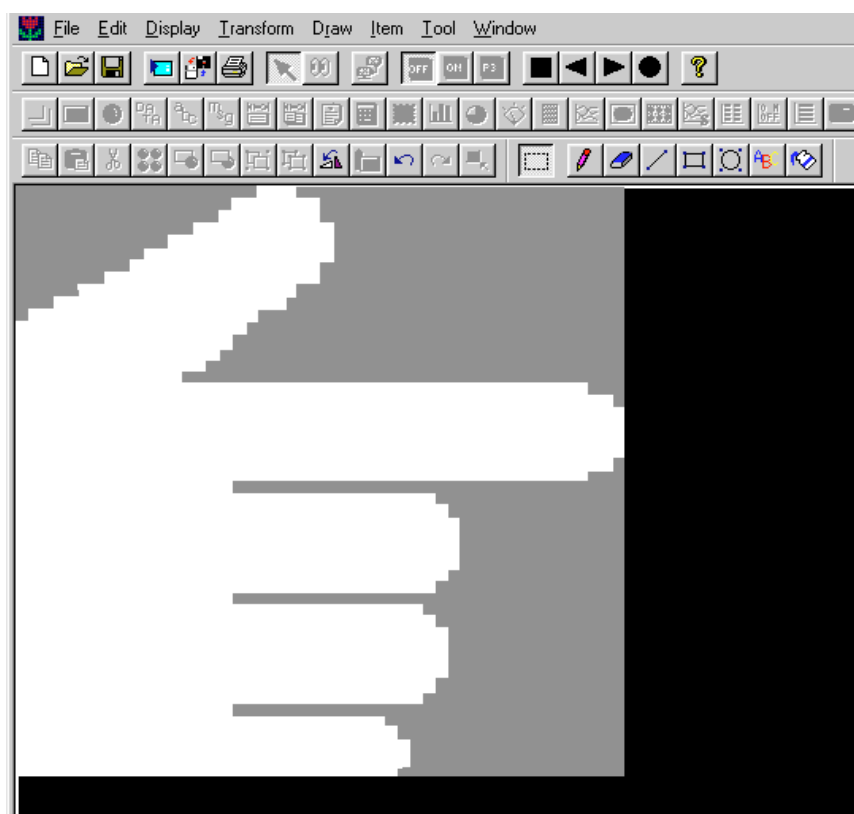


Control Terminal

Model name

Screen edit software ***ZM-71SE***

Instruction Manual



Thank you for purchasing the screen edit software ZM-71SE for Control Terminal ZM-41/42/52/70/72/82 series. This manual leads you to understand the outline and the functions and to master it effectly, by making each example of each chapter. Read this manual thoroughly to completely familiarize yourself with the operation according to the examples. Keep this manual for future reference. We are confident that this manual will be helpful whenever you encounter a problem.

Note

- This module is made in accordance with Japanese domestic specifications. Its guarantee clauses are described in a separate guarantee card (packed together with the module). When this module is used outside Japan, these guarantee clauses are not applicable. In addition, the guarantee should be understood as a guarantee of the delivered product as a single unit and every other damages or losses due to damage or malfunction of the product will not be included in this guarantee.
- Should you have any questions and inquiries, please feel free to contact our dealers.
- The whole or partial photocopy of this booklet is prohibited.
- Contents of this booklet may be revised for improvement without notice.

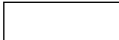
Note

- In this manual, the module name of Control Terminal is expressed as follows.

Expression in this manual	Module name
ZM-*2	ZM-82T, ZM-82TC, ZM-82TV, ZM-82TVC, ZM-82D, ZM-82DC, ZM-72T, ZM-72TC, ZM-72TV, ZM-72TVC, ZM-72TS, ZM-72TSC, ZM-72TSV, ZM-72TSVC, ZM-72, ZM-72D, ZM-72DC, ZM-52D, ZM-42D, ZM-42L
ZM-41/70	ZM-41D, ZM-41L, ZM-70D, ZM-70T
ZM-30	ZM-30E, ZM-30L, ZM-61E, ZM-61T, ZM-40D, ZM-40L

Color of ZM-41/70 Monochrome Type

The following is the color list of ZM-41/70 monochrome types. Refer when editing a file.

Editing	Control Terminal	
	ZM-70L/ZM-41L	
Black (Gray)		White
Blue (Navy blue)		 8-gradation 
Red (Mahogany)		
Magenta (Maroon)		
Green (Pine green)		
Cyan (Slate blue)		
Yellow (Camel)		
White (Silver-color)		Blue

* **8-gradation colors may be flickering on ZM series. Using 2-gradation colors is recommended.**

* **If the editing file which has 16 colors on the screen editing is changed into '8-color' editing file, each color in bracket is changed into the color indicated on the left.**

Marks on Manual

In this manual, the following marks are used for focusing on the operations.

