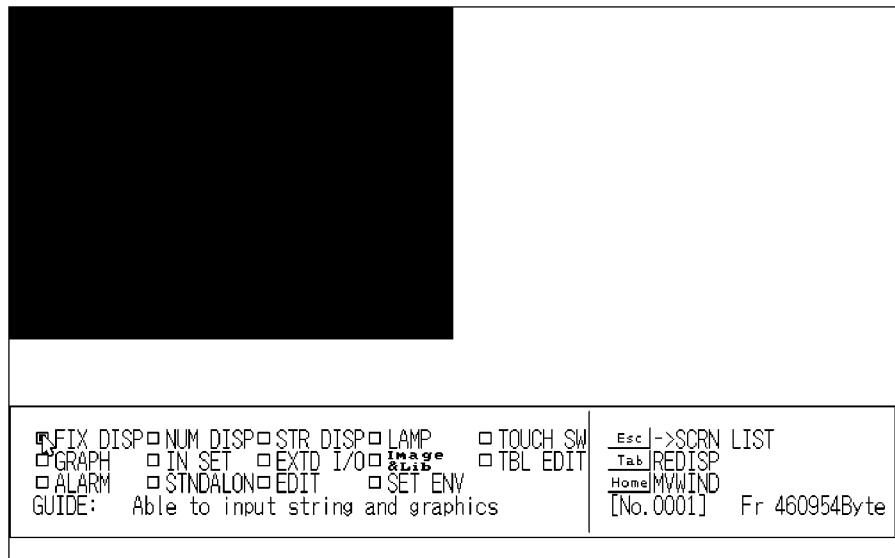
- Bit memory table: "Bit Memory Table" (page 154)

Pressing [F4] (Attrib) on the "Screen List" screen enables the screen attributes to be set in the Help Message area. The following screen attributes can be set:

- Buzzer: None, Cont (continuous sound), Long (long intermittent sound), Short (short intermittent sound)

- History: No, Yes

- Keypad: System, User

- Back Col

Back Col. (background color) can only be set when using an NT30C.

⬇

Select a screen number and press [Enter].


```
FIX DISP  NUM DISP  STR DISP  LAMP        TOUCH SW   Esc  ->SCRN LIST
GRAPH     IN SET    EXTD I/O  Image        TBL EDIT  Tab  REDISP
                              &Lib
ALARM     STNDALON  EDIT      SET ENV                Home MVWIND
GUIDE:    Able to input string and graphics          [No.0001]  Fr 460954Byte
```

Create screen data in the Edit screen of the support tool. Data of one screen can be created by registering (laying out) the following display elements and attributes on the screen.

- Fixed display
  Input characters and graphics.

  ...."Characters and Figures which can be Displayed (page 138)

- Numeral display:
  Set the numeral memory table number and display method.

129

- Character-string display:
  Set the character-string memory table number and display method.

  ...."Character-String Memory Table" (page 149)

- Lamp:
  Set the allocated bit and display method.

  ....Section 4-6 "Lamp" (page 167)

- Touch switch:
  Set the functions allocated bits for control and notification, and display method.

  ....Section NO TAG "Touch Switches" (page NO TAG)

- Graph:
  Set the type of graph, numeral memory table number, and display method.

  ....Section 4-5 "Graphs" (page 156)

- Expanded I/O:
  Set the screen number of the screen to be switched to.

  ....Section NO TAG "Operation of Expanded I/O Unit" (page NO TAG)

- Input setting:
  Set the numeral/character-string memory table number.

  ....Section NO TAG "Numeral Setting" (page NO TAG)

  ...…..........................Section NO TAG "Character-String Setting" (page NO TAG)

- Image & Library:
  Set the code for the image/library data.

  ...."Characters and Figures which can be Displayed" (page 138)

- Alarm:
  Set the type of alarm, bit memory table number, and display method.

  ....Section NO TAG "Alarm List & History Display Functions" (page NO TAG)

⬇   [Exiting the Edit screen]

Return to the "Screen List".

To successively create or modify another screen, select the screen number.

```
[LINE_A ] Scr list NT30C-V4-0  512KB    ──── Screen Selection ────

No. │ Status │  Comment      PgDn│PgUp│    ──── Help Message ────
  1 │        !│Production Qty Disp
  2 │        !│Production Rat. Disp.      Tab │Specified Page
  3 │        !│Production Qty Disp.
  4 │        !│No. 1 Press Monitor       Space│Mark/Unmark
  5 │
  6 │                                     Home│Unmark All
  7 │                      ⌖
  8 │                                    Shift│Mark/Unmark All
  9 │                                    +Home
 10 │                                      Esc│Select File
 11 │
 12 │                                  Hist. [                    ]
 13 │
 14 │
 15 │
 16 │                                              0Byte        131

  1 Copy 2Delete3Print 4Attrib  5 Read 6Commnt7Image 8Co/Ovl 9 Mark 0 Next
                                        &Lib
```

[To the File Selection]

Enter filename to newly created screen data.

Return to the "File List".

```
┌─────────────────────────────────┬──────────────────────────────┐
│  File List    NT30C-V4-0  512KB  │  ────  File Selection  ────   │
│ ┌──────────┬──────────────────┐  ├──────────────────────────────┤
│ │FileName│ Title    2/ 12 PgDn│PgUp││  ────  Help Message  ────   │
│ │NEW_FILE│Creation of New File│  │                              │
│ │LINE_A  │Process dontrol Line A│ │   Esc│Exit to Main Menu       │
│ │INPT_SCR│For Line Input      │  │                              │
│ │PROC_B  │Process control backup│ │                              │
│ │PROC_C  │Production Qty Check │  │                              │
│ │SAMPLE  │                    │  │                              │
│ │A       │A                   │  │                              │
│ │INPT_SCR│For Line Input      │  │   1995/06/20      16:31:46    │
│ │PROC_B  │Process control backup│ │                              │
│ │PROC_C  │Production Qty Check │  │   NT30C           Ver 4.0     │
│ │PROC_CTL│For process A       │  │   Direct          OMRON       │
│ │        │]                   │  │   Num.Mem.Tabls   1000        │
│ │        │                    │  │   Str.Mem.Tabls   1000        │
│ │        │                    │  │   DAC func.                   │
│ │        │                    │  │              61.93KB          │
│ └──────────┴──────────────────┘  │                              │
│  1 Copy 2Delete3Print 4ToolS  5Hist. 6 Tmx. 7 Rcv. 8In.Scr 9Title 0 Next │
└─────────────────────────────────┴──────────────────────────────┘
```

Pressing the [F8] (In.Scr) key on the "File Selection" screen allows you to set the NT30/300C memory switches (the settings are actually made when the screen data is transmitted).

Transmitting Screen Data to the NT30/30C

Transmit the screen data created by using the support tool to the NT30/30C screen data memory.

Connect the NT30/30C to the support tool and set the NT30/30C to Transmit Mode. Then, press the [F6] (Transmit) key in the "File List" screen to transmit the created screen data to the NT30/30C.

For the connection procedure to the support tool, refer to Section 2-3 "Connecting to the Support Tool" (page 28). For the transmission of the screen data, refer to Section 3-6 "Registering the Screen Data" (page 93).

4-2   Outline of Functions

4-2-1   NT30/30C Screen

This section gives the outline of the screen which is the basis of all NT30/30C functions.

For specific operation procedure such as screen switching, refer to "Switching the Screen Display" (page NO TAG).

Create screen data, which will be displayed on the screen, on the support tool, and register it in the image data memory of the NT30/30C. For registration of screen data, refer to 3-6 "Registering the Screen Data" (page 93).

Screen Composition

The NT30/30C screen is 320 dots wide by 240 dots long. Each dot is set by a combination of an X coordinate (horizontal) and a Y coordinate (vertical).

The coordinate origin (0, 0) is positioned in the upper left corner of the screen.
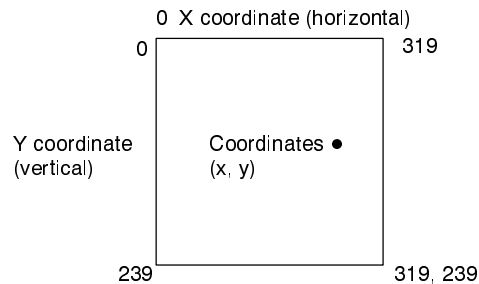
Display Elements

The screen can display the following elements. Each element is called a display element.
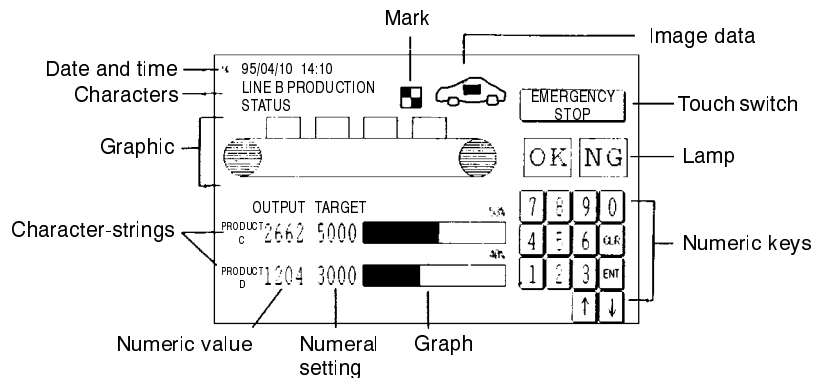
Screen Management

All screens displayed on the NT30/30C are managed by their screen numbers.

A screen number can be assigned at the time of the creation of a screen by the use of the support tool. Up to 2000 screens can be created, and screen numbers from 1 to 2000 can be given to each of them as desired. The screen number is very helpful in switching the screen being displayed to a desired one from the PC, or in specifying the screen to be displayed at the startup of the system (initial display screen).

Special Screen Numbers

Screens No. 0 and No. 1997 through No. 1999 are kept for the following special purposes:

- Screen No. "0"

Screen No. 0 is reserved with the system as the no-display screen. Select this screen when there is no need to display data on the screen.

