OMRON

Programmable Terminal

NS-B-series

Software
User's Manual

NB15W-TW01B-V1-S
NB10W-TW01B-V1-S
NB7W-TW01B-V1-S
NB5Q-TW01B-V1-S



V130-E1-01

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Introduction

Thank you for purchasing an NS-B-series Programmable Terminal.

This manual contains information that is necessary to use the NS-B-series Programmable Terminal. Please read this manual and make sure you understand the functionality and performance of the NS-B-series Programmable Terminal before you attempt to use it in a control system.

Keep this manual in a safe place where it will be available for reference during operation.

Based on the assumption that many users will use the NS-B-series PT as a replacement for their NS-series PT, the products other than PT that may have already been discontinued are described in this manual. If you are considering purchasing these products, check that the relevant product has not been discontinued.

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

Applicable Products

This manual covers the following products.

- NS-B-series Programmable Terminal
  NB15W-TW01B-V1-S, NB10W-TW01B-V1-S, NB7W-TW01B-V1-S, and NB5Q-TW01B-V1-S

Relevant Manuals

The basic information required to use an NS-B-series PT is provided in the following manuals.

- *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*
- *NS-B-series Programmable Terminal Software User's Manual (Cat. No. V130)*
- *NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131)*
- *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)*
- *CX-Designer Version 4.□ Operation Manual (Cat. No. V133)*

Confirming Functional/Fixed Object Setting Procedures when Using the CX-Designer

- *CX-Designer Help*

The online help feature explains CX-Designer operating methods and settings (including detailed settings for functional and fixed objects).

It also explains how to transfer project to the PT Unit.

Checking PLC Functions and Operation

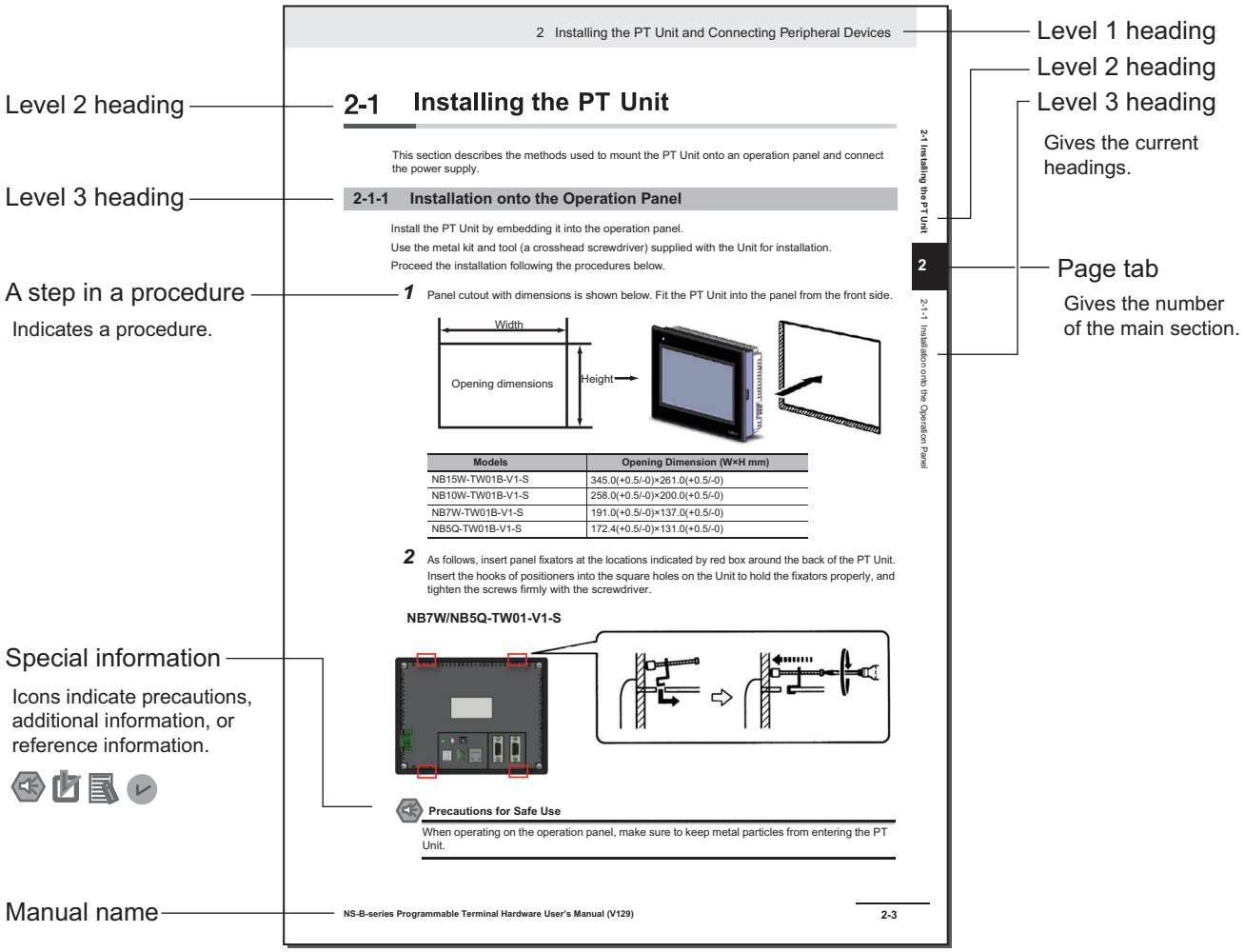
- *Operation Manuals for the PLC Being Used*

For information on PLC operation and functions, refer to the operation manuals for the CPU Unit, Special I/O Units, CPU Bus Units, Communications Units, or other Units that you are using.

Manual Structure

Page Structure

The following page structure is used in this manual.



This illustration is provided only as a sample. It may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:



Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.



Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.



Version Information

Information on differences in specifications and functionality for different versions of the CX-Designer is given.

Precaution on Terminology

In this manual, “download” refers to transferring data from the CX-Designer to the PT Unit and “upload” refers to transferring data from the PT Unit to the CX-Designer.

Sections in this Manual

1 Overview
2 NS-B-series Functions
3 Using PT Units
4 Using Functions
5 Troubleshooting and Maintenance
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CHANGE IN SPECIFICATION

The software specifications and accessories may be changed at any time based on improvements and other reasons.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

Refer to the following manuals for safety precautions.

- *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*

Precautions for Safe Use

Refer to the following manuals for precautions for safe use.

- *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*

Precautions for Correct Use

Refer to the following manuals for precautions for correct use.

- *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*

Regulations and Standards

Refer to the following manuals for regulations and standards.

- *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*

Related Manuals

The followings are the manuals related to this manual. Use these manuals for reference.

Manual name	Cat. No.	Models	Applications	Description
NS-B-series Programmable Terminal Hardware User's Manual	V129	NB□□□-TW01B-V1-S	Learning the specifications and settings required to install an NS-B-series PT and connect peripheral devices.	Information is provided on NS-B-series Programmable Terminal specifications, part names, installation procedures, and procedures to connect an PT Unit to peripheral devices. Information is also provided on maintenance after operation and troubleshooting.
NS-B-series Programmable Terminal Software User's Manual	V130	NB□□□-TW01B-V1-S	Learning about NS-B-series PT pages and object functions.	Describes the pages and object functions of the NS-B-series Programmable Terminals.
NS-B-series Programmable Terminal Host Connection User's Manual	V131	NB□□□-TW01B-V1-S	Learning the specifications required to connect devices to an NS-B-series PT.	Information is provided on connection procedures and setting procedures to connect an NS-B-series PT to a Controller or other device.
NS-B-series Programmable Terminal Macro Reference Manual	V132	NB□□□-TW01B-V1-S	When you wish to know the language specifications of the macros used with the NS-B-series PT.	Describes the language specifications and functions of the macros used with the NS-B-series PT.
CX-Designer Version 4.□ Operation Manual	V133	CXONE-AL□□C-V4 CXONE-AL□□D-V4	When you wish to know how to create screens in CX-Designer and how to download to the PT Unit.	Describes how to create screens in CX-Designer and the procedure to download to the PT Unit.

Refer to the following manual for other related manuals.

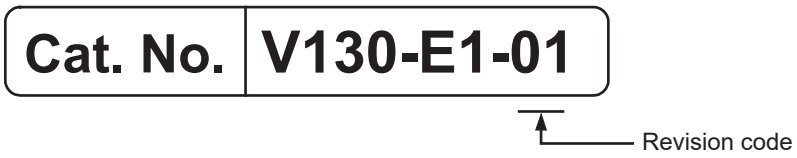
- *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*

Terminology

Term	Description
PT Unit	In this manual, indicates an NS-B-series Programmable Terminal.
PLC	Indicates Programmable Controllers in the OMRON SYSMAC CS/CJ, C, or CVM1/CV Series of Programmable Controllers.
CS Series	Indicates Programmable Controllers in the OMRON SYSMAC CS Series of Programmable Controllers: CS1G, CS1H, CS1G-H, or CS1H-H
C Series	Indicates Programmable Controllers in the OMRON SYSMAC C Series of Programmable Controllers: C200HS, C200HX/HG/HE-E/-ZE, CQM1, CQM1H, CPM1A, CPM2A, CPM2C
CVM1/CV Series	Indicates Programmable Controllers in the OMRON SYSMAC CV/CVM1 Series of Programmable Controllers: CV500, CV1000, CV2000, CVM1
CJ Series	Indicates Programmable Controllers in the OMRON SYSMAC CJ Series of Programmable Controllers: CJ1G, CJ1G-H, CJ1H-H, CJ1M, CP1H, CP1L, CP1E, CP2E, CJ2H, CJ2M References to “CJ1H-H” in this manual indicate the CJ1H-CPU□□H-R and CJ1H-CPU□□H. References to “CJ1H-H-R” indicate the CJ1H-CPU□□H-R. “CJ2” is used when referring specifically to only the CJ2 CPU Units.
NJ Series	Indicates a Controller in the OMRON NJ Series of Controllers: (Only models that can be connected to NS-B-series PTs are given.): NJ101, NJ301, NJ501
NX Series	Indicates Controllers in the OMRON NX Series of Controllers: (Only models that can be connected to NS-B-series PTs are given.): NX701, NX102, or NX1P2
Serial Communications Unit	Indicates a Serial Communications Unit for an OMRON CS/CJ-series PLC.
Serial Communications Board	Indicates a Serial Communications Board for an OMRON CS-series or CQM1H PLC.
Communications Board	Indicates a Communications Board for an OMRON C200HX/HG/HE-E/-ZE PLC.
CPU Unit	Indicates a CPU Unit in the OMRON SYSMAC CS/CJ, C, or CVM1/CV Series of Programmable Controllers.
CX-Designer	Indicates the OMRON CX-Designer.
Host	Indicates the PLC, FA computer, or personal computer functioning as the control device and interfaced with the NS-B-series PT.
Removable media	Indicates a USB memory.
Project	Indicates a collection of files containing screen data, settings, and other information for the NS-B-series that are created in CX-Designer.

Revision History

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.



Revision code	Date	Revised content
01	October 2026	Original production

1

Overview

This section provides an outline of the NS-B-series PTs, including their functions, features, connection types, and communication methods. It gives an understanding of the capabilities of the NS-B-series PTs.

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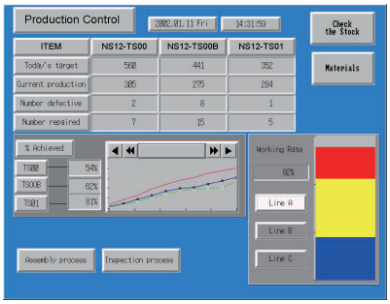
1-1 NS-B-series PT Operation

The NS-B-series Programmable Terminals (PTs) are sophisticated operator interfaces that can automatically display information and perform operations as required at FA production sites. This section describes the role and operations of the NS-B-series PTs for beginning users.

1-1-1 How NS-B-series PTs Work at FA Production Sites

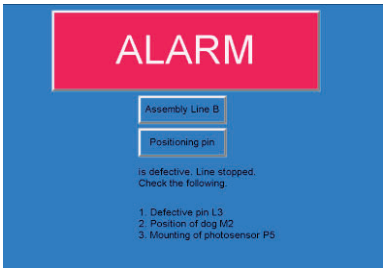
Monitoring Line Operating Status

The system and device operating status can be displayed in real time. Graphs can be used to improve visual expressions to display data in an easy-to-understand format.



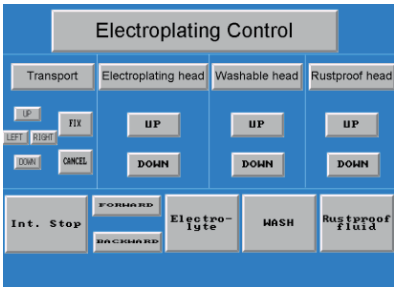
Instructions for FA Staff

PTs can be used to notify operators if there is a system or device error and provides information on appropriate countermeasures.



Replacing Control Panel Switches

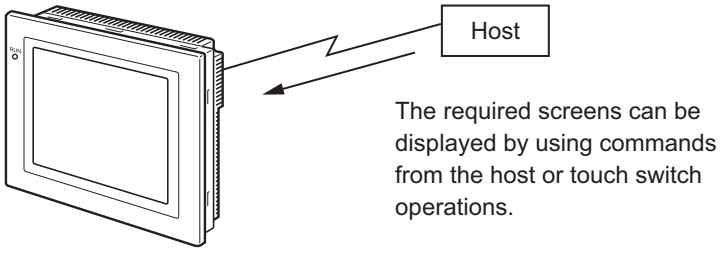
NS-B-series PTs have a touch panel. Buttons and other functional objects on the displayed screen can be operated by touch.



1-1-2 NS-B-series PT Operation

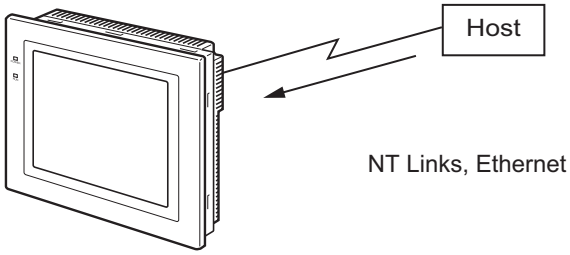
Displaying Screens

The data to be displayed on the screens is created using the CX-Designer on a personal computer and the data is stored in the PT Unit. The required screen can be displayed by a command from the host or by operating the touch switches.



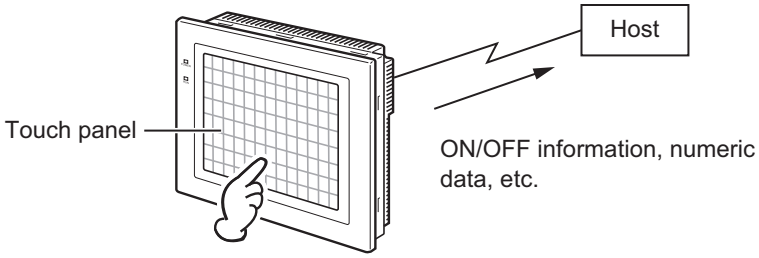
Reading Data from the Host

NS-B-series PTs connect to the host using NT Links, Ethernet communications to automatically read required data from the host.



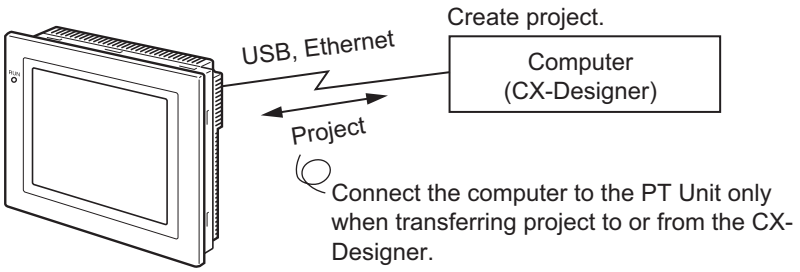
Sending Data to the Host

Data entered on the touch panel, (button ON/OFF status, numerals, and character strings) can be sent to the host.

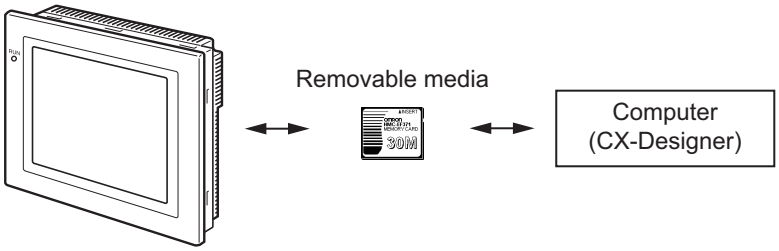


Project

The project displayed on PTs is created using CX-Designer on a personal computer. Project is transferred to the PT Unit by connecting the PT Unit and the personal computer using a USB cable, or Ethernet.



Project can also be transferred using removable media.



1-2 NS-B-series PT Functions

This section describes the features and main functions of the NS-B-series PTs.

1-2-1 NS-B-series PT Functions

Two standard-feature Ports for Serial Communications, Ports A and B

(a) RS-422A/485 (serial port B only) can be used without a conversion unit.

(b) Bar code data can be read from a bar code reader via the other port while communicating with the host.

Ethernet Interface

Ethernet communications with the host are possible.

Ethernet/IP communications with the host are also possible.

More Precise Touch Switches

The NB□□□-TW01B-V1-S uses an analog touch panel.

Fast System Program and Project Replacement Using Removable Media

(a) Project can be written on site simply by mounting a removable media on the PT Unit.

(b) System programs can also be stored on removable media with NS-B-series PTs.

(c) Operation log data that contains alarm history data, data log data, error log data, functional object operations, screen display history, and macro execution history can be stored on removable media.
Data is saved in CSV files, which are easy to use on a personal computer.

Screen Data Confirmation Function

Screens can be checked even if CX-Designer is not connected, by using the System Menu on the PT Unit.

Character Display in Windows Fonts

Fonts used in Windows can be used in fixed (text) displays.

Simple Upgrades

The system program can be replaced using a removable media.

Conforms to International Standards

The NS-B-series PT conforms to UL standards, CSA standards, and EC Directives.

Multiple Windows

Up to 3 pop-up windows can be displayed at the same time on a normal screen. Commands to switch screens can also be given from the host.

Strong Processing Functions Using Macros

(a) Various instructions are available, including arithmetic operations, bit operations, logic operations, comparison operations, screen controls (open, close, etc.), and object movement.

(b) Processing can be performed independently from the host or data from the host can be further processed and the results can be displayed on the screen.

(c) Host data processing can be transferred to macros to reduce the load on the host.

Multiple Label Registration

(a) Up to 16 different languages or labels for production lines can be registered on one project in the NS-B-series PTs.

(b) The displayed label can be switched during operation.

More than 1,000 Standard Parts

NS-B-series PTs provide not only touch switches and lamps, but also complicated parts such as toggle switches and 7-segment displays. It is easy to create attractive screens simply by pasting on the CX-Designer.

Characters

Display characters at various sizes. Characters can be flashed or character colors can be changed.

Fixed Objects

Lines, poly lines, rectangles, polygons, circles, oval, arcs, and sectors can be displayed. Objects can be filled in various colors and flashed.

Internal Memory Data

The contents of registers in internal memory ($B, $W, $HB, $HW, $SB, and $SW) can be displayed.

Graphs

Bar graphs, analog meters, broken - line graphs, and trend (data logging) graphs are supported.

Lamps

Lamps controlled by the host can be lit or flashed. Different graphics can be used for lit and not lit status.

Alarms/Events

Host bit status can be used to automatically display messages and related information (e.g., time stamps).

Alarms and events can be displayed one line at a time, in lists, or in histories.

Communications Functions: Host Communications

Any of five communications methods can be used: 1:1 NT Links, 1:N NT Links (standard or high speed), Host Link, Ethernet, Ethernet/IP. Host data can be read and displayed, and data can be input and sent to the host, for buttons, numeral display and input objects, and character display and input objects.

Output Functions: Buzzer

The buzzer in the PT Unit can be controlled.

Inputting via Touch Switches

Buttons can be displayed easy input by touching the screen. Input functions include sending data to the host and switching the display screen.

Pop-up Windows

Windows that overlap the current screen can be opened, closed, and moved. Various objects can be registered for pop-up windows, and up to three pop-up windows can be displayed at the same time. Accessing the required windows when needed enables more effective use of screens.

Numeral/Character String Input

Touch switches can be used to input numerals and character strings. The input data can be sent to the host, and inputs can also be prohibited using controls from the host.

Bar Code Reader Inputs

Data read from bar code readers can be input to character string display and input objects.

Control Flags

Allocating host addresses to control bits enables controlling display of functional objects and enabling or disabling input functions from the host.

System Menu

System setting and maintenance are performed from the system menu displayed on the screen.

Creating Project

The CX-Designer running on a personal computer is used to create project and record it in memory built into the PT Unit. Project can also be saved on removable media in the PT Unit.

Screen Saver

A screen saver increases the life of the backlight.

Built-in Clock

The built- in clock enables displaying dates and times.

Data Transfers

Project and system programs can be transferred by the Transfer Data function on the CX-Designer or by using removable media.

Operation Logging and Alarm/Event History

A history can be kept of screen switches, functional object operation, and macro execution. The times and frequency that specific addresses turn ON can also be kept in a history.

Data Logging for Trend Graphs and Background Execution

The contents of addresses displayed for trend graphs can be logged, even while the graph is not being displayed (background execution).

Macros

Calculations data can be set as project to perform calculations at specific times during operation. Calculations include arithmetic, bit operations, logic operations, and comparisons. Various commands are also provided, e.g., to move objects or pop-up windows, manipulate character strings, etc.

Starting External Applications

Communication Test or other applications can be started from the system menu.

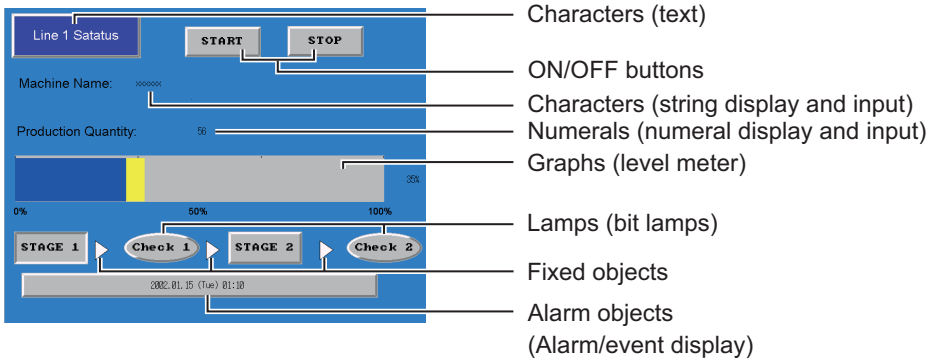
1-2-2 Differences between Models

Four models are available with different display sizes.

Model	Color	Display panel	Ethernet
NB15W-TW01B-V1-S	Black	15.0-inch TFT	10/100Base-T
NB10W-TW01B-V1-S	Black	10.1-inch TFT	10/100Base-T
NB7W-TW01B-V1-S	Black	7.0-inch TFT	10/100Base-T
NB5Q-TW01B-V1-S	Black	5.7-inch TFT	10/100Base-T

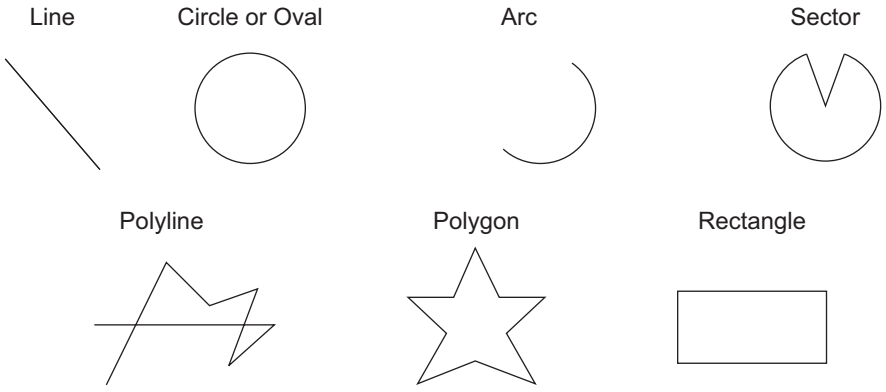
1-2-3 NS-B-series Displays

A variety of elements can be displayed on one screen, including character strings, numerals, graphs, lamps, and buttons. The screen displayed on NS-B-series PTs is created using CX-Designer.



Fixed Objects

A fixed object is merely graphic data displayed on the screen. Unlike functional objects, fixed objects cannot exchange data with the host, execute operations, or change display attributes (except for flickering). There are seven types of fixed objects: Lines, circles/ovals, arcs, sectors, polylines, polygons, and rectangles.



Buttons

Button can be registered to the screens as required. There are three types of buttons: ON/OFF buttons, word buttons, and command buttons. The following functions can be executed by touching the buttons on the screen.

- Turn bits ON or OFF (ON/OFF buttons).
- Write numerals to words (word buttons).
- Switch the displayed screen (command buttons).
- Transfer numeral or character string data (command buttons).
- Open, close, or move pop-up screens (command buttons).
- Display the System Menu (command buttons).
- Stop the buzzer (command buttons).

Buttons can be lit depending on the status of the allocated address.

Also, inputs from the host can be controlled (enabled or disabled) by allocating the address of a control flag.

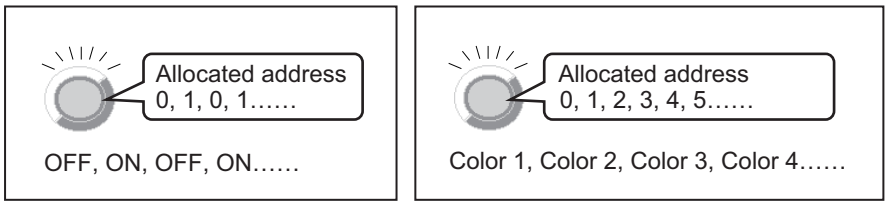
There are three display shapes for buttons: Rectangle, select shape (ON/OFF buttons and word buttons), and circle (for ON/OFF buttons only). When the select shape option is used, the display shape is specified for the ON and OFF status of the allocated address.

There are two types of button labels: Fixed string display and ON/OFF switch display (for ON/OFF buttons only). In addition, the label can be displayed on multiple lines.

Lamps

There are two types of functional objects, bit lamps and word lamps, that change the display status depending on the status of the allocated address.

The color and shape of the lamps can be changed depending on the ON/OFF status of bits for bit lamps or the contents of words for word lamps.



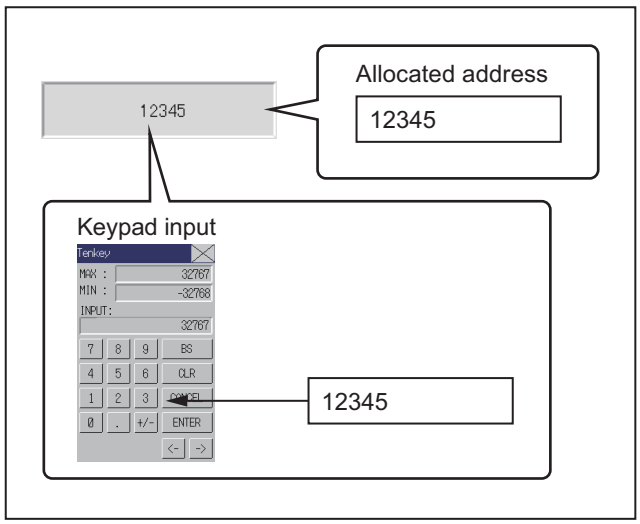
Bit lamp Word lamp

Fixed character strings can be displayed as lamp labels. In addition, multiple lines can be displayed.

Numeral Display and Input

Numerals stored at the allocated address can be displayed and data can be input to the allocated address. Four different data formats can be displayed as required, including decimal and hexadecimal, and data can be stored as required in any of eleven data formats, including signed integers and BCD. Host values can be converted and displayed at a specified scale or displayed with units, such as mm or g.

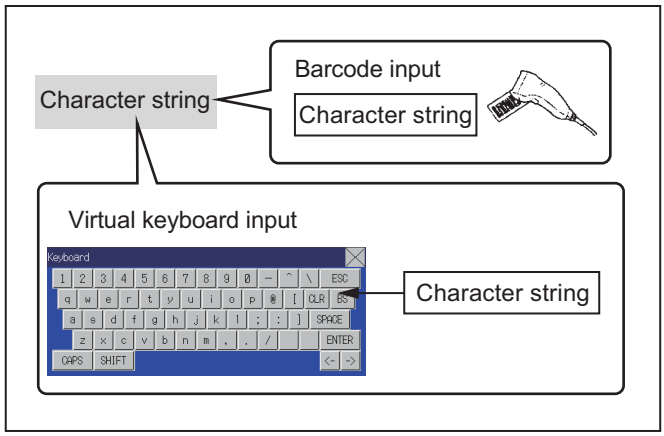
Also, inputs from the host can be controlled (enabled or disabled) by assigning the address of a control flag.



String Display and Input

Character string data stored at allocated addresses can be displayed and can be input to the address. Bar code data can be read using a bar code reader.

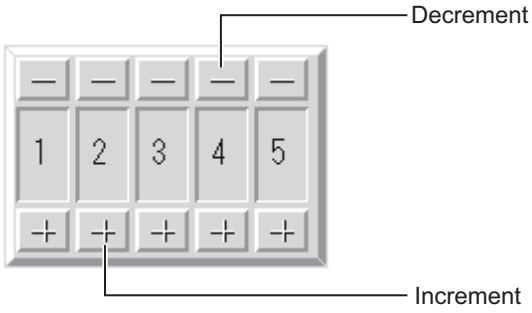
Also, inputs from the host can be controlled (enabled or disabled) by allocating the address of a control flag.



Thumbwheel Switches

The numerical contents of the allocated address can be input by incrementing or decrementing the numeral using the + and - buttons for each digit.

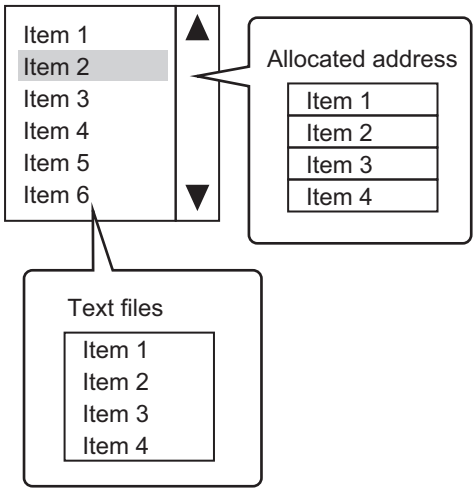
Also, inputs from the host can be controlled (enabled or disabled) by allocating the address of a control flag.



List Selections

Allocated addresses or character string data stored in text files can be displayed in a list and specific character strings can be specified from the list.

Also, inputs from the host can be controlled (enabled or disabled) by allocating the allocated address of a control flag.



Text

Preset character strings can be displayed.

Display characters can also be changed.

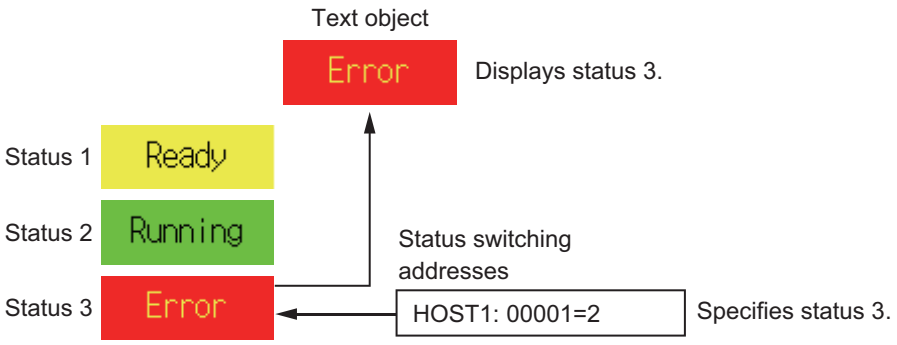
The following three methods are available for changing displayed characters.

- Indirect Specification From a Text File

  A list of character strings to be displayed can be stored in a text file and any character string in the text file can be specified for display.
- Indirect Specification From a Character String Table

  Any character string can be specified for display from preset character strings in a character string table.
- Message Indicator Function

  Character strings and background colors to be displayed can be registered for each status number and any registered status can be specified for display.



Bitmaps

Bitmaps are functional objects that display bitmap files or JPEG files. Complex pictures or photographic images that cannot be drawn can be displayed on the screen. The display can also switch among different images depending on the contents of the specified address.

Level Meters

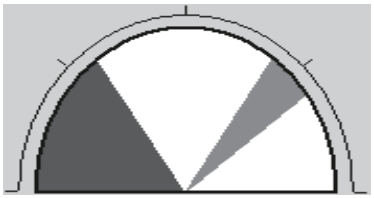
The current value of the allocated address can be displayed by coloring the specified range. The display direction (up, down, left, or right), different color for each specified range, and whether or not scaling will be used can be set.



Analog Meters

An analog meter displays the current value for the allocated address by coloring regions or by means of a needle. The shape can be selected from a quarter circle, semi-circle, and full circle.

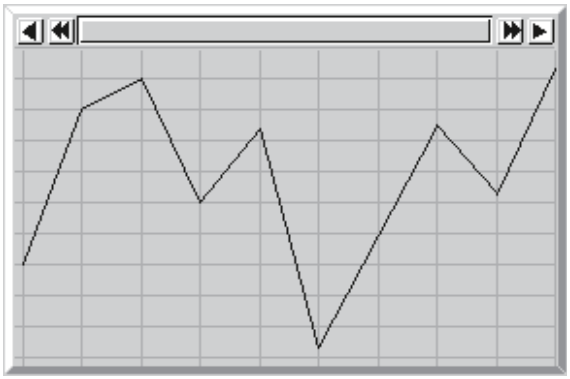
The display direction (up, down, left, or right), incremental direction for the meter (clockwise or anti-clockwise), and whether or not scaling will be used can be set.



Broken-line Graphs

Broken-line graphs display the present values for multiple consecutive allocated addresses on one graph.

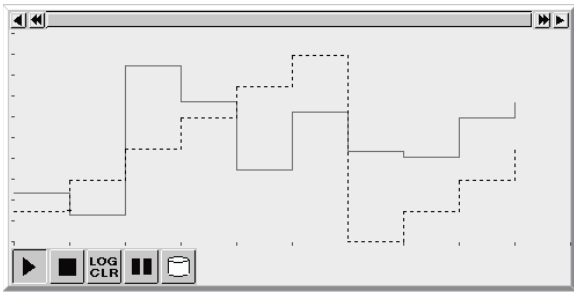
Up to 256 line graphs can be displayed in one broken-line graph display region.



Data Log Graphs

The data log function saves changes over time in the contents of the allocated address. The saved data can be displayed for each data logging group.

Data can be read (sampled) even if the data log graph is not displayed.



Alarms and Events

The alarm/event function reports alarms based on changes in bit status. There are two functional objects: Alarm/event displays and alarm/event summary and history.

Alarm/event display objects display a pre-registered message and the date and time of the alarm or event when the monitored bit turns ON.

Either one message or multiple messages (using the flowing string function) can be displayed.

The alarm/event summary and history functional object displays a list of messages. The display order can be switched between displaying in order of occurrence, order of frequency, and by alarm level. Also, the history and data to be displayed when an alarm is generated can be selected.

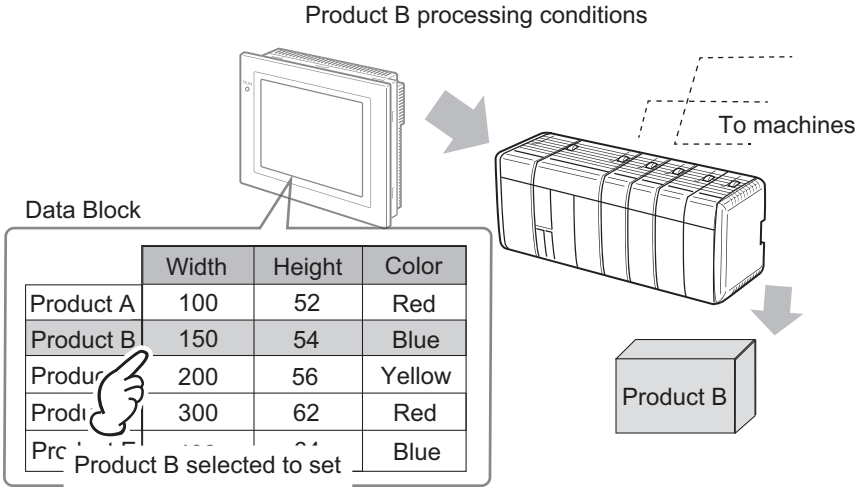
System Clock

The system clock displays the current date and time. The date and time can also be changed.

Data Blocks

Data blocks (recipes) enable reading/writing values and character strings from/to memory areas, such as those in a PLC. Data blocks can be used to easily change the setup of the system. Create the data in a CSV file and store it in the PT Unit beforehand. This data can be changed while operating the PT Unit.

Example: Setting width (numeric value), height (numeric value), and color (character string) in the PLC. (Refer to the figure shown below.) Set width: 150, height: 54, and color: blue for product B. Just select product B to set these three items in the PLC. If product A is selected a width for 100, a height of 52, and a color of red are set in the PLC.



Using data blocks, users do not need to save data in the PLC beforehand, so that the memory of the PLC can be saved and the ladder program can be reduced.

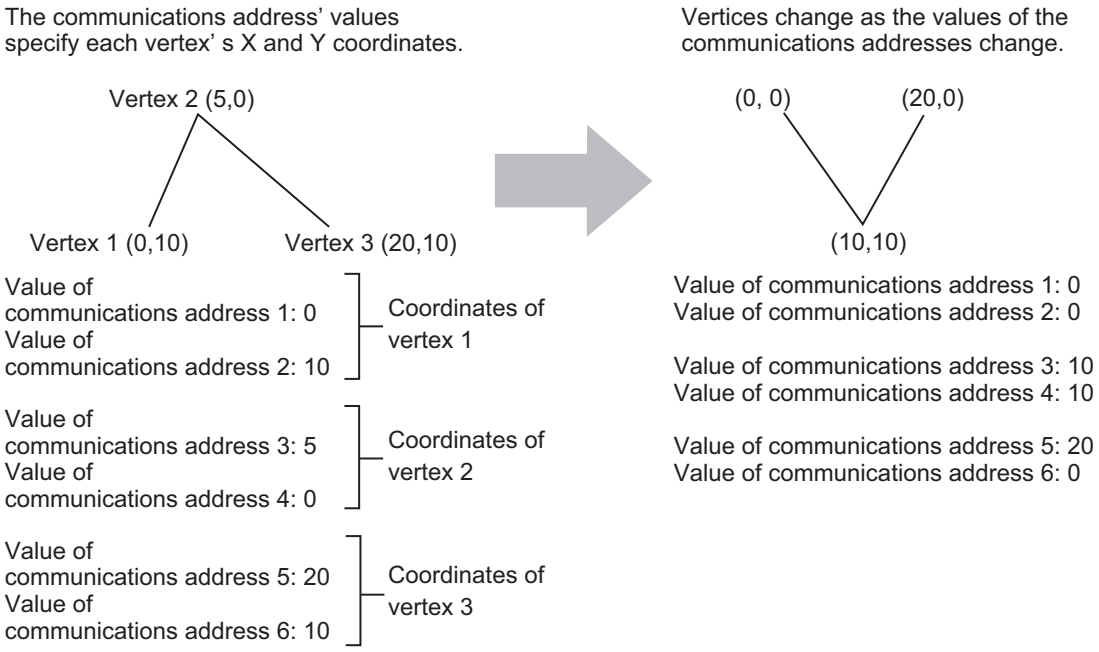
Data blocks also have the following features.

- Data in CSV format can be edited and managed on a computer.
- Data can be edited on the PT Unit.
- Data can be written to a removable media.
- Data from read from a removable media.
- Process values and character strings can be handled.
- Maximum number of rows: 1,000. Maximum number of columns: 500. Data blocks with both 1,000 rows and 500 columns, however, cannot be set.

Consecutive Line Drawing

Polylines can be drawn by using the contents of communications addresses as coordinates of the vertex points. These shapes differ from regular polylines because the shapes can be changed actively.

Example:

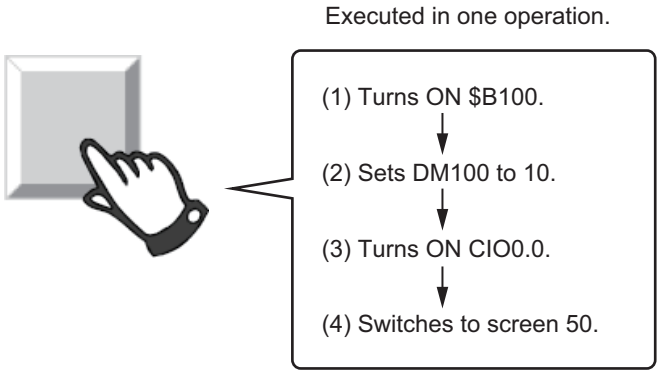


Multifunction Objects

Multifunction Objects are functional objects that can execute multiple functions in order with a one-touch operation.

The set functions are executed one after the other when the Multifunction Object is pressed or the value at a specified address changes. Up to 32 functions can be set for each execution condition.

The Multifunction Object function enables operations that were performed using a combination of macros and multiple functional objects to be performed in one operation.



Note Safety functions can be set as an execution condition for when the Multifunction Object is pressed, e.g., Double Press, ON Delay, OFF Delay, and Prohibit Simultaneous Press

Contents Display

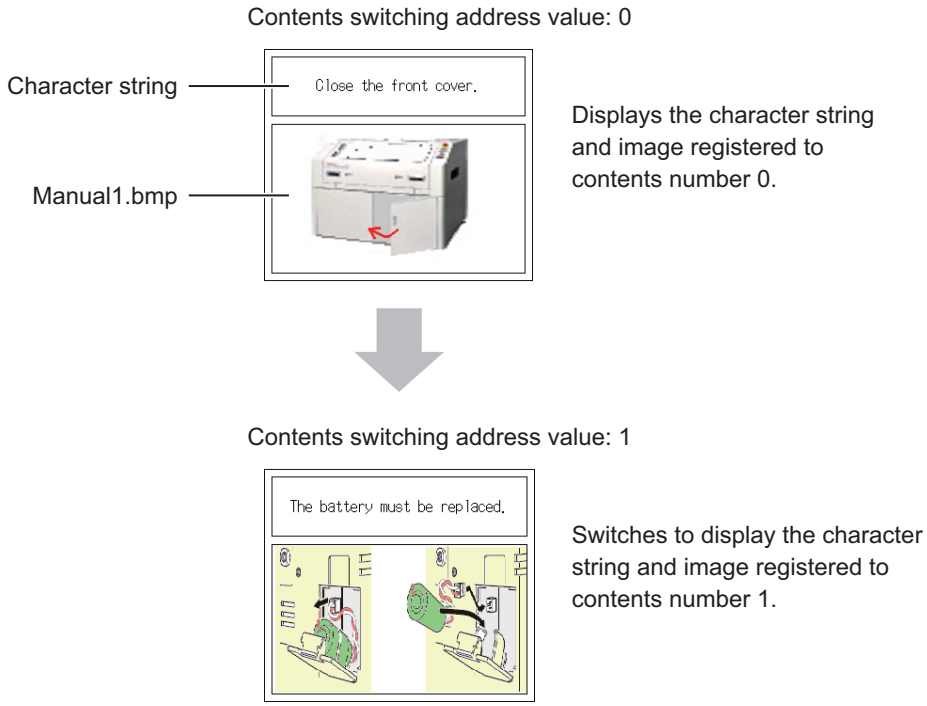
Contents Display is a functional object that switches character string and image file display according to its status. Character string displays and image files are indicated by the term “contents” and settings for switching display is referred to as the settings for switching contents.

The character string and image combinations and the communications address for switching display for each status (i.e., each contents number) are made in the settings for switching contents.

Contents display switches the displayed character string/images according to the specified communications address. The contents display can also be switched in connection with any alarms/events that occur or are cleared.

Example Settings for Switching Contents

Contents No.	Contents	
	String	Image
0	Close the front cover.	Manual1.bmp
1	Replace the battery.	Manual2.bmp



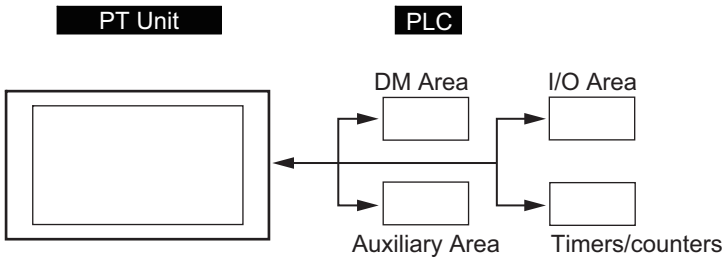
1-3 Communicating with the Host

1-3-1 Host Registration and Address

With NS-B-series PTs, data required for display can be accessed and the words and bits where the entered data will be stored can be allocated to any area in the PLC.

The allocated words and bits are read from and written to directly, the display status changed for the objects on the screen, and the status controlled or reported.

Communications with multiple PLCs are also possible with NS-B-series PTs. Host names are registered for the connected PLCs and any area in the PLC can be accessed by specifying the host name and address.



Connect to the host using one of the following methods.

- 1:1 NT Link
- 1:N NT Links (standard, high speed)
- Ethernet
- Host Link
- Temperature Controller Connection
- Memory Link
- Modbus Device Connection
- EtherNet/IP

Up to 48 registrations are possible for hosts.

Refer to *NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131)* for details.

1-3-2 Ethernet

Hosts connected on the Ethernet can communicate with devices that support FINS (Factory Interface Network Service) messages. FINS is a standard OMRON communications service. NS-B-series PTs can read and write data, word contents, and bit status from supported PLC Ethernet Units without having to be concerned about protocols.

1-3-3 NT Links

The NT Link protocol was specially designed to enable high-speed communications with OMRON PLCs.

In addition to the 1:1 NT Links, where one serial port of PT Unit is connected to one PLC, NS-B-series PTs can also use the 1:N NT Links, where up to eight PT Units are connected to one PLC.

NS-B-series PTs also support a high-speed 1:N NT Link that allows faster communications.

In later sections, the term “NT Link” will be used when describing the NT Link communications method in general, “1:1 NT Link” will be used when describing the 1:1 NT Link connection method only, and “1:N NT Link” will be used when describing the 1:N NT Link connection method only. Furthermore, differentiation will be made between standard and high-speed 1:N NT Links when required. If only “1:N NT Link” is noted, the description will refer to both standard and high-speed 1:N NT Links.

NT Link Features

NT Links have the following features.

(a) NT Links facilitate high-speed communications with PLCs. The high-speed 1:N NT Link, which enables even faster communications, is also supported.

(b) Data can be written to PLC memory areas in bit units. This allows other bits in the word to which a touch switch has been allocated to be used for another applications, such as lamp allocations. However, data is written in word units only in the DM and EM Areas, so other bits in the word to which touch switches are allocated cannot be used for other applications in these memory areas.

(c) NS-B-series PTs can be connected without switching PLC operating modes.

(d) Up to eight PTs can be connected to one PLC port when 1:N NT Links are used and all ports can be used simultaneously. Up to eight ports can be used simultaneously for high-speed 1:N NT Links also. Normal 1:N NT Links and high-speed 1:N NT Links cannot, however, both be used on the same PLC port.

(e) If a Communications Board is mounted in the CPU Unit option slot on a C200HX/HG/HE-E/-ZE PLC, up to three standard 1:N NT Link systems (up to 24 PTs) can be connected. Only standard 1:N NT Link connections can be made. Refer to the *C200HX/HG/HE Communications Boards Operation Manual (Cat. No. W304)* for information on Communications Boards.

(f) If a Serial Communications Board is mounted in the CPU Unit Inner Board slot on CQM1H PLCs, up to two standard 1:N NT Link systems (up to 16 PTs) can be connected. Only standard 1:N NT Link connections can be made. Refer to *CQM1H Serial Communications Board Operation Manual (Cat. No. W365)* for information on Serial Communications Boards.

(g) If a Serial Communications Board is mounted to the CPU Unit Inner Board slot or a Serial Communications Unit is mounted to the Backplane of a CS1G/H or CS1G/H PLC, multiple standard or high-speed 1:N NT Link systems can be connected. Refer to *CS/CJ Series Serial Communications Boards and Unit Operation Manual (Cat. No. W336)* for information on Serial Communications Boards and Serial Communications Units.

1-3-4 Host Link

The Host Link method uses a 1:1 connection between the host and a PT Unit to read and display word and bit data from the host. Many PLC models can be connected using Host Link.

The following PLCs can be connected to NS-B-series PTs using Host Link. The PLCs are connected via their built-in serial port or a Host Link Unit supported by the PLC.

Refer to *NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131)* for details on Host Link communications settings.

1-3-5 EtherNet/IP

EtherNet/IP is an industrial multivendor network protocol that uses Ethernet. The specification is an open standard managed by the ODVA (Open DeviceNet Vendors Association), and it is used for a variety of industrial devices.

With NS-B-series PTs, communications can be performed with CS/CJ-series EtherNet/IP Units and CJ-series or NJ/NX-series with a built-in EtherNet/IP port. Also, it is possible to perform tag message communications when using a CPU Unit with a built-in EtherNet/IP port. These CPU Units contain a tag name server, so if tag names and an address table are stored in advance in the CPU Unit, it is possible to perform access from the NS-B-series PT using only the tag names.

1-4 PT Memory

PT memory is made up of internal memory and system memory.

1-4-1 Internal Memory

The internal memory in the NS-B-series PT can be read and written by the user. Internal memory can be allocated as required for settings, such as the addresses for functional objects.

The internal memory is divided into four sections.

Memory	Contents
$B	Bit Memory Bit memory is used for I/O flags and signal information. Up to 32 Kbits (32,768 bits).
$W	Word Memory Word memory is used to store numeral and character string data. Each word contains 16 bits, but consecutive words can be used as required for character strings and 32-bit data. Up to 32 Kwords (32,768 words).
$HB	Internal Holding Bit Memory Internal Holding Bit Memory is used for I/O flags and signal information. Up to 8 Kbits (8,192 bits) can be used. Values are held even when the power supply to the PT Unit is turned OFF.
$HW	Internal Holding Word Memory Internal Holding Word Memory is used to store numeral and character string data. Each word contains 16 bits, and consecutive words can be used as required for character strings and 32-bit data. Up to 8 words (8,192 words) can be used. Values are held even when the power supply to the PT Unit is turned OFF.



Additional Information

Internal memory cannot be read and written from the host.

1-4-2 System Memory

System memory is used to change information between the host and the PT Unit, such as controlling the PT Unit and notifying the host of status.

The system memory is divided into two sections. Refer to *System Memory* on page 2-20 for details.

Memory	Contents
$SB	System Bit Memory The system bit memory contains 64 bits with predefined functions.
$SW	System Word Memory The system word memory contains 41 words with predefined functions.

The functions for each $SB and $SW address are outlined on the following tables.

Additional Information

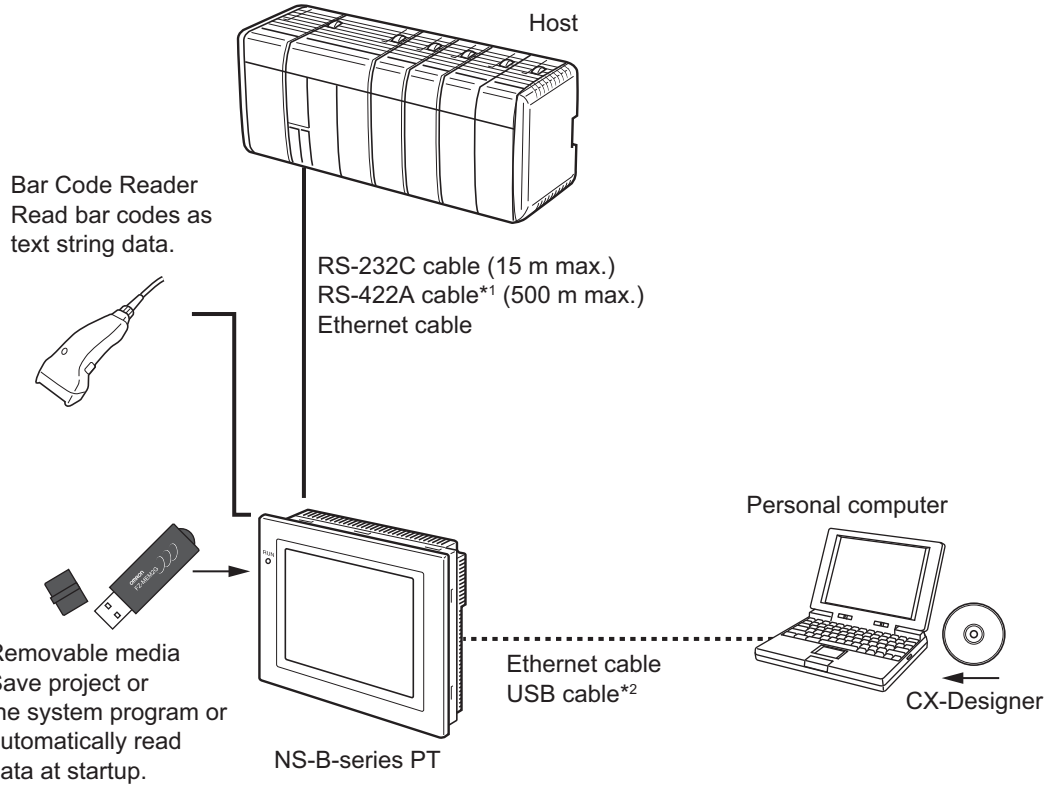
- System memory can be allocated as host addresses or as internal memory.
  Refer to the **System Settings and Project Properties** in the *CX-Designer Online Help* for details on setting methods.
- The PT Unit will automatically update the system memory wherever it is allocated. The update timing will be different depending on whether $SB or $SW is used directly or whether an address in the allocated memory is used.

1-5 System Configuration

This section shows the system configuration used for NS-B-series PTs. Refer to *A-2 List of Models* on page A-14 for details on formats.

1-5-1 Peripheral Devices

The following peripheral devices can be connected to NS-B-series PTs.



*1. Only serial port B is supported.

*2. Refer to *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)* to connect the PT Unit and computer with a USB cable.

PTs (Refer to *NS-B series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.)

Recommended Bar Code Readers: OMRON V520-RH21-6/V400-H111/V400-H211 Bar Code Reader

(Refer to *NS-B series Programmable Terminal Host Connection User's Manual (Cat. No. V131)*.)

Recommended Removable media devices (Refer to *NS-B series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.)

CX-Designer (Refer to *CX-Designer Version 4.□ Operation Manual (Cat. No. V133)*.)

1-5-2 Connecting to the Host

The NS-B-series PTs provide the following two serial communications ports.

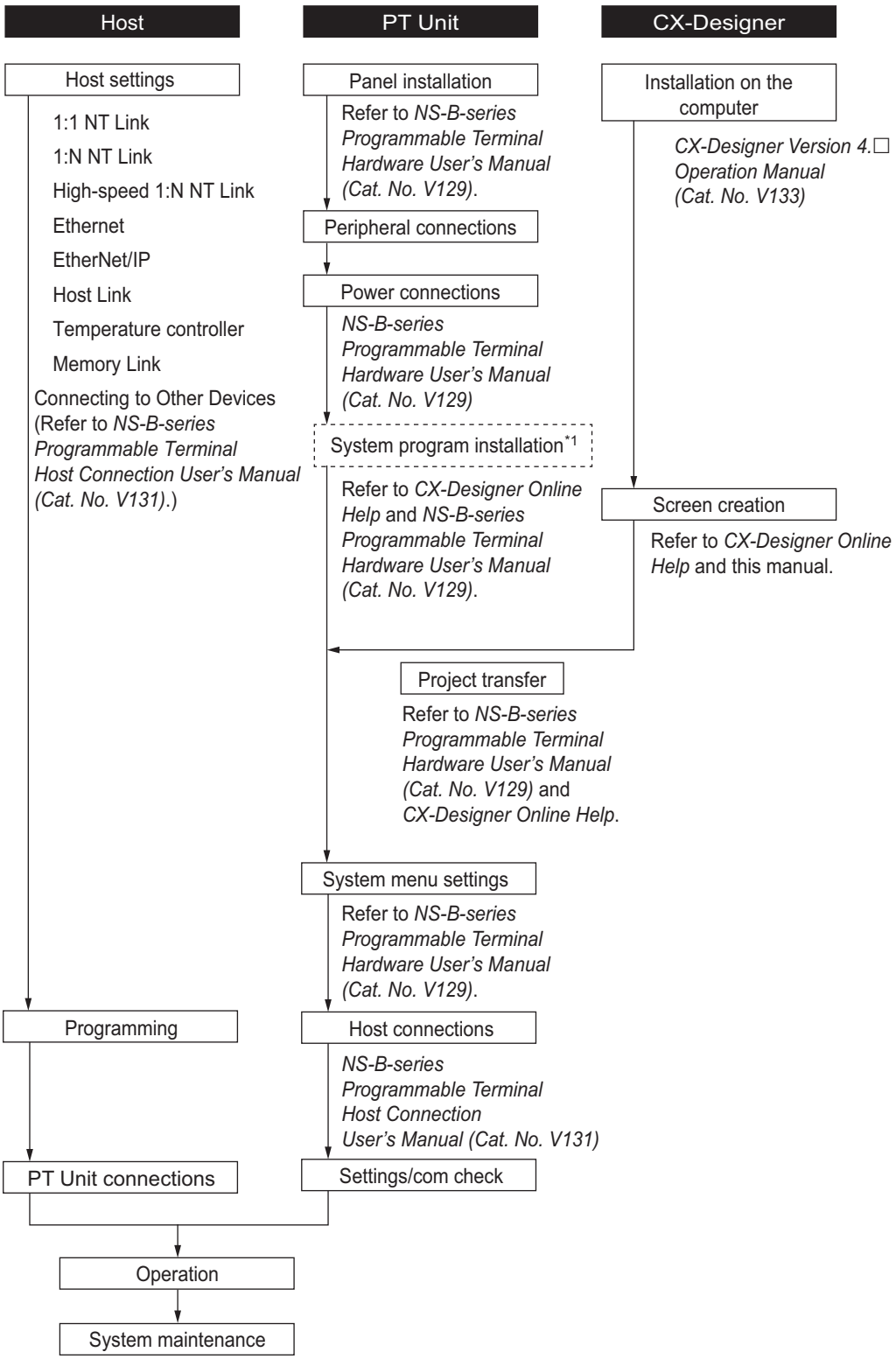
- Serial port A:
  9-pin D-sub connector
  RS-232C host (Bar code reader can be connected.)
- Serial port B:
  9-pin D-sub connector
  RS-232C host (Bar code reader can be connected.)

Ethernet communications with the host and CX-Designer are possible.

Ethernet interface: 8-pin modular connector, 10/100Base-T

1-6 Procedure before Operation

Perform the following procedure to start the PT Unit.



*1. The system program is installed only in special circumstances, such as when the system program is replaced or repaired.

2

NS-B-series Functions

This section provides a detailed explanation of NS-B-series functions and CX-Designer setting methods.

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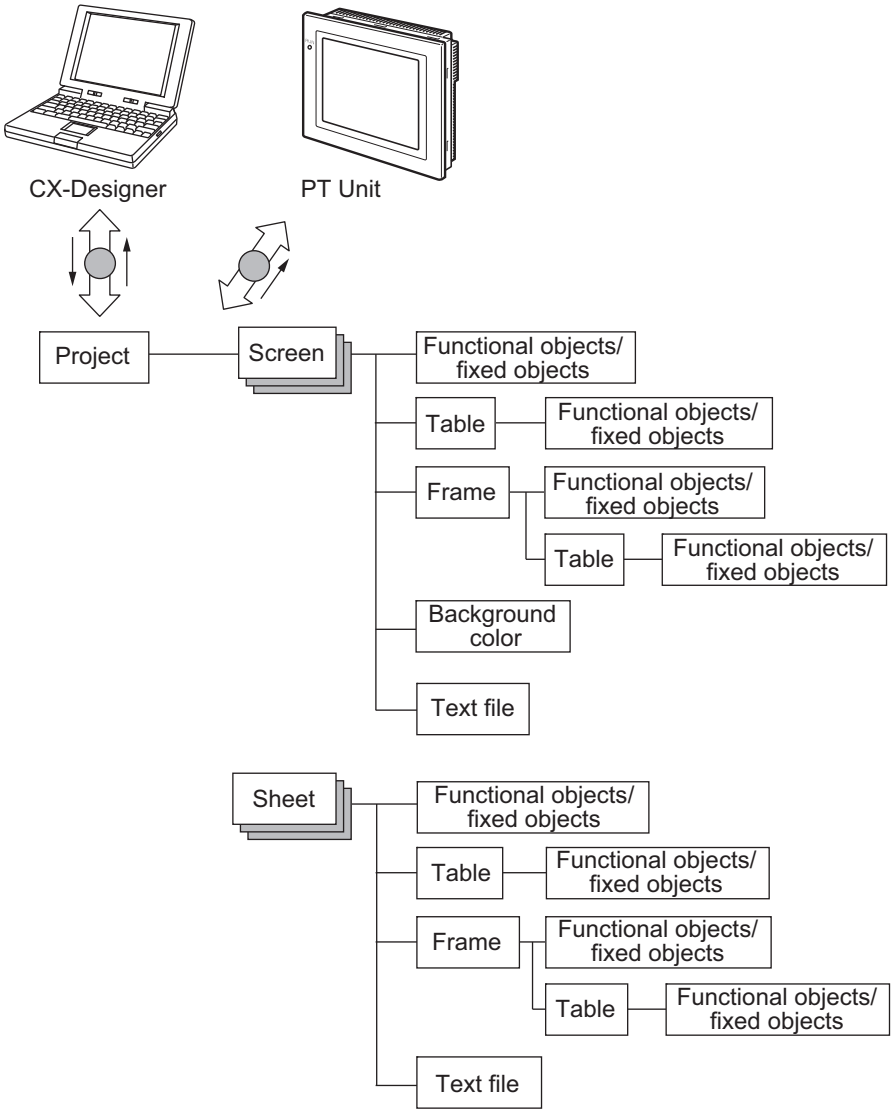
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2-1 Project

2-1-1 Project Configuration

Data is created in units called “projects.”

This section describes in detail the data that makes up projects.



● Data Elements

Name	Contents
Project	All data, such as screen and settings files, are created in units called projects.
Screen	A screen number is allocated to each screen and up to 4,000 screens can be created in each project.
Sheets	Sheets are screens that can be displayed in layers on normal screens. Sheets are useful when the same images are to be displayed on more than one screen. Up to 32 sheets can be created in each project.
Functional Objects	Functional objects include buttons, lamps, numeral display and input objects, and string display and input objects. Various screens can be created by setting the properties for each functional object in the dialog boxes. Up to 1,024 functional objects can be used in one screen.
Fixed Objects	Fixed objects are unlike functional objects in that they do not have monitor or input functions. Although fixed objects can be set to flicker, they are otherwise displayed in a constant state. There are seven types of fixed objects: Lines, circles/ovals, arcs, sectors, polylines, polygons, and rectangles. Up to 2,048 fixed objects can be used in one screen.
Tables	The table function combines multiple functional objects into a single table format. Up to 256 functional objects can be combined into one table.
Frames	A frame object enables creating areas on a screen so that only part of the screen can be switched to another page. Frames consist of more than one page, and the displayed contents of the functional objects created on each page can be switched using the page switching function of the frame. Up to 256 frame pages can be created for each frame. Up to 256 functional objects can be used on each frame page. Up to 10 frames can be created for each screen.
Backgrounds	A background is a graphic screen that is displayed as the background of another screen.*1
Text Files	Text files are used to browse character stings and screen file names displayed by list selection objects, text objects, and bitmap objects.
Flicker settings	The flicker settings make fixed and functional objects flicker at specified intervals. Ten flicker types can be registered for each screen. For fixed objects, a selection can be made from three prepared flicker types.
Password settings	This function asks for a password to be entered when functional objects are manipulated. A password of up to 16 characters can be set. Up to 5 passwords can be set for one project.
Data log settings	Data log settings are used to register changes over time to the contents of an address. Settings can be made for 100 groups, including the log timing. Up to 16 addresses can be set for one group. Up to 50 addresses can be set for constant logging.
Group specifications	This function performs mutually exclusive operations when buttons are pressed. If the same group number is set to multiple buttons, this function ensures that only one button can be turned ON. Groups 1 to 16 can be selected for one screen. The group specification function is used with ON/OFF buttons.
Numeral unit and scale settings	This function facilitates unit name display and scale conversion display for numeral display objects. Up to 1,000 numeral unit and scale settings can be made for one project.
Dialog settings	This function displays a confirmation message when data is written to functional objects. Any confirmation message can be set. Up to 200 write confirmation messages can be set for one project.
Alarm and event settings	This function always monitors signals registered as alarms or events and records any value change (e.g., from OFF to ON.) The registered data can be displayed simply in the alarm and event objects or can be displayed in a list. Up to 5,000 alarms and events can be registered for one project.
Data Block setting	This function writes and reads preset data to a PLC.

Name	Contents
Broken-line graph group setting	This function registers a communications address to be displayed in the broken-line graph. When a broken-line graph group has been set, the new graph can be displayed over the existing graph display. Up to 16 groups can be registered. Up to 256 communications addresses can be set in each group.
Symbol table	This function manages the variables that are registered in a project. Variables can be registered, changed, and deleted.
String Table Setting	This function manages character strings used in projects. Character strings registered in the string table can be used by more than one functional object. Up to 10,000 character strings can be registered for each project.
Settings for switching contents	This function manages character strings and image files (called “contents”) to be displayed. Registered contents can be displayed using the Contents Display. Up to 10,000 contents can be registered for each screen.
Operation Log Setting	The operation log records the following operations. • Operations with functional objects • Operations that switch screens • Operations that execute macros • Operations that turning ON and OFF communications addresses (Used to record the operations of external devices.) A message of up to 32 characters can be set for operations with functional objects and communications addresses. Up to 16 communications addresses can be set for one project.
Device Data Transfer Settings	This function transfers data from transfer sources to transfer destinations when specified conditions are met.

*1. Backgrounds cannot be set for sheets.



Additional Information

A total of up to 1,024 functional objects, frames, and tables can be placed in one screen.

Up to 2,048 graphic displays can be placed in one screen.

2-1-2 Project Properties

Set the properties for the project currently being edited. The following items can be set using this function. Project properties can be changed at any time while project is being created.

Settings	Contents
Title	Sets the project title (up to 64 characters).
Switch label	Sets the number of labels (1 to 16) and the label names (up to 15 characters).
Macro	Sets the macros to be used for the project.
Language selection	Sets the system language to Japanese or English.
Pop-up menu	Sets the popup menu used to set Word Button, Command Button, String Display & Input objects.
Macro option	Sets "\n" in character strings as the line feed code when the message box macro (MSGBOX) is used.
Input option	Sets whether to display the current string in the display fields when entering values in numeral display and input objects, or whether to clear the current string and enter the new string. Also sets whether to disable inputting data from barcodes while the input pad is being used.
Input Status Color	Sets the text and background colors when inputting numerals or character strings in numeral display and input objects, string display and input objects, and temporary input objects.
Data format	Sets the data format when specifying the line number for indirectly specified files.

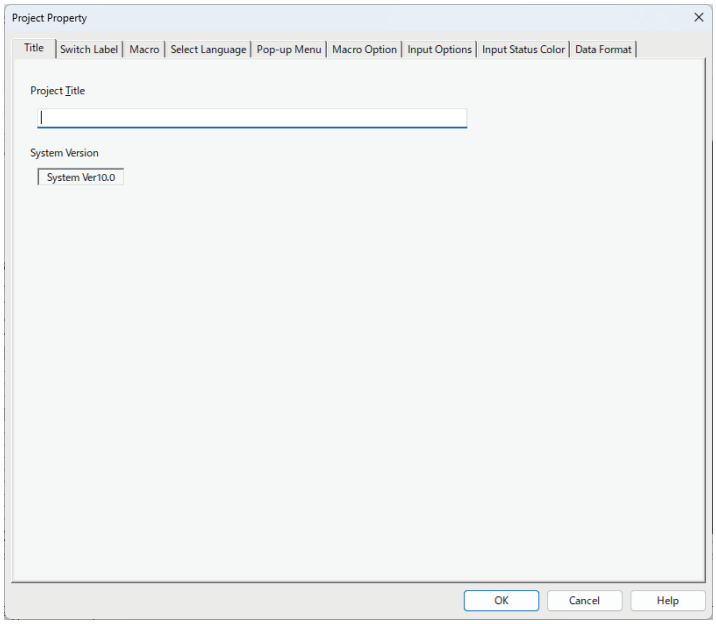
Procedure

1. Select **PT – Project Properties**.
2. The Project Properties Dialog Box will be displayed.
3. Make the settings and then click the **OK** Button.

The setting method for each setting item is explained below.

● Title

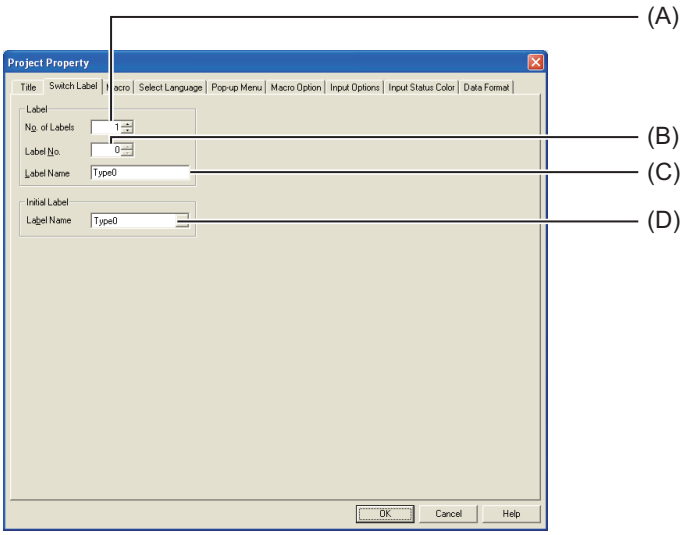
Select the **Title** Tab. Set a title up to 64 characters.



Switching Labels

1 Select the **Switch label** Tab.

2 Make the switch label settings.

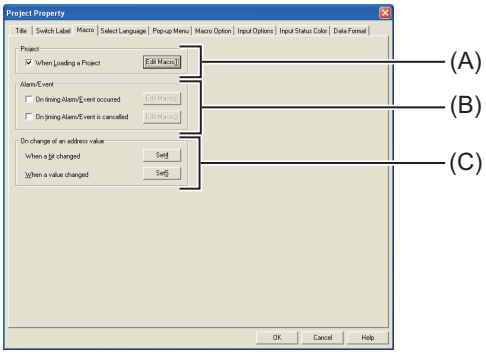


No.	Settings	Contents
(A)	Number of labels	Set how many labels can be switched (1 to 16).
(B)	Switch No.	Set the label number.
(C)	Label name	Set the name for each label number (up to 15 characters).
(D)	Initial label	Set the label number to show on the screen after power to the PT Unit is turned ON. The default setting is 0.

Macros

1 Select the **Macro** Tab.

2 Set the macros to be used for the project. Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)*.



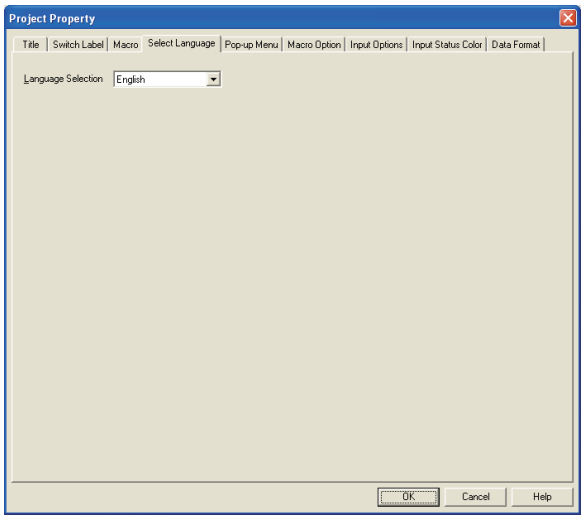
No.	Settings	Contents
(A)	Project	Specify whether to execute the macro when loading a project. Click the **Edit Macro** Button to perform programming.
(B)	Alarm/Event	Specify whether to execute the macro when an alarm/event occurs or when an alarm/event is cancelled. Click the **Edit Macro** Button to perform programming.
(C)	When changing value	Specify whether to execute the macro when a specified address (bit) is turned ON/OFF or when the value in a specified address (word) changes. For details on setting methods, refer to *System Settings and Project Properties* in the *CX-Designer Online Help*.

Language Setting

1 Click the **Select Language** Tab.

2 Select the system language for the PT Unit.

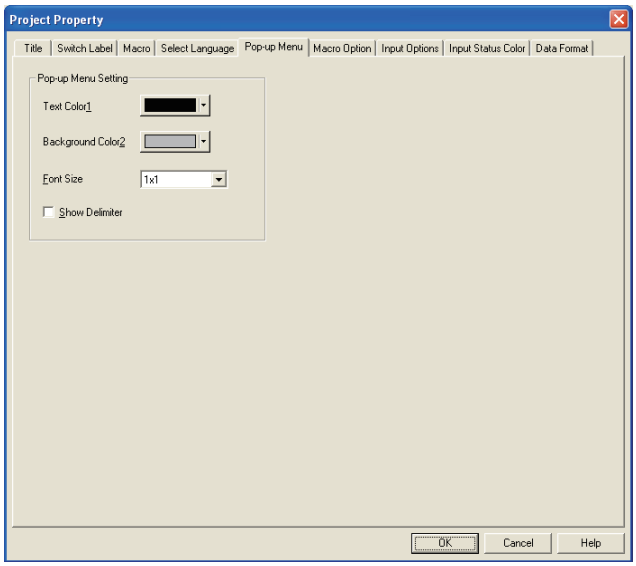
The system language will be displayed on the PT Unit for system menus, keypads, messages, dialog boxes, etc.



Pop-up Menu Setting

1 Click the **Pop-up Menu** Tab.

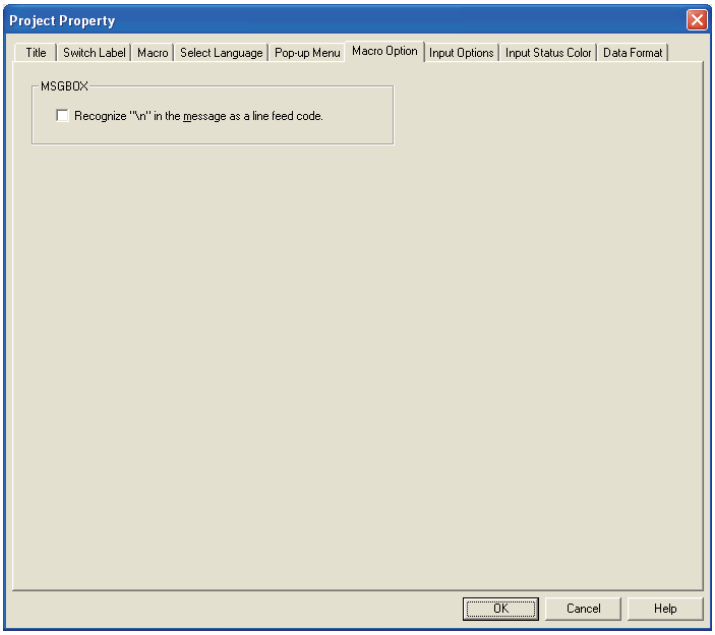
2 Make the settings for the pop-up menu used to set word button, command button, string display, and string input objects.



Macro Option

1 Click the **Macro Option** Tab.

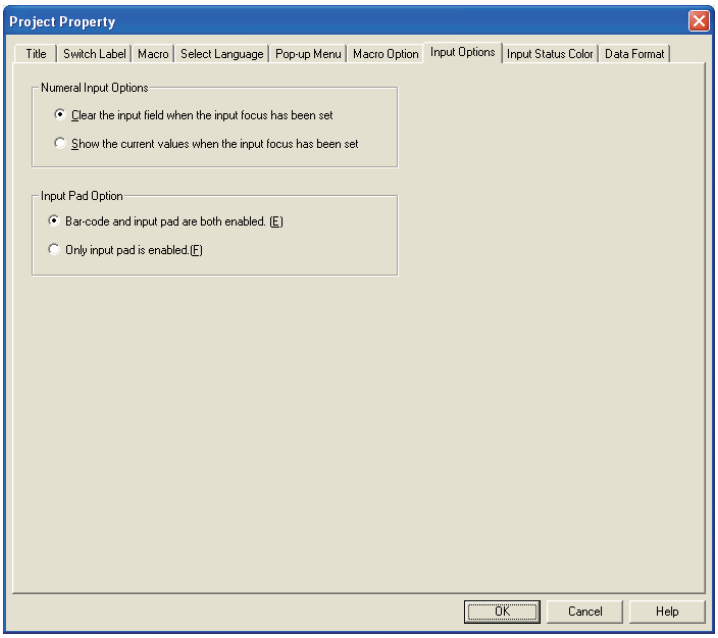
2 Select the option to recognize “\n” in character strings as the line feed code and to display multiple-line messages when using the message box macro (MSGBOX).



Input Option

1 Click the **Input Options** Tab.

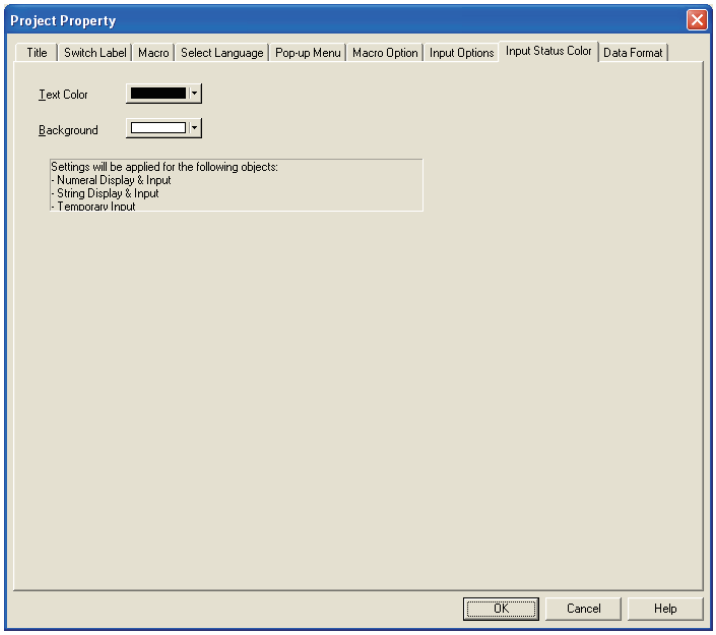
2 Set whether to display the present value when entering values in numeral display and input objects, or whether to clear the present value and enter the new value. Also set whether to enable inputting data from barcodes while the input pad is being used.



Input Status Color

1 Click the **Input Status Color** Tab.

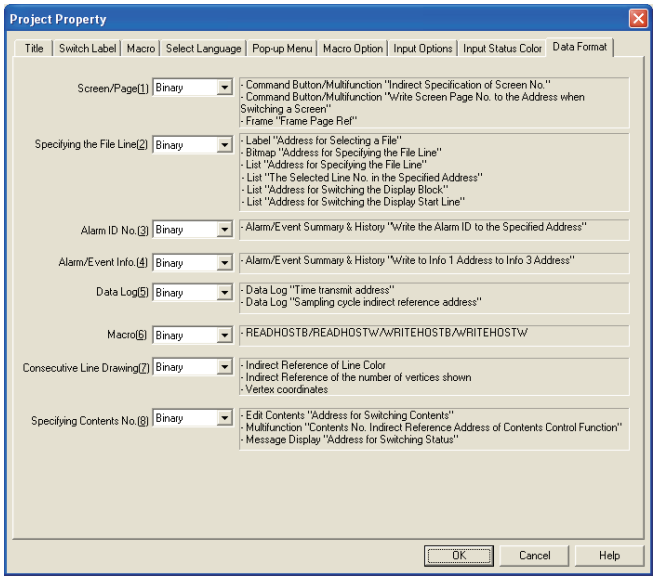
2 Set the text and input status background colors when inputting numerals or character strings in numeral display and input objects, string display and input objects, and temporary input objects.



Data Format

1 Click the **Data Format** Tab.

2 Select either BCD or binary as the data format when specifying the line numbers for indirectly specified files.



2-2 NS-B-series Screen Types

2-2-1 Display Colors

Up to 256 colors can be used in NS-B-series displays. BMP and JPEG images can be displayed with up to 65,536 colors (16 million colors for the NB15W-TW01B-V1-S).

Select the color to be displayed from the *Color setting* Dialog Box displayed when creating screens using CX-Designer.

An alternative indirect method for specifying display colors is to change the display color based on the contents of a set address.

Additional Information

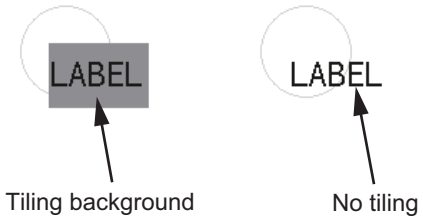
Set a color code of between 0 and FF at the communications address to indirectly specify the display color. If a value other than 0 to FF is set at the address, the display color will be undefined.

Through Display

If layers of objects are displayed, the background color for the object on top will normally overwrite the object underneath and the bottom object will no longer be visible.

Some objects can be set so that the background will not be filled.

If the object is set for no tiling, the background of the object will not have a color and other objects under the background or the screen background color will show through.



- **No Tiling**

  Labels, numeral display and input objects, string display and input objects, list selection objects, thumbwheel switches, broken-line graphs, alarm/event displays, alarm/event summary & histories, dates, times, data log graphs, rectangles, circle/ovals, polygons, and sector can be set for no tiling.

Screen Background Colors

The background color for each screen can be set under **Background color** in the screen attributes. The screen attributes are set using CX-Designer as properties for each screen.

Character Colors

The color of the characters themselves can also be set.

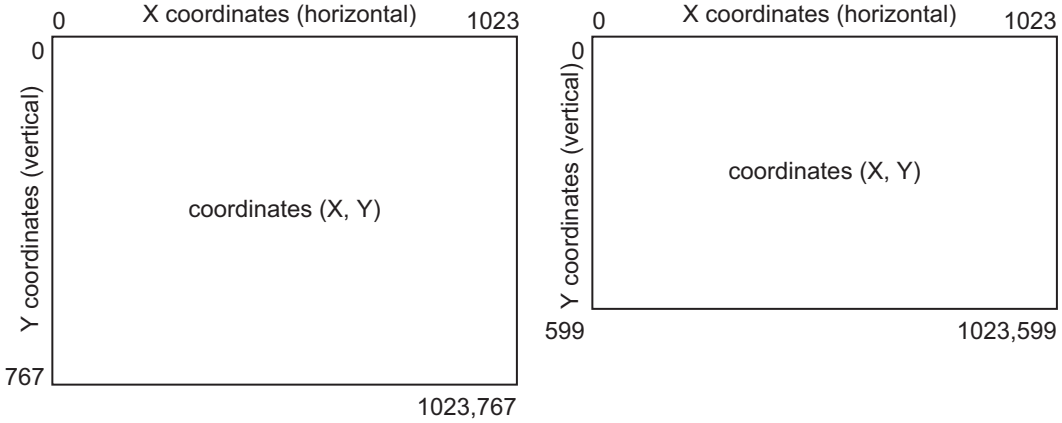
The character color is set as one of the properties when setting the labels for each object using CX-Designer. Character colors can also be specified indirectly.

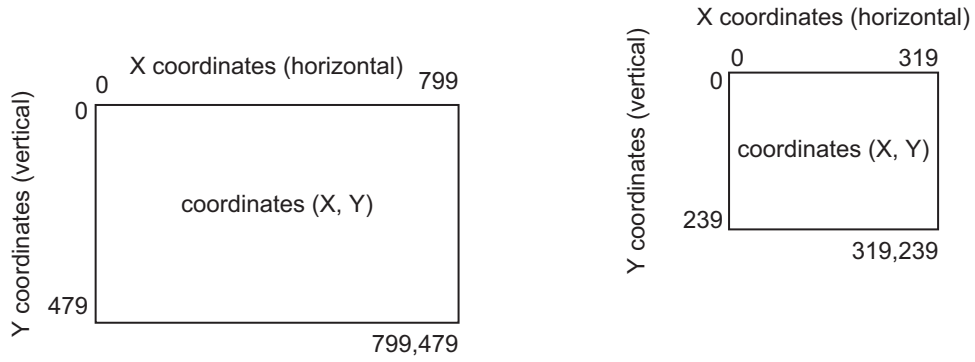
2-2-2 Screen Configuration

The screens of the models have the following configurations.

- NB15W-TW01B-V1-S: 1024 dots horizontal and 768 dots vertical
- NB10W-TW01B-V1-S: 1024 dots horizontal and 600 dots vertical
- NB7W-TW01B-V1-S: 800 dots horizontal and 480 dots vertical
- NB5Q-TW01B-V1-S: 320 dots horizontal and 240 dots vertical

Each point on the screen is specified using X (horizontal) and Y (vertical) coordinates. The origin of the coordinates (0,0) is the upper left corner.





2-2-3 Screen Numbers

NS-B-series screens are categorized and controlled using screen numbers.

Screen numbers are used to specify the display screen when the PT Unit is started or when switching the displayed screen.

Except for the System Menu Screen for which specific functions have been set, up to 4,000 screens can be set for NS-B-series PTs. Any number between 0 and 3,999 can be set for these screens.

In addition, up to 32 sheets can be registered for layered display on normal screens. Any number between 0 and 31 can be set for these sheets.

When screens are created using the CX-Designer, the screen number is specified and the objects to be displayed are registered.

2-2-4 Screen Types

The following two screen types are available.

Screen	Contents
User Screens	Used to create normal screens. • Normal screens (base screens) Basic screens displayed during operation. • Pop-up screens Pop-up screens that can be displayed layered on top of base screens.
Sheets	Sheets are screens used when the same images are to be displayed on more than one screen. Used in layers on normal screens.

There are also frames that have a switching function that switches the display on specific areas in the screen.

Name	Contents
Frame	Objects can be created on each page of the frames in the screen.

Additional Information

Refer to *Creating Screens* in the *CX-Designer Online Help* for details on creating screens.

User Screens

● Normal Screens

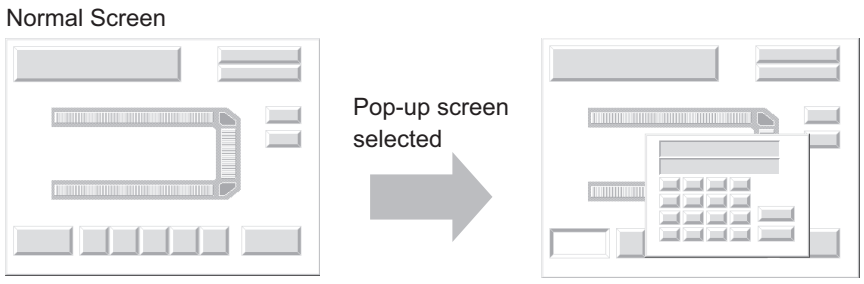
Normal screens are basic screens displayed during operation.

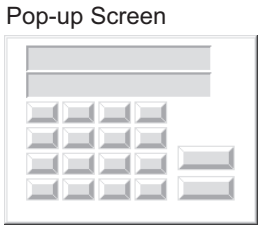
Any functional objects or fixed objects can be created for normal screens.

Up to 4,000 screens can be created for each project and any number between 0 and 3,999 can be allocated to the screens.

● Pop-up Screens

Only one normal screen at a time can be displayed during operation, but pop-up screens can be layered on top of normal screens. Pop-up screens are created the same way as normal screens. These pop-up screens can be used to display user keypads or help screens. Up to three pop-up screens can be opened at a time.





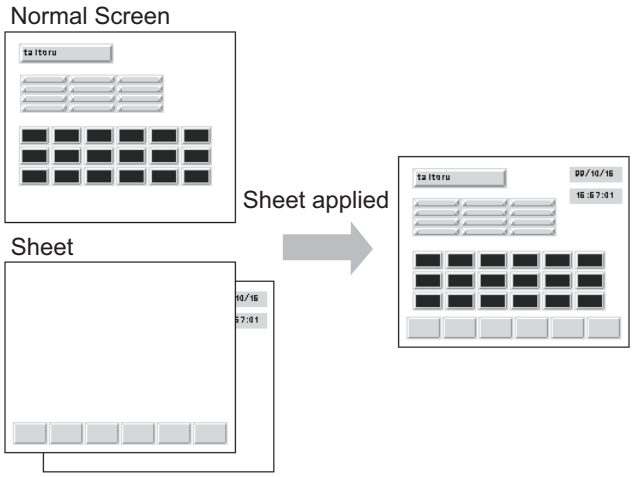
Additional Information

- Pop-up screens are created the same way as normal screens.
  After a screen is created, specify under the screen properties whether it will be a normal screen or pop-up screen. Screen number 0, however, cannot be set as a pop-up screen.
- Data Block Tables and Video Displays cannot be created on pop-up screens. For details, refer to *Creating Screens* in the *CX-Designer Online Help*.

Sheets

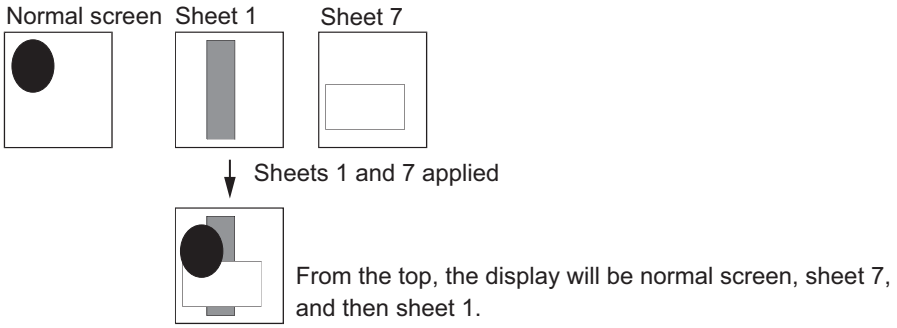
Sheets are screens that can be displayed in layers on standard screens.

If a functional object, such as screen switching buttons or date display, is used in multiple screens, the functional object can be registered to a sheet. By then setting which sheet is applicable to which screen, the functional object can be used on all applicable screens.



Additional Information

- Up to 32 sheets can be created for each project.
  Up to 1,024 functional objects can be created in one sheet, the same as for normal screens.
- Up to 10 sheets can be applied over one user screen.
- If multiple sheets are applied to a normal screen and if the position of the functional objects for the normal screen and the sheets overlaps, the standard screen objects will be displayed on top. The sheet objects will be displayed in order, with the object with the highest screen number on top.



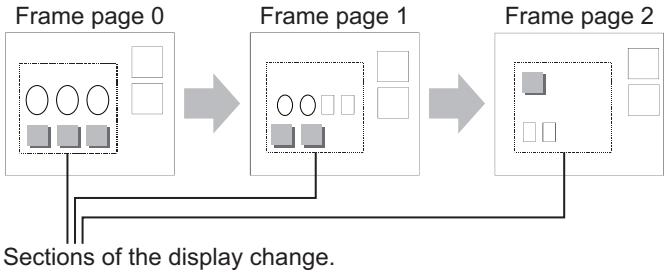
- Data Block Tables cannot be created on sheets.

Frames

A frame object enables creating areas on a screen so that only part of the screen can be switched to another page. Frames consist of more than one page based on the user settings and the displayed contents of the functional objects configuring each page can be switched based on PT Unit or PLC status.

Frames can contain fixed objects, functional objects, and tables.

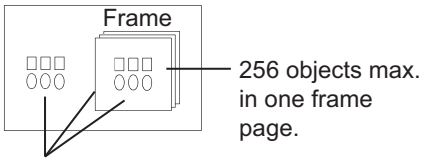
Created frames registered in a library can be easily reused at many different locations or on different screens.



Additional Information

- If frames are switched frequently, the display update may take some time and communications may be delayed. Care must be taken because this means that sometimes data will not be logged or the momentary ON/OFF buttons may not operate normally.
- Make sure the functional objects in the frame do not protrude from the frame. If the objects do protrude from the frame when it is created, they will be displayed incorrectly outside the frame.
- Up to 10 frames can be created within one screen.

  Up to 256 functional objects can be created in one frame page. The total number of functional objects that can be created in one screen, including the functional objects on each frame page and the functional objects outside frames, is 1,024.



Total of 1,024 objects overall.
Each frame also counted as 1 object.

- Data Block Tables cannot be created in frames.

2-2-5 Screen Objects

Functional Objects

The following functional objects can be used.

Icon	Name	Function
	ON/OFF Button	Controls the ON/OFF status of the specified write address. The action type can be selected from momentary, alternate, SET, or RESET.
	Word Button	Sets numeric data at the specified address. The contents can also be incremented and decremented.
	Command Button	Performs special processing, such as switching screens, controlling pop-up screen and Video display, etc.
	Bit lamp	Turns ON and OFF according to the ON/OFF status of the specified address.
	Word lamp	Lights in 10 steps according to the contents of the specified address (0 to 9).
	Multifunction Object	Executes multiple functions at the same time when the object is pressed or the value at a specified address changes.
	Label	Displays the registered character string.
	Numeral Display & Input	Numerically displays the word data from the specified address and input data from a tenkey pad.
	String Display & Input	Displays the character string from the word data from the specified address and input data from a keyboard.
	List Selection	Displays the registered character strings in a list for selection.
	Thumbwheel Switch	Numerically displays the word data from the specified address and increment and decrement the data when increment/decrement buttons are pressed.
	Analogue Meter	Displays graphs in three colors in circles, semi-circles, or quarter circles for the word data at the specified addresses.
	Level Meter	Displays levels in three colors for the word data at the specified address.
	Broken-line Graph	Displays broken-line graphs for the word data at the specified addresses.
	Bitmap	Displays image data. Image data in BMP and JPEG format can be displayed.
	Alarm/Event Display	Displays alarms or events that have occurred in order of priority.
	Alarm/Event Summary History	Displays a list of alarms/events and the history.
	Date	Displays and sets a date.
	Time	Displays and sets a time.
	Temporary Input	Provides a temporary display of an input value or character string.
	Data Log Graph	Displays trend graphs for the word data at the specified addresses.
	Data Block Table	Writes to and reads from PLC preset recipe data, such as instructions for manufacturing process.
	Consecutive Line Drawing	Displays a polyline shape that can be changed with the contents of communications addresses.

Icon	Name	Function
	Contents display	Displays the contents (character strings or image files) according to the contents switching setting.

Tables and Frames

The following frames and tables are available.

Icon	Name	Contents
	Frame	Switches the specified rectangle area (frame).
	Table	Displays functional objects in a table format.

Fixed Objects

The following fixed objects can be used.

Icon	Name	Contents
	Rectangle	Displays a rectangle.
	Circle/Oval	Displays a circle or ellipse.
	Line	Displays a line or arrow.
	Polyline	Displays a polyline.
	Polygon	Displays a polygon.
	Sector	Displays a sector.
	Arc	Display an arc.

2-3 Internal Memory

The internal memory in the NS-B-series PT can be read and written by the user. Internal memory can be allocated as required for settings, such as the communications addresses of functional objects.

The internal memory is divided into bit and word sections.

2-3-1 Bit Memory ($B)

The bit memory in an NS-B-series PT is indicated by $B. Up to 32,768 bits can be used. Addresses from $B0 to $B32767 can be read and written by the user.

Bit memory is used for signal information that indicate ON/OFF status for functional object addresses and control flags.

2-3-2 Word Memory ($W)

The word memory in PTs is indicated by $W. Up to 32,768 words can be used. Addresses from $W0 to $W32767 can be read and written by the user.

Word memory is used to store all numeral and character string data, including data for allocated addresses for functional objects.

Each word contains 16 bits, but consecutive words can be used as required for character strings and 32-bit data.

Additional Information

- Internal memory cannot be read and written directly from the host.
- The internal memory size is fixed at 32,768 bits for $B and 32,768 words for $W.

2-3-3 Internal Holding Memory ($HB/$HW)

The memory in NS-B-series PT that holds values even when the power to the PT Unit is turned OFF is indicated by $HB and $HW. $HB holds 8,192 bits and $HW holds 8,192 words. Any address from $HB0 to $HB8191 or $HW0 to $HW8191 can be read and written by the user.

$HB is used for signal information that indicates ON/OFF status for functional object addresses and control flags. $HW is used to store numeral and character string data, including data for allocated addresses for functional objects.

Each word in $HW contains 16 bits, but consecutive words can be used as required for character strings and 32-bit data.

2-4 System Memory

System memory is used for exchanging information between the host and the PT Unit, such as for controlling the PT Unit and notifying the host of status.

The system memory is divided into bit and word sections.

2-4-1 System Bit Memory ($SB)

System bit memory is used to exchange information between the host and the PT Unit, such as for controlling the PT Unit and notifying the host of status, in bit units.

The system bit memory contains 64 bits with predefined functions.

The system bit memory is listed in the following table.

Address	Classification	Function
$SB0	Notification	RUN Signal (Pulse)
$SB1	Notification	RUN Signal (Always ON)
$SB2	Notification	Screen Switch Strobe
$SB3	Control	Prohibit Shifting to System Menu
$SB4	---	Reserved
$SB5	Notification	Data Input Detector
$SB6	Control	Brightness Adjust, High
$SB7	Control	Brightness adjust, middle
$SB8	Control	Brightness adjust, low
$SB9	Control	Backlight Control (Screen Saver Start/Cancel)
$SB10	Control	Control Backlight Flashing
$SB11	Notification	Backlight Status
$SB12	Control	Continuous Buzzer
$SB13	Control	Short Intermittent Buzzer
$SB14	Control	Long Intermittent Buzzer
$SB15	---	Reserved
$SB16	Control	Processing Priority Registration for Port A (NT Link 1:N)
$SB17	Control	Processing Priority Registration for Port B (NT Link 1:N)
$SB18	Control	Display Keypad with Temporary Input
$SB19	Control	Prohibit Input
$SB20	---	Reserved
$SB21	---	Reserved
$SB22	---	Reserved
$SB23	---	Reserved
$SB24	---	Reserved
$SB25	Control	Capture Screen
$SB26	---	Reserved
$SB27	---	Reserved
$SB28	---	Reserved
$SB29	---	Reserved
$SB30	Notification	Capture Busy Status
$SB31	Notification	Capture Screen Error
$SB32	Notification/control	Initialize Alarm/Event History
$SB33	Notification/control	Save Alarm/Event History
$SB34	Notification/control	Internal Holding Memory ($HB/$HW) Initialization
$SB35	Notification/control	Initialize Data Log
$SB36	Notification/control	Save Data Log
$SB37	Notification/control	Initialize Operation Log

Address	Classification	Function
$SB38	Notification/control	Save Operation Log
$SB39	Control	Log Functional Object Operation
$SB40	Control	Log Switch Screen Operation
$SB41	Control	Log Macro Operation
$SB42	Notification/control	Initialize Error Log
$SB43	Notification/control	Save Error Log
$SB44	---	Reserved
$SB45	Control	Macro error display control
$SB46	Notification	Notification of Macro Error
$SB47	Notification	Logging Process or Video Capture Error Flag
$SB48	Notification	USB Memory Free Space Check Flag
$SB49	Notification/control	Stop USB Memory
$SB50	Notification	USB Memory Removing Status (Power OFF)
$SB51	Notification	Periodical Data Log Save in Process Flag
$SB52	Notification	Data Block Operation Complete Flag
$SB53	Notification/control	Prohibit Screen Saver Startup
$SB54	Notification	Password Level 1 Operable Status
$SB55	Notification	Password Level 2 Operable Status
$SB56	Notification	Password Level 3 Operable Status
$SB57	Notification	Password Level 4 Operable Status
$SB58	Notification	Password Level 5 Operable Status
$SB59	---	Reserved
$SB60	---	Reserved
$SB61	---	Reserved
$SB62	Notification/control	Save Internal Holding Memory
$SB63	---	Reserved

Note The notification bits are not write-prohibited. Also, the system will not restore values, except when the status has changed.



Additional Information

The NS-B-series PT may operate incorrectly if addresses that are reserved by the system are accessed. Do not access these addresses.

System bit memory ($SB) can be allocated to the following areas on the host PLC. Set a BOOL variable with 64 elements when allocating a tag.

Symbol	Area Name	Allocation			
		C-series PLCs	CVM1/CV-series PLCs	CS/CJ-series PLCs	NJ-series Controllers
None	I/O area (IR)	○	○	○	○
H	HR Area	○	---	○	○
A	AR Area	○	×	○	---
L	LR Area	○	---	○*1	○*1
T	Timer present values	×	×	×	---
TU	Timer Completion Flags	---	---	×	---
C	Counter present values	×	×	×	---
CU	Counter Completion Flags	---	---	×	---
W	Work Area	---	---	○	○
TK	Task Flags	---	---	×	×
D	DM Area	○	○	○	○
E	EM Area (Current bank)	○*2	○	○	---
E0_ to E18_	EM Area Bank 0 to 18	---	---	○	○

*1. LR 00000 to LR 00199 are converted to and used as I/O area words CIO 01000 to CIO 01199.

*2. C200HX/HG/HE-E/-ZE PLCs are the only C-series PLCs that support the EM Area (EM).

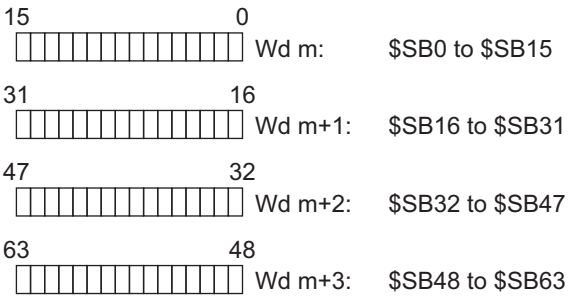
All bits in the AR Area for CVM1/CV-series PLCs are allocated for system functions and cannot be used for any other application.

Additional Information

The ranges for each area vary with the PLC model. Refer to *NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131)*. Refer to *System Settings and Project Properties in the CX-Designer Online Help* for details on allocation methods.

System memory is allocated to PLC areas as shown below.

Set the allocation addresses for the system memory on the Initial Tab Page of the CX-Designer. Select **PT – System Settings** to access the Initial Tab Page.



Additional Information

- The method for allocating system memory in the PLC areas is the same as for the NT Series. Refer to *2-4-3 System Memory Compatibility with the NT Series* on page 2-44 for details.
- Set a BOOL variable with 64 elements when allocating a tag.

● RUN Signal (Pulse) ($SB0)

$SB0 notifies the host memory and PT memory that the PT Unit is operating (normal operation on normal screens.) During operation, $SB0 alternates between ON and OFF according to the interval set for RUN signals (pulses).

$SB0 will not turn OFF and ON if no communications between $SB0 and the allocated address is set in the CX-Designer system settings.

Status	RUN signal status	Operation when status cleared
System Menu	Stops notification.	Restarts notification.
Transfer	Stops notification.	Restarts notification.
Error*1	Stops notification.	Restarts notification.
Start	Stops notification.	Starts notification.
Screen saver	Continues to alternate ON/OFF notification.	Continues to alternate ON/OFF notification.

*1. An error dialog box (× dialog box) is displayed.

● RUN Signal (Always ON) ($SB1)

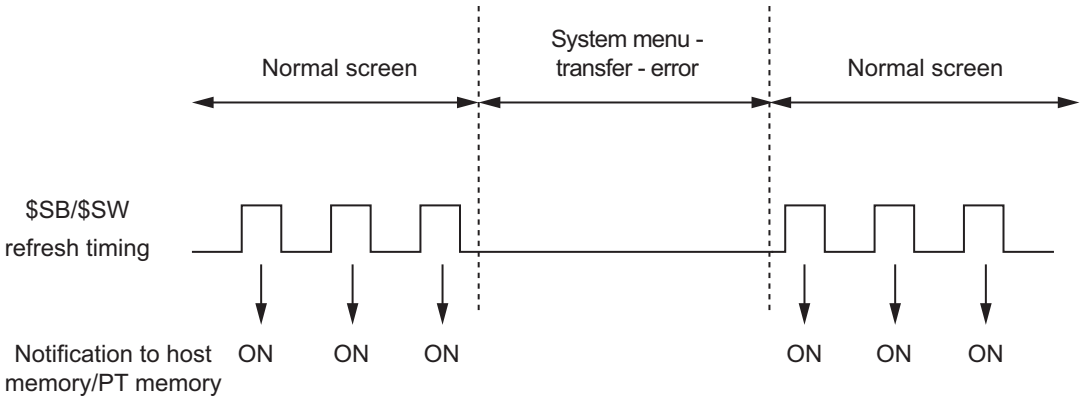
$SB1 notifies the host memory and PT memory that the PT Unit is operating (normal operation on normal screens.) During operation, $SB1 turns ON according to the interval set for RUN signals (pulses) in the $SB and $SW.

$SB1 will not turn ON if no communications between $SB1 and the allocated address is set in the CX-Designer system settings.

Status	RUN signal status	Operation when status cleared
System Menu	Stops notification.	Restarts notification.
Transfer	Stops notification.	Restarts notification.
Error*1	Stops notification.	Restarts notification.
Start	Stops notification.	Starts notification.
Screen saver	Continues to notify ON.	Continues to notify ON.

*1. An error dialog box (× dialog box) is displayed.

If the status is changed to System Menu, transfer, or another status, the notification will stop but OFF notification will not be made before the status change.



Precautions for Safe Use

Include programming that regularly accesses the RUN signal and confirms that the PT Unit is operating normally.

Screen Switch Strobe ($SB2)

$SB2 is for notification of screen switching.

Immediately after the screen is switched, $SB2 is turned ON the next time $SB/$SW is refreshed and then turned OFF at the following $SB/$SW refresh.

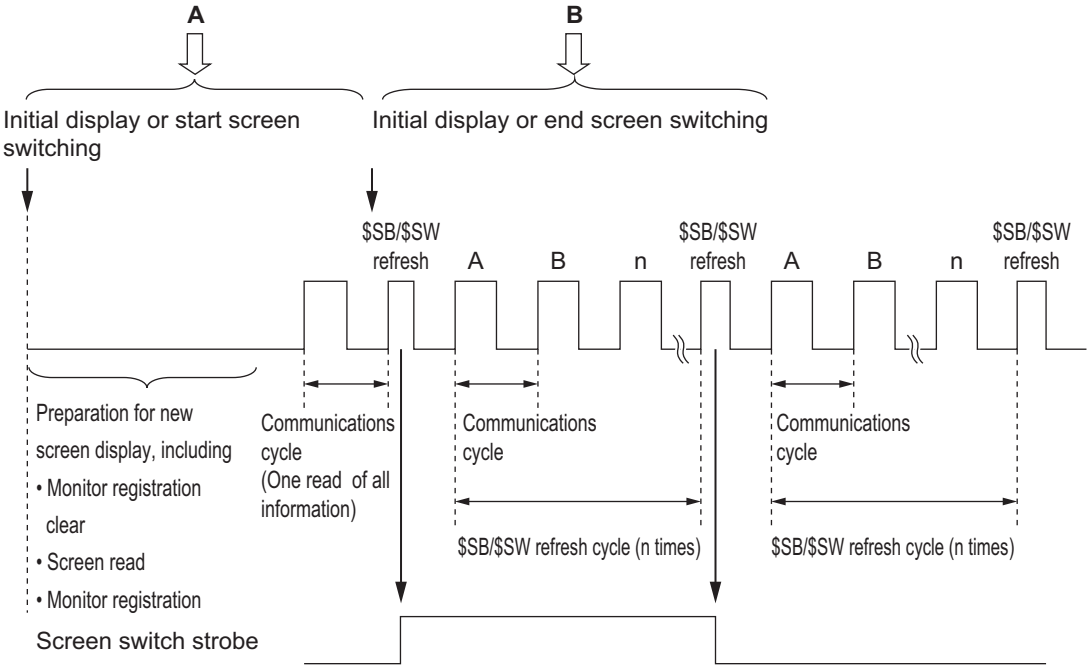
Notification is made when the screen switches to a normal (base) screen.

Timing	Screen switch strobe notification
From base screen to base screen	Yes
From non-base screen to base screen*1	No
Open, close, move pop-up screen	No
Move to System Menu	No
Move to transfer	No
Startup initial screen display	No
Move to screen saver	No
Frame switch	No
Screen switch failure (switched to non-existent screen)	No

*1. Applicable to System Menu, transfer, and screen saver.

$SB2 will not turn OFF if no communications between $SB2 and the allocated address is set in the CX-Designer system settings.

The screen switch strobe will operate as shown in the following diagram if a screen switch is performed after another screen switch.



Switching to Another Base Screen during “A”

The PT Unit moves to the next screen switch processing without making screen switch strobe notification for the first screen.

Switching to Another Base Screen during “B”

The PT Unit moves to the next screen switch processing without turning OFF screen switch strobe notification for the first screen.

Prohibit Shifting to System Menu ($SB3)

$SB3 prohibits transfer to System Menu. If $SB3 is turned ON, transfer to System Menu is prohibited by pressing the two points on the screen. Transfer from an error dialog box to the System Menu when an error is generated is not prohibited.

Data Input Detector ($SB5)

$SB5 detects numeral and character input. $SB5 turns ON when numeral and character (virtual keyboard) input dialog boxes are opened and turns OFF when these dialog boxes are closed.

If *Input from Pop-up Screen* is specified as the input method in the input functional object for numeral or character string display and input, $SB5 will turn ON when the pop-up screen is opened and will turn OFF when the focus is moved to another object. If *Other Input Method (command button, etc.)* is specified, $SB5 will turn ON when the focus is on the object and will turn OFF when the focus leaves the object.

Brightness Adjust ($SB6, $SB7, and $SB8)

$SB6 to $SB8 are used to adjust backlight brightness.

$SB6 is used to adjust the backlight brightness to high. The brightness can be adjusted to high by turning ON $SB6.

$SB7 is used to adjust the backlight brightness to middle. The brightness can be adjusted to middle by turning ON $SB7.

$SB8 is used to adjust the backlight brightness to low. The brightness can be adjusted to low by turning ON $SB8.

If the screen saver has started, the screen saver will remain even if $SB6, $SB7, or $SB8 is turned ON.

If $SB6 to $SB8 and $SW12 are changed at the same time, the backlight brightness will be changed to the setting for which the change was detected last.



Additional Information

- If more than one of these bits turns ON at the same time, the priority order of brightness is high, middle, and then low.
- If bits $SB6 to $SB8 are all turned OFF, the background brightness will be high.

Backlight Control (Screen Saver Start/Cancel, $SB9)

When $SB9 turns ON, the backlight will go out 3 seconds later and the screen saver will start. When $SB9 turns OFF, the screen saver is canceled and the backlight turns ON. Even if the screen saver is set to OFF on the PT Tab Page of the System Settings, the screen saver will start when this bit turns ON. The screen saver will also be canceled if the screen is touched while the screen saver is being displayed. If $SB9 is turned ON while the Control Backlight Flashing bit ($SB10) is ON, the backlight will flash. $SB9 will turn OFF.

Control Backlight Flashing ($SB10)

$SB10 controls backlight flashing. When $SB10 turns OFF, the backlight is lit and when $SB10 turns ON, the backlight flashes.

If the screen saver has started, the screen saver will remain and the screen will not flash even if $SB10 is turned ON. If $SB10 is ON when the screen saver is closed, the screen will start flashing after the screen saver has closed.

If the screen is switched to System Menu while the backlight is flashing (i.e., $SB10 is turned ON), the flashing will stop. The flashing will start again when the screen is changed back from System Menu.

If an error dialog box is displayed while the backlight is flashing (i.e., $SB10 is turned ON), the flashing will stop. The flashing will start again when the error dialog box is closed.

Backlight Status ($SB11)

$SB11 indicates the status of the backlight. $SB11 turns ON while the backlight is not lit.

Buzzers ($SB12, $SB13, and $SB14)

Bits $SB12 to $SB14 are used to sound buzzers. $SB12 starts a continuous buzzer, $SB13 starts a short intermittent buzzer (0.5 s intervals), and $SB14 starts a long intermittent buzzer (1 s intervals). When bits $SB12 to $SB14 turn ON, the buzzer sounds while the bit remains ON. Bits $SB12 to $SB14 all turn OFF if the buzzer is stopped using the command buttons.

The buzzers sound only when the buzzer sound setting in the System Menu is set to ON in the CX-Designer system settings. (The buzzer will not sound if this setting is set to OFF or ERROR ON.)



Additional Information

If more than one of these bits turns ON, the priority order for the buzzers is continuous, short intermittent, and then long intermittent.

Processing Priority Registration ($SB16 and $SB17)

$SB16 and $SB17 are used to register processing priorities for serial ports A and B, respectively.

When multiple PTs are connected using standard or high-speed NT Links (for 1:N), one PT Unit can be registered for priority processing. The PT Unit with bits $SB16 and $SB17 set to ON will be given priority, with improved display and touch switch response speed. This registration will be cleared if $SB16 and $SB17 are turned OFF and the response speed will return to normal.



Additional Information

If more than one PT Unit is registered for priority processing, the most recently registered PT Unit will be given priority.

The unit number of the PT Unit with priority registration can be checked by monitoring (reading) the PLC words. Refer to the manual for the PLC for information on how to monitor words in the PLC.

The contents of the words that reflect the status of standard and high-speed NT Links (for 1:N) are shown in the following table.

Word	Bit	Function		
C200HX/HG/HE-E/-ZE 265 (internal RS-232C port) 284 (port A)*1 285 (port B)*1 CS Series, CP Series, and CJ Series AR393 (internal RS-232C port) AR394 (peripheral port) CIO 1909 (port 1)*2 CIO 1919 (port 2)*2 n + 9 (port 1)*3 n + 19 (port 2)*3 CQM1H IR 202 (port 1)*2 IR 203 (port 2)*2	0	Unit 0	Peripheral Port PT Communications Flag	ON when connected
	1	Unit 1	Peripheral Port PT Communications Flag	ON when connected
	2	Unit 2	Peripheral Port PT Communications Flag	ON when connected
	3	Unit 3	Peripheral Port PT Communications Flag	ON when connected
	4	Unit 4	Peripheral Port PT Communications Flag	ON when connected
	5	Unit 5	Peripheral Port PT Communications Flag	ON when connected
	6	Unit 6	Peripheral Port PT Communications Flag	ON when connected
	7	Unit 7	Peripheral Port PT Communications Flag	ON when connected
	8	Unit 0	Priority Registered Flag	ON when given priority
	9	Unit 1	Priority Registered Flag	ON when given priority
	10	Unit 2	Priority Registered Flag	ON when given priority
	11	Unit 3	Priority Registered Flag	ON when given priority
	12	Unit 4	Priority Registered Flag	ON when given priority
	13	Unit 5	Priority Registered Flag	ON when given priority
	14	Unit 6	Priority Registered Flag	ON when given priority
	15	Unit 7	Priority Registered Flag	ON when given priority

*1. Port on the Communications Board.

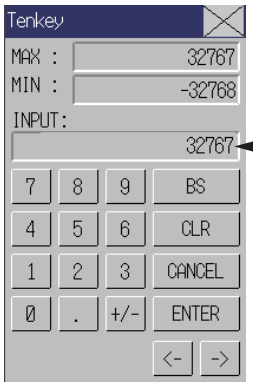
*2. Port on the Serial Communications Board.

*3. Port on the Serial Communications Board.
n = 1500 + 25 × Serial Communications Unit No. (CIO Area)

● Display Keypad with Temporary Input ($SB18)

$SB18 changes the keypad displayed for a Numeral Display & Input or Data Block Table object. The following keypads will be displayed according to the bit status.

$SB18: ON



Input values are displayed on the keypad.

$SB18: OFF



Additional Information

- A keypad with temporary input is not displayed on the test screen. The normal keypad is always displayed.
- If display of the unit name is specified for Numeral Display & Input objects, the unit will also be added to the keypad with a temporary input field.

Input Prohibit ($SB19)

$SB19 prohibits input. Input to base and pop-up screens is prohibited when $SB19 is turned ON. However, $SB and $SW controls, e.g., screen switching using SW0, are not prohibited. Input using tenkey pads, error dialog boxes, or other dialog boxes displayed by the system is not prohibited either.

To clear input prohibit, turn OFF $SB19 from the host or enter the password specified using $SW13 in the password dialog box displayed when the screen is touched. The system automatically turns OFF $SB19 if a password is used to clear input prohibit.

If $SW13 is not a value between 1 and 5, $SB19 (input prohibit clear) will be turned OFF without displaying the password dialog box when the screen is touched.

If a password character string has not been set under the password settings for the password number specified using $SW13, $SB19 will be turned OFF without displaying the password dialog box, i.e., input prohibit is cleared when the screen is touched.

Additional Information

- The password character string for each login level is set under either **PT – Password** on the CX-Designer or **System Menu – Password** on the PT Unit.
- Use the Touch Switch Lock Control Flag to not display the password input dialog box used to cancel input prohibition when the screen is touched and keep input prohibited. Refer to *3-10-2 Prohibiting and Allowing Input to All Screen Functional Objects* on page 3-33 for information on the Touch Switch Lock Control Flag.

Capture Screen ($SB25)

$SB25 starts capturing and saving it as a bitmap file on the removable media. When “1” is stored in $SW11 and $SB25 is turned ON, the currently displayed screen is captured and a screen_-cap_XXX.bmp file is output to the \LOG\CAPTURE folder in the removable media directory. If a value other than “1” is stored in $SW11 and $SB25 is turned ON, the currently displayed screen is printed. $SB25 will remain ON until turned OFF either from the host or by using a functional object. Printing or screen capture will not be started again while the screen is being printed or a bitmap file is being output, even if $SB25 is turned ON again.

screen_cap_999.bmp

- File Number
  The files will be automatically numbered in order from 001 to 999. When all numbers have been used or there is insufficient space left on the removable media, the oldest file will be deleted and the new file saved.
- Fixed character string “screen_cap”

Additional Information

$SB26 to $SB29 will not function while “1” is stored in $SW11.

Capture Busy Status ($SB30)

$SB30 turns ON when the following operations are being executed: Capture Screen. $SB30 turns OFF automatically when these operations have been completed.

Capture Screen Error ($SB31)

$SB31 turns ON when any of the following operations end in an error: Capture Screen. $SB31 turns OFF when all errors related to Capture Screen have been eliminated.

Initialize Alarm/Event History ($SB32)

$SB32 initializes alarm and event history data. When $SB32 is turned ON, the alarm and event history information recorded in the PT Unit is initialized. Once the initialization has been completed, the system automatically turns OFF $SB32. The history data to be initialized can be specified using $SW40.

Save Alarm/Event History ($SB33)

$SB33 saves alarm and event history data. When $SB33 is turned ON, the alarm and event history data is saved to the removable media as a CSV file. Once the data has been saved, the system automatically turns OFF $SB33.

Alarm data is output to log\Alarm.csv (classified into high, middle, and low level alarms) and event data is output to \log\Event.csv files on the removable media. The file names are fixed, and files previously output to the removable media will be overwritten.

If no alarms have accumulated, alarm data will not be saved. ($SB33 will turn OFF and $SB47 will not turn ON.)

If no events have accumulated, event data will not be saved. ($SB33 will turn OFF and $SB47 will not turn ON.)

If an error occurs during the save operation (e.g., the removable media is not in place, there is insufficient free disk space, or the removable media is damaged), $SB33 will turn OFF and $SB47 will turn ON. No error message will appear on the screen, however, when an error occurs.

If $SB32 and $SB33 turn ON simultaneously, initialization will be executed first. For this reason, Alarm.CSV and Event.CSV files will not be created.

Internal Holding Memory ($HB/$HW) Initialization ($SB34)

$SB34 initializes the internal holding memories. When $SB34 is turned ON, the internal holding memories ($HB0 to $HB8191 and $HW0 to $HW8191) are initialized. Once the initialization has been completed, the system automatically turns OFF $SB34.

Initialize Data Log ($SB35)

$SB35 initializes the data log data. When “0” is stored in $SW37 and $SB35 is turned ON, data log information for all groups recorded by the PT Unit is initialized. If a group number is stored in $SW37 and $SB35 is turned ON, the data log information for that group only will be initialized. Once the initialization has been completed, the system automatically turns OFF $SB35.

Save Data Log ($SB36)

$SB36 saves data log data. When “0” is stored in $SW37 and $SB36 is turned ON, log data for all groups is saved to the removable media as a CSV file. If a group number is stored in $SW37 and $SB36 is turned ON, the data log information for that group only will be saved as a CSV file. Once the data has been saved, the system automatically turns OFF $SB36.

When “0” is stored in $SW37 and $SB36 is turned ON, the data is saved to a series of files called Trend001.CSV to Trend999.CSV in the removable media in the directory \log\ trend. If a group number is stored in $SW37 and $SB36 is turned ON, the data is saved to a series of files called Trd00001.CSV to Trd99999.CSV. The name of the folder will be the name of the output file. Trd00 to Trd99 can be changed using the data log settings. Each time data is saved, a new file is automatically created, incrementing the file numbered each time. Up to 999 files can be saved. Only up to 099 CSV files will be saved in each folder if the output file names are six characters or longer. When the number of files exceeds 999, existing files are overwritten in order beginning with Trend001.CSV or Trd##001CSV.

If there is no accumulated data log, the group number and data collection address will be output. ($SB36 will turn OFF and $SB47 will not turn ON.)

If an error occurs during the save operation (e.g., the removable media is not in place, there is insufficient free disk space, or the removable media is damaged), $SB36 will turn OFF and $SB47 will turn ON. No error message will appear on the screen, however, when an error occurs.

If $SB35 and $SB36 turn ON simultaneously, initialization will be executed first. For this reason, no Trend#.CSV file will be created.

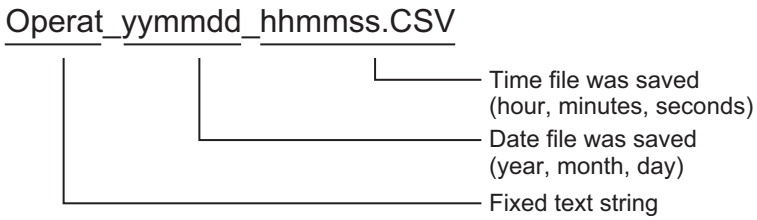
Initialize Operation Log ($SB37)

$SB37 initializes the operation log data. When $SB37 is turned ON, the operation log information recorded in the PT Unit is initialized. Once the initialization has been completed, the system automatically turns OFF $SB37.

● Save Operation Log ($SB38)

$SB38 saves operation log data. When $SB38 is turned ON, the operation log data is saved to the removable media as a CSV file. Once the data has been saved, the system automatically turns OFF $SB38.

The data is output to a file called Operat.csv in the removable media \log\ directory.



If there is no accumulated data log, only the title line will be output. ($SB33 will turn OFF and $SB47 will not turn ON.)

If an error occurs during the save operation (e.g., the removable media is not in place, there is insufficient free disk space, or the removable media is damaged), $SB38 will turn OFF and $SB47 will turn ON.

No error message will appear on the screen, however, when an error occurs.

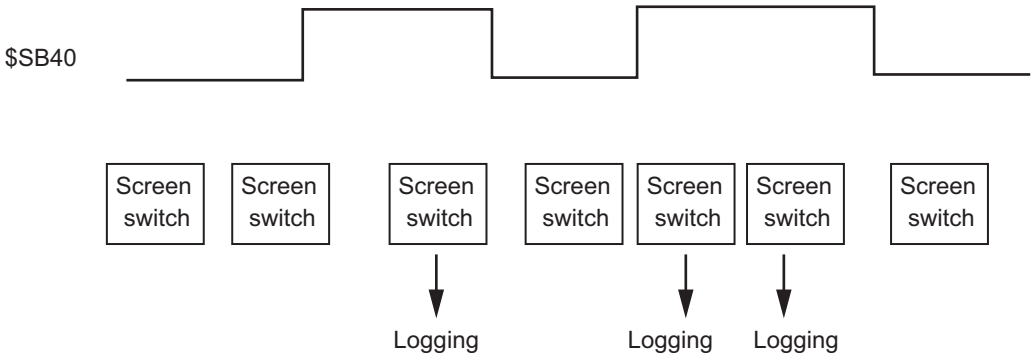
If $SB37 and $SB38 turn ON simultaneously, initialization will be executed first. For this reason, no Operat.CSV file will be created.

● Operation Log Control ($SB39, $SB40, and $SB41)

Bits $SB39 to $SB41 control the operation log. $SB39 controls functional object operations and changes to communications addresses. $SB40 controls screen switching operations, and $SB41 controls macro operations.

When each of the bits $SB39 to $SB41 turn ON, the relevant logging operation starts. The logging operation is ended when the bits turn OFF.

Screen Switching



Any instance of screen switching executed while $SB40 is ON will be logged.

● Initialize Error Log ($SB42)

$SB42 initializes the error log data. When $SB42 is turned ON, the error log information recorded in the PT Unit is initialized. Once the initialization has been completed, the system automatically turns OFF $SB42.

Save Error Log ($SB43)

$SB43 saves error log data. When $SB43 is turned ON, the error log data is saved to the removable media as a CSV file. Once the data has been saved, the system automatically turns OFF $SB43.

The data is output to a file called MacroErr.csv in the removable media \log\ directory. The file names are fixed and files previously output to the removable media will be overwritten.

If there is no accumulated data log, only the title line will be output. ($SB43 will turn OFF and $SB47 will not turn ON.)

If an error occurs during the save operation (e.g., the removable media is not in place, there is insufficient free disk space, or the removable media is damaged), $SB43 will turn OFF and $SB47 will turn ON.

No error message will appear on the screen, however, when an error occurs.

If $SB42 and $SB43 turn ON simultaneously, initialization will be executed first. For this reason, no MacroErr.CSV file will be created.



Additional Information

Log data can be output in multibyte code or Unicode. This enables outputting data displayed in other languages as log data. For details on using other languages, refer to *Reference – Multi-language Display* in the *CX-Designer Online Help*.

Macro Error Dialog Control ($SB45)

$SB45 changes the processing for macro errors. If $SB45 turns ON, no error dialog box is displayed when a macro error occurs but the execution of macro processing is stopped. If $SB45 is turned OFF, an error dialog box will be displayed and macro execution will be stopped.



Additional Information

When a macro error occurs, processing of the macro where the error occurred will be interrupted regardless of whether or not $SB45 is ON or OFF, but other macro processing will continue.

Notification Macro Error ($SB46)

$SB46 turns ON when a macro execution error occurs.

$SB46 will remain ON until turned OFF from the host, using a functional object, or other method.

If a macro error occurs when values are being changed, the macro error notification is executed after the Macro Error Dialog Box is closed by pressing the OK Button. Macro error notification will be executed immediately after any other macro error occurs.

Logging Process Error Flag ($SB47)

$SB47 turns ON if an error occurs during alarm, data log, operation history, error log processing, or video capture.

$SB47 will remain ON until turned OFF from the host, using a functional object, or other method.

USB Memory Free Space Check ($SB48)

$SB48 turns ON when the free space on the USB Memory mounted to the PT Unit drops below a specified size when saving data to the USB Memory.

The amount of free space that will trigger the warning is set using *Free Space* under CX-Designer **System Setting – Initial**. The default is 1,024 Kbytes.

● Stop USB Memory ($SB49)

$SB49 is turned ON to remove the USB Memory. When $SB49 is turned ON, the USB Memory power supply turns OFF and the USB Memory can be removed from the PT Unit. $SB49 automatically turns OFF after the USB Memory has been removed.

● USB Memory Removing Status (Power OFF) ($SB50)

$SB50 notifies the result of executing $SB49. When $SB49 is turned ON and the USB Memory can be removed, $SB50 turns ON. After the USB Memory has been removed and $SB49 automatically turns OFF, and $SB50 also automatically turns OFF.

This bit indicates the power supply status of the USB Memory. If $SB50 is OFF, it indicates that the power is ON.

● Periodical Data Log Save in Process Flag ($SB51)

$SB51 turns ON when the data log is being periodically saved. When saving is completed, the system automatically turns $SB51 OFF.

● Data Block Operation Complete Flag ($SB52)

$SB52 turns ON when command button data block control has been completed. $SB52 will remain ON until it is turned OFF from the host, using a functional object, or other method.

● Prohibit Screen Saver Startup ($SB53)

Bit $SB53 stops the screen saver from starting. When $SB53 is ON, the screen saver will not start. When $SB53 is OFF, the screen saver will be started/canceled normally by the Screen Saver Start/Cancel Bit ($SB9) as specified with the *Screen Saver* settings on the System Settings Window's PT Tab Page.

The following table shows the operation of the NS-B-series PT when the status of $SB9 or $SB53 changes.

Status of $SB9	Status of $SB53	Operation
OFF	OFF → ON	Screen display continues. (The screen saver will not start.)
OFF	ON → OFF	The screen saver starts after the Screen Saver Startup Time specified in the System Settings Window.
ON	OFF → ON	The screen saver is canceled.
ON	ON → OFF	The screen saver starts after 3 s.
OFF → ON	OFF	The screen saver starts after 3 s.
ON → OFF	OFF	The screen saver is canceled.
OFF → ON	ON	Screen display continues. (The screen saver will not start.)
ON → OFF	ON	Screen display continues. (The screen saver will not start.)

Password Level Operable Status ($SB54 to $SB58)

If passwords are being used with the password level function, flags $SB54 to $SB58 indicate the range of functional objects that can be manipulated in the window.

Example: Authenticating level 3

$SB54 ON
$SB55 ON
$SB56 ON
} Operations are allowed on functional objects set to levels 1 to 3.

$SB57 OFF
$SB58 OFF
} Operations are not allowed on functional objects set to level 4 or 5.

If the functional object's Display setting in the Control Flag Tab is set for *Indirect Address* and *Display When Address ON* and the status flag is indirectly specified, the status flag can be used to display only the functional objects that are operable in that current password level.

$SB54 is turned ON when level 1 or higher authentication is completed. $SB54 is turned OFF when authentication is cancelled.

$SB55 is turned ON when level 2 or higher authentication is completed. $SB55 remains OFF during level 1 and is turned OFF when authentication is cancelled.

$SB56 is turned ON when level 3 or higher authentication is completed. $SB56 remains OFF during level 2 or lower and is turned OFF when authentication is cancelled.

$SB57 is turned ON when level 4 or higher authentication is completed. $SB57 remains OFF during level 3 or lower and is turned OFF when authentication is cancelled.

$SB58 is turned ON when level 5 or higher authentication is completed. $SB58 remains OFF during level 4 or lower and is turned OFF when authentication is cancelled.



Additional Information

The status flags will not operate if the *Function mode* is set to enable a password without levels in the Password Setting Dialog Box. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details on password settings.

Save Internal Holding Memory ($SB62)

With the NS-B-series, some data is saved to the screen data area at set intervals. The automatic save interval can be cleared and saving can be executed immediately by setting $SB62 to ON. When saving completes, it will turn OFF and automatic saving interval counting will resume.

- Internal holding memory
- Operation logs
- Error logs
- Alarm/event history
- Data logs

2-4-2 System Word Memory ($SW)

System word memory ($SW) is used to exchange information between the host and the PT Unit in word units, such as for controlling the PT Unit and notifying the host of status. The system word memory contains 41 items with predefined functions.

The system word memory is listed in the following table.

Address	Classification	Function
$SW0	Notification/control	Current screen number
$SW1	Notification/control	Current pop-up screen 1 number
$SW2	Notification/control	Position of pop-up screen 1 (X coordinate)
$SW3	Notification/control	Position of pop-up screen 1 (Y coordinate)
$SW4	Notification/control	Current pop-up screen 2 number
$SW5	Notification/control	Position of pop-up screen 2 (X coordinate)
$SW6	Notification/control	Position of pop-up screen 2 (Y coordinate)
$SW7	Notification/control	Current pop-up screen 3 number
$SW8	Notification/control	Position of pop-up screen 3 (X coordinate)
$SW9	Notification/control	Position of pop-up screen 3 (Y coordinate)
$SW10	Notification/control	Current label number
$SW11	---	Reserved
$SW12	Control	Backlight Brightness Adjustment (1 to 32)
$SW13	Control	Password number for canceling input prohibition
$SW14	Notification	Current time (min, s)
$SW15	Notification	Current date and time (day, hour)
$SW16	Notification	Current date (year, month)
$SW17	Notification	Current day (day of the week)
$SW18	Notification	No. of alarm/event occurred
$SW19	Notification	Occurred alarm/event ID
$SW20	Notification	Cancelled alarm/event ID
$SW21	Notification	Alarm/event ID of alarm/event object macro
$SW22	---	Reserved
$SW23	Notification	Macro error number
$SW24	Notification	Screen No. Having Macro Error
$SW25	Notification	Object ID Having Macro Error
$SW26	Notification	Macro Timing Having Error
$SW27	Control	Offset value for index I0
$SW28	Control	Offset value for index I1
$SW29	Control	Offset value for index I2
$SW30	Control	Offset value for index I3
$SW31	Control	Offset value for index I4
$SW32	Control	Offset value for index I5
$SW33	Control	Offset value for index I6
$SW34	Control	Offset value for index I7
$SW35	Control	Offset value for index I8
$SW36	Control	Offset value for index I9
$SW37	Control	Data log group number
$SW38	Notification	Data block error number
$SW39	Notification	Authentication Level
$SW40	Control	Range for initializing alarm/event history

Note The notification words are not write-prohibited. In addition, the system will not restore values, except when the status has changed.

System word memory can be allocated to the following areas in the host PLC. Set an array variable with 41 elements when allocating a tag. The data type must be UINT, INT, UINT_BCD, CHANNEL, or WORD.

Symbol	Area Name	Allocation			
		C-series PLCs	CVM1/CV-series PLCs	CS/CJ-series PLCs	NJ-series Controllers
None	I/O area (IR)	○	○	○	○
H	HR Area	○	---	○	○
A	AR Area	○	×	○	---
L	LR Area	○	---	○*1	○*1
T	Timer present values	×	×	×	---
TU	Timer Completion Flags	---	---	×	---
C	Counter present values	×	×	×	---
CU	Counter Completion Flags	---	---	×	---
W	Work Area	---	---	○	○
TK	Task Flags	---	---	×	×
D	DM Area	○	○	○	○
E	EM Area (Current bank)	○*2	○	○	---
E0_ to E18_	EM Area Bank 0 to 18	---	---	○	○

*1. LR 00000 to LR 00199 are converted to and used as I/O area words CIO01000 to CIO 01199.

*2. C200HX/HG/HE-E/-ZE PLCs are the only C-series PLCs that support the EM Area (EM).

All bits in the CVM1/CV-series Auxiliary Area are allocated for system functions and cannot be used for any other application.

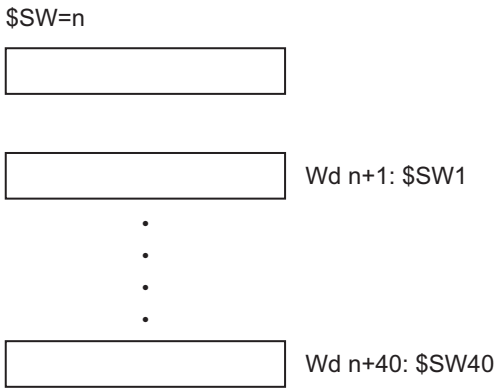
Additional Information

The ranges for each area vary with the PLC model. Refer to NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131).

Refer to System Settings and Project Properties in the CX-Designer Online Help for details on allocation methods.

Words in the PLC are allocated to system word memory ($SW).

Set the allocation addresses for the system memory on the Initial Tab Page. You can select the data type to store in memory to BCD or binary for each group by pressing the **System Memory List** Button on the Initial Tab Page.



Additional Information

- System memory allocations in the PLC areas can be allocated the same way as for the NT Series. For details, refer to *2-4-3 System Memory Compatibility with the NT Series* on page 2-44.
- Set an array variable with 41 elements when allocating a tag. The data type must be UINT, INT, UINT_BCD, CHANNEL, or WORD.

● Current Screen Number ($SW0)

$SW0 stores the screen number for the current screen. (Stored in BCD or binary.)

If a screen number is written to $SW0, the display will switch to that screen.

The display will not switch to that screen, however, if that screen does not exist or if it is a pop-up screen. In such cases, no error message will be displayed but the system will change the screen number stored in $SW0 back to the original screen number. ($SB2 screen switch strobe will not be notified.)

If screens are switched frequently, the display update may take some time and communications may be delayed.

If no initial display screen exists, screen 0 will be initially set to $SW0.

If screens are switched while displaying the screen saver, the screen saver will be canceled.

● Current Pop-up Screen 1 Number ($SW1)

$SW1 stores the screen number for the current pop-up screen 1. (Stored in BCD or binary.) The value “0” will be stored in $SW1 if no pop-up screen is open.

If a screen number is written to $SW1, that pop-up screen will be displayed.

The display will not switch to that screen, however, if that screen does not exist or if it is a base screen. In such cases, no error message will be displayed but the system will change the screen number stored in $SW1 back to the original screen number.

If pop-up screens are opened and closed frequently, the display update may take some time and communications may be delayed.

The pop-up screen will close if 0 is written to $SW1. Also, 0 will be set to the pop-up screen display position ($SW2 and $SW3).

If a pop-up screen is opened, closed, or switched while displaying the screen saver, the screen saver will be canceled.

Position of Pop-up Screen 1 ($SW2 and $SW3)

$SW2 and $SW3 store the display position for pop-up screen 1. (Stored in BCD or binary.)

The upper left X coordinate for pop-up screen 1 is stored in $SW2 and the upper left Y coordinate is stored in $SW3.

If the display position is written directly to $SW2 and $SW3, the pop-up screen will move to the specified position. The display size is limited so that the pop-up screen does not protrude outside the screen display range. The display position will be such that the whole pop-up screen is displayed.

If pop-up screens are moved while the screen saver is displayed, the screen saver will be canceled. The display position when pop-up screen 1 is opened cannot be specified using $SW2 and $SW3.

Current Pop-up Screen 2 Number ($SW4)

$SW4 stores the screen number for the current pop-up screen 2. (Stored in BCD or binary.) The value “0” will be stored in $SW4 if no pop-up screen is open.

If a screen number is written to $SW4, that pop-up screen will be displayed. The display will not switch to that screen, however, if that screen does not exist or if it is a base screen. In such cases, no error message will be displayed but the system will change the screen number stored in $SW4 back to the original screen number.

If pop-up screens are opened and closed frequently, the display update may take some time and communications may be delayed.

The pop-up screen will close if 0 is written to $SW4. Also, 0 will be set for the pop-up screen display position ($SW5 and $SW6).

If a pop-up screen is opened, closed, or switched while the screen saver is displayed, the screen saver will be canceled.

Position of Pop-up Screen 2 ($SW5 and $SW6)

$SW5 and $SW6 store the display position for pop-up screen 2. (Stored in BCD or binary.) The upper left X coordinate for pop-up screen 2 is stored in $SW5 and the upper left Y coordinate is stored in $SW6. If the display position is written directly to $SW5 and $SW6, the pop-up screen will move to the specified position. The display size is limited so that the pop-up screen does not protrude outside the screen display range. The display position will be such that the whole pop-up screen is displayed.

If a pop-up screen is opened, closed, or switched while the screen saver is displayed, the screen saver will be canceled.

The display position when pop-up screen 2 is opened cannot be specified using $SW5 and $SW6.

Current Pop-up Screen 3 Number ($SW7)

$SW7 stores the screen number for the current pop-up screen 3. (Stored in BCD or binary.) The value “0” will be stored in $SW7 if no pop-up screen is open.

If a screen number is written to $SW7, that pop-up screen will be displayed.

The display will not switch to that screen, however, if that screen does not exist or if it is a base screen. In such cases, no error message will be displayed but the system will change the screen number stored in $SW7 back to the original screen number.

If pop-up screens are opened and closed frequently, the display update may take some time and communications may be delayed.

The pop-up screen will close if 0 is written to $SW7. Also, 0 will be set to the pop-up screen display position ($SW8 and $SW9).

If a pop-up screen is opened, closed, or switched while the screen saver is displayed, the screen saver will be canceled.

Position of Pop-up Screen 3 ($SW8 and $SW9)

$SW8 and $SW9 store the display position for pop-up screen 3. (Stored in BCD or binary.) The upper left X coordinate for pop-up screen 3 is stored in $SW8 and the upper left Y coordinate is stored in $SW9.

If the display position is written directly to $SW8 and $SW9, the pop-up screen will move to the specified position. The display size is limited so that the pop-up screen does not protrude outside the screen display range. The display position will be such that the whole pop-up screen is displayed.

If a pop-up screen is opened, closed, or switched while the screen saver is displayed, the screen saver will be canceled.

The display position when pop-up screen 3 is opened cannot be specified using $SW8 and $SW9.

Current Label Number ($SW10)

$SW10 stores the current label number. (Stored in BCD, between 0 and 15, or in binary, between 0 and F.)

If a label number is written to $SW10, the display will switch to that label.

No error message will be displayed if a label number that does not exist has been specified but the system will store the original label number in $SW10.

Backlight Brightness Adjustment ($SW12)

$SW12 is used to adjust the brightness of the backlight. Store 1 to 32. Store 32 in $SW12 for the brightest backlight. Store 1 in $SW12 for the darkest backlight. If $SB6 to $SB8 and $SW12 are changed at the same time, the backlight brightness will be changed to the setting for which the change was detected last inside the PT Unit.

Password Number for Canceling Input Prohibition ($SW13)

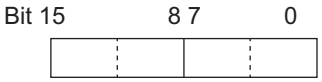
$SW13 is used to specify the password number for clearing input prohibit when $SB19 is ON. (Stored in BCD or binary.) The password dialog box will be displayed if the screen is touched when $SB19 is ON. However, the value stored in $SB13 immediately after touching the screen will be used for the password.

● Current Date and Time ($SW14, $SW15, $SW16, and $SW17)

Words $SW14 to $SW17 store the current date and time in BCD or binary.

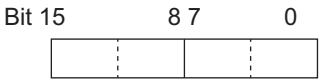
The storage formats are shown below.

$SW14 stores the minutes and seconds.



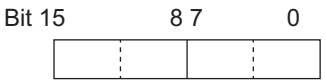
BCD: min (00 to 59) s (00 to 59)
Binary: min (00 to 3B) s (00 to 3B)

$SW15 stores the date and hour.



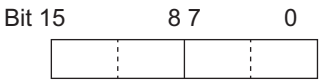
BCD: date (01 to 31) hour (00 to 23)
Binary: date (01 to 1F) hour (00 to 17)

$SW16 stores the year (last two digits) and month.



BCD: year (00 to 99) month (01 to 12)
Binary: year (00 to 63) month (01 to 0C)

$SW17 stores the day of the week.



BCD/binary: (00 fixed) day of week (00 to 06)
Sun: 00; Mon: 01: Tue: 02; Wed: 03; Thur: 04; Fri: 05; Sat: 06

● No. of Alarm/Event Occurred ($SW18)

$SW18 stores the number of generated alarms and events. (Stored in BCD or binary.)

The total number of alarms and events is stored.

● Alarm/Event ID Storage ($SW19, $SW20, and $SW21)

The last generated alarm or event ID number is written to $SW19. (Stored in BCD or binary.)

The last cleared alarm or event ID number is written to $SW20. (Stored in BCD or binary.)

The alarm or event ID displayed on the relevant alarm/event display object is written to $SW21 when the Pressing a Display Area macro is executed. Alternatively, the alarm/event ID number selected when the Selecting an Alarm/Event macro is executed for the alarm/event summary/history object is written to $SW21. (Stored in BCD or binary.) If the macro is executed when nothing is displayed on the alarm/event display object or alarm/event summary & history object, then nothing will be written to $SW21.

● Macro Error Number ($SW23)

The macro execution error number is stored in $SW23. There are no errors if 0 is stored in $SW23.

The error number is held until 0 is written to $SW23 from the host, using a functional object, or other method. (Stored in BCD or binary.)



Additional Information

- The following values are set to $SW23, depending on the macro error.
  1: Program error
  2: 0 allocation error
  3: BCD error
  4: Argument value error
- The last generated macro execution error number is stored in $SW23 if macros are executed alternatively as follows: no error, error, no error, etc.

● Screen No. Having Macro Error ($SW24)

The screen number where the macro error occurred is stored in $SW24. FFFFh is stored for project macros. (Stored in BCD or binary.)

● Object ID Having Macro Error ($SW25)

The ID number of the functional object where the macro error occurred is stored in $SW25. FFFFh is stored for project/screen macros. (Stored in BCD or binary.)

● Macro Timing Having Error ($SW26)

The macro execution timing when the macro error occurred is stored in $SW26. (Stored in BCD or binary.)

Number	Description
0 (0)	When loading a project
4 (4)	Alarm/Event ON
5 (5)	Alarm/Event OFF
16 (10)	When loading a screen
17 (11)	When unloading a screen
32 (20)	Touch ON
33 (21)	Touch OFF
34 (22)	Before Inputting Numeral and String
35 (23)	Before Writing Numeral and String
37 (25)	When Changing Numeral or String
38 (26)	When selecting a list
48 (30)	When pressing a Display Area
49 (31)	When selecting an Alarm/Event

Note The values inside parentheses ( ) are binary.

● Index ($SW27 to $SW36)

$SW27 to $SW36 store index numbers. Each of the index numbers correspond to I0 to I9 set using address input. (Stored in BCD or binary.) If an illegal value is set in BCD as the index number (e.g., AAAAh) when stored in BCD, the index will operate as index 0. (Values between -999 and 9999 (BCD) or between -32768 and 32767 (binary) can be specified as index values.)

Data Log Group Number ($SW37)

$SW37 stores a data log group number (Stored in BCD or binary.). When $SB35 (Initialize Data Log) or $SB36 (Save Data Log) is turned ON, the data log for the group number stored in $SW37 is either initialized or saved. When the data logs for all groups are initialized or saved, “0” is stored in $SW37.

Data Block Error Number ($SW38)

The numbers of any errors that occur during command button – data block control execution are stored in $SW38 (in BCD or binary).

Number	Description
0 (0)	Normal end
10 (A)	The specified group number does not exist, i.e., the specified number is not between 1 and 100 or the specified number between 1 and 100 has not been registered.
11 (B)	The specified record number does not exist, i.e., the specified number is not between 0 and 999 (exceeds the maximum number of records per group) or data has not been registered for the specified number between 0 and 999.
12 (C)	An attempt was made to insert data into a file for which the set number of records for that group have already been registered.
13 (D)	The file does not exist in the specified location or it cannot be opened.
14 (E)	A CSV file cannot be created to save the data.
15 (F)	A write error (e.g., insufficient space) occurred when writing the CSV file.
16 (10)	A communications error occurs when writing or reading the communications address.
17 (11)	The sum of the specified beginning address in PT memory and the record size exceeds $W32767.
18 (12)	Memory cannot be acquired for reading or writing.

Note The values inside parentheses ( ) are binary.

Authentication Level ($SW39)

If passwords are being used with the password level function, the current authentication level is contained in $SW39. When the authentication is cleared, $SW39 will contain 0. Use this word to display the authentication level or check the authentication level from the host.



Additional Information

The password setting will not operate if the *Function mode* is set to enable passwords without levels in the Password Setting Window. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details on setting passwords.

● Range for Initializing Alarm/Event History ($SW40)

The option settings for initialization of alarm/event histories are made using $SB32.

The alarm/event history to be initialized using the value contained in $SW40 can be specified as shown in the following table.

$SW40 value	Alarm/event history data initialized	Remarks
0	All alarm/event history data	Initializes all alarms/events, including current and unconfirmed alarms/events.
1	Cleared and confirmed alarm/event history data only	Initializes alarms/events including current alarms/events.
2	Cleared alarm/event history data only	Initializes alarms/events including unconfirmed alarms/events.
3	Confirmed alarm/event history data only	
4	Resolved alarm/event history data and number of occurrences	Initializes alarms/events including unconfirmed alarms/events. The current number of alarm/event occurrences will be set to 1.

Alarm/event history data is checked using the alarm/event summary/history object. Set the alarm history as the display data for the alarm/Event Summary/History object.

If $SW40 contains a value other than 0 to 4, $SB32 will not initialize when turned ON.

Additional Information

- All values stored in system word memory can be selected from either BCD or binary. Select BCD or binary data storage for each group by pressing the **System Memory List** Button under **Settings – System Setting – Initial**.
- BCD values starting with Fh will be handled as negative values. (The value range for system word memory is -999 to 9999.)
- All addresses not specified above are reserved for system use. Do not access reserved addresses.

2-4-3 System Memory Compatibility with the NT Series

The method for allocating system memory in the PLC areas can be changed to the same method as for the NT30/620 and NT31/631 Series.

System memory in the NS-B-series can be allocated in the PLC areas as a PT status control area, PT status notification area, and Window control area, the same as the NT Series system memory.

This makes it easy to use PLC ladder programs as is when converting from the NT Series to the NS-B-series.



Additional Information

- PLC area operations for functions that are unique to the NT Series will not operate in the NS-B-series.
- System memory that contains functions unique to the NS-B-series cannot be allocated to the PLC areas. Set $SB and $SW directly, e.g., by using a functional object or other object, when using system memory for these unique functions.
- This function will not work when connected to a PLC that is not manufactured by OMRON.
- Only numerical values in BCD format can be stored in the PLC areas if compatibility with the NT Series is enabled.
- Compatibility with NT-series PTs will be lost if tags are set as allocation addresses.

NT30/620 Series

The PT status control area allocations are listed in the following table.

Word	Function	Corresponding system memory
n	Screen number (control only)*1	$SW0 (currently displayed screen number)
n+1	Not used	---
n+2	Not used	---
n+3	PT control bits	See the following table.
n+4	Not used	---

*1. Only numeric values in BCD format can be stored.

● PT Status Control Bits

Bit	Function	Corresponding system memory
15	Not used	---
14	Not used	---
13	Continuous Buzzer*2	$SB12 (Continuous Buzzer)
12	Short Intermittent*2	$SB13 (Short Intermittent)
11	Initialize Alarm History*2	$SB32 (Initialize alarm/event history)
10	Not used	---
9	Long Intermittent*2	$SB14 (Long Intermittent)
8	Backlight Mode (ON: Lit, OFF: Flashing)*1	$SB10 (Backlight Flash Control)
7	Not used	---
6	Not used	---
5	Not used	---
4	Not used	---
3	Not used	---
2	Not used	---
1	Not used	---
0	Not used	---

*1. The operation for Backlight Mode is different if NT compatibility is not used. (The options if NT compatibility is not used are as follows: ON: Flashing, OFF: Lit.)

*2. Notification will not be provided in the allocated PLC address even if the corresponding $SB is directly manipulated. The value at the PLC address is always written to $SB.

The PT status notification area allocations are listed in the following table.

Word	Function	Corresponding system memory
m	Screen Number (notification only)*1	$SW0 (currently displayed screen number)
m+1	Not used*2	---
m+2	PT Status Notification Bits	See the following table.

*1. Only numeric values in BCD format can be stored.

*2. “0” is always written to the allocated address.

● PT Status Notification Bit

Bit	Function	Corresponding system memory
15	PT Operation Status	$SB1 (RUN Signal (always ON))
14	Not used	---
13	Not used	---
12	Screen Switch Strobe	$SB2 (Screen Switch Strobe)
11	Not used	---
10	Not used	---
9	Not used	---
8	Not used	---
7	Not used	---
6	Not used	---
5	Not used	---
4	Not used	---
3	Not used	---
2	Not used	---
1	Not used	---
0	Not used	---

The window control area allocations are shown in the following table.

NS-B-series pop-up screens do not distinguish between global windows and local windows like the NT Series. The screens are differentiated as pop-up screen 1 (k to k+2), pop-up screen 2 (k+3 to k+5), and pop-up screen 3 (k+6 to k+8).

Word	Function	Corresponding system memory
k	Global Window Screen No.*1	$SW1 (Current Pop-up Screen 1 Number)
k+1	Global Window X Coordinate*1	$SW2 (Position of Pop-up Screen 1 (X Coordinate))
k+2	Global Window Y Coordinate*1	$SW3 (Position of Pop-up Screen 1 (Y Coordinate))
k+3	Local Window 1 Screen No.*1	$SW4 (Current Pop-up Screen 2 Number)
k+4	Local Window 1 X Coordinate*1	$SW5 (Position of Pop-up Screen 2 (X Coordinate))
k+5	Local Window 1 Y Coordinate*1	$SW6 (Position of Pop-up Screen 2 (Y Coordinate))
k+6	Local Window 2 Screen No.*1	$SW7 (Current Pop-up Screen 3 Number)
k+7	Local Window 2 X Coordinate*1	$SW8 (Position of Pop-up Screen 3 (X Coordinate))
k+8	Local Window 2 Y Coordinate*1	$SW9 (Position of Pop-up Screen 3 (Y Coordinate))

*1. Only numeric values in BCD format can be stored.

NT31/631 Series

The PT status control area allocations are shown in the following table.

Word	Function	Corresponding system memory
n	Screen Number (control and notification)*1	$SW0 (currently displayed screen number)
n+1	Not used	---
n+2	Not used	---
n+3	PT control bit	See the following table.
n+4	Not used	---

*1. Only numeric values in BCD format can be stored.

● PT Status Control Bit

Bit	Function	Corresponding system memory
15	Not used	---
14	Not used	---
13	Continuous Buzzer*2	$SB12 (Continuous Buzzer)
12	Short Intermittent*2	$SB13 (Short Intermittent)
11	Not used	---
10	Not used	---
9	Long Intermittent*2	$SB14 (Long Intermittent)
8	Backlight Mode (ON: Lit, OFF: Flashing)*1	$SB10 (Backlight Flash Control)
7	Not used	---
6	Not used	---
5	Not used	---
4	Not used	---
3	Not used	---
2	Not used	---
1	Initialize Alarm History*2	$SB32 (Initialize alarm/event history)
0	Not used	---

*1. The operation for Backlight Mode is different if NT compatibility is not used. (The options if NT compatibility is not used are as follows: ON: Flashing, OFF: Lit.)

*2. Notification will not be provided in the allocated PLC address even if the corresponding $SB is directly manipulated. The value at the PLC address is always written to $SB.

The PT status notification allocations are shown in the following table.

Word	Function	Corresponding system memory
m	Not used	---
m+1	PT Status Notification Bit	See the following table.

● PT Status Notification Bit

Bit	Function	Corresponding system memory
15	PT Operation Status	$SB1 (RUN Signal (always ON))
14	Not used	---
13	Not used	---
12	Screen Switch Strobe	$SB2 (Screen Switch Strobe)
11	Not used	---
10	Not used	---
9	Not used	---
8	Not used	---
7	Not used	---
6	Not used	---
5	Not used	---
4	Not used	---
3	Not used	---
2	Not used	---
1	Not used	---
0	Not used	---

The window control area allocations are shown in the following table.

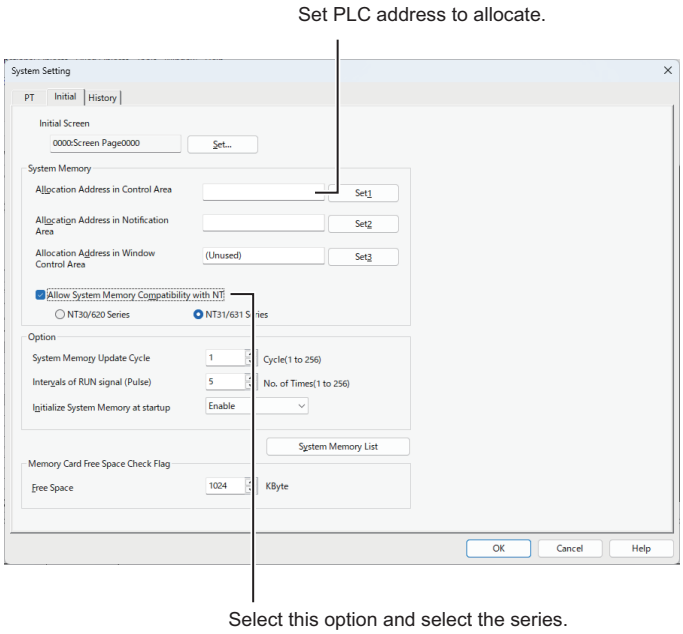
NS-B-series pop-up screens do not distinguish between global windows and local windows like the NT Series. The pop-up screens are handled as pop-up screen 1 (k to k+2), pop-up screen 2 (k+3 to k+5), and pop-up screen 3 (k+6 to k+8), based on the order they are opened.

Word	Function	Corresponding system memory
k	Global Window Screen No.*1	$SW1 (Current Pop-up Screen 1 Number)
k+1	Global Window X Coordinate*1	$SW2 (Position of Pop-up Screen 1 (X Coordinate))
k+2	Global Window Y Coordinate*1	$SW3 (Position of Pop-up Screen 1 (Y Coordinate))
k+3	Local Window 1 Screen No.*1	$SW4 (Current Pop-up Screen 2 Number)
k+4	Local Window 1 X Coordinate*1	$SW5 (Position of Pop-up Screen 2 (X Coordinate))
k+5	Local Window 1 Y Coordinate*1	$SW6 (Position of Pop-up Screen 2 (Y Coordinate))
k+6	Local Window 2 Screen No.*1	$SW7 (Current Pop-up Screen 3 Number)
k+7	Local Window 2 X Coordinate*1	$SW8 (Position of Pop-up Screen 3 (X Coordinate))
k+8	Local Window 2 Y Coordinate*1	$SW9 (Position of Pop-up Screen 3 (Y Coordinate))

*1. Only numeric values in BCD format can be stored.

Setting Method

1. Select PT – System Setting.
2. The System Settings Dialog Box will be displayed. Select the Initial Tab Page.
3. Select the *Allow system memory compatibility with NT* checkbox and select the corresponding NT Series.



4. Make the PLC address allocations for the PT Status Control, PT Status Notification, and Window Control Areas.

Additional Information

- Internal memory addresses cannot be allocated for PT Status Control, PT Status Notification, and Window Control Areas.
- Leave the input field blank if not allocating addresses for the Window Control Area.

2-5 Communications Address Settings

NS-B-series PTs have improved network functions and can communicate with multiple hosts. Host names are registered for the connected hosts and any area in the host can be accessed by specifying the host name and area. With NS-B-series PTs, data required for display can be accessed and the words and bits that store the entered data can be allocated from any area in the PLC. The allocated words and bits are read from and written to directly, the display status changed for the objects on the screen, and the status controlled or reported. Refer to System Settings and Project Properties and Creating Functional Objects in the CX-Designer Online Help for details on registering hosts and setting addresses.

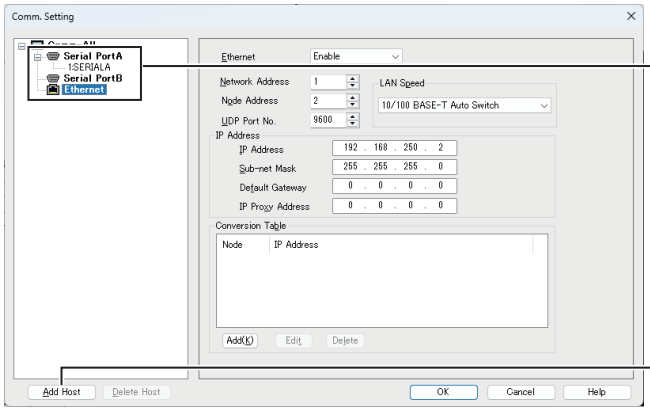
For details on various devices, refer to the relevant devices in *NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131)*.

2-5-1 Register Host

1 Select **PT – Comm. Setting**.

2 The Comm. Setting Dialog Box will be displayed.

3 Select the connection method being used for the host connection (Serial Port A, Serial Port B, Ethernet) and click the **Add Host** Button.



Select the connection method.

Click the **Add Host** Button.

4 The host will be added. Make the host settings.

The host settings depend on the connection method. For details, refer to *System Setting and Project Properties* in the online help of the CX-Designer.

Additional Information

- To delete a registered host, select the host in the Comm. Setting Dialog Box, and then click the **Delete Host** Button.
- To connect to the host using EtherNet/IP, select *Ethernet* in the Comm. Setting Dialog Box.

2-5-2 Communications Addresses

Memory in the host is accessed from an NS-B-series PT by using addresses called communications addresses.

There are two types of communications addresses.

- Direct addresses
- Tags

A direct address specifies a specific element in host memory by using an area name and numeric address.

A tag specifies a network variable set in the PLC.

The correspondence of hosts that are available with the tag is as follows:

CJ2H-CPU□□-EIP, CJ2M-CPU3□, CJ3M-CPU3□, NJ501-□□□□, NJ101-□□□□, NJ301-□□□□, NX701-□□□□, NX1P2-□□□□, NX102-□□□□

Data Types

The CX-Designer has the ability to associate names and comments with communications addresses. In addition, the physical type of data stored at the communications address can be specified.

The following 24 types of data can be used with an NS-B-series PT.

Data type	Description
BOOL	Bit
CHANNEL	Word
USINT	Address of 1-byte unsigned binary value
SINT	Address of 1-byte signed binary value
UINT	Address of 1-word unsigned binary value
INT	Address of 1-word signed binary value
UINT_BCD	Address of 1-word unsigned BCD value
UDINT	First address of 2-word unsigned binary value
DINT	First address of 2-word signed binary value
UDINT_BCD	First address of 2-word unsigned BCD value
ULINT	First address of 4-word unsigned binary value
LINT	First address of 4-word signed binary value
ULINT_BCD	First address of 4-word unsigned BCD value
REAL	First address of 2-word floating-point value
LREAL	First address of 4-word floating-point value
BYTE	Address of 8-bit character string
WORD	Address of 16-bit character string
DWORD	First address of 32-bit character string
LWORD	First address of 64-bit character string
STRING	Literal character string of 1 to 255 characters (1 to 1,986 characters for an NJ/NX-series Controller)
TIME	Time
DATE	Date
TIME_OF_DAY	Date and Time
DATE_AND_TIME	Date and Time

Additional Information

- STRING communications addresses cannot be created with the CX-Designer.

  To use STRING communications addresses, copy STRING symbols in the symbol table of the CX-Programmer or STRING variables in the variable table of the Sysmac Studio and paste them into the symbol table of the CX-Designer.
- For communications addresses, all direct address data that is not set to BOOL will be treated by the NS-B-series PT as CHANNEL data.

  The data type settings for actual addresses other than BOOL and CHANNEL are provided for compatibility with the symbol tables of the CX-Programmer and the variable tables of the Sysmac Studio.
- The data types for internal memory are BOOL ($B/$HB/$SB) and CHANNEL ($W/$HW/$SW).
- If tags are used, the data type must be set to a size that is appropriate for the functional component (bit, 1 word, 2 words, or 4 words). For details, refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 and *A-3-2 Using Tags* on page A-20.
- STRING tags can store character data of 1 byte times the number of characters set for the tag.

  For example, up to ten characters can be stored if the number if characters of a STRING tag is set to ten and all characters are single-byte and stored in multibyte code.

  Up to five characters can be stored if all characters are double-byte and stored in multibyte code.

  If the characters are store in Unicode (UTF-16), up to five characters can be stored.

  For UFT-8 Unicode, you can store up to 10 single-byte characters and between 3 and 5 multibyte characters (depending on the characters).

  If STRING tags are used, set the number of characters and character code so that the storable character string data size is not exceeded.
- The following data types can be used only when the host is an NJ/NX-series Controller.

  BYTE, SINT, USINT, TIME, DATE, TIME_OF_DAY, DATE_AND_TIME

Array Variables (Tags Only)

One-dimensional array variables can be created with the CX-Programmer. An array specification is used when multiple variables are used with the same data attribute to manage these variables as a group. Multi-dimensional array variables to three dimensions can be created on the Sysmac Studio.

Additional Information

- All data types except STRING and NUMBER can be set with the CX-Programmer. (The NUMBER data type is not supported by NS-B-series PTs.)
- With the Sysmac Studio, array variables can be specified for any data type except for STRING.

Data Structures (Tags Only)

Structures can be created with the CX-Programmer or Sysmac Studio. In the CX-Designer, a structure will be separated into its members, and each will be treated as one variable. Arrays in data structures will be separated into individual elements and each will be treated as a separate variable.

Members and elements can be created as individual variables in the CX-Designer.

2-5-3 Directly Specifying Addresses

Address Settings

Addresses are specified using the following formats.

(a) Bit Access

- Internal Addresses:
  [Memory area name][bit number]
  Example: $B1, $SB20
- Specifying Host Addresses:
  [Host name]:[area name][5-digit word number].[2-digit bit address]
  Example: HOST1:00001.11

(b) Word Access

- Internal Addresses:
  [Memory area name][word number]
  Example: $W00001
- Specifying Host Addresses:
  [Host name]:[area name][5-digit word number]
  Example: HOST1:DM00001

The address settings can be entered directly or from the Address Settings Dialog Box.

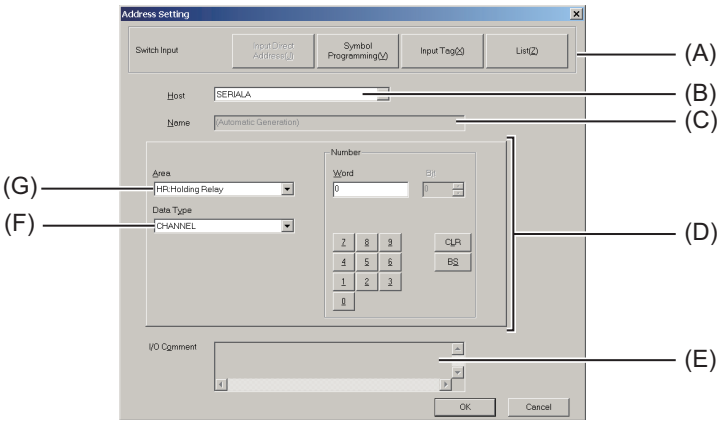
● Address Setting Dialog Box

The following three methods can be used to input set the address in the Address Setting Dialog Box.

- Directly specifying the address
- Inputting a symbol
  (For details on symbols, refer to the heading *Symbols* on page 2-56 below.)
- Selecting a registered symbol

Directly Inputting an Address

Select the **Input Direct Address** Tab from the *Switch Input* Options. Specify the host, area, and address (“number”).



No.	Setting	Details
(A)	Switch	Switches the input method.
(B)	Host	Select the pre-registered host name or PT memory (internal PT memory).
(C)	Name	Displays the name set for the communications address.
(D)	Number	Specify the word address and bit address.
(E)	I/O Comment	Displays the I/O comment set for the communications address.
(F)	Data type	Specifies the type of data stored at the communications address.
(G)	Area	Select the area name.

Additional Information

- Indexes cannot be set in the Address Setting Dialog Box. Enter a index directly into the input area. An index is an address whose contents is used to determine the address that is referenced. Refer to *Creating Functional Objects* in the *CX-Designer Online Help* for details.
- Leading zeros may be omitted from addresses.

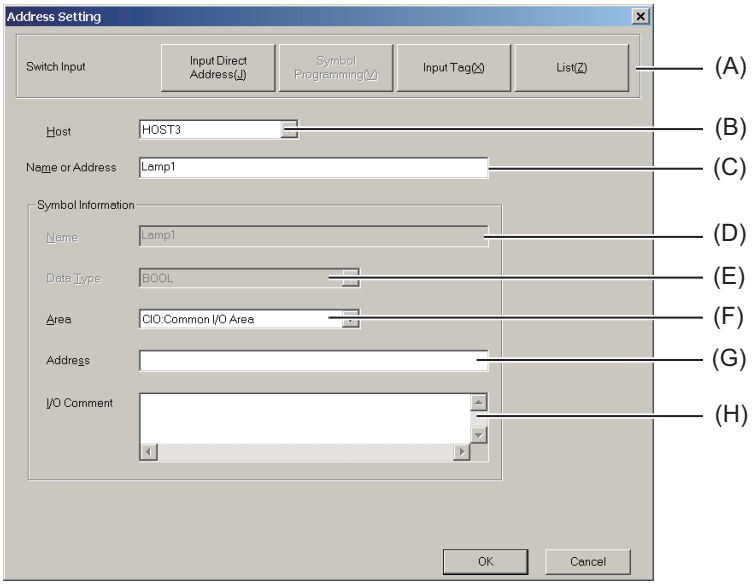
  For example, both $B10 and $B00010 are acceptable.

  Serial A:DM1 and Serial A:DM00001 are also both acceptable.
- The device set as the host determines which areas and other settings are displayed.

Inputting a Symbol

Use this method when symbols are being used to edit screens.

Select the **Symbol Programming** Tab from the *Switch Input* Options. Input the symbol name in the *Name or Address* Field. It is possible to input just the symbol name, without inputting the area and address.



No.	Setting	Details
(A)	Switch	Switches the input method.
(B)	Host	Select the pre-registered host name or PT memory (internal PT memory).
(C)	Name or Address	Input the name of the desired symbol.
(D)	Name	Displays the symbol name set in the *Name or Address* Field.
(E)	Data	Displays the data type that can be set. (CHANNEL stands for word data.)
(F)	Area	When a symbol name that is not registered in the symbol table has been set in the *Name or Address* Field, select the area name here. When a symbol name that is registered in the symbol table has been set in the *Name or Address* Field, that symbol's area name will be displayed here.
(G)	Address	When a symbol name that is not registered in the symbol table has been set in the *Name or Address* Field, set the address here. When a symbol name that is registered in the symbol table has been set in the *Name or Address* Field, that symbol's address name will be displayed here.
(H)	I/O Comment	When a symbol name that is not registered in the symbol table has been set in the *Name or Address* Field, set an I/O comment here. When a symbol name that is registered in the symbol table has been set in the *Name or Address* Field, that symbol's I/O comment will be displayed here.