Mark



: Important notes



page 1-1

: Cross reference pages



: Supplemental information

Contents

Outline

Chapter 1 Basic Operation

Mouse Usage and Short-Cut Keys	1-1
Mouse Usage	1-1
Short-Cut Keys	1-1
Screen Opening.....	1-2
Icon Bar	1-2
[Select] and [Detail/Prop. Change] Icons	1-3
Screen Change Icons	1-3
[OFF], [ON], and [P3] Icons	1-3
Tool Bar	1-4
Edit Tool Bar and Draw Tool Bar	1-4
Tool Bar Usage	1-5
Status bar	1-5
Setting and Operating Technique in Dialogs	1-6
Basic Components	1-6
Setting up Memory Addresses	1-7
[Part] Auxiliary Tool Box of Dialog	1-9
Deletion or Copy of Icons in the [Part] Auxiliary Tool Box	1-9
Deletion of Icons	1-9
Copy of Icons	1-10
Arrow Buttons in the [Part] Auxiliary Tool Box	1-10
About Parts	1-11
Selection and Placement of Parts	1-11
Parts File (Ex.: Switch)	1-11
Parts Placement (Ex.: Switch)	1-12
Parts Usage	1-13
Parts Enlargement/Reduction	1-13
Parts Selection	1-13
Parts Movement	1-13
Screen List	1-14
Screen List Usage	1-14
Calling a Screen	1-14
Screen Copy	1-15
Display of Multiple Screens	1-15
Right-clicking Menu.....	1-16
When No Parts Are Selected:	1-16
When a Part Is Selected:	1-16
When a Normal Overlap is Placed:	1-17
When a Table Data Display Part Is Selected (ZM-*2 Function):	1-17
Menu Bar	1-18
[File] Menu	1-18
[Edit] Menu	1-19
[Multi Copy]	1-20
[Rotate Graphic]	1-22
[Flip]	1-23

[Align]	1-24
[Select Environment]	1-25
[Point Search] Icon	1-25
[Display] Menu	1-26
[Display Environment]	1-27
[Draw] Menu	1-30
[Parts] Menu	1-30
[Item] Menu	1-31
[Tool] Menu	1-32
[Window] Menu	1-32
[Help] Menu	1-32

Chapter 2 System Setting

System Setting Items	2-1
PC Models	2-2
PC Models	2-2
Edit Model Selection	2-3
Communication Parameter	2-4
[Main] Tab Window	2-4
[Detail] Tab Window	2-6
Function Switch Setting	2-10
Outline of Function Switches	2-10
[Function Switch Setting] Dialog	2-11
Other Settings	2-13
[P1] Tab Window	2-14
[P2] Tab Window	2-17
[P3] Tab Window (ZM-*2)	2-23
System Memory	2-24
Read Area	2-24
Write Area	2-29

Chapter 3 Screens

Screen Composition	3-1
Parts Placement Limit	3-2
Limits for One Screen	3-3
Division (DIV)	3-4
Screen Resolution	3-5
Screen Setting	3-6
Screen Setting	3-6
P1 Tab Window	3-6
P2 Tab Window (ZM-*2 Function)	3-7
Macro	3-8
Local Function Switch Setting	3-8
Process Cycle	3-9
Processing in ZM Series	3-10

Chapter 4 **Overlap**

Outline of Overlap	4-1
Overlap Is:	4-1
Overlap and Screen	4-2
Video Input (ZM-*2 Function)	4-2
Overlap Display Formats	4-3
Normal Overlap	4-3
Multi-overlap	4-3
Call-overlap	4-4
Video Input	4-4
Normal Overlap	4-5
Setting Procedure	4-5
Memory Set in Normal Overlap	4-6
[Normal Overlap] Dialog	4-6
Editing in Overlap	4-7
Displaying and Erasing Normal Overlap	4-8
Feature of Overlap — SYSTEM Switch	4-9
Multi-overlap	4-10
Setting Procedure	4-10
Memory Set in Multi-overlap	4-11
[Multi-overlap] Dialog	4-11
Multi-overlap Edit	4-13
Normal Overlap	4-13
Macro Setting in Multi-overlap Edit	4-13
Call-overlap	4-14
Setting Procedure	4-14
[Call-overlap] Dialog	4-15
Call-overlap Display Control	4-15
Multi-overlap Registration	4-15
Video Input (Option) ZM-*2 Function	4-16
Setting Procedure	4-16
Overlap (Video) Dialog	4-17
Video Screen Display/Erase Method	4-17
Moving the Video Screen	4-17
Video Control (Size, Channel, Contrast, Etc.)	4-17
Overlap Size Limits	4-18

Chapter 5 **Switches**

Outline of Switches	5-1
Basic Function of Switches	5-1
Lamps in Switches	5-2
Creating Switches	5-3
Outline of Switch Setting	5-3
Switch Creating Procedure	5-3
Notes on placing switches	5-3
Confirmation of Switches in Display Environment	5-4
Switch Output	5-6
[Switch] Dialog	5-7
Memory Set in Switches	5-8

[Main] Tab Window Setting	5-8
About the [Character] Tab Window	5-14
[Detail] Tab Window	5-14
About the [Color] Tab Window	5-16
Switch Function Examples	5-17
Switching the Screen (=screen, return)	5-17
To Print out the Screen Display (= Hard Copy):	5-18
Occupy	5-18
To Display Normal Overlap (= Overlap):	5-19
To Display Multi-Overlaps (= Multi-overlap):	5-21
To Process Arithmetic Operation:	5-22

Chapter 6 Lamp

Outline of Lamp	6-1
Creating Lamps	6-2
Outline of Lamp Creation	6-2
Lamp Creating Procedure	6-2
Notes on Placing Lamps	6-2
[Lamp] Dialog	6-3
Lamp Memory	6-3
Tree Diagram for Lamp	6-3
[Main] Tab Window	6-4
[Character] Tab Window	6-5
Lamp Text Alignment	6-6
[Color] Tab Window	6-6
Lamp Colors	6-7
When Standard Part Is Chosen:	6-7
Draw Mode: XOR	6-7
Lamp Colors	6-7
Text on Lamps	6-8
Example	6-8
Draw Mode: REP	6-9
Lamp Colors	6-9
Text on Lamps	6-9
When Non-Standard Part is Chosen:	6-10
Lamp Colors	6-10
Draw Mode: XOR	6-11
Draw Mode: REP	6-11
Text on Lamps	6-12
Relation between Lamp Memory and Drawing	6-12