- Screen No. "1997"

Screen No. 1997 is reserved with the system as the screen for History record in order of occurrence. Select this screen to display screen data in order of occurrence.

- Screen No. "1998"

Screen No. 1998 is reserved with the system as the screen for History record in order of frequency. Select this screen to display screen data in order of frequency.

- Screen No. "1999"

Screen No. 1999 can be defined as the "Connecting to host" screen. Without registering this screen, a screen with the message "Connecting To Host" automatically appears when the power is turned on, or the mode is shifted to operation. Screens No. 1900 through No. 1979 may be used for window screens for the pop-up window function. In other cases, they are usable as normal screens.

Reference Screens No. 1980 through No. 1996 are intended to be used for extension functions. If they are used as user screens, it will not be possible to use extension functions.

4-2-2   Color Display (NT30C only)

The NT30C can display the entire screen and screen elements, such as characters and graphics, in eight different colors. Specify a color as an attribute for each display element when creating a screen on the support tool.

The NT30 is not capable of color display.

Available Colors

The following eight colors can be selected:

black, blue, red, magenta, green, cyan, yellow, white

The four color combinations below are exclusive ORed. The combination of two exclusive ORed colors means that if the color of a display element is the same as that of the background, it will be displayed in a different color.

Yellow, for example, is exclusive ORed with blue.

Red ↔ Cyan Green ↔ Magenta Blue ↔ Yellow White ↔ Black

The following display elements are displayed in the above combinations of colors:

- Input area display frame and background colors of numeral and character-string setting screen (Refer to pages NO TAG and NO TAG.)

- Lamp colors when they are on, and lamp guide display character colors (Refer to page 167.)

- Touch switch colors when they are on, and guide display character colors (Refer to page NO TAG.)

- Display color of eight dots beyond the top of a bar graph, and screen background color (Refer to page 156.)

Transparent Display

When two display elements overlap with each other, the background color of the overlying element conceals the underlaid display element.

Besides the above eight colors, the color of "transparency" is available for the background of some display elements.

When "transparency" is set, nothing appears behind a display element, and the display element or screen background color under it becomes visible.
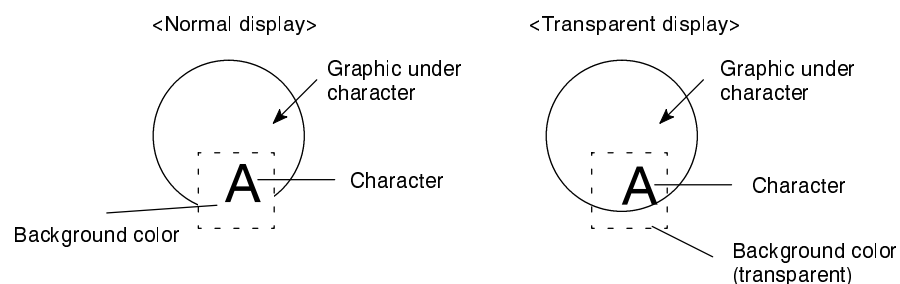
• Display elements which can be displayed in the color of "transparency"

   Normal display characters

   Lamp (or touch switch) guide display characters

   Lamps (or touch switches) when they are off

   Filled graphic patterns

• Display elements which cannot be displayed in the color of "transparency"

   Display character-strings in character-string memory table

   Display numeric values in numeral table

   Numeric values and character-strings on numeral and character-string setting screen

   Characters indicating percentage (%) on graphs

Color Display of the Screen   The background color of the entire screen can be specified. Set the background color as a screen attribute when creating screen data on the support tool.

Color Display of Characters   The color of characters (character color) and that of the square frame (background color) can be specified.

Background color

Character color
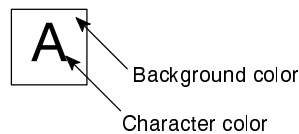
Color Display of Graphics   The outline of a graphic can be drawn in a specified color, and the graphic can be filled in a pattern in specified colors.

As filling pattern colors, the display color of the pattern itself, the pattern background color and the filled area boundary line color can be set.

Filling

Outline color

Pattern display color

Pattern background color

Line color
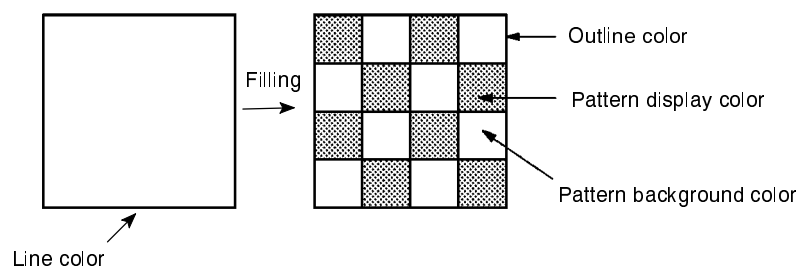
When a lamp, a touch switch and a graphic are to be displayed in specific colors, part of the frames of the display elements may be invisible because of the combination of the background, outline and filling colors. This is a phenomenon peculiar to a color LCD, not a failure with the system.

In such a case, change the color combination.

137

4-2-3   Characters and Figures Which can be Displayed

The NT30/30C screen can display characters, figures, and other various elements.

This section describes the types and attributes of the characters and figures which can be displayed and do not need to be changed at all.

For the settings, display, and use of the characters, numeric values, and graphs which change according to the system operation status and other conditions, refer to Section 4-4 "Memory Tables" (page 149).

The power of expression of the screen can be increased by giving various attributes such as the enlarged or reverse display to the characters and figures.

The character and figure attributes can be set in the edit screen when creating the screen data by using the support tool.

Types and Attributes of Characters and Figures

The following types of characters can be input and displayed.

Character Type	Dots (vertical x horizontal)	Character Set	Maximum Number of Characters Displayed in One Screen (without overwriting)
Half size character	8 x 8	Alphanumerics and symbols	80 characters x 50 lines (4000 characters)
Normal size characters	8 x 16	Alphanumerics and symbols	80 characters x 25 lines (2000 characters)

The NT30/30C is provided with "marks", "image data" and "library data" in addition to regular characters.

• Marks

A mark is a graphic pattern combining 16 x 16, 32 x 32 and 64 x 64 dots. 32- dot and 64-dot marks, however, are combinations of 4 (2 x 2) and 16 (4 x 4) 16-dot marks, respectively.

Up to 224 16-dot marks can be registered in one screen data file as characters with 2-byte codes FF20H to FFFFH.

16-dot mark   32-dot mark   64-dot mark
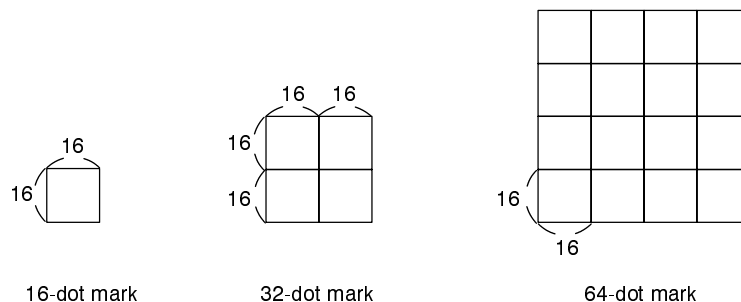
- Image data

  Image data is a set of images of which sizes can be designated in units of 8 dots in a square area ranging from 8 x 8 dots to 320 x 240 dots (entire screen).

  Create images to be registered as image data by cutting part of another display screen or drawing them on the screen when creating screen data. All data displayed on the entire screen can also be registered as image data.
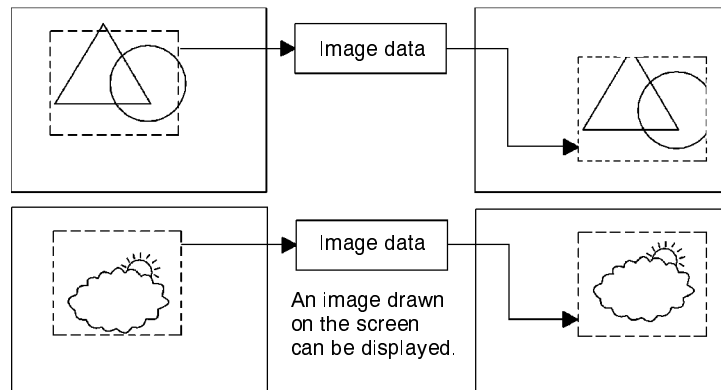
  Image data of up to 224 images can be registered in a screen data file as 2-byte codes of FE20H to FEFF.

  Basically, image data can be displayed in any position on the screen, however, the entire image may not be displayed in some specific positions.

- Library data

  Library data is image data consisting of plural characters and graphics of which sizes can be designated in units of 1 dot in a square area ranging from 1 x 1 dots to 320 x 240 dots (entire screen).

  The creation of library data starts by laying out characters and graphics with attributes on the screen in the same manner as regular screen data.

  Next, specify the area to be registered. Only characters and graphics can be extracted from other screen data and registered as library data. Library data cannot be registered as displayed elements.
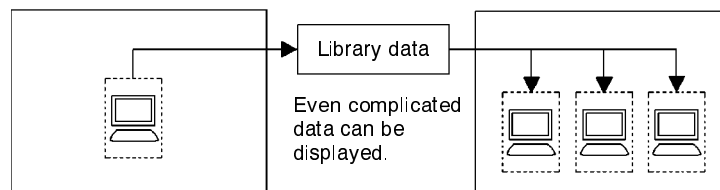
  Once they are registered as library data, complicated images composed of characters and graphics can be displayed many times easily, and need not be created again. The image data memory can be saved at the same time.

Library data of up to 896 images can be registered in a screen data file as 2-byte codes FA20 to FAFF, FB20 to FBFF, FC20 to FCFF and FD20 to FDFF.

Basically, library data can be displayed in any position on the screen. But, in a position where the entire library data cannot be displayed, it automatically moves to another position. Use care in setting a display position.