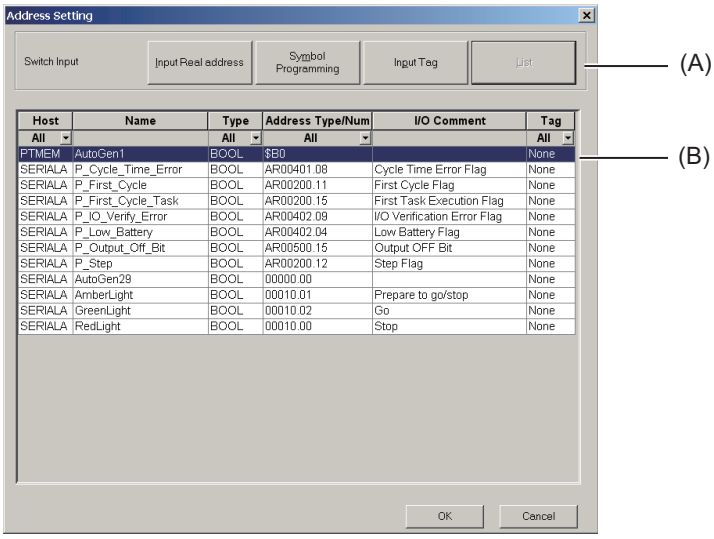
Additional Information

With any one of the input methods, a communications address can be input when specifying the address.

In this case, input the address in the *Name or Address* Field. The address can be input with an index

Selecting a Registered Symbol

Select the List Tab from the *Switch* Options. Select the desired symbol from the list of symbols registered in the symbol table.



No.	Setting	Details
(A)	Switch	Switches the input method.
(B)	Symbol table	A list of the registered symbol is displayed in the symbol table. Select the desired symbol.

Symbols

In the CX-Designer, it is possible to set a symbol as the data referenced by a functional object instead of a directly specified host address or internal memory address.

- Inputting an Address



- Inputting a Symbol



Program maintenance can be simplified by converting the program to text so that the text indicates the contents of each program address. Text comments can be added to each address to explain the contents, but a more effective technique is specifying label names and symbol names in the address.

In the example above, the address SerialA:00048 is specified as a name with symbol TimeInterval.

This name can be used instead of the address. When the I/O configuration is changed, the variable names allow you to make global changes to the entire project just by changing the address associated with the symbol name so it isn't necessary to change the addresses in the program individually. In the CX-Designer, names and comments can be specified for address constants.

Symbols are registered in the symbol table. Registered symbols can be input in any communications address setting.

Additional Information

The following restrictions apply to symbol names.

- A number cannot be used for the symbol's first character.
- The following symbols cannot be used. (The underscore character (_) can be used.)
  [!] [”] [$] [%] [&] [’] [(] [)] [-] [=] [^] [~] [|] [@] [`]
  [[] [{] [;] [+] [:] [*] []] []] [,] [<] [.] [>] [/] [?] [#] [\]
- Spaces cannot be used.
- Addresses cannot be used as names.
- The maximum length of the symbol name is 64 characters.

2-5-4 Tags

Format

Tags are specified in the following format.

Host name:Tag name

Example: HOST1:Lamp1

For array variables, specify tags using the following format.

Host name:Tag name[index]

Example: HOST1:WORD[0] (Specifies the first element of an array called WORD.)



Additional Information

- Bit positions cannot be specified using tags.
- Structured variables are not supported.
  (The members are handled as separate elements.)

Creating Tags

The following methods can be used to create tags.

- Copying from the CX-Programmer's Symbol Table or the Sysmac Studio's Variable Table
- Registering new tags in the symbol table.
- Inputting new tags for a communications address in the Address Setting Dialog Box.
- Directly inputting new tags for a communications address.



Additional Information

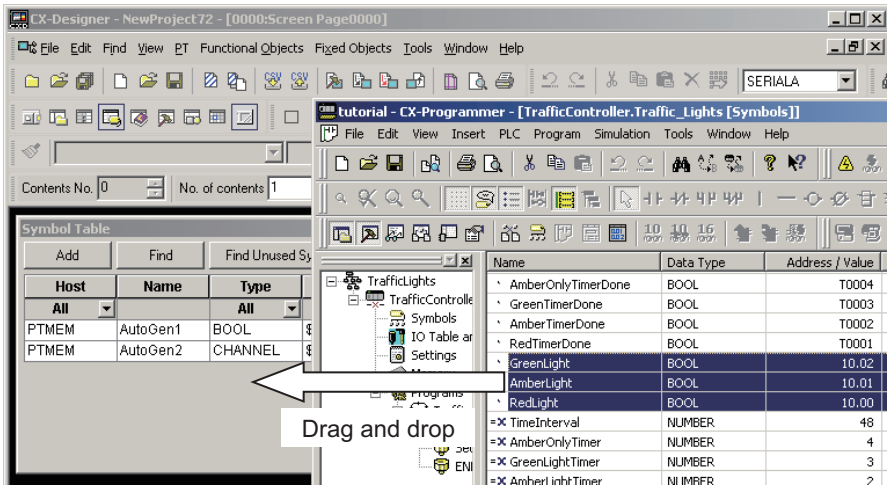
- If tags are used, they must have the data types and names as the corresponding network variable in the host (PLC). We therefore recommend that you copy the tags from the symbol table of the CX-Programmer or the variable table of the Sysmac Studio.
- CX-Programmer version 9.2 or higher are required to copy data structures. Structures are supported by all versions of the Sysmac Studio.

Copying from the Symbol Table of the CX-Programmer

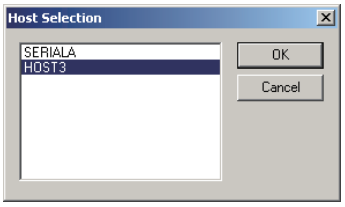
Use the following procedure to copy tags from the CX-Programmer's symbol tables.

1 Select the network variable to be reused in the CX-Programmer's symbol table.

2 Drag and drop the tag to the CX-Designer's symbol table to copy it.



3 A dialog box for selecting the host for which the tag will be set will be displayed. Select a host that can use tags, and then click the **OK** Button.



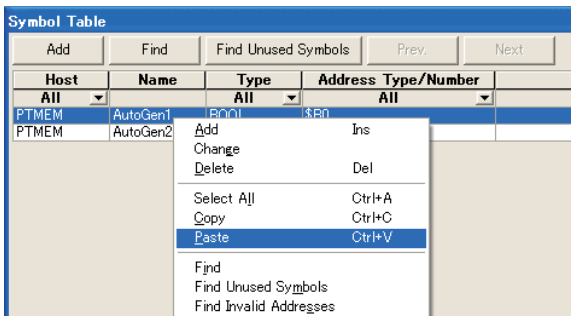
4 The tag will be registered in the symbol table of the CX-Designer.

Copying from a Variable Table in the Sysmac Studio

Use the following procedure to copy tags (i.e., network variables) from a variable table in the Sysmac Studio.

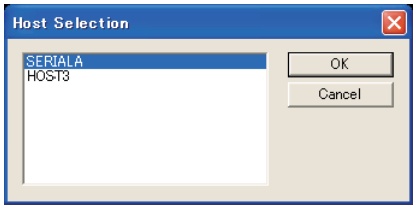
1 Select **Tool – Export Global Variables – CX-Designer**.

2 Paste the variable in the symbol table in the CX-Designer.



3 A dialog box will appear to select the host to set for the variable.

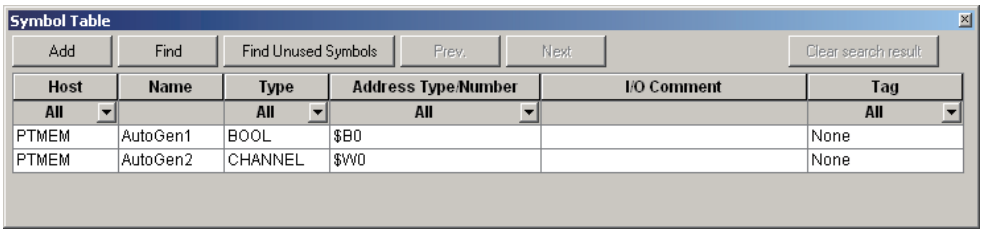
Select a host for the tag and click the **OK** Button.



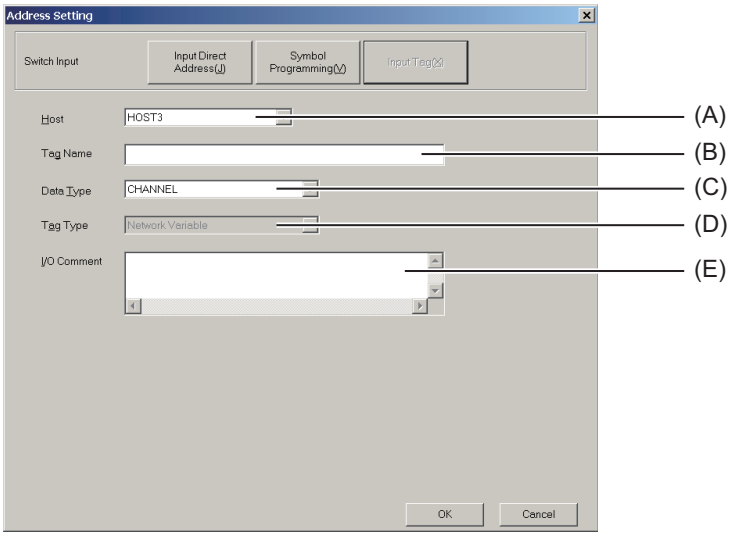
4 The tag will be registered in the symbol table of the CX-Designer.

● Registering New Tags in the Symbol Table

1 Click the **Add** Button in the CX-Designer's Symbol Table Dialog Box.



2 The Address Setting Dialog Box will be displayed. Click the **Input Tag** Button.



No.	Setting	Details
(A)	Host	Sets the host.
(B)	Tag name	Sets the tag name. The following restrictions apply to tag names. • The following characters cannot be used. [!], ["], [$], [%], [&], ['], [(), []], [=], [-], [~], [^], [¦], [`], [@], [{}, [[], [+], [;], [*], [:], [[], [[], [<], [,], [>], [.], [?], [/], space • Set tag names so that they do not exceed the following character string lengths. CJ2 CPU Unit: 48 bytes for UTF-8 characters NJ/NX-series CPU Unit: 255 bytes for UTF-8 characters • Only an alphabetic character or an underscore can be set as the first character of the tag name.
(C)	Data type	Sets the data type of the tag.
(D)	Tag type	Displays the tag link type. Network Variable will be displayed when registering a new tag.
(E)	I/O comment	Sets an I/O comment of 255 characters max.

3 Make the settings, and then click the **OK** Button.

Additional Information

- When setting a new tag, use the same settings as those used in the host (PLC) tag. If there is no tag in the host, copy the tag that you created from the CX-Designer's symbol table to the CX-Programmer's symbol table or the Sysmac Studio's variable table. (Structure variables cannot be copied.)
- The tag link type set with the CX-Programmer or Sysmac Studio is displayed in the Tag Link Type Field. It cannot be changed with the CX-Designer. If a new tag is created with the CX-Designer, Network Variable will always be displayed.
- For UTF-8, the number of bytes depends on the character. (It will be 1 byte for ASCII and 2 to 6 bytes for others.)

Inputting New Tags in the Address Setting Dialog Box

Use the following procedure to input a new tag in the Address Setting Dialog Box.

1. Click the **Set** Button by the *Communications Address* Field.

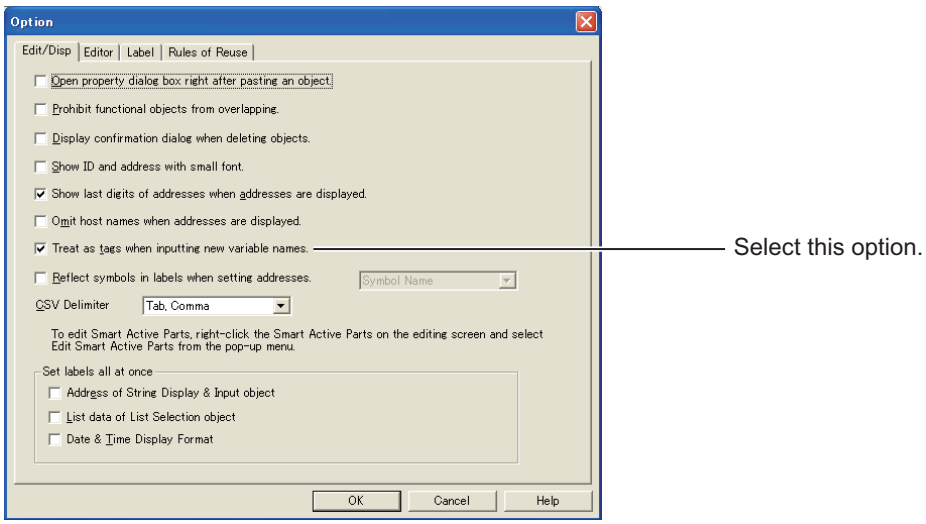


2. The Address Setting Dialog Box will be displayed.
3. Click the **Input Tag** Button. Refer to *Registering New Tags in the Symbol Table* on page 2-60 for information on how to make settings in the Address Setting Dialog Box.

Directly Inputting Tags for Communications Addresses

Use the following procedure to directly input a new tag into a Communications Address Field.

1. Select **Tools – Options**.
2. The Option Dialog Box will be displayed.
3. Select the *Treat As Tags When Inputting New Variable Names* Option on the Edit/Disp Tab Page.



4. Click the **OK** Button.

5 Input the new tag in the *Communications Address* Field. Refer to *Registering New Tags in the Symbol Table* on page 2-60 for information on the characters that can be used for tags.



The data type of tags that are created depends on the settings for the communications address.

Setting	Storage type	Data type set for tag
Items that can be set only to BOOL		BOOL
Items set together with storage type	SINT	SINT
	USINT	USINT
	INT	INT
	UINT	UINT
	DINT	DINT
	UDINT	UDINT
	LINT*1	LINT
	ULINT*1	ULINT
	REAL	REAL
	LREAL*1	LREAL
	BCD2 (1 word, unsigned)	UINT_BCD
	BCD2 (2 words, unsigned)	UDINT_BCD
	Other storage types	CHANNEL
Other items		CHANNEL

*1. These can be set only for Numeral Display and Input objects.

Additional Information

Even if the *Treat As Tags When Inputting New Variable Names Option* is selected in the Option Dialog Box, tags will be treated as direct addresses or variable names of direct addresses in the following cases.

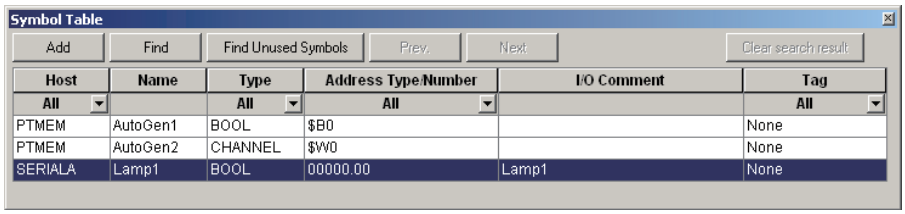
- Direct addresses are input.
- A host that cannot use tags is specified.

Converting from Direct Addresses to Tags

Direct addresses that have been registered in symbol tables (including symbols without addresses) can be converted to tags.

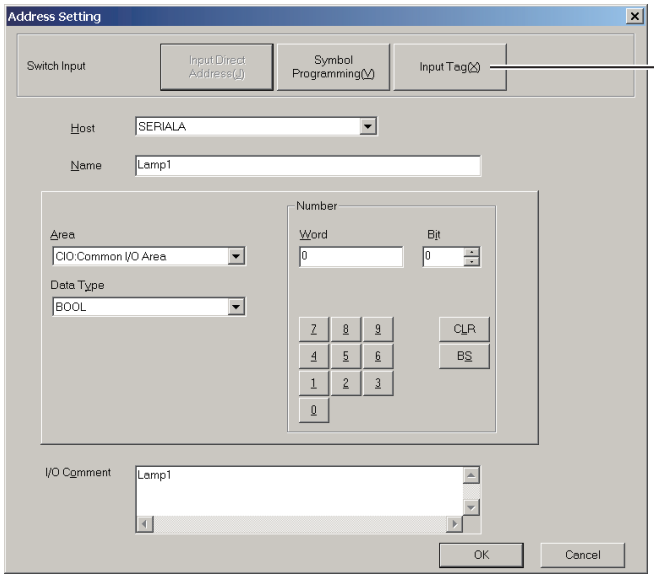
Use the following procedure for conversion. The following example assumes that SERIALA is a host that does not support tags and that HOST3 is a host that supports tags.

1 Select the direct address (symbol) to be converted in the symbol table.

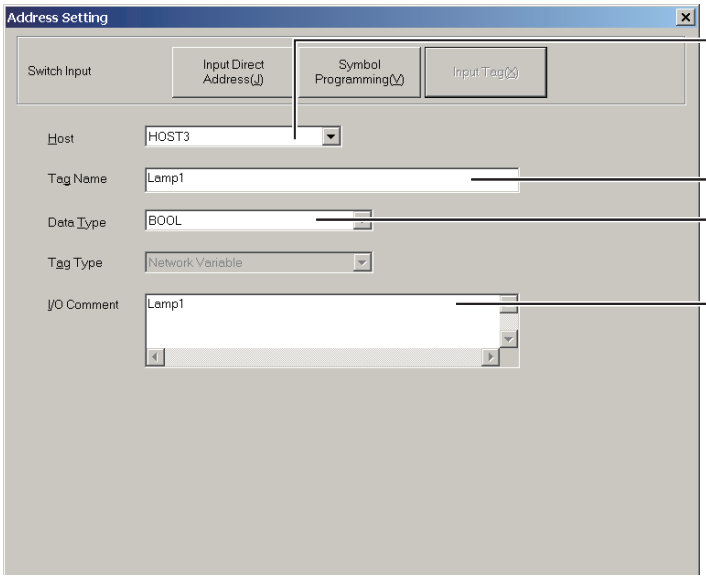


2 Double-click the address to display the Address Setting Dialog Box.

Click the **Input Tag** Button.

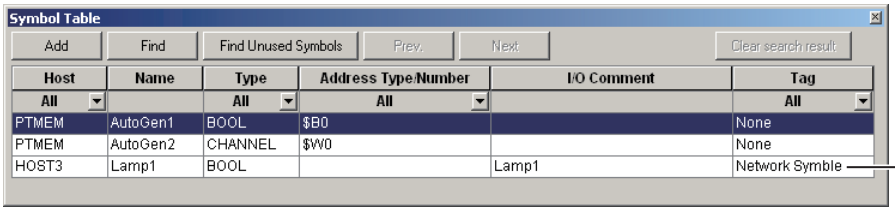


3 The host setting, data type, and I/O comment will be inherited if the host supports tags. If the host does not support tags, the host will be changed to a host that support tags.



4 Adjust the settings as required, and then click the **OK** Button.

5 The address will be converted to a tag.



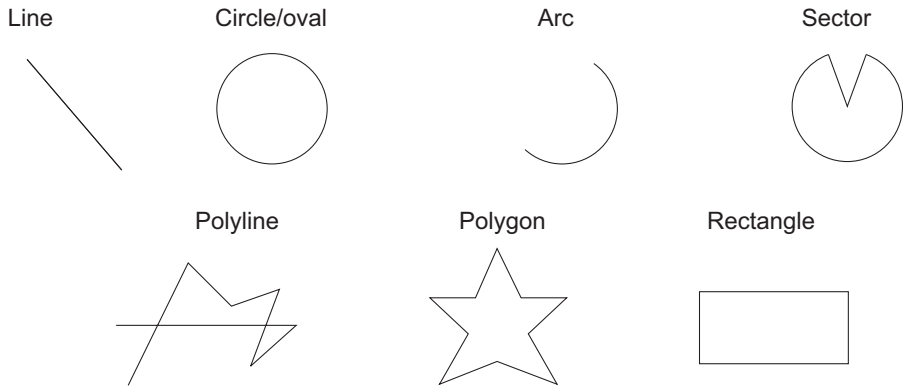
Additional Information

Tags can be converted to direct addresses.

2-6 Fixed Objects

2-6-1 Common Fixed Object Settings

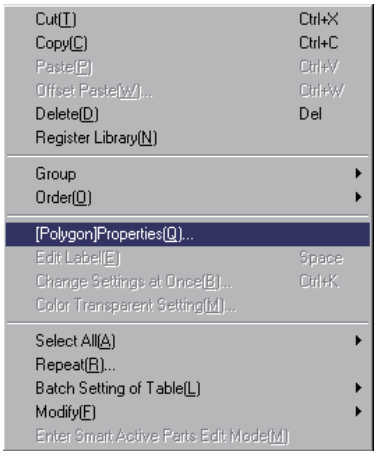
Unlike functional objects, fixed objects do not have many functions. Fixed objects display fixed data. The following seven types of fixed objects can be used.



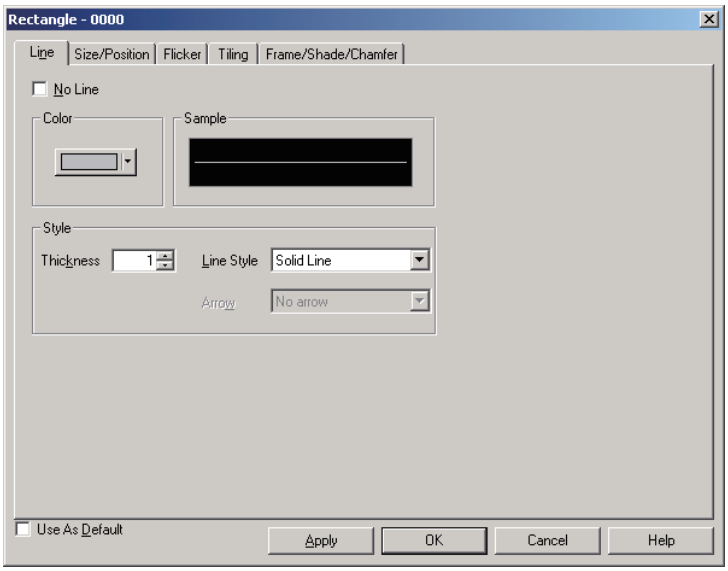
Name	Details
Rectangle	Draws a rectangle.
Circle/Oval	Draws an inscribed circle or oval within a specified rectangle.
Line	Draws a straight line or arrow.
Polyline	Draws a series of specified lines.
Polygon	Draws a polygon from a series of specified lines.
Sector	Draws a circle and then a sector from a specified angle in that circle.
Arc	Draws a circle and then an arc from a specified angle in that circle.

All display properties for fixed objects, such as color and size, are set in the Fixed Object Property Setting Dialog Box. The properties for each fixed object are displayed, with the items that cannot be set for that particular fixed object shown in gray (i.e., invalid).

Select the object for which the properties are to be set and then select **PT – Functional Object Properties** or click the right mouse button and select **Properties** from the pop-up menu. The menu items on the pop-up menu will depend on the selected fixed object.



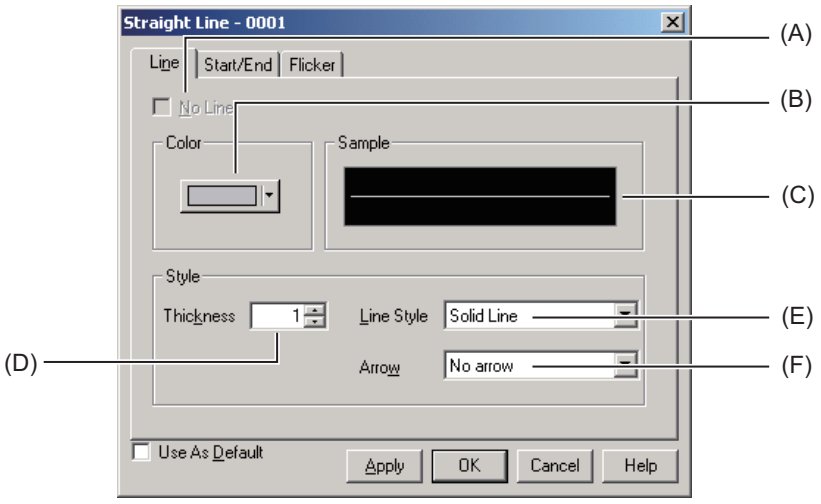
Fixed Object Property



Line:	Set the line color and type.
Size/position:	Set the position and size of the fixed object. (Displayed for fixed objects other than lines.)
Start/end:	Set the start and end points for lines. (Displayed only for lines.)
Flicker:	Set the flicker display.
Tiling:	Set the display color for the fixed object. (Displayed for fixed objects other than lines, polylines, and arcs.)
Frame/shade/ chamfer:	Set frames, shading, colors, and beveling for these. (Displayed for fixed objects other than lines, polylines, and arcs.)

Line

Set the type of lines for the fixed object.



No.	Setting	Details
(A)	No line	Select whether or not to use frame lines.
(B)	Color	Set the line color.
(C)	Sample	Displays the current selected combination.
(D)	Thickness	Set the line thickness.

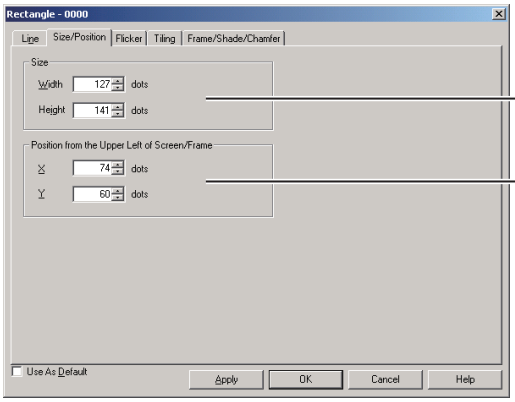
No.	Setting	Details
(E)	Line style	Set the line type. Select from the 5 types of lines shown in the list. • Solid lines • Broken lines • Dotted lines • 1-dot chain lines • 2-dot chain lines
(F)	Arrow	Select one of the following: • No arrow • Start arrow • End arrow • Both ends arrow

Additional Information

Arrows can be set only for straight lines.

Size and Position

Set the size and display position of the fixed object.



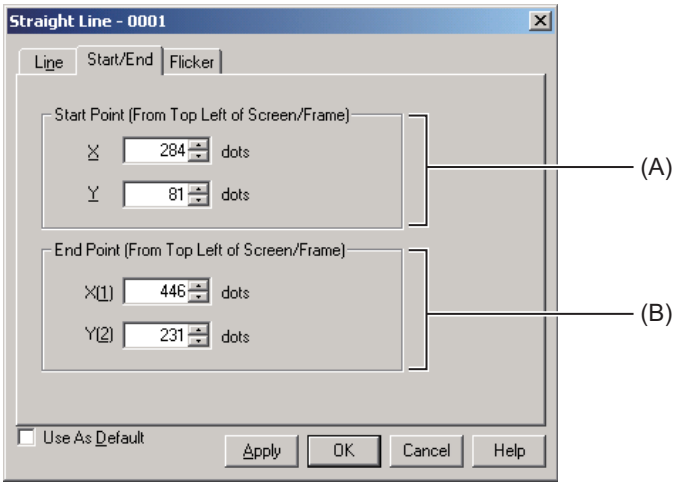
No.	Setting	Details
(A)	Size	Specify the width and height of the fixed object in dot units.
(B)	From Top Left of Screen/Frame	Specify the position (upper left X and Y coordinates) of the object from upper left of the screen or frame. (X coordinate: 0 to 2,559; Y coordinate: 0 to 1,919)

Additional Information

- Set the position so that the object is not outside the screen or frame area.
- Validation can be performed to check for fixed objects outside the screen or frame area. For details on error checks, refer to *Validation* in the *CX-Designer Online Help*.

Start and End

Set the display position for the line.



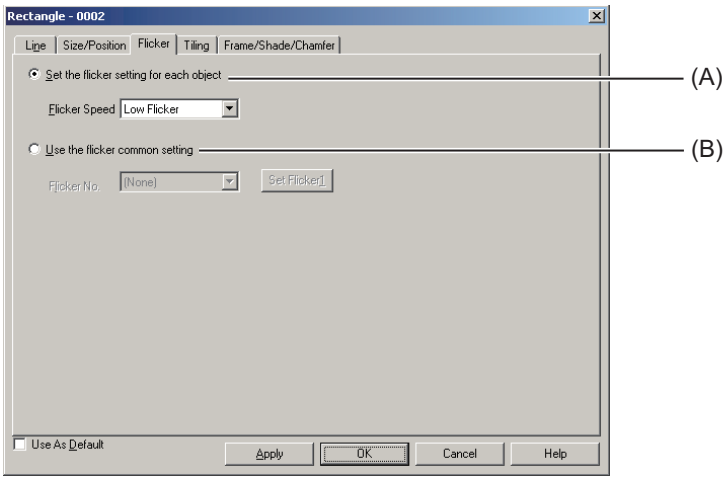
No.	Setting	Details
(A)	Start point (from top left of screen or frame)	Specify the position for the start point of the line in bit units, from the top left of the screen or frame. (X coordinate: 0 to 2,560; Y coordinate: 0 to 1,920)
(B)	End point (from top left of screen or frame)	Specify the position for the end point of the line in bit units, from the top left of the screen or frame. (X coordinate: 0 to 2,560; Y coordinate: 0 to 1,920)

Additional Information

- Care must be taken when setting the start and end points of lines within frames so that the line is not positioned outside the frame area. Be careful when setting the position so that the line is not outside the screen.
- Validation can be performed to check for lines outside the screen or frame area. For details on error checks, refer to *Validation* in the *CX-Designer Online Help*.

Flicker

Make settings on the Flicker Tab Page to make fixed objects flicker (flash).



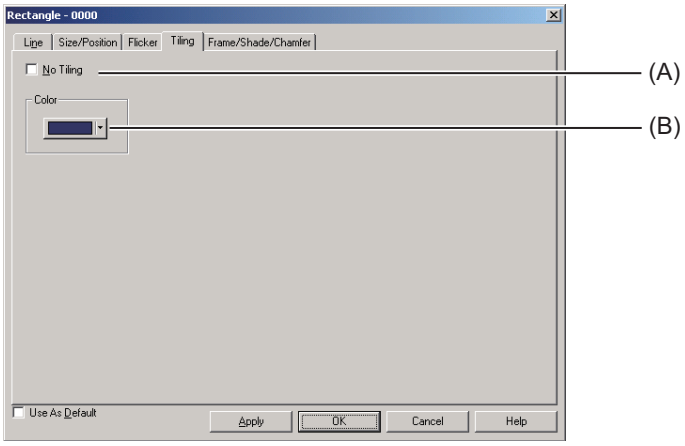
No.	Item	Details
(A)	Set the flicker setting for each object	Alternately displays the fixed object display color and its inverse color. The following three flicker speed options can be selected. • Low flicker • Middle flicker • High flicker
(B)	Use the flicker common setting	Used to select the flicker method from the Flicker No. options set under **PT – Flicker – Flicker Settings**. Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details on flicker settings.

Additional Information

- Select **None** under *Flicker Speed* or *Flicker No.* to have the object not flicker.
- If inverse flicker is selected under the flicker common settings, the whole fixed object will be displayed in inverse colors, including straight lines, continuous straight lines, and arc, regardless of the flicker range setting.
- If inverse flicker is set for a 3-dot frame or 5-dot frame under the flicker common settings, the outside of the fixed object (screen background) of polygons and sectors will also be displayed in inverse colors.

Tiling

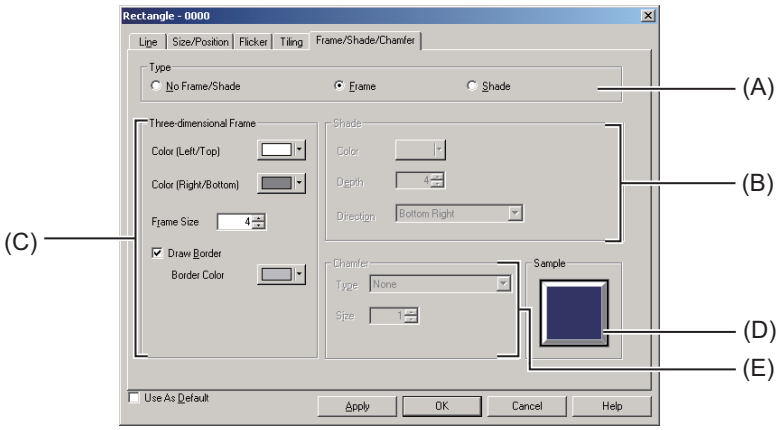
Set the color for the fixed object.



No.	Setting	Details
(A)	No Tiling	Select whether or not to tile the object.
(B)	Color	Set the object color.

Frame, Shade, and Beveling

Specify the frame, shading color, size, and bevel setting for the three-dimensional display of fixed objects.



No.	Setting	Details
(A)	Type	Select one of the following three types of fixed objects. • No frame or shade • Frame • Shade
(B)	Shade	Set the shade color, depth, and direction. Select the *Shade* Option. Set the color with the **Color** setting. Set the depth under **Depth**. Select one of the four shade direction types. • Top Left • Top Right • Bottom Left • Bottom Right
(C)	Three-dimensional Frame	Set the frame color, size, and border. Select the *Frame* Option. Set the color with the **Color (Left/Top)** and **Color (Right/Bottom)** settings. The size of the frame is set under **Frame Size**. When drawing a frame border, select the *Draw Border* Option to draw the frame border and specify the color with the **Border Color** setting.
(D)	Sample	The current settings will be reflected.
(E)	Chamfer	Set a bevel. **Type** Select one of the following three bevel choices. None: No bevel Radius of curve: Rounds the corners using the bevel size setting for the radius. Cut: Cuts off an isosceles triangle from each corner based on the bevel size setting. **Size** Specify the bevel size.

Additional Information

Only shade settings can be made for polygons and sectors.

2-7 Registering/Using Library

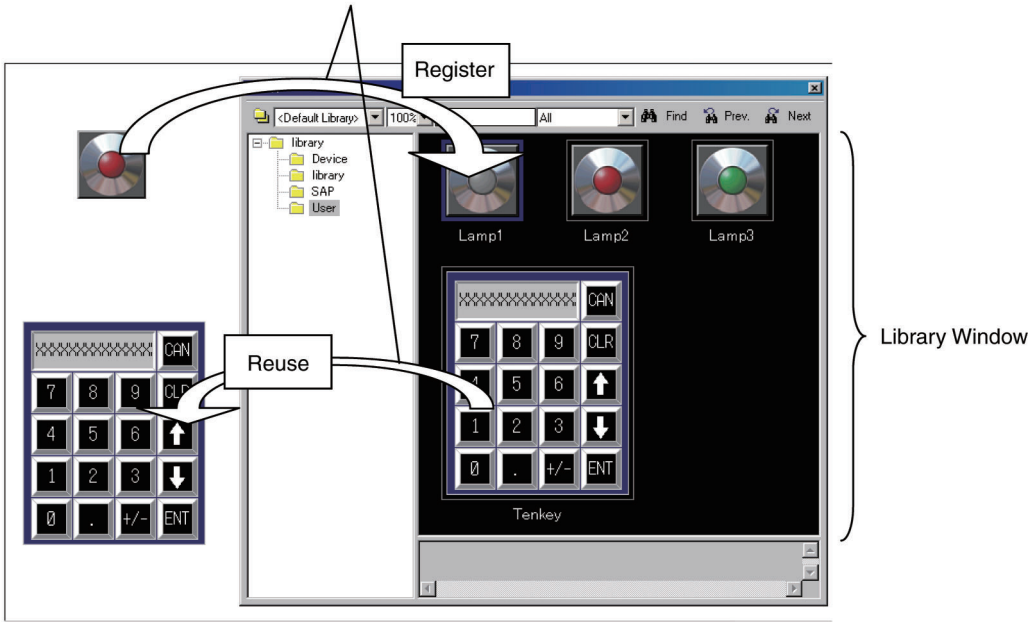
The library contains pieces of data that registered functional and/or fixed objects created on CX-Designer.

If complicated fixed objects or other frequently used objects are registered to the library by category, those fixed objects can be displayed as required.

When functional objects are registered to the library, the property settings for those objects are also registered.

When frames are registered, all of the information within the frame is registered and can be used as is.

Objects can be easily registered and reused, using the drag-and-drop function.



Additional Information

- The computer's available free disk space determines how many library items can be registered.
- Video Displays and Data Block Tables cannot be registered in the library.
- For details on registering and reusing libraries, refer to *Editing Objects* in the *CX-Designer Online Help*.
- As a function similar with the Library, it implements Palette function that provides preset screens used as templates. Refer to the "Palette window" in the CX-Designer Online help.

2-8 Common Functional Object Functions

2-8-1 Table of Functional Object Settings

○: Supported, ---: Not supported

	Communications Address*1	Unit and Scale	Numeral Display Type	Date and Time	Text Attributes	Color	Background	Shape	Label	Scroll Bar	Frame	Flicker	Write Settings	Password	Control Flag*2	Macro	Size/Position
ON/OFF Buttons	○	---	---	---	---	○	---	○	○	---	○	○	○	○	○	○	○
Word Buttons	○	---	---	---	---	○	---	○	○	---	○	○	○	○	○	○	○
Command Buttons	○	---	---	---	---	○	---	---	○	---	○	○	---	○	○	○	○
Bit lamps	○	---	---	---	---	○	---	○	○	---	○	○	---	---	○*3	○	○
Word lamps	○	---	---	---	---	○	---	○	○	---	○	○	---	---	○*3	○	○
Numeral display and input objects	○	○	○	---	○	---	○	---	---	---	○	○	○	○	○	○	○
String display and input objects	○	---	---	---	○	---	○	---	---	---	○	○	○	○	○	○	○
Temporary input	---	---	---	---	○	---	○	---	---	---	○	---	---	---	---	---	○
Thumbwheel switches	○	○	○	---	○	---	○	---	---	---	○	○	○	○	○	○	○
List selection objects	○	---	---	---	○	---	○	---	---	○	○	○	---	○	○	○	○
Labels	○	---	---	---	---	---	○	---	○	---	○	○	---	---	○*3	---	○
Bitmaps	○	---	---	---	---	---	---	---	---	---	○	○	---	---	○*3	---	○
Level display objects	○	---	○	---	---	○	○	---	---	---	○	○	---	---	○*3	---	○
Analog meters	○	---	○	---	---	○	○	---	---	---	○	○	---	---	○*3	---	○
Alarm/Event display objects	○	---	---	○	○	---	○	---	---	---	○	○	---	○	○	○	○
Alarm/Event summary and history objects	○	---	---	○	○	---	○	---	---	○	○	○	---	○	○	○	○
Data log graphs	○	---	○	○	---	---	○	---	---	○	○	○	---	---	○	---	○
Broken-line graphs	○	---	○	---	---	---	○	---	---	○	○	○	---	---	○	---	○
Data Block Table	○	---	○	---	○	---	○	---	---	○	○	---	○	○	○	○	○
Date objects	○	---	---	○	○	---	○	---	---	---	○	○	○	○	○	---	○
Time objects	○	---	---	○	○	---	○	---	---	---	○	○	○	○	○	---	○
Consecutive line drawings	○	---	---	---	---	○	---	---	---	---	---	---	---	---	---	---	○
Multifunction Object	○	---	○	---	○	○	---	○	○	○	○	○	○	○	○	○	○
Contents display	○	---	---	---	---	---	---	---	---	○	○	○	---	---	○	---	○

*1. Communications address can be set in the General Tab Page as well as other Tab Pages.

*2. Controls input and display.

*3. Controls display only.

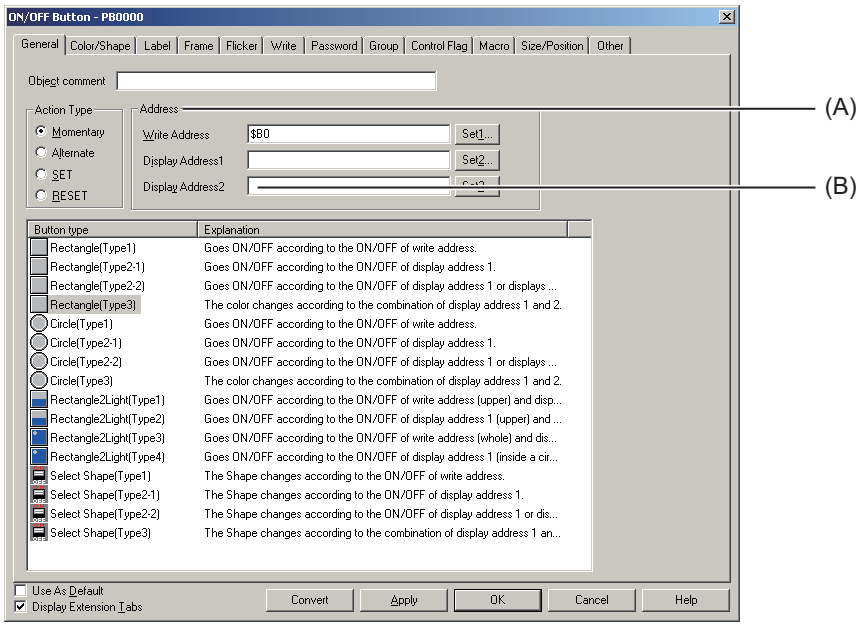
Additional Information

If functional objects that receive inputs are overlapped, the objects may not operate properly. When creating a screen, do not overlap the following functional objects.

- ON/OFF Buttons
- Word Buttons
- Command Buttons
- Numeral display and input objects
- String display and input objects
- Thumbwheel switches
- List selection objects
- Multifunction Object
- Alarm/Event display objects
- Alarm/Event summary and history objects
- Data log graphs
- Broken-line graphs
- Date objects
- Time objects
- Data Block Table
- Contents display

2-8-2 Address Settings (General Tab and Other Tabs)

If addresses are set in the properties of functional objects, the colors can be made to change depending on the status read via communications and the host can be notified when objects are pressed. For example, the write address when an ON/OFF Button is pressed, as well as display address 1 and display address 2 are set on the General Tab Page for an ON/OFF Button.

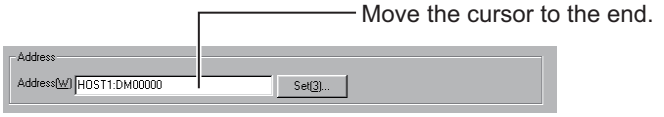


No.	Setting	Details
(A)	Address setting	Enter the address to be set. The addresses that can be set depends on the functional object and the setting items. For example, only bits can be set to functional objects such as ON/OFF buttons or lamps that read the ON/OFF status of addresses. Refer to *A-3 Addresses for Functional Objects* on page A-15. If an address that cannot be set is entered, a message saying that the address is incorrect will be displayed when the OK Button is pressed.

No.	Setting	Details
(B)	Index setting	If an index is specified for a particular address, the address can be automatically changed to a value to which the index value has been added. Ten index types, I0 to I9, can be set and each type corresponds to $SW27 to $SW36. Refer to *2-4 System Memory* on page 2-20 for information on system memory ($SW27 to $SW36). • Example Usage of Indexes Address setting: HOST1: 00000I0 The address for communications will automatically change based on the I0 value. I0 value 0: Address = HOST1:00000 I0 value 1: Address = HOST1:00001 I0 value 2: Address = HOST1:00002 ...

Additional Information

- When specifying indexes, the index (between I0 and I9) is added at the end of the address.
  Example: Setting HOST1:DM00000I9



  Move the cursor to the end of “HOST1: DM00000” and enter “I9”.



- An index cannot be entered from the Address Setting Dialog Box.
- If the address exceeds the setting range as a result of the index being specified, the address will be invalid and communications will not be processed.
- If the *Use as default* option is selected when an address is set to a functional object, that setting will be enabled even for other projects. The operation in such cases is described below.
  - If there is a host with the same host name, that host name will be applied.
    Example: If “HOST1” is created as the number 2 host for project 1 and “HOST1” is created as the number 2 host for project 2:
    If the functional object for which HOST1:00000 is set is registered using the default value for project 1, HOST1:00000 will be set when that functional object is created for project 2.
  - If there is no host with the same host name, the default value ($B0, $W0) will be used.
    Example: If “HOST1” is created for the number 2 host for project 1 and no host is registered as the number 2 host for project 2.
    If the functional object for which HOST1:00000 is set is registered as the default value for project 1, $W0 will be applied when that functional object is created for project 2.

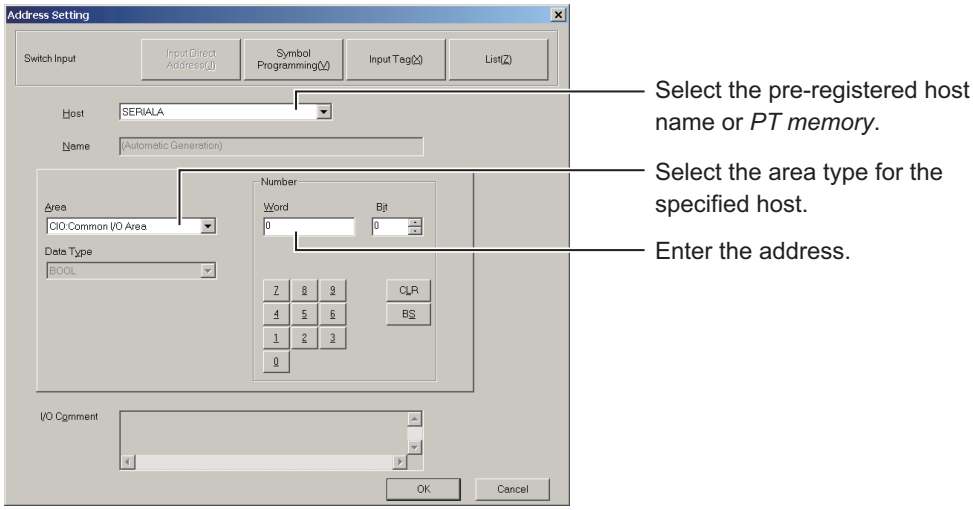
  Refer to *Editing Object* in the *CX-Designer Online Help* for details on the registering as an existing value option.
- Indexes cannot be set for tags.

Address Settings

The host name, area type, and address are set in the Address Setting Dialog Box. Select *PT memory* from the list of host names when specifying the internal memory. The area types that can be selected depend on the model of host that is registered.

Select **PT – Communication Setting** to display the Comm. Setting Dialog Box and set the host name.

Example: Address Setting Dialog Box for communications with OMRON C-series PLCs



● Host Name

Select the pre-registered host name or *PT memory*. If *PT memory* is selected, the internal PT memory is accessed.

● Area Type

Select the area type for the selected host name. The area types that can be selected change depending on the selected host name.

If *PT memory* is selected under *Host name*, the internal memory areas outlined in the following table can be specified.

- Area Types when PT Memory Selected

Area type	Details
$B	Internal bit memory
$W	Internal word memory
$SB	System bit memory
$SW	System word memory
$HB	Internal holding bit memory
$HW	Internal holding word memory

● Inputting Addresses

Use the numeric buttons 0 to 9 below the input field to enter the address.

Press the **CLR** Button to clear the address and the **BS** Button to delete the last character in the address.

Additional Information

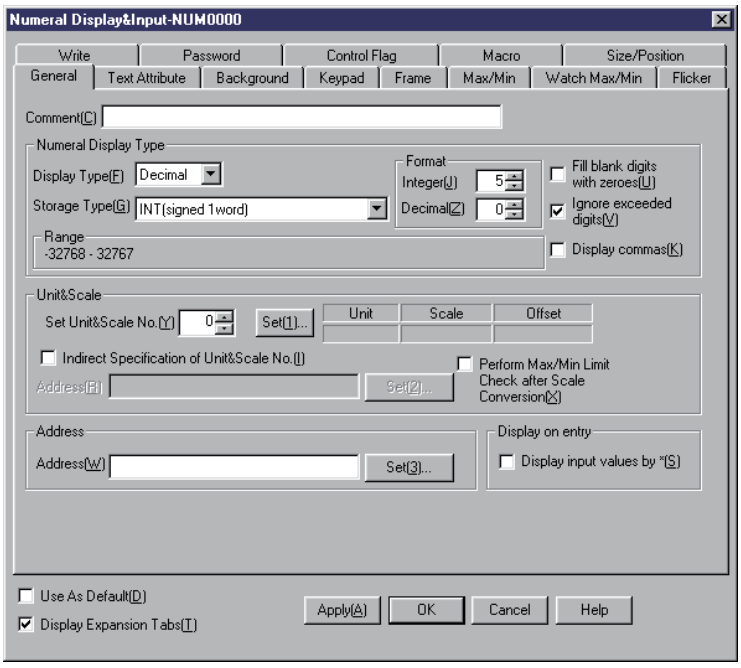
- The addresses that can be set depend on the functional object and the setting items.

  For example, only bits can be set for functional objects, such as ON/OFF buttons or lamps, that read the ON/OFF status of specified address bits.

  Refer to *A-3 Addresses for Functional Objects* on page A-15.
- Indexes cannot be set in the Address Setting Dialog Box. Enter indexes directly.

2-8-3 Unit and Scale (General Tab)

For numeral display objects and thumbwheel switches, scale conversions can be included in the display. The unit can also be displayed for numeral display objects. The unit and scale display settings are made on the General Tab Page of the Functional Object Properties Dialog Box.



Additional Information

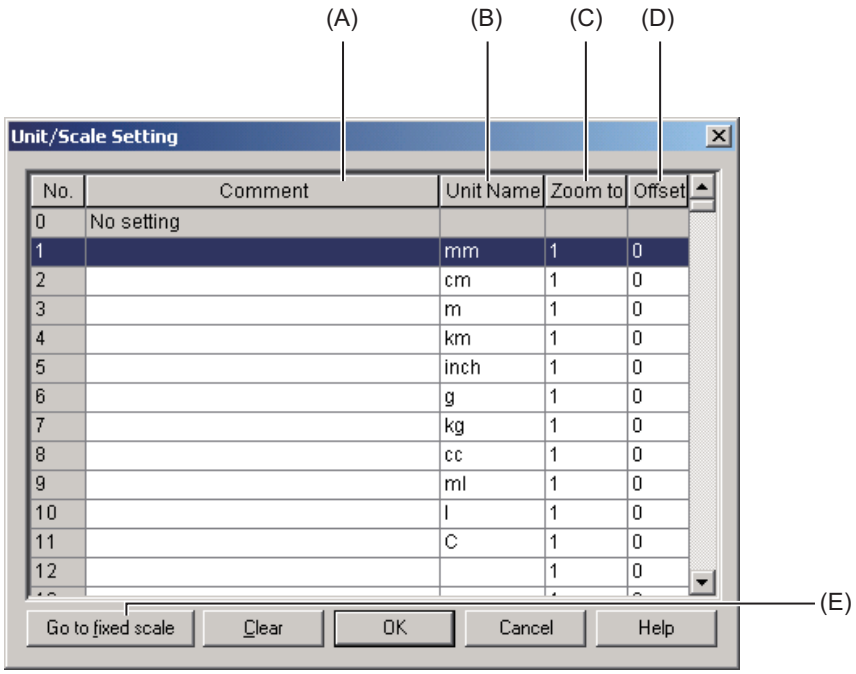
If *Indirect specification of unit and scale No.* is selected in the Functional Object Properties Dialog Box, the contents at the address is taken as the unit and scale number and the unit number is switched accordingly. The display unit or scale conversion coefficient can be switched from the host using this indirect specification method.

Indirect specification is not possible for units and scales numbers for thumbwheel switches.

Unit and Scale: Setting

Set the unit name and scale (magnification) combinations for the numerals to be displayed. Click the **Set** Button in the *Unit and Scale* column on the General Tab Page in the Functional Object Property Dialog Box to set the unit and scale.

Up to 1,000 units-scale combinations can be registered. Only the set information is downloaded to the PT Unit.



No.	Setting	Details
(A)	Comment	Sets comments for units (16 characters).
(B)	Unit name	Sets the name of the unit (up to 8 characters).
(C)	Scale	Sets the magnification*1. The magnification can be set in integers, decimals, and indices. Fractions cannot be set.
(D)	Offset	Sets the offset value*1.
(E)	Go to fixed scale Button	Displays a pre-registered fixed scale (after unit No. 1001).

*1. Approximately 2.22507385850720e-308 to approximately 1.79769313486231+308

Editing Units and Scales

Double-click each item in the Unit & Scale Setting Dialog Box to edit the units and scales.

Example: When the address is set to $W1000, unit to mm, scale to 100, and offset value to 50:

$W1000 contents	Formula	Display value
0	50 + 0 × 100	50 mm
1	50 + 1 × 100	150 mm
2	50 + 2 × 100	250 mm
100	50 + 100 × 100	10,050 mm

Additional Information

- If a decimal with many digits is set as the scale, the test and display values may differ. The contents of the address, however, will be the same.
- The scale for a thumbwheel switch must be set to a power of 10, and the offset must be set to 0. If any other values are set, the thumbwheel switch many not operate properly.

2-8-4 Numeral Display and Storage Type (General Tab)

The following display and storage formats can be specified for functional objects that handle numeric values.

The display and storage formats for numerals are set on the General Tab Page.

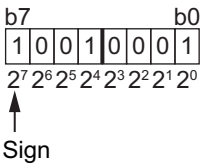
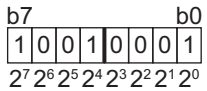
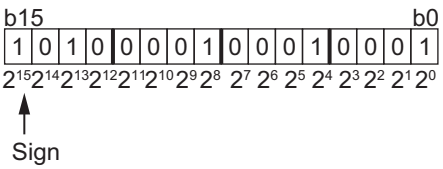
● Display Type

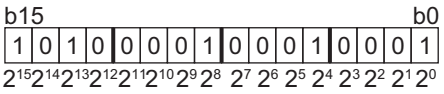
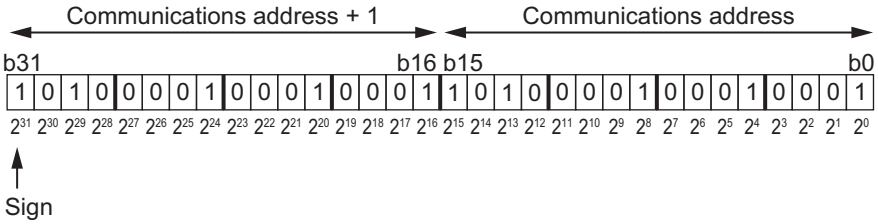
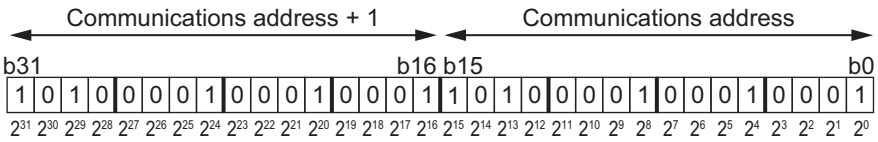
Display Type	Details
Decimal	BCD and real number storage formats can be specified. Byte: -128 to 127 (signed) 0 to 255 (unsigned) Word: -32,768 to 32,767 (signed) 0 to 65,535 (unsigned) 2-Word: -2,147,483,648 to 2,147,483,647 (signed) 0 to 4,294,967,295 (unsigned) 4-Word: -9,223,372,036,854,770,000 to 9,223,372,036,854,770,000 (signed) 0 to 18,446,744,073,709,500,000 (unsigned)
Hexadecimal	BCD, real number, and 4-word storage formats cannot be specified. Byte: 0 to FF (unsigned) Word: 0 to FFFF (unsigned) 2-Word: 0 to FFFFFFFF (unsigned)
Binary	BCD, real number, and 4-word storage formats cannot be specified. Byte: 0 to 11111111 (unsigned) Word: 0 to 1111111111111111 (unsigned) 2-Word: 0 to 11111111111111111111111111111111 (unsigned)
Octal	BCD, real number, and 4-word storage formats cannot be specified. Byte: 0 to 377 (unsigned) Word: 0 to 177777 (unsigned) 2-Word: 0 to 37777777777 (unsigned)

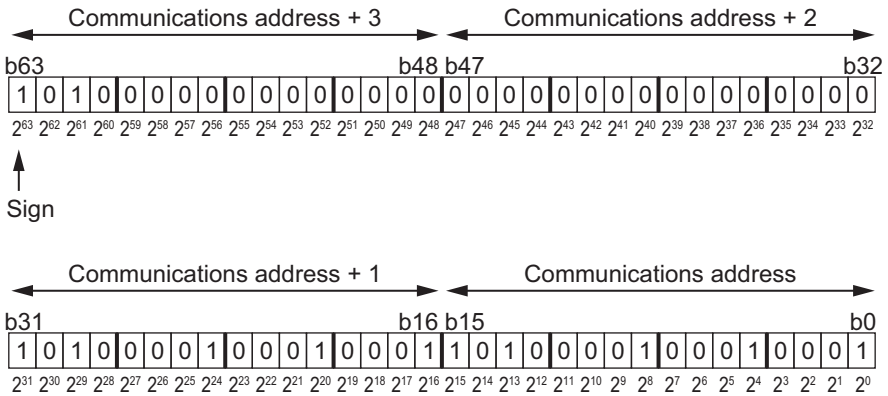
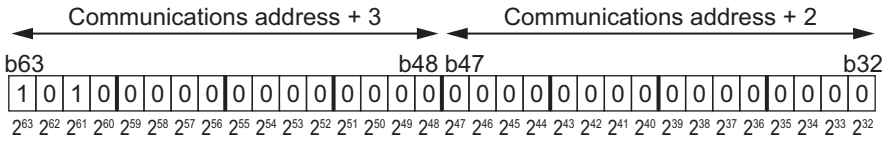
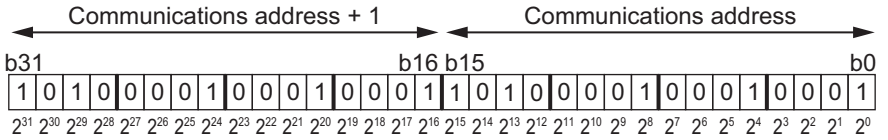
Real numbers have floating decimal points. BCD are numerals with each digit of the decimal number displayed in 4-bit binary code. When display formats other than decimal are selected, real number and BCD cannot be selected for the storage type.

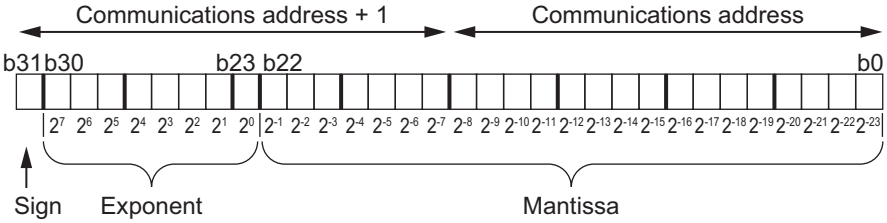
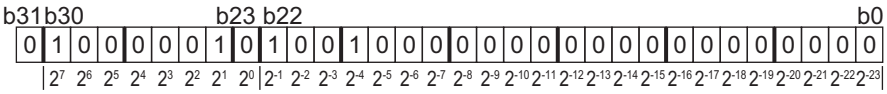
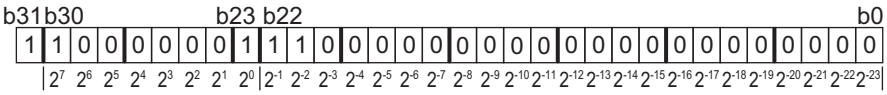
Once decimal has been selected as the display type, real number or BCD can be selected for the storage type. If other display formats are then selected, UINT (1-word unsigned) is automatically set as the storage format.

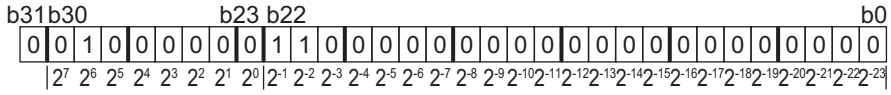
● Storage Types

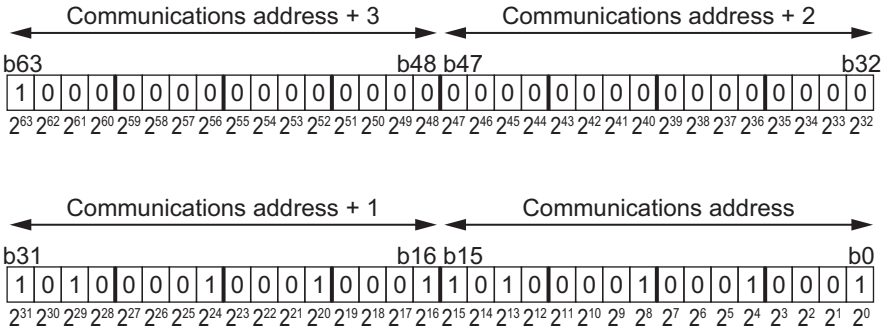
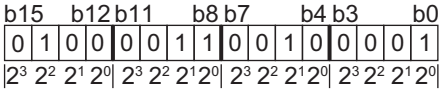
Storage Type	Details
SINT (signed, 1 byte)	Stored as a 1-byte integer at the write destination address. (-128 to 127 in decimal) The data format is described below. The most significant bit is treated as the sign. (0: Positive, 1: Negative)  Example: 1001 0001 $-1 \times 2^7 + 2^4 + 2^0 = -128 + 16 + 1 = -111$ If there is an overflow, bits 8 and later are ignored. Example: If 1 is added to 11111111 (-1), the result is 00000000 (0).
USINT (unsigned, 1 byte)	Stored as a 1-byte integer at the write destination address. (0 to 255 in decimal) The data format is described below.  Example: 1001 0001 $2^7 + 2^4 + 2^0 = 128 + 16 + 1 = 145$ If there is an overflow, bits 8 and later are ignored. Example: If 1 is added to 11111111 (-1), the result is 00000000 (0).
INT (signed, 1 word)	Stored as a 2-byte integer at the write destination address. (-32,768 to 32,767 in decimal) The data format is described below. The most significant bit is treated as the sign. (0: Positive, 1: Negative)  Example: 1010 0001 0001 0001 $-1 \times 2^{15} + 2^{13} + 2^8 + 2^4 + 2^0 = -32768 + 8192 + 256 + 16 + 1 = -24303$ If there is an overflow, bits 16 and later are ignored. Example: If 1 is added to 1111111111111111 (-1), the result is 0000000000000000 (0).

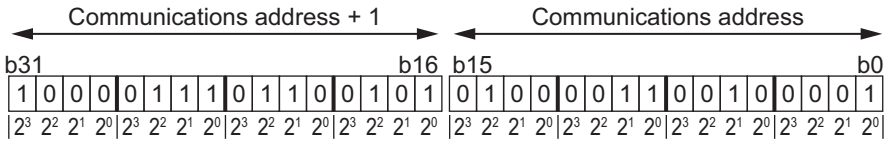
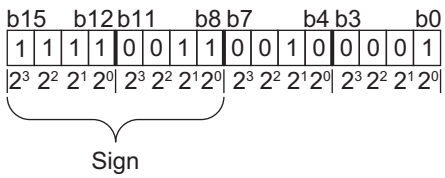
Storage Type	Details
UINT (unsigned, 1 word)	Stored as a 2-byte integer at the write destination address. (0 to 65,535 in decimal) The data format is described below.  Example: 1010 0001 0001 0001 $2^{15} + 2^{13} + 2^{8} + 2^{4} + 2^{0} = 32768 + 8192 + 256 + 16 + 1 = 41233$ If there is an overflow, bits 16 and later are ignored. Example: If 1 is added to 1111111111111111 (-1), the result is 0000000000000000 (0).
DINT (signed, 2 words)	Stored as a 4-byte integer at the write destination address. (-2,147,483,648 to 2,147,483,647 in decimal) The data format is described below. The most significant bit is treated as the sign. (0: Positive, 1: Negative)  The set address and the address +1 (2 words) are used to give one number. Example: 1010 0001 0001 0001 1010 0001 0001 0001 $-1 \times 2^{31} + 2^{29} + 2^{24} + 2^{20} + 2^{16} + 2^{15} + 2^{13} + 2^{8} + 2^{4} + 2^{0} =$ -2147483648+536870912 + 16777216 + 1048576 + 65536 + 32768 + 8192 + 256 + 16 + 1 = -1592680175
UDINT (unsigned, 2 words)	Stored as a 4-byte integer at the write destination address. (0 to 4,294,967,295 in decimal) The data format is described below.  The set address and the address +1 (2 words) are used to give one number. Example: 1010 0001 0001 0001 1010 0001 0001 0001 $2^{31} + 2^{29} + 2^{24} + 2^{20} + 2^{16} + 2^{15} + 2^{13} + 2^{8} + 2^{4} + 2^{0} = 2147483648 +$ 536870912 + 16777216 + 1048576 + 65536 + 32768 + 8192 + 256 + 16 + 1 = 2702287121

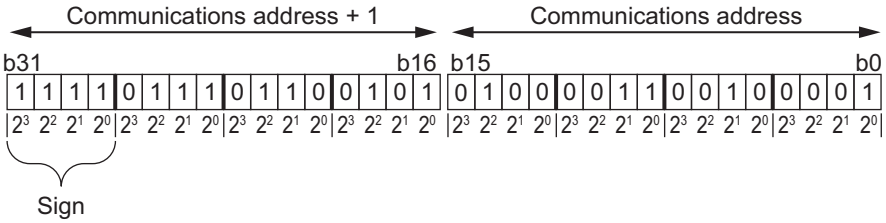
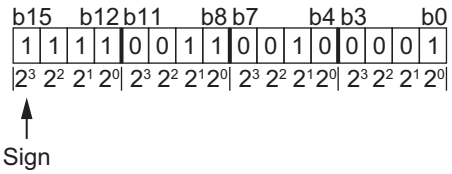
Storage Type	Details
LINT (signed, 4 words)	Stored as an 8-byte integer at the write destination address. (-9,223,372,036,854,770,000 to 9,223,372,036,854,770,000 in decimal) The data format is described below. The most significant bit is treated as the sign. (0: Positive, 1: Negative)  The set address through the address +3 (4 words) are used to give one number. However, the effective digits guaranteed is only 15. Example: 1000 0000 0000 0000 0000 0000 0000 0000 1010 0001 0001 0001 1010 0001 0001 0001 $-1 \times 2^{63} + 2^{31} + 2^{29} + 2^{24} + 2^{20} + 2^{16} + 2^{15} + 2^{13} + 2^{8} + 2^{4} + 2^{0} =$ -1×9223372036854775808 + 2147483648 + 536870912 + 16777216 + 1048576 + 65536 + 32768 + 8192 + 256 + 16 + 1 = -9223372034152480000 (Rounded at the 15th digit.)
ULINT (unsigned, 4 words)	Stored as an 8-byte integer at the write destination address. (0 to 18,446,744,073,709,500,000 in decimal) The data format is described below.   The set address through the address +3 (4 words) are used to give one number. However, the effective digits guaranteed is only 15. Example: 1000 0000 0000 0000 0000 0000 0000 0000 1010 0001 0001 0001 1010 0001 0001 0001 $2^{63} + 2^{31} + 2^{29} + 2^{24} + 2^{20} + 2^{16} + 2^{15} + 2^{13} + 2^{8} + 2^{4} + 2^{0} =$ 9223372036854775808 + 2147483648 + 536870912 + 16777216 + 1048576 + 65536 + 32768 + 8192 + 256 + 16 + 1 = 9223372039557060000 (Rounded at the 15th digit.)

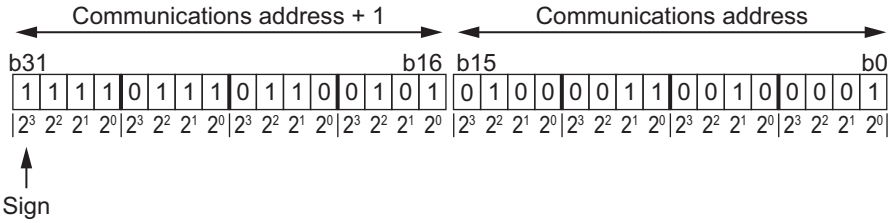
Storage Type	Details
REAL (real number)	Stored as a 4-byte real number at the write destination address. (Can be set in decimal between approximately ±1.175494351 × 10^{-38} and ±3.402823466 × 10^{+38} (7 significant digits).) Four-byte real numbers that conform to IEEE 754. Expressed as real number = $(-1)^{sign}$ × -1 [mantissa] × $2^{exponent-127}$. The data format is described below. Bits 0 to 22 (23 bits) are the mantissa, bits 23 to 30 (8 bits) are the exponent, and bit 31 is the sign (0: positive; 1: negative).  The set address and the address +1 (2 words) are used to give one number. Real numbers are divided into 5 types: Normalized numbers, subnormal numbers, zero, infinity, and non-numbers. • Normalized Number If the exponent is 00000001 to 11111111, and the mantissa is 00000000000000000000 to 11111111111111111111, the number is called a normalized number. Example 1: 0100 0001 0100 1000 0000 0000 0000 0000 If the sign, exponent, and mantissa are separated, the number will appear as shown below.  Sign: + Exponent: $2^7 + 2^1 = 128 + 2 = 130$ Mantissa: $2^{-1} + 2^{-4} = 0.5 + 0.0625 = 0.5625$ Real number = $(1 + 0.5625) \times 2^{(130 - 127)} = 1.5625 \times 8 = 12.5$ Example 2: 1100 0000 1110 0000 0000 0000 0000 0000 If the sign, exponent, and mantissa are separated, the number will appear as shown below.  Sign: - Exponent: $2^7 + 2^0 = 128 + 1 = 129$ Mantissa: $2^{-1} + 2^{-2} = 0.5 + 0.25 = 0.75$ Real number = $(1 + 0.75) \times 2^{(129 - 127)} = -1.75 \times 4 = -7$

Storage Type	Details
REAL (real number)	Example 3: 0010 0000 0110 0000 0000 0000 0000 0000 If the sign, exponent, and mantissa are separated, the number will appear as shown below.  Sign: + Exponent: 2^6 - 127 = 64 - 127 = -63 Mantissa: $2^{-1} + 2^{-2}$ = 0.5 + 0.25 = 0.75 Real number = $(1 + 0.75) \times 2^{-63} = 1.75 \times 2^{-63} \approx 1.897353 \times 10^{-19}$ • Subnormal Numbers and Zero If the exponent is 0 and the mantissa is a value other than 0, the number is called a subnormal number. If the exponent is 0 and the mantissa is also 0, the number is called zero. For subnormal numbers and zeros, a Numeral Display and Input object will be 0000.0000 (for 4-digit integer and 4-digit decimal display), and the value will be displayed as “0”. • Infinity and Non-numbers If the exponent is 11111111 and the mantissa is 0, the number is called infinity. If the exponent is 11111111 and the mantissa is a value other than 0, the number is called a non-number. For subnormal numbers and zeros, a Numeral Display and Input object will be ####.#### (for 4-digit integer and 4-digit decimal display), and the value will be displayed as “#”. For REAL numbers, there are 7 significant digits. Errors will occur for more than 7 digits. Example: If 1,234,567,890 is entered when REAL is set for a Numeral Display and Input object (10-digit integer part), the value will be displayed and stored as shown below. Input:1,234,567,890 Display:1,234,567,936 ↑An error has occurred for the digits after the 7th digit. Storage: 0100 1110 1001 0011 0010 1100 0000 0110

Storage Type	Details
LREAL (double-precision real number)	Stored as a 8-byte real number at the write destination address. (Can be set in decimal between approximately ±2.2250 × 10^{-308} and ±1.797693134862315 × 10^{308} (16 significant digits).) Four-byte real numbers that conform to IEEE 754. Expressed as real number = $(-1)^{sign}$ × -1.[mantissa] × $2^{exponent-1023}$. The data format is described below. Bits 0 to 51 (52 bits) are the mantissa, bits 52 to 62 (11 bits) are the exponent, and bit 63 is the sign (0: positive; 1: negative).  There are more digits, but otherwise the specifications are the same as for REAL.
BCD2 (unsigned, 1 word)	Stored as 2-byte BCD at the write destination address. (0 to 9,999 in decimal) The data format is described below.  Example: 0100 0011 0010 0001 1st digit: 2^0 = 1; 2nd digit: 2^1 = 2; 3rd digit: $2^1 + 2^0$ = 3; 4th digit: 2^2 = 4 BCD value: 4321 Values between 0 and 9 can be obtained for each digit. Higher values (A to F) cannot be expressed in BCD. The display for a Numeral Display and Input object will be ####.

Storage Type	Details
BCD2 (unsigned, 2 words)	Stored as 4-byte BCD at the write destination address. (0 to 99,999,999 in decimal) The data format is described below. The set address and the address +1 (2 words) are used to give one number.  Example: 1000 0111 0110 0101 0100 0011 0010 0001 1st digit: 2^0 = 1; 2nd digit: 2^1 = 2; 3rd digit: $2^1 + 2^0$ = 3; 4th digit: 2^2 = 4; 5th digit: $2^2 + 2^0$ = 5; 6th digit: $2^2 + 2^1$ = 6; 7th digit: $2^2 + 2^1 + 2^0$ = 7; 8th digit: 2^3 = 8 BCD value: 87,654,321 Values between 0 and 9 can be obtained for each digit. Higher values (A to F) cannot be expressed in BCD. The display for a Numeral Display and Input object will be ########.
BCD1 (signed (left-most digit: F), 1 word))	Stored as 2-byte BCD at the write destination address. (-999 to 9,999 in decimal) The data format is described below. The leftmost digit (bits 12 to 15) is treated as the sign. (The number is negative when the leftmost digit is F(1111).)  Example: 1111 0011 0010 0001 1st digit: 2^0 = 1; 2nd digit: 2^1 = 2; 3rd digit: $2^1 + 2^0$ = 3; 4th digit: 1111, therefore the number is negative. BCD value: -321 Values between 0 and 9 can be obtained for each digit. Higher values (A to F) cannot be expressed in BCD. (F can be stored only in the leftmost digit.) The display for a Numeral Display and Input object will be ####.

Storage Type	Details
BCD1 (signed (left-most digit: F), 2 words))	Stored as 4-byte BCD at the write destination address. (-9,999,999 to 99,999,999 in decimal) The data format is described below. The leftmost digit (bits 28 to 31) is treated as the sign. The address set for the Numeral Display and Input object and the address +1 (2 words) are used to give one number.  Example: 1111 0111 0110 0101 0100 0011 0010 0001 1st digit: 2^0 = 1; 2nd digit: 2^1 = 2; 3rd digit: $2^1 + 2^0$ = 3; 4th digit: 2^2 = 4; 5th digit: $2^2 + 2^0$ = 5; 6th digit: $2^2 + 2^1$ = 6; 7th digit: $2^2 + 2^1 + 2^0$ = 7; 8th digit: 1111, therefore the number is negative. BCD value: -7,654,321 Values between 0 and 9 can be obtained for each digit. Higher values (A to F) cannot be expressed in BCD. (F can be stored only in the leftmost digit.) The display for a Numeral Display and Input object will be ########.
BCD2 (signed (left-most bit: 1), 1 word))	Stored as 2-byte BCD at the write destination address. (-7,999 to 7,999 in decimal) The data format is described below. The most significant bit is treated as the sign. (Leftmost bit 0: Positive, 1: Negative)  Example: 1111 0011 0010 0001 1st digit: 2^0 = 1; 2nd digit: 2^1 = 2; 3rd digit: $2^1 + 2^0$ = 3; 4th digit: (-1) × ($2^2 + 2^1 + 2^0$) = -7 BCD value: -7,321 Values between 0 and 9 can be obtained for each digit (0 to 7 for leftmost digit). Higher values (A to F) cannot be expressed in BCD. The display for a Numeral Display and Input object will be ####.

Storage Type	Details
BCD2 (signed (left-most bit: 1), 2 words))	Stored as 4-byte BCD at the write destination address. (-79,999,999 to 79,999,999 in decimal) The data format is described below. The most significant bit is treated as the sign. (Most signification bit 0: Positive, 1: Negative) The set address and the address +1 (2 words) are used to give one number.  Example: 1111 0111 0110 0101 0100 0011 0010 0001 1st digit: 2^0 = 1; 2nd digit: 2^1 = 2; 3rd digit: $2^1 + 2^0$ = 3; 4th digit: 2^2 = 4; 5th digit: $2^2 + 2^0$ = 5; 6th digit: $2^2 + 2^1$ = 6; 7th digit: $2^2 + 2^1 + 2^0$ = 7; 8th digit: (-1) × ($2^2 + 2^1 + 2^0$) = -7 BCD value: -77,654,321 Values between 0 and 9 can be obtained for each digit (0 to 7 for leftmost digit). Higher values (A to F) cannot be expressed in BCD. The display for a Numeral Display and Input object will be ########.

Using Tags

If screens are to be created using tags, the storage type and the size of the tag data type (1 word or 2 words) must be the same in the settings for functional objects that handle numbers.

The following table gives the combinations of storage types and compatible data types. CHANNEL can be used with all storage types.

Storage type	Data type of corresponding tag*1
SINT	SINT, CHANNEL
USINT	USINT, CHANNEL
INT	INT, CHANNEL
UINT	UINT, CHANNEL
DINT	DINT, CHANNEL
UDINT	UDINT, CHANNEL
LINT	LINT, CHANNEL
ULINT	ULINT, CHANNEL
REAL	REAL, CHANNEL
LREAL	LREAL, CHANNEL
BCD2 (1 word, unsigned)	UINT_BCD, CHANNEL
BCD2 (2 words, unsigned)	UDINT_BCD, CHANNEL
BCD1 (signed (leftmost digit: F), 1 word))	WORD, CHANNEL
BCD1 (2 words, signed (leftmost digit: F))	DWORD, CHANNEL
BCD2 (1 word, signed (leftmost bit))	WORD, CHANNEL
BCD2 (2 words, signed (leftmost bit))	DWORD, CHANNEL

*1. The above data types also apply to tags that are array variables.

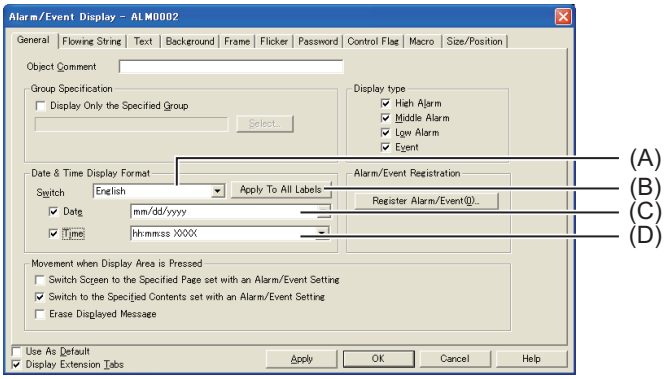
Additional Information

- You can use the CX-Designer's error check to confirm whether the storage type matches the data type of tags set for functional components. For details on the error check, refer to "validation" in the online help for the CX-Designer.
- Depending on the settings for functional objects, there will be items for specifying BCD or binary in the Project Properties Dialog Box under **PT – Properties** in the CX-Designer.

  For these items, the error check finds only whether the size matches. It will not check whether the data type matches. Therefore, be sure to set tags with the correct data type when making the settings.
- ULINT, LINT, and LREAL data can be used as storage types. There are not storage types for ULINT_BCD, LWORD, TIME, DATE, TIME_OF_DAY, and DATE_AND_TIME, so they can be used only for the READCMEM, WRITECMEM, and LOCALTIME macros.
- If direct addresses are set, there are no restrictions on the data type resulting from the storage type.

2-8-5 Date and Time Format (General Tab)

The display formats outlined below can be used for functional objects that display date and time. In most cases, the date and time format is set on the General Tab Page.



No.	Setting	Details
(A)	Switch	Switches labels. The date and time display format can be set for each label.
(B)	Apply the same value to all labels	Applies the data display format and time display format to all of the selected labels. This button can be used only when the ON Check Box for the data or time is selected. This button cannot be used in the following cases. • When the *Date & Time Display Format* Check Box is selected on the Edit/Disp Tab Page in the Option Dialog Box accessed from the **Tools – Option** Menu Command • When there is only one label • When the ON Check Boxes for the data and time are cleared
(C)	Date	Select the date display format from the list. For some functional objects, you can select whether or not to display the date. For the functional objects with that option, tick the check box to display the date.
(D)	Time	Select the time display format from the list. For some functional objects, you can select whether or not to display the time. For the functional objects with that option, tick the check box to display the time.

Display item	Display format	
Date	yyyy: year (4 digits); yy: year (2 digits) mm: month (2 digits) MMM. month in 3 characters, e.g., Feb MMMM month full spell out, e.g., February dd: day of month (2 digits) ddd: day of the week (1 Japanese characters, e.g., 土) dddd: day of the week (3 Japanese characters, e.g., 土曜日) DDD: day of the week (3 characters, e.g., Sat)	
	Display formats	Display examples
	yyyy[JY]mm[JM]dd[JD] dddd	2000年06月17日 土曜日
	yy[JY]mm[JM]dd[JD] dddd	00年06月17日 土曜日
	yyyy[JY]mm[JM]dd[JD] (dddd)	2000年06月17日 (土曜日)
	yy[JY]mm[JM]dd[JD] (dddd)	00年06月17日 (土曜日)
	yyyy[JY]mm[JM]dd[JD]	2000年06月17日
	yy[JY]mm[JM]dd[JD]	00年06月17日
	yyyy/mm/dd dddd	2000/06/17 土曜日
	yy/mm/dd dddd	00/06/17 土曜日
	yyyy/mm/dd (dddd)	2000/06/17 (土曜日)
	yy/mm/dd (dddd)	00/06/17 (土曜日)
	yyyy/mm/dd	2000/06/17
	yy/mm/dd	00/06/17
	ddd mm/dd/yyyy	土 06/17/2000
	ddd mm/dd/yy	土 06/17/00
	(ddd) mm/dd/yyyy	(土) 06/17/2000
	(ddd) mm/dd/yy	(土) 06/17/00
	yyyy.mm.dd dddd	2000.06.17 土曜日
	yy.mm.dd dddd	00.06.17 土曜日
	yyyy.mm.dd (dddd)	2000.06.17 (土曜日)
	yy.mm.dd (dddd)	00.06.17 (土曜日)
	yyyy.mm.dd	2000.06.17
	yy.mm.dd	00.06.17
	ddd mm.dd.yyyy	土 06.17.2000
	ddd mm.dd.yy	土 06.17.00
	(ddd) mm.dd.yyyy	(土)06.17.2000
	(ddd) mm.dd.yy	(土)06.17.00
	yyyy-mm-dd	2000-06-17
	mm/dd/yyyy	02/23/2001
	mm/dd/yy	02/23/01
	DDD,MMMM dd,yyyy	Fri,February 23,2001
	MMMM dd,yyyy	February 23,2001
	DDD,MMM dd,yy	Fri,Feb 23,01
	MMM dd,yy	Feb 23,01
	dd/mm/yyyy	23/02/2001
	dd/mm/yy	23/02/01
	DDD/dd/mm/yyyy	Fri/23/02/2001
	DDD/dd/mm/yy	Fri/23/02/01

Display item	Display format	
Date	DDD,dd MMMM,yyyy	Fri,23 February,2001
	dd MMMM,yyyy	23 February,2001
	DDD,dd MMM,yy	Fri,23 Feb,01
	dd MMM,yy	23 Feb.01
	dd.mm.yy	23.02.01
	DDD.dd.mm.yy	Fri.23.02.01
Time	hh: hour, mm: minutes, ss: seconds, xxxx: 午前/午後, XXXX: AM/PM	
	Display formats	Display examples
	xxxx hh[Jh]mm[Jm]ss[Js]	午後01時51分25秒
	xxxx hh[Jh]mm[Jm]	午後01時51分
	hh[Jh]mm[Jm]ss[Js]	13時51分25秒
	hh[Jh]mm[Jm]	13時51分
	xxxx hh:mm:ss	午前10:15:20
	xxx hh:mm	午前10:15
	hh:mm:ss XXXX	10:15:20 AM
	hh:mm XXXX	10:15 AM
	hh:mm:ss	10:15:20
	hh:mm	10:15
	nn ms *1	1000 ms
	n s *1	1 s

*1. Only data log objects can be used.

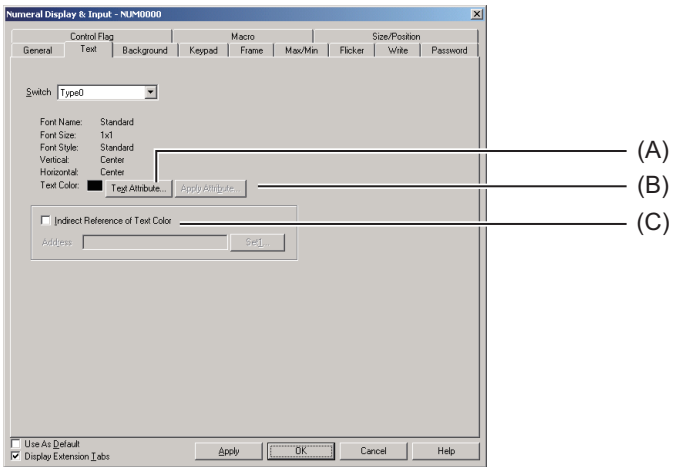
Additional Information

Depending on the settings at the CX-Designer, the Japanese characters shown below will be displayed at the PT Unit.

Display at CX-Designer	Display at PT Unit
[JY]	年
[JM]	月
[JD]	日
[Jh]	時
[Jm]	分
[Js]	秒

2-8-6 Text Attributes

The text attributes such as font, size, and color can be set for functional objects that display characters. The text attributes are set on the Text Tab Page.



No.	Setting	Details
(A)	Text Attribute Button	Click the **Text Attribute** Button to display the Text Attribute Dialog Box. Set the font, size, and other text attributes.
(B)	Apply Attribute Button	If multiple labels are being set, the text attributes for one label can be applied to all labels. Click the **Apply Attribute** Button to display the Apply Text Attribute Dialog Box and select the attributes to be applied. The **Apply Attribute** Button cannot be used if there is only one label.
(C)	Indirect Reference of Text Color	When this option is selected, the label's color can be changed using the value of a preset communications address. Set a valid color code (0 to FF) in the communications address.

● Fonts

Raster, vector, scalable font, and 7-segment fonts can be displayed on NS-B-series.

Raster fonts display the font itself as a bitmap and can be used for all functional objects that display characters.

Vector fonts display multiple points that show coordinates of characters and the border that connect those points. Vector fonts can only be used only for buttons, lamps, multifunction objects, and labels.

A scalable font is a font that expresses character shapes as the coordinates of the base point and a collection of lines.

The scalable font can be used for all functional objects that display text.

The 7-segment font uses a 7-segment LED-type font. The following characters can be displayed: 0 to 9, A to F, the plus and minus signs (+ and -), periods (.), commas (,), spaces ( ), and colons (:).

The 7-segment font can be used for all functional objects that display text.

Raster Fonts

The following raster fonts can be used.

Font	Characters that can be displayed	Base sizes	Magnification
Rough	Half-width alphanumerics, Katakana, Greek, Coptic, Cyrillic	8×8	1×1, 1×2, 2×1, 2×2, 3×3, 4×4, 8×8
Standard	Half-width alphanumerics, Katakana, full-width JIS1 and JIS2 standard characters, Greek, Coptic, Cyrillic, Korean, simplified Chinese	8×16, 16×16	1×1, 1×2, 2×1, 2×2, 3×3, 4×4, 8×8
Fine	Half-width alphanumerics, Katakana, full-width JIS1 and JIS2 standard characters, Greek, Coptic, Cyrillic	16×32, 32×32	1×1, 1×2, 2×1, 2×2, 3×3, 4×4, 8×8
Gothic numeral	0 to 9, A to F, +, -, decimal point, comma, space, and colon	---	8×16, 16×32, 24×48, 32×64, 48×96, 64×128

Vector Fonts

All vector fonts installed on the personal computer using CX-Designer can be used, e.g., Arial.

Vector fonts can be used when displaying labels for ON/OFF buttons, word buttons, command buttons, bit lamps, word lamps, and Multifunction Objects, or when displaying fixed character strings using fixed text strings.

Scalable Font

The following scalable font can be used.

Font	Size	Horizontal magnification
Scalable Gothic	6 to 255 pixels	50% to 200%

The scalable font can be enlarged or reduced horizontally.



Seven-segment Font

The following 7-segment font can be used.

Font	Sizes
7-segment numeral	8×14, 12×21, 16×27, 20×34, 24×41, 32×54, 48×82, 64×108, 80×135, 96×161, 112×188, 128×216, 160×269, 200×336*1

*1. For the NB5Q-TW01B-V1-S, sizes 8x14 to 96x161 can be used.

The following characters can be displayed in 7-segment font: 0 to 9, A to F, the plus and minus signs (+ and -), periods (.), commas (,), spaces ( ), and colons (:).

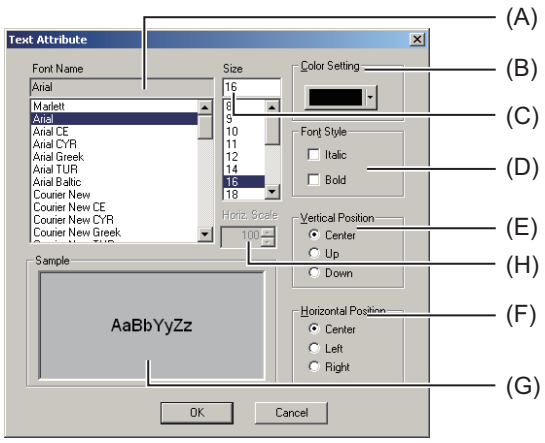
Additional Information

- Precautions When Using Raster Fonts

  If \ is entered using raster fonts, a backslash will be displayed on the PT Unit.
- Vector fonts cannot be used if text is used for character strings or to indirectly specify character color or background color.
- Refer to the appendices for details on the characters that can be displayed.
- Only characters that can be displayed in the Gothic numeral or 7-segment font will display correctly. Other characters will not be displayed correctly.
- Use the scalable font if displaying text in Thai.
- If background fill is set to OFF when 7-segment fonts are displayed on the PT Unit, then a rough outline will be displayed for the fonts. Set the background fill to ON to display the fonts smoothly.
- When you display a “,” (comma) at the beginning of a string with 7-segment font, the string will not be shown correctly.

Setting Text Attributes

Click the **Text Attribute** Button to display the Text Attribute Dialog Box. Set the font, size, and other text attributes.

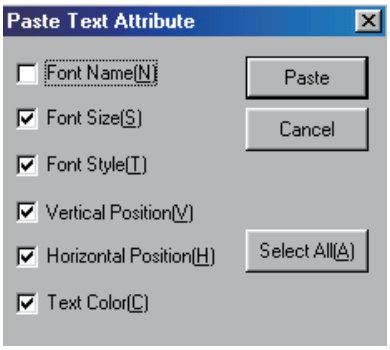


No.	Setting	Details
(A)	Font Name	Select the font from the list.
(B)	Color Setting	Sets the display character color.
(C)	Size	Sets the font size. Set the magnification for raster and 7-segment fonts and character size for vector and scalable fonts.
(D)	Font style	Sets bold or italics. This selection can be made only for vector fonts.
(E)	Vertical position	Select the vertical position as the up, center, or down.

No.	Setting	Details
(F)	Horizontal position	Select the horizontal position as left, center, or right.
(G)	Sample	Displays a sample at the current settings.
(H)	Horizontal magnification	With the scaled font, a magnification between 50% and 200% can be specified.

Applying Text Attribute

Text attributes such as font, size, and color can be applied to other labels. Click the **Apply Attribute** Button on the Label Tab Page (or Text Attribute Tab Page) to display the Apply Text Attribute Dialog Box. Select the attributes to be applied to other labels.

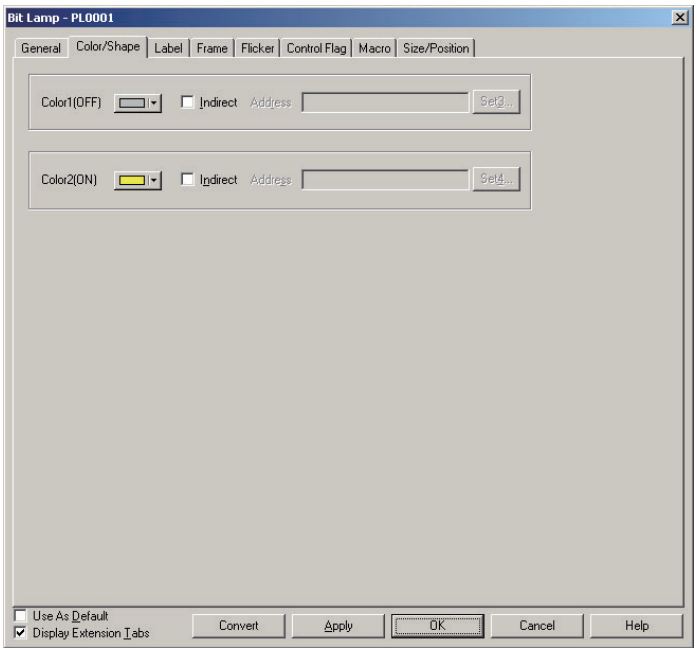


Types of Attributes for Application

Attribute type	Details
Font name	Selected font types
Font size	Sets the font size. Set the magnification for raster and 7-segment fonts and character size for vector and scalable fonts.
Font style	Bold, italic (for vector fonts only)
Vertical position	Up, center, down
Horizontal position	Left, center, right
Text color	Character color

2-8-7 Setting Colors (Color/Shape Tab)

Set the ON and OFF colors for buttons and lamps. Specify the shape of the button or lamp then click the **Color1(OFF)** or **Color2(ON)** Button on the Color/Shape Tab Page and select the color from the Color Setting Dialog Box. The label color can also be set indirectly from an address by selecting the *Indirect* Option.



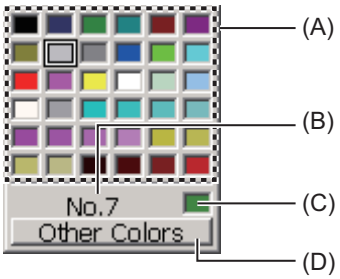
Additional Information

- The color settings will not be displayed if *Select* shape is selected for the object shape.
- If an indirect reference of Text Color is set, set a color code between 0 and FF to the address. Check the color codes and display colors in the Color Setting Dialog Box.

  If a value other than 0 to FF is set as the address, the display color will be invalid.

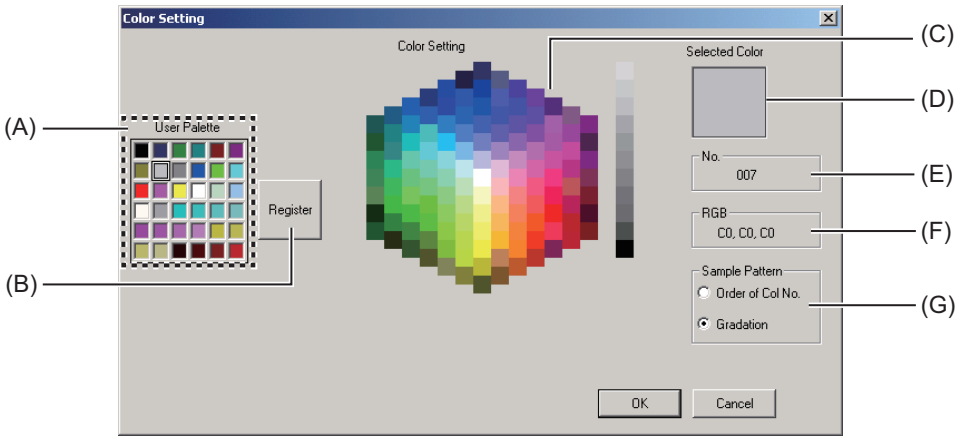
Color

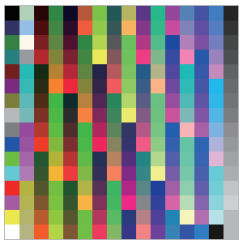
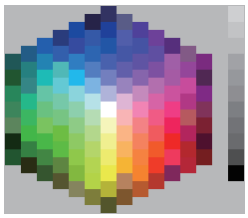
Color is set from the Color Setting Dialog Box.



No.	Setting	Details
(A)	Color palette	Select from one of the 36 colors registered in the color palette (favorite colors).
(B)	Color code	Indicates the color code of the selected color.
(C)	Current color	Displays the selected color when that color is not registered in the color palette.
(D)	Other Colors Button	Click this button to select a color that is not registered in the color palette.

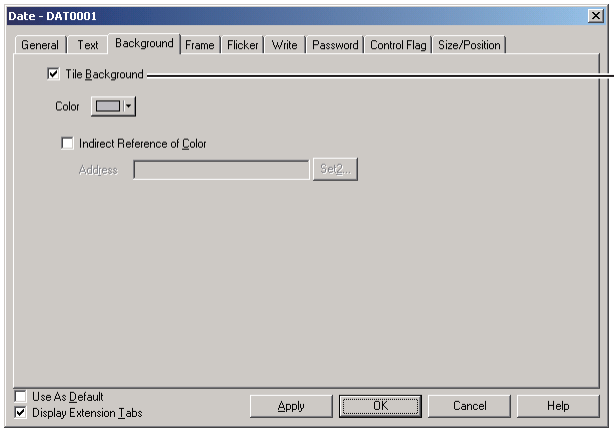
The following dialog box can be displayed by clicking the **Other Colors** Button. Use the Color Setting Dialog Box to select a color that is not registered in the color palette or register a color in the color palette.



No.	Setting	Details
(A)	User Palette	Displays the colors that have been registered as favorite colors in the color palette.
(B)	Register	Registers the selected color in the color palette.
(C)	Color Setting	Displays all of the available colors.
(D)	Selected Color	Displays the selected color.
(E)	No.	Displays the selected color's color code.
(F)	RGB	Displays the selected colors RGB values (in hexadecimal).
(G)	Sample Pattern	The Color Setting display can be set to *Order of Col No.* (color code matrix) or *Gradation*. The Order of Col No. display shows all 256 colors. The Gradation display shows only 138 colors, but makes it easy to change the color slightly by selecting a nearby color tone. Order of Col No. (arranged by color code)  Gradation 

2-8-8 Background

Set the tile color for the background of functional objects. Click the **Color** Button to tile the background and select the background color from the Color Setting Dialog Box. The functional object's background color can also be set indirectly from an address by selecting the *Indirect Reference of Color* Option.



No.	Setting	Details
(A)	Tile background	Select this option to tile the background. (Selected in default settings.) Deselect this option to leave the background transparent.

Additional Information

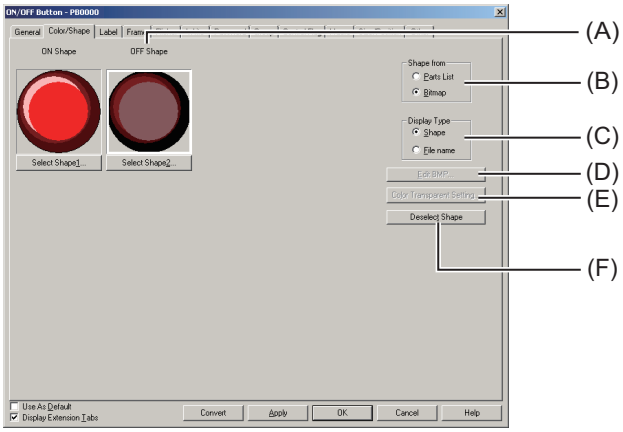
If an indirect reference of color is set, set a color code between 0 and FF to the address.

If a value other than 0 to FF is set as the address, the display color will be invalid.

2-8-9 Selecting Shape (Color/Shape Tab)

If a shape can be specified for the selected lamp or button functional object, the shape displayed on the Color/shape Tab Page can be selected. Click the **Select** Button to select from a variety of shape types.

For some shape types, a pair of ON and OFF shapes can be set.



No.	Setting	Details
(A)	Selected image display area	The image or file name of the shape selected in (B), above, will be displayed.
(B)	Shape from	If *Parts List* is selected and a Select Shape Button is clicked, the Select Shape Dialog Box will be displayed. If *Bitmap* is selected and a shape specification button is clicked, the Select File Dialog Box will be displayed.
(C)	Display Type	If *Shape* is selected, an image of the selected shape will be displayed. If *File name* is selected, the file name of the selected shape will be displayed.
(D)	Edit BMP	If the displayed BMP or JPEG image is selected and the Edit Button is clicked, the image editor will start and editing will be enabled.
(E)	Color Transparent Setting	Click this button to display the Transparent Color Setting Dialog Box and enable setting transparent colors for bitmaps.
(F)	Deselect shape	Click this button to cancel the selection of a shape.

Additional Information

The frame and background within the frame will be transparent if both frame and border are set to OFF on the Frame Tab Page.



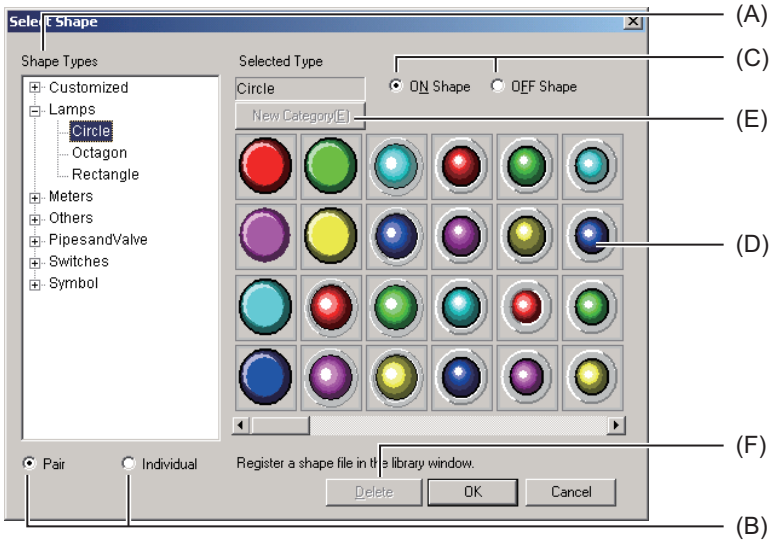
Frame and border set to ON.



Frame and border set to OFF.

Selecting Shape

Select the shape to be displayed in the Select Shape Dialog Box. Click the shape type to be displayed as the functional object and click the **OK** Button to set that selection.



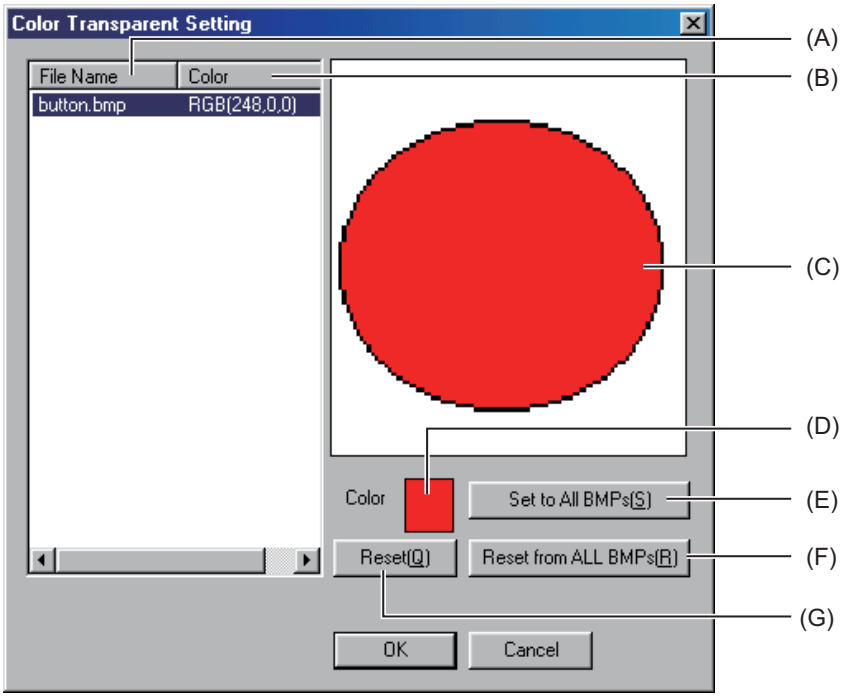
No.	Setting	Details
(A)	Shape Types	Select the shape type group that will be displayed on the shape selection list. If the group is selected from the directory tree, the specified group will be displayed on the shape selection list.
(B)	Pair/Individual	Select this option to automatically set the ON/OFF shapes in pairs. This option will be disabled (grayed out) for fixed objects for which ON/OFF pairs are not available. Select *Individual* to select the ON and OFF shapes individually.
(C)	ON Shape/OFF Shape	Switch the display between ON and OFF shapes. This option will be disabled (grayed out) for shapes for which ON/OFF pairs are not available.
(D)	Shape selection list	Displays the shapes that can be selected. Click the shape to be selected for display.
(E)	New Category/ Edit Category	Click this button to add a shape type category name to the shape type directory tree or to change an existing category name. The buttons will be enabled when Customized is selected in the directory tree. When the New Category Button is clicked, a New Category Dialog Box will be displayed. Input the shape type name and click the OK Button. The new name will appear under Customized in the directory tree. Up to 7 categories can be added. When a shape type under Customized is selected, the button will change to enable changing shape type names. If the Edit Category Button is clicked, a dialog box will appear to enable changing the name. Input the new name and click the OK Button.
(F)	Delete	Deletes shapes from under Customized in the directory tree. Select shape to be deleted and click the Delete Button. A confirmation dialog box will be displayed. Click the OK Button to delete.

Additional Information

A shape created in the CX-Designer can be used as a selectable shape. For details, refer to *Creating Functional Objects* in the *CX-Designer Online Help*.

Color Transparent Setting for Bitmaps

Click the **Color Transparency Setting** Button to display the following dialog box. The color transparency of bitmaps for selected object shapes can be set. Color transparency can be applied to individual bitmaps or to all bitmaps for selected object shapes.

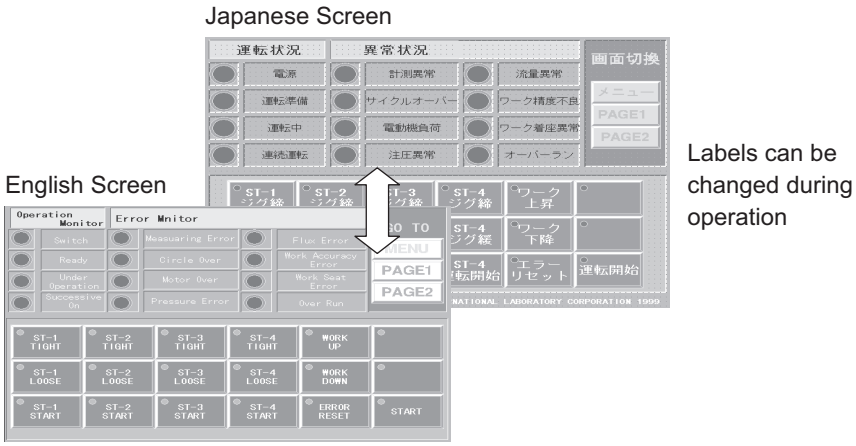


No.	Setting	Details
(A)	File Name	Displays all the bitmaps in the project folder. However, only files that conform to the following conditions can be displayed. • The file name must contain no more than 12 characters (8 file name characters and 4 file extension characters (.bmp)). • The file name can contain only alphanumeric characters, underscores (_), dollar signs ($), and periods (.).
(B)	Color	Displays the specified color.
(C)	BMP display	Displays the selected bitmap.
(D)	Display color	Sets the color for the selected bitmap file.
(E)	Set to All BMPs	Applies the color of the selected bitmap to all bitmaps.
(F)	Reset from All BMPs	Cancels the color setting for all bitmaps in the project folder.
(G)	Reset	Resets the color setting for all selected bitmaps.

2-8-10 Labels

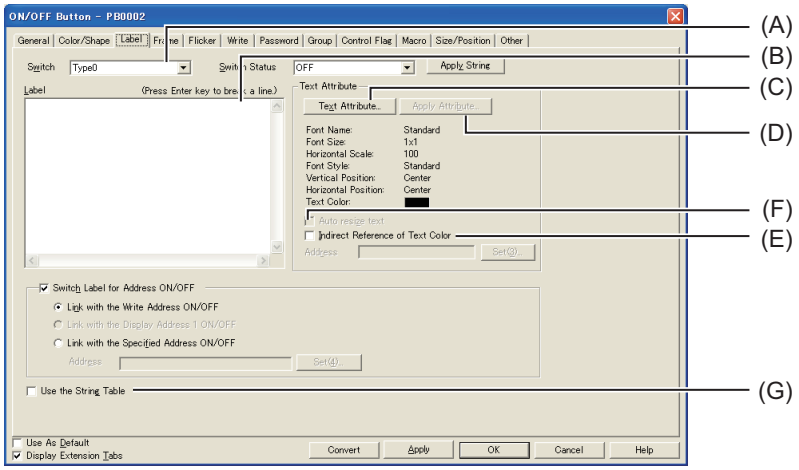
Up to 16 different labels (characters) can be set for each functional object. Multiple labels can be set for each project. This means that screen and settings can be combined without separating projects simply by using different labels, e.g., Japanese and English. All labels can be switched (e.g., Japanese to English) with a one-touch operation by using the label switching function. The label text colors can be set from an address by selecting *Indirect reference of text color*.

All of these label functions are set on the Label Tab Page of each Functional Object Properties Dialog Box.



Additional Information

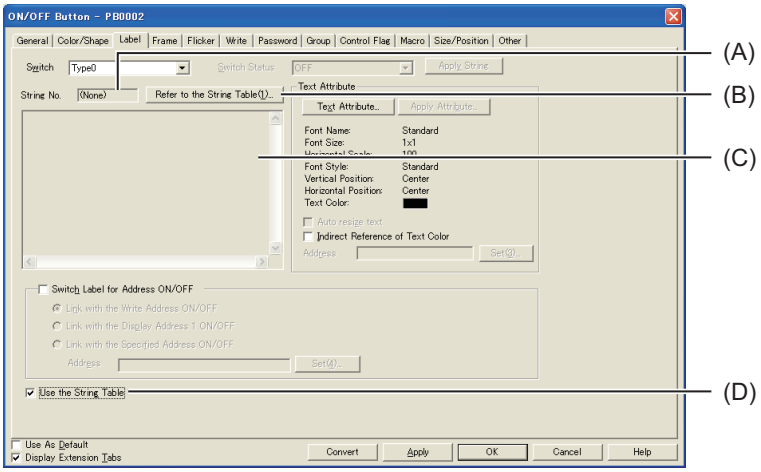
- The number of labels is set under **PT – Project properties**. Refer to *2-1-2 Project Properties* on page 2-7.
- Labels can be switched by setting the desired label number from the host to system memory address $SW10.
- For ON/OFF buttons, bit lamps, labels, and Multifunction Objects, select a character string from the character string table to be displayed as a label. Refer to *2-8-20 String Table* on page 2-126 for details.



No.	Setting	Details
(A)	Switch	Switches labels.
(B)	Label	Enter the character string to be displayed as a label. (Labels and Multifunction Objects: Up to 256 characters; Other functional objects: Up to 64 characters)
(C)	Text Attribute Button	Displays the Text Attribute Dialog Box. Set the text attributes such as font, size, and color for the label.

No.	Setting	Details
(D)	Apply Attribute Button	Displays the Apply Text Attribute Dialog Box. This option applies the text attribute for the current label to other labels. It is disabled (grayed out) when only 1 label is registered.
(E)	Indirect Reference of Text Color	Select this check box to change the label text color based on the value at a specified address. Set a color code between 0 and FF at the address.
(F)	Fit the Object Size	Select this check box to automatically adjust fonts to the size of objects when vector fonts are selected.
(G)	Use the String Table	Select this checkbox to select a label string from the strings registered in the string table. (ON/OFF buttons, bitmaps, labels, and Multifunction Objects only)

Refer to the String Table



No.	Item	Details
(A)	String No.	Displays the string number selected from the string table.
(B)	Refer to the String Table	Selects the string to be displayed as a label from the string table displayed when the Refer to the String Table Button is clicked.
(C)	String	Displays the string selected from the string table. Up to 1,024 characters can be displayed.
(D)	Use the String Table	Deselect this option to directly input and set the label string.

Additional Information

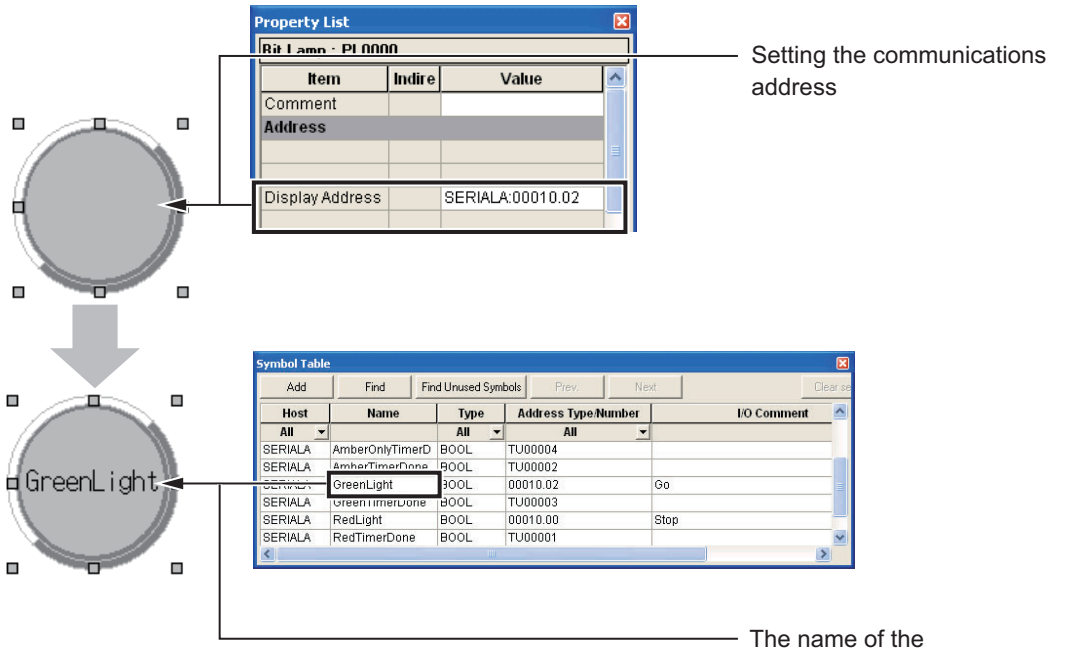
- Line feeds in label character strings are counted as 2 characters.
- The display color will be invalid if a value other than 0 to FF is set to the address when an indirect reference of text color is selected.
- While the functional object with a label is selected, press the Space Key to edit the label directly. Then press the Tab Key or click a functional object other than the current object to set the character string. Press the ESC Key to cancel the edit operation during input.
- Always use the Japanese version of CX-Designer running on Japanese Windows when editing Japanese-language text in labels. If the English version of CX-Designer is used, the Japanese-language text may not be displayed correctly.
- If the *Fit the Object Size* option is selected, a scale can be set for the object size. Select **Tools – Option – Label** to set the scale.
- The vector font cannot be used when referencing the string table for label strings.

Automatically Setting the Symbol Name or I/O Comment as the Label

When the communications address is set for the following functional objects, the symbol name or I/O comment can be automatically set as the label.

- ON/OFF Buttons (when setting the Write Address)
- Word Buttons (when setting the Write Address)
- Bit Lamps (when setting the Display Address)
- Word Lamps (when setting the Display Address)

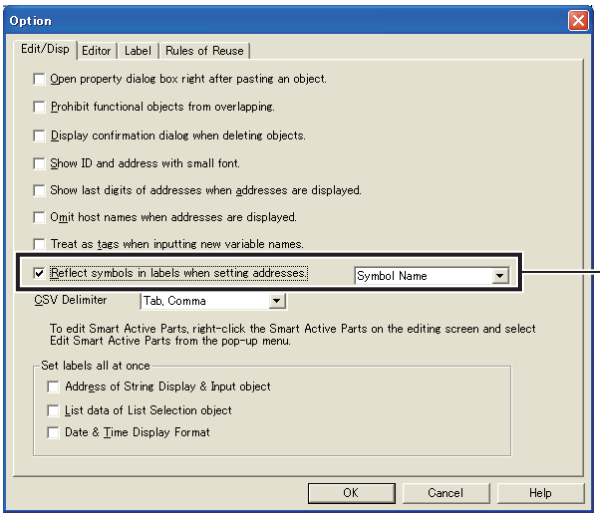
In a similar manner, when setting communications addresses in the Alarm/Event Details Dialog Box, variable names or I/O comments can be set as alarm messages.



1 Select **Tools – Option** to display the Option Dialog Box.

Open the Edit/Disp Tab.

2 Select the *Reflect to label when an address is set* Option and select either the Symbol Name or I/O comment as the label.



Check the box as shown, and select either *Symbol Name* or *I/O Comment* for the label character string.

3 Create the functional objects.

4 Set the communications address for each functional object from one of the following locations.

- The *Address* Field of the functional object's Property Setting Dialog Box
- The *Address* Field of the Property List.
- Address Tool Bar
- Edit Properties Window (List Edit)

5 The symbol names or I/O comments that have been set will be automatically set as label character strings.

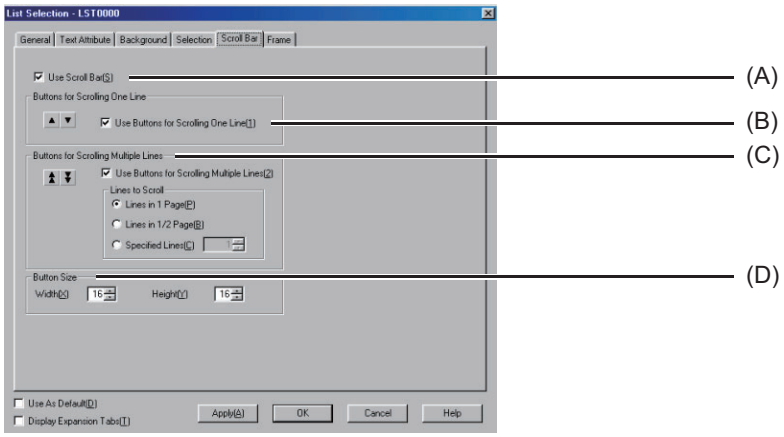
Additional Information

- If there are two or more labels, the symbol names and I/O comments will be set for the character strings for all of the labels.
- Symbol names and I/O comments will not be set automatically in the following cases:
  - When the communications address is replaced by another one.
  - When a symbol name or I/O comment is changed from a symbol table after the label character string has been set.
  - When communications address settings other than those indicated above have been set.
  - When the communications address is set by a method other than those indicated in step 4.
- In the same way, when setting communications addresses in the Alarm/Event Details Dialog Box, symbol names or I/O comments can be set as alarm messages.

2-8-11 Scroll Bars

For functional objects that display data in a list format, display/no display, scroll width, button size, and other settings can be made for the scroll bar for the displayed object.

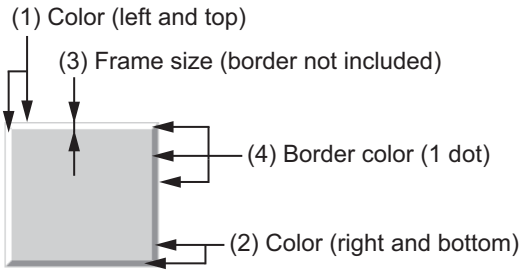
The scroll bar settings are made on the Scroll Bar Tab Page of the Functional Object Properties Dialog Box.



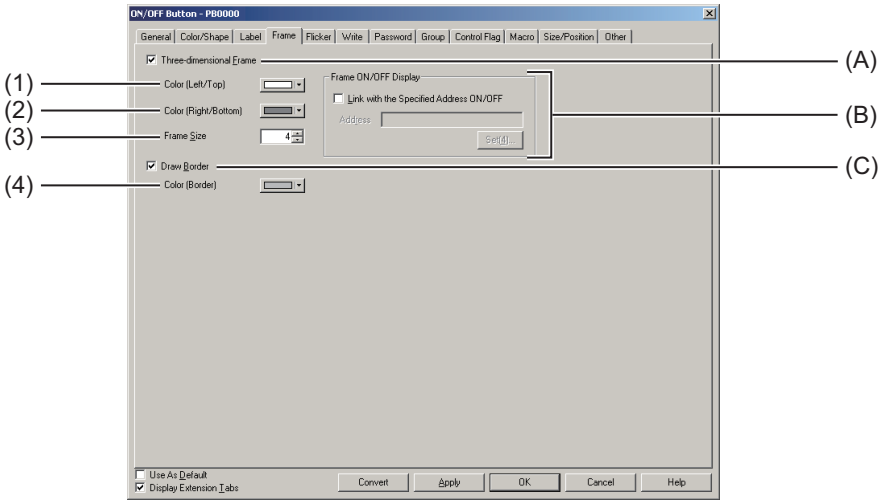
No.	Setting		Details	
(A)	Use scroll bar		Select *Use scroll bar* if a scroll bar is to be used.	
(B)	Buttons for Scrolling One Line		Select *Use Buttons for Scrolling One Line* to enable a scroll button that moves up or down one line each time it is pressed.	
(C)	Buttons for Scrolling Multiple Lines		Select *Use Buttons for Scrolling Multiple Lines* to enable a scroll button that moves up or down by the specified number of lines each time it is pressed. Select the number of lines to be scrolled from the option listed below.	
		Lines to Scroll	Lines in 1 Page	Scrolls up or down the displayed number of lines (i.e., one page).
			Lines in 1/2 Page	Scrolls up or down the half the number displayed number of lines (i.e., half a page).
			Specified lines	Scrolls up or down the specified number of lines.
(D)	Button size		Set the size of the scroll buttons in dot units (16 to 48).	

2-8-12 Frames

The color and size of buttons, lamps, and other frames can be set. The frame settings are made on the Frame Tab Page of the Functional Object Properties Dialog Box.



Note: The numbers in the above diagram correspond to the descriptions below.



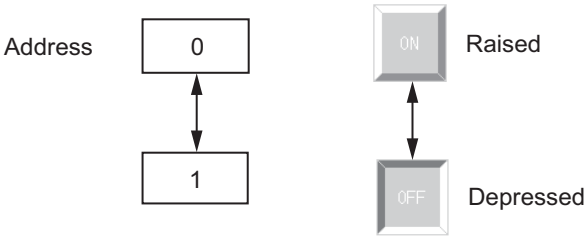
No.	Setting	Details
(A)	Three-dimensional Frame	Select **Three-dimensional Frame** to add a frame to the object. De-select **Three-dimensional Frame** to not have a frame for the object.
(B)	Draw border	Select **Draw border** to draw a border on the frame. De-select this option if no border is to be drawn.
(C)	Frame ON/OFF display	Select **Link with address ON - OFF** to have the frame raised or depressed, depending on whether the specified address is ON (1) or OFF(0).

Frame ON/OFF Display

Link with Address ON/OFF

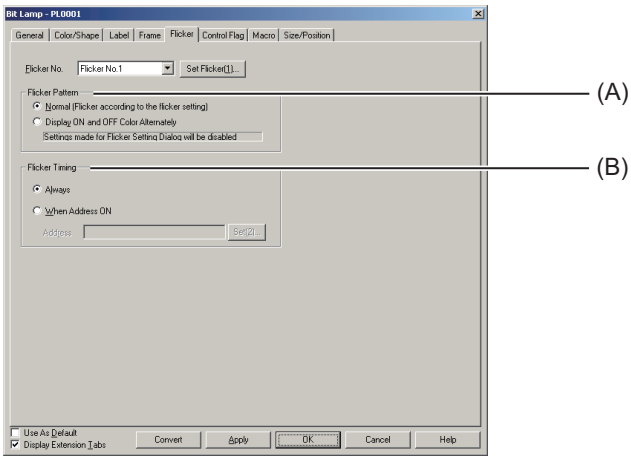
The button shape is updated when the specified address turns ON (1) or OFF (0).

Select the **Link with address ON/OFF** and click the **Set** Button to make the address settings.



2-8-13 Flicker (Extension Tab)

The flicker settings make functional objects flicker at specified intervals. Select a flicker type from the 10 registered types. The flicker settings are made on the Flicker Tab Page of the Functional Object Properties Dialog Box. Flicker settings can be made for each screen.



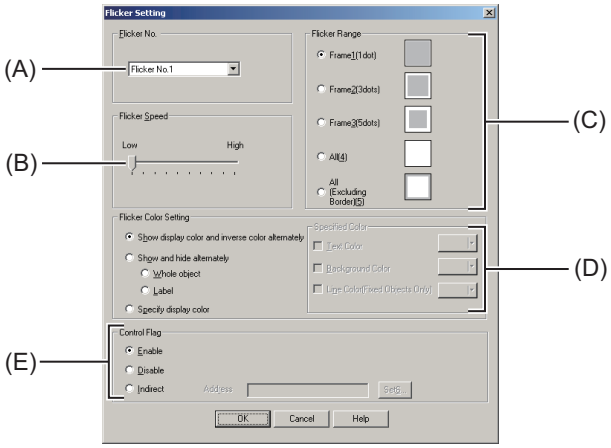
No.	Setting	Details
(A)	Flicker Pattern (bit lamps only)	When *Normal* is selected, flickering will be performed with the inverse of the display color. If *Display ON and OFF Colors Alternately* is selected, the ON and OFF colors of the object will be display alternately according to the flicker timing.
(B)	Flicker Timing	Select *Always* to make the object flicker continuously. Select *When address ON* to make the object flicker while a specified address is ON. The object will not flicker, however, if the flicker control flag is disabled.

Control flag	Flickering	Flicker/no flicker
Enabled	Always	Flickers
	When address ON.	Flickers
	When address OFF.	Does not flicker.
Disabled	Always	Does not flicker.
	When address ON.	Does not flicker.
	When address OFF.	Does not flicker.

Flicker Settings

The flicker speed and area can be set separately for each flicker number.

Click the **Flicker setting** Button on the Flicker Tab Page to make these flicker settings.



No.	Setting	Details
(A)	Flicker No.	Set the flicker number between 1 and 10.
(B)	Flicker speed	Sets the flicker speed.
(C)	Flicker range	Select one of the following 5 of flicker ranges.
(D)	Flicker color settings	Sets the flicker method and color for flicker.
	Show display color and inverse color alternately	Repeats alternate display of the display color and its inverse color.
	Show and hide alternately	Repeatedly alternates between showing and hiding display of the whole object or the label string.
	Specify display color	Repeats alternate display of the current display color and the specified color. The color for flicker can be specified as *Text Color*, *Background Color*, or *Line Color*. Select the checkbox under *Specified Color* for what color is to be changed (text, background, or line color) and specify the color.
(E)	Control flag	When set to *Enabled*: The object flickers. When set to *Disabled*: The object does not flicker. When set to *Indirect*: Switches between enabled and disabled when the specified address turns ON and OFF. Only bits can be set for indirect.

Additional Information

- The flicker settings can also be made under **PT – Flicker setting**.
- At the slowest flicker speed, the object will flicker approximately every 2 seconds. At the fastest speed, the object will flash approximately every 200 ms. The flicker speed can be set in 200-ms units. Flicker speed settings can be made for each screen. The flicker speed will differ slightly depending on the volume of screen.
- Flicker settings can be made for each screen.

  The flicker settings are shared for all objects on the same screen. If the flicker settings are changed for a particular functional object, the new settings will be reflected for all functional objects with the same flicker number in that screen.
- Depending on the set color, the inverse color during flickering may differ between the PT Unit and the CX-Designer test mode.
- If the control flag is set to *Indirect*, the display color will return to the original color when the set address turns OFF. For this reason, the whole screen is refreshed.
- When the bit lamps are set to **Select Shape**, they will not flicker, even if **Display ON and OFF Colors Alternately** are selected in the flicker method settings.
- Flicker will not occur if all the checkboxes under *Specify Color* are deselected, even if *Specify display color* is selected under *Flicker Color Settings*. Always select the checkbox for the flicker target and specify the color.

The following three flicker display methods can be selected.

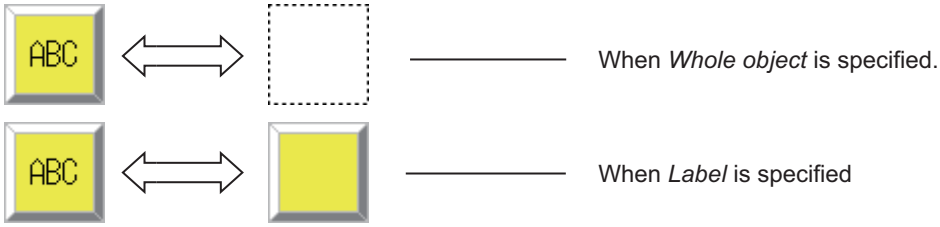
Show Display Color and Inverse Color Alternately

This option repeats alternate display of the display color and its inverse color. The flicker action occurs at the specified flicker speed and in the specified flicker range.



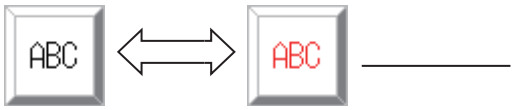
Show and Hide Alternately

Repeatedly alternates between showing and hiding display of the whole object or the label string. The flicker action occurs at the specified flicker speed.

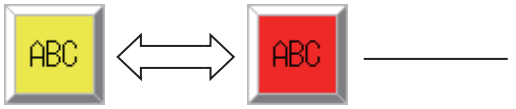


Specify Display Color

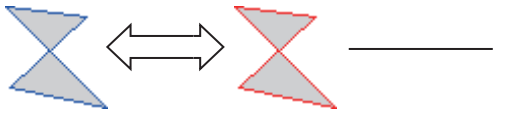
Repeats alternate display of the current display color and the specified color. The text color, background color, or line color can be specified.



When text color is specified.



When background color is specified.



When line color is specified.

When *Background color* is specified, the background excluding the frame is displayed in the specified color.

Supported Flicker Methods by Functional and Fixed Objects

The supported flicker methods depend on the functional or fixed object.

Functional/Fixed object	Show display color and inverse color alternately	Show and hide alternately		Specify display color		
		Whole object	Label	Text color	Background color	Line color
ON/OFF buttons	○	○	○	○	○	×
Word buttons	○	○	○	○	○	×
Command buttons	○	○	○	○	○	×
Bit lamps	○	○	○	○	○	×
Word lamps	○	○	○	○	○	×
Labels	○	○	○	○	○	×
Numeral display and input	○	○	○	○	○	×
String display and input	○	○	○	○	○	×
List Selection	○	×	×	×	×	×
Thumbwheel switch	○	×	×	×	×	×
Analog meter	○	×	×	×	×	×
Level meter	○	×	×	×	×	×
Broken-line graph	○	×	×	×	×	×
Bitmaps	○	×	×	×	×	×
Alarm/event display	○	○	△*1	△*1	○	×
Alarm/Event Summary/History	○	×	×	×	×	×
Date	○	○	○	○	○	×
Time	○	○	○	○	○	×
Data Log Graph	○	×	×	×	×	×
Temporary Input	---	---	---	---	---	---
Continuous Line Drawings	---	---	---	---	---	---
Contents Display (for string display)	○	○	○	○	○	×
Contents Display (for image display)	○	○	×	×	×	×

Functional/Fixed object	Show display color and inverse color alternately	Show and hide alternately		Specify display color		
		Whole object	Label	Text color	Background color	Line color
Multifunction Object	○	○	○	○	○	△*3
Data Block Table	---	---	---	---	---	---
Rectangle	○	○	×	×	○	○
Circle/Oval	○	○	×	×	○	○
Straight Line	△*2	○	×	×	○	○
Continuous Straight Line	△*2	○	×	×	○	○
Polygon	○	○	×	×	○	○
Sector	○	○	×	×	○	○
Arc	△*2	○	×	×	○	○

○: Flicker, ×: No flicker, △: Action depends on settings, ---: Flicker function not supported

*1. The object will not flicker if *Flowing text* is selected in the alarm/event display property settings.

*2. The whole object will flicker, regardless of the flicker range settings.

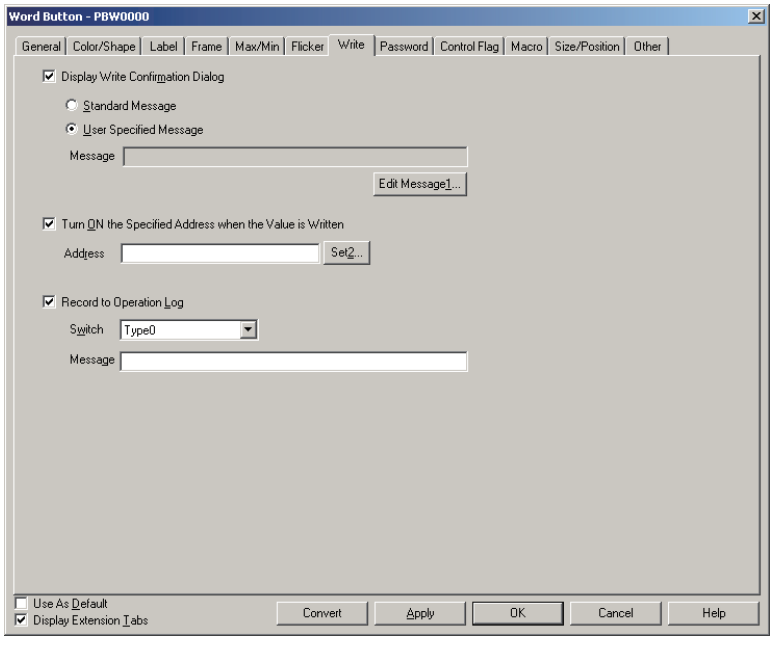
*3. The object will flicker only if the shape is set as a polygon or sector.

Additional Information

A functional object will not flicker if an unsupported flicker method is specified in the property settings for that object.

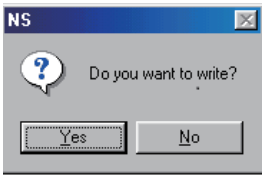
2-8-14 Write Settings (Extension Tab)

A confirmation message can be set to be displayed when data is written using buttons and other functional objects that are manipulated. Any confirmation message can be set. The write settings are made on the Write Tab Page of the Functional Object Properties Dialog Box. (For Multifunction Objects, make the setting on the General Tab Page.)



Using Standard Messages

Select *standard message* on the Write Tab Page. The standard message shown below will be displayed.



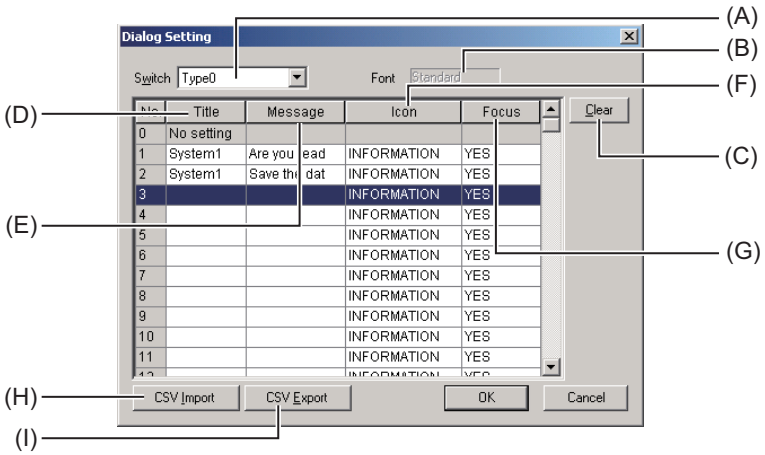
Additional Information

The message may protrude outside the screen when displayed on the PT Unit, depending on the length of the entered message. If the message goes outside the screen, edit the message and insert a carriage return at an appropriate spot.

User-specified Messages

Any confirmation message can be specified. Select *User specified message* on the Write Tab Page and click the **Edit message** Button.

The Dialog Setting Dialog Box will be displayed. Select a message from the list.

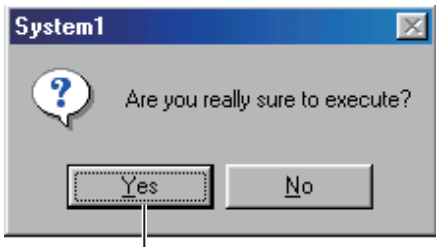


No.	Setting	Details
(A)	Switch	Switches labels.
(B)	Font	Displays the font name (fixed to *Standard*).
(C)	Clear	Clears the selected message.
(D)	Title	Changes the Message Dialog Box title. (Up to 64 characters.)
(E)	Message	Changes the contents of the message. (Up to 256 characters.)
(F)	Icon	There are 4 icons available. STOP / QUESTION MARK / EXCLAMATION MARK / INFORMATION
(G)	Focus	Changes the default focus position when the message is displayed. Select **Yes** to change the focus to *Yes*, and select **No** to change the focus to *No*.
(H)	CSV import	Imports a message from a CSV file.
(I)	CSV export	Exports a registered message to a CSV file.

Editing Messages

To register or edit a message, double-click the line in the message list. When the following settings are input, the following confirmation message will be displayed.

- Title: System1
- Message: Are you really sure to execute?
- Icon: QUESTION



Gets focus in Test Mode.

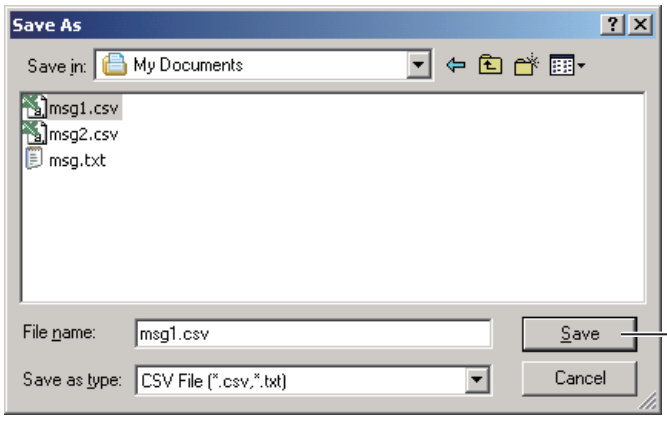
Additional Information

- Focus settings are only enabled in test mode.
  They are not displayed on the PT Unit.
- The message may protrude outside the screen when displayed on the PT Unit, depending on the length of the entered message. If the message goes outside the screen, edit the message and insert a carriage in an appropriate spot.
- Messages can also be set by selecting **PT – Dialog Setting**.

Importing and Exporting CSV Files

The CSV import and export functions are useful when there are a lot of confirmation messages and you want to edit them efficiently.

Click the **CSV Import** or **CSV Export** Button at the bottom of the Dialog Setting Dialog Box.



Changes to *Open* for CSV file import.

A File Specification Dialog Box will be displayed. If importing from a CSV file, select the name of the file to be imported and press the **Open** Button. If exporting to a CSV file, enter the name of the file in the *File name* input field and click the **Save** Button. The output CSV file will be displayed in the following format.

Display for Microsoft Excel

	A	B	C	D	E
1	No.	Icon	Default Fo	Label(Type0)Title	Label(Type0)Message
2	1	question	no	System1	Are you sure to execute?
3	2	question	yes	System1	Do you want to save the data?

The icon and default focus settings are shown on the following table.

Icon	STOP: Stop (X) symbol	EXCLAMATION: Exclamation mark
	QUESTION: Question mark	INFORMATION: Information (i) symbol
Focus	Yes: Yes	No: No

The set numerals and character strings can be all edited together because the efficient editing functions of market software can be used. Once editing has been completed, import the file again to enable the settings.



Additional Information

When exporting a CSV file, specify the character code of the CSV file (multibyte/Unicode).

Turn ON the Specified Addresses when the Value is Written

A specified address can be turned ON (1) whenever a button is pressed or a value is entered and written. Turn OFF the address from a PLC or other external device.



Additional Information

- Set the same host address for the write address on the General Tab and the address set under *Turn ON the specified address when the value is written (confirmed)*.

  If a different host is set, the address set under *Turn ON the specified address when the value is written (confirmed)* may turn ON before the write address contents have been changed, depending on the communications timing.
- When exporting data, specify the CSV file's character code (multibyte code or Unicode).
- It is also possible to import CSV files that were exported from the CX-Designer.

Record Operation Log

Select *Record Operation log* to keep a history of functional object operations during operation. Set the message character strings added to the operation log to 32 characters of less for each label.

Refer to *2-20-1 Operation Log Function* on page 2-451 for information on operation log functions and settings.

2-8-15 Passwords (Extension Tab)

A password can be set for when entering data to functional objects during operation. Refer to *2-8-1 Table of Functional Object Settings* on page 2-72 for functional objects to which passwords can be set.

There are two password functions: the password function and login function.

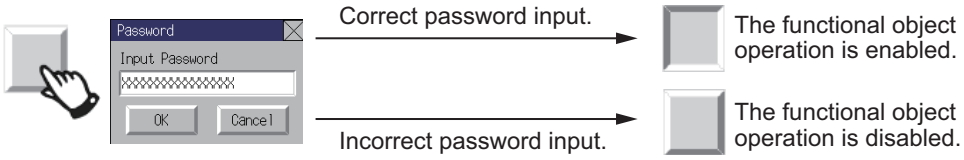
Password function:	The password must be input before an operation on a password-protected functional object.
Password function (with level function):	The password must be input before an operation on a password-protected functional object. Once the password is input, all object operations allowed at that authentication level and lower levels can be performed until the authentication is cleared.

Additional Information

If a password is set for a button or other functional object, operation will not be possible until the password is input, delaying operation. Therefore, do not set passwords for functional objects that control machine operation.

Password Function

The password must be input before an operation on a password-protected functional object. An operation can be performed on a functional object only if the password is at the protection level set for that functional object. The password must be input each time that an operation is performed on the functional object.

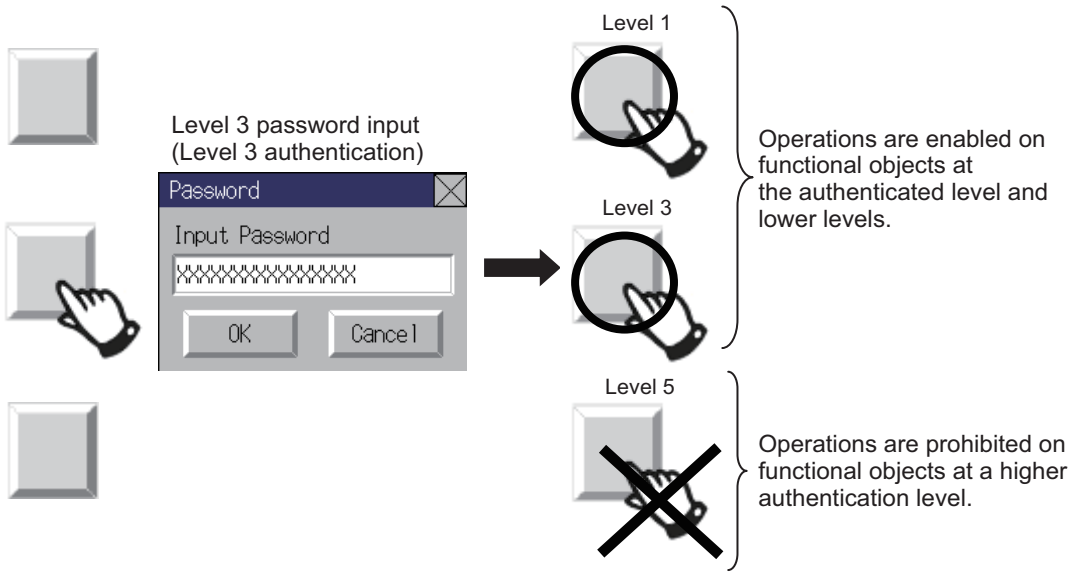


Password Function (with level function)

When passwords with levels have been set, a password will be required the first time a password-protected functional object is manipulated.

Inputting the password set for the functional object will authenticate that password level, enabling manipulating functional objects in the same and lower levels. Functional objects with higher-level passwords cannot be manipulated.

Level 1 is the lowest level and level 5 is the highest level.



To manipulate functional objects with higher-level passwords, you must first cancel authentication. Authentication can be canceled using the following methods.

- Authentication is canceled if the PT Unit is restarted.
- Authentication is canceled if the user presses a Command Button set to cancel authentication.
- Authentication is canceled if a specified timeout time elapses without performing an operation.

The timeout monitor is disabled in some operating conditions.

Status	Timeout monitor
Displaying user screen	Enabled
Displaying screen saver	Enabled
Displaying system dialog	Disabled
Displaying transfer screen	Disabled
System menu screen	Disabled

Additional Information

- The PT Unit starts with authentication canceled. When the PT Unit starts, it does not display the specified screen specified after authentication is canceled; it displays the initial screen specified on the System Setting Dialog Box's Initial Tab Page.
- The verification status will be cleared if any of the following functions are used.
  - Memory Card transfers
  - Device Monitor

Using Passwords with Levels

Passwords with level can be used to display screen suitable to the operation to prevent inappropriate operation, including operating errors.

The level authentication screen can be displayed as the startup screen. Command buttons on this screen can be used, for example, to provide separate authentication levels for operators vs. managers. The screen can be switched depending on the level that is authenticated.

A level would be set for each command buttons, for example level 1 for operators and level 5 for managers. All screens displayed after authentication (e.g., device operation monitoring screens and maintenance screens) would contain a command button to cancel authentication.

The password settings would specify that the authentication screen be displayed when authentication is canceled.

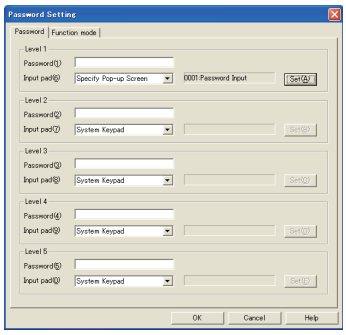
1 An operator or manager would press the command button set for them on the authentication screen and then enter the password in the password input dialog box to authenticate the appropriate level.

2 If the level is authenticated, either the operator's screen or the manager's screen would be displayed. These screens would be user application screen for device operation monitoring, maintenance, etc.

3 To complete the work and move away from the front of the device, press the Cancel authentication button to cancel authentication and also switch to the authentication screen.

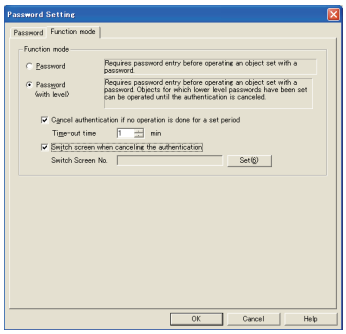
(It is possible to switch to any specified screen after authentication is canceled.)

Password Tab Page in Password Setting Dialog Box

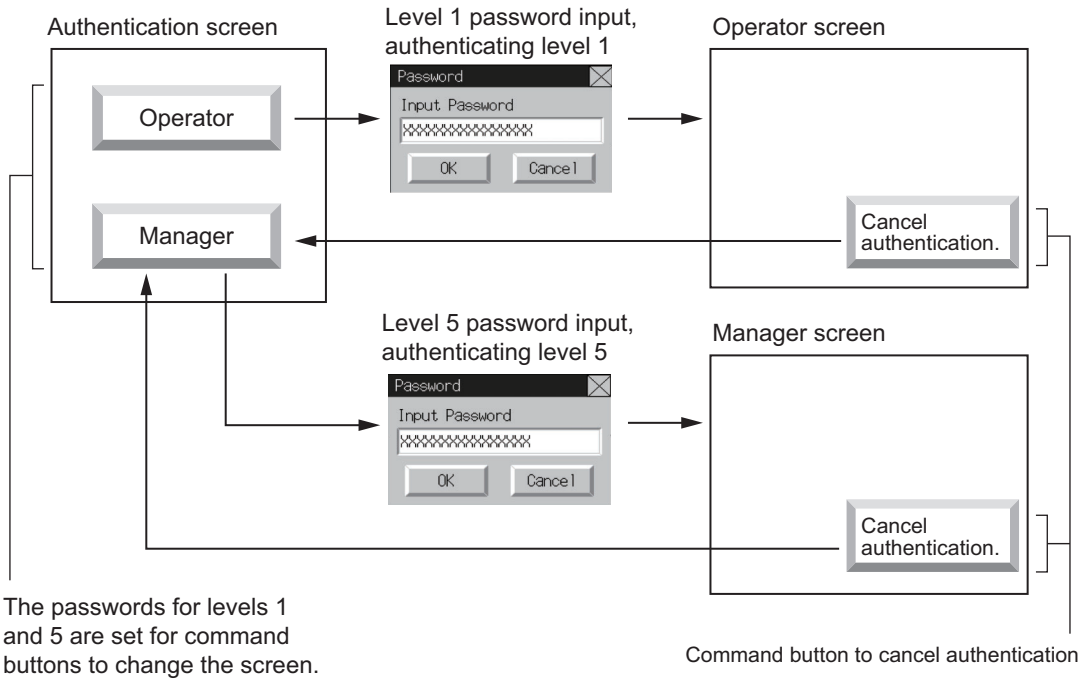


Passwords and keyboard screens are set for levels 1 and 5.

Model Selection Tab Page in Password Setting Dialog Box

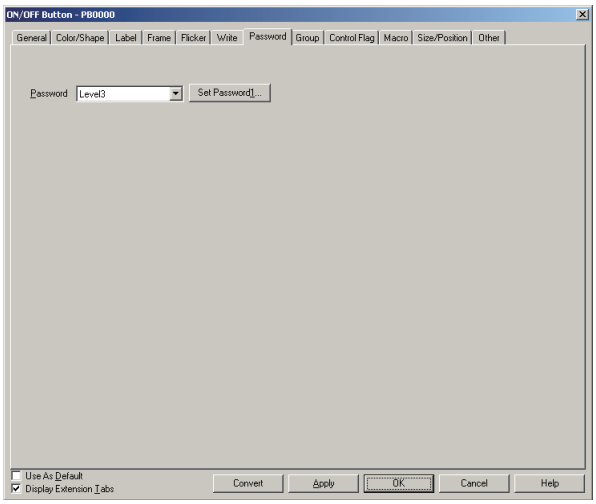


The password function with levels is enabled and the authentication screen is specified for display after authentication is canceled.



Setting Passwords

Click the **Set password** Button on the Password Tab Page to set a password. Level 1 to level 5 passwords can be set. The set password is shared by all functional objects.



Operation of functional objects with set passwords will only be permitted if the password that matches the password character string for the specified level is entered when the operation is received by the object.

The password input keyboard can be specified from the pop-up window.

A user-created pop-up window can be used as the keyboard screen for inputting the password character string. This allows the user to set the keyboard screens for inputting passwords.

For each of the five password levels, the system keypad or a user-created pop-up window can be specified for the keyboard, and the pop-up window to be used as a user-created keyboard can be set.

Additional Information

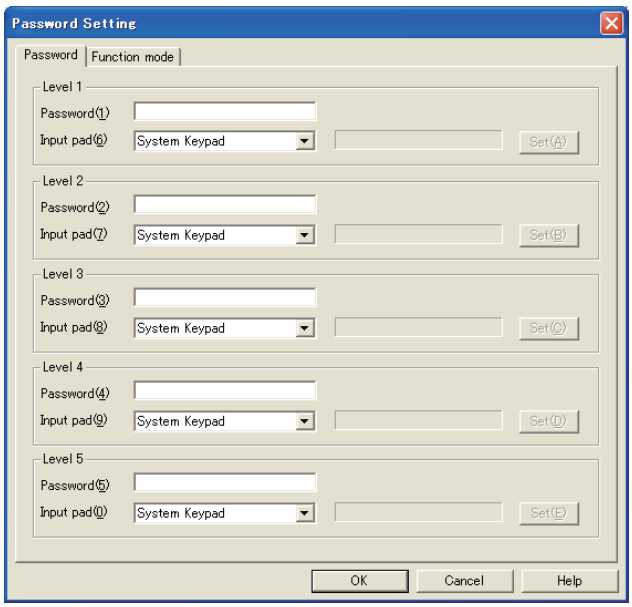
Only the following objects can be placed on the password input keyboard.

- Command Buttons (Function selection: Key Button)
- Temporary Inputs (Function selection: Temporary Input Field)
- Label objects

Password Setting Properties

This section describes the password settings.

To set a password, click the **Set Password** Button on the Password Tab Page from the functional object properties.



Password: Set the password and keypad for each level from 1 to 5.
Function mode: Select the *Password* or *Password (with level)* Option.

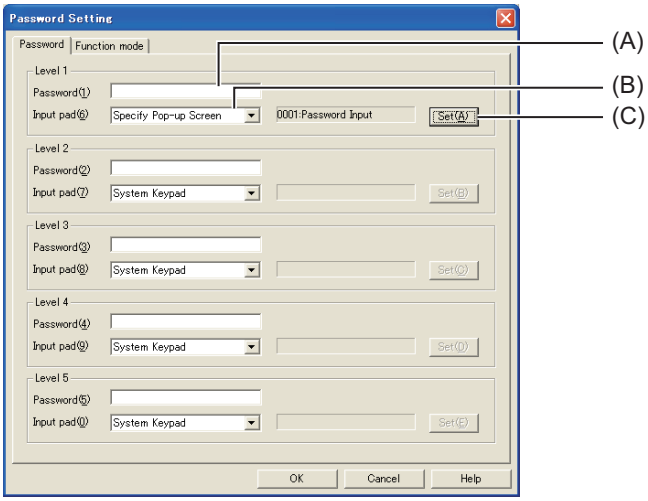
Additional Information

The Password Setting Dialog Box can also be displayed with the following operations.

- Double-click **Password** in the Project Workspace Window's Common Settings Tab Page.
- Click the **Set Password** Button in the Password Tab Page of the functional object's Property Dialog Box.

Password

Set the password and keypad for each level from 1 to 5.

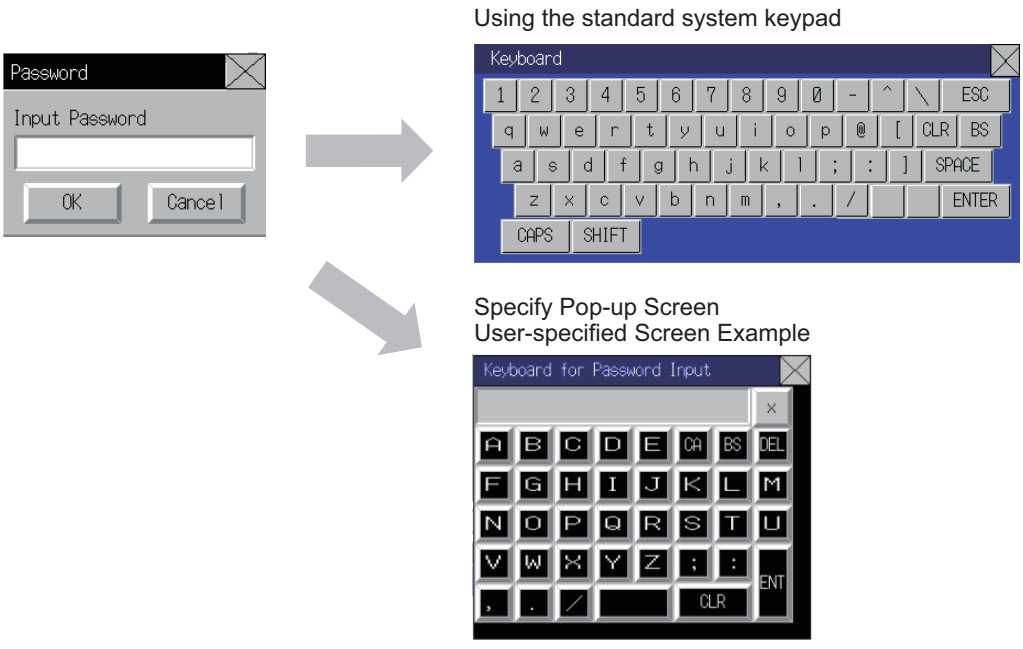


No.	Setting	Details
(A)	Password	Set the password for each level (up to 16 alphanumeric characters).
(B)	Keypad	Select the standard system keypad or select specifying a pop-up window.
(C)	Specified screen No.	When specifying a pop-up window is selected, set the pop-up window to be opened for password input.

Additional Information

- Passwords must be 16 characters maximum and can include only one-byte alphanumeric characters.
- Passwords can also be set under **PT – Password**.

If a functional object with a password set is pressed during operation, a Password Dialog Box will be displayed. Press the input area to display the keyboard screen that has been set for that level. Use this keyboard to enter the password.

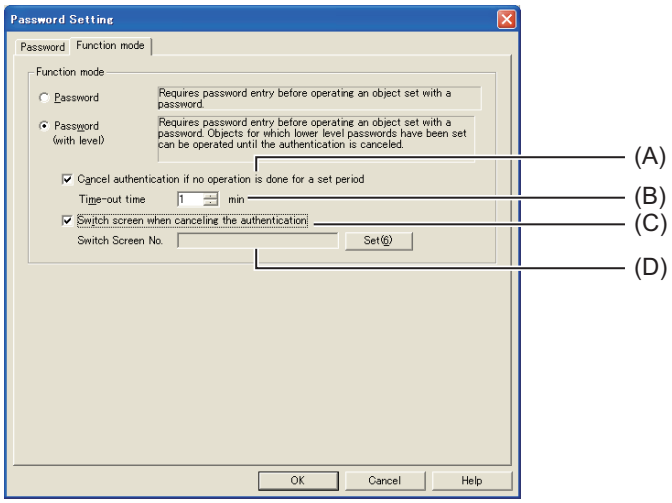


Additional Information

A different dialog box will be displayed in test mode.

Function Mode

Select the *Password* or *Password (with level)* Option.



No.	Setting	Details
(A)	Cancel authentication if no operation is done for a set period	If this check box is selected, authentication will be automatically cancelled if no screen operation is performed within the specified timeout time after level authentication.
(B)	Time-out Time	Sets the time until authentication is cancelled. Can be set from 1 to 60 (minutes).
(C)	Switch screen when canceling authentication	If this check box is selected, the screen will be switched to the screen specified when authentication is cancelled for a timeout or by a Command Button.
(D)	Screen Switch No.	Set the screen to switch to when authentication is cancelled.

Additional Information

If a pop-up window is used as the password keyboard, the keyboard screen will be closed when the input is entered or cancelled, just as it is with the system keypad.

A button operation is required to close the pop-up window. Register a macro for a functional object and set it so to close the pop-up window.

- Macro Setting Example: Closing a Pop-up Window

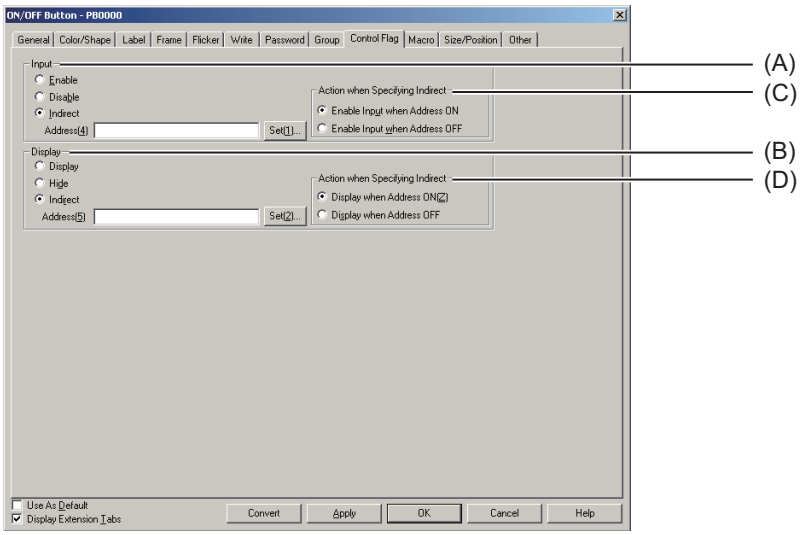
  Under the properties of the functional object, select *Touch OFF* on the Macro Tab Page and then click the **Macro Edit** Button.

  A pop-up window can be closed by setting CLOSEPOPW(-1) in the *Program* Field.

For details, refer to the *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)*.

2-8-16 Control Flags (Extension Tab)

Control flags control the input and display of functional objects. Control flags can be used for an interlock function and are used to enable display or enable input depending on the ON (1) or OFF(0) status of the address. The control flag settings are made on the Control Flag Tab Page of the Functional Object Properties Dialog Box.



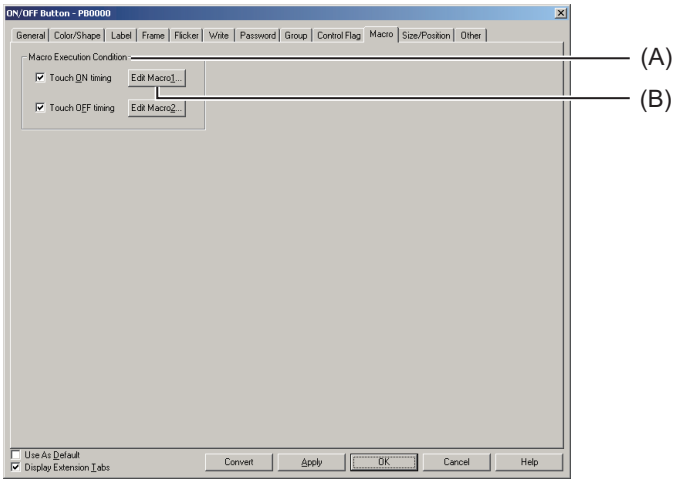
No.	Setting	Details
(A)	Input	Sets whether or not input will be enabled for buttons and other functional objects. Switches between input enable and disable when the specified address turns ON and OFF, if *Indirect* is specified. Only bits can be set for indirect.
(B)	Display	Sets whether or not the functional object will be displayed. Switches between display and no display when the specified address turns ON and OFF, if *Indirect* is specified. Only bits can be set for indirect.
(C)	Action When Specifying Indirect	Sets the input timing for indirect address specifications. • Enable Input When Address ON: Input will be enabled when the specified address is ON and disabled when it is OFF. • Enable Input When Address OFF: Input will be enabled when the specified address is OFF and disabled when it is ON.
(D)	Action When Specifying Indirect	Sets the display timing for indirect address specifications. • Display When Address ON: Display will be enabled when the specified address is ON and disabled when it is OFF. • Display When Address OFF: Display will be enabled when the specified address is OFF and disabled when it is ON.

Additional Information

If numeral display and input objects and string display and input objects are set to not display, input will be disabled regardless of the input enable/disable setting. Input will be enabled for other functional objects that accept inputs if the settings enable input but do not display the object. For example, if the ON/OFF button is set to input enable and no display, a transparent button can be created.

2-8-17 Macro (Extension Tab)

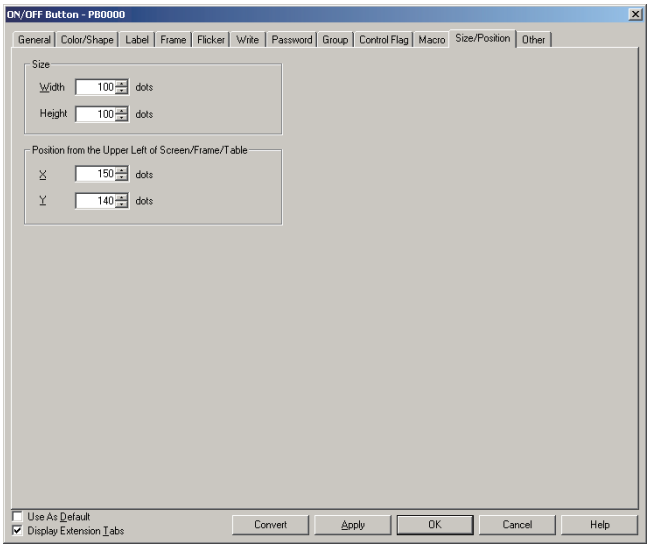
The macro function allows users to create and execute simple programs. Arithmetic operations, discrimination between conditions, and other functions that are not supported by functional objects can be added by the user. This section describes how to set macro execution using the Functional Object Properties Dialog Box. For details, refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)*.



No.	Setting	Details
(A)	Macro execution condition	For functional objects with macro function, specifies whether or not the functional object will be executed for each condition.
(B)	Edit Macro	Click the **Edit Macro** Button to create new macro or edit macro.

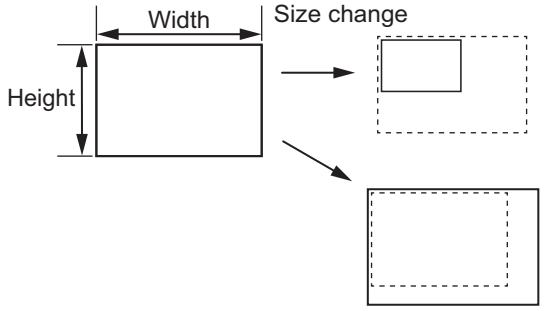
2-8-18 Size/Position (Extension Tab)

Display and set the size of the functional object and the position from the upper left of the screen (frame/table).



Size

Set the height and width of the functional object in dot units. The height can be set between 1 and 1,920 and the width between 1 and 2,560.



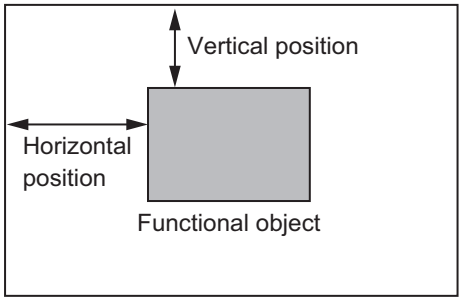
The top left position of the functional object is used as the origin when the size is changed.

Additional Information

The object may protrude outside the screen or frame, depending on the set size. The section outside the screen or frame will not be displayed.

Position

Specify the horizontal position (X coordinate) and vertical position (Y coordinate) of the functional object from the top left of the screen or frame. The horizontal position can be set between 0 and 2,559 and the vertical position between 0 and 1,919. Set the horizontal and vertical positions in dot units.



Screen or frame

Additional Information

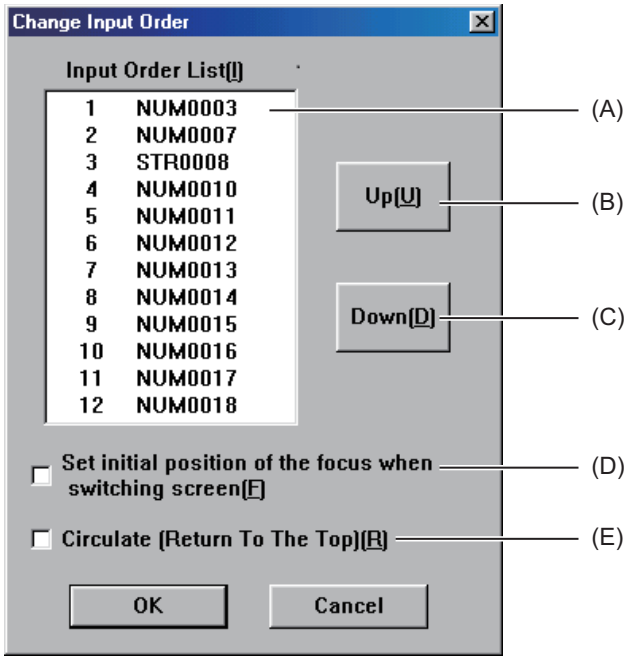
Set the position so that the object is not outside the screen or frame area.

An error check can be performed to check for functional objects outside the screen or frame area. Refer to *Validation* in the *CX-Designer Online Help* for details on error checks.

2-8-19 Change Input Order

The input order that was set on the Keypad Tab Page of the Property Dialog Box for numeral input and display objects or string input and display objects can be changed here.

Select **Change Input Order** from the PT Menu.



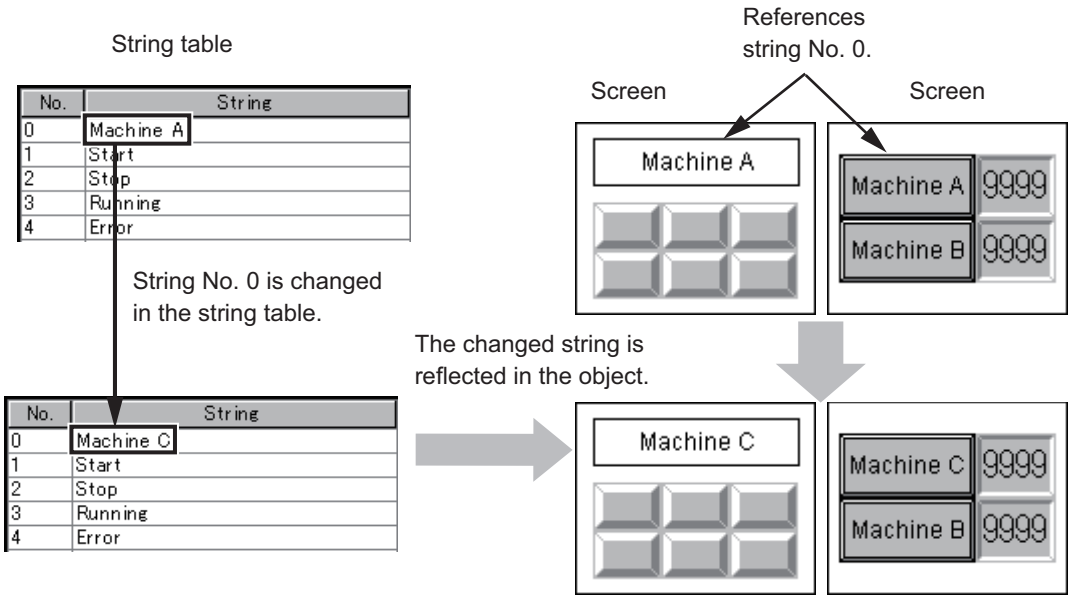
No.	Setting	Details
(A)	Input Order List	Displays the current input order and object ID. (The corners of objects selected in the list will flash on the project editing screen. They will not flash, however if they are located on a on pages where the frames cannot be seen.)
(B)	Up	Moves the input order of the selected object up one in the input order list.
(C)	Down	Moves the input order of the selected object down one in the input order list.
(D)	Set initial position of the focus when switching screen	Enables or disables the input order on the destination screen when switching screens.
(E)	Circulate	Select this check box to move the focus to the first object in the list after an input has been made for the last object in the list. This function will not work for objects that can be input when they are on sheets.

2-8-20 String Table

The string table function manages character strings used in projects.