Chapter 7 Data Display

Outline of Data Displays	7-1
Outline of Numerical Data Display	7-1
Outline of Character Display	7-2
Outline of Message Display	7-3
Outline of Table Data Display (ZM-*2 Function)	7-3

Outline of Data Display Setting	7-4
Notes on Parts Placement	7-4
Use of Data Display Part Independently	7-4
Use of Data Display Part Linked with Another Part	7-4
Notes on Placing Data Display Part on Switches/Lamps	7-5
Simple Data Display	7-5
Numerical Data Display	7-6
Setting Procedure of Numerical Data Display	7-6
Tree Diagram for Numerical Data Display	7-6
Numerical Data Display Memory	7-7
[Main] Tab Window	7-7
[Type] Tab Window	7-7
[Char. Prop.] Tab Window	7-11
[Detail] Tab Window	7-13
Character Display	7-15
Setting Procedure of Character Display	7-15
Tree Diagram for Character Display	7-15
Character Display Memory	7-15
[Main] Tab Window	7-16
[Type] Tab Window	7-16
[Char. Prop.] Tab Window	7-17
[Detail] Tab Window	7-17
Message Display	7-18
Setting Procedure of Message Display	7-18
Tree Diagram for Message Display	7-18
Message Display Memory	7-18
[Main] Tab Window	7-18
[Char. Prop.] Tab Window	7-19
[Detail] Tab Window	7-19
Table Data Display (ZM-*2 Function)	7-20
Table Data Display Part	7-20
Setting Procedure	7-20
[Table Data Display] Dialog	7-20
Table Data Display Property Modification	7-21
Property Modification of One Data Cell	7-21
Property Modification of Multiple Data Cells	7-22
[Table Data Display (Num. Display/Char. Display/Message Disp.) Dialog	7-22
[Table Data Display (Text in Drawing)] Dialog	7-24
Table Data Display Edit	7-24
Change of Cell Height and Cell Width	7-24
Right-Clicking Menu	7-24
Simple Data Display (ZM-*2 Function)	7-26
Simple Data Display	7-26
Setting Procedure	7-26
Data Display Conversion Utility (ZMDataConv)	7-26
Conversion Procedure	7-26

Chapter 8 Message Display (Relay/Message)

How to Display Messages	8-1
Relay Mode	8-2
Message Mode	8-2

Relay Mode 8-3

Outline of Relay Mode	8-3
Relay Mode Setting Procedure	8-4
Message Registration	8-5
Composition of Message Editing	8-5
Message Editing Procedure	8-5
[Relay] Dialog	8-6
[Main] Tab Window	8-6
[Text Prop.] Tab Window	8-7
[Detail] Tab Window	8-8
Display Area Parts	8-9
Outline of Display Area Parts	8-9
Note When Placing Display Area Parts	8-9
[Mode Display Area] Dialog	8-9
Changes of Settings for Display Area Parts	8-9
Message Scroll Up/Down	8-10
Notes on Setting Switch Parts	8-10
To Display Relay Messages on Switches or Lamps	8-10
[Relay] Dialog Settings	8-10
Switches as Action Area	8-11
For [Action Area: Lamp]	8-11
Displaying Detailed Explanation to Messages (Relay-sub function)	8-12
Outline of Relay-Sub Mode	8-12
[Relay -sub] Dialog	8-13
Setting for “Sub-display” in the [Relay] Dialog	8-14
Display Area Part for Relay-Sub Mode	8-15
Roll Up/Roll Down Switch for Relay-Sub Mode	8-15
Registering Messages for Sub-display	8-16
Registering Graphics for Sub-display	8-16
Calling Screens from Messages (Screen-Call)	8-17
Outline of Screen-Call Function	8-17
[Relay] Dialog for Screen Call	8-17
Screen Block Editing	8-18

Message Mode 8-21

Outline of Message Mode	8-21
How to Specify the Message Number	8-21
How to Specify the Block Number	8-22
Setting Procedure for Message Mode	8-23
Message Registration	8-24
About Message Editing	8-24
Block Registration	8-25
Page Block	8-25
Direct Block	8-26
[Message] Dialog	8-28
[Main] Tab Window	8-28
[Text Prop.] Tab Window	8-31
Display Area Part	8-31
Display a Message on Switches (or Lamps)	8-31
Other Switches that can be used in Message Mode	8-32
Roll Up, Roll Down	8-32
Plus Block, Minus Block, Block Call	8-32