Reference Difference between image data and library data

While image data can take any form as shown in the screen example, only images consisting of characters and graphics can be library data.

Because only drawn characters and graphic information are registered as library data, library data requires less memory capacity than image data of which the dots to be displayed on the screen are all registered.

- Enlargement of characters and marks

  Characters and marks can be enlarged to the following scales. Image data and library data are exceptions.

  PT PT PT PT PT PT PT

  Equ
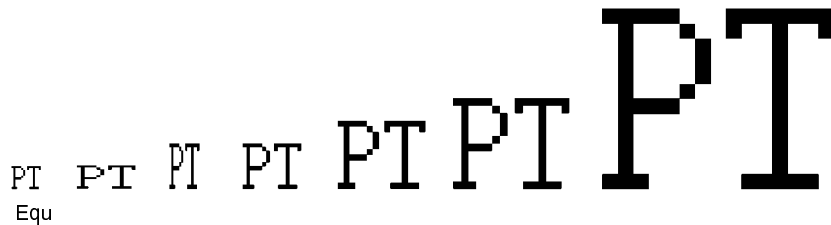
- Smoothing

  Characters (or marks) enlarged to x4 scales or larger are displayed with the outline automatically smoothed. This function is called "smoothing". Image data and library data cannot be smoothed.

  Enlarged Characters   Enlarged Characters

  With smoothing   Without smoothing

- Color display (NT30C only)

  Number of color: 8
  Number of background color: 8 or "transparent"

- Reverse and flashing display

Normal display:	Character and background are reversed.
Reverse display:	The display brightness of the character and the background is reversed comparing with the normal display.
Flashing display:	Characters are displayed as they flash. The normal display alternates with no-display.
Reverse and flashing display:	The reverse display alternates with the normal display.

140

Image data cannot be inverted, flashed or inverted and flashed alternately.

Library data will be inverted, flashed or inverted and flashed alternately according to the setting at registration.

Graphic Types and Their Attributes

On the NT30/30C, the following types of graphic can be entered and displayed:

Polylines	Square	Polygon

* A continuous straight line with up to 255 middle points can be drawn.

* A polygon with up to 255 vertexes can be drawn.

Circle	Arc	Fan
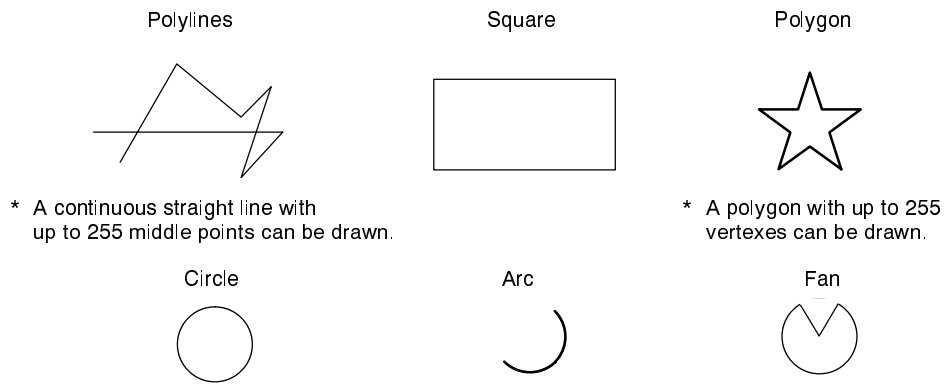
• Designation of line types

Straight lines are available in the following four types:

Solid line

Broken line

1-dot chain line

2-dot chain line
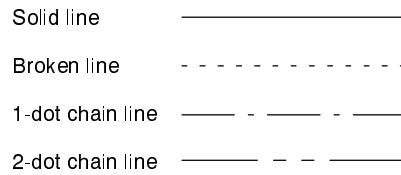
Other graphics can be drawn only with a polyline.

• Filling

The areas of graphics within the outline (closed areas) can be filled in a tiling pattern.

There are ten tiling patters, as shown below:

Name	Pattern	Name	Pattern
Flat		Slant right	
Box		Crosshatch	
Slant left		Grid	
Stripe		Border	
Diamond		Halftone	

• Color display (NT30C only)

Number of graphic frame colors: 8

Number of display colors (in filling): 8

  The tiling pattern colors are display colors.

Number of background colors (in filling): 8 or "transparent"

  The color visible between the blocks of the tiling pattern is the background color. When "transparent" is selected, the display element under the graphic appears to be transparent.

Number of outline colors (in filling): 8

  The color of the boundary line surrounding the area to be filled is the outline color.

Background color

Tiling pattern display color

Tiling pattern background color

When "transparent" is selected, the screen background color appears to be transparent.
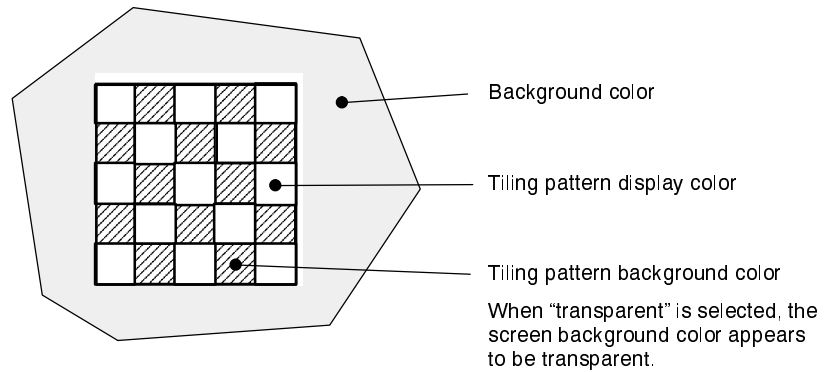
Part of the graphic frame may be invisible because of the combination of the display (in filling), background and outline colors. This phenomenon is peculiar to a color LCD, not a failure with the system.

In such a case, change the color combination.

• Reverse and flashing display

Normal display:	Only the outline of a graphic is displayed in a designated color.
Reverse display:	A graphic, whose inner contrast of the border line is reversed, is displayed.
Flashing display:	Normal display alternates with no-display.
Reverse and flashing display:	Normal display alternates with reverse display.

Continuous straight lines and arcs cannot be inverted, flashed or inverted and flashed alternately.

Filling can be designated only with normal display.

Note Do not fill graphics to which a flashing display or inverse flashing display attribute has been set.

If a graphic with a flashing display or inverse flashing display attribute is to be filled, the area outside the graphic may be filled in the same pattern when the system operates.

4-2-4   Communication with the PC

Communication Using Host Link/NT Link

The NT30/30C can communicate with a PC by using the host link/NT link functions. Using these functions, bits and words can be allocated to any area in the PC memory and data can be written to and read from these bits and words directly. This makes the following functions possible:

Control and notification of screen elements

Control and notification of NT30/30C statuses

Screen switching

Obtaining the screen number of the currently displayed screen

Memory table operations

For details on the actual operations required for these functions, refer to Section 5 "Using Host Link/NT Link".

NT30/30C Functions that can be Controlled

The following NT30/30C functions can be controlled.

Screen display	Screens can be displayed and deleted.
Buzzer	Three types of buzzer can be sounded, and stopped.
Display history initialization	The display history can be initialized.
Screen printing	The displayed screen can be printed.
Window control	The opening of pop-up windows can be disabled.
Numeral/character-string input control	
	The input of numerals and character-strings can be disabled.

For details on the actual methods used for these types of control with the NT30/30C, see Section NO TAG "NT30/30C Status Control" (page NO TAG).

Ascertainable NT30/30C Operation Statuses

The following NT30/30C statuses can be ascertained.

Operating status	Whether the NT30/30C is operating or not
Battery voltage	The battery voltage
Screen number	The screen number of the currently displayed screen
Numeral setting input	Whether a numerical value has been input with a numeral setting
Character-string setting input	Whether a character-string has been input with a character-string setting
Printer operating status	Whether the printer is printing or stopped

For the actual methods used to determine these operation statuses of the NT30/30C, see Section NO TAG "Notification of the Operating Status to the PC (Determining the NT30/30C Operating Status)" (page NO TAG).

143

4-3 Screen Display

This section describes the screen information required for the operation with the NT30/30C.

For the actual method used to change the displayed screen, see "Switching the Screen Display" (page NO TAG).

For the actual method used determine the screen number of a displayed screen, see "Notifying the Display Screen to the PC (To know the Number of Currently Displayed Screen)" (page NO TAG).

4-3-1 Classification of Screens

The NT30/30C is provided with the following types of screens which are classified by the display method.

- Normal screen

- Overlapping screen

- Consecutive screen

The screen type is set with each screen in the "Screen List" screen of the support tool. Select a screen type according to the purpose, and create characters and figures on the screen. The details of each screen type are given below.

Normal Screen
A normal screen is the basic screen of the NT30/30C. It is not necessary to select a screen type (overlapping or consecutive) when to create the screen data on a normal screen.

When a normal screen is selected, existing screens will be erased and a normal screen will be displayed.

Overlapping Screen
Several normal screens can be overlapped and displayed as one screen. A group of overlapped screens is called an "overlapping screen".

Several normal screens are displayed in the order of screen numbers which have been designated to each screen and form an overlapping screen. Up to eight screens can be overlapped to form one overlapping screen. The base screen used for making an overlapping screen is called a "parent screen", and a bunch of screens which are laid over the parent screen are called "child screens".

All display elements can be used on a parent screen.

The screen attributes such as a buzzer attribute set in the parent screen become effective in an overlapping screen.

[Example overlapping screen]
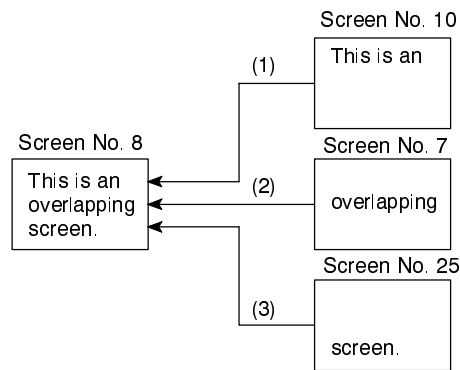
- Parent screen: No. 8

- Child screens: No. 10, No. 7, and No. 25

When screen No. 8 is designated, screen No. 8 becomes the parent screen and the child screens No. 10, No. 7, and No. 25 are displayed over the parent screen in that order.