Strings registered in the string table can be used by ON/OFF buttons, bit lamps, Multifunction Objects, labels, and alarm/event functions.

Any changes to strings registered in the string table are automatically reflected in the functional objects.



Up to a maximum of 10,000 strings can be registered in a string table and each string can be up to a maximum of 1,024 characters. The maximum setting file size that can be registered for one project, however, is 5 MB. Do not set any value larger that this. The setting file name is txttable.cfg. You can check the size of the current setting file by selecting **Tools – Resource Report** from the CX-Designer menus.

Registered strings can be changed as a group by importing/exporting CSV files. The string table can be exported as a CSV file, edited or translated, and then imported. All of the data in the edited CSV file can then be registered together in the string table.

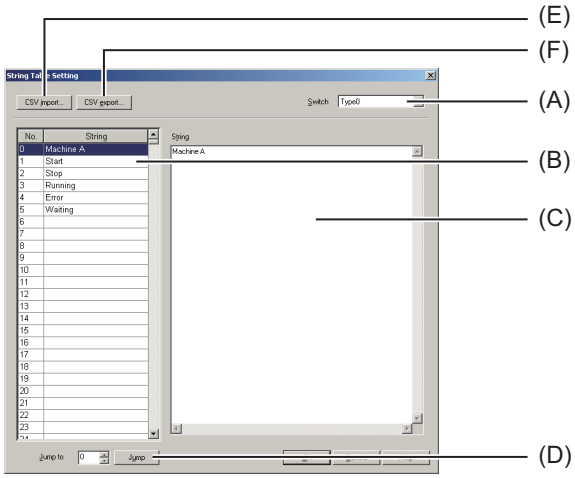
Additional Information

The size of the settings file depends on the number of registered characters and labels. Use the following table as a guide.

File size	No. of labels	Number of registered statuses	No. of characters in each string
5.0 MB	1	10,000	256
4.9 MB	1	2,500	1,024
4.8 MB	2	10,000	120
4.7 MB	2	1,200	1,024
4.9 MB	16	10,000	10
4.7 MB	16	150	1,024

Registering Strings

To register a string in a string table, select **PT – String Table** in the CX-Designer or click the Refer to the **String Table** Button in the functional object Property Dialog Box.



No.	Item	Details
(A)	Switch	Switches labels.
(B)	String list	Displays a list of the strings registered in the string table.
(C)	String input field	The string selected from the string list is displayed and can be edited. Up to 1,024 characters can be registered in a string. (Single- and double-byte characters are counted as one character. Carriage returns are counted as two characters.)
(D)	Jump	Specify a string number and click the **Jump** Button to jump to the specified string.
(E)	CSV import	Strings can be imported from CSV files.
(F)	CSV export	The contents of the string table can be exported to CSV files.

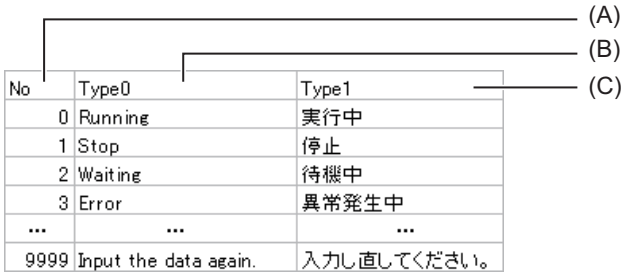
Additional Information

- Strings can be copied, pasted, and otherwise manipulated in the string list by using the following procedures.
  - Copy: Press the **Ctrl + C** Keys or right-click the mouse and select **Copy** from pop-up menu.
  - Paste: Press the **Ctrl + V** Keys or right-click the mouse and select **Paste** from pop-up menu.
  - Clear: Press the **Del** Key or right-click the mouse and select **Clear** from pop-up menu.
  - Move input focus to the string input field: Press the **Esc, F12**, or **Tab** Keys.
  - Move cursor to *Switch* and press the **Shift + Tab** Keys.
- Registered strings can be exported as a group to a CSV file and edited. Refer to *Importing/Exporting CSV Files* on page 2-128 later in this section for details.

Importing/Exporting CSV Files

The CSV import/export function is useful for translating or editing as a group strings registered in the string table.

Click either the **CSV import** or **CSV export** Button in the String Table Setting Window to execute import or export.



No.	Item	Details
(A)	String No.	Sets the string number (0 to 9999).
(B)	Label	Sets the string for each label (up to 1,024 characters).
(C)	Title	The title for each item is displayed in the first row of the CSV file. Do not change the title row.

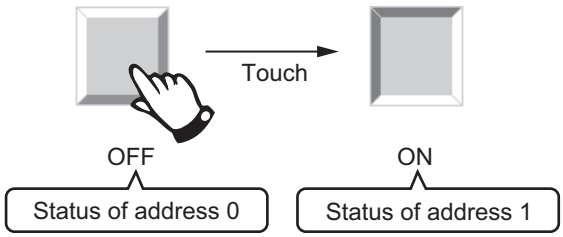
Additional Information

- An error will be displayed and the import canceled when importing CSV files if the CSV file format is different (e.g., if the title line has changed or the number of labels has changed.)
- For any CSV files with strings of more than 1,024 characters, the first 1,024 characters will be imported but the remaining characters will be ignored.
- Lines in CSV files with string numbers outside the range will be ignored. Only lines with string numbers inside the range will be imported.

2-9 Buttons

2-9-1 ON/OFF Buttons

An ON/OFF Button is a functional object that turns the status of a specified address ON or OFF using a touch switch input.



Select **Functional Objects – ON/OFF Button** or the PB icon in CX-Designer to create an ON/OFF Button.

Additional Information

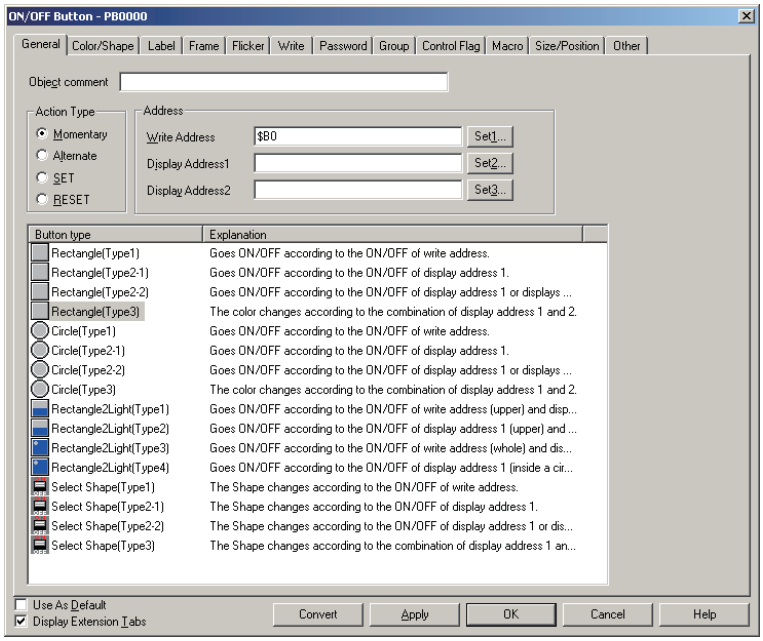
- When the display is switched to a screen with many objects, press the position where the ON/OFF Button is located to enable input even if the object display on the screen has not been completed yet. The processing does not start until the screen display has been completed, so a short time may lapse before processing is executed.
- ON/OFF buttons can be changed to Multifunction Objects.

  If changed to a Multifunction Object, the button can be changed to a lamp or multiple functions can be executed at once when the button is pressed.

  Refer to *2-11 Multifunction Objects* on page 2-171 on converting to a Multifunction Object.

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for ON/OFF Buttons.

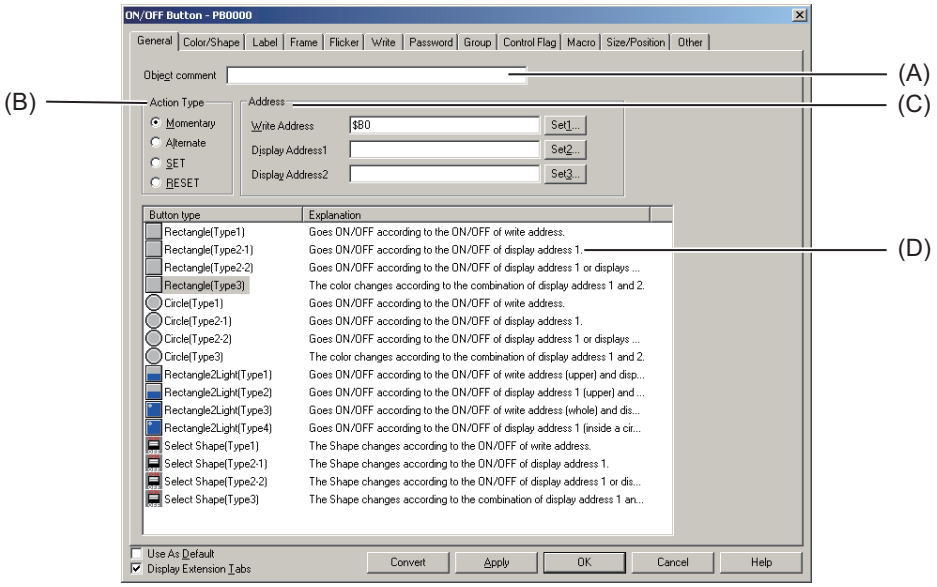


General:	Sets the address, action type, and other basic operations.
Color/shape:	Sets the button display color and shape.
Label:	Sets the label display.
Frame:	Sets the button frame display.
Flicker*1:	Sets the flicker display.
Write*1:	Sets the contents of the write confirmation message when the ON/OFF Button is pressed.
Password*1:	Sets the password to be entered when the ON/OFF Button is pressed.
Group*1:	Sets group numbers to exclusive buttons.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets macros to be executed.
Size/Position*1:	Sets the object size and position.
Other*1:	Sets the input sound for individual touch switches to OFF.

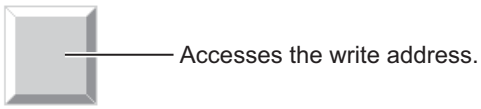
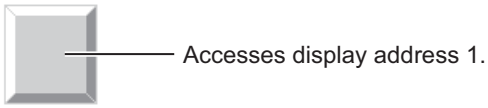
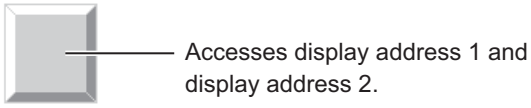
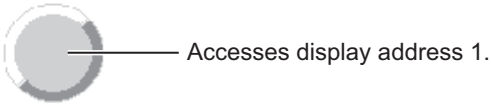
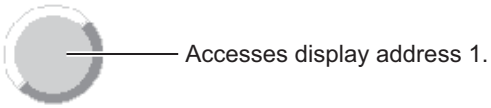
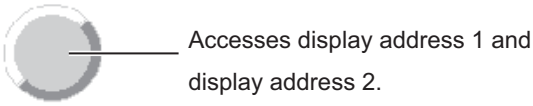
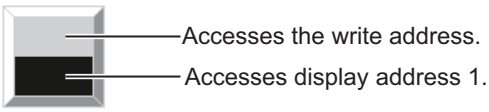
*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

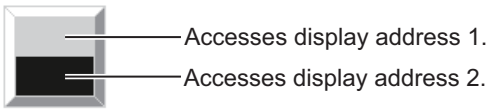
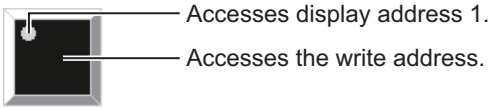
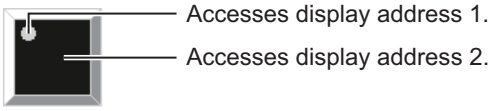
General Tab Page

Sets the button action type and address.



No.	Setting		Details
(A)	Object comment		Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Action type		Select an operation for when the button is pressed from the following 4 options.
		Momentary	Writes *1* to the write address when the button is pressed and writes *0* to when the button is released.
		Alternate	Alternates between writing *0* and *1* to the write address when the button is pressed.
		SET	Writes *1* to the write address when the button is pressed.
		RESET	Writes *0* to the write address when the button is pressed.
(C)	Address		Sets the write and read addresses for button operations.

No.	Setting	Details
(D)	Button type	Select the button shape and action type from the following 13 options. All buttons write *1* or *0* to the write address when they are pressed. Depending on the button type, some buttons change their status, e.g., their color, when the contents of the specified address change.
	Rectangle (Type 1)	The button color changes based on whether the write address is ON or OFF. 
	Rectangle (Type 2-1)	The button color changes based on whether the display address is ON or OFF. 
	Rectangle (Type 2-2)	The button color changes based on whether display address 1 is ON or OFF. The button color also changes when the button is pressed. 
	Rectangle (Type 3)	Changes the button color based on the status of display address 1 and display address 2 (i.e., 1/1, 1/0, 0/1, or 0/0). 
	Circle (Type 1)	A circle button with the same action as Rectangle (Type 1). 
	Circle (Type 2-1)	A circle button with the same action as Rectangle (Type 2-1). 
	Circle (Type 2-2)	A circle button with the same action as Rectangle (Type 2-2). 
	Circle (Type 3)	A circle button with the same action as Rectangle (Type 3). 
	Rectangle 2 Light (Type 1)	The top color changes based on whether the write address is ON or OFF and the bottom color changes based on whether display address 1 is ON or OFF. 

No.	Setting	Details
(D)	Rectangle 2 Light (Type 2)	The top color changes based on whether display address 1 is ON or OFF and the bottom color changes based on whether display address 2 is ON or OFF. 
	Rectangle 2 Light (Type 3)	The whole button color changes based on whether the write address is ON or OFF and the color of a circle inside the button changes based on whether display address 1 is ON or OFF. 
	Rectangle 2 Light (Type 4)	The color of the circle inside the button changes based on whether display address 1 is ON or OFF and the whole button color changes based on whether display address 2 is ON or OFF. 
	Select Shape (Type 1)	The button shape changes based on whether the write address is ON or OFF. Various button shapes can be set by selecting from the list.
	Select Shape (Type 2-1)	The button shape changes based on whether display address 1 is ON or OFF. Various button shapes can be set by selecting from the list.
	Select Shape (Type 2-2)	The button shape changes based on whether display address 1 is ON or OFF. The button shape also changes when the button is pressed. Various button shapes can be set by selecting from the list.
	Select Shape (Type 3)	Changes the button shape based on the status of display address 1 and display address 2 (i.e., 1/1, 1/0, 0/1, or 0/0). Various button shapes can be set by selecting from the list.

Additional Information

If frames are switched frequently, the display update may take some time and communications may be delayed. Care must be taken because this means that sometimes the momentary ON/OFF buttons may not operate normally.

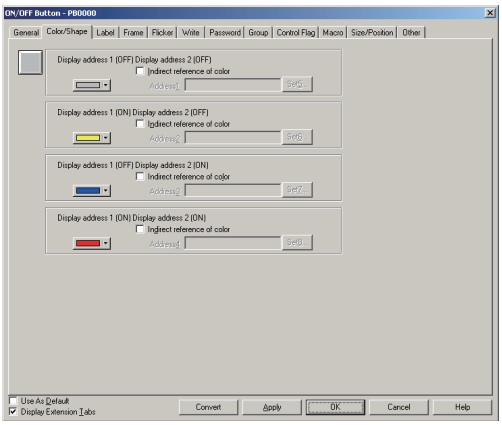
Color/Shape Tab Page

The Color/Shape Tab Page is used to select the ON/OFF Button display status.

If *Select shape* is selected under *Button type*, select a display shape from the list. For all other cases, select one of the 256 colors. Depending on the button type, only colors 1 and 2 may be used, or all colors 1 to 4 may be used.

Similarly for shape specification, only shapes 1 and 2 may be used or all shapes 1 to 4 may be used, depending on the button type.

● Color



The display methods for colors 1 to 4 depends on the ON/OFF Button type.

Button type	Display		
Rectangle (Type 1)	Whole button color	Write address on 0: OFF color Write address on 1: ON color	
Rectangle (Type 2-1)	Whole button color	Display address 1 on 0: OFF color Display address 1 on 1: ON color	
Rectangle (Type 2-2)	Whole button color	Display address 1 on 0: OFF color Display address 1 on 1: ON color When button is pressed: ON color	
Rectangle (Type 3)	Whole button color	Display address 1/display address 2 on 0/0: 1 (OFF) Display address 1/display address 2 on 1/0: 1(ON) Display address 1/display address 2 on 0/1: 1(OFF) Display address 1/display address 2 on 1/1: 1(ON)	2 (OFF) 2 (OFF) 2 (ON) 2 (ON)
Circle (Type 1)	Same as for Rectangle (Type 1).		
Circle (Type 2-1)	Same as for Rectangle (Type 2-1).		
Circle (Type 2-2)	Same as for Rectangle (Type 2-2).		
Circle (Type 3)	Same as for Rectangle (Type 3).		
Rectangle 2 Light (Type 1)	Top color	Write address on 0: OFF color Write address on 1: ON color	
	Bottom color	Display address 1 on 0: OFF color Display address 1 on 1: ON color	
Rectangle 2 Light(Type 2)	Top color	Display address 1 on 0: OFF color Display address 1 on 1: ON color	
	Bottom color	Display address 2 on 0: OFF color Display address 2 on 1: ON color	

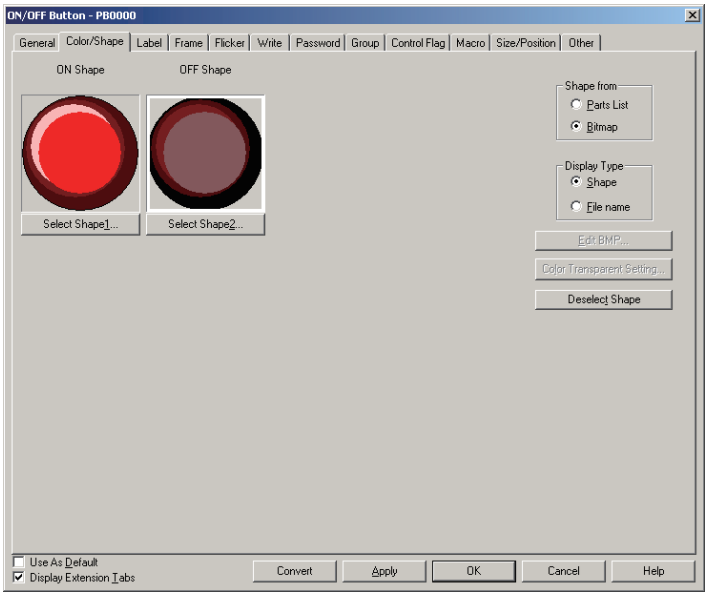
Button type	Display	
Rectangle 2 Light (Type 3)	Inside circle color	Display address 1 on 0: OFF color Display address 1 on 1: ON color
	Whole button color	Write address on 0: OFF color Write address on 1: ON color
Rectangle 2 Light (Type 4)	Inside circle color	Display address 1 on 0: OFF color Display address 1 on 1: ON color
	Whole button color	Display address 2 on 0: OFF color Display address 2 on 1: ON color
Select shape (Type 1)	Cannot be set here. The setting screen will be displayed for specifying the shape.	
Select shape (Type 2-1)	Cannot be set here. The setting screen will be displayed for specifying the shape.	
Select shape (Type 2-2)	Cannot be set here. The setting screen will be displayed for specifying the shape.	
Select shape (Type 3)	Cannot be set here. The setting screen will be displayed for specifying the shape.	

Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for information on how to set colors.

Additional Information

To change the button color based on the contents of an address, select *Indirect Reference* and allocate an address. Set a hexadecimal color code to the address. If a value other than 0 to FF is set the display color will be invalid.

● Select Shape



If shapes with ON/OFF pairs are specified, the shape for OFF (shapes 2 or 4) will be automatically selected when the shape for ON (shape 1 or 3) is selected.

Button type	Display
Button types except select shape	Cannot be set here. The setting screen will be displayed for setting colors.

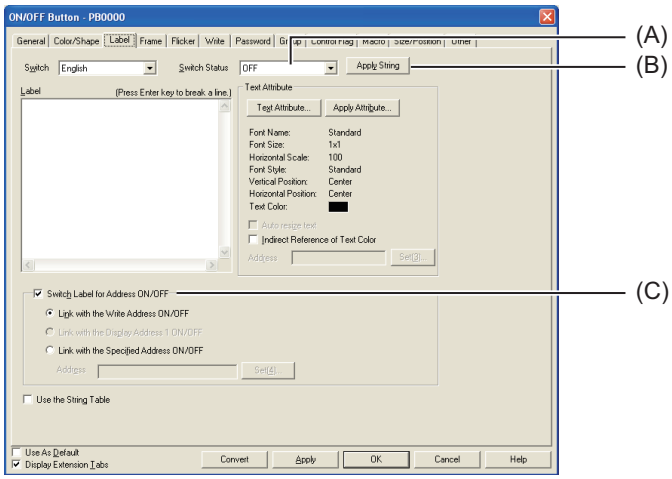
Button type	Display
Select shape (Type 1)	Write address on 1: ON shape Write address on 0: OFF shape
Select shape (Type 2-1)	Display address on 1: ON shape Display address on 0: OFF shape
Select shape (Type 2-2)	Display address on 1: ON shape Display address on 0: OFF shape When button is pressed: ON shape
Select shape (Type 3)	Display address 1/display address 2: 1/0 Shape 1 Display address 1/display address 2: 0/0 Shape 2 Display address 1/display address 2: 1/1 Shape 3 Display address 1/display address 2: 0/1 Shape 4

Refer to *2-8-9 Selecting Shape (Color/Shape Tab)* on page 2-98 for information on how to set fixed objects.

Label Tab Page

Use the Label Tab Page to set labels to the ON/OFF Button. Refer to *2-8-10 Labels* on page 2-101 for basic settings information. This section describes how to make settings for ON/OFF Buttons only.

Labels can be switched when the ON/OFF Button turns ON and OFF.



No.	Setting	Details
(A)	Switch Status	Select *ON* or *OFF* from the displayed list and edit the label for when the specified address is ON/OFF. The ON/OFF label is switched each time the button is clicked.
(B)	Apply String	Uses the current character string for all object states. The string is used as the label not only for the selected object, but for all other object states as well. If the Switch Status cannot be set, then the Apply String Button can also not be set.
(C)	Switch Labels for Address ON/OFF	Switches the label when the specified address turns ON or OFF. *ON/OFF* is also enabled when *Switch labels for Address ON/OFF* is selected.
	Link with Write Address ON/OFF	Switches label display when the Write Address, which is specified on the General Tab Page, turns ON or OFF.
	Link with Display Address1 ON/OFF	Switches label display when Display Address1, which is specified on the General Tab Page, turns ON or OFF.
	Link with the Specified Address ON/OFF	Switches label display when the specified address turns ON or OFF.

Frame

Specify the color and size of the button frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.



Additional Information

The buttons are not linked to write address ON/OFF or the raised/depressed status of the frame when the button action type is *Momentary, SET,* or *RESET*. The frame is concave when the button is pressed. To make the frame concave when the write address is ON, set the same address as the write address to *Link with the specified address ON/OFF*.

Flicker (Extension Tab)

Make flicker settings to make the functional object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write (Extension Tab)

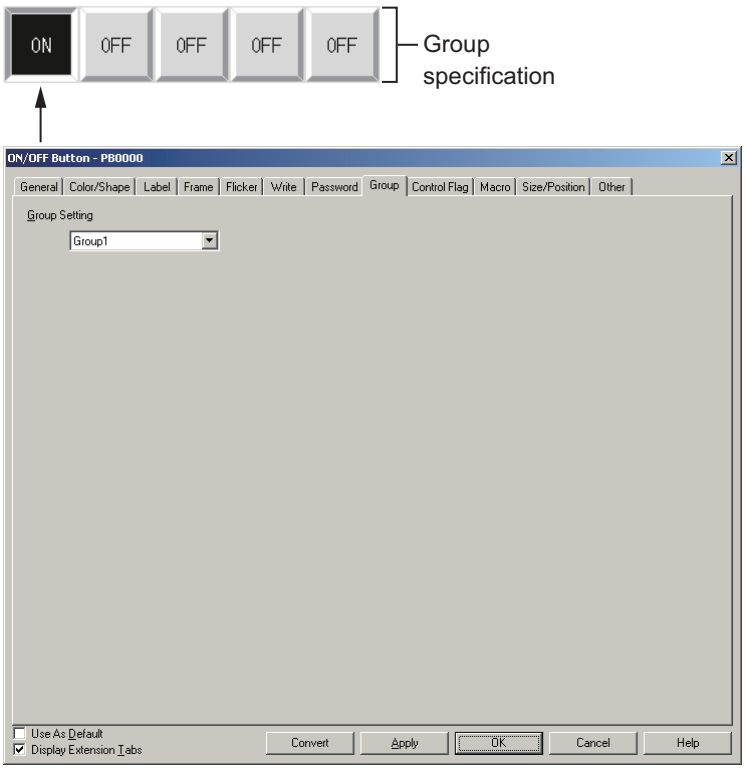
Use the write to display a confirmation dialog box before writing values to a write address. The con-firmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password (Extension Tab)

Set a password for when buttons are pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Group (Extension Tab)

Group is used to create buttons that are to be exclusively controlled (i.e., only one button can be selected out of multiple buttons). If the same group number is set to multiple buttons, this function ensures that only one button can be turned ON. Group numbers are specified on the Group Tab Page of the ON/OFF Button Properties Dialog Box. Groups 1 to 16 can be selected for one screen.



Additional Information

- Group settings are enabled only when *Momentary, Alternate,* or *SET* button action is selected in the properties settings. If the action type is set to *RESET*, the buttons will not operate according to group settings.
- If the button is set to *Alternate* action and is pressed when ON, the button will turn OFF.
- This function is different from the group function executed by selecting **Edit – Group – Group** from the menu bar or right-clicking and selecting **Group** from the pop-up menu.
- Set the same host address to buttons with the same group number. The buttons will not operate normally if different host addresses are allocated.
- If the same group number is set to several Multifunction Objects, they will also be subject to exclusive operation.

Control Flags (Extension Tab)

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macros (Extension Tab)

Macros can be specified for ON/OFF Buttons.

Macros executed by the following triggers can be registered.

Trigger	Details
Touch ON	Executes macro when the button is pressed.
Touch OFF	Executes macro when the button is released.

Refer to the *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/Position (Extension Tab)

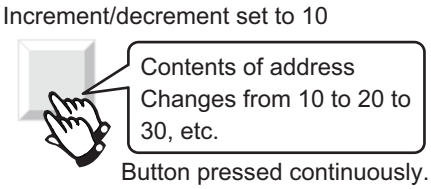
Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

Other (Extension Tab)

The touch switch input sound for ON/OFF buttons can be individually turned OFF. The touch switch input sound will be turned OFF for all objects (regardless of the individual settings) if the touch switch input sound (Key Press Sound) has been set to OFF in the PT's System Menu or in the System Setting PT Tab Page in the CX-Designer.

2-9-2 Word Buttons

Word Buttons either write values to a specified address or increase or decrease the value of the contents or a specified address when the button is pressed. Items on a pop-up menu can also be selected and the values specified to those items written to the address.



Select **Functional Objects – Word Button** or the W icon in CX-Designer to create a Word Button.

Additional Information

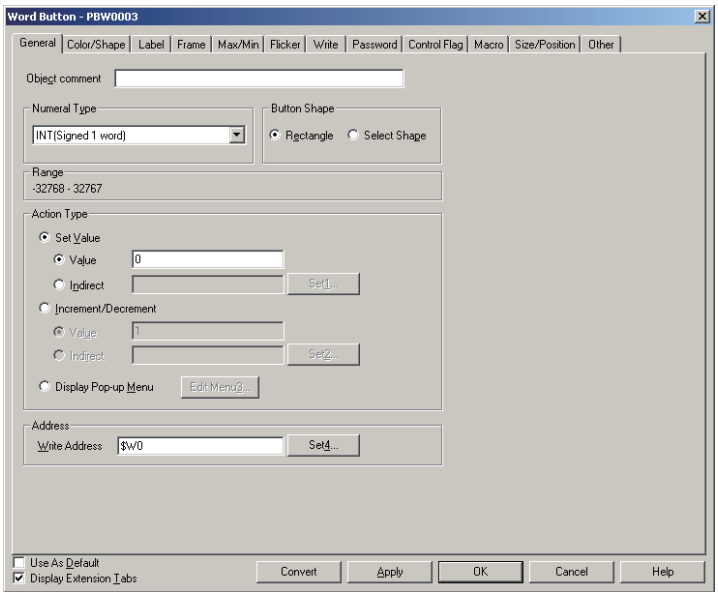
- When the display is switched to a screen with many objects, press the position where the Word Button is located to enable input even if the object display on the screen has not been completed yet. The processing does not start until the screen display has been completed, so a short time may lapse before processing is executed.
- Word buttons can be changed to Multifunction Objects.

  If changed to a Multifunction Object, the button can be changed to a lamp or multiple functions can be executed at once when the button is pressed.

  Refer to *2-11 Multifunction Objects* on page 2-171 for information on converting to a Multifunction Object.

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for Word Buttons.



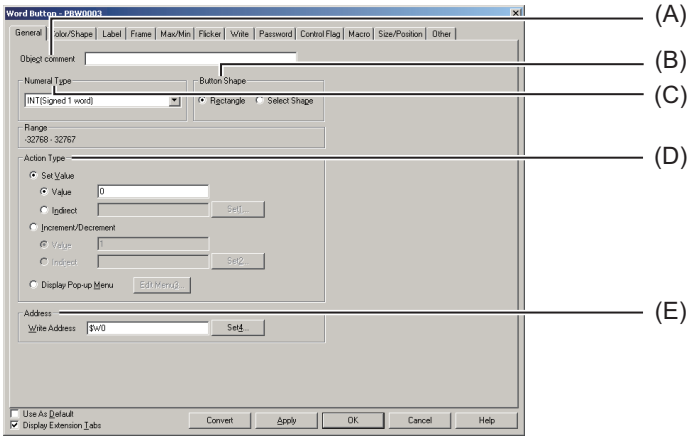
General:	Sets the address, action type, and other general operations.
Color/shape:	Sets the button display color and shape.
Label:	Sets the label display.
Frame:	Sets the button frame display.

Max/Min:	Sets the maximum and minimum limits for address contents when Word Button is pressed.
Flicker*1:	Sets the flicker display.
Write*1:	Sets the contents of the write confirmation message when the Word Button is pressed.
Password*1:	Sets the password to be entered when the Word Button is pressed.
Control flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets macros to be executed.
Size and Position*1:	Sets the object size and position.
Other*1:	Sets the input sound for individual touch switches to OFF.

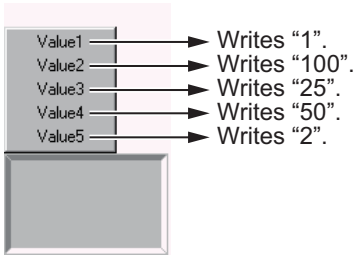
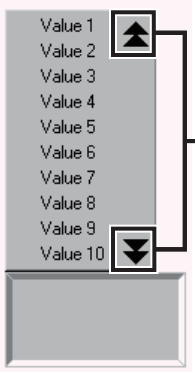
*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the button action type and address.

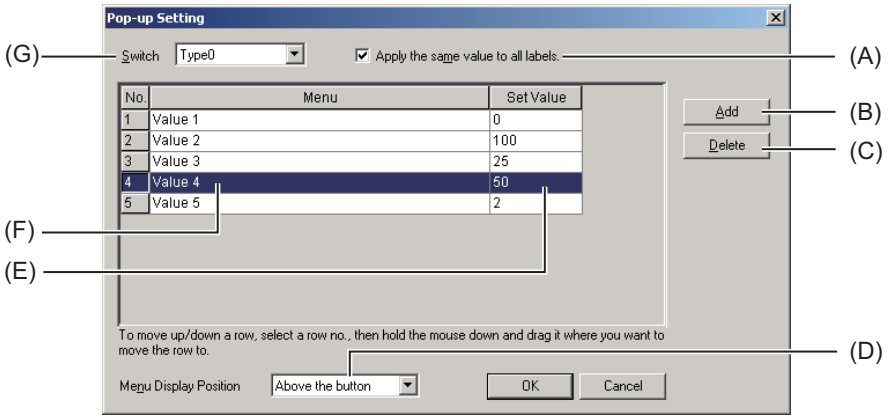


No.	Setting	Details
(A)	Object comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Button shape	Specifies the displayed button shape. Select *Rectangle* to display buttons of various colors. If *Select shape* is selected, the shape can be selected from the Shape Types Selection Dialog Box on the Color/shape Tab Page.
(C)	Numeral Type	Select the write format for the numeral when the button is clicked from the following eleven types. • SINT (signed, 1 byte) • USINT (unsigned, 1 byte) • INT (signed, 1 word) • UINT (unsigned, 1 word) • DINT (signed, 2 words) • UDINT (unsigned, 2 words) • REAL (real number) • BCD2 (unsigned, 1 word) • BCD2 (unsigned, 2 words) • BCD1 (signed (leftmost digit: F), 1 word) • BCD1 (signed (leftmost digit: F), 2 words) • BCD2 (signed (leftmost bit: 1), 1 word) • BCD2 (signed (leftmost bit:1), 2 words) Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details on numeral storage types.

No.	Setting	Details
(D)	Action type	Select one of the following three types of action.
	Set Value	Sets a set value to the write address when the button is pressed. The numeric value can only be input as a decimal. Hexadecimal values cannot be input. To input hexadecimal values to the PLC, first convert the hexadecimal number to decimal and then input the converted value. Example: To write FFFF, set "-1" in decimal (for signed values). When indirect is selected, the contents of the set address are written.
	Increment/ decrement	When the button is pressed, the contents of the address are incremented or decremented and set. Example: If *Increment/decrement* is set to "10", the contents of the address will increase by 10 each time the button is pressed. If *Increment/ decrement* is set to "-10", the contents of the address will decrease by 10 each time the button is pressed. When indirect is selected, the contents of the set address becomes the increment/decrement value. When the maximum or minimum limit is exceeded, the action will be changed based on the settings on the MAX/MIN Tab Page. Refer to *Maximum/Minimum Limits Tab Page* on page 2-145 for details.
	Display Pop-up menu	When the button is pressed, a pop-up menu will be displayed and the write value can be selected from the menu. Set the character strings (up to 64 characters) that will be displayed on the pop-up menu and the values that will be written when the items on the pop-up menu are selected. As many pop-up menus as there are label switches can be set. If labels are switched during operation, the displayed pop-up menu will also change. Up to 32 items can be set on pop-up menus. Example  Click the **Edit** Button to edit the pop-up menu.  At the PT Unit, a scroll bar will be displayed if there are more than ten items on a pop-up menu, as shown on the left. Use the scroll bar to display other items on the menu.
(E)	Address	Sets the write address for button operations. Only words can be specified.

Editing Pop-up Menus

Click the **Edit Menu3** Button on the General Tab Page to display the Pop-up Setting Dialog Box.



No.	Setting	Details
(A)	Apply the same value to all labels.	This option applies the same Set Value to all labels.
(B)	Add	Adds a menu item below of the currently selected row. If there is no row selected, a new row is added to the bottom of the list.
(C)	Delete	Deletes the currently selected menu item.
(D)	Menu display position	Sets one of the following display positions for the pop-up menu. • Above the button • Below the button
(E)	Set Value	Specifies the value that will be written to the communications address when the corresponding menu item is selected.
(F)	Menu list	Sets the heading name displayed in the pop-up menu. The name can be up to 64 characters long.
(G)	Switch	Switches labels.

Additional Information

When a row has been selected by clicking the row number, the row can be dragged and dropped in another location to change its order in the list.

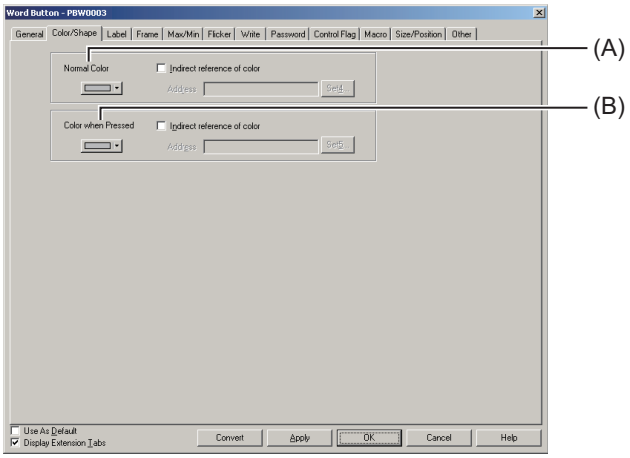
Color/Shape Tab Page

Specify the color and shape of the button.

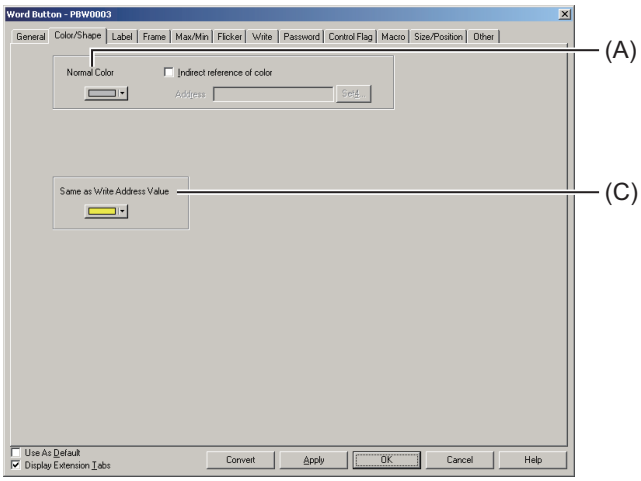
If *Rectangle* is selected as the button shape, one of 256 colors can be selected. If *Select shape* is selected under *Button type*, select a display shape from the list.

● Color

- The following Dialog Box is displayed when *Increment/Decrement* or *Display Pop-up Menu* is selected as the Action Type.



- The following Dialog Box is displayed when Set Value is selected as the Action Type.

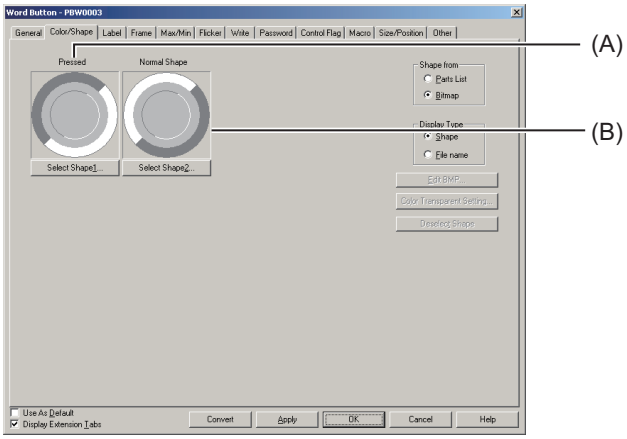


No.	Setting	Details
(A)	Normal Color	Sets the normal display color for the Set Button.
(B)	Color when Pressed	Sets the color when the button is pressed. Set the pressed color when *Increment/decrement* or *Pop-up menu display* is selected as the button action type.
(C)	Same as Write Address Value	Sets the color that will be displayed when the contents of the write address match the set value for *Set Value* button action types. When the values do not match, the button color will be that set as the normal color. Multiple word buttons can be used as exclusive buttons by specifying the same word address and changing each of the values set to *Set Value*.

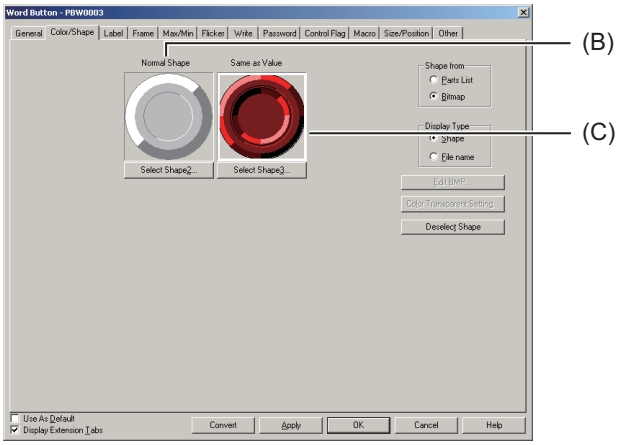
Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for information on how to set colors.

● Select Shape

- The following Dialog Box is displayed when *Increment/Decrement* or *Display Pop-up Menu* is selected as the Action Type.



- The following Dialog Box is displayed when *Set Value* is selected as the Action Type.



No.	Setting	Details
(A)	Pressed	Click the **Select Shape** Button to set the button's shape when it is pressed.
(B)	Normal shape	Click the **Select Shape** Button to set the button's normal shape.
(C)	Same as value	Sets the button shape that will be displayed when the contents of the write address match the set value for *Set Value* button action types. When the values do not match, the button shape will be that set as the normal shape.

Refer to *2-8-9 Selecting Shape (Color/Shape Tab)* on page 2-98 for information on how to set fixed objects.

Label Tab Page

Set a label for each button. Refer to *2-8-10 Labels* on page 2-101 for basic set-tings information.

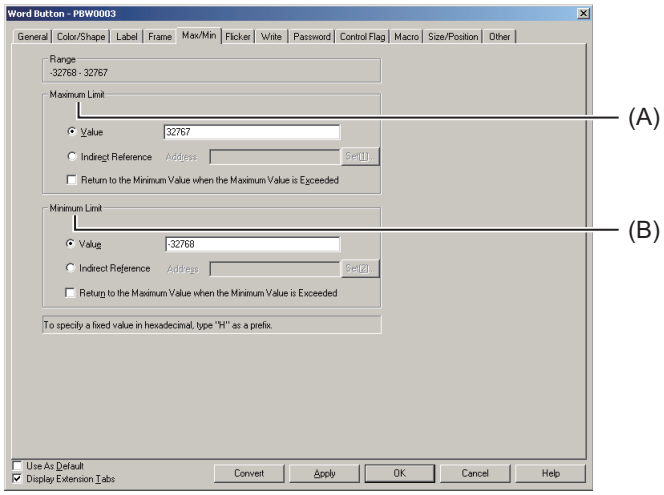
Frame Tab Page

Specify the colors and sizes of the button frame to change the shape or color when the button is de-pressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Maximum/Minimum Limits Tab Page

Set the maximum and minimum limits for the contents of the write address. The setting range for maximum and minimum limits depends on the numeral types.

If the action type is *Increment/decrement*, the value can be returned to the maximum or minimum limit if the limits are exceeded.



No.	Setting	Details
(A)	Maximum limit	Sets the maximum limit. Select either value or indirect reference. If the action type is *Increment/decrement* and *Return to the Minimum Value when the Maximum Value is exceeded* is selected, the value will be returned to the minimum limit and set if the maximum limit is exceeded. Example If the Word Button is pressed at a current value of 998 at the following settings: • Maximum limit of 1,000, minimum limit of 0, increment/decrement set to 5, and *Return to the Minimum Value when the Maximum Value is exceeded* not selected: Stays at 998. • If *Return to the Minimum Value when the Maximum Value is exceeded* is selected: Writes “0”.
(B)	Minimum limit	Sets the minimum limit. Select either value or indirect reference. If the action type is *Increment/decrement and Return to the Maximum Value when the Minimum Value is exceeded* is selected, the value will be returned to the maximum limit and set if the minimum limit is exceeded. Example: If the Word Button is pressed at a current value of 3 at the following settings: • Maximum limit of 1,000, minimum limit of 0, increment/decrement set to -5, and *Return to the Maximum Value when the Minimum Value is exceeded* is not selected: Stays at 3. • If *Return to the Maximum Value when the Minimum Value is exceeded* is selected: Writes “1000”.

The setting ranges for maximum and minimum limits depend on the *Numeral types* set on the General Tab Page. If a value is set under *Value* that exceeds the range set under *Numeral types* and the OK Button is pressed, a message stating that the setting range has been exceeded will be displayed and the setting will not be made.

Flicker Tab Page

Make flicker settings to make the functional object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write Tab Page

Use the write to display a confirmation dialog box before writing values to a write address. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password Tab Page

Set a password for when buttons are pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page

Macros can be specified for Word Buttons.

Macros executed by the following triggers can be registered.

Trigger	Details
Touch ON	Executes macro when the button is pressed.
Touch OFF	Executes macro when the button is released.

Refer to the *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/position Tab Page

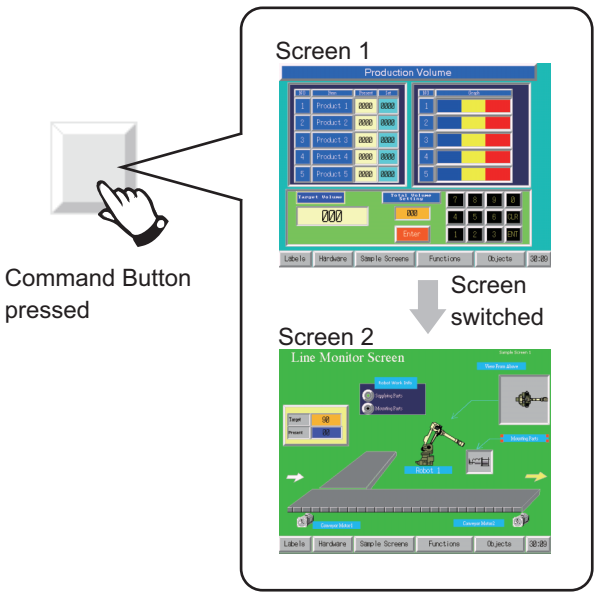
Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

Other (Extension Tab)

The touch switch input sound for ON/OFF buttons can be individually turned OFF. The touch switch input sound will be turned OFF for all objects (regardless of the individual settings) if the touch switch input sound (Key Press Sound) has been set to OFF in the PT's System Menu or in the System Setting Window's PT Tab Page in the CX-Designer.

2-9-3 Command Buttons

A Command Button is a functional object that switches screens and transmits character codes.



Select **Functional Objects – Command Button** or the CMD icon in CX-Designer to create a Command Button.

Additional Information

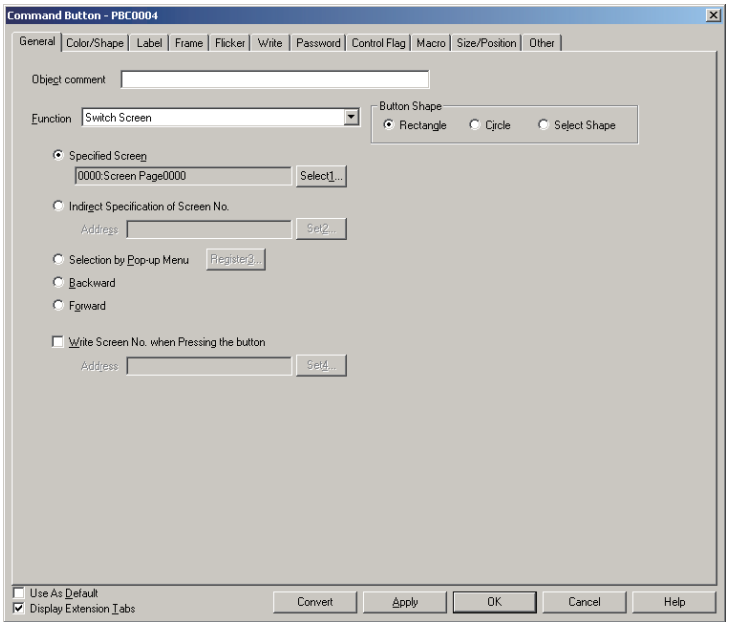
- When the display is switched to a screen with many objects, press the position where the Command Button is located to enable input even if the object display on the screen has not been completed yet. The processing does not start until the screen display has been completed, so a short time may lapse before processing is executed.
- Command buttons can be changed to Multifunction Objects.

  If changed to a Multifunction Object, the button can be changed to a lamp or multiple functions can be executed at once when the button is pressed.

  Refer to *2-11 Multifunction Objects* on page 2-171 for information on converting to a Multifunction Object.

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for Command Buttons.

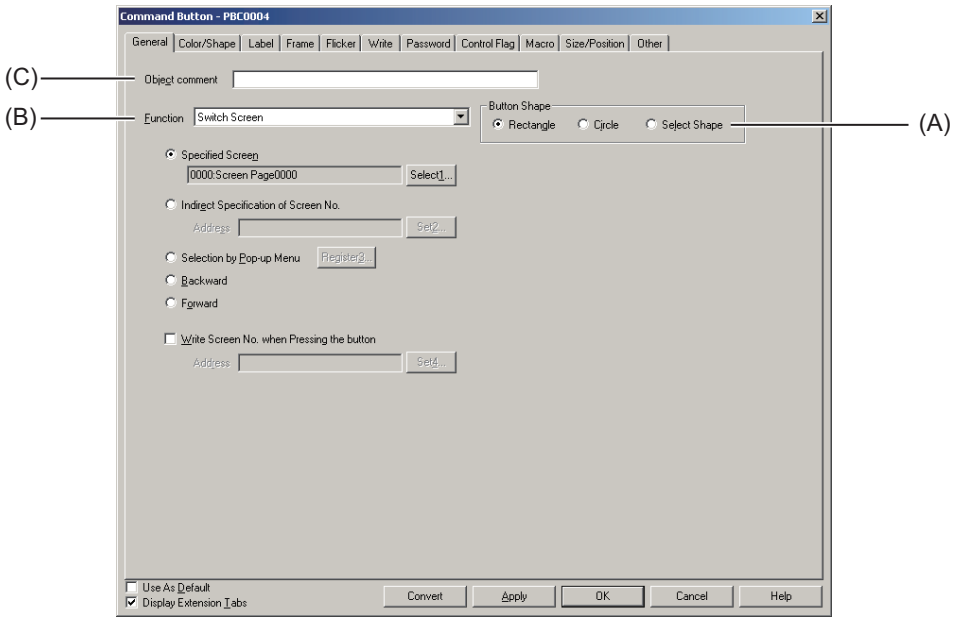


General:	Sets the types of functions and operations for the Command Button.
Color/shape:	Sets the button display color.
Label:	Sets the label display.
Frame:	Sets the button frame display.
Flicker*1:	Sets the flicker display.
Write*1:	Sets the write confirmation message when the button is pressed.
Password*1:	Sets the password to be entered when the Command Button is pressed.
Control flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets macros to be executed.
Size/position*1:	Sets the object size and position.
Other*1:	Sets the input sound for individual touch switches to OFF.

*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

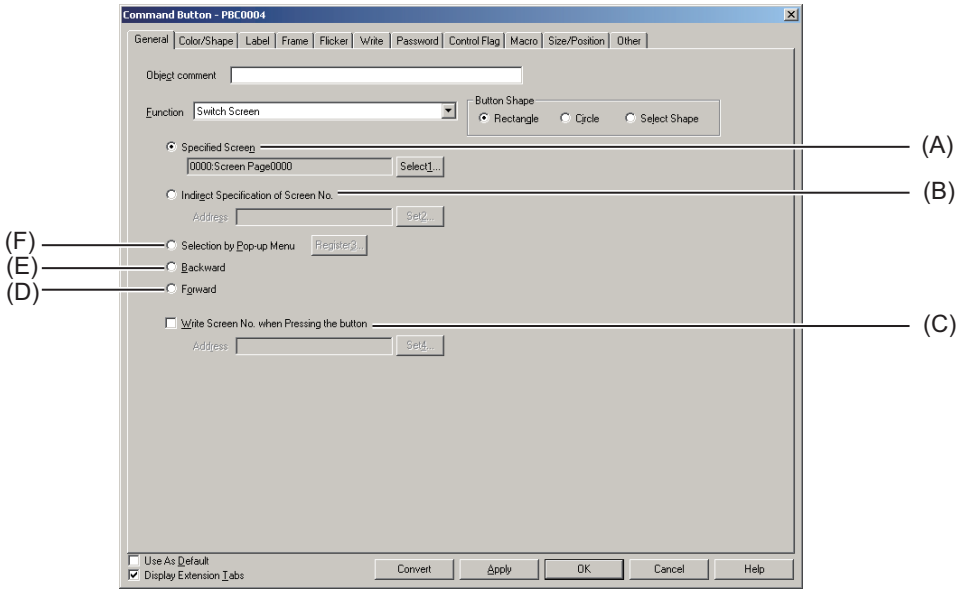
Sets the types of functions and operations for the button.



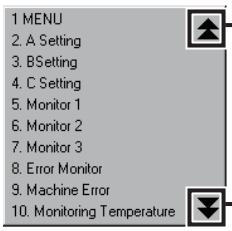
No.	Setting	Details
(A)	Button shape	Used to select Rectangle, Circle, or Select Shape.
(B)	Function	Used to select the functions that will operate when the Command Button is pressed. *Switch screen, Key Button, Control Pop-up screen, Display System Menu, stop buzzer, none, Data Block Control,* and Authentication *Cancellation* can be selected as required. The detailed settings differ with each function.
(C)	Object comment	Sets an explanatory comment for the pasted object (up to 32 characters).

● Switch Screen

The screen can be switched when the button is pressed and released again. The destination screen for the switch screen can be selected from the following five types.



No.	Setting	Details
(A)	Specified screen	Switches to a specified page number.

No.	Setting	Details
(B)	Indirect Specification of Screen No.	Reads the contents of a specified address as the page number and switches to that specified screen page number.
(C)	Write Screen Page No. to the Address when Switching a Screen	The destination screen number can be written to a specified address when screens are switched. Click the check box on the left and specify the write address.
(D)	Forward	If the *Backward* function has been used to go back to previous pages, the *Forward* function can be used to move ahead to later pages.
(E)	Backward	The last 32 page switching operations are recorded and the pages can be returned based on this record. Switches to pop-up screens cannot be recorded.
(F)	Selection by Pop-up Menu	Displays a pop-up menu for screen selection. (Up to 32 items of up to 64 characters each). The display position of the pop-up menu can be specified to be above or below the Command Button.   At the PT Unit, a scroll bar will be displayed if there are more than ten items on a pop-up menu, as shown on the left. Use the scroll bar to display other items on the menu.

Additional Information

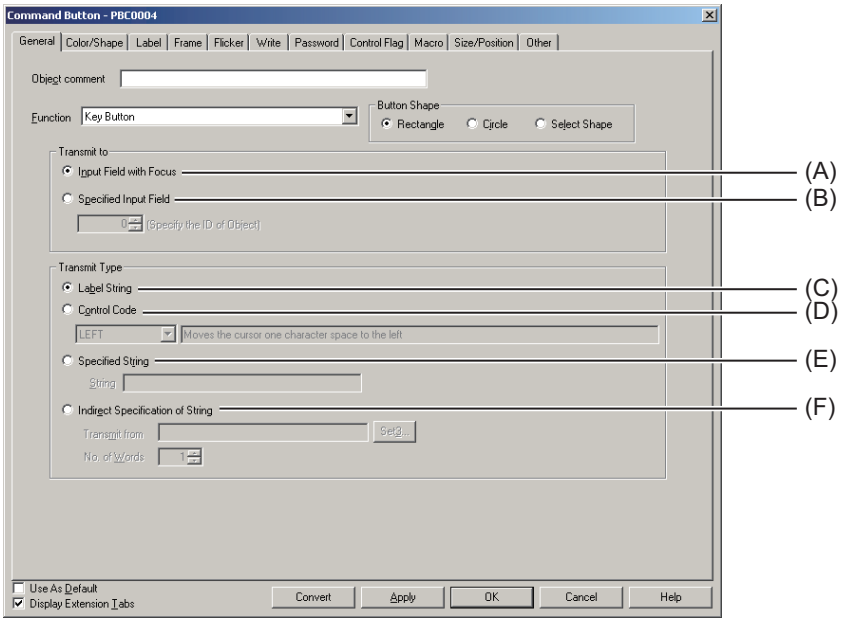
- If screens are opened and closed frequently, the display update may take some time and communications may be delayed.
- Use the *Indirect Specification of Screen No.* option to use the Command Button *Switch Screen* function to display the System Menu. The System Menu is displayed when “4002” (BCD) or “FA2” (binary) is written to the specified address. The *Specified screen* option cannot be used to switch to the System Menu.

  The display can also be switched to the System Menu by selecting the *Display System menu* function. Refer to *Display System Menu* on page 2-154.
- The data format (BCD or binary) is set by selecting **PT – Project Properties** and using the *Data Format* Tab Page.

Key Buttons

A Key Button is an object that transmits a specified character code to the numeral display and input or character string display field in focus. Character codes (combinations of 0 to 9 and A to F) can be transmitted to the numeral display and input object. The transmitted code will, however, be displayed in the display type for the Numeral display and Input object. For example, if the display is in decimal format, character codes including characters A to F cannot be transmitted.

The settings at the destination determine whether the transmitted character string will be ASCII or Unicode. For example, if the destination string display and input object are set to ASCII, the transmitted character string will be stored in ASCII. If the Command Button is set to a pop-up screen, the code will still be transmitted to the base screen if the focus is on that base screen. Special control codes, (e.g., BS: backspace, CLR: clear, etc.) can also be transmitted as required by the application.



No.	Setting	Details
(A)	Input field with focus	Transmits the character string to the input field (*Numeral display and input* or *String display and input*) that is in focus.
(B)	Specified input field	Sets functional object ID numbers when transmitting to a specific functional object. *1
(C)	Label string	Transmits the character code for characters set to labels. Up to 64 characters can be transmitted, i.e., the entire registered label can be transmitted.
(D)	Control code (Refer to the next page)	Select the specific control code from the list. Only for list display when *S PAGE UP* (scroll bar previous page) or similar items are selected.
(E)	Specified string	Transmits the character code (up to 256 characters) for a specified string other than labels.
(F)	Indirectly specification of string	Transmits a specified number of words from a specified address as the character code.

*1. A functional object on the base screen or pop-up screen must be set as the destination. The destination cannot be a functional object on a different screen, e.g., a functional object on the base screen cannot be used as the destination from a pop-up screen.

Functional objects on sheets also cannot be used as the destination.

When creating a Command Button on a sheet, the destination must be a functional object with a specified ID number on a base screen or pop-up screen using that sheet.

Additional Information

- Functional object ID numbers can be checked by selecting **View – Show ID** (click on Show ID) or opening the Functional Object Properties Dialog Box.





Specify the 4-digit number displayed here if using *Specified Input Field* to specify the ID number. (In the above example, “7” is specified.)

Refer to *Create Screens* in the *CX-Designer Online Help* for information on ID displays.

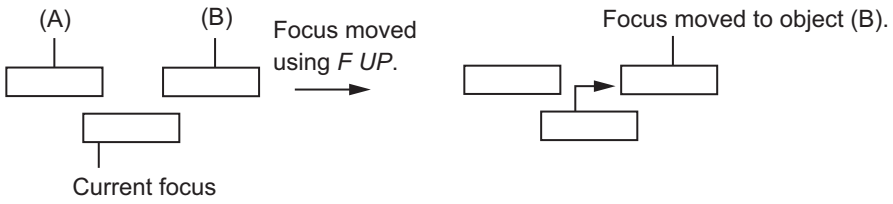
- Set *Input Field with Focus* to transmit to other screens. Data cannot be transmitted even if the ID number is set under *Specified Input Field*.

- Control Codes

Control code	Explanation
LEFT	Moves the cursor one character space to the left, deleting the character to the left of the original cursor position.
RIGHT	Moves the cursor one character space to the right, inserting a space to the right of the original cursor position.
CLR	Clears the input data.
CAN	Cancels the input data.
BS	Deletes one character to the left of the cursor.
DEL	Deletes one character to the right of the cursor.
RET	Confirms the input characters.
ENT	Confirms the input characters and moves the focus to the next registered data input object.
±	Reverses the sign of the numeral in the data input field. This option is invalid for character string display.
***.*	Adds a decimal point to the data input field. Use this option when entering real numbers.
HOME	Moves the focus to the data input object at the top left of the screen.
F UP	Moves the focus to the closest data input object above.
F DOWN	Moves the focus to the closest data input object below.
F LEFT	Moves the focus to the closest data input object to the left.
F RIGHT	Moves the focus to the closest data input object to the right.
F NEXT	Moves the focus to the next data input object in ascending order.
F PREV	Moves the focus to the previous data input object in descending order.
S PAGEUP	(For list selection only.) Page-up for scroll bar.
S PAGEDOWN	(For list selection only.) Page-down for scroll bar.
S LINEUP	(For list selection only.) Line-up for scroll bar.
S LINEDOWN	(For list selection only.) Line-down for scroll bar.

Additional Information

- Focus is not moved to input-prohibited objects for focus control codes.
- If there are two input objects at an equal distance from the current object, the focus will move to the object created first on the CX-Designer.

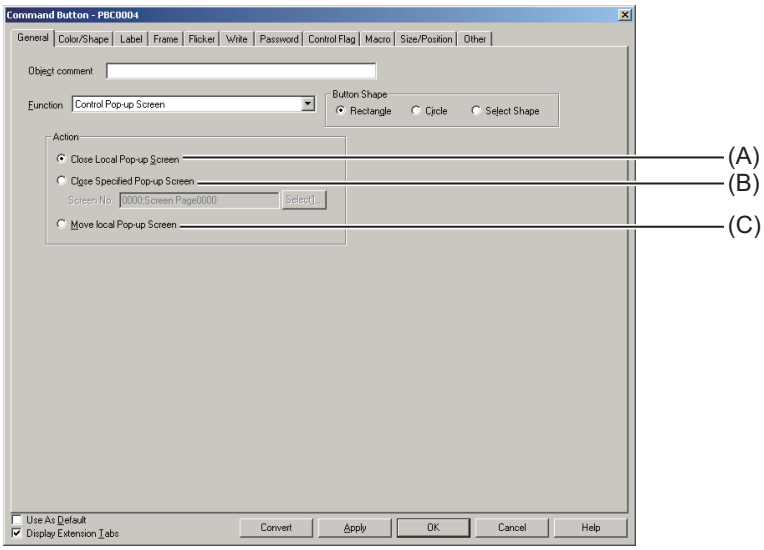


Assuming object (B) is created earlier than object (A) on CX-Designer.

- Press a functional object other than a Command Button to which *Key Button* is set to remove the focus from numeral display and input objects and string display and input objects.
- If using *S PAGEUP, S PAGEDOWN, S LINEUP,* or *S LINEDOWN,* select *Specified Input Field* as the *Transmit to* and specify the ID number for list selection.

Control Pop-up Screen

Control Pop-up screen controls the pop-up screen specified for display when a button is pressed.



No.	Setting	Details
(A)	Close Local pop-up screen	Closes the currently displayed pop-up screen using a Command Button in the same screen.
(B)	Close specified pop-up screen	Closes a specified pop-up screen. Use the **Select** Button to specify the pop-up screen to be closed. The current screen as well as other pop-up screens can be specified using this option.
(C)	Move Local pop-up screen	Moves the pop-up screen after the Command Button is pressed to any position pressed on the screen.

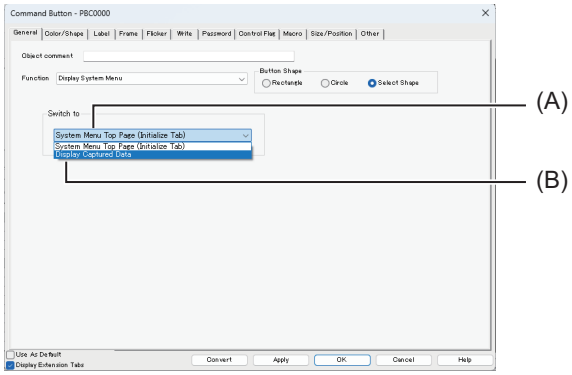
Additional Information

- If pop-up screens are controlled (e.g., moved or closed) frequently, the display update may take some time and communications may be delayed.
- If the screen specified under *Close Local pop-up screen, Close specified pop-up screen,* or *Move Local pop-up screen* is a base screen, the Command Button will be disabled while the PT Unit is operating.
- When moving pop-up screens using *Move Local pop-up screen,* the position touched on the screen after the Command Button is pressed will become the top left corner of the new position for the pop-up screen.

Display System Menu

The System Menu Initial Tab, or Display Captured Data will be displayed when the Command Button is pressed.

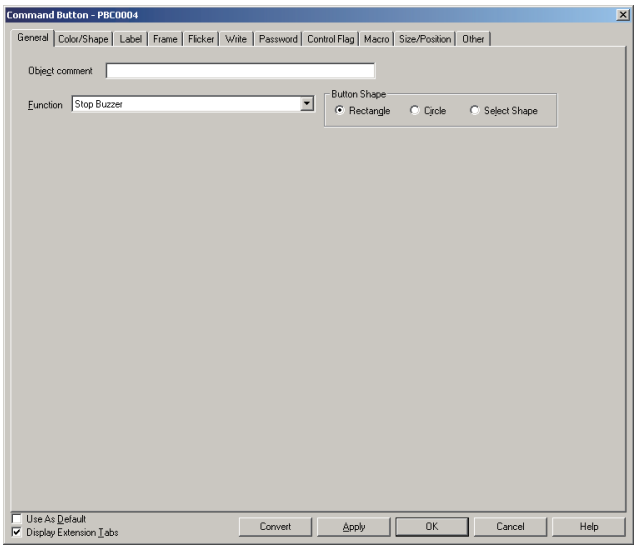
There are no settings to be made for this option.



No.	Setting	Details
(A)	System Menu Top Page (Initialize Tab)	Switches from the user screen to the top page (Initial Tab) of the System Menu.
(B)	Display Capture Data	Switches directly from the user screen to Display Capture Data under Special Screen.

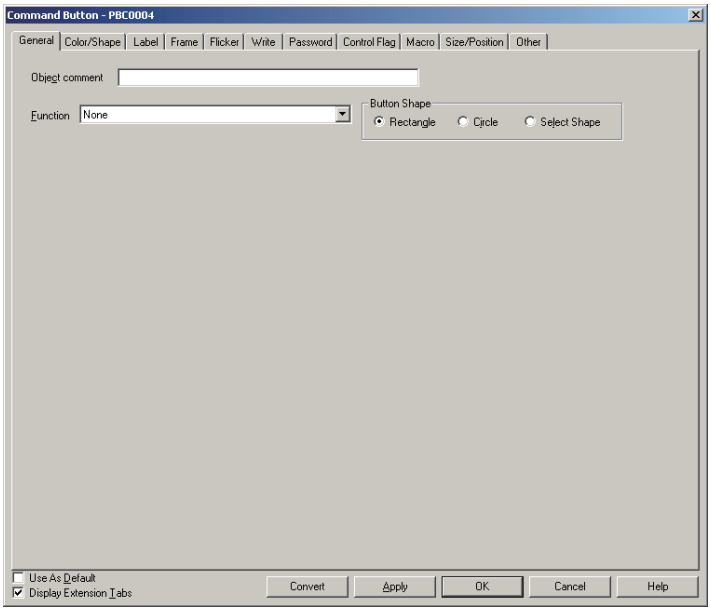
● Stop Buzzer

The current buzzer will stop when the Command Button is pressed. There are no settings to be made for this option.



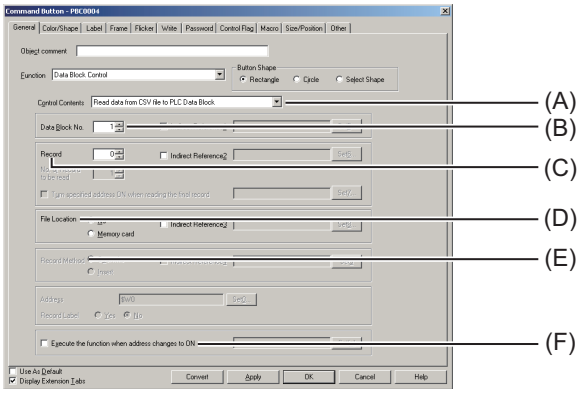
● None

There are no functions for the button itself. This option is used for starting macros. There are no settings to be made for this option.



● Data Block Control – File – PLC

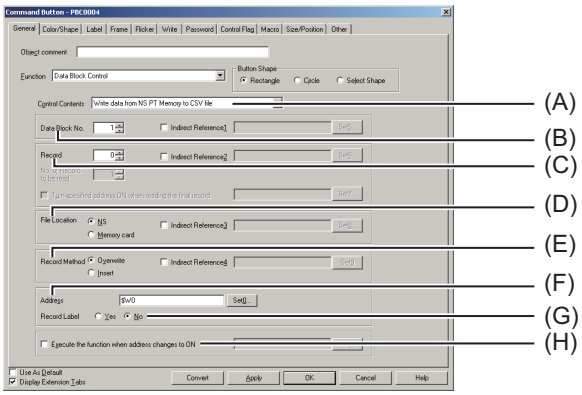
This function operates on data blocks. When a button is pressed, CSV file data is transferred to the specified addresses in the PLC or the data from specified addresses in the PLC is transferred to the specified record in the CSV file.



No.	Setting		Details
(A)	Control content		Specifies the control operation to be performed when the command button is pressed.
		Read data from CSV file to PLC Data Block	Transfers the data from the specified record in the CSV file to the PLC address specified in each field.
		Write data from PLC Data Block to CSV file	Transfers the data from the PLC address specified in each field to the specified record in the CSV file.
		Delete record	Deletes the data from the specified record in the CSV file.
(B)	Data Block No.		Specifies the data block group number (1 to 100) for the control operation. The group number can be set indirectly through a communications address by selecting the *Indirect Reference* Option.
(C)	Record		Specifies the record number in the CSV file (0 to 999) to use in the control operation. The Record number can be set indirectly through a communications address by selecting the *Indirect Reference* Option.
(D)	File Location		Specifies either the PT Unit or a removable media as the location of the CSV file. The File Location can be set indirectly by selecting the *Indirect Reference* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(E)	Record Method		If the *Control Content* Field is set to *Write data from PLC Data Block to CSV file*, the data at the specified record can be overwritten or it can be inserted at the specified record number. The Record Method can be set indirectly by selecting the *Indirect Reference* Option. If the specified address is 0, the data will be overwritten. If the specified address is 1, the data will be inserted.
(F)	Execute the function when address changes to ON		If the option is selected, the specified control operation is performed when the specified address changes from OFF to ON while the command button is being displayed.

● Data Block Control – File – PT Unit, PT Unit – PLC

This function operates on data blocks. When a button is pressed, data is read/written between the CSV file and the specified PT address or between the specified PT address and the specified PLC address.

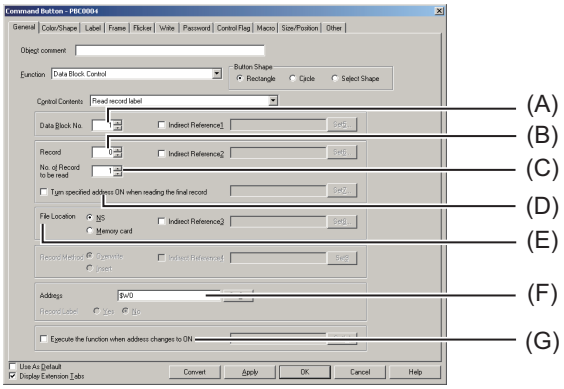


No.	Setting	Details
(A)	Control content	Specifies the control operation to be performed when the command button is pressed.
	Read data from CSV file to PT Memory	Transfers the data from the specified record in the CSV file to the specified address in the PT Unit.
	Write data from PT Memory to CSV file	Transfers one record of data from the specified address in the PT Unit to the specified record in the CSV file.
	Read data from PT Memory to PLC Data Block	Transfers one record of data from the specified address in the PT Unit to the PLC address specified in each field.
	Write data from PLC Data Block to PT Memory	Transfers the data from the PLC address specified in each field to the specified address in the PT Unit.
(B)	Data Block No.	Specifies the data block group number (1 to 100) for the control operation. The group number can be set indirectly through a communications address by selecting the *Indirect Reference* Option.
(C)	Record	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The Record number can be set indirectly through a communications address by selecting the *Indirect Reference* Option.
(D)	File Location	Specifies either the PT Unit or a removable media as the location of the CSV file. The File Location can be set indirectly by selecting the *Indirect Reference* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(E)	Record Method	If the *Control Content* Field is set to *Write data from PT Memory to CSV file*, the data at the specified record can be overwritten or it can be inserted at the specified record number. The Record Method can be set indirectly by selecting the *Indirect Reference* Option. If the specified address is 0, the data will be overwritten. If the specified address is 1, the data will be inserted.
(F)	Address	Specifies the PT address for reading/writing the PLC address specified in each field or reading/writing data for CSV file.
(G)	Record Label	Specifies whether to include the record label when reading and writing PT addresses.

No.	Setting	Details
(H)	Execute the function when address changes to ON	If the option is selected, the specified control operation is performed when the specified address changes from OFF to ON while the command button is being displayed.

● Data Block Control – Read Record Label

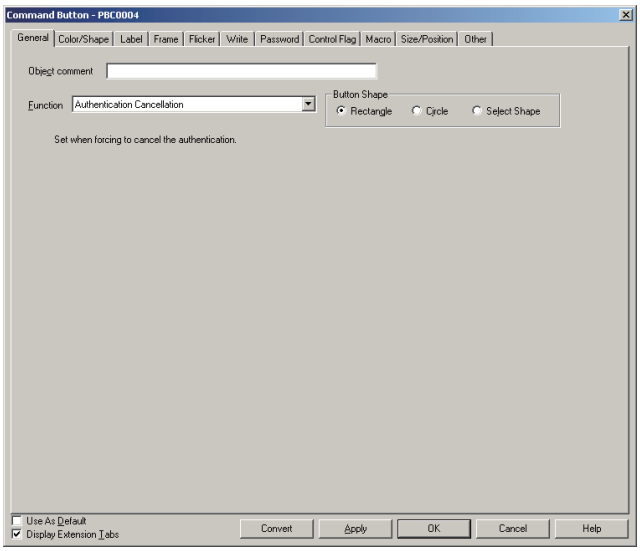
This function operates on data blocks. When a button is pressed, the record labels for the specified records in the CSV file are transferred to the specified addresses in the PT Unit.



No.	Setting	Details
(A)	Data Block No.	Specifies the data block group number (1 to 100) to be controlled. The group number can be set indirectly through a communications address by selecting the *Indirect Reference* Option.
(B)	Record	Specifies the first record number (0 to 999) in the CSV file for which the record label is to be read. The Record number can be set indirectly through a communications address by selecting the *Indirect Reference* Option.
(C)	No. of Record to be read	Specifies the number of record labels to read starting from the top record number.
(D)	Turn specified address ON when reading the final record	If this option is selected, the specified address will turn ON when the record label has been read for the last record number.
(E)	File Location	Specifies either the PT Unit or a removable media as the location of the CSV file. The File Location can be set indirectly by selecting the *Indirect Reference* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(F)	Address	Specifies the PT address to which to write the record labels.
(G)	Execute the function when address changes to ON	If the option is selected, the specified control operation is performed when the specified address changes from OFF to ON while the command button is being displayed.

● Authentication Cancellation

The authentication will be cancelled when the Command Button is pressed. There are no settings to be made for this option.



Additional Information

No processing is performed if the button is pressed when the authentication has already cancelled.

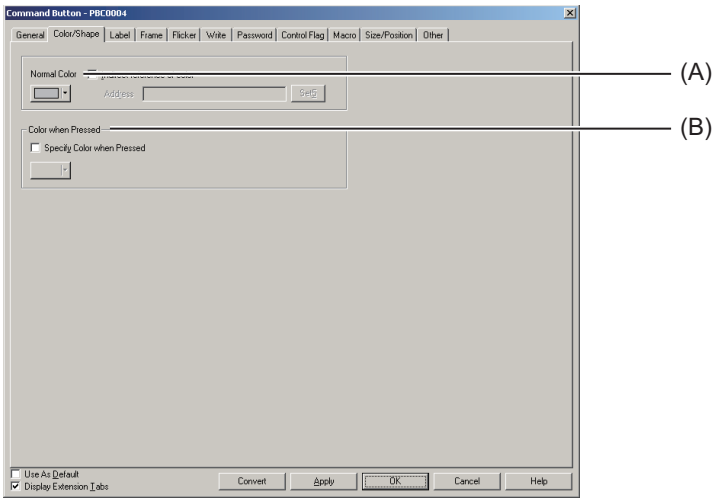
Color/Shape Tab Page

Specifies the button color and shape.

Select the button color from 256 options, when rectangle or circle buttons are selected.

If *Select Shape* is selected under *Button Shape*, select a Display Shape from the Shape Types list.

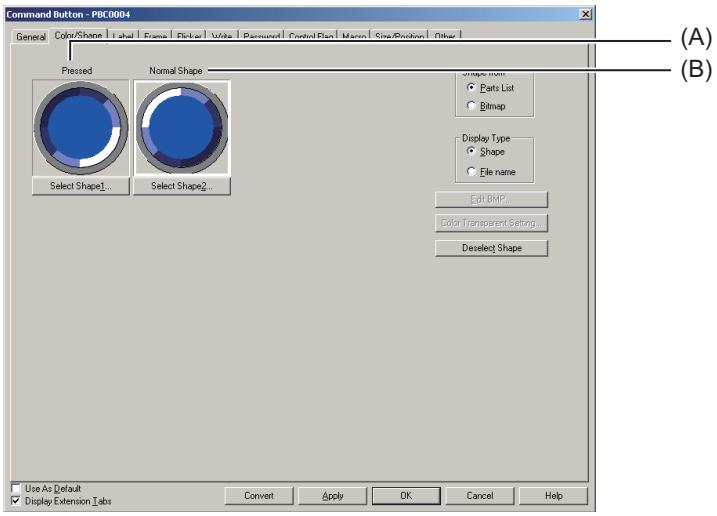
● Color



No.	Setting	Details
(A)	Normal color	Sets the button's color.
(B)	Color when pressed	Select the *Specify Color when Pressed* option and set the button's color.

Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for information on how to set colors.

● Specifying Shapes



No.	Setting	Details
(A)	Shape when Pressed	Click the **Select Shape** Button to set the button's shape when it is pressed.
(B)	Normal Shape	Click the **Select Shape** Button to set the button's normal shape.

Refer to *2-8-9 Selecting Shape (Color/Shape Tab)* on page 2-98 for information on how to set shapes.

Label Tab Page

Set a label for the button. Refer to *2-8-10 Labels* on page 2-101 for details.

Frame Tab Page

Specify the colors and sizes of the button frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page

Make flicker settings to make the button flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write Tab Page

Use the Write Tab Page to display a confirmation display box before writing values to a write address. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password Tab Page

Set a password for when buttons are pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page

Macros can be specified for Command Buttons.

Macros executed by the following triggers can be registered.

Trigger	Details
Touch ON	Executes macro when the button is pressed.
Touch OFF	Executes macro when the button is released.

Refer to the *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/Position Tab Page

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

Other (Extension Tab)

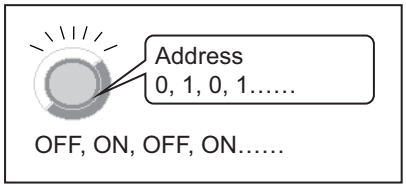
The touch switch input sound for ON/OFF buttons can be individually turned OFF. The touch switch input sound will be turned OFF for all objects (regardless of the individual settings) if the touch switch input sound (Key Press Sound) has been set to OFF in the PT's System Menu or in the System Setting Window's PT Tab Page in the CX-Designer.

2-10 Lamps

Lamps are functional objects for which the display depends on the contents of the address on the host. There are bit lamps and word lamps.

2-10-1 Bit Lamps

The bit lamp display color depends on the ON/OFF status of the specified address.



Select **Functional objects – Bit lamp** or the icon in CX-Designer to create a bit lamp.

Additional Information

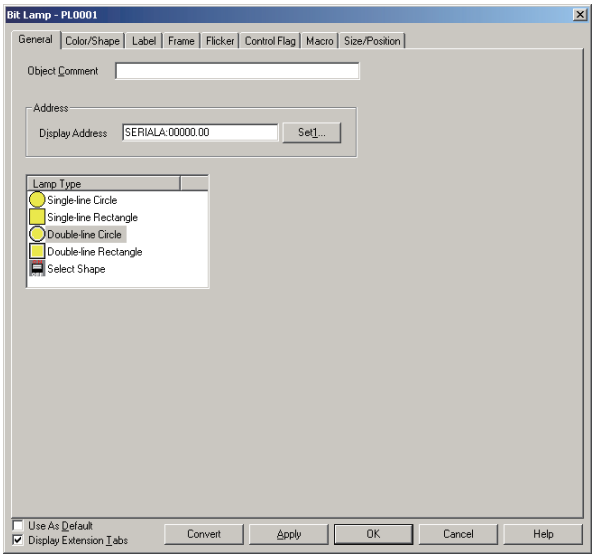
Bit lamps can be changed to Multifunction Objects.

If changed to a Multifunction Object, the lamp can be changed to a button or multiple functions can be executed at once when the button is pressed.

Refer to *2-11 Multifunction Objects* on page 2-171 for information on converting to a Multifunction Object.

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for bit lamps.



General:	Sets the address and lamp shape.
Color/Shape:	Sets the lamp display color and shape.
Label:	Sets the label display.
Frame:	Sets the lamp frame display.
Flicker*1:	Sets the flicker display.
Control Flag*1:	Sets display/no display of the functional object.

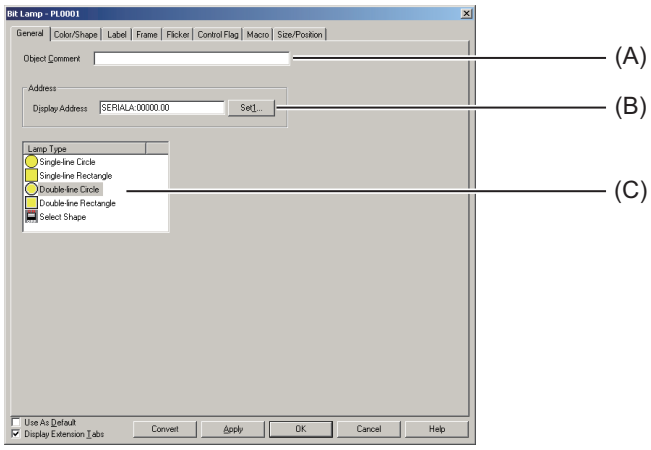
Macro*1: Sets macros to be executed.

Size/Position*1: Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the lamp shape and address.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Display Address	Sets the address referenced for lamp display directly or by using the **Set** Button. Only bits can be set.
(C)	Lamp type	Select from the five lamp shapes shown below.  Single-lined circle / Single-lined rectangle / Double-lined circle / Double-lined rectangle / Select shape Various lamp shapes can be selected from the list and displayed when the shape is specified. The image displayed in the Properties Dialog Box is a sample. The actual display will depend on the settings made on the Color/shape Tab Page.

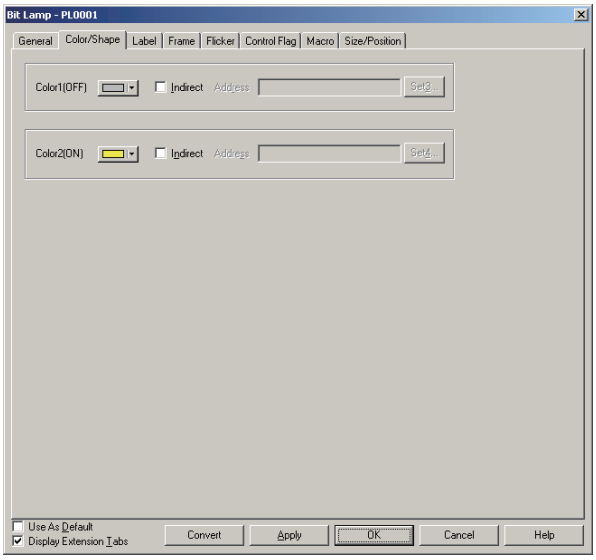
Color/Shape Tab Page

Specifies the shape and color when lamps are ON and OFF.

If a selection other than *Select shape* is made for the lamp type, one of 256 colors can be selected.

If *Select shape* is selected under *Lamp type*, select a display shape from the list.

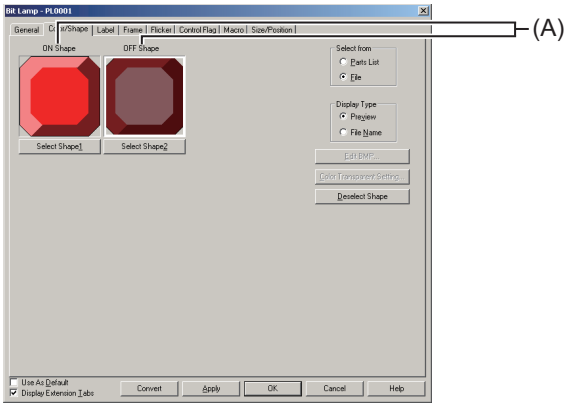
● Color



No.	Setting	Details
(A)	Color 1 and Color 2 (OFF/ON)	Sets the lamp color when the contents of the lamp address is 0 or 1 (OFF/ON). Colors can also be set after referencing the contents of the address.

Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for information on how to set colors.

● Select Shape



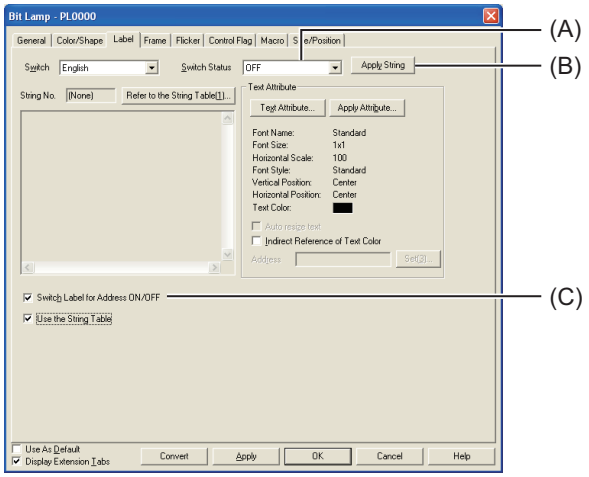
No.	Setting	Details
(A)	ON/OFF Shapes	Sets the shape when the lamp is turned ON or OFF using the **Select Shape** Button.

Refer to *2-8-9 Selecting Shape (Color/Shape Tab)* on page 2-98 for information on how to set fixed objects.

Label Tab Page

Sets labels for lamps. Refer to *2-8-10 Labels* on page 2-101 for basic settings information. This section describes only the settings for bit lamps.

The labels of bit lamps can be switched as the lamp turns ON and OFF.



No.	Setting	Details
(A)	Switch Status	Select *ON* or *OFF* from the displayed list. Click the **ON/OFF** Button to edit the labels for when the specified address is ON and OFF. The label will switch each time the ON/OFF Button is clicked.
(B)	Apply String	Uses the current character string for all object states. The string is used as the label not only for the selected object, but for all other object states as well. If the Switch Status cannot be set, then the Apply String Button can also not be set.
(C)	Switch a label with ON/OFF of communications address	Select this option to enable switching the label when the specified address turns ON and OFF. The ON/OFF Button in 1, above, will be enabled when this option is selected.

Frame Tab Page

Specify the colors and sizes of the lamp frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page

Make flicker settings to make the lamp flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page

Control flags control the display of functional objects. Use control flags to enable display when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page

Macros can be specified for bit lamps.

Macros executed by the following trigger can be registered.

Trigger		Details
When changing value		Executes the macro when the contents of the address changes.
Action timing		Sets the timing for executing the macro.
	Execute when ON/OFF	Executes the macro when the specified bit turns ON or OFF
	Execute when ON	Executes the macro when the specified bit turns ON.
	Execute when OFF	Executes the macro when the specified bit turns OFF.

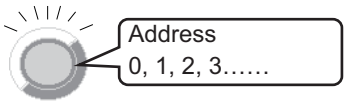
Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/Position Tab Page

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-10-2 Word Lamps

A word lamp is a functional object where the lamp color depends on the level (0 to 9) of the contents of a specified address (word).



Color 1, Color 2, Color 3, Color 4……

Select **Functional objects – Word lamp** or the icon in CX-Designer to create a word lamp.

Additional Information

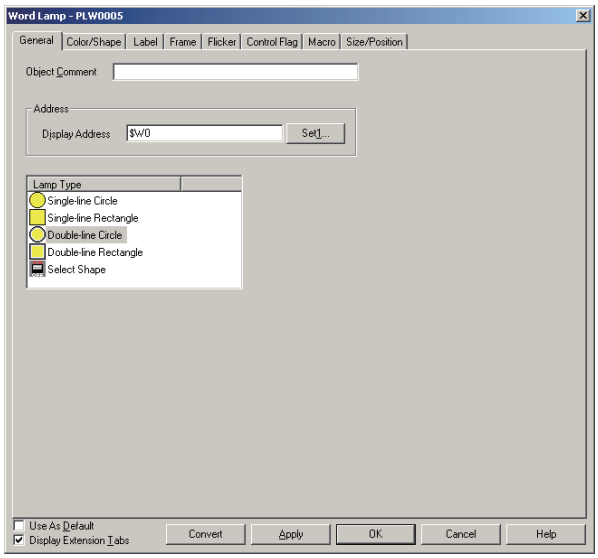
Word lamps can be changed to Multifunction Objects.

If changed to a Multifunction Object, the lamp can be changed to a button or multiple functions can be executed at once when the button is pressed.

Refer to *2-11 Multifunction Objects* on page 2-171 for information on converting to a Multifunction Object.

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for word lamps.

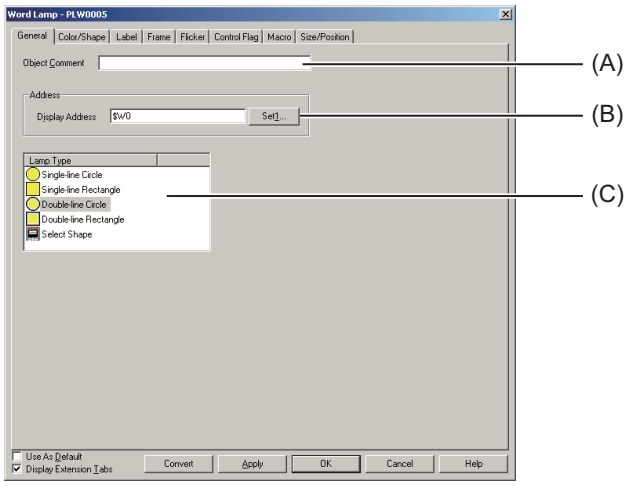


General:	Sets the address and lamp shape.
Color/Shape:	Sets the lamp display color and shape.
Label:	Sets the label display.
Frame:	Sets the lamp frame display.
Flicker*1:	Sets the flicker display.
Control Flag*1:	Sets display/no display of the functional object.
Macro*1:	Sets macros to be executed.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the lamp shape and address.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)

No.	Setting	Details
(B)	Address	Sets the address referenced for lamp display. Only words can be set.
(C)	Lamp type	Select from the five lamp shapes shown below.  Single-lined circle　Single-lined rectangle　Double-lined circle　Double-lined rectangle　Select shape Various lamp shapes can be selected from the list and displayed when the shape is specified. The image displayed in the Properties Dialog Box is a sample. The actual display will depend on the settings made on the Color/Shape Tab Page.

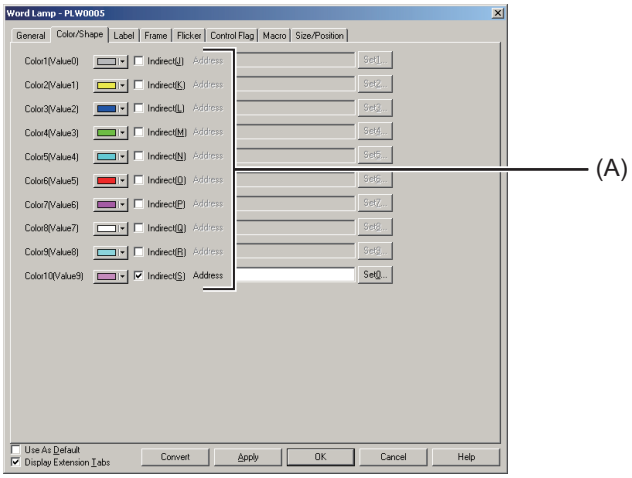
Color/Shape Tab Page

Specify the color and shape of the lamp.

If a selection other than *Select shape* is made for the lamp type, one of 256 colors can be selected.

If *Select shape* is selected under *Lamp type*, select a display shape from the list.

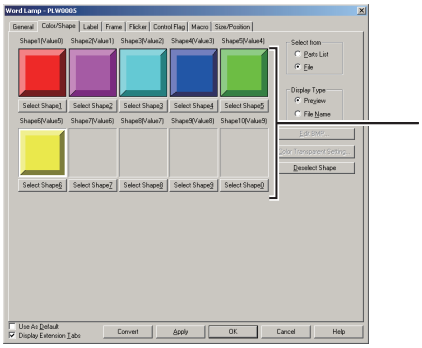
● Color



No.	Setting	Details
(A)	Colors 1 to 10	Sets the lamp color when the contents of the lamp address is 0 to 9. Colors can also be set after referencing the contents of the address.

Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for information on how to set colors.

● Select Shape

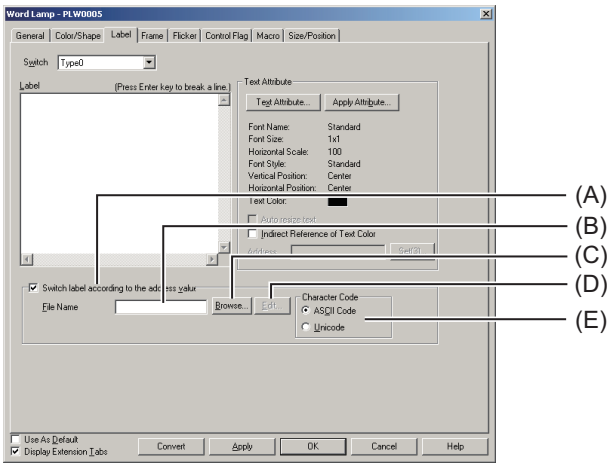


No.	Setting	Details
(A)	Colors 1 to 10	Sets the lamp color when the contents of the lamp address is 0 to 9. If no shape has been selected, the lamp will be a single-lined rectangle during operation.

Refer to *2-8-9 Selecting Shape (Color/Shape Tab)* on page 2-98 for information on how to set colors.

Label Tab Page

Sets labels for lamps. Only the settings unique to word lamps are described here. Refer to *2-8 Common Functional Object Functions* on page 2-72 for basic settings information.



No.	Setting	Details
(A)	Switch label according to address value	Select to display the text strings specified in a file according to changes in the value of an address. This setting cannot be used if Windows fonts are selected.
(B)	File Name	Displays the name of the file containing the text strings to display for changes in the value of the address.
(C)	Browse	Click this button to display the file selection dialog box and select the file containing text strings.
(D)	Edit	Starts the text editor so that the text file can be edited. To set the text editor that is started when the **Edit** Button is pressed, select **Tools – Option** and open the Editor Tab Page.
(E)	Character Code	Sets the text code used to store text strings in the file.

Frame Tab Page

Specify the colors and sizes of the lamp frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page

Make flicker settings to make the lamp flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page

Control flags control the display of functional objects. Use control flags to enable display when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page

Macros can be specified for word lamps.

Macros executed by the following trigger can be registered.

Trigger	Details
When changing value	Executes macro when the contents of the address change.

Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/Position Tab Page

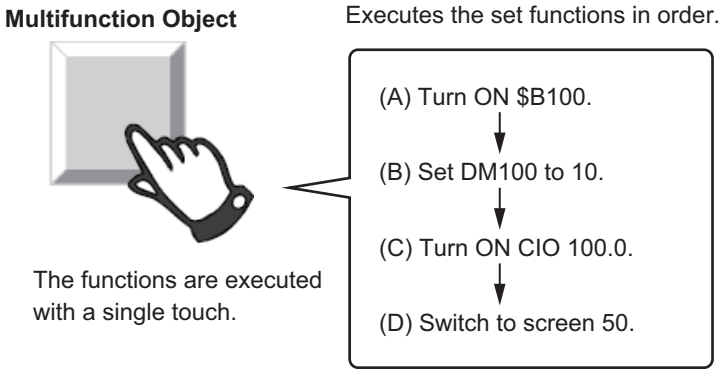
Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-11 Multifunction Objects

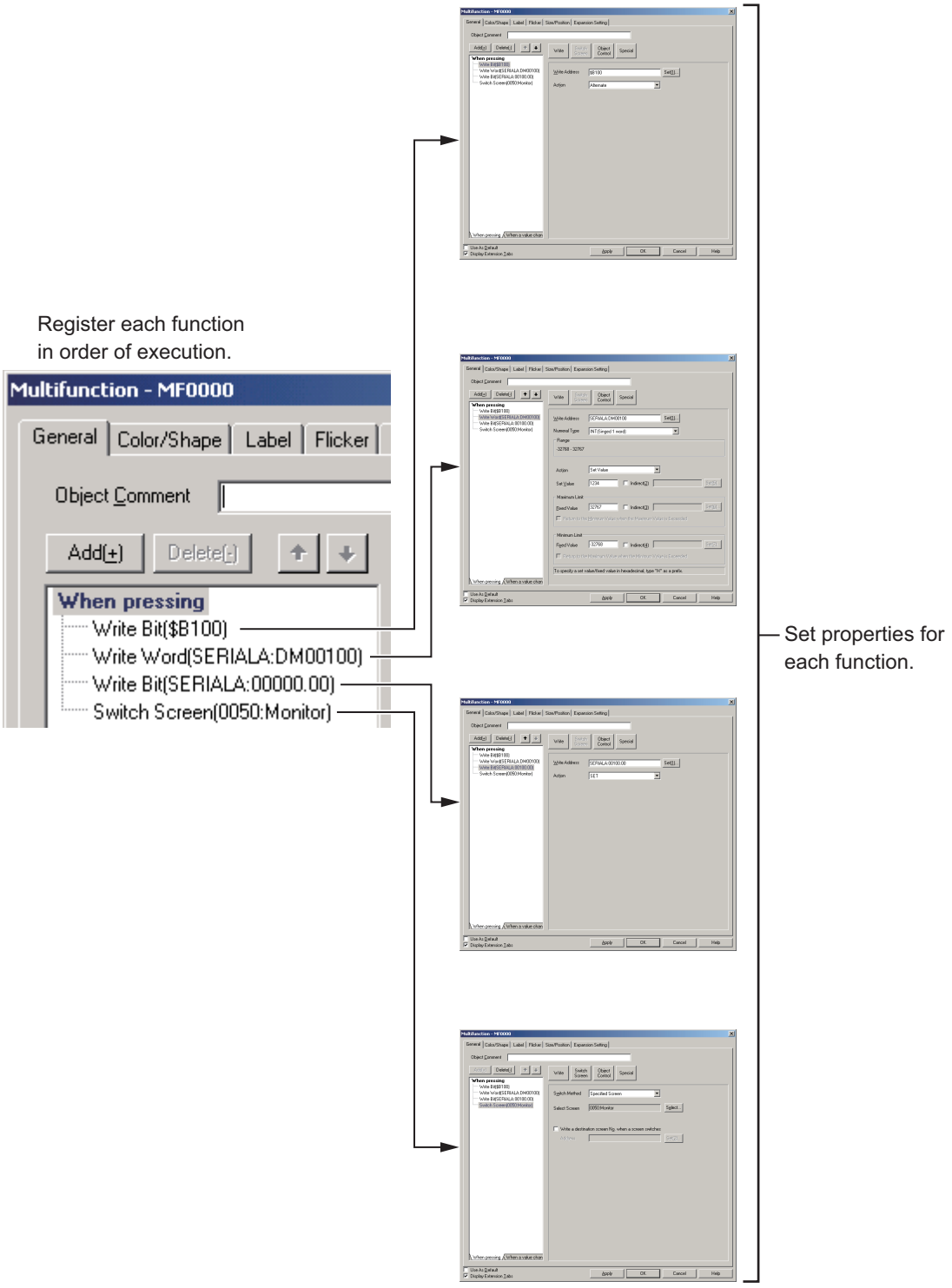
Multifunction Objects are functional objects that be can be used to execute more than one function at the same time with just one touch.

When the object is touched or the value at a specified address changes, the functions that have been set will be executed consecutively. Up to 32 functions can be set for each execution condition.

Using Multifunction Objects means that operations that were performed using a combination of macros and multiple functional objects can now be performed in one operation.



With Multifunction Objects, the series of operations for each function can be executed in any order, by making property settings as shown below.



2-11-1 Functions That Can Be Executed Using Multifunction Objects

The following functions can be executed using Multifunction Objects.

Function		Details
Write	Write Bit	Turns ON/OFF the specified bit address.
	Write Word	Changes the value at a specified word address.
	Write String	Sets a character string to a specified word address.
Switch Screen	Switch Screen	Switches the displayed screen.
	Control Pop-up Screen	Controls pop-up screens, e.g., closing the specified pop-up screen.
	Display System Menu	Displays the following System Menu displays. • Data Initialization Screen • Capture Data • Operation log (sort by occurrence) • Operation log (sort by frequency)
Object Control	Key Button	Transmits a key code to the object to which an input is being made.
	Data Block Control	Controls data blocks. The following functions are supported. • Read data from CSV file to PLC Data Block • Write data from PLC Data Block to CSV file • Read data from CSV file to PT • Write data from PT to CSV file • Read data from PT to PLC Data Block • Write data from PLC Data Block to PT • Read record label • Delete record
	Contents Control	Switches the displayed contents.
	Alarm/Event Control	Saves and clears alarm/event histories. Also performs operations on Alarm/Event Summary & History.
	Data Log Control	Controls specified data log groups and data log graphs.
	Scroll Object	Scrolls the following objects in a specified direction. List Selection, Alarm/Event Summary/History, Broken-line Graphs, Data Block Tables, Data Log Graphs, and Contents Display
Special	Password Setting	A password can be requested for operation of Multifunction Objects.
	Authentication Cancellation	Cancels authentication when an authentication level is set.
	Confirmation Dialog Box	A confirmation dialog box can be displayed when a Multifunction Object is operated.
	Buzzer	Controls starting and stopped the buzzer.
	Macro	Executes macros.
	Operation Log Control	Initializes or saves the operation log.

Additional Information

If an NJ/NX-series Controller is the host, a STRING or WORD array tag is specified for the communications address, and the specified text string has an odd number of bytes, the contents is rounded to an even number of bytes with NULL added. Provide a sufficient size for such tags (e.g., for UTF8, provide about three times the number of characters).

2-11-2 Execution Conditions for Multifunction Objects

The following table outlines the execution conditions, i.e., timing, for functions when an Multifunction Object is used.

Timing	Description
When pressing	The set functions are executed when the Multifunction Object is pressed. The timing for execution can also be specified to either *Touch ON timing* or *Touch OFF timing*.
	• Touch ON timing: Executes the functions when the Multifunction Object is pressed. • Touch OFF timing: Executes the functions when the Multifunction Object is released.
When value changed	The set functions are executed when the value at a specified address changes. The communications address can set as a bit or word address, and the following execution timings can be set. When a bit address is specified:
	• Execute when ON/OFF: Executes the functions when the communications address turns ON or turns OFF. • Execute when ON: Executes the functions when the communications address turns ON. • Execute when OFF: Executes the functions when the communications address turns OFF.
	When a word address is specified: • When an address value changed • Set Value = Address Value • Set Value != Address Value • Set Value < Address Value • Set Value <= Address Value • Set Value > Address Value • Set Value >= Address Value

Additional Information

- Specify *When pressing* as the execution condition if using the Multifunction Object as a button. Multifunction Objects can be used as lamps if *When pressing* is not specified.
- The operation for when the object is pressed and when the address value is changed can be set separately. Both can also be used at the same time.

2-11-3 Safety Functions

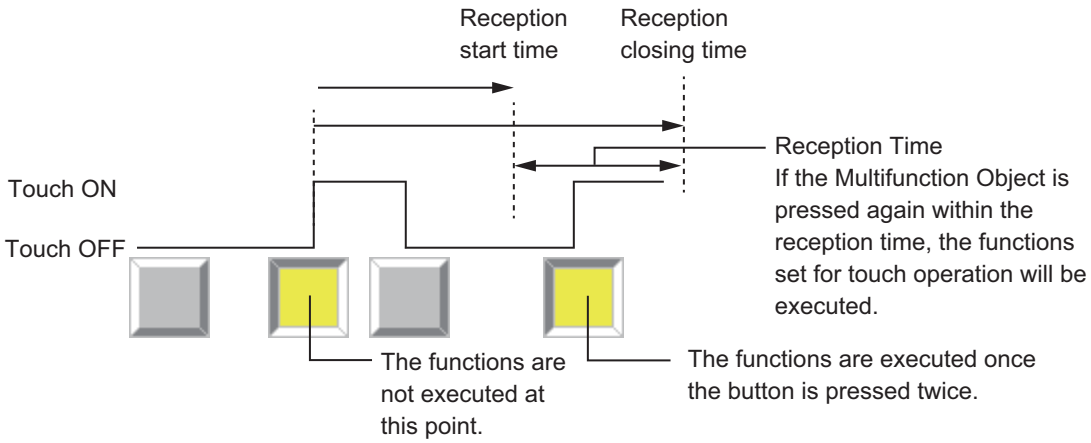
The following functions can be used to prevent malfunctions when using Multifunction Objects.

- Double pressing
- ON delay and OFF delay
- Prohibiting simultaneous pressing

Double-pressing

Multifunction Objects can be set so that the touch operation is enabled when the object is pressed twice.

The operation is executed if the Multifunction Object is pressed again within the specified reception time after initially being pressed. If the Multifunction Object is not pressed within the set reception time, the set functions will not be executed.

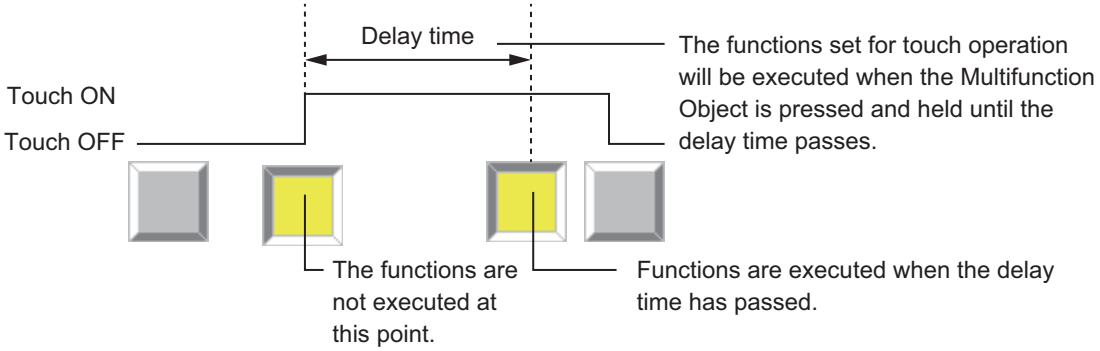


Additional Information

- If the Multifunction Object is pressed before reception start time, that input will be ignored.
- The entire Multifunction Object will flicker (reverse its display state) in the following cases when the double-pressing operation is performed.
  - From the first time the Multifunction Object is touched ON until the second time it is touched ON.
  - From the first time the Multifunction Object is touched ON until the reception time expires (when the Multifunction Object is not touched a second time).
- If a Control Flag disables input while the double-pressing operation is being performed, the second touch will not be accepted and the functions set for the Multifunction Object will not be executed.

ON Delay

Multifunction Objects can be set so that the touch operation is enabled when the object continues to be pressed for at least as long as the specified delay time. The functions that were set for touch operation will not be executed if the Multifunction Object is released before the delay time has passed.

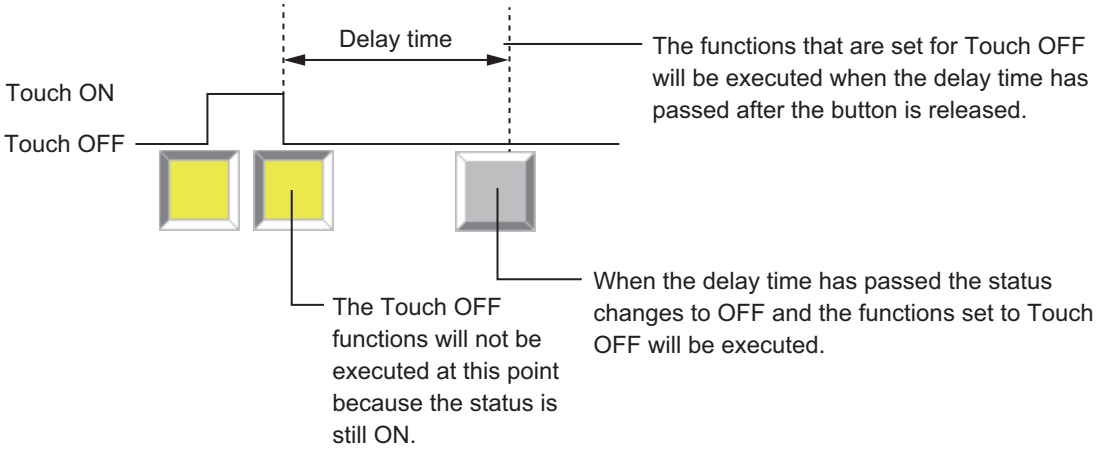


Additional Information

- If both the ON delay and double pressing are set, the ON delay will function the first time the Multifunction Object is pressed, and will not function the second time it is pressed.
- If a Control Flag disables input before the delay time expires, the functions for which the ON delay was set will not be executed.

OFF Delay

The functions set for execution at Touch OFF will be executed when the specified delay time has passed after the Multifunction Object is released.



Additional Information

- Functions set for execution *When pressing* or at *Touch ON timing* are executed at when the Multifunction Object is pressed, and are thus not affected by the OFF delay function.
- If both the OFF delay and double pressing are set, the OFF delay will not function the first time the Multifunction Object is released, and will function the second time it is released.
- If a Control Flag disables input before the delay time expires, the functions for which the OFF delay was set will not be executed.

Prohibiting Simultaneous Pressing

This function stops simultaneous operation with other functional objects.

Other functional objects will not operate while a Multifunction Object set to Prohibit simultaneous pressing is being pressed.

And Multifunction Objects set to Prohibit simultaneous pressing will not operate while another functional object is being pressed.

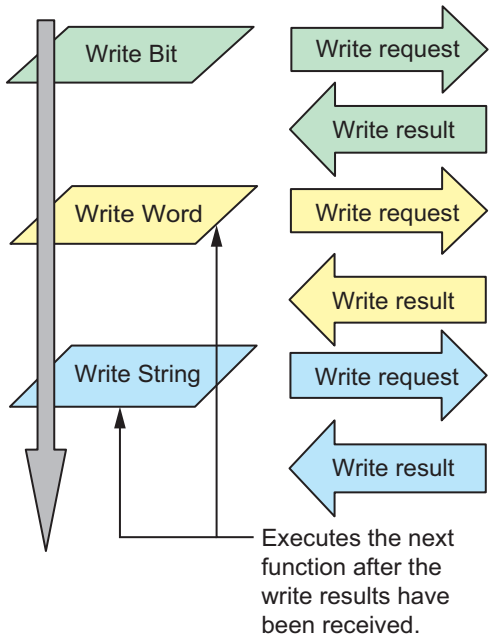
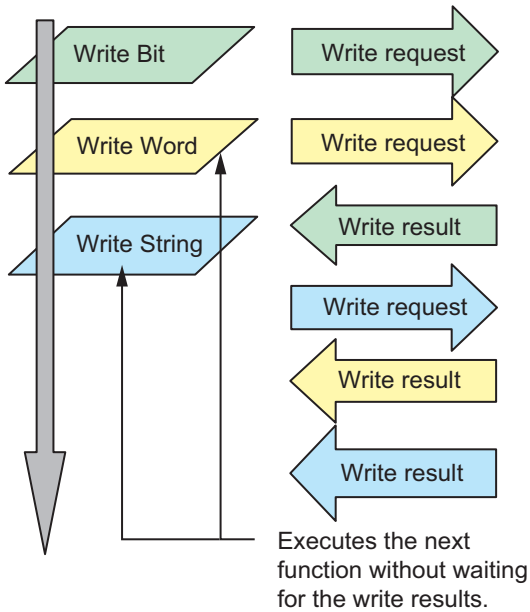
Additional Information

If a Multifunction Object is set to Prohibit simultaneous pressing, the focus will not be set as specified even if an operation to set the focus on an input object is set for the Multifunction Object (e.g., with the SETFOCUS macro). Do not prohibit simultaneous pressing in this case.

2-11-4 Writing and Reading Communications Addresses

Synchronous and Asynchronous Communications

Multifunction Objects can be set to write to more than one communications address. There are two methods available: synchronous communications and asynchronous communications.

Synchronous communications	Asynchronous communications
When a communications address is read or written, the next function will be executed only after the response for the operation results has been received.	When a communications address is read or written, the next function will be executed without waiting for a response for the write operation results.
Example: 	Example: 

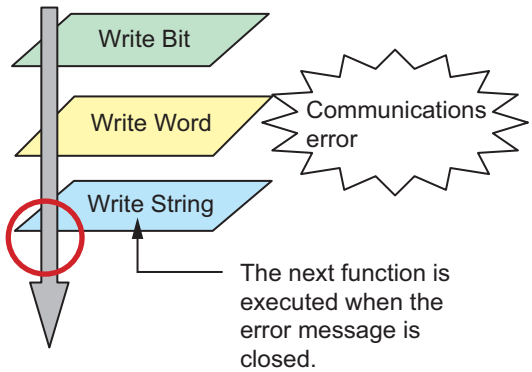
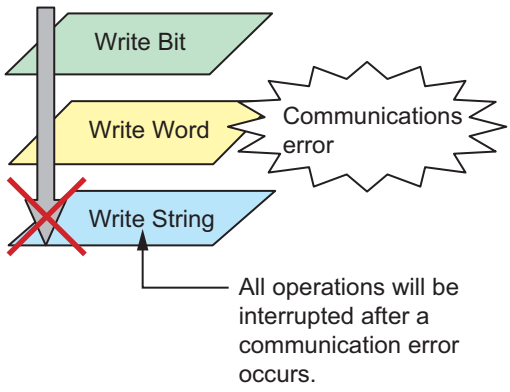
Additional Information

- The use of synchronous communications is set on the Expansion Settings Tab Page in the Property Settings Dialog Box for Multifunction Objects.
- Synchronous communications takes longer to complete operations than asynchronous communications but is effective if waiting for the results of one operation execution before performing the next operation.
- Macro execution will be performed with synchronous communications, regardless of the settings.
- If functions are executed that do not read or write to a communications address, the next function will be executed without waiting for a response about the results.

Operations When Communications Errors Occur

A communications error will occur if an attempt is made to read or write to a communications address in an unconnected host. This function is used to set whether or not to continue with subsequent set operations or to interrupt the operations when such a communications error occurs.

Interruption of operations can only be selected for synchronous communications. Operations will continue for asynchronous communications.

Continue operations	Interrupt operations
Example: 	Example: 

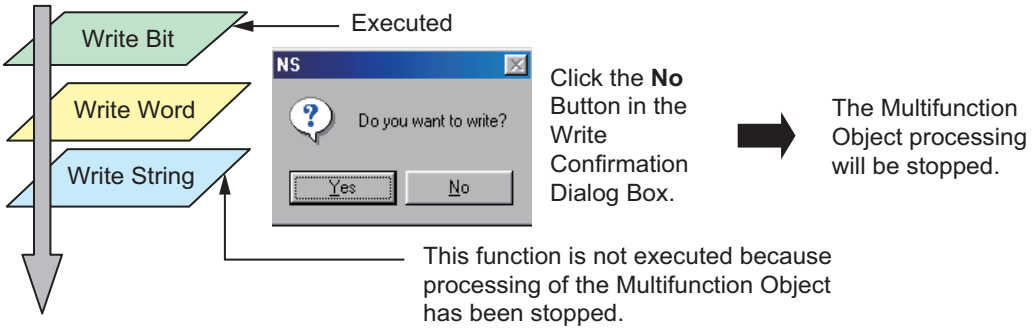
Additional Information

- Whether or not to continue operation after a communications error is set on the Expansion Setting Tab Page in the Property Settings Dialog Box for Multifunction Objects.
- If a communications error caused by something other than communications with an unconnected host occurs, the error message display will be followed by the System Menu. For this reason, Multifunction Object processing will be canceled.

2-11-5 Canceling Multifunction Object Processing

More than one function can be executed using a Multifunction Object, but if an error occurs during execution or if the execution of the operation is cancelled, Multifunction Object processing is stopped.

In such cases, the functions set for execution after the cancelled function will not be executed.



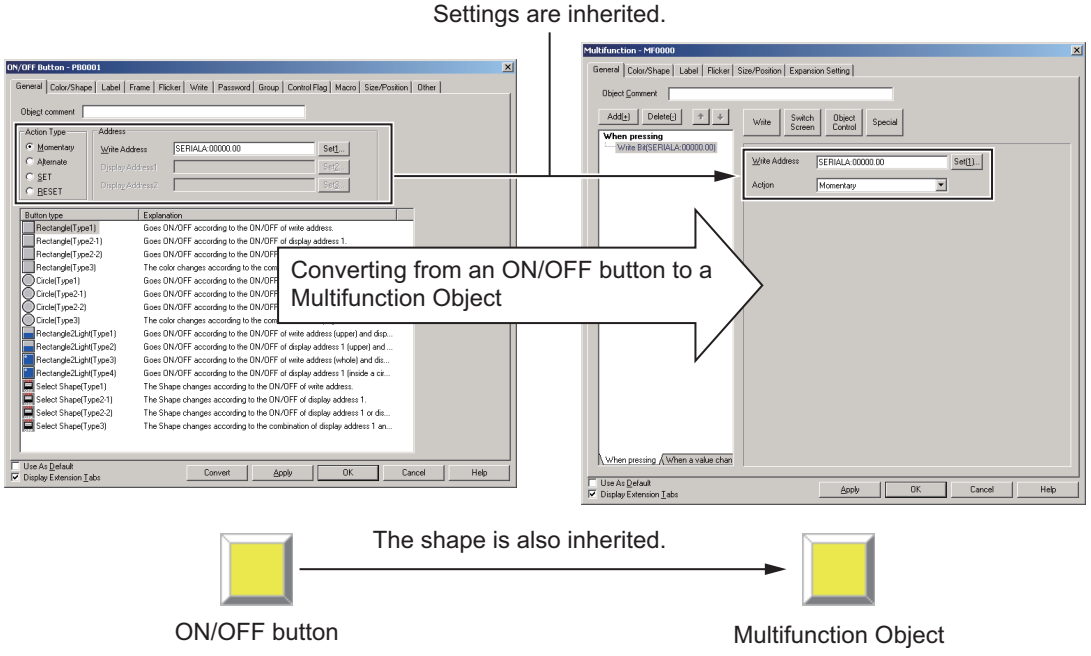
Additional Information

- Refer to the previous section *Operations When Communications Errors Occur* on page 2-178 for information on operations when a communications error occurs.
- Refer to the description of each function if Multifunction Object processing is stopped.

2-11-6 Converting from Other Objects to Multifunction Objects

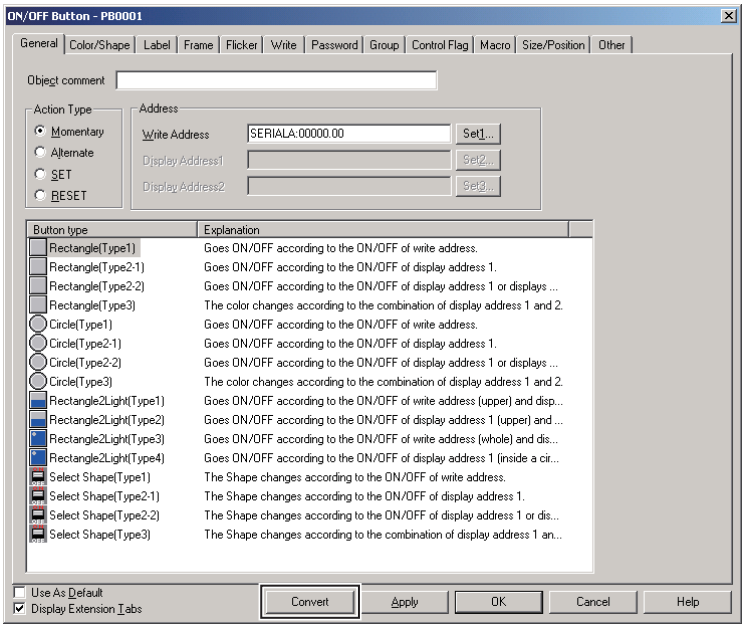
ON/OFF buttons, word buttons, command buttons, bit lamps, and word lamps can be converted to Multifunction Objects.

Converting objects is useful for applications such as keeping the original object settings and adding operations or converting lamps to buttons, etc.



1 Open the Property Settings Dialog Box for the functional object to be converted to a Multifunction Object.

2 Click the **Convert** Button.



3 A confirmation message asking if it is OK to convert the object will be displayed. Click the **OK** Button to execute the conversion.

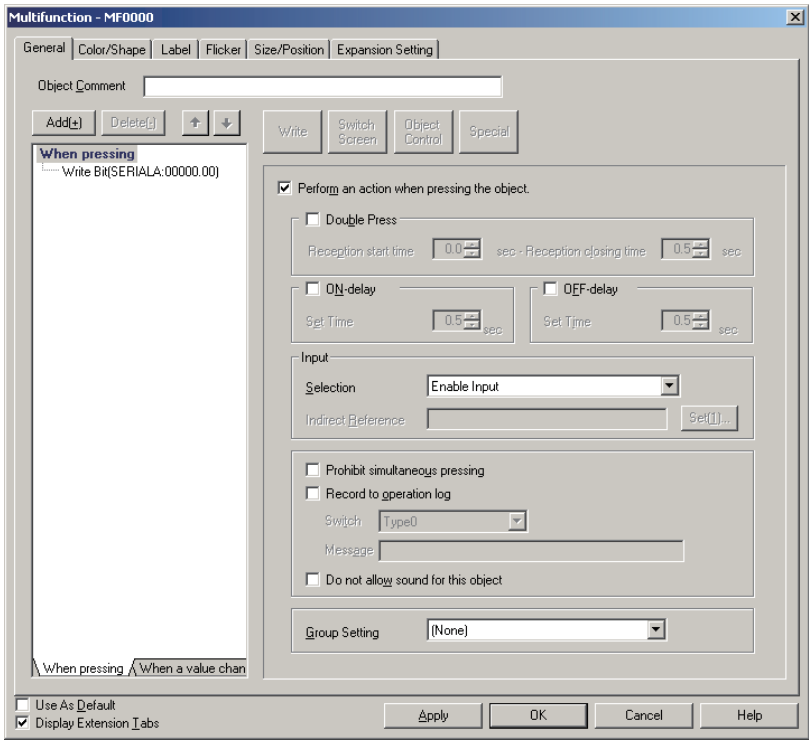
4 The functional object will be converted to a Multifunction Object and the Property Settings Dialog Box will be opened.

Additional Information

- The settings for the functional object prior to conversion will be used for the Multifunction Object as is, except in the following cases.
  - Word lamps that fulfill all of the following conditions cannot be converted.
    - Switch label according to address value is selected.
    - A vector font is set.
    - There are two or more labels.
  - ON/OFF buttons and word buttons can be converted to Multifunction Objects with the write address field left blank, but the Write Bit and Write Word operations will not be set.
  - If a command button has None set when it is converted to a Multifunction Object, the None specification will not be set in the Multifunction Object property settings. All other settings will be converted as is for the Multifunction Object.
- ON/OFF buttons, word buttons, command buttons, bit lamps, and word lamps in tables cannot be converted to Multifunction Objects. Select **Functional Objects – Multifunction** or click the MF icon to create a Multifunction Object.
- Even if the screen display is incomplete, such as when switching screens to a screen with a lot of functional objects, inputting to Multifunction Objects is possible by clicking the Multifunction Object position. In such cases, the functions will be executed once the screen display has been completed, so execution of the functions may take some time.
- ON/OFF buttons, word buttons, command buttons, bit lamps, and word lamps can be converted to Multifunction Objects.

2-11-7 Functional Object Property Settings

This section describes the setting items in the functional object property dialog box for Multifunction Objects.



General:	Sets the functions to be executed and the operation timing.
Color/Shape:	Sets the color and shape of the Multifunction Object.
Label:	Executes the label display contents.
Flicker*1:	Sets flicker display.
Size/Position*1:	Sets the size and position of the object.
Expansion Setting*1:	Sets the operation options for function execution.

*1. The Flicker, Size/Position, and Expansion Setting Tabs are displayed when the *Display Extension Tabs* Checkbox is selected.

General

The General Tab Page is used to set the functions to be executed and the execution conditions for the Multifunction Object.

● Setting Execution Conditions

The execution condition can be set to *When pressing* or to *When a value changed*.

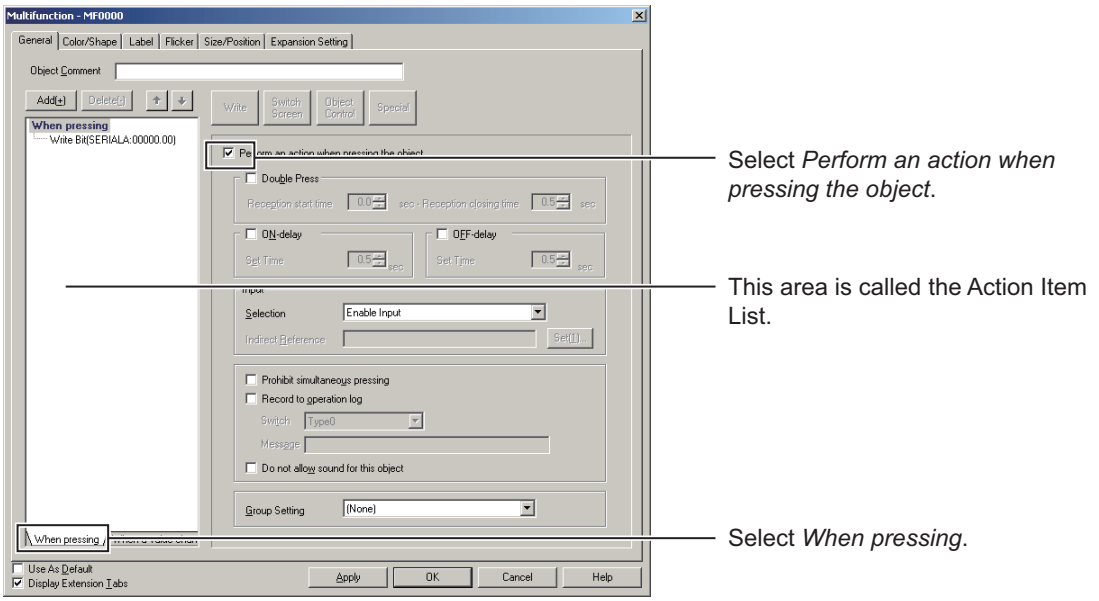
If *When pressing* is selected, the operation will be executed when the Multifunction Object is pressed (for Touch ON timing). The timing for execution when *When pressing* is selected can be set to either Touch ON timing or Touch OFF timing.

If When a value changed is selected, the operation is executed when the value of a specified address changes.

When Pressing

1 Open the **When Pressing** Tab Page in the Action Item List.

2 Click *When pressing*.

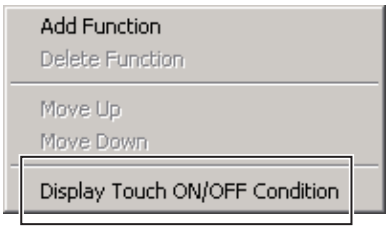


3 Select the *Perform an action when pressing the object* Checkbox. (This checkbox is selected by default.)

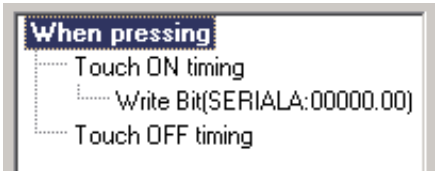
Make the following settings to further specify execution conditions to *Touch ON timing* or *Touch OFF timing*.

1 Move the mouse cursor to the Action Item List.

2 Right-click the mouse button and select **Display Touch ON/OFF Condition** from the pop-up menu that is displayed.



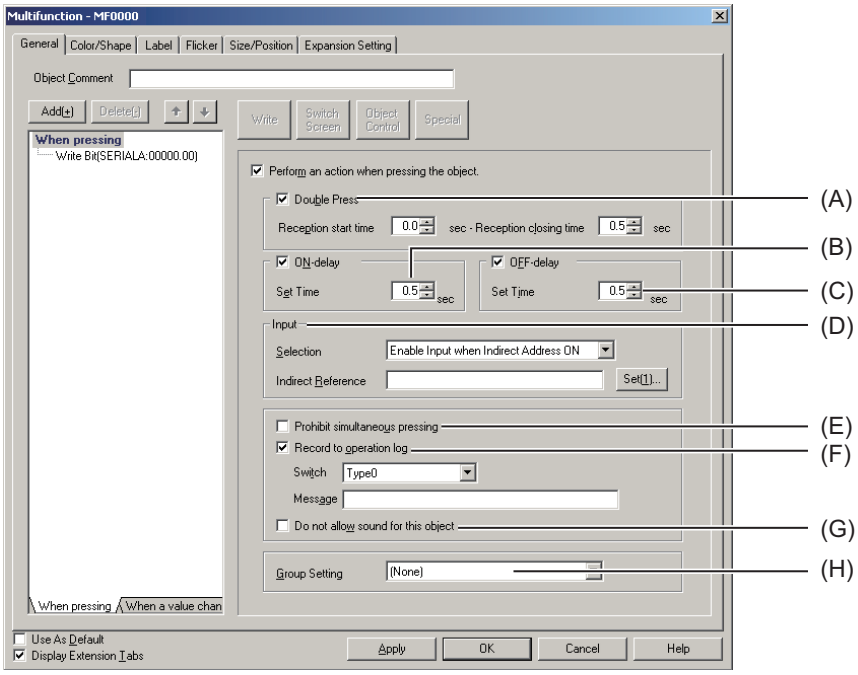
3 *Touch ON timing* and *Touch OFF timing* will be added to the action timing conditions.



Additional Information

- If the execution conditions are changed to Display Touch ON/OFF Condition, the following functions will be set to Touch OFF timing.
  - Switch Screen (if not set to Pop-up page selection.)
  - Control Pop-up Screen
  - Display System Menu
  - Authentication Cancellation
- *Key Button* can be set only for touch ON timing.

The settings for *When pressing* operation are outlined below.



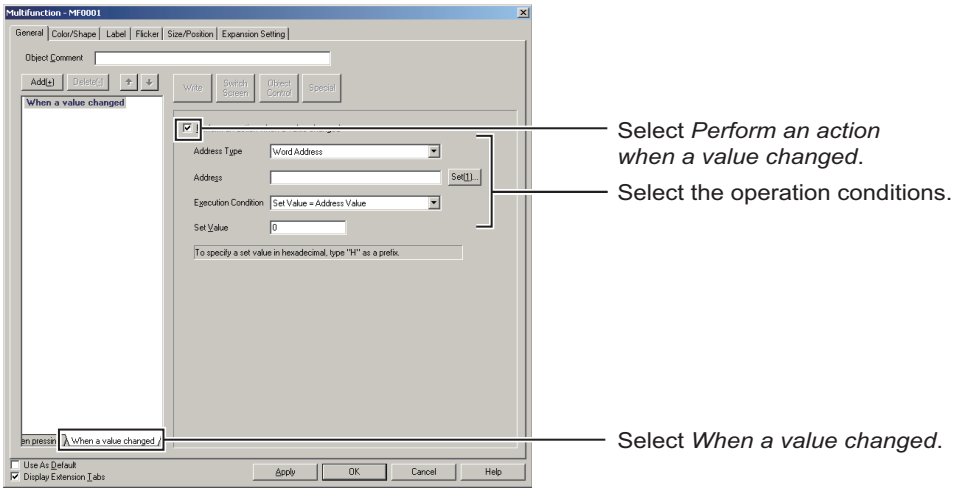
No.	Item	Details
(A)	Double Press	Executes the set functions when the Multifunction Object is pressed twice in a row. The *Reception start time* and *Reception closing time* can be set. The reception start time can be set to 0, 0.5, or between 1 and 15 seconds. The reception closing time can be set to 0.5 or between 1 and 30 seconds. Always set the reception closing time later than the reception start time.
(B)	ON Delay	The functions set for touch operation will be executed when the Multifunction Object is held down until the delay time passes. The *Set time* can be set to 0.5 or between 1 and 15 seconds.
(C)	OFF Delay	The functions set for execution at *Touch OFF timing* will be executed when the time specified under *Set time* has passed after the Multifunction Object is released. The *Set time* can be set to 0.5 or between 1 and 15 seconds.
(D)	Input	Used to specify whether or not inputs are accepted. This function can be used as an interlock function. The following selections are available. • Enable input • Disable input • Enable Input When Indirect Address ON • Enable Input When Indirect Address OFF If you select either *Enable Input When Indirect Address ON or Enable Input When Indirect Address OFF*, set the address for input control in the *Indirect Reference* field.
(E)	Prohibit simultaneous pressing	Select this checkbox to prohibit simultaneous pressing.
(F)	Record to operation log	Select this checkbox to keep a log of Multifunction Object operations. Set the message character string set in the operation log for each label to 32 characters or less.

No.	Item	Details
(G)	Do not allow sound for this object	The touch switch input sound can be set separately to OFF so that the Multifunction Object will not produce a sound when operated. All object touch switch sounds will be OFF if the touch switch input sound is set to OFF under the System Menu or on the PT Tab Page of the CX Designer System Settings.
(H)	Group Setting	This function is enabled for Write Bit operations. This function ensures that there is only one communications address that is ON at a time for Multifunction Objects or ON/OFF buttons set in the same group in the same screen. (The communications address that was ON will be turned OFF.) If more than one Write Bit function is set for a Multifunction Object, all addresses set for those functions will turn ON. (If another object in the same group is pressed, all addresses will turn OFF.) Groups 1 to 16 can be selected. If no groups are to be specified, select *None*.

● When a Value Changed

1 Open the When A Value Changed Tab Page in the Action Item List.

2 Click *When a value changed*.



3 Select the *Perform an action when a value changed* Checkbox. (This checkbox is OFF by default.)

4 Set the operation conditions for the following items.

Item	Details
Address Type	Set the type of address to be monitored for value changes to either *Bit address* or *Word address*.
Address	Set the address to be monitored.

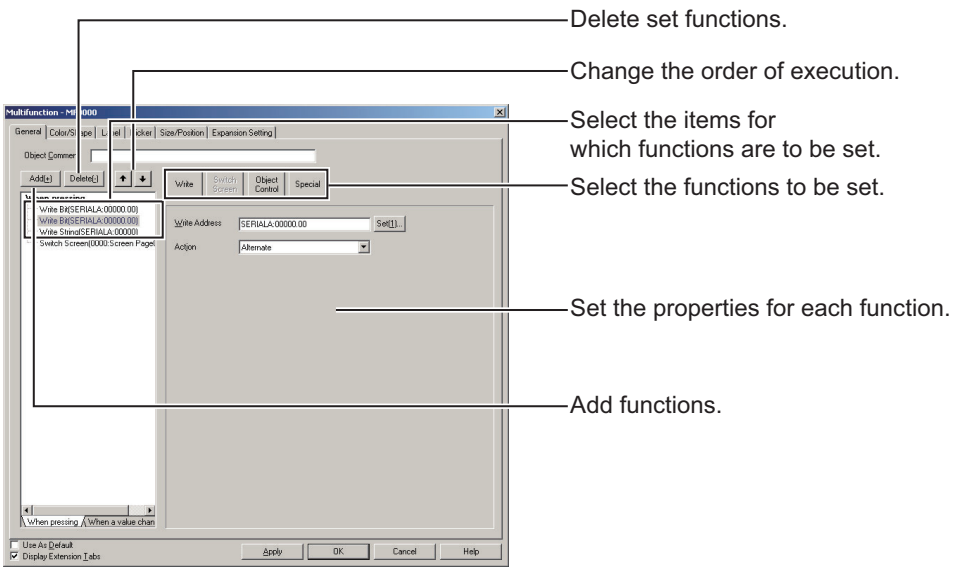
Item	Details
Execution Condition	Used to set the conditions under which the set functions will be executed, i.e., how the address value needs to change. Bit Addresses: • Execute when ON/OFF • Execute when ON • Execute when OFF Word Addresses: • When an address value changed • Set Value = Address Value • Set Value != Address Value • Set Value < Address Value • Set Value <= Address Value • Set Value > Address Value • Set Value >= Address Value The address value is compared with the numeric value stored in integer format.
Set Value	Set the set value if comparing a word address value with a set value. The set value can be set between -32,678 and 32,767.

Setting the Functions To Be Executed

More than one function can be executed at the same time when a Multifunction Object is used. Up to 32 functions can be executed for each of the *When pressing* and *When a value changed* Options.

Use the following procedure to set the functions to be executed. With the PT Unit, the functions are executed in set order. The following procedure describes the settings for the *When pressing* screen, but the settings are the same for the *When a value changed* screen.

1 Select the items for which functions are to be set from the Action Item List.



2 Select the functions to be set from the Action Item Selection Buttons.

3 Property settings for the selected function will be displayed. Make the required settings.

4 Click the **Add** Button to add functions to be executed.

5 Repeat steps 1 to 4 until all the settings have been made for the functions to be executed.

6 Click the **Delete** Button to remove set functions. Use ↑ and ↓ Buttons to change the execution order.

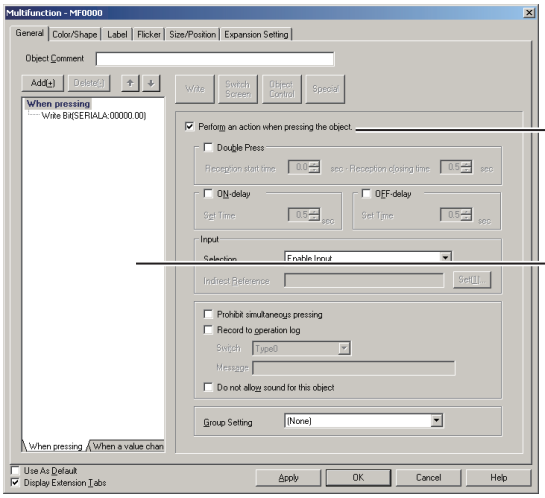
Additional Information

- The *Switch Screens*, *Control Pop-up Screen*, *Display System Menu*, and *Authentication Cancellation* functions can be set only as the last function to be executed.
- The Key Button function cannot be set when *Touch OFF timing* is selected.

Using Multifunction Objects as Buttons

To use a Multifunction Object as a button, select the *Perform an action when pressing the object* Checkbox on the When Pressing Tab Page in the Action Item List.

The operation when the button is pressed is set in the Action Item List.



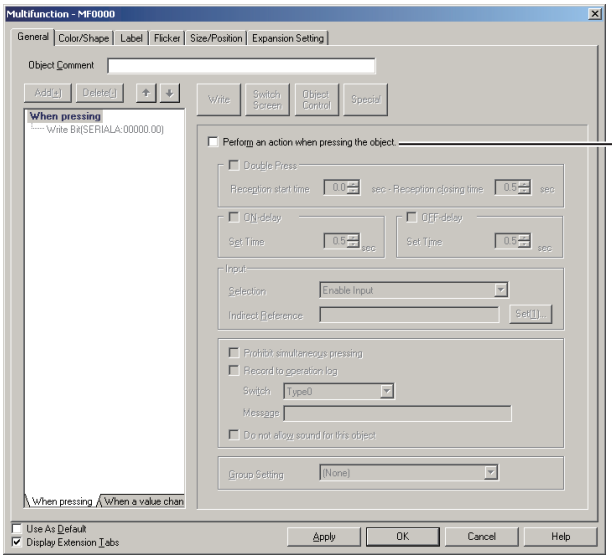
Select *Perform an action when pressing the object*.

Set the actions to be performed when the button is pressed.

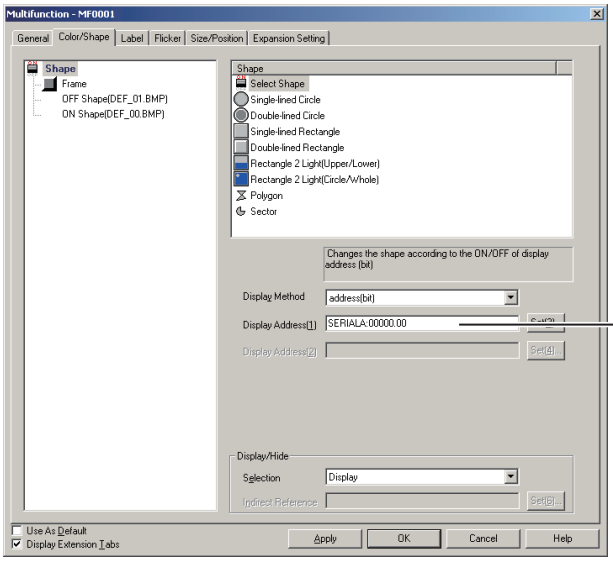
Using Multifunction Objects as Lamps

To use a Multifunction Object as a lamp, clear the selection of the *Perform an action when pressing the object* Checkbox on the When Pressing Tab Page in the Action Item List.

The address to be monitored is set under *Display Address* on the Color/Shape Tab Page.



Clear the selection of *Perform an action when the object is pressed Checkbox*.



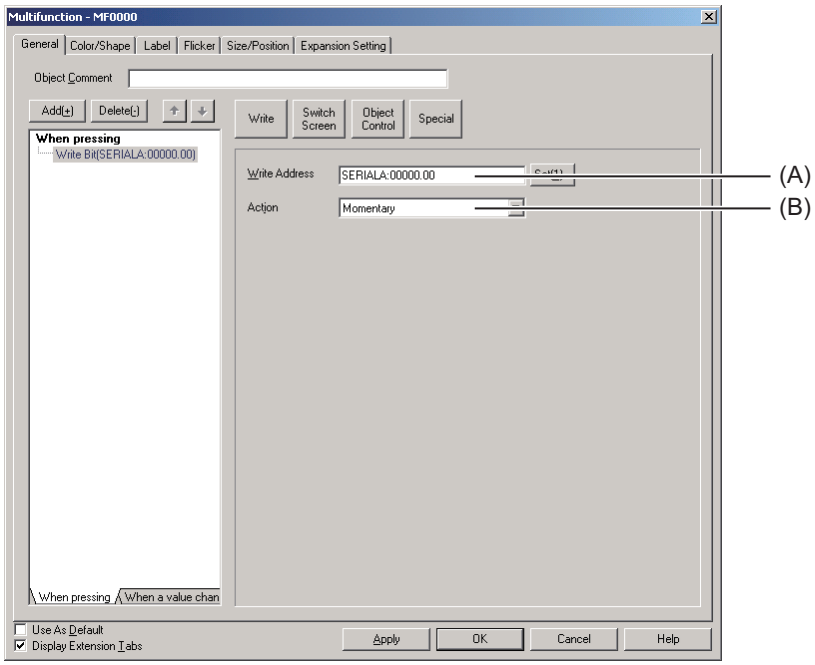
Set the address to be monitored.

Make the settings on the When a Value Changed Tab Page in the Action Item List to execute actions corresponding to bit lamp or word lamp *When a value changed* macros.

2-11-8 Detailed Settings for Each Function

Write Bit

The Write Bit function turns ON/OFF the specified communications address. Press the **Write** Button and select *Write Bit* from the list that is displayed.



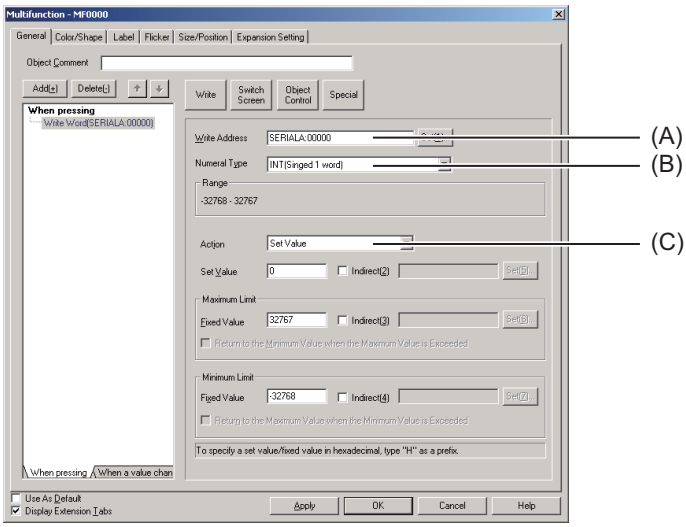
No.	Item	Details
(A)	Write Address	Used to set the bit address to be written to.
(B)	Action	Select the action from the following options: Momentary, Alternate, SET, and RESET. Momentary action cannot be set if the operation timing is set to *Touch OFF timing* or *When a Value Changed*.

Additional Information

- The actions for the Momentary, Alternate, SET, RESET, and Group Setting are the same as ON/OFF Buttons.
- Group settings are enabled only when *Momentary*, *Alternate*, or *SET* button action is selected in the property settings. If the action type is set to *RESET*, the button will not operate according to group settings.
- If the button is set to *Alternate* and is pressed when ON, the button will turn OFF.
- This function is different from the group function executed by selecting **Edit – Group – Group** from the menu bar or right-clicking and selecting **Group** from the pop-up menu.
- Set the same host address to buttons with the same group number. The buttons will not operate normally if different host addresses are allocated.

Write Word

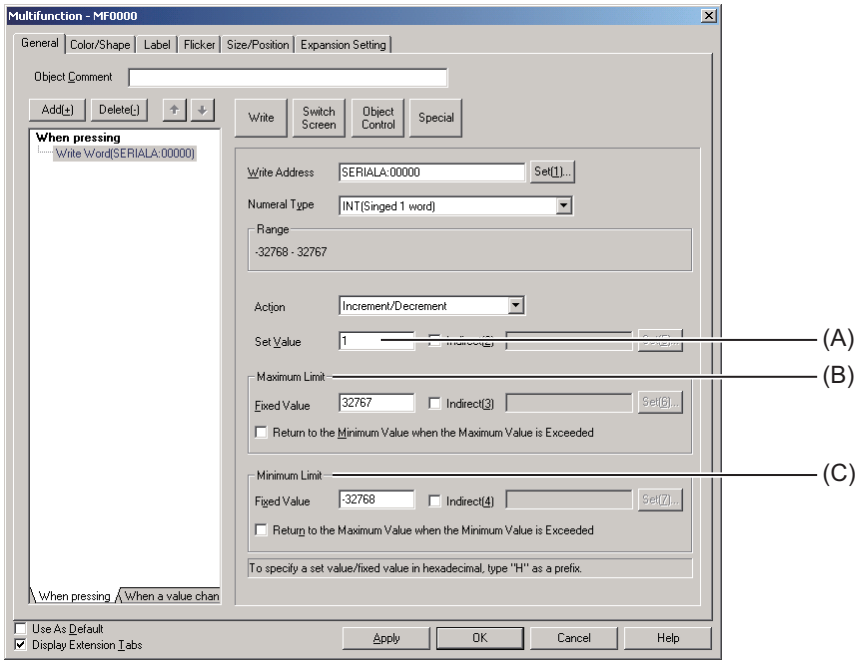
The Write Word function changes the value at a specified address. Press the **Write** Button and select *Write Word* from the list that is displayed.



No.	Item	Details
(A)	Write Address	Used to set the word address to be written to.
(B)	Numeral Type	Select the write format for the numeral when the Multifunction Object is pressed from the following eleven types. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details on numeral storage types. • SINT (signed, 1 byte) • USINT (unsigned, 1 byte) • INT (signed, 1 word) • UINT (unsigned, 1 word) • DINT (signed, 2 words) • UDINT (unsigned, 2 words) • REAL (real number) • BCD2 (unsigned, 1 word) • BCD2 (unsigned, 2 words) • BCD1 (signed (leftmost digit: F), 1 word) • BCD1 (signed (leftmost digit: F), 2 words) • BCD2 (signed (leftmost bit: 1), 1 word) • BCD2 (signed (leftmost bit: 1), 2 words)
(C)	Action	Set one of the following types of action. • Set Value • Increment/decrement • Display Pop-up Menu • AND • OR • XOR The setting items depend on the selected action.

● Set Value

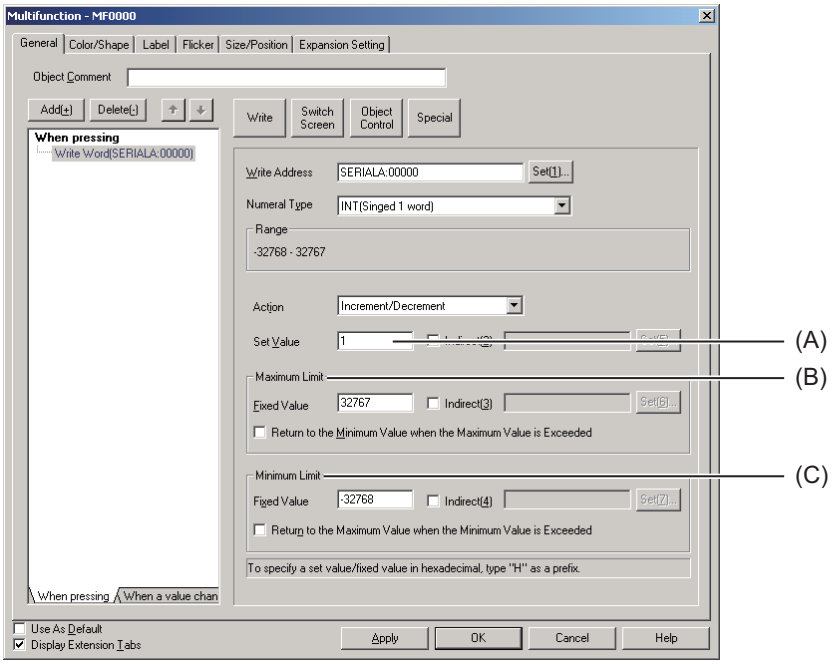
The Set Value action sets the write address to a set value.



No.	Item	Details
(A)	Set Value	Sets a set value to be written to the write address. When indirect specification is selected, the contents of the set address are written.
(B)	Maximum Limit	Sets the maximum limit. Either a fixed value or indirect specification can be selected.
(C)	Minimum Limit	Sets the minimum limit. Either a fixed value or indirect specification can be selected.

Increment/Decrement

When the button is pressed, the contents of the address are incremented or decremented and set.

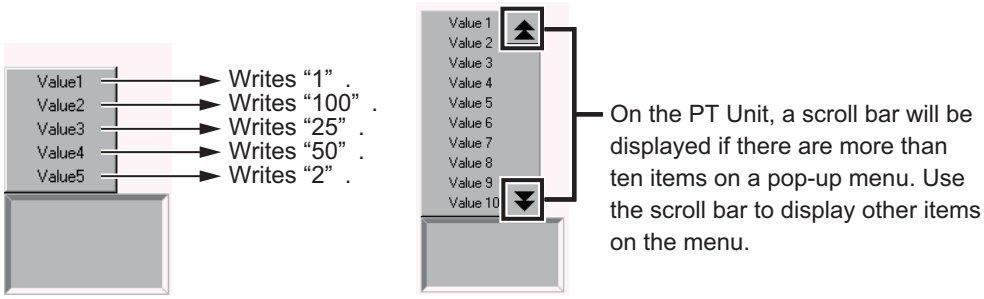


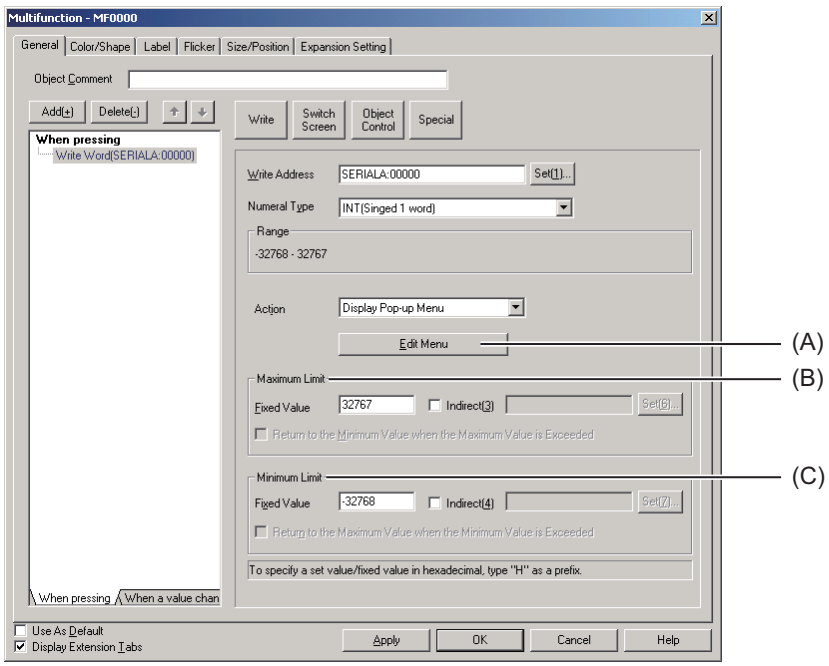
No.	Item	Details
(A)	Set Value	Sets the value by which the contents of the address are to be incremented or decremented. Example: If *Increment/decrement* is set to “10,” the contents of the address will increase by 10 each time the button is pressed. If *Increment/decrement* is set to “-10,” the contents of the address will decrease by 10 each time the button is pressed. When indirect specification is selected, the contents of the set address becomes the increment/decrement value.
(B)	Maximum Limit	Sets the maximum limit. Either a fixed value or indirect specification can be selected. if *Return to the Minimum Value when the Maximum Value is Exceeded* is selected, the value will return to and be set to the minimum value when the maximum value is exceeded. Example for a Maximum Limit of 1,000, Minimum Limit of 0, and Increment/Decrement of 5: • If the present value is 998 and *Increment/decrement* is executed, the present value will remain unchanged at 998 if the *Return to Minimum Value when the Maximum Value is Exceeded* Checkbox is not selected. • If, however, the *Return to Minimum Value when the Maximum Value is Exceeded* Checkbox is selected, 0 will be written to the address.

No.	Item	Details
(C)	Minimum Limit	Sets the minimum limit. Either a fixed value or indirect specification can be selected. If *Return to the Maximum Value when the Minimum Value is Exceeded* is selected, the value will return to and be set as the maximum value when the minimum value is exceeded. Example for a Maximum Limit of 1,000, Minimum Limit of 0, and Increment/Decrement of -5: • If the present value is 3 and *Increment/decrement* is executed, the present value will remain unchanged at 3 if the *Return to Maximum Value when the Minimum Value is Exceeded* Checkbox is not selected. • If, however, the *Return to Maximum Value when the Minimum Value is Exceeded* Checkbox is selected, 1000 will be written to the address.

● Display Pop-up Menu

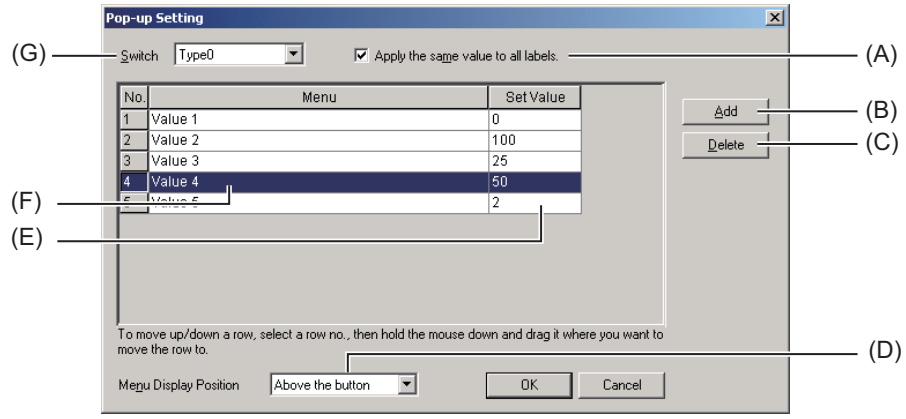
When the button is pressed, a pop-up menu will be displayed and the write value can be selected from the menu. As many pop-up menus as there are label switches can be set. If labels are switched during operations, the displayed pop-up menu will also change. Up to 32 items can be set on pop-up menus.





No.	Item	Details
(A)	Edit Menu	Displays the Pop-up Setting Dialog Box.
(B)	Maximum Limit	Sets the maximum limit. Either a fixed value or indirect specification can be selected.
(C)	Minimum Limit	Sets the minimum limit. Either a fixed value or indirect specification can be selected.

- Editing Pop-up Menus



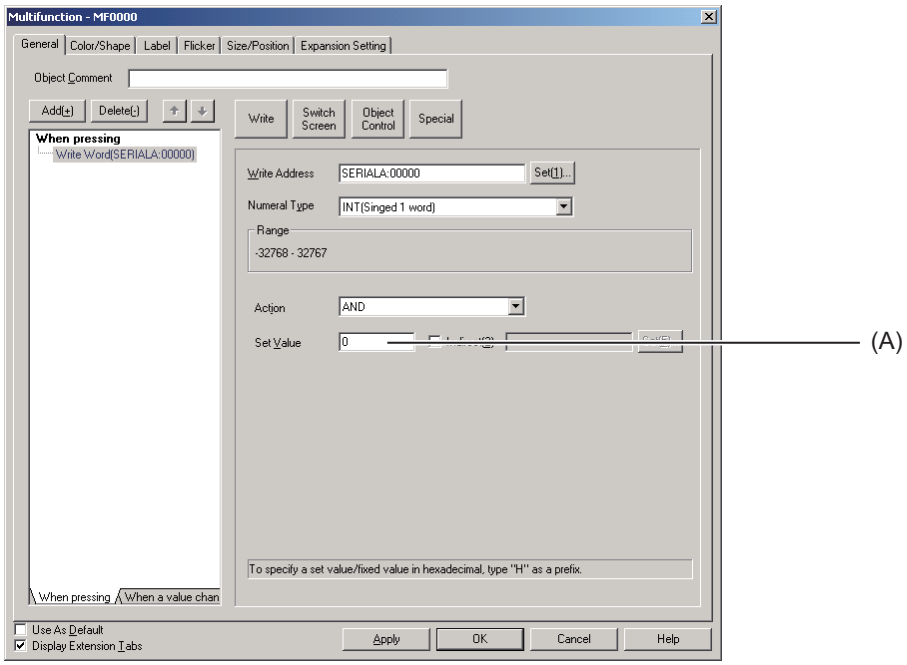
No.	Item	Details
(A)	Apply the same value to all labels	Applies the same set value to all labels.
(B)	Add	Adds a menu item below the currently selected row. If there is no row selected, a new row is added to the bottom of the list.
(C)	Delete	Deletes the currently selected menu item.
(D)	Menu display position	Sets one of the following display positions for the pop-up menu. • Above the button • Below the button
(E)	Set Value	Specifies the value that will be written to the communications address when the corresponding menu item is selected.
(F)	Menu list	Sets the heading name displayed in a pop-up menu. The name can be up to 64 characters long.
(G)	Switch	Switches labels.

Additional Information

When a row has been selected by clicking the row number, the row can be dragged and dropped in another location to change its order in the list.

AND/OR/XOR

When the button is pressed, AND, OR, or XOR calculations are applied to the Set Value and the write address value and the write address is set to the result.

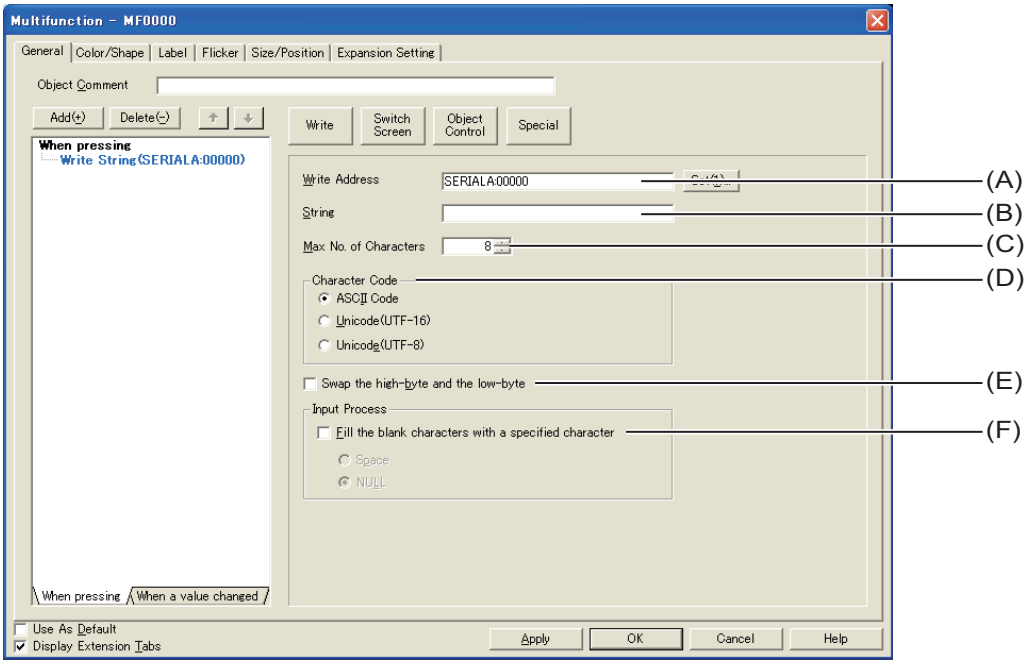


No.	Item	Details
(A)	Set Value	Sets the value to be used in the equation. When indirect specification is selected, the contents of the set address becomes the set value.

Write String

Sets a character string in a specified communications address. The string can be up to 256 characters long.

Press the Write Button and select *Write String* from the list that is displayed.



No.	Item	Details
(A)	Write Address	Sets the communications address to be written to. The character string is written to consecutive addresses starting with the set communications address, according to the number of characters and the character code.
(B)	String	Specifies the character string to be written. The string can be up to 256 characters long.
(C)	Max. No. of Characters	Sets the number of characters to be written (1 to 256).
(D)	Character Code	Select either ASCII or Unicode (UTF-16/UTF-8) for the character code.
(E)	Swap the high-byte and the low-byte	Swaps the higher bytes and lower bytes in the string and writes the result to the communications address.
(F)	Fill the blank characters with a specified character	If this option is selected, spaces or null characters are automatically added to the end of strings to fill the space if the number of input characters is less than the set number of characters. For example, if the number of characters has been set to 8 and only the 5 characters ABCDE are input, then 3 spaces will be added: ABCDE□□□□ (□ indicates a space.) If this option is not selected, all characters up to the null character at the end of the string will be written to the specified address. For example, if the string already set to the address is ABCDEFG, when A is written to the address, 0 will be written in the place of B, and C and the other characters will not be written. The data is written in word format, so when the string AB is written in ASCII, CD will be 0.

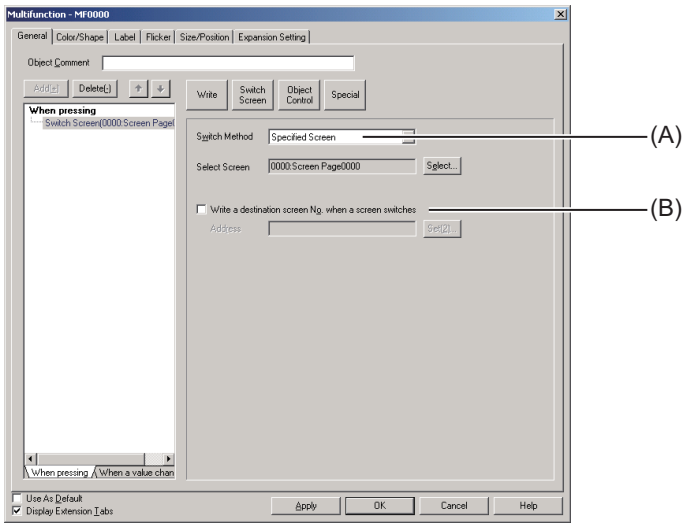
Additional Information

- If the number of characters or the address is set too high, the maximum address for the specified area may be exceeded, e.g., when the number of words is 256 and the write address is $W32767. If the maximum address in an area is exceeded, a communications error will occur when the screen to which the string display and input object is set is opened on the PT Unit. Make sure the maximum address is not exceeded.
- If ASCII characters are set in string displays, the following character codes will be used by the PT Unit depending on the system language that has been set.

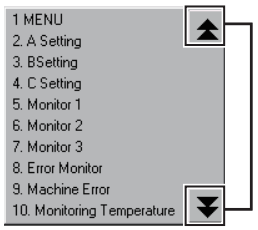
System language	Character display	Example (character code B5)
Japanese	Shift-JIS code	ｵ
Chinese (traditional or simplified)	GB2312 code	Nothing is displayed because there are no corresponding characters.
Other	Latin 1 code	µ

Switch Screen

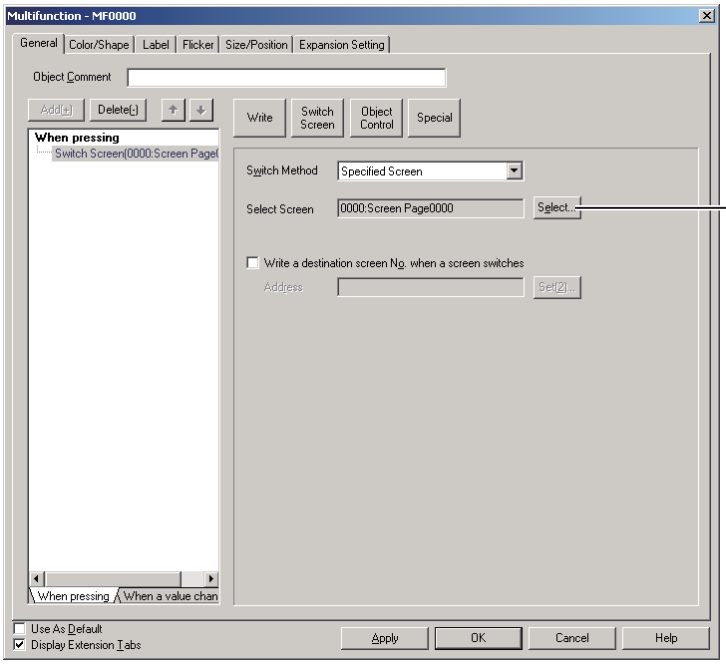
Switches to the specified screen when the button is pressed. Press the Switch Screen Button and select Switch Screen from the list that is displayed.



No.	Item		Details
(A)	Switch Method		Selects the method for switching screens. The setting items depend on the selected method.
		Specified Screen	Switches to a specified screen. Press the **Select** Button and select the destination screen from the Screen List Dialog Box that is displayed.
		Indirect Specification of Screen No.	Reads the contents of a specified address as the page number and switches to that specified screen page number. The data format for the value set for the communications address can be selected as either BCD or binary. Select the data format under **PT – Project Properties**.

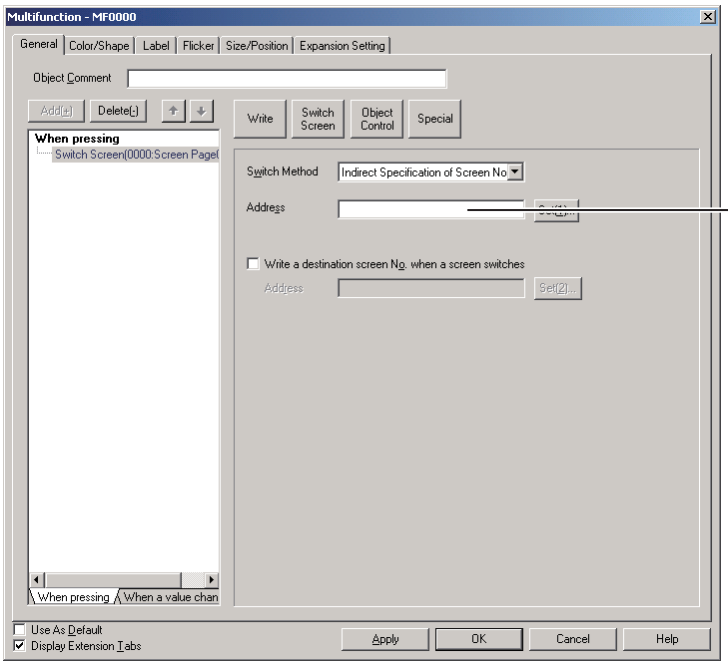
No.	Item	Details
(A)	Selection by Pop-up Menu	Displays a pop-up menu for screen selection. (Up to 32 items of up to 64 characters each). The display position of the pop-up menu can be specified to be above or below the button.   At the PT Unit, a scroll bar will be displayed if there are more than ten items on a pop-up menu, as shown on the left. Use the scroll bar to display other items on the menu. Pop-up menu settings are made in the Pop-up Setting Dialog Box displayed when the Register Button is pressed.
	Backward	The last 32 page switching operations are recorded and the pages can be returned based on this record. Switches to pop-up screens cannot be recorded.
	Forward	If the *Backward* function has been used to go back to previous pages, the *Forward* function can be used to move ahead to later pages.
	Next Page	Displays the screen with the next page number.
	Previous Page	Displays the screen with the previous page number.
(B)	Write a destination screen No. when a screen switches	The destination screen number can be written to a specified address when screens are switched.