Chapter 9 Entry Mode

Entry Mode Usage	9-1
Outline of Entry Mode	9-2
Applications of Entry Mode	9-2
When the Entry Target Is a Numerical Data Display Part:	9-2
When the Entry Target Is a Character Display Part:	9-3
When the Entry Target Is a Table Data Display Part:	9-3
Direct Data Entry for Data Display Parts (= [Type: Data Display]) ...	9-4
[Entry] Dialog Setting	9-5
[Main] Tab Window	9-5
[Detail] Tab Window	9-9
Data Display Part as Entry Target	9-9
Data Display Part as Entry Display	9-10
Entry Data Range	9-11
Entry Keys (Keypad)	9-12
Placement of Keypad on Overlap	9-14
Notes on Overlap Setting	9-14
Overlap Types and Calling Method	9-15
How to Change Over Entry Targets (= [Type: Block])	9-16
[Entry] Dialog Setting	9-17
[Main] Tab Window	9-17
[Detail] Tab Window	9-17
Data Display Part as Entry Display	9-17
Entry Data Range	9-17
Entry Keys (Keypad)	9-17
[Data Block Area] Dialog Setting	9-18
[Main 1] Tab Window	9-18
[Main 2] Tab Window	9-18
[Display Area] Dialog	9-19
Block Change Switch	9-19
Entry Target	9-19
Notes on Entry Target Setting	9-19
Notes on Entry Target Placement	9-20
When [Direct] Is Chosen for [Type]:	9-21
[Entry] Dialog Setting	9-21
[Main] Tab Window	9-21
[Detail] Tab Window	9-24
Data Display Part as Entry Display	9-24
Entry Keys (Keypad)	9-24
Data Reading Steps	9-24
Entry for Table Data Display Part (ZM-*2 Function)	9-25
[Entry] Dialog Setting	9-25
[Main] Tab Window	9-25
[Detail] Tab Window	9-28
Table Data Display Setting	9-29
[Type 1] Tab Window	9-29
[Type 2] Tab Window	9-29
[Detail Setting] Tab Window	9-29
Switches for Table Data Display	9-30
Special Function for Table Data Display	9-30

Item Select Function	9-31
Item Select Memory Setting	9-31
When Entry Targets Are Placed on the Base Screen:	9-31
When Entry Targets Are Placed on Overlaps:	9-31
When Entry Targets are Placed in Data Blocks:	9-32
When Entry Targets are Table Data Display Parts:	9-32
Contents of Item Select Memory	9-32
For Numerical Data/Character Display Parts as Entry Targets	9-32
For Cells in Table Data Display Part as Entry Targets	9-33
Item Select Switch	9-33
Digital-switch	9-34
Switches for Digital-switch	9-34
Notes on Setting	9-34
Notes on the Digital-switch Function	9-34
Switch Functions	9-35
Character Entry	9-35
Write	9-35
Clear	9-35
Toggle Sign	9-35
Space	9-36
Backspace	9-36
Delete (DEL)	9-36
+1/-1	9-36
LFT (<-)/RGT (->)	9-36
Item Selection (UP/DW)	9-37
Entry area selection (>>/<<)	9-37
Graphic Library (Plus/Minus block)	9-37
Move Cursor R/L	9-37
Table Move +/-	9-37

Chapter 10 Graph Display

Graph Display Outline	10-1
Bar Graph Outline	10-1
Pie Graph Outline	10-2
Panel Meter Outline	10-2
Statistic Graph Outline	10-2
Trend Graph Outline	10-3
Closed Area Graph Outline (ZM-*2 Function)	10-3
Bar Graph	10-4
Bar Graph Setting Procedure	10-4
Tree Diagram for Bar Graph	10-4
Bar Graph Memory	10-5
[Main] Tab Window	10-5
[Setting] Tab Window	10-5
[Disp. Prop.] Tab Window	10-6
[Alarm Setting] Tab Window	10-7
[Alarm Color] Tab Window	10-7
Examples with Alarm Setting	10-8
Pie Graph	10-9
Pie Graph Setting Procedure	10-9

Tree Diagram for Pie Graph	10-9
Pie Graph Memory	10-10
[Main] Tab Window	10-10
[Setting] Tab Window	10-10
[Disp. Prop.] Tab Window	10-11
[Alarm Setting] Tab Window	10-11
[Alarm Color] Tab Window	10-12
Examples with Alarm Setting	10-13
Panel Meter	10-14
Panel Meter Setting Procedure	10-14
Tree Diagram for Panel Meter	10-14
Panel Meter Memory	10-15
[Main] Tab Window	10-15
[Setting] Tab Window	10-15
[Disp. Prop.] Tab Window	10-15
[Alarm Setting] Tab Window	10-16
[Alarm Color] Tab Window	10-17
Examples with Alarm Setting	10-17
Statistic Graph (bar, pie)	10-18
Statistic Graph (bar, pie) Setting Procedure	10-18
Tree Diagram for Statistic Graph (bar, pie)	10-19
Statistic Bar Graph Memory	10-19
[Main] Tab Window	10-19
[Setting] Tab Window	10-19
[Data 0 (~7) Prop.] Tab Windows	10-20
Trend Graph	10-21
Trend Graph Setting Procedure	10-21
Tree Diagram for Trend Graph	10-21
Trend Graph Memory	10-22
[Main] Tab Window	10-22
[Setting 1] Tab Window	10-23
[Setting 2] Tab Window	10-25
[0] to [15] Tab Windows	10-26
Memory Allocation without XY Parameters	10-26
Memory Allocation with XY Parameters	10-27
Closed Area Graph (ZM-*2 Function)	10-28
Closed Area Graph Setting Procedure	10-28
Notes on Placement of Closed Area Graph	10-28
Tree Diagram for Closed Area Graph	10-28
Closed Area Graph Memory	10-29
[Main] Tab Window	10-29
[Disp. Prop.] Tab Window	10-29
[Alarm Setting] Tab Window	10-30
[Alarm Color] Tab Window	10-30

Chapter 11 Graphic Display

Displaying Graphics	11-1
Graphic Mode	11-2
Graphic Mode	11-2
Graphic Relay Mode	11-2
Outline of Graphic Mode	11-2