Only one numeral setting screen or character-string setting screen (screens which allow numeral and character-string input on the NT30/30C screen) can be registered as a child screen. For details on numeral settings, see Section NO TAG "Numeral Setting" (page NO TAG), and for details on character-string settings, see Section NO TAG "Character-String Setting" (page NO TAG).

Make sure that the touch switches and numbers set in the normal screens do not overlap in an overlapping screen. If the set positions of the touch switches and/or numbers in the normal screens overlap with each other, such settings may sometimes not be effective as intended. Use the support tool and make sure that the set positions do not overlap with each other.

Consecutive Screens

A group of normal screens which are related in series and can be switched consecutively is called the "consecutive screens". Up to eight screens can be registered to one screen as a group of consecutive screens.

The base screen used for registering the consecutive screens is called a "parent screen", and the registered consecutive screens are called "child screens".

The current screen number and the total number of consecutive screens can be displayed in the top right corner of the screen. This is called the "page number display".

The page number is set when creating the screen data by using the support tool. Refer to the "NT-series Support Tool Operation Manual" (V028-E1-☐).

All display elements except "numeral setting" and "character-string setting" can be used in the consecutive screens.

The screen attributes set in the parent screen become effective in the consecutive screens.

[Example consecutive screens]
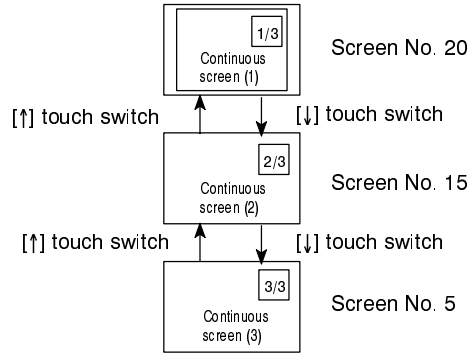
- Parent screen: No. 10

- Child screens: No. 20, No. 15, and No. 5

When screen No. 10 (continuous screen) is designated, screen No. 20 which is page 1 of the continuous screens will be displayed. Screen No. 15 or No. 5 can be displayed by using the touch switches. Since screen No. 10 has been set for the continuous screens, that screen cannot be displayed as an individual screen.

Switching the Continuous Screens by Using the Touch Switches

Consecutive screens can be switched by using touch switches to which control keys [↑] and [↓] have been allocated.

If the numeral setting attribute "Keybpad attribute" of the parent screen is "system", the [↑] and [↓] control keys will be automatically created as shown in the figures below.
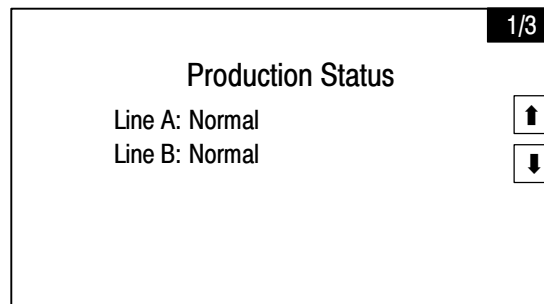
If the numeral setting attribute of the parent screen is "user", create touch switches to which the control keys [↑] and [↓] are allocated during screen creation (see "Functions of Control Keys", page NO TAG).
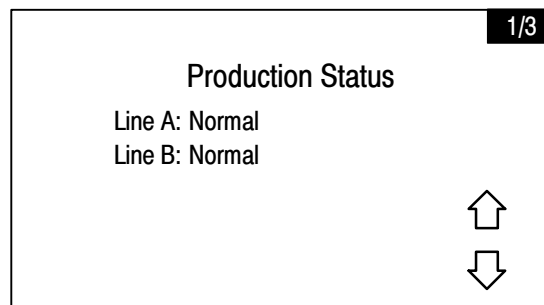
4-3-2   Screen Attributes

Each screen can be set with a specific function by designating a screen attribute, so that the specific function can be executed by displaying the screen. For example, by displaying a screen to which a "buzzer attribute" has been set, the buzzer of the NT30/30C starts sounding.

Set the screen attributes for each screen on the "Screen List" screen of the support tool.

Note that the support tool displays the "Bit input" and "Alarm" attributes but these attributes cannot be used with the NT30/30C.

The following several attributes can be set with one screen.

- Buzzer attribute

This attribute will become effective to sound the buzzer in the NT30/30C when the screen to which this attribute has been set is displayed. The buzzer sound can be set as follows:

No: Buzzer does not sound when the screen is displayed.

Continuous sound: Buzzer sounds continuously.

Short: Buzzer sounds intermittently at 0.5 second intervals.

Long: Buzzer sounds intermittently at 1.0 second intervals.

The buzzer sound is set with the NT30/30C memory switch. The buzzer can also be set by using the PC. Refer to "Using the buzzer" (page 100) for the buzzer setting using the memory switch.

To stop the buzzer by using the screen operation, create a ▣ control key as a touch switch.

- Display history recording attribute

When a screen with this attribute appears, the screen number, date and time (hour, minute, second), frequency and messages will be recorded as screen data.

Screen data can be read in the maintenance mode or on the support tool.

Screens No. 1997 and No. 1998 can be used to read the data (see page NO TAG).

- Numeral setting attribute

Select whether the numeric keys are automatically displayed or the numeric keys are created at arbitrary positions on the numeral setting screen. The following two numeral setting attributes are used.

System: The numeric keys and control keys registered to the system are automatically displayed.

User: The numeric keys and control keys can be created at any arbitrary positions.

- Back Col (NT30C only)

  Screens for which this attribute has been set are automatically displayed with the set background color extending over the entire screen.

- Backlight attributes

  Select whether the backlight is lit or flashes when the screen is displayed. When using an NT30, these attributes can be used in conjunction with the backlight color attribute. There are two types of backlight attribute in the screen attributes

  Lit: Backlight is lit when the screen is displayed.

  Flashing: Backlight flashes when the screen is displayed.

- Backlight color attribute (NT30 only)

  Set whether the screen is displayed using the white backlight or the red backlight. This attribute can be used in conjunction with the "backlight" attributes.

4-4   Memory Tables

The NT30/30C has three types of memory area which can be written to and up-dated freely by the PC. These are "character-string memory tables" for character data, "numeral memory tables" for numerical data, and "bit memory tables" for bit data.

The contents of the memory tables can be set by using the support tool when displaying the memory tables on the screen or by editing the table.

4-4-1   Character-String Memory Table

The character-string memory table is an NT30/30C internal memory used to store the character data. Up to 1000 character-string memory tables can be used, and up to 40 characters (40 bytes) can be stored in one memory table. The character-string memory tables at up to 50 positions can be registered in one screen.

Number of Character-string Memory Tables

Set the number of character-string memory tables in the support tool's "system memory".

 256   : Sets the number of character-string memory tables to 256

 1000 : Sets the number of character-string memory tables to 1000.

The difference between setting 1000 character-string memory tables and 256 character-string memory tables in terms of the memory capacity required for screens is 29760 bytes.

Displaying a Character-string

The character-string memory tables are registered with table numbers 0 to 999.

When creating the screen data by using the support tool, set the position on the screen to display a character-string and also set a character-string number to be displayed.

When the NT30/30C is operated, the screen displays the contents of the character-string memory table.

For the actual method used to modify a currently displayed character-string, see "Changing Displayed Numerals or Character-Strings (Changing the Contents of Allocated Words)" (page NO TAG, NO TAG).

Character-string memory tables are divided into two types depending on their numbers. Numbers 0 to 255 can be written to and read from without restriction, while numbers 256 to 999 are read-only character-string memory tables.
The difference in the way memory tables are used depending on which of these number groups they fall into is explained below.
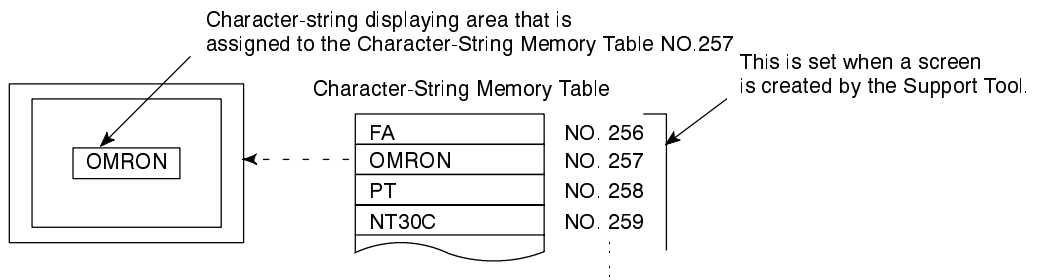
• Memory Table from 0 to 255

During PT operation, the character-string data in the Character-String Memory Table written from the PC is displayed in the screen. An initial value can also be set when screen data is created.

Character-string displaying area that is
assigned to the Character-String Memory Table NO.2

Character-String Memory Table

Capable of being overwritten
by the Host

FA	NO. 1
OMRON	NO. 2
PT	NO. 3
NT30C	NO. 4

OMRON

PC
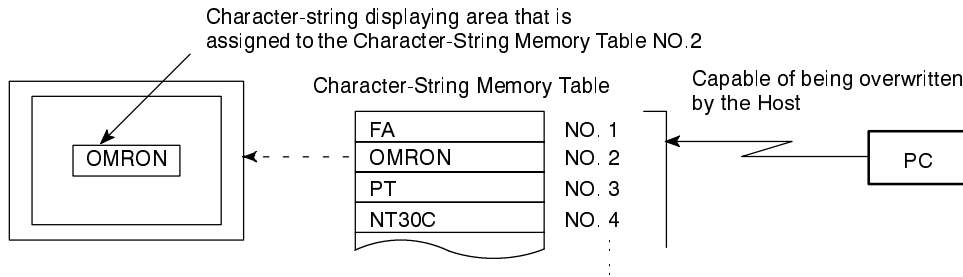
• Memory Table from 256 to 999 (read-only)

Data cannot be written by the PC. Character-string data is set when screen data is created. This Memory Table can be set not to be used by the "System Memory" setting of the Support Tool.