● Specified Screen



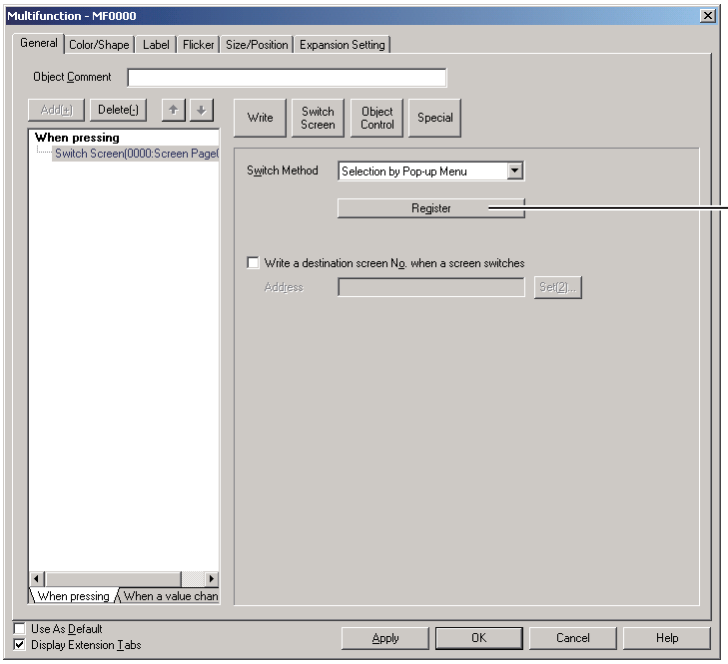
Specifies the destination screen.

● Indirect Specification of Screen Numbers



Sets the communications address that specifies the destination screen number.

● Selection by Pop-up Menu



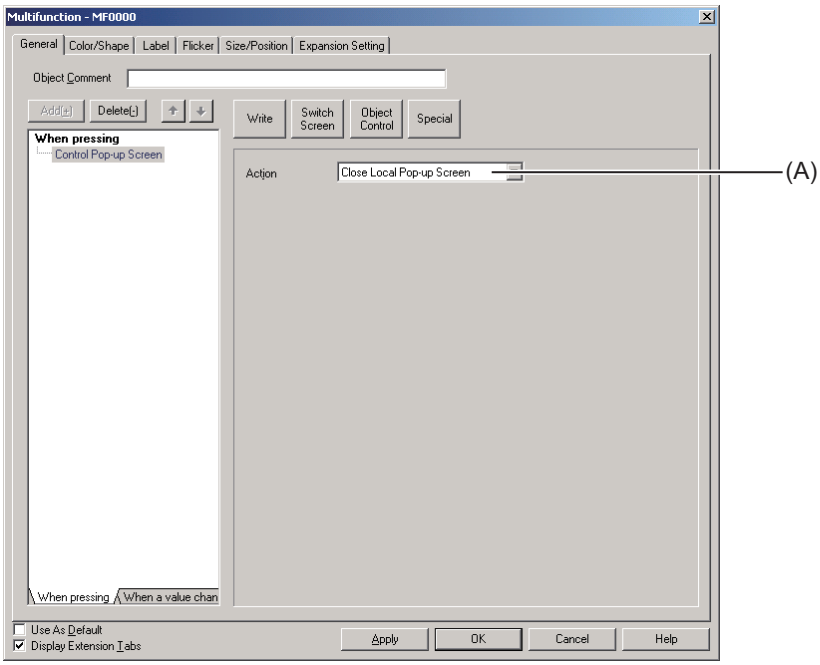
Registers pop-up menus.

There are no settings to be made for *Backward*, *Forward*, *Next Page*, or *Previous Page*.

Control Pop-up Screen

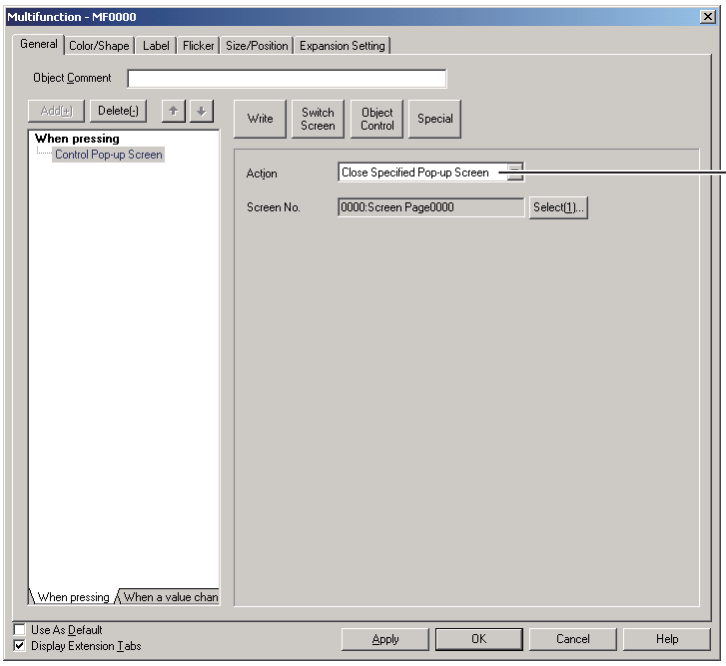
Control Pop-up Screen controls the pop-up screen specified for display when a button is pressed.

Click the **Switch Screen** Button and select *Control Pop-up Screen* from the list that is displayed.



No.	Item		Details
(A)	Action		Set one of the following types of action. The setting items depend on the selected method.
		Close Local Pop-up Screen	Closes the currently displayed pop-up screen using a Multifunction Object in the same screen.
		Close Specified Pop-up Screen	Closes a specified pop-up screen. Use the **Select** Button to specify the pop-up screen to be closed. The current screen as well as other pop-up screens can be specified using this option.
		Move Local Pop-up Screen	Moves the pop-up screen after the Multifunction Object functions have been executed to any position pressed on the screen.

● Close Specified Pop-up Screen



Select *Close Specified Pop-up Screen*.

There are no settings to be made for Close Local Pop-up Screen or Move Local Pop-up Screen.

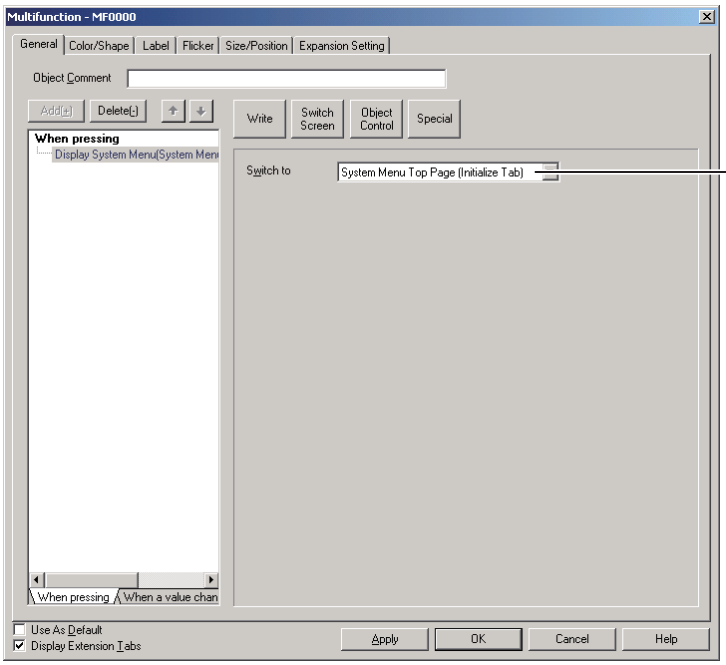
Additional Information

- If pop-up screens are controlled (e.g., moved or closed) frequently, the display update may take some time and communications may be delayed.
- If the screen specified under *Close Local Pop-up Screen*, *Close Specified Pop-up Screen*, or *Move Local Pop-up Screen* is a base screen, the Multifunction Object will be disabled while the PT Unit is operating.
- When moving pop-up screens using *Move Local Pop-up Screen*, the position touched on the screen after the Multifunction Object is executed will become the top left corner of the new position for the pop-up screen.

Display System Menu

The Display System Menu function is used to display the System Menu and start external applications.

Click the **Switch Screen** Button and select *Display System Menu* from the list that is displayed.



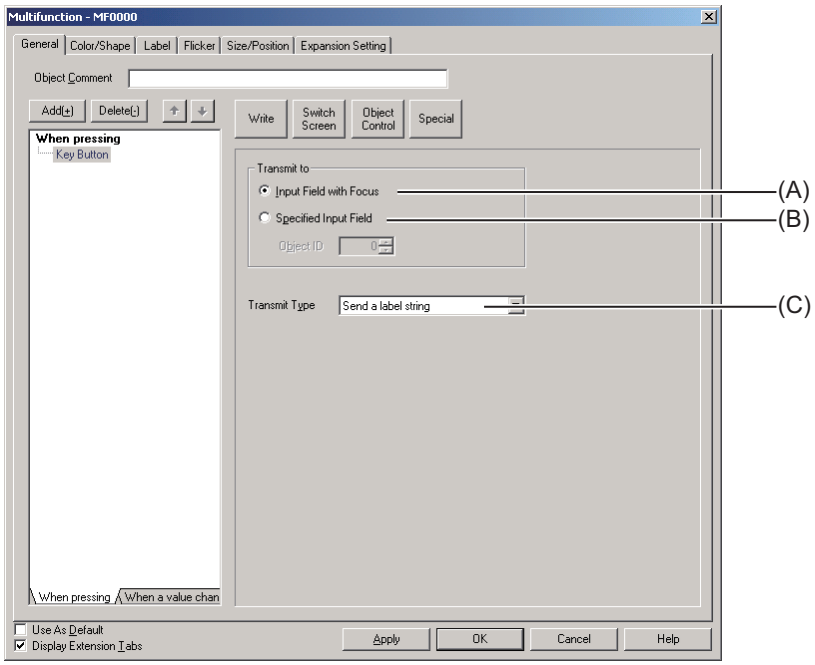
No.	Item	Details
(A)	Switch to	Selects the switch destination. • System Menu Top Page (Initialize Tab) • Display Capture Data • Operation log (sort by occurrence) • Operation log (sort by frequency)

Additional Information

If the model is NB5Q-TW01B-V1-S, the System Menu top page will be displayed if a Multifunction Object set to *System Menu Top Page (initialize Tab)* is executed.

Key Buttons

A Key Button is an object that transmits a specified character code to the functional object in focus. Press the **Object Control** Button and select *Key Button* from the list that is displayed.



No.	Item	Details
(A)	Input Field with Focus	Transmits the character string to the input field (*Numeral display and input* or *String display and input*) that is in focus.
(B)	Specified Input Field	Sets functional object ID numbers when transmitting to a specific functional object.*1
(C)	Transmit Type	Select one of the following transmission character codes. • Send a label string. • Send a control code. • Send a special character string. • Indirectly specify and send a special character string. The setting items depend on the selected transmission type.

*1. A functional object on the base screen or pop-up screen must be set as the destination. The destination cannot be a functional object on a different screen, e.g., a functional object on the base screen cannot be used as the destination from a pop-up screen.

Functional objects on sheets also cannot be used as the destination.

When creating a Multifunction Object on a sheet, the destination must be a functional object with a specified ID number on a base screen or pop-up screen using that sheet.

Additional Information

Multifunction Object processing will be canceled in the following cases.

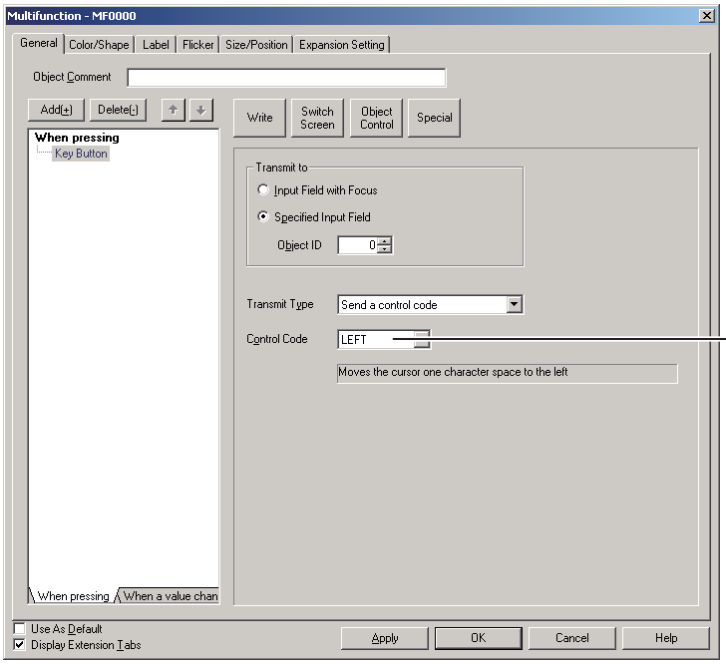
- When a Multifunction Object set to transmit to the *Input Field with Focus* is executed but there is no object with the focus.
- When a Multifunction Object set to transmit to the *Specified Input Field* is executed but no object ID has been specified.

Send a Label String

Sends the character codes for the characters set for the Multifunction Object label. A string of up to 256 characters long can be sent. There are no settings required for this function.

Send a Control Code

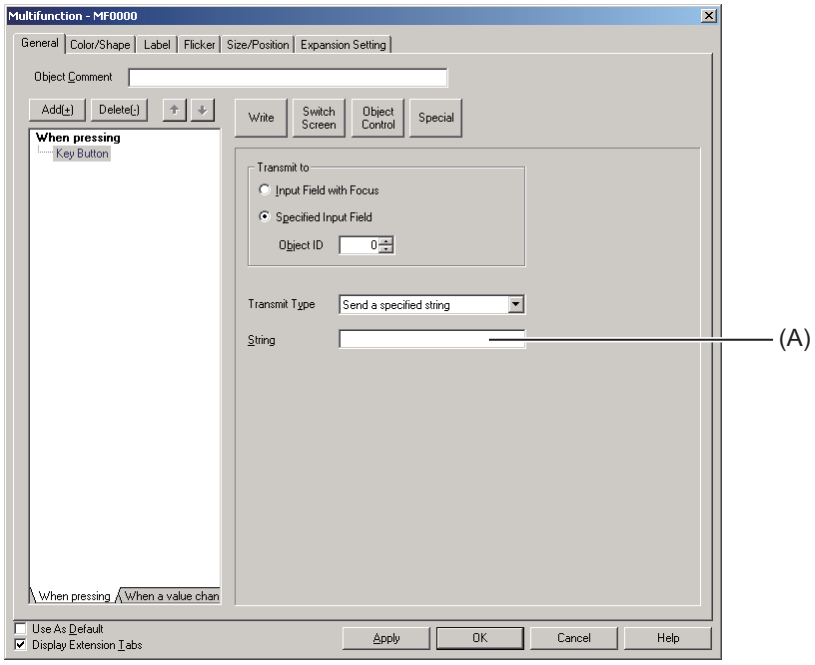
Sends the specified control code.



No.	Item	Details
(A)	Control Code	Select the control code to be sent. Refer to *2-9-3 Command Buttons* on page 2-147 for information on control codes.

Send a Specified String

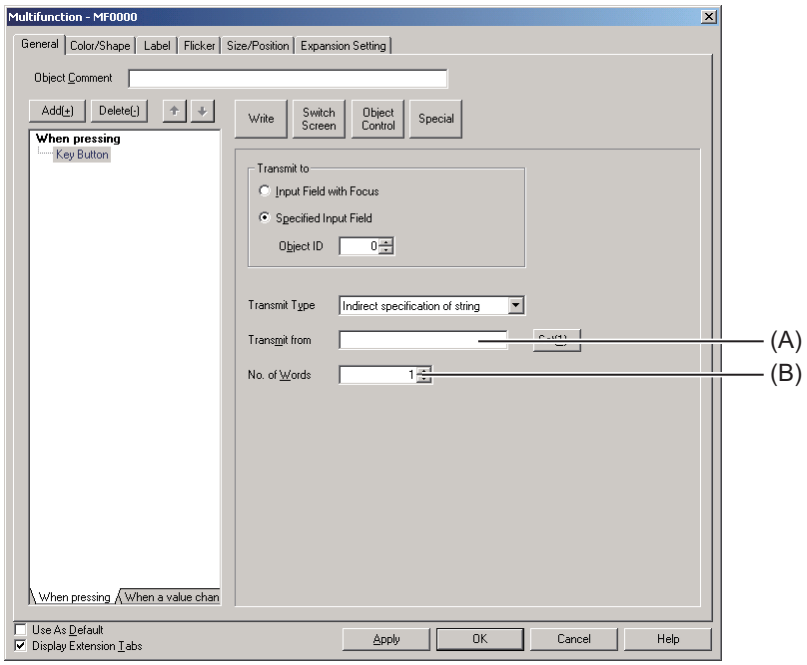
Sends the character codes for a specified string (up to 256 characters).



No.	Item	Details
(A)	String	Specifies the character string to be sent (up to 256 characters).

Indirect Specification of String

Sends the string data stored at a specified communications address.



No.	Item	Details
(A)	Transmit from	Specifies the communications address at which the send string is stored.
(B)	No. of Words	Transmits the specified number of words as the data.

Additional Information

- Functional object ID numbers can be checked by selecting **View – Show ID** (click on *Show ID*) or opening the Functional Object Properties Dialog Box.

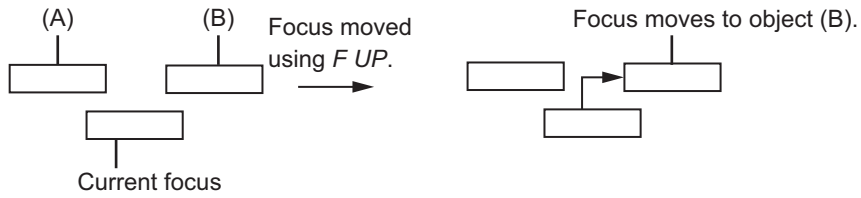




  Specify the 4-digit number displayed here if using *Specified Input Field* to specify the ID number. (In the above example, “7” is specified.)

  Refer to *Create Screens* in the *CX-Designer Online Help* for information on ID displays.

- Set *Input Field with Focus* to transmit to other screens. Data cannot be transmitted even if the ID number is set under *Specified Input Field*.
- A backslash will be sent if a yen symbol is specified as one of the characters to be sent.
- Focus is not moved to input-prohibited objects for focus control codes.
- If there are two input objects at an equal distance from the current object, the focus will move to the object created first on the CX-Designer.



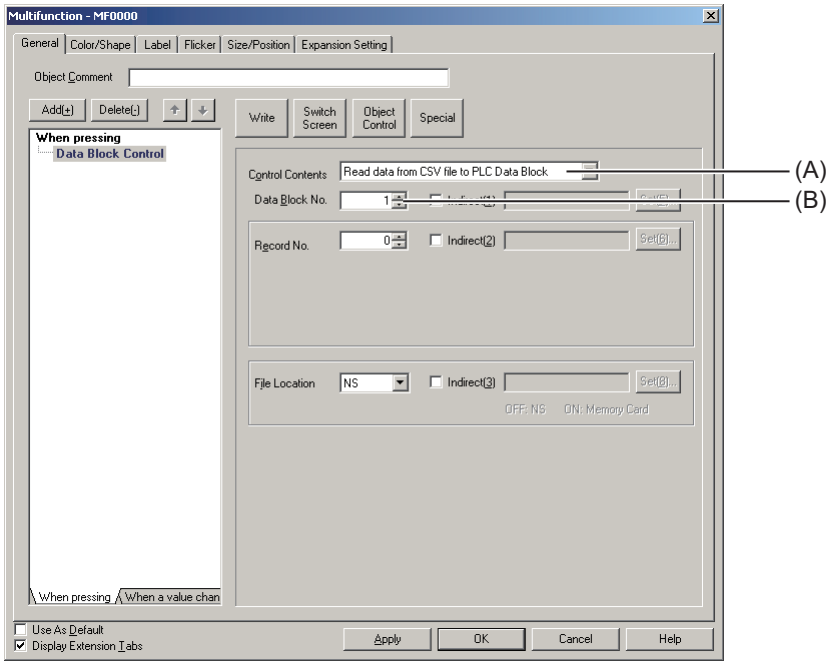
  In this example, it is assumed that object (B) is created earlier than object (A) on CX- Designer.

- Press a functional object other than a Command Button to which *Key Button* is set to remove focus from numeral display and input objects and string display and input objects.
- To use *S PAGEUP*, *S PAGEDOWN*, *S LINEUP* or *S LINEDOWN*, select *Specified Input Field* as the *Transmit to* Option and specify the ID number for list selection.

Data Block Control

This function operates on data blocks. When a button is pressed, CSV file data is transferred to the specified addresses in the PLC or the data from specified addresses in the PLC is transferred to the specified record in the CSV file.

Click the **Object Control** Button and select *Data Block Control* from the list that is displayed.



No.	Item	Details
(A)	Control Content	Select one of the following control operations. • Read data from CSV file to PLC Data Block • Write data from PLC Data Block to CSV file • Read data from CSV file to PT • Write data from PT to CSV file • Read data from PT to PLC Data Block • Write data from PLC Data Block to PT • Read record label • Delete record The setting items depend on the selected control operation.
(B)	Data Block No.	Specifies the data block group number (1 to 100) for the control operation. The group number can be set indirectly through a communications address by selecting the *Indirect* Option.

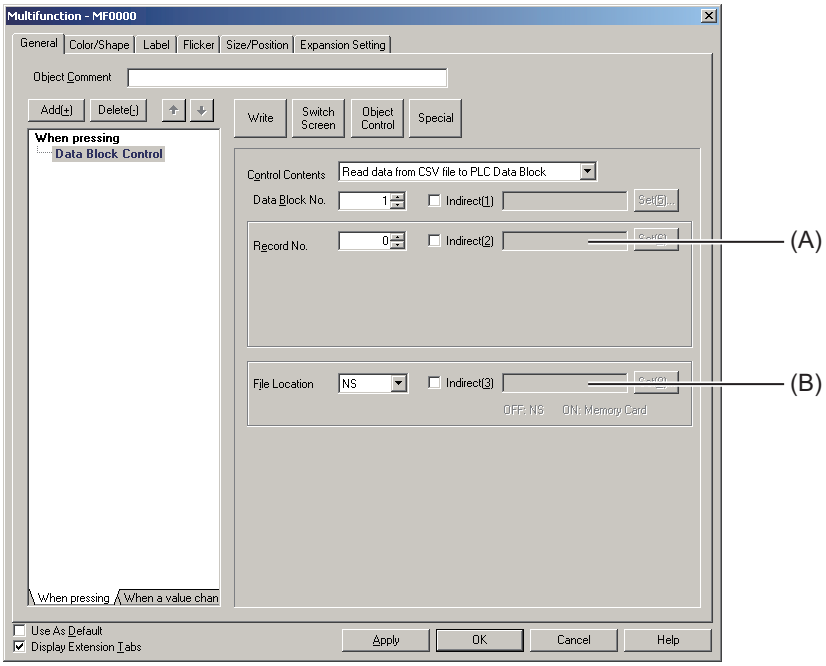
Additional Information

Multifunction Object processing will be canceled in the following cases.

- If the specified data block group does not exist.
- If the specified record does not exist.

● Read Data from CSV File to PLC Data Block

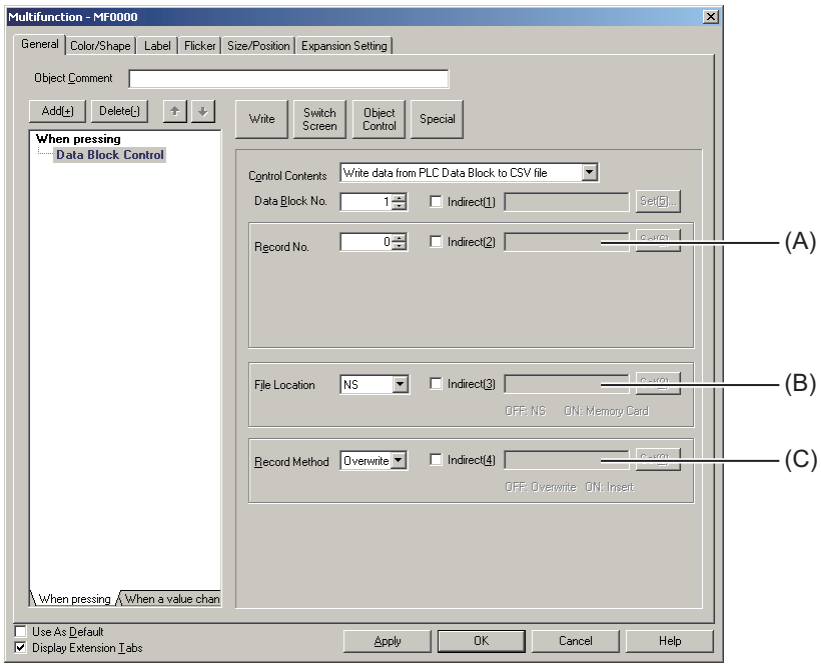
Reads the data from the specified record in the CSV file to the specified address set in each field.



No.	Item	Details
(A)	Record No.	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The record number can be set indirectly through a communications address by selecting the *Indirect* Option.
(B)	File Location	Specifies either the PT Unit or the removable media as the location of the CSV file. The file location can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.

● Write Data from PLC Data Block to CSV File

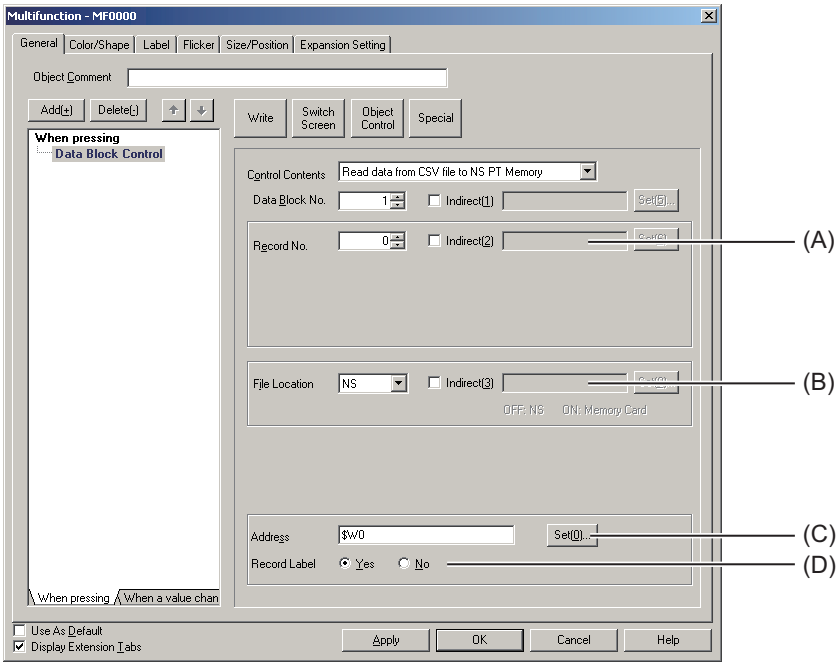
Transfers the data from the specified addresses in the PLC Data Block set in each field to the specified record in the CSV file.



No.	Item	Details
(A)	Record No.	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The record number can be set indirectly through a communications address by selecting the *Indirect* Option.
(B)	File Location	Specifies either the PT Unit or the removable media as the location of the CSV file. The file location can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(C)	Record Method	The data at the specified record can be overwritten or it can be inserted at the specified record number. The record method can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the data will be overwritten. If the specified address is 1, the data will be inserted.

● Read Data from CSV File to PT

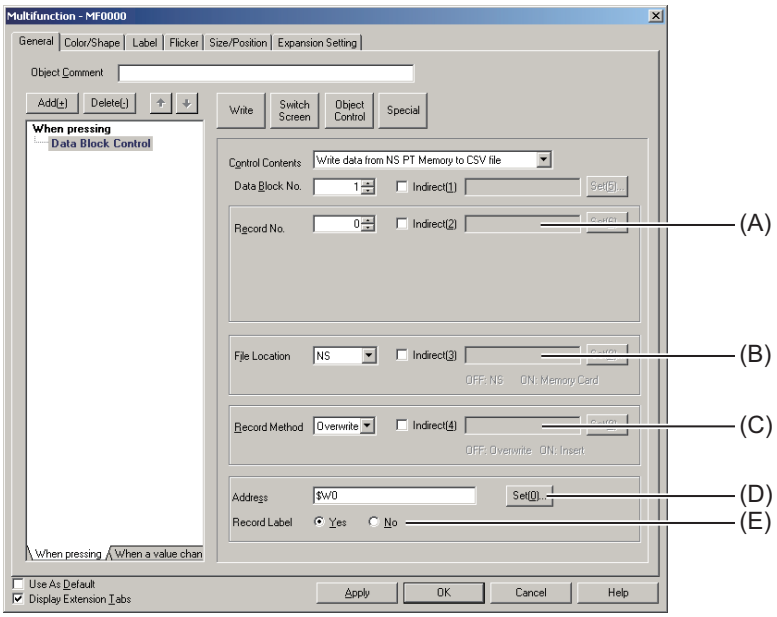
Reads the data from the specified record in the CSV file to the specified PT address.



No.	Item	Details
(A)	Record No.	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The record number can be set indirectly through a communications address by selecting the *Indirect* Option.
(B)	File Location	Specifies either the PT Unit or the removable media as the location of the CSV file. The file location can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(C)	Address	Specifies the communications address for storing the CSV file data.
(D)	Record Label	Specifies whether to include the record label when reading.

● Write Data from PT to CSV File

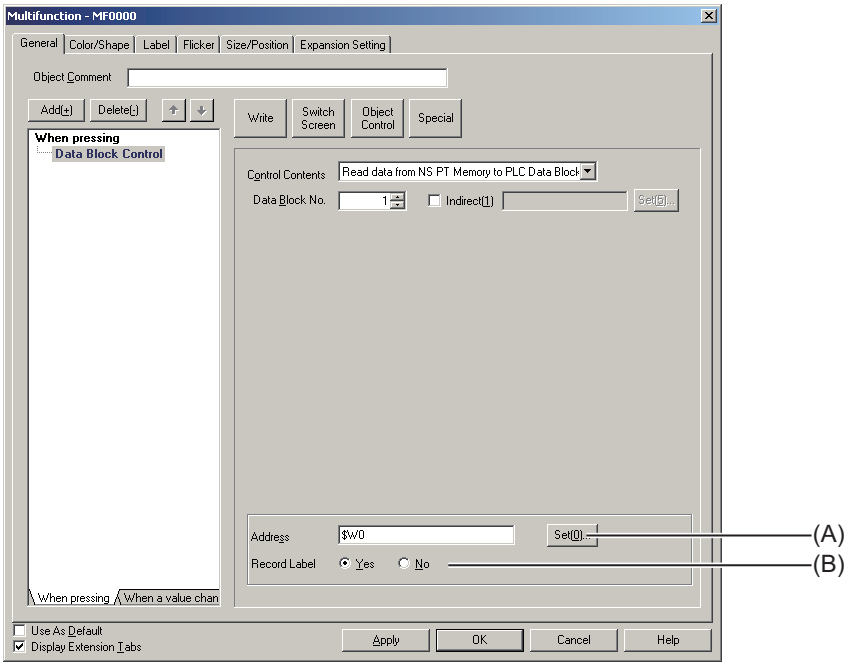
Transfers one record of data from the specified addresses in the PT Unit to the specified record in the CSV file.



No.	Item	Details
(A)	Record No.	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The record number can be set indirectly through a communications address by selecting the *Indirect* Option.
(B)	File Location	Specifies either the PT Unit or the removable media as the location of the CSV file. The file location can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(C)	Record Method	The data at the specified record can be overwritten or it can be inserted at the specified record number. The record method can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the data will be overwritten. If the specified address is 1, the data will be inserted.
(D)	Address	Specifies the PT address where the one record of data to be written to the CSV file is stored.
(E)	Record Label	Specifies whether to include the record label when reading.

● Read Data from PT to PLC Data Block

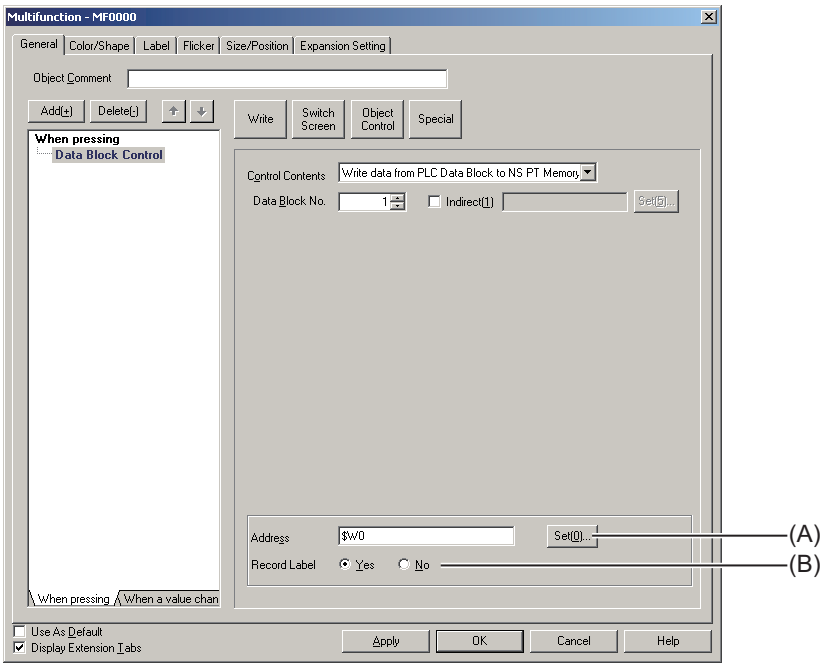
Transfers one record of data from the specified addresses in the PT Unit to the PLC Data Block address set in each field.



No.	Item	Details
(A)	Address	Specifies the PT address where the one record of data is stored.
(B)	Record Label	Selects whether or not the record label is included in the data stored at a specified communications address.

● Write Data from PLC Data Block to PT

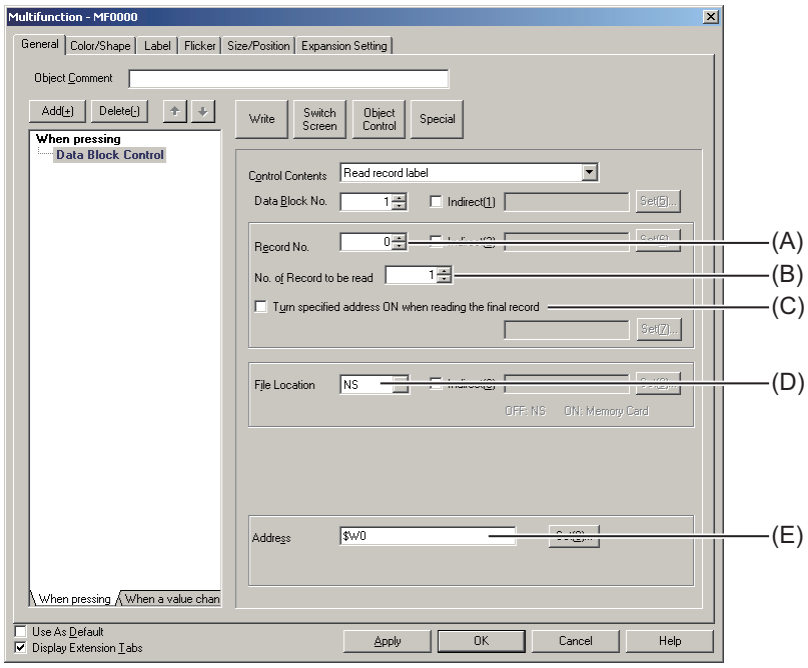
Reads the data from the PLC Data Block address set in each field to the specified PT address.



No.	Item	Details
(A)	Address	Specifies the PT address where the one record of data will be stored.
(B)	Record Label	Specifies whether to include the record label when reading.

Read Record Label

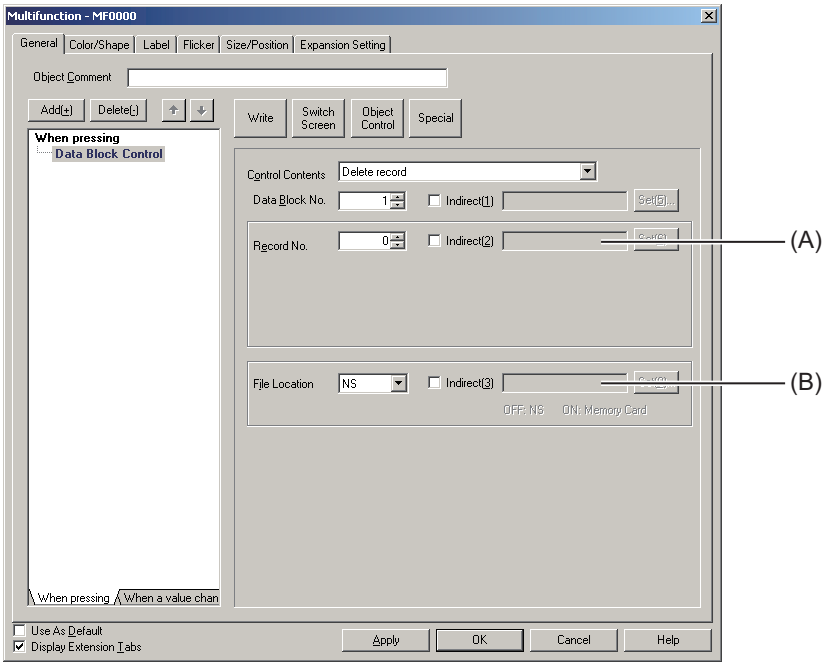
Reads the record labels for the specified number of records in the CSV file to the specified PT address.



No.	Item	Details
(A)	Record No.	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The record number can be set indirectly through a communications address by selecting the *Indirect* Option.
(B)	No. of Records to be read	Specifies the number of record labels to be read at a time from the specified starting record number.
(C)	Turn specified address ON when reading the final record	Can be selected to turn ON a specified address when the final record has been read.
(D)	File Location	Specifies either the PT Unit or the removable media as the location of the CSV file. The file location can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.
(E)	Address	Specifies the PT address where the record label data will be stored.

Delete Record

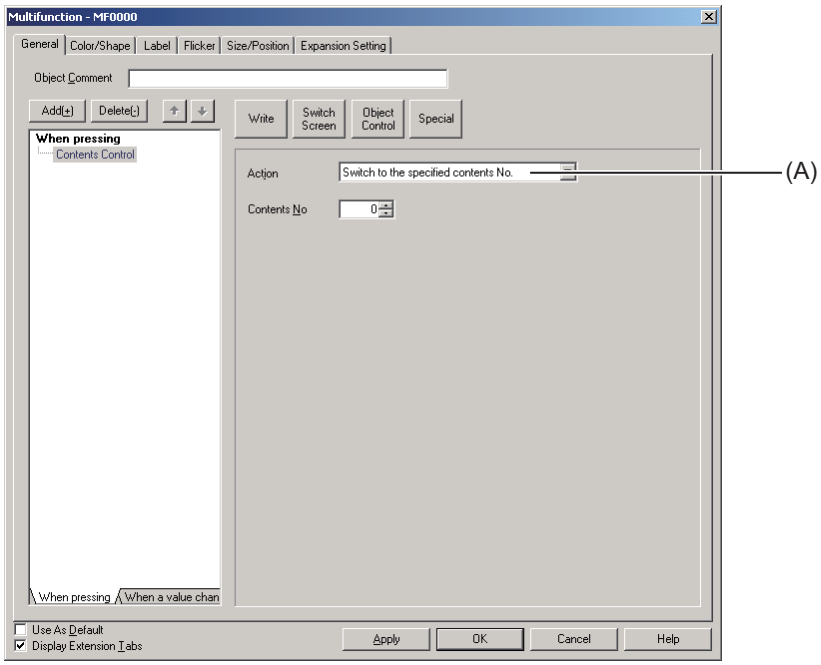
Deletes the data for the specified CSV file record.



No.	Item	Details
(A)	Record No.	Specifies the record number in the CSV file (0 to 999) to use in the control operation. The record number can be set indirectly through a communications address by selecting the *Indirect* Option.
(B)	File Location	Specifies either the PT Unit or the removable media as the location of the CSV file. The file location can be set indirectly by selecting the *Indirect* Option. If the specified address is 0, the PT Unit will be used. If the specified address is 1, the removable media will be used.

Contents Control

Switches the displayed contents. Press the **Object Control** Button and select *Contents Control* from the list that is displayed.



No.	Item		Details
(A)	Action		Selects the method for switching contents. The setting items depend on the selected method.
		Switch to the specified contents No.	Switches to the specified contents number when the button is pressed.
		Switch to the indirect reference contents No.	Reads the contents of a specified address as the contents number and switches to that contents number. Sets the contents of the communications address as a binary value.
		Switch to the next contents No.	Displays the data for the next contents number.
		Switch to the previous contents No.	Displays the data for the previous contents number.

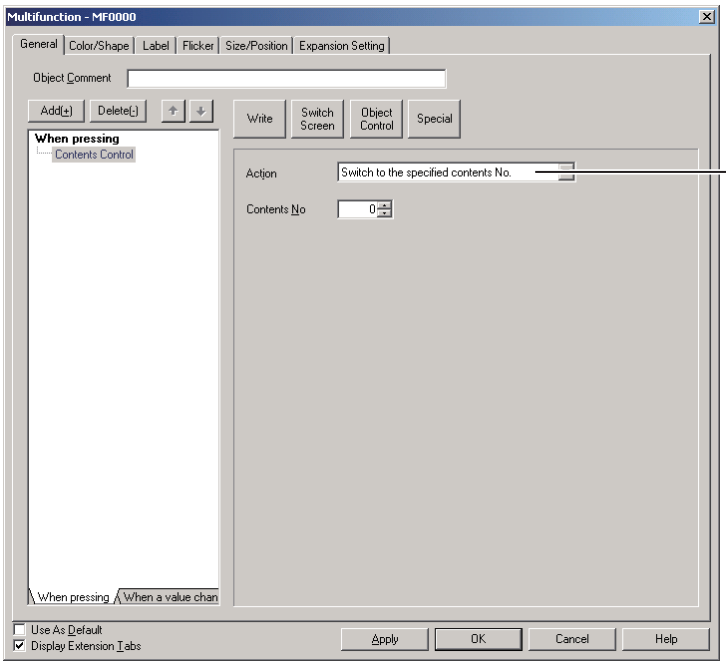
Additional Information

Multifunction Object processing will be canceled in the following cases.

- If the specified contents number does not exist.

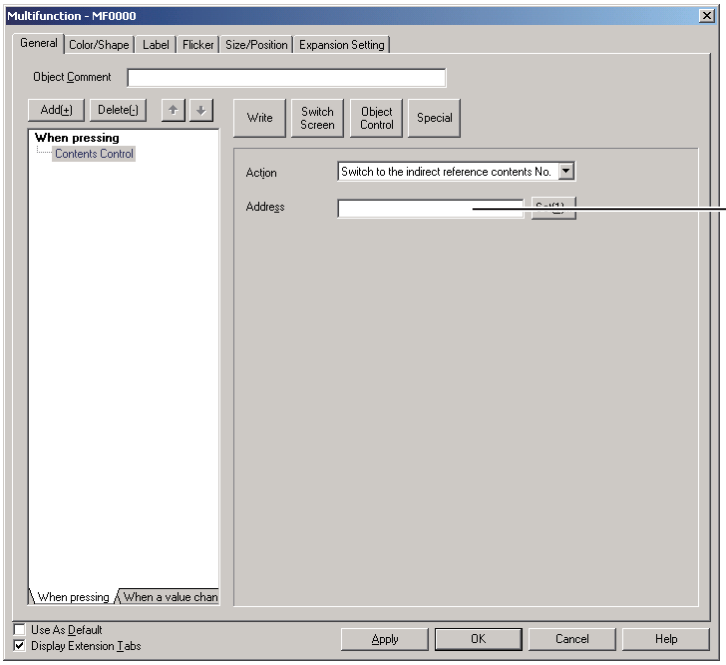
If contents control is executed in a screen where contents switching has not been set, the operation will be canceled and the next function will be executed.

● Switch to Specified Contents No.



Specifies the contents number to switch to.

● Switch to the Indirect Reference Contents No.

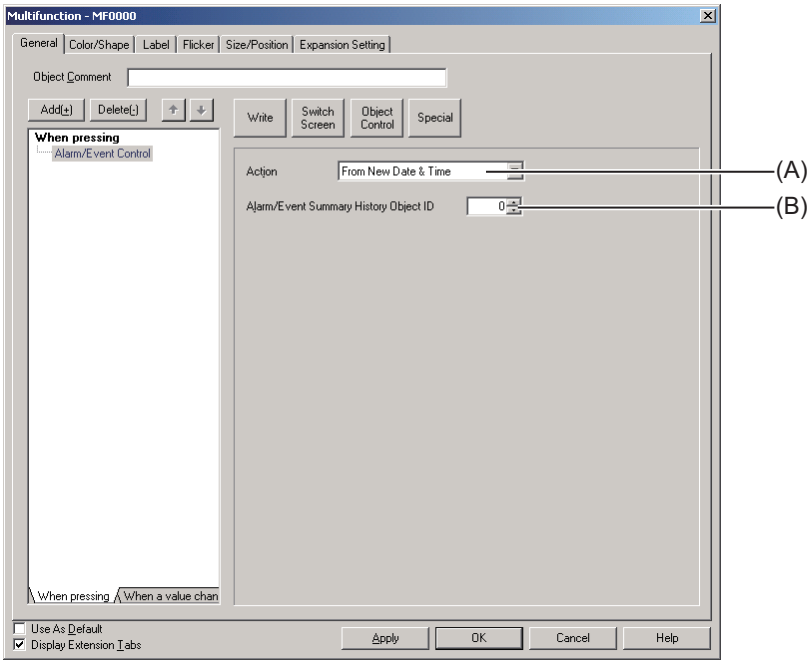


Sets the communications address that specifies the contents number to be switched to.

There are no settings to be made for *Switch to the next contents No.* and *Switch to the previous contents No.*

Alarm/Event Control

This function operates on alarm/event functions. It saves and clears alarm/event histories. It can also be used to manipulate Alarm/Event Summary & History. Press the **Object Control** Button and select *Alarm/Event Control* from the list that is displayed.



No.	Item		Details
(A)	Action		Selects the control operation for the alarm/event function. The setting items depend on the selected method.
		Clear	Clears alarm/event histories.
		Save	Saves alarm/event histories to a CSV file.
		Home	Selects the first row in the specified Alarm/Event Summary & History.*1
		End	Selects the last row in the specified Alarm/Event Summary & History.*1
		Next	Selects the next row after the currently selected row in the specified Alarm/Event Summary & History.*1
		Previous	Selects the row before the currently selected row in the specified Alarm/Event Summary & History.*1
		From New Date & Time	Displays the specified Alarm/Event Summary & History in order from newest to oldest.*1
		From Old Date & Time	Displays the specified Alarm/Event Summary & History in order from oldest to newest.*1
		From High Priority	Displays the specified Alarm/Event Summary & History in order from highest priority.*1
		From Low Priority	Displays the specified Alarm/Event Summary & History in order from lowest priority.*1
		From High Frequency	Displays the specified Alarm/Event Summary & History in order from highest frequency.*1
		From Low Frequency	Displays the specified Alarm/Event Summary & History in order from lowest frequency.*1
		Check Selected Alarm	Checks the selected alarm or event using the Alarm/Event Summary & History.*1

No.	Item		Details
(A)		Delete Selected Alarm	Deletes the selected alarm/event in the specified Alarm/Event Summary & History.*1
		Check All Alarms	Checks all alarms/events in the specified Alarm/Event Summary & History.*1
		Cancel All Alarms' Checks	Cancels the check of all alarms/events in the specified Alarm/Event Summary & History.*1
		Change Display Type	Changes the display type for the specified Alarm/Event Summary & History. When the function is executed, a menu for selecting the display type will be displayed.*1 
(B)	Alarm/Event Summary & History Object ID		Specifies the Alarm/Event Summary & History ID number for the control operation if *Clear* and *Save* are not selected.

*1. An Alarm/Event Summary & History on the base screen or pop-up screen must be set for the control operation. An Alarm/Event Summary & History on a different screen cannot be controlled, e.g., an Alarm/Event Summary & History on the base screen cannot be controlled from a pop-up screen.

An Alarm/Event Summary & History on a sheet also cannot be controlled.

When creating a Multifunction Object on a sheet, an Alarm/Event Summary & History with a specified ID number on the base screen or pop-up screen using that sheet must be controlled.

Additional Information

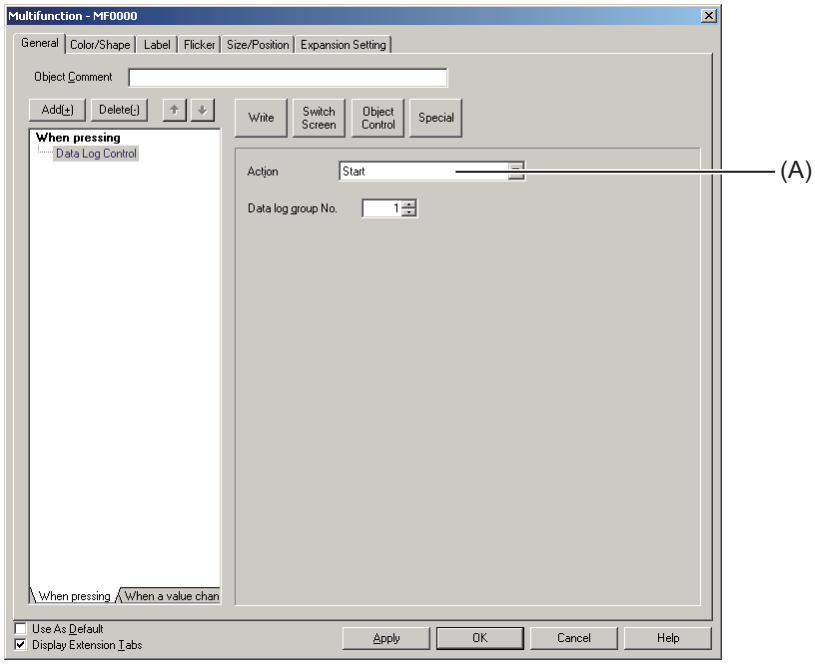
- The *Clear* and *Save* functions perform the same operations as $SB32 (Initialize Alarm/Event History) and $SB33 (Save Alarm/Event History), respectively. However, when the Multifunction Object is executed, the $SB32 and $SB33 bits will not turn ON/OFF.
- Multifunction Object processing will be canceled in the following cases.
  - If an object ID other than an Alarm/Event Summary & History is specified.
  - If menu selection is canceled when *Change Display Type* is selected.

Data Log Control

This function operates on data log functions.

It starts and stops data logging and saves logs. Data log graphs can also be manipulated using this function.

Click the **Object Control** Button and select *Data Log Control* from the list that is displayed.



No.	Item		Details
(A)	Action		Selects the control operation for the data log function. The setting items depend on the selected method.
		Start	Starts logging of the specified data log group. If *Control start/stop data log by the specified address* is selected under the data log group settings, the set address will turn ON.
		Stop	Stops logging of the specified data log group. If *Control start/stop data log by the specified address* is selected under the data log group settings, the set address will turn OFF.
		Log Clear	Clears the log data for the specified data log group.
		Save to File	Writes the logging data to a file to the group folder displayed in the \LOG\Trend removable media directory, using the output file name set for the specified data log group.
		Read File	Used to select the file saved in the group folder displayed in the \LOG\Trend removable media directory from a pop-up menu. The selected file is displayed as a graph.*1
		Pause	Pauses and cancels pause of data log graph display.*1
		Move the cursor forward	Moves the time axis cursor forward one position along the time axis.*1
		Move the cursor backward	Moves the time axis cursor back one position along the time axis.*1

*1. A Data Log Graph on the base screen or pop-up screen must be set for the control operation. A Data Log Graph on a different screen cannot be controlled, e.g., a Data Log Graph on the base screen cannot be controlled from a pop-up screen.

A Data Log Graph on a sheet also cannot be controlled.

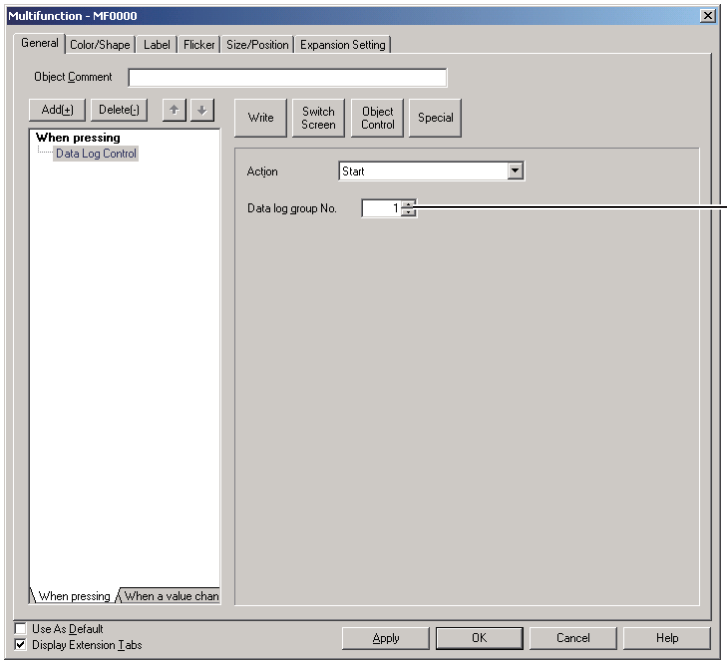
When creating a Multifunction Object on a sheet, a Data Log Graph with a specified ID number on the base screen or pop-up screen using that sheet must be controlled.

Additional Information

- Even if display update is stopped because the *Pause* function is being used, data logging will continue when *Start* is selected. The latest log will be displayed when the screen is updated.
- Graph displays of files read from the removable media will be cleared when screens are switched.
- Multifunction Object processing will be canceled in the following cases.
  - If the specified data log group does not exist.
  - If an object ID other than a data log graph is specified.
  - If the file save or file read operation fails.
  - If menu selection is canceled when *Read File* is selected.

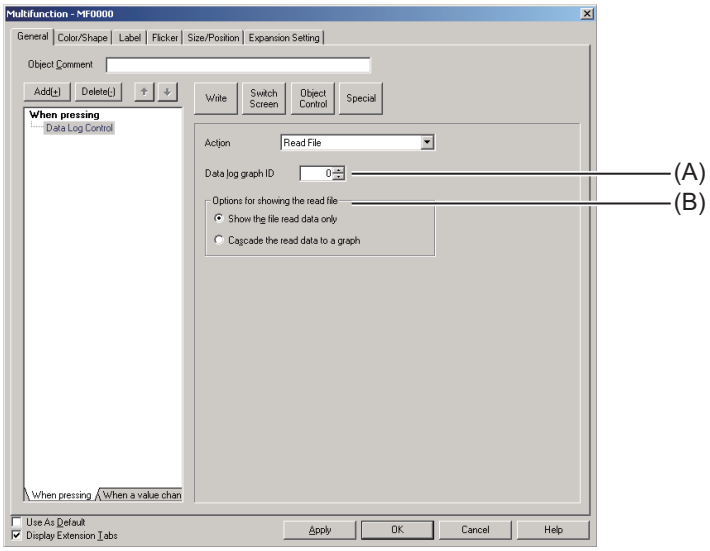
Start, Stop, Delete Data Log, and Write File

Specify the data log group for the control operation.



Read File

Specify the data log graph for the control operation and the display method for the graph that is read.



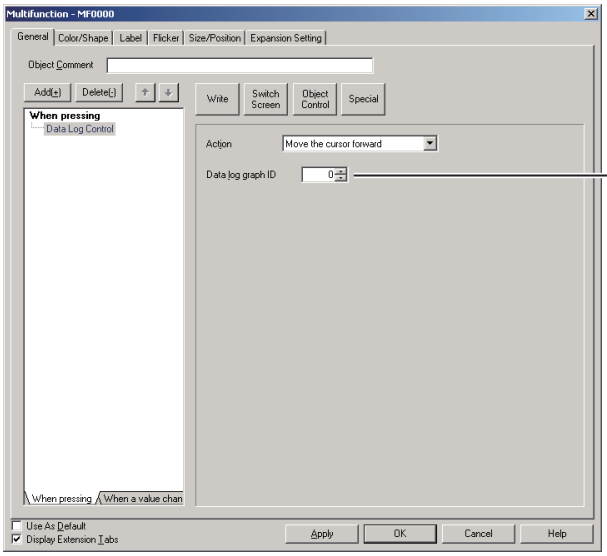
No.	Item	Details
(A)	Data log graph ID	Specifies the ID number of the data log graph for the control operation.
(B)	Options for showing the read file	The graph display method for the read file can be selected from one of the following two options. • Show the file read data only. • Cascade the graph on the file read data.

Additional Information

Data log graphs also have an *Options for showing the read file* Setting but the Multifunction Object settings are enabled when executing data log graph file read from a Multifunction Object.

Pause, Move the Cursor Forward, and Move the Cursor Backward

Specify the data log graph for the control operation.

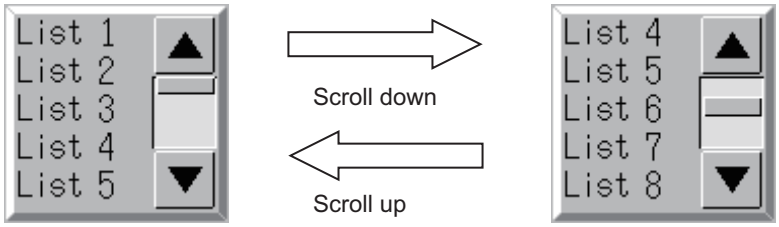


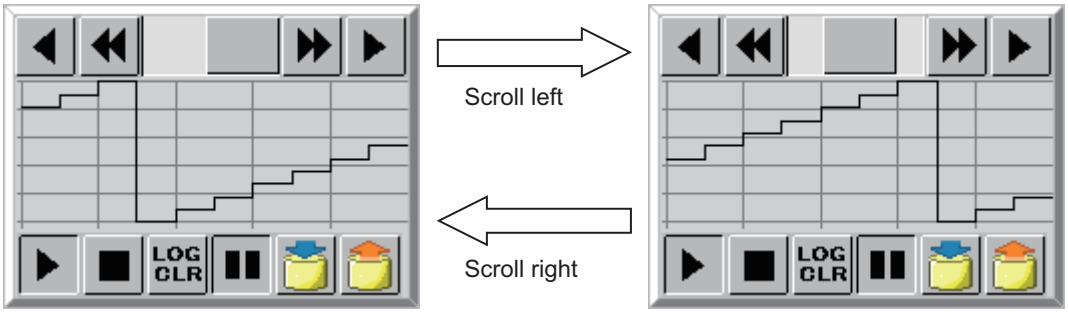
Scroll Object

Scroll bars on functional objects can be operated from Multifunction Objects. The functional object is scrolled in the specified direction for the specified amount.



Executable from Multifunction Objects





The following tables show the functional objects that can be scrolled using the object scroll function and the scrolling unit for that functional object.

Functional object	Scrolling unit
List Selection	Row
Broken-line Graph	Dot
Alarm/Event Summary/History	Row (scroll up/down)
	Item (scroll right/left)
Data Log Graph	Gradation
Data Block Table	Row (scroll up/down)
	Item (scroll right/left)
Contents Display (for string display)	Row (scroll up/down)
	Dot (scroll right/left)
Contents Display (for image display)	Dot

A functional object on the base screen or pop-up screen must be set for scrolling. A functional object on a different screen cannot be set, e.g., a functional object on the base screen cannot scrolled from a pop-up screen.

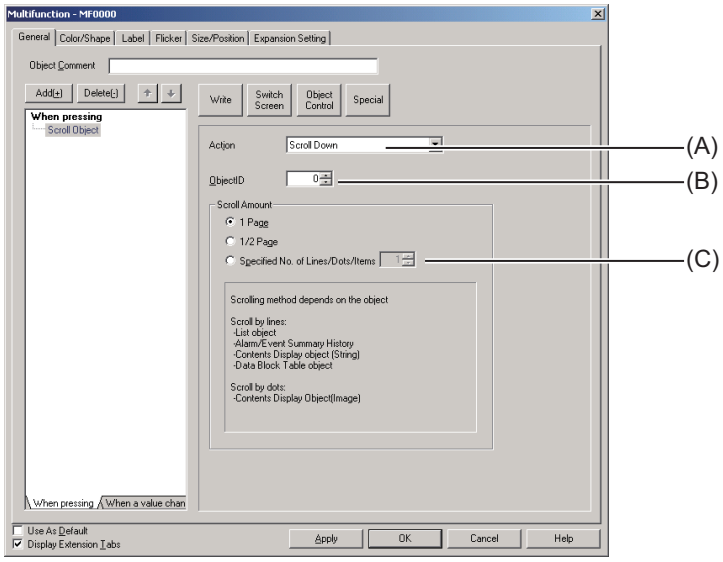
Functional objects on sheets also cannot be scrolled.

When creating a Multifunction Object on a sheet, a functional object with a specified ID number on the base screen or pop-up screen using that sheet must be scrolled.

Additional Information

- The operation for the object scroll function is the same as when the scroll button on the functional object itself is pressed.
- Functional objects that do not display the scroll button can still be scrolled from a Multifunction Object.
- The object scroll function will be disabled in the following cases.
  - If scrolling is attempted in a direction for which scrolling is not possible.
- Multifunction Object processing will be canceled in the following cases.
  - If an object with the specified ID does not exist.
  - If the object scroll function has been executed for a functional object that does not have a scroll bar.

Press the **Object Control** Button and select *Scroll Object* from the list that is displayed.



No.	Item	Details
(A)	Action	Select one of the following scroll directions. • Scroll Down • Scroll Up • Scroll Right • Scroll Left
(B)	Object ID	Specify the ID number for the functional object to be scrolled.
(C)	Scroll Amount	Specify the scroll amount. • 1 Page • 1/2 Page • Specified No. of Lines/Dots/Items If *Specified No. of Lines/Dots/Items* is selected, specify a scroll amount from 1 to 9,999.

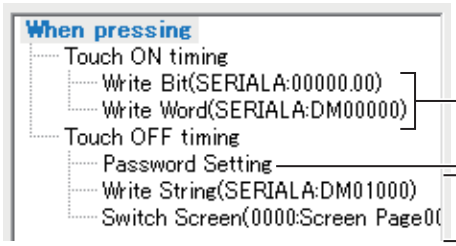
Password Setting

The password setting function requests a password before executing a functional object.

The functions set for execution after Password Setting are executed only after the password matching the set level has been entered.

The next functions will not be executed if an incorrect password has been entered three times or password input has been canceled.

For example, if the following settings are made, the Password Dialog Box will be displayed after Write Bit and Write Word are executed. If the correct password is entered, the Write String and Switch Screen functions will be executed.



(A) *Write Bit* and *Write Word* are executed. (Always executed before the Password Dialog Box displayed.)

(B) The Password Dialog Box is displayed.

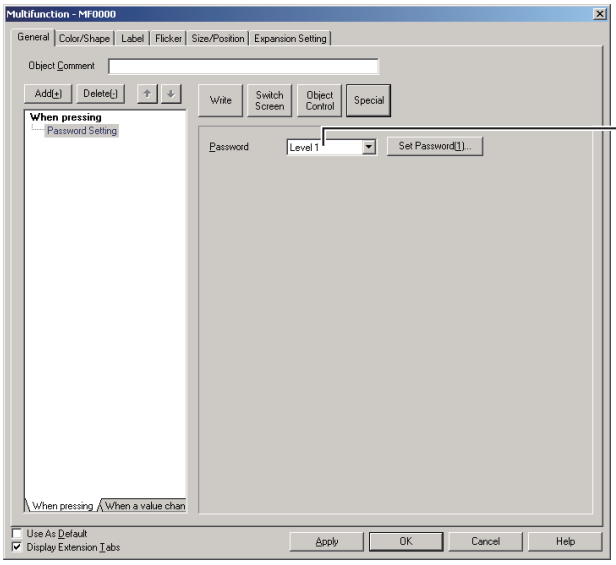
(C) If the correct password is entered, *Write String* and *Switch Screen* will be executed. If an incorrect password is entered three times or password input canceled, *Write String* and *Switch Screen* will not be executed.

Additional Information

- Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details on password functions.
- If the *Switch Screen* is set after *Password Setting* when the execution condition is set to *When pressing*, the screen will be switched even if the password is entered incorrectly three times or password entry is canceled.

  To use passwords to prevent the screen from being changed, set *Display Touch ON/OFF Condition* for the execution condition, and then set *Password Setting* and *Switch Screen* for *Touch OFF timing*.

Press the **Special** Button and select *Password Setting* from the list that is displayed.



(A)

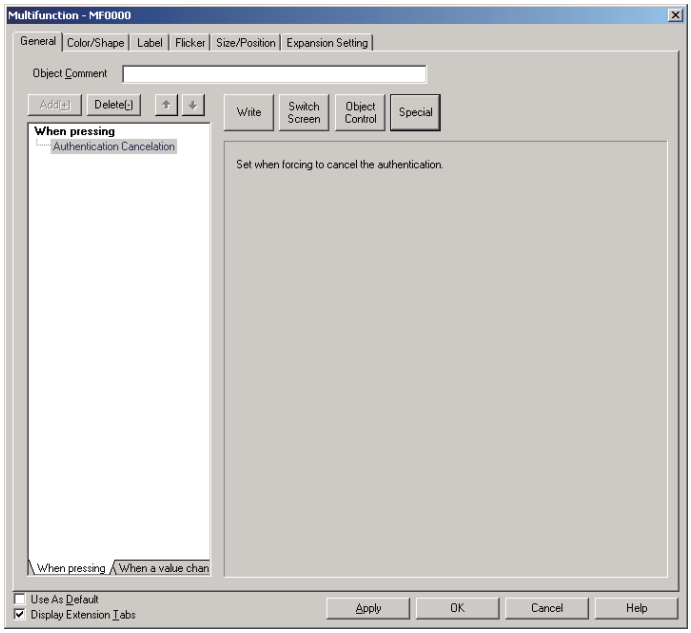
No.	Item	Details
(A)	Password	Select the password level (1 to 5). If no password is to be specified, select *None*.

Authentication Cancellation

Cancels authentication when an authentication level has been set.

Press the Special Button and select *Authentication Cancellation* from the list that is displayed.

There are no settings required for the authentication cancellation function.

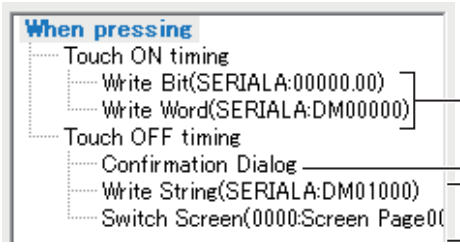


Confirmation Dialog Box

A confirmation message can be set to be displayed before execution of functions.

The functions set for execution after the confirmation dialog are executed only after the Yes Button has been pressed in the confirmation dialog box. The functions set for execution after the confirmation dialog will not be executed if the No Button has been pressed in the confirmation dialog box.

For example, if the following settings are made, a confirmation message will be displayed after Write Bit and Write Word are executed. If the **Yes** Button is pressed, the Write String and Switch Screen functions will be executed. If the **No** Button is pressed, the Write String and Switch Screen functions will not be executed.



(A) *Write Bit* and *Write Word* are executed.
(Always executed before the confirmation message is displayed.)

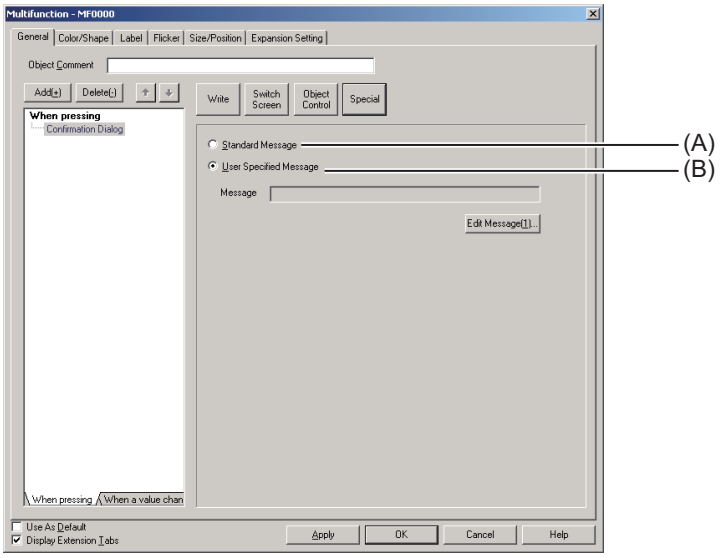
(B) A confirmation message is displayed.

(C) If the **Yes** Button is pressed, *Write String* and *Switch Screen* are executed.
If the **No** Button is pressed, *Write String* and *Switch Screen* are not executed.

Additional Information

Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details on confirmation dialog boxes.

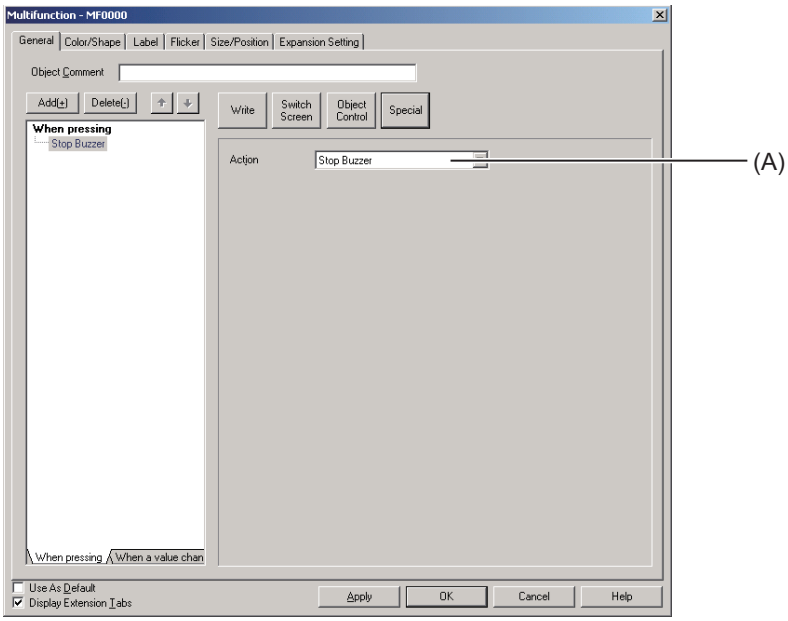
Press the **Special** Button and select *Confirmation Dialog* from the list that is displayed.



No.	Item	Details
(A)	Standard Message	Displays a standard message for confirming the write operation.
(B)	User Specified Message	Displays a unique confirmation messaged created by the user. Press the **Edit Message** Button to display the Dialog Settings Dialog Box to create a message. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Buzzer

The Buzzer function is used to sound and stop the buzzer. Press the **Special** Button and select *Buzzer* from the list that is displayed.

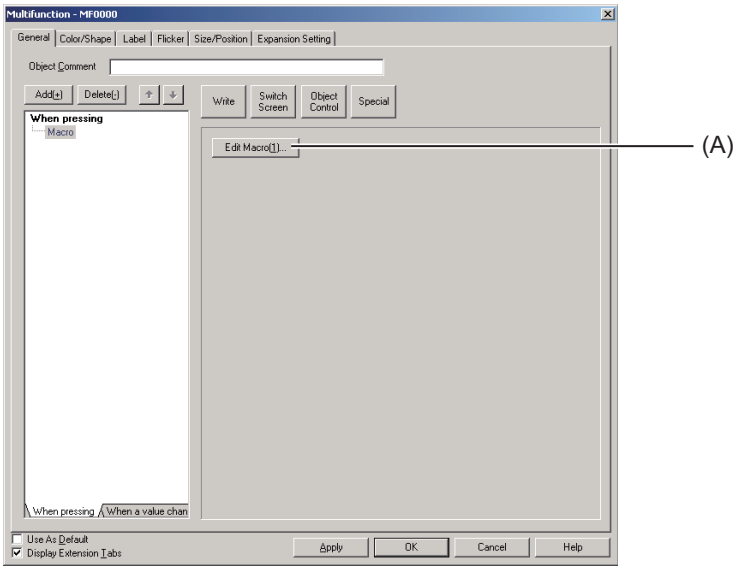


No.	Item		Details
(A)	Action		Sets the control operation for the buzzer function.
		Stop Buzzer	Stops the buzzer that is currently sounding. Any ON bit at $SB12 (continuous buzzer), $SB13 (short intermittent), or $SB14 (long intermittent) will turn OFF.
		Continuous Buzzer	Sounds a continuous buzzer. $SB12 will turn ON.
		Short Intermittent Buzzer	Sounds a short intermittent buzzer. $SB13 will turn ON.
		Long Intermittent Buzzer	Sounds a long intermittent buzzer. $SB14 will turn ON.

Macro

The macro function can be used to set macros. Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for details on macros.

Press the **Special** Button and select *Macro* from the list that is displayed.

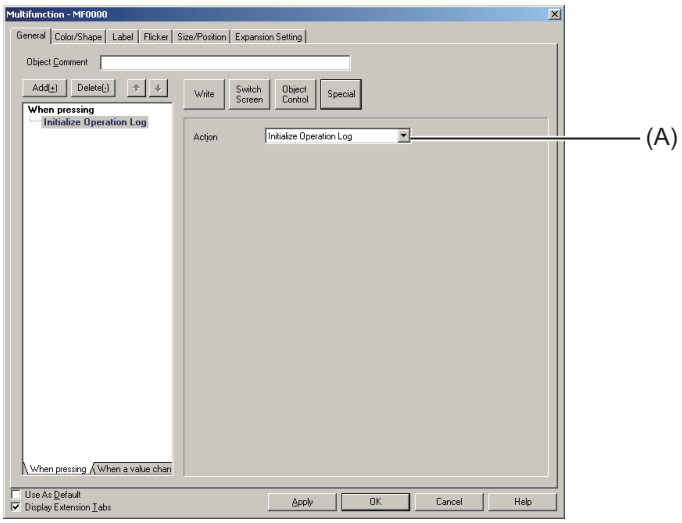


No.	Item	Details
(A)	Edit Macro	Displays the Edit Macro Dialog Box to create new macros or edit macros.

Operation Log Control

The operation log control function can be used to initialize or save the operation log.

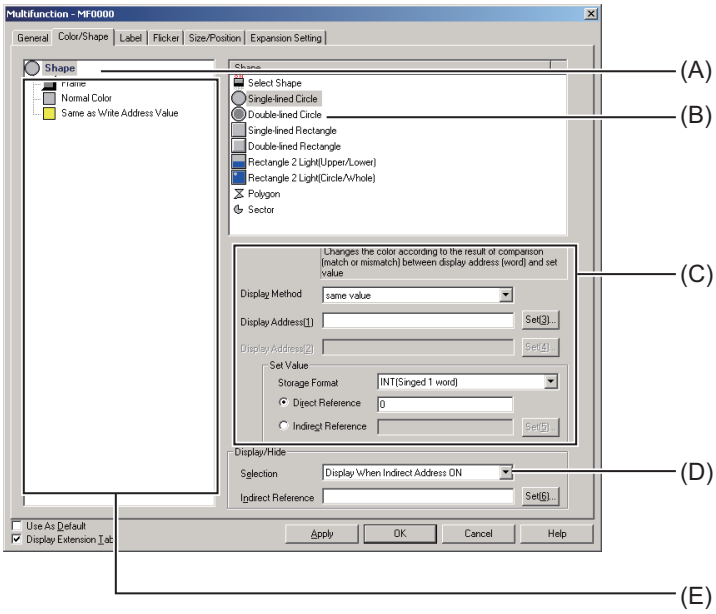
Press the **Special** Button and select *Initialize Operation Log* from the list that is displayed.



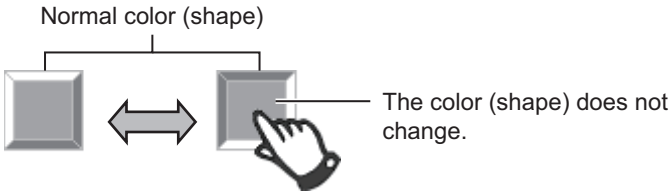
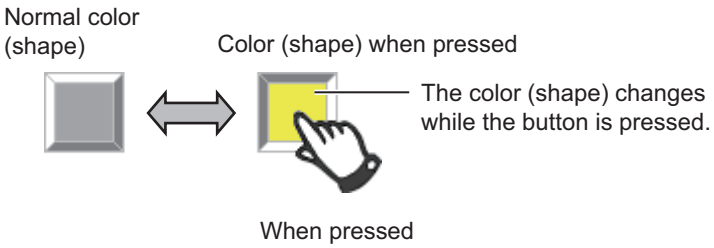
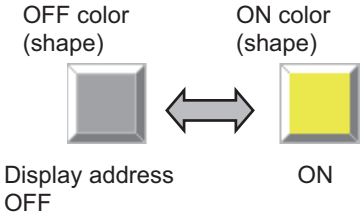
No.	Item	Details
(A)	Action	Sets the control action for the operation log from the following options. • Initialize operation log. • Save operation log.

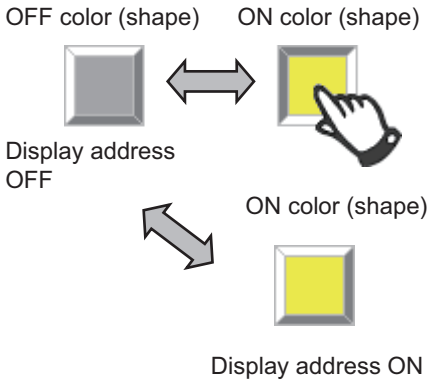
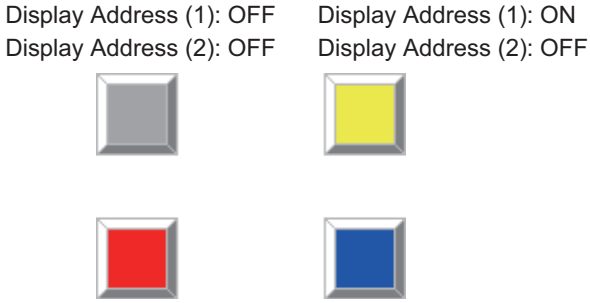
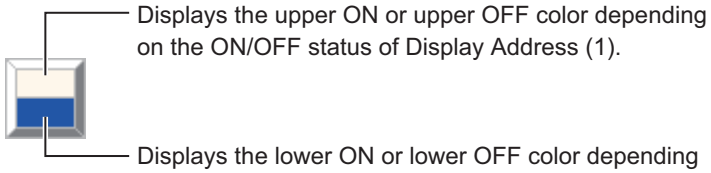
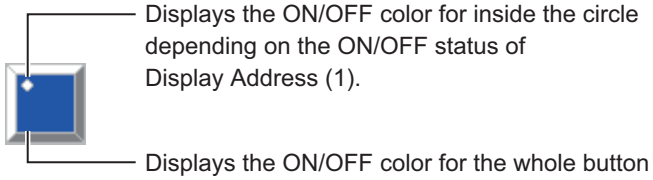
Color/Shape

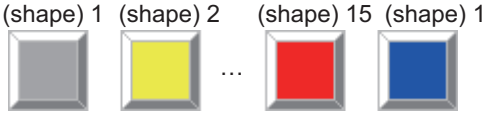
Sets the color and shape of the Multifunction Object.



No.	Item	Details
(A)	Shape	Select to make shape settings for the Multifunction Object.

No.	Item		Details
(B)	Shape		Select one of the following Multifunction Object shapes.
		Select Shape	Displays the specified shape file when the Multifunction Object is pressed or according to the specified communications address value.
		Single-lined Circle	Displays the specified color when the Multifunction Object is pressed or according to the specified communications address value.
		Double-lined Circle	Displays the specified color when the Multifunction Object is pressed or according to the specified communications address value.
		Single-lined Rectangle	Displays the specified color when the Multifunction Object is pressed or according to the specified communications address value.
		Double-lined Rectangle	Displays the specified color when the Multifunction Object is pressed or according to the specified communications address value.
		Rectangle 2 Light (Upper/Lower)	Displays the specified color according to the values for two specified communications addresses.
		Rectangle 2 Light (Circle/Whole)	Displays the specified color according to the values for two specified communications addresses.
		Polygon	Displays the specified color when the Multifunction Object is pressed or according to the specified communications address value.
		Sector	Displays the specified color when the Multifunction Object is pressed or according to the specified communications address value.
(C)	Display Method		Selects the method for color/shape changes for the specified shape. Refer to *Display Method Settings* on page 2-232 later in this section for details.
		• Normal Color • Normal Shape	Always displays the same shape/color, whether or not the Multifunction Object is pressed. 
		When Pressed	Switches between the normal color (shape) and the pressed color (shape) when the Multifunction Object is pressed. 
		Bit Address	Switches between the ON color (shape) and OFF color (shape) depending on the ON/OFF status of the specified display address. 

No.	Item	Details
(C)	Bit Address/When Pressed	Switches between the ON color (shape) and OFF color (shape) depending on the ON/OFF status of the specified display address. Or displays the ON color (shape) while the Multifunction Object is pressed. 
	• Bit Address 1, 2 (4 Colors) • Bit Address 1, 2 (4 Shapes)	Switches color (shape) depending on the ON/OFF status of two specified display addresses. 
	Bit Address 1, 2 (Upper/Lower)	This option can be selected only when *Rectangle 2 Light (Upper/Lower)* has been specified. Switches the upper and lower display colors depending on the ON/OFF status of two specified display addresses. 
	Bit Address 1, 2 (Circle/Whole)	This option can be selected only when *Rectangle 2 Light (Circle/Whole)* has been specified. Switches the whole display color and the circle section display color depending on the ON/OFF status of two specified display addresses. 

No.	Item	Details
(C)	Same Value	Displays the set value match color (shape) if the contents of the specified address and the set value match. Displays the normal color (shape) if the values do not match. Normal color (shape) Set value matched color (shape)  Display address contents and set value do not match. Display address contents and set value match.
	• Word Address (16 Colors) • Word Address (16 Shapes)	Displays the set color (shape) according to the value at the specified communications address (0 to 15). Color (shape) 1 Color (shape) 2 … Color (shape) 15 Color (shape) 16  Display address value Value=1 Value=14 Value=15
(D)	Display/hide	Sets whether to display or hide the Multifunction Object. If *Indirect Reference* is selected, switches between display/hide depending on the ON/OFF status of the set communications address. Only bit addresses can be specified under *Indirect Reference*.
(E)	Color/Shape List	Sets the color, shape file, frame and other settings according to the selected shape and display method. Refer to *Setting Color/Shape* on page 2-234 later in this section for details.

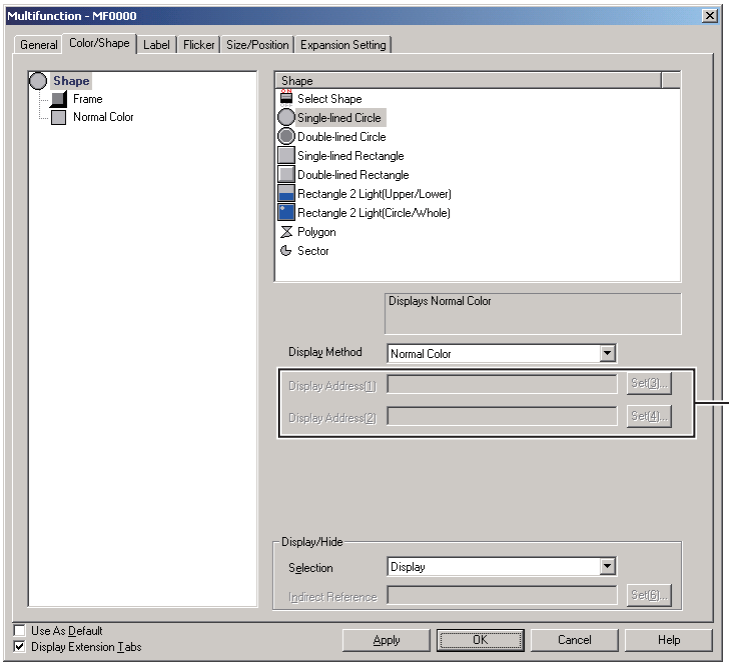
● Setting Procedure

1. Select **Shape** from the Color/Shape List at the left of the Dialog Box. (**Shape** will be selected by default when the Color/Shape Tab is opened.)
2. Select the Multifunction Object shape.
3. Select the display method. Make the communications address and other settings according to the selected display method.
4. Make the display/hide control settings.
5. Make the frame, color, and shape settings.

Display Method Settings

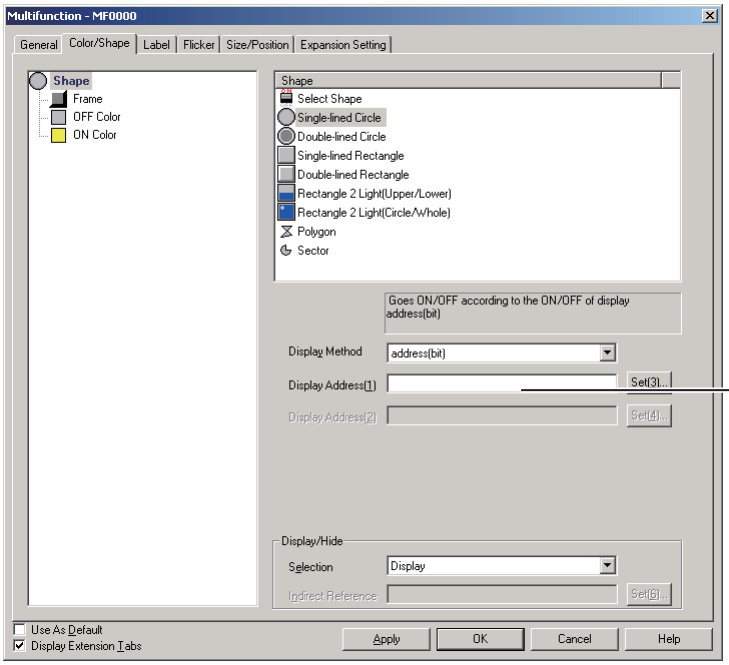
The action and setting items depend on the selected display method.

- Normal Color (Normal Shape) and When Pressed



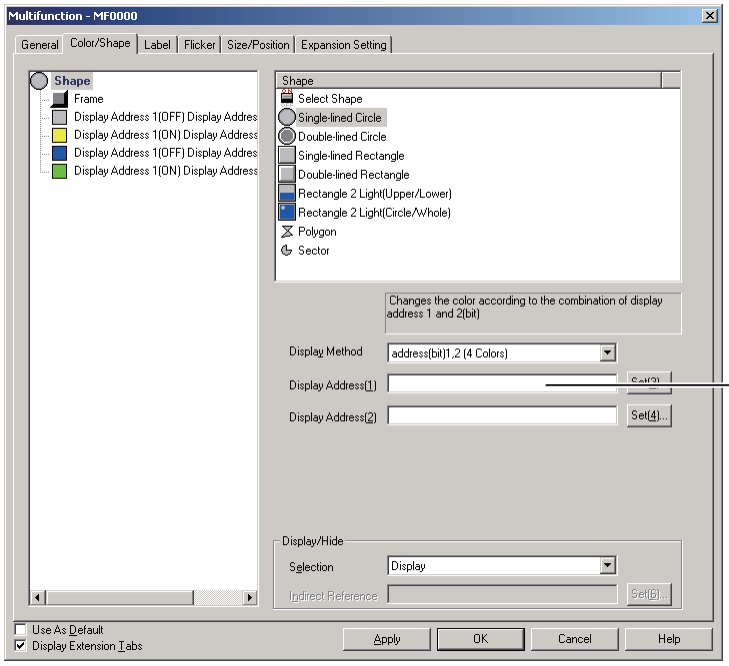
No settings required.

- Bit Address, Bit Address/When Pressed, and Word Address (16 Colors)

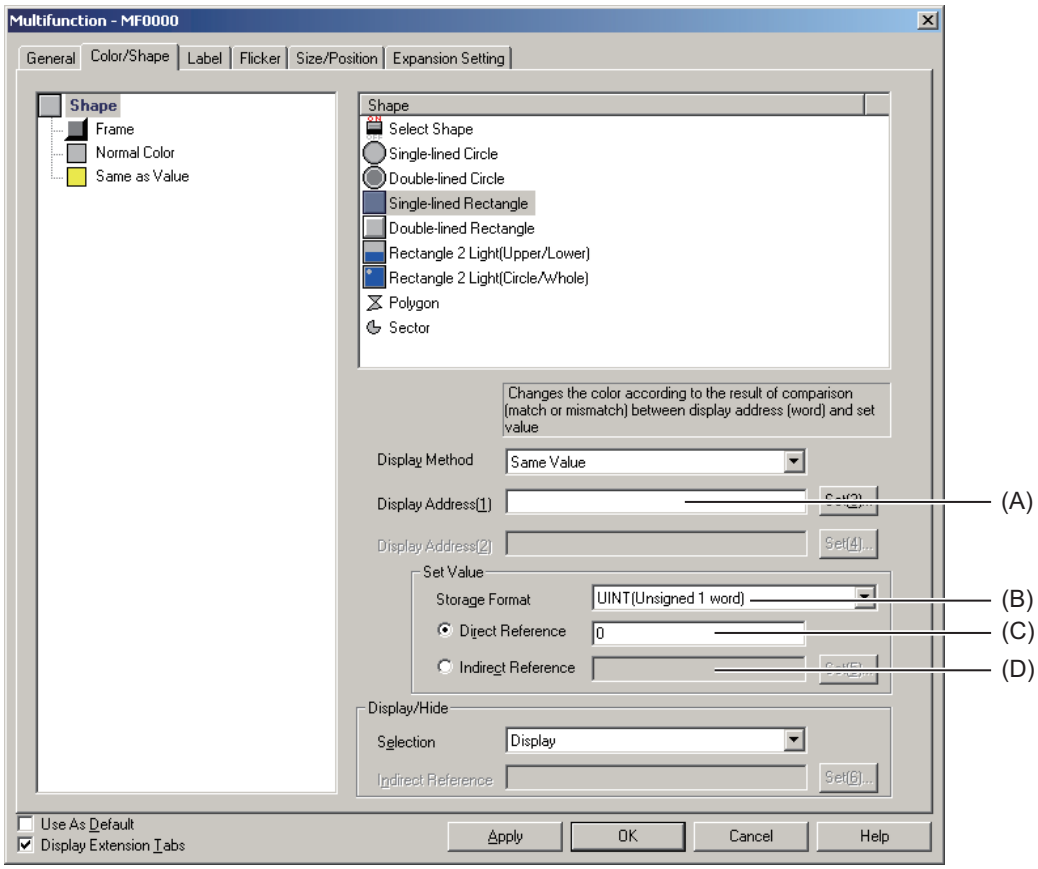


Sets display address 1.

- Bit Address 1, 2 (4 Colors), Bit Address 1, 2 (Upper/Lower), and Bit Address 1, 2 (Circle/Whole)



- Same Value



No.	Item	Details
(A)	Display Address (1)	Sets the communications address for comparison with the *Set Value*.

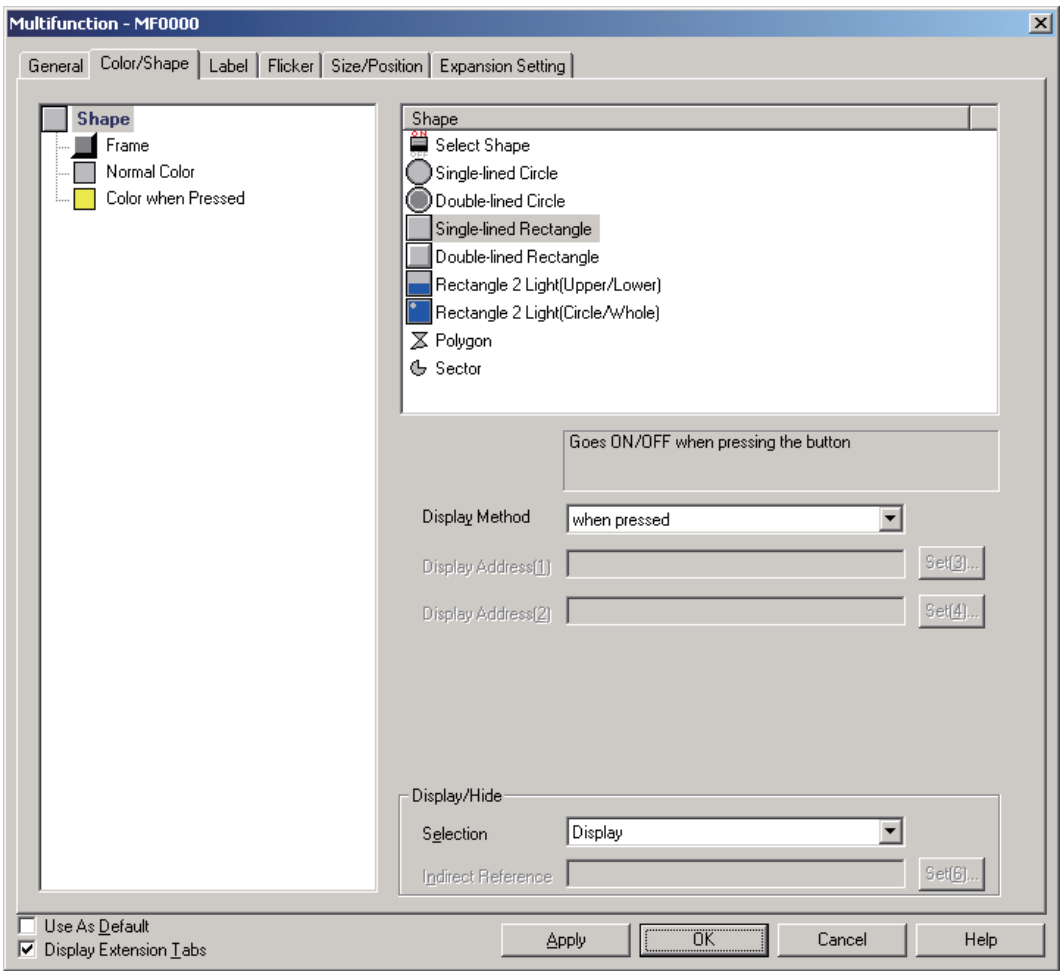
No.	Item	Details
(B)	Storage Format	Select the storage format for the numeric value stored at the communications address from the following. • SINT (signed, 1 byte) • USINT (unsigned, 1 byte) • INT (signed, 1 word) • UINT (unsigned, 1 word) • DINT (signed, 2 words) • UDINT (unsigned, 2 words) • REAL (real number) • BCD2 (unsigned, 1 words) • BCD2 (unsigned, 2 words) • BCD1 (signed (leftmost digit: F), 1 words) • BCD1 (signed (leftmost digit: F), 2 words) • BCD2 (signed (leftmost bit: 1), 1 words) • BCD2 (signed (leftmost bit: 1), 2 words)
(C)	Direct Reference	Sets the value (set value) for comparison with the display address.
(D)	Indirect Reference	Sets a communications address for comparison with the display address.

● Setting Color/Shape

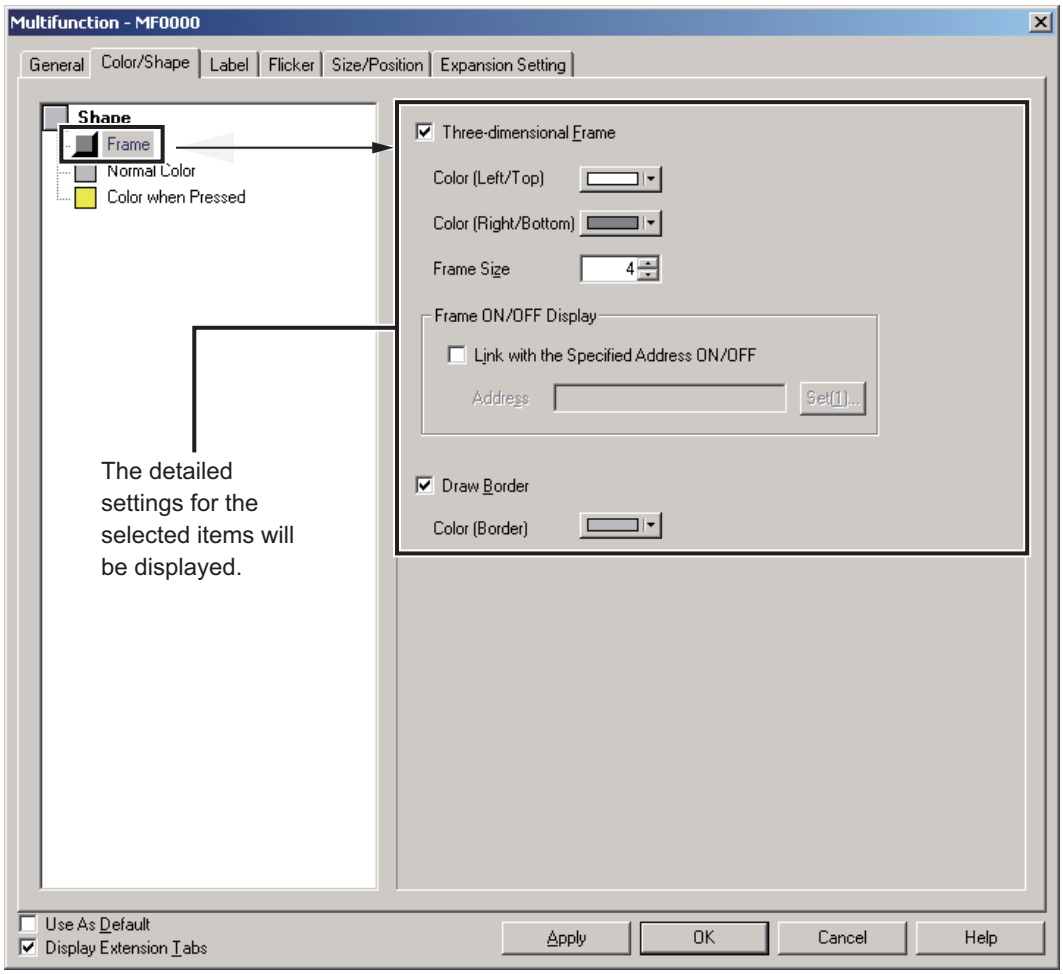
- Method for Setting Color/Shape List

1 Displays the setting items in the Color/Shape List corresponding to the selected *Shape* and *Display Method*.

2 Click the items to be set.



3 The detailed setting items are displayed. Make the required settings.



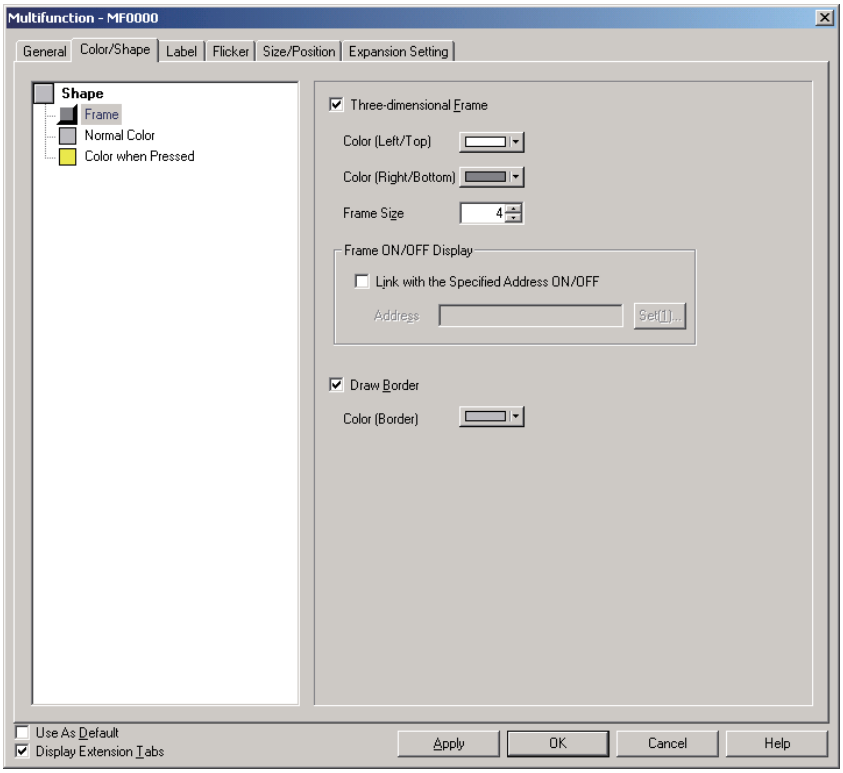
4 Repeat steps 2 to 3 until all the settings have been made.

The following items are displayed in the Color/Shape List. (The item names depend on the selected combination of *Shape and Display Method*.)

Item	Details
Frame	Selected to make the frame settings. The frame settings are made when shapes other than *Polygon* and *Sector* are selected.
Shape	Selected to specify the shape file to be displayed. The shape settings are made when *Select Shape* has been selected under *Shape*.
Color	Selected to make the color settings. The color settings are made when a selection other than *Select Shape* has been made under *Shape*.
Line	Selected to make the displayed line settings. The line settings are made when *Polygon* and *Sector* are selected under *Shape*.
Shade	Selected to make shade settings. The line settings are made when *Polygon* and *Sector* are selected under *Shape*.
Angle	Selected to make the start angle and end angle settings for sectors. The angle settings are made when *Sector* has been selected under *Shape*.

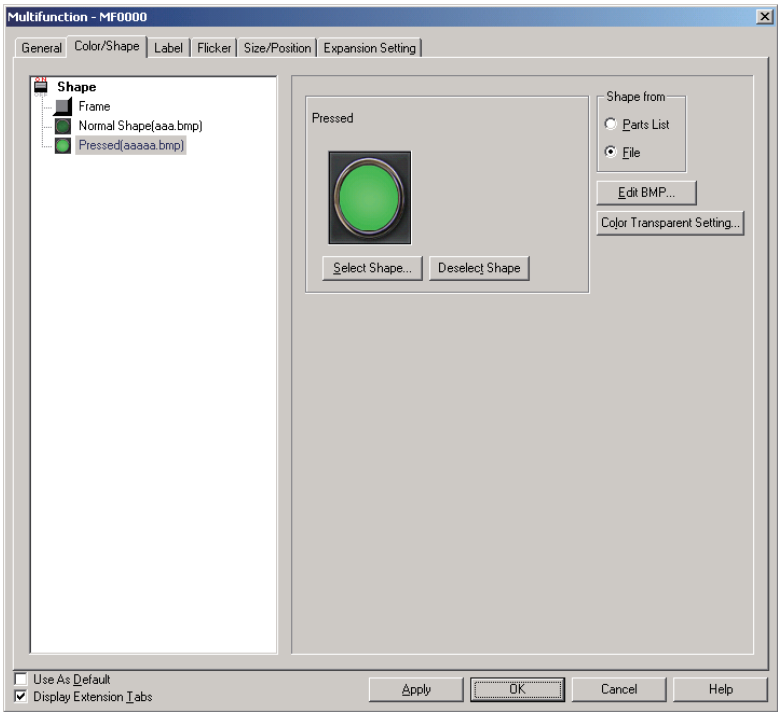
- Frame

  Specifies the frame color and size and changes the shape and color of the button. Refer to *2-8-12 Frames* on page 2-106 for details.



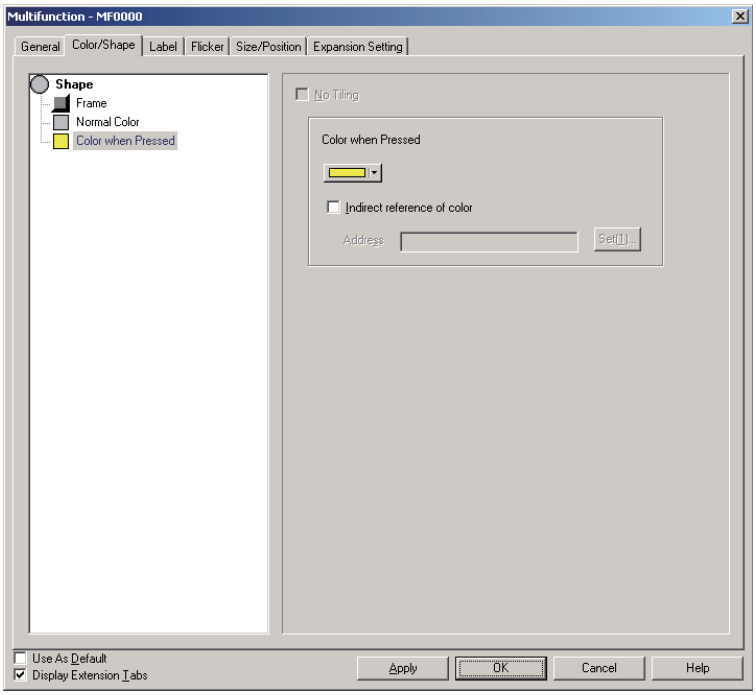
- Shape

  Sets the displayed shape file. Refer to *2-8-9 Selecting Shape (Color/Shape Tab)* on page 2-98 for details.



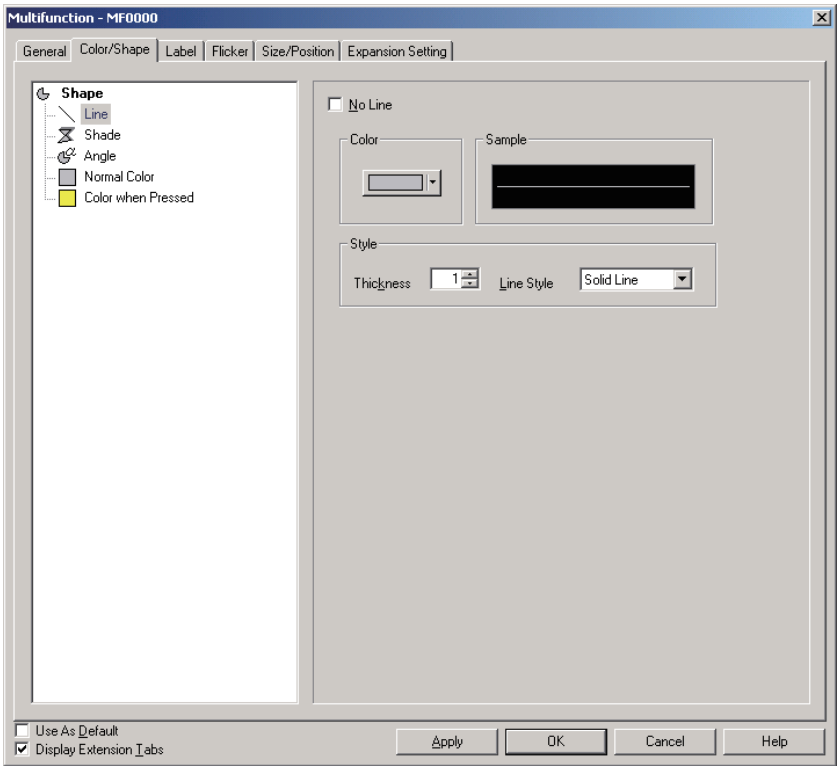
- Color

  Sets the display color. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.



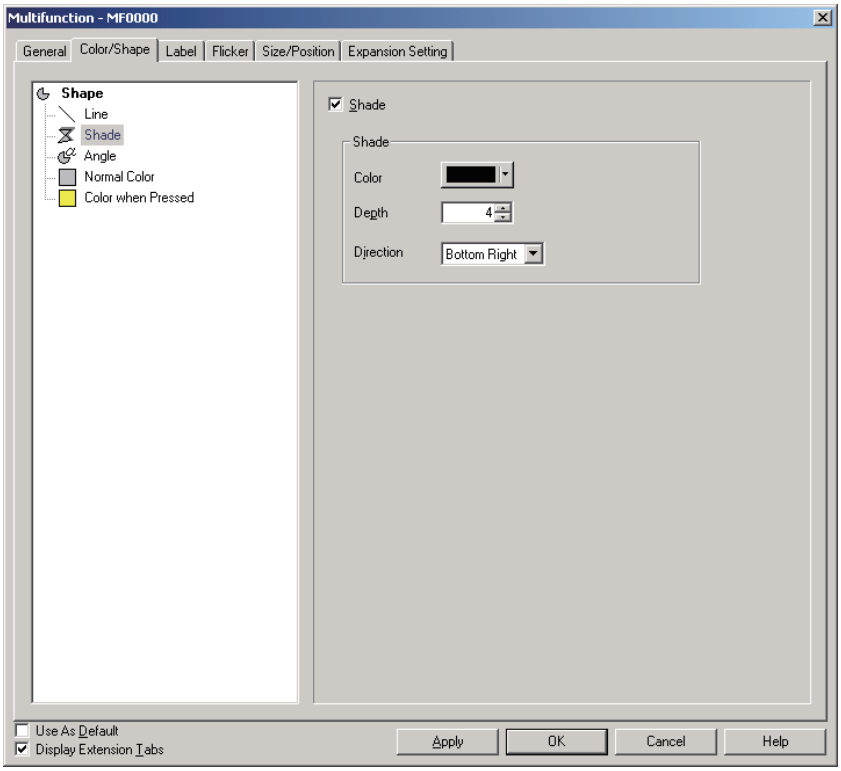
- Line

  Sets the line type for polygons and sectors. Refer to *Line* on page 2-66 for details.



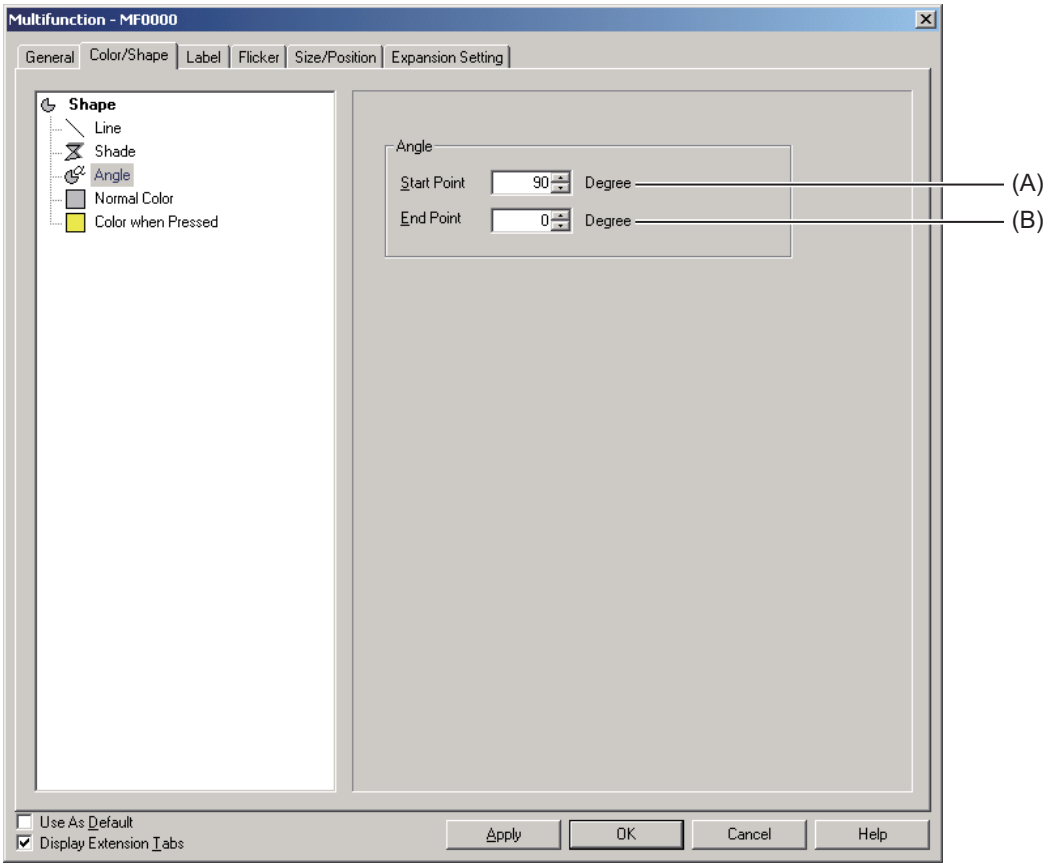
- Shade

  Sets the shading for polygons and sectors. Refer to *Frame, Shade, and Beveling* on page 2-70 for details.



- Angle

  Sets the start and end angles for polygons and sectors.



No.	Item	Details
(A)	Start Point	Sets the start angle between 0 and 359 (°).
(B)	End Point	Sets the end angle between 0 and 359 (°).

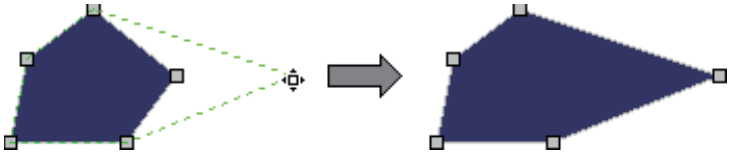
When *Polygon* or *Sector* is selected, the shape can be changed using the following method.

(1) Select the Multifunction Object for changing the shape.

(2) Select **Edit – Edit Node**.

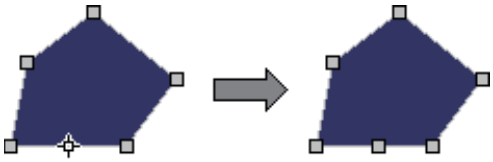
(3) Squares (■) will be displayed at the nodes.

(4) Place the node on a corner and, when the cursor shape changes to ✣, drag the node to the desired position.

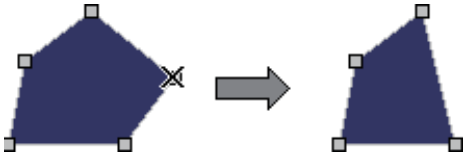


Nodes can be added or deleted for polygons.

(5) Press and hold the **Ctrl** Key and bring the cursor close to the outline. When the cursor shape changes to ✣, click on the position on the outline where a node is to be added.



(6) Press and hold the **Ctrl** Key and bring the cursor close to the node to be deleted. When the cursor shape changes to ✕, click on the node to be deleted.



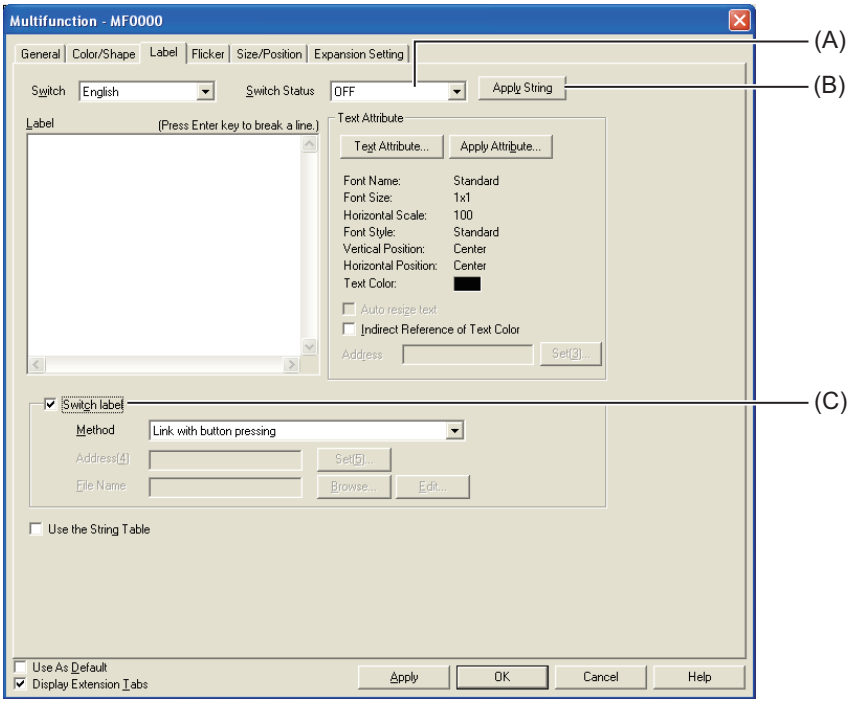
(7) Right-click to exit the node edit mode.

Label

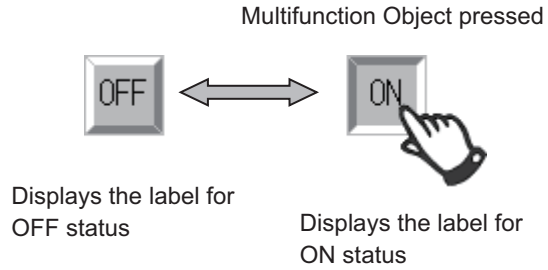
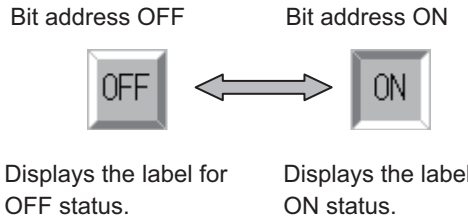
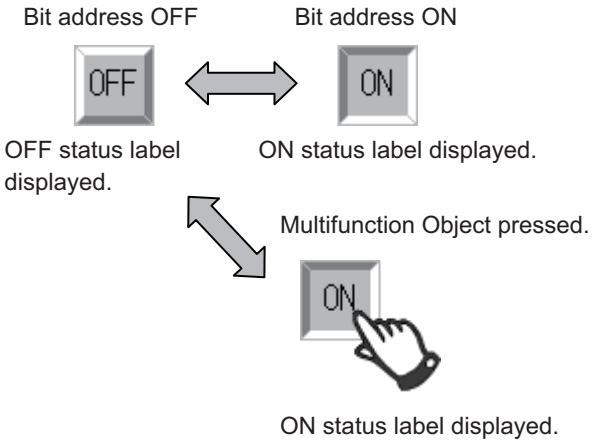
This function sets labels. Refer to *2-8-10 Labels* on page 2-101 for information on basic settings. This section describes the settings for Multifunction Objects only.

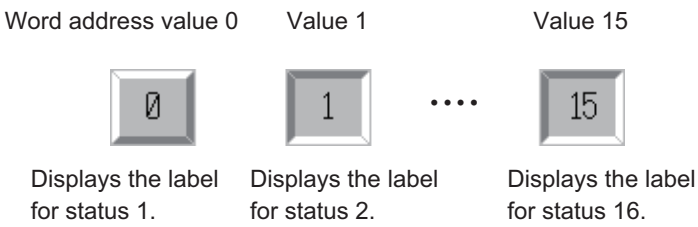
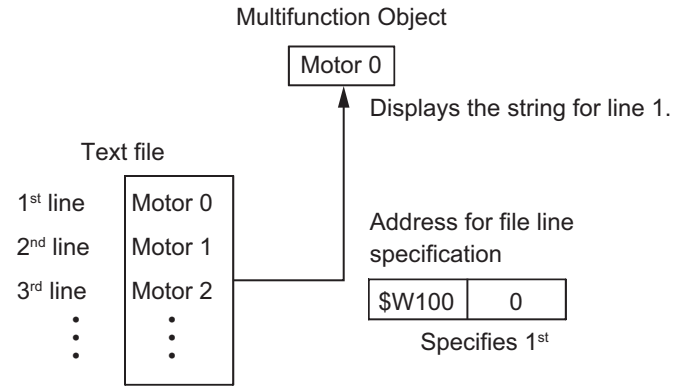
The following methods can be used to switch labels using Multifunction Objects.

- Switch labels by pressing the Multifunction Object.
- Switch labels when the specified bit address turns ON/OFF.
- Switch labels by turning ON/OFF a bit address or by pressing the Multifunction Object.
- Switch labels according to the contents of the specified word address.
- Read and display a label string from a specified file.



No.	Item	Details
(A)	Switch Status	Switches the status for setting labels.
(B)	Apply String	Uses the current character string for all object states. The string is used as the label not only for the selected object, but for all other object states as well. If the Switch Status cannot be set, then the Apply String Button can also not be set.

No.	Item	Details
(C)	Switch label	Select this checkbox to switch label display and select the method for label switching under *Method*.
	Link with button pressing	Switches labels when a Multifunction Object is pressed. Select *OFF* under *Switch Status* and set the label for before the Multifunction Object is pressed. Select *ON* under *Switch Status* and set the label for when the Multifunction Object is pressed. 
	Link with bit address ON/OFF	Switches the label according to the ON/OFF status of the bit address set under *Address*. Select *OFF* under *Switch Status* and set the label for when the bit address is OFF. Select *ON* under *Switch Status* and set the label for when the bit address is ON. 
	Link with bit address ON/OFF/ button pressing	Switches the labels when the bit address set under *Address* turns ON or OFF or when the Multifunction Object is pressed. Select *OFF* under *Switch Status*, set the label for when the bit address and button are OFF, and set the label for when the bit address and button are ON.  If the bit address is turned OFF while the Multifunction Object is being pressed, an ON status label will be displayed.

No.	Item	Details
(C)	Link with word address value	Switches the label according to the value (0 to 15) of the word address set under *Address*. Select *Status 1 (Value 0)* to *Status 16 (Value 15)* under *Switch Status* and set the label to be displayed according to the word address value (0 to 15).  Sets the contents of the word address as a binary value. Labels will not be displayed when the word address is set to values other than 0 to 15.
	Refer to the file	Reads and displays the string at the line in the text file set under *File Name*. The line is specified by the value at the word address specified under *Address*. The first line is specified as 0.  Labels will not be displayed when the word address is set to a value outside the range.

Additional Information

The file name specifications for the text file set under *File Name* when *Refer to the file* is selected are as follows:

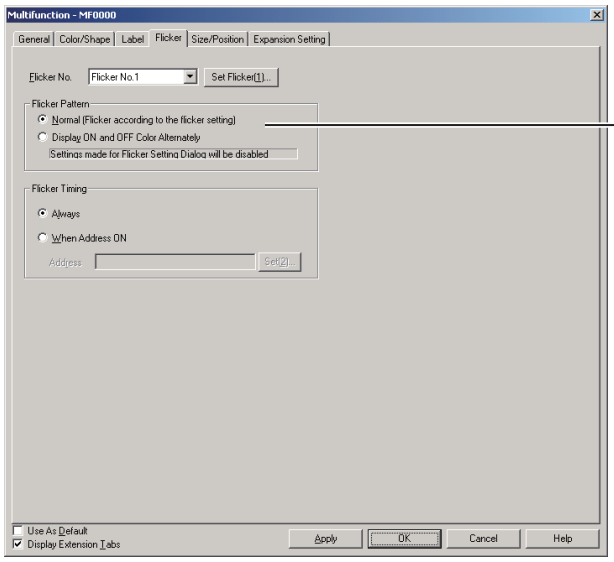
File name: 8 characters + extension (txt)

The following characters can be used in the file name. Double-byte characters cannot be used.

English alphanumerics, underscore (_), dollar sign ($), and period (.)

Flicker (Extension Tab)

Make settings on the Flicker Tab Page to make functional objects flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for information on basic settings. This section describes the settings for Multifunction Objects only.



No.	Item	Details
(A)	Flicker Pattern	Used to set either flicker according to the flicker colors selected under *PT – Flicker – Flicker settings* or flicker using the ON/OFF colors set on the Color/Shape Tab Page. The *Display ON and OFF Color Alternately* Option can be selected only when the following options are set under *Flicker Pattern* on the Color/Shape Tab Page. • Color when pressed • Bit address • Bit Address/Color when pressed

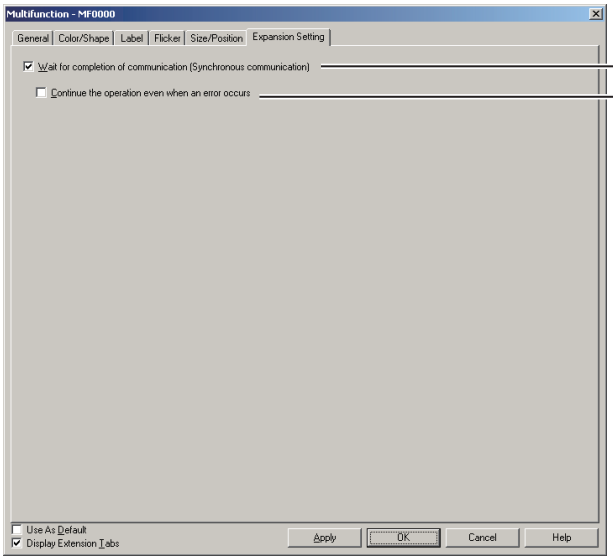
Size/Position (Extension Tab)

Displays and sets the size and position of functional objects. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

Expansion Settings (Extension Tab)

Used to set the operations when writing to or reading from communications addresses.

Refer to the previous section *2-11-4 Writing and Reading Communications Addresses* on page 2-177 for details of operations.



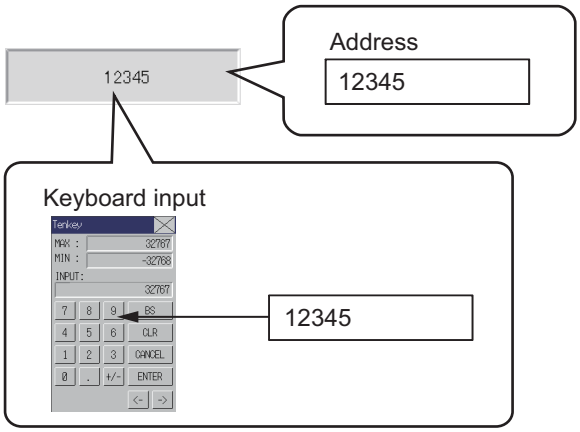
No.	Item	Details
(A)	Wait for completion of communication (Synchronous communication)	When this checkbox is selected, the next operation will be started only after the read/write results response has been received. When this checkbox is not selected, the next operation will be started without waiting for the read/write results response.
(B)	Continue the operation even when an error occurs	Sets whether or not to execute the next operation after an error has occurred when reading or writing to a communications address. When this option is not selected, the Multifunction Object execution stops when a communications error occurs. When this option is selected, the next operation is executed even if a communications error occurs. This option is enabled only when the Wait for completion of communication (Synchronous communication).

2-12 Display and Input Objects

Display and input functional objects set and display the contents of a specified address on the allocated host. Numeral display and input, string display and input, thumbwheel switch, and list selection are available.

2-12-1 Numeral Display and Input

Numeral display and input objects display the numeric contents of a specified address and enable the contents to be changed by numeric input from the tenkey pad.



Select **Functional objects – Numeral display & input** or the  icon in CX-Designer to create a numeral display and input object.

Additional Information

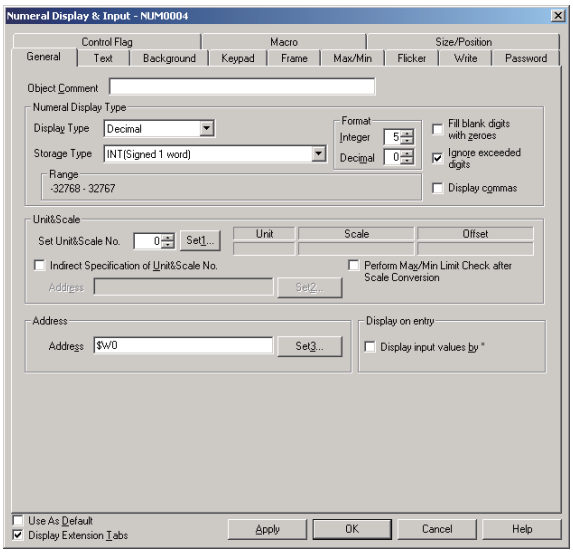
The numeral display and input object can be used for numeral display only (i.e., no input) by changing the control flag settings.

Input is enabled under the default control flag settings. The following procedure must be performed to use the display-only function.

(1) Display the Numeral Display and Input Functional Object Properties Dialog Box.
(2) Click *Display Extension Tabs* and select the displayed Control Flag Tab Page.
(3) Select either *Enable* or *Disable under the Input*.

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for numeral display and input.

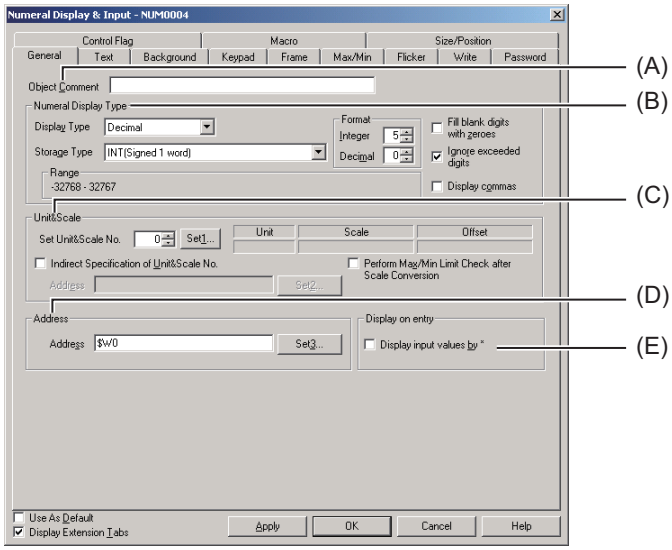


General:	Sets the address and numeral display type and units.
Text:	Sets the text attributes for the displayed numerals.
Background:	Sets the background color for numeral display.
Keypad:	Sets the input method and display position and size of the keypad.
Frame:	Sets the frame display for numeral display.
Max/Min*1:	Sets the maximum and minimum limits for input. This Tab Page also sets the watch minimum limit and watch maximum limit, as well as the colors displayed when the input exceeds the watch minimum or watch maximum limit value.
Flicker*1:	Sets the flicker display.
Write*1:	Sets whether or not a confirmation message is displayed when values are written to addresses.
Password*1:	Sets whether or not a password input field is displayed when values are written to addresses.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets macros that operate when values are input or address contents change.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the address and numeral display type and units.



No.	Setting		Details
(A)	Object Comment		Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Numeral display type		Various numeral displays can be set through a combination of display and storage types. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details on numeral display and storage types.
		Display type	Select from the following 4 display formats. • Decimal • Hexadecimal • Binary • Octal
		Storage type	Select from the following 11 storage formats. • SINT (signed, 1 byte)*1 • USINT (unsigned, 1 byte)*1 • INT signed, 1 word*1 • UINT unsigned, 1 word • DINT signed, 2 words*1 • UDINT unsigned, 2 words • LINT (signed, 4 words)*1 • ULINT (unsigned, 4 words) • REAL (real number)*1 • LREAL (double-precision real number)*1 • BCD2 unsigned, 1 word*1 • BCD2 unsigned, 2 words*1 • BCD1 signed (leftmost digit: F), 1 word*1 • BCD1 signed (leftmost digit: F), 2 words*1 • BCD2 signed (leftmost bit: 1), 1 word*1 • BCD2 signed (leftmost bit: 1), 2 words*1

No.	Setting	Details
(B)	Format*2 Integer Decimal	Specifies the number of display digits for integers and decimals. The numeral display can be changed to any format. Fractions can only be set when *Decimal* is selected as the display format. Example: When set to 2 integer digits, 1 decimal place, and to not ignore extra digits: • Actual value: 9.51 → Numeral display: 9.5 • Actual value: 99.51 → Numeral display: 99.5 • Actual value: 999.51 → Numeral display: 99.5 As shown in the above table, only the decimal fraction is rounded off to the specified number of digits.
	Fill blank digits with zeros	Inserts zeros to fill the specified number of display digits. For example, if the number of display digits is set to 4 and the value is 1, the display will be 0001.
	Ignore exceeded digits	Ignores digits over specified number of display digits. For example, if the number of display digits is set to 2 and the value is 123, the display will be 23.
	Display commas	Inserts a comma every 3 digits.
(C)	Unit and scale	Converts the contents of the address to the set scale and displays the value with units. Tick *Perform Max/Min Limit Check after Scale Conversion* to execute the check of maximum and minimum limits after the contents have been converted to the set scale. Refer to *2-8-3 Unit and Scale (General Tab)* on page 2-76 for information on units and scales.
(D)	Address	Sets the destination address accessed and written to by numeral display and input functional objects. Only a word address can be set.
(E)	Display on entry	If *Display input characters by* * is selected, characters input using the virtual keyboard or the Key Buttons or characters being monitored are indicated by *.

*1. Can be selected only when display format is set to *Decimal*.

*2. When set to *Fill blank digits with zeros*, 9.51 in the example in the table will be displayed as 09.51. Tick *Display commas* to insert commas after every 3 digits in an integer, e.g., 999,999.

The number of digits that can be input is as follows:

- For signed values with no decimal places =No. of integer digits + 1 (for sign)
- For signed values with decimal places =No. of integer digits + No. of decimal places + 1 (for sign) + 1 (for decimal point)
- For unsigned values with no decimal places =No. of integer digits
- For unsigned values with decimal places =No. of integer digits + No. of decimal places + 1 (for decimal point)



Additional Information

- When pasting CX-Designer functional objects, use the numeral 9 and create a number such as 9,999.99 to set the number of display digits by default.
- If the unit and scale are set and values input using a numeral display and input functional object, the value converted using the magnification (scale) and offset is stored in the specified address.

  For example, if *Decimal* and *INT* are selected under *Numeral display type*, a scale of 10 and offset of 0 are selected under *Unit and scale*, and 30 is input from the tenkey pad for the object, the value stored to the address will be the input value (30) divided by the scale (10), i.e., 3.

  The decimal places will be rounded off.

  For example, if the input value is 37, the result of the division by the scale of 10 will be 3.7. However, with the rounding off of the decimal points, the value stored to the address will be 4.
- If a decimal with many digits is set as the scale, the test and display values may differ. The contents of the address, however, will be the same.

Text Tab Page

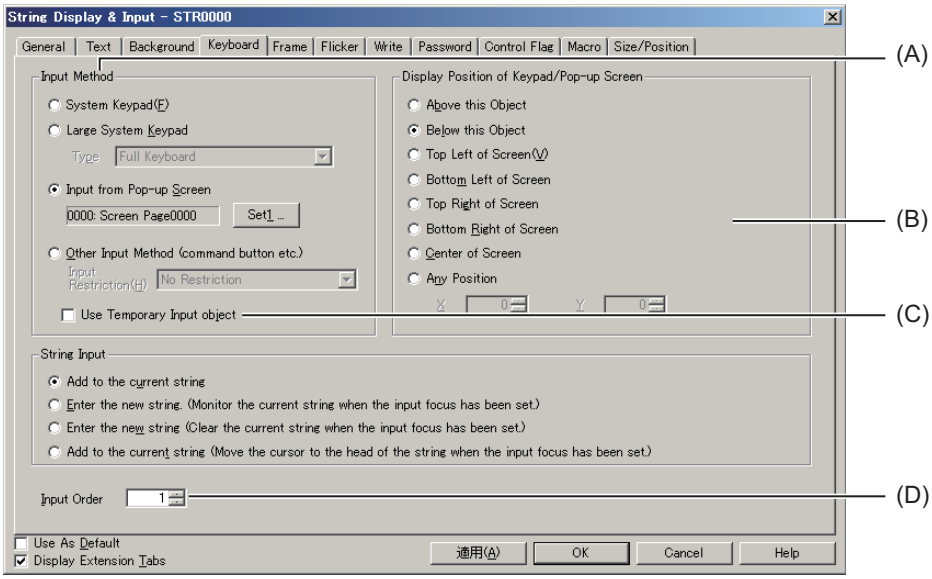
Sets the text attributes, such as font and color, for the display string. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

Set the fill color for the background of functional objects. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

Keypad Tab Page

Sets the display position and size of the keypad.



No.	Setting	Details
(A)	Input method	Select one of the following input methods for numerals. • System keypad. • Large system keypad. • Input from a pop-up screen • Other input method (e.g., using Command Buttons) The input method can be restricted to use only functional objects or barcodes.
(B)	Display Position of Keypad/Pop-up Screen	Select one of the following display positions for keypad and pop-up screen display for numeric input. • Below This Object • Above This Object • Top left, bottom left, top right, bottom right, or center of screen • Any Position (The top left position of the keypad or pop-up screen is specified.)
(C)	Use Temporary Input object	Select to use a temporary input object when inputting a value. Selection is possible only when *Input from Pop-up Screen* or *Other Input Method (command button etc.)* is set under Input method.
(D)	Input Order	Set the order for moving the input focus. Refer to *2-8 Common Functional Object Functions* on page 2-72.

Command Buttons are used for input when *Input from Pop-up Screen* or *Other Input Method* are set. For these options, Command Buttons to which Key Buttons are set must be created on the pop-up screen or the main screen. Numerals can be input if a numeral display and input object is pressed during operation. The specified pop-up screen will be displayed if *Input from a pop-up screen* is set.

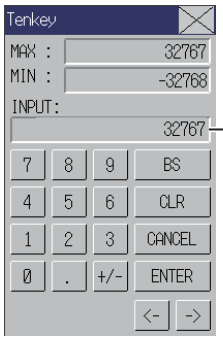
Numerals can be input from Command Buttons created on the pop-up screen.

Additional Information

- If the keypad or pop-up screen protrudes outside the main screen, the display position of the keypad or pop-up screen will be automatically adjusted so that it does not protrude.
- If the keypad or pop-up screen overlaps another functional object, the keypad or pop-up screen will be displayed on top.
- If *Input from a pop-up screen* or *Other input method* are selected, the focus will shift if an object other than a Command Button to which Key Buttons are set is selected.
- If *Input from a pop-up screen* is selected as the input method and the pop-up screen is closed during input, the numeral display and input object will continue waiting for input. In such cases, cancel or confirm the input by pressing a Command Button set to send a control code such as CAN or RET. Refer to *2-9-3 Command Buttons* on page 2-147 for information.)
- There are two types of system keypad: keypads with temporary input and keypads without temporary input. Both types of keypad are displayed as shown below. Switching the keypad type is performed using system bit memory $SB18.

  $SB18: ON

  Keypad with Temporary Input



Temporary Input
Input value will be displayed.

  $SB18: OFF

  Keypad without Temporary Input



- If displaying the unit name is specified, it will be displayed in the temporary input field as well.

Frame Tab Page

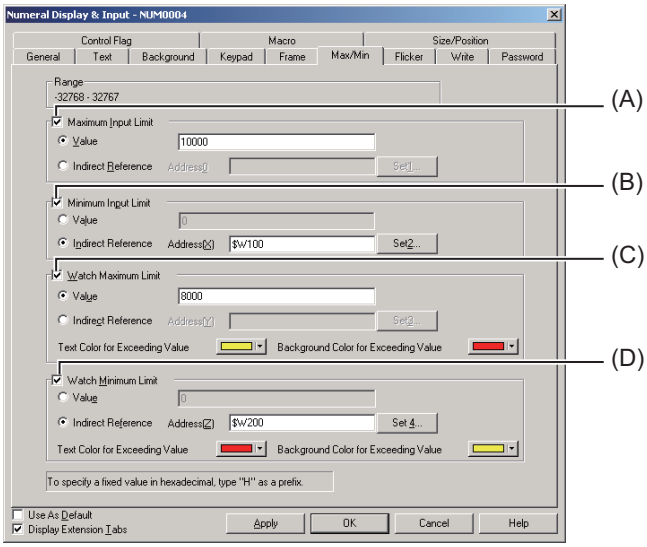
Specify the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Maximum and Minimum Input Limits Tab Page

Sets the maximum and minimum limits for input values. A message is displayed and input prevented if a value that exceeds the maximum or minimum limits is entered.

The values set as the maximum and minimum limits are before scale conversion. If a value is set under *Value* that exceeds the input range for the storage type and the OK Button is pressed, a message will be displayed and the setting will not be made. The same message will be displayed and the setting will not be made if a value is set that exceeds the input range for the storage format, even if unit and a scale are set.

This tab page is also used to set the watch maximum and watch minimum limits for input values, as well as the text color and background color displayed when the watch maximum or watch minimum limit is exceeded.



No.	Setting	Details
(A)	Maximum Input Limit	Sets the maximum limit under the Value or Indirect Reference.
(B)	Minimum Input Limit	Sets the minimum limit under the Value or Indirect Reference.
(C)	Watch Maximum Limit	The Watch Maximum Limit can be set as a fixed value or set indirectly through an address. It is also possible to set the text color and background color that will be displayed if this upper limit is exceeded.
(D)	Watch Minimum Limit	The Watch Minimum Limit can be set as a fixed value or set indirectly through an address. It is also possible to set the text color and background color that will be displayed if this lower limit is exceeded.

Set maximum/minimum limits and watch maximum/minimum limits that suitable for the storage type set on the General Tab Page. If, however, the hexadecimal, binary, or octal display types have been selected, enter a value converted to decimal (USINT, UINT, UDINT, or ULINT) or hexadecimal. When inputting data in hexadecimal, input an “H” before the hexadecimal digits. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details on storage types.



Additional Information

- If indirect reference is specified under *Watch Maximum/Minimum Limits* settings, use the same type for the values as set on the General Tab Page for the storage type.

  For example, if *REAL* (real number) is specified on the General Tab Page, set the maximum and minimum limits as real numbers to the address for indirect reference.
- Set the maximum and minimum limits before input if they are to be indirectly specified.

  If the maximum and minimum limits are set using the *Before inputting numeral* macro for the numeral display and input object, those values will not be reflected in the maximum and minimum limit display on the keypad.

Flicker Tab Page

Make flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write Settings Tab Page

Use the write settings to display a confirmation dialog box before writing values to a write address. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.



Additional Information

The write confirmation dialog box will not be displayed if no value is entered and the ENTER Button on the tenkey pad is pressed or *ENT* or *RET* is sent using a Command Button (Key Button). The contents of the address set under *Turn ON the specified address when the value is confirmed* will not turn ON either.

Password Tab Page

A password can be set for when the object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

To display but not input numerals, change the control flag settings to *Disable input*.

If the object is hidden, input will not be possible even if the object is set to enable input.

Macro Tab Page

Macros can be specified for display and input objects.

Macros executed by the following triggers can be registered.

Trigger	Details
Before Inputting Numeral	Executes macro before numeral input starts.
Before Writing Numeral	Executes macro immediately before the numeric value is written.
When Changing Numeral	Executes macro when the numerals change.

A value comparison macro can be registered only for a Numeral Display & Input object.

Trigger	Details
Value = Set value	Executes macro when the value stored at the communications address equals the set value.
Value > Set value	Executes macro when the value stored at the communications address is greater than the set value.
Value < Set value	Executes macro when the value stored at the communications address is less than the set value.

Additional Information

If the conditions are met at the same time for the *When Changing Numeral* macro and a value-comparison macro (*Value = Set Value*, *Value > Set Value*, or *Value < Set Value*), the *When Changing Numeral* macro will be given priority over the value-comparison macro.

Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting methods.

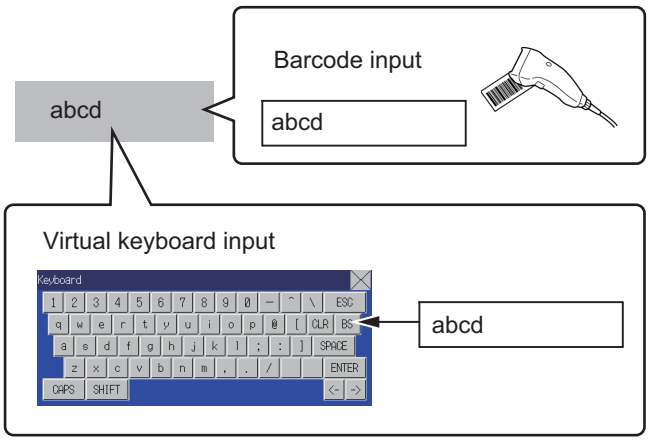
Size/Position Tab Page

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-12-2 String Display and Input

String display and input objects are functional objects that convert the contents of a specified address to character string data and display that data. String display and input objects also convert data through character string input from a barcode reader or virtual keyboard.

The string display and input object can be used for string display only (i.e., no input) by changing the control flag settings.



Select **Functional objects – String display & input** or the  icon in CX-Designer to create a string display and input object.



Additional Information

The string display and input object can be used for string display only (i.e., no input) by changing the control flag settings.

Input is enabled under the default control flag settings. The following procedure must be performed to use the display-only function.

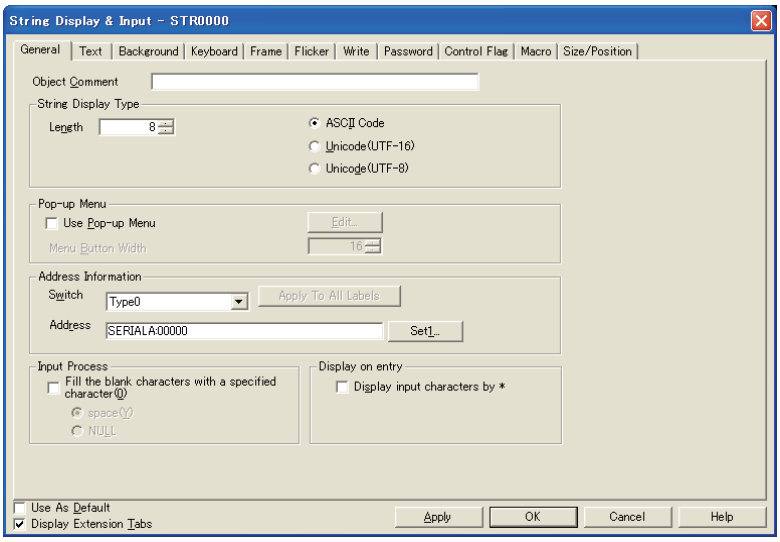
(1) Display the String Display and Input Functional Object Properties Dialog Box.

(2) Click *Display Extension Tabs* and select the displayed Control Flag Tab Page.

(3) Select *Disable under the Input*.

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for string display and input.

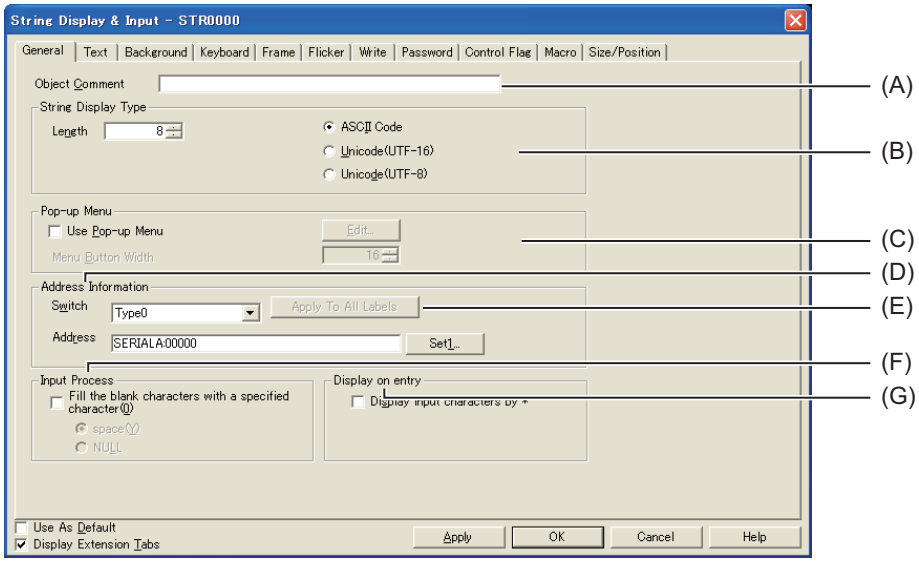


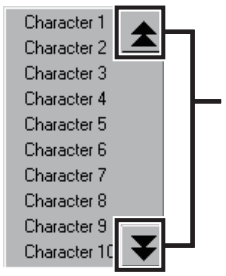
General:	Sets the address and string display type.
Text:	Sets the text attributes for the displayed characters.
Background:	Sets the background color for character string display.
Keyboard:	Sets the input method and display position and size of the keyboard.
Frame:	Sets the character string frame display.
Flicker*1:	Sets the flicker display.
Write*1:	Sets whether or not a confirmation message is displayed when character strings are written to addresses.
Password*1:	Sets whether or not a password input field is displayed when character strings are written to addresses.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets macros that operate when characters are input or character strings change.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the address and string display type.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.) The set comment can be printed or edited together.
(B)	String Display Type	Specifies the number of characters and the string display type. ASCII or Unicode (UTF-16) or Unicode (UTF-8) can be specified for the display type. ASCII express half-size characters as 1 byte and full-size characters as 2 bytes. Unicode (UTF-16) expresses all characters as 2 bytes. Unicode UTF-8 provides character codes that express either single-byte characters or multi-byte (2 to 6) characters. For example, if “ab” was stored in the start address $W0, the string would be stored as $W0=0×6162 in ASCII. In Unicode the string would be stored as $W0=0×61 and $W1=0×62.
(C)	Pop-up menu	Makes settings to enable display strings to be selected from pop-up menus.  At the PT Unit, a scroll bar will be displayed if there are more than ten items on a pop-up menu, as shown on the left. Use the scroll bar to display other items on the menu.
(D)	Address information	Sets the address to be accessed and written by string display and input object.
(E)	Apply to All Labels	Uses the address of the selected label for all labels. This setting cannot be made in the following cases. • When the *Address of String Display & Input object* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label.

No.	Setting	Details
(F)	Input Process	If the *Fill the blank characters with a specified character* Option is selected, spaces or nulls are automatically added to the end of strings to fill the space if the number of input characters is less than the set number of characters. For example, if the number of characters has been set to 8 and only the 5 characters ABCDE are input, then 3 spaces will be added: ABCDE□□□(□ indicates a space). If the *Fill the blank characters with a specified character* Option is not selected, all characters up to null at the end of the string will be written to the specified address. For example, if the set string is ABCDEFG, when A is written to the address, 0 will be written in place of B, and C and the other characters will not be written. The data is written in word format, so when the string AB is written, CD will be 0.
(G)	Display on entry	If the *Display input characters by* * Option is selected, characters input using the virtual keyboard or the Key Buttons or characters being monitored are indicated by *.

Additional Information

- To make settings easier to understand when CX-Designer objects are pasted, the number of characters is indicated by using Xs (e.g., XXXXX).
- If the number of characters or the address is set too high, the maximum address for the specified area may be exceeded, e.g., when the number of words is 256 and the start address is $W32767. If the maximum address in the area is exceeded, a communications error will occur when the screen to which the string display and input object is set is opened on the PT Unit. Make sure the maximum address is not exceeded.
- If ASCII codes are set in string displays, the following character codes will be used by the PT Unit depending on the system language that has been set.

System language	Character display	Example (character code B5)
Japanese	Shift-JIS code	ｵ
Chinese (traditional or simplified)	GB2312 code	Nothing is displayed because there are no corresponding characters.
Other	Latin 1code	µ

- If an NJ/NX-series Controller is the host, a STRING or WORD array tag is specified for the communications address, and the specified text string has an odd number of bytes, the contents is rounded to an even number of bytes with NULL added. Provide a sufficient size for such tags (e.g., for UTF8, provide about three times the number of characters).

Text Tab Page

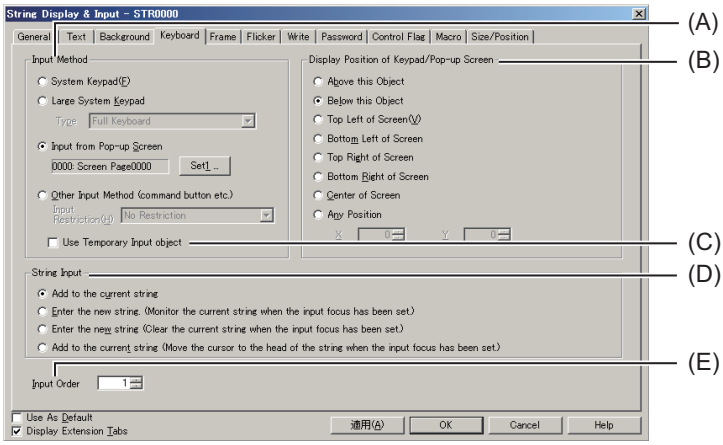
Sets the text attributes, such as font and color, for the display string. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

Sets the background color for character string display from a selection of 256 colors. Refer to *2-8-8 Background* on page 2-97 and *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

Keyboard Tab Page

Specifies the display position and size of the keyboard.



No.	Setting	Details
(A)	Input Method	Select one of the following input methods for character strings. • System keypad. • Large system keypad. Select keyboard: Full keyboard, decimal keys, hexadecimal keys, decimal keys (+,-), hexadecimal (+,-), decimal keys (+, -, *, /), or hexadecimal keys (+,-, *, /). • Input from a pop-up screen • Other input method (e.g., using Command Buttons) The input method can be restricted to use only functional objects or barcodes. Refer to *3-6 Inputting Numeral and Character Strings* on page 3-21 for information on how to operate these keypads.
(B)	Display Position of Keypad/Pop-up Screen	Select one of the following display positions for keypad and pop-up screen display for character string input. • Below This Object • Above This Object • Top left, bottom left, top right, bottom right, or center of screen. • Any position
(C)	Use Temporary Input object	Select to use a Temporary Input Object when inputting a character string. Selection is possible only when *Input from Pop-up Screen or Other Input Method (command button etc.)* is set under Input method.
(D)	String Input	Select one of the following options for the input display field status when inputting character strings. • Add to the current string. • Enter the new string. (Monitor the current string when the input focus has been set.) • Enter the new string. (Clear the current string when the input focus has been set.) • Add to the current string. (Move the cursor to front of string when setting the input focus been set.)
(E)	Input Order	Set the order for moving the input focus. Refer to *2-8 Common Functional Object Functions* on page 2-72.

Command Buttons are used for input when *Input from pop-up screen* or *Other input method* are set.

For these options, Command Buttons to which Key Buttons are set must be created on the pop-up screen or the main screen.

Characters can be input if a string display and input object is pressed during operation. The specified pop-up screen will be displayed if *Input from a pop-up screen* is set.

Character strings can be input from Command Buttons created on the pop-up screen.



Additional Information

- If the keypad or pop-up screen protrudes outside the main screen, the display position of the keypad or pop-up screen will be automatically adjusted so that it does not protrude.
- If the keypad or pop-up screen overlaps another functional object, the keypad or pop-up screen will be displayed on top.
- If *Input from pop-up screen* or Other input method are selected, the focus will shift if an object other than a Command Button to which Key Buttons are set is selected.
- If *Input from pop-up screen* is selected as the input method and the pop-up screen is closed during input, the string display and input object will continue waiting for input. In such cases, cancel or confirm the input by pressing a Command Button set to send a control code such as CAN or RET. Refer to *2-9-3 Command Buttons* on page 2-147 for information.

Frame Tab Page

Specify the colors and sizes of the object frame to change the shape or color when the button is depressed or raised.

Refer to *2-8-12 Frames* on page 2-106 for details

Flicker Tab Page

Make flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write Tab Page

Use the write settings to display a confirmation dialog box before writing strings to a write address. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password Tab Page

A password can be set for when the object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

To display but not input characters strings, change the control flag settings to Disable input.

If the object is hidden, input will not be possible even if the object is set to enable input.

Macro Tab Page

Macros can be specified for string display and input objects.

Macros executed by the following triggers can be registered.

Trigger	Details
Before inputting string	Executes macro before string input starts.
Before writing string	Executes macro immediately before the string is written.
When changing string	Executes macro when the string changes.

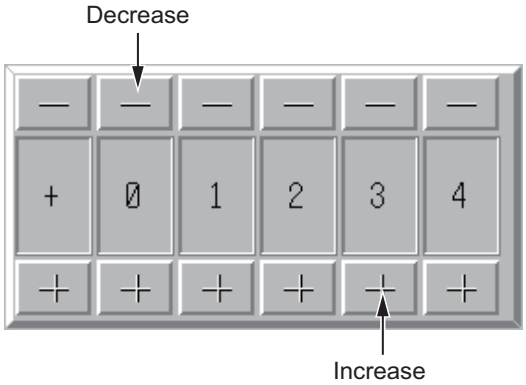
Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting methods.

Size/Position Tab Page

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-12-3 Thumbwheel Switches

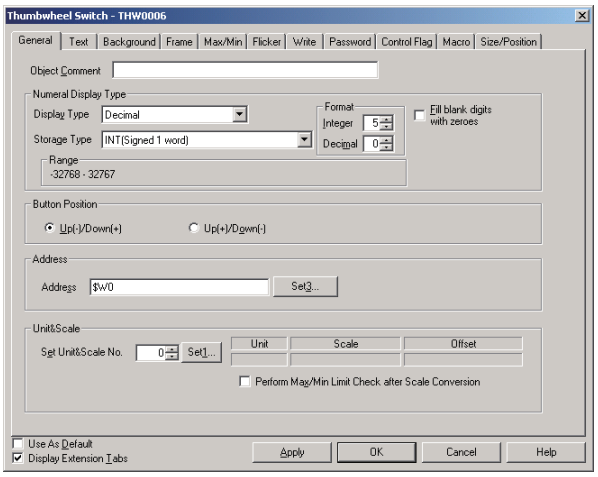
Thumbwheel switches are objects that increase or decrease numeric data when + or - (increase or decrease) Buttons are pressed and display and set the data. The values of single digits are increased or decreased and the contents of the allocated address is updated each time the value changes.



Select **Functional objects – Thumbwheel switch** or the  icon in CX-Designer to create a thumbwheel switch.

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for thumbwheel switches.

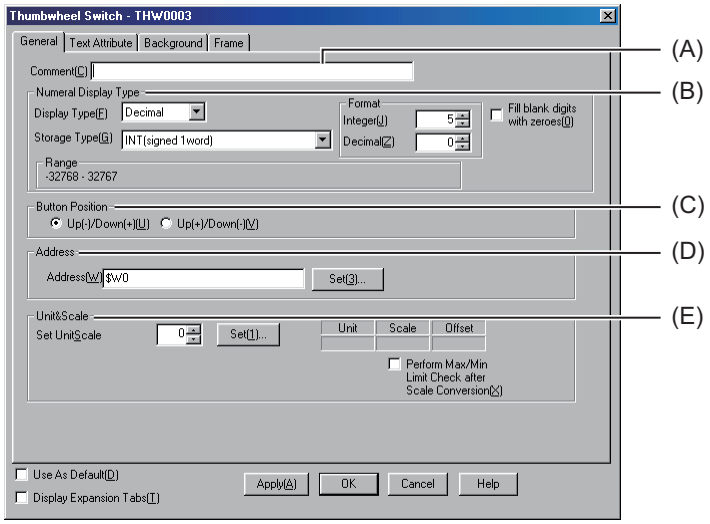


General:	Sets the address and numeral display type.
Text:	Sets the text attributes for the displayed numerals.
Background:	Sets the background color for numeral display.
Frame:	Sets the frame display for numeral display.
Max/Min*1:	Sets the maximum and minimum limits for input.
Flicker*1:	Sets the flicker display.
Write*1:	Sets whether or not a confirmation message is displayed when values are written to addresses.
Password*1:	Sets whether or not a password input field is displayed when values are written to addresses.
Control Flag*1:	Sets display/no display for objects and enable/disable for input.
Macro*1:	Sets macros that operate when values are input or address contents change.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the address and numeral display format and units.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Numeral display type	Sets the numeral display type.
	Display type	Select from the following 4 display formats. • Decimal • Hexadecimal • Binary • Octal
	Storage type	Select from the following 11 storage types. • INT signed, 1 word • UINT unsigned, 1 word • DINT signed, 2 words • UDINT unsigned, 2 words • REAL (real number)*1 • BCD2 unsigned, 1 word*1 • BCD2 unsigned, 2 words*1 • BCD1 signed (leftmost digit: F), 1 word*1 • BCD1 signed (leftmost digit: F), 2 words*1 • BCD2 signed (leftmost bit: 1), 1 word*1 • BCD2 signed (leftmost bit: 1), 2 words*1
	Integer Decimal	Specifies the number of display digits for the integer and decimals. The numeral display can be changed to any format. Example: When set to 2 integers and 1 decimal place: • Actual value: 9.51 → Numeral display: 9.5 • Actual value: 99.51 → Numeral display: 99.5 • Actual value: 999.51 → Numeral display: 99.5 As shown above, digits after the specified number of integers are ignored. The decimal is rounded to the specified number of digits.
	Fill blank digits with zeros*2	Inserts zeros to fill the specified number of display digits. For example, if the number of display digits is set to 4 and the value is 1, the display will be 0001.

No.	Setting	Details
(C)	Button position	Sets the position for the + and - Buttons.
(D)	Address	Sets the destination address accessed and written by thumbwheel switches.
(E)	Units and scales	Scales the contents of the communications address using the set scale value. Click *Limit check after scale conversion* to check the upper and lower limits after the contents have been converted using the set scale. Refer to *2-8-3 Unit and Scale (General Tab)* on page 2-76 for information on units and scales.

*1. Can be selected only when display type set to *Decimal*.

*2. When set to *Fill blank digits with zeros*, 9.51 in the example in the table will be displayed as 09.51.



Additional Information

- When pasting CX-Designer functional objects, use the numeral 9 and create a number such as 9,999.99 to set the number of display digits by default.
- For real numbers, 7 digits are valid. If the number of display digits is set higher than 7, error will occur when numbers are input and the values may change for digits that are not input.
- If a value that cannot be displayed at the address is stored, e.g., 10 (a binary value) has been stored when the display type is BCD, # will be displayed for every digit. When this happens, the + and - Buttons cannot be used to change the value. Use the PLC or another functional object to reset the value.
- Units cannot be displayed for thumbwheel switches.
- The scale for a thumbwheel switch must be set to a power of 10, and the offset must be set to 0. If any other values are set, the thumbwheel switch many not operate properly.

Text Tab Page

Sets the text attributes, such as font and color, for the display string. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

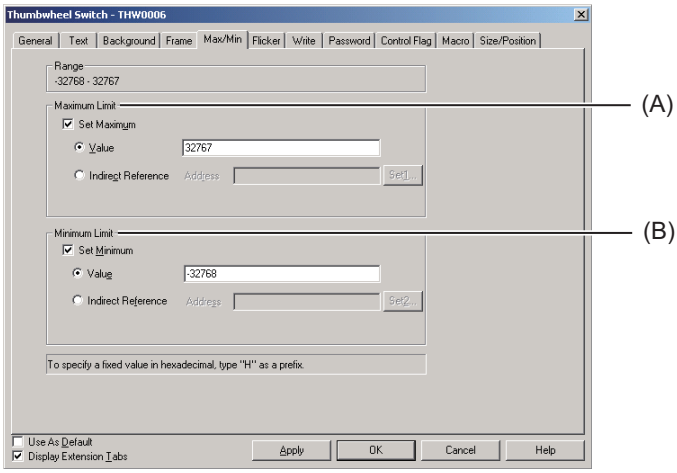
Sets the background color for thumbwheel switches from a selection of 256 colors. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

Frame Tab Page

Specify the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Max/Min Tab Page

Set the maximum and minimum limits for the contents of the write address. The setting range for maximum and minimum limits depends on the numeral display type.



No.	Setting	Details
(A)	Maximum limit	Sets the maximum limit. Select either value or indirect reference.
(B)	Minimum limit	Sets the minimum limit. Select either value or indirect reference.

Set maximum and minimum limits suitable for the storage type set on the General Tab Page. If, however, the hexadecimal, binary, or octal display types have been selected, enter a value converted to decimal (UINT or UDINT). Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details on storage types.

Additional Information

- If indirect reference is specified under the maximum and minimum limits, use the same type for the values as set on the General Tab Page for the storage type.

  For example, if *REAL* (real number) is specified on the General Tab Page, set the maximum and minimum limits as real numbers.
- If a value is written from the PLC or another functional object that exceeds the set maximum or minimum limits, the + and - Buttons can no longer be used to change the value. Use the PLC or another functional object to reset the value.

Flicker Tab Page

Make flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write Tab Page

Use the write settings to display a confirmation dialog box before writing values to a write address. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password Tab Page

A password can be set for when the object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

To display but not input numerals, change the control flag settings to *Disable input*.

Macro Tab Page

Macros can be specified for string display and input objects. Macros executed by the following triggers can be registered.

Trigger	Details
Before writing numeral	Executes macro immediately before the numeric value is written.
When Changing numeral	Executes macro when the numerals change.

Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting methods.

Size/Position Tab Page

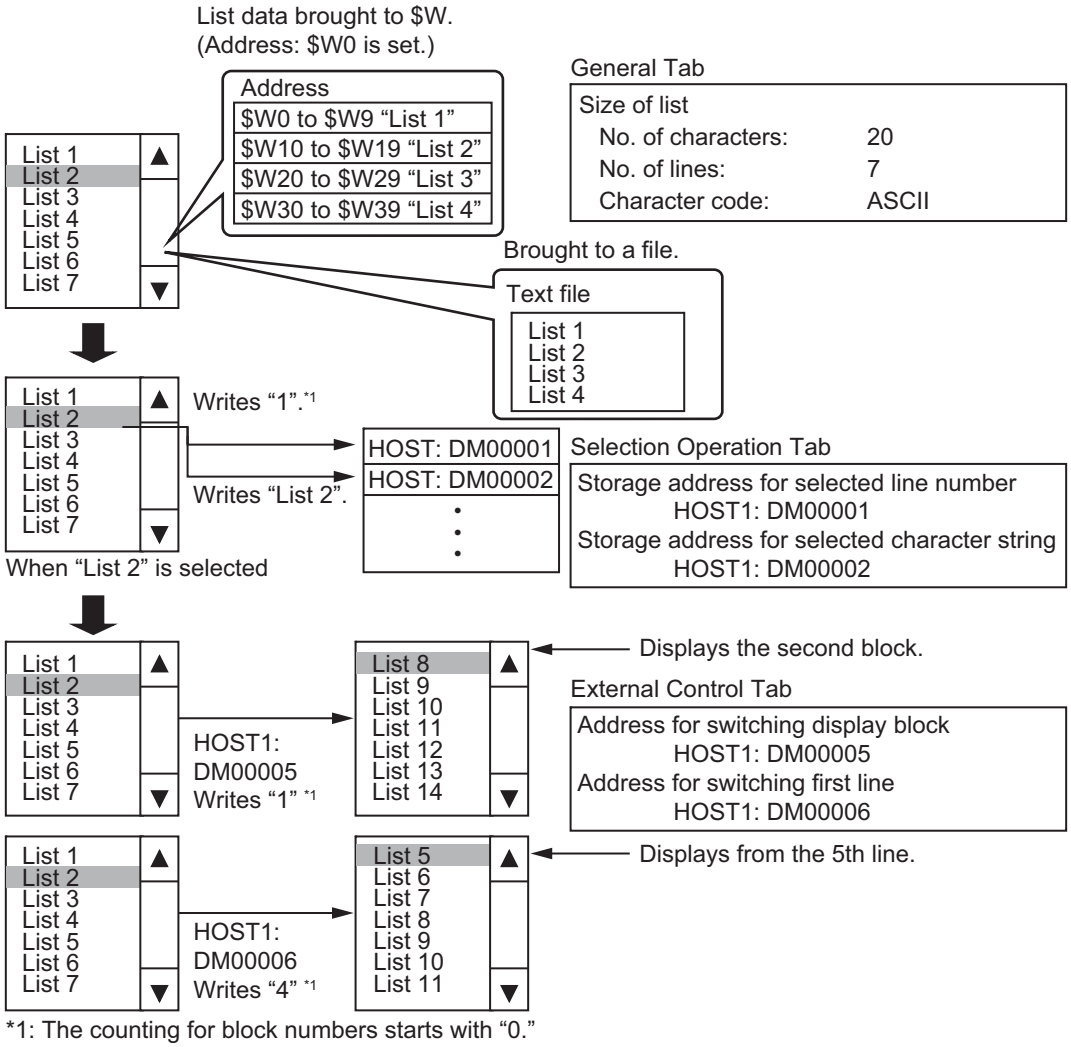
Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-12-4 List Selection

List selection objects display and select character string data. Character strings to be displayed in lists can be selected from specified addresses or text files.

List selection objects can write the selected line or string information to a specified address, allowing the string information to be received and used by the host.

List strings to be displayed from the host can also be specified.



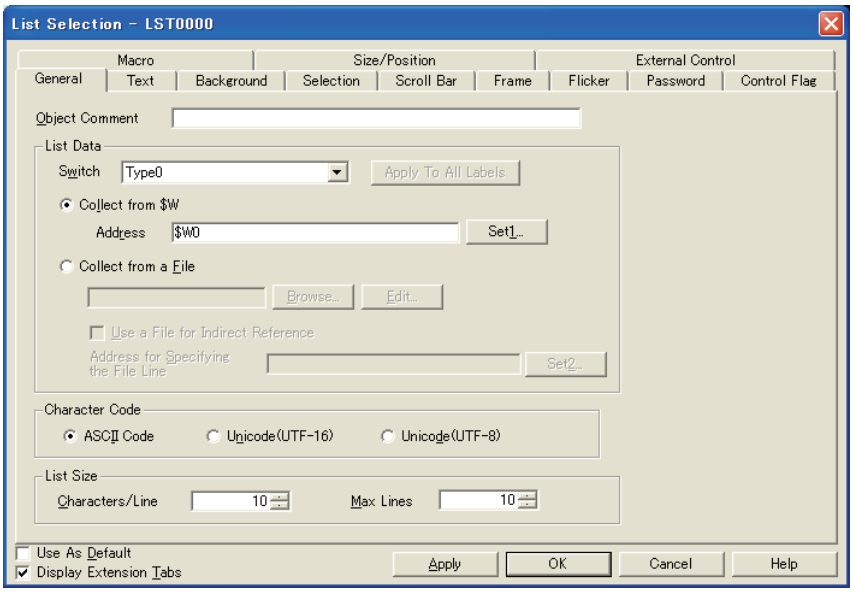
ASCII or Unicode can be selected as the character code for list text strings to be assigned to addresses.

Note ASCII characters use one byte per half-size character and two bytes per full-size character. Unicode characters use two bytes for any character.

Select **Functional objects – List selection** or the  icon in CX-Designer to create a list selection object.

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for list selection.