Setting Up Graphic Mode	11-3
[Graphic] Dialog	11-4
When [Internal] is chosen:	11-4
When [External] is chosen:	11-5
Display Area Part	11-6
Outline of display area part	11-6
Setting procedure of display area part	11-6
Mode Display Area Dialog	11-7
Changing Displayed Graphics with Switches	11-8
Note When Setting Switch Parts	11-8
Graphic Relay Mode	11-9
Outline of Graphic Relay Mode	11-9
Graphic Relay Mode Setting Procedure	11-10
[Graphic Relay] Dialog	11-10
Registering Graphics (Graphic Library)	11-15
Structure of Graphic Library	11-15
Editing Graphic Library	11-15
Offset	11-16
Outline of offset	11-16
Offset setting procedure	11-16
[Parameter]	11-17
Outline of Parameter	11-17
Setting Parameter	11-17
[Parameter Setting] Dialog	11-18
Parameter Setting Items	11-19
Data Display	11-21
Outline of data display in the graphic library	11-21
Data Display Setting Procedure	11-21
Parameter Setting for Data Display Parts	11-22
Graphic Colors	11-23
Classification of Display Modes	11-23
XOR Colors	11-24
Canceling the XOR Display (ZM-*2 Function)	11-25
In Pattern Edit	11-26
Transparent	11-26
Pattern Size	11-27
In Graphic Library Edit	11-27
Parameter Setting	11-27
In Screen Edit	11-28
Graphic Mode	11-28
Graphic Relay Mode	11-28

Chapter 12 Sampling Mode

Outline of Sampling Mode	12-1
Sampling Mode Types	12-1
Setting Outline of Sampling Mode	12-3
Buffering Area Setting	12-3
Buffering Area Composition	12-3
Buffering Area Setting Procedure	12-4
[Buffering Area Setting] Dialog	12-4

Buffering Area Capacity	12-8
Setting Examples of Buffering Area	12-9
Trend Sampling	12-10
Outline of Trend Sampling	12-10
Trend Sampling Setting Procedure	12-10
[Trend Sampling] Dialog	12-11
[Main] Tab Window	12-11
[Setting 1] Tab Window	12-11
[Setting 2] Tab Window	12-13
[0] to [15] Tab Windows	12-14
Trend Sampling Area and Plot Points	12-15
Data Display Function for Trend Sampling	12-16
Data Display Function Setting Procedure	12-16
Sampling Count Display	12-16
Sampling Time Display	12-17
Mean, Min., Max. and Total Data Display Functions	12-17
Switches for Trend Sampling	12-19
Switch Setting Procedure	12-19
Notes on Switch Setting	12-19
Sampled Data Display By Switches	12-20
Data Sampling	12-21
Outline of Data Sampling	12-21
Data Sampling Setting Procedure	12-21
[Data Sampling] Dialog	12-22
[Sampling Display Area] Dialog	12-24
[Main] Tab Window	12-24
[Detail] Tab Window	12-24
Size Setting of Sampling Display Area Part	12-27
Data Display Function for Data Sampling	12-28
Data Display Function Setting Procedure	12-28
Sampling Count Display	12-29
Sampling Time Display	12-29
Mean, Min., Max., and Total Data Display Functions	12-30
Switches for Data Sampling	12-31
Switch Setting Procedure	12-31
Notes on Switch Setting	12-31
Sampled Data Display By Switches	12-32
Bit Sampling	12-33
Outline of Bit Sampling	12-33
Bit Sampling Setting Procedure	12-33
[Bit Sampling] Dialog	12-34
[Main 1] Tab Window	12-34
[Main 2] Tab Window	12-36
[Char. Prop. ON/OFF] Tab Window	12-37
Display Area Part	12-38
Outline of Display Area Part	12-38
Notes on Display Area Part Placement	12-38
[Display Area] Dialog	12-38
Data Display Function for Bit Sampling	12-39
Data Display Function Setting Procedure	12-39
Sampling Count Display	12-39
Sampling Time Display	12-40
Sampling Status Display	12-40

Switches for Bit Sampling	12-41
Switch Setting Procedure	12-41
Notes on Switch Setting	12-42
Sampled Data Display By Switches	12-42
Relay Sampling	12-44
Outline of Relay Sampling	12-44
Relay Sampling Setting Procedure	12-44
[Relay Sampling] Dialog	12-45
[Main] Tab Window	12-45
[Char. Prop.] Tab Window	12-46
[Detail] Tab Window	12-46
Display Area Part	12-46
Switches for Relay Sampling	12-46
Switch Setting Procedure	12-46
Notes on Switch Setting	12-47
Differences between Relay Mode & Relay Sampling	12-47
Display of Messages	12-47
Setting Procedure	12-48

Chapter 13 Memory Card Mode (optional)

Memory Card Mode Outline	13-1
Memory Manager Function	13-1
Data Logging Function	13-2
Memory Card Editor	13-2
Memory Cards	13-3
Available Types of Memory Cards	13-3
Memory Card Map	13-3
Calculation of File Size	13-3
Memory Card Mode Setting	13-4
Memory Card Setting Procedure	13-4
[Memory Card] Dialog	13-4
Memory Card Setting Example	13-8
Memory Manager Function	13-9
Memory Manager Function Setting Procedure	13-9
[Memory Card] Dialog	13-10
[Main] Tab Window	13-10
[Char. Prop.] Tab Window	13-12
[Display Area] Dialog	13-12
Display Area Part Setting	13-12
Display Area Function	13-12
Data Display for Memory Manager Function	13-13
Procedure of Data Display Function Setting	13-13
[Memory Card Card No.] [Memory Card File No.] [Memory Card Record No.]	13-13
[Memory Card Card Name][Memory Card File Name][Memory Card Record Name]	13-14
Switches for Memory Manager Function	13-15
Switch Setting Procedure	13-15
Notes on Switch Setting	13-16
Examples of Switch Operations	13-17
Entry Key (Entry Mode) Setting	13-18
Placing Entry Keys on Multi-Overlap	13-18
Placing Entry Keys on Call-Overlap	13-20