Character-string displaying area that is
assigned to the Character-String Memory Table NO.257

This is set when a screen
is created by the Support Tool.

Character-String Memory Table

FA	NO. 256
OMRON	NO. 257
PT	NO. 258
NT30C	NO. 259

OMRON

Characters and Figures which can be Displayed

The power of expression of the screen can be increased by giving various attributes such as the enlarged or reverse display to the characters of the character-string memory table.

The character attributes can be set in the edit screen when creating the screen data by using the support tool.

The following types of characters can be displayed on the NT30/30C:

Character Type	Dots (vertical x horizontal)	Character Set	Maximum Number of Characters Displayed in One Screen (without overwriting)
Half size character	8 x 8	Alphanumerics and symbols	40 characters x 30 lines (1200 characters)
Normal size characters	8 x 16	Alphanumerics and symbols	40 characters x 15 lines (600 characters)
Marks	16 x 16, 32 x 32, 64 x 64	Create by using the support tool	
Image data	Not fixed (8-dot units in both horizontal and vertical directions)	Created using the support tool	
Library data	Not fixed	Created using the support tool	

- Enlarged display of the characters and marks

  The characters and marks can be enlarged to the following scales.

  Double width scale, Double height scale, x4 scale, x9 scale, x16 scale, x64 scale

- Smoothing

  The characters and marks enlarged to the x4 scale or larger are displayed with the outline automatically smoothed. This function is called "smoothing".

- Reverse and flashing display

  Reverse display: The display brightness of the character and the background is reversed comparing with the normal display.

  Flashing display: Characters are displayed as they flash. The normal display alternates with no-display.

  Reverse and flashing display: The reverse display alternates with the normal display.

- Character color (NT30C only)

  When using an NT30C, colors can be assigned to characters as follows:

  Character display color: 8 colors

  Character background color: 8 colors

4-4-2 Numeral Memory Table

The numeral memory table is an NT30/30C internal memory used to store the numeral data. Up to 1000 numeral memory tables can be used, and up to eight digits (four bytes) of numeral data (including signs) can be stored in one numeral memory table. The numeral memory tables at up to 50 positions can be registered in one screen.

Number of Numeral Memory Tables

Set the number of numeral memory tables in the support tool's "system memory".

512: Sets the number of numeral memory tables to 512

1000: Sets the number of numeral memory tables to 1000.

The difference between setting 1000 numeral memory tables and 512 numeral memory tables in terms of the memory capacity required for screens is 4880 bytes.

Displaying a Numeral

The numeral memory tables are registered with table numbers 0 to 999.

When creating the screen data by using the support tool, set the position on the screen to display a numeral and also set a numeral number to be displayed.

When the NT30/30C is operated, the screen displays the contents of the numeral memory table. For the actual method used to modify a currently displayed numerical value, see "Changing Displayed Numerals or Character-Strings (Changing the Contents of Allocated Words)" (page NO TAG, NO TAG).

Numeral memory table numbers 247 through 255 are used for the clock function. They cannot be used for other applications. For details on the clock function, see Section NO TAG "Clock Function" (page NO TAG).

Numerals which can be Displayed

The power of expression of the screen can be increased by giving various attributes such as the enlarged or reverse display to the numerals of the numeral memory table.

The numeral attributes can be set in the edit screen when creating the screen data by using the support tool.

The following types of numerals can be displayed on the NT30/30C:

- Digits of the whole numbers: 1 to 8 digits

- Digits of the decimal fraction: 0 to 7 digits

- Character sizes: Half, normal

- Enlarged display: Double width, double height, x4, x9, x16, x64

                                                        The characters enlarged to the x4 scale or larger are displayed with the outline automatically smoothed. This function is called "smoothing".

- Display attributes: Normal, reverse, flashing, reverse flashing

- Character displaying color: 8 colors

- Character background color: 8 colors

- Sign display setting

- Decimal/hexadecimal display setting

- Zero suppress setting

"Character displaying color" and "Character background color" can only be set when using an NT30C.

To display one numeral memory table on several different screens simultaneously, the display attributes on such screens must be the same. If there is discrepancies among the display attributes, the numeral table may not be displayed correctly.

Reference   Zero suppress setting

The numeral data are displayed in designated display areas as right-aligned. If the number of digits of a numeral data is smaller than that of the display area, number "0"s will be displayed at the vacant digits. These "0"s will not be displayed if the zero suppress setting is made for "Yes".

4-4-3   Bit Memory Table

The Bit Memory Table is an internal memory for contact data.

The NT30/30C can use a maximum of 256 Bit Memory Tables. One contact status on the PC can be stored in a single Bit Memory Table.

Functions of Bit Memory Table

There are two functions of Bit Memory Table:

• Screen changeover function

When any contact on the PC to which the Bit Memory Table is assigned is changed from "0" (OFF) to "1" (ON), the screen is changed over to show a screen being set to that contact.
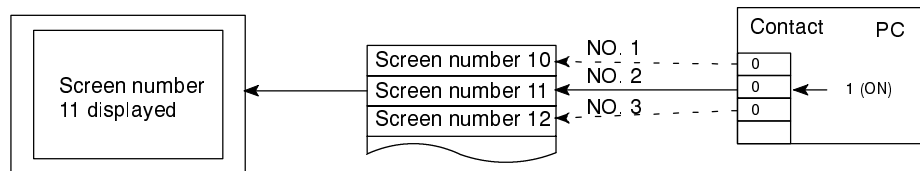
• Alarm list function

When any contact on the PC assigned to the Bit Memory Table is "1" (ON), the Character-String Memory Table (message) and Image Library being set are displayed. Since smaller Bit Memory Table number is displayed preferentially when multiple Bit Memory Tables have been set to the alarm list function, the order of priority can be given to the message to be displayed. For details, refer to the NO TAG "Alarm List & History Display Functions" (page NO TAG).
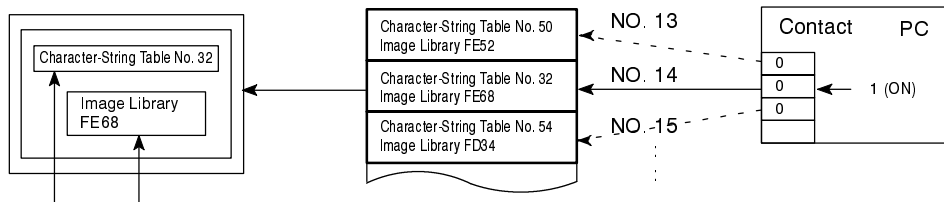
Message (character-string No. 32) and Image Library
(FE68) set to the Bit Memory Table number 14

Bit Memory Table Setting

When the Bit Memory Table is used, it is necessary to perform the following setting at each Table before creating the screen data with the Support Tool. For the setting used for alarm list and history display function, refer to the NO TAG "Alarm List & History Display Functions" (page NO TAG).

- Recording in the alarm history

  This setting is to determine whether a change of PC contact to which the Bit Memory Table is assigned is recorded in the Alarm History.

- Screen changeover function

  This setting is to determine whether the Bit Memory Table is used for the screen changeover function.

- Character-string memory table number

  The Character-String Memory Table number displayed as a message is set. This setting is not necessary when used for the screen changeover function.

- Display color (NT30C only)

  Color of the characters used for message is to be set. This setting is not necessary when used for the screen changeover function.

- Image library

  This is a setting of a code for Image Library data displayed together with a message. This setting is not necessary when used for the screen changeover function.

- Screen changeover

  This is a setting of a screen number displayed for the screen changeover function or alarm list & history display function.

- Contact

  This is a setting of a contact on the PC to which the Bit Memory Table is assigned.

Symbol	C Series PC	CVM1/CV Series PC	Allocated
DM	Data Memory	Data Memory	○
CH	Internal/Special Relay	Internal/Special Relay	○
TIM	Timer	Timer	×
CNT	Counter	Counter	×
HR	Holding Relay	–	○
AR	Auxiliary Relay	Auxiliary Relay	○
LR	Link Relay	–	○

○: Possible
×: Impossible

The Special Auxiliary Relay Area of CV series PC is used exclusively for special application in the system, and cannot be used for other application.

When the Data Memory (DM) is specified, a bit number (00 to 15) is also specified in conjunction with a channel number.

4-5   Graphs

The contents of the numeral memory tables of the NT30/30C can be displayed as graphs as well as numeral data.

Three types of graph can be displayed: bar graphs, trend graphs, and broken line graphs.

The display data of graphs is changed by changing the contents of numeral memory tables.

For the actual method used to update the data of a currently displayed graph, see "Upgrading Graphs (Changing the Contents of Allocated Words)" (page NO TAG). Graph settings are made when creating screen data using the support tool.

4-5-1   Bar Graph Functions

The bar graph function displays a value in a bar graph form as a percentage to the specified value according to the contents of a numeral memory table. Up to 50 bar graphs can be registered in one screen.

- Reference table

 The numeral memory table used as the reference for the bar graph display can be set.

The support tool has the "direct" and "indirect" options for the reference method of the numeral memory table. However, the NT30/30C recognizes the "direct" method only.

The bar graph display cannot use hexadecimal numbers. If hexadecimal numbers are set in the reference numeral table, the bar graph cannot be displayed. Use caution not to write hexadecimal numbers except the minus sign "F" to the reference numeral table.

Bar Graph Attributes

The following attributes can be set with the NT30/30C for the bar graph display:

- Graph frame

 This attribute specifies a rectangular area used to display a graph.

- Incremental direction

 The incremental direction of the bar graph can be selected from those mentioned below.

 ↑ (up):   The bar graph increments upward.

 ↓ (down): The bar graph increments downward.