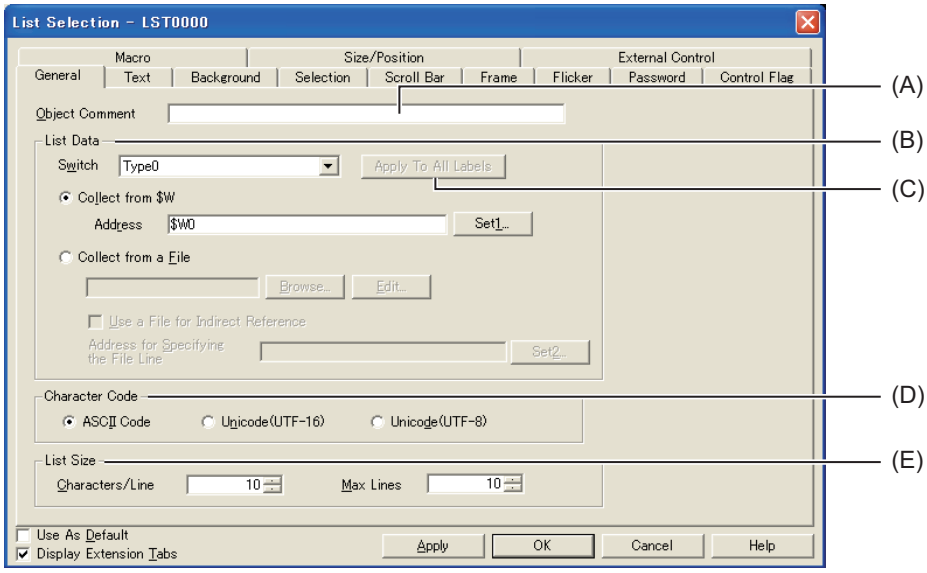


General:	Sets the reference destination for list data, list size, and object comment.
Text:	Sets the text attributes for the displayed string.
Background:	Sets the background color for the list selection object.
Selection:	Sets the selection bar color, selected line number, and string destination.
Scroll bar:	Sets the scroll bar size and scroll width.
Frame:	Sets the list selection frame display.
Flicker*1:	Sets the flicker display.
Password*1:	Sets the password to be entered when a button is pressed.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets macros that operate when lists are selected.
Size/Position*1:	Sets the object size and position.
External Control*1:	Sets switching of displayed block position from an external device.

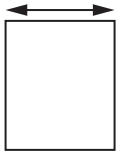
*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the list data, number of characters, and number of lines to be displayed.



No.	Setting	Details
(A)	Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	List data	Browses for a specified address or text file for strings to be displayed in the list. If *Store in $W* is selected, the string data stored after a specified address will be displayed. If *Store in a file* is selected, the string in a specified text file will be displayed. If storing strings in text files for display using a list selection object, make the text file extension .LST. The file name can be up to 12 characters, including the .LST extension. Click the **Edit** Button to open the text editor specified under CX-Designer *Options* (Notepad is the default text editor) and edit the currently selected text file. The file to be read can also be specified indirectly. Select *Use a file for indirect reference* and specify *Store in a file for* the LST file that created the list of file names to be read. The list file that will be read will switch based on the contents of the address specified under *Address for Specifying the File Line*.
(C)	Apply to All Labels	Applies the following items to all of the selected labels: • Store in &W: Address set value • Store in file: File name *Apply to All Labels* cannot be set in the following cases. • When the *List data of List Selection object* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label.
(D)	Character code	Select one of the following for the string in the address or the text file: ASCII, UFT-16 Unicode, or UFT-8 Unicode. This setting is for the character code that is finally used to display the list object. This setting is not related to processing of files for indirect specifications between file lists, which are always processed in multibyte code.

No.	Setting	Details
(E)	List size	Specifies the number of characters per line and the number of lines in a list. Specifies the number of half-size characters when ASCII has been set. Full-size characters are counted as two characters. For Unicode characters, all characters are counted as one character. 1 to 256 characters per line  1 to 1,024 lines max.

If list strings are held in internal memory at $W, the settings will be as shown below because $W is one word (two bytes) in length.

When list size in the list selection settings is set to 64 characters per line with a maximum of 4 lines and the address is set to $W0:

Note ASCII (Half-size Characters: 1 byte; Full-size characters: 2 bytes)

$W0 to $W31	1st line string
$W32 to $W63	2nd line string
$W64 to $W95	3rd line string
$W96 to $W127	4th line string

Note Unicode Characters (1 character: 2 bytes)

$W0 to $W63	1st line string
$W64 to $W127	2nd line string
$W128 to $W191	3rd line string
$W192 to $W255	4th line string

If the character string contains a zero (0), the display string for the line will stop at the zero.

Example

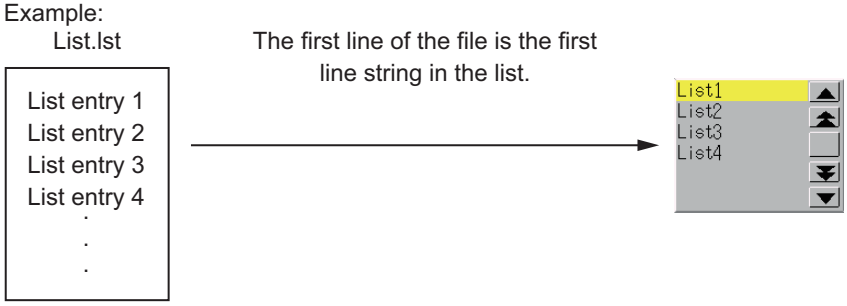
$W0	61	62
$W1	63	64
$W2	65	66
$W3	67	00
$W4	6A	6B
⋮	⋮	⋮

All character up to here will be displayed as the list string and subsequent characters will be ignored.

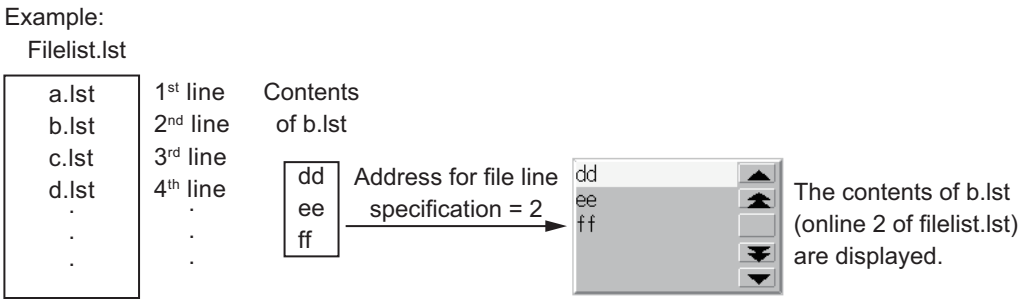
The list selection data is treated as shown below when *Store in a file* is specified.

Example:

List.lst



The list selection data is treated as shown below when *Use a file for indirect Reference file* is selected.



A file name (including the extension) is input as the text file (.lst file) for indirect file specification (file size: 65,535 max.). Create the lst file to be specified here in the same folder as where all of the screen files are stored. When the file is accessed from another directory, it is automatically copied to the directory where the screen files are stored. However, the lst file written inside the text file for indirect specification is not copied. Copy this lst file manually to the folder where the project is stored. Refer to the following note for information on restrictions on file names. If these restrictions are not followed, an error will be generated when the data is transferred to the PT Unit.

Additional Information

- Specify a file name of up to 12 characters (8 file name characters and 3 file extension characters). The following characters can be used in file names. Full-size characters cannot be used.

  Alphanumeric characters, underscore (_), dollar sign ($), and periods (.).

  An error message will be displayed if illegal characters are used in a file name. If an error message appears, re-enter the file name using permissible characters.
- There are no restrictions on the number of characters or lines that can be set to a LST file, but the number of characters and lines that are set should match the settings under *List size*. Any characters or lines over the settings under *List size* will be ignored.

  Example: 10 characters per line

  When ABCDEFGHIJKLMN (14 characters) is set to the first line in the LST file, the display will be ABCDEFGHIJ when the first line is displayed. The 11th and subsequent characters will be ignored.
- Only multibyte code is supported for text files that are used for indirect specifications between files.
- Click the **Edit** Button to open the text editor and, if creating a new LST file, save the file with LST as the extension. Refer to the manual for the text editor you are using for information on methods for saving files.

  Some text editors automatically set TXT as the file extension. In such cases, use Explorer to change the extension to LST.
- If ASCII is set in string displays, the following character codes will be used by the PT Unit depending on the system language that has been set.

System language	Character display	Example (character code B5)
Japanese	Shift-JIS code	ｵ
Chinese (traditional or simplified)	GB2312 code	Nothing is displayed because there are no corresponding characters.
Other	Latin 1code	µ

If the list data is specified to be held in a file, the language of the file and the system language must be the same (e.g., Japanese or English).

- The address storing the text string for the selected list will be cleared if screens are switched with *Switching screens with Store the Selected Line No. in the Specified Address* or *Store the String of the Selected Line in the Specified Address* while either *Switch Display Block* or *Support Display Start Line Switching* is set for external control will clear.

  If the text string for a selected list will be used again after the screens are switched, use the ladder program or other host program to store text string data before switching the screens.
- The data format (BCD or binary) for the *Address for Specifying the File Line* on the General Tab Page, *Store the Selected Line No. in Specified Address* on the Selection Tab Page, *and Address for Switching the Display Block* and *Address for Switching the Display Start Line* on the External Control Tab Page is set by selecting **Project Properties** from the PT Menu and using the Data Format Tab Page.

Text Tab Page

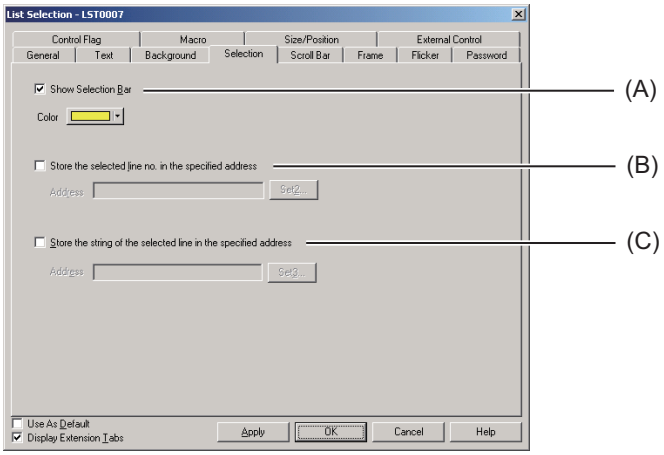
Sets the text attributes, such as font and color, for the display string. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

Sets the background color for the functional object from a selection of 256 colors. Refer to *2-8-8 Background* on page 2-97 and *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

Selection Tab Page

Sets the selection bar color that is reversed during list selection and the address where the selected line number and selected character string are stored.



No.	Setting	Details
(A)	Show selection bar	Sets the selection bar color.
(B)	Store the Selected Line No. in Specified Address	Stores the selected list line number to the specified address. The first line is counted as 0.
(C)	Store the String of the Selected Line in the Specified Address	Stores the selected list character string to the specified address.

Additional Information

- If an NJ/NX-series Controller is the host, a STRING or WORD array tag is specified for the communications address, and the specified text string has an odd number of bytes, the contents is rounded to an even number of bytes with NULL added. Provide a sufficient size for such tags (e.g., for UTF8, provide about three times the number of characters).

Scroll Bar Tab Page

Sets display/no display, scroll width, and button size for the list scroll bar displayed to the right of the list. The Scroll Up Button is displayed to the top right of the scroll bar and the Scroll Down Button is displayed to the bottom right.

Refer to *2-8-11 Scroll Bars* on page 2-105 for details.

Frame Tab Page

Specify the colors and sizes of the object frame to change the shape or color when the list selection frame is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page

Make flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Password Tab Page

Set a password for when objects are pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page

Macros can be specified for string display and input objects.

Macros executed by the following trigger can be registered.

Trigger	Details
When selecting a list	Executes macro when a list item is selected.

Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting methods.

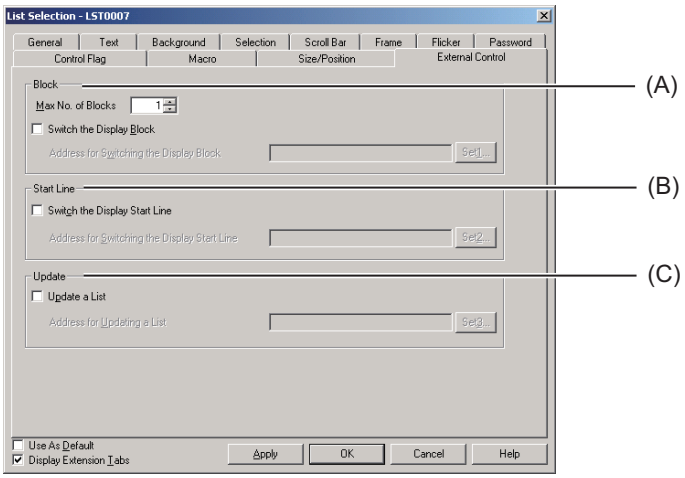
Size/Position Tab Page

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

External Control Tab Page

Display blocks and the start line can be switched when designated by the host.

Any refreshes required when list data has been changed can also be specified.

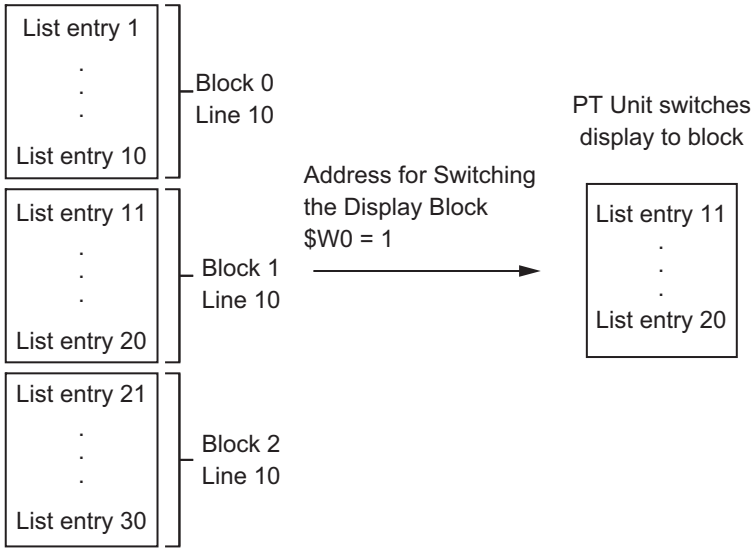


No.	Setting	Details
(A)	Block	Sets the maximum number of blocks (1 to 32) and the address for specifying block switches.
(B)	Start line	Sets the address for switching the display start line. The start line is specified as a offset from the beginning of the block (i.e., the beginning of the block is 0).
(C)	Update	Sets the address for updating a list.

Switching Blocks

When blocks are specified, internal memory or the contents of text files are split into a maximum of 32 blocks and the blocks are switched based on the contents (0 to 31) of the allocated address.

Example: If the maximum number of lines set on the General Tab Page is 10, the number of blocks set on the External Control Tab Page is 3, and the address for switching the display block is $W0.

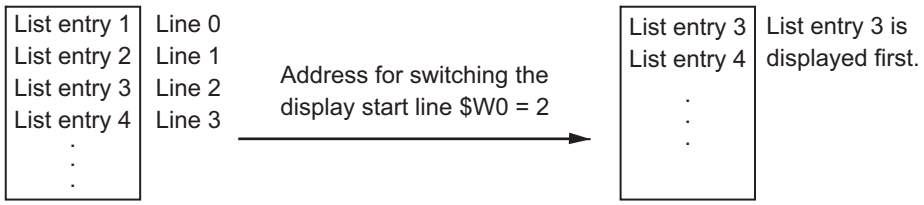


The number of lines for each block will be the number set under *Maximum No. of lines*.

Switching Start Line

The first line currently displayed in a list can be switched based on the contents of the allocated address. The first line in a list is counted as line 0.

Example: When the address for switching the display start line is set in $W0.



Update a List

The list display will be updated when the contents of the allocated address are changed.

Update a List is required in the following circumstances.

- When the string data of an address being referenced changes.
- When the string in a list file being referenced changes.
- When labels have been switched.

2-12-5 Temporary Input Objects

The Temporary Input Object displays a temporary input display field when keypads and keyboards have been created for Numeral Display and Input Objects or String Display and Input Objects using Command Keys. Temporary input objects can also be displayed for the maximum and minimum values set for Numeral Display and Input Objects.

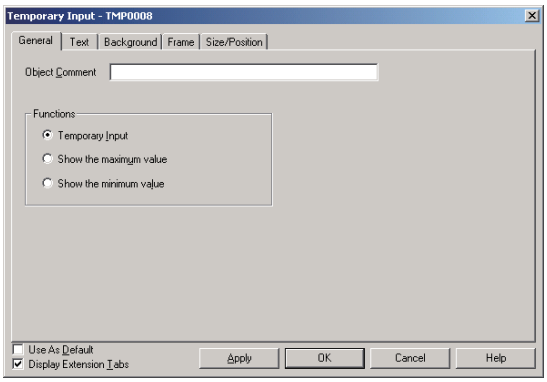


To create a temporary input, select CX-Designer **Functional Object – Temporary Input** or use the 

icon.

Functional Object Property Settings

This section describes the settings in the Functional Object Properties Dialog Box for temporary inputs.

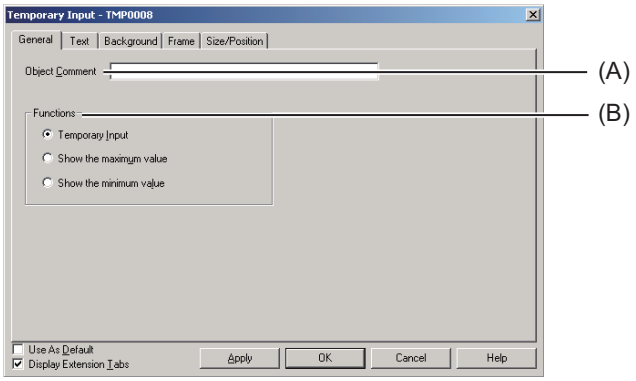


General:	Sets the object comment and temporary input object functions.
Text:	Sets the text attributes for the displayed numeral/character string.
Background:	Sets the background color for the object.
Frame:	Sets the frame display for the temporary input object.
Size/Position*1:	Sets the object size and position.

*1. This tab is displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Set the functions for the temporary input object.



No.	Setting		Details
(A)	Object Comment		Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Functions		Sets the functions for the temporary input object.
		Temporary input	Displays the numeric value or character string input by the user when input focus is on the numeral display and input object or string display and input object.
		Show the maximum value	Displays the set upper limit for input when input focus is on numeral display and input object or string display and input object.
		Show the minimum value	Displays the set lower limit for input when input focus is on numeral display and input object or string display and input object.

Text Attribute Tab Page

Sets the text attributes, such as font and color, for the display numerals or string. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

Sets the background color for functional objects. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

Frame Tab Page

Specify the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

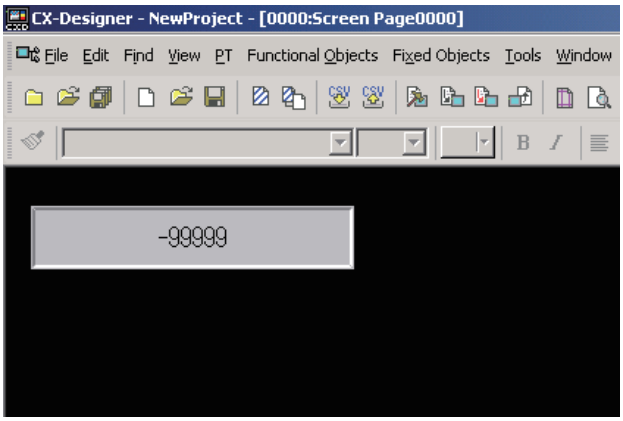
Size/Position Tab Page

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

Creating Temporary Input Keypads in Numeral Display and Input Objects

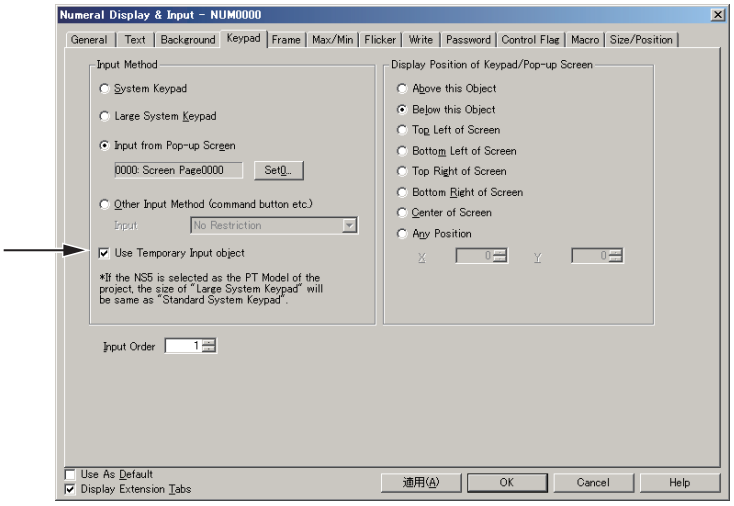
Use the following procedure to create a keypad using a temporary input object.

1 Position a numeral display and input object on the screen.



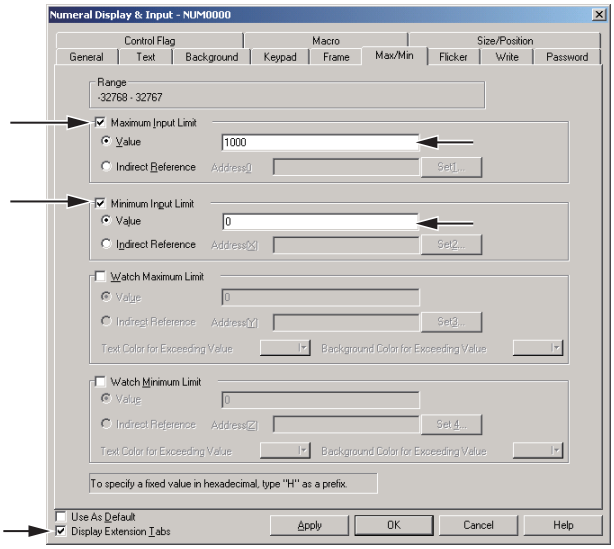
2 Double-click the object to display the Properties Dialog Box.

3 Display the **Keypad** Tab Page. Select *Input from Pop-up Screen or Other Input Method (command button etc.)* under Input Method. Select the *Use temporary input* option under Input Method.



4 Select the *Display Extension Tabs* Option to display the Max/Min Tab Page.

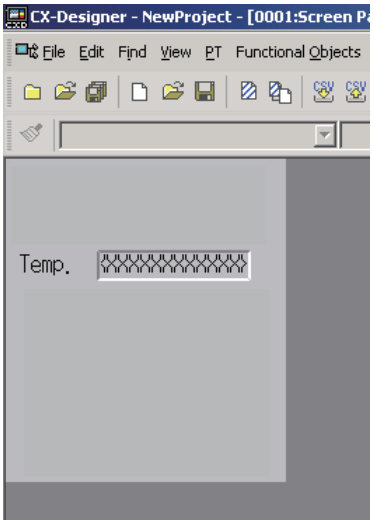
Select both the *Check Maximum Input Limit* and the *Check Minimum Input Limit*, and select the *Value* option. The maximum and minimum values are set as shown in the following diagram.



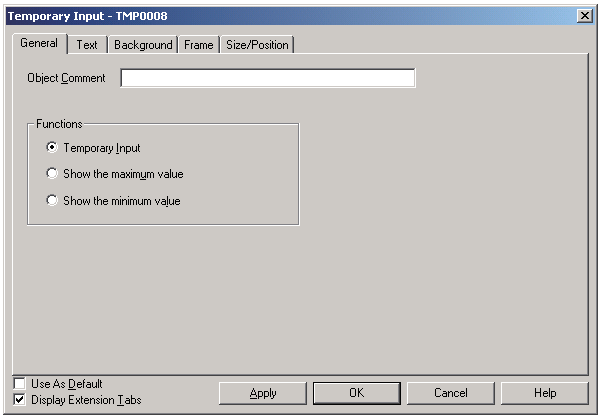
Creating Temporary Input Keypads

The following example shows creating a keypad using a temporary input object.

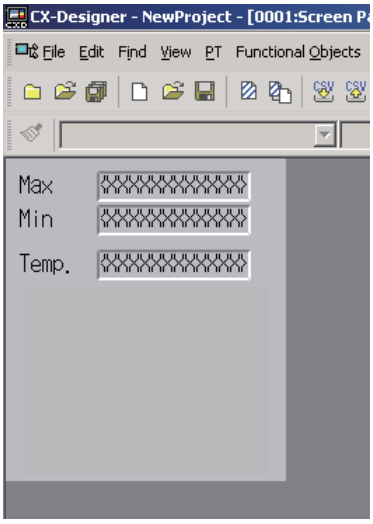
1 Position the temporary input object, which will be the temporary input display field, on the screen.



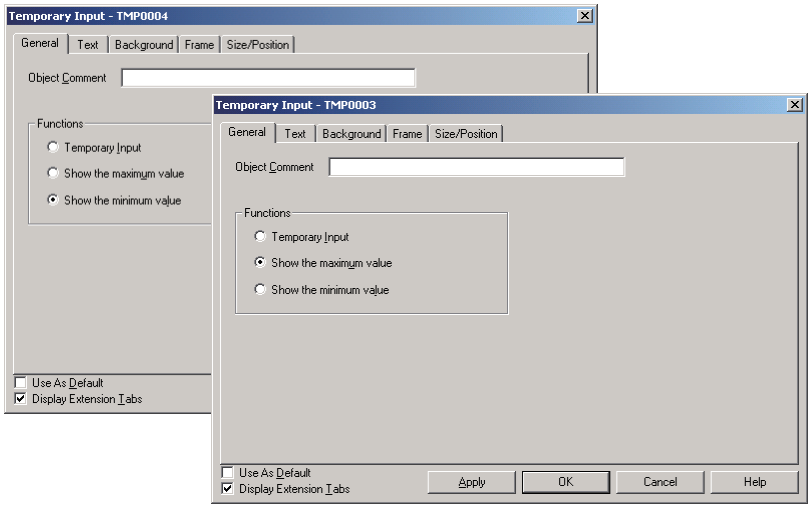
2 Double-click the object to display the Properties Dialog Box. Select the *Temporary input* option under *Function* on the General Tab Page.



3 Position the temporary input objects on the screen for displaying the maximum and minimum values.



4 Double-click the objects to display the Properties Dialog Box. Select *Show the maximum value* and *Show the minimum value* under *Function* on the General Tab Page.



5 Use a Command Button to create a keypad. Refer to *Key Buttons* on page 2-151 for details on how to create keypad command buttons. Set the destination to the *Input Field with Focus* option under the properties settings for each **Command** Button.

6 Check the keypad operation using the test function.



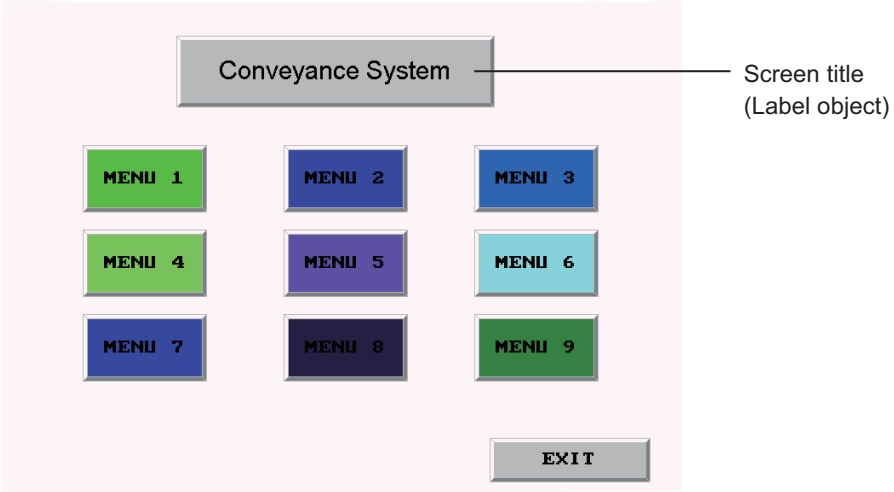
When the focus is on the numeral display and input object, the input value is displayed in the temporary input object. Click the **Command** Button to overwrite the present values with the new input value.

2-13 Display

This section describes objects with display functions only. This includes label, bitmaps, level meters, analogue meters, video displays, and consecutive line drawings.

2-13-1 Label

Label objects are functional objects used to display fixed character strings. Use label objects for screen titles, item names, and other character string displays that do not require any other particular function.



Display characters can also be changed. The following three methods can be used to change display characters.

(a) Indirect Specification from a Text File

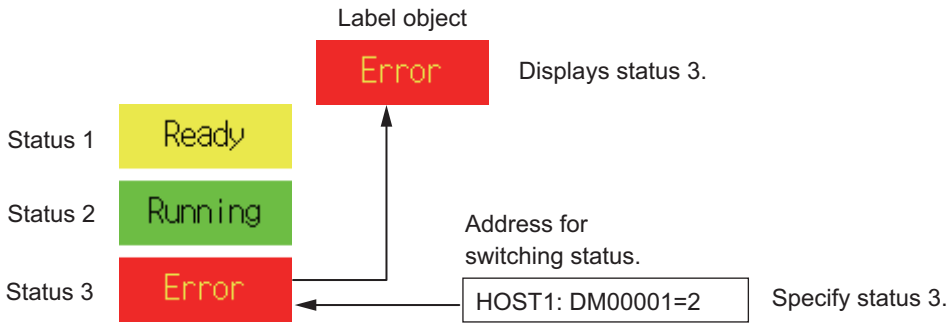
A list of display strings can be stored in a text file and any string can be specified for display from that list.

(b) Indirect Specification from a String Table

Any string can be specified for display from the strings registered in the string table.

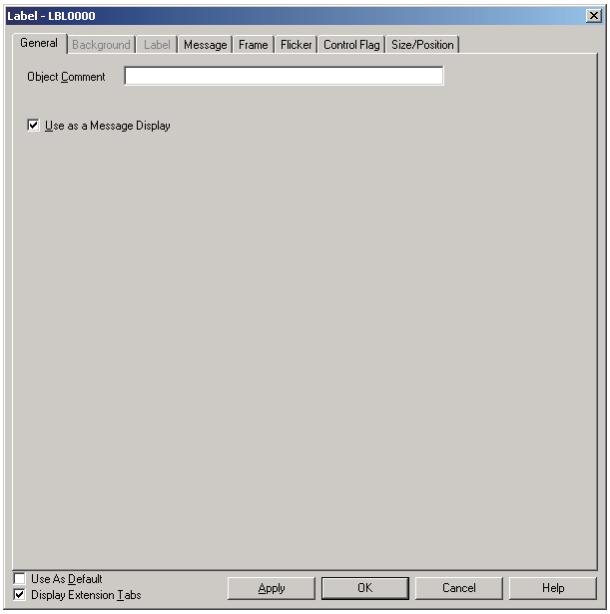
(c) Message Display Function

This function registers a display string and background color for each status number set for the label. Any set status can be specified for display.



Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for label objects.

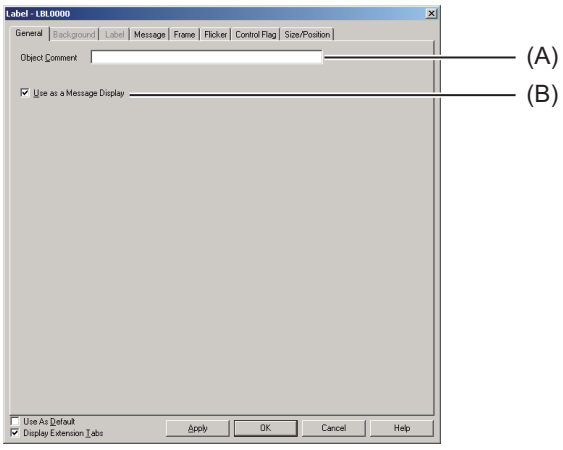


General:	Sets object comments.
Background:	Sets the background color for the label object.
Label:	Sets the label display.
Message:	Sets the label display data and background color for when the message display function is used.
Frame:	Sets the object frame display.
Flicker*1:	Sets the flicker display.
Control Flag*1:	Sets display/no display of the object.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets object comments.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Use as a Message Display	Select this checkbox to use the message display function.

Background Tab Page

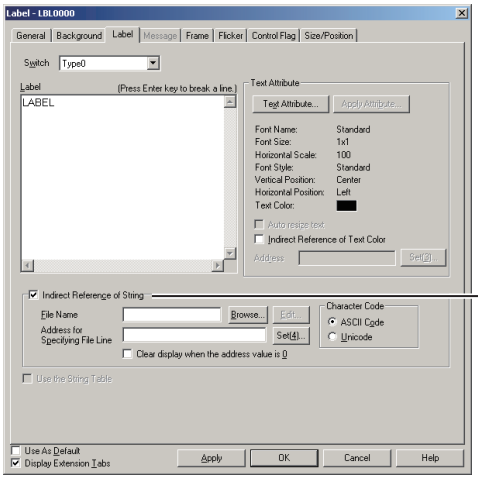
Sets the background color for label objects from a selection of 256 colors. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

Additional Information

The *Indirect reference of color* option is enabled only when raster font is specified for label character strings.

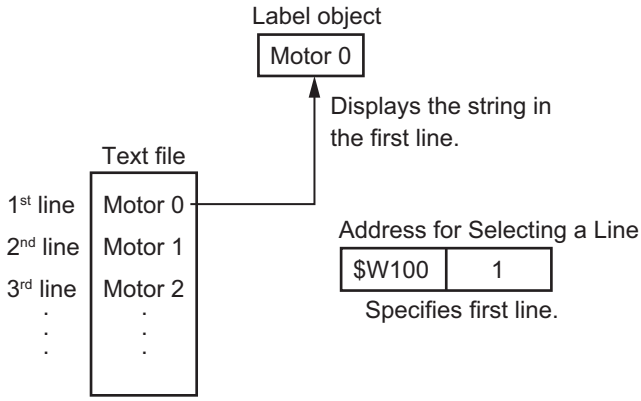
Label Tab Page

Labels can be set for label objects. Alternatively, label strings can be read and displayed from a specified file or the string table. Refer to *2-8-10 Labels* on page 2-101 for basic settings information.



(A)

No.	Setting		Details
(A)	Indirect Reference of String		Normally displays the string as fixed characters. When specifying a raster font, it is also possible to select *Indirect reference of string* and browse for the file containing the string to display.
		File Name	Specifies the file where the string to be displayed is stored. Only files with the extension .txt can be specified. The file must be stored in the folder where the projects are stored. Click the **Browse** Button to specify a string file in any directory. The specified string file will be automatically copied to the folder where the screen files are stored. Use this copied file for any subsequent editing. The file specifications are given below. File name: 8 file name characters + .txt (extension) Alphanumeric characters, underscore (_), dollar signs ($), and periods (.). Editing software: Text editor No. of lines: 32,767 Label object 1 — No. of characters per line: Up to 64 Label object 2 Label object 3 . . . .

No.	Setting	Details
(A)	Address for Specifying File Line	 The previously displayed string will remain if the file line specification address contents change to 0. The display will be cleared when the contents change to 0 if the *Clear display when address value is 0* checkbox is selected.
	Character code	Specify the character code as multibyte or Unicode. Multibyte code uses one byte for half-width characters and two bytes for full-width characters. Unicode uses two bytes for all characters.
(B)	Refer to the Character String Table	Select this checkbox to select a label string from the strings registered in the character string table.

Additional Information

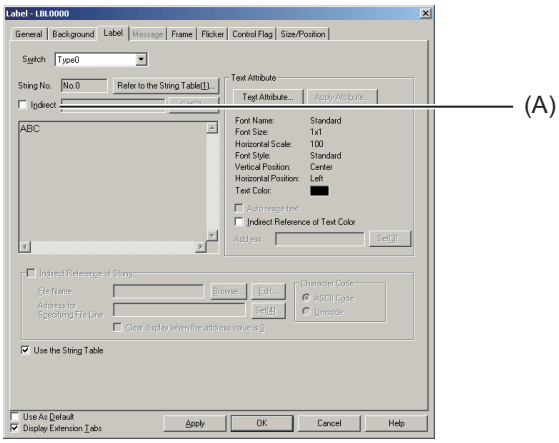
- If vector fonts are specified for label strings, the string and character color cannot be specified indirectly.
- Up to 32,767 lines can be set but this may depend on the text editor being used.
- If ASCII is set in text, the following character codes will be used by the PT Unit depending on the system language that has been set.

System language	Character display	Example (character code B5)
Japanese	Shift-JIS code	ｵ
Chinese (traditional or simplified)	GB2312 code	Nothing is displayed because there are no corresponding characters.
Other	Latin 1code	µ

- Character codes for indirectly specified text strings are used to handle other languages. Refer to *Multi-Language Display* in the *CX-Designer Online Help* for details on using other languages.
- To set the data type (BCD or binary) for the address for specifying the File Line, select **Project Properties** from the PT Menu and set the data type on the Data Type Tab Page.

Referencing Strings from String Table

If referencing the string table for strings, the display string can be switched depending on the value at a specified communications address.



No.	Item	Details
(A)	Indirect	Select this checkbox to indirectly specify the display string number. The value at the set communications address will be used as the string number for displaying the label string. The contents of the communications address is set as a binary value.

Additional Information

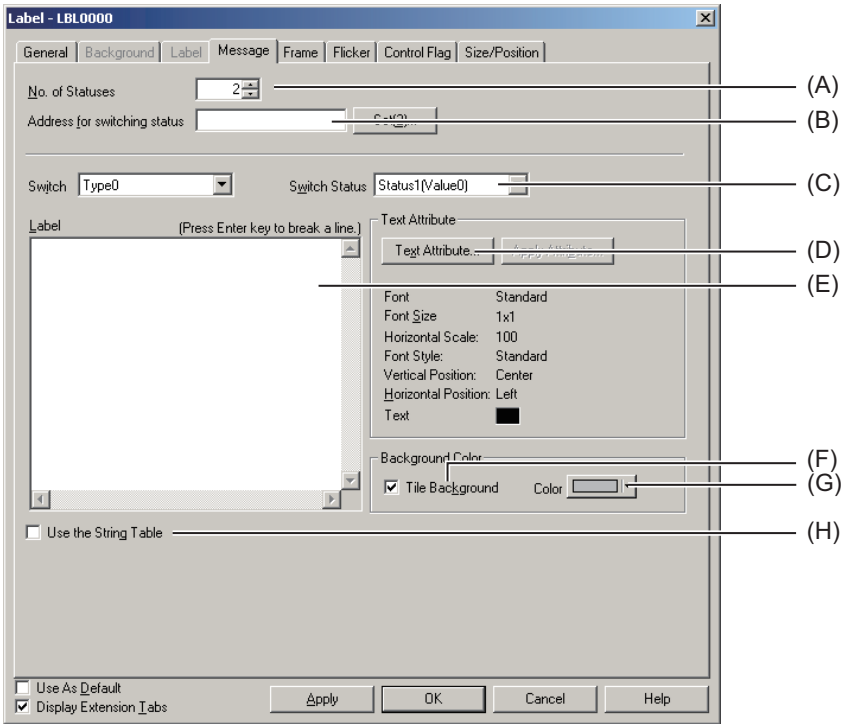
The vector font cannot be used when referencing the string table for label strings.

Message

Sets the display data for when the message display function is used.

The display string can be directly input or selected from the string table.

● Direct Input of Strings



No.	Item	Details
(A)	No. of Statuses	Sets the number of statuses (2 to 10000).
(B)	Address for switching status	Displays the status for the number corresponding to the value at the set communications address. The contents of the communications address is set as a binary value.
(C)	Switch Status	Selects the status for setting the string background.
(D)	Text Attribute	Specifies the text attributes for each status. Refer to *2-8-6 Text Attributes* on page 2-91 for details on settings.
(E)	Label	Sets the string for each status (up to 256 characters).
(F)	Tile Background	Select this checkbox to fill the background. Deselect this option to leave the background clear. If this checkbox is deselected, the background will be clear for all statuses.
(G)	Color	Sets the background color for each status if the *Fill background* checkbox is selected.
(H)	Use the String Table	Select this checkbox to select a label string from the strings registered in the string table.

Additional Information

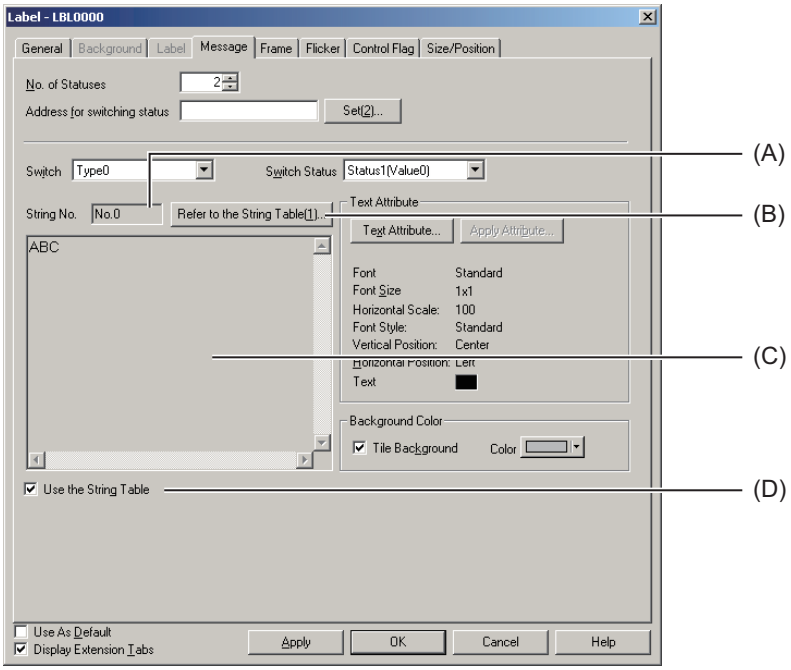
- Up to a maximum of 10,000 statuses can be registered. The maximum setting file size that can be registered for one screen, however, is 5 MB. Do not set any value larger that this. The setting file name is CNTxxx.cfg, where “xxx” is the screen number in hexadecimal. You can check the size of the current setting file by selecting **Tools – Resource Report** from the CX-Designer menus.Registered strings can be changed as a group by importing/exporting CSV files. The string table can be exported as a CSV file, edited or translated, and then imported. All of the data in the edited CSV file can then be registered together in the string table.

  The size of the settings file depends on the number of registered characters and labels. Use the following table as a guide.

File size	No. of labels	Number of registered statuses	No. of characters in each string
5.0 MB	1	10,000	256
4.9 MB	1	2,500	1,024
4.8 MB	2	10,000	120
4.7 MB	2	1,200	1,024
4.9 MB	16	10,000	10
4.7 MB	16	150	1,024

- Although a maximum of 10,000 status can be registered, the operations of the CX-Designer could be unstable with restrictions of the Windows if the number of status is increased. If the operations of the CX-Designer turns to be unstable, decrease the number of the status.

Referencing Label from the String Table



No.	Item	Details
(A)	String No.	Displays the string number selected from the string table for each status.
(B)	Refer to the String Table	Selects the string to be displayed as a label from the string table displayed when the Refer to the String Table Button is clicked.
(C)	Label	Displays the string selected from the string table. Up to 1,024 characters can be displayed.
(D)	Use the String Table	Deselect this option to directly input the label string.



Additional Information

The vector font cannot be used when referencing the string table for label strings.

Frame Tab Page (Extension Tab)

Specifies the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Makes flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page (Extension Tab)

Control flags control the display of functional objects. Use control flags to enable display when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-13-2 Bitmaps

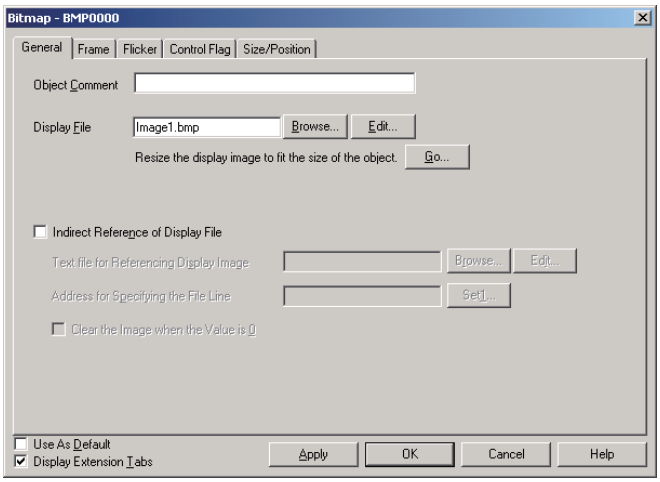
Bitmaps are objects that display images made up of dots. Bitmaps are used to display complex pictures or photographic images that cannot be drawn. BMP (.bmp) and JPEG (.jpg) files can be displayed using bitmap objects.



Bitmap object　　Bitmap data

Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for bitmaps.

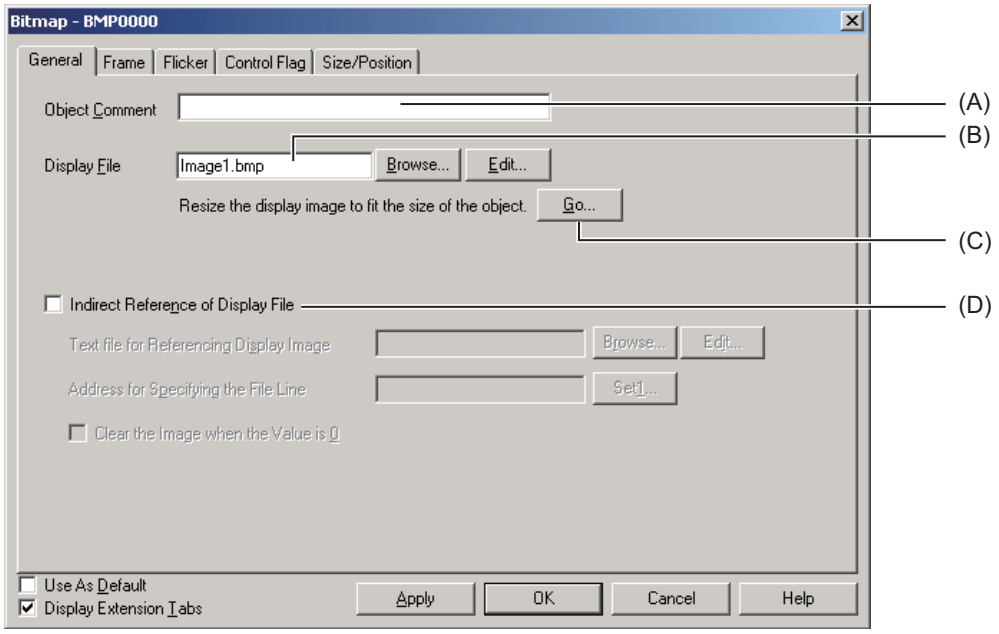


General:	Sets the image file and object comment to be displayed.
Frame:	Sets the bitmap object frame display.
Flicker*1:	Sets the flicker display.
Control Flag*1:	Sets display/no display of the object.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

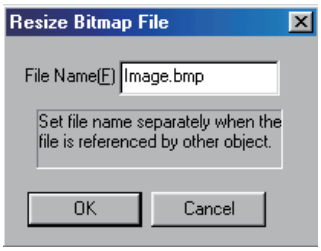
Sets the bitmap file and comment to be displayed.



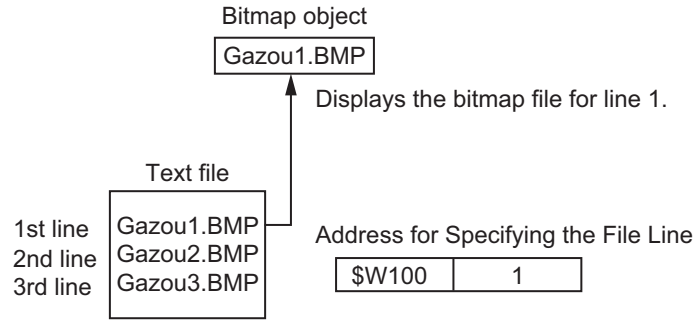
No.	Setting	Details
(A)	Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Display file	Selects the image file to be displayed. Files with the extension .bmp or .jpg can be selected. Click the **Browse** Button to select image files. The specified image file is copied to the folder where the project files are stored. Specify a file name of up to 12 characters (8 file name characters and 3 file extension characters). The following characters can be used in file names. Alphanumeric characters, underscore (_), dollar signs ($), and periods (.).

Additional Information

- RLE bitmap files and progressive format jpg files are not supported.
- If a corrupted jpg file is set, the CX-Designer will not operate correctly. Check that the file can be displayed correctly before specifying an image file for the bitmap.

No.	Setting	Details
(C)	Resize the display image to fit the size of the object.	Use this function to enlarge or reduce the image file specified under *Display file* to match the size of the current bitmap object. Use the following procedure to enlarge or reduce the image file. 1. Click the **Go** Button. 2. The dialog box shown below will be displayed. Set a separate file name to access this file from other objects.  3. Click the **OK** Button. A message saying that the processing has been completed will be displayed. 4. Click the **Apply** or **OK** Button in the Bitmap Object Properties Dialog Box to reflect the settings. Example:  Before adjustment After adjustment
(D)	Indirect Reference of Display File	Normally, images are displayed when fixed files are read and displayed. Text files can be browsed, however, for the display file name and a selected file displayed if the *Indirect Reference of Display File* option is selected. Click the **Browse** Button to specify a text file in any directory. This text file is then automatically copied to the folder where the project files are stored. Use this copied file for any subsequent editing. Lines where the display file name appear can be specified. For example, if the contents of the memory set to Address for Specifying the File Line changes to 1, the first and subsequent lines of the specified text file will be loaded. If the contents of the memory changes to 2, the second and subsequent lines will be loaded. If the contents of Address for Specifying the File Line is changed to 0, the bitmap file will not change from the one displayed immediately prior to the change. Select *Clear the Image when the Value is 0* to clear the display if the contents of Address for Specifying the File Line changes to 0.

No.	Setting	Details
(D)	Indirect Reference of Display File	The procedure for indirectly specifying the display file is described below. 1. Create a text file that will be used for indirect reference. Text files are created from the following elements using a text editor. (Create the file in any directory. Refer to *Text File Specifications* for restrictions on text files.) Example Image file name + .bmp when content of address specifying 1st line is 1. → IMAGE1.bmp Image file name + .bmp when content of address specifying 2nd line is 2. → IMAGE2.bmp Image file name + .bmp when content of address specifying 3rd line is 3. → IMAGE3.bmp ⋮ (Files with bmp extensions can be used for JPEG files.) 2. Click the **Browse** Button under *Display file* and select the image file. If necessary, select *Resize the specified display file to fit the size of the object*. 3. Repeat the previous step and select all the required image files. (The selected image files will be copied automatically to the directory where the project files are stored.) 4. Select Indirect Reference of Display File. 5. Click the **Browse** Button next to *Text File for Referencing Display Image* and specify the text file created in step 1. 6. Specify the address for specifying the file lines. If necessary, select *Clear the Image when the Value is 0*. 7. A separate program must be created if you want to switch bitmap displays like animation. Create a program that increases the contents of the specified address by 1 each time. Text File Specifications The file specifications are given below. File name: 8 file name characters + .txt (extension) The characters that can be used in file names are listed below. Alphanumeric characters, underscore (_), dollar signs ($), and periods (.). Editing software: Text editor Check that the text file has been created according to the above specifications and then specify Text File for Referencing Display Image. If a different text file has been specified by mistake, the PT Unit may not operate correctly. There is no limit on the number of rows IMAGE1.BMP IMAGE2.BMP IMAGE3.BMP ⋮

No.	Setting	Details
(D)	Indirect Reference of Display File	

Additional Information

- Always use the Browse Button to select the display file.
- Always use BMP or JPEG files with an image size given in the following table. If image files larger than the sizes given below are used, there may be insufficient memory available when the PT Unit is operating.

	Image size
Not NB5Q-TW01B-V1-S	800 × 600 dots max.
NB5Q-TW01B-V1-S	320 × 240 dots max.

- When bitmap objects are deleted, the BMP or JPEG files are not deleted from the folder where image data is stored. The BMP or JPEG files are also not deleted from the image data folder when deleting from an indirectly referenced file. If a BMP or JPEG file is no longer needed, check that it is not used in any other screens and then delete it manually.
- To set the data type (BCD or binary) for the address for specifying the File Line, select **Project Properties** from the PT Menu and set the data type on the Data Type Tab Page.
- There is no limit to the number of bitmaps that can be switched for the display. However, make sure that the total size of the BMP/JPEG files is within the transfer capacity of the PT Unit.

Frame Tab Page (Extension Tab)

Specify the colors and sizes of the bitmap object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Make flicker settings to make the bitmap object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page (Extension Tab)

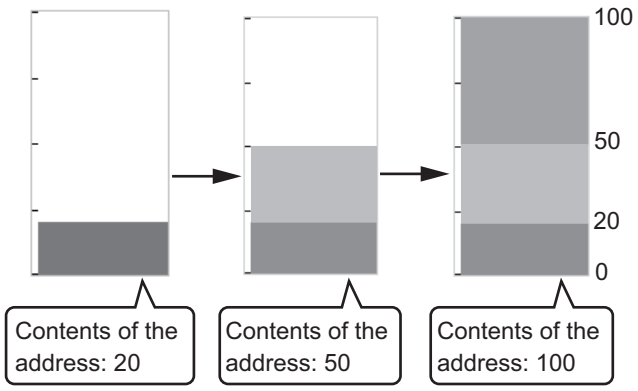
Control flags control the display of functional objects. Use control flags to enable display when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

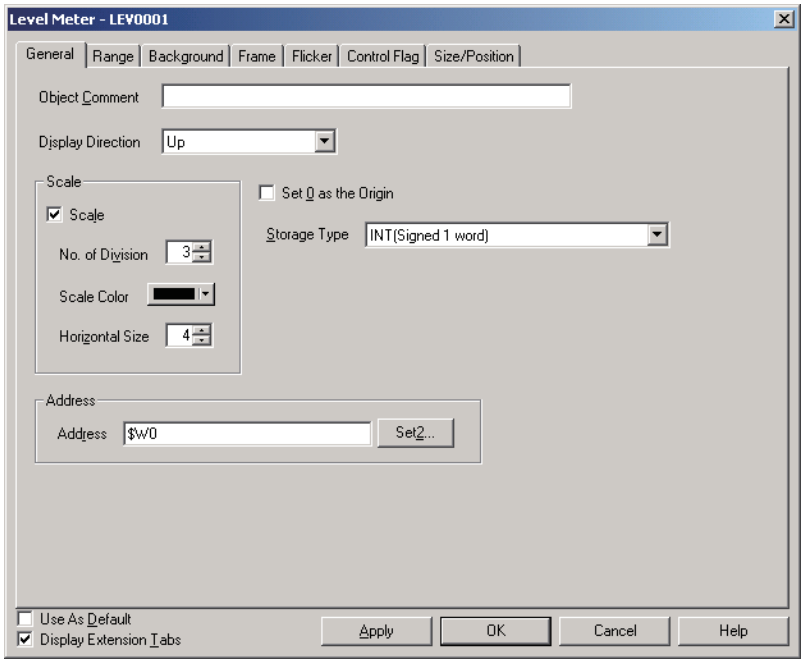
2-13-3 Level Meters

Level Meter objects are functional objects that fill rectangular regions based on the contents of a specified address. Ranges can be specified for color differentiation.



Settings for Functional Object Properties

This section describes the settings items in the Functional Object Properties Dialog Box for level display objects.

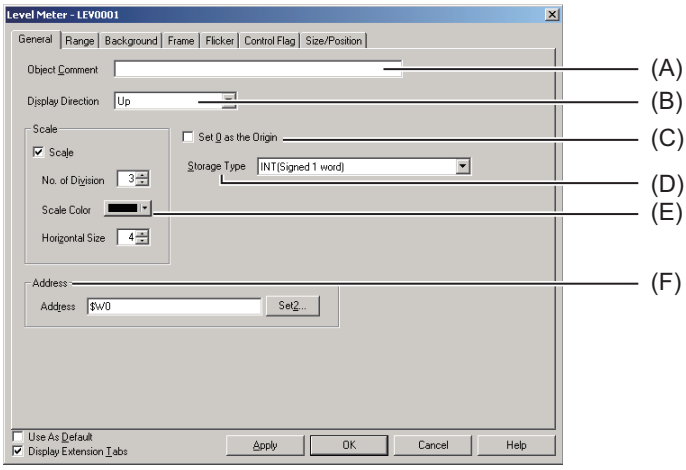


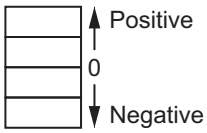
General:	Sets the object comment, display direction, and scale.
Range:	Sets the border (boundary value) and color for each range.
Background:	Sets the object background color.
Frame:	Sets the object frame display.
Flicker*1:	Sets the flicker display.
Control Flag*1:	Sets display/no display of the object.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the values referenced for scale shape and level display and the comment.



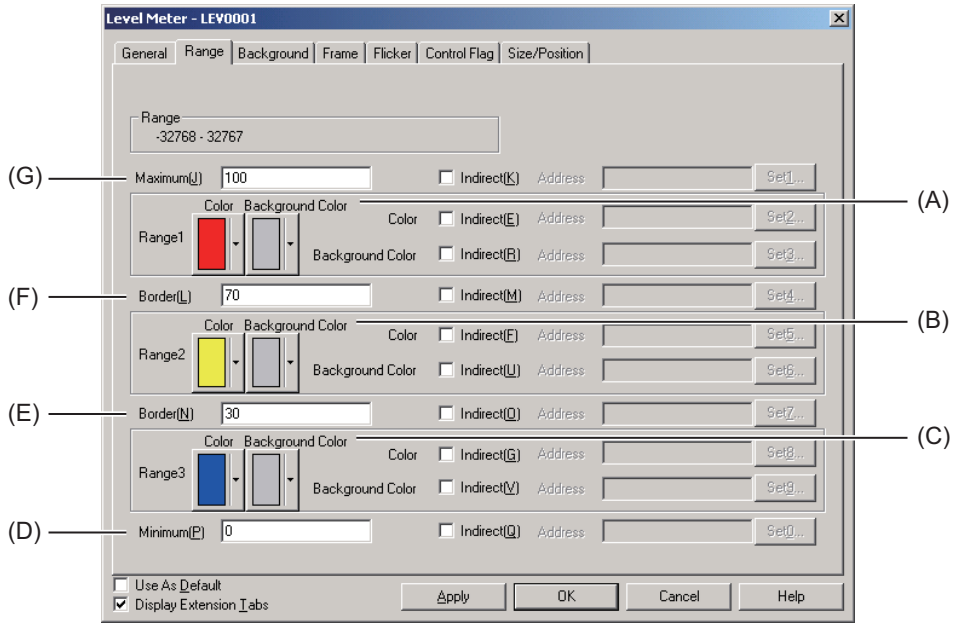
No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Display direction	Select a display direction of *Up, Down, Left,* or *Right*.
(C)	Set 0 as origin	If *Set 0 as origin* is selected, the border will be 0 and the level will be displayed in the specified display for positive values and in the opposite direction for negative values. Example: For *Up* display direction 
(D)	Storage type	Select and set the storage type from the pull-down list.
(E)	Scale	Set whether to use a scale. If a scale is used, set the number of divisions (1 to 99), the scale color, and the horizontal size (4 to 32).
(F)	Address	Sets the address to access the data. Only a word address can be set.

Additional Information

Sometimes the gaps between divisions will not be even, depending on the number of divisions and the size of the object.

Range Tab Page

Sets the maximum, minimum, borders, and colors for ranges 1 to 3.



No.	Setting	Details
(A)	Range1	Sets the fill color and background color for range 1. These colors can also be set indirectly through a communications address.
(B)	Range2	Sets the fill color and background color for range 2. These colors can also be set indirectly through a communications address.
(C)	Range3	Sets the fill color and background color for range 3. These colors can also be set indirectly through a communications address.
(D)	Minimum	Minimum range value or indirect word address.
(E)	Border	Delimiter for range 2/range 3 or indirect word address.
(F)	Border	Delimiter for range 1/range 2 or indirect word address.
(G)	Maximum	Maximum range value or indirect word address.

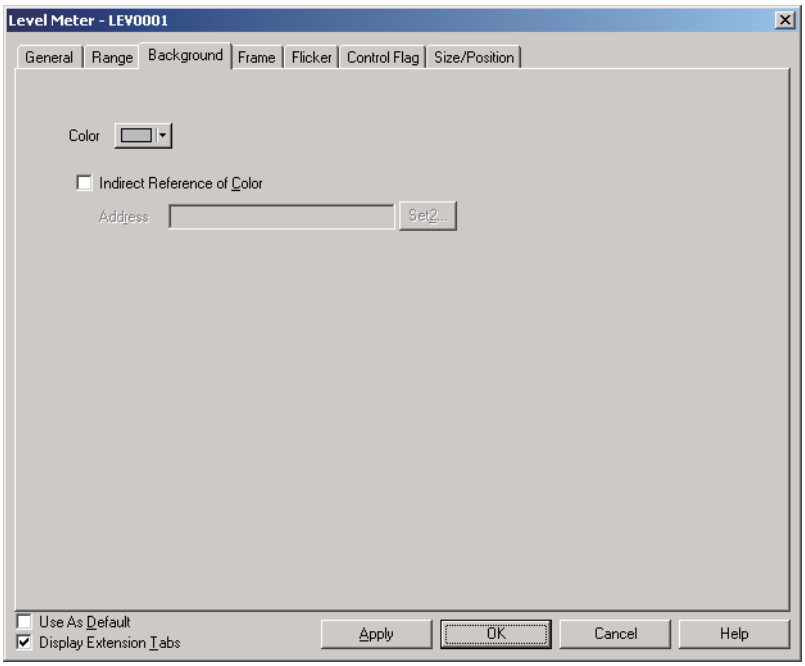
Additional Information

- The ranges that can be set for each item depend on the selected storage type. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78.
- When referencing the border indirectly, specify a value in the same type as the storage type set on the General Tab Page.

  For example, if *REAL* (real number) is specified on the General Tab Page, set the border as a real number.
- When indirectly referencing the border, make sure the size relationships between the maximum, minimum, and borders are correct. If the size relationships are incorrect, the level display object will not be displayed correctly.

Background Tab Page

Sets the background color for the functional object from a selection of 256 colors. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.



Colors can also be set by referencing the contents of the address.

Frame Tab Page (Extension Tab)

Specifies the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Makes flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page (Extension Tab)

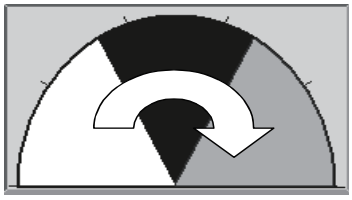
Control flags control the display of functional objects. Use control flags to enable display when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

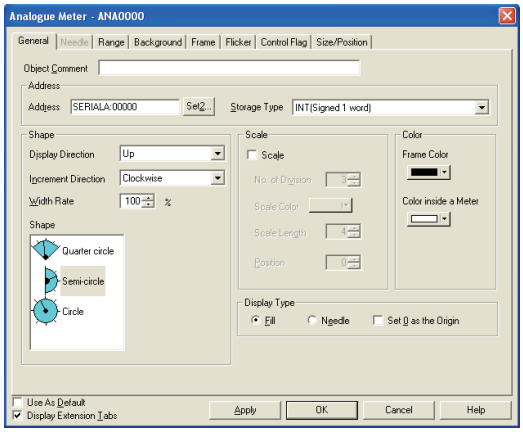
2-13-4 Analogue Meter

Analogue meters are objects that are displayed as quarter-circle, semi-circle, or circle graphs. The display direction (up, down, left, or right) and incremental direction for the meter (clockwise or anti-clockwise) can be set.



Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for analogue meters.



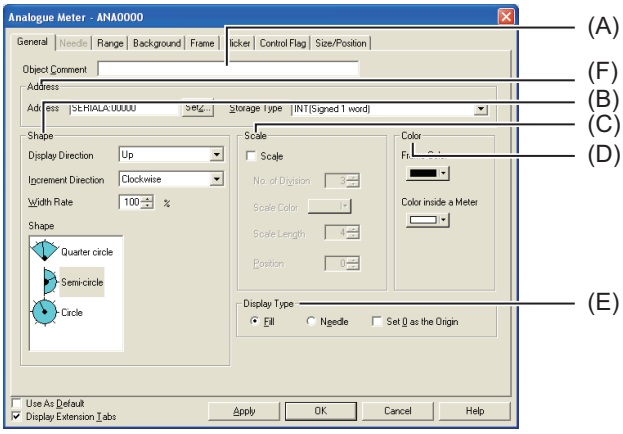
General:	Sets the address and display type.
Needle*1:	Sets the needle type and style.
Range:	Sets the border (boundary value) and color for each range.
Background:	Sets the object background color.
Frame:	Sets the analogue meter frame display.
Flicker*2:	Sets the flicker display.
Control Flag*2:	Sets display/no display for the analogue meter.
Size/Position*2:	Sets the object size and position.

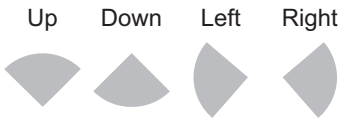
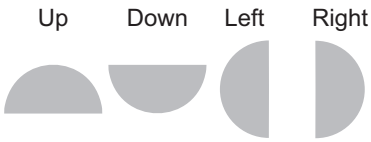
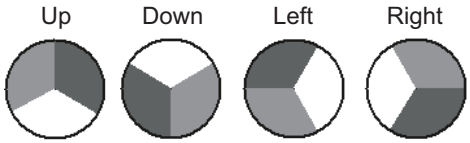
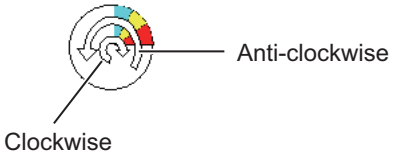
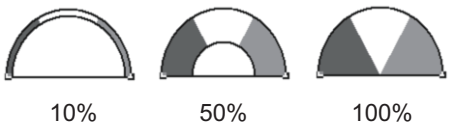
*1. Can be set only when *Needle* is selected as the display method on the General Tab Page.

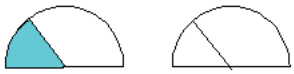
*2. These tabs are displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Sets the address and character display format for analogue meters.



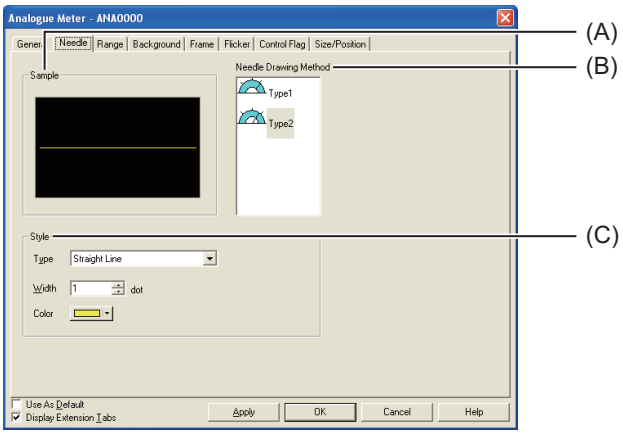
No.	Setting		Details
(A)	Object Comment		Sets an explanatory comment for the pasted object (up to 32 characters).
(B)	Shape		Sets the analog meter shape. Select the meter shape from the list: Quarter circle, semi-circle, or circle.
		Display direction	Set the display direction as *Up, Down, Left,* or *Right* for quarter-circle and semi-circle meters. For circle meters, the starting point for the meter is set by the display direction. Quarter-circle Analogue Meters  Semi-circle Analogue Meters  Circle Analogue Meters 
		Increment direction	Sets the incremental direction for the meter. 
		Width Rate	Specifies the meter width as a percentage of the radius (10% to 100%). Example: When meter widths for semi-circle meters set to *Up* 
		Shape	Selects the shape from a quarter circle, semi-circle, and circle.

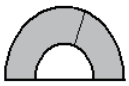
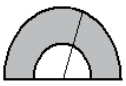
No.	Setting		Details
(C)	Scale		Sets whether or not the meter will have a scale. The number of scale lines and their color, length, and position can be set.  Example: Divisions: 8 Length of scale lines: 10 Position: 10
		No. of divisions	Separates the edge of the specified object into 1 to 99 gradations.
		Scale Color	Selects the scale color from 256 colors.
		Scale length	The scale lines can be set between -32 to 32 dots.
		Position	Sets the scale position between 0 and 999 dots (within the radius width). "0" is on the meter line and + is toward the outside.
(D)	Color		Sets the frame, inside meter, and needle colors.
(E)	Display type		Sets the display type for the meter. Selects whether up to the current value will be filled or whether it will be indicated by the needle. If the origin is 0, select *Set 0 as the Origin* (i.e., fill). If the origin is 0, 0 becomes the border and the meter is filled in the incremental direction if the value is position and in the opposite direction if the value is negative. The meter is filled from the starting point if the origin is not 0.  Fill Needle
(F)	Address		Specifies the address and the storage type.
		Address	Specifies the address for obtaining the current value for the meter. Only word addresses can be set.
		Storage type	Select and set the storage type from the pull-down list.

Needle

Sets the needle type and style.

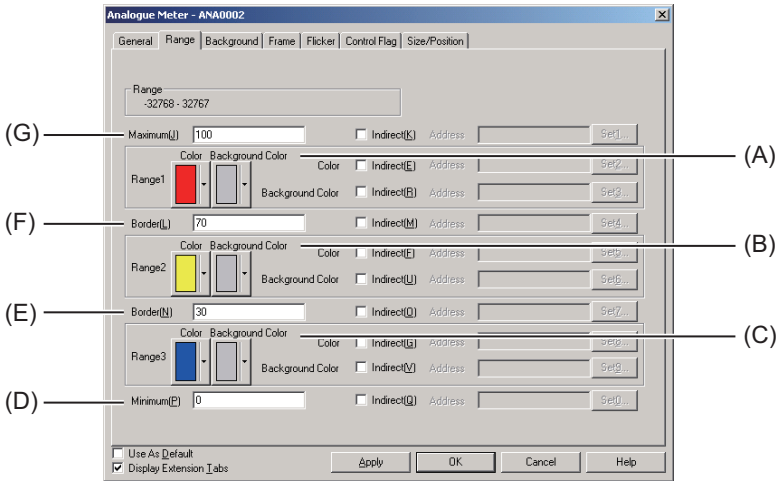
Can be set only when Needle is selected as the display method on the General Tab Page.



No.	Setting	Details
(A)	Sample	Displays a sample of the currently set needle shape.
(B)	Needle Type	Selects the type of needle for the meter. Type 1  Type 2 
(C)	Style	Sets the needle style.
	Shape	Selects straight line, arrow, or triangular arrow as the needle shape.
	Width	Selects the width from 1 to 3 (dots). This setting can be made when the shape is set to either straight line or arrow.
	Color	Selects the color for the arrow.

Range Tab Page

Sets the maximum, minimum, and borders for ranges 1 to 3.



No.	Setting	Details
(A)	Range1	Sets the fill color and background color for range 1. These colors can also be set indirectly through a communications address.
(B)	Range2	Sets the fill color and background color for range 2. These colors can also be set indirectly through a communications address.
(C)	Range3	Sets the fill color and background color for range 3. These colors can also be set indirectly through a communications address.
(D)	Minimum	Minimum range value or indirect word address
(E)	Border	Border for range 2/range 3 or indirect word address
(F)	Border	Border for range 1/range 2 or indirect word address
(G)	Maximum	Maximum range value or indirect word address

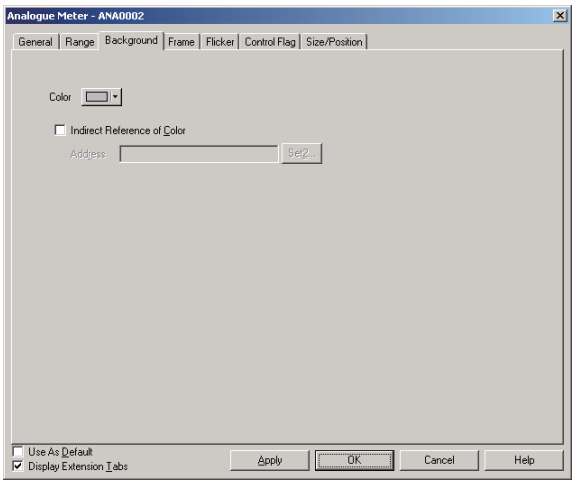
Additional Information

- The ranges that can be set for each item depend on the selected storage type. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78.
- When referencing the border indirectly, specify a value in the same type as the storage type set on the General Tab Page.

  For example, if *REAL* (real number) is specified on the General Tab Page, set the border as a real number.
- When indirectly referencing the border, make sure the size relationships between the maximum, minimum, and borders are correct. If the size relationships are incorrect, the level display object will not be displayed correctly.

Background Tab Page

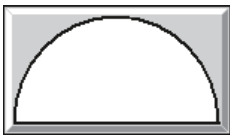
Sets the fill color for the background of functional objects. Refer to *2-8-8 Background* on page 2-97 and *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.



Frame Tab Page (Extension Tab)

Specifies the colors and sizes of the functional object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Analogue meters themselves are based on circles but the frame is drawn as a rectangle.



Flicker Tab Page (Extension Tab)

Makes flicker settings to make the analogue meter flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page (Extension Tab)

Control flags can control the display of functional objects. Use control flags to enable display when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

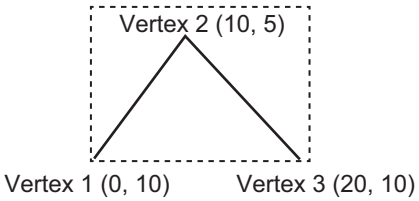
Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-13-5 Consecutive Line Drawings

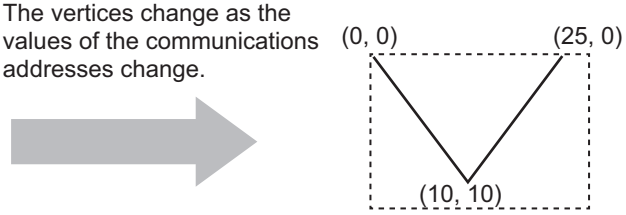
A consecutive line drawing is an object drawn within the object area using communications address values as coordinates of the vertex points. Unlike regular polylines, these shapes can be changed dynamically. The top left vertex of the created object is the origin. If a vertex is outside of the object area, that vertex will not be drawn.

The communications address values specify each vertex's X and Y coordinates.

The top-left point of the object is (0, 0).



The vertices change as the values of the communications addresses change.



The *Start address* of X-Y coordinate is set to $W100.

$W100=0
$W101=10 ┐ Coordinates of vertex 1
$W102=10
$W103=5 ┐ Coordinates of vertex 2
$W104=20
$W105=10 ┐ Coordinates of vertex 3

$W100=0
$W101=0
$W102=10
$W103=10
$W104=25
$W105=0

The Start address of X-Y coordinate is set to $W100.

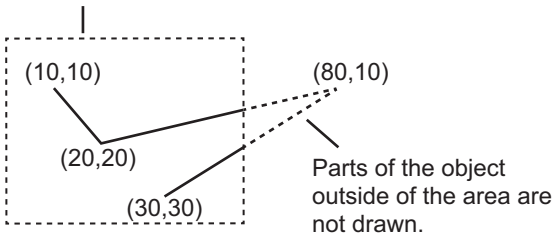
$W100=10
$W101=10

$W102=20
$W103=20

$W104=80
$W105=10

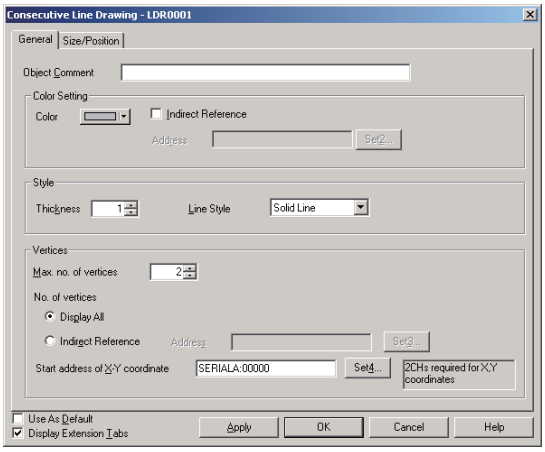
$W106=30
$W107=30

Created object area



Functional Object Property Settings

This section describes the functional object property settings in the Consecutive Line Drawing Window.



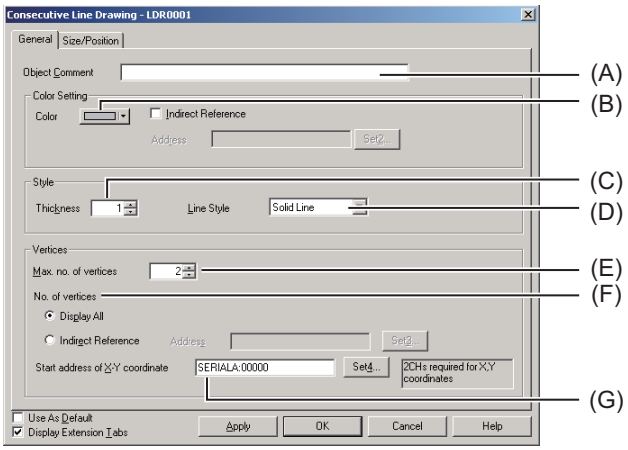
General: Sets basic properties such as the maximum number of vertices and the starting address of the X-Y coordinates.

Size/Position*1: Sets the object's size and position.

*1. This tab is displayed when the *Display Extension Tabs* Option is selected.

General Tab Page

Use the General Tab Page to set basic properties such as the maximum number of vertices and the starting address of the X-Y coordinates.



No.	Item	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Color	Sets the line color. The color can also be set indirectly through an address.
(C)	Thickness	Sets the line thickness. If the *Line Style* is set to *Solid Line*, the thickness can be set between 1 and 8. For other line styles, the thickness can be set to either 1 or 2.

No.	Item	Details
(D)	Line Style	Sets the line style to one of the following 5 styles. • Solid line • Broken line • Dotted line • 1-dot chain lines • 2-dot chain lines A line thickness of 3 or higher can be set for a solid line only.
(E)	Max. no. of vertices	Sets the maximum number of vertices between 2 and 128.
(F)	No. of vertices	When the *Display All* Option is selected, all of the vertices set in the *Max. no. of vertices* setting will be displayed. When the *Indirect Reference* Option is selected, the number of vertices indicated in the specified address will be displayed. If the specified address's value is 0 or 1, the object will not be drawn.
(G)	Start address of X-Y coordinate	Sets the starting address of the communications addresses containing the X-Y coordinates. Set the addresses so that the start address contains the X coordinate of vertex 1, the next address contains the Y coordinate of vertex 1, and each subsequent pair of words contains the X and Y coordinates for one vertex.

Additional Information

To set the data format (BCD or binary) for an indirectly referenced *Color*, an indirectly referenced *No. of vertices*, and the X-Y coordinate data starting at the *Start address of X-Y coordinate*, select **Project Properties** from the PT Menu and set the data format on the Data Format Tab Page.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

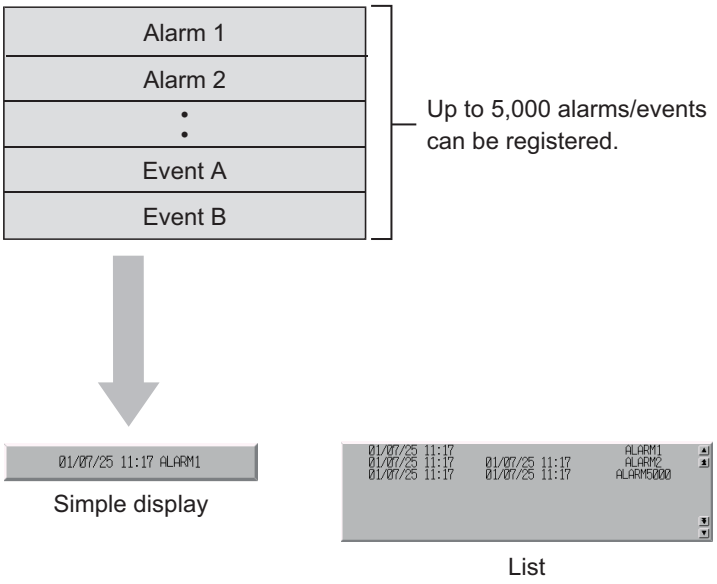
2-14 Alarms and Events

2-14-1 Outline

Alarms and events are functions that enable addresses registered for alarm monitoring to provide notification for alarms from those addresses. Alarms and events can also be used as functions that execute display when a bit to which start operation or a similar event has been specified is turned ON.

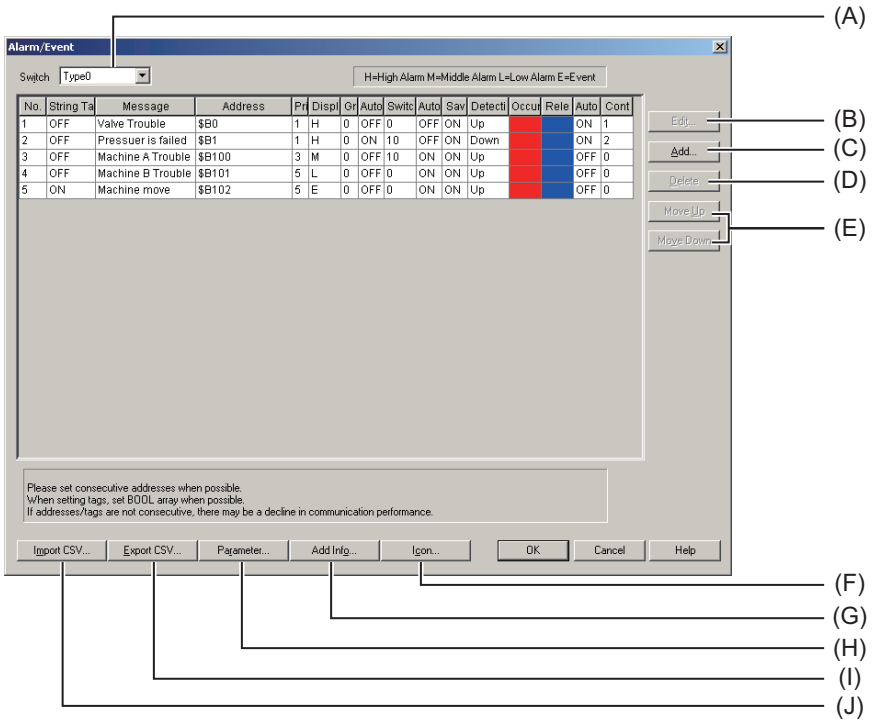
Up to 5,000 alarms and events can be registered and monitored for one project with NS-B-series PTs.

Related functional objects can display current alarms/events (alarm/event display) or a historical list (alarm/event summary and history). Also, the display can be switched automatically to a specified screen while an alarm or event is generated.



Registering Alarms/Events

Alarms/events must be registered before related functional objects are used. Either select **PT – Alarm/Event** or click the **Register alarm/event** Button in the Properties Dialog Box for the related functional object.



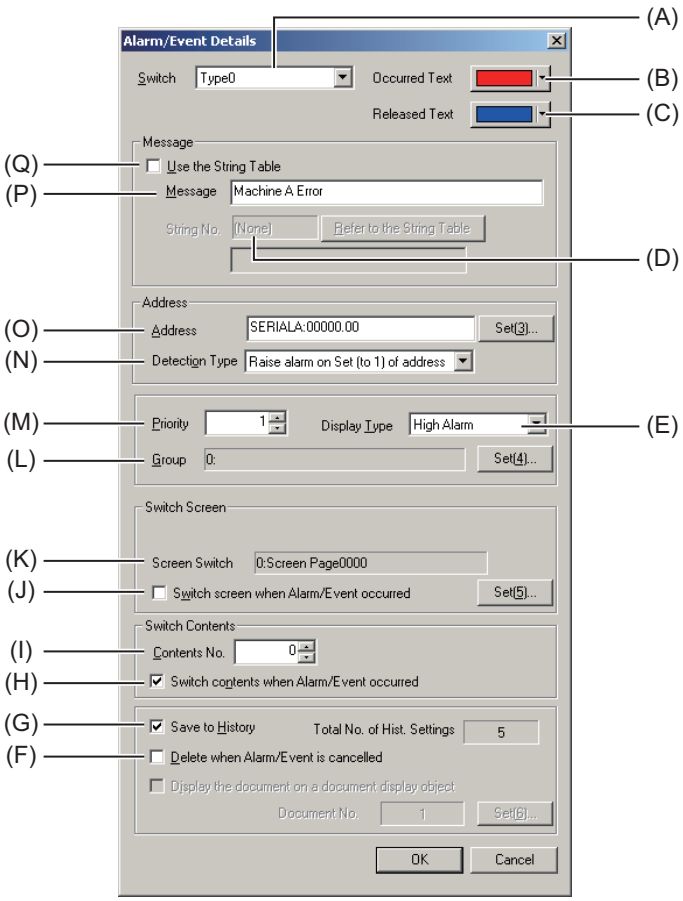
No.	Setting	Details
(A)	Switch	Switches the message display for each label.
(B)	Edit	Changes settings for the selected item in an alarm/event list. Click the **Edit** Button to display the Alarm/Event Details Dialog Box.
(C)	Add	Creates a new alarm/event. Click the **Add** Button to display the Alarm/Event Details Dialog Box.
(D)	Delete	Deletes the selected item in an alarm/event list. Click the **Delete** Button to display a confirmation box and click the **Yes** Button to delete the item.
(E)	Move up/Move down	Moves up or down the number for the item selected in the alarm/event list.
(F)	Icon	Specifies a bitmap or JPEG file for the icon. Click the **Icon** Button to display the Details Dialog Box.
(G)	Add Info.	Allocates the address to refer when an alarm or event occurs. Click the **Add Info.** Button to display the Add Alarm/Event Info. Dialog Box.
(H)	Parameter	Sets the screen switching when alarms or events are generated and the conditions for saving alarm/event history. Click the **Parameters** Button to display the Alarm/Event Parameters Settings Dialog Box.
(I)	Export CSV	Alarm/event settings can be exported to CSV files. Click the **Export CSV** Button to display the Export CSV Dialog Box. Specify the file name and click the **Save** Button.
(J)	Import CSV	Alarm/event settings edited in CSV format can be imported from a file. Click the **Import CSV** Button to display the Select alarm CSV Import Dialog Box. Select either **Add to Current Alarm** or the **Delete Current Alarm** and click the OK button.

Additional Information

- Messages can be set for each label for registered alarms or events.
- Registered alarms/events can be output in CSV format and edited as a group. Refer to *Importing and Exporting CSV Files* on page 2-314 for details.
- The communications speed may be reduced if consecutive addresses are not set in the Alarm/event Setting Items Dialog Box under *Alarm/event setting*. Set consecutive addresses if the communications speed is slow.

Adding and Editing Alarms/Events

Alarms and events can be added or edited.



No.	Setting	Details
(A)	Switch	Sets messages for each label.
(B)	Occurred Text	Sets the character color displayed when alarms or events occur.
(C)	Released Text	Sets the character color displayed when alarms or events are cleared.
(D)	String No.	Selects the character string to be displayed as a message from the character string table displayed when the **Refer to the String Table** Button is clicked if the *Use the String Table* Option is selected. The selected character string number is displayed in the *String No.* Field.
(E)	Display Type	Select one of the following four types of display. • High alarm • Middle alarm • Low alarm • Event Restrictions can be applied based on the display type when displaying alarms using related functional objects.

No.	Setting	Details
(F)	Delete when Alarm/Event is cancelled	Automatically clears messages from related functional objects when alarms/events are cleared, i.e., when the contents of the specified address turn OFF. The messages are displayed again if the address turns ON again. This option is available only when *Save to history file* is not selected.
(G)	Save to History	Records when alarms/events are generated and cleared. The number of alarms and events and the messages are also saved to the history file.
(H)	Switch contents when Alarm/Event occurred	Automatically switches to the contents display to the contents set under *Contents No.* if this checkbox is selected and an alarm/event occurs.
(I)	Contents No.	Sets the contents number for contents display when an alarm/event occurs.
(J)	Switch screen when Alarm/Event occurred	Automatically switches screens when alarms/events are generated, i.e., when the contents of the specified address turn ON.
(K)	Screen Switch	Sets the screen that will be automatically switched to when an alarm or event is generated.
(L)	Group	Specifies the group that belongs to the set alarm/event data. Click the **Set** Button to display the Alarm/Event Group Settings Dialog Box. Select the group, add it, and click the **OK** Button. Refer to *Specifying Alarm/Event Groups* on page 2-312 for details. Only information for specified groups can be displayed when displaying on related functional objects.
(M)	Priority	Sets the alarm/event priority order (1 to 9,999). The display order on related functional objects can be changed based on the priority order.
(N)	Detection Type	Sets the method for detecting alarms and events. • Raise alarm on Set (to 1) of address: An alarm has occurred when the address set for the alarm/event goes from OFF to ON and is cleared when the address goes from ON to OFF. • Raise alarm on Reset (to 0) of address: An alarm has occurred when the address set for the alarm/event goes from ON to OFF and is cleared when the address goes from OFF to ON.
(O)	Address	Sets the address to monitor alarms/events.
(P)	Message	Sets the message (up to 80 characters) to be displayed on related functional objects.
(Q)	Use the String Table	Select to use a character string registered in the character string table as messages to display functional objects related to alarms and events.



Additional Information

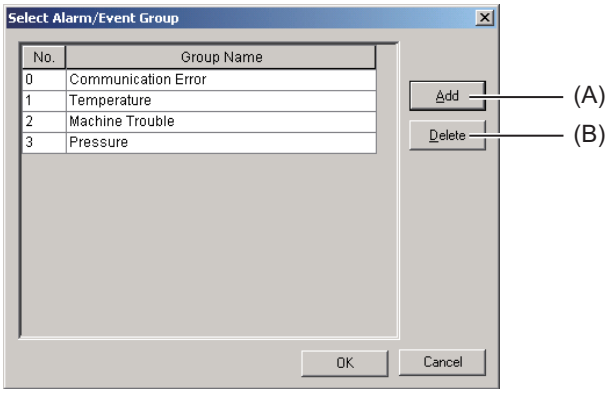
The following restrictions apply when referencing the character string table.

- If the character string has more than 80 characters, it will be treated as a message with 80 characters max.
- If there are multiple lines set for the character string, the first line of the character string will be treated as the message.

● Specifying Alarm/Event Groups

Specifies the group that belongs to the set alarm/event data.

Select the group in the CX-Designer Dialog Box and click the **OK** Button.



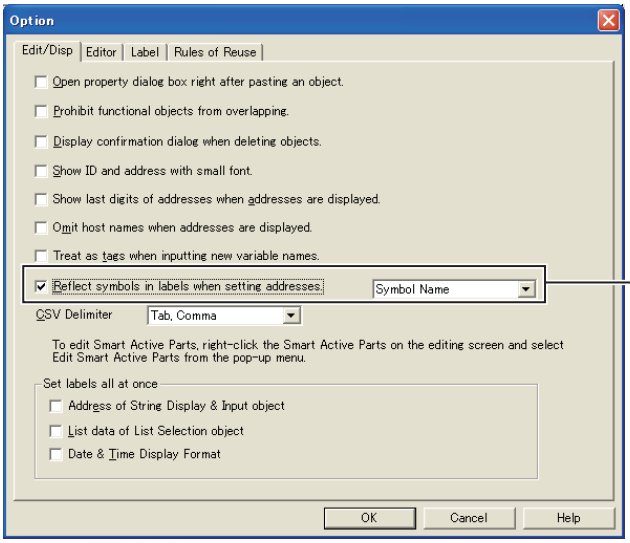
No.	Setting	Details
(A)	Add	Creates a new group. Click the **Add** Button and set a group name of up to 32 characters.
(B)	Delete	Deletes the group selected from the list.

Automatically Setting a Variable Name or I/O Comment in a Message

When an address has been set in the *Address* Field of the Alarm/Event Details Dialog Box, the communications address' symbol name or I/O comment can be automatically set as the alarm message.

1 Select Options from the Tools Menu. Open the Edit/Disp Tab Window in the Option Dialog Box.

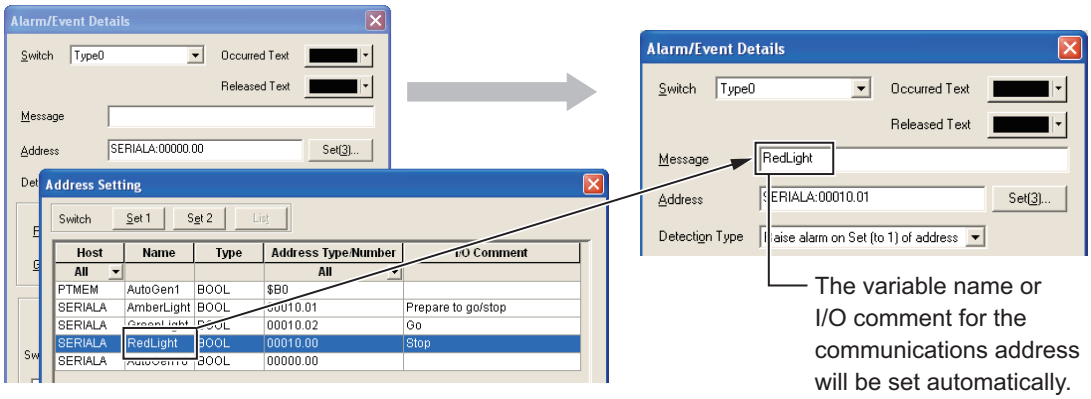
2 Select Reflect symbols in labels when setting addresses, and select either Symbol Name or I/O Comment for the label character string.



Check the box as shown, and select either *Symbol Name* or *I/O Comment* for the label character string.

3 Set the communications address in the *Address* Field of the Alarm/Event Details Dialog Box.

4 The symbol name or I/O comment for the communications address that was set for the message will be set automatically.



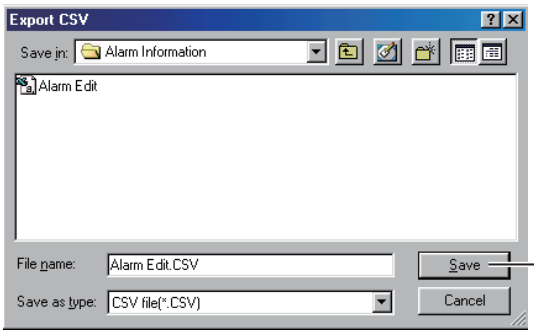
Additional Information

- If there are two or more labels, the symbol names and I/O comments will be set for the character strings for all of the labels.
- Symbol names and I/O comments will not be set automatically in the following cases:
  - When the communications address is replaced by another one.
  - When a symbol name or I/O comment is changed from a symbol table after the label character string has been set.
  - When an alarm/event was added from a CSV import.
  - When the *Use the String Table* Option is selected.
- If the *Reflect to label when an address is set* Option is selected in the Option Dialog Box, the symbol name or I/O comment will be reflected in the label of an ON/OFF Button, Word Button, Bit Lamp, or Word Lamp when the communications address is set.

Importing and Exporting CSV Files

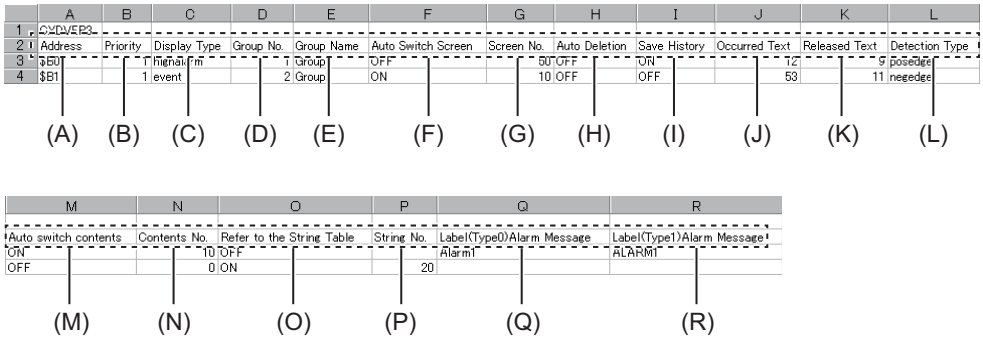
The CSV import and export functions are useful when there are numerous alarms or events registered and they need to be edited efficiently.

Click the **Import CSV** or **Export CSV** Button in the Alarm/Event Settings Dialog Box.



Changes to *Open* when importing CSV files.

A File Selection Dialog Box will be displayed. If exporting to a CSV file, enter the name of the file in the *File name* input field and click the **Save** Button. If importing from a CSV file, select the name of the file to be imported and press the **Open** Button. The output CSV file will be displayed in the following format.
Display for Microsoft Excel



No.	Setting	Details
(A)	Address	Sets the communications address. Only bit addresses can be set.
(B)	Priority	Sets the priority order (1 to 9,999).
(C)	Display Type	Sets the display type. highalarm: High alarm middlealarm: Middle alarm lowalarm: Low alarm Event: event
(D)	Group No.	Set the group number (0 to 99).
(E)	Group Name	Sets the group name (up to 32 characters long).
(F)	Auto switch screen	Select whether or not to switch screens automatically. ON: Automatic screen switch OFF: No automatic screen switch
(G)	Screen No.	Select the destination for automatic screen switching (0 to 3999).
(H)	Auto deletion	Sets whether or not to automatically delete alarms/events. ON: Automatic delete OFF: No automatic delete
(I)	Save history	Sets whether or not to save alarm/event history. ON: Save OFF: No save
(J)	Occurred Text	Sets the character color displayed when alarms or events occur (0 to 255).
(K)	Released Text	Sets the character color displayed when alarms or events are cleared (0 to 255).

No.	Setting	Details
(L)	Detection Type	Sets the method for detecting alarms and events. • Raise alarm on Set (to 1) of address: posedge • Raise alarm on Reset (to 0) of address: negedge
(M)	Auto switch contents	Sets whether or not automatic contents switching is enabled. Automatically switch contents switching: ON Do not automatic switch contents: OFF
(N)	Contents No.	Sets the contents number that is displayed when an alarm/event occurs (0 to 9999).
(O)	Refer to the String Table	Sets whether to reference a message character string from the character string table. Reference the character string table: ON Do not reference the character string table: OFF
(P)	String No.	Sets the character string number of the referenced character string when a message character string is referenced in a character string table. Leave blank if the message character string will not be referenced in the character string table.
(Q)	Alarm message	Sets the display message (up to 80 characters). Leave blank if the message character string will be referenced in the character string table.
(R)	Title	The CX-Designer version information and the title for each item will be displayed in lines one and two of the CSV file. Do not change or delete this information.

The set numerals and character strings can be all edited together because the efficient editing functions of the commercially available software can be used. Once editing has been completed, import the file again to enable the settings.

Alarm/event settings can be changed and added by using the import function.

The contents of the CSV file will change if an address is set in the file that is registered as an existing alarm/event. Alternatively, if an address that has not been registered yet is set to the CSV file, it will be added as a new alarm/event.

If the imported CSV file contains any errors (e.g., insufficient columns or number of columns increased), an error message will be displayed.



Click the **OK** Button to edit the CSV file.

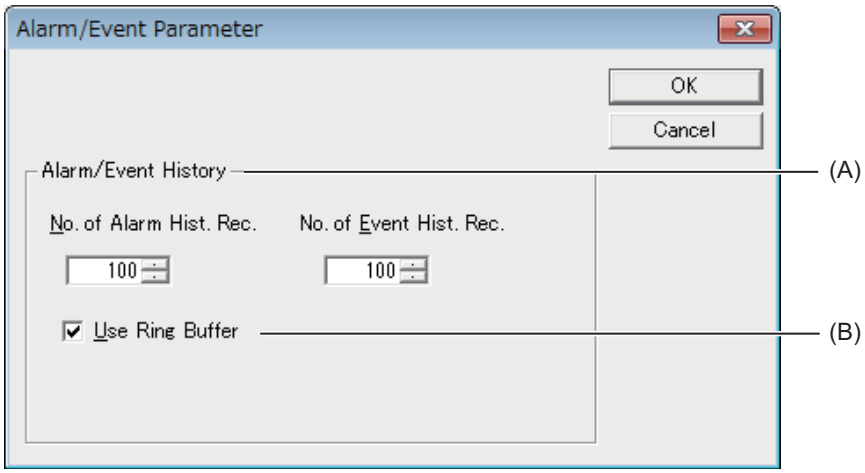
Additional Information

- CSV files can be edited using spreadsheet software or a text editor. If an exported CSV file is opened using a text editor, items with alarm messages or other character strings will be delimited by inverted commas (“ ”). Up to 1,110 characters can be set per line when using a text editor. This is the maximum number of characters that can be set for each item.

  Example: “Item 1,” “Item 2.”
- Up to 5,000 alarms or events can be set for each CSV file. If there are more than 5,000 alarms or events in a file, only 5,000 will be imported. The rest of the settings will be ignored.
- Use the **Move up/Move down** Button to change the alarm/event number after importing a CSV file.

Parameters

Sets the screen switching for when alarms or events are generated and the conditions for saving alarm/event history.



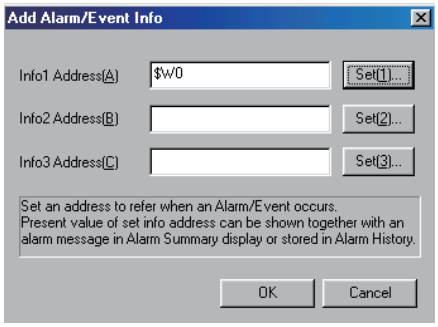
No.	Setting	Details
(A)	Alarm/Event history	Sets the maximum number of alarm and the maximum number of events to be recorded. Up to 1,024 can be set for each.
(B)	Use Ring Buffer	If *use ring buffer* is selected, the oldest alarm/event record will be deleted when the set record number is exceeded and an alarm/event is generated, and the new alarm/event will be saved. If *use ring buffer* is not selected, new alarms or events will not be recorded once the set record number has been reached.

Additional Information

Alarm and event histories are kept separately.

Add Alarm and Event Information

Sets as attributes the addresses whose contents is to be displayed for alarm/event summaries or and history object or the addresses whose contents is to be stored in the alarm/event summary.



The specified address is referenced and displayed on the alarm/event summary and history object or saved.

The address can either be input directly or set in the Address Setting Dialog Box, which is displayed when the corresponding **Set** Button is clicked.

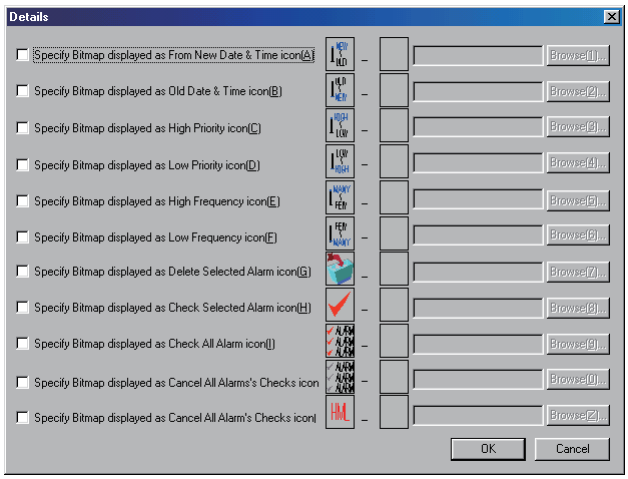
Additional Information

To set the data type (BCD or binary) for the specified addresses, select **Project properties** from the **PT** Menu and set the data type on the Data Format Tab Page.

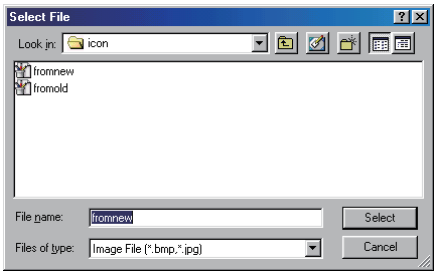
Specifying Icons

Sets bitmap files for the alarm/event summary and history object icon.

1 Select **PT – Alarm/event setting** to display the Alarm/event Settings Dialog Box. Click the **Icon** Button at the bottom of the screen to display the Details Dialog Box.



2 Select the check box for the icon for which the bitmap will be specified and click the **Browse** Button. The File Selection Dialog Box will be displayed. Specify the file to be displayed as the icon.



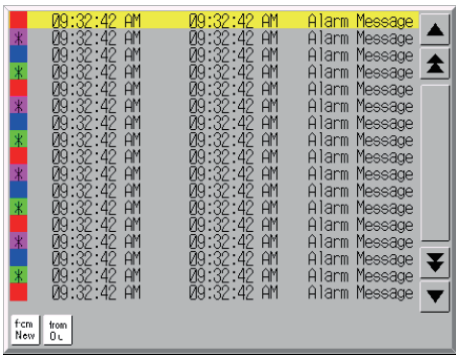
3 Click the **Select** Button to close the dialog box. An image of the selected bitmap file will be displayed to the right of the existing icon in the Details Dialog Box.

4 Click the **OK** Button to close the Details Dialog Box.

5 Click the **OK** Button to close the Alarm/event Settings Dialog Box.

6 Set the icon to be displayed on the Icon Tab of the Alarm/event Summary and History Object Properties Dialog Box.

7 Click the **OK** Button to close the Properties Dialog Box. The icons to which bitmap files have been specified will be displayed on the alarm/event summary and history object, as shown in the following diagram.



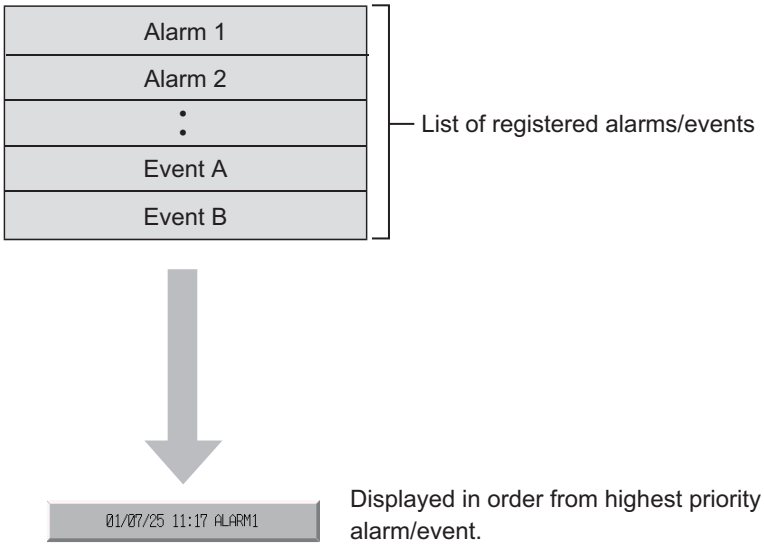
Additional Information

- When the number of colors in the designated image file is a True Color number, it is automatically reduced to 32,000.
- Specify a file name of up to 12 characters (8 file name characters and 3 file extension characters). The following characters can be used in filenames.

  Alphanumeric characters, underscore(_), dollar signs ($), and periods(.).

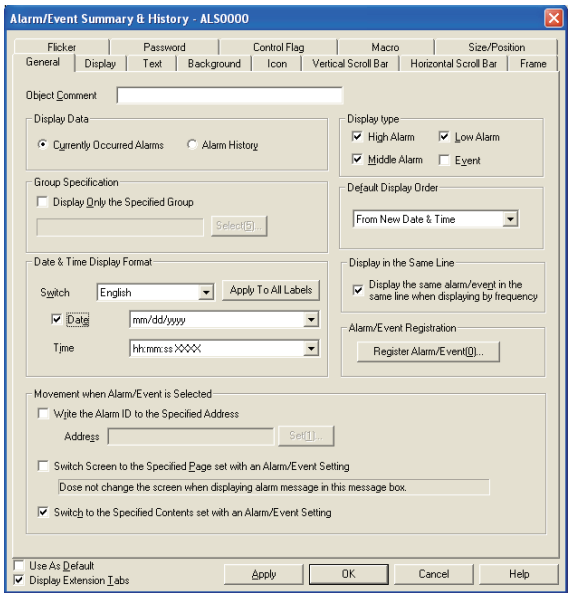
2-14-2 Alarm/Event Display Objects

Alarm/event display objects are functional objects that display the current recorded alarm or event in one line. The highest priority alarm or event will normally be displayed, but multiple alarms or events can be displayed in order of highest priority if flowing text is specified.



Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for alarm/event display objects.



General:	Sets the alarm/event display format.
Flowing string:	Sets flowing string for the display character string.
Text:	Sets the font and size for alarm/event display characters.
Background:	Sets the background color for alarm/event display.
Frame:	Sets the object frame display.
Flicker*1:	Sets the flicker display.
Password*1:	Sets the password to be entered when the object is pressed.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets the macros that will operate when the alarm/event display area is pressed.

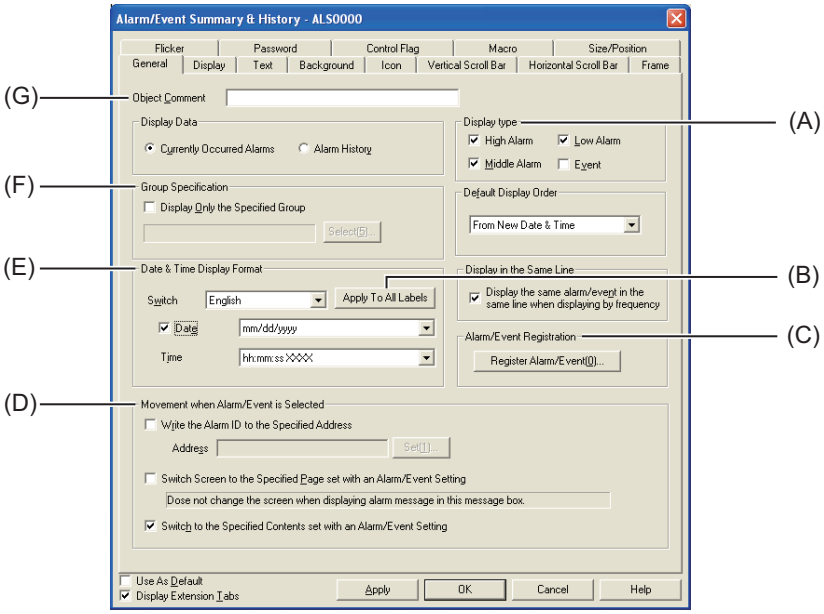
Size/Position[*1]: Sets the object size and position.

*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the alarm/event display format and display conditions.

The information in the Alarm/Event Registration Dialog Box can also be read from the General Tab Page.



No.	Setting	Details
(A)	Display type	Select the alarm/event type to be displayed from the following 4 options. • High alarm • Medium alarm • Low alarm • Event
(B)	Apply to All Labels	Uses the date display method for the selected label for all labels. This setting is used only for labels for which a date display and time display are selected. *Apply to All Labels* cannot be set in the following cases. • When the *Date & Time Display Format* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label. • When a date display and time display are not selected.
(C)	Alarm/event registration	Click the **Register Alarm/Event** Button to display the Alarm/Event Setting Dialog Box and register or edit alarms or events.

No.	Setting		Details
(D)	Movement when Display Area is Pressed		One of the following three operations can be selected for when the object area where the alarm/event is displayed is pressed.
		Switch Screen to the Specified Page Set with an Alarm/Event Setting	Jumps to the page registered to the display alarm/event when the display area is pressed.
		Switch to the Specified Contents set with an Alarm/Event Setting	Switches the contents display to the contents set to the alarm/event displayed when the display area is pressed.
		Erase Displayed Message	Clears the displayed alarm/event message when the display area is pressed.
(E)	Time and date display format		Displays the date and time of the alarm or event. Select both *Date* and *Time* and select the display format from the list. Refer to *2-8-5 Date and Time Format (General Tab)* on page 2-88 for information.
		Switch	Sets the date and time display format for each label.
		Date display	Selects the date display format from the list.
		Time display	Selects the time display format from the list.
(F)	Group specification		The display can be set to include only information from groups specified when alarms/events are registered. Select *Display only the specified group* and click the **Select** Button to display Select Alarm/Event Group Dialog Box.
(G)	Object Comment		Sets an explanatory comment for the pasted object. (Up to 32 characters.)

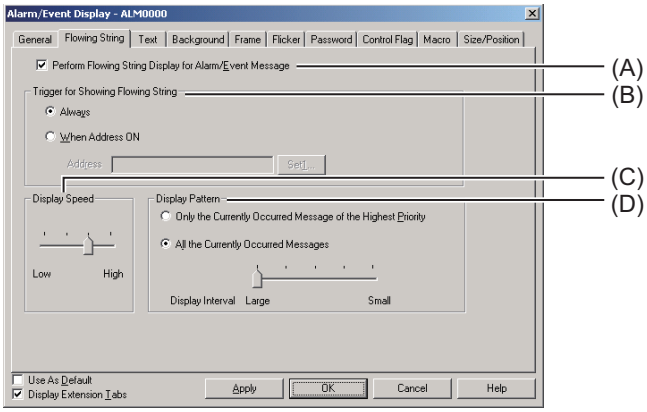
Additional Information

If nothing is selected under *Display type*, there will be no alarm/event to display and nothing will be displayed during operation.

Flowing String Tab Page

Displayed character strings can be set to flowing string.

When flowing string is set, the message information for the generated alarm/event will flow from right to left in the display area.



No.	Setting	Details
(A)	Perform Flowing String Display for Alarm/Event Message	When clicking the check box, the display conditions for flowing string for alarm/event messages can be set.

No.	Setting	Details
(B)	Trigger for Showing Flowing String	The timing for starting flowing string display can be selected from the following two options. • Always. • When Address ON.
(C)	Display speed	There are four speed options for flowing string. From fastest to slowest, the options are 100 ms, 500 ms, 1,000 ms, and 1,500 ms. The characters move to the left by one at a time at the specified speed.
(D)	Display pattern	Select one of the following two display patterns. Display Currently Occurred Message of the Highest Priority If there are multiple alarms/events with the same level of priority generated, the message for the latest alarm/event will be displayed. All the Currently Occurred Messages If this option is selected, the display interval for each message can be specified. • Small (right edge): Messages flow with no interval. Example Alarm 1 Alarm 1 Alarm 1 • Large (left aligned): Displays the next message once the previous message has moved completely across the screen. Example Alarm 1 Alarm 1

Additional Information

The actual display speed may be slower than the specified speed, depending on the amount of screen.

Text Tab Page

Sets the text attributes, such as font and color, for the display string. The text attribute settings will be reflected (appear) differently in CX-Designer, on the PT Unit, and in test mode.

	Font	Character size	Character color
CX-Designer	○	○	○
PT Unit	○	○	●
Test mode	○	○	●

○: Reflects alarm/event display property settings.

●: Reflects alarm/event settings made under the PT menu.

Refer to *2-8-6 Text Attributes* on page 2-91 and *2-14-1 Outline* on page 2-308.

Background Tab Page

Sets the background color for alarm/event display from 256 color options. Refer to *2-8-8 Background* on page 2-97 for details.

Frame Tab Page

Specify the colors and sizes of the functional object frame to change the shape or color when the alarm/event display object is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Makes flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Password Tab Page (Extension Tab)

A password can be set for when the alarm object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page (Extension Tab)

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page (Extension Tab)

Macros can be specified for alarm/event display objects.

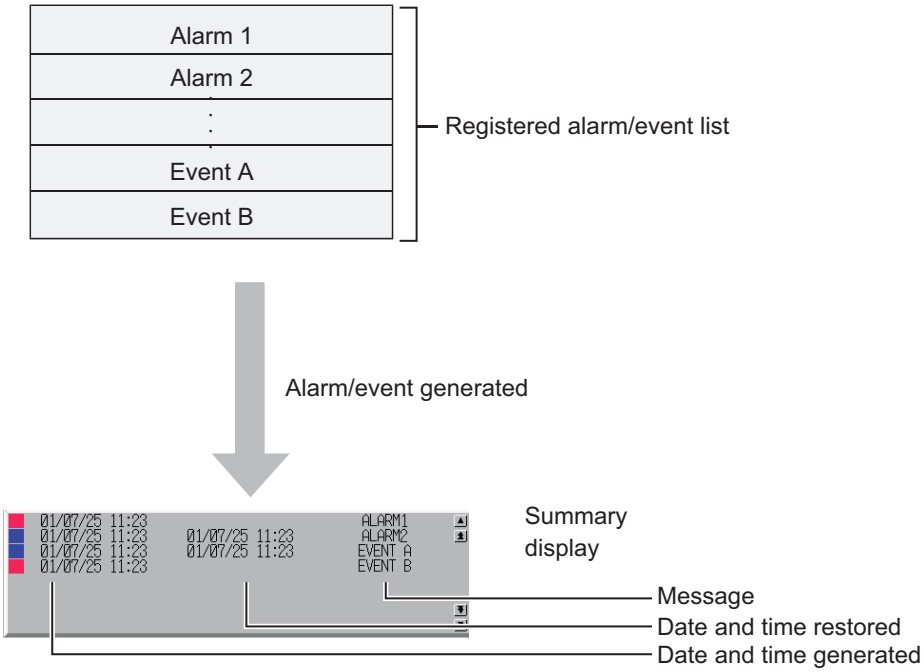
Refer to the *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-14-3 Alarm/Event Summary and History

Alarm/event summary/history objects are functional objects that display the current recorded alarm or event messages as a list. The display order can be specified, e.g., by date, by priority level, and by frequency.



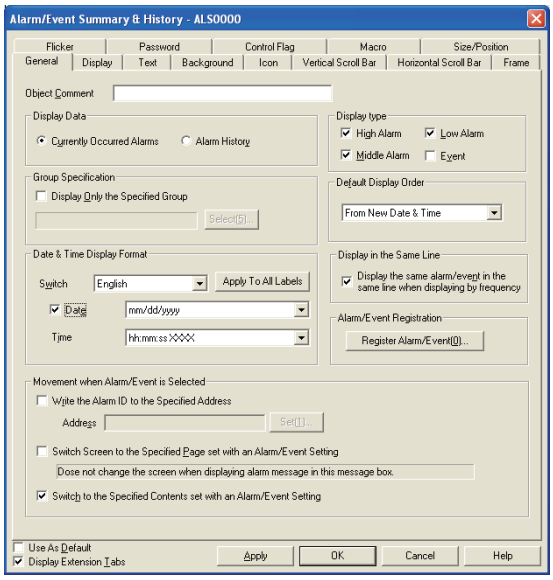
The display is refreshed every time an alarm or event specified for display is generated or reset. The refreshed display will be in the set display order.

Additional Information

Sometimes not all information can be displayed on the screen, depending on the set number of message characters or display items.

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for alarm/event summary and history objects.

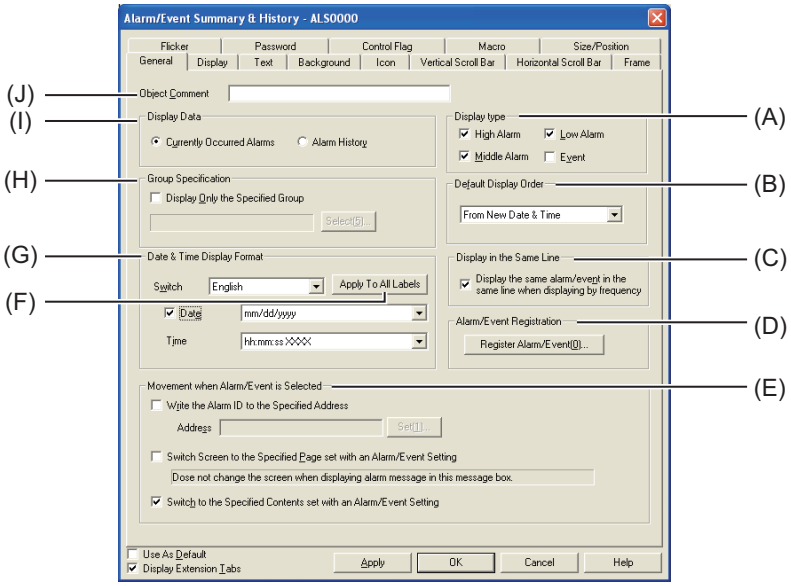


General:	Sets the alarm/event display format and display order.
Display:	Sets the selection bar color, line height, and alarm/event summary display items.
Text:	Sets the font and size for alarm display characters.
Background:	Sets the background color for character display.
Icon:	Selects the icon to operate alarm/event summaries.
Vertical Scroll Bar:	Sets the bar size and scroll width for the vertical scroll bar.
Horizontal Scroll Bar:	Sets the scroll width for the horizontal scroll bar.
Frame:	Sets the object frame display.
Flicker*1:	Sets the flicker display.
Password*1:	Sets the password to be entered when the object is pressed.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Macro*1:	Sets the macros for alarm/event summary and history objects.
Size/Position*1:	Sets the object size and position.

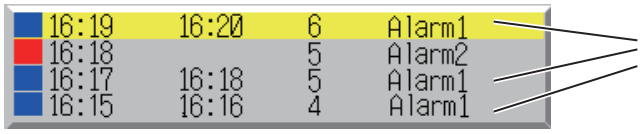
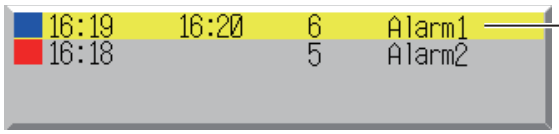
*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the alarm/event summary/history display format and display order.



No.	Setting	Details
(A)	Display type	Select the alarm/event type to be displayed from the following 4 options. • High alarm • Middle alarm • Low alarm • Event
(B)	Default display order	The default display order for alarm/event summary/history display can be selected from the following 6 options. • From New Date & Time • From Old Date & Time • From High priority • From Low priority • From High Frequency • From Low Frequency

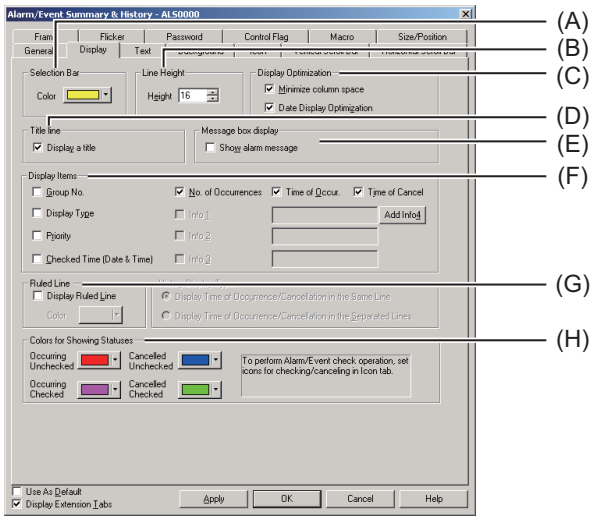
No.	Setting	Details
(C)	Display in the same line	Sets whether to display the same alarm/event by date/time of occurrence or only the display the latest alarm/event time, when the display order is set to *From High Frequency/From Low Frequency* is selected and the display data is set to *Alarm History*. If this checkbox is deselected, the same alarm/event will be displayed by date and time. Example:  The same alarm/event is displayed by date of occurrence. If this checkbox is selected, only the most recent occurrence of each alarm/event will be displayed. Example:  Only the most recent occurrence of each alarm/event is displayed.
(D)	Alarm/event registration	Click the **Register Alarm/Event** Button to display the Alarm/Event Setting Dialog Box and register or edit alarms.
(E)	Movement when Alarm/Event is Selected	Select the operation when alarms/events are selected from the following three options. • Write the alarm ID to the specified address. Writes the alarm ID number for the selected alarm/event to the specified address. • Switch Screen to the Specified Page set with an Alarm/Event Setting. Switches the display to the **Switch Screen No.** set to the alarm event. • Switch to the Specified Contents set with an Alarm/Event Setting. Switches the contents display to the contents for the contents number set to the alarm/event.
(F)	Apply to All Labels	Uses the date display method for the selected label for all labels. This setting is applied only to labels for which a date display is selected. *Apply to All Labels* cannot be set in the following cases. • When the *Date & Time Display Format* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label.
(G)	Date and Time display Format	Displays the date and time of the alarm or event. Select the date and time display format from the list.
	Switch	Sets the date and time display format for each label.
	Date	Selects the date display format from the list.
	Time	Selects the time display format from the list.
(H)	Group Specification	The display can be set to include only information from groups specified when alarms/events are registered. Click the **Select** Button to display Select Alarm/Event Group Dialog Box.
(I)	Display data	Select one of the following 2 display data types. • Current Occurred alarms (Displays the current alarm). • Alarm history (Displays all alarms, including past alarms.)
(J)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)

Additional Information

- If nothing is selected under *Display type*, there will be no alarm/event to display and nothing will be displayed during operation.
- If the alarms/events during operation have the same level set under *Default display order*, they will be displayed in the order they occurred.
- Alarm ID refers to the number set under *PT – alarm/event setting – No.* To set the data type (BCD or binary) for the specified address, select **PT – Project Properties** and set the data type on the Data Format Tab Page.
- Sometimes not all information can be displayed on the screen, depending on the set number of message characters or display items.

Display Tab Page

Sets the selection bar color that will be reversed and the display items when alarm/event summaries or histories are selected.



No.	Setting	Details
(A)	Selection bar	Sets the color to one of the 256 colors available in the selection bar.
(B)	Line height	Sets the height of the lines in dot units. (8 to 64 dots)
(C)	Display optimization	If the *Minimize column space* Option is selected, the space between items on the display will be minimized. If the *Date Display Optimization* Option is selected, the date will be displayed for the leftmost item only and omitted for the other items.
(D)	Title line	If the *Display a title* option is selected, the title of each item will be displayed at the top.
(E)	Message box display	If the *Show alarm message* option is selected, the entire alarm message will be displayed in a message box when the alarm message area is clicked.
(F)	Display items	Select one of the following eight types of display items. (Multiple items can be selected.) • Group number, Display type • Priority, Checked Time (date and time) • No. of Occurrences • Time: Date of occurrence • Time: Date of recovery • Info 1 • Info 2 • Info 3 (The Info is set in the Alarm/Event Registration Dialog Box. The Info options will not be displayed if additional information has not been set.)
(G)	Ruled line	Select *Display Ruled lines* to display ruled lines and use the **Set** Button to set the color for the lines.
(H)	Colors for Showing Status	Sets the color that indicates the status of the displayed alarm/event. The following four types of status are used. These cannot be set when *Use Text Color/Font of Alarm/Event Setting* is selected on the Text Attributes Tab Page. • Occurring Unchecked • Occurring Checked • Canceled Unchecked • Canceled Checked

Text Tab Page

Sets the text attributes, such as font and color, for the display string.

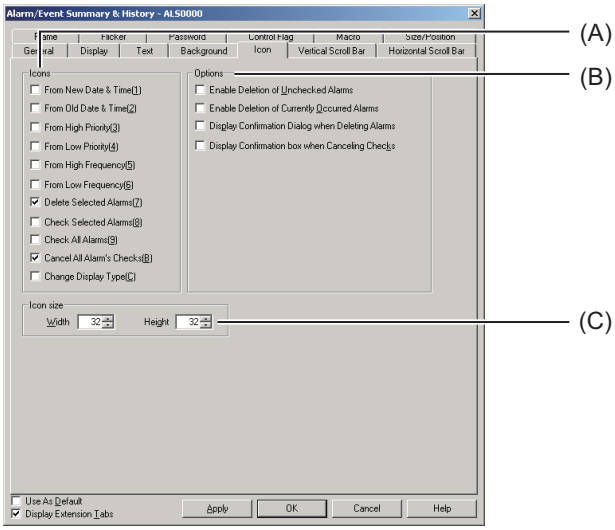
When *Use Text Color/Font of Alarm/Event Setting* is selected, the display will be in the color and font set under *PT – alarm/event setting*. Refer to *2-8-6 Text Attributes* on page 2-91 and *2-14-1 Outline* on page 2-308.

Background Tab Page

Sets the background color for alarm/event summary or history display from 256 color options. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 and *2-8-8 Background* on page 2-97 for details.

Icon Tab Page

Selects the icon to operate alarm/event summaries and histories.



No.	Setting		Details
(A)	Icon		Icon buttons that perform specific operations can be set to be displayed at the bottom of the alarm/event summary/history object. The following icon buttons can be displayed.
	From New Date & Time		Sorts the display from latest to oldest. If multiple alarms/events have the same date, the display will be in the order those alarms/events were generated.
	From Old Date & Time		Sorts the display from oldest to latest. If multiple alarms/events have the same date, the display will be in the order those alarms/events were generated.
	From High priority		Sorts the display from highest to lowest priority. If multiple alarms/events have the same priority, the display will be in the order those alarms/events were generated.
	From Low priority		Sorts the display from lowest to highest priority. If multiple alarms/events have the same priority, the display will be in the order those alarms/events were generated.
	From High frequency		Sorts the display from highest to lowest frequency. If multiple alarms/events have the same frequency, the display will be in the order those alarms/events were generated.
	From Low frequency		Sorts the display from lowest to highest frequency. If multiple alarms/events have the same frequency, the display will be in the order those alarms/events were generated.

No.	Setting		Details
(A)	Delete selected alarms		Deletes the selected alarms/events from the list. Select *Display confirmation dialog box when Deleting Alarm* under the options to display a confirmation message before deleting alarms/events. Click the **Yes** Button in the dialog box to clear the alarms/events.
	Check selected alarm		A mark (*) will appear beside the selected alarms/events when this option is selected.
	Check all alarms		A mark (*) will appear beside all alarms/events when this option is selected.
	Cancel All Alarms' Check		Clears all marks (*) from beside alarms/events.
	Change Display Type		The following four types of menus can be selected for display when icons are pressed. An asterisk (*) will appear in the menu for the current alarm/event. A question mark (?) will appear when in test mode. • High alarm • Middle alarm • Low alarm • Event
(B)	Options		Select one of the following four operation options. • Enable Deletion of Unchecked Alarms. • Enable Deletion of Currently Occurred Alarms. • Display confirmation dialog box when Deleting Alarms. • Display confirmation dialog box when Canceling Checks.
(C)	Icon size		Sets the horizontal and vertical dimensions of the icon (16 to 64).

Vertical Scroll Bar Tab Page

Sets display/no display, scroll width, and button size for the list vertical scroll bar displayed to the right of the alarm/event summary/history object.

Refer to *2-8-11 Scroll Bars* on page 2-105 for details.

Horizontal Scroll Bar Tab Page

Sets display/no display, scroll width, and button size for the list horizontal scroll bar displayed to the right of the alarm/event summary/history object.

Refer to *2-8-11 Scroll Bars* on page 2-105 for details.

Frame Tab Page

Specifies the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Makes flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Password Tab Page (Extension Tab)

A password can be set for when the alarm object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page (Extension Tab)

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page (Extension Tab)

Macros can be specified for alarm/event summary/history objects. Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on setting macros.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

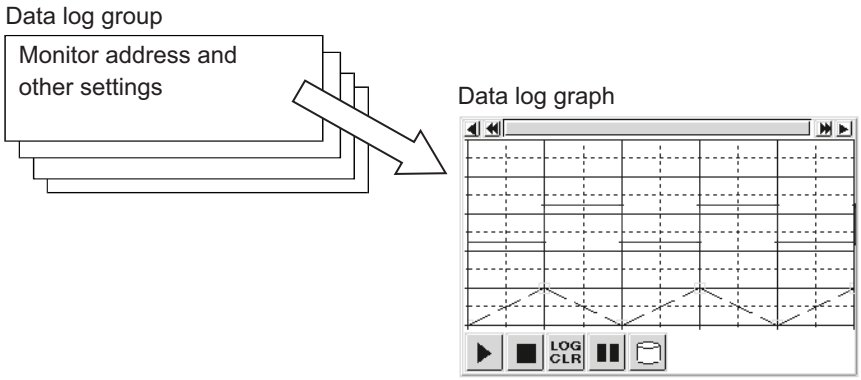
2-15 Data Logs

2-15-1 Outline

The data log function saves changes over time in the contents of the allocated address. The saved data can be displayed as a data log graph object for each set data logging group. In Version 6 and later versions, the following two applications can be executed by using data log objects. Refer to *2-15-3 Example Setting Procedure* on page 2-358 for information on how to make settings for each application.

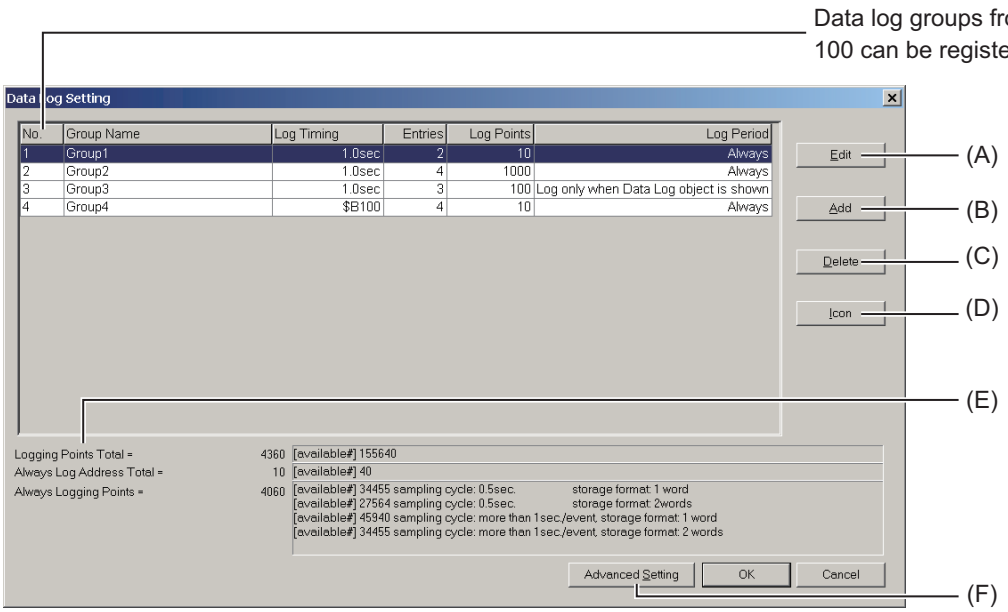
1 Saving log data automatically and periodically to a removable media and continuing logging.

2 Overlapping a data log graph (standard data) in the removable media with the graph being logged.



Registering Data Logging Groups

Data logging groups must be registered before data logs can be displayed as graphs. Select **PT – Data Log Settings**.



The Data Log Setting Dialog Box will be displayed. New data logging groups are created and settings are edited, deleted, and confirmed in this dialog box.

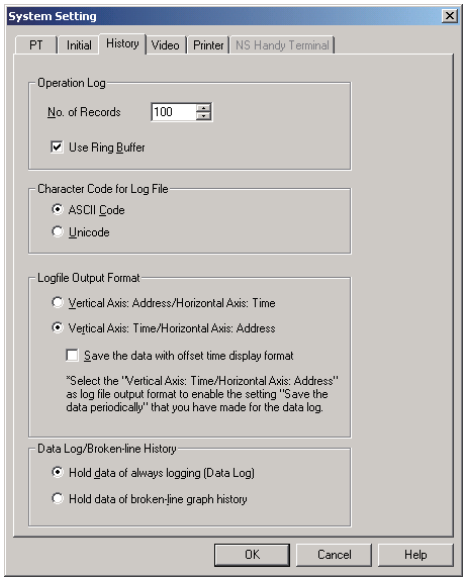
No.	Setting	Details
(A)	Edit	To change a set data logging group, select the display line for the group to be changed and press the **Edit** Button to display the Data Log Group Setting Dialog Box. Refer to *Data Log Group Settings* on page 2-336 for information on how to change data logging groups.
(B)	Add	To add data logging groups, click the **Add** Button to display the Data Log Group Setting Dialog Box. Refer to *Data Log Group Settings* on page 2-336 for information on how to add data logging groups. Up to 100 groups can be registered for each project. The **Add** Button will be disabled when 100 groups have been registered.
(C)	Delete	To delete a set data logging group, select the display line for that group and click the **Delete** Button. A confirmation message will be displayed. Click the **Yes** Button to delete the selected group.
(D)	Icon	Click the **Icon** Button to display the Details Dialog Box. BMP/JPEG files can be specified to the icon for the data log object.
(E)	Logging Points Total	The total number of logging points is displayed. Logging is possible for up to160,000 points. Refer to *Calculating Logging Points* on page 2-342 for details.
	“Always” Log Address Total	Displays the total number of addresses that are always logged. Up to 128 addresses can be constantly logged.
	Always Logging Points	The number of points for constant logging is displayed. Constant logging is possible for up to 50,000 points. Refer to *Calculating Logging Points* on page 2-342 for details.
(F)	Advanced Setting	Click the **Advanced Setting** Button to set display settings for data log graphs. For details, refer to *Display Settings for Data Log Graphs* on page 2-341.

Additional Information

- The available number of “Always logging points” differs depending on the sampling cycle for the data log group and the log address storage type.
- The following option must be set in advance before using the “always logging” function.

(1) Select **PT – System Setting** and open the History Tab Page.

(2) Select the *Hold data of always logging (Data Log)* Option and click the **OK** Button.

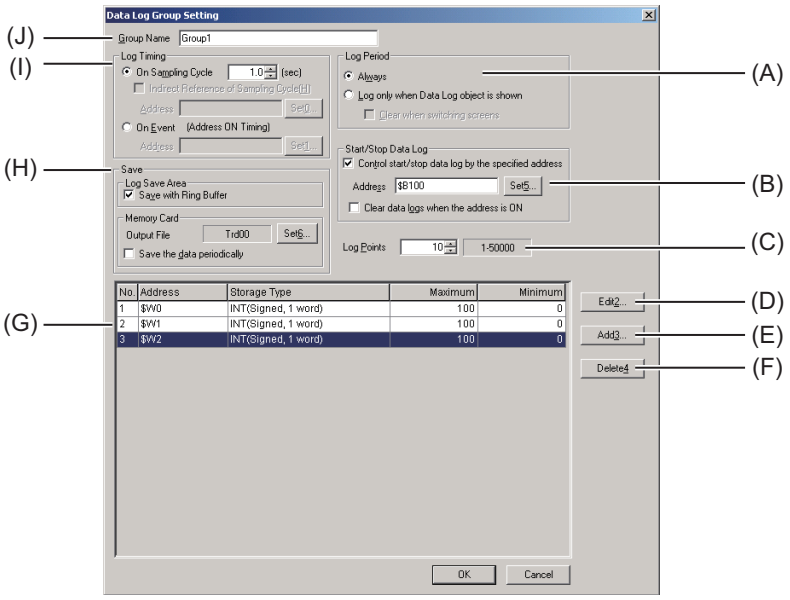


- When the “always logging” function is being used, the “broken-line graph history” function cannot be used.

Data Log Group Settings

Sets data logging groups.

New groups can be added and registered groups can be edited.



Settings that will affect the whole group, such as group names, are made under group setting. New settings can be made and settings can be edited and confirmed for lines displayed on data log graphs. Up to 100 groups can be registered for each project.

No.	Setting	Details
(A)	Log Period	Selects and sets one of the following two log periods.
	Always	Select this option for always logging.
	Log only when Data Log object is shown	Select this option to perform logging only while the data log graph is displayed. Select *Clear data logs when the address is ON* to clear the saved information when the screen is switched.
(B)	Start/Stop Data Log	Set to log while a specified address is ON.
	Control start/stop data log by the specified address	Select this option to log while a specified address is ON. Select the *Clear data logs when the address is ON* option to clear the data logged at the last start/stop data log.
(C)	Log Points	Sets the number of log bits or words (1 to 50,000).
(D)	Edit	To change the registered data log address settings, select the display line for the setting to be changed and press the **Edit** Button to display the Data Log Address Setting Dialog Box. Refer to *Data Log Address Settings* on page 2-339 for information on how to change data log settings.
(E)	Add	To add data log addresses, click the **Add** Button to display the Data Log Address Setting Dialog Box. Refer to *Data Log Address Settings* on page 2-339 for information on how to add data log settings. Up to 16 lines can be set for each group. The **Add** Button will be disabled when 16 lines have been registered.
(F)	Delete	To delete a registered data log address setting, select the display line for that setting and click the **Delete** Button. A confirmation message will be displayed. Click the **Yes** Button to delete the selected setting.
(G)	Data log address list	Displays a list of addresses set for the group that obtain the data logs.

No.	Setting		Details
(H)	Data Log Save		Sets the following two log save methods.
		Save with Ring Buffer	Select to continue logging after the number of logging points has been reached. If this option is selected, the oldest logging data is overwritten with the most recent data when the total number of logging points has been reached.
		Output File	Sets the file name for logging data output as a file to the removable media/Log/ directory after creating a folder for each group. The file name can be up to 36 characters. Alphanumeric characters (0 to 9, A to Z, and a to z), the dollar sign ($), and underscores (_) can be used in the file name. File name: File name□□□.csv └□□□: ID number from 001 to 999 The ID number for files saved for each group is added after the file name. Beginning with 001, the number is automatically incremented by 1 each time the operation is executed.
		Save the data periodically	Select this option for automatic, periodical saving of the data log. When choosing this option, set *Logfile Output Format* on the **Settings – System settings – History Tab Page** to Vertical Axis: Time/Horizontal Axis: Address. Also, when outputting log data to a CSV file, select the *Save the data with offset time display format* option for offset time display.
(I)	Log Timing		Specifies the timing for obtaining data from the following 2 options.
		On Sampling Cycle	Obtains data each specified sampling cycle. The shortest possible sampling cycle is 0.5 s. The setting range is 0.5, or 1 to 86,400 (seconds).
		Indirect reference of sampling cycle	If data logging is performed only when a Data Log object is displayed, the sampling cycle can be indirectly specified by selecting this option.
		On Event	Obtains data each time a specified address status changes from OFF to ON.
(J)	Group Name		Sets the group name. For new groups, the input field will be Group □. Enter the group name (up to 32 characters).



Additional Information

- The file size of the CSV files output for each data log group can be calculated using the following formula as a guideline. This varies depending on the log timing, the number of digits in the value stored in the log address, the number of log addresses, and the number of logs.

  CSV file size (bytes) = (A + B * C) * D

  A: Timing data size

		Size (bytes)
Log timing	Sampling cycle: 1 to 86,400s, or each event	22
	Sampling cycle: 0.5 s	26

  B: Number of digits in value stored in log address +1

  (for a value of 1,000 to 9,999: 4 + 1 = 5)

  C: Number of log addresses

  D: Number of logs

  Example 1:

Log timing: Sampling cycle 1 s	A=22
Digits of value stored in log address: 5	B=5+1=6
Number of log addresses: 5	C=5
Number of logs: 10,000	D=10,000

  The CSV file size for the above data log group is calculated as follows.

  CSV file size = (22 + 6 * 5) * 10,000 = 520,000 (bytes) ≈ 508 (KB)

  Example 2:

Log timing: Sampling cycle 0.5 s	A=26
Digits of value stored in log address: 10	B=10+1=11
Number of log addresses: 2	C=2
Number of logs: 15,000	D=15,000

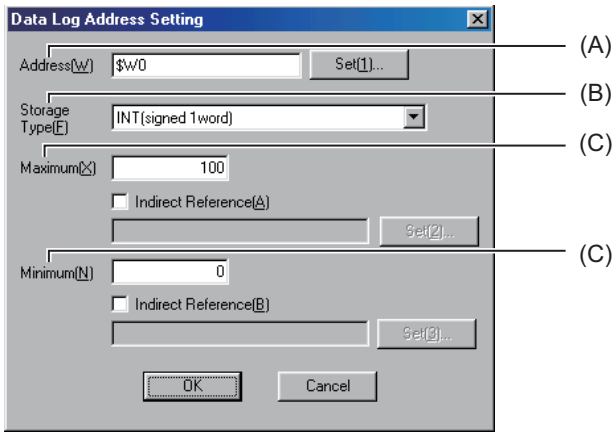
  The CSV file size for the above data log group is calculated as follows.

  CSV file size = (26 + 11 * 2) * 15,000 = 720,000 (bytes) ≈ 704 (KB)

- Removable media devices can be rewritten up to 100,000 times. If you were to repeatedly rewrite the removable media in 10-minute intervals, 100,000 rewriting cycles would be completed within 2 years.

Data Log Address Settings

Sets the address for the data to be saved and the graph line information to be displayed on the data log graph.



The settings for each line shown in the data log graph are made under the data log address setting. Up to 16 items of data can be set for each group.

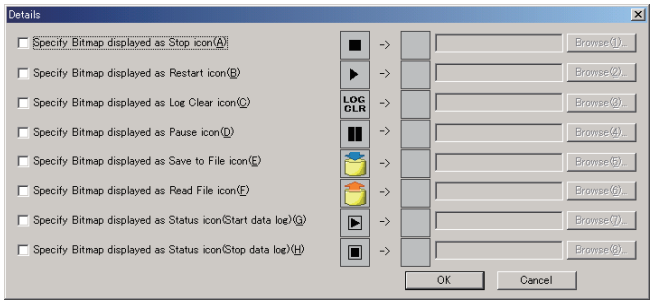
No.	Setting	Details
(A)	Address	Sets the address where the data is stored.
(B)	Storage type	Select the storage type for numerals from the list. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details.
(C)	Maximum/minimum	Sets the maximum and minimum values for graph display.
	Maximum	The maximum that can be set depends on the storage type for each line.
	Minimum	The minimum that can be set depends on the storage type for each line.
	Indirect Reference	If *Indirect reference* is set, the maximum and minimum values can be specified by the contents of an address.

Specifying Icons

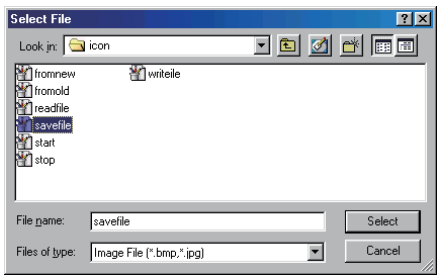
Bitmap files can be specified for data log object icons. The setting method is described below.

1 Select **PT – Data log** to display the Data Log Setting Dialog Box.

2 Click the **Icon** Button to display the Details Dialog Box.



3 Select the icon for the specified Bitmap and click the **Browse** Button. The Select File Dialog Box will be displayed. Specify the file to be displayed as an icon.



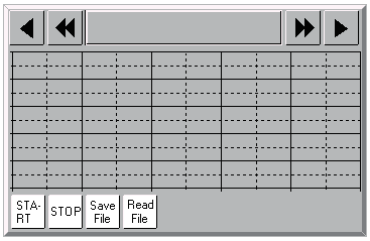
4 Click the **Select** Button to close the dialog box. The selected bitmap file image will be displayed to the right of the existing icons in the Details Dialog Box.

Click the **OK** Button to close the Details Dialog Box.

Click the **OK** Button to close the Data Log Setting Dialog Box.

5 Set the icon to be displayed on the Icon Tab Page of the data log object Property Dialog Box.

6 Click the **OK** Button to close the Property Dialog Box. The icon for which a Bitmap was specified will be displayed on the data log object.



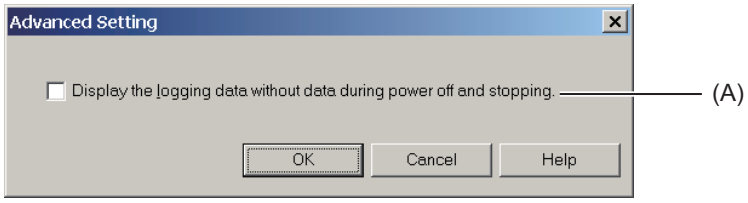
Additional Information

- When the number of colors in the designated image file is a True Color number, it is automatically reduced to 32,000.
- Specify a file name of up to 12 characters (8 file name characters and 3 file extension characters). The following characters can be used in file names: alphanumeric characters, underscore (_), dollar signs ($), and periods (.).

Display Settings for Data Log Graphs

The display method for data long graphs can be changed.

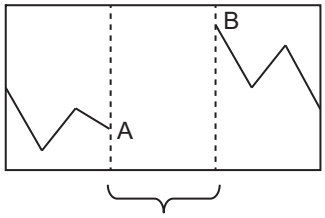
Press the **Advanced Setting** Button on the Data Log Setting Dialog Box to display the Advanced Setting Dialog Box.



No.	Setting	Description
(A)	Display the logging data without data during power off and stopping	If this option is selected, no blanks will occur in the data log graph during the following periods: • While data logging is stopped • While the power to the PT Unit is turned OFF • While the System Menu is displayed

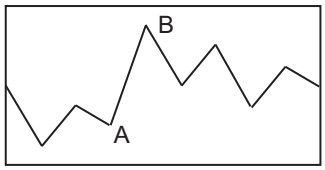
● Displaying Logged Data without Data When Power Is OFF or Logging is Stop

If the *Display the logging data without data during power off and stopping* Option is selected, no blanks will be left in the graph when power is turned OFF or logging is stopped. If this option is not selected, the graph line will not be displayed in a data log graph whenever logging was not performed.



Interval when data was not logged

If the *Display the logging data without data during power off and stopping* Option is selected, there will be no blanks in the graph from when data was not logged, i.e., the graph line will be continuous.



The graph is displayed with no blanks from when data was not logged.

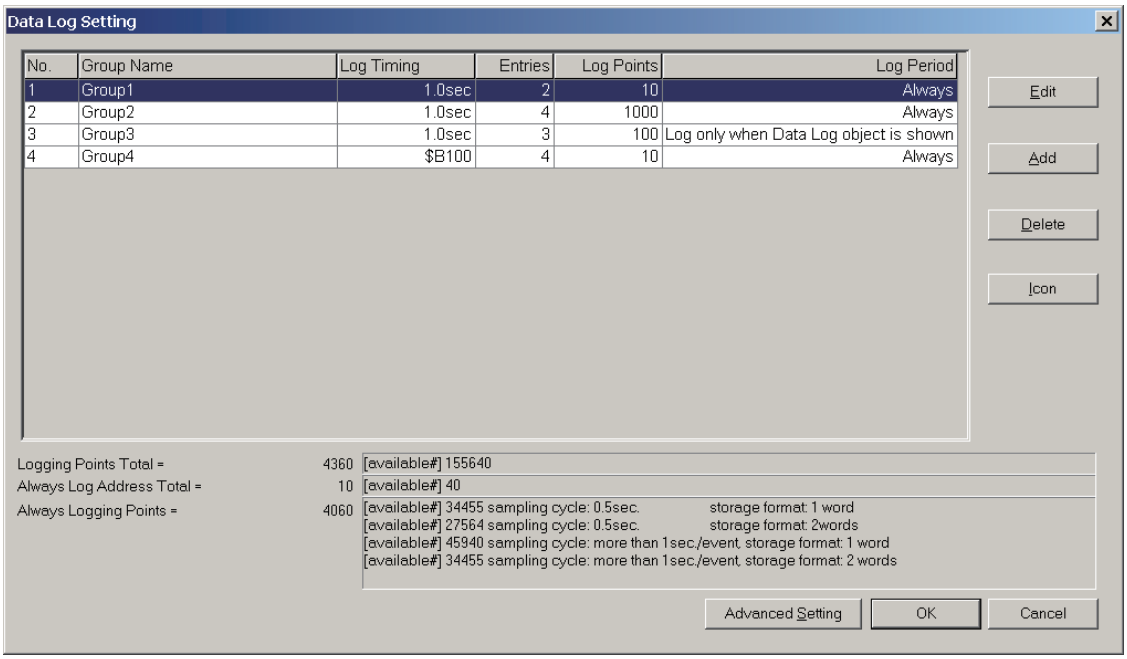
If the *Display the logging data without data during power off and stopping* Option is selected, the display settings will be changed or restricted as described in the following table.

Setting	Description
Time display position	The time will be displayed where logged data is displayed.
Data log graph settings that are disabled	The following settings cannot be made. • The sampling cycle cannot be set to 0.5 s. • The sampling cycle cannot be set to *Indirect reference of sampling cycle* • The log timing cannot be set to *On event*.
Data log graph property settings than cannot be set	The following setting cannot be made on the Time Axis Tab Page of the Property Setting Dialog Box for the data log graph. • The scale cannot be set to *Indirect Reference*. • The graph display position cannot be set to *Position end of scrolling at the center of data log graph*. • The graph display position cannot be set to *Setting Address for Updating Display*.

Note If the *Display the logging data without data during power off and stopping* Option is selected for a data log graph for which any of the above settings has already been made, the settings will automatically be canceled. The scale of the data log graph will be set to *Time*.

Calculating Logging Points

This section describes how the number of logging points displayed in the **Data Log Setting** Dialog Box are calculated.



Always Logging Points

The number of “Always logging points” is the sum of the products of the number of points registered and the number of logging points for each group for which the log period is set to “always.”

- (Number registered × Number of log points)+(Number registered × Number of log points)+ ⋯ +(Number registered × Number of log points)

For the above example, calculations would be as follows:

- {2 × 10(Group 1)}+{4 × 1000(Group 2)}+{4 × 10(Group 4)} = 4060

The available number of “Always logging points” differs depending on the sampling cycle for the data log group and the log address storage type.

Example: The following table shows the maximum number of “Always logging points” that can be registered for one group with one log address.

		Log address storage type	
		1 word	2 words (including REAL)
Log timing	Sampling cycle 1 to 86,400 s or on event	50,000	37,500
	Sampling cycle 0.5 s	37,500	30,000

When registering multiple log addresses, the maximum number of “Always logging points” will be the number shown on the table divided by the number of log addresses.

Maximum number of “Always logging points” for one group and 10 log addresses:

		Log address storage type	
		1 word	2 words (including REAL)
Log timing	Sampling cycle 1 to 86,400 s or on event	5,000	3,750
	Sampling cycle 0.5 s	3,750	3,000

Logging Points Total

The “‘Always’ Log Address Total” is the sum of the products of the number of points registered and the number of logging points for each group.

- (Number registered × Number of log points)+(Number registered × Number of log points)+ ⋯ +(Number registered × Number of log points)

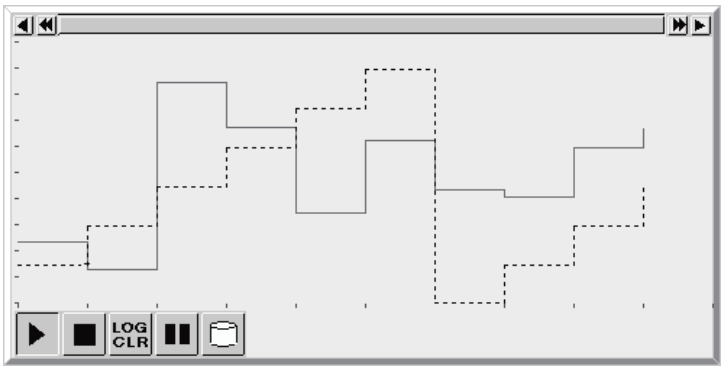
For the above example, calculations would be as follows:

- (2 × 10)+(4 × 1000)+(3 × 100)+(4 × 10) = 4360

2-15-2 Data Log Graphs

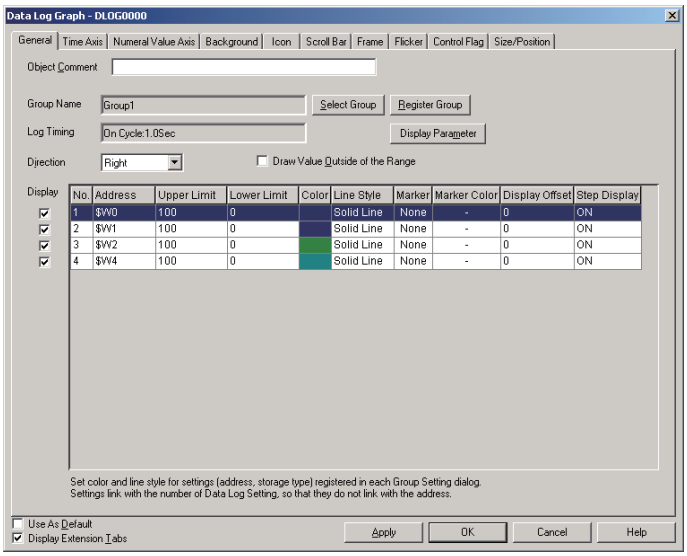
Data log graphs are objects that display in graph format the registered data contained at registered data group addresses.

The general position of the current graph in relation to the overall data can be checked using the scroll bar to the top of the graph.



Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for data log graphs.

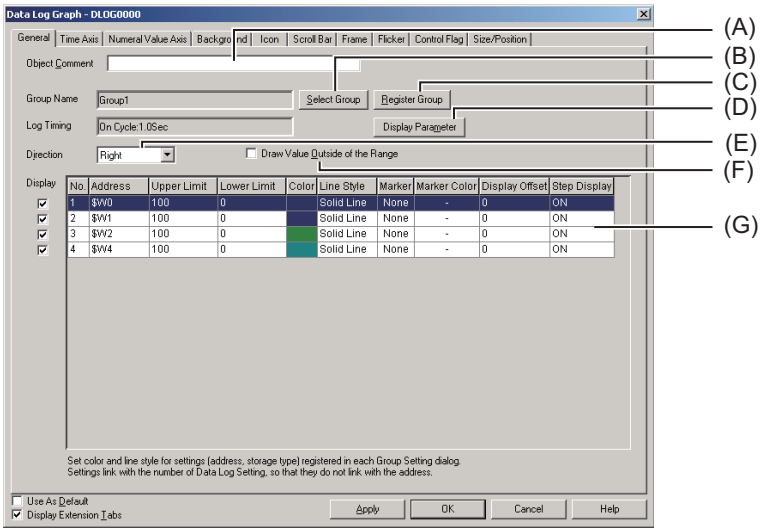


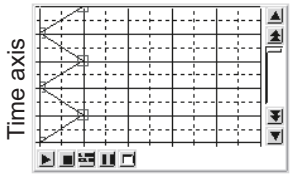
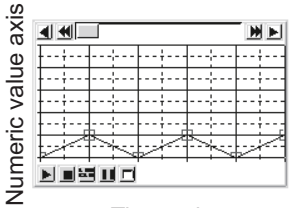
General:	Sets the data log group and line parameters to be displayed.
Time Axis:	Makes settings related to the data log graph's time axis.
Numeral Value Axis:	Makes settings related to the data log graph's numeral value axis.
Background:	Sets the base color for data log graphs.
Icon:	Selects the displayed icon used to manipulate data log graphs.
Scroll bar:	Sets the scroll bar size and scroll width.
Frame:	Sets the frame display for data log graphs.
Flicker*1:	Sets the flicker display.
Control flag*1:	Sets display/no display and input enabled/disabled for data log graphs.
Size/position*1:	Sets the object size and position.

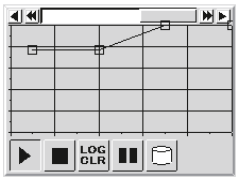
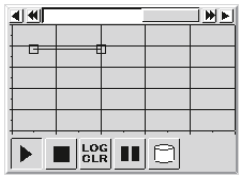
*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the data log group and address to be displayed.

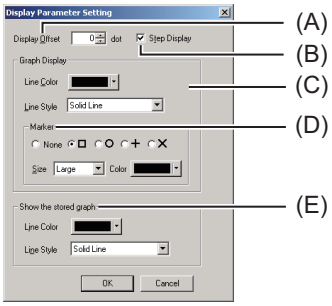


No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object (up to 32 characters).
(B)	Select Group	Click the **Select Group** Button to display the Select Group Dialog Box. Selects the group for group display.
(C)	Register Group	Click the **Register Group** Button to display the Data Log Setting Dialog Box. Use this button to add, edit, or delete data log groups.
(D)	Display parameter	Select the data log address from the list of addresses and click the **Display Parameter** Button to display the Display Parameter Setting Dialog Box. Sets the line type and markers.
(E)	Direction	Select one of the following four display directions. • From Up • Down • Right • Left The time and numeric value axes will depend on the display direction, as shown in the following diagram. · Up or Down  Numeric value axis · Right or Left  Time axis

No.	Setting	Details
(F)	Draw Value Outside of the Range	If the *Draw Value Outside of the Range* Option is selected, the positions of the maximum and minimum values outside of the range will be displayed.  If the *Draw Value Outside of the Range* Option is not selected, the values outside of the range will not be displayed. 
(G)	Data log address list	Displays the registered addresses for the selected data log groups. Deselect addresses that are not to be displayed on the graph. Remove the tick to the left of the address to deselect it.

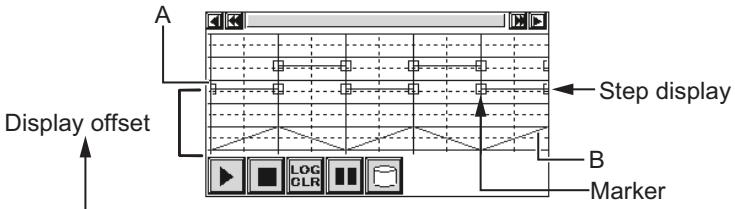
● Display Parameter Settings

Sets the lines to be shown on the data log graph.



No.	Setting	Details
(A)	Display offset	Displays the data log graph in an offset position, where a specified offset (number of dots) have been added to the position for the present value. Fine adjustment can be made to the display position.
(B)	Step display	When step display is selected, the logged points are connected by vertical and horizontal lines. Refer to the diagram outside the table for details.
(C)	Graph display	Select the line parameters for the graph being logged.
	Line Color	Sets the line color (from 256 available colors).
	Line Style	Select from the five line types listed below. • Solid line • Dotted line • Broken line • 1-dot chain line • 2-dot chain line

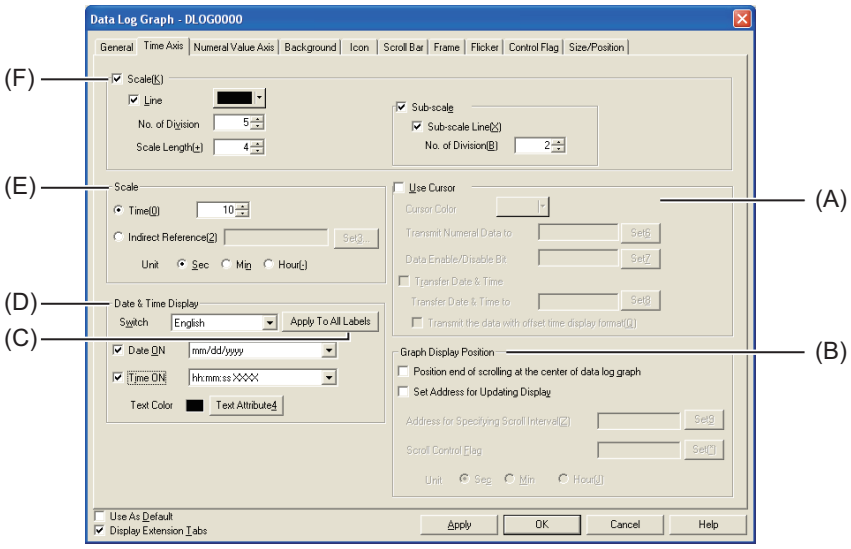
No.	Setting	Details
(D)	Marker	Selects one of the following five markers to be displayed at the logged points. • None • □ • ○ • + • ×
	Size	Selects large, middle, or small for marker size. The sizes are shown below. Large Medium Small
	Color	Sets the marker color (from 256 available colors).
(E)	Show the stored graph	Select the line parameters for a file retrieved using *Read File*.
	Line Color	Sets the line color (from 256 available colors).
	Line Style	Select from the five line types listed below. • Solid line • Dotted line • Broken line • 1-dot chain line • 2-dot chain line



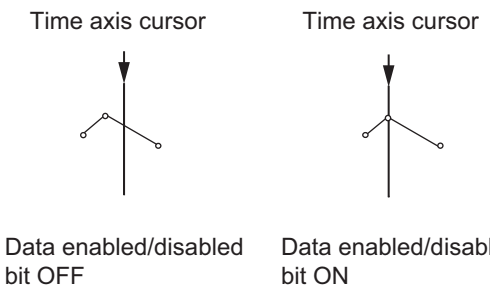
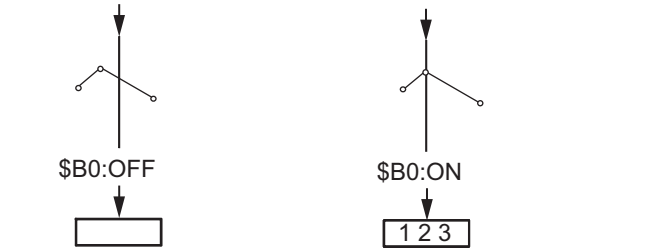
• A and B log the same address contents.
• An offset of 65 dots is specified for A log graph.
Therefore, a log line will always be drawn 65 dots above the original position.

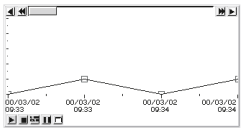
Time Axis Tab Page

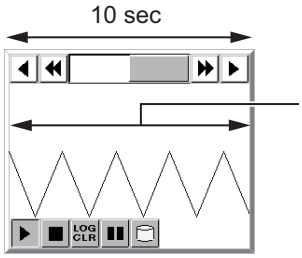
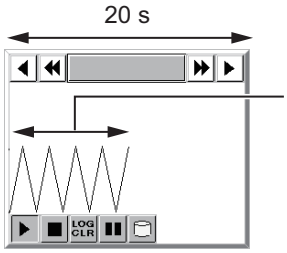
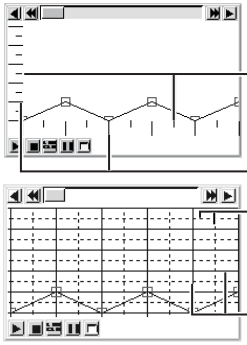
Contains the settings for the data log graph's time axis.



No.	Setting	Details
(A)	Use Cursor	Sets whether or not there will be a cursor on the time axis. Select *Use cursor* to use a cursor. A vertical line will be displayed on the time axis if *Use cursor* is selected. The value for the position where the time axis cursor and the log graph cross is sent to a specified address. Touch any position on the object, except the scroll bar, to move the cursor to that position. Alternatively, touch the Scroll Button for the time axis cursor.
	Cursor Color	Sets the cursor color (from 256 available colors).
	Transmit Numerical Data to	Sets the destination address for the data under the **Set** Button. The data length is set in each data log, and depends on the storage format. Example (two words per data) Transfer destination: $W0 1 → Stores graph 1 value to $W0 and $W1. 2 → Stores graph 2 value to $W2 and $W3. 3 → Stores graph 3 value to $W4 and $W5. Time axis cursor

No.	Setting	Details
(A)	Data enable/disable bit	Sets the address for the data under the **Set** Button. The specified bit turns ON when the time axis cursor is on the logged point. The specified bit remains ON until it is turned OFF from another functional object or the cursor is moved to a data disabled position.  For example, the display can be linked to control flags for numeral display and input objects, as shown in the following diagram. Setting Example • Data enable/disable bit: $B0 • Numeral display and input object control flag (display/no display (numeral display): indirect): $B0 
	Transfer Date & Time	Select the *Transmit Time Data* option to transfer the date and time for the position where the time axis cursor and the time axis cross to a specified address. The date and time will be output in the format specified for the Date and Time Display for Time Axis.
	Transfer Date & Time to	Set the destination address under the **Set** Button. One word of data each is stored for the year, month, day, day of the week, hour, minute, second, and millisecond. Example: Transmit Time Data To: $W100 This is stored from $W100 to $W107.
	Transmit the Data with Offset Time Display Format	Select to display data with offset (the time elapsed since data logging was started) when transmitting time data.

No.	Setting		Details
(B)	Graph display position		Makes the settings for display refresh.
		Position end of scrolling at the center of data log graph	Select to scroll when a log graph has reached the center of the time axis.
		Setting Address for Updating Display	When setting the address for display refresh, check Setting Address for Updating Display, then press the **Set** Button.
		Scroll Control Flag	Sets the address for updating display under the **Set** Button. If the bit specified here turns from OFF to ON, the graph display is scrolled for the amount of time specified by the contents of the address specified under *Address for specifying Scroll interval*. Once the display has been scrolled, the address for updating display will automatically turn OFF. Turn ON the address to update the graph at any time.
		Address for Specifying Scroll interval	Sets the address for specifying scroll interval under the **Set** Button. When the Refresh notification address turns ON, the graph display is scrolled for the amount of time specified here. The amount of time is specified in binary format. The graph will not be scrolled if 0 is specified. Seconds, minutes, or hours can be selected as the unit of time. Example: When *No. of scroll seconds* set to 10  Scrolls the graph by 10 seconds' worth of display.
(C)	Apply to All Labels		Uses the date display method for the selected label for all labels. This setting is used only for labels for which a date display and time display are selected. It is not used for all labels for items set in the character attributes. *Apply to All Labels* cannot be set in the following cases. • When the *Date & Time Display Format* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label. • When a date display and time display are not selected (OFF).
(D)	Date and time display		Sets whether or not the date and time will be displayed on the time axis.
		Switch	Sets the date and time display format for each label. The date and time are displayed on the time axis scales as shown in the following diagram. 
		Date	Select *Date* to display the date. Selects the date display format from the pull-down list. Refer to *2-8-5 Date and Time Format (General Tab)* on page 2-88 for details.
		Time	Select *Time* to display the time. Selects the time display format from the pull-down list. Refer to *2-8-5 Date and Time Format (General Tab)* on page 2-88 for details.
		Text color	Sets the character color and font under the **Text Attribute** Button. Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 and *2-8-10 Labels* on page 2-101 for details.

No.	Setting	Details
(E)	Scale	Sets the scale for the time axis between 1 and 32,767. The time scale can be input directly or, when the **Set** Button is pressed, an address can be specified indirectly. Examples When the sampling cycle is 1 s, the number of logged points is 20, and the time axis scale is set to 10:  Ten out of twenty logged points (i.e., the points logged in a 20-s period) are dis-played graphically. When the sampling cycle is 1 s, the number of logged points is 10, and the time axis scale is set to 20:  Ten points (i.e., the points logged in a 10-s period) are displayed graphically.
(F)	Scale	Makes the settings for the time axis.  Auxiliary gradations (sub-scales): Used to further separate gradations. Gradations: Basic gradations Auxiliary gradation (sub-scale) lines: Dotted lines drawn horizontally or vertically from auxiliary gradations. Gradation lines: Dotted lines drawn horizontally or vertically from gradations.
	Scale	Select *Scale* to display scale.
	Line	Select *Line* to display scale lines.
	No. of division	Sets the number of divisions between 1 and 99.
	Scale color	Sets the scale color (from 256 available colors).
	Scale length	Sets the scale length between 4 and 32. (Units: Dots)
	Sub-scale	Sets whether or not there will be sub-scale. Select *Sub-scale* to display sub-scale.
	Sub-scale Line	Select *Sub-scale Line* to display the auxiliary gradation (sub-scale) lines.
	No. of division	Sets the number of divisions between 1 and 99.