Placing Entry Keys on Normal Overlap	13-21
Placing Entry Keys on Base Screen	13-22
Data Logging Function	13-23
Data Logging Function Setting Procedure	13-23
Memory Card and Buffering Area Settings	13-23
Buffering Area Setting	13-23
Memory Card Setting	13-23
Memory Card Mode Setting	13-23
Sampling Mode Setting	13-24
Data Conversion to Text File	13-24

Chapter 14 **Macro**

Macro Set-up	14-1
Macro Commands	14-2
Table of Macro Commands	14-2
Explanation of Macro Commands	14-3
Details of System Calls	14-14
Video Display	14-21
Indirect Designation Memory	14-23
Notes on Macro Commands	14-24
Macro Block Edit	14-25
Macro Mode	14-26
Setting the [Macro] Dialog	14-26
Macro Mode	14-26

Chapter 15 **Internal Memory**

Memory Type	15-1
System Memory	15-2

Chapter 16 **Calendar**

Calendar Setting	16-1
Calendar Display	16-1
Setting Calendar Data	16-1
Correcting Calendar Data	16-2
Setting [Calendar] Dialog	16-2
Setting Procedure	16-2
Display on the PC	16-2
Calendar Parts	16-3
[Calendar] Dialog	16-5
[Main] Tab Window	16-5
[Year] Tab Window	16-5
[Month], [Day], [Hour], [Minute], [Second] Tab Window	16-6
[Day of the Week] Tab Window	16-7

Chapter 17 **Memo Pad Function (ZM-*2 Function)**

Outline of the Memo Pad Function	17-1

Memo Pad Function Setting Procedure	17-2
[Memo Pad] Dialog	17-2
[Display Area] Dialog	17-2
Switches for Memo Pad Function	17-3
Switch Setting Procedure	17-3
Switches for Exclusive Use in Memo Pad Function	17-3
Switches Available in Memo Pad Function	17-3
Notes on Switch Setting	17-3
Memo Pad Usage	17-4

Chapter 18 Interval Timer (ZM-*2 Function)

Outline of Interval Timer	18-1
Setting Procedure of Interval Timer	18-2
Interval Timer Setting	18-2
[Interval Timer] Dialog	18-2
Macro Block Edit	18-4
Interval Timer Examples	18-4
Screen Change Switch	18-4
Screen Edit (Ex.: Screen No. 0)	18-4
Macro Block Editing (Ex.: Macro block No. 0)	18-5
Graphic Movement on Screen	18-5
Screen Edit	18-5
Graphic Library Editing (Ex.: Graphic No. 0 in group No. 0)	18-6
Macro Block Edit (Ex.: Macro block No. 1)	18-6

Chapter 19 Bar Code (ZM-41/70 Optional)

Outline of Bar Code	19-1
Setting Bar Codes	19-1
Connecting the Bar Code Reader	19-1
[Bar Code Setting] Dialog	19-2
Bar Code Setting Example	19-5
Connecting Control Terminal ZM-*2 and Bar Code Reader	19-6

Chapter 20 Data Sheets

Outline of the Data Sheet Function	20-1
Setting Data Sheets	20-2
Data Sheet Edit	20-3
Printing Data Sheets	20-5
Printed Data Sheet	20-6

Chapter 21 Screen Library

Outline of Screen Library (ZM-*2 Function)	21-1
Screen Library Registration	21-3
Limits for Part Use	21-3
Offset Position for Screen Library Placement	21-4

Chapter 22 Drawing Tools

Drawing Tool Bar	22-1
Line	22-1
Box	22-3
Circle	22-5
Examples of drawing circles	22-6
Text	22-9
Pattern	22-11
Paint	22-13
Graphic Call	22-14
Dot	22-15
Bar Graph Scale	22-15
Pie Graph Scale	22-16
Displaying Pie Graph Scale	22-17
Trend Graph Scale	22-18
Multi-Text	22-19
Screen Library	22-19
Pattern Editing	22-20
Outline of Patterns	22-20
Pattern Editing Procedure	22-20
Pattern Edit Tools	22-20
[Edit] Menu	22-20
[Display] Menu	22-20
[Transform] Menu	22-21
[Draw] Menu	22-23
[Tool] Menu	22-24
How to Place Patterns	22-25
Size of Placed Patterns	22-25
Tile Editing	22-26
Outline of Tiles	22-26
Tile Editing Procedure	22-26
Tile Editing Tools	22-26

Chapter 23 Tools

Outline of Tools	23-1
Functions of Tools	23-1
Tool Function 1: Screen List	23-2
Operation Procedure	23-2
Opening/Closing the Screen List	23-2
Screen Copy or Deletion	23-2
Attaching Screen Comments	23-3
Tool Function 2: Item List	23-4
Operation Procedure	23-4
Opening/Closing the Item List	23-4
Format Change of the Item List	23-4
Tool Function 3: Memory Use	23-6
Operation Procedure	23-6
Opening/Closing the List of Memory Use	23-6
Bringing Up the Detailed List of Edit Item	23-7