 ← (left):   The bar graph increments to the left.

 → (right): The bar graph increments to the right.

Direction: →

Direction: ↑
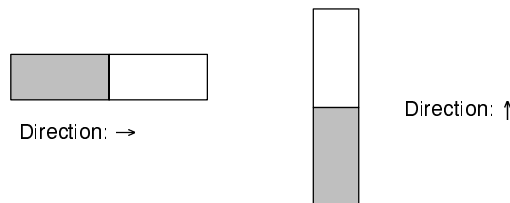
- Graph frame

Select whether or not the graph frame (boundary line of a graph display area) which indicates the effective display range is displayed.

← This frame is not displayed if
"Graph frame: No" has been set.
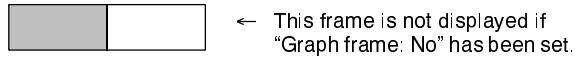
- % Data value

Data value corresponding to 0%, 100%, –100% can be specified. % Data value can be specified by two methods: by directly specifying a numeric value and/or by referring to the Numeral Memory Table.

- Directly specifying method

Numeric value from 0 to 99999999 (max. 8-digit) is specified. It is necessary to set that 0% value is more than –100% one, and 100% value be more than 0% one without fail.

- Memory table referring method

Numeral Memory Table number to be referred is specified instead of a numeric value. With this method specified, each data value can be changed from the Host during operation.

- % Display

% Value can be displayed.

% Value can be calculated according to the following equation:

$$\% \text{ Value} = \frac{\text{Referred Numeral Memory Table value} - 0\% \text{ Value}}{100\% \text{ Value} - 0\% \text{ Value (or } 0\% \text{ Value} - (-100\% \text{ Value}))} \times 100$$

For the font and attributes used for the numeral display, refer to "Numerals which can be displayed" (page 153).

- Sign display and display method

Select whether or not the bar graph which indicates a value below 0% is displayed.

[To display a value below 0%: Sign display "Yes"]

The bar graph is displayed in the range of –100% to 100%. The middle of the bar graph indicates 0%.

% display
–60%

–100%   0%   100%
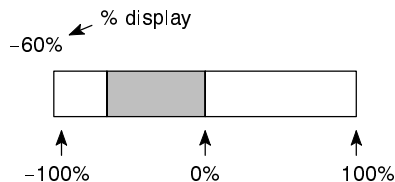
[Not to display a value below 0%: Sign display "No"]

The bar graph is displayed in the range of 0% to 100%. The end of the bar graph indicates 0%. Values below 0% are indicated as 0%.
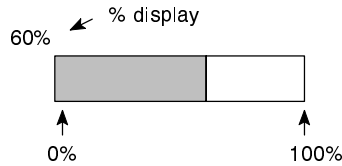
- Differences in the bar graph display method according to the % values

The bar graph display method varies according to the % value range.

(1) When the % value is in the minus range

The display varies as follows according to the sign display setting:

Sign display "No":   Displayed as 0%.
Sign display "Yes":   Displayed in the minus range.

(2) When the absolute value of the % value is in the range of 100% to 999%

The % value is displayed as it is.

Sign display "No":   The display will be as mentioned below according to the graph frame setting.

When the frame is displayed:
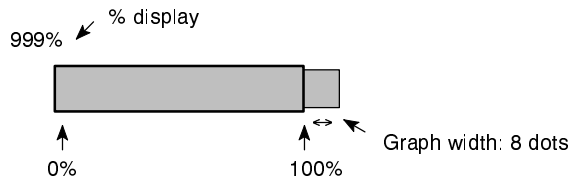
When the frame is not displayed:
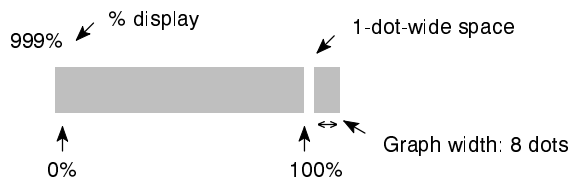
Sign display "Yes":   A value below −100% will be displayed in the minus direction as shown above.

(3) When the absolute value of the % value is above 1000%

The bar graph will be displayed the same as (2) above.

The % value is displayed as follows according to the sign display setting:

Sign display "No":   ✳✳✳%
Sign display "Yes":   ✳✳✳✳%

- Color display (NT30C only)

Color of a graph to be displayed can be specified. For background of a graph, screen background color is displayed.

Graph frame (in case of a graph frame): 8 colors
+ direction display area: 8 colors
− direction display area: 8 colors

158

4-5-2   Trend Graph Setting

A trend graph displays the displacement with the lapse of time as a locus while monitoring (sampling) the Numeral Memory Table value periodically. As time goes by, the displacement varies as shown below.

<Example of normal type that increases rightward with a sign displayed>
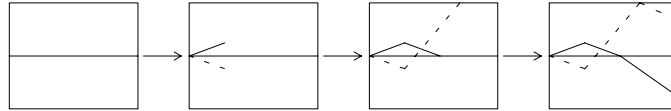
For a trend graph, a single graph frame can be shown in a screen and a maximum of 50 graphs can be registered in the graph frame.

- Reference table

  This is the same as for bar graphs. See page 156.

  Although it is possible to select either "direct" or "indirect" as the reference method with the support tool, only the "direct" setting is meaningful when using an NT30/30C.

  It is not possible to use hexadecimal values for bar graphs. If hexadecimal values are specified in numeral memory tables referenced to obtain graph values, the graph will not be displayed. The letter "F" may be used to indicate negative values, but make sure that no hexadecimal values are written.

  It is not possible to use hexadecimal values for trend graphs. If hexadecimal values are specified in numeral memory tables referenced to obtain graph values, the graph will not be displayed. The letter "F" may be used to indicate negative values, but make sure that no hexadecimal values are written.

Trend Graph Attributes   When using an NT30/30C, the following attributes can be used when displaying trend graphs.

- Graph frame

  This attribute specifies a rectangular area used to display a graph. Range of this area is a maximum of 320 dots in length by 240 dots in width.

  The following setting can be performed for a graph frame.

  - Frame display

    With the "Frame Display" specified, 1-dot width frame line is displayed outside of the frame area. With the NT30C, color of a frame line can be selected out of eight colors.

  - Background color in a frame (NT30C only): 8 colors
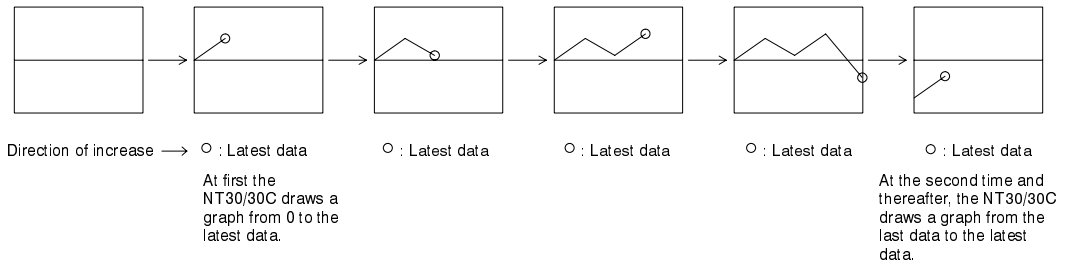
    Separate background color can be specified for positive and negative value display area.

• Displaying method

A graph displaying method can be selected out of two types: normal type and pen recorder type.
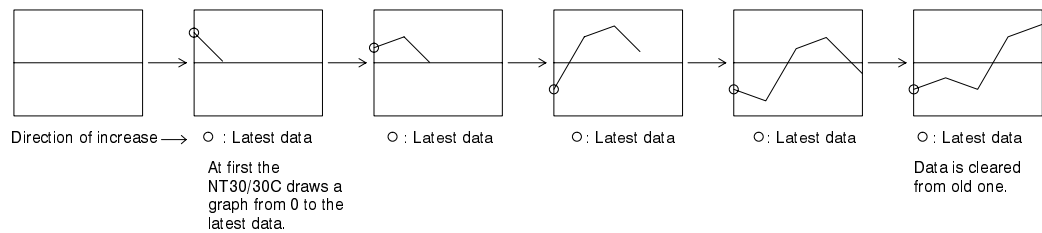
- Normal type

As time goes by, the latest data display position moves toward the direction of increase. When the displacement increases to the right, a graph varies as shown below. When a polygonal line reaches the end of a screen, it is cleared once and the NT30/30C starts drawing a polygonal line again from the first.

Direction of increase ⟶   ○ : Latest data   ○ : Latest data   ○ : Latest data   ○ : Latest data   ○ : Latest data

At first the NT30/30C draws a graph from 0 to the latest data.

At the second time and thereafter, the NT30/30C draws a graph from the last data to the latest data.

- Pen recorder type

The latest data is always displayed at the end of the screen. As time goes by, the graph already displayed moves in the direction of increase. When a graph increases to the right, it varies as shown in the figure below.

Direction of increase ⟶   ○ : Latest data   ○ : Latest data   ○ : Latest data   ○ : Latest data   ○ : Latest data

At first the NT30/30C draws a graph from 0 to the latest data.

Data is cleared from old one.

• Direction of movement

The normal type can select the direction that the display position of the latest data moves with the lapse of time. The pen recorder type can select the direction that entire graph moves.

Rightward   Upward   Leftward   Downward

100%   100%

100%   100%
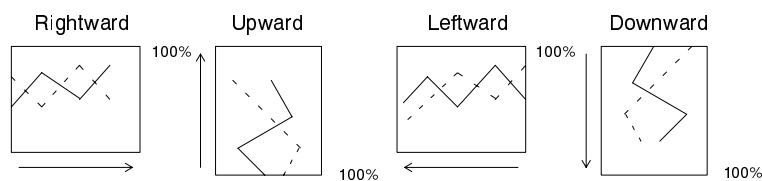
100% position is determined in accordance with the direction of scroll. 100% position falls to the right when a graph scrolls longitudinally and at the upper side when a graph scrolls laterally.