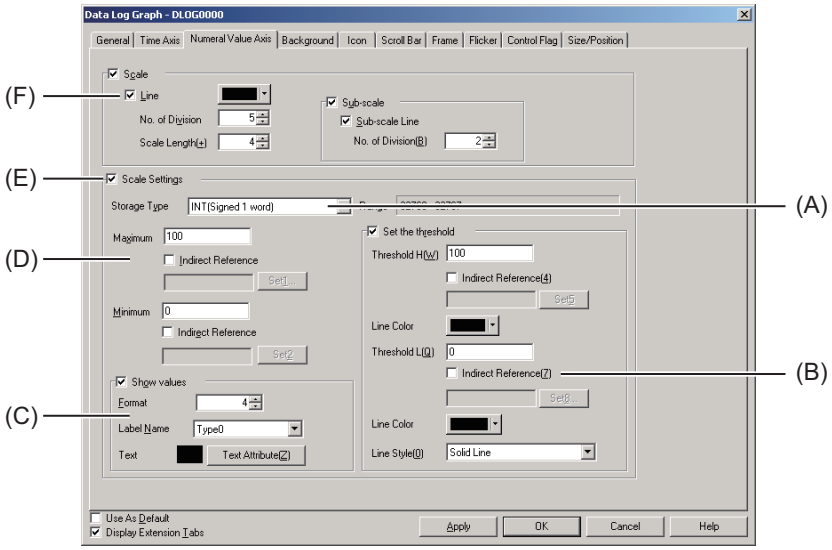


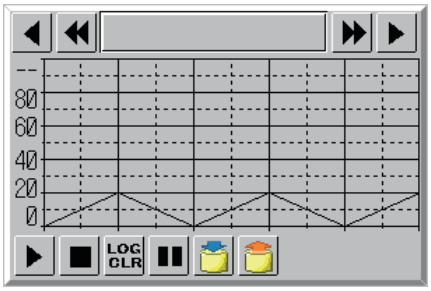
Additional Information

- If the clock is changed during operation, the time will no longer match the time that has been displayed up to that point so graphs will not be displayed correctly. In such cases, clear the log by using the Log Clear icon on the data log graph or initializing the data under the System Menu.
- If *Save with Ring Buffer* is selected for the data log save format, data will be deleted in order from the oldest data when the number of logged data items reaches the set number of log points. Sometimes this means that the oldest graph data will have already been deleted when the graph is scrolled when the address for updating display turns ON. For example, if the display direction has been set to *Left*, the data displayed at the left of the graph may have already been deleted. In this situation, the graph display is also refreshed when the address for updating display turns OFF and the data registered at that time is displayed on the graph.
- If frames are switched frequently, the display update may take some time and communications may be delayed. This means that sometimes data is not logged.
- The data format (BCD or binary) for *Transmit Time Data To* is set by selecting **PT – Project Properties** and using the Data Format Tab Page.

Numeral Value Axis Settings

Click the **Scale Settings** Button to display the following Details of Numeral Value Axis screen.



No.	Setting		Details
(A)	Storage type		Select the format for storing the scaling range of the numeral axis value from the four types below. • INT (signed 1 word) • UINT (unsigned 1 word) • DINT (signed 2 words) • UDINT (unsigned 2 words)
(B)	Threshold		Sets the threshold values for graph display.
		Set the threshold	Select to make threshold settings.
		Threshold H	The threshold H that can be set depends on the storage type.
		Line Color	Sets the line color (from 256 available colors) for threshold H.
		Threshold L	The threshold L that can be set depends on the storage type.
		Line Color	Sets the line color (from 256 available colors) for threshold L.
		Line Style	Sets the line style from one of the following 5 styles: Solid line, dotted line, broken line, single chain line, double chain line
(C)	Show values		Sets values.
		Show values on the numeral value axis	Selects to show values on the numeral value axis.
		Format	"-" will be displayed for values that exceed the number of digits set under *Format*. Example: When *Format* is set to 2 (digits), and the maximum value is 100: 
		Text	Click the **Text Attribute** Button to set text attributes such as the text color and font. For details, refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 and *2-8-10 Labels* on page 2-101.

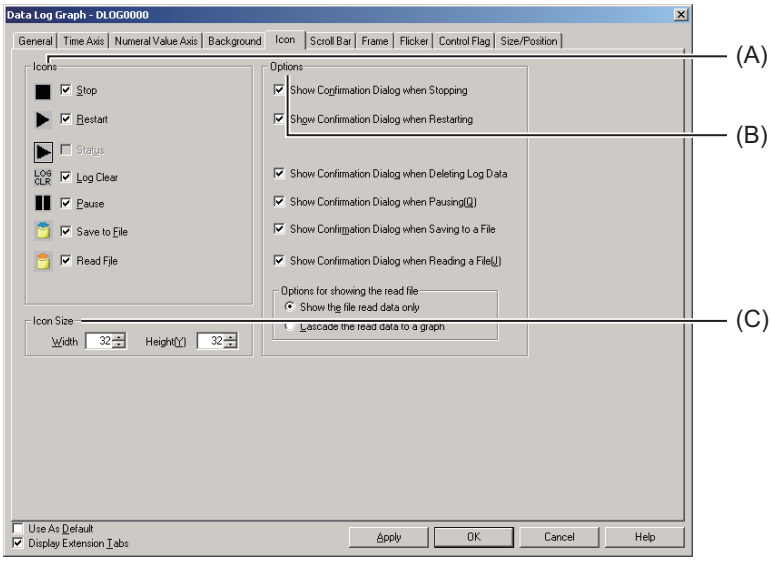
No.	Setting		Details
(D)	Scaling range of numeral value axis		Sets the minimum and maximum values on the numeral value axis.
		Maximum	The maximum that can be set depends on the storage type.
		Minimum	The minimum that can be set depends on the storage type.
		Indirect Reference	Select to set the minimum and maximum values at a communications address.
(E)	Scale Settings		Select to make settings under “Scaling range of numeral value axis,” “Threshold,” and “Show values.”
(F)	Scale		Makes the settings related to the numeral value axis’ scale.
		Scale	Select *Scale* to display scale.
		Line	Select *Line* to display scale lines.
		No. of division	Sets the number of divisions between 1 and 99.
		Scale color	Sets the scale color (from 256 available colors).
		Scale length	Sets the scale length between 4 and 32.
		Sub-scale	Sets whether or not there will be sub-scale. Select *Sub-scale* to display auxiliary gradations.
		Sub-scale Line	Select *Sub-scale lines* to display sub-scale lines.
		No. of division	Sets the number of gradations between 1 and 99.

Background Tab Page

Sets whether or not the background is tiled. If the background is to be tiled, the background color for the graph can be selected from 256 colors. Click **Indirect reference of color** to reference the color code stored at a specified address for the background color. Refer to *2-8-8 Background* on page 2-97 for details.

Icon Tab Page

Selects the icon to be displayed for manipulation of graph display.



No.	Setting		Details
(A)	Icons		Sets whether or not an icon will be used for manipulating graph display.
			Press to stop data logging.
		Stop	Stops data logging when pressed, if the *Control start/stop data log by the specified address* option was not selected when data log group settings were made.
			Select to allocate the set address to the icon, if the *Control start/stop data log by the specified address* option was selected when data log group settings were made. This option cannot be selected if the Status icon is selected.
			Press to start data logging that has been stopped.
		Restart	Press to restart data logging that has been stopped, if *Control start/stop data log by the specified address* was not selected when data log group settings were made.
		Start	Select to allocate the set address to the icon, if the *Control start/stop data log by the specified address* option was selected when data log group settings were made. This option cannot be selected if the Status icon is selected.
		Status	Can be selected only when *Control start/stop data log by the specified address* was selected when data log group settings were made. Displays the status of the specified address, when an externally-controlled address is specified to start/stop data logging. Select when the specified address is allocated to an externally-controlled address.
		Log Clear	Clears the graph display and log.
		Pause	Pauses display of the data log graph. Press the icon again to cancel pause.
		Save to File	Writes a file of logging data to Log/Trend directory on the removable media for the data log group being displayed, in the output file name set for the data log group being displayed.
		Read File	Selects the file saved to Log/Trend directory on the removable media from a popup menu for the data log group being displayed. The selected file is displayed on the graph.

No.	Setting	Details
(B)	Options	A confirmation dialog box can set to be displayed when any of the icons are pressed. • Show Confirmation Dialog when Stopping. • Show Confirmation Dialog when Restarting. • Show Confirmation Dialog when Deleting Log Data. • Show Confirmation Dialog when Pausing. • Show Confirmation Dialog when Saving to a File. • Show Confirmation Dialog when Reading a CSV File.
	Options for showing the read file	Select the graph display format when reading a file, from the following two options. • Show the read data only. • Cascade the read data to a graph.
(C)	Icon size	Set the size of the icon. (16 to 64)

Additional Information

- Even if display update is stopped because the Pause icon has been pressed, data logging will continue when the Restart icon is selected. The latest log is then displayed if the screen is updated.
- The Clear icon usually displays the characters *LOG CLR*, but if the icon size is smaller than 32 dots × 32 dots, only *C* will appear on the icon.
- Files can be written by using the system memory ($SB and $SW).

  Log data for a specified group can be saved as a CSV file by storing the group number in $SW37 and turning ON $SB36.

  Output file name: Output file name set for each group

  All log data can be saved as a CSV file if “0” is stored in $SW37 and $SB36 is turned ON.

  Output file name:

  Trend☐.CSV

  ☐ = 001 to 999, the number is automatically incre-mented beginning with 001 each time the output operation is executed. After 999, the number reverts to 001.

  Similarly, if the group number or “0” is stored in $SW37 and $SB35 is turned ON, the specified group data or all log data is initialized.
- Graph displays of files read from the removable media will be cleared when screens are switched.
- Removable media devices can be rewritten up to 100,000 times. If you were to repeatedly rewrite the removable media in 10-minute intervals, 100,000 rewriting cycles would be completed within 2 years.

Scroll Bar Tab Page

Sets display/no display, scroll width, and button size for the graph scroll bar displayed at the top of the data log graph. The scroll bar will appear at the top of the graph when the display direction is set to *Left* or *Right*. It will appear to the right of the object if the display direction is set to *Up* or *Down*.

Refer to *2-8-11 Scroll Bars* on page 2-105 for details.

Frame Tab Page (Extension Tab)

Specifies the colors and sizes of the functional object frame to change the shape or color when the graph frame is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Make flicker settings to make the functional object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page (Extension Tab)

Control flags can control the display of and input to functional objects. Use control flags to enable display and input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-15-3 Example Setting Procedure

The following two applications can be executed by using data log objects.

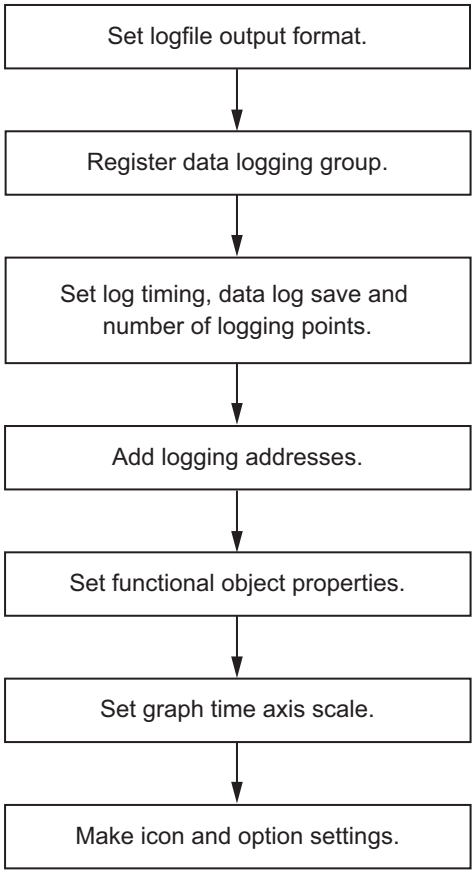
Automatic periodical saving of log data to a removable media and continued logging.

Overlapping a data log graph (standard data) in the removable media with the graph being logged.

This section provides an example of the CX-Designer setting procedures required to use these two functions. The values provided are only examples and should be changed to actual values as required.

Automatic Periodical Saving of Log Data to a Removable Media and Continued Logging

The following flowchart shows the settings required to automatically and periodically save log data to a removable media and continue logging.



The procedure for saving data log files to the removable media and continuing logging is provided below.

● Setting Example

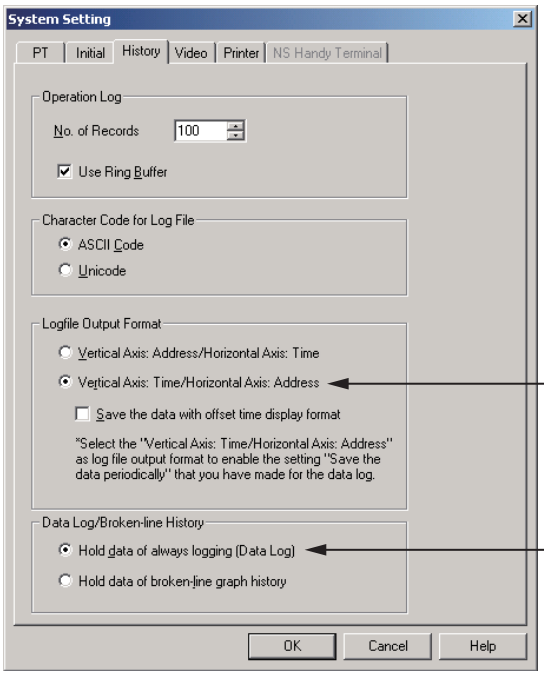
To automatically save every 5 hours a data log file with 5 log addresses and a sampling cycle of 2 seconds.

Set the Logfile Output Format.

1 Select **PT – System setting** to display the System Setting Dialog Box.

2 Click the History Tab Page.

3 Set *Logfile Output Format* to “Vertical axis: Time/ Horizontal axis: Address.”
Set the *Data Log/Broken-line History* to “Hold data of always logging (Data Log).”



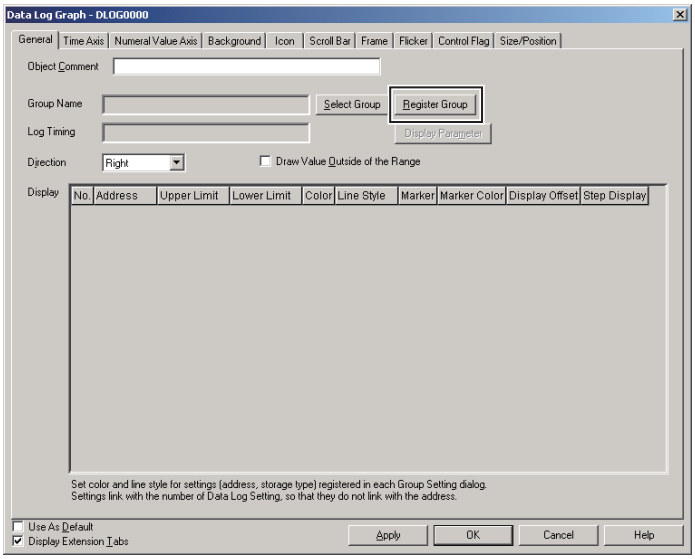
Set Logfile Output Format to “Vertical axis: Time/ Horizontal axis: Address”.

Set Data Log/Broken-line History to “Hold data of always logging (Data Log)”.

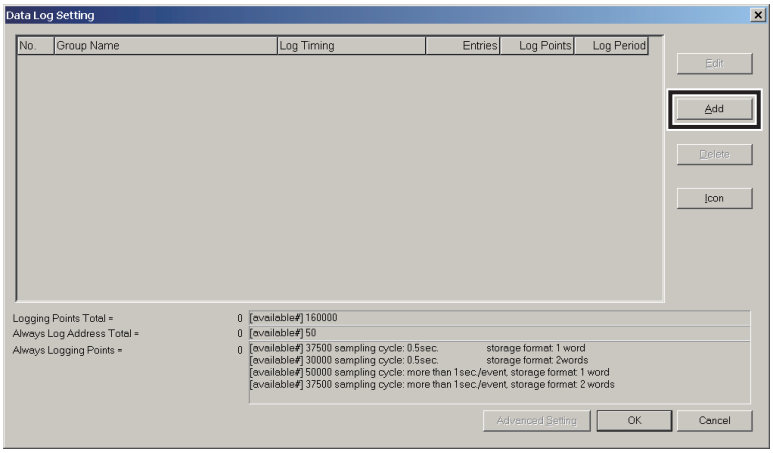
4 Click the **OK** Button.

Set for Data Logging Group Registration.

1 Select **PT – Data log**, or click the **Register Group** Button on the General Tab Page in the data log Functional Object Properties Dialog Box, to display the Data Log Setting Dialog Box.

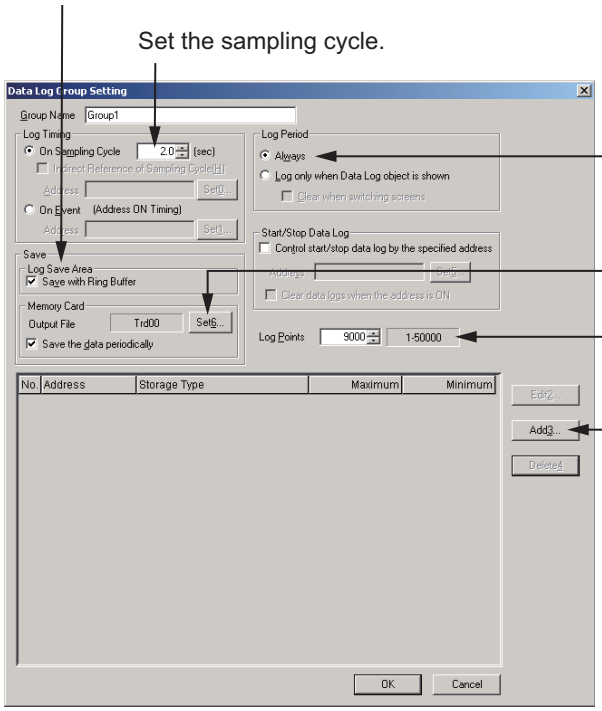


2 Click the **Add** Button in the Data Log Setting Dialog Box to display the Data Log Group Setting Dialog Box.



3 Set the sampling cycle.

Select both *Save data periodically* and *Save with Ring Buffer*.

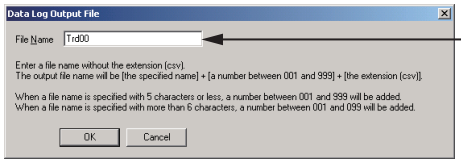


4 Select both *Save the data periodically* and *Save with Ring Buffer*.

5 Set the number of logging points to be saved in one CSV file.

In this example, the logging period is 5 hours (18,000 s) and the sampling cycle is 2 s, so the number of logging points is 18,000 ÷ 2, i.e., 9,000, so 9000 is set.

6 Click the **Set** Button next to *Output file* at the upper right of the screen to display the Data Log Output File Dialog Box.



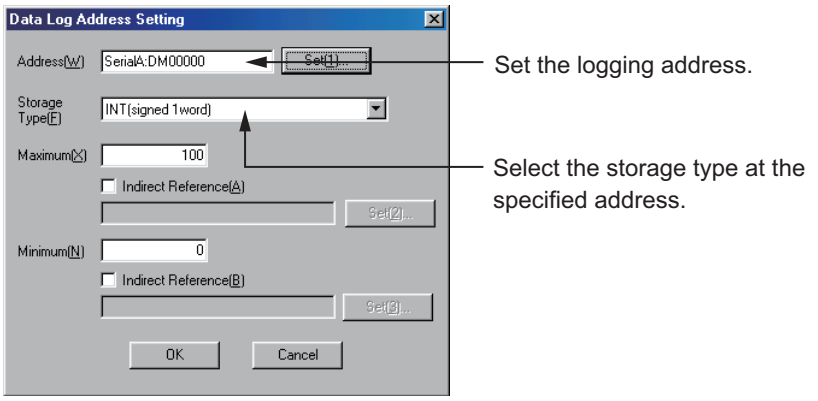
7 Enter the output file name.

8 Click the **OK** Button to return to the Data Log Group Setting Dialog Box.

9 Check that the logging period is set to *Always*.

10 Click the **Add** Button to display the Data Log Address Setting Dialog Box.

11 Set the logging address and the address storage type.



12 Click the **OK** Button to return to the Data Log Group Setting Dialog Box.

13 Repeat steps 10 to 12 to register 5 addresses.

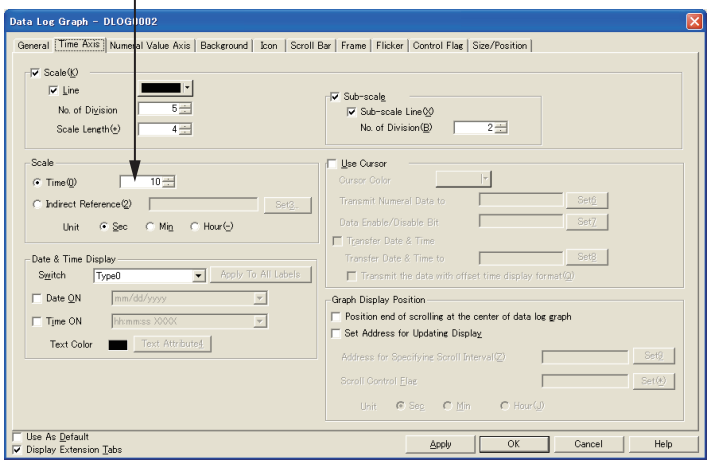
14 Click the **OK** Button in the Data Log Group Setting Dialog Box.

15 Click the **OK** Button in the Data Log Setting Dialog Box.

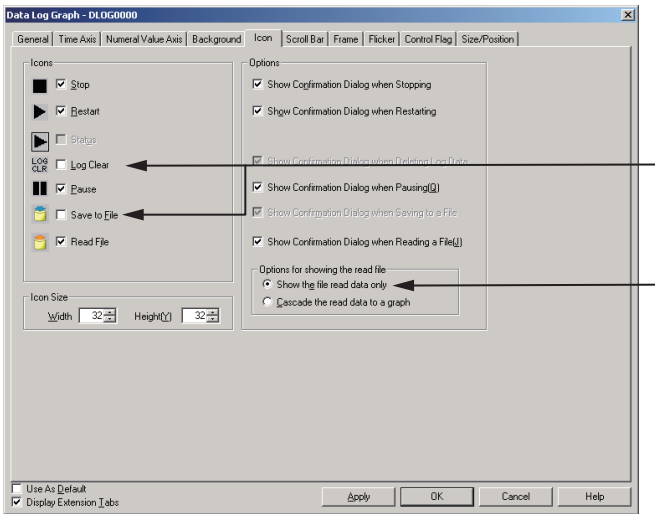
Set for Functional Object Properties.

1. Place a data log object on the screen if there isn't one there already.
2. Double-click the data log object to display the Functional Object Properties Dialog Box.
3. Display the Time Axis Tab Page and set the scale for the time axis. In this example, "10" minutes' worth of log data is set for display.

Set the amount of the logging period to be displayed at one time.



4. Display the Icon Tab Page and de-select *Log clear* and *Save to file* under Icon Display. These icons are not required because the log is set to be automatically saved.



De-select *Log clear* and *Save to File*.

Select *Show the read data only*.

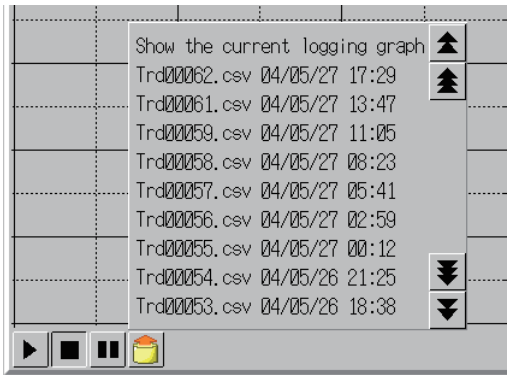
5. Select *Show the read data only* under *Options for showing the read file* in the Options section.
6. Click the **OK** Button to transfer the project to the PT Unit.

Operations on the PT Unit

1. Insert the removable media into the PT Unit.
2. Start the PT Unit, which now has the project created using the procedures described in the last section.

The PT Unit logs 5 addresses every 2 seconds and periodically saves the logging data to the removable media.

To read the saved data from the removable media, click the *Read File* Icon on the Object while logging is stopped to display the list of data file names, in descending order, in a pop-up menu. Select the desired file from the pop-up menu.



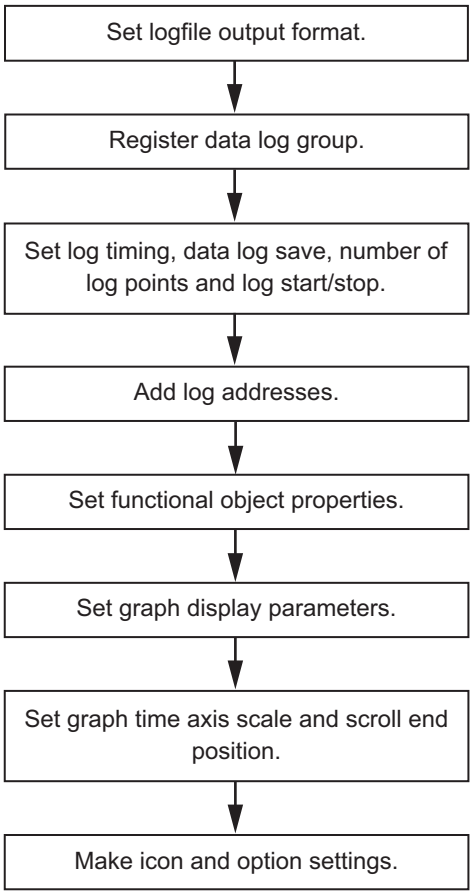
To display a graph that is currently being logged, click the *Read File* Icon on the Object and select *Show the current logging graph*, in the first line of the pop-up menu.

Additional Information

Removable media devices can be rewritten up to 100,000 times. If you were to repeatedly rewrite the removable media in 10-minute intervals, 100,000 rewriting cycles would be completed within 2 years.

Overlapping a Standard Data Log Graph from the Removable Media and a Graph Currently Being Logged

The settings required to overlap the standard data and the data currently being logged on the same graph are shown in the following flowchart.



The procedure for overlapping the data log graph on the removable media (standard data) and the graph of data currently being logged (measured data) is shown below.

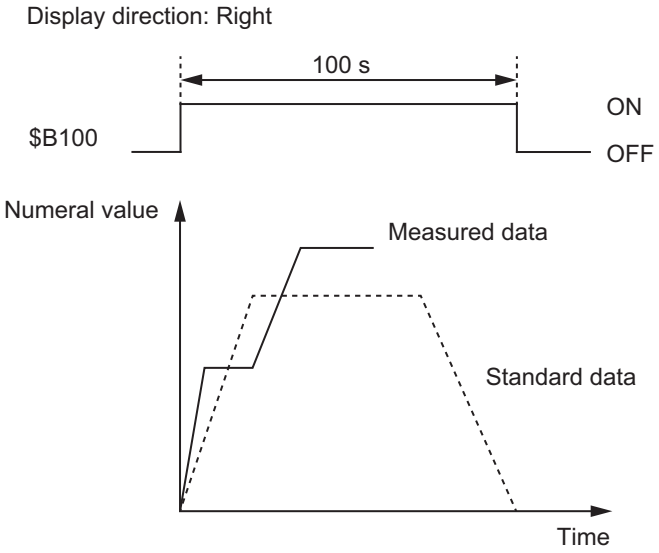
When setting the logging address cycle time to, for example, 100 s, to log data for one address at a sampling cycle of 1 s for a period of 100 s after the specified address changes from OFF to ON.

Example 1: Allocation of specified address (PT memory: $B100) to an icon and manual control of log start/stop

Example 2: Allocation of an externally controlled address (SerialA: CIO00100.00) to the specified address

● Setting Procedure of Example 1

Allocation of Specified Address (PT Memory: $B100) to an Icon and Manual Control of Log Start/Stop

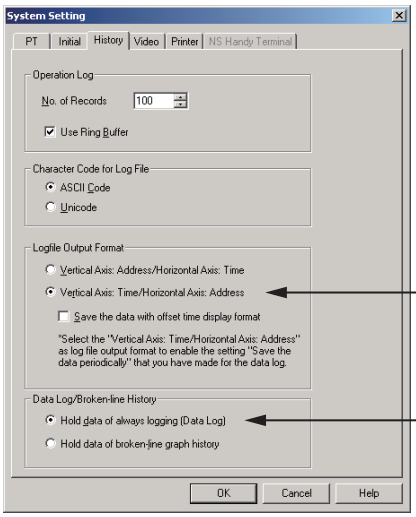


Set the data log file output format.

1 Select **PT – System setting** to display the System Settings Dialog Box.

2 Select the History Tab Page.

3 Set *Logfile Output Format* to “Vertical Axis: Time/ Horizontal Axis: Address.”



Set logfile output format to “Vertical Axis: Time/ Horizontal Axis: Address”.

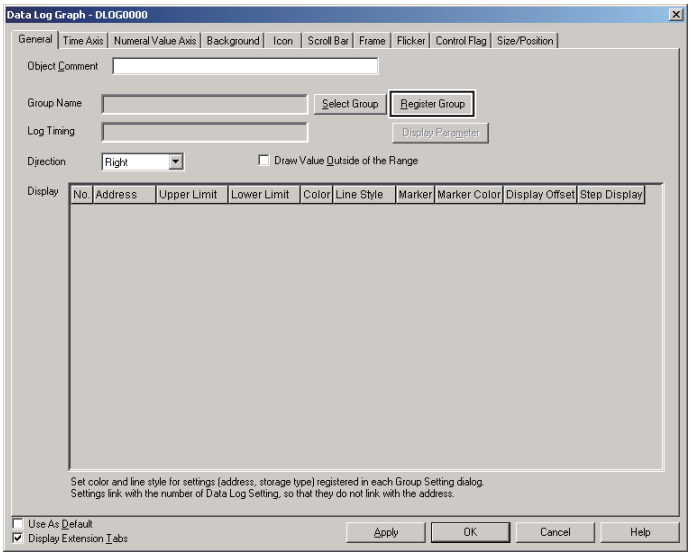
Set Data Log/Broken-line History to “Hold data of always logging (Data Log)”.

4 Set the *Data Log/Broken-line History* to “Hold data of always logging (Data Log).”

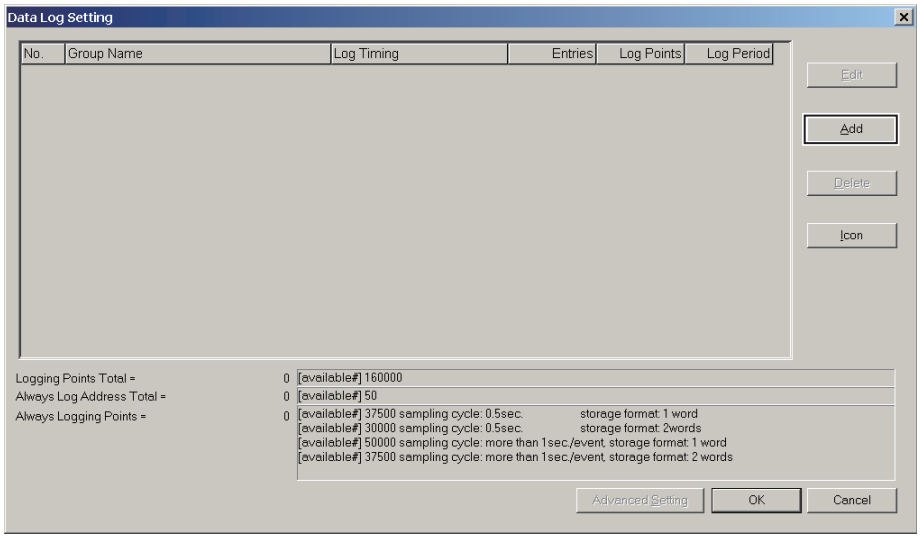
5 Click the **OK** Button.

Set for Data Logging Group Registration.

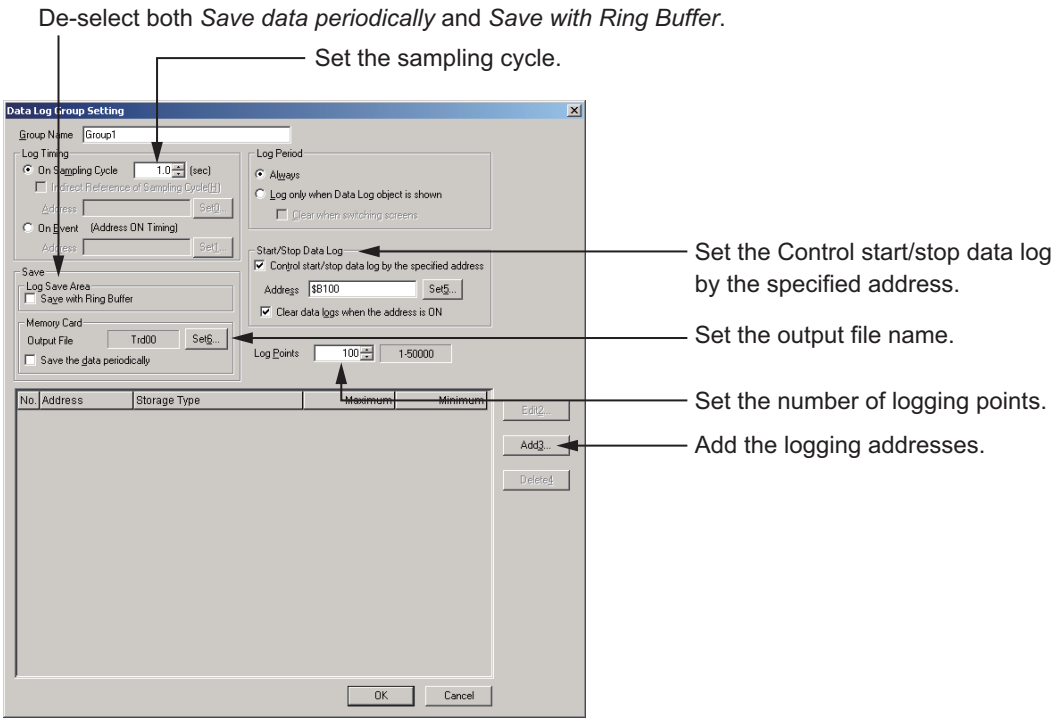
1 Select **PT – Data log**, or click the **Register Group** Button on the General Tab Page in the data log Functional Object Properties Dialog Box, to display the Data Log Setting Dialog Box.



2 Click the **Add** Button in the Data Log Setting Dialog Box to display the Data Log Group Setting Dialog Box.



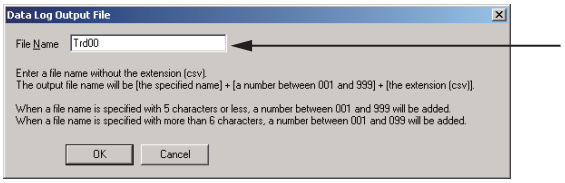
3 Set the log timing. In this example, the sampling cycle is “1” (s).



4 De-select both *Save the data periodically* and *Save with Ring Buffer*.

5 Set the number of logging points. In this example, the logging period is 100 s and the sampling cycle is 1 s, so the number of logging points to be set is “100” (100 ÷ 1 = 100).

6 Click the **Set** Button next to *Output file name* at the upper right of the screen to display the Data Log Output File Name Setting Dialog Box.



7 Enter the output file name.

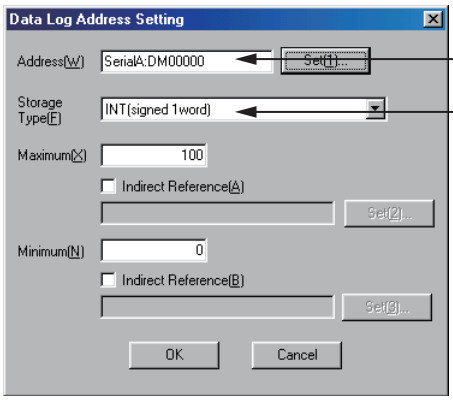
8 Click the **OK** Button to return to the Data Log Group Setting Dialog Box.

9 Select *Control start/stop data log by the specified address ON/OFF* and click the **Set** Button to set the address. The address is set to “PT memory: $B100” in this example.

Select *Clear data logs when the address is ON* to clear the previous data log graph when the specified address changes from OFF to ON.

10 Click the **Add** Button to display the Data Log Address Setting Dialog Box.

11 Set the logging address and the address storage type.



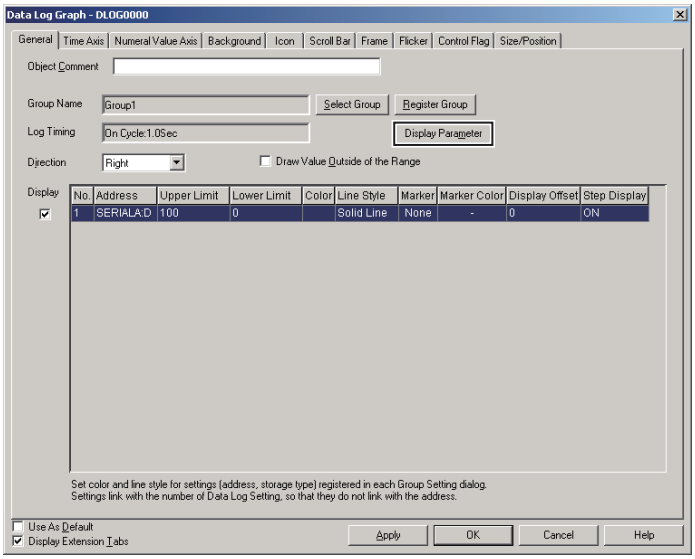
12 Click the **OK** Button to return to the Data Log Group Setting Dialog Box.

13 Click the **OK** Button in the Data Log Group Setting Dialog Box.

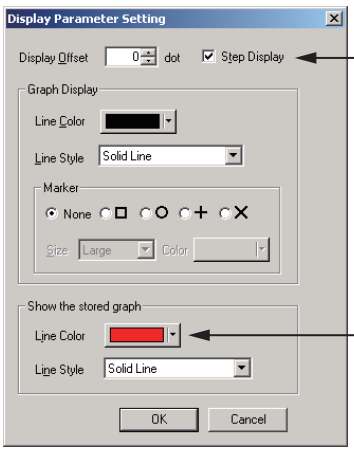
14 Click the **OK** Button in the Data Log Settings Dialog Box.

Set for Functional Object Properties.

1. Place a data log object on the screen if there isn't one there already.
2. Double-click the data log object to display the General Tab Page for the functional object properties.
3. Select the address from the data log address list, and double-click it, or click the **Display Parameter** Button at the top right of the screen to display the Display Parameter Settings Dialog Box.



4. Click the Line Color Box to set the line color for the stored graph, to distinguish the stored graph read from the removable media from the graph of data currently being logged. In this example, No. 012 (red) is selected for the stored graph.



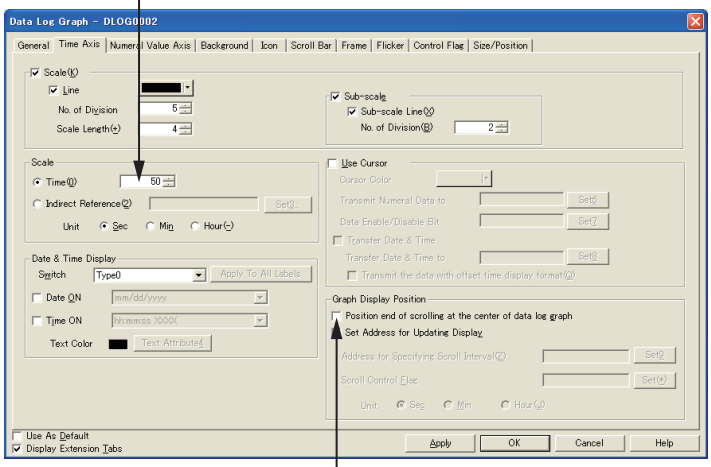
If *Step display* is selected, the logged points will be connected by vertical and horizontal lines.
De-select *Step display* to join logging points by the shortest possible straight line.

Sets the line color when logging data is read from the removable media and displayed. In this example, No. 012 (red) has been selected.

5. Click the **OK** Button to return to the Functional Object Properties Dialog Box.

6 Display the Display Tab Page and set the graph time axis scale. In this example, “50” seconds’ worth of logging data will be displayed.

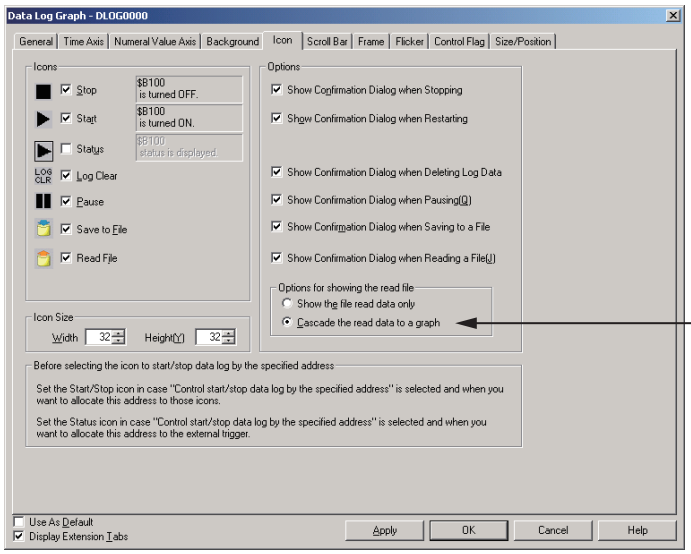
Set the amount of the logging period to be displayed at one time.



Select *Position end of scrolling at the center of data log graph*.

7 Select *Position end of scrolling at the center of data log graph* when all of the standard data cannot fit on to the graph.

8 Display the Icon Tab Page and select *Cascade the read data to a graph* under Options.



Select *Cascade the read data to a graph*.

9 Click the **OK** Button and transfer the project to the PT Unit.

Operations on the PT Unit

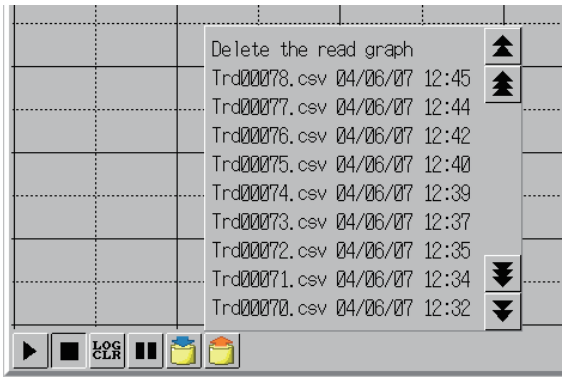
1. Insert the removable media into the PT Unit.
2. Start the PT Unit, which now has the project created using the procedures described in the last section.

When address $B100 changes from OFF to ON, data is logged for 100 s (1 min 40 s).

When the *Start* icon is pressed, $B100 changes to ON and logging starts.

When the *Stop* icon is pressed, $B100 changes to OFF and logging stops.

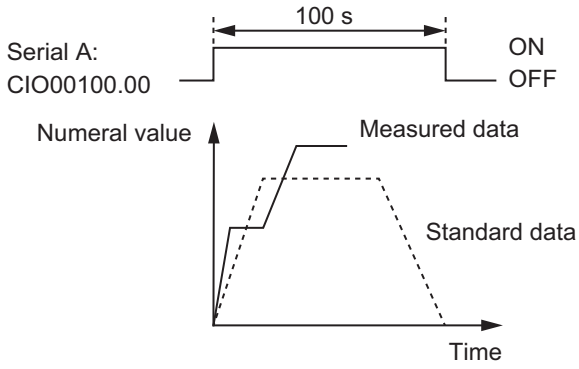
To read saved data, press the *Read File* icon on the object while logging is stopped and select the desired file from the pop-up menu.



● Setting Procedure of Example 2

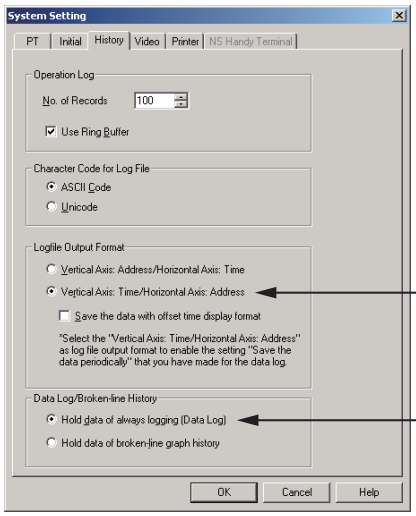
Allocation of an Externally Controlled Address (Serial A: CIO00100.00) to the Specified Address

Display direction: Right



Set data log file output formats.

1. Select **PT – System setting** to display the System Settings Dialog Box.
2. Click the **History** Tab.
3. Set *Logfile Output Format* to “Vertical Axis: Time/ Horizontal Axis: Address.”
4. Set the *Data Log/Broken-line History* to “Hold data of always logging (Data Log).”



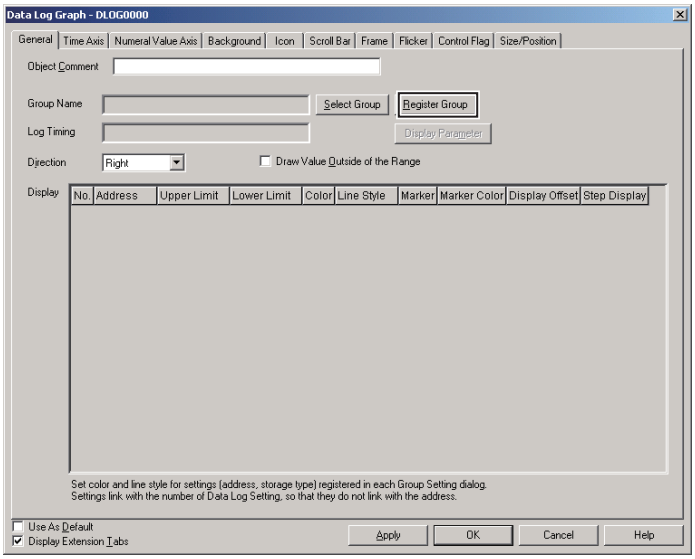
(3) Set Logfile Output Format to “Vertical Axis: Time/ Horizontal Axis: Address” .

(4) Set Data Log/Broken-line History to “Hold data of always logging (Data Log)” .

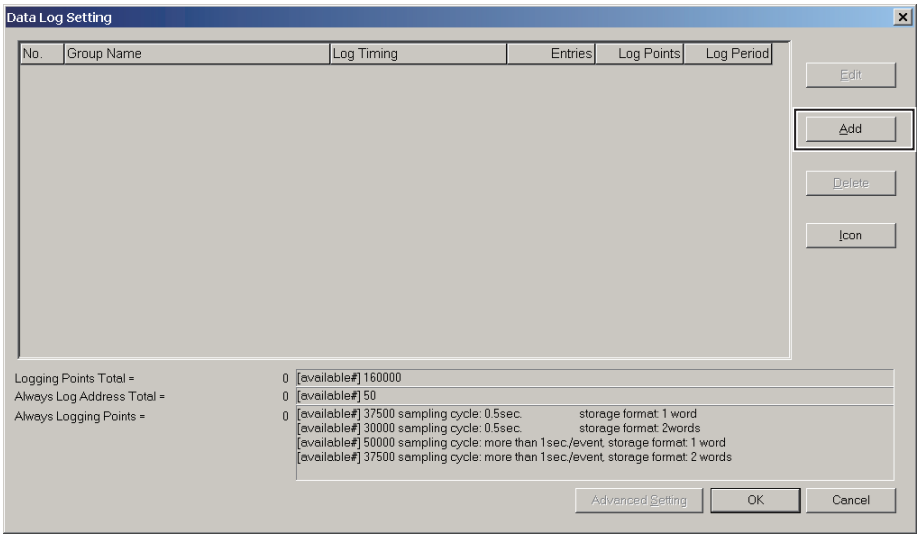
5. Click the **OK** Button.

Set for Data Logging Group Registration.

1 Select **PT – Data Log Setting**, or click the **Register Group** Button on the General Tab Page in the data log Functional Object Properties Dialog Box, to display the Data Log Settings Dialog Box.



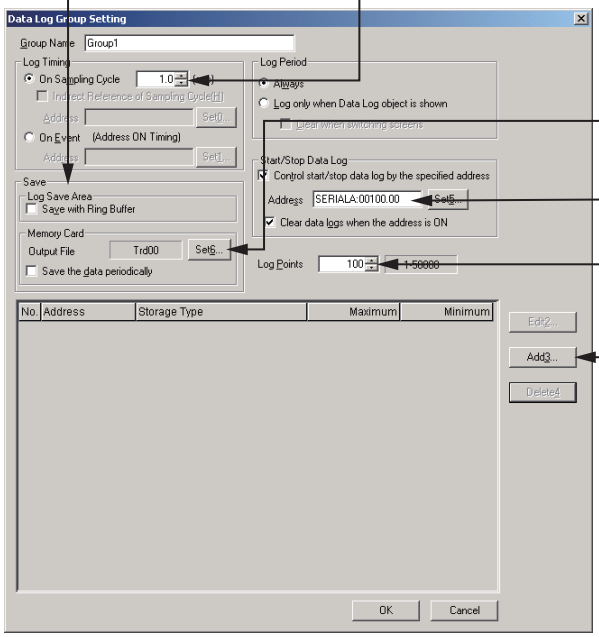
2 Click the **Add** Button to display the Data Log Group Setting Dialog Box.



3 Set the log timing. In this example, the sampling cycle is “1” (s).

De-select both *Save the data periodically* and *Save with Ring Buffer*.

Set the sampling cycle.



Set the output file name.

Set the Control start/stop data log by the specified address.

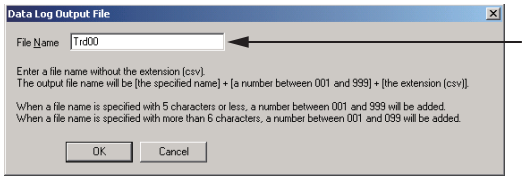
Set the number of logging points.

Add the logging addresses.

4 De-select both *Save the data periodically* and *Save with Ring Buffer*.

5 Set the number of logging points. In this example, the logging period is 100 s and the sampling cycle is 1 s, so the number of logging points to be set is “100” (100 ÷ 1 = 100).

6 Click the **Set** Button next to *Output file* at the upper right of the screen to display the Data Log Output File Dialog Box.



Enter the output file name.
The default is “Trd00”. A file name of up to 36 alphanumeric characters can be used.

7 Enter the output file name.

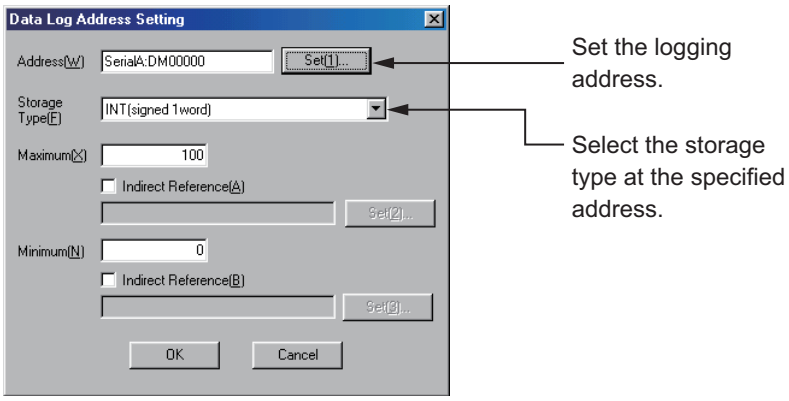
8 Click the **OK** Button to return to the Data Log Group Setting Dialog Box.

9 Select *Control start/stop data log by the specified address ON/OFF* and click the **Set** Button to set the address. The address is set to “SerialA: CIO00100.00” in this example.

Select *Clear data logs when he address is ON* to clear the previous data log graph when the specified address changes from OFF to ON.

10 Click the **Add** Button to display the Data Log Address Setting Dialog Box.

11 Set the logging address and the address storage type.



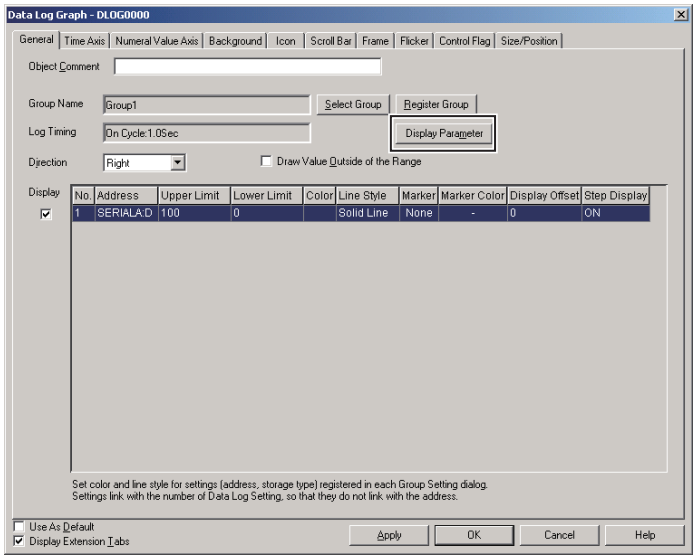
12 Click the **OK** Button to return to the Data Log Group Setting Dialog Box.

13 Click the **OK** Button in the Data Log Group Setting Dialog Box.

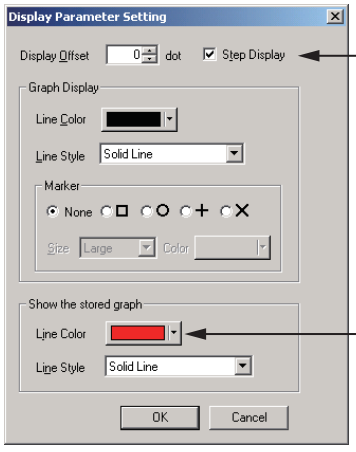
14 Click the **OK** Button in the Data Log Settings Dialog Box.

Set for Functional Object Properties.

1. Place a data log object on the screen if there isn't one there already.
2. Double-click the data log object to display the General Tab Page for the functional object properties.
3. Select the address from the data log address list, and double-click it, or click the **Display Parameter** Button at the top right of the screen to display the Display Parameter Settings Dialog Box.



4. Click the **Set** Button next to Line color to set the line color for the stored graph, to distinguish the stored graph read from the removable media from the graph of data currently being logged. In this example, No. 012 (red) is selected for the stored graph.



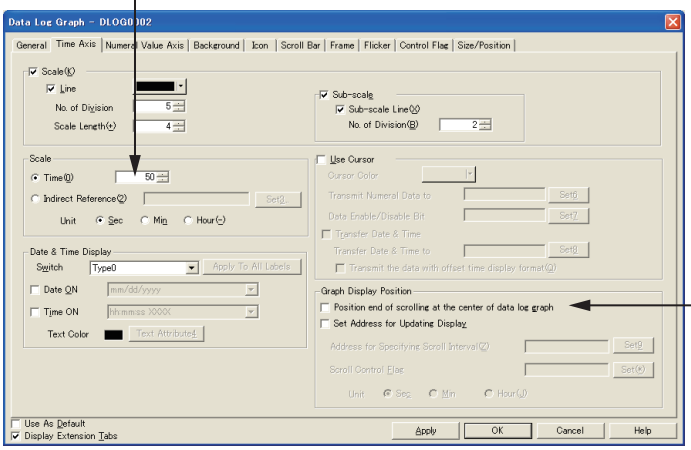
If *Step display* is selected, the logged points will be connected by vertical and horizontal lines.
De-select *Step display* to join logging points by the shortest possible straight line.

Sets the line color when logging data is read from the removable media and displayed. In this example, No. 012 (red) has been selected.

5. Click the **OK** Button to return to the Functional Object Properties Dialog Box.

6 Display the Time Axis Tab Page and set the graph time axis scale. In this example, “50” seconds’ worth of logging data will be displayed.

Set the amount of the logging period to be displayed at one time.

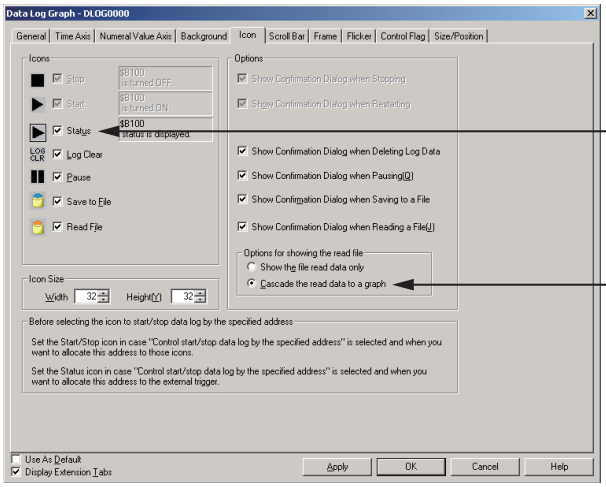


Select *Position end of scrolling at the center of data log graph*.

7 Select *Position end of scrolling at the center of data log graph* when all of the standard data cannot fit on to the graph.

8 Display the Icon Tab Page.

9 Select *Status* under Icon.



Select *Status*.

Select *Cascade the read data to a graph*.

10 Select *Cascade the read data to a graph* under Options.

11 Click the **OK** Button and transfer the project to the PT Unit.

Operations on the PT Unit

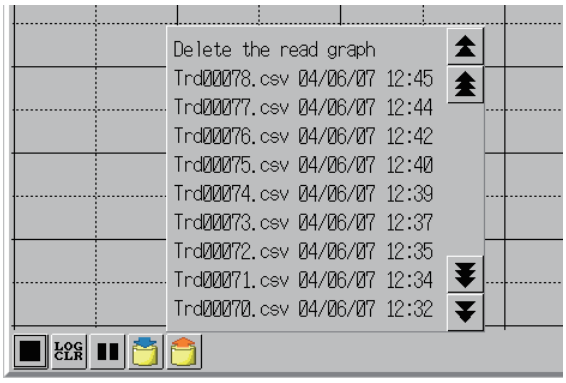
1. Insert the removable media into the PT Unit.
2. Start the PT Unit, which now has the project created using the procedures described in the last section.

When SerialA: CIO00100.00 changes from OFF to ON, data is logged for 100 s (1 min 40 s).

When SerialA: CIO00100.00 changes to ON, logging starts.

When SerialA: CIO00100.00 changes to OFF, logging stops.

To read saved data, press the *Read File* icon on the object while logging is stopped and select the desired file from the pop-up menu.



Saving Logging Data to Removable Media and Using as Standard Data

The procedure for setting logged data as standard data is shown below.

1 While logging is stopped, make sure the data to be saved is displayed on the data log object, and press the *Save to file* icon.

When the Save to file icon is pressed, the data is saved as a CSV file to Log/Trend directory on the removable media after folders for the displayed graphs are created. The output file name set for each group is used as the name of the folder.

The saved data can be displayed directly as the standard data, but the file name can also be changed to make it easy to recognize as the standard data.

2 Turn OFF the power to the PT Unit, or display the System Menu, then click the Remove Memory Card Button in the Initialize Tab Page.

3 Remove the removable media from the PT Unit.

4 Use Explorer or a similar program on a personal computer to change the file name in Log/Trend directory on the removable media.

Example: When the output file name for group 1 is the default

Before changing → After changing

Trd00□□□.CSV → Stddata□.CSV

(□□□: 001 to 999) → (□: 0 to 9)

Creating a CSV File of Standard Data

There are two methods for creating CSV files, depending on the data log file output format set on the History Tab Page under *PT – System settings*.

a) When the data log file output format is set to *Vertical axis: address, Horizontal axis: time*

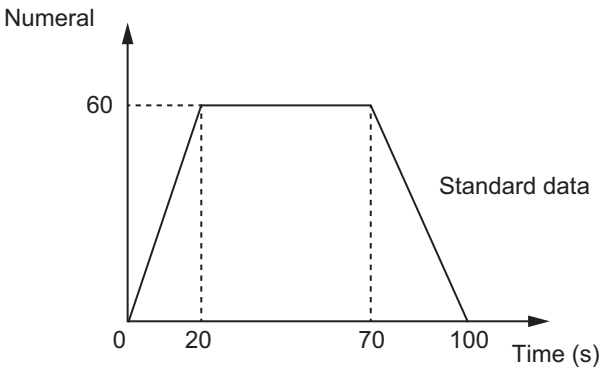
b) When the data log file output format is set to *Vertical axis: time, Horizontal axis: address*.

Here we will create a CSV file for the data log graph shown in the following diagram.

In this example, the data log file output format is set to *Vertical axis: time, Horizontal axis: address* (in the case of b) above.) Simply swap the horizontal and vertical axis information in the following procedure if the data log file output format is *Vertical axis: address, Horizontal axis: time* (in the case of a) above).

Graph display direction: Right

Logging address: SerialA: DM00000



Use the following format to create the CSV file with the standard values.

#Comment

Group name, log address A name, log address B name...

OFFSET, logging start time

Time 1, address A data 1, address B data 1, ...

Time 2, address A data 2, address B data 2, ...



Additional Information

- A comment can be inserted in the first line of the file. When inserting a comment, put a hash mark (#) directly in front of it.
- When the logging start time is omitted, it will appear on the graph as January 1, 1970 0 (h) 0 (m) 0 (s).
- When editing in Excel, set the cell format for the time to “Text.”

1 Start the spreadsheet software (commercially available).

2 Enter the time on the vertical axis, the address on the horizontal axis, and the standard data, as shown in the diagram.

- For a sampling cycle of 0.5 s.

  #Group 1 standard data

  Group 1, Serial A: DM00000

  OFFSET, 2004/06/21 10:00:00.000

  00:00:00.000,0

  00:00:20.000,60

  00:01:10.000,60

  00:01:40.000,0

- For a sampling cycle other than 0.5 s.

  #Group 1 standard data

  Group 1, Serial A: DM00000

  OFFSET, 2004/06/21 10:00:00

  00:00:00,0

  00:00:20,60

  00:01:10,60

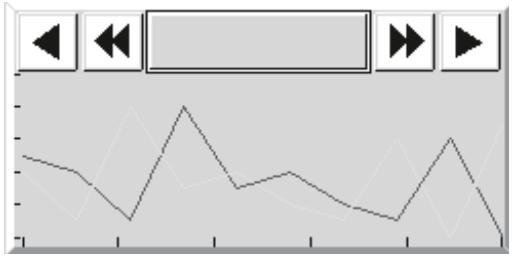
  00:01:40,0

3 Once the editing has been completed, set the file name to Stddata□ (□: 0 to 9), make sure the extension is “CSV,” then save.

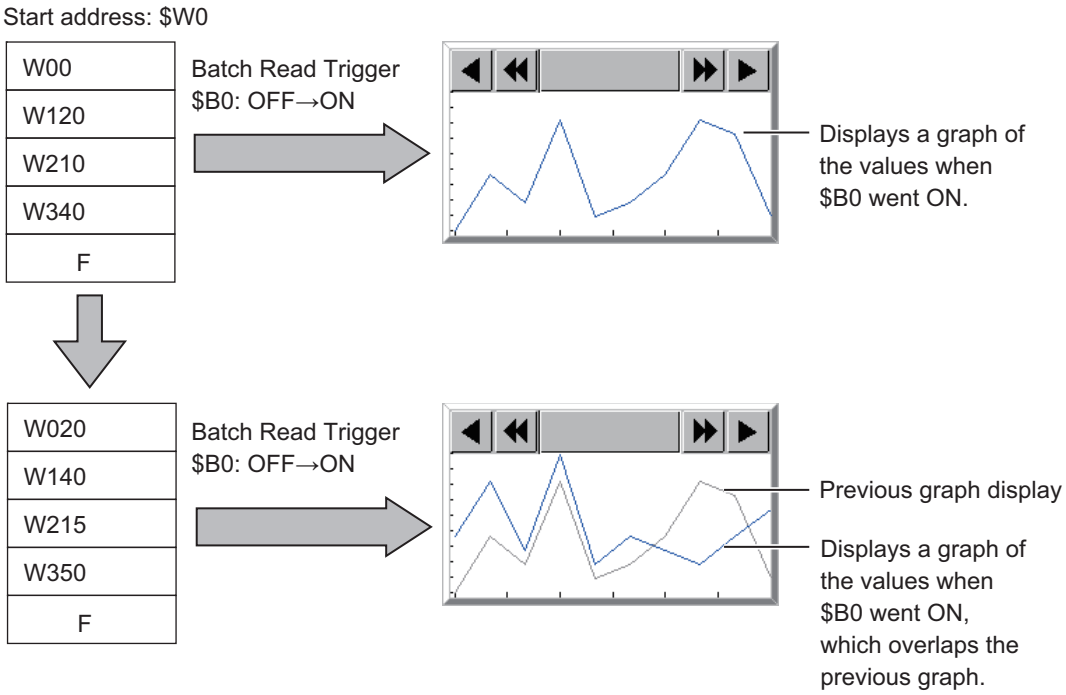
2-16 Broken-line Graphs

Broken-line graphs are objects that display in graphs current values for multiple consecutive addresses.

Up to 256 line graphs can be displayed in one broken-line graph display region.



The Batch Read and the History functions can be used when a broken-line graph group is registered.

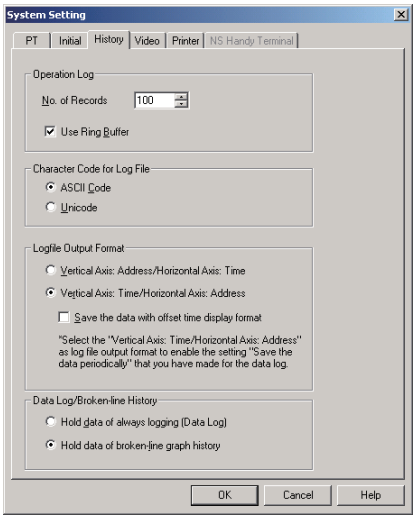


Additional Information

- The following option must be set in advance before using the History function.

(1) Select **PT – System Setting** and open the History Tab Page.

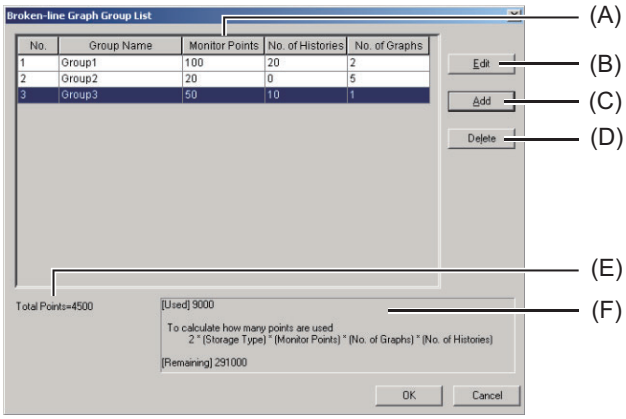
(2) Select the *Hold data of broken-line graph history* Option and click the **OK** Button.



- When the “broken-line graph history” function is being used, the “always logging” Data Log function cannot be used.
- Data will not be read if the Batch Read trigger address goes ON when the displayed screen does not contain a broken-line graph.

Registering Broken-line Graph Groups

A broken-line graph group must be registered when using the Batch Read and History functions. Select **PT – Broken-line Graph Group Setting** to display the Broken-line Graph Group List Window. This window can be used to add a new broken-line graph group, edit a group's settings, delete a group, and verify group settings.

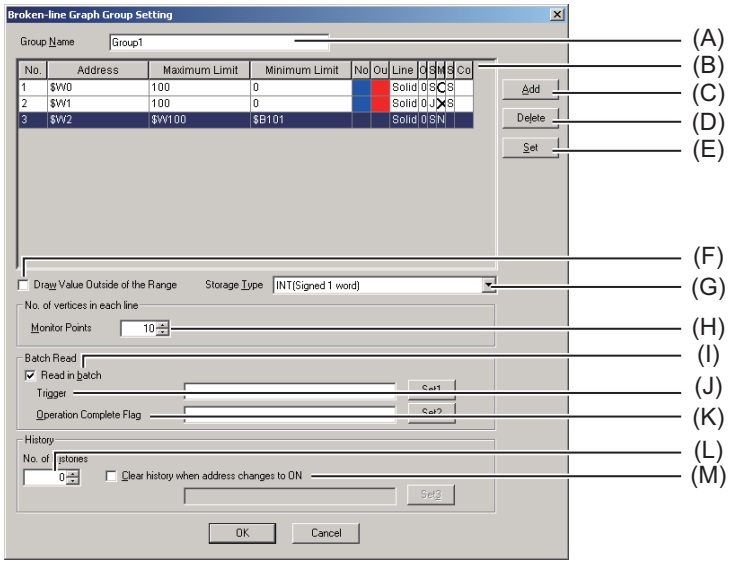


No.	Item	Details
(A)	Group List	Lists the registered broken-line graph groups.
(B)	Edit	To edit a registered broken-line graph group, select the row containing the desired group and click the **Edit** Button. The Broken-line Graph Group Setting Dialog Box will be displayed. For details on editing the settings, refer to *Setting a Broken-line Graph Group* on page 2-385.
(C)	Add	To add a broken-line graph group, click the **Add** Button. The Broken-line Graph Group Setting Dialog Box will be displayed. For details on adding settings, refer to *Setting a Broken-line Graph Group* on page 2-385. Up to 16 groups can be registered in a project.
(D)	Delete	To delete a registered broken-line graph group, select the row containing that group and click the **Delete** Button.
(E)	Total Points	Displays the total number of points set in the broken-line graph history.
(F)	Used/Remaining Memory	Displays the number of used bytes and remaining bytes. For details, refer to *Calculating the Amount of Broken-line Graph History Being Used* on page 2-389 below.

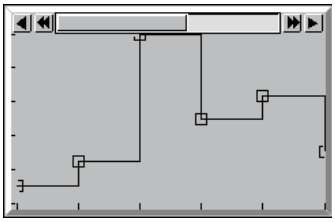
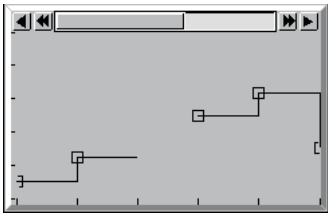
Setting a Broken-line Graph Group

The following Broken-line Graph Group Setting Window will be displayed when the Add or Edit Button is clicked in the Broken-line Graph Group List Window.

This window can be used to add a new group or edit a registered group.



No.	Item	Details
(A)	Group name	Sets the name of the broken-line graph group (up to 32 characters long; both one-byte and two-byte are counted as one character).
(B)	Graph line list	Lists the graph lines registered in the broken-line graph group.
(C)	Add	To add a graph line, click the **Add** Button. The Line Setting (Broken-line Graph Group) Dialog Box will be displayed. For details on adding a line, refer to *Line Setting (Broken-line Graph)* on page 2-388. Up to 256 lines can be set in a group.
(D)	Delete	To delete a graph line, select the row containing that line and click the **Delete** Button.
(E)	Set	To change a registered graph line's settings, select the row containing the desired line and click the **Set** Button. The Line Setting (Broken-line Graph Group) Dialog Box will be displayed. For details on editing a line, refer to *Line Setting (Broken-line Graph)* on page 2-388.

No.	Item	Details
(F)	Draw Value Outside of the Range	The following diagrams show the display when *Draw the value outside of range* is selected. • *Draw the value outside of range* selected: Values outside the range will be displayed at the top of the graph.  • *Draw the values outside of range* not selected: Values outside the range will not be displayed. 
(G)	Storage Type	Select the storage format from the pull-down list on the right. For details, refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78.
(H)	Monitor Points	Sets the number of points to monitor in the broken-line graph.
(I)	Read in batch	Select this option when performing batch reads. If this option is not selected the broken-line graph will always display the present value.
(J)	Trigger	A batch read is performed when the specified communications address goes from OFF to ON.
(K)	Operation Complete Flag	Sets the address that will be turned ON by the system when the batch read is completed.
(L)	No. of Histories	Sets the number of graphs to be retained in the broken-line graph history. When this value is set to 0, history data is not retained. When the number of saved graphs exceeds this set value, the oldest history data will be deleted.
(M)	Clear history when address changes to ON	The history data will be cleared when the specified communications address goes from OFF to ON.

Additional Information

- If the displayed screen does not contain a broken-line graph, data will not be read when the batch read *Trigger* address goes ON and data will not be cleared when the *Clear history when address changes to ON* address goes ON.
- The *Operation Complete Flag* is not turned OFF automatically. This flag must be turned OFF from a user screen or the PLC.
- When the *No. of Histories* is set to 1 or higher, the most recent graph and the specified number of previous graphs are displayed in the broken-line graph. When the *No. of Histories* is set to 0, only the most recent graph is displayed in the broken-line graph.

Example:

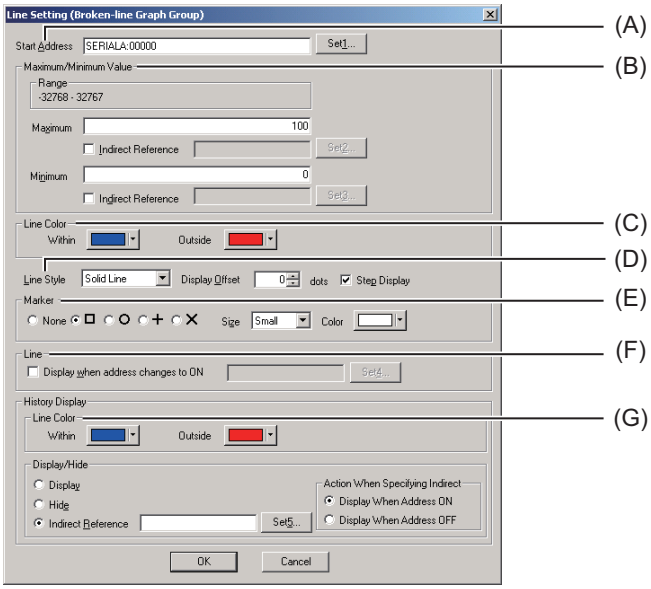
No. of Histories	Displayed graphs	Graph data retained in history
2	Most recent graph and the last graph	The most recent graph's data and the last graph's data are retained. (Data for two graphs is retained.)
1	Only the most recent graph	The most recent graph data is retained.
0	Only the most recent graph	No graphs are retained.

- You can monitor up to 6,500 words on one screen. If the number of monitor points on a broken-line graph exceeds 6,500 points, use the Batch Read function.

Line Setting (Broken-line Graph)

The Line Setting (Broken-line Graph Group) Window will be displayed when the Add or Set Button is clicked in the Broken-line Graph Group Setting Window.

Use this window to make the settings for the broken-line graph's lines.



No.	Setting	Details
(A)	Start address	Sets the start address referenced for the data.
(B)	Maximum and minimum values	Sets the maximum and minimum values for graph display. If maximum and minimum values are set, the color of the graph lines can be set to change when these values are exceeded. If Indirect reference is set, the maximum and minimum values can be specified by the contents of an address.
	Maximum	Sets the upper limit.
	Minimum	Sets the lower limit.
(C)	Line color	Select the line color (from a choice of 256 colors) under the Set Button. The color can be changed depending on whether or not the set upper and lower limits have been exceeded.
(D)	Line style	Select from the five line types listed below. • Solid line • Dotted line • Broken line • 1-dot chain line • 2-dot chain line
	Display offset	Displays the broken-line graph in an offset position, where a specified offset (number of dots) have been added to the position for the present value.
	Step display	If step display is used, the origin is shown connected by vertical and horizontal lines.
(E)	Marker	Selects one of the following five markers to be displayed at the peaks. • None • □ • ○ • + • ×
	Size	Selects large, middle, or small for marker size. The sizes are shown below. Large Medium Small
	Color	Set the marker's color (from 256 available colors).

No.	Setting	Details
(F)	Display when address changes to ON	When this option is selected, the graph line will be displayed while the specified communications address is ON.
(G)	History Display	Makes settings related to the history lines.
	Line Color	Sets the color of the history lines (from 256 available colors). Different colors can be displayed for lines within the maximum and minimum values and lines outside of the range.
	Display/Hide	Sets whether to display or hide the history lines. The Display/Hide setting can be specified indirectly by specifying an address in the *Indirect Reference* Field and turning that address ON/OFF.

Calculating the Amount of Broken-line Graph History Being Used

The amount of the broken-line graph history being used can be calculated for each group with the following equations.

Bytes used by 1 group = 2 × Storage type[*1] × Monitor points × No. of graphs × No. of Histories

*1. Use a multiplier of 1 for 1-word storage formats and a multiplier of 2 for 2-word storage formats.

Example: Broken-line graph group with the following settings

	Storage format	Monitor points	No. of graphs	No. of histories
Group 1	INT	10	2	10
Group 2	DINT	20	5	5

Bytes used = (2 × 1 × 10 × 2 × 10) + (2 × 2 × 20 × 5 × 5) = 400 + 4,000 = 4,400 bytes

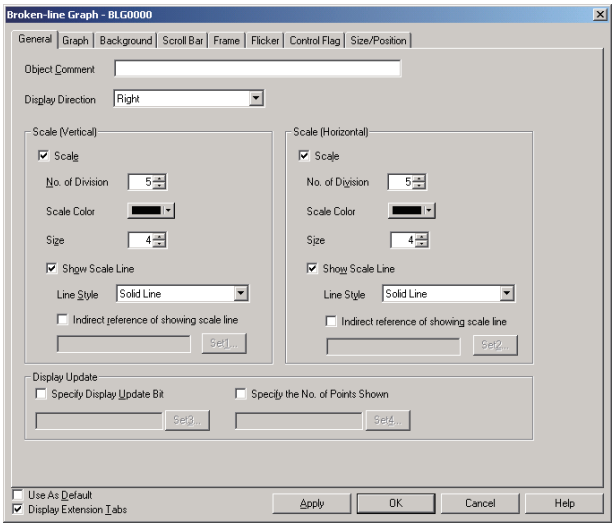
Use the following equation to calculate the number of bytes remaining:

Remaining bytes = 300,000 - bytes used

From the equation above: Remaining bytes = 300,000 - 4,400 = 296,000 bytes

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for broken-line graphs.



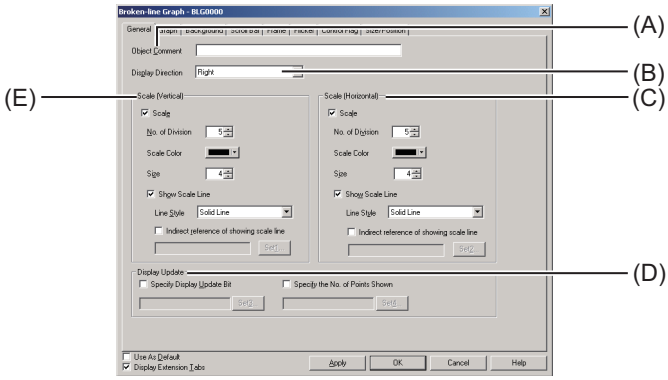
General: Sets the display direction and gradation lines for broken-line graphs.

Graph:	Registers the start address for monitoring, the number of points, and the type of lines.
Background:	Sets the base color for broken-line graphs.
Scroll bar:	Sets the scroll bar size and scroll width.
Frame:	Sets the frame display for broken-line graphs.
Flicker*1:	Sets the flicker display.
Control flag*1:	Sets display/no display and input enabled/disabled for broken-line graphs.
Size/position*1:	Sets the object size and position.

*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the display direction and gradations for broken-line graphs.

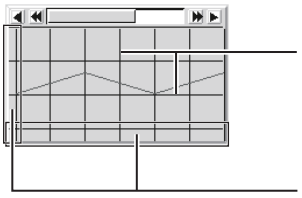


No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object (up to 32 characters).
(B)	Display direction	Select a display direction of *Up, Down, Left,* or *Right*. The axis for showing the number of graph points monitored (indicated by *a* in the diagram) and the axis for showing the values for each graph point (indicated by *b* in the diagram) depends on the set display direction. • Up • Down • Left • Right

No.	Setting		Details
(C)	Scale (Horizontal)		Sets whether or not scales will be used on axes showing the number of graph points.
		No. of division	Sets the number of division between 1 and 99.
		Scale color	Sets the scale color (from 256 available colors).
		Size	Sets the length of the scale between 4 and 32 (dots).
		Show Scale Line	Sets whether or not to display the scale.
		Line style	Select from the five line types listed below. • Solid line • Dotted line • Broken line • 1-dot chain line • 2-dot chain line
		Indirect reference of showing scale line	If this option is selected the scale is displayed when the specified address is ON.
(D)	Display update		The broken-line graph display can be updated (refreshed).
		Specify display Update bit	Normally, the display is updated whenever a value changes. If *Specify display update bit* is selected, the display will be updated only when the specified address turns ON.
		Specify the No. of points shown	The number of bits from the beginning that will be displayed can be specified.
(E)	Scale (Vertical)		Sets whether or not scales will be used on axes showing the number of graph points being monitored.
		No. of division	Sets the number of division between 1 and 99.
		Scale color	Sets the scale color (from 256 available colors).
		Size	Sets the length of the scale between 4 and 32 (dots).
		Show Scale Line	Sets whether or not to display the scale.
		Line style	Select from the five line types listed below. • Solid line • Dotted line • Broken line • 1-dot chain line • 2-dot chain line
		Indirect reference of showing scale line	If this option is selected the scale is displayed when the specified address is ON.

Additional Information

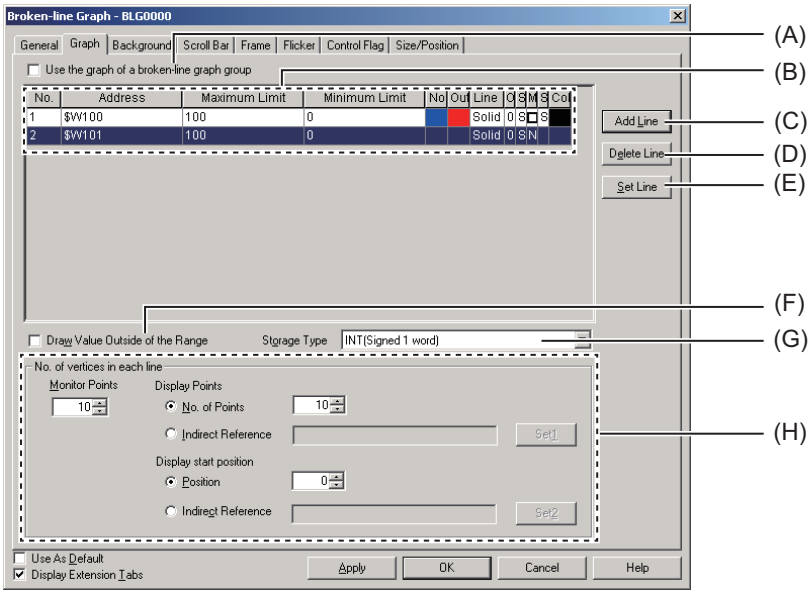
Refer to the following diagram for information on scales and scale lines.



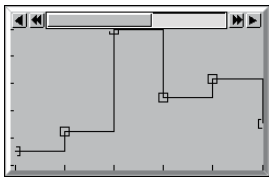
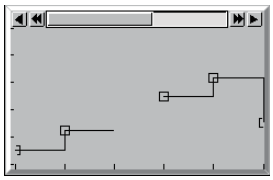
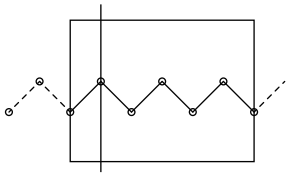
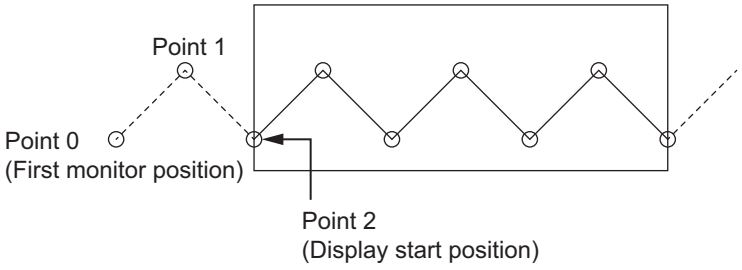
Graph Tab Page

Displays a list of information about lines displayed on broken-line graphs. Graph lines can be added, deleted, or set on the Graph Tab Page.

● Displaying Graph Lines Registered in an Individual Graph

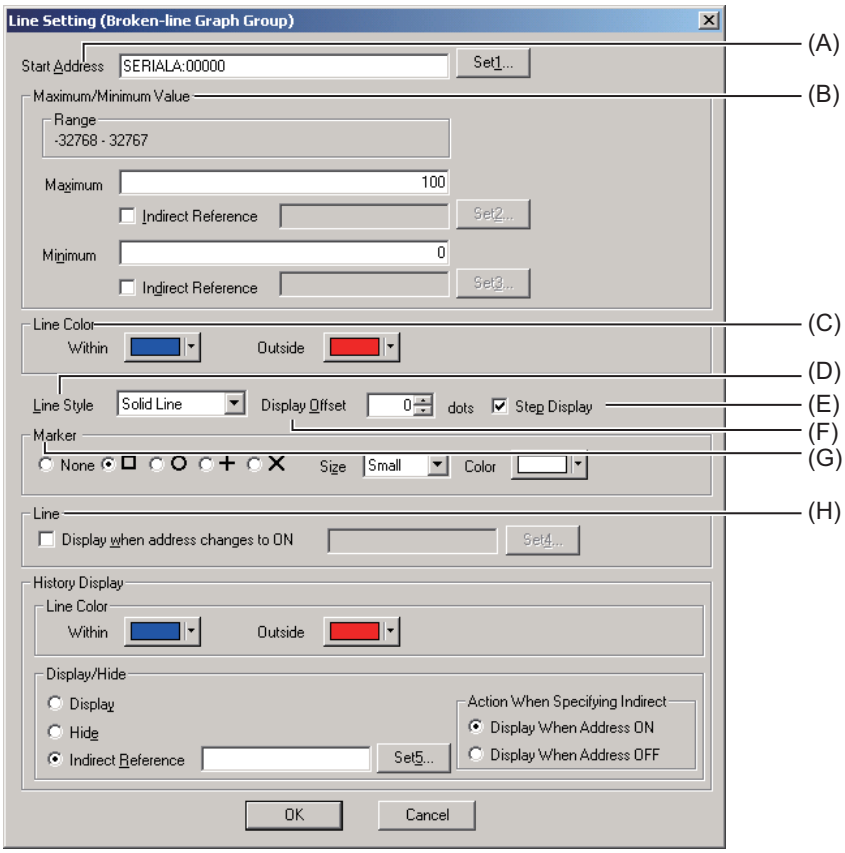


No.	Setting	Details
(A)	Use the graph of a broken-line graph group	Leave this option unselected when registering graph lines that will be displayed in an individual broken-line graph. (Select this option when displaying a graph belonging to a broken-line graph group.)
(B)	Graph list	Displays a list of the lines that are displayed on currently set graphs. Lines are added, deleted, and set by pressing the **Add Line**, **Delete Line**, and **Set Line** Buttons.
(C)	Add Line	Adds and registers lines for display on graphs. Press the **Add Line** Button to display the Line Settings Dialog Box. Refer to *Line Setting (Broken-line Graph) Dialog Box* on page 2-394 for further information.
(D)	Delete Line	Deletes the selected line or lines on the graph list, including the settings information for those lines.
(E)	Set Line	Sets the line attributes. Select a line on the graph list and press the **Set Line** Button to display the Line Setting Dialog Box. Refer to *Line Setting (Broken-line Graph) Dialog Box* on page 2-394 for further information.

No.	Setting	Details
(F)	Draw the value outside of range	The following diagrams show the display when *Draw the value outside of range* is selected. • *Draw the value outside of range* selected: Values outside the range will be displayed at the top of the graph.  • *Draw the values outside of range* not selected: Values outside the range will not be displayed. 
(G)	Storage type	Select the storage type from the pull-down list to the right. Refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78 for details.
(H)	No. of points for each graph line	Sets the number of points monitored on the broken-line graph under *Monitor points*. Sets the number of points displayed on the broken-line graph object under *Display points*. Set a *Display points* value smaller than the value set to *Monitor points*.)  No. of display points: 7 No. of monitor points: 9 The two points not displayed can be viewed by scrolling the display down with the Scroll Button. The *Display start position* sets the broken-line graph's a starting display position. The start position is treated as point 0. Set a display start position that is smaller than the difference of the Monitor Points – Display Points. When the Indirect reference is specified, the value of the specified address is used for the display start position.  Display start position [2]

Line Setting (Broken-line Graph) Dialog Box

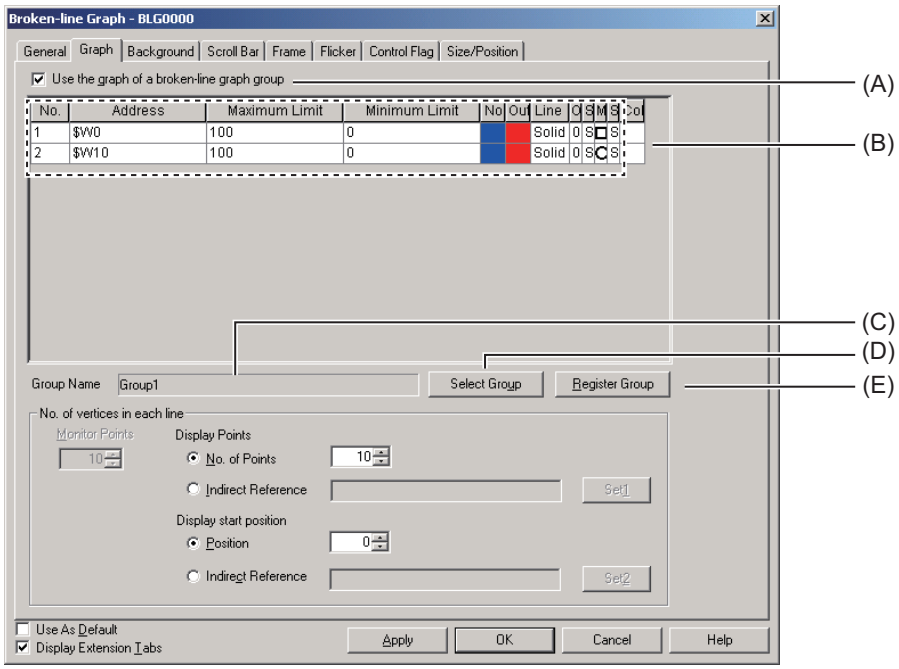
Sets the line attributes. Press the **Add Line** and **Set Line** Buttons on the Graph Tab Page to display the following dialog box.



No.	Setting	Details
(A)	Start address	Sets the start address referenced for the data.
(B)	Maximum and minimum values	Sets the maximum and minimum values for graph display. If maximum and minimum values are set, the color of the graph lines can be set to change when these values are exceeded. If *Indirect reference* is set, the maximum and minimum values can be specified by the contents of an address.
	Maximum	Sets the upper limit.
	Minimum	Sets the lower limit.
(C)	Line color	Sets the line color (from 256 available colors). The color can be changed depending on whether or not the set upper and lower limits have been exceeded.
(D)	Line style	Select from the five line types listed below. • Solid line • Dotted line • Broken line • 1-dot chain line • 2-dot chain line
(E)	Step display	If step display is used, the origin is shown connected by vertical and horizontal lines.
(F)	Display offset	Displays the broken-line graph in an offset position, where a specified offset (number of dots) have been added to the position for the present value

No.	Setting	Details
(G)	Marker	Selects one of the following five markers to be displayed at the peaks. • None • □ • ○ • + • ×
	Size	Selects large, middle, or small for marker size. The sizes are shown below. Large Medium Small
	Color	Select the marker color (from a choice of 256 colors) under the **Set** Button.
(H)	Display when address changes to ON	When this option is selected, the graph line will be displayed while the specified communications address is ON.

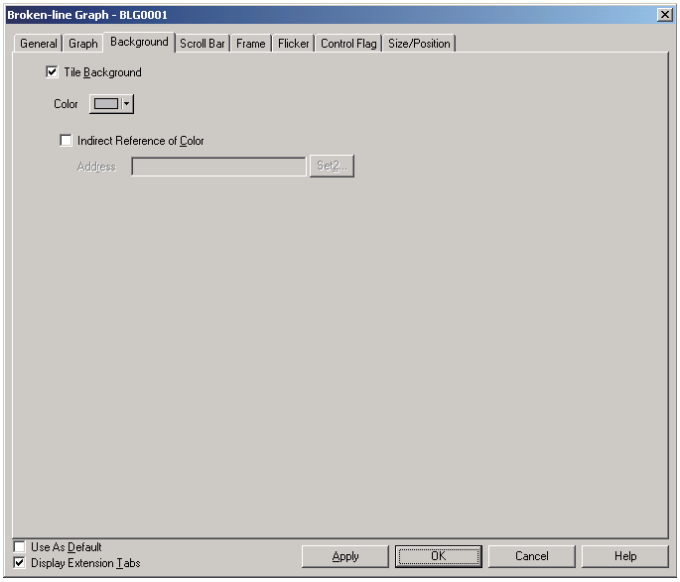
● Displaying the Graph of a Broken-line Graph Group



No.	Setting	Details
(A)	Use the graph of a broken-line graph group	Select this option to display the graph of a broken-line graph group.
(B)	Graph list	Displays the information about graph lines registered in the displayed broken-line graph group.
(C)	Group Name	Displays the name of the displayed broken-line graph group.
(D)	Select Group	Click the **Select Group** Button to display the Graph Group Selection Window and select the group that will be displayed.
(E)	Register Group	Click the **Register Group** Button to display the Broken-line Graph Group List Window. Use this window to add a new broken-line graph group, edit a group's settings, or delete a group.

Background Tab Page

Sets whether or not the background is tiled. If the background is to be tiled, the background color for broken-line graphs can be selected from 256 colors. Click **Indirect reference of color** to reference the color code stored at a specified address for the background color.



Scroll Bar Tab Page

Sets display/no display, scroll width, and button size for the graph scroll bar displayed with broken-line graphs.

Refer to *2-8-11 Scroll Bars* on page 2-105 for details.

Frame Tab Page (Extension Tab)

Specifies the colors and sizes of the functional object frame to change the shape or color when the broken-line graph is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Make flicker settings to make the functional object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag Tab Page (Extension Tab)

Control flags can control the display of and input to functional objects. Use control flags to enable display or control input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

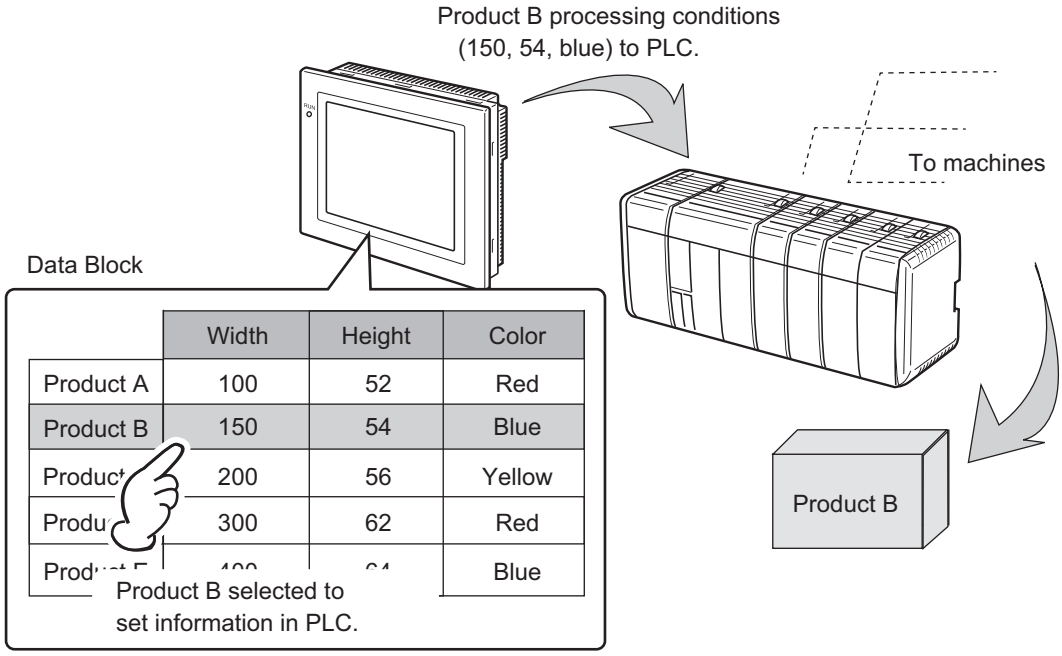
Displays and sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-17 Data Blocks

2-17-1 What Is a Data Block?

Data blocks (recipes) enable reading/writing values and character strings from/to memory areas, such as those in a PLC. Data blocks can be used to easily change the setup of the system. Create the data in a CSV file and store it in the PT Unit beforehand. This data can be changed while operating the PT Unit.

Example: Setting width (numeric value), height (numeric value), and color (character string) in the PLC. (Refer to the figure shown below.) Set width: 150, height: 54, and color: blue for product B. Just select product B to set these three items in the PLC. If product A is selected, a width of 100, a height of 52, and a color of red are set in the PLC.

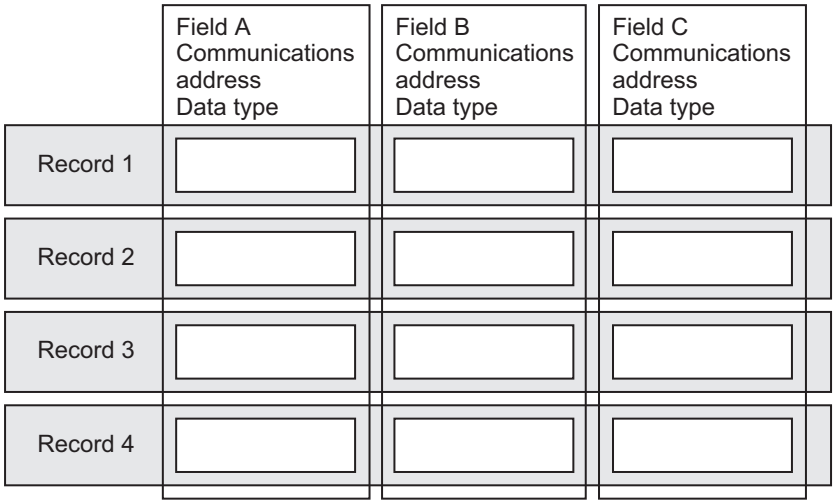


Using data blocks, users do not need to save data in the PLC beforehand, so that the memory of the PLC can be saved and the ladder program can be reduced. Data blocks also have the following features.

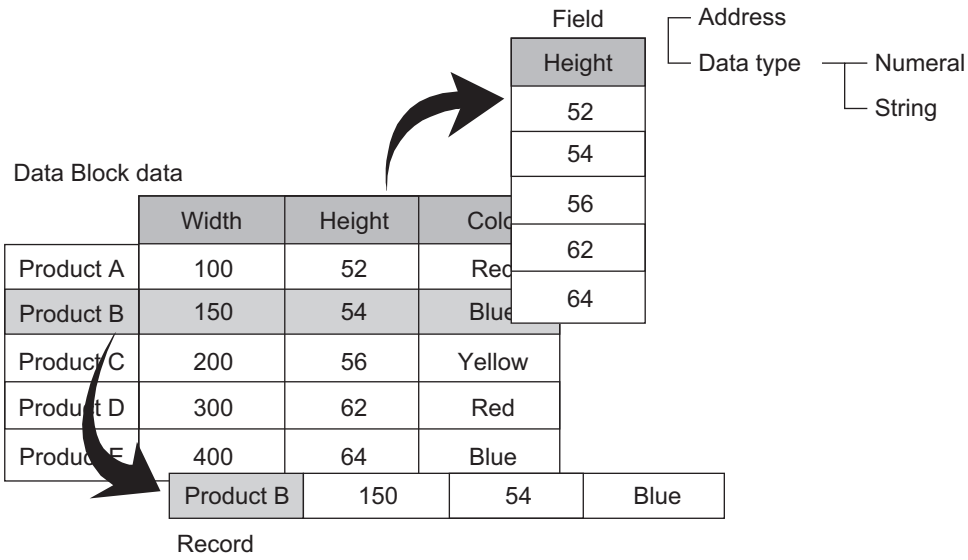
- Data in CSV format can be edited and managed on a computer.
- Data can be edited on the PT Unit.
- Data can be written to a removable media.
- Data from read from a removable media.
- Processes values and character strings can be handled.
- Maximum number of rows: 1,000. Maximum number of columns: 500. Data blocks with both 1,000 rows and 500 columns, however, cannot be set.

Refer to *Restrictions on Data Blocks* on page 2-406 for details.

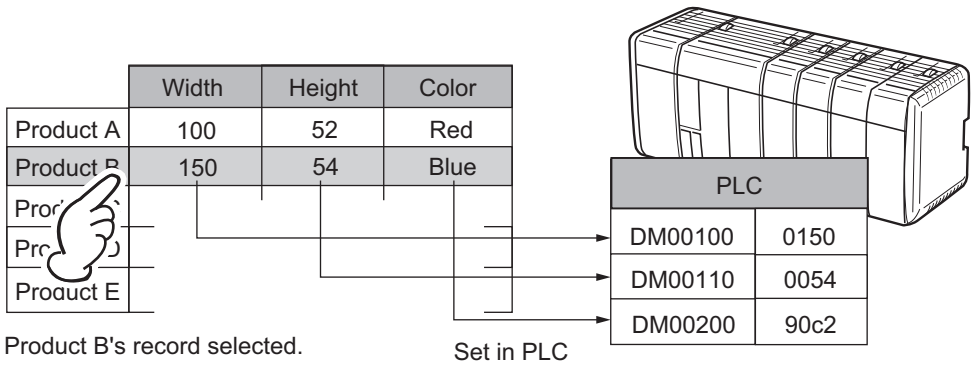
A data block consists of records and fields. The address and data format are set for each field. A record is a group of fields.



Conditions, such as the widths and heights shown below, are called fields, and the group of data for product B is called a record.



To set data from a data block in the PT Unit to the PLC, select the record from the data block and write it to PLC. When writing to the PLC, fields are written in order one at a time from the beginning of the record. Therefore, it takes time to write the values for all fields.

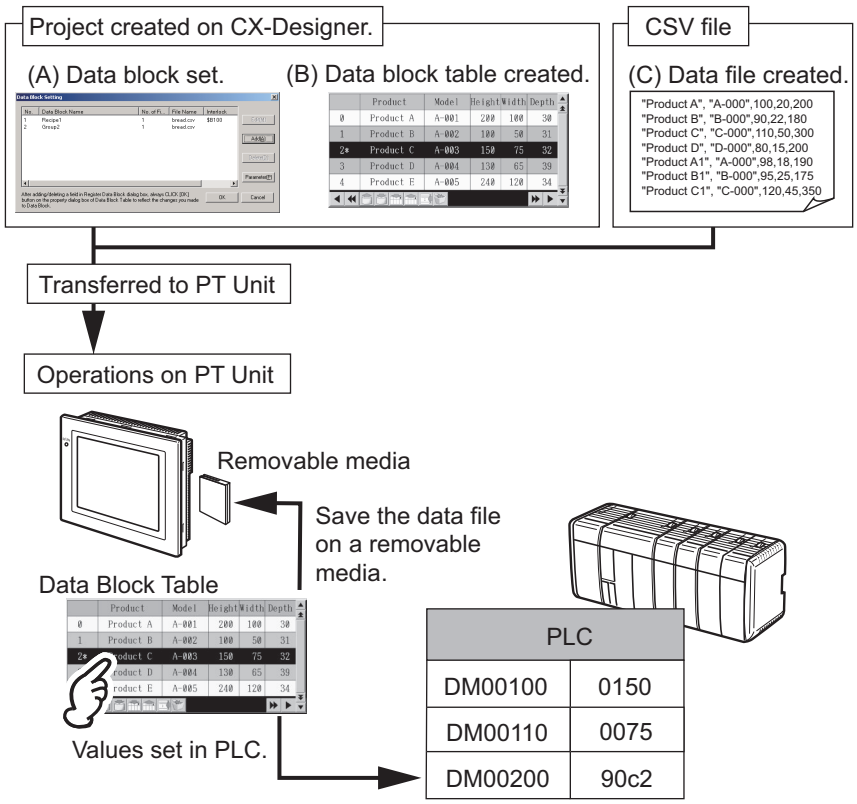


2-17-2 Procedures for Data Blocks

There are two methods that can be used to transfer, display, and edit recipe data: manipulate the data in the data block or combine functional objects, such as command buttons and Numeral Display & Input objects.

Manipulating Data Block Data

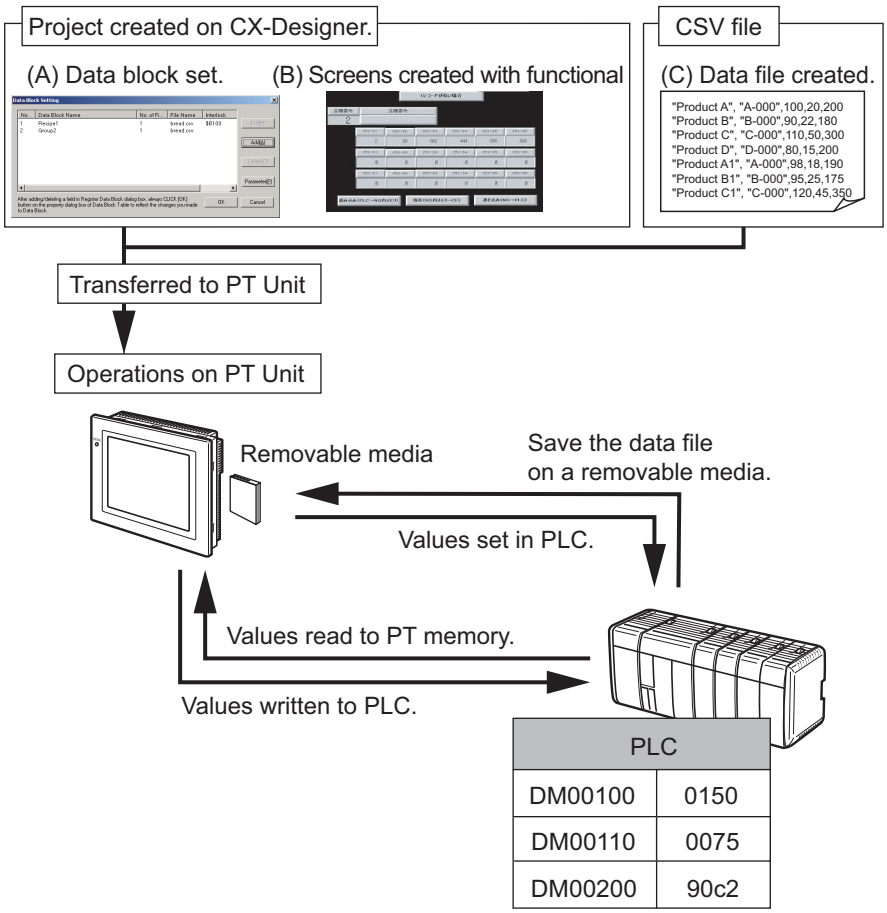
Use the following procedure to transfer, display, and edit recipe data by manipulating the data in the data block.



No.	Item	Contents	See
(A)	Data Block Setting	Sets the data format and address for the field, and the number of records.	*2-17-3 Setting Data Blocks* on page 2-401
(B)	Data Block Table	Shows the data block, and sets the selected data for each address.	*2-17-4 Data Block Tables* on page 2-407
(C)	Data File	Shows the data in the data block.	*2-17-6 Creating Data Files* on page 2-417

Combining Functional Objects

Use the following procedure to transfer, display, and edit recipe data by combining functional objects, such as command buttons and Numeral Display & Input objects.



No.	Item	Contents	See
(A)	Data Block Setting	Sets the data format and address for the field, and the number of records.	*2-17-3 Setting Data Blocks* on page 2-401
(B)	Creating Screen with Functional Objects, such as Command Buttons	Sets communications addresses for specified data and creates screens to edit data file.	*2-17-7 Using Data Block Tables* on page 2-419
(C)	Data File	Shows the data in the data block.	*2-17-6 Creating Data Files* on page 2-417

Additional Information

- Either the data block settings and the data block table can be created on the CX-Designer first, or the data file can be created first. The following items, however, must correspond.
  · Number of fields · Data format · Number of records
- Refer to the relating parts of this manual for items set on the CX-Designer and the data file setting first, and then make the settings.

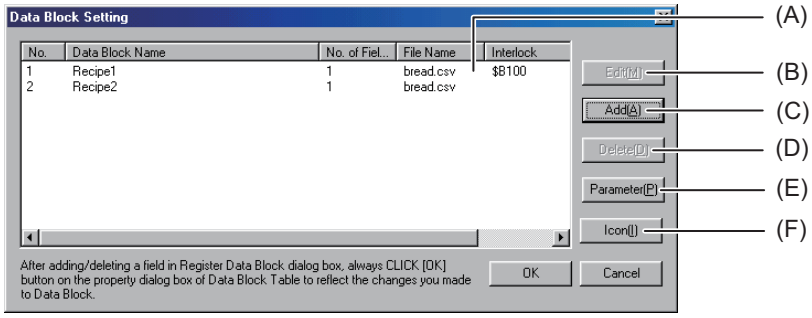
2-17-3 Setting Data Blocks

This section explains the settings required for data blocks. Set the number of fields, the field labels, and the data format for each field.

Setting Data Blocks

Select **PT – Data Block Setting**.

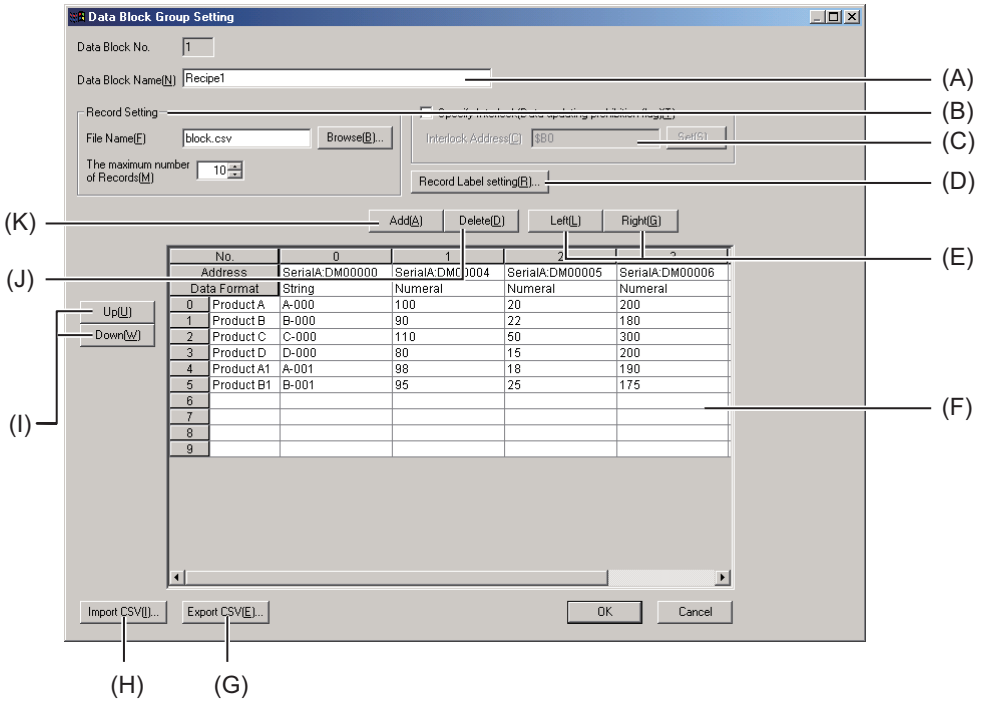
The Data Block Setting Dialog Box will be displayed. Data blocks can be added, edited, and deleted using this dialog box.



No.	Item	Details
(A)	Data block list	Lists the registered data blocks. Select the data block from the list to edit or delete it.
(B)	Edit Button	Edits the data block selected from the list. Click the **Edit** Button to display the Register Data Block Dialog Box.
(C)	Add Button	Creates a new the data block. Click the **Add** Button to display the Register Data Block Dialog Box. Up to 100 data blocks can be created.
(D)	Delete Button	Deletes the selected data block from the list. A confirmation dialog box will be displayed when the Delete Button is clicked. Click the **Yes** Button to delete.
(E)	Parameter Button	Selects the character code to use in the data file. A data block parameter setting dialog box will be displayed when the **Parameter** Button is selected, enabling selection of the character code between multibyte and Unicode.
(F)	Icon Button	Specifies a bitmap or JPEG file for the icon. The Details Dialog Box is displayed.

Registering Data Blocks

The items set in the Data Block Registration Dialog Box are described in the following table.



No.	Item	Details
(A)	Data block name	Sets the name of the data block. (32 characters max.). The name set here will be displayed in the data block list in the Data Block Setting Dialog Box.
(B)	Record setting	Specifies the CSV-format data file related to the data block.
	File name	File name (8 characters max. plus file name extension .csv) Alphanumeric characters, underscores (_), dollar signs ($), and periods (.) can be used in the file name.
	The maximum number of Records	Sets the maximum number of records in the data block. Up to 1,000 records can be created. Refer to *Restrictions on Data Blocks* on page 2-406 for details.
(C)	Specify Interlock (Data updating prohibition flag)	Writing to the CSV file from the data block can be enabled and disabled. If this option is selected, writing to the CSV file will be disabled when the communications address set for the interlock address is ON.
(D)	Record label setting	Specifies the number of characters and the stored character format for record labels. Refer to *Record Label Setting* on page 2-405 for details.
(E)	Left/Right	Moves the selected field left or right.
(F)	Recipe data list	Lists the file name, data type, communications address, and recipe data. The data can also be edited. Double-click a field to display the Field Setting Dialog Box and change the field settings.
(G)	Export CSV	Exports the edited recipe data to a specified CSV file.
(H)	Import CSV	Reads recipe data from the specified CSV file.
(I)	Up/Down	Moves the selected record up or down.
(J)	Delete Button	Deletes the currently selected field.
(K)	Add Button	Adds a field to the right of the currently selected field. Up to 500 fields can be created. Refer to *Restrictions on Data Blocks* on page 2-406 for details.

Additional Information

- The **Delete** Button deletes the selected field only. Multiple fields cannot be deleted at the same time.
- You cannot add more records than the maximum number of records on the PT Unit.
- Always specify the data file. The PT Unit automatically reads data file when displaying data blocks. If data file set in the data block setting does not exist, the following message will be displayed.

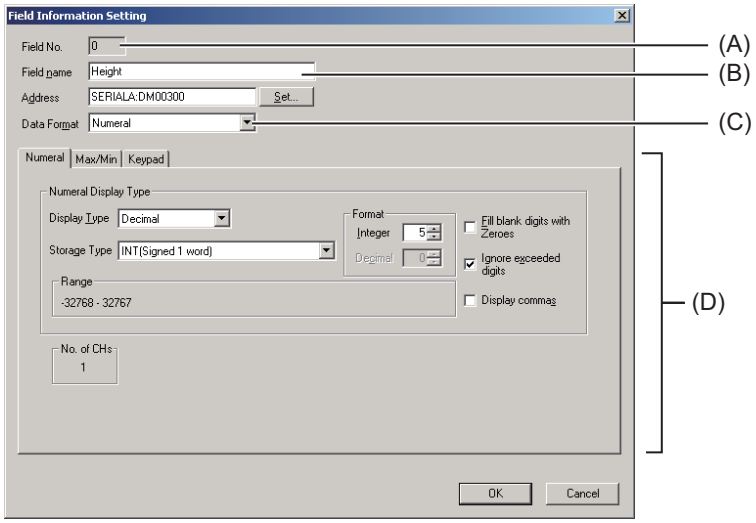
  Although the data block table exists on the screen, failed to read CSV file to display in the data block table.

  [Data Block (X) CSV File]

  The object will not be displayed correctly.

Field Settings

This section explains the properties in the Field Setting Dialog.

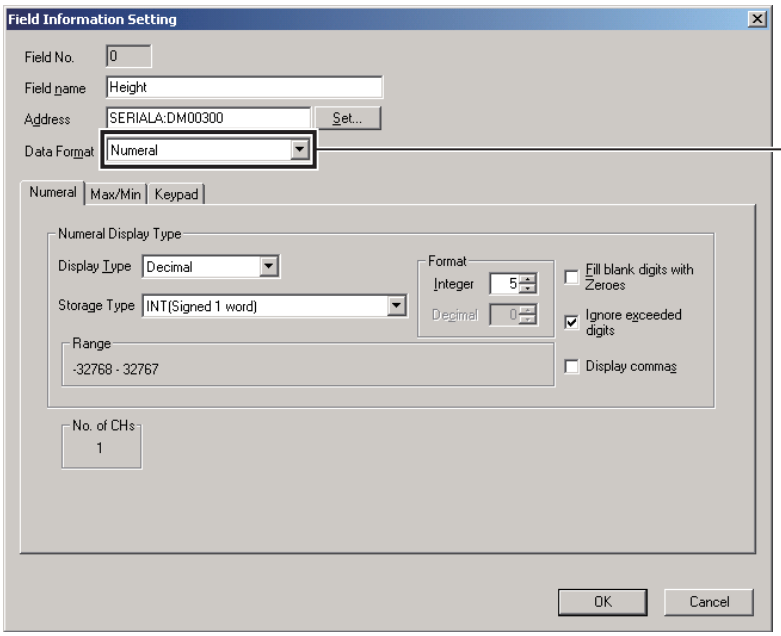


No.	Item	Details
(A)	Field Name	Sets the field name (up to 32 characters).
(B)	Address	Sets the destination address to read and write for the field.
(C)	Data Format	Sets the data format for the field. The following types can be set. • Numeral • String
(D)	Detailed Setting	Displays items for each data format. Refer to the next page for details.

This section explains items set for each data format.

- Numeral Data

  When selecting numeral data for the data format, set the following items.



Numeral:	Sets the storage type.
Max/Min:	Sets the maximum and minimum limits for inputting.
Keypad:	Sets the input method, and the display position and size of the keypad.

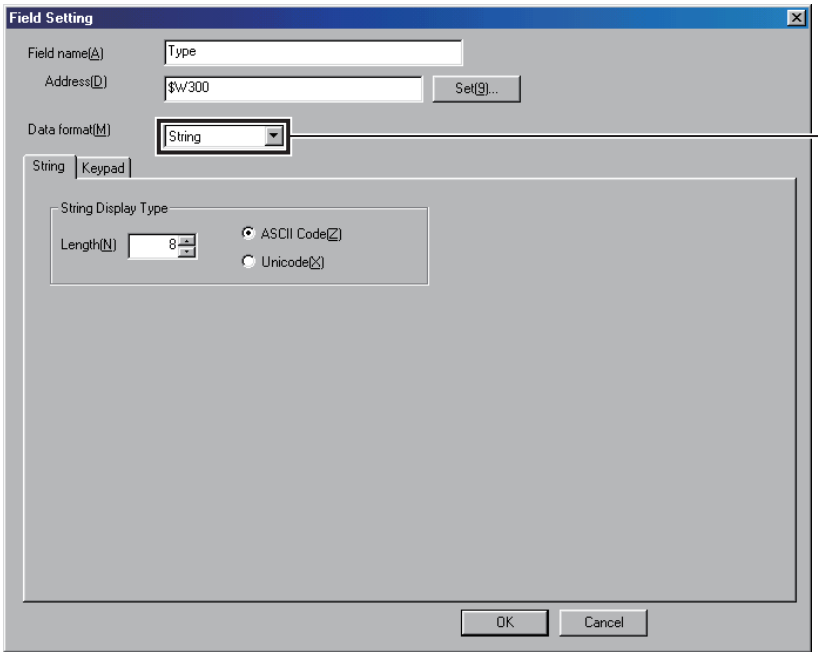
The detailed settings for each tab page are the same as for Numeral Display & Input objects. Refer to *2-12-1 Numeral Display and Input* on page 2-245 for details.

Additional Information

The item *Other Input Method (command button etc.)* does not appear on the Keypad Tab Page of the Field Setting Dialog Box for Data Block Tables.

- String Data

  When selecting string data for the data format, set the following items.



String: Sets the display format.

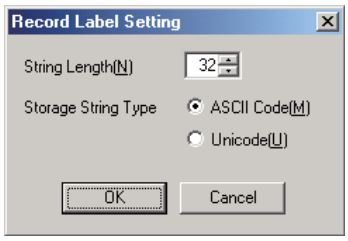
Keypad: Sets the input method, and the display position and size of the keypad.

The detailed settings for each tab page are the same as for Numeral Display & Input objects. Refer to *2-12-2 String Display and Input* on page 2-255 for details.

Additional Information

The item *Other Input Method (command button etc.)* does not appear on the Keypad Tab Page of the Field Setting Dialog Box for Data Block Tables.

● Record Label Setting



No.	Item	Details
(A)	String Length	Sets the number of valid characters for record labels (1 to 32).
(B)	Storage String Type	Selects one of the following as the storage type for record labels in PT memory. • ASCII code • Unicode

Restrictions on Data Blocks

There are restrictions for setting data blocks. Make settings within the following restrictions.

No.	Item	Restriction
(a)	Number of data blocks per project	100 max.
(b)	Number of fields per data block.	500 max.
(c)	Number of records per data block.	1,000 max.
(d)	Data quantity per data block	512 KB max.

(a) Number of Data Blocks per Project

Up to 100 data blocks can be set for one project. To add or delete data blocks, display the Data Block Setting Dialog Box, and click the **Add** or **Delete** Button. Refer to *2-17-3 Setting Data Blocks* on page 2-401 for details.

(b) Maximum Number of Fields per Data Block

Up to 500 fields can be set per data block. Set the field while confirming the number of fields displayed in the Register Data Block Dialog Box. Refer to *Registering Data Blocks* on page 2-402 for details.

(c) Number of Records per Data Block

Up to 1,000 records can be set for one data block. The maximum number of records is set in the Register Data Block Dialog Box. Refer to *Registering Data Blocks* on page 2-402 for details.

(d) Data Quantity per Data Block

The maximum data quantity per data block is 512 KB.

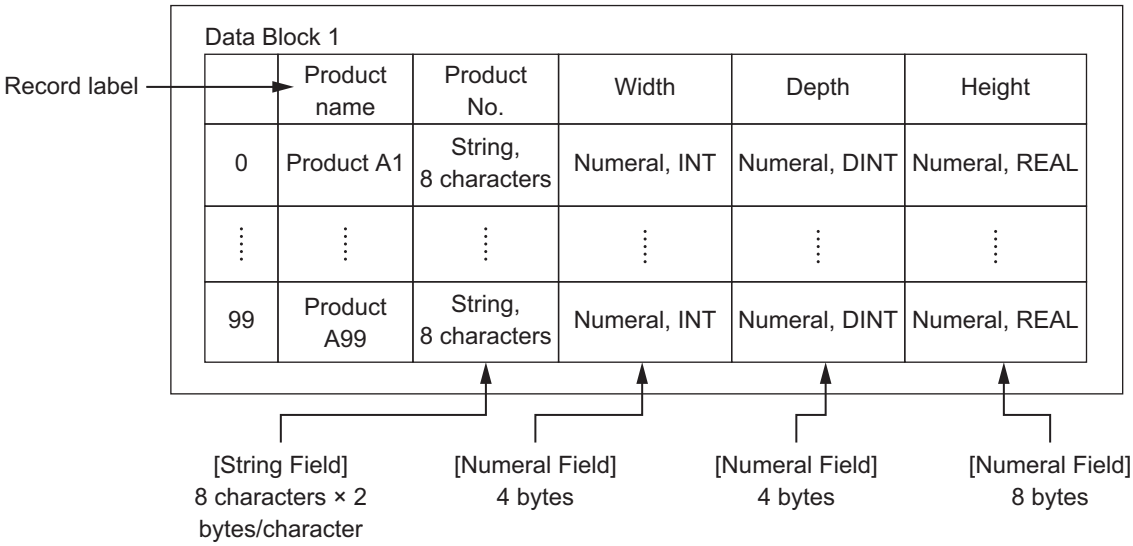
Each field requires the following data.

Field		Data quantity
Numeral	Except REAL	4 bytes
	REAL	8 bytes
String	(Each character)	2 bytes

● Calculating Data Bytes for Data Blocks

This section explains how to calculate the data quantity for data blocks.

Example:



1 record = [8 characters × 2 bytes/character]+[4 bytes]+[4 bytes]+[8 bytes]= 32 bytes

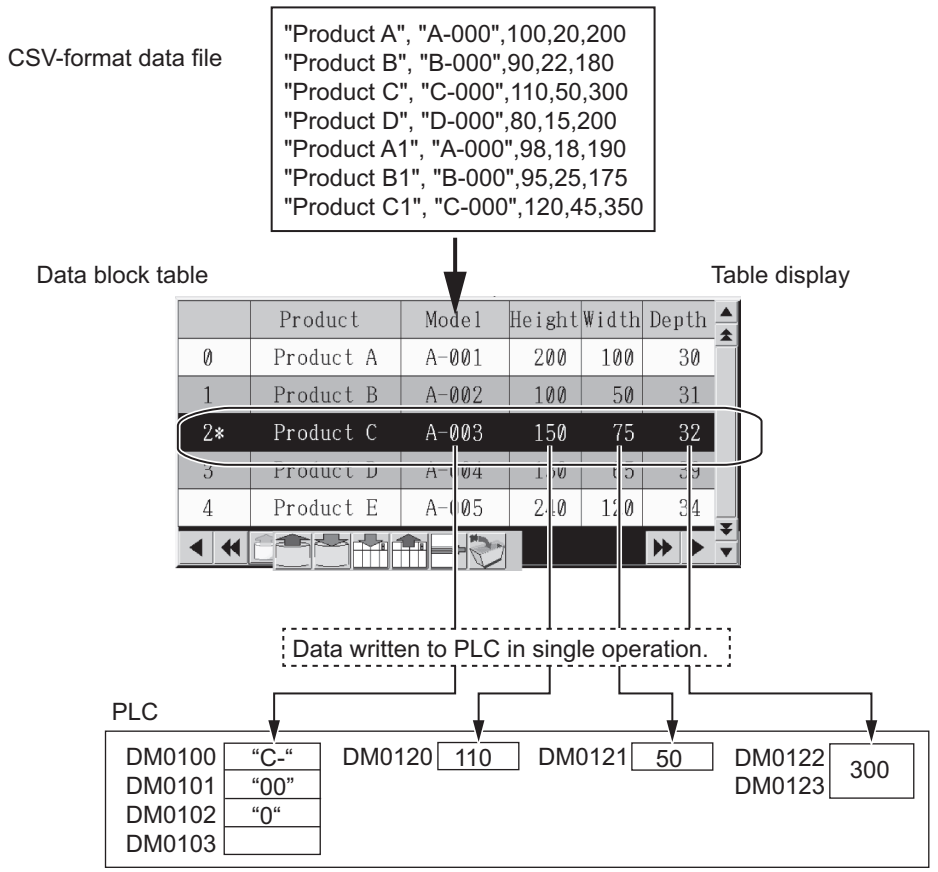
100 records = 32 bytes/record × 100 records = 3,200 bytes

Additional Information

The record labels are not calculated in the data quantity. Refer to *2-17-6 Creating Data Files* on page 2-417 for record labels.

2-17-4 Data Block Tables

A data block table is a functional object that displays a preset data file as a table and sets the specified data in the PLC.



To create the data block table, select **Data Block Table** from the **Functional Objects** Menu or click the icon.

Additional Information

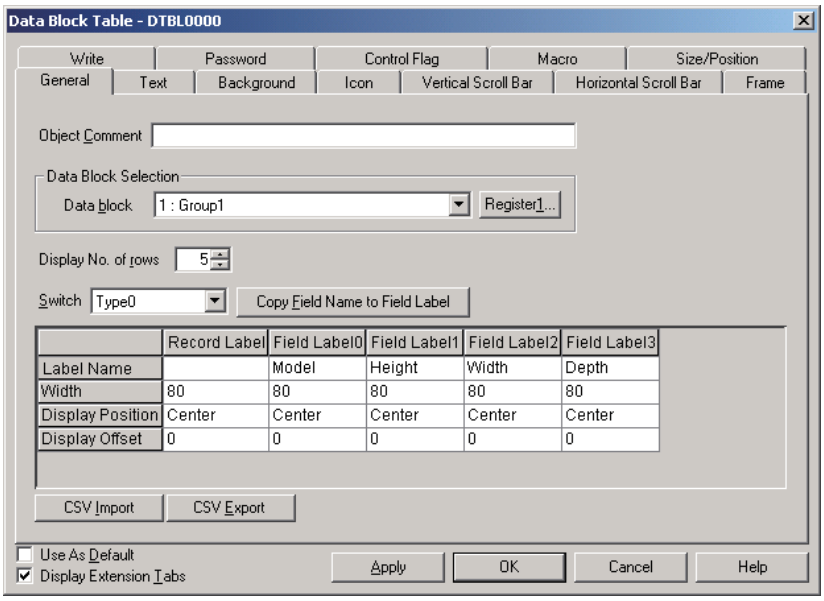
Only one data block object can be set for each screen.

Data blocks cannot be set for pop-up screens, sheets or inside of frames.

2-17-5 Setting Data Block Tables

Settings for Functional Object Properties

This section explains the properties set for data block tables in the Data Block Table Dialog Box.

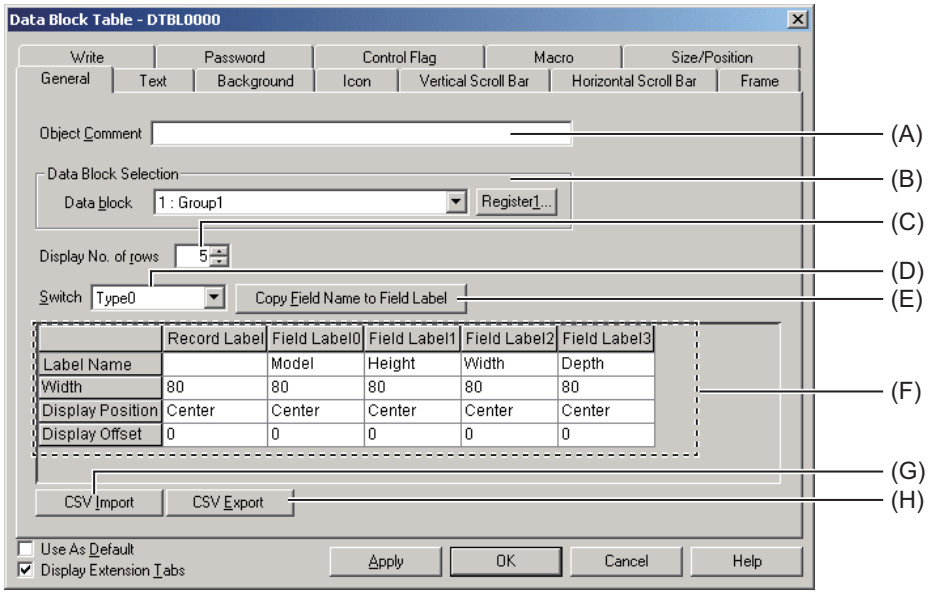


General:	Sets the data block and display format.
Text:	Sets the text attribute for displaying numeral and string data.
Background:	Sets the background color of the data block and the record color.
Icon:	Sets whether an icon button is displayed at the bottom of the object.
Vertical Scroll Bar:	Sets the button size and scroll range for the vertical scroll bar.
Horizontal Scroll Bar:	Sets scroll range for the horizontal scroll bar.
Frame:	Sets the frame color and size of the data block.
Write*1:	Sets the write confirmation message to be displayed when changing field data on the data block.
Password*1:	Sets the password to be entered when changing field data on the data block.
Control Flag*1:	Enables and disables input and display.
Macro*1:	Sets the macro to be executed when setting the field value.
Size/Position*1:	Sets the size and position of the object.

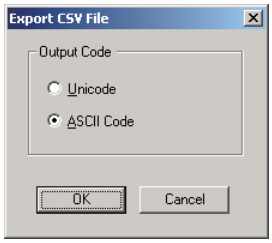
*1. These tabs are displayed only when *Display Extension Tabs* is selected.

General Tab Page

Sets the data block and display format.



No.	Item		Contents
(A)	Object Comment		Set an explanatory comment for the pasted object (up to 32 characters).
(B)	Data Block Selection		Select the data block to be displayed. The Data Block Setting Dialog Box can be displayed by clicking the **Register** Button. Use this dialog box to create, change, or delete Data Block groups.
(C)	Display No. of rows		Set the number of columns to display.
(D)	Switch		Switches the field label.
(E)	Copy Field Name to Field Label		Copies the field name, which was set in the Data Block Group Setting Dialog Box, to the field label.
(F)	Field settings		Sets the codes and each field.
		Label Name	Sets a label name of up to 32 characters for the record label and each field label.
		Width	Sets the width for record and field label display to 0 or to between 16 and 800 (dots). If the width is set to 0, the labels will not be displayed.
		Display Position	Sets the horizontal alignment of the text in record or field labels to one of the following. • Left • Center • Right Text attributes other than the horizontal alignment (font, vertical alignment, font color, etc.) are set in the Text Tab Page.
		Display Offset	Sets the offset for the display position of the field label name in dots (0 to 128). The offset is calculated from the leftmost edge of the field label name display area.
(G)	CSV Import		Reads the label name from the specified CSV file.

No.	Item	Contents
(H)	CSV Export	Exports the current label name to a specified CSV file. Select the character code when exporting data. 

Additional Information

The number of fields displayed in the data block table is determined by widths of the object and fields. If all fields will not fit in the data block table, they can be displayed by using the horizontal scroll bar.

Text Tab Page

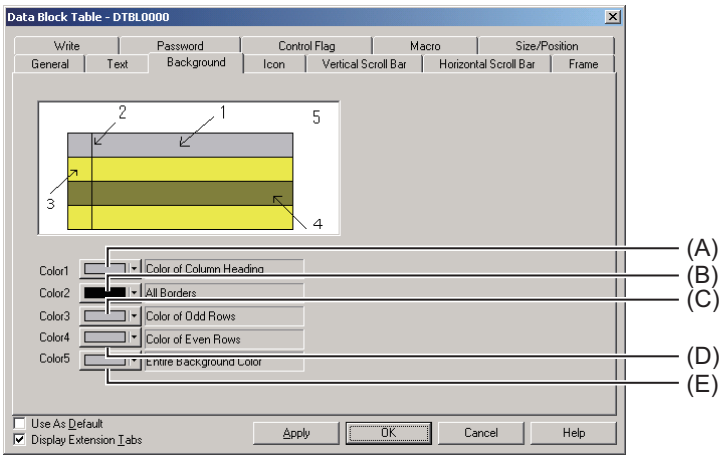
Sets the text attributes (font, color, etc for the numeral values and character strings. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Additional Information

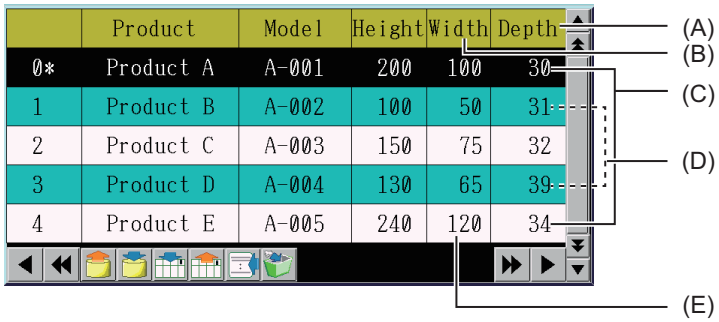
The offset and display position set in the Field Label Setting Dialog Box will be reflected in numeral field and string field. The horizontal position set on the Text Attribute Tab Page will not be reflected.

Background Tab Page

Sets the background color of the object and the record color. To fill the record, click the **Set** Button to display the Color Setting Dialog Box and select the color for the record.



Example:



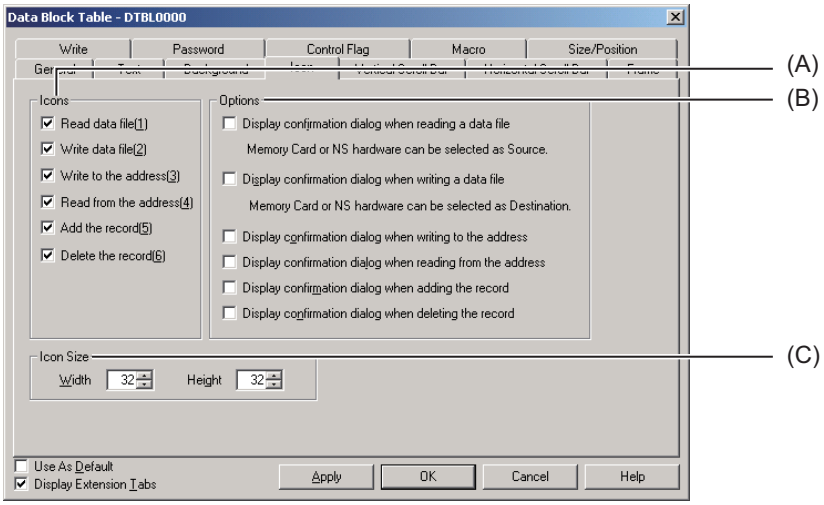
The selected line is displayed in reverse video.

No.	Item	Details
(A)	Color of Top Column	Sets background color of the column header.
(B)	All borders	Sets entire border color.
(C)	Color of Odd Columns	Sets background color of odd columns.
(D)	Color of Even Columns	Sets background color of even columns.
(E)	Entire background Color	Sets background color except for field label name and record data display areas.

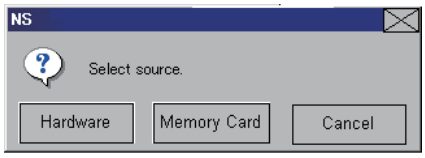
Refer to *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details on operating Color Setting Dialog Box.

Icon Tab Page

Sets whether an icon button is displayed at the bottom of object.



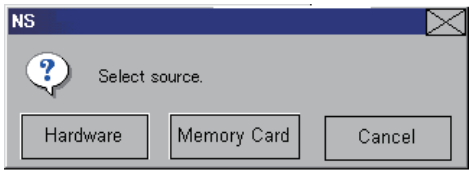
No.	Item		Details	
(A)	Icon		Icon buttons that perform operations can be displayed at the bottom of the data block object.	
		Read Data File		Reads data from the specified CSV data file, and displays it in the data block table.
		Write Data File		Overwrites data displaying from the data block table to the specified CSV data file.
		Read from the address		Retrieves data from the addresses set in Field Setting Dialog Box to the records selected on the data block.
		Write to the address		Writes data selecting in the data block to the addresses set in the Field Setting Dialog Box.
		Add the record		Adds a new record below the selected record.
		Delete the record		Deletes the selected record.

No.	Item	Details
(B)	Options	Check the items for which to display confirmation messages when a process is performed by pressing one of the icon buttons as described for number 1, above.
	Display confirmation dialog box when reading data file.	When retrieving the CSV data file, the following dialog box is displayed. Click a button to select the source (PT Unit or removable media).  When this option is not set, data file will always be retrieved from the PT Unit (“Hardware”).
	Display confirmation dialog box when writing data file.	When writing to the CSV Data File, the following dialog box is displayed. Click a button to select the destination (PT Unit or removable media).  When this option is not set, data will always be written to the PT Unit (“Hardware”).
	Display confirmation dialog box when reading from the address.	Display confirmation messages when executing the process.
	Display confirmation dialog box when writing to the address.	
	Display confirmation dialog box when adding to the record.	
	Display confirmation dialog box when deleting from the record.	
(C)	Icon Size	Sets the horizontal and vertical dimensions of the icon. (16 to 48)

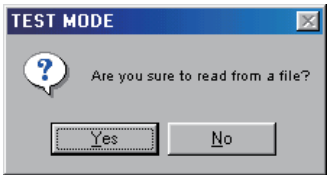
Additional Information

- The icon size and button size of the horizontal scroll bar are the same. When changing the icon size, the button size of the horizontal scroll bar will be changed simultaneously.
- The confirmation dialog boxes (for reading/writing CSV data file) displayed in test mode and on the PT Unit are different. A Source/Destination Dialog Box is displayed on the PT Unit, and a confirmation dialog box is displayed in test mode.

PT Unit



Test Mode

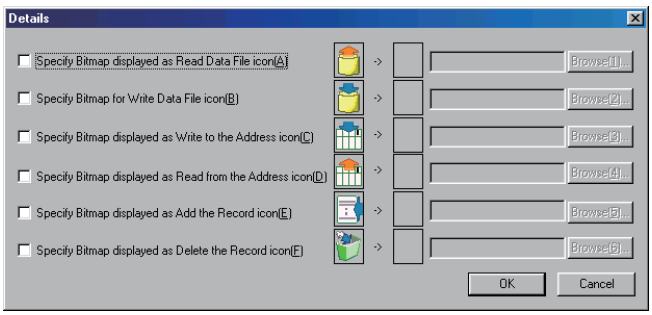


Specifying Icons

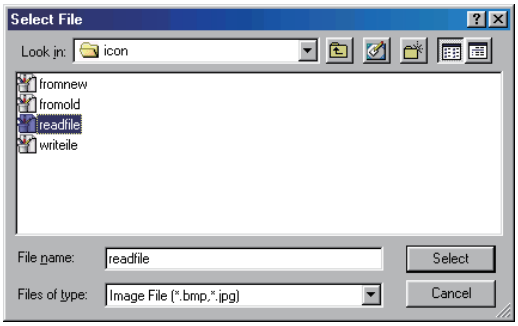
Bitmap files or JPEG files can be set for data block object icons. Use the following method to set these files for icons.

1 Select **PT – Data block Setting**. The Data Block Setting Dialog Box will be displayed.

2 Click the **Icon** Button at the bottom right of the screen to display the Details Dialog Box.



3 Select the check box for the icon to which a bitmap is to be specified and click the **Browse** Button. The File Selection Dialog Box will be displayed. Specify the file to be displayed as the icon.



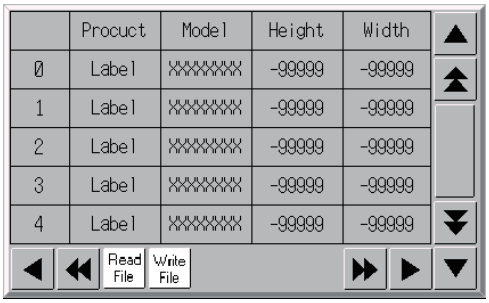
4 Click the **Select** Button to close the dialog box. An image of the selected bitmap file will be displayed to the right of the existing icon in the Details Dialog Box.

Click the **OK** Button to close the Details Dialog Box.

Click the **OK** Button to close the Data Block Setting Dialog Box.

5 Set the icons to be displayed on the Icon Tab Page of the data block object Properties Dialog Box.

6 Click the **OK** Button to close the Properties Dialog Box. The specified bitmap file icon will be displayed on the data block object, as shown below.



Additional Information

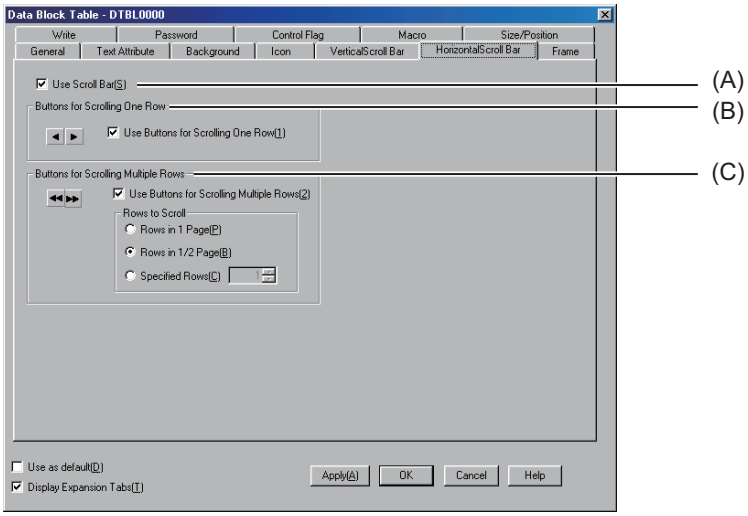
- When the number of colors in the designated image file is a True Color number, it is automatically reduced to 32,000.
- Specify a file name of up to 12 characters (8 file name characters and 3 file extension characters). The following characters can be used in file names: alphanumeric characters, underscore (_), dollar signs ($), and periods (.).

Vertical Scroll Bar Tab Page

Enables/disables the display and sets the scroll width and button size. Refer to *2-8-11 Scroll Bars* on page 2-105 for the vertical scroll bar.

Horizontal Scroll Bar Tab Page

Enables/disables the display and sets the scroll width.



No.	Item		Details	
(A)	Use Scroll Bar		Select *Use Scroll Bar* if a scroll bar is to be used.	
(B)	Use Buttons for Scrolling One Row		Select *Use Button for Scrolling One Row* to enable to a scroll button that moves to the right or left one row each time it is pressed, as shown below.	
		▶	Scrolls to the right by one row until only the rightmost field is displayed.	
		◀	Scrolls to the left by one row until the leftmost row is displayed.	
(C)	Use Buttons for Scrolling Multiple Rows		Select *Buttons for Scrolling Multiple Rows* to enable to a scroll button that moves to the right or left by the specified number of rows each time it is pressed. Select the number of rows to be scrolled from the options listed below.	
		Rows to Scroll ◀◀ / ▶▶	Rows in 1 Page	Scrolls to the right or left the displayed number of rows. Suppose that two of seven rows are displayed on the screen. Click the Button, and the button will be scrolled two rows. If the end of the row is displayed, the scroll button will not move any farther.
			Rows in 2/1 Page	Scrolls to the right or left the half the number displayed number of rows. Suppose that three of seven rows are displayed on the screen. Click the Button, and the button scrolls two rows. If the end of the row is displayed, the scroll button will not move any farther.
			Specified Rows	Scrolls to the right or left the specified number of rows. If the end of the row is displayed, the scroll button will not move any farther.

Additional Information

The icon size and button size of the horizontal scroll bar are the same.

Frame Tab Page

Specifies the color and size of the object frame. Refer to *2-8-12 Frames* on page 2-106 for details.

Write Setting Tab Page (Extension Tab)

Sets whether a confirmation message is displayed when writing a value to each field in the data block table. Any confirmation message can be set. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.



Additional Information

A confirmation dialog box is not displayed if the **Enter** Key of the tenkey pad is pressed without inputting a value, or [ENT] or [RET] is sent from a command button. The address set for *Turn ON the specified address When the value* is written is also not turned ON.

Password Tab Page (Extension Tab)

Passwords can be set when field in the data block table is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page (Extension Tab)

Control flags control the input and display of the data block table. Use control flags to enable display or input when the status of an address turns ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Macro Tab Page (Extension Tab)

A macro can be specified for execution when setting a value for a field of the data block.

Trigger	Details
Before Inputting Numeral/String	Execute immediately after touching the field.
Before Writing Numeral/String	Execute immediately after touching field or pressing **Enter** Key of the tenkey pad or keyboard. This macro is not executed when closing tenkey pad or keyboard using the Cancel Key, Esc Key or Close Button. When a value exceeding the limit is set and an input error occurs for the numeral field, the macro is not executed.

Refer to the *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for details.

Size/Position Tab Page (Extension Tab)

Displays and sets the size of the data block object and the position from the upper left of the screen. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-17-6 Creating Data Files

A data file is created as a group of records. The data block table retrieves the data from the file and displays it as record data. The data file is created in a CSV-format file. Use the following procedure.

Procedure for Creating CSV Files

The CSV file for a data block is created in the following format.

Record label A, Field data A1, Field data A2, ⋯

Record label B, Field data B2, Field data B2,⋯

.

.

.

Set the record label on the left of each line. Any character string can be set for record label as the record name. Up to 32 characters can be displayed in the data block table.

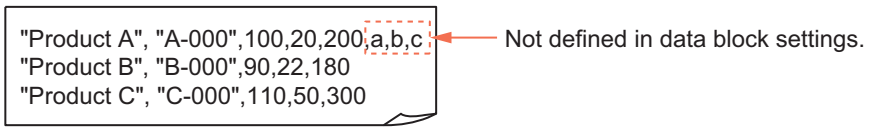
There are two types of fields; numeral fields and string fields. Select the data format for each field and set the field data as shown below.

Field name	Description
Numeral Field	Input numeral value using decimal numbers.
String Field	Input any character string.

Restrictions on Creating Data Files

1 The CSV format must be used when creating data files. If a file is created using another format, data will not be read when using the data block on the PT Unit, and data will not be displayed normally.

2 Set the same as the number of fields as that set in the data block settings on the CX-Designer. If the number of fields set in the data file is larger than that set for the data block settings on the CX-Designer, the PT Unit will not read overflow data.



As the figure above shows, if more than 5 fields are set for the first record, which consists of 4 fields, “a,b,c” set for the fifth field on will not be read.

“a,b,c,” registered in the data file will be deleted when writing to the data file.

3 If the number of fields set in the data file is less than that set in the data block, the following error message will be displayed when displaying the data block, and PT will not display the data block. Set the same number of fields in the field data as for the data block setting.

Although the Data Block Table exists on the screen, it failed to read the csv file to display on the Data Block Table.
[Data Block (x) csv file]
The object will not be displayed correctly.

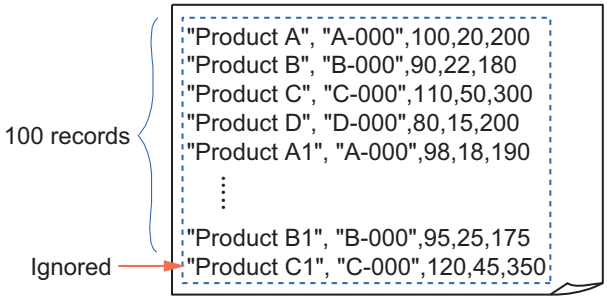
4 If ASCII is set for the string display type, the following codes will be used on the PT Unit according to the language.

Language	Code	Example (character code B5)
Japanese	SHIFT-JIS Code	ｵ
Chinese (traditional or simplified)	GB2312 code	Nothing is displayed be-cause there are no corresponding characters.
Other	Latin 1 Code	µ

Additional Information

To output other languages in the CSV file output for the data block, the output format must be set to Unicode in the data block setting dialog box. Refer to *Multi-language Display* in the *CX-Designer Online Help* for details on using other languages.

5 If the user sets more than the preset number of records, the data exceeded that number will be ignored. Also, the data will be deleted when writing to the data file.



As the figure above shows, the last record data will be ignored.

When writing data to data file, the last record data will be deleted.

6 To write data to the data file, the record label and character string of the field are automatically enclosed in double quotation marks. Therefore, character strings will be enclosed in double quotation marks in the CSV file after writing. When creating data file, it is not necessary to enclose record label and character string with double quotation marks.

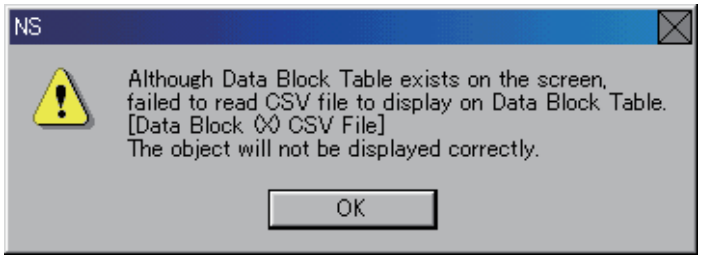
7 When putting double quotation marks in the middle of a string for the record label or a character string, follow the rules given in the following table. Create data for the record label and string field according to the character string to be displayed or set in the data block.

Rule	Example for setting in data file	Display in the data block table
To display double quotation marks (“), set two double quotation marks [””]. When two double quotation marks are set, one double quotation mark will be displayed.	AB””CD	AB”CD
To display a comma (,) in the string, enclose the entire string with double quotation marks.	“AB,CD”	AB,CD

If invalid double quotation marks are input, an error message will be displayed when displaying the data block.

Invalid	Remark
ABCD” AB”CD	Setting double quotation marks at the right end or middle of the string causes an error. Set two double quotation marks, such as in [ABCD””] to display a double quotation mark.

Error message displayed on the screen



8 If numeral data is set for a string field, the input numeral data will be processed as a string.

9 If data includes characters other than numeral values for a numeral field, the field will be processed as 0.

10 If the value set for a numeral field is out of range, 0 will be displayed.

11 If data including a decimal fraction is set for a numeral field, the following processes will be performed.

Storage format	Procedure	Example		
		Setting	Display	Write value
Except REAL	Decimal position is not displayed. When writing to data file or address, only integer part is written.	1.5	1	1
REAL	The number will be rounded off. When writing to the data file or address, the number before rounding up will be used.	1.5	2	1.5

12 Lines at the beginning of the CSV file that start with #COMMENT will not be read as part of the data log.

2-17-7 Using Data Block Tables

This section explains how to use a data block table.

● Selecting a Record on a Data Block Table

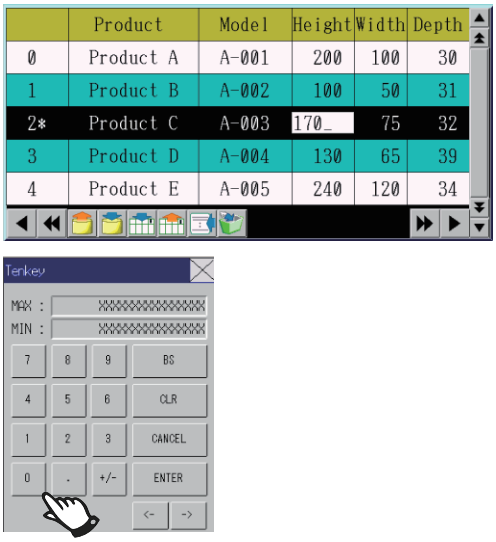
Click the record number to select record from the data block table. The record numbers are automatically displayed in the data block table.

The selected record is displayed in reverse video and "*" is added to the record number.



Inputting Value in a Data Block Table

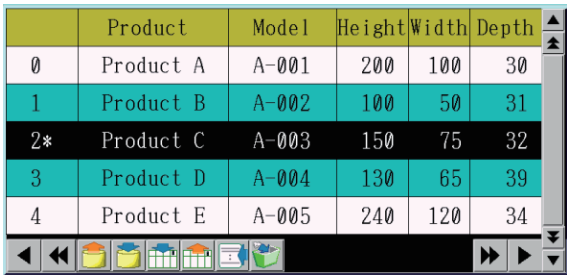
The user can change the value of a field in the data block table.



Touch field for which you want to change the value. The keyboard or keypad will be displayed. Then, change the value.

Adding/Deleting Records for a Data Block Table

Records can be added or deleted in the data block table.



- Adding a Record

	Click the icon to add a new record. The record numbers are automatically renumbered.

- Delete a Record

	Click the icon to delete the selected record. The record numbers are automatically renumbered.

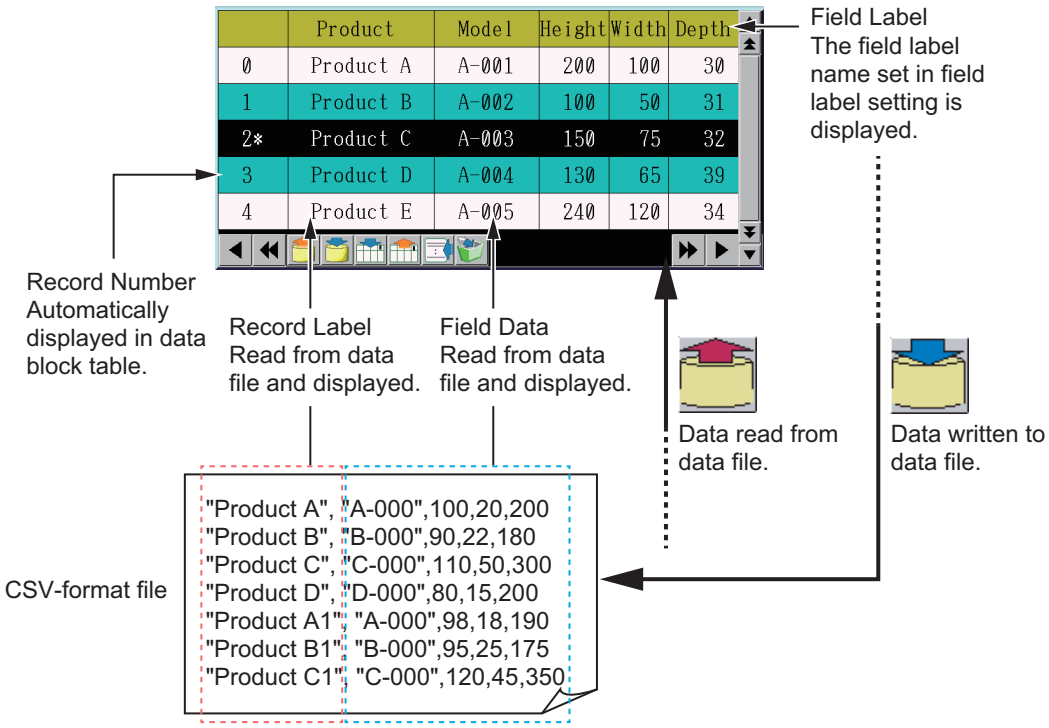
Editing Record Labels in a Data Block Table

Up to 32 characters can be displayed for a record label. Record labels are set in data file beforehand, but they can be also edited from the data block table.

Click the record label in the data block table to display a keyboard and input a character string.

Reading/Writing Data Files

The CSV-format data file and the data block table correspond as shown below.



1 To display the data block table on the PT Unit, data is read from the data file. (When transferring project to the PT Unit, the data file is also transferred.)

2 Using the  and  icons, data files can be written and read to/from a removable media or the PT Unit. Select the source/destination in confirmation dialog box for reading/writing. When writing to a removable media, data will be written to the file under the folder “DBLK” automatically created on the removable media. When reading from a removable media, create the folder “DBLK” in the removable media beforehand and store the data file in the folder.

Additional Information

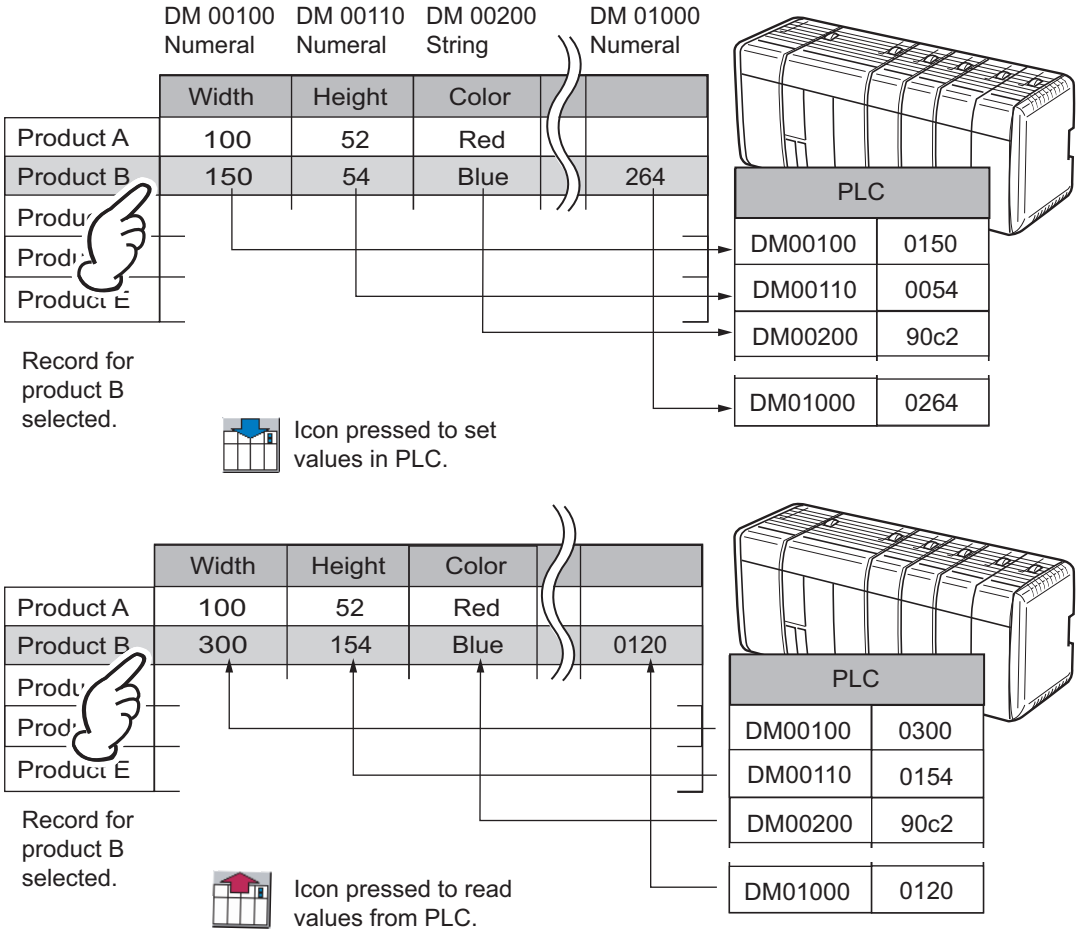
- Be sure to write the data file to save any changes made in the data block table. If the screen is switched before writing to the data file, the changed values will not be saved.

  Writing to the data file is required to save the changes in test mode. However, if the screen is switched in the test mode before writing to data file, the changed values before screen was switched will remain.
- When writing data to the data file in test mode, data will be written directly to the CSV file set in the Register Data Block Dialog Box. Before writing data to the data file, make a backup of CSV file to transfer to the PT Unit.

Reading/Writing from/to Addresses

Press the icon to write data to an address. When this icon is pressed, the record data selected in the data block table will be written to the address set for each field.

Press the icon to retrieve data from the address to the data block table. Retrieved data will be set for the record selected in the data block table.

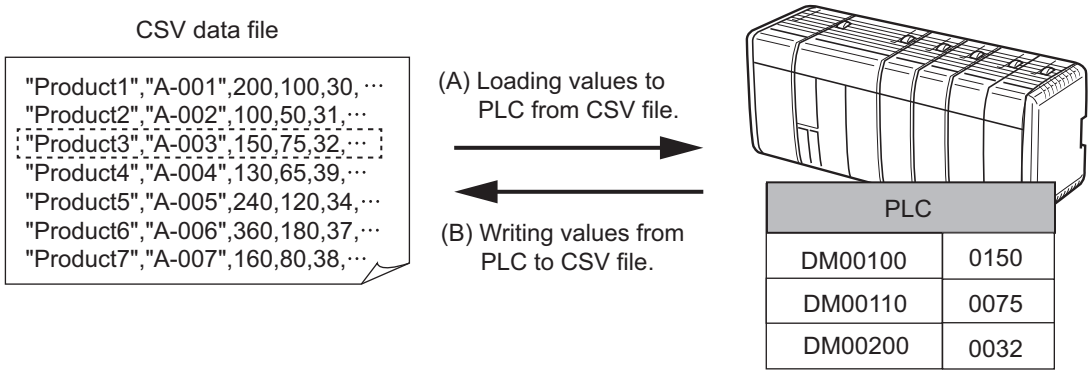


Combining Functional Objects

Use the following procedure to combine functional objects, such as command buttons and Numeral Display & Input objects. Refer to *2-9-3 Command Buttons* on page 2-147 for command button settings to control data blocks.

Reading/Writing Communications Addresses and Adding/Deleting Records

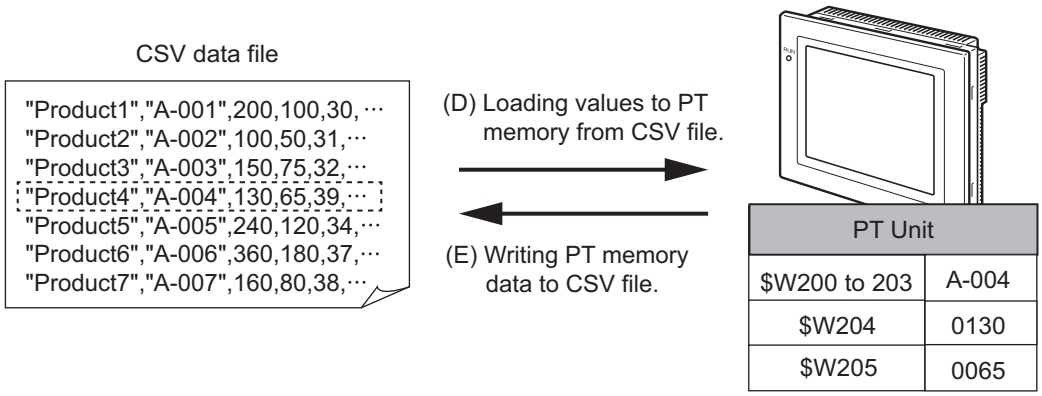
Command button data block control functions are used to read and write data between a CSV file and communications addresses and to add and delete records from CSV files.



No.	Setting	Details
(A)	Read data from CSV file to PLC Data Block	Loads the specified record data from the CSV file to the communications addresses set in the fields.
(B)	Write data from PLC Data Block to CSV file	Writes the data at the communications addresses set in the fields to the specified records in the CSV file. Either overwriting the data at the specified record number or inserting the data at the specified record number is selected.
(C)	Delete Record	Deletes the data from the specified record number in the CSV file.

Loading/Writing between CSV Files and PT Memory

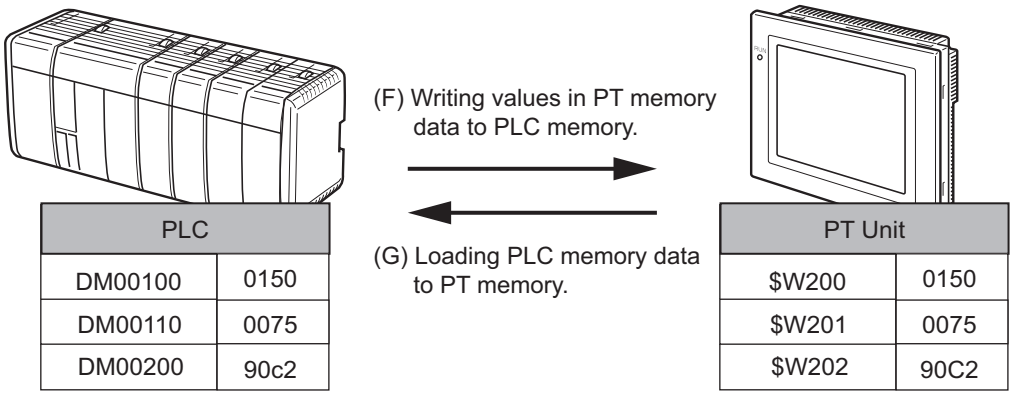
The command button data block control functions can be combined with Numeral Display & Input objects, Character Display & Input objects, and other functional objects to edit CSV files or to display only the desired files on the screen.



No.	Setting	Details
(D)	Read data from CSV file to PT Memory	Loads the specified record data from the CSV file to the specified address in the PT Unit.
(E)	Write data from PT Memory to CSV file	Writes one record of data stored at the specified address in the PT Unit to the specified record in the CSV file. Either overwriting the data at the specified record number or inserting the data in the specified record number is selected.

Writing/Loading PT Memory Data to/from Communications Addresses

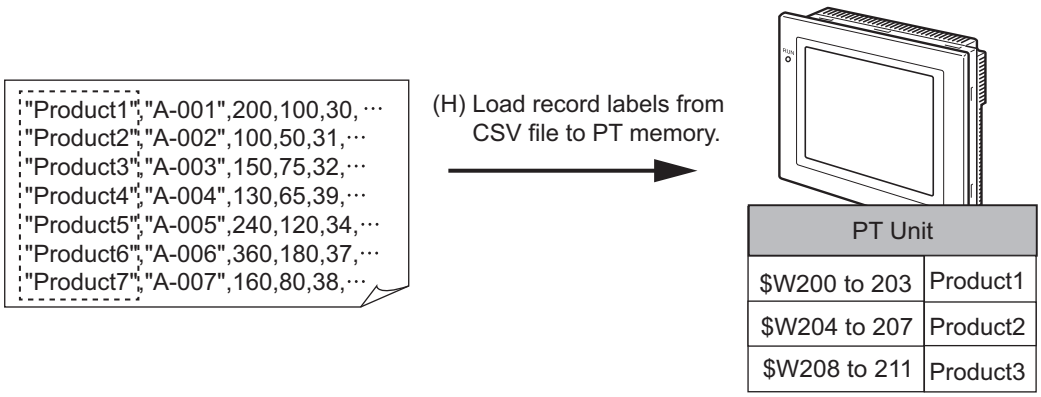
Command button data block control functions can be used to write and load data between PT memory and PLC memory areas.



No.	Setting	Details
(F)	Read data from PT Memory to PLC Data Block	Writes one record of data stored at the specified address in the PT Unit to communications address specified in each field.
(G)	Write data from PLC Data Block to PT Memory	Loads the data from the communications address specified in each field to the specified address in the PT Unit.

Reading CSV File Record Labels

Command button data block control functions can be combined with list display objects to display lists of record labels.



No.	Setting	Details
(H)	Read Record Labels	Loads the specified number of records from the first read record number to the specified addresses in the PT Unit.

● Restrictions on Writing to Addresses

1 When writing data to an address, the data will be written one at a time and in order starting from the leftmost field.

Time is required until the last field data is written.

To switch the control using a data block, set the interlock for the PLC that confirms the last field data (rightmost field) is written and starts the control action.

2 While writing data to an address, other processes will stop.

If a screen switch is specified while writing data, the screen will be switched after writing has been complete.

2-18 System Clock

NS-B-series PTs have a built-in clock function that allows the date and time to be displayed or changed on the PT Unit using date or time objects.

2-18-1 Date Object

Date objects are functional objects used to display or change the date of the system clock. The display section is a touch switch. A Settings Dialog Box (keypad) for changing the system time is displayed when this touch switch is pressed.





Change the system clock.