Tool Function 4: Error Check	23-8
Operation Procedure	23-8
Error Check	23-8
Contents of the [Error Check] Window	23-8
Tool Function 5: Change All Memory	23-9
Operation Procedure	23-9
Memory Address Change	23-9
[Change Item Select] Dialog	23-10
Tool Function 6: Change Memory (Select)	23-11
Operation Procedure	23-11
Memory Change	23-11
About [Option]	23-11
Tool Function 7: Memory Address Use	23-12
Operation Procedure	23-12
Display of Memory Address Use List	23-12
Retrieval Range Change	23-13
Tool Function 8: Paste Bitmap	23-14
Operation Procedure	23-14
Pasting a Bitmap	23-14
About [Dither]	23-15
Tool Function 9: Copy Image to Pattern	23-16
Operation Procedure	23-16
Screen Registration as a Pattern	23-16
Tool Function 10: Copy Image to Clip Board	23-18
Operation Procedure	23-18
Copy of Screen Image to Clipboard	23-18
Import of Screen Image into Word Processing Software	23-18
Tool Function 11: Custom Part	23-20
Operation Procedure	23-20
Registration in Custom Parts File	23-20
Pasting a Custom Part to the Screen	23-21
Tool Function 12: Tray	23-22
Operation Procedure	23-22
Registration/Deletion in/from Trays	23-22
Pasting Part in Tray to Screen	23-23
Tray File Display Change	23-23
Tool Function 13: Make SIV File	23-24
Tool Function 14: Start Simulator	23-24
Operation Procedure	23-24
SIV File Creation Procedure	23-24
Tool Function 15: DXF File Convert	23-25
Operation Procedure	23-25
Import of DXF File	23-25
Tool Function 16: Option	23-26

Chapter 24 Part Editing

Outline of Parts	24-1
Components of Parts	24-2

Modifying Parts (In screen data files)	24-3
Outline of Modifying Parts	24-3
Parts Modifying Procedure	24-3
Creation and Storage of Part Files	24-4
Creating Part Files	24-4
<Creating a new file>	24-4
<Opening an existing file>	24-4
Saving and Closing Part Files	24-5
Editing Procedures for Each Part	24-6
Editing Overlap Parts	24-6
Editing Procedure	24-6
Editing Switch/Lamp Parts	24-7
2-Notch/3-Notch	24-7
Editing Procedure (Ex. 2-notch switch part)	24-7
Editing Data Display Parts	24-11
Editing Example (Ex. Numerical data display part)	24-11
Editing a Keypad	24-12
Editing Procedure	24-12
Editing Graph Parts	24-14
Bar Graph Editing Procedure	24-14
Pie Graph Editing Procedure	24-15
Panel Meter Editing Procedure	24-18
Statistic Graph (Bar) Editing Procedure	24-18
Statistic Graph (Pie) Editing Procedure	24-19
Trend Graph (Trend Sampling) Editing Procedure	24-20
Closed Area Graph Editing Procedure	24-21
Editing Display Area Parts for Data Sampling	24-23
Editing Procedure	24-23
Editing Calendar Parts	24-25
Composition of Calendar Parts	24-25
Editing Procedure	24-25
Editing Display Area Parts	24-27
Editing Procedure	24-27
Print-Out the Part (Part file)	24-28
Printing Procedure	24-28
[Option Setting] Dialog	24-28
Printing	24-28
Part File Management	24-29
Part File Managing Procedure	24-29
Part Editing Menu	24-30
In a Part Edit Window	24-30
[File] Menu	24-30
[Edit] Menu	24-30
[Display] Menu	24-31
[Edit Part] Menu	24-31
[Item] Menu	24-32
[Tool] Menu	24-32
[Window] Menu	24-32
In a [Modify Part] Window	24-33
[File] Menu	24-33
[Edit] Menu	24-33
[Display] Menu	24-33

[Draw] Menu	24-33
[Tool] Menu	24-34
[Window] Menu	24-34

Chapter 25 File Management

File Management Outline	25-1
File Management Functions	25-1
Files for File Management	25-1
Screen Data File Management	25-2
Part File Management	25-2
File Management Method 1: Screen Data File	25-3
Copying Screens between File Windows	25-4
Change to a Different Item	25-7
Copying Items by Designating Item Numbers	25-8
Change to a Different Item	25-8
Quitting [File Managing]	25-9
File Management Method 2: Part File	25-10
Quitting [File Managing]	25-12
File Management Method 3: File Copy	25-13
File Management Method 4: File Deletion	25-14
File Management Method 5: File Division and Combination	25-15
[File Divide]	25-15
[File Combine]	25-16

Chapter 26 File Conversion

Outline of File Conversion	26-1
Converting a Screen Data File	26-1
Parts File Conversion	26-1
Notes When Converting Files	26-2
1. Screen Size	26-2
2. Limits on the Screen Data File Capacity	26-3
Conversion From ZM-30	26-4
Outline of the ZM-30 Conversion	26-4
Conversion Method	26-4
Details of Conversion from ZM-30 to ZM Series	26-5
Converting From ZM-41/70	26-12
Outline of ZM-41/70 Conversion	26-12
Conversion Method	26-12
Notes on Conversion from ZM-41/70	26-13
Overlap	26-13
Switch	26-13
RUN/BZ signal	26-13
Converting a Parts File	26-14
Outline of Parts File Conversion	26-14
Conversion Method	26-14