• Sign representation

This attribute can specify whether or not a numeric value less than 0% value is displayed.
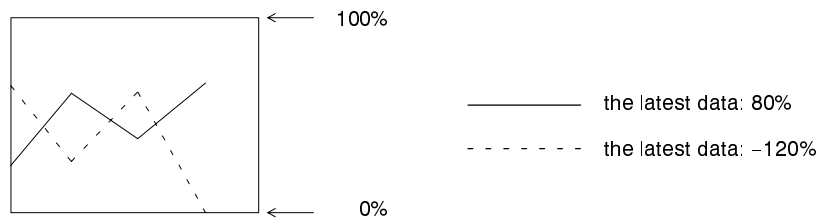
[To display a value below 0%: Sign display "Yes"]

The trend graph is displayed in the range of –100% to 100%. In this case, 0% position of a graph falls the center of a graph display area.
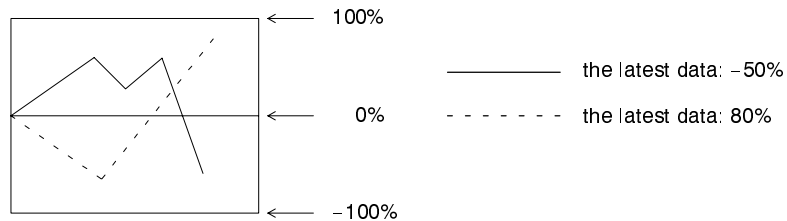

[Not to display a value below 0%: Sign display "No"]

The trend graph is displayed in the range of 0% to 100%. 0% position is at the end of a graph. All values less than 0% are displayed as 0%.

• Drawing width

Drawing width (direction of increase) must be specified from the previous data to the following data in the range of 1 to 320 dots. If a value more than the graph displaying frame is specified, a graph will not be displayed.

Direction of increase ⟶
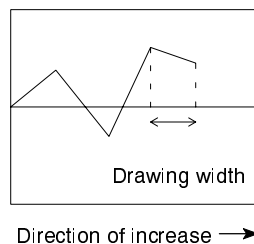
• Sampling period

Sampling period is the time interval applied when the NT30/30C samples and displays the Numeral Memory Table value and is specified in the range of 1 to 65535 in increments of 0.1 second.

Reference   Actual drawing timing varies depending on the operating conditions. This does not accurately coincide with the time interval specified.

• % Data value

The same is also true as the bar graph. Refer to page 157.

• Graph line type

This attribute specifies a graph line type among those as shown below. Line color can be selected out of eight colors. A graph width is fixed at one dot.

Solid line   ————————————

Broken line   - - - - - - - - - - - -

1-dot chain line   ——— - ——— - ———

2-dot chain line   ———— – – ————

• % representation

The same is also true as the bar graph. Refer to page 157.

• Differences in the bar graph display method according to the % values

The bar graph display method varies according to the % value range.

(1) When the % value is in the minus range

The display varies as follows according to the sign display setting:

Sign display "No": Displayed as 0%.

Sign display "Yes": Displayed in the minus range.

(2) When the absolute value of the % value is in the range of 100% to 999%

A graph is not displayed in this range of %. Only a part of % value within the graph frame is displayed. A % value is displayed as it is.

————— the latest data: 50%

- - - - - - - the latest data: −300%
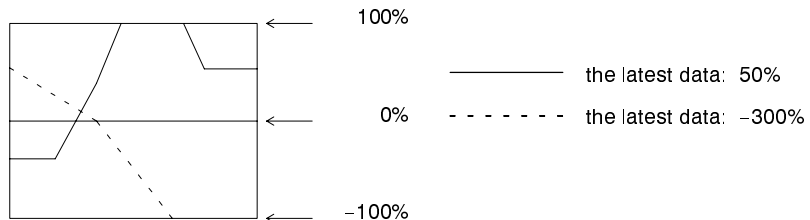
(3) When an absolute value of % is equal to or greater than 1000%

A value is displayed in a graph in the same way as (2) at the % display position depending on the presence of a sign as follows:

With a sign not displayed: ✳✳✳%

With a sign displayed: ✳✳✳✳%

• When the graph width is not an integral multiple of the drawing width

In the normal type, when a graph is over the graph frame next time, the NT30/30C draws a graph of the latest data at the end of the frame.
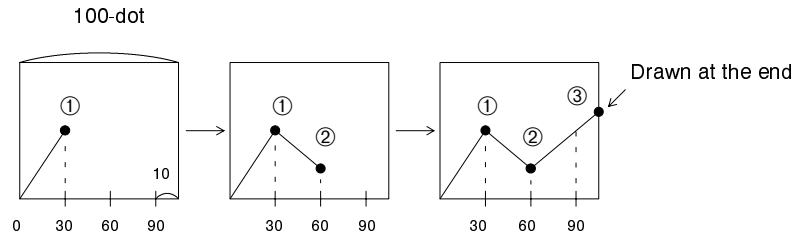
<Example: In case the graph width 100-dot and the drawing width 30-dot>

Reference If a graph is duplicated by drawing multiple graph lines of the same % value, it is overwritten and displayed in the order of setting. Similarly, when 0% value continues in a graph with a sign displayed, a graph line is overwritten and displayed with respect to the graph frame indicating 0%.

4-5-3   Broken Line Graph Setting

A broken line graph displays multiple present value of Numeral Memory Table by a single polygonal line. This allows variation of continuous values of the Numeral Memory Table to be seen at a time.
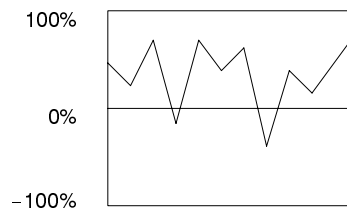
Example displaying 11 Numeral Memory Table values with signs

For a broken line graph, a single graph frame can be shown in a screen and a maximum of 256 graphs can be registered in the graph frame. A single broken line can display a maximum of 512 Numeral Memory Tables. However, the maximum number of numeral memory tables that can be displayed on one screen is also 512.

• Reference table

Specifies the first memory table number of the series of referenced memory tables.

Although it is possible to select either "direct" or "indirect" as the reference method with the support tool, only the "direct" setting is meaningful when using an NT30/30C.

It is not possible to use hexadecimal values for broken line graphs. If hexadecimal values are specified in numeral memory tables referenced to obtain graph values, the graph will not be displayed. The letter "F" may be used to indicate negative values, but make sure that no hexadecimal values are written.

Broken Line Graph Attributes

When using an NT30/30C, the following attributes can be used when displaying broken line graphs.

• Graph frame

This attribute specifies a rectangular area used to display a graph. Range of this area is a maximum of 320 dots in length by 240 dots in width.

The following setting can be performed for a graph frame.

- Frame display

With the "Frame Display" specified, 1-dot width frame line is displayed outside of the frame area. With the NT30C, Color of a frame line can be selected out of eight colors.

- Background color in a frame (NT30C only): 8 colors

Separate background color can be specified for positive and negative value display area.

• Direction

This attribute can select the direction of putting the referring Memory Table values in order.
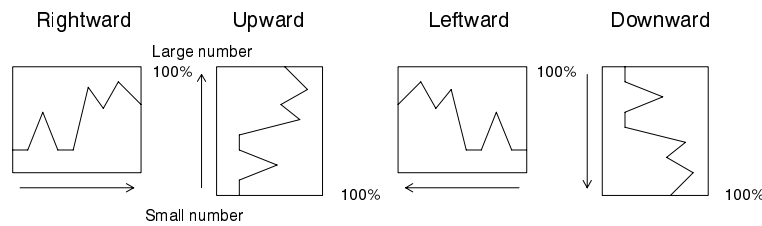
100% position is determined in accordance with the direction of putting the referring Numeral Memory Table values in order. 100% position falls to the right when putting those values longitudinally in order and at the upper side when putting those laterally.

• Sign representation

This attribute can specify whether or not a numeric value less than 0% value is displayed.

[To display a value below 0%: Sign display "Yes"]

A numeric value less than 0% value is also displayed in a graph. The broke line graph is displayed in the range of –100% to 100%. In this case, 0% position of a graph falls the center of a graph display area.
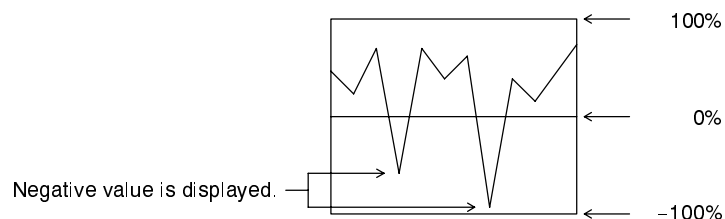
[Not to display a value below 0%: Sign display "No"]

The broken line graph is displayed in the range of 0% to 100%. All values less than 0% are displayed as 0%. 0% position is at the end of a graph.

Negative value is not displayed.
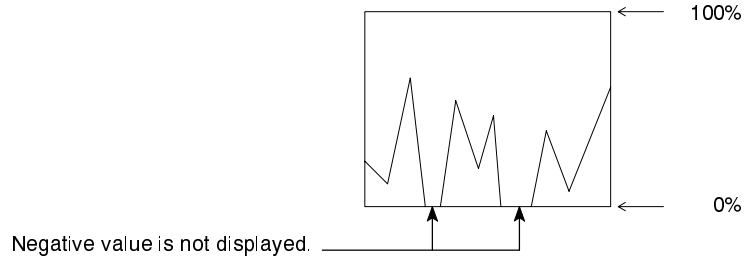
- Number of apexes

This specifies the number of Numeral Memory Tables to be referred to. One apex indicates a single Memory Table value.

Since a minimum of one dot width is required to display one Memory Table value as a polygonal line, maximum number of Memory Table capable of referring in accordance with a graph frame width is determined by the following equation.

Graph frame width (number of dots) $\geqq$ Number of referring Memory Table

- % Data value

This attribute specifies the % data value at every polygonal line. For the specifying method, the same is also true as the bar graph. Refer to page 157.