Changing Dates during Operation

1. Press the date object.
2. A dialog box for entering the date such as shown in the above diagram will be displayed.
3. Enter the new date.

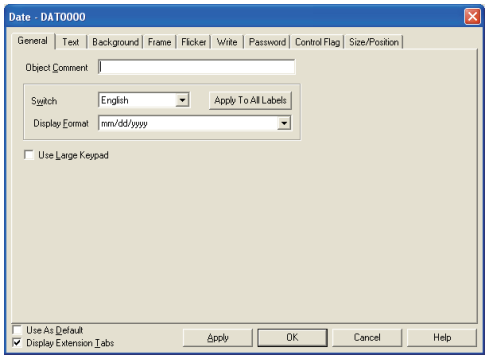
   Regardless of the date display format, enter the date in yyyy.mm.dd format. (There is no need to add zeros.)
4. Press the **ENTER** Button.
5. The date will be set.

Additional Information

- Errors may occur in the calendar and clock. Adjust their settings regularly.
- If the date object extends off the screen, the setting dialog box (i.e., the keypad) will also extend off the screen. Always be sure that date objects are completely within the screen.

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for date objects.

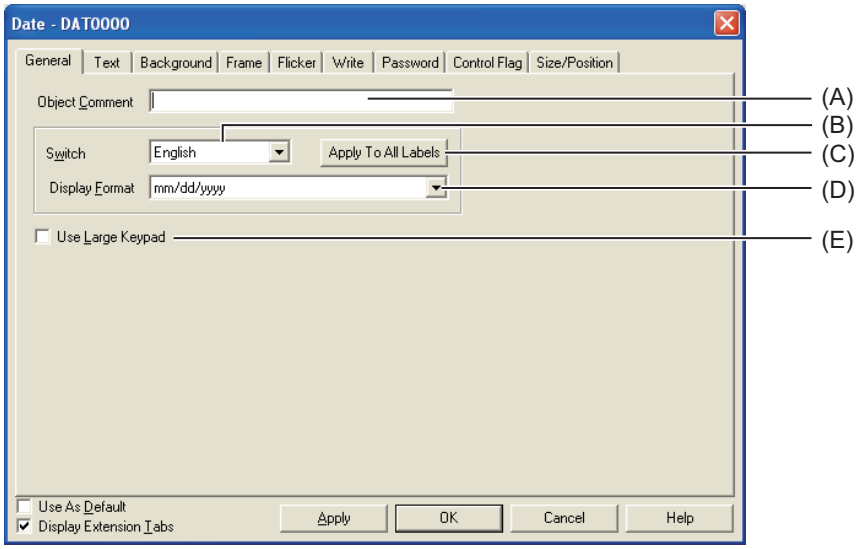


General:	Sets the date display format.
Text:	Sets the font and size for date display characters.
Background:	Sets the background color for date display.
Frame:	Sets the object frame display.
Flicker*1:	Sets the flicker display.
Write*1:	Sets the contents of the write confirmation message when the date object is pressed.
Password*1:	Sets the password to be entered when the object is pressed.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the date display format.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Switch	Sets the date display format for each label.

No.	Setting	Details
(C)	Apply to All Labels	Uses the date display method of the selected label for all labels. *Apply to All Labels* cannot be set in the following cases. • When the *Date & Time Display Format* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label.
(D)	Display format	Refer to *2-8-5 Date and Time Format (General Tab)* on page 2-88 for information.
(E)	Use Large keypad	Select *Use Large keypad* to use a large Setting Dialog Box (keypad). A 252 × 268 dot (V × H) keypad will be displayed during operation.

Text Tab Page

Sets the text attributes, such as font and color, for the date display. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

Sets the background color for date display from a selection of 256 colors. Refer to *2-8-8 Background* on page 2-97 and *2-8-7 Setting Colors (Color/Shape Tab)* on page 2-95 for details.

De-select (i.e., remove the tick from) Tile background to have a transparent background.

Frame Tab Page

Specifies the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Makes flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write (Extension Tab)

Confirms the write operation using a dialog box before the date is set. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password Tab Page (Extension Tab)

A password can be set for when the object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page (Extension Tab)

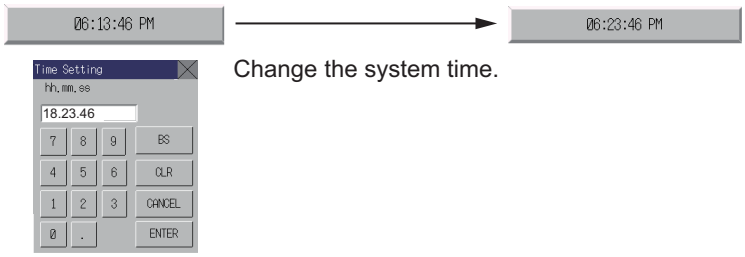
Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

Sets the object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-18-2 Time Objects

Time objects are functional objects used to display or set the time for the system clock. The display section is a touch switch. A Setting Dialog Box (keypad) for changing the system time is displayed when this touch switch is pressed.



Change the system time.

Changing Times During Operation

1. Press the time object.
2. A dialog box for entering the time such as shown in the above diagram will be displayed.
3. Enter the new time.

   Regardless of the time display format, enter the time in hh (24-hour clock).mm.ss format. There is no need to add zeros.)
4. Press the **ENTER** Button.
5. The time will be set.

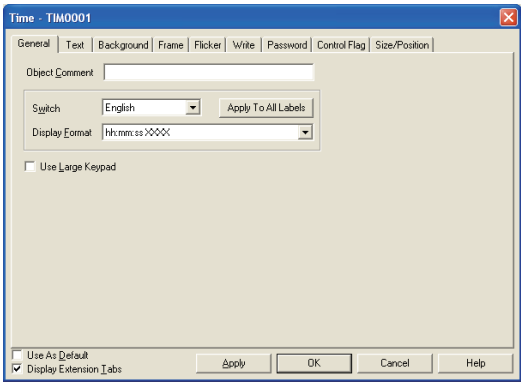
Example: When setting the time to 4:36:4 PM, input 16.36.04.

When changing the time during operation, refer to the following table and set the time.

	AM	PM
Time	0 1 2 3 4 5 6 7 8 9 10 11	0 1 2 3 4 5 6 7 8 9 10 11
Input to the PT Unit	0 1 2 3 4 5 6 7 8 9 10 11	12 13 14 15 16 17 18 19 20 21 22 23

Settings for Functional Object Properties

This section describes the settings in the Functional Object Properties Dialog Box for time objects.

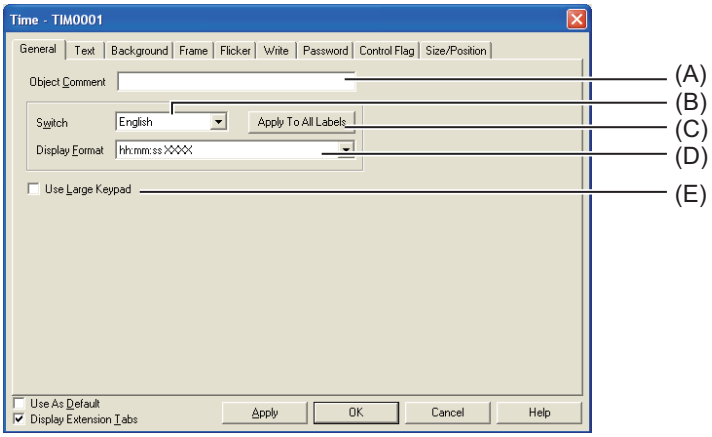


General:	Sets the time display format.
Text:	Sets the font and size for time display characters.
Background:	Sets the background color for time display.
Frame:	Sets the object frame display.
Flicker*1:	Sets the flicker display.
Write*1:	Sets the contents of the write confirmation message when the time object is pressed.
Password*1:	Sets the password to be entered when the object is pressed.
Control Flag*1:	Sets enable/disable input and display/no display for objects.
Size/Position*1:	Sets the object size and position.

*1. These tabs are displayed when *Display Extension Tabs* Option is selected.

General Tab Page

Sets the time display format.



No.	Setting	Details
(A)	Object Comment	Sets an explanatory comment for the pasted object. (Up to 32 characters.)
(B)	Switch	Sets the time display format for each label.
(C)	Apply to All Labels	Uses the date display method of the selected label for all labels. *Apply to All Labels* cannot be set in the following cases. • When the *Date & Time Display Format* Check Box is selected on the Edit/Display Tab Page of the Option Dialog Box accessed by selecting **Tools – Option**. • When there is only one label.

No.	Setting	Details
(D)	Display format	Select the time display format from the list. Refer to *2-8-5 Date and Time Format (General Tab)* on page 2-88 for information on the time display format.
(E)	Use Large keypad	Select Use Large keypad to use a large Settings Dialog Box (keypad). A 252 × 268 dot (V × H) keypad will be displayed during operation.

Text Attributes Tab Page

Sets the text attributes, such as font and color, for the time display. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Background Tab Page

Sets the background color for time display from a selection of 256 colors. Refer to *2-8-8 Background* on page 2-97 for details.

Frame Tab Page

Specifies the colors and sizes of the object frame to change the shape or color when the button is depressed or raised. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker Tab Page (Extension Tab)

Makes flicker settings to make the object flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Write (Extension Tab)

The write operation can be confirmed using the dialog box before the time is set. The confirmation message can be changed. Refer to *2-8-14 Write Settings (Extension Tab)* on page 2-111 for details.

Password Tab Page (Extension Tab)

A password can be set for when the object area is pressed. Five passwords of up to 16 characters each can be set. One password can be requested for each object. Refer to *2-8-15 Passwords (Extension Tab)* on page 2-115 for details.

Control Flag Tab Page (Extension Tab)

Control flags control the input and display of functional objects. Use control flags to enable display or input when the contents of an address turn ON or OFF. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

Size/Position Tab Page (Extension Tab)

Sets the functional object size and position. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-19 Machine Navigator Function

2-19-1 Machine Navigator

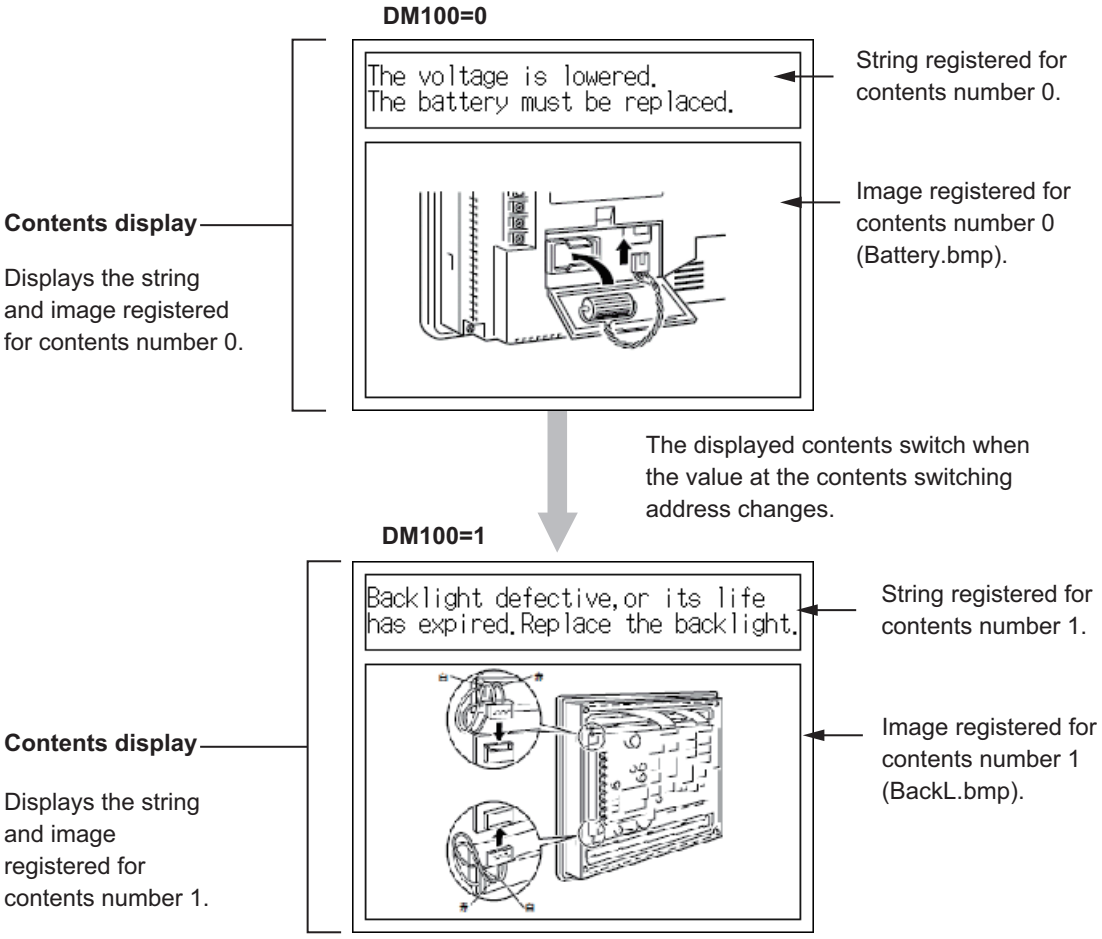
The Machine Navigator function switches the display of strings and image files registered to screens based on the value at a specified address or on the occurrence or clearing of an alarm/event. The general term “contents” is used here for strings and image files. Contents are displayed using contents display objects.

This function makes it easy to create operating procedure displays or troubleshooting screens for when errors occur. When using the Machine Navigator function, contents can be switched using the following three methods.

Switching Contents by Specified Address (Address for switching contents)

The settings shown in the following table are made.

Contents switching address: DM100		
Contents No.	**Contents**	
0	The battery …	Battery.bmp
1	The backlight …	BackL.bmp
…	…	…

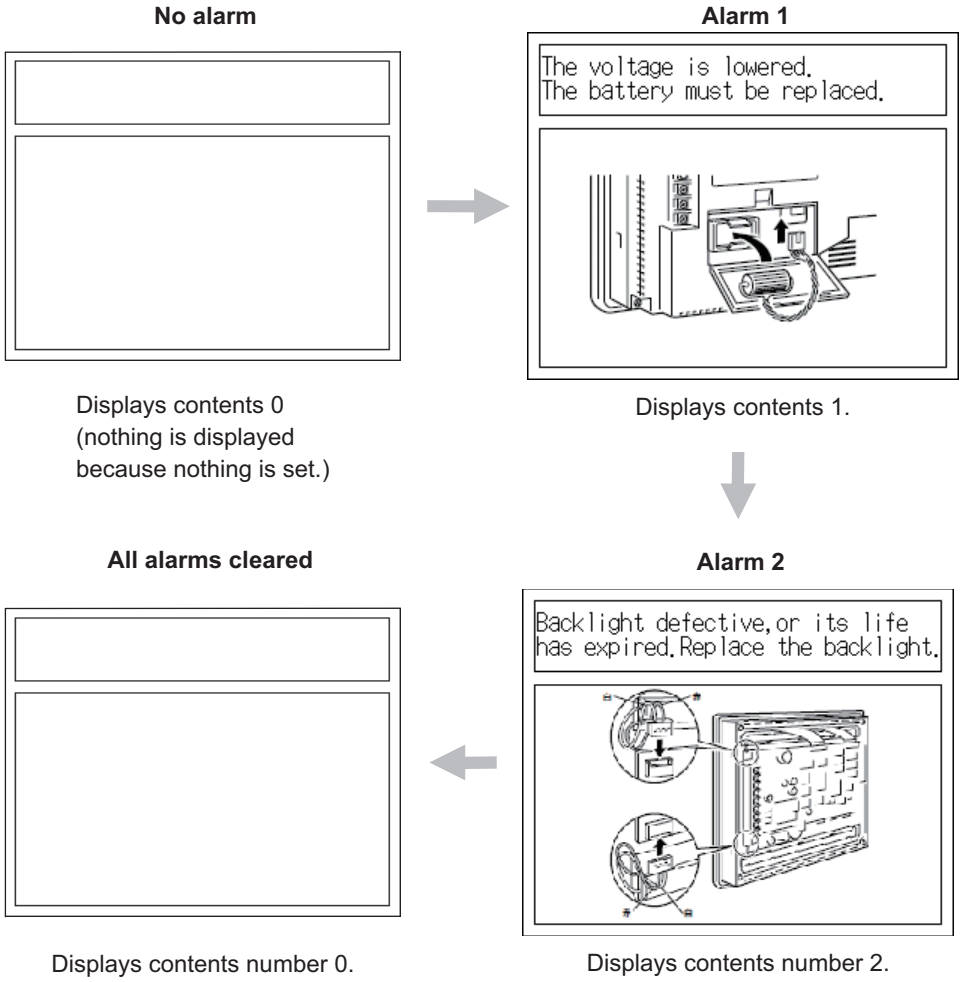


Automatically Switching Contents When Alarm Occurs

The settings shown in the following table are made.

Settings for switching contents		
Link with alarm: ON		
Contents number for no alarm: 0		
Contents No.	Contents	
0	(Not set.)	(Not set.)
1	The battery …	Battery.bmp
2	The backlight …	BackL.bmp
…	…	…

Alarm/event settings		
No.	Displayed contents number	Automatic contents switching when alarm occurs
1	1	ON
2	2	ON
…	…	…



Switching Contents from Alarm/Event Objects

The settings shown in the following table are made.

Settings for switching contents		
Link with alarm: ON		
Contents number for no alarm: 0		
Contents No.	Contents	
0	(Not set.)	(Not set.)
1	The battery …	Battery.bmp
2	The backlight …	BackL.bmp
…	…	…

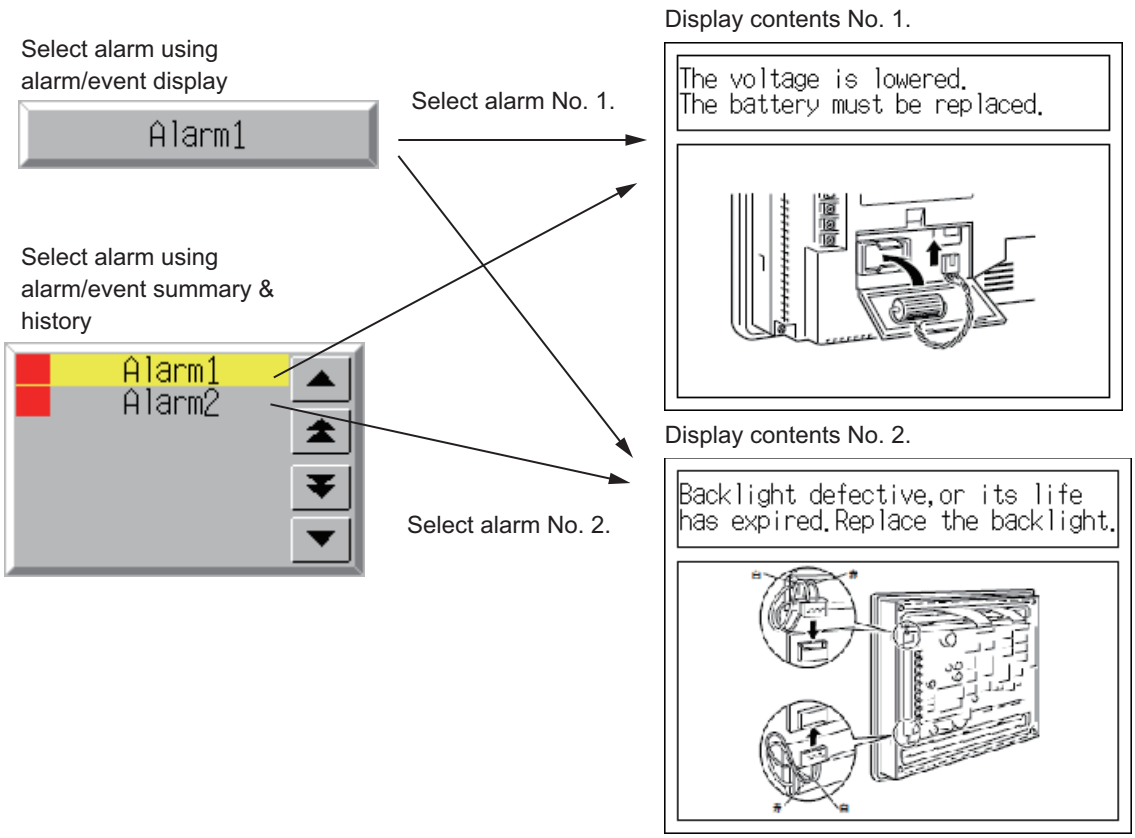
Alarm/event settings		
No.	Displayed contents number	Automatically switch contents when alarm occurs
1	1	OFF
2	2	OFF
…	…	…

Alarm/Event Display Settings
Switching to the specified contents set with an Alarm/Event Setting: ON

Alarm/Event Summary/History Settings
Switching to the specified contents set with an Alarm/Event Setting: ON

Additional Information

- If the alarm/event summary/history object settings are made to turn ON switching to the specified contents in the alarm/event registrations and to turn OFF automatically switching the contents when an alarm or event occurs, the contents will not automatically switch when an alarm or event occurs, but the contents will be displayed according to the selection bar in the alarm/event summary/history object.
- Not only when the selection bar in the alarm/event summary/history object is touched, the operation described above is also applicable when the contents selected by the selection bar change from an alarm occurring or being cleared.
- When switching the contents from an alarm/event object, as a rule, the alarm/event objects and contents display objects on the same screen are used. Place the objects on the same screen.



Additional Information

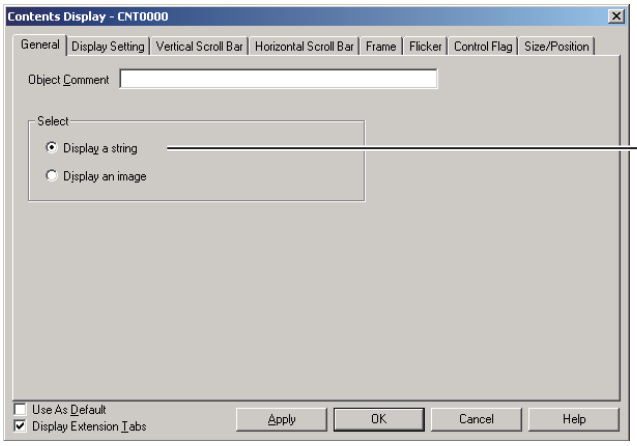
- The switch contents settings are made for each screen. Up to 10,000 contents items can be set for each screen.
- Do not place contents on sheets.
- Screens set using the contents switching function are called contents display screens.
- Either string display or image display is set for each contents display. Refer to *2-19-2 Contents Display* on page 2-441 for details on contents display settings.
- Refer to *2-14 Alarms and Events* on page 2-308 for information on alarm/event settings.
- If more than one alarm/event occurs at the same time, the contents for the alarm/event with the highest priority will be displayed. If the priority level is the same, the contents for the last alarm/event that occurred will be displayed.
- If switching contents when an alarm/event occurs or is cleared, the currently displayed contents number will be stored at the address for switching contents. The contents display will switch if the value at the address for switching contents changes, even if contents display is switched using alarms/events.

Creating Contents Display Screens

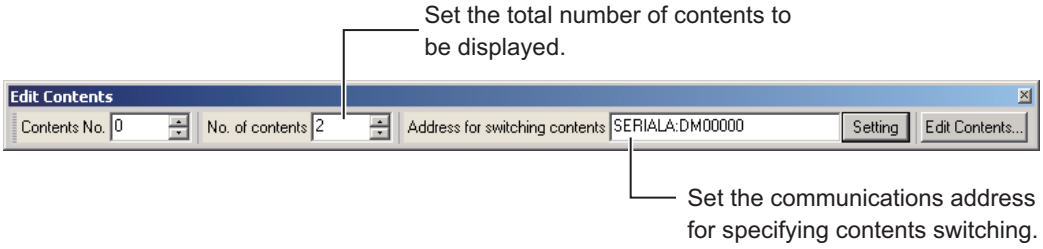
The following procedure is used to create contents display screens.

1 Create the contents required for the screen.

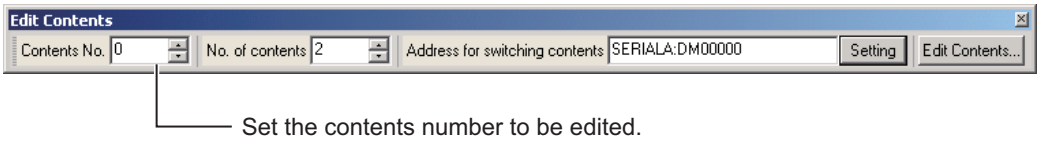
2 Set whether to display a string or an image on the General Tab Page of the Contents Display Property Settings Dialog Box.



3 Set the number of contents on the Edit Contents toolbar. Set the total number of strings and images to be displayed. Set the address for switching contents in the input field at *Address for switching contents*.



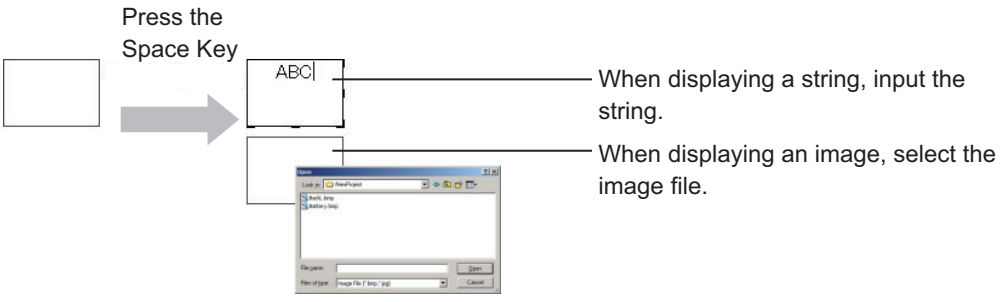
4 Enter the contents number to be edited in the input field for *Contents No.* on the Edit Contents tool bar.



5 Select the contents display and press the Space Key.

Enter the display string for contents display that will display a string.

A file selection dialog box will be displayed for contents display that displays images. Select the image file to be displayed.



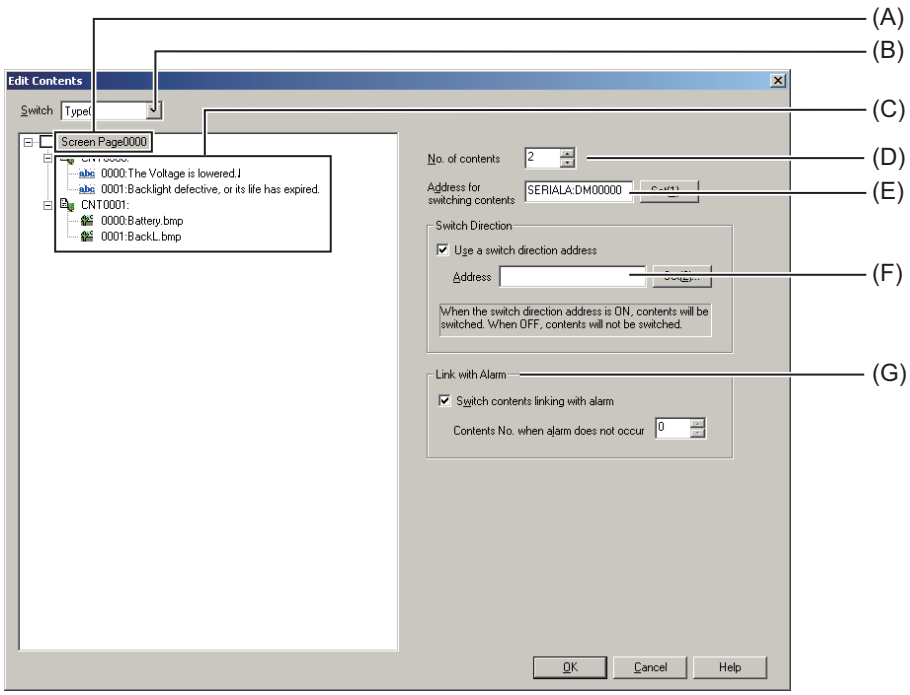
6 Repeat steps 4 and 5 for the number of contents to be created.

Detailed settings for the set contents are made in the Edit Contents Dialog Box.

1 Click the **Edit Contents** Button on the tool bar or **select PT – Edit Contents**.



2 The Edit Contents Dialog Box will be displayed. Click the screen number at the top left of the dialog box (1 in the following graphic.) Make the contents switching settings.



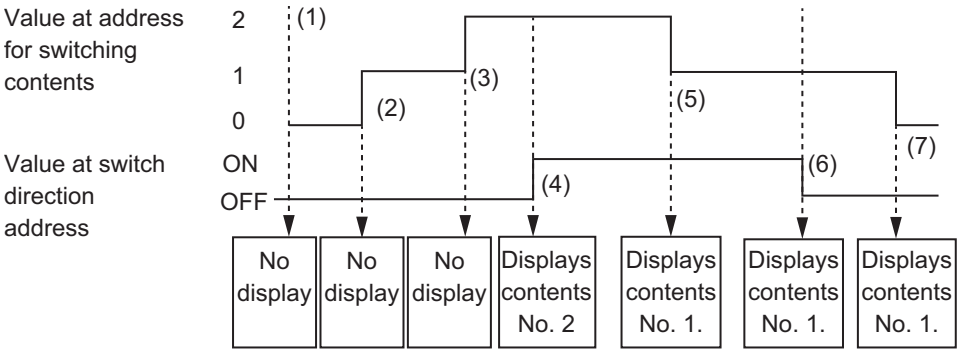
No.	Item	Details
(A)	Screen No.	Displays the screen number and title of the screen currently being edited. The Contents Switching Setting screen will be displayed when the screen number is clicked.
(B)	Switch	Switches the label being edited.
(C)	Contents	A list of the contents display ID numbers created for the screen and the registered contents will be displayed. The registered strings will be displayed for strings. File names will be displayed for image files. The edit setting screen will be displayed when each contents is clicked.
(D)	No. of contents	Sets the number of contents to between 2 and 10,000.
(E)	Address for switching contents	Sets the address for switching contents (the communications address for specifying contents switching).
(F)	Use a switch direction address	If this checkbox is selected, the contents will be displayed and refreshed while the set communications address is ON. For details, refer to *Switching Specification* on page 2-438 later in this section. If this checkbox is deselected, the contents will switch when the contents of the address for switching contents changes.
(G)	Link with alarm	Select this checkbox to switch contents when an alarm/event occurs or is cleared. When an alarm event occurs, the contents with the number set in the Alarm/Event Settings Dialog Box will be displayed. When an alarm/event is cleared, the contents for the number set under *Contents No. when alarm does not occur* will be displayed.

Switching Specification

If *Use an address for switching* is selected, the contents display will be displayed and refreshed while the specified address is ON. The contents for contents display are displayed/refreshed as shown below, depending on whether the switch direction address is ON or OFF.

Operation example

Multi-contents screen displayed.



(1) Nothing is displayed for contents display when switching to the contents display screen because the switch direction address is OFF.

(2)(3) The value at the address for switching contents changed, but the switch direction address is OFF so there is no contents display. (The display remains blank.)

(4) The switch direction address has turned ON, so the contents for contents number 2 are displayed in the contents display because the value at the switch direction address contents is 2.

(5) The switch direction address is ON so the contents for contents number 1 is displayed, according to the change in the value at the address for switching contents.

(6) There is no change to the contents display because the switch direction address is OFF.

(7) The value at the address for switching contents has changed but the switch direction address is OFF so the contents display does not change.

Additional Information

- Up to a maximum of 10,000 contents can be registered. The maximum setting file size that can be registered for one screen (including the label settings (message display), however, is 5 MB. Do not set any value larger that this. The setting file name is CNTxxx.cfg, where “xxx” is the screen number in hexadecimal. You can check the size of the current setting file by selecting **Tools – Resource Report** from the CX-Designer menus.

  Registered strings can be changed as a group by importing/exporting CSV files. The string table can be exported as a CSV file, edited or translated, and then imported. All of the data in the edited CSV file can then be registered together in the string table.

The size of the settings file depends on the number of registered characters and labels. Use the following table as a guide. This table shows sizes for when only one contest display (string display) is created.

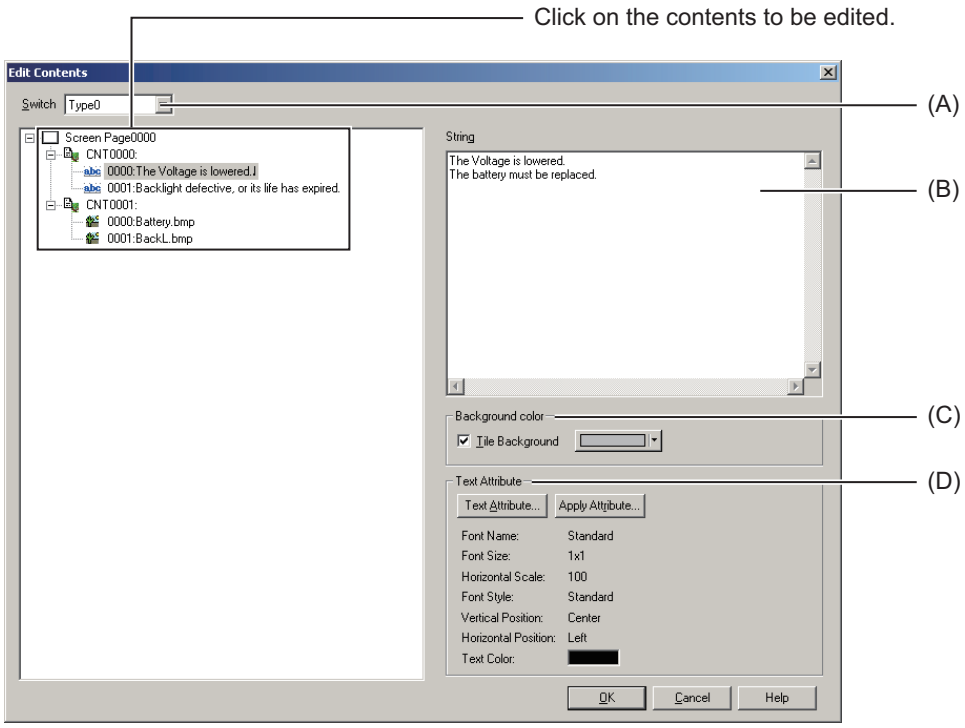
File size	No. of labels	Registered contents	No. of characters in each content
5.0 MB	1	10,000	256
4.9 MB	1	2,500	1,024
4.8 MB	2	10,000	120
4.7 MB	2	1,200	1,024
4.9 MB	16	10,000	10
4.7 MB	16	150	1,024

- You can click the contents display section to input or export the data for each contents display to or from a CSV file.

Editing Contents

Each contents can be edited in the Edit Contents Dialog Box.

- Editing Strings

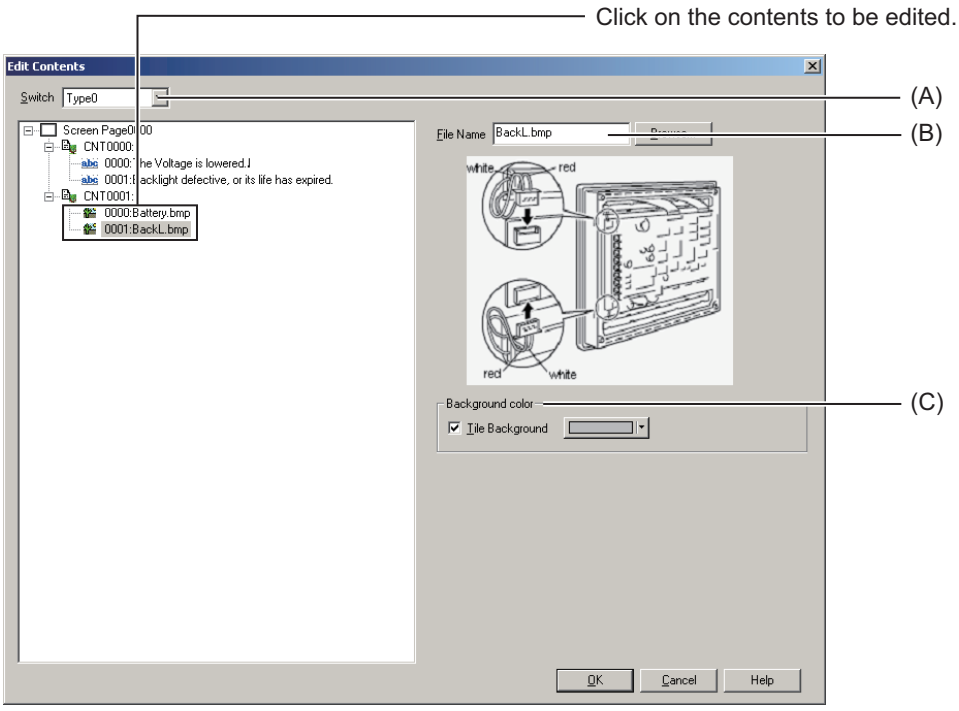


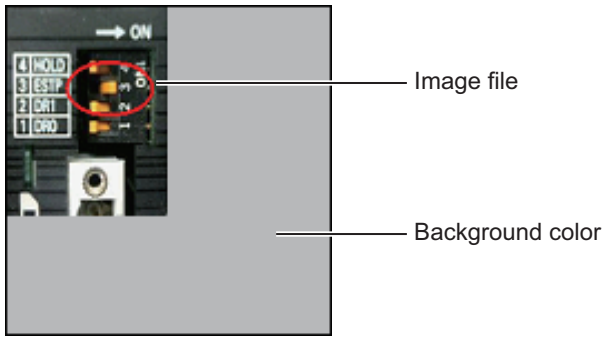
No.	Item	Details
(A)	Switch	Switches the label to be edited.
(B)	String	Sets the display string. Strings can be up to 1,024 characters long. (Single- and double-byte characters are counted as one character. Carriage returns are counted as two characters.)
(C)	Background color	Sets the background color. Refer to *2-8-8 Background* on page 2-97 for details.
(D)	Text Attribute	Sets the text attributes. Refer to *2-8-6 Text Attributes* on page 2-91 for details.

Additional Information

The background color and text attributes can be set for each contents number.

- Image Files



No.	Item	Details
(A)	Switch	Switches the label to be edited.
(B)	File name	Sets the image file to be displayed. Files with .bmp and jpg. extensions can be set. Click the **Browse** Button to select an image file. The specified image file will be copied to the folder where the project file is stored. Specify a string of up to 12 characters (8 characters for the file name + 3 characters for the extension) as the file name. The following characters can be used. Double-byte characters cannot be used. English numerals, underscore (_), dollar sign ($), and period (.)
(C)	Background color	Sets the background color. The background is displayed when the size of the displayed image is smaller than the contents display size.  Refer to *2-8-8 Background* on page 2-97 for details.

Additional Information

The background color can be set for each contents number.

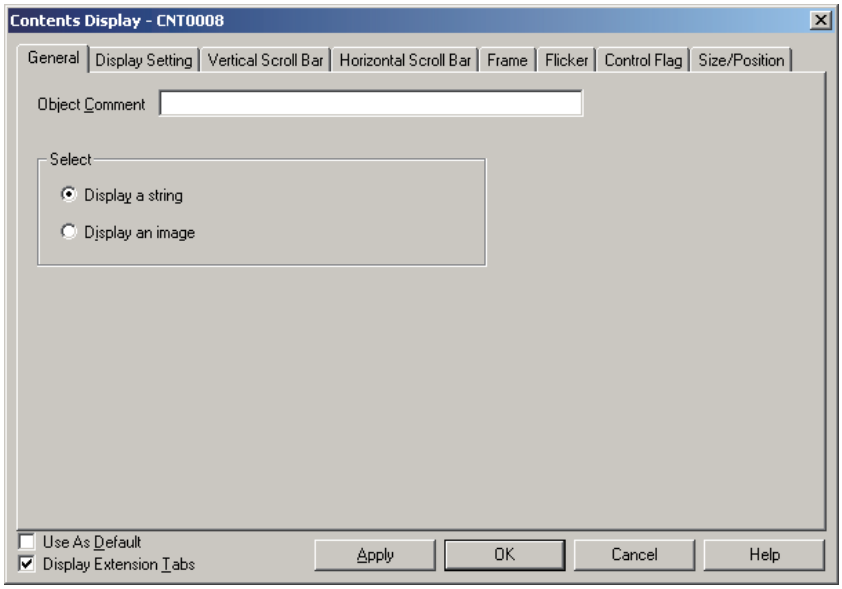
2-19-2 Contents Display

Contents display is a functional object for displaying contents (strings and image files) according to the contents switching settings.

Select *Functional Objects* – *Contents Display* from the CX-Designer or select the icon to create a contents display object.

Setting Items for Functional Object Properties

This section describes the functional object property settings for contents display objects.

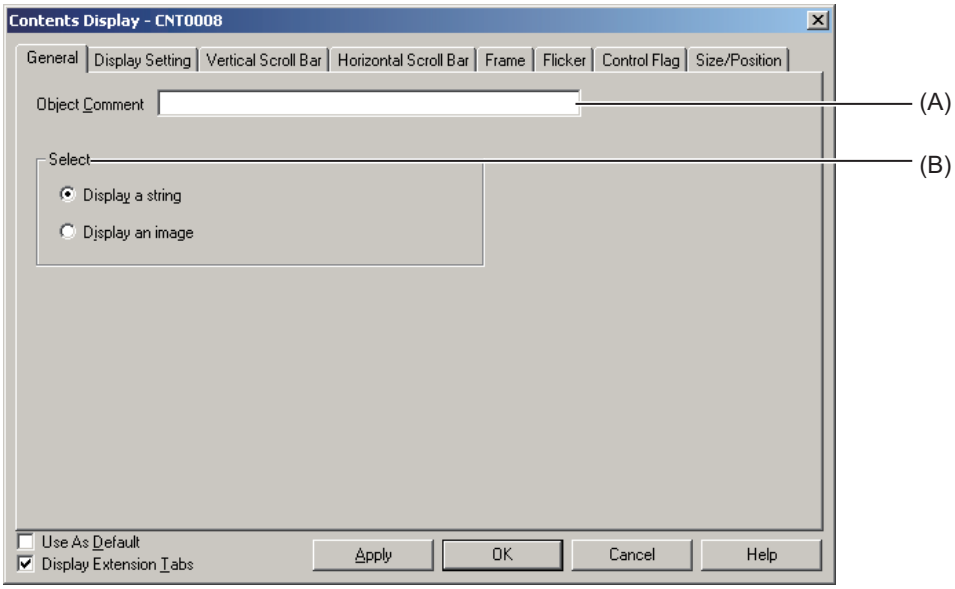


General:	Selects the contents (string or image) to be displayed in the object.
Display Setting:	Sets the display method for strings and images.
Vertical Scroll Bar:	Sets size, scroll width, and other vertical scroll button settings.
Horizontal Scroll Bar:	Sets size, scroll width, and other horizontal scroll button settings.
Frame:	Sets the object frame display details.
Flicker*1:	Sets flicker display.
Control Flag*1:	Sets object display/hide.
Size/Position*1:	Sets the object size and position.

*1. The Flicker, Control Flag, and Size/Position Tab Pages are displayed when the *Display Extension Tabs* checkbox is selected.

General

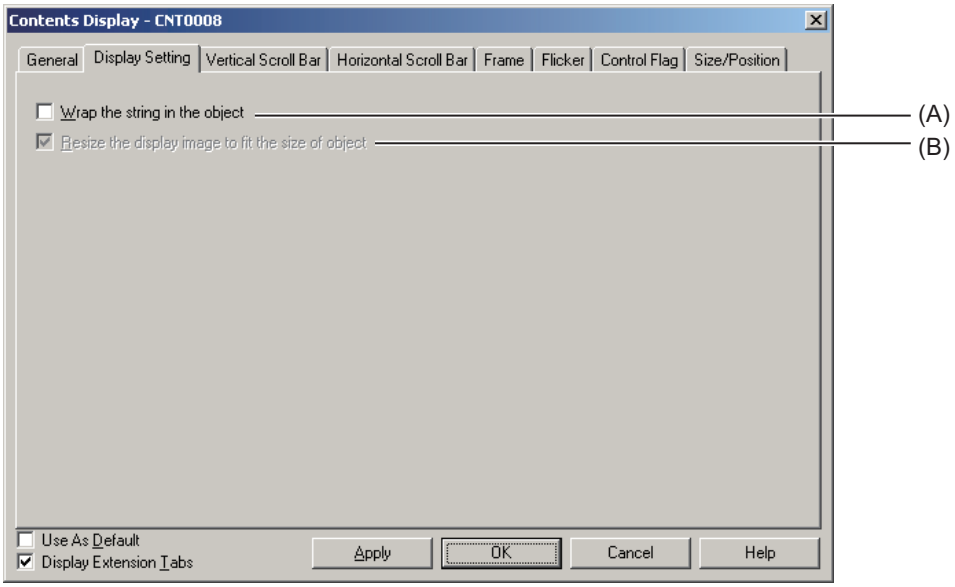
The General Tab page is used to select whether to display character strings or images.

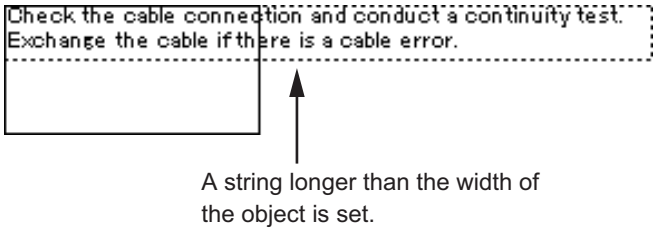
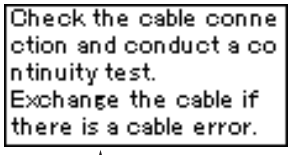
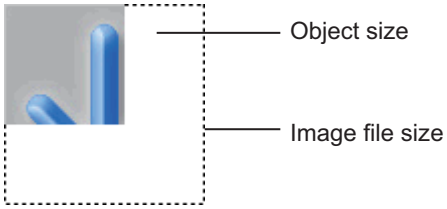
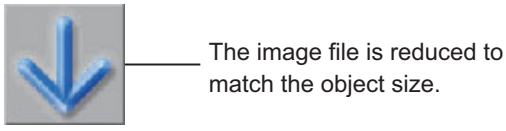


No.	Item	Details
(A)	Object Comment	Sets a comment to describe the pasted object. (Up to 32 characters. Single- and double-byte characters are counted as one character.)
(B)	Select	Selects whether to display a string or image file.

Display Setting

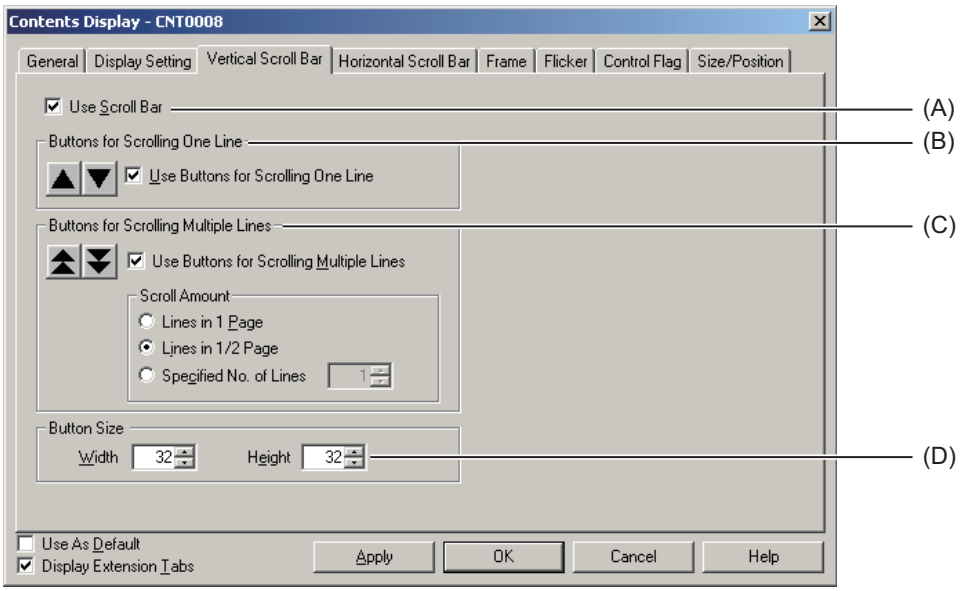
Sets the display method for strings and images.



No.	Item	Details
(A)	Wrap the string in the object	If this checkbox is selected, the string is wrapped at the end of the line to fit the width of the object. Example: When the Wrap Function Is Not Used (i.e., When the Checkbox Is Deselected)  A string longer than the width of the object is set. Example: When the Wrap Function Is Used (i.e., When the Checkbox Is Selected)  The text is wrapped at the right edge of the object and all characters are displayed on each line. This function is enabled when displaying strings.
(B)	Resize the display image to fit the size of object	When this checkbox is selected, the image is expanded or reduced to fit the size of the object. Example: When the Image Is Displayed in Its Original Size (i.e., When the Checkbox Is Deselected)  Example: When the Image Is Displayed To Match the Object Size (i.e., When the Checkbox Is Selected)  This function is enabled when images are displayed.

Vertical Scroll Bar Tab Page

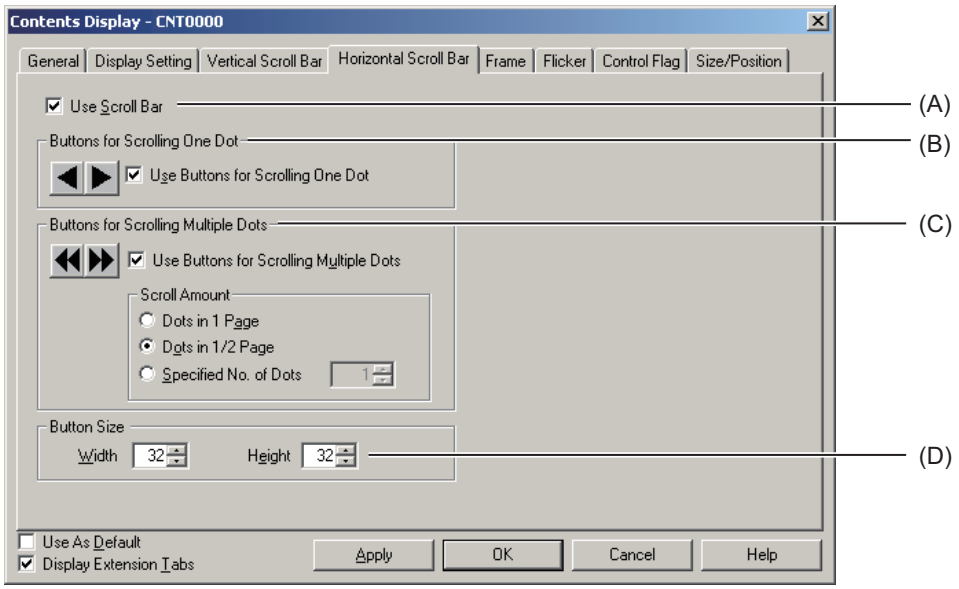
The Vertical Scroll Bar Tab Page is used to display/hide the scroll bar and to set the scroll width and the button size for the vertical scroll bar. Strings are scrolled by line and images are scrolled by dot.



No.	Item		Details	
(A)	Use Scroll Bar		Select to use a scroll bar.	
(B)	Buttons for Scrolling One Line/ Buttons for Scrolling One Dot		Select this checkbox to use a one-line (one-dot) scroll button. Each time the scroll button is pressed the display will move up one line (for string display) or one dot (for image display).	
(C)	Buttons for Scrolling Multiple Lines/ Buttons for Scrolling Multiple Dots		Select this checkbox to use a scroll button that scrolls the specified number of lines (or dots). Select one of the following scroll amounts.	
		Scroll Amount	Lines in One Page/Dots in One Page	Scrolls the number of lines displayed at one time, for string display. For image display, scrolls the number of dots displayed at one time.
			Lines 1/2 Page/Dots 1/2 Page	Scrolls half the number of lines displayed at one time, for string display. For image display, scrolls half the number of dots displayed at one time.
			Specified No. of Lines/Specified No. of Dots	Scrolls the specified number of lines for string display. Scrolls the specified number of dots for image display. (1 to 1,920).
(D)	Button Size		Sets the scroll button size dots (16 to 48).	

Horizontal Scroll Bar Tab Page

The Horizontal Scroll Bar Tab Page is used to display/hide the scroll bar, and to set the scroll width and the button size for the horizontal scroll bar. Horizontal scroll is by dot for both string and image display.



No.	Item		Details	
(A)	Use Scroll Bar		Select to use a scroll bar.	
(B)	Buttons for Scrolling One Dot		Select this checkbox to use one-line scroll buttons. The display moves one dot to the right or left each time a scroll button is pressed.	
(C)	Use Buttons for Scrolling Multiple Dots		Select this checkbox to use scroll buttons for a specified number of dots. Select one of the following scroll amounts.	
		Scroll Amount	Dots in One Page	Scrolls the display for the number of dots displayed at one time.
			Dots in 1/2 Page	Scrolls the display for half the number of dots displayed at one time.
			Specified No. of Dots	Scrolls the specified number of dots (1 to 2,560).
(D)	Button Size		Sets the scroll button size in line units (16 to 48).	

Frame

The Frame Tab Page is used to specify the frame color and size and to change the button shape and color. Refer to *2-8-12 Frames* on page 2-106 for details.

Flicker (Extension Tab)

The Flicker Tab Page is used for settings to make objects flicker (flash). Refer to *2-8-13 Flicker (Extension Tab)* on page 2-107 for details.

Control Flag (Extension Tab)

The Control Flag Tab Page is used to control whether or not to display objects. These settings are used, for example, to enable display according to the ON/OFF status of a communications address. Refer to *2-8-16 Control Flags (Extension Tab)* on page 2-122 for details.

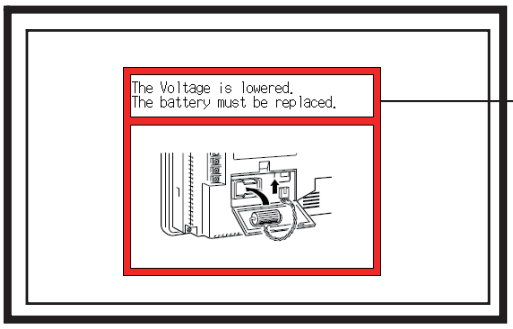
Size/Position (Extension Tab)

The Size/Position Tab Page is used to display and set the size and position of functional objects. Refer to *2-8-18 Size/Position (Extension Tab)* on page 2-123 for details.

2-19-3 Usage Examples for Machine Navigator Function

This section describes the settings for automatically displaying a pop-up screen showing countermeasures when an alarm occurs, as an example of the use of the Machine Navigator function.

PT Unit



A pop-up screen showing countermeasures for alarms will be displayed automatically. The countermeasures can be given using text and images.

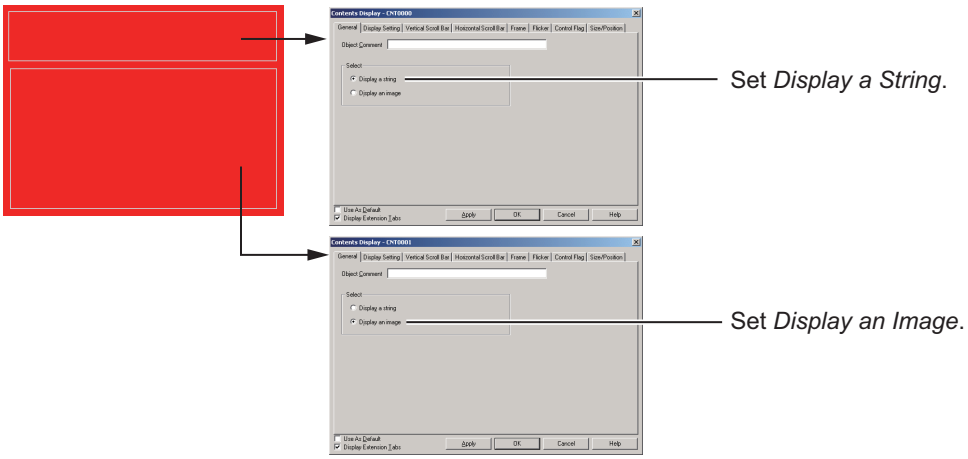
This section describes the method for creating the following project.

- Registering HOST1:100.00 and HOST1:100.01 as alarms.
- Displaying pop-up screen 100 when an alarm occurs.
- Displaying alarm countermeasures in pop-up screen 100. Nothing is displayed when no alarm has occurred.

Creating Pop-up Screens

1 Create pop-up screen 100.

2 Place two contents display objects in the created pop-up screen 100. One will be for string display and the other for image display. Set each one to *Display a String* or *Display an Image* in the Contents Property Settings Dialog Box.

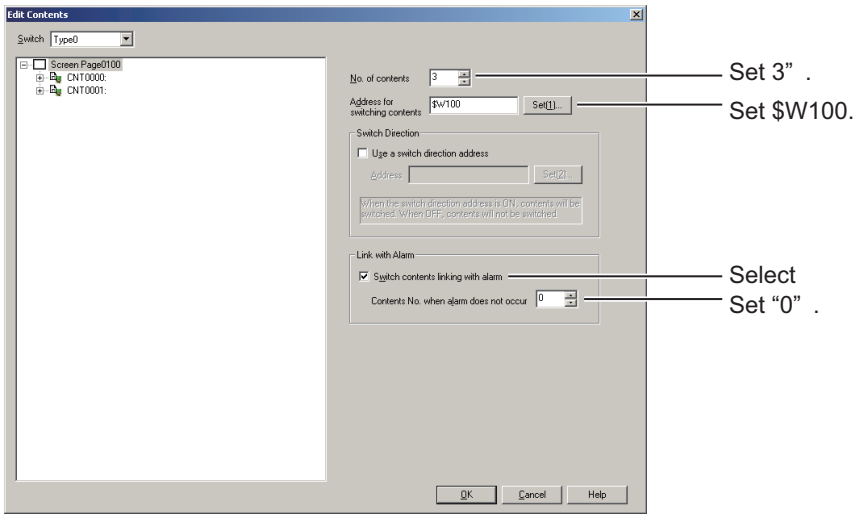


3 Click the **Edit Contents** Button on the Edit Content Toolbar.

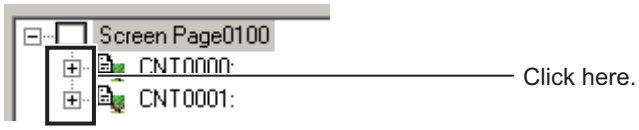


4 The Edit Contents Dialog Box will be displayed. Make the settings for switching contents.

- Set “3” in the *No. of Contents* input field. (The setting “3” indicates the three statuses: the two when an alarm is generated and one when there is no alarm.)
- Select the *Link with Alarm* checkbox. (This checkbox is selected by default.)
- Set “0” in the *Contents No.* field.
- Set $W100 as the *Address for switching contents*.

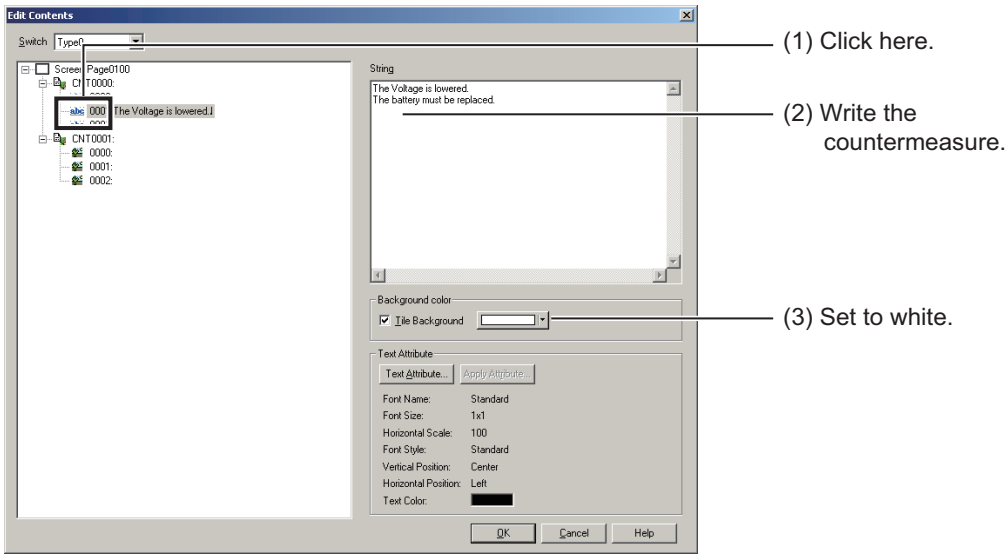


If the contents numbers are not displayed, click ⊞ after the settings have been input.

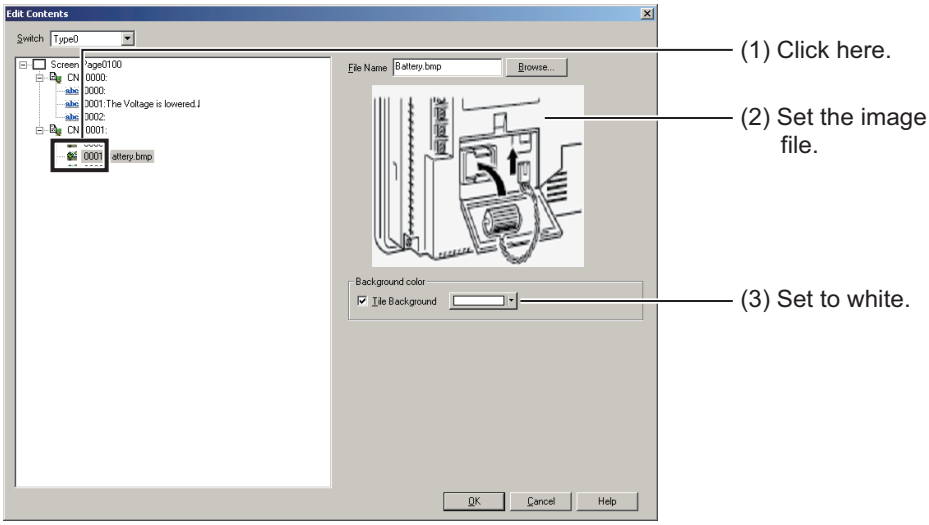


5 Set the contents. *Contents No. when alarm does not occur* has been set to Contents No. 0, so no settings are required.

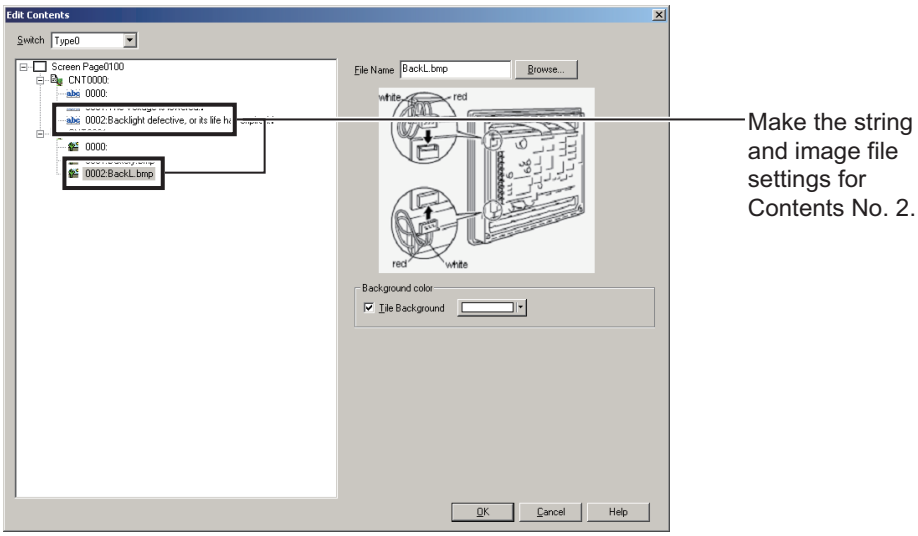
- Click the string for Contents No. 1 and enter the string describing the countermeasure.
- Set the background color to white.



- Click the image for Contents No. 1 to set the image file showing the countermeasure.
- Set the background color to white.



Make the settings the same way for contents number 2.



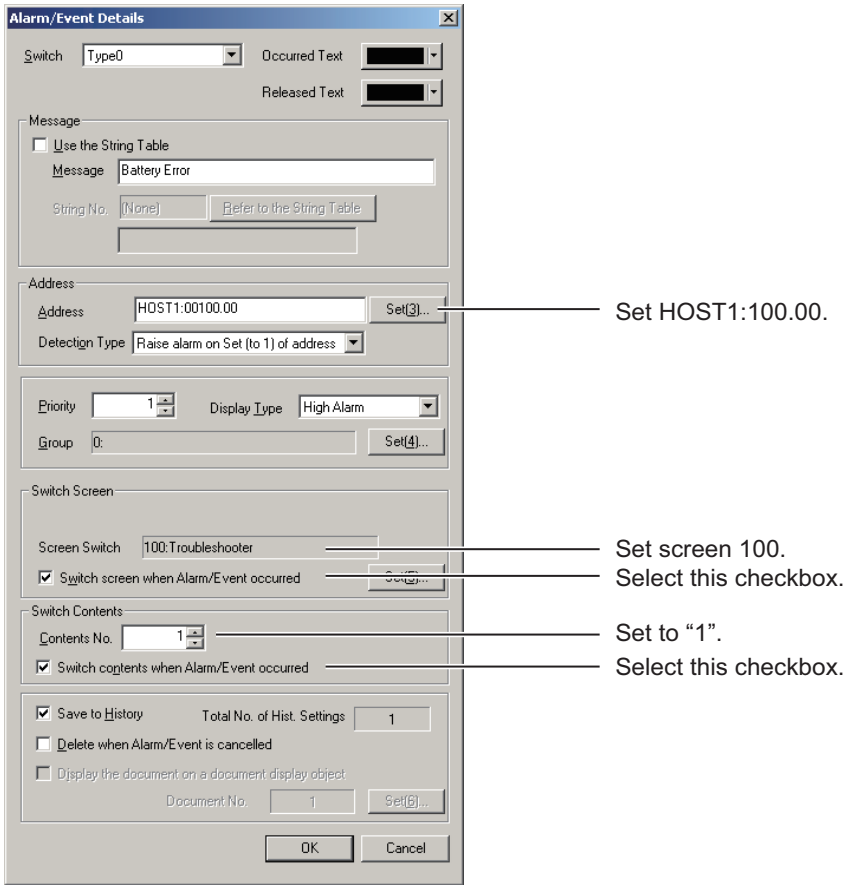
Click the **OK** Button to close the Edit Contents Dialog Box.

6 Make the alarm settings.

Select *PT – Alarm/Event Settings* to display the Alarm/Event Settings Dialog Box. Click the **Add** Button.

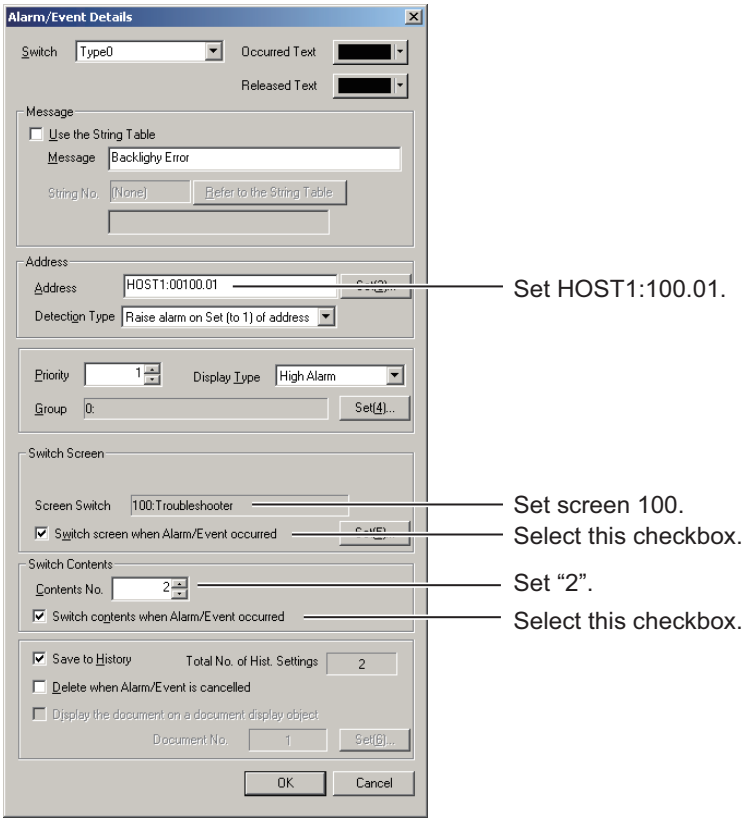
Make the settings for HOST1:100.00 in the Alarm/Event Details Dialog Box.

Use the following procedure to make the settings.



Click the **OK** Button to close the Alarm/Event Details Dialog Box.

Make the settings for HOST1:100.01 in the same way. In this example, “2” will be set as the contents number.



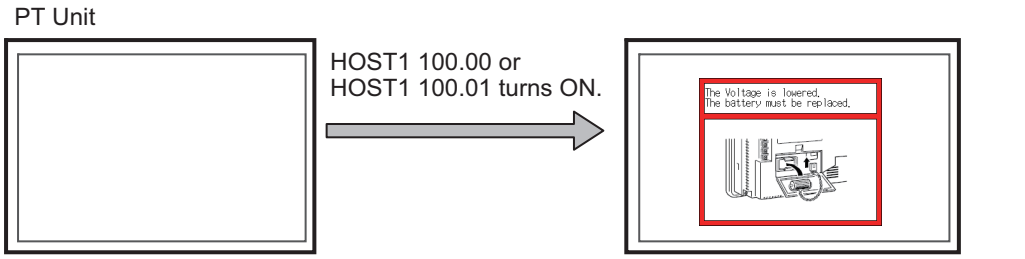
Click the **OK** Button to close the Alarm/Event Details Dialog Box.

Click the **OK** Button to close the Alarm/Event Dialog Box.

7 The settings have now been completed. Transfer the project to the PT Unit.

When HOST1:100.00 turns ON in the PT Unit, pop-up screen 100 will be displayed and the contents for contents number 1 will be displayed.

When HOST1:100.01 turns ON in the PT Unit, pop-up screen 100 will be displayed and the contents for contents number 2 will be displayed.



Pop-up screen 100 will be automatically displayed and the contents corresponding to the alarm will be shown in the contents display.

2-20 Special Functions

In addition to the various functional and fixed objects, NS-B-series PTs have functions that hold a variety of historical data and display or change host data. These functions are called special functions.

- Operation log function
- Alarm/event history function
- Data log function
- Error log function
- Screen saver function
- Buzzer function
- Time function
- Starting external applications

This section describes these functions.

2-20-1 Operation Log Function

The operation log function records the order and number of user operations.

The following touch panel usage and operations are recorded and saved in CSV format.

- Functional object operation history
- Screen display history
- Macro execution history
- Communications address bit change history

The records can be edited on a personal computer because they are saved as CSV files.

Operation Log Setting Procedure

Use the CX-Designer to make settings for the operation log of functional components and changes in communications addresses. There are no settings in the CX-Designer for the screen display history and macro execution history.

● Functional Object Operation History

The operation log can be registered for seven types of functional objects: ON/OFF buttons, word buttons, numeral display & input, string display & input, thumbwheel switches, data block tables, and Multifunction Objects.

The following ways can be used to set the functional object for the operation log.

- Make the setting in the Property Setting Dialog Box for the functional object.
- Make the setting in the pop-up menu.

- Making the Setting in the Property Dialog Box for the Functional Object

  Select the *Record to Operation Log* Check Box on the Property Setting Write Tab Page (Extension Tab Page) of the functional object. Doing this will make the object recorded.

  Also, a message of up to 32 characters can be set for each label.



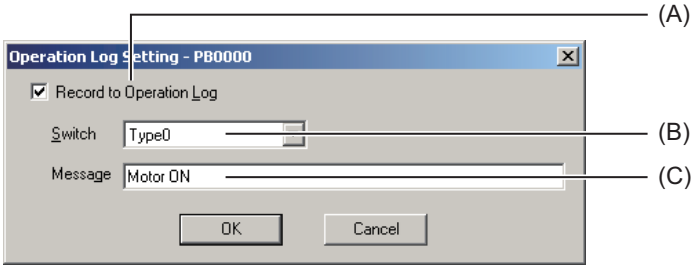
No.	Setting	Details
(A)	Record to Operation Log	Select to maintain an operation log for functional objects.
(B)	Switch	Sets the labels to be set.
(C)	Message	Sets a message string of up to 32 characters.

- Making the Setting in the Pop-up Menu

  (1) Select the functional object to set for the operation log.

  (2) Right-click to display the menu, and then select *Operation to Log Setting*.

  (3) The Operation Log Setting Dialog Box will be displayed.



No.	Setting	Details
(A)	Record to Operation Log	Select to maintain an operation log for the functional object.
(B)	Switch	Sets the label to be set.
(C)	Message	Sets a message string of up to 32 characters.

  (4) Click the **OK** Button.

● Communications Address Value Change History

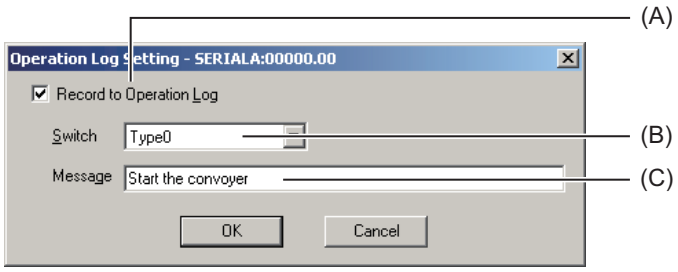
Changes in bit-type communications address status can be recorded. Up to 16 communications addresses can be set.

Operation for items other than PT Unit can be recorded by assigning control panel switches to PLC addresses.

1 Select the communications address (bit) for which to set the operation log from the symbol table.

2 Right-click to display a menu, and then select *Operation Log Setting*.

3 The Operation Log Setting Dialog Box will be displayed.



No.	Setting	Details
(A)	Record to Operation Log	Select to maintain an operation log for the functional object.
(B)	Switch	Sets the label to be set.
(C)	Message	Sets a message string of up to 32 characters.

4 Click the **OK** Button.

Procedure for Using Operation Logs

Perform the following procedure to use operation logs.

1 Initialize operation log.

If necessary, initialize the operation log from the PT System Menu and clear old records before starting recording.

2 Execute operation log.

Whether or not records will be kept for functional object operations, screen displays, or macro execution will be determined by the contents of system memory for each object.

(1) Functional object operation history and communications address value change history → $SB39 ON: Execute OFF: Not execute

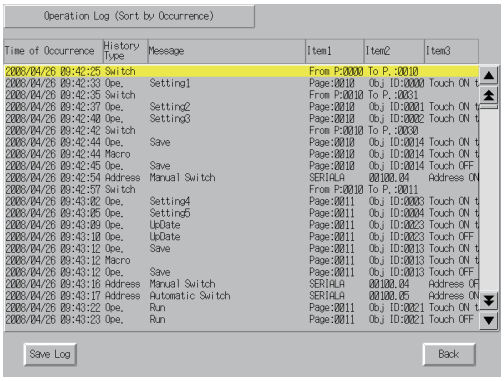
(2) Screen display history → $SB40 ON: Execute OFF: Not execute

(3) Macro execution history → $SB41 ON: Execute OFF: Not execute

3 Confirm operation log records.

Operation log records can be displayed and confirmed using the System Menu.

The records can be displayed in the order the operations were performed (sort by occurrence) or in the order of frequency.



Additional Information

- When screens with sheets have been displayed, the normal screen display records will remain but there will be no record of the sheet display.
- The following methods can also be used to initialize the operation log data.
  - Turn ON system memory $SB37 from the host.
  - Execute a Multifunction Object for which Operation Log Initialization is set.
- You can set whether to automatically initialize log data when project is downloaded by selecting **PT – Transfer** in the Transfer Settings Menu.

  In the following cases, however, be sure to initialize the log data.
  - When alarm/event settings, data log settings, the operation log, or other settings related to logs are changed.
  - When a project different from the project stored in the NS-B-series PT is downloaded.

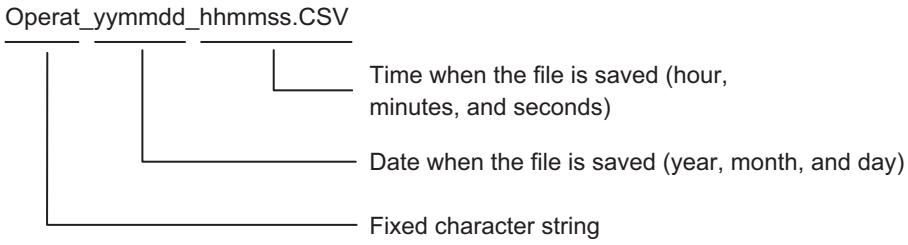
Operation Log Record Format

The data listed below is recorded as the operation log.

This data can be saved as a CSV file to a removable media by using any of the following methods.

- Turning ON system memory bit $SB38.
- Execute a Multifunction Object for which Operation Log Save is set.
- Click the Save Button for the operation log in the Data Initialization Screen of the System Menu.
- Click the Save Log Button in the Operation Log (Sort by Occurrence) Screen or Operation Log (Sort by Frequency) Screen.

The name of the CSV file is Operat_yymmdd_hhmmss.CSV.

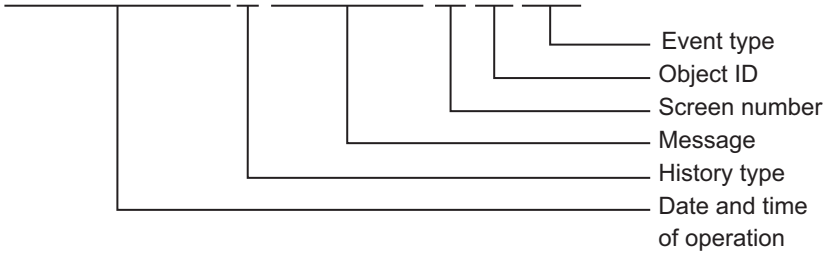


(a) Functional object operation history

- Date and time of operation
- History type (“O”)
- Message
- Screen number
- Functional object ID number
- Event type (20: Touch switch ON 21: Touch switch OFF)

Example: How to read functional log operation histories saved as CSV files.

Example: 2026/02/24 12:48:20, O, Setting Button, P0, ID1,EV20



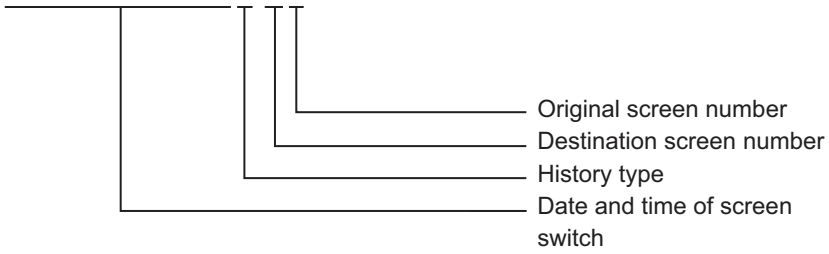
Meaning: A functional object with ID number 1 was touched on screen 0 on 2026/02/24 at 12:48:20.

(b) Screen display history

- Date and time of screen display
- History type (“P”)
- Original screen number
- Destination screen number

Example: How to read screen display histories saved as CSV files.

Example: 2026/02/24 12:48:19,P,,0,1



Meaning: Switched from screen 0 to screen 1 on 2026/02/24 at 12:48:19.

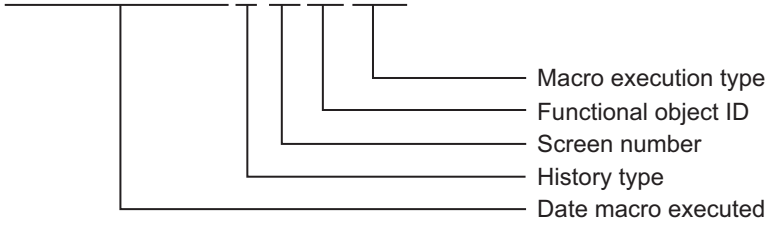
(c) Macro execution history

- Time and date of macro execution
- History type (“M”)
- Screen number (-1 for project macros.)
- Functional object ID (-1 for project macros and screen macros.)
- Macro execution type

  0: When loading a project
  4: Alarm/Event ON
  5: Alarm/Event OFF
  10: When loading a screen
  11: When unloading a screen
  20: Touch ON
  21: Touch OFF
  22: Before inputting numeral and string
  23: Before writing numeral and string
  25: When changing numeral or string
  26: When selecting a list
  30: When pressing a Display Area
  31: When selecting an Alarm/Event

Example: How to read macro execution histories saved as CSV files.

Example: 2026/02/24 12:48:25,M,,P0,ID2,EV20



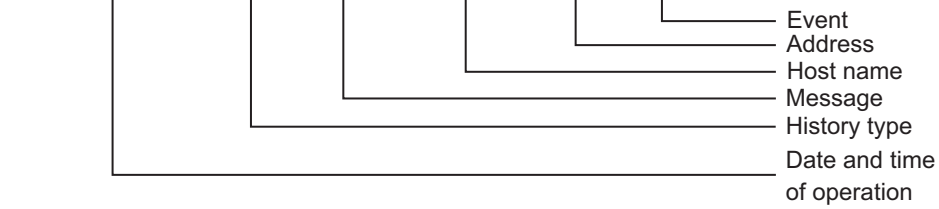
Meaning: Macro executed when the touch switch for functional object with ID 2 turned ON in screen 0 on 2026/02/24 at 12:48:25.

(d) Communications address value change history

- Time and date of occurrence
- History type
- Message
- Host Name
- Address
- Event type (40: Address ON, 41: Address OFF)

Interpreting CSV Files Containing Communications Address Value Change Histories

Example: 2026/02/24 12:48:20,O,A,Stop Button,SERIAL A,00010.00,EV40



Meaning: CIO 00010.00 for SERIAL A (the stop button) was turned ON at 12:48:20 on 2026/02/24.

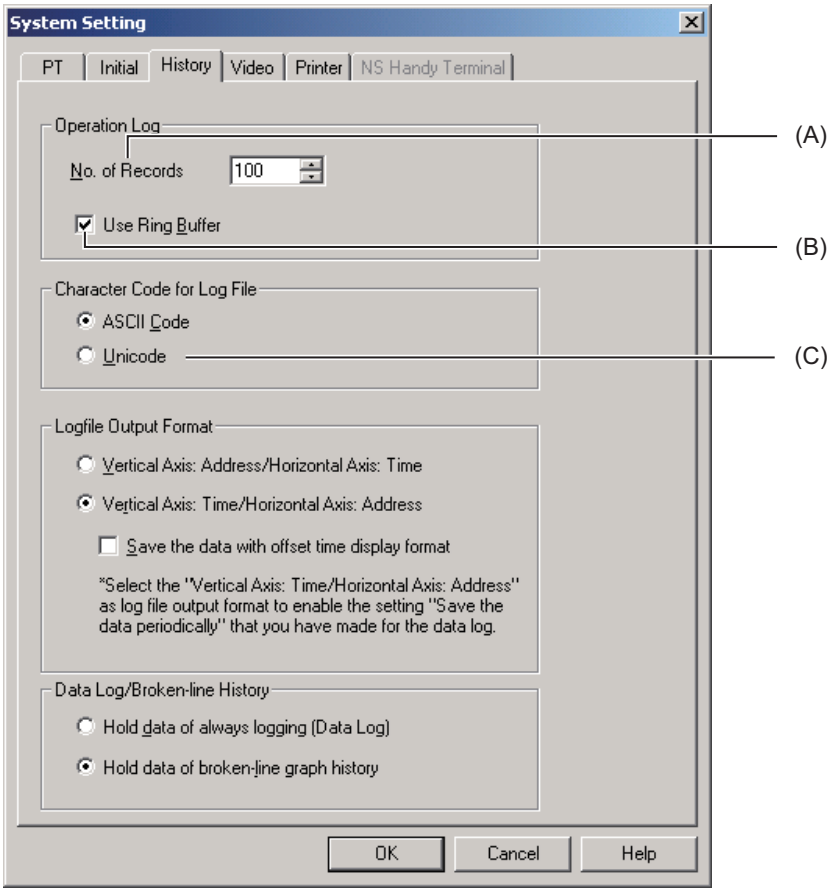
Additional Information

CSV files are saved to directory \LOG\OPERAT on the removable media.

Maximum Number of Records

Up to 1,024 operations can be recorded.

Set the maximum number to be recorded under the History Tab Page under *PT – System Setting* on the CX-Designer.



No.	Setting	Details
(A)	No. of records	Sets the number of operations to be recorded.
(B)	Use Ring Buffer	Select this option to save in ring buffer format.
(C)	Character Code for Log file	Select the character format to output the log file from multibyte or Unicode. “Log file” includes the alarm/event summary and history, data log, operation log, and error log.

If *Use Ring Buffer* is selected, the oldest records will be deleted in order when the set maximum has been exceeded and new data will be saved. If *Use Ring Buffer* is not selected, no more records will be kept when the set maximum is reached. The set record format can be checked under the System Menu.

Checking the Log

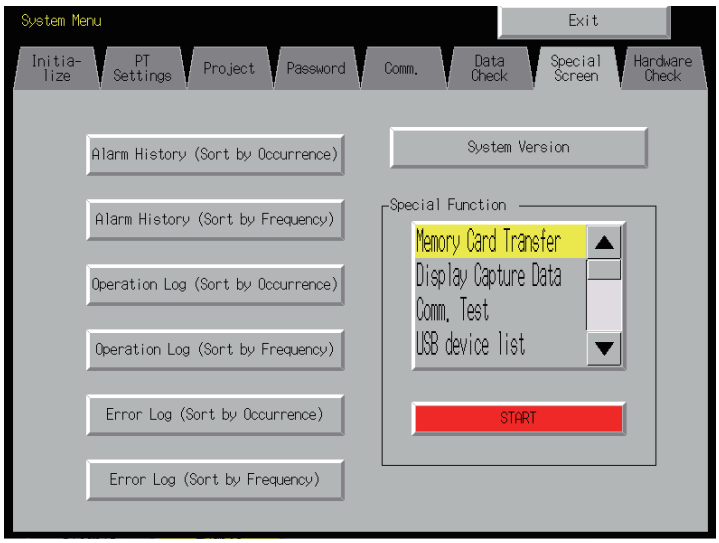
The operation log can be checked on the Operation Log (Sort by Occurrence) Screen or Operation Log (Sort by Frequency) Screen of the System Menu.

The following methods can be used to display the Operation Log (Sort by Occurrence) Screen or Operation Log (Sort by Frequency) Screen during operation.

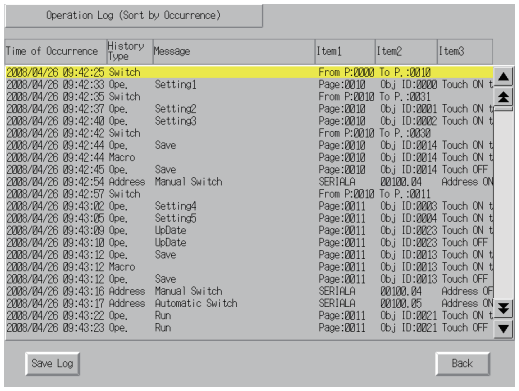
- Switch screens in the System Menu.
- Execute a Multifunction Object for which displaying the operation log is set (display from user screen).

● Switching Screens in the System Menu

1 Select *Operation Log (Sort by Occurrence)* or *Operation Log (Sort by Frequency)* from the Special Screen Tab Page of the System Menu.

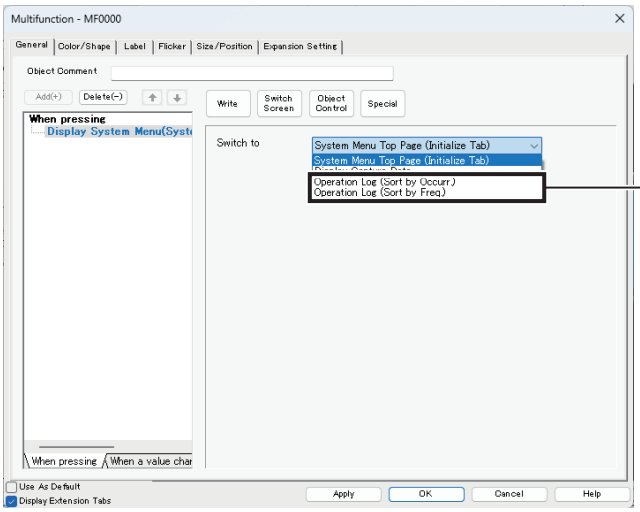


2 The operation log can be checked.



● Executing a Multifunction Object Set to Display the Operation Log

1. Create a Multifunction Object on a user screen.
2. Select **Switch Screen – Display System Menu – Operation Log (Sort by Occurr.)** or **Operation Log (Sort by Freq.)** in the property settings of the Multifunction Object.



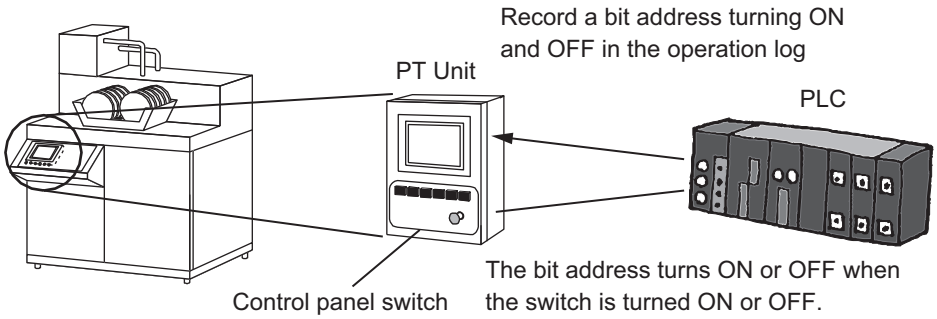
Select *Operation Log (Sort by Occurr.)* or *Operation Log (Sort by Freq.)*

3. Execute the Multifunction Object in step 2 while the NS-B-series PT is operating.
4. The Operation Log (Sort by Occurrence) Screen or Operation Log (Sort by Frequency) Screen will be displayed.

Recording Operation for Control Panel Switches and Others Items Other Than a PT Unit

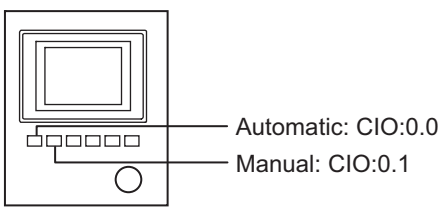
The operation log can record changes in bit address values.

This function can be used to record operation of items other than a PT Unit, such as control panel switches.



● CX-Designer Settings

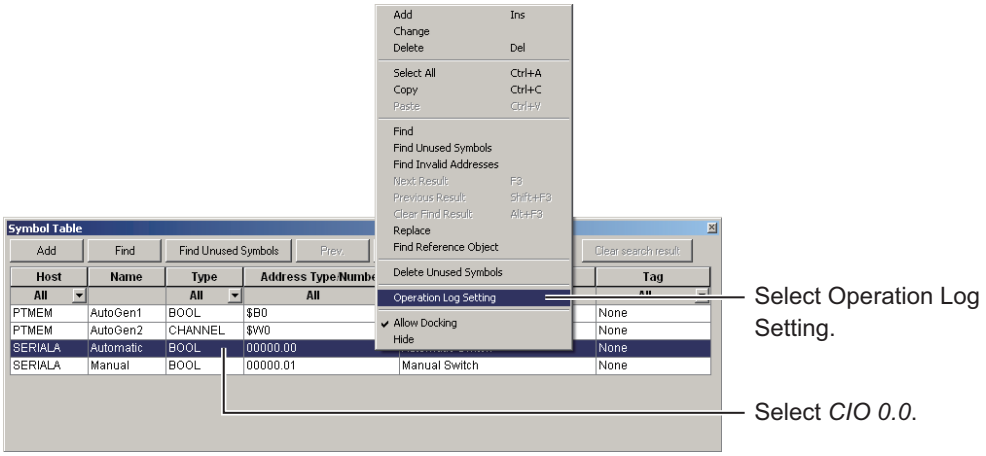
The following example shows the settings to record the operation of the *manual* switch and *automatic* switch on a control panel as shown in the following figure.



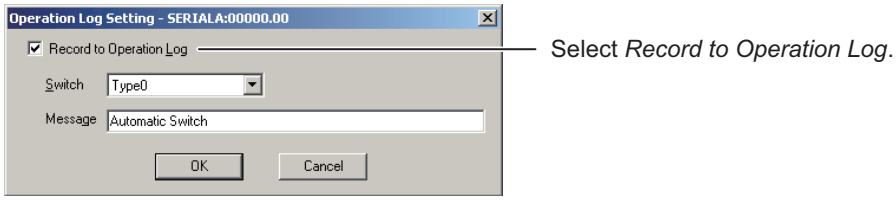
1 Register CIO 0.0 and CIO 0.1 in the CX-Designer's symbol table.

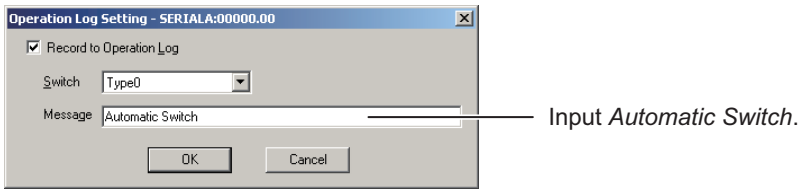
2 Select *CIO0.0* in the symbol table.

3 Right-click to display the menu, and then select *Operation Log Setting*.

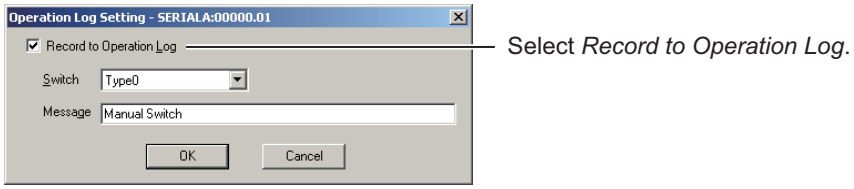


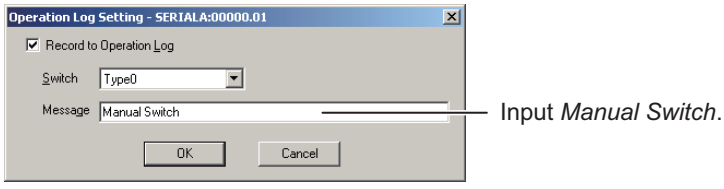
4 Setting Dialog Box will be displayed. Select the *Record to Operation Log* Check Box. Input Automatic Switch into the *Message* Field, and then click the OK Button.





5 Use the same procedure to set the operation log for CIO0.1.





6 Create a Multifunction Object on any screen and make the following settings.

Execution timing	Function	Label
When pressing	**Switch Screen – System Menu Display – Operation Log (Sort by Occurrence)**	Operation Log Display

7 In the same way, create a Multifunction Object and make the following setting

Execution timing	Function	Label
When pressing	**Special – Operation Log Control – Operation Log Save.**	Operation Log Save

8 Transfer this project to the NS-B-series PT.

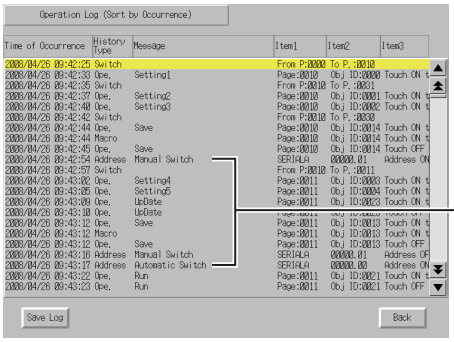
● Operation with the NS-B-series PT

1 Start the NS-B-series PT that includes the project created above.

2 Turn ON $SB39.

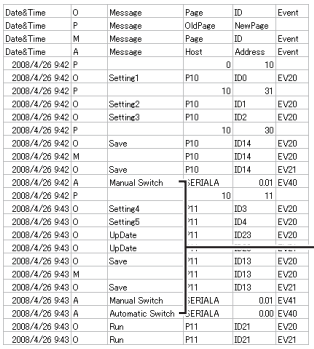
3 The status of CIO 0.0 and CIO 0.1 (ON and OFF for the automatic switch and manual switch) will be registered in the operation log.

4 Click the **Operation Log Display Button**. The Operation Log (Sort by Occurrence) Screen in the System Menu will be displayed. The operation log can be checked for the *automatic* switch and *manual* switch.



The operation log can be checked for the *automatic* switch and *manual* switch.

5 Click the **Operation Log Save** Button.



Date&Time	O	Message	Page	ID	Event
Date&Time	P	Message	OldPage	NewPage	
Date&Time	M	Message	Page	ID	Event
Date&Time	A	Message	Host	Address	Event
2008/4/26 9:42	P		0	10	
2008/4/26 9:42	O	Setting1	P10	ID0	EV20
2008/4/26 9:42	P		10	31	
2008/4/26 9:42	O	Setting2	P10	ID1	EV20
2008/4/26 9:42	O	Setting3	P10	ID2	EV20
2008/4/26 9:42	P		10	30	
2008/4/26 9:42	O	Save	P10	ID14	EV20
2008/4/26 9:42	M		P10	ID14	EV20
2008/4/26 9:42	O	Save	P10	ID14	EV21
2008/4/26 9:42	A	Manual Switch	SERIALA	0.01	EV40
2008/4/26 9:42	P		10	11	
2008/4/26 9:43	O	Setting4	P11	ID3	EV20
2008/4/26 9:43	O	Setting5	P11	ID4	EV20
2008/4/26 9:43	O	UpDate	P11	ID23	EV20
2008/4/26 9:43	O	UpDate			
2008/4/26 9:43	O	Save	P11	ID13	EV20
2008/4/26 9:43	M		P11	ID13	EV20
2008/4/26 9:43	O	Save	P11	ID13	EV21
2008/4/26 9:43	A	Manual Switch	SERIALA	0.01	EV41
2008/4/26 9:43	A	Automatic Switch	SERIALA	0.00	EV40
2008/4/26 9:43	O	Run	P11	ID21	EV20
2008/4/26 9:43	O	Run	P11	ID21	EV21

The automatic switch and manual switch will be registered in the operation log.

2-20-2 Alarm/Event History Function

The alarm/event history function continually checks the status of bits registered as alarms or events and records the date, time, and frequency during operation when the bit turns ON.

The records can be edited on a personal computer because they are saved as CSV files.

Procedure for Using Alarm/event Histories

Perform the following procedure to use the alarm/event history function.

1 Make alarm/event history settings.

When a screen is created using CX-Designer, register the bit memory as an alarm or event under *PT – Alarm/Event setting*. Make related information and other settings as required. Refer to *2-14-1 Outline* on page 2-308 for details on alarm/event settings.

2 Initialize alarm/event history.

If necessary, initialize the alarm/event history from the PT System Menu and clear old records before starting recording.

3 Execute alarm/event history.

When bits registered as alarms/events turn ON or OFF during operation, a record will be kept that alarms/events occurred or were cleared.

4 Confirm alarm/event history records.

There are two methods for checking the alarm/event history records.

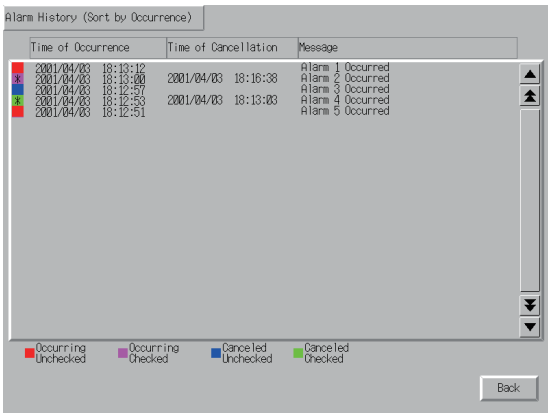
- Check using System Menu.

  Alarm histories can be checked under the System Menu.

  The records can be displayed in the order the alarms/events occurred (sort by occurrence) or in the order of frequency.

- Check using functional objects.

  The records can be checked using alarm/event summary and histories created on screens. The records can be displayed in order of occurrence, order of frequency, or order of priority.



Additional Information

- Alarm/event histories can be initialized using system memory bit $SB32.
- You can set whether to automatically initialize log data when project is downloaded by selecting **PT – Transfer** in the Transfer Settings Menu.

  In the following cases, however, be sure to initialize the log data.
  - Alarm/event settings, data log settings, or other settings related to logs are changed.
  - A project different from the project stored in the NS-B-series PT is downloaded.

Alarm/Event History Record Format

The following data is stored to memory for alarm/event histories.

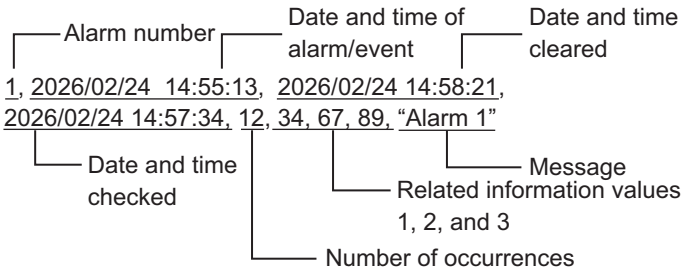
- Alarm number (ID)
- Time and date of alarm/event (On-date & time)
- Time and date alarm/event cleared (Off-date & time)
- Time and date checked (Confirm-date & time)
- Number of occurrences (On-count)
- Related information value 1 (Val 1)
- Related information value 2 (Val 2)
- Related information value 3 (Val 3)
- Message

The related information values are the contents of the addresses set under *Alarm/Event setting*.

This data can be saved as a CSV file to a removable media by turning ON system memory bit $SB33. Alarm histories are saved in a file called Alarm.csv and event histories in a file called Event.csv.

Example: How to read alarm/event histories saved as CSV files.

Example:



Meaning: Alarm 1 occurred on 2026/02/24 at 14:55:13, was cleared on 2026/02/24 at 14:58:21, and checked on 2026/02/24 at 14:57:34.

This alarm has occurred 12 times.

The contents of the addresses set to related information values 1 to 3 are 34, 67, and 89, respectively.

The message for alarm 1 is “Alarm 1”.

Event histories are saved in the same format as alarm histories, i.e., as CSV files.

Additional Information

- CSV files are saved to directory \LOG on the removable media.
- The CSV file names are fixed to Alarm.csv and Event.csv, so any previously output Alarm.csv or Event.csv files will be overwritten.

Maximum Number of Records

Up to 1,024 alarm records and 1,024 event records can be kept.

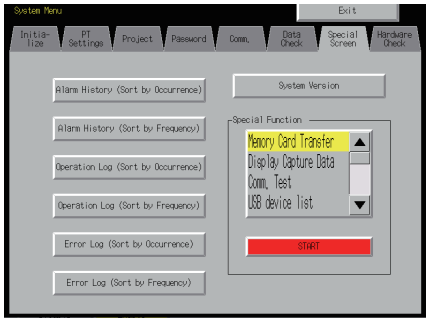
Set the number of alarm and event records under *PT/Alarm/Event setting/Alarm/Event Parameter* on the CX-Designer. If *Use Ring Buffer* is selected, the oldest data will be deleted and new data saved in its place when the maximum number of records is exceeded.

The set record format can be checked under the System Menu.

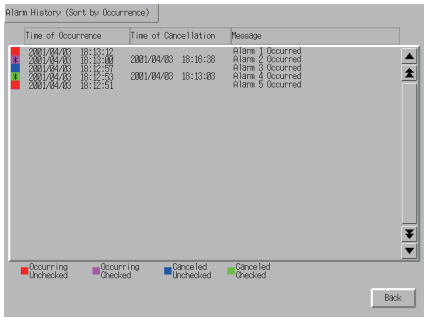
Checking Records

Displays the alarm history from the System Menu during operation.

1 Select *Special screen/Alarm history (sort by occurrence)* or *Alarm history (sort by frequency)* from the System Menu.



2 Check the alarm history. (The event history cannot be checked.)



The alarm history can also be checked during operation by using an alarm/event summary and history functional object.

2-20-3 Data Log Function

The data log function is used to register changes over time to the contents of a registered address. The data can be edited on a personal computer because it is saved as a CSV file.

Procedure for Using Data Logs

Perform the following procedure to use the data log function.

1 Make the data log settings.

Register addresses under *PT – Data Log setting* when creating a screen with CX-Designer. Refer to *2-15-1 Outline* on page 2-333 for information on data log setting.

2 Initialize data log.

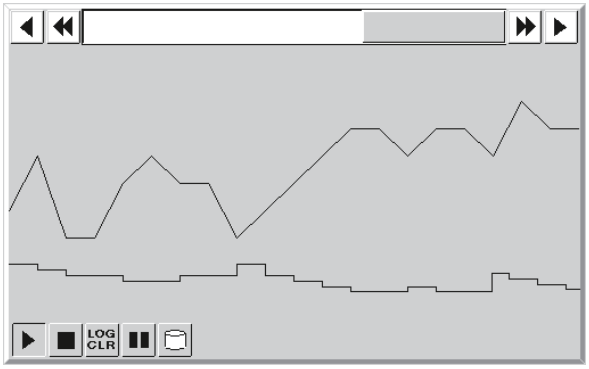
If necessary, initialize the data log from the PT System Menu and clear old records before starting recording.

3 Execute the data log.

Records address contents during operation at a specified timing. The data logging timing is set under *Settings/Data log setting*.

4 Check data log records.

The data log records are displayed on a data log graph functional object.



Additional Information

- Data logs can be initialized using system memory bit $SB35.
- You can set whether to automatically initialize log data when project is downloaded by selecting **PT – Transfer** in the Transfer Settings Menu.

  In the following cases, however, be sure to initialize the log data.
  - Alarm/event settings, data log settings, the operation log, or other settings related to logs are changed.
  - A project different from the project stored in the NS-B-series PT is downloaded.

Data Log Record Format

The data listed below is recorded as the data log.

- Group number
- Date and time data 1st saved
- Date and time data saved 2nd time
  …

Date and time of data sampling

- Data 1 address
- Data 1 contents (1st log)
- Data 1 contents (2nd log)
  …
- Data 2 address
- Data 2 contents (1st log)
- Data 2 contents (2nd log)

Sampled data (by address)

Data 1 and data 2 indicate addresses registered under the data log settings.

This data is saved in CSV file format to a removable media when system memory bit $SB36 turns ON or the save icon for data log graphs is pressed.

When the data is saved as a result of $SB36 turning ON, it is saved to a Trend□.csv file.*1 The data for all registered data log groups will be saved to file if 0 is stored in $SW37. If a value other than 0 is stored in $SW37, only the log data for that group number will be saved to file.*2

If the data is saved as a result of the data log graph save icon being pressed, the data will be saved to a Trd□□.csv file.*2 When the data is saved using the save icon, only the data for data log groups registered to the data log graph will be saved to the file. The CSV file name can be changed.

Note 1: When“0”is stored in $SW37

Trend□.csv

001 to 999
Beginning with 001, the number is automatically incremented by 1 each time the save operation is executed. After 999, the number reverts to 001.

Note 2: Data is saved either when a value other than “0” is stored in $SW37, or using the save icon.

Trd□□.csv

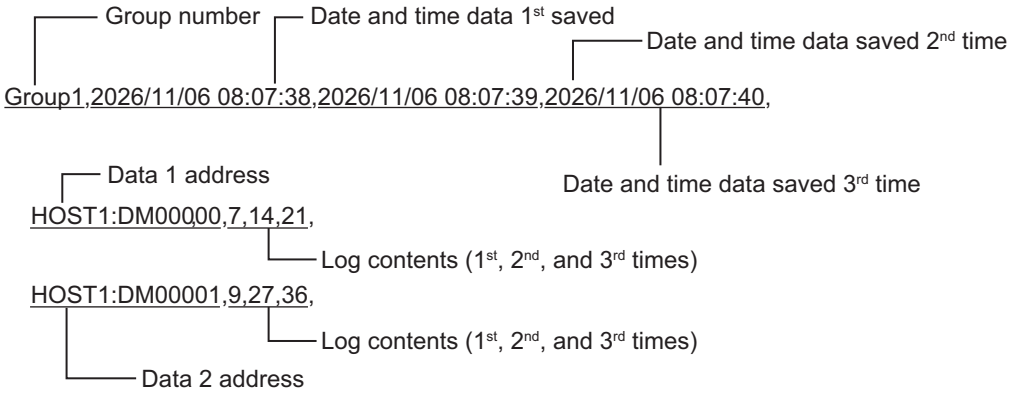
001 to 999 (001 to 099 if the output file names are 6 characters or longer)
The ID number for files saved for each group. Beginning with 001, the number is automatically incremented by 1 each time the output operation is executed. After 999, the number reverts to 001.

00 to 99
Indicates one less than the group number (1 to 100).

Example: How to read data logs saved as CSV files

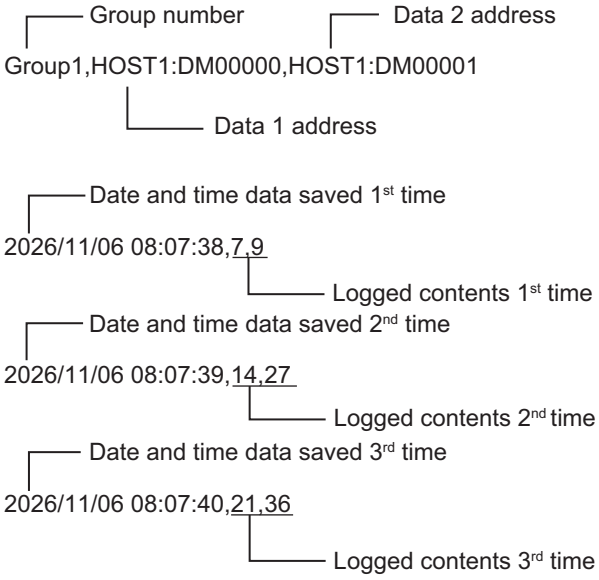
Vertical axis: Addresses, Horizontal axis: Times

Example:



Vertical axis: Times, Horizontal axis: Addresses

Example:



Additional Information

- The order that data is saved in a CSV file can be changed by setting the data log file output format on the History Tab Page under *Settings*.
- HOST1 is the host name set in the Comm. Setting Dialog Box, which is opened by selecting **PT - Communication Setting**.
- Up to 999 CSV files can be saved each for Trend□.csv and Trd□□.csv. When this number is exceeded, the saved files will be overwritten in order beginning with 001.
- If a Trd□□.csv file is saved, a folder is created for each group below the \LOG\Trend folder in the removable media directory. The name of the folder will be the name of the output file. Up to 999 CSV files will be saved in each folder if the output file names are less than five characters long. If more than 999 files are saved, the saved files will be overwritten in order beginning from 001. Only up to 099 CSV files will be saved in each folder if the output file names are six characters or more. If more than 099 files are saved, the saved files will be overwritten in order beginning from 001.
- Saving will be stopped when the removable media has no more available space. When the file number reaches the upper limit, the oldest number will be overwritten as new files are saved.

Maximum Number of Records

Up to 50,000 records can be kept for each group.

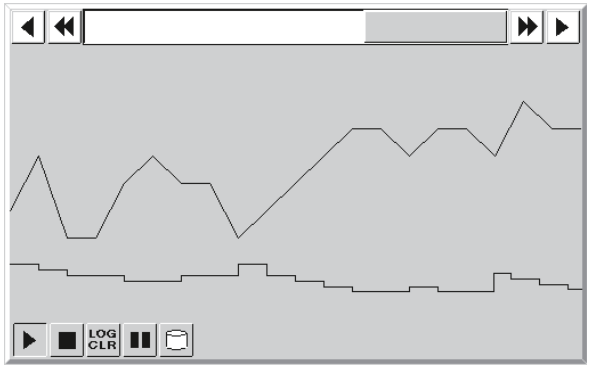
The number of records is set under *PT – Data Log setting* on the CX-Designer.

The set ring buffer format is fixed for records. With the ring buffer format, the oldest data is deleted when the maximum number of records is exceeded and new data is then recorded.

Checking Records

Records can be checked during operation by using data log graph functional objects.

Open the screen on which the data log graph was created.



2-20-4 Error Log Function

The error log function keeps a record of macro execution errors.

Procedure for Using Error Logs

Perform the following procedure to use the error log function.

1 Make the error log settings.

There are no settings required on the CX-Designer for error logs.

2 Initialize error log.

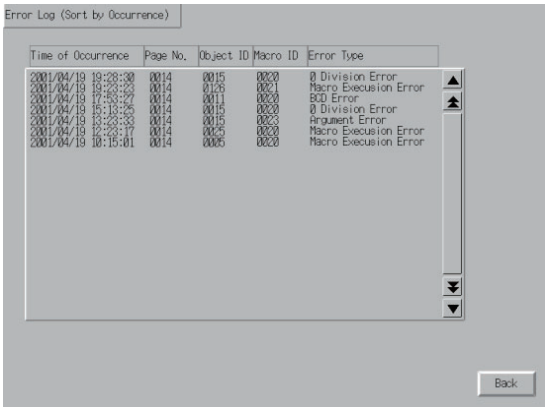
If necessary, initialize the error log from the PT System Menu and clear old records before starting recording.

3 Execute the error log function.

Errors that occur when macros are executed during operation will be recorded.

4 Check error log records.

Error log records are displayed from the System Menu. The records can be displayed in the order the errors occurred (sort by occurrence) or in the order of frequency.



Additional Information

- The error log can be initialized using system memory bit $SB42.
- You can set whether to automatically initialize log data when project is downloaded by selecting **PT – Transfer** in the Transfer Settings Menu.

  In the following cases, however, be sure to initialize the log data.
  - Alarm/event settings, data log settings, the operation log, or other settings related to logs are changed.
  - A project different from the project stored in the NS-B-series PT is downloaded.

Error Log Record Format

The following data is stored to memory for error logs.

- Time and date of error
- Screen number (-1 for project macros.)
- Functional object ID (-1 for project macros and screen macros.)
- Macro execution type

  0: When loading a project
  4: Alarm/Event ON
  5: Alarm/Event OFF
  10: When loading a screen
  11: When unloading a screen
  20: Touch ON
  21: Touch OFF
  22: Before inputting numeral and string
  23: Before writing numeral and string
  25: When changing numeral or string
  26: When selecting a list
  30: When Pressing a Display Area
  31: When selecting an Alarm/Event

Error number (1: Program error; 2: 0 allocation error; 3: BCD error; 4: argument error)

This data can be saved as a CSV file to a removable media by turning ON system memory bit $SB43.

Example: How to read error logs saved as CSV files.

Example: 2026/02/24 14:18:38, 0, 2, 20, 2

- Error number
- Macro execution type
- Functional object ID
- Screen number
- Date and time of error

Meaning: Macro executed when the touch switch for functional object with ID 2 turned ON in screen 0 on 2026/02/24 at 14:18:38 PM.

The error occurred because of a macro zero division.

Maximum Number of Records

Up to 100 records can be kept. The set ring buffer format is fixed for records. With the ring buffer format, the oldest data is deleted when the maximum number of records is exceeded and new data is then recorded.

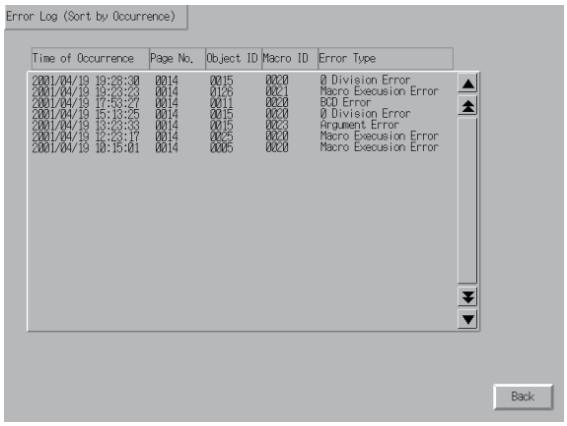
Checking Records

Displays the error log from the System Menu during operation.

1 Select *Special screen/Error log (Sort by Occurrence)* or *Error log (Sort by Frequency)* from the System Menu.



2 Check the error log.



2-20-5 Screen Saver Function

NS-B-series PTs have a screen saver function to help preserve the life of the backlight. This function turns off the backlight and clears the screen if there has been no operation of the PT Unit for a set period.

If the screen saver *Display Erased* function is used, the backlight turns OFF at the same time as the displayed screen is cleared. Use the *Display Erased* function to help preserve the life of the backlight.

The screen saver works only during operation. It will not operate during System Menu display.

Precautions for Safe Use

Do not carelessly press the screen when the backlight is not lit or when there is no display.

Check system safety before pressing the screen.

Displaying Cleared Screens

Screens that have been cleared using the screen saver function can be displayed again by pressing the screen or executing screen switch from the host. Even if the position for a functional object is pressed, the first input will be invalid after the screen is pressed to redisplay the screen.

Screens will not be re-displayed simply by changing numerals or character strings or by updating the display.

The screen saver function will be released if one of the operations listed below is performed by system memory or a macro.

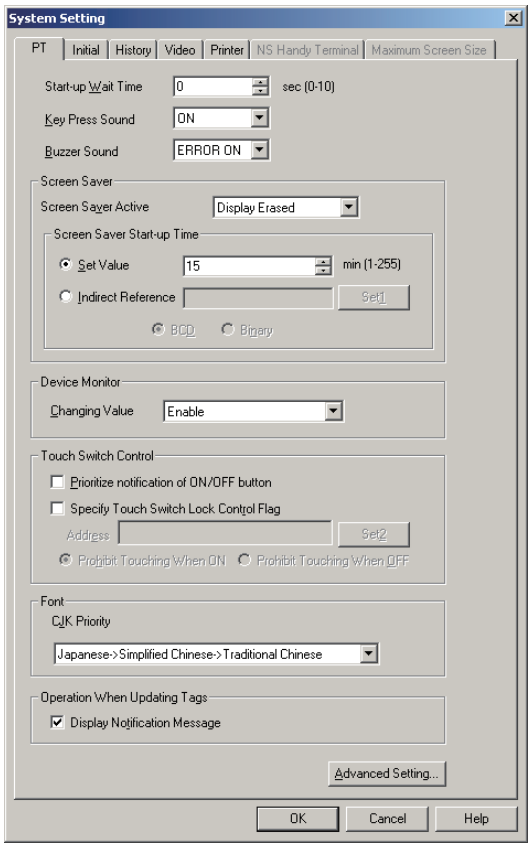
- Switch screen (automatic screen switch from system memory, macro, or because of alarm or event)
- Opening, closing, or moving of pop-up screens (automatic screen switch from system memory, macro, or because of alarm or event)
- Error (Error Dialog Box displayed)
- Changing an Indirect Address (if the screen saver startup time is specified indirectly.)

Screen Saver Function Settings

The screen saver settings can be made under CX-Designer system settings or from the System Menu. The settings include whether or not to use a screen saver and how long should lapse before the screen saver operates.

● Setting Screen Saver Using CX-Designer

1 Select **PT – System setting**. The System Settings Dialog Box will be displayed. Select the PT Operation Tab Page.



2 Set *Display Erased* under *Screen Saver Active* and set the length of time in minutes (1 to 255) before the screen saver is started in the *Set Value* Field under *Screen Saver Start-up Time*.

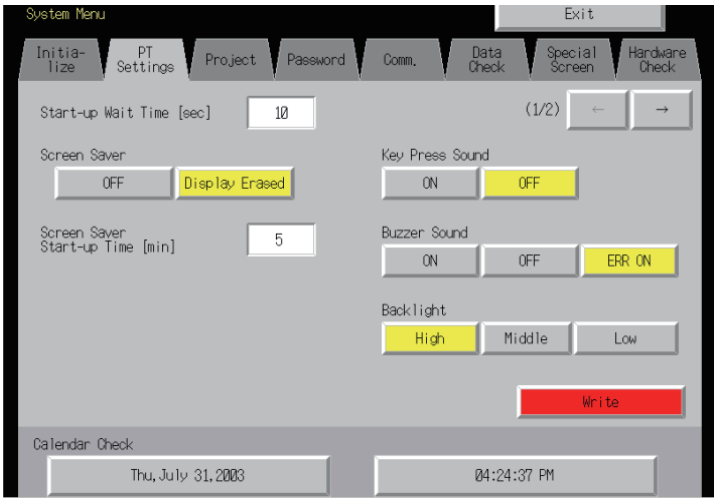
3 Select the *Indirect Reference* Option and set the communications address if the specified communications address value will be used as the screen saver start-up time. Select BCD or binary as the type for the value stored at the communications address.

Additional Information

If the screen saver start-up time is to be indirectly specified, store a value from 1 to 255 at the communications address in the specified format. The screen saver will not operate if a value outside that range is stored.

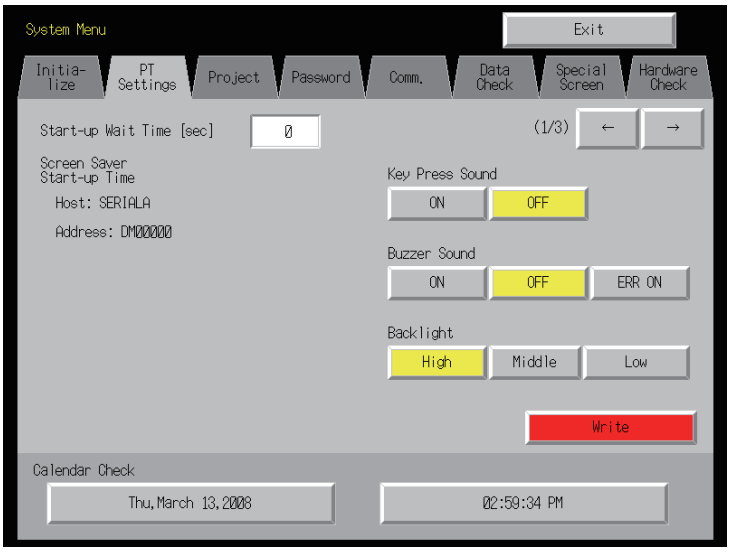
● Setting Screen Saver Using System Menu

1 Open *PT* under the System Menu.



2 Set *Display Erased* under *Screen saver operation* and set the length of time in minutes (1 to 255) before the screen saver is started under *Screen Saver Start-up time*.

3 The allocation address will be displayed if the screen saver start-up time is specified indirectly. It cannot be set.



2-20-6 Buzzer Function

A buzzer can be sounded to signal an emergency situation or a host error.

Additional Information

The PT settings will determine whether or not a buzzer will actually sound.

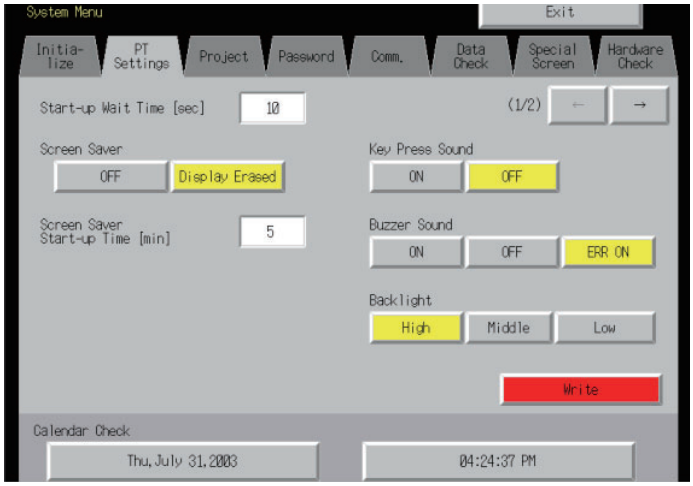
One of the following three settings can be made.

OFF: The buzzer will not sound.

ERR ON: A buzzer will sound when a message is displayed using the “x” or “!” icons, when an error occurs on the PT Unit.

ON: A buzzer will sound when a message is displayed using the “x” or “!” icons or an instruction is given from the host that turns ON $SB12 to $SB14, when an error occurs on the PT Unit.

The settings for buzzer sounds are made under the System Menu. Set the buzzer sounds under *PT – Buzzer sound* under the System Menu.



Refer to the next section *Buzzer Types* on page 2-475 for information on continuous, short intermittent, and long intermittent buzzers.

The buzzer sound when functional objects are touched is not set under *Buzzer sound*. It is set under *Key Press sound*.

Buzzer Types

Buzzer types can be controlled only from system memory.

Buzzer types cannot be set from the System Menu.

The following three types of buzzers can be sounded for NS-B-series PTs.

Continuous	Continuous buzzer	$SB12
Short intermittent	Intermittent buzzer that repeats a cycle of sounding for 0.5 seconds and stopping for 0.5 seconds.	$SB13
Long intermittent	Intermittent buzzer that repeats a cycle of sounding for 1 second and stopping for 1 second.	$SB14

The order of priority for buzzers when multiple and different types of buzzers have been specified at the same time by system memory is outlined below. The highest priority buzzer is listed first and the corresponding system memory bit is indicated in parentheses ().

a) Continuous ($SB12)

b) Short intermittent ($SB13)

c) Long intermittent ($SB14)

For example, the continuous buzzer will sound if continuous and short intermittent buzzers have been specified at the same time. If, for example, the long intermittent buzzer is specified while the short intermittent buzzer is sounding, the short intermittent buzzer will continue to sound.

Sounding Buzzers

There are three ways to make buzzers sound on the PT Unit.

- Control from Host

  Buzzers can be sounded from the host if buzzers are set to ON under the CX-Designer system setting or the PT System Menu and system memory bits $SB12 to $SB14 are manipulated from the host during operation.

- Error Buzzers

  Buzzers can be made to sound when communications or other errors occur during operation if buzzers are set to *ON* and *ERR ON* is set under the CX-Designer system setting or the PT System Menu.

- Dialog Box Buzzers

  Buzzers can be made to sound when messages are displayed using the X or ! icons during operation if buzzers are set to *ON* and *ERR ON* is set under the CX-Designer system settings or the PT System Menu.

Stopping Buzzers

Buzzers that are sounding can be stopped using the following methods.

- Turn OFF system memory bits $SB12 to $SB14 from the host.

  The buzzer will not stop, however, unless all bits for continuous, short intermittent, and long intermittent buzzers are changed to 0 (OFF).

- Press a Command Button that has the buzzer stop function set to it.

  Bits $SB12 to $SB14 will turn OFF.

2-20-7 Clock Function

NS-B-series PTs have a clock function used to set and display the date and time. The clock function is backed up by the built-in capacitor.

Additional Information

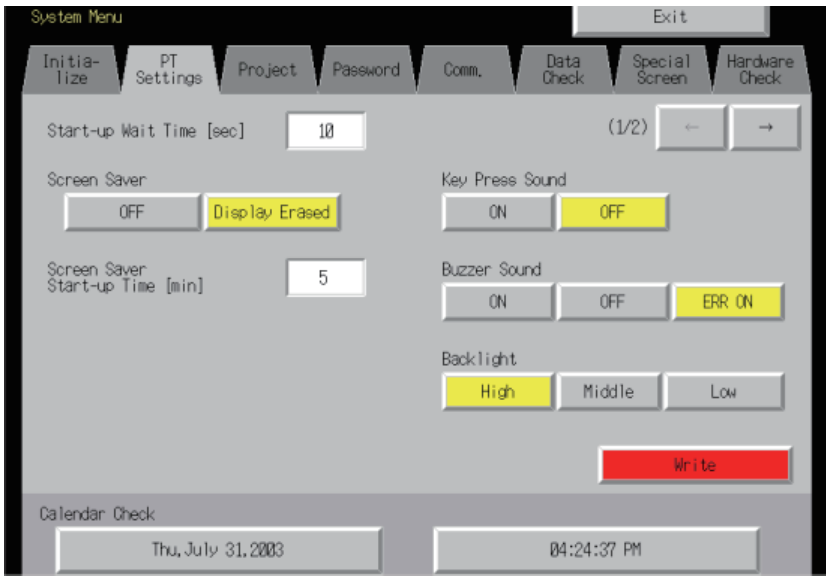
- If the capacitor voltage drops, the time and date data can no longer be held when the PT Unit is turned OFF or reset and the clock function will no longer operate correctly.
- Use the System Menu or create date or time functional objects and operate these to make and change date and time settings.

Setting Clock Data

There are two methods for setting clock data.

- Setting from System Menu

  Display the menu for displaying and setting clock data under the System Menu and make the settings. The date and time can be changed under *PT – Calendar Check* under the System Menu. The date and time will change as soon as the new settings are input. There is no need to press the Write Button.



- Setting from Functional Objects
  Make the time data settings using data and time functional objects created on the screen.
  The settings are input from the Date/Time Input Dialog Box.



The date is entered in the yyyy.mm.dd format and the time is entered in the hh.mm.ss format.
Example:
Date: 2026.4.22 (2026/4/22)
Time: 14.36.14 (2:36:14 PM)
When changing time during operation, refer to the table shown below and set the time.

	AM	PM
Time	0 1 2 3 4 5 6 7 8 9 10 11	0 1 2 3 4 5 6 7 8 9 10 11
Input to the PT Unit	0 1 2 3 4 5 6 7 8 9 10 11	12 13 14 15 16 17 18 19 20 21 22 23

Refer to *3-9 Displaying and Setting System Clock* on page 3-32 for details.

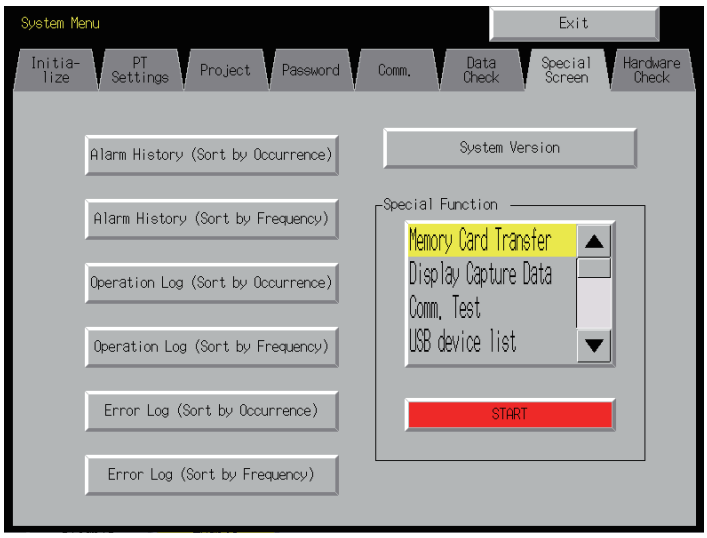
2-20-8 Starting External Applications

The NS-B-series PTs provide the functionality to start Communication Test and other external applications.

Method for Starting External Applications

External applications are started from the System Menu.

1 Display the System Menu, select the desire external applications from *Special Functions* on the Special Screen Tab Page, and press the **START** Button.



2 The PT Unit will be reset.

3 The specified external application will be started after the PT Unit restarts.

Refer to the manual for the external application for operating methods and procedures for messages that are displayed.

Additional Information

Communication Test, *USB Device List* and *Show the Captured Data* are not external applications. If any of these is selected and the START Button is pressed, the display will change in the System Menu. The PT Unit will not be restarted.

2-21 System Settings and System Menu

The parameters for NS-B-series PT operation are set under CX-Designer system setting or the PT System Menu. These settings include backlight brightness, buzzer sound, communications settings, and data initialization.

The System Menu is also used to display operation and alarm histories and special screens and perform hardware checks.

The settings that can be made under system setting or the System Menu are outlined in the following table.

Item	CX-Designer system setting	PT System Menu
Screen data area format	×	○
Operation log initialization and save	×	○
Alarm/event history initialization and save	×	○
Data log initialization and save	×	○
Error log initialization and save	×	○
Language selection	▲*5	○
Startup wait time	○	○
Key press sound	○	○
Backlight	×	○
Buzzer sound	○	○
Screen saver (operation)	○	○
Screen saver start-up time	○	○*10
Calendar check	×	○
Tag update notification message	○	○
Double-touch Interval	×	○
Project title	▲*1	△
Number of labels	▲*2	△
Initial label	▲*6	○
Initial screen number	○	○
Barcode input when using keypad	▲*13	○
Operation log record method	○	△
Alarm/event history record method	▲*3	△
Data log record method	×	△
Error log record method	×	△
System memory (allocated addresses)	○	△
Password	▲*4	○
Serial port A (usage)	▲*8	○
Serial port B (usage)	▲*8	○
Ethernet (usage)	▲*8	○
$SB and $SW update cycle	○	×
Intervals of Run signal (Pulse)	○	×
Intervals of Message-Comm.	▲*8	×
Serial port A (communications method)	▲*8	○
Serial port B (communications method)	▲*8	○
Ethernet (communications conditions)	▲*8	○
Communications auto return	▲*8	○
Timeout interval	▲*8	○
Retry counts	▲*8	○

Item	CX-Designer system setting	PT System Menu
Screen data confirmation	×	△
Read allocation address	▲*8	×
Host name	▲*8	△*9 *11
Host type	▲*8	○*9 *11
Network address	▲*8	○*9
Node address	▲*8	○*9
IP address	▲*8 *11	○*11
Route path	▲*8 *11	△*11
Operation log display	×	△
Alarm history display	×	△
Error log display	×	△
Communications test	×	○
Display Capture Data	▲*7	○
USB device list	×	○*12
Version display	×	△
LCD check	×	△
Touch switch check	×	○
Touch panel Calibration	×	○
Key Status Address	○	×

○: Can be set, ×: Cannot be set, △: Display only

▲: Can be set using different CX-Designer menu

*1. Set using Title Tab Page in the Project Property Dialog Box under *PT – Project Properties*.

*2. Set using Switch Labels Tab Page in the Project Properties Dialog Box under *PT – Project Properties*.

*3. Set in the Alarm/Event Parameter Setting Dialog Box, which is displayed when the Parameter Setting Button is pressed. The Parameter Setting Button is found in the Alarm/Event Setting Dialog Box under *PT – Alarm/Event*.

*4. Set in the Password Setting Dialog Box under *PT – Password setting*.

*5. Set on the Select Language Tab of the Project Property Dialog Box under *PT – Project Properties*.

*6. Set using Switch Labels Tab Page in the Project Property Dialog Box under *PT – Project Properties*.

*7. A button to switch to the Display Capture Data screen can be created with the Display System Menu command button function.

*8. Set by selecting **PT – Communication Setting** on the Comm. Setting Dialog Box.

*9. Only for hosts connected via Ethernet.

*10. If the screen saver startup time is specified indirectly, only the allocated address will be displayed.

*11. Only when connected to the host through EtherNet/IP. The setting cannot be changed if the host type is set to EtherNet/IP,

*12. Only printers connected to the USB host connector will be displayed.

*13. Set on the Input Options Tab Page of the Project Properties Dialog Box (**PT – Project Properties**).

Refer to the *System Settings* and *Project Properties* settings in the *CX-Designer Online Help* and the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)* for detailed explanations of CX-Designer system settings and the PT System Menu.

2-22 Transferring Device Data

2-22-1 What Is Device Data Transfer?

Device data transfer is used to read a specified number of elements starting from a transfer source address at a specified time, and write them to memory starting from a destination address.

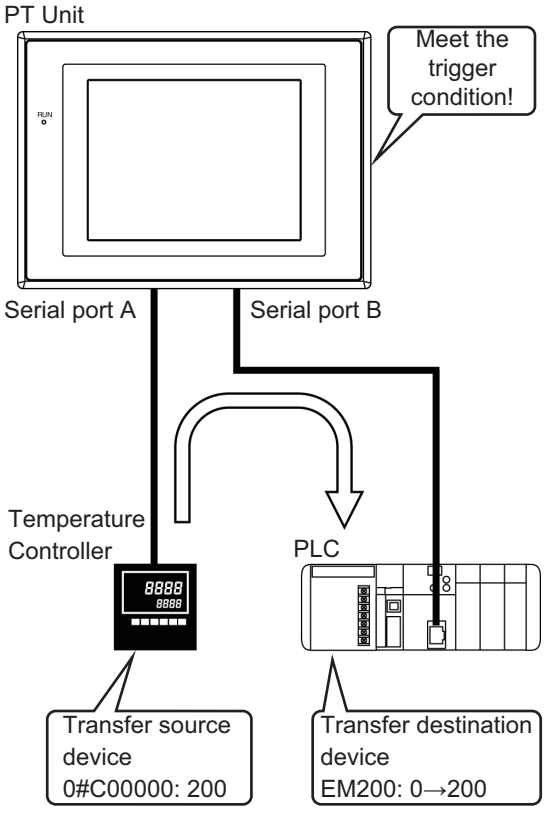
Multiple device data transfer entries can be set by saving device data transfer setting groups in a device data transfer table.

For example, assume that the process value (C00000) of the Temperature Controller connected to the PT Unit is transferred to EM200 in the EM Area in the PLC as shown below. Here, the Temperature Controller would be the transfer source device and the PLC would be the transfer destination device. When the trigger condition is met (i.e., when address CIO 10.5 turns ON), device data 200 from the Temperature Controller will be transferred to EM200 in the PLC.

As you can see, the Temperature Controller is not connected directly to the PLC, but Temperature Controller data can be transferred to the PLC through the PT Unit without any special programming.

Device data transfer settings

- Trigger condition: Serial B, CIO 10.5 turning ON
- Transfer source device: Serial A: 0#C00000
- Transfer destination device: Serial B: EM200



The device data transfer function consists of the following three elements.

- Device Data Transfer Setting Table

  A device data transfer setting table is used to manage multiple device data transfer setting groups.

  Only one device data transfer table can be set in a project.
- Device Data Transfer Setting Groups

  Device data transfer setting groups are used to manage multiple device data transfer entries. Trigger addresses and the transfer timing or cycle can be set.

  Up to 10 device data transfer setting groups can be set in a table.
- Device Data Transfer Entries

  The transfer source address, transfer destination address, and number of elements are set.

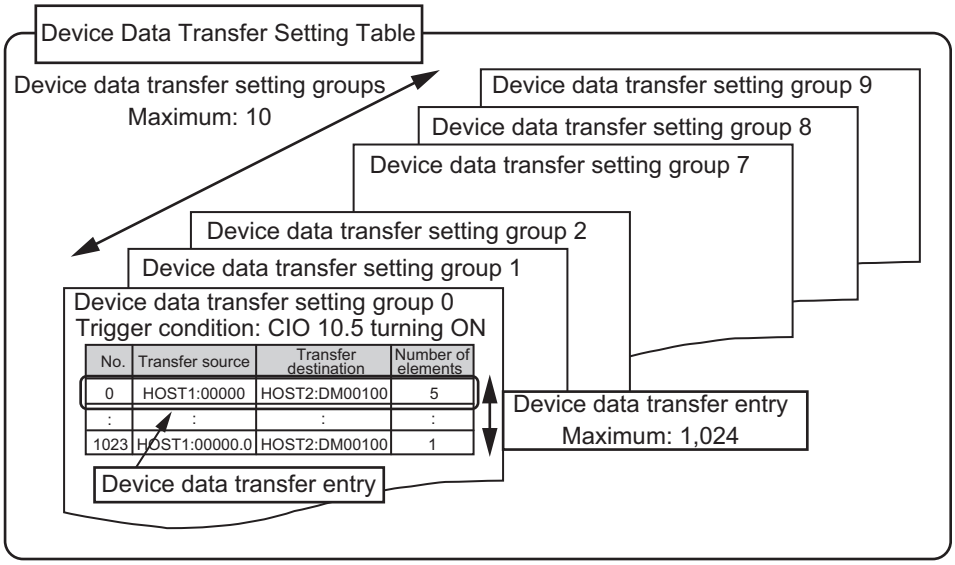
  Up to 1,024 device data transfer entries can be set in each group.

One device data transfer table can be used to transfer up to 1,024 data elements.

The maximum numbers of groups and entries that can be set may be less that those give above depending on the numbers of data elements that are set.

For example, if 1,024 data elements are set for entry 0 of group 0, then no other groups or entries can be set.

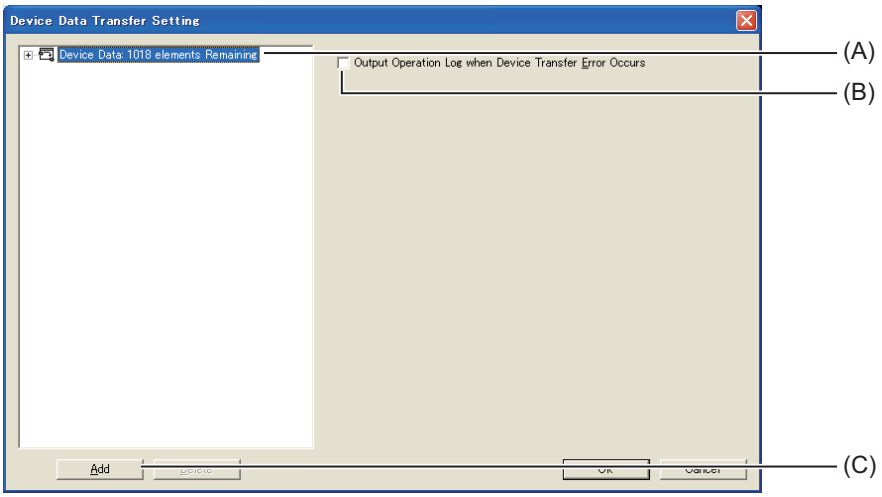
A schematic diagram for device data transfer settings is shown below.



2-22-2 Device Data Setting Dialog Box

Select **Device Data Transfer Settings** from the PT Menu. The Device Data Transfer Setting Dialog Box will be displayed.

● Device Data Transfer Setting Table



No.	Item	Description
(A)	Device data transfer setting table	Displays the device data transfer setting table and the number of elements remaining that can be set.
(B)	Output Operation Log when Device data Transfer Error Occurs	When this check box is selected, a transfer error will be output to the operation log when a device transfer error occurs.
(C)	**Add** Button	Click the **Add** Button to add a device data transfer setting group. (The operation is the same as right-clicking the device data transfer setting table and selecting **Add** from the pop-up menu.)

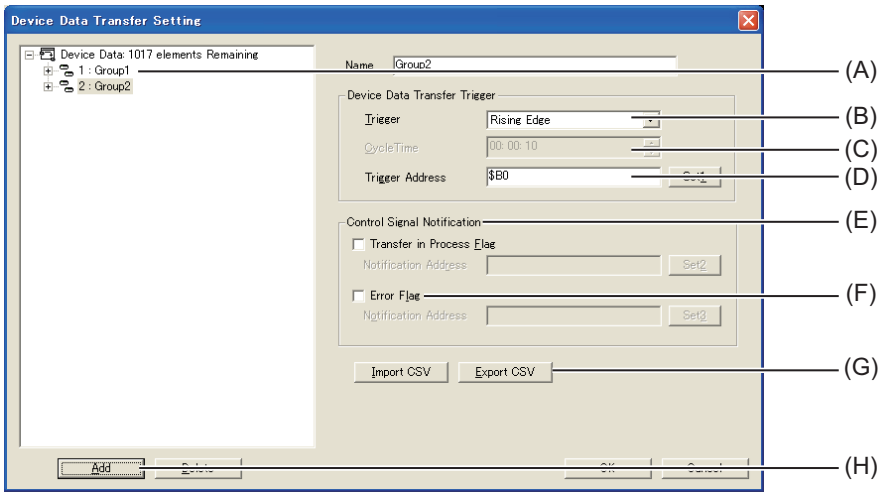
Additional Information

- The Device Data Transfer Setting Dialog Box can also be displayed by selecting Device Data Transfer Setting on the Common Settings Tab Page in the Property Workspace Window.
- You must turn ON $SB39 to output device data transfer errors to the operation log.

Device Data Transfer Setting Groups

Select the device data transfer setting table and click the **Add** Button.

A device data transfer setting group will be added and the settings will be displayed.

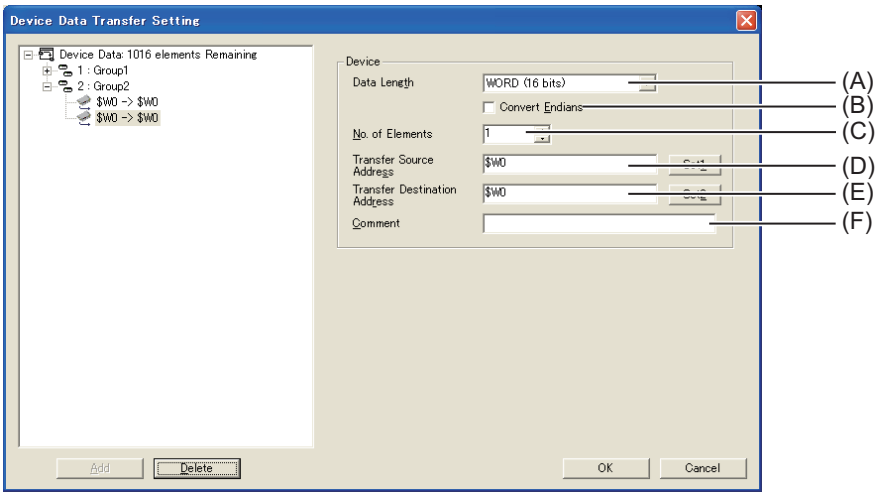


No.	Item	Description
(A)	Device data transfer setting groups	The names of the device data transfer setting groups are displayed. Up to 32 characters can be input for a group name.
(B)	Trigger type	Sets the device data transfer condition. Select from *Rising Edge* (turning ON), *Falling Edge* (turning OFF), or *Cycle*.
(C)	Cycle Time	Sets the cycle time in hours, minutes, and seconds. This setting can be made only when the trigger condition is set to *Cycle*.
(D)	Trigger address	Sets the trigger address. This setting cannot be made if the trigger condition is set to *Cycle*.
(E)	Transfer in Progress Flag	Sets a flag to indicate that device data is being transferred. If you set a flag, set the address of the flag in the *Notification Address* Field.
(F)	Error Flag	Sets a flag to indicate that an error has occurred. If you set a flag, set the address of the flag in the *Notification Address* Field.
(G)	Import CSV and Export CSV Buttons	Imports or exports a CSV file.
(H)	Add	Adds a group to the table if the focus is on the table. Adds an entry to the group if the focus is on a group.

Device Data Transfer Setting Entries

Select the device data transfer setting table and click the Add Button.

A device data transfer setting group will be added and the settings will be displayed.



No.	Item	Description
(A)	Data Length	Sets the data length for the transfer source and destination addresses. The length will be the same for both the transfer source and destination addresses. Select from the following: BIT (1 bit), BYTE (8 bits), WORD (16 bits), or DWORD (32 bits).
(B)	Convert Endians	Select this check box to convert the endian when data is transferred from the source address to the destination address. This setting cannot be made when the data length is set to BIT.
(C)	No. of Elements	Sets the number of elements (1 to 1,024) to be transferred starting from the source address to memory starting from the destination address. This setting is always 1 when the data length is set to BIT.
(D)	Transfer Source Address*1	Sets the transfer source address.
(E)	Transfer Destination Address*1	Sets the transfer destination address.
(F)	Comment	Sets a comment.

*1. This address must be set. A tag cannot be set.

Precautions for Correct Use

- Reading from the transfer source and writing to the transfer destination of the device data transfer function is sometimes performed in multiple transfers. Data concurrency may not be maintained for the data.
- If a communications error or a PT Unit power interruption occurs while data is being read from the transfer source, processing will stop and the data will not be transferred to the destination.
- If a communications error or a PT Unit power interruption occurs while data is being read to the transfer destination device after having been read from the transfer source, processing will stop. Depending on the size of the data transfer, it is possible that only that portion of the data that was read to the destination device before the interruption will be transferred.

When the Size of Memory Accessed by Each Address (i.e., the Access Size) Is Different at the Source and Destination

The data transfers that would be performed for various data lengths and numbers of elements are shown below for when the transfer source access size is 16 bits and the transfer destination access size is 8, 16, or 32 bits.

Note These examples all show the transfer source data and transfer destination data that would be displayed on the screen using Numeral Display and Input objects.

- Transfer Destination Access Size of 8 Bits (without Endian Conversion)

Offset	+0	+1	+2	+3	+4	+5	+6	+7
Transfer source (8 bits)	01	02	03	04	05	06	07	08

Transfer destination (16 bits)		Word offset			
Data length	Number of elements	+0	+1	+2	+3
BYTE	1	0001			
	2	0201			
	3	0201	0003		
	4	0201	0403		
WORD	1	0201			
	2	0201	0403		
	3	0201	0403	0605	
	4	0201	0403	0605	0807
DWORD	1	0201	0403		
	2	0201	0403	0605	0807

- Transfer Destination Access Size of 16 Bits (without Endian Conversion)

Offset	+0	+1	+2	+3	+4	+5	+6	+7
Transfer source (16 bits)	0102	0304	0506	0708	090A	0B0C	0D0E	0F10

Transfer destination (16 bits)		Word offset							
Data length	Number of elements	+0	+1	+2	+3	+4	+5	+6	+7
BYTE	1	0002							
	2	0102							
	3	0102	0004						
	4	0102	0304						
WORD	1	0102							
	2	0102	0304						
	3	0102	0304	0506					
	4	0102	0304	0506	0708				
DWORD	1	0102	0304						
	2	0102	0304	0506	0708				
	3	0102	0304	0506	0708	090A	0B0C		
	4	0102	0304	0506	0708	090A	0B0C	0D0E	0F10

- Transfer Destination Access Size of 32 Bits (without Endian Conversion)

Offset	+0	+1	+2	+3
Transfer source (32 bits)	01020304	05060708	090A0B0C	0D0E0F10

Transfer destination (16 bits)		Word offset							
Data length	Number of elements	+0	+1	+2	+3	+4	+5	+6	+7
BYTE	1	0004							
	2	0304							
	3	0304	0002						
	4	0304	0102						
WORD	1	0304							
	2	0304	0102						
	3	0304	0102	0708					
	4	0304	0102	0708	0506				
DWORD	1	0304	0102						
	2	0304	0102	0708	0506				
	3	0304	0102	0708	0506	0B0C	090A		
	4	0304	0102	0708	0506	0B0C	090A	0F10	0D0E

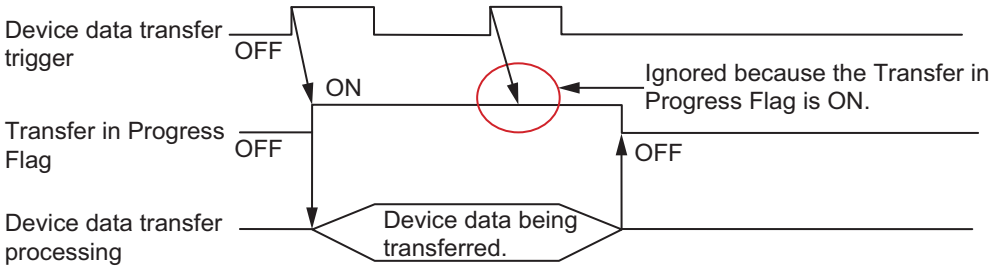
Additional Information

The data will be converted as shown below if the Convert Endians Check Box is selected.

- Data Length: WORD (16 Bits)
  The endianness will be converted every 8 bits.
  Example: 12 34 → 34 12
- Data Length: DWORD (32 Bits)
  The endianness will be converted every 16 bits.
  Example: 00 01 0B 0A → 0B 0A 00 01

Timing of Device Data Transfers

Device data will be transferred when the transfer trigger condition is met and the Transfer in Progress Flag is OFF. The data will therefore not be transferred if the device data transfer trigger for one group occurs when device data is being transferred for another group.

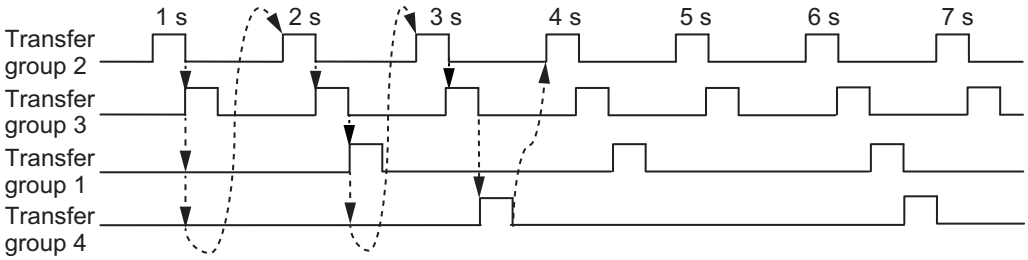


If the rising edge or falling edge is set as the trigger condition, the trigger address will not be automatically turned ON or OFF by the system after the trigger condition occurs. If a cyclic trigger is set, however, the triggers will be sorted with the shortest cycles first and transfers will be executed in order.

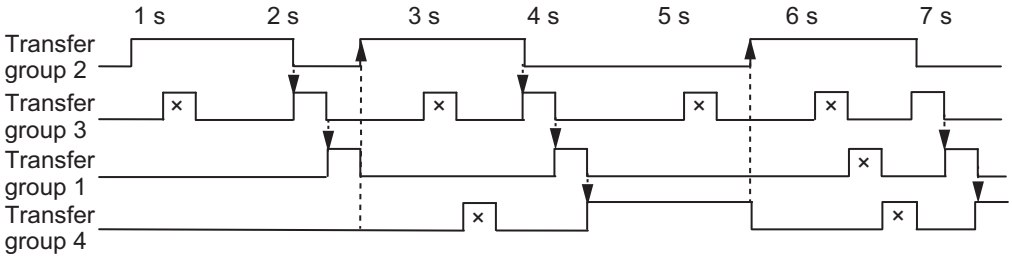
An example of using cyclic triggers is provided below.

Transfer group	Trigger condition
1	Cycle time: 2 s
2	Cycle time: 1 s
3	Cycle time: 1 s
4	Cycle time: 3 s
5	ON

Example 1: Short Device Data Transfer Times

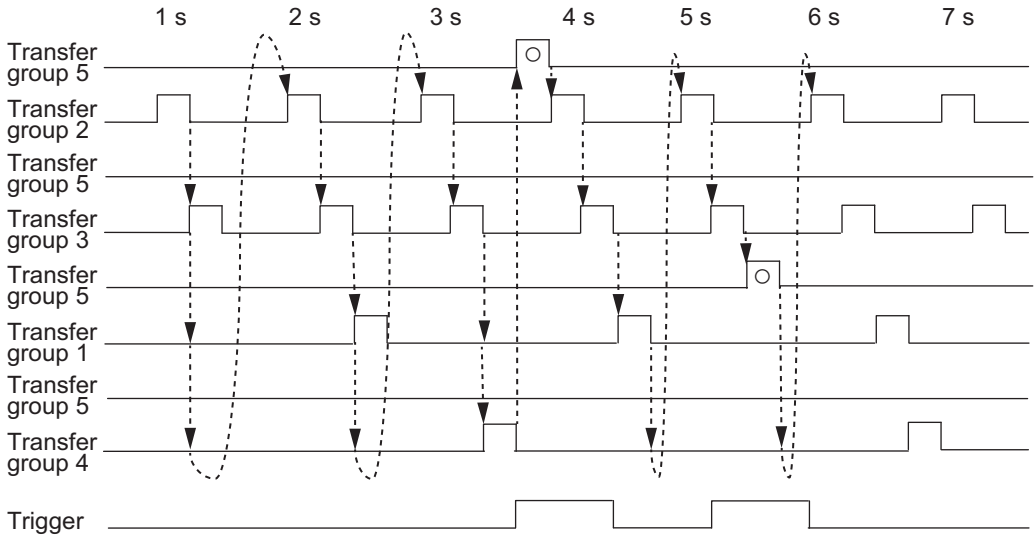


Example 2: Long Data Transfer Times for Transfer Groups 2 and 4



Even if the trigger condition is met, data will not be transferred while another transfer group is being processed. This will create inconsistencies in the transfer cycles.

Example 3: A Trigger Occurs During Operation



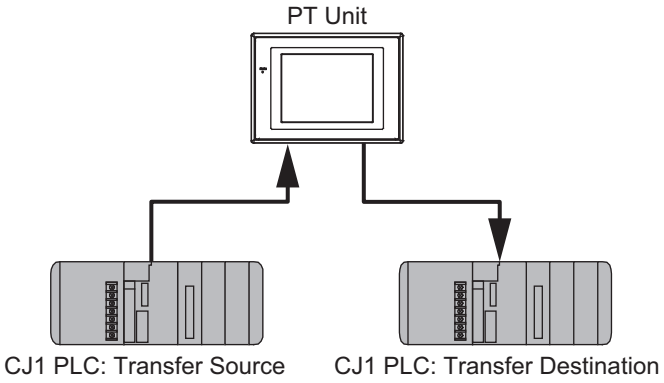
The trigger status is checked each cycle. If a trigger condition is met, cyclic transfer processing will be interrupted to transfer the data.

Reference Data

The times are estimates of the device data transfer times*1 when using NT Links via Ethernet.

The processing times are for the following configuration and conditions.

*1. The transfer time is the time from when the trigger bit turns ON until the Transfer in Progress Flag turns OFF.



- Device data is transferred from the CJ1 PLC that is the transfer source device to the CJ1 PLC that is the transfer destination device.
- The transfer times are for 10 and 1,024 WORD data elements set for one group and one entry.
- The transfer times are for when no other processing is being performed.

Connection method	10 elements	1.024 elements
1:N High-speed NT Link	723 ms	8,733 ms
Ethernet	733 ms	8,915 ms

3

Using PT Units

This section describes how to use PT Unit functions.

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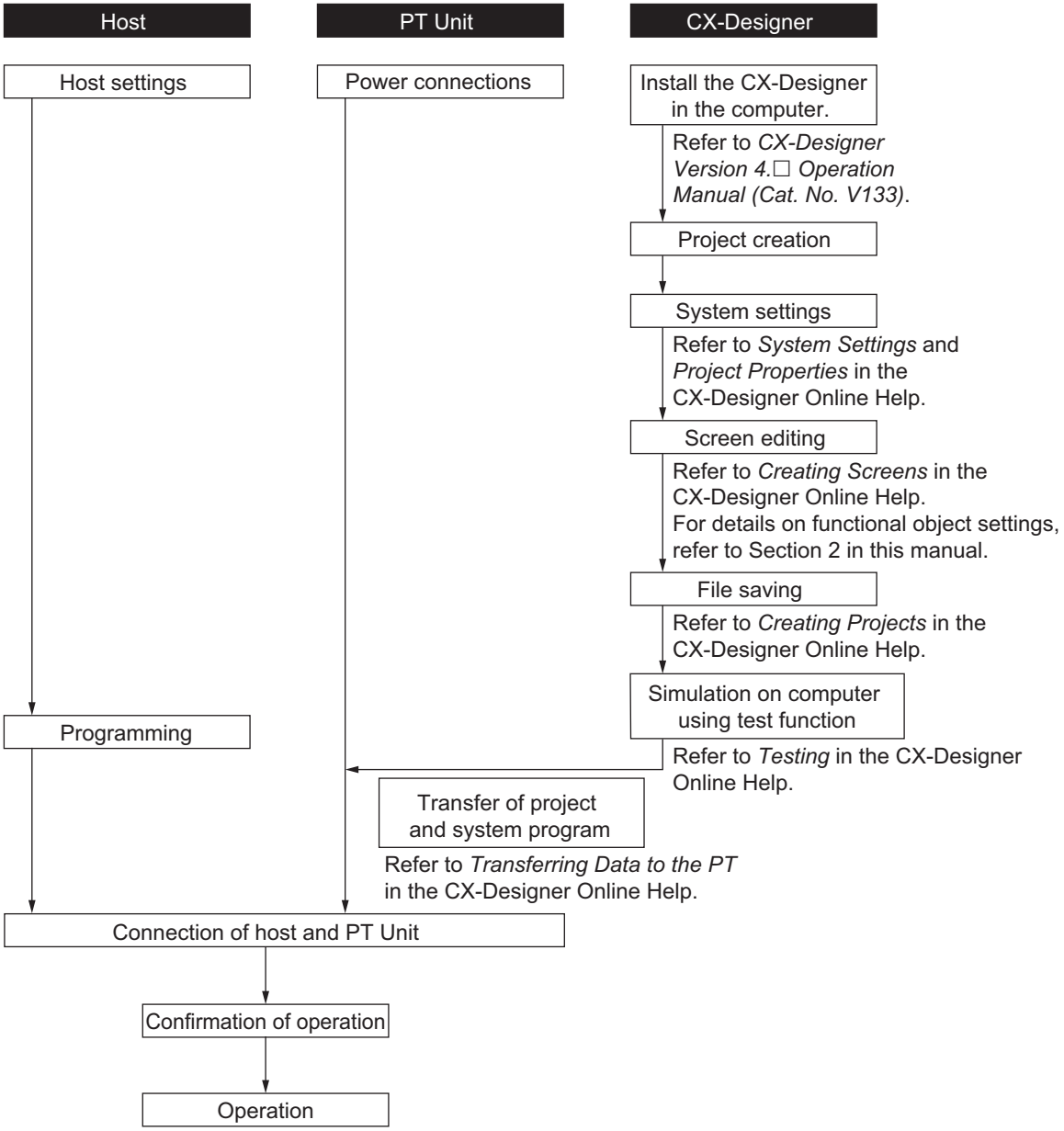
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3-1 Procedure before Operation

Perform the following procedure to start the PT Unit.



Additional Information

- Refer to the *CX-Designer Online Help* for information on how to operate the CX-Designer.
- Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)* for information on how to operate PTs.

3-2 Controlling Buzzers, Backlights, and Display

This section describes how to control the status of NS-B-series PTs, including buzzers, backlights, and screen display.

3-2-1 Sounding Buzzers

NS-B-series PTs have the following 3 types of buzzers.

- Continuous: Continuous buzzer
- Short intermittent: Intermittent buzzer that sounds at 0.5-second intervals.
- Long intermittent: Intermittent buzzer that sounds at 1-second intervals.

Buzzers can be sounded using the following method.

Sounding Buzzers Using System Memory

System memory word $SB provides bits for sounding buzzers.

Set buzzer sound to *ON* under the CX-Designer system settings and select the *Basics* check box in the system memory list.

The system memory is manipulated as shown below when the need arises for a buzzer to sound.

The bits listed on the following table will turn ON depending on the type of buzzer to be sounded.

- Continuous buzzer: $SB12
- Short intermittent buzzer: $SB13
- Long intermittent buzzer: $SB14

3-2-2 Stopping Buzzers

Buzzers can be stopped using the following methods.

- Using system memory.
- Pressing a Command Button to which *Stop buzzer* has been set.

Stopping Buzzers Using System Memory

Turns OFF all bits in system memory $SB used to sound buzzers, i.e., turns OFF $SB12 to $SB14.

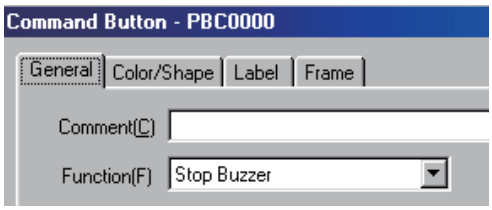


Additional Information

If multiple bits listed above turn ON at the same time, only one buzzer will sound, depending on the order of priority. The order of buzzer priority is continuous buzzer, short intermittent buzzer, then long intermittent buzzer. When buzzers are turned OFF, not only the bit that corresponds to the buzzer but all of the bits listed above are turned OFF.

Stopping Buzzers Using Command Buttons

If Command Buttons are used, the buzzer can be stopped immediately from the PT Unit. Press a Command Button to which *Stop buzzer* has been set under the button property settings.



3-2-3 Controlling Backlights

NS-B-series PTs have the following two types of backlight modes.

- ON: Backlight remain ON.
- Flashing: Backlights alternates between ON and OFF.

Backlights can be controlled using the following method.

Controlling Backlights Using System Memory

System memory word $SB provides bits for controlling the backlight.

The system memory is manipulated as shown below when the need arises to control a backlight.

$SB10, the backlight mode control bit, operates as shown on the table.

- To turn backlight ON: $SB10 turns from ON to OFF.
- To make backlight flash: $SB10 turns from OFF to ON.

3-2-4 Turning OFF Screen Display

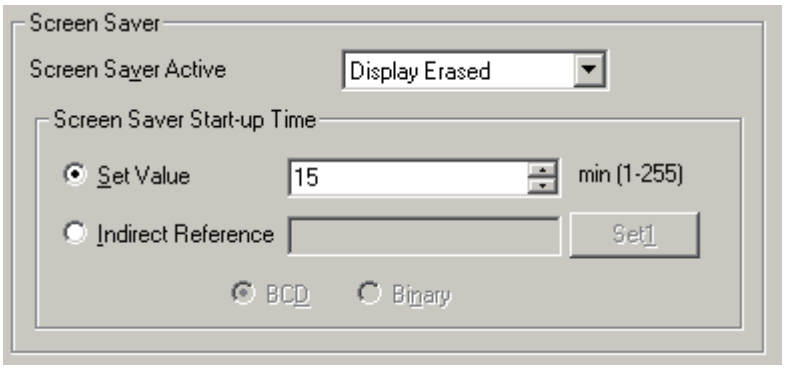
If the screen display is set to turn OFF when not required, the life of the backlight can be extended. The backlight also turns OFF automatically while the screen display is turned OFF.

Screen display can be turned OFF using the following method.

Turning OFF Screen Display Using Screen Saver

Under *System Menu – PT Settings*, set *Screen Saver to Display Erased* and set the time from the last operation until the screen saver will be started (1 to 255) under *Screen Saver Start-up Time*.

Specify a number from 1 to 255 in the Set Value Field to set a constant value for the screen saver start-up time. If an indirect specification is used, the value of the set communications address will be the screen saver start-up time. In that case, set BCD or binary as the storage type.



Additional Information

If the screen saver start-up time is specified indirectly, store 1 to 255 at the specified communications address.

The screen saver will not start if a value outside this range or a value that cannot be expressed by the specified storage format is stored.

3-2-5 Displaying Cleared Screens

If the screen display is turned OFF using the screen saver function, the screen display can be turned ON using the following method.

Displaying Cleared Screens Using Touch Panels

Cleared screens are re-displayed when touch panels are pressed.

Any position on the screen can be pressed.



Additional Information

- Even if a functional object position is touched, the first touch will re-display the screen and the functional object will not react.
- The screen saver is automatically cleared in the following situations.
  - Base screens switched (automatic screen switch from system memory, macro, or because of alarm or event)
  - Pop-up screens opened, closed, or moved (automatic screen switch from system memory, macro, or because of alarm or event)
  - Error (Error Dialog Box displayed)
  - The value of an indirectly specified address is changed (if the screen saver start-up time is indirectly specified)

3-3 Screen Display and Notification

This section describes how to switch screens displayed on NS-B-series PTs and how to check the screen number for the displayed screen.

3-3-1 Switching Screens

Screens can be switched using the following methods.

- Manipulating system memory.
- Pressing a Command Button or Multifunction Object with the *Switch screen* function.
  a) Using the alarm/event switch screen function.
  b) Using the macro function SHOWPAGE or SHOWPAGEBCD.

Manipulating System Memory to Switch Screens

System memory area $SW has words for switching screens.

- If a screen number is written to $SW0, the display will switch to that screen.

Screen page numbers 0 to 3,999 are set to $SW0 in BCD (0 to F9F in binary).



Additional Information

- Pop-up screens set to $SW0 will be ignored.
- Non-existent screen numbers set to $SW0 will be ignored.

Manipulating System Memory to Switch Pop-up Screens

Pop-up screens can be switched from the system memory using the following method.

- Store the desired pop-up screen page numbers to words $SW1, $SW4, and $SW7.

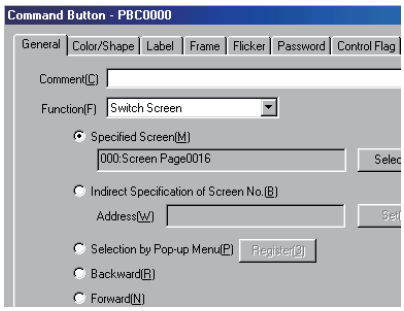


Additional Information

Normal screens set to $SW1, $SW4, and $SW7 will be ignored.

Using Command Buttons or Multifunction Objects to Switch Screens

Screens can be switched on the spot from the PT Unit by using Command Buttons. Press a Command Button to which *Switch screen* has been set under the button property setting.



There are seven types of screen switching that can be performed with Command Buttons.

Specified screen	Switches to the screen (fixed) for the set page number.
Indirect Specification of Screen No.	Switches to the screen page number (specified binary or BCD) for the contents of the specified address.
Selection by Pop-up menu	Selects the desired screen from a pop-up menu.
Backward	Switches screens by going back through the last 32 screen switches (screen display history).
Forward	Switches screens by going forward through the last 32 screen switches after using *Backward* function.
Next Page (Multifunction Objects only)	Displays the screen at the next page number.
Previous Page (Multifunction Objects only)	Displays the screen at the previous page number.

Additional Information

- The display cannot be switched to System Menu using *Switch to specified screen*.
- The display can be switched to System Memory (Data Initialization Screen) by specifying 4002 (BCD)/FA2 (binary) as the screen number under *Switch to Indirect Specification of screen number*.
- The display cannot be switched to System Menu using *Backward* or *Forward*.

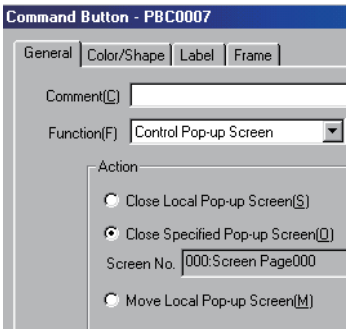
Using Command Buttons or Multifunction Objects to Open Pop-up Screens

Pop-up screens can be displayed by using Command Buttons. The settings are the same as for opening normal screens. Specify a pop-up screen when a screen needs to be specified.

Using Command Buttons or Multifunction Objects to Close or Move Pop-up Screens

Pop-up screens can be closed or moved by using **Command** Buttons.

Press a **Command** Button to which control *Pop-up screen* has been set under the button property setting.