"% representation" cannot be performed for the polygon.

- Graph line type

This attribute specifies a graph line type among those as shown below. With NT30C, line color can be selected out of eight colors. A graph width is fixed at one dot.

Solid line

Broken line

1-dot chain line

2-dot chain line

- Differences when a broken line graph is displayed using percentage values

When % value is in the following range, the graph displaying method is restricted as follows:

(1) In case of negative % value

A graph is displayed differently depending on the sign representation.
Without sign representation: Displayed in the same manner as 0%.
With sign representation: A graph is displayed in the negative direction.

(2) When an absolute value of % is from 100% to 999%

A graph is not displayed in this range of %. Only a part of % value within the graph frame is displayed.

The values outside of this range are not displayed.
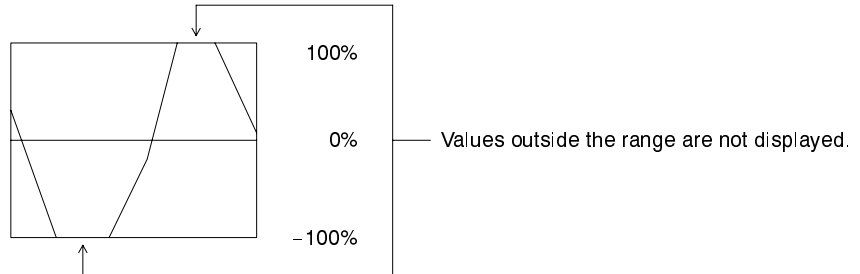
(3) When an absolute value of % is equal to or greater than 1000%

A value is not displayed in a graph in the same way as (2).

Reference
- If a graph is duplicated by drawing multiple graph lines of the same % value, it is overwritten and displayed in the order of setting. At this time, since the part that the lines are duplicated is displayed by use of those colors of the Exclusive OR display (Refer to page 136), the line type and line color are displayed differently than that specified.

- Since a graph line is overwritten with respect to the graph frame when 0% value continues in a graph with a sign displayed, line type and line color are displayed differently than that specified.

- When creating a graph, apexes of polygon are placed in order at regular intervals within the frame width. Apex interval can be changed freely when correcting a polygonal line.

4-6   LAMP

Lamp is a graphic area capable of changing the displaying state according to an instruction from the PC. There are two kinds of lamps: Normal Lamp that changes the displaying state (OFF, ON, Flashing) of a graphic fixedly displayed and Image Library Lamp that displays separate graphics in OFF and ON states. Lamp is set when creating a screen data with the Support Tool.

A maximum of 256 Lamps can be set in a screen, and 1024 lamps can be registered in a screen data file.

Contents of the setting differs depending on the lamp type (Normal Lamp, Image Library Lamp).

For the actual method used to modify a currently displayed lamp, see "Turning ON (lit) and OFF (unlit) the lamps (Changing the Contents of Allocated Bits)" (page NO TAG).

4-6-1   Normal Lamp Functions

Normal Lamp is used to change the display state (reverse flashing, erase) of a graphic fixedly displayed according to an instruction (bit ON/OFF) from the PC.

OFF state   ON state
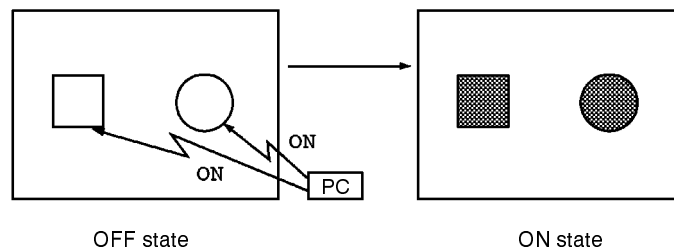
Lamp Attributes

The following attributes can be set for the Normal LAMPs.

• Shape

Any shape can be selected out of the following four kinds of shapes. Size can be specified freely.

Square   Circle   Polygon   Fan

• External frame

This attribute can be set to determine whether or not a boundary line of the Lamp is displayed. When an external frame is set to "not to be displayed", only the guide display characters of the LAMP are displayed when the LAMP is not ON (or flashing). When the guide display character is not set, nothing is displayed.

- ON/Flashing

  When LAMP is ON by an instruction from the PC, its displaying state can be specified out of ON (inverse illumination) or Flashing (inverse flashing).

- Color display (NT30C only)

  External frame color (in case of color display): 8 colors

  OFF color: 8 colors or "transparent"

  ON/Flashing color: 8 colors

  A part of external frame may be lost depending on a combination of external frame color of the normal LAMP and OFF color or ON/Flashing color. This is caused by the properties of the color LCD and does not indicate failure of equipment. When part of the external frame is lost, change a combination of colors.

- Guide display

  Guide display character can be attached to the LAMP. Attributes of the guide display character are the same as that of character display. Refer to "Characters and Figures which can be Displayed" (page 151).

- When a memory table display is overlapped with a normal lamp

  The guide display character of the normal LAMP is a fixed character-string. In order to change the guide display of the normal LAMP according to the circumstances, display the display area of the Numeral Memory Table or Character-String Memory Table in conjunction with illumination of LAMP. However, depending on a timing of ON of normal LAMP and Memory Table update, the result of indication differs as shown in the examples below. Be careful when creating a control program.

  Example 1: When the normal LAMP is turned on after updating the Memory Table
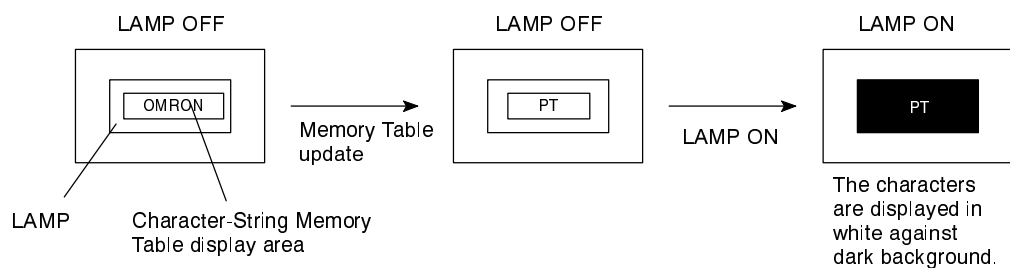
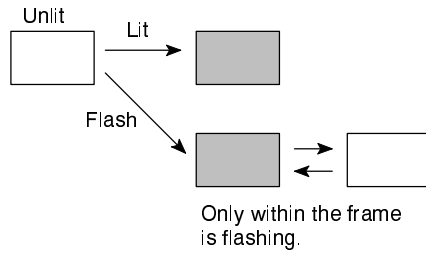 Example 2: When the Memory Table is updated while normal LAMP is ON
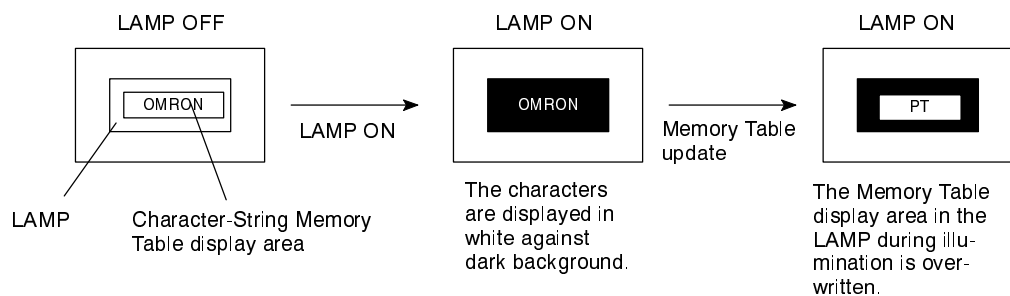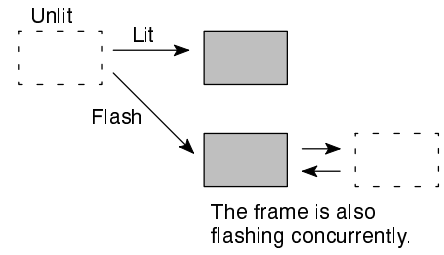
• Frame display and ON/Flashing

ON/Flashing operations differ depending on the presence of the frame display of the normal LAMP.

When the frame is displayed, only an area within the frame is ON or flashing. When the frame is not displayed, an area is ON or flashing together with the frame.

<When the frame is displayed>

<When the frame is not displayed>

Unlit

Lit

Flash

Only within the frame is flashing.

Unlit

Lit

Flash

The frame is also flashing concurrently.

• Combined display of normal LAMP

With multiple LAMPs of the same number (or the same contact) registered, the LAMPs combined as shown below can be ON simultaneously.
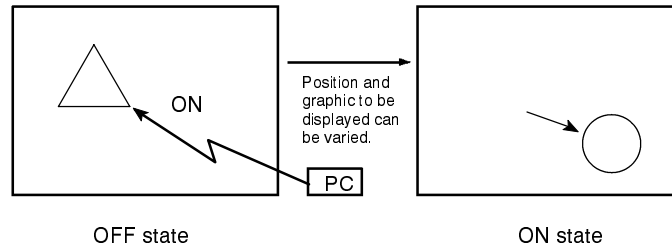
<Display example>

The same number (or contact) is specified for the LAMPs L1 through L5.

L1		
L2		
L3	L4	L5

L1	L2	L3
L4		
L5		

4-6-2   Image Library Lamp Function

The Image Library LAMP overwrites a different graphic (image data or library data) and displays it at a separate position according to an instruction (bit ON/OFF) from the PC.

OFF state   ON state

For the Image Library LAMP, presence of external frame, ON/Flashing, color display, guide display, and so forth cannot be specified, unlike normal LAMP.

However, since the attributes of every display factors when registering the Library Data are displayed as they are, a range of application will be widened further.

Image Library Lamp Attribute

The following attributes can be set to the Image Library LAMP.

- LAMP code

  Graphics to be displayed during ON and OFF are specified by the Library Data or Image Data code, respectively.

- Display position

  Positions to be displayed during ON and OFF are specified.