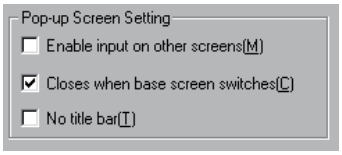


Close local pop-up screen	Closes the current pop-up screen if the Command Button is inside the pop-up screen.
Close specified pop-up screen	Closes a specified pop-up screen.
Move local pop-up screen	Enables the current pop-up screen to be moved if the Command Button is inside the pop-up screen.

Closing Pop-up Screens when Normal Screens Switched

Pop-up screens can be closed at the same time that the base screen used to open the pop-up screen is switched to another screen.

Select *Closes when base screen switches* on the Size/Pop-up Tab Page found in the pop-up screen property setting under *PT – Screen/Sheet properties*.

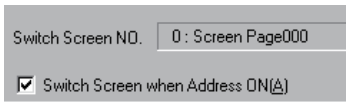


Using Alarms/events to Switch Screens

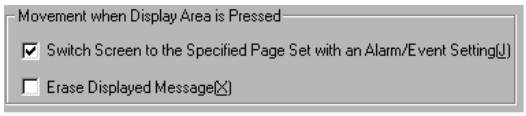
Screens can be switched when alarms or events occur or when an alarm or event display object is pressed.

Alarms/events are functions that monitor addresses (bits). When the bit turns ON a corresponding message can be displayed. The display can also be switched to a corresponding screen.

If *Switch Screen when Address ON* is selected when alarms/events are registered, the display will automatically switch to the screen specified under *Switch screen No.* when an alarm or event occurs.



Furthermore, if *Switch screen to the specified page set with an alarm/event setting* is selected in the alarm/event display object setting, the display will switch to the specified screen when the alarm/event display object is pressed on the screen during an alarm or event.



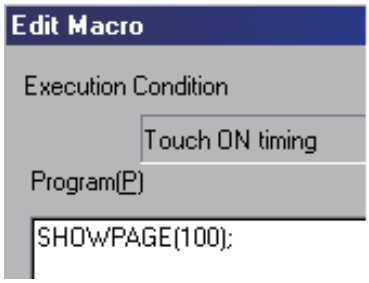
Additional Information

Alarms/events have a priority order, if multiple alarms occur at the same time, the display will switch to the screen with the highest priority.

Using Macro SHOWPAGE to Switch Screens

The SHOWPAGE function provided with the macro function is used to switch screens.

Specify the desired screen number in the SHOWPAGE argument.



Using Macro SHOWPAGE to Open Pop-up Screens

The SHOWPAGE function provided in the macro function is used to switch screens.

The settings are the same as for opening normal screens. Specify a pop-up screen number when a screen needs to be specified.

3-3-2 Finding Current Screen Numbers

NS-B-series PTs have a function to notify the host that screens have been switched by the PT Unit and to notify the host of the new screen number.

The host is informed the timing of the screen switch and the new screen number using the following method.

Reading System Memory

Screen switch notification is provided in the following system memory areas.

Screen switch timing	*Screen switch strobe* at system memory bit $SB2. Turns ON when screens are switched and turns OFF automatically when the host is notified.
Current screen number	*Current screen number* at system memory word $SW0.
Current pop-up screen number	*Current pop-up screen 1 number, Current pop-up screen 2 number,* and *Current pop-up screen 3 number* at system memory words $SW1, $SW4, and $SW7. Store the screen numbers for pop-up screens 1, 2, and 3.

- Screen switch timing

  Check the rising edge of $SB2 in the host program.

  When bit $SB2 turns ON, it means that a screen has been switched by operation.

- Current screen number

  The host program reads the *Current Screen Number* from $SW0 and the *Current pop-up screen 1 number, Current pop-up screen 2 number,* and *Current pop-up screen 3 number* from $SW1, $SW4, and $SW7.

3-4 Changing Numeral and Character String Display

This section describes how to change the display for numerals and character strings.

Refer to *2-8 Common Functional Object Functions* on page 2-72 for information on the functional objects used to display numerals and character strings. These functional objects are numeral display and input objects, string display and input objects, and label objects.

3-4-1 Methods for Changing Numeral and Character String Display

The following methods can be used to change numeral and character string display on NS-B-series PTs.

- Change the contents of addresses allocated to numeral display and input objects.
- Change the contents of addresses allocated to string display and input objects.
- Indirectly specify text character strings.
  a) Use Indirect Specification of String Tables for Labels.
  b) Using the label message display function
  c) Changing the contents displayed using the contents display function
- Press a Command Button with the Key Button function.
- Switch labels.

Changing Address Contents for Numeral Display and Input Objects

The display can be refreshed for numeral display and input objects if a host address is allocated to the object. The display is refreshed simply by changing the contents of that address in the host.

The address referenced by one numeral display and input object can be switched by modifying the index of the address.

Perform the following procedure to modify indexes.

1 Set index Ix (x:0 to 9) to the allocated address under the numeral display and input object property setting made using CX-Designer.

Example: HOST 1: DM00000I0

2 During operation, change the contents of the word in system memory ($SW27 to $SW36) that corresponds to index Ix (x: 0 to 9).

The contents are set in BCD.

Example: If 5 (BCD) is set to system memory word $SW27 which corresponds to I0: HOST 1: The numeral display and input object to which DM00000I0 is set will display the contents of HOST 1: DM00005.

Changing Address Contents for String Display and Input

Display can be refreshed for string display and input objects if words on the host at which a character code is stored are allocated as the address. The display is refreshed simply by changing the contents of those words from the host.

The displayed address by one string display and input object can be switched by modifying the index of the address.

The method for modifying indexes is the same as for numeral display and input objects.

Additional Information

ASCII and Unicode (UTF-16/UTF-8) character codes can be used for string display and input objects.

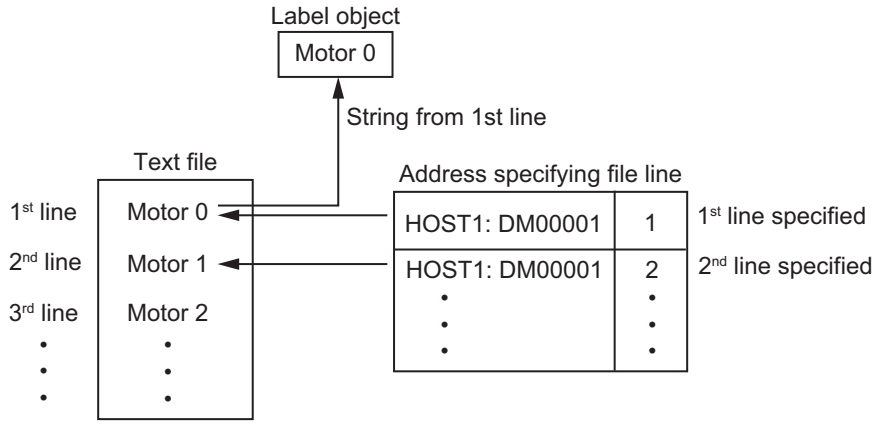
Indirectly Specifying Text Character Strings

Label objects normally display fixed character strings, but they can also be used to read and display character strings from text files. Text files can be selected from any directory but will be copied automatically when the text file is specified under the Properties Setting Dialog Box to the folder where the project files are stored.

1 Select *Indirect Reference of string* when making the label property setting using CX-Designer and set text file where the string to be referenced is stored and specify the address.

2 The string from the specified line (when a text file line number is specified) will be displayed when the contents of the set address are changed during operation.

Refer to *2-13-1 Label* on page 2-282 for details.



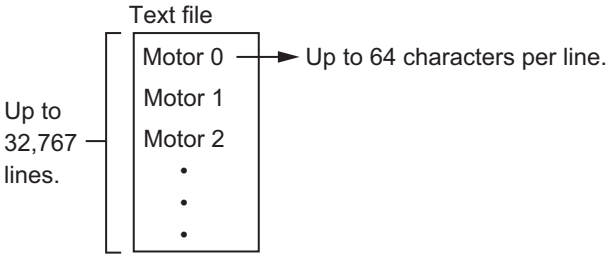
Create a text file in the following format.

(The text file outlined shown above is used as an example.)

- File extension: txt
- File name: Up to 8 characters + txt

  The following characters can be used in file names.

  Alphanumeric characters, underscore (_), dollar signs ($), and periods (.).



Additional Information

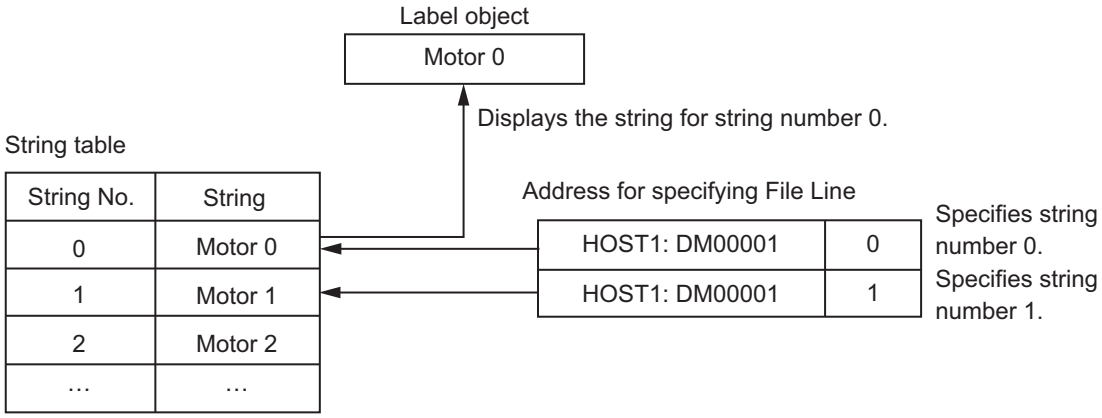
- Character strings cannot be indirectly specified if vector fonts are specified for the label object.
- Up to 32,767 lines can be set but this may depend on the text editor being used.
- If the number of characters per line specified in the text file exceed the number of characters that can be displayed by the label object, only the portion of the character string from the beginning of the string to the last character that can be displayed by the label object will be displayed.

  Example:



Using Indirect Specification of String Tables for Labels

Labels can be used to display strings read from a string table.



1 Select **PT – String table settings** from the CX-Designer to display the string table.

Register the string to be displayed.

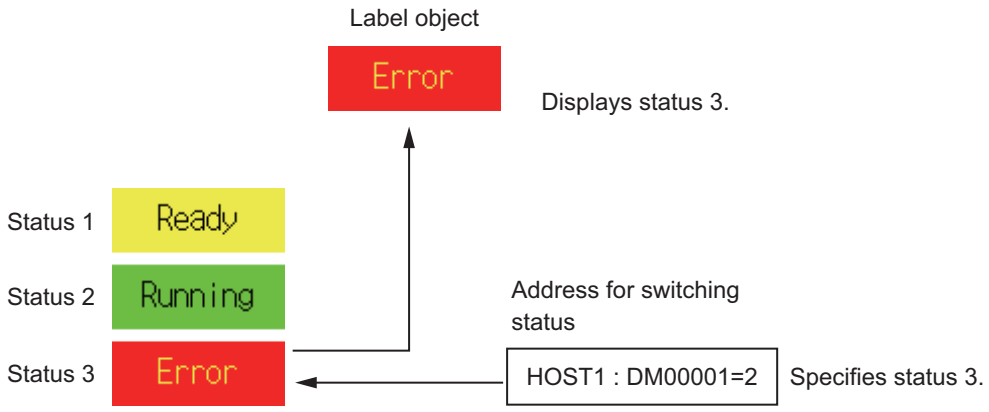
2 Select the *Refer to the String Table* checkbox when making the label property settings.

3 Select the *Indirect* checkbox and set the communications address.

Refer to *2-13-1 Label* on page 2-282 for details.

Using the Label Message Display Function

This function registers a display string and background color for each status number set for the label. Any set status can be specified for display.



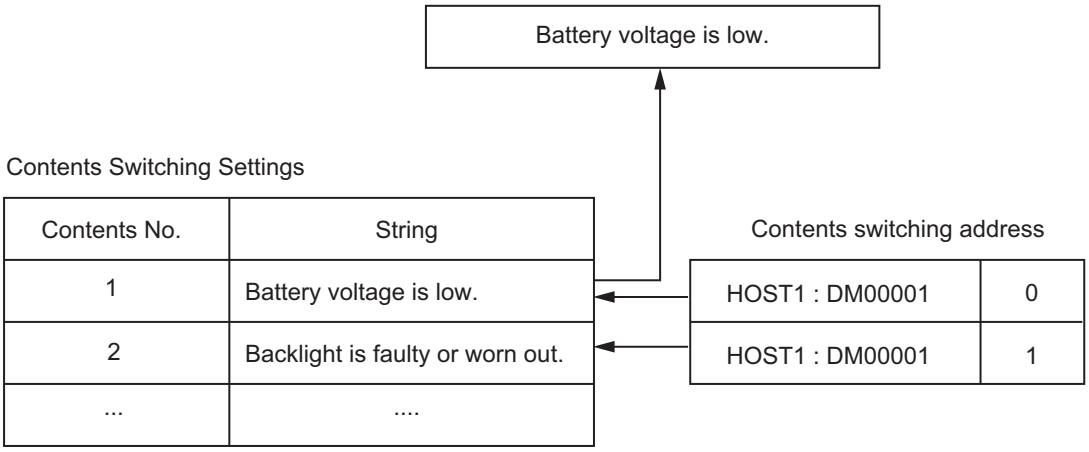
1 Select the *Use as a Message Display* checkbox on the General Tab Page when making the label property settings from the CX-Designer.

2 Set the string to be displayed, the background color, and other settings on the Message Tab Page.

Refer to *2-13-1 Label* on page 2-282 for details.

Changing the Contents Displayed for a Contents Display

The Contents Display Object can display the contents registered for a screen.



1 The contents display is placed in screens using CX-Designer.

2 Select the *Display a string* checkbox on the General Tab Page when making the contents display property settings.

3 Set the *No. of Contents* and *Address for switching Contents* on the Edit Contents toolbar in CX-Designer.

4 Enter the contents number to be edited in the input field for *Contents No.* on the Edit Contents tool bar.

5 Select **Contents Display**. Press the **Space** Key and enter the string to be displayed.

6 Repeat steps 4 and 5 for the number of contents to be set.
Refer to *2-19 Machine Navigator Function* on page 2-432 for details.

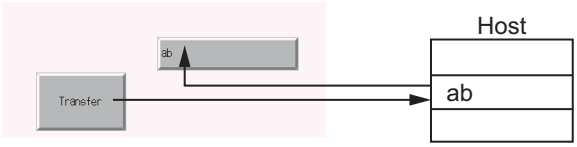
Using Command Buttons with Key Button Function

1 Select **function – Key button** on the Command Button General Tab Page.

2 Select the destination.

● Indirect Specification of Target Strings

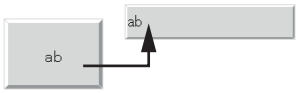
Specify the address where the numeral or string data is stored and the number of transmit words. Select **Transmit type - Indirect specification of string** and specify the address and number of words.



If more characters than are set for the character string display and input object are transferred, only the set number of characters will actually be transferred. For example, if 10 characters are transferred to a character string and display object to which only 3 characters are set, only three characters will actually be transferred.

● Transferring Label Strings Set to Command Buttons

Select **Transmit type – Label string**.



● Transferring Specified Strings

Select **Transmit type – specified string** and set the string to be transferred.

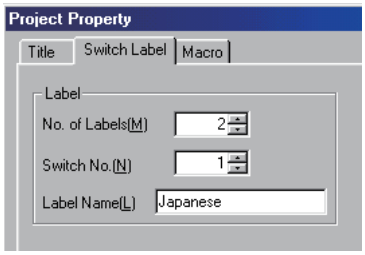


Changing Label Strings by Switching Labels

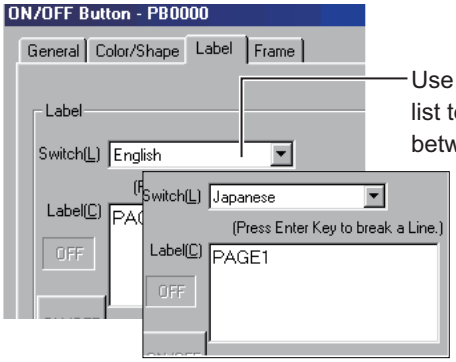
Multiple strings can be set to functional object labels using CX-Designer.

The functional object label display can then be changed by switching the labels.

1 Set the number of label switches and the name of each corresponding label in the Project Property Window's Switch Label Tab Page. (Select **PT – Project Properties** and click the **Switch Label** Tab.)



2 Set the label string for each corresponding label in the functional object property setting (Label Tab Page).



3 Use the following procedure to switch label displays during operation.

$SW10 stores the current label number. Write a label number directly to $SW10 to switch to that label.

3-5 Displaying Graphs

This section describes how to change displayed graphs. Data log graphs will be used as an example.

3-5-1 Changing Graph Displays

Graph display can be changed using the following methods.

- Using icons.
- Using *address for updating display*.

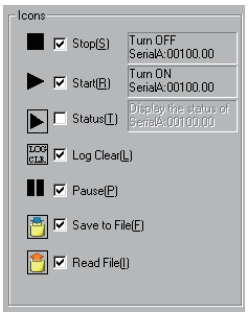
Refreshing Display Using Icons

Special icons can be added to graphs.

1 Make the data log settings when creating a screen using CX-Designer and create a data log graph.

A special icon will be added to the data log graph.

2 The data log graph display will change during operation based on the functions of the icon pressed.



Multifunction Object Data Log Control can execute the same functions as icons.

Changing Display Using Addresses for Updating Display

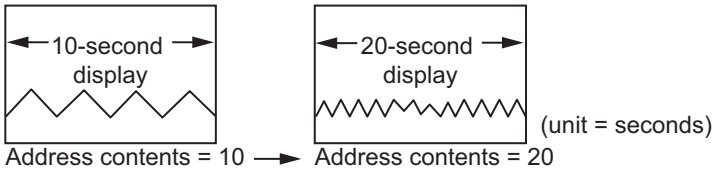
Refreshing of data log graph display can be controlled by the contents of specified addresses.

● Changing Time Axis Scales

The graph can be displayed using a different specified time scale.

1 Select **Scale for Time Axis – Indirect** under the data log graph property setting and specify the address that will specify the scale.

The scale displayed on the graph will change based on the contents of the specified address.



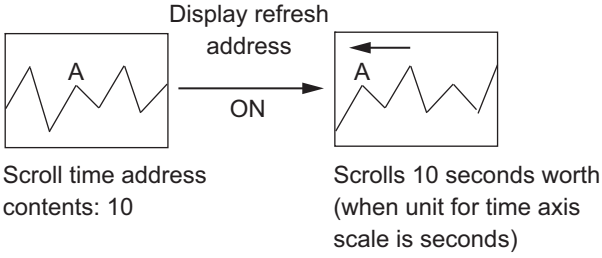
Additional Information

Nothing will be displayed on the graph if the content of the specified address is 0 or a lower number.

● Refreshing Graph Display at Specified Intervals

Graphs can be scrolled and the display refreshed at any time interval based on a specified time.

1 Select *Set Address for updating display* under the data log graph property setting, and then set an address for specifying refreshing the display under *Scroll Control Flag* and an address where the scroll time is stored under *Address for Specifying Scroll Interval*.



3-6 Inputting Numeral and Character Strings

This section describes how to input numerals and character strings.

3-6-1 Inputting Numerals

The following two objects are used to input numerals.

- Numeral display and input objects
- Thumbwheel switches

Inputting to Numeral Display and Input Objects

There are two methods for inputting to numeral display and input objects.

- Input from a keypad.
- Input from Command Buttons.

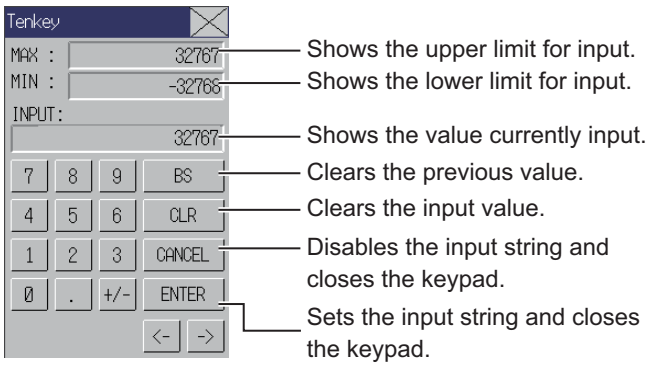
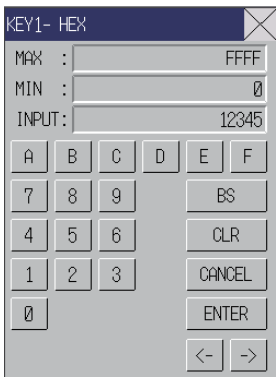
● Inputting From a Keypad

1 In the numeral display and input property setting on the Keypad Tab Page, set either *system keypad* or *Large system keypad* as the input method.

2 A keypad will be displayed during operation when a numeral display and input object is pressed.

The keypad displayed for input will depend on the display type selected on the General Tab Page.

- List of Keypads

Display type	Keypad Dialog Box
Decimal Octal Binary	
Hexadecimal	

Inputting from Command Buttons

1. In the numeral display and input property setting on the Keypad Tab Page, set either *Input from pop-up screen* or *Other Input method (e.g., Command Button)* as the input method.
2. Create a Command Button with a key button function on the same screen or pop-up screen.
3. If *Open pop-up screen* has been specified, the specified pop-up screen will be displayed when the numeral display and input object is pressed during operation. Command buttons inside the pop-up screen are used to enter numerals.
4. If *Other method (e.g., Command Button)* is specified, numerals are entered using the command buttons in the same screen.

- Command Button Settings
  (1) Set *Key button* under the Command Button property setting on the General Tab Page.
  (2) Set *Transmit to*.
  (3) Set *Transmit type*. Select *label string* and set 0 to 9 and A to F to the Command Button labels to create a button that inputs 0 to 9 and A to F like a tenkey pad. Select *control code* and specify a control code to create BS and Enter Command Buttons.

  Refer to *2-9-3 Command Buttons* on page 2-147 for details on Command Button settings.

Inputting Decimal Fractions

Unit and scale must be set using the CX-Designer for decimal fraction input. The number of decimal points must also be specified.

Refer to *2-8 Common Functional Object Functions* on page 2-72 for details on numeral display and input setting.

Maximum and Minimum Limits for Input

NS-B-series PTs can check maximum and minimum limits when setting numeral input, to ensure that illegal values that may affect the system are not input. Errors are prevented because an error message is displayed if a value outside the range is input. The maximum and minimum input limits can be set when numeral display and input objects are created using CX-Designer.

Refer to *2-8 Common Functional Object Functions* on page 2-72 for details on numeral display and input settings.

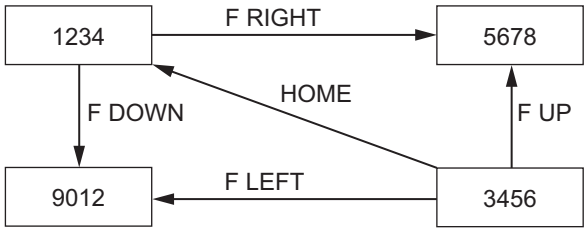
● Moving Focus

In addition to moving the focus to a numeral display and input object by touching the screen, focus can also be moved using Command Buttons.

Set *Key button* for the Command Button to send a control code for moving the focus.

Refer to *2-9-3 Command Buttons* on page 2-147 for details on Command Button settings and control codes.

Example



The focus can also be moved automatically to the right or down once the input has been confirmed, if the numeral display and input object is created using the table function.

Precautions for Safe Use

Always use set maximum and minimum limits to ensure the safety of numeral display and input objects.

Inputting to Thumbwheel Switches

Thumbwheel switches are used to input numerals by using the + and - Buttons for each digit.



The value for that digit will increase or decrease by 1 each time the + or - Button is pressed. The changed value will be stored to the specified address each time the + or - Buttons are pressed. Unlike numeral display and input objects, there is no button operation required to confirm the input.

● Changing Signs

If thumbwheel switches have signed display, the sign is changed each time the + or - Button of the digit displaying the sign is pressed.

● Inputting Decimals

To input decimals, it is necessary to use CX-Designer to set the unit and scale and the number of decimal digits to be input.

Refer to *2-8 Common Functional Object Functions* on page 2-72 for information on setting units and scales.

Additional Information

- Decimals can be input only when the display format is decimal.
- The scale for a thumbwheel switch must be set to a power of 10, and the offset must be set to 0. If any other values are set, the thumbwheel switch may not operate properly.

● Maximum and Minimum Limits for Input

NS-B-series PTs can check maximum and minimum limits when numerals are input (each time the + or - Button is pressed), to ensure that illegal values that may affect the system are not input. Errors are prevented because an error message is displayed if a value outside the range is input. The maximum and minimum input limits can be set when thumbwheel switches are created using CX-Designer.

Refer to *2-12-3 Thumbwheel Switches* on page 2-261 for details on Thumbwheel Switches setting.

3-6-2 Inputting Character Strings

Character strings are input using string display and input objects.

Inputting to String Display and Input Objects

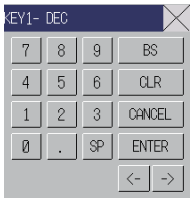
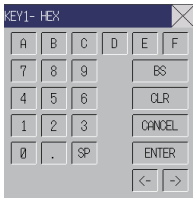
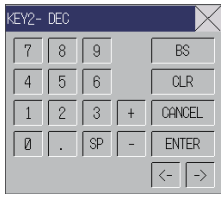
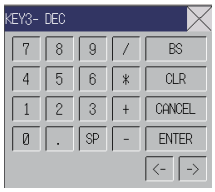
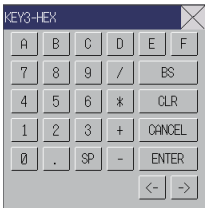
There are two methods for inputting to string display and input objects: Input from a keypad and Input from Command Buttons.

● Inputting From a Keypad

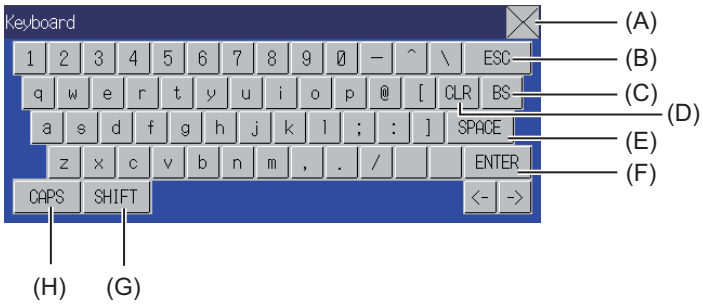
1 In the string display and input property setting on the Keypad Tab Page, set either *system keypad* or *Large system keypad* as the input method.

2 A keypad (virtual keyboard) will be displayed during operation when a string display and input object is pressed.

List of Keyboards

Full keyboard	Decimal key (unsigned)	Hexadecimal key (unsigned)	Decimal key (signed)
			
Hexadecimal key (signed)	Decimal key (signed, with * and /)	Hexadecimal key (signed, with * and /)	
			

Operating Virtual Keyboard



The operation of virtual keyboards is almost the same as a normal keyboard. Refer to *Inputting From a Keypad* on page 3-21 in the previous section for information on operating keyboards other than the full keyboard.

No.	Contents
(A)	Closes the virtual keyboard.
(B)	Disables the input character string and exits the virtual keyboard.
(C)	Deletes 1 character from the immediately preceding character string.
(D)	Deletes the character string stored at the first word.
(E)	Inserts a space each time this button is pressed.
(F)	Sets the input character string and exits the virtual keyboard.
(G)	Changes the characters that can be selected to !, $, #, %, and other symbols. This does not affect upper or lower case for alphabet letters.
(H)	Changes the input mode to upper case when alphanumeric input mode is selected.

Inputting from Command Buttons

1 In the string display and input property settings on the Keyboard Tab Page, set either *Input from pop-up screen* or *Other Input method (e.g., Command Button)* as the input method.

2 Create a Command Button with a key button function on the same screen or pop-up screen.

3 If *Input from pop-up screen* has been specified, the specified pop-up screen will be displayed when the string display and input object is pressed during operation. Command buttons inside the pop-up screen are used to enter character strings.

4 If *Other Input method (e.g., Command Button)* is specified, strings are entered using the command buttons in the same screen.

- Command Button Settings
  (1) Set *Key button* under the Command Button property settings on the General Tab Page.
  (2) Set *Transmit To*.
  (3) Set *Transmit type*. Select *control code* and specify a control code to create BS and Enter Command Buttons.

  Refer to *2-9-3 Command Buttons* on page 2-147 for details on Command Button settings.

- Moving Focus

  In addition to moving the focus to a string display and input object by touching the screen, focus can also be moved using Command Buttons.

  Set a *Key button* for the Command Button to send a control code for moving the focus. Refer to *2-9-3 Command Buttons* on page 2-147 for details on Command Button setting and control codes.

  The focus can also be moved automatically to the right or down if the string display and input object is created using the table function.

3-7 Using Alarm/Event Summary History Functions

This section describes how to use alarm/event summary/history functional objects.

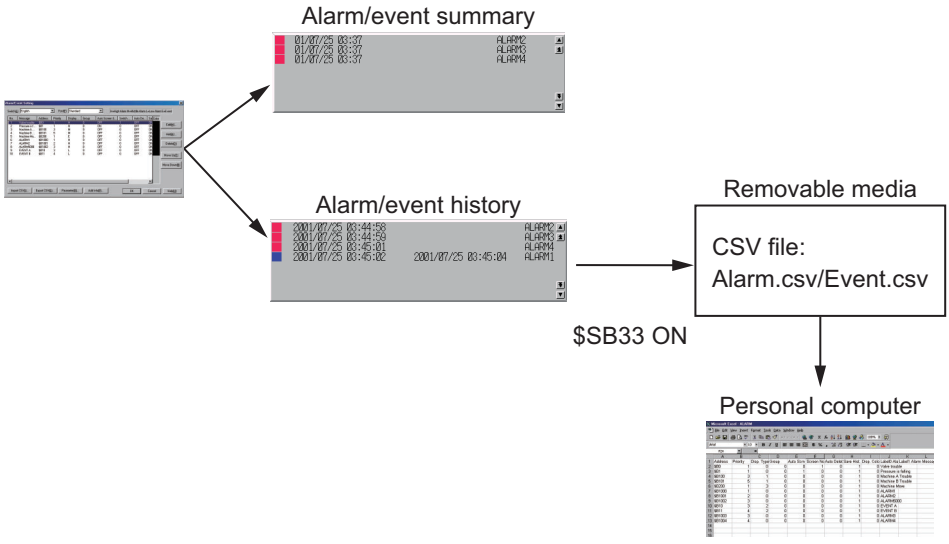
Alarms/events monitor host bits and display messages for the user when the bits turn ON.

Alarms/events can be used to record errors, operation start, and other events.

The main features of the alarm/event summary function (current alarm display) are to receive notification of alarms/events and display messages set to the alarms/events and a list of when the alarm/event occurred and when it was cleared. The alarm/event history function (alarm history display) displays messages set to past or current alarms/events and a list of when the alarms/events occurred and when they were cleared.

Alarm/event summary histories can be checked under the PT System Menu (histories only) and summaries and histories can be checked during an operation if an alarm/event summary/history functional object is placed on the screen.

Alarm/event histories recorded on PTs can be saved to a CSV-format file and saved on removable media devices by turning ON system memory bit $SB33.

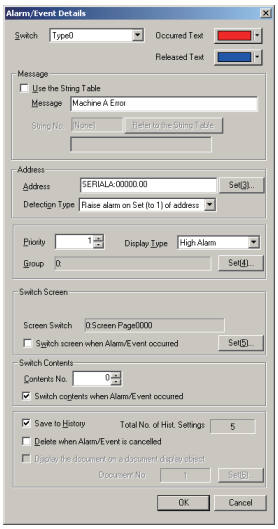


When opened in Excel.

Alarms/Event Registration

Monitored alarms/events can be registered using the following dialog box.

Refer to *2-14-1 Outline* on page 2-308 for details on each setting item.



Checking Without Stopping Operation

The status of monitored bits (alarm current/cancelled) and records of status changes can be checked during operation.

1 Create a screen using CX-Designer and create an alarm/event summary & history object on the screen.

Set whether the current alarm/event summary or history will be displayed.

Select *Display data/Currently Occurred Alarms* to display the summary and select *Display data/Alarm history* to display the history.

Refer to *2-14-3 Alarm/Event Summary and History* on page 2-324 for information on other settings.

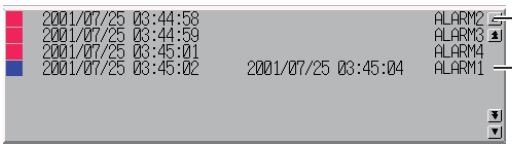
2 Open the screen with the alarm/event summary & history object during operation.

The alarm/event summary and history object displays the data recorded at that point. If the monitored host bit is turned ON, the message set to that bit will be displayed. Depending on the settings, the date and time the alarm/event occurred and was cancelled, the group number, display type, priority order, confirmation date and time, and number of occurrences will be displayed.



The previous display is cleared if the same alarm occurs.

Example alarm/event summary



Past alarms are also recorded.

Example alarm/event history

For alarm/event summaries, if an alarm or event that is currently displayed occurs again, the record for the last occurrence will be cleared and only the latest information displayed.

For alarm/event histories, however, previous records are not cleared from the list. The latest information is simply added to the list.

3 When a current alarm or event object is pressed, the alarm/event ID number can be written to the address specified at registration and switched to the registered screen.

4 To initialize alarm/event history data, either turn ON system memory bit $SB32 or select *Initialize alarm/event history* on the Initialize Tab Page under the System Menu.

● Scroll Buttons and Icons

Alarm/event summary and history objects have scroll buttons and icons allocated to them. Use the scroll buttons and icons to scroll through lists and change the display order.

- Scroll Buttons

  Scrolls up and down one line or a specified number of lines.

- Icons

  The following 11 icons are available.

Icon	Description
	Displays from latest alarm/event.
	Displays from oldest alarm/event.
	Displays from highest priority alarm/event.
	Displays from lowest priority alarm/event.
	Displays from most frequent alarm/event.
	Displays from least frequent alarm/event.
	Deletes selected alarms.
	Checks selected alarms.
	Checks all alarms.
	Cancels all alarm’s check.
	Changes display type (high alarm, middle alarm, low alarm, event).

Additional Information

- The user can select whether or not to use scroll buttons and icons. Refer to *2-14-3 Alarm/Event Summary and History* on page 2-324 for information on settings.
- Multifunction Object *Scroll Object* and *Alarm/Event Control* functions can execute similar functions to icons.

Checking from System Menu

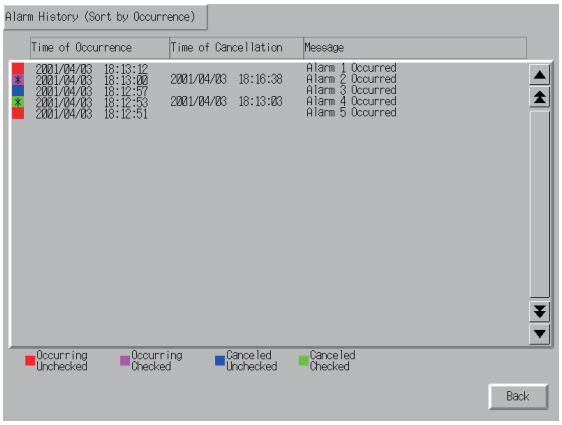
Recorded alarm history data can be checked from the System Menu.

1 Register an alarm/event.

The procedure is the same as *Checking Without Stopping Operation* on page 3-27, described in the previous section. (The settings are shared by all projects.)

2 Display the Alarm History Screen from the Special Screen Tab Page under System Menu.

The recorded alarm history data will be displayed.



3 Alarm histories can be displayed in order of occurrence and order of frequency.

4 The method for initializing alarm/event history data is the same as outlined under *Checking Without Stopping Operation* on page 3-27.

3-8 Using Operation Log Functions

This section describes how to use operation log functions.

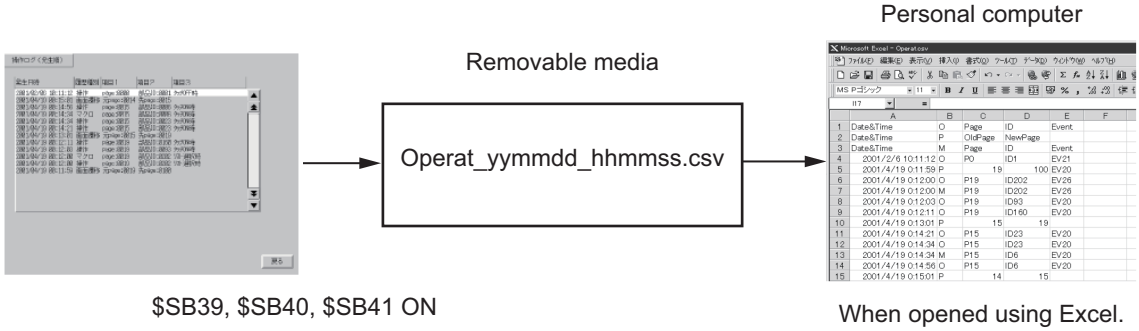
Operation logs record the following operation histories.

- Functional object operation history
- Screen display history
- Macro execution history
- Communications Address (Bit) Value Change History

Recorded data can be stored as a CSV file and saved to a removable media by turning ON system memory bit $SB38.

The various operation logs operate while the system memory bits outlined in the following table are turned ON.

Functional object operation history and communications address value change history	$SB39
Screen display histories	$SB40
Macro execution histories	$SB41



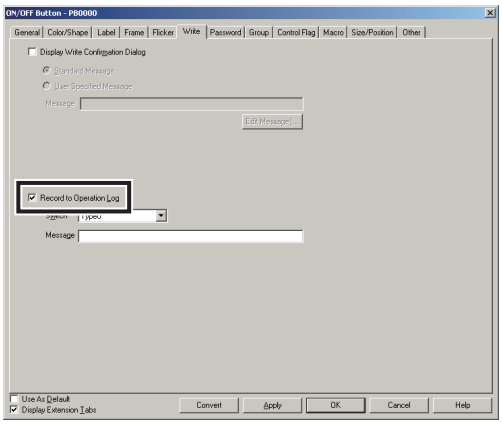
Additional Information

- Refer to *2-20-1 Operation Log Function* on page 2-451 for information on the operation log.
- Operation log data can be saved by performing any of the following actions.
  - Execute a Multifunction Object set to save the operation log.
  - Click the **Save** Button for operation log on the Data Initialization Tab Page of the System Menu.
  - Click the Save Log Button in the Operation Log (Sort by Occurrence) Screen or Operation Log (Sort by Frequency) Screen.

3-8-1 Settings for Operation Logs

To record operation histories for functional objects, *Record to Operation Log* must be selected beforehand on the Write Tab Page (extension tab page) for each functional object when screens are created using CX-Designer.

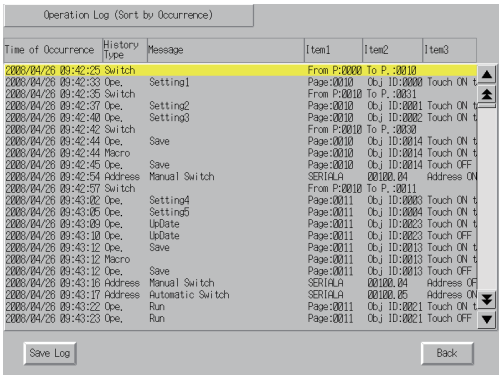
This enables records to be kept for the functional objects.



3-8-2 Checking Operation Logs

1 Display the Operation Log Screen from the Special Screen Tab Page under System Menu.

The recorded operation log data will be displayed.



2 Operation logs can be displayed in order of occurrence and order of frequency.

3 Execute initialization of operation log data from the Initialize Tab Page under System Menu. Execute a Multifunction Object for which initializing the Operation Log is set.

3-9 Displaying and Setting System Clock

NS-B-series PTs have a functional object used to set and display the date and time.

3-9-1 Displaying Date and Time

Date and time objects display the system clock. The date and time can be displayed simply by creating these objects on the screen.

1 Create both date and time functional objects when creating screens using CX-Designer. Select any display format in the property settings for each.

Refer to *2-8-5 Date and Time Format (General Tab)* on page 2-88 for information.

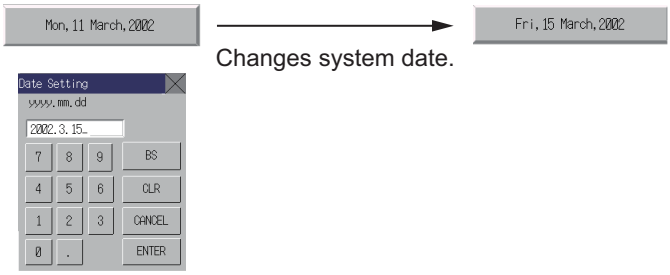
2 The system clock will be displayed during operation.

3-9-2 Setting Date and Time

The date and time functions do not only display the system clock. They can also be used to change the date and time displayed during operation.

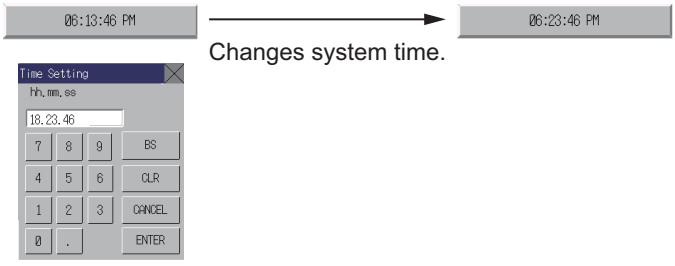
1 Press the date object during operation to display an input dialog box. Enter the desired date.

The input format is yyyy.mm.dd. Enter four digits for the year.



2 Press the time object during operation to display an input dialog box. Enter the desired time.

The input format is hh.mm.ss. Enter the hour in 24-hour format.



3-10 Prohibiting and Allowing Operation

Instructions from the host can be used to prohibit and permit NS-B-series PT operation for the following functions.

- System Menu movement (system memory operation)
- All screen functional object input (system memory operation)
- Input for each functional object (control flag operation)

3-10-1 Prohibiting and Allowing System Menu Movement

System Menu movement can be prohibited or allowed for NS-B-series PTs using the following method.

- Prohibit/allow System Menu movement by manipulating system memory bit $SB3.

Controlling System Menu Movement Using System Memory

Change the status of system memory bit $SB3 to prohibit or allow System Menu movement.

- Prohibit System Menu movement: OFF → ON (0 → 1)
- Allow System Menu movement: ON → OFF (1 → 0)

3-10-2 Prohibiting and Allowing Input to All Screen Functional Objects

Input to the whole screen can be prohibited or allowed for NS-B-series PTs by changing the status of system memory bit $SB19 or the specified communications address.

Controlling All Screen Functional Object Input Using System Memory

1 Change the status of system memory bit $SB19 to prohibit or allow input to all screen functional objects.

Prohibit input to screen: OFF → ON (0 → 1)

Allow input to screen: ON → OFF (1 → 0)

2 If the screen is touched while input is prohibited, a password dialog box will be displayed. Input the correct password to enable input to the screen functional objects. $SB19 will automatically turn OFF. The password level is specified by system memory bit $SW13.

For example, if the content of $SW13 is “3”, a level 3 password must be input.

Procedure for Prohibiting and Allowing Input to All Screen Functional Objects by Manipulating Specified Communications Addresses

1 In the CX-Designer, select **PT – System Settings**, select the *Touch Switch Lock Control Flag* in the **PT** Tab Page in the System Settings Dialog Box, and then set the desired communications address.

2 Specify *Prohibit Touch when ON* or *Prohibit Touch when OFF* as the prohibit condition.

3 The following table shows the Touch Switch Lock Control Flag during operation.

Prohibit/allow input	Condition	Communications address
Prohibit input	Prohibit touch when ON	OFF to ON (0 to 1)
	Prohibit touch when OFF	ON to OFF (1 to 0)
Allow input	Prohibit touch when ON	ON to OFF (1 to 0)
	Prohibit touch when OFF	OFF to ON (0 to 1)



Additional Information

- Unlike with $SB19 in the system memory, a dialog box for the password to cancel the input prohibit will not be displayed even if the screen is touched with input prohibited.
- The Touch Switch Lock Control Flag has priority if both $SB19 in the system memory and the Touch Switch Lock Control Flag are used as input prohibit conditions.
- Entering the System Menu by pressing any corner of the screen twice is prohibited when input is prohibited using the Touch Switch Lock Control Flag.

3-10-3 Prohibiting and Allowing Input for Individual Functional Objects

Input to functional objects is controlled by control flags for functional objects on NS-B-series PTs that accept input.

Method

1 When creating a screen using CX-Designer, select **Control flag – Input – Indirect** in the property settings for each functional object and set the control flag address.

2 Input can be prohibited and allowed by changing the status of the specified control flag address.

Prohibiting input: Change set address status from ON to OFF (1 → 0).

Allowing input: Change set address status from OFF to ON (0 → 1).



Additional Information

- If *disable* is set using the control flag, no input from the PT Unit to that functional object is possible during operation.
- Control flags also have a function for displaying or not displaying functional objects.

3-11 Using Removable Media

This section describes how to use Removable Media.

Removable Media are used for the following operations.

- Transferring data.
- Saving history files.
- Saving data blocks
- Saving captured images

Data transfer enables project and system programs to be downloaded from a Removable Media to the PT Unit and uploaded from the PT Unit to the Removable Media.

When history files are saved, alarm/event history, data log, operation log, and error log data is saved in CSV file format. CSV files can be edited on personal computers.

Files can be saved from functional objects or by manipulating system memory.

Refer to *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)* for information on mounting Removable Media.



Additional Information

Use a Removable Media recommended by OMRON. Operation will may not be performed correctly if other Removable Media are used.

3-11-1 Transferring Data Using Removable Media

Data can be downloaded or uploaded, either automatically or manually, when the PT Unit is started.

1. Use the DIP switches on the back of the PT Unit to make the automatic/manual and download/upload settings.
2. Start the PT Unit.
3. The download/upload operation will start.

Refer to *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)* for information on DIP switch settings and transferring data using Removable Media. Data can also be manually downloaded or uploaded using **System Menu – Special Screen – Memory Card transfer**. Refer to *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)* for details.

3-11-2 Saving Alarm/Event Histories to Removable Media

Alarm/event history files can be saved by turning ON system memory bit $SB33 or by saving the data from the Initialize Tab Page on the System Menu.

The file name will be Alarm.csv for alarm histories and Event.csv for event histories.

3-11-3 Saving Data Logs to Removable Media

Data log graph object data can be saved to a file by manipulating system memory.

1 Use the *Write to File* icon or save the group number to $SW37 and turn ON $SB36 to save data log graph files.

The file name will be Trd□□.csv, and up to 999 files can be saved for each group. The output file name can be changed. If the output file names are 6 characters or longer, only up to 99 files can be saved in a folder.

Trd□□.csv

- 0 to 99
  Indicates one less than the group number (1 to 100).
- 001 to 999 (001 to 099 if the output file names are 6 characters or longer)
  The ID number for files saved for each group. Beginning with 001, the number is automatically incremented by 1 each time the output operation is executed. After 999, the number reverts to 001.
- The file name set in the Data Log Properties Dialog Box will be displayed. The default is Trd.

2 Files can also be saved by storing “0” in $SW37 and turning ON system memory bit $SB36.

The file name will be Trend□.csv, and the logs are saved for all registered groups.

Trend□.csv

- 001 to 999
  Beginning with 001, the number is automatically incremented by 1 each time the save operation is executed. After 999, the number reverts to 001.

3 The data log can be saved from the Initialize Tab Page on the System Menu.

File names are the same as when using the system memory bit ($SB36).

3-11-4 Saving Operation Logs to Removable Media

Operation log data can be saved to an CSV file by using any of the following methods.

- Turn ON system memory bit $SB38 from the host.
- Execute a Multifunction Object for which saving the operation log is set.
- Save the operation log from the Data Initialization Tab Page of the System Menu.
- Click the Save Log Button in the Operation Log (Sort by Occurrence) Screen or Operation Log (Sort by Frequency) Screen.

The name of the CSV file is Operat_yymmdd_hhmmss.CSV

Operat_yymmdd_hhmmss.CSV

- Time when the file is saved (hour, minutes, and seconds)
- Date when the file is saved (year, month, and day)
- Fixed character string

3-11-5 Saving Error Logs to Removable Media

Error log files can be saved by turning ON system memory bit $SB43 or by saving the data from the Initialize Tab Page on the System Menu.

The file name will be MacroErr.csv.

Refer to *2-4 System Memory* on page 2-20 for details on system memory.

3-11-6 Saving Data Blocks to Removable Media

A file can be saved in CSV format by pressing icons on the data block object. When pressing the icon to save the file, the folder *DBLK* will be automatically created in the removable media, and the file will be saved in the folder.

4

Using Functions

This section describes some simple applications that may serve as reference for using functions. Use this section as a reference when using the PT Unit.

4-1 Application 4-2
4-1-1 When Monitoring Bits Turn ON 4-2
4-1-2 Always Reading PLC Word Contents 4-8
4-1-3 Changed Bit Status 4-11
4-1-4 For Numeral/String Input 4-15
4-1-5 For Button Operation By User 4-15
4-1-6 When Screens Are Switched 4-16

4-1 Application

This section gives examples of applications for functions.

Only the minimum settings required will be displayed. Make any other settings as required.

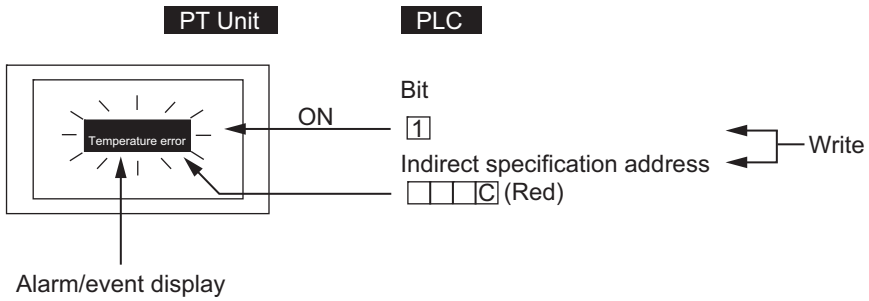
Refer to the *CX-Designer Online Help* for information on how to create screens using the CX-Designer.

Refer to *NS-B-series Programmable Terminal Macro Reference Manual (Cat. No. V132)* for information on macro functions.

4-1-1 When Monitoring Bits Turn ON

Displaying Alarms When Bits Turn ON

- **Example 1: To display Temperature error in red on the screen when the monitored PLC bit turns ON, regardless of what screen is displayed.**



1 Allocate the bit to be monitored in the alarm/event settings and set the message as *Temperature error*.

The red color code (12) must be set in the address set for indirect reference the background color using the PLC or macro function (=; substitution) when an alarm/event occurs.

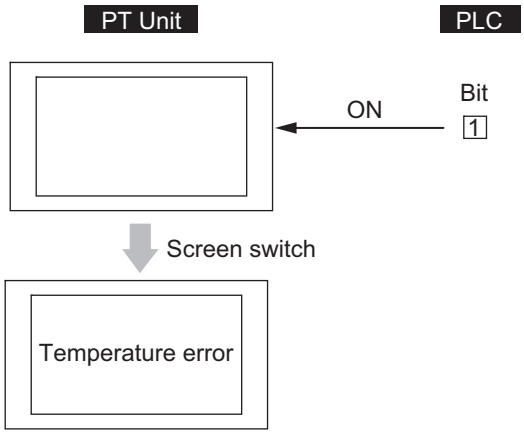
2 Create a sheet and set alarm/event display as shown in the following table.

Frame	None
Background	Indirect reference (change background color at alarm)
Character color	Black

3 Apply the sheet created in the previous step to all screens displayed on the PT Unit.

- Set the sheet created in step 2 to be displayed on all displayed screens, so that the message *Temperature error* is displayed.
- Frames can also be used to achieve the same message display. Make the settings so that the frame page is switched when an alarm/event occurs and the text *Temperature error* is displayed.
- A combination of ON/OFF Buttons to switch colors and the label switching function can be used to achieve the same display.

- **Example 2: To change the whole screen to red and display a screen with the message Temperature error in black when the monitored PLC bit turns ON.**



1 Make the following property settings for creating the screen to be displayed when the monitored bit turns ON.

Background color	Red

2 Create the following text for the above screen.

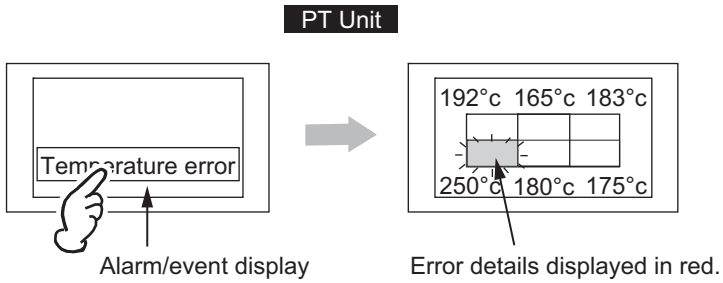
Label	Temperature error
Character color	Black
Background color	No tile
Frame	Frame and border set to OFF.

3 Make the following alarm/event settings.

Address	Number of the PLC bit to be monitored
Auto screen switch	ON (Select *Switch Screen when Address ON.*)
Screen No.	Screen number for the screen used in steps 1 and 2 above.

When this method is used, the error screen will remain even if the monitored PLC bit turns from ON to OFF after the display has switched to that error screen. Once the device error has been checked, a Command Button for switching screens must be created or the system memory bits for switching screens must be manipulated to switch back to the original screen.

- **Example 3: To display a screen with error details when the alarm message Temperature error is touched.**



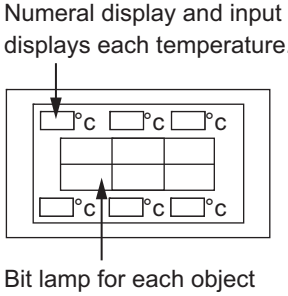
1 Make the following alarm/event settings.

Address	Number of the PLC bit to be monitored
Auto screen switch	OFF (Do not select.)
Screen No.	Number for the screen to display error details (Refer to step 3, below.)

2 Set alarm/event display on the screen as shown in the following table.

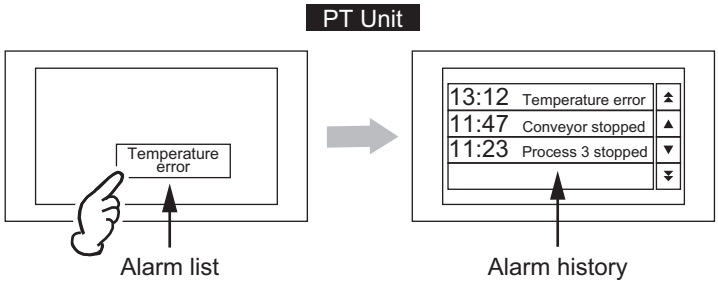
Background color	Red
Movement when Alarm/Event is selected	Select *Switch Screen to the specified Page Set with an Alarm/Event Setting*.

3 Register objects to the error details screen, as shown in the following diagram.



A ladder program must be written to turn ON the bit lamp for indicating the error position for each temperature at the same time that the temperature error bit turns ON.

- **Example 4: To display a screen that provides a history of past alarms including the time of the error, when the Temperature error alarm message is touched.**



1 Make the following alarm/event settings.

Message	Temperature error
Address	Number of the PLC bit to be monitored
Auto screen switch	OFF (Do not select.)
Screen No.	Number for the screen to display error details (Refer to step 3, below.)

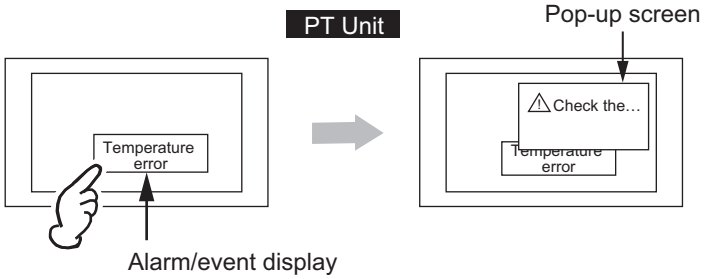
2 Set the alarm/event display on the screen as shown in the following table.

Background color	Red
Movement when Alarm/Event is selected	Select *Switch Screen to the Specified Page Set with an Alarm/Event Setting*.

3 Create an alarm/event summary/history object with the settings shown in the following table on the destination alarm history display screen.

Display data	Alarm history
Default display order	From New Date & Time.

- **Example 5: To display the possible countermeasures for the error when the alarm message Temperature error is touched.**



1 Make the following alarm/event settings.

Address	Number of the PLC bit to be monitored
Auto screen switch	OFF (Do not select.)
Screen No.	Number for the screen that displays countermeasures for the error.

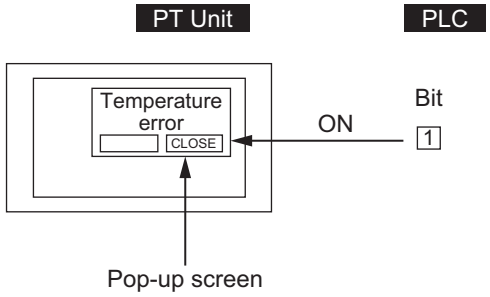
2 Set the alarm/event display on the screen as shown in the following table.

Movement when Alarm/Event is selected	Select *Switch Screen to the Specified Page Set with an Alarm/Event Setting*.

3 Create text that describes the countermeasure (e.g., *Check the …*) on the countermeasures screen. (Select *Use as pop-up screen* in the screen properties.)

Displaying Messages on Pop-up Screen

- **Example: To open and display an error message on a pop-up screen when the monitored PLC bit turns ON.**



1 Make the following alarm/event settings.

Address	Number of the PLC bit to be monitored
Display type	High alarm
Auto screen switch	ON (Select.)
Screen No.	Number for the pop-up screen to be displayed (Refer to step 2.)

2 Create alarm/event display on the pop-up screen.

Background color	Red

3 Create 2 Command Buttons with the following settings on the pop-up screen.

- Close Button

Function selection – control Pop-up screen	Close local pop-up screen
Label	CLOSE

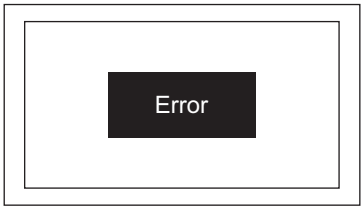
- Move Button

Function selection – control Pop-up screen	Move local pop-up screen
Label	Move

- Up to three pop-up screens can be created.
- When multiple pop-up screens are to be opened at the same time, the display positions for the screens can be specified so that they do not overlap.
- The pop-up screen display position can be moved by pressing the Move Button. Move the screens if there is overlap with the base screen that prevents the screens being viewed properly.
- The displayed message can be switched to match the alarm by placing a Contents Display Object in the pop-up screen and linking the alarm and contents switching.

Executing Set Expressions

- **Example: To turn ON the Error lamp and sound a continuous buzzer when 1 or more monitored PLC bits turns ON.**



1 Register the bits to be monitored under the alarm/event settings.

2 Register a macro with the following settings under the project properties.

Alarm/Event ON Timing	Execute (i.e., select)
Macro	$B0 = 1 $SB12 = 1
Alarm/Event OFF Timing	Execute (i.e., select)
Macro	$B0 = 0 $SB12 = 0

3 Set the lamp on the screen as shown below.

Address	$B0
Label	Error

Macros can also be used to switch screens or display pop-up screens.

4-1-2 Always Reading PLC Word Contents

Displaying Word Contents on Data Log Graph

- **Example: To use data logging function and data log graphs.**

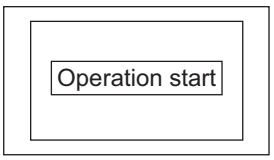
1 Register a group with the following settings under the data log settings.

Log period	Always.
Address	Word number for monitoring word contents.

2 Create a data log graph on the screen with the following settings.

Group name	The name of the group registered in step 1.
Scroll bar	Select *Use scroll bar*.

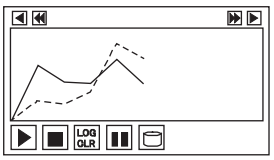
The reading of the contents of the specified word will start at the same time as operation starts, regardless of whether or not a data log graph is set to be displayed.



Data read starts at the same time as operation starts.

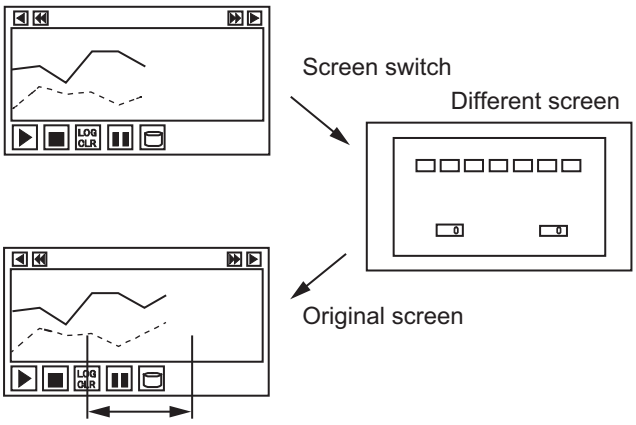
↓

Display the data log screen to display the latest status.



The latest data log graph is displayed based on the collected data.

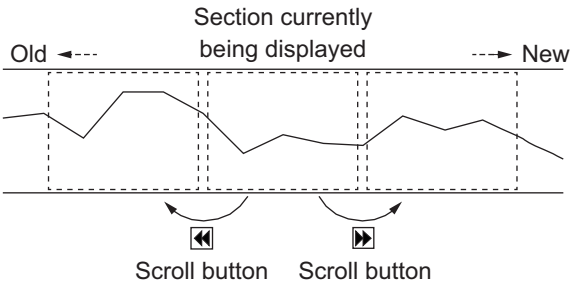
The contents of the specified word continue to be read even while other screens are being displayed.



Data gathered during different screen display.

↓

Changes in past status are displayed if required.

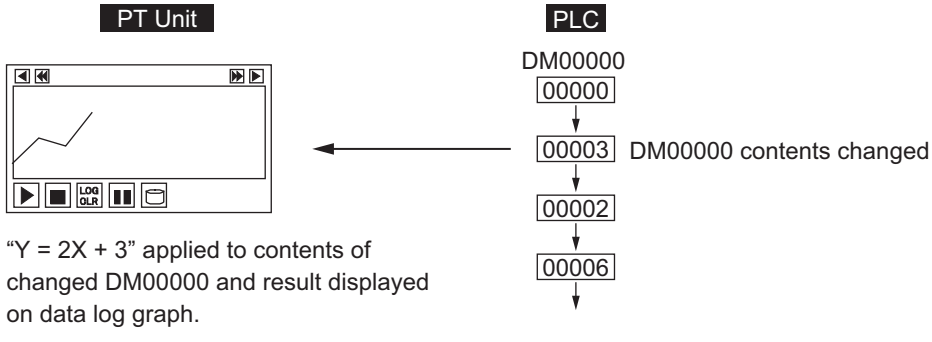


Data log graphs can display other icons in addition to the Scroll Button shown above. These icons can control display and data registration.

Stop		Stops data sampling.
Restart/Start		Restarts/Starts stopped data sampling.
Status		Displays the status of a specified address when *Start/stop data log* is controlled by an external address ON/OFF.
Log Clear		Clears the graph and starts drawing from the latest status. (Past records are held.)
Pause		Pauses graph display. (Continues data sampling.)
Write to File		Outputs logged data to a removable media as a CSV file.
Read File		Reads the CSV file saved on the removable media.

Displaying Word Contents after Scaling with Macro Function

- **Example: To execute the operation "Y = 2X + 3" on the contents of the PLC word (X) and display the results on a data log graph.**



1 Use CX-Designer to set the following numeric expression to the word lamp macro (to change word contents).

Expression format	READCMEM ($W0, [SerialA:DM00000], 1); $W10 = 2 × $W0 + 3; (To store Serial A:DM00000 to $W0 and operation result to $W10.)

2 Register $W10 in the data log settings.

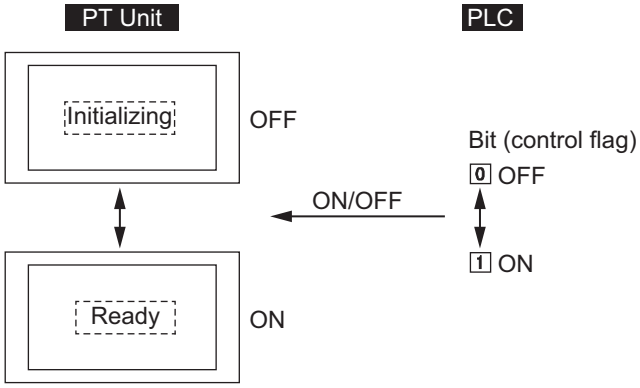
3 Create and register a data log graph that will display $W10 on the screen.

- Macros cannot directly specify PLC addresses. Use READCMEM() to store the address at $W.
- A numeral display and input object can be used to display word contents. Set the scale and offset under *Unit & scale setting* to display an automatically scaled result without executing a macro operation.
- Word contents can be judged because operators can use logical and comparative operands in addition to arithmetic operands. If word lamp display is not required, change the settings to no display or move the word lamp outside the screen.

4-1-3 Changed Bit Status

Prohibiting/Allowing Button Operation Based on Bit Status of Device Operation Status

- **Example: To display Initializing on an ON/OFF Button and prohibit operation while the device is initializing and to display Ready on the ON/OFF Button and allow input (with the password "OMRON" required) when the initialization has been completed.**



1 Create an ON/OFF Button on the screen with the following settings.

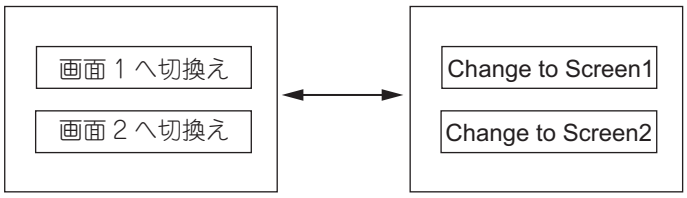
Address (write address)	PLC bit number manipulated using the ON/OFF Button
OFF label	Initializing
ON label	Ready
Switch label for address ON/OFF	Select *Switch label for address ON/OFF* and *Link with the Specified address ON/OFF*. Specify as the address the PLC bit number that reflects the device operation status.
Control flag – Input – Indirect	PLC bit number that reflects the device operation status. This bit turns OFF during device initialization and ON when device ready.
Password	Select *Level 1* and set OMRON under password level 1 settings.

With these settings, the ON/OFF Button display will depend on the device operation status and operation is prohibited or allowed.

The write address turns ON when input is allowed, the ON/OFF button is pressed, and the password OMRON is input.

Input can be prohibited or allowed for the entire screen by manipulating system memory.

PLC Designated Switching from Japanese to English Screens



1 Select **PT – Project Properties**, open the Switch Label Tab Page, set the *No. of labels* to 2, and click the **OK** Button.

2 Create the first Command Button.

Function	Switch Screen
Specified screen	Select *ON* and select *Screen 1*.
Label (*Type 0* under *Switch*)	Set *Switch to screen 1.*
Label (*Type 1* under *Switch*)	Set *Change to Screen 1*.

3 Create the second Command Button.

Function	Switch Screen
Specified screen	Select *ON* and select *Screen 2*.
Label (*Type 0* under *Switch*)	Set *Switch to screen 2.*
Label (*Type 1* under *Switch*)	Set *Change to Screen 2*.

4 Set *$SB address* and *$SW address* under *System Memory* on the Initial Tab Page under *PT – System setting*.

Write the label switch number (0 or 1) from the PLC to the word corresponding to $SW10 to switch the display.

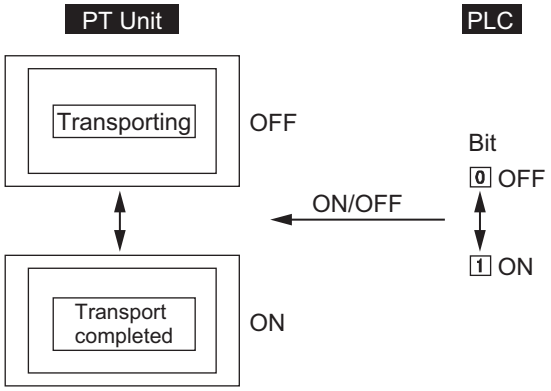
Create a Word Button on the screen and manipulate $SW10 directly to switch labels.

Additional Information

The System Menu labels will not changed even when a label change is executed. System Menu labels can be changed on Initialize Tab Page in the System Menu Window.

Changing Display Based on PLC Bit Status

- **Example 1: To change display string based on one PLC bit.**



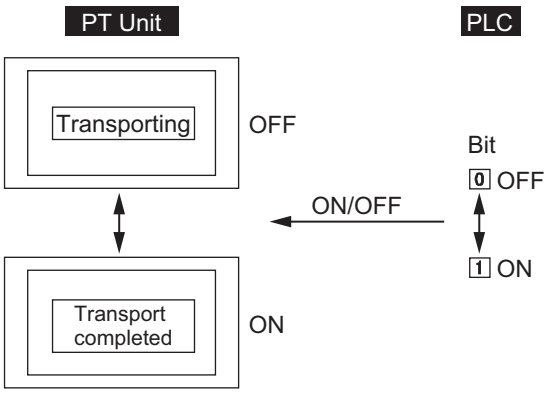
1 Register an ON/OFF Button on the screen with the following settings.

Switch label for address ON/OFF	Select.
OFF – label	Transporting
ON – label	Transport completed
Address	PLC bit number used to change characters.
Control flag	Disable input (When operation not required.)

Additional Information

Image data (BMP or JPEG files) cannot be specified for labels.

- **Example 2: To indicate on the screen the position of the driverless transport vehicle based on the value (0 to F) in the PLC word that indicates the position of the vehicle.**



1 Create a bit map (object) for the vehicle position for 0.

Display file	Specify BMP file name for vehicle.

2 Create a word lamp outside the screen.

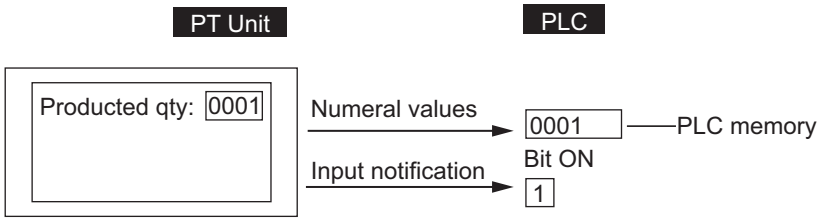
Address	PLC address that indicates the vehicle position (HOST:00000 in this example.)
Macro – when changing value	Select.

Macro contents	READCMEM ($W0, [HOST:00000], 1);
	IF($W0==0)
	MOVEPARTS(1,600,100); ← When display position for 0 is (600,100).
	ENDIF
	IF($W0==1)
	MOVEPARTS(1,500,100); ← When display position for 1 is (500,100).
	ENDIF
	…
	IF($W0==15)
	MOVEPARTS(1,700,200); ← When display position for 15 is (700,200).
	ENDIF
	($W0 is used as a work area.) When ID for bit map (object) created in step 1 is 1.

4-1-4 For Numeral/String Input

Notification of Numeral/String Input from PT Unit

- **Example: To send a signal to the host notifying any numeral/string input from the PT Unit.**



1 Create a numeral display and input object on the screen with the following settings.

Write (extension tab page)	Select *Turn ON the Specified Address when the Value is Confirmed*. Set the PLC address for notification.

2 Create a string display and input object on the screen with the following settings.

Write (extension tab page)	Select *Turn ON the Specified Address when the Value is Written*. Set the PLC address for notification.

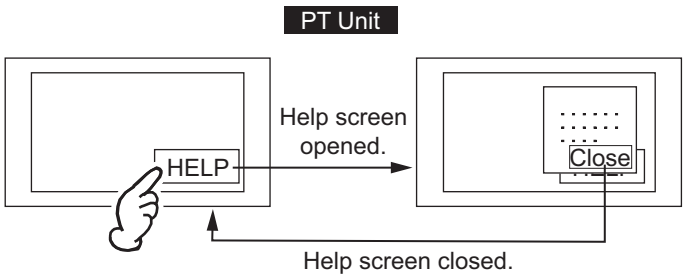
3 The PLC address for notification turns ON when a numeral or string is input.

Turn OFF the PLC notification address from the PLC.

4-1-5 For Button Operation By User

Displaying Online Help Using a Button

- **Example: To display a pop-up help screen by pressing a button.**



1 Use text on the screen and create the help contents.

2 Create a Command Button with the following settings on the screen from step 1.

Function – control Pop-up screen	Close local pop-up screen

3 Set the above screen as a pop-up screen under *Screen Properties* by select **PT - Screen/Sheet Properties**, opening the Size/Pop-up Tab Page, and selecting the *Use as Pop-up Screen* Option.

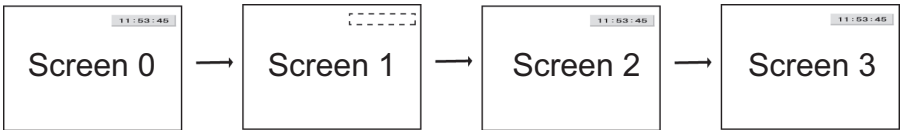
4 Create a Command Button with the following settings on the screen that is the display basis for the help screen.

Function – Switch screen	Specify the screen from step 1.

4-1-6 When Screens Are Switched

Clearing Specific Sheet Objects

- **Example: To place a clock at the same position on all screens but to clear clock display for screen 1 only.**



1 Create sheet 0.

2 Create a clock with the following settings on sheet 0.

Display/no display of control flag – Indirect	$B100

3 Apply sheet 0 to all screens.

4 Register a macro with the following settings under the project properties.

Macro for project load	Execute (i.e., select)
Macro	$B100=1;

5 Register a macro with the following settings under *Screen properties* for screen 1.

When Loading a screen	Execute (i.e., select)
Macro	$B100=0;
When Unloading a screen	Execute (i.e., select)
Macro	$B100=1;

If no other objects are created on the sheet, application of sheet 0 can be deselected from screen 1.

5

Troubleshooting and Maintenance

This section describes the countermeasures for errors that may occur on PTs.

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5-2 Error Messages 5-7

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5-1 Errors

If an error occurs during operation, find the symptoms of the error on the following table and then perform the suggested countermeasures.

Precautions for Safe Use

- Check that the system is safe before turning the power ON/OFF or pressing the reset switch.
- Do not dismantle, repair, or modify NS-B-series PTs.

Errors during Data Transfer

Symptoms	Cause	Possible countermeasure
Cannot communicate with CX-Designer.	Not in transfer mode.	Execute the transfer program from the CX-Designer. (Refer to *Transferring Data to the PT* in the *CX-Designer Online Help*.)
	Not connected to CX-Designer.	Check the connection cable wiring. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.)
Personal computer cannot detect PT Unit when connected via USB.	The USB cable is longer than 2 m.	To use a cable longer than 2 m, connect a USB Hub between the PT Unit and personal computer as shown in the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.
	A malfunction has occurred due to external noise.	Configure the USB Hub and wire the USB cables taking measures to prevent noise.
Timeout occurs during screen transfer using USB.	A malfunction has occurred due to external noise.	Configure the USB Hub and wire the USB cables taking measures to prevent noise.

Errors at PT Unit Startup

Symptoms	Cause	Possible countermeasure
Indicators are not lit.	Power not supplied to the PT Unit.	Check the connections and supply power correctly to the PT Unit. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.)
	Power supply fuse broken.	The PT Unit must be repaired. Contact your nearest OMRON representative.
Indicator is lit green and screen is empty.	System program corrupted. (Fatal error.)	The PT Unit must be repaired. Contact your nearest OMRON representative.
	DIP switch set to other than the user project mode, but cannot check removable media.	Use an OMRON specified removable media. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.)
	The system program is corrupted (non-fatal error). The combination of NS-B-series PT hardware and system program version is incorrect.	Recovery/update the system program. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.) Contact your nearest OMRON representative if the same problem occurs after recovering/updating the system program.
	In the following cases, project was downloaded without clearing the log data saved in the PT Unit. • A project was downloaded to the NS-B-series PT in which settings related to history, such as alarm/ event or data log settings, have been changed. • An attempt was made to download a project that was different from the project saved in the PT Unit.	Download the project again. When downloading the project data again, be sure to clear the log data saved in the PT Unit.
	Automatic upload/download has ended abnormally.	• The system program may be corrupted. Reinstall the system program. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.) If the same problem occurs after reinstalling the system program, the PT Unit may be faulty. Contact your nearest OMRON representative. • An attempt may have been made to transfer project that are larger than the memory of the PT Unit. Check the project at the transfer destination.
Screen is empty and indicator remains.	Automatic upload/ download has ended normally.	This is not an error. To return to normal operation, set all DIP switches to OFF and cycle the power.
The indicator remains and the screen is blank.	The PT Unit is faulty, or the system program is corrupted.	Reinstall the system program. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.) If the same problem occurs after reinstalling the system program, the PT Unit may be faulty. Contact your nearest OMRON representative.
The Tag Comparison Result Screen is shown.	The tag set for the project does not match and tag set for the host.	• Correct the host tag, and then click the **Recompare** Button. • Correct the project tag, and then download the project to the PT Unit again.

Errors When Connecting the Host

Symptoms	Cause	Possible countermeasure
Cannot connect to host. (“Connecting” message displayed at bottom right of screen.)	If the connection is via the Ethernet, the node address, network number, IP address, or other settings are incorrect.	Refer to the *NS-B-series Programmable Terminal Host Connection User’s Manual (Cat. No. V131)*.
	Protocol settings for the host and PT Unit do not match.	Use CX-Designer to make communications settings.
	PT Unit and host not connected properly.	Check that the type of connection cable, the length, and the wiring meet the specifications. (Refer to the *NS-B-series Programmable Terminal Host Connection User’s Manual (Cat. No. V131)*.)
	For 1:N NT Links, a duplicate unit number has been used.	Change the unit number setting so the number is not duplicated. (Refer to the *NS-B-series Programmable Terminal Hardware User’s Manual (Cat. No. V129)*.)
	Initialization of System Memory at startup is disabled, and the NS-B-series PT is started with a non-existing screen number (0 to 3,999) stored in the allocation address for $SW0 or a special screen number, such as 4002, that displays the System Menu is stored.	Store a correct screen number to display at the allocation address for $SW0.
Cannot communicate after changing communications port.	The communications port set under project or in the host settings is incorrect.	Change the CX-Designer communications settings or the host settings to the correct settings. (Refer to *System Settings and Project Properties* in the *CX-Designer Online Help*.)

Errors during PT Unit Operation

Symptoms	Cause	Possible countermeasure
Indicator is not lit.	Power not supplied to the PT Unit.	Check the connections and supply power correctly to the PT Unit. (Refer to the *NS-B-series Programmable Terminal Hardware User’s Manual (Cat. No. V129)*.)
	Power supply fuse broken.	The PT Unit must be repaired. Contact your nearest OMRON representative.
Screen is empty.	Waiting for system startup.	This is not an error. The screen will be empty if the wait time has been exceeded.
	Screen saver operating.	This is not an error. Touch the screen to display the screen.
	Backlight is OFF.	Screen saver is started up. Please turn OFF the screen saver.
	Backlight failure.	Replace the backlight. Contact your nearest OMRON representative.
	The backlight is too dark.	Increase the brightness of the backlight on the PT Setting Tab Page of the System Menu.

Symptoms	Cause	Possible countermeasure
No response from the touch panel.	Touch panel malfunctioning due to external noise.	Wire the ground wire to suit the conditions.
	Touch panel malfunction.	Test the touch panel by using *Hardware Check* under the System Menu. Contact your nearest OMRON representative if there is an error.
Display is dark.	Backlight defective or service life over.	Replace the backlight. Contact your nearest OMRON representative.
	The backlight is too dark.	Increase the brightness of the backlight on the PT Setting Tab Page of the System Menu.
Slow display refresh.	Frequent opening/closing of screens and pop-up screens or frequent switching of frames.	If screens or frames are switched or pop-up screens are opened and closed too frequently, the display may update slowly and communications may be delayed. Adjust the interval between screen switches to prevent system overload.
	Message communications interval is too long.	Select **PT – Communications Setting** in the CX-Designer, click *Comm-All*, and set a shorter interval in the *Intervals of Message-Comm.* Field. (Refer to *Making Communications Settings* in the *CX-Designer Online Help*.)
Slow screen switching.	Unable to communicate with host.	When a communications error is displayed, refer to *5-2-7 Communications Errors and Countermeasures* on page 5-17. Communications errors will not be displayed when communications are set to recover automatically (*Comm. Auto-return* set to *ON*). In this case, verify that the PT Unit can communicate with the host by performing a communications test from the system menu. If two or more hosts are registered, test communications with all of the hosts.

Errors During Object Operation

Symptoms	Cause	Possible countermeasure
Slow numeral or string refresh.	Communications unstable due to external noise.	Reset the power supply and wire the ground wire to suit the conditions. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.)
	Too many numeral display and input or string display and input objects on the current screen.	Reduce the number of numeral display and input objects or string display and input objects on the screen with the slow refresh.
	Host processing slow, increasing cycle time.	Shorten the host cycle time.
Some objects set for the screen not displayed.	Communications error.	Check the communications settings again.
	A *No display* flag has turned ON for an object control flag.	Use the following method to set the control flags to *Display* for the objects not displayed. • Set the object properties on the Control Flag Tab Page to *Display* using CX-Designer. • Set the contents of the indirect address for the object control flag to *ON* for bits and *1* for words.
Log graph display does not match actual log timing.	Address set as log timing event turning ON/OFF at high speed.	Lengthen the ON/OFF cycle for the event address.
Cannot input numerals.	Maximum/minimum limit check function operating for numeral input.	Check the maximum and minimum limits for numeral input and adjust if necessary.

Symptoms	Cause	Possible countermeasure
Cannot input to some functional objects.	A *Disable input* flag has been set for an object control flag.	Use the following method to set the control flags to *Enable input*. • Set the object properties on the Control Flag Tab Page to *Enable input* using CX-Designer. • Set contents of indirect address for object control flag to ON.
	Password set.	Enter the password in the displayed Password Dialog Box.
	Input objects overlapping.	Some input objects do not operate correctly if they are overlapping. Arrange the input objects so that they do not overlap when creating screens.
Cannot input to any functional object.	In prohibit input mode.	• Set system memory bit $SB19 to OFF. • Touch the screen and enter the password for clearing prohibit input into the displayed dialog box.
		• Manipulate the Touch Switch Lock Control Flag from the host to allow input.
Nothing displayed on list selection or bitmap objects.	No reference file.	Use the CX-Designer (on the personal computer) to check that the reference file exists in the folder where project is stored and transfer the project to the PT Unit again.
	More than the maximum number of lines has been specified for first line of list selection.	Set a line number within the maximum number of lines.

5-2 Error Messages

If one of the messages listed on the following table is displayed on the PT Unit, find the symptoms of the error below and then perform the suggested countermeasures.

5-2-1 Troubleshooting Data Transfers from the CX-Designer

This section describes possible errors during data transfer and their countermeasures.

Message	Cause	Possible countermeasure
Either Screen Data Transfer or Memory Card Transfer is already started up. Cannot start up both programs at once.	Tried to start both Memory Card Transfer and Screen Data Transfer.	Only one transfer program can be started at a time.
The file name can be up to 42 characters, including the extension.	Project file name (*.IPP) contains 43 or more characters.	There are limits on transferable file names. Check the error message and use CX-Designer to adjust the file name accordingly. There are similar limits on notation for text files indirectly accessed.
The file name can be up to 14 characters, including the extension, when characters other than alphanumeric characters, underscores, and dollar signs are contained.	Project file name (*.IPP) contains 14 or more characters when special characters are used.	There are limits on transferable file names. Check the error message and use CX-Designer to adjust the file name accordingly. There are similar limits on notation for text files indirectly accessed.
Specified file name contains an invalid character. Unusable character: \ / : , ; * ? ” < > |	File name contains invalid characters.	There are limits on transferable file names. Check the error message and use CX-Designer to adjust the file name accordingly. There are similar limits on notation for text files indirectly accessed.
Downloading aborted. This project includes the file which name contains an invalid character. Usable characters are alphanumeric (0 to 9, A to Z, a to z), dollar mark ($), underscore (_), and . Check the project file and correct it.	File name contains invalid characters.	There are limits on transferable file names. Check the error message and use CX-Designer to adjust the file name accordingly. Only one period (.) before the extension will be valid. There are similar limits on notation for text files indirectly accessed.
System Program Version differs. Do you want to continue downloading? Source: X.XX Destination: X.XX	The system version of the CX-Designer and PT Unit are not the same.	If the system Program cannot be replaced by using automatic download of the PT Unit, use the procedure in the *NS-B-series Programmable Terminal Hardware User’s Manual (Cat. No. V129).*
Time-out error occurred. Check cable. Perform transmission again after restarting PT Hardware	Timeout occurred during connecting or transferring to PT Unit.	Check the following items. • Power supply. • Cable connection.
PT Hardware is already connected. Restart the PT Hardware to change the communication method.	Tried to use a different communications method while personal computer and PT Unit connected (e.g., tried to switch to Ethernet and connect during serial communications).	Restart the PT Unit and make the new connection.

Message	Cause	Possible countermeasure
Cannot establish connection with the specified communication method. (If the error persists after the suggested countermeasures are performed, close the application and restart the personal computer then try connecting again.)	Connection failed.	Check the following items. • Power supply. • Cable connection.
	Pressed **Connect** Button even though some items remain unset under the Communications Method Settings Dialog Box.	Refer to *Transferring Data to the PT* in the *CX-Designer Online Help* for details on proper settings and check the settings.
Error occurred while writing to a flash memory Transmission failed	Data cannot be written.	Initialize data using *Screen data area format* on the Initialize Tab Page under System Menu and transfer the project.
Cannot find Project file at PT Hardware. Transmit the whole project again.	Cannot find project on PT Unit.	Resend the whole project.
Project file differs between transmission source and destination. Select the whole project and perform transmission again.	Tried to send separately a different project screen to the project stored on the PT Unit.	With separate screen transfers, one project screen cannot be sent individually to a PT Unit that stores a different project. Select the whole project and resend.
The capacity of PT Hardware is insufficient. Transmission failed.	The created project exceeds the storage capacity of the PT Unit.	Reduce the size of the project and retransfer the project.
Cannot delete screen file in PT Hardware.	Could not delete project.	Initialize data using *Screen data area format* on the Data Initialize Tab Page under System Menu and transfer the whole project.
File size exceeded the maximum. Please check the Project data.	Transferable file size exceeded.	The maximum size file that can be transferred is 1.44 MB. Re-execute the transfer with a file smaller than 1.44 MB.
Failed to start the CX-Server.	CX-Server may not be installed correctly.	CX-Server may not be installed correctly. Uninstall CX-Server then reinstall CX-Server.
Error detected at PT Hardware. (0x03a6)	Unexpected error.	The PT Unit may need repaired. Contact your nearest OMRON representative.
PT hardware error.	Possible hardware error.	The PT Unit may need repaired. Contact your nearest OMRON representative.
Cannot execute because an invalid address exists. Check with the Find Invalid Addresses in the Symbol Table.	The host type (*Type*) was changed in the CX-Designer's Comm. Setting Dialog Box, but the communications address was created in an area that does not exist in that host. The user attempted to transfer a project containing that invalid address.	If there is an invalid address, the project cannot be transferred. Find the invalid address by right clicking the **Find Invalid Addresses** Button in the CX-Designer's Symbol Table Window and correct the address.

5-2-2 Troubleshooting Errors when Turning ON Power

This section describes possible errors immediately after power is turned ON to the PT Unit and the countermeasures for these errors.

No.	Message	Cause	Possible countermeasure
1	FATAL ERROR No. 01: Touch Panel is not connected: Please contact your OMRON service center.	Touch panel error.	The PT Unit may need repaired. Contact your nearest OMRON representative.
	FATAL ERROR No.01: Touch Panel Initialization Error: Please contact your OMRON service center		
2	FATAL ERROR No. 02: Holding memory Initialization Error: Please contact your OMRON service center.	Hardware error in Holding memory.	
3	FATAL ERROR No. 03: MAC Address Error: Please contact your OMRON service center.	Incorrect MAC address.	
4	FATAL ERROR No. 04: PT Model type Identify error.	The PT model cannot be determined.	
10	ERROR No. 10: File System Error: Please recover the system program.	File system is corrupted. (A hardware fault occurred or power was interrupted during writing.)	Reinstall the system program by inserting the removable media containing the recovery program in the PT Unit and resetting the PT Unit or turning the power supply OFF and ON again. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.) If a read-only file is stored in the PT Unit, perform a clean install. After that, confirm that the file is not read-only and transfer the project to the PT Unit. If the same problem occurs after reinstalling the system program, the PT Unit may need repaired. Contact your nearest OMRON representative.
10	ERROR No. 10: Fail in loading files or executing program: Please recover the system program.	File reading or program execution failed.	
		Read-only file is being transferred to the PT Unit.	
10	ERROR No. 10: Fail in loading files: Please recover the system program.	File reading failed.	
11	ERROR No. 11: Fail in loading files: Please reinstall the system program.	File reading failed.	Execute automatic download of the system program. If the same problem occurs after downloading, insert the removable media containing the recovery program in the PT Unit and reset the PT Unit or turn the power supply OFF and ON again. (Refer to the *NS-B-series Programmable Terminal Hardware User's Manual (Cat. No. V129)*.) If the same problem occurs after reinstalling the system program, the PT Unit may need repaired. Contact your nearest OMRON representative.
11	ERROR No. 11: Device check program error: Please reinstall the system program.	Hardware check program is corrupted.	
11	ERROR No. 11: Holding memory check program error: Please reinstall the system program.	Holding memory check program is corrupted.	
11	ERROR No. 11: IP Address Setting Error: Please reinstall the system program.	IP address setting program is corrupted.	

No.	Message	Cause	Possible countermeasure
12	ERROR No. 12: Installed system program is not applicable for this hardware: Please reinstall the system program.	The installed system program does not match the hardware.	Install the correct system program. For details on compatible system programs, refer to the *CX-Designer Version 4.□ Operation Manual (Cat. No. V133)*.
14	ERROR No.14 : Touch Panel Initialization Error. : Please do not touch the screen during startup. If the error is displayed while the screen is untouched, please consider replacement.	The touch panel is touched during startup. Failure of the touch panel hardware due to aging deterioration.	Do not touch the touch panel during startup. If an object is placed on the screen, remove it. If this error is displayed while the screen is untouched, the PT Unit may need repair. Consider replacing the hardware.
20	WARNING No. 20: Date and Time are not set: Touch the screen to continue.	Date set outside the PT's allowable range of 2024 to 2062.	Touch the touch panel to continue booting. Then set the correct date in the System Menu.
21	WARNING No. 21: Holding memory previously broken... Initialization Complete: Touch the screen to continue.	Holding memory contents could not be held because there was insufficient capacity. For this reason, Holding memory was initialized.	Touch the touch panel to continue booting. Replace the battery the next time power is turned OFF.
22	WARNING No. 22: Memory Card Error: Some files in a memory card may be corrupted. Safely remove the memory card, and check whether files are not corrupted on a computer. You can continue to startup the PT Unit by touching on the screen, however, it may NOT operate correctly when accessing to the memory card. (The same message will also be displayed in Japanese. This is not a fault.)	The two following causes are possible: The previous time the PT Unit was used, power was turned OFF while accessing the removable media. Removable media access safety information could not be held because there was insufficient capacity.	Touch the touch panel to continue booting. When the removable media is accessed, however, the PT Unit may not operate normally.
23	WARNING No. 23: Screen data file(s) is not correct: Touch the screen to continue and transfer screen data again.	The project in the PT Unit is damaged. (The power supply was turned OFF while project was being transferred, or a cable was disconnected.)	Touch the touch panel, and after *connecting* is displayed at the bottom right of the screen, or after the message "No project data is registered. Press OK button and download project." is displayed, reattempt screen transfer.
24	WARNING No. 24: The recovery program in the inserted memory card is not supported by the PT. Update the recovery program, referring to NS-B-series Setup Manual. To continue starting the PT without executing the program, touch the screen.	The recovery program cannot be started because the recovery program installer in the memory card that is inserted in the PT Unit is not supported by the current hardware version of the PT Unit.	Touch the screen to start the system that is currently installed in the PT Unit (i.e., not the recovery program). To start the recovery program that is in the removable media, you must update the recovery program that is stored in the removable media. To update the program, refer to *How to recover or update the system program*.

5-2-3 Troubleshooting Errors at Startup

This section describes possible errors after power is turned ON to the PT Unit, when operation is started, and during operation and the countermeasures for these errors.

Message	Cause	Possible countermeasure
No project data is registered. Press **OK** button and download project data.	Cannot read project (not transferred or corrupted).	Download the project.
No project data is registered. Press **OK** button and download project data.		
Failed to read host registration. Correct host registration with CX-Designer. Then, press **OK** and download project data.	Cannot read project (not transferred or corrupted).	Use a support software to correct the project and then download the project.
Initial Screen does not exist. Please set correct screen number in [Project] tab of System Menu.	No initial screen.	Download project.
		Check that the screen exists with the number set under *Initial screen number* on the Project Tab Page under the System Menu. (The default screen number is 0.)
Cannot open pop-up screen without opening the base screen.	Specified pop-up screen as screen to be displayed at startup.	Specify a base screen as the initial screen number on the Project Tab Page under the System Menu and restart the PT Unit.
Although Data Block Table exists on the screen, failed to read CSV file to display on Data Block Table. [Data Block (x) CSV file] The object will not be displayed correctly.	The CSV files set for the data block does not exist.	Create the CSV file for the data block in the project folder.

5-2-4 Troubleshooting Errors when Switching Screens

This section describes possible errors when screens are switched and the countermeasures for these errors.

Message	Cause	Possible countermeasure
Page file load error. (Page: xxx, ERR: xxx) (Page: Destination page number; ERR: Error code)	Cannot find specified screen file (ERR:-1).	Correct the destination screen number. Alternatively, download the corresponding project.
	Open error for specified screen file (ERR: -2).	Download the project again.
	Cannot reserve buffer for reading screen header (ERR:-10).	Download the project again.
	Cannot reserve buffer for reading screen (ERR:-11).	Download the project again. If the error persists after the data has been downloaded again, the screen file is too large for the memory capacity. Reduce the size of the screen file by reducing, for example, the number of objects on the screen.
	Cannot reserve buffer for reading macro data (ERR:-12).	Download the project again.
	File read error (screen header part) (ERR:-20).	Download the project again.
	File read error (macro data part) (ERR:-21).	Download the project again.
	Screen file ID error (ERR:-30).	Download the project again.
	Screen file version error (ERR:-40).	Execute *Save all* under the CX-Designer File Menu and download the project again.
	File read error (functional object header part) (ERR:-102).	Download the project again.
	Functional object type error (ERR:-103).	Download the project again.
	File read error (functional object properties part) (ERR:-104).	Download the project again.
	Cannot reserve buffer for reading functional object data (ERR:-105).	Download the project data again. If the error persists after the data has been downloaded again, the screen file is too large for the memory capacity. Reduce the size of the screen file by reducing, for example, the number of objects on the screen.
Although the data block table exists on the screen, failed to read CSV file to display in the data block table. [Data Block (x) CSV file] The object will not be displayed correctly.	The CSV files set for the data block does not exist.	Create the CSV file for the data block in the project folder.
No. of addresses that can be set in one page are 6,500.	The number of monitor points exceeds 6,500.	The maximum number of monitor points per screen is 6,500 (for both bits and words). Do not set more than 6.500.

Additional Information

- If a screen switching error occurs, the current pop-up screen will automatically close.
- The number of communications points (bits and words) is the total number of addresses (in host and internal memory) set to functional objects in displayed screens, sheets, and pop-up screens and alarms/events and data logs.

  If the same address is used multiple times, that address is counted for each time it is used. Addresses used in macros, however, are not counted. Addresses allocated in system memory are not counted either.

  Example: To display the following project

  - Allocate host DM00000 to system memory $SW0. (Zero communications points (words) used.)
  - Screen 1: Create 10 bit lamps and set bits $B0 to $B9 to each. (10 communications points (bits) used.)

    $W0 used by macro for screen loading. (0 words used.)

    Sheet 0 applied. Set pop-up screen 10 to be opened at the same time.
  - Sheet 0: Create one ON/OFF Button to which $B10 is set. (1 bit used.)

    $W1, $W2, and $B20 used by touch ON macro for this ON/OFF Button. (0 bits/words used.)
  - Screen 10: Create 10 numeral display and input objects, to which $W10 to $W19 are set. (10 words used.)
  - Alarm/event: Set 20 points, $B0 to $B19. (20 bits used.)
  - Data log: Standard logging of 10 words, $W100 to $W109. (10 words used.)

  A total of 51 communications points (bits and words) are used.

5-2-5 Troubleshooting Errors for Functional Objects

This section describes possible errors during operation of functional objects and their countermeasures.

Message	Cause	Possible countermeasure
Input date is incorrect.	Input error when changing date using date object.	Press the **OK** Button and input the correct date.
Input time is incorrect.	Input error when changing time using time object.	Press the **OK** Button and input the correct time.
Exceeding maximum limit.	Incorrect input to numeral display and input object.	Press the **OK** Button and return to the original screen. Input data below the upper limit.
Exceeding minimum limit.	Incorrect input to numeral display and input object.	Press the **OK** Button and return to the original screen. Input data above the lower limit.
Input data is incorrect.	Incorrect input.	Input the data again.
Password error.	Incorrect password input.	Press the **OK** Button and input the correct password.
Wrong passwords are entered three times. Password operation cancelled.	Incorrect password input.	Press the **OK** Button and display the password input screen again. Input the correct password. If you have forgotten the password, use CX-Designer to reset the password. Use the Password Tab Page under the System Menu to change the password if required.
Memory Capacity insufficient. Cannot continue operation.	Insufficient memory.	Reduce the data size by reducing number of screen objects, reducing the size of the displayed BMP file, or similar measures.
Failed to save to a file.	Failed to save CSV file from data log graph or Multifunction Object.	Insert a removable media with sufficient free space into the PT Unit. Check to see if the removable media is damaged.
Failed to read file. [Data Block (Data Block No.) CSV File]	Failed to read data file at Data Block Table.	Create CSV file set for Data Block Setting under Project folder.
Failed to write to the file. [Data Block (Data Block No.) CSV File]	Failed to write data file at Data Block Table.	Create CSV file set for Data Block Setting under Project folder.
Cannot add any more.	Attempt to add more than the maximum number of the records using Add to the record icon.	Increase the maximum number of records for Data Block at Data Block Setting in CX-Designer.
Cannot write to memory card. Confirm that memory card is inserted.	Failed to write the file from Data Block.	Check whether or not removable media is inserted or corrupted.
Stop logging data before reading the CSV file.	The Read File icon was pressed during data logging.	When reading a CSV file, stop logging and then press the Read File icon.

5-2-6 Troubleshooting Errors during System Menu Operation

Message	Cause	Possible countermeasure
Error occurred while formatting screen data range.	Hardware failure.	Contact your nearest OMRON representative.
Failed to save to a file.	File system damaged.	Format the project area and transfer the project again.
The address set at CH type selection is not correct. Check the address and input the correct address again. Allocated host: XXXX Allocated address: XXXX MRES = XXXX, SRES = XXXX.	Set address is incorrect.	Check whether or not an illegal address has been set and set the correct address.
Time-out error occurs while downloading by the following case: • Disconnection of the connecting cable • Stopped host MRES = XXXX, SRES = XXXX. NB5Q-TW01B-V1-S: Time-out error occurs while downloading Host Allocated host: XXXX	Cable is disconnected. PLC power supply is OFF.	Connect the cable correctly. Turn ON the PLC power supply.
The address set at CH type selection is not for writing. Check the address and input the correct address again. Allocated host: XXXX Allocated address: XXXX MRES = XXXX, SRES = XXXX.	Host is in RUN mode. Tried to write to a write prohibited address.	Change to program or monitor mode. Check the address and set the correct address.
Other peripheral tool is accessing. Send commands again after access right is released. Allocated host: XXXX Allocated address: XXXX MRES = XXXX, SRES = XXXX.	CX-Programmer or other programming device is connected.	Disconnect the connected programming device.
Failed to delete the file.	The file is a read-only file.	Clear the read-only setting.
Failed to stop the memory card. It is not ready to be removed.	The **Remove** Button was pressed while the removable media was being accessed.	Wait until the removable media stops being accessed, and then press the **Remove** Button again to remove the removable media.

Message	Cause	Possible countermeasure
Communication error detected while downloading by the following case: • Corrupted data by noise • Transmit error by the host MRES = XXXX, SRES = XXXX. NB5Q-TW01B-V1-S: Communication error detected while downloading the data Allocated host: XXXX	Data corrupted by noise. • Invalid host communications command.	Check the cable connection and conduct a continuity test. Exchange the cable if there is a cable error. If necessary, rewire the cable.
Registered host information and communication setting are not match. Check the communication setting.	Registered host selected but not connected.	Change the communications settings under the System Menu so that the corresponding port is set.
Destination address is incorrect. Check the host information.	The remote address where the host is registered is incorrect. Connected to a different PLC while online.	Check the host registration and, if necessary, use CX-Designer to change the address.
Cannot cancel error by the following case: • Operation mode is not in program mode. • Cause of error at host side is not yet removed.	Not in program mode. Cause of error not cleared on host side.	Change to program mode. Clear error on host side.
Writing to this memory is not possible.	Tried to write to AR.	AR is write prohibited. Select another memory area.
Cannot write in during RUN mode.	Tried to write in RUN mode.	Change to program or monitor mode.
Force ON/OFF is not possible with this address type.	Tried to force ON/OFF DM or EM.	Select another memory area.
No project data.	Tried to change settings even though there is no project.	Download the project.
Old password is NOT correct.	Input incorrect previous password when changing password.	Use CX-Designer to check the password and input the correct password.
Password input in the confirmation does NOT match with the New Password.	Input the incorrect new password to the Confirmation input field when changing password.	Enter the new password again.
Failed to save data to CSV file in a memory card. Check the memory card.	A removable media is not inserted or the removable media is not one supported by the PT Unit.	Check to see if a removable media is inserted, replace it if necessary, and try to save the data again.

5-2-7 Communications Errors and Countermeasures

This section describes the communications errors that may occur during operation and possible countermeasures.

Refer to *5-2-9 Troubleshooting Errors with EtherNet/IP Communications* on page 5-28.

Operation When Errors Occur

An error message is displayed on the PT Unit when an error occurs, and a buzzer will sound if *Buzzer sound* under the System Menu is set to ON or ERR ON. Error messages are displayed when *Communications auto return* is turned OFF under the System Menu.

User Operation When Errors Occur

Check the error message displayed and press the **OK** Button. When the OK Button is pressed, the screen before the communications error will be returned and operation will restart. Alternatively, the display may automatically switch to the System Menu. Check the settings under the System Menu and change if necessary.



The information in the following table will be displayed, depending on the error.

Screen No.: Screen number

Allocated host: Host name

MRES: Main response code

SRES: Sub-response code

Additional Information

- If *Communications auto return* is set to ON and an error occurs at one port while both ports are being used, the other port will continue communications.
- When a communications error occurs, press the **OK** Button in the error message to return the original screen. The numeral and other data on the original screen will be the data from before the error occurred.

Messages for Communications Errors

The following messages are displayed for communications errors.

Message	Cause	Possible countermeasure
Addressing error exists in the screen, alarm, data log, or macro. Correct address setting by the CX-Designer. Screen No.: XXXX Allocation host: XXXX MRES=XXX, SRES=XXXX NB5Q-TW01B-V1-S: Addressing error exists in the screen, alarm, data log, or macro. Screen No.: XXXX Allocation host: XXXX MRES=XXX, SRES=XXXX	The set address is invalid.	Press the **OK** Button to move to the System Menu. Check the communications settings under *data check*, in particular that the address is valid. Use CX-Designer to change the settings.
Time-out error occurs while downloading by the following case: • Disconnection of the connecting cable. • Stopped host • Incorrect time-out period. NB5Q-TW01B-V1-S: Time-out error occurs while downloading Host Allocated host: XXXX	The communications cable is not connected properly. The host communications service has stopped. The timeout monitor time is too short.	Check the cable connection and conduct a continuity test. Exchange the cable if there is a cable error. If necessary, rewire the cable.
Communication error detected while downloading by the following case: • Corrupted data by noise • Transmit error by the host MRES=XXX, SRES=XXXX NB5Q-TW01B-V1-S: Communication error detected while downloading the data Allocated host: XXXX	Data corrupted by noise. Invalid host communications command.	Check the cable connection and conduct a continuity test. Exchange the cable if there is a cable error. If necessary, rewire the cable.
Addressing error exists in the screen, alarm, data log, or macro. Correct address setting by the CX-Designer. Screen No.: XXXX Allocation Host: XXXX Allocation Address: XXXX MRES: XXXX SRES: XXXX NB5Q-TW01B-V1-S: Addressing error exists in the screen, alarm, data log or macro. Screen No.: XXXX Allocation Host: XXXX Allocation Address: XXXX MRES: XXXX SRES: XXXX	An illegal address is set.	Press the **OK** Button to go to the System Menu. Select Data Check to see whether the address is valid and the communications settings are correct. Use CX-Designer to change settings if necessary.

Message	Cause	Possible countermeasure
Communication error detected while uploading by the following cases: • Corrupted data by noise • Transmit error by the host Allocation Host: XXXX NB5Q-TW01B-V1-S: Communication error detected while uploading the data Allocation Host: XXXX	Data corrupted by noise Invalid host communications command	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Failed to read host registration. Correct host registration with CX-Designer. Then, press OK and then download project data.	Project cannot be downloaded (was not transmitted or is corrupted).	Use a Programming Device to repair the project and try to download it again.
Time-out error occurred while writing by the following case: • Disconnection of the connecting cable • Stopped host_- Incorrect time-out period Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Time-out error occurred while writing the data Allocation Host: XXXX Do you want to retry?	The communications cable is not properly connected. The host communications service has stopped. The timeout monitoring time is too short.	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Time-out error occurred while writing due to the following: • Disconnection of the connecting cable • Stopped host_- Incorrect time-out period Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Time-out error occurred while writing to the System Memory Area. Allocation Host: XXXX Do you want to retry?	The communications cable is not properly connected. The host communications service has stopped. The timeout monitoring time is too short.	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Communication error detected while writing by the following case: • Corrupted data by noise • Transmit error by the host Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Communication error detected while writing to the System Memory Area Allocation Host: XXXX Do you want to retry?	Data corrupted by noise Invalid host communications command	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.

Message	Cause	Possible countermeasure
Communication error detected while writing by the following case: • Corrupted data by noise • Transmit error by the host Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Communication error detected while writing to the System Memory Area. Allocation Host: XXXX Do you want to retry?	Data corrupted by noise Invalid host communications command	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.

Probable Causes and Possible Countermeasures

Perform the following countermeasures for the displayed cause.

Errors	Suggested cause as displayed	Possible countermeasure
Local node error (MRES:01)	Local node not connected to network (SRES:01).	Connect the node to the network.
	No token received (SRES:02).	Set the local node within the maximum node address range.
	Cannot send because number of retries exceeded (SRES:03).	If tests executed between nodes do not operate normally, check the operating environment again.
	Cannot send because allowable number of frames exceeded (SRES:04).	Check the status of the event executed in the network and reduce the number of events in one cycle. Alternatively, increase the number of frames allowed to be sent.
	Node address setting incorrect (SRES:05).	Make the correct rotary switch settings. Make sure the node address is not outside the specified range and is not duplicated.
	Node address duplicated in network (SRES:06).	Change the duplicated node address.
Destination node errors (MRES:02)	Remote node not connected to network (SRES:01).	Connect the remote node to the network.
	No Unit for the unit address (SRES:02).	Check the remote unit address.
	No third node (SRES:03).	Check the address for the unit used as the third node. Check the third node address in the CMND instruction send data.
	Broadcast specified (SRES:03).	Specify only one node as the third node.
	Reception concentrated at remote node (SRES:04).	Increase the number of retries or redesign the system so that there is not concentration at the remote node.
	Message frame broken (SRES:05).	Increase the number of set retries. Perform an internode test to check the noise status.
	Response monitor time too short (SRES:05).	Increase the response monitor time parameters.
	Send/receive frame discarded (SRES:05).	Check the error history and take the correct action.
	Parity error, BBC error, or similar error has occurred (SRES:06).	Set the maximum unit number to 1 or higher for NT Link mode in the PLC Setup.
Controller error (MRES:03)	Communications controller error (SRES:01).	Refer to the Unit and Board user's manuals and take the correct action.
	CPU error on remote node CPU Unit. (SRES:02)	Refer to the CPU Unit manual and remove the cause of the CPU Unit error.
	No response returned because of Board error (SRES:03).	Check the network communications status and restart the Board. If the error persists, replace the Board.
	Incorrect Unit number setting (SRES:04)	Make the correct rotary switch settings. Make sure the Unit number is not outside the specified range and is not duplicated.

Errors	Suggested cause as displayed	Possible countermeasure
Service unsupported (MRES:04)	The Unit or Board do not support the command code used (SRES:01).	Check the command code.
	Command cannot be executed because the model or version is different (SRES:02).	Check the model and version.
Routing table error (MRES:05)	No destination address set on routing table (SRES:01).	Set the destination address on the routing table.
	Destination unclear because there is no routing table (SRES:02).	Set routing tables to the source, destination, and relay nodes.
	Routing table error (SRES:03).	Make the correct routing table settings.
	Command used more than 3 levels (SRES:04).	Edit the network or change the routing tables so that the command uses 3 or fewer levels.
Command format error (MRES:10)	Command too long (SRES:01).	Check the command format and set the correct command data.
	Command too short (SRES:02).	Check the command format and set the correct command data.
	The specified number of elements and the number of data to write do not match (SRES:03).	Check and match the number of nodes and the number of data writes.
	Different format (SRES:04).	Check the command format and set the correct command data.
	Local node relay table or relay node local network table settings incorrect (SRES:05).	Make the correct routing table settings.
Parameter error (MRES:11)	No corresponding variable code or EM (SRES:01).	Check command variables and parameter codes and set the corresponding code.
	Different access size specification or odd start address specified (SRES:02).	Check the variable and parameter access sizes and set the correct access size.
	Start address in processing range for command is in access-prohibited area (SRES:03).	Check the allowable processing range and set the processing range within the allowable range.
	End position in processing range for command is outside allowable processing range (SRES:04).	Check the allowable processing range and set the processing range within the allowable range.
	Total number of words exceeds limit (SRES:04).	Make the correct data link table settings.
	Non-existent program number set (SRES:05).	Check the valid program numbers and make the correct size relationship settings.
	Incorrect size relationship for command elements (SRES:09).	Check the command data and set the correct size relationships.
	Node not set in common link parameters is set in refresh parameters (SRES:09).	Make the correct data link table settings.
	Duplicate node address. (SRES:0A)	Make the correct data link table settings.
	Response exceeds maximum response length (SRES:0B).	Check the command format and set the correct number of elements.
Parameter error (MRES:11)	Error in set parameters (SRES:0C).	Check the command data and set the correct parameters.
	Error in file (SRES:0C).	Check file contents.

Errors	Suggested cause as displayed	Possible countermeasure
Read not possible (MRES:20)	Program area protected. (SRES:02)	Use support software to remove the protection and re-execute the command.
	No registered tables (SRES:03).	Set tables.
	Table error (SRES:03).	Make the correct table settings.
	No data to match search data (SRES:04).	------
	Non-existent program number set (SRES:05).	Check valid program numbers and set valid number.
	No corresponding file on specified file device (SRES: 06).	Check that the file name, including the subdirectory, is correct.
	Mismatched data in data being verified (SRES:07).	Check memory contents and write the correct data.
	File read failed (SRES:07).	Check file contents.
Write not possible (MRES:21)	Cannot access because read-only area. (SRES:01)	If write protected by switch settings, remove the protection and re-execute the command. Write commands cannot be executed for write-prohibited areas.
	Program area protected (SRES:02).	Use support software to remove the protection and re-execute the command.
	Write prohibited due to automatic data link table settings (SRES:02).	Change the system settings to allow any data link table settings.
	Tried to create file when number of files that can be registered has been exceeded (SRES:03).	Delete unnecessary files and then create a new file or create memory area for new files.
	Tried to open too many files for system limits (SRES:03).	Close open files and then re-execute the command.
	Non-existent program number set (SRES:05).	Check valid program numbers and set valid number.
	No corresponding file on specified file device (SRES: 06).	Check file name and re-execute command.
	Same file already on specified file device (SRES:07).	Change the write file name and re-execute the command.
	Cannot change because change caused error. (SRES:08)	------
Not executable in current mode (MRES:22)	The mode is incorrect (SRES:01).	Check operating mode.
	Cannot execute because data link starting (SRES:01)	Check the data link startup status.
	Cannot execute because data link stopped (SRES:02).	Check the data link startup status.
	Different command operating mode (program mode) (SRES:03).	Check PLC and FA computer operating mode.
	Different command operating mode (debug mode) (SRES:04).	Check PLC and FA computer operating mode.
	Different command operating mode (monitor mode) (SRES:05).	Check PLC and FA computer operating mode.
	Different command operating mode (run mode) (SRES:06).	Check PLC and FA computer operating mode.
	Not polling node (SRES:07)	Check the polling node on the network.
	Different command operating mode (SRES:08).	Check active status of the step.
No such device Unit (MRES:23)	No memory (media) for file device (SRES:01).	Mount memory (media). Alternatively, format EM.
	No file memory (SRES:02).	Check that file memory is mounted.
	No clock (SRES:03).	Check the model.

Errors	Suggested cause as displayed	Possible countermeasure
Cannot start/stop (MRES:24)	Data link table not registered or data link table error (SRES:01).	Make the data link table settings.
Unit error (MRES:25)	Memory error (SRES:02)	Resend correct data to memory.
	Registered I/O and actual I/O configurations different (SRES:03).	Change the actual configuration to match the registered configuration or create the I/O tables again.
	Registered number of I/O points or remote I/O points exceeded (SRES:04).	Change the registered number of points so that it will not be exceeded.
	Data transfer error between CPU and CPU Bus Unit (SRES:05).	Check that the Unit, Board, and cable are connected correctly and execute the *ERROR CLEAR* command.
	Duplicate number in rack or Unit numbers or I/O address settings under system settings (SRES:06).	Check the system settings and change any duplicate numbers.
	Data transfer error between CPU and I/O Unit. (SRES:07)	Check that the Unit, Board, and cable are connected correctly and execute the *ERROR CLEAR* command.
	SYSMAC BUS/2 data transfer error. (SRES:09)	Check that the Unit, Board, and cable are connected correctly and execute the *Clear error* command.
	CPU Bus Unit data transfer error. (SRES:0A)	Check that the Unit, Board, and cable are connected correctly and execute the *Clear error* command.
	Duplicate word settings (SRES:0D).	Verify I/O table data and reset I/O words.
	Error during error check of internal memory, removable media, or EM file memory (SRES:0F).	• For internal memory errors, write the correct data and re-execute the command. • Removable media or EM file memory errors indicate that the file data has been corrupted. Execute the *Format extension memory* command. • Replace the memory if the error is not cleared after the above processing has been performed.
	The communications load is too heavy when connected using Host Link (SRES: 0F).	• Use NT Link. • Reduce the size of the system word memory ($SW) allocation.
	Terminator has not been set (SRES:10).	Make the correct end station settings.

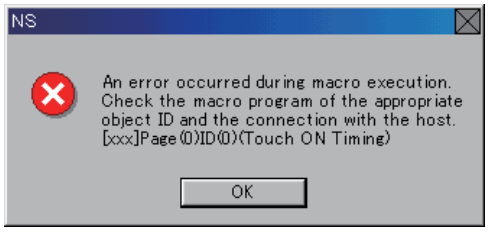
Errors	Suggested cause as displayed	Possible countermeasure
Command error (MRES:26)	No protection (SRES:01).	Protection does not need to be removed because there is no protection on the program area.
	Specified password different from registered password (SRES:02).	Specify the correct registered password.
	Protected (SRES:03).	Use support software to remove the protection and re-execute the command.
	More than 5 commands processing at command receive node (SRES:04).	Close or stop a service being executed and re-execute the command.
	Service executing. (SRES:05)	Close or stop a service being executed and re-execute the command.
	Service not executed (SRES:06).	Execute the corresponding service as required.
	No authority to execute service (SRES:07).	Local node not in data link. Execute service from node in data link.
	No response received due to buffer error (SRES:07).	Restart the Board. Replace the Board if the error persists.
	Settings not made before service executed (SERS:08).	Make the required settings.
	Required settings not made for command data (SRES: 09).	Check the command format and set the required command data.
	Tried to register program using already registered action/transition numbers (SRES:0A).	Change to unregistered action/transition numbers and re-execute the command.
	Cause of error not removed (SRES:0B).	Remove the cause of the error and execute the *ERROR CLEAR* command.
Access right error (MRES:30)	Another node has the access right. (SFC online edit using other node FIT is executed or *ACCESS RIGHT ACQUIRE* or *ACCESS RIGHT FORCE ACQUIRE* command executed on another node.) (SRES:01)	Wait until access rights are cleared and re-execute the command. (Execute *ACCESS RIGHT FORCE ACQUIRE* or *ACCESS RIGHT RELEASE* command to enable execution of original command. Current processing on the node that had access rights may be affected, however.)
Abort (MRES:40)	Interrupted by ABORT command (SRES:01).	------

Errors	Suggested cause as displayed	Possible countermeasure
PT memory error (MRES:7F)	Exception error during processing. (SRES:05)	System program corrupted. Download the system program. If the error persists, contact your nearest OMRON representative.
	Incorrect element type (SRES:13).	Project corrupted. Download project.
	Incorrect start address. (SRES:1A)	Address outside range has been set. Check the setting data and use CX-Designer to correct the setting.
	Insufficient read data buffer (SRES:1B).	System program corrupted. Download the system program. If the error persists, the PT Unit may need repaired. Contact your nearest OMRON representative.
	Standby processing failed for exclusive processing. (SRES:1C)	System program corrupted. Download the system program. If the error persists, the PT Unit may need repaired. Contact your nearest OMRON representative.
	Insufficient write data elements. (SRES:1D)	System program corrupted. Download the system program. If the error persists, the PT Unit may need repaired. Contact your nearest OMRON representative.
	Incorrect end address. (SRES:2B)	Address outside range has been set. Check the setting data and use CX-Designer to correct the setting.
	Access method initialization failure (SRES:3C).	System program corrupted. Download the system program. If the error persists, the PT Unit may need repaired. Contact your nearest OMRON representative.
	Access method exit processing failure (SRES:3D).	System program corrupted. Download the system program. If the error persists, the PT Unit may need repaired. Contact your nearest OMRON representative.
	Incorrect Access Method parameters (SRES:3E).	System program corrupted. Download the system program. If the error persists, the PT Unit may need repaired. Contact your nearest OMRON representative.
	Other incorrect subresponse code.	The PT Unit may need repaired. Contact your nearest OMRON representative.

5-2-8 Troubleshooting Macros

This section describes possible errors during macro execution and their countermeasures.

The following message is displayed if an error occurs during macro execution.



[xxx]: Error details.

Page (xxx): Screen number where error occurred (“-1” for project macros).

ID (xxx): Functional object ID number where error occurred (“-1” for project and screen macros).

(xxx): Macro execution timing.

The information displayed under error details, the cause, and the countermeasures are outlined in the following table.

Error details	Cause	Possible countermeasure
0 division error	Divided by zero.	Set a numeral other than 0.
Illegal argument.	Illegal value set to function argument.	Check the set argument and make the correct setting.
Illegal program	Illegal program has been set or timeout error occurred.	Check the macro contents again and program again correctly. Check for the following: • Disconnection of the connecting cable • Stopped host • Incorrect timeout period
BCD code error	Value has been set that cannot be converted to BCD or BIN command argument.	Check the set argument and make the correct setting.

The following information is displayed under macro execution timing.

Macro execution timing	Details
When loading a project	Macro executed when project loaded.
Alarm/Event ON	Macro executed when alarm or event ON.
Alarm/Event OFF	Macro executed when alarm or event cleared.
When loading a screen	Macro executed when screen opened.
When unloading a screen	Macro executed when screen closed.
Touch ON	Macro executed when ON/OFF, Word, or Command Buttons touched ON.
Touch OFF	Macro executed when ON/OFF, Word, or Command Buttons touched OFF.
Before Inputting numeral and string	Macro executed when numeral display and input or string display and input objects touched.
Before writing numeral and string	Macro executed when input made to numeral display and input or string display and input objects or thumbwheel switches.
When changing numeral or string	Macro executed when contents of address set to a bit lamp, word lamp, numeral display and input object, string display or input object, or thumbwheel switch are changed.
When selecting a list	Macro executed when selection made from list selection.

Macro execution timing	Details
When Pressing a Display Area A	Macro executed when alarm or event display area is pressed during an alarm or event.
When Selecting an Alarm or Event	Macro executed when displayed alarm/event selected using alarm/event summary and history object.

Additional Information

A communications error message will also be displayed if an illegal address is accessed by a macro.

5-2-9 Troubleshooting Errors with EtherNet/IP Communications

This section describes the countermeasures for EtherNet/IP errors that may occur.

Operation When Errors Occur

An error message is displayed on the PT Unit when an error occurs, and a buzzer will sound if *Buzzer sound* under the System Menu is set to ON or ERR ON. Error messages are basically displayed when *Communications auto return* is turned OFF under the System Menu.

User Operation When Errors Occur

Check the error message displayed and press the **OK** Button. When the OK Button is pressed, the screen before the communications error will be returned and operation will restart. Alternatively, the display may automatically switch to the System Menu. Check the settings under the System Menu and change if necessary.



The information in the following table will be displayed, depending on the error.

Screen No.: Screen number

Allocated host: Host name

General: General Status (0xXX)

Additional: Additional Status (0xXX XXXX)

Upper 2 digits: Number of words of additional status

Lower 4 digits: Error code

Additional Information

- If *Communications auto return* is set to ON and an error occurs at one port while both ports are being used, the other port will continue communications.
- When a communications error occurs, press the **OK** Button in the error message to return the original screen. The numeral and other data on the original screen will be the data from before the error occurred.
- If the setting of the tag data link or the like is changed on a host, the connection with the PT Unit may be disconnected. When it happens, wait for a while and try communication again. The error will be resolved.

Messages for Communications Errors

The following messages are displayed for communications errors.

Message	Cause	Possible countermeasure
Addressing error exists in the screen, alarm, data log, or macro. Correct address setting by the CX-Designer. Screen No.: XXXX Allocation host: XXXX General=XXX, Additional=XXXX NB5Q-TW01B-V1-S: Addressing error exists in the screen, alarm, macro or data log. Screen No.: XXXX Allocation Host: XXXX General=0xXX, Additional=0xXX XXXX	The set address is invalid.	Press the **OK** Button to move to the System Menu. Check the communications settings under *data check*, in particular that the address is valid. Use CX-Designer to change the settings.
Time-out error occurs while downloading by the following case: • Disconnection of the connecting cable. • Stopped host • Incorrect time-out period. NB5Q-TW01B-V1-S: Time-out error occurs while downloading Host Allocated host: XXXX	The communications cable is not connected properly. The host communications service has stopped. The timeout monitor time is too short.	Check the cable connection and conduct a continuity test. Exchange the cable if there is a cable error. If necessary, rewire the cable.
Communication error detected while downloading by the following case: • Corrupted data by noise • Transmit error by the host General=0xXX, Additional=0xXX XXXX NB5Q-TW01B-V1-S: Communication error detected while downloading the data Allocated host: XXXX	Data corrupted by noise. Invalid host communications command.	Check the cable connection and conduct a continuity test. Exchange the cable if there is a cable error. If necessary, rewire the cable.
Addressing error exists in the screen, alarm, data log, or macro. Correct address setting by the CX-Designer. Screen No.: XXXX Allocation Host: XXXX Allocation Address: XXXX General=0xXX, Additional=0xXX XXXX NB5Q-TW01B-V1-S: Addressing error exists in the screen, alarm, data log or macro. Screen No.: XXXX Allocation Host: XXXX Allocation Address: XXXX General=0xXX, Additional=0xXX XXXX	An illegal address is set.	Press the **OK** Button to go to the System Menu. Select Data Check to see whether the address is valid and the communications settings are correct. Use CX-Designer to change settings if necessary.

Message	Cause	Possible countermeasure
Communication error detected while uploading by the following cases: • Corrupted data by noise • Transmit error by the host Allocation Host: XXXX NB5Q-TW01B-V1-S: Communication error detected while uploading the data Allocation Host: XXXX	Data corrupted by noise Invalid host communications command	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Failed to read host registration. Correct host registration with CX-Designer. Then, press OK and then download project data.	Project cannot be down-loaded (was not transmitted or is corrupted).	Use a Programming Device to repair the project and try to download it again.
Time-out error occurred while writing by the following case: • Disconnection of the connecting cable • Stopped host_- Incorrect time-out period Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Time-out error occurred while writing the data Allocation Host: XXXX Do you want to retry?	The communications cable is not properly connected. The host communications service has stopped. The timeout monitoring time is too short.	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Time-out error occurred while writing due to the following: • Disconnection of the connecting cable • Stopped host_- Incorrect time-out period Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Time-out error occurred while writing to the System Memory Area. Allocation Host: XXXX Do you want to retry?	The communications cable is not properly connected. The host communications service has stopped. The timeout monitoring time is too short.	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Communication error detected while writing by the following case: • Corrupted data by noise • Transmit error by the host Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Communication error detected while writing to the System Memory Area Allocation Host: XXXX Do you want to retry?	Data corrupted by noise Invalid host communications command	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.

Message	Cause	Possible countermeasure
Communication error detected while writing by the following case: • Corrupted data by noise • Transmit error by the host Allocation Host: XXXX Do you want to retry? NB5Q-TW01B-V1-S: Communication error detected while writing to the System Memory Area. Allocation Host: XXXX Do you want to retry?	Data corrupted by noise Invalid host communications command	Check the cable connection and conduct a continuity test. Replace the cable if there is a cable error, or rewire the cable if necessary.
Addressing error exists in the screen, alarm, data log, or macro. Correct address setting by the CX-Designer. Screen No.: XXXX Allocation Host: XXXX Allocation Address: XXXX NB5Q-TW01B-V1-S: Addressing error exists in the screen, alarm, data log or macro. Screen No.: XXXX Allocation Host: XXXX Allocation Address: XXXX	The storage type of the number set for a functional object does not match the data type of the tag. Settings are made to monitor data that exceeds the maximum number of elements for an array variable.	Change the settings using the CX-Designer. Alternatively, change the host tag settings. If you transfer a screen by the Select Update Screen button using a transfer program, tag settings may be inconsistent and an allocation address may turn to be ?????. If it happens, transfer an entire project, or transfer the screen from CX Designer to send the tag settings again.
Communication error detected while communicating via EtherNet/IP by the following case: • NS internal communication load has become high (*Communications auto return* is ON) NS will be rebooted after 1 minute. Press the OK button to restart immediately. (*Communications auto return* is OFF) Perform communication recovery. Press the OK button and restart the NS. NS5: Communication error detected in the EtherNet/IP comm. by the following case: • NS internal load becomes high (*Communications auto return* is ON) NS will be rebooted after 1 min. Press the OK button to restart. (*Communications auto return* is OFF) Perform communication recovery. Press the OK button and restart the NS.	The load of EtherNet/IP communication processing inside PT Unit is high and normal communications are damaged.	Restart the PT Unit. If the communication auto return setting is ON, PT Unit will be restarted automatically after 1 minute. If it occurs repeatedly after rebooting the PT Unit, please review the system configuration and screen configuration to reduce the communication load.

CIP Error Codes

Perform the following countermeasures for the displayed cause.

General	Additional	Error	Possible countermeasure
0x01	0x01 0203	Communications error	Check the cable connections and test the cables for continuity. If there are any problems, replace the cable or connect a ground wire.
0x02	0x00 0000	The host communications service stopped.	Adjust the system service execution time in the host to create unused time between task execution.
0x1F	0x02 0102 (Writing disabled.)	• The number of elements does not agree with the write data size. • The write start address exceeds the range of the variable area. • The write end position exceeds the range of the variable area.	Confirm the range that can be processed and set the write operation within that range.
		• The relevant part of the EM Area has been converted to file memory. • The specified EM Area bank does not exist. • The variable type specification is not valid.	Set the correct code, referring to information on the command variables and parameter type codes.
		• Write-protected words are included in the write area.	If write protection is set with a switch, release the protection and execute the instruction again. Execution is not possible for read-only areas.
		• FINS write protection is in effect.	Clear protection from Support Software and execute the instruction again.
	0x02 0104 (Writing disabled.)	• One of the specified EM Area banks does not exist. • The relevant part of the EM Area has been converted to file memory.	Set the correct code, referring to information on the command variables and parameter type codes.
		• The read start address exceeds the range of the variable area. • The specified read exceeds the maximum value.	Confirm the range that can be processed and set the read operation within that range.
0xFF	0x01 6008	Communications error	Check the communications settings in the Unit and set them to enable using Ethernet.

A

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A-1 Specifications

A-1-1 Display Specifications

Functional objects

A total of 1,024 functional objects in frames or tables can be created for each screen. There are some functional objects, however, for which it is not possible to create more than one functional object for the same screen.

● ON/OFF Buttons

- Button shape
  Rectangle, circle, 2-light rectangle, select shape.
- Button operation
  Momentary, alternate, SET, RESET.

● Word Buttons

- Button type
  Rectangle, select shape.
- Button operation
  Set value, increase/reduce value, display pop-up menu.
- Numeral specifications
  Word, 2-word, real number

● Command Buttons

- Button operation
  Screen switch, key button, pop-up screen control, System menu display, buzzer stop, no processing, Data Block Control, and Authentication cancellation

● Bit lamps

- Lamp type
  Single-line circle, single-line rectangle, double-line circle, double-line rectangle, specify shape.

● Word lamps

- Lamp type
  Single-line circle, single-line rectangle, double-line circle, double-line rectangle, specify shape.
- Color change
  Up to 10 colors.

● Numeral display and input objects

- No. of display digits
  Up to 25.
  Integer part: Up to 15 digits
  Decimal fraction part: Up to 10 digits.
  (Decimal fraction display is available only when decimal display format has been selected and gradations have been set or when *Real number* has been selected for the storage format.)

- Input method
  Keypad or Command Button.

● String display and input objects

- Character display format
  ASCII code (Shift JIS), Unicode.
- No. of characters
  Up to 256.
- Input method
  Keypad, Command Button, bar code reader.

● Label objects

- Fixed string display or indirect specification. (With indirect specification, either multibyte code or Unicode can be selected.)
- No. of characters
  Up to 256.
- Reference file format
  File name (8 characters) + .TXT

● List selection objects

- Reference file format
  File name (up to 8 characters) +.LST
- Operations at list selection
  Display/no display of selected bar.
  Store selected line number to specified address.
  Store selected line character string to specified address.
- Character display format
  ASCII code (Shift JIS), Unicode.
- No. of characters per line
  Up to 256.
- Maximum number of display lines
  1,024.

● Thumbwheel switches

- No. of displayable digits
  Integer part: Up to 15 digits
  Decimal fraction part: Up to 10 digits.
  (Decimal fraction input is enabled only when the display format is set to decimal and scaling is set, or when real number storage is set.)
- Input method
  + and - Buttons.

● Analog meters

- Display direction
  Up, down, left, right.
- Incremental direction
  Clockwise, counterclockwise.

- Shape
  Quarter circle, half circle, circle.
- Display format
  Colored, needle.
- Needle type
  Straight line, arrow, triangular arrow
- Needle width
  1 to 3 dots

● Level display objects

- Display direction
  From bottom to top, top to bottom, right to left, left to right
- Coloring
  3 levels

● Broken-line graphs

- No. of graph points per broken line
  Up to 1000.
- No. of displayable graphs per broken-line graph
  Up to 256.
- No. of graphs that can be registered per project
  Up to 16.
- No. of graphs that can be registered per group
  Up to 256.
- Amount of data that can be stored in log
  300,000 bytes

● Bitmaps

- Displayable file formats
  BMP, JPEG (RLE and progressive jpeg are not supported.)

● Alarm/Event display objects

- Display format
  Fixed character, flowing text
- Maximum number of display objects
  5,000

● Alarm/Event summary and history objects

- Display data
  Current alarms/events, alarm/event history.
- Maximum number of display objects
  2,048 (for histories).

● Date objects

- Date displayed on PT Unit (year, month, day)
- Display format: 27 types.

● Time objects

- Time displayed on PT Unit (hour, minute, seconds)
- Display format: 8 types.

● Data log graphs

- No. of log points
  1 to 50,000.
- No. of data logs per project
  Up to 100 groups.
- No. of logging points per project
  Up to 160,000
- No. of addresses that can be recorded to 1 group
  Up to 16.
- No. of addresses for standard logging
  Up to 128.
- Number of always logging points
  50,000 max.

● Data Block Table

- Maximum number of records
  Up to 1,000 lines
- Maximum number of fields
  Up to 500 columns
- Data Quantity for 1 Data Block
  524,288 bytes

● Consecutive Line Drawing

Number of vertices: Up to 128 points

● Multifunction Object

- Shape
  Select Shape, Single-lined Circle, Single-lined Rectangle, Double-lined Circle, Double-lined Rectangle, Rectangle 2 Light, Polygon, Sector
- Change Color/Shape
  Up to 16 types

● Contents Display

- String, bmp file, jpg file (RLE-format bmp files and progressive jpeg are not supported).
- No. of characters
  Up to 1,024. Line wrapping is possible.

Graphic display (fixed)

- Displayed at any position.
  Rectangle, circle, ellipse, line, polyline, polygon, sector, arc.
- Up to 2,048 graphic displays can be created per screen.

Frames

- Up to 10 can be created per screen.
- Up to 256 functional objects can be created per frame page.
  However, a limit of 1,024 functional object per screen applies, and this may restrict the number of objects per frame.

Tables

- No. of tables
  Any number of tables can be created, as long as the total number of functional objects per screen does not exceed 1,024.
- Horizontal
  Up to 30 columns.
- Vertical
  Up to 40 lines.
- No. of functional objects per table
  Up to 256.

Libraries

Up to 4,096 libraries can be registered.

User screens

- Up to 4,000 screens, including base and pop-up screens, can be created per project.
- Up to 3 pop-up screens can be overlapped.

Sheets

- Up to 32 sheets can be created per project.
- Up to 10 sheets can be set for layered display on standard screens. s
- Up to 1,024 functional objects, including those inside frames and tables, can be created per sheet. Up to 2,048 graphic displays can be created per sheet.

No. of label switches

Up to 16.

Background screen files

Displayable file formats

BMP, JPEG (RLE-format bmp files and progressive jpeg are not supported.)

Background colors

256

Project registration method

Transfer from CX-Designer Data transfer (under File/Data transfer) to PT Unit.

- PT – Transfer – Transfer [To PT]
- PT – Transfer – Quick Transfer [To PT]
- PT – Transfer – Transfer Program

A-1-2 Specifications for Display Elements

Characters

Raster font/Vector font, Scalable font/7-segment font

● Raster font

Font name	Characters that can be displayed	Base sizes	Magnification
Rough	Half-width alphanumerics, Katakana, Greek, Coptic, Cyrillic	8×8	1×1, 1×2, 2×1, 2×2, 3×3, 4×4, 8×8
Standard	Half-width alphanumerics, Katakana, full-width JIS1 and JIS2 standard characters, Greek, Coptic, Cyrillic, Korean, simplified Chinese	8×16, 16×16	1×1, 1×2, 2×1, 2×2, 3×3, 4×4, 8×8
Fine	Half-width alphanumerics, Katakana, full-width JIS1 and JIS2 standard characters, Greek, Coptic, Cyrillic	16×32, 32×32	1×1, 1×2, 2×1, 2×2, 3×3, 4×4, 8×8
Gothic numeral	0 to 9, A to F, +, -, decimal point, comma, space, and colon	---	8×16, 16×32, 24×48, 32×64, 48×96, 64×128

● Vector font

All fonts, types, and sizes that can be specified o for CX-Designer can be displayed.

● Scalable Font

Font	Size	Magnification
Scalable Gothic	6 to 255 pixels	50% to 200%

● 7-segment Font

7-segment numeral	8×14, 12×21, 16×27, 20×34, 24×41, 32×54, 48×82, 64×108, 80×135, 96×161, 112×188, 128×216, 160×269, 200×336

Numerals 0 to 9, characters A to F, the plus and minus signs (+ and –), periods (.), commas (,), spaces ( ) and colon (:) can be displayed on the 7-segment display.

Text attributes

- Colors: 256
- Font style (only when vector fonts are specified.): Bold, italics
- Vertical position: Top, center, bottom
- Horizontal position: Left-aligned, center, right-aligned

Flicker

Objects for which flicker can be set: Functional Objects and Fixed Objects

Flicker settings: Up to 10 objects can be registered per screen.

The flicker method, speed, and range can be set.

Flicker method: Select one of the following three options.

- Invert color display.
- Display/hide whole object or label string.
- Specify flicker color (text color, background color, or line color).

Functional Object: Select under flicker settings.

Fixed Object: Select from flicker settings or select from one of three types for each Fixed Object (Select flicker speed. The flicker range is set to the whole object.)

Unit and scale settings

Up to 1,000.

Alarm/event settings

Up to 5,000.

Display colors

Up to 256. (Up to 16 million with BMP or JPEG.)

Numeral display and storage formats

● Numeral display format

Format	Details
Decimal	BCD and real number storage formats can be specified. 1-byte: -128 to 127 (signed) 0 to 255 (unsigned) Word: -32768 to 32767 (signed) 0 to 65535 (unsigned) 2-word: -2147483648 to 2147483647 (signed) 0 to 4294967295 (unsigned) 4-word: -9,223,372,036,854,770,000 to 9,223,372,036,854,770,000 (signed) 0 to 18,446,744,073,709,500,000 (unsigned)
Hexadecimal	BCD, real number, and 4-word storage formats cannot be specified. 1-byte: 0 to FF (unsigned) Word: 0 to FFFF (unsigned) 2-word: 0 to FFFFFFFF (unsigned)
Binary	BCD, real number, and 4-word storage formats cannot be specified. 1-byte: 0 to 11111111 (unsigned) Word: 0 to 1111111111111111 (unsigned) 2-word: 0 to 11111111111111111111111111111111 (unsigned)

Format	Details
Octal	BCD, real number, and 4-word storage formats cannot be specified. 1-byte: 0 to 377 (unsigned) Word: 0 to 177777 (unsigned) 2-word: 0 to 37777777777 (unsigned)

● Storage format

Format	Details
SINT (signed, 1 byte)	Stored as a 1-byte integer at the write destination address. (-128 to 127 in decimal)
USINT (unsigned, 1 byte)	Stored as a 1-byte integer at the write destination address. (0 to 255 in decimal)
INT (1-word signed)	Stores the data as a 2-byte integer at the write destination address. (-32,768 to 32, 767 in decimal)
UNIT (1-word unsigned)	Stores the data as a 2-byte integer at the write destination address. (0 to 65,535 in decimal)
DINT (2-word signed)	Stores the data as a 4-byte integer at the write destination address. (-2147483648 to 2147483647 in decimal)
UDINT (2-word unsigned)	Stores the data as a 4-byte integer at the write destination address. (0 to 4294967295 in decimal)
LINT (4-word signed)	Stored as a 8-byte integer at the write destination address. (-9,223,372,036,854,770,000 to 9,223,372,036,854,770,000 in decimal)
ULINT (4-word unsigned)	Stored as a 8-byte integer at the write destination address. (0 to 18,446,744,073,709,500,000 in decimal)
REAL (real number)	Stores the data as a 4-byte real number at the write destination address. (Can be set in decimal between approximately $\pm1.175494351\times10^{-38}$ and approximately $\pm3.402823466\times10^{+38}$ (7 digits enabled)). 4-byte real numbers that conform to IEEE754.
LREAL (double-precision real number)	Stored as an 8-byte real number at the write destination address. (Can be set in decimal between approximately $\pm2.2250\times10^{-308}$ and $\pm1.797693134862315\times10^{308}$ (16 significant digits).) Eight-byte real numbers that conform to IEEE 754.
BCD1 (1-word signed, most significant digit: F)	Stores the data as 2-byte BCD at the write destination address. Negative value when most significant digit is F. (-999 to 9,999 in decimal)
BCD1 (2-word signed, most significant digit: F)	Stores the data as 4-byte BCD at the write destination address. Negative value when most significant digit is F. (-9999999 to 99999999 in decimal)
BCD2 (1-word signed, most significant bit))	Stores the data as 2-byte BCD at the write destination address. Negative value when most significant digit is 1. (-7,999 to 7,999 in decimal)
BCD2 (1-word unsigned)	Stores the data as 2-byte BCD at the write destination address. (0 to 9,999 in decimal)
BCD2 (2-word signed, most significant bit))	Stores the data as 4-byte BCD at the write destination address. Negative value when most significant digit is 1. (-79,999,999 to 79,999,999 in decimal)
BCD2 (2-word unsigned)	Stores the data as 4-byte BCD at the write destination address. (0 to 99999999 in decimal)

Date and time format

● Date display

Display item	Display format
yyyy	year (4 digits)
yy	year (2 digits)
mm	month
dd	day of month
ddd	day of the week (1 character, e.g., S)
dddd	day of the week (3 characters, e.g., Sat)
yyyy[JY]mm[JM]dd[JD] dddd	2000年06月17日土曜日
yy[JY]mm[JM]dd[JD] dddd	00年06月17日土曜日
yyyy[JY]mm[JM]dd[JD] (dddd)	2000年06月17日(土曜日)
yy[JY]mm[JM]dd[JD] (dddd)	00年06月17日(土曜日)
yyyy[JY]mm[JM]dd[JD]	2000年06月17日
yy[JY]mm[JM]dd[JD]	00年06月17日
yyyy mm dd ddd	2000 06 17 Sat
yy mm dd ddd	00 06 17 Sat
yyyy mm dd (ddd)	2000 06 17 (Sat)
yy mm dd (ddd)	00 06 17 (Sat)
yyyy mm dd	2000 06 17
yy mm dd	00 06 17
yyyy/mm/dd ddd	2000/06/17 Sat
yy/mm/dd ddd	00/06/17 Sat
yyyy/mm/dd (ddd)	2000/06/17 (Sat)
yy/mm/dd (ddd)	00/06/17 (Sat)
yyyy/mm/dd	2000/06/17
yy/mm/dd	00/06/17
ddd mm/dd/yyyy	S 06/17/2000
ddd mm/dd/yy	S 06/17/00
(ddd) mm/dd/yyyy	(S) 06/17/2000
(ddd) mm/dd/yy	(S) 06/17/00
yyyy.mm.dd ddd	2000.06.17 Saturday
yy.mm.dd ddd	00.06.17 Saturday
yyyy.mm.dd (ddd)	2000.06.17 (Saturday)
yy.mm.dd (ddd)	00.06.17 (Saturday)
yyyy.mm.dd	2000.06.17
yy.mm.dd	00.06.17
ddd mm.dd.yyyy	S 06.17.2000
ddd mm.dd.yy	S 06.17.00
(ddd) mm.dd.yyyy	(S) 06.17.2000
(ddd) mm.dd.yy	(S) 06.17.00
yyyy-mm-dd	2000-06-17

Display item	Display format
mm/dd/yyyy	02/23/2001
mm/dd/yy	02/23/01
DDD,MMMM dd,yyyy	Fri,February 23,2001
MMMM dd,yyyy	February 23,2001
DDD,MMM dd,yy	Fri,Feb 23,01
MMM dd,yy	Feb 23,01
dd/mm/yyyy	23/02/2001
dd/mm/yy	23/02/01
DDD/dd/mm/yyyy	Fri/23/02/2001
DDD/dd/mm/yy	Fri/23/02/01
DDD,dd MMMM,yyyy	Fri,23 February,2001
Dd MMMM,yyyy	23 February,2001
DDD,dd MM,yy	Fri,23 Feb,01
dd MMM,yy	23 Feb.01
dd.mm.yy	23.02.01
DDD.dd.mm.yy	Fri.23.02.01

● Time display

Display item	Display examples
hh	hour
mm	minutes
ss	seconds
xxxx	a.m./p.m.
xxxx hh[Jh]mm[Jm]ss[Js]	午後01時51分25秒
xxxx hh[Jh]mm[Jm]	午後01時51分
hh[Jh]mm[Jm]ss[Js]	13時51分25秒
hh[Jh]mm[Jm]	13時51分
hh mm ss xxxx	10h 15m 20 s A.M.
hh mm xxxx	10h 15m A.M.
hh mm ss	10h 15m 20s
hh mm	10h 15m
hh:mm:ss xxxx	10:15:20 A.M.
hh:mm xxxx	10:15 A.M.
hh:mm:ss	10:15:20
hh:mm	10:15

Write settings

Up to 200 messages

A-1-3 Special Functions

Buzzer sound

- Three types (continuous, short intermittent, long intermittent)
  The type of buzzer sound is controlled at system memory bits $SB12 to $SB14.
- Press the Command Button with the *Buzzer stop* function to stop the buzzer. Alternatively, turn OFF system memory bits $SB12 to $SB14.
- Settings under System Menu *PT Operation Settings Screen*/*CX-Designer system settings*.

ON: Buzzer sounds when $SB12 to $SB14 turn ON or when an error occurs.

When an error message or other x or ! dialog boxes are displayed.

OFF: Buzzer does not sound.

ERR ON: Buzzer sounds when an error occurs.

When an error message or other × or ! dialog boxes are displayed.

Key press sound

- Settings under System Menu *PT Operation Settings Screen*/*CX-Designer system settings*.

ON: Input sound when functional object that receives the input is pressed.

OFF: No input sound even when functional object that receives the input is pressed.

Maintenance function

- All settings status monitor function
  The status of all settings can be checked from the System Menu Screen.
- Communications test function
  Communications can be tested by performing simple communications.
- Data initialization
  Data saved to the PT Unit can be initialized from the System Menu.
- Operation log/error log/alarm/event history/data log display
  The record settings and data for all kinds of log data can be displayed.
- Registered Screen test display function
  Registered screens can be displayed and checked from the System Menu.
- Hardware check
  Hardware can be checked.

Automatic Saving

The following data is saved to the screen data area automatically every 30 seconds. Furthermore, the data can be saved at arbitrary timing by setting $SB62 to ON.

- Internal holding memory
- Operation logs
- Error logs
- Alarm/event history
- Data logs

Calendar clock function

- Current date and time display based on internal clock.
- Display and settings using System Menu *PT Operation Settings Screen*/*CX-Designer Date*/*Time Object*.
- The settings are retained by the built-in capacitor.

Transfer function

● System program transfer/Project transfer

Downloads/uploads from CX-Designer (computer) or removable media.

History save function

Saves operation log, error log, alarm, event history, or data log data to removable media.

Device data transfer

Data can be transferred from the transfer source to the transfer destination under specified conditions.

A-2 List of Models

A-2-1 PT Models

Model	LCD				Ethernet	Body
	Type	Size	Color	No. of dots		Color
NB15W-TW01B-V1-S	TFT	15.0 inches	Color	1024×768	10/100Base-T	Black
NB10W-TW01B-V1-S	TFT	10.1 inches	Color	1024×600	10/100Base-T	Black
NB7W-TW01B-V1-S	TFT	7.0 inches	Color	640×480	10/100Base-T	Black
NB5Q-TW01B-V1-S	TFT	5.7 inches	Color	320×240	10/100Base-T	Black

A-3 Addresses for Functional Objects

A-3-1 Using Direct Addresses

The following table shows the types of addresses that can be set for functional objects.

B: Bit

W: Word

L: 32-bit data

If data is written to a bit for an address for which only W or L can be set, all other bits will be set to 0.

Refer to *NS-B-series Programmable Terminal Host Connection User's Manual (Cat. No. V131)* for information on the PLC addresses that can be used.

Functional object	Tab page name	Set address	B	W	L
ON/OFF Buttons	General	Write address	OK	No	No
		Display address 1	OK	No	No
		Display address 2	OK	No	No
	Color/Shape	Color 1 (OFF color)*1	No	OK	No
		Color 2 (ON color)*1	No	OK	No
		Color 3	No	OK	No
		Color 4	No	OK	No
	Label	Switch label specification	OK	No	No
		Indirect specification of label character color	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Word Buttons	General	Write address	No	OK	OK
		Indirect write value specification	No	OK	OK
		Indirect increment/decrement specification	No	OK	OK
	Color/Shape	Indirect specification of normal background color	No	OK	No
		Indirect specification of background color when object is pressed	No	OK	No
	Label	Indirect specification of label character color	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Upper/lower Limits	Indirect specification of upper limit	No	OK	OK
		Indirect specification of lower limit	No	OK	OK
	Flicker	Flicker specification	OK	No	No
	Write Settings	Write notification address	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Command Buttons	General	Indirect specification of screen switch page	No	OK	No
		Switch screen page notification address	No	OK	No
		String source address	No	OK	No
	Color/Shape	Indirect background color specification	No	OK	No
	Label	Indirect specification of label character color	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No

Functional object	Tab page name	Set address	B	W	L
Bit lamps	General	Display address	OK	No	No
	Color/Shape	Indirect specification of background color when ON	No	OK	No
		Indirect specification of background color when OFF	No	OK	No
	Label	Indirect specification of label character color	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/no display flags	OK	No	No
Word lamps	General	Display address	No	OK	No
	Color/Shape	Indirect specification of background color when 0	No	OK	No
		Indirect specification of background color when 1	No	OK	No
		Indirect specification of background color when 2	No	OK	No
		Indirect specification of background color when 3	No	OK	No
		Indirect specification of background color when 4	No	OK	No
		Indirect specification of background color when 5	No	OK	No
		Indirect specification of background color when 6	No	OK	No
		Indirect specification of background color when 7	No	OK	No
		Indirect specification of background color when 8	No	OK	No
		Indirect specification of background color when 9	No	OK	No
	Label	Indirect specification of label character color	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/no display flags	OK	No	No
Label objects	Background	Indirect background color specification	No	OK	No
	Label	Indirect specification of label character color	No	OK	No
		Indirect specification of label string file line	No	OK	No
		Indirect reference to string number	No	OK	No
	Message	Address for switching status	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/no display flags	OK	No	No
Numeral display & input objects	General	Communications address	No	OK	OK
		Indirect specification of units/scale number	No	OK	No
	Text Attributes	Indirect specification of numeral/character color	No	OK	No
	Background	Indirect background color specification	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Input Upper and Lower Limits	Indirect specification of input upper limit	No	OK	OK
		Indirect specification of input lower limit	No	OK	OK
	Limit Monitor	Indirect specification of upper limit monitoring	No	OK	OK
		Indirect specification of lower limit monitoring	No	OK	OK
	Flicker	Flicker specification	OK	No	No
	Write Settings	Write notification address	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags (all)	OK	No	No
		Display/no display flags (numerals)	OK	No	No
String display & input objects	General	String start address	No	OK	No
	Text Attributes	Indirect character color specification	No	OK	No
	Background	Indirect background color specification	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Write Settings	Write notification address	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No

Functional object	Tab page name	Set address	B	W	L
List selection objects	General	List data address	No	OK	No
		Indirect file line specification	No	OK	No
	Background	Indirect background color specification	No	OK	No
	Selection Operation	Selection line number address	No	OK	No
		Selection line string address	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
	External Control	Display block number specification address	No	OK	No
		Address specifying display start line	No	OK	No
		List re-display specification	OK	No	No
Thumbwheel switches	General	Communications address	No	OK	OK
	Text Attributes	Indirect specification of numeral/character color	No	OK	No
	Background	Indirect background color specification	No	OK	No
	Upper/lower Limits	Indirect specification of input upper limit	No	OK	OK
		Indirect specification of input lower limit	No	OK	OK
	Flicker	Flicker specification	OK	No	No
	Write Settings	Write notification address	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Analog meters	General	Communications address	No	OK	OK
	Border	Indirect specification of border value (maximum)	No	OK	OK
		Indirect specification of border value (delimiter 1)	No	OK	OK
		Indirect specification of border value (delimiter 2)	No	OK	OK
		Indirect specification of border value (minimum)	No	OK	OK
	Color	Indirect specification of range 1 color	No	OK	No
		Indirect specification of range 2 color	No	OK	No
		Indirect specification of range 3 color	No	OK	No
	Background	Indirect background color specification	No	OK	No
		Indirect specification of range 1 background color	No	OK	No
		Indirect specification of range 2 background color	No	OK	No
		Indirect specification of range 3 background color	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/no display flags	OK	No	No
Level meters	General	Communications address	No	OK	OK
	Border	Indirect specification of border value (maximum)	No	OK	OK
		Indirect specification of border value (delimiter 1)	No	OK	OK
		Indirect specification of border value (delimiter 2)	No	OK	OK
		Indirect specification of border value (minimum)	No	OK	OK
	Color	Indirect specification of range 1 color	No	OK	No
		Indirect specification of range 2 color	No	OK	No
		Indirect specification of range 3 color	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Background	Indirect background color specification	No	OK	No
		Indirect specification of range 1 background color	No	OK	No
		Indirect specification of range 2 background color	No	OK	No
		Indirect specification of range 3 background color	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/no display flags	OK	No	No

Functional object	Tab page name	Set address	B	W	L
Broken-line Graphs	General	Display refresh bit	OK	No	No
		No. of display-enabled points	No	OK	No
		Indirect specification of scale line display/hide setting	OK	No	No
	Graph	Graph data	OK	OK	OK
		Indirect specification of number of graph points	No	OK	No
		Indirect specification of display start position	No	OK	No
		Indirect specification of maximum graph data value	OK	OK	OK
		Indirect specification of minimum graph data value	OK	OK	OK
	Background	Indirect background color specification	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Bitmaps	General	Address for indirect specification of display file	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/no display flags	OK	No	No
Alarm/event display objects	General	Alarm/event data	OK	No	No
		Alarm and event information	OK	OK	No
	Flowing Text	Specification of flowing text display start	OK	No	No
	Background	Indirect background color specification	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Alarm/event summary and history objects	General	Selected alarm ID write address	No	OK	No
		Alarm/event data	OK	No	No
		Alarm information	OK	OK	No
	Background	Indirect background color specification	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Date objects	Background	Indirect background color specification	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Time objects	Background	Indirect background color specification	No	OK	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No

Functional object	Tab page name	Set address	B	W	L
Data log graphs	General	Graph data	OK	OK	OK
		Indirect specification of maximum graph data value	OK	OK	OK
		Indirect specification of minimum graph data value	OK	OK	OK
	Display	Indirect specification of time axis	No	OK	No
		Time axis data destination	No	OK	No
		Time axis data enable/disable bit	OK	No	No
		Display refresh notification	OK	No	No
		Scroll seconds specification	No	OK	No
		Time data transmission destination	No	OK	No
	Background	Indirect background color specification	No	OK	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Frame objects	General	Frame page number	No	OK	No
	Control Flag	Input enabled/disabled flags	OK	No	No
		Display/no display flags	OK	No	No
Data block tables	General	Specify interlock (Data Prohibition Flag)	OK	No	No
		Indirect reference of maximum limit for numeral field	No	OK	OK
		Indirect reference of minimum limit for numeral field	No	OK	OK
		Address for numeral field	No	OK	OK
		Address for string field	No	OK	OK
	Text Attribute	Indirect specification of text colors	No	OK	No
	Write Setting	Write notification address	OK	No	No
	Control Flag	Input enable/disable flag	OK	No	No
		Display enable/disable flag	OK	No	No
Consecutive Line Drawing	General	Indirect specification of color	No	OK	No
		Indirect specification of the number of vertices	No	OK	No
		Starting address of the X-Y coordinates data	No	OK	No
Multifunction Object	General	Input	OK	No	No
		Perform an action when a value changed	OK	OK	No
		Write bit	OK	No	No
		Write word	No	OK	OK
		Write string	No	OK	No
		Switch screen	No	OK	No
		Key Buttons	No	OK	No
		Data Block Control	No	OK	No
		Contents Control	No	OK	No
		Macro	OK	OK	OK
	Color/Shape	Display Address 1	OK	OK	OK
		Display Address 2	OK	No	No
		Indirect Reference for Color	No	OK	No
		Display/hide	OK	No	No
	Label	Switch labels	OK	OK	No
		Indirect Reference for Text Color	No	OK	No
	Flicker	Flicker specification	OK	No	No

Functional object	Tab page name	Set address	B	W	L
Contents Display	Frame	Indirect reference for frame ON/OFF.	OK	No	No
	Flicker	Flicker specification	OK	No	No
	Control Flag	Display/hide flag	OK	No	No

*1. The address name in parentheses ( ) is the name when Rectangle Simple (Type 1), Rectangle Simple (Type 2-1), Rectangle Simple (Type 2-2), Circle Simple (Type 1), Circle Simple (Type 2-1), or Circle Simple (Type 2-2) are selected as the button type.



Additional Information

When using direct addresses, NS-B-series PLCs treat communications addresses set to any data type other than BOOL as if they were set to CHANNEL. (CHANNEL stands for word data.)

The data types other than BOOL and CHANNEL are provided for compatibility with the symbol tables of the CX-Programmer and the variable tables of the Sysmac Studio.

A-3-2 Using Tags

The data types for tags that can be set for functional objects (including arrays) are shown in the following table.

B (bit): BOOL

SI (1 byte): SINT, USINT, BYTE*1

W (1 word): CHANNEL, INT, UINT, UINT_BCD, WORD

D (2 words): DINT, UDINT, REAL, UDINT_BCD, DWORD

L (4 words): LINT, ULINT, LREAL*1

ST (text string): STRING

*1. Supported only for NJ/NX-series Controllers.

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
ON/OFF Buttons	General	Write address	OK	No	No	No	No	No
		Display address 1	OK	No	No	No	No	No
		Display address 2	OK	No	No	No	No	No
	Color/Shape	Color 1 (OFF color)	No	No	OK	No	No	No
		Color 2 (ON color)	No	No	OK	No	No	No
		Color 3	No	No	OK	No	No	No
		Color 4	No	No	OK	No	No	No
	Label	Switch label specification	OK	No	No	No	No	No
		Indirect specification of label character color	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Word Buttons	General	Write address	No	OK*1	OK*1	OK*1	No	No
		Indirect write value specification	No	OK*1	OK*1	OK*1	No	No
		Indirect increment/decrement specification	No	OK*1	OK*1	OK*1	No	No
	Color/Shape	Indirect specification of normal background color	No	No	OK	No	No	No
		Indirect specification of background color when object is pressed	No	No	OK	No	No	No
	Label	Indirect specification of label character color	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Upper/lower Limits	Indirect specification of upper limit	No	OK*1	OK*1	OK*1	No	No
		Indirect specification of lower limit	No	OK*1	OK*1	OK*1	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Write Settings	Write notification address	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
Command Buttons	General	Indirect specification of screen switch page	No	No	OK	No	No	No
		Switch screen page notification address	No	No	OK	No	No	No
		String source address	No	No	OK*2	No	No	OK
		Indirect specification of data block number	No	No	OK	No	No	No
		Indirect specification of the record number	No	No	OK	No	No	No
		Specification of address when the final record is read	OK	No	No	No	No	No
		Indirect specification of the file location	OK	No	No	No	No	No
		Indirect specification of the record method	OK	No	No	No	No	No
		Executed when the specified address changes from OFF to ON	OK	No	No	No	No	No
	Color/Shape	Indirect background color specification	No	No	OK	No	No	No
	Label	Indirect specification of label character color	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Bit lamps	General	Display address	OK	No	No	No	No	No
	Color/Shape	Indirect specification of background color when ON	No	No	OK	No	No	No
		Indirect specification of background color when OFF	No	No	OK	No	No	No
	Label	Indirect specification of label character color	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/no display flags	OK	No	No	No	No	No
Word lamps	General	Display address	No	OK	OK	No	No	No
	Color/Shape	Indirect specification of background color when 0	No	No	OK	No	No	No
		Indirect specification of background color when 1	No	No	OK	No	No	No
		Indirect specification of background color when 2	No	No	OK	No	No	No
		Indirect specification of background color when 3	No	No	OK	No	No	No
		Indirect specification of background color when 4	No	No	OK	No	No	No
		Indirect specification of background color when 5	No	No	OK	No	No	No
		Indirect specification of background color when 6	No	No	OK	No	No	No
		Indirect specification of background color when 7	No	No	OK	No	No	No
		Indirect specification of background color when 8	No	No	OK	No	No	No
		Indirect specification of background color when 9	No	No	OK	No	No	No
	Label	Indirect specification of label character color	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Label objects	Background	Indirect background color specification	No	No	OK	No	No	No
	Label	Indirect specification of label character color	No	No	OK	No	No	No
		Indirect specification of label string file line	No	No	OK	No	No	No
	Message	Address for switching status	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/no display flags	OK	No	No	No	No	No
Numeral display & input objects	General	Communications address	No	OK*1	OK*1	OK*1	OK*1	No
		Indirect specification of units/scale number	No	No	OK	No	No	No
	Text Attributes	Indirect specification of numeral/character color	No	No	OK	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Input Upper and Lower Limits	Indirect specification of input upper limit	No	OK*1	OK*1	OK*1	OK*1	No
		Indirect specification of input lower limit	No	OK*1	OK*1	OK*1	OK*1	No
	Limit Monitor	Indirect specification of upper limit monitoring	No	OK*1	OK*1	OK*1	OK*1	No
		Indirect specification of lower limit monitoring	No	OK*1	OK*1	OK*1	OK*1	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Write Settings	Write notification address	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags (all)	OK	No	No	No	No	No
		Display/no display flags (numerals)	OK	No	No	No	No	No
String display & input objects	General	String start address	No	No	OK*2	No	No	OK
	Text Attributes	Indirect character color specification	No	No	OK	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Write Settings	Write notification address	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
List selection objects	General	List data address	No	No	No	No	No	No
		Indirect file line specification	No	No	OK	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Selection Operation	Selection line number address	No	No	OK	No	No	No
		Selection line string address	No	No	OK*2	No	No	OK
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
	External Control	Display block number specification address	No	No	OK	No	No	No
		Address specifying display start line	No	No	OK	No	No	No
		List re-display specification	OK	No	No	No	No	No
Thumbwheel switches	General	Communications address	No	No	OK*1	OK*1	No	No
	Text Attributes	Indirect specification of numeral/character color	No	No	OK	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Upper/lower Limits	Indirect specification of input upper limit	No	No	OK*1	OK*1	No	No
		Indirect specification of input lower limit	No	No	OK*1	OK*1	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Write Settings	Write notification address	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Analog meters	General	Communications address	No	No	OK*1	OK*1	No	No
	Border	Indirect specification of border value (maximum)	No	No	OK*1	OK*1	No	No
		Indirect specification of border value (delimiter 1)	No	No	OK*1	OK*1	No	No
		Indirect specification of border value (delimiter 2)	No	No	OK*1	OK*1	No	No
		Indirect specification of border value (minimum)	No	No	OK*1	OK*1	No	No
	Color	Indirect specification of range 1 color	No	No	OK	No	No	No
		Indirect specification of range 2 color	No	No	OK	No	No	No
		Indirect specification of range 3 color	No	No	OK	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
		Indirect specification of range 1 background color	No	No	OK	No	No	No
		Indirect specification of range 2 background color	No	No	OK	No	No	No
		Indirect specification of range 3 background color	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Level meters	General	Communications address	No	No	OK*1	OK*1	No	No
	Border	Indirect specification of border value (maximum)	No	No	OK*1	OK*1	No	No
		Indirect specification of border value (delimiter 1)	No	No	OK*1	OK*1	No	No
		Indirect specification of border value (delimiter 2)	No	No	OK*1	OK*1	No	No
		Indirect specification of border value (minimum)	No	No	OK*1	OK*1	No	No
	Color	Indirect specification of range 1 color	No	No	OK	No	No	No
		Indirect specification of range 2 color	No	No	OK	No	No	No
		Indirect specification of range 3 color	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
		Indirect specification of range 1 background color	No	No	OK	No	No	No
		Indirect specification of range 2 background color	No	No	OK	No	No	No
		Indirect specification of range 3 background color	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/no display flags	OK	No	No	No	No	No
Broken-line Graphs	General	Display refresh bit	OK	No	No	No	No	No
		No. of display-enabled points	No	No	OK	No	No	No
	Graph	Graph data	OK	No	OK*1,2	OK*1,2	No	No
		Indirect specification of number of graph points	No	No	OK	No	No	No
		Indirect specification of maximum graph data value	OK	No	OK*1	OK*1	No	No
		Indirect specification of minimum graph data value	OK	No	OK*1	OK*1	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Bitmaps	General	Address for indirect specification of display file	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/no display flags	OK	No	No	No	No	No
Alarm/event display objects	General	Alarm/event data	OK	No	No	No	No	No
		Alarm and event information	OK	No	OK	No	No	No
	Flowing Text	Specification of flowing text display start	OK	No	No	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
Alarm/event summary and history objects	General	Selected alarm ID write address	No	No	OK	No	No	No
		Alarm/event data	OK	No	No	No	No	No
		Alarm information	OK	No	OK	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
Date objects	Background	Indirect background color specification	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
Time objects	Background	Indirect background color specification	No	No	OK	No	No	No
	Frame	Indirect specification of frame ON/OFF	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Data log graphs	General	Graph data	OK	No	OK*1	OK*1	No	No
		Indirect specification of maximum graph data value	OK	No	OK*1	OK*1	No	No
		Indirect specification of minimum graph data value	OK	No	OK*1	OK*1	No	No
	Display	Indirect specification of time axis	No	No	OK	No	No	No
		Time axis data destination	No	No	No	No	No	No
		Time axis data enable/disable bit	OK	No	No	No	No	No
		Display refresh notification	OK	No	No	No	No	No
		Scroll seconds specification	No	No	OK	No	No	No
		Time data transmission destination	No	No	OK*2	No	No	No
	Background	Indirect background color specification	No	No	OK	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
Frame objects	General	Frame page number	No	No	OK	No	No	No
	Control Flag	Input enabled/disabled flags	OK	No	No	No	No	No
		Display/no display flags	OK	No	No	No	No	No
Data block tables	General	Address for numeral field	No	No	OK*1	OK*1	No	No
		Address for string field	No	No	OK*2	No	No	OK
		Specify interlock	OK	No	No	No	No	No
	Text Attribute	Indirect specification of text colors	No	No	OK	No	No	No
	Write Setting	Write notification address	OK	No	No	No	No	No
	Control Flag	Input enable/disable flag	OK	No	No	No	No	No
		Display enable/disable flag	OK	No	No	No	No	No
Consecutive Line Drawing	General	Indirect specification of color	No	No	OK	No	No	No
		Indirect specification of the number of vertices	No	No	OK	No	No	No
		Starting address of the X-Y coordinates data	No	No	OK*2	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Multifunction Object	General	Input	OK	No	No	No	No	No
		Perform an action when a bit value changes	OK	No	No	No	No	No
		Perform an action when a word value changes	No	No	OK	No	No	No
		Write bit	OK	No	No	No	No	No
		Write word – write address	No	OK*1	OK*1	OK*1	No	No
		Write word – indirect specification of value	No	OK*1	OK*1	OK*1	No	No
		Write word – indirect specification of upper limit	No	OK*1	OK*1	OK*1	No	No
		Write word – indirect specification of upper limit	No	OK*1	OK*1	OK*1	No	No
		Write string	No	No	OK*2	No	No	OK
		Indirect specification of the switch screen page	No	No	OK	No	No	No
		Switch screen page notification address	No	No	OK	No	No	No
		Key Buttons – string source address	No	No	OK*2	No	No	OK
		Indirect specification of data block number	No	No	OK	No	No	No
		Indirect specification of the record number	No	No	OK	No	No	No
		Specification of address when the final record is read	OK	No	No	No	No	No
		Indirect specification of the file location	OK	No	No	No	No	No
		Indirect specification of the record method	OK	No	No	No	No	No
		Executed when the specified address changes from OFF to ON	OK	No	No	No	No	No
		Switch to the indirect reference contents number	No	No	OK	No	No	No
		Macro	OK	No	OK	OK	No	OK
	Color/Shape	Display Address 1	OK	No	OK*1	OK*1	No	No
		Display Address 2	OK	No	No	No	No	No
		Indirect specification of set value	OK	No	No	No	No	No
		Indirect Reference for Color	No	No	OK	No	No	No
		Display/hide	OK	No	No	No	No	No
	Label	Switch labels	OK	No	OK	No	No	No
		Indirect Reference for Text Color	No	No	OK	No	No	No

Functional object	Tab page name	Set address	B	SI	W	D	L	ST
Contents Display	General	Contents switching address	No	No	OK	No	No	No
		Specified switching address	OK	No	No	No	No	No
	Frame	Indirect reference for frame ON/OFF.	OK	No	No	No	No	No
	Flicker	Flicker specification	OK	No	No	No	No	No
	Control Flag	Display/hide flag	OK	No	No	No	No	No

*1. Set the same data type as is used for the storage type of the functional object, or set a tag with a CHANNEL type. For information on data types for storage types, refer to *2-8-4 Numeral Display and Storage Type (General Tab)* on page 2-78.

*2. Can only be set for array variables.

Additional Information

- The ULINT, LINT, ULINT_BCD, LREAL, and LWORD data types can be set for tags. However, tags that are set using these data types cannot be used for functional objects. They can be used only for READCMEM or WRITECMEM macros.
- For the NJ/NX-series Controllers, tag data types can be set to TIME, DATE, TIME_OF_DAY, or DATE_AND_TIME. However, tags that are set to these data types cannot be used in functional objects. They can be used only for the READCMEM, WRITECMEM, and LOCALTIME macros.

A-4 Update History of NS-B-series

The following tables show the main functions that have been added or improved with the NS-B-series upgrade.

Ver.10.0*1

Supplement/Enhancement	Function
Support for new model	The NB□□□-TW01B-V1-S is supported.

*1. Ver.10.0 and later is for the NB□□□-TW01B-V1-S only. NS□□□-□□□□□(-V□) models are not supported.

I

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Cat. No. V130-E1-01 1026