Chapter 27 Data Transference

Data Transfer to ZM-*2	27-1
Preliminaries	27-1
Data Transferring Cable	27-1
ZM-*2 and Computer Connection	27-1
ZM-*2 Preparation	27-2
Transferring Procedure	27-2
Transferred Data	27-3
Screen Data Transfer	27-3
Data Transfer From the Computer to the ZM-*2	27-3
Data Transfer from the ZM-*2 to the Computer	27-4
Data Comparison between the Computer and the ZM-*2	27-5
PLC Protocol File (= I/F Driver File) Transfer	27-6
Font Data Transfer	27-7
ZM-*2 System Program Transfer	27-7
System Updating	27-8
On-line Editing	27-9
Preliminaries for On-line Editing	27-9
On-line Editing Procedure	27-9
Escaping from On-line Editing	27-10
Data Transfer to ZM-41/70	27-11
Preliminaries	27-11
Data Transferring Cable and Connection	27-11
ZM-41/70 Preparation	27-12
Transferring Procedure	27-12
Transferred Data	27-13
Screen Data Transfer	27-13
Data Transfer From the Computer to the ZM-41/70	27-13
Data Transfer from the ZM-41/70 to the Computer	27-14
Data Comparison between the Computer and the ZM-41/70	27-15
PLC Protocol File (= I/F Driver File) Transfer	27-15
On-line Editing	27-17
Preliminaries for On-line Editing	27-17
On-line Editing Procedure	27-17

Chapter 28 Printing

Procedure	28-1
[Option Setting] Dialog	28-2
Options Under [Page Setting]	28-2
[Print Setup] Dialog	28-3
[Print Setting] Dialog	28-3
[Option Setting] Button	28-4
[Print] Button	28-4
Printing the Currently Opened Window (ZM-*2 Function)	28-5
When the [Memory Address Use] List Is Opened	28-5
Printing Examples	28-6
By [Screen Output]:	28-6
By [List Output]:	28-6
By [Table Print]:	28-6
By [System Setting]:	28-7

By [Use Cross-reference]:	28-7
For messages	28-7
For graphic library	28-7

Chapter 29 Error Display 29-1

Errors Caused on the PC when a Screen is Created 29-1

Error Check 29-2

Errors on the ZM Series when an Error is Found in the Data 29-3

Communication error	29-3
Error Messages for Network Communication	29-5
Check	29-6
WARNING	29-11
System Error	29-12
Touch Switch Activated	29-12

Outline

This screen edit software ZM-71SE is a support tool to create screens for the Control Terminal ZM-42/52/72/82 series and conventional models ZM-41/70 series.

Therefore, see respective ZM series user's manual or instruction manual for system configuration with ZM series in detail.

■ Operating environment

This software runs on any computer, which is equipped with the following operating environment.

Item	Specifications
Computer	CPU in use : i 486DX2 66MHz minimum (recommend Pentium 100MHz or better)
Operating system	MS Windows95/98/NT4.0
Memory	Min. service memory : 16MB minimum
Capacity of hard disk	Free space : approx.10MB or more
Display	Resolution : 640×480 pixels (recommend 800×600 pixels or more)
CD-ROM drive	One model
RS-232C port	One port or more
Mouse	A mouse or pointing device compatible with the Windows 95/98/NT4.0 environment. (operations only by the keyboard are possible)

■ Product structure

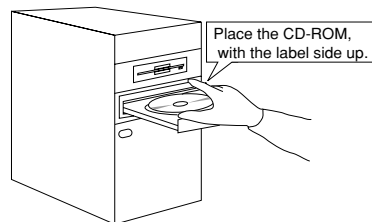
CD-ROM ----- One sheet
Instruction Manual ----- One set

■ System requirements

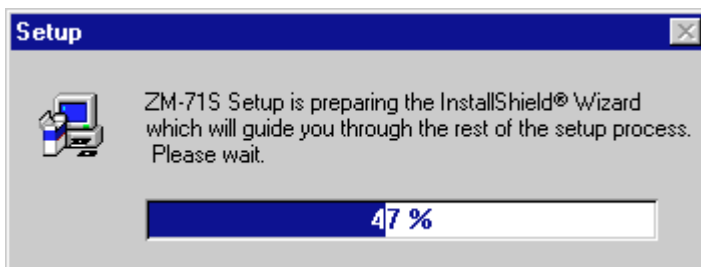
Setup means the condition of the application/software that is ready to be operated by installing it into the personal computer. In this chapter, the setup order of the screen edit software ZM-71SE is explained.

ZM-71SE operates under Windows 95/NT, but the setup order of this software is explained for Windows 95 environment.

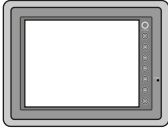
1. Start-up Windows 95, and place the ZM-71SE CD-ROM into the CD-ROM drive of the personal computer.
2. Open [My Computer] on the desktop by double clicking the icon.
3. Open the CD-ROM drive by double clicking the icon.
4. Double click [setup.exe].



The setup program will start-up, and the next dialog box will be displayed.



When the setup preparation is completed, the next dialog box will be displayed.

**ZM Series**

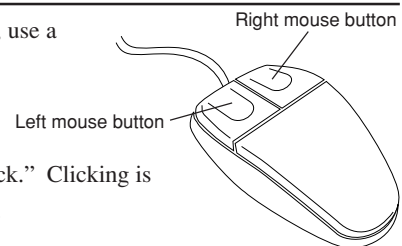
Basic Operation

This chapter provides the operation basics and the names of the screen components for the Control Terminal ZM series.

Mouse Usage and Short-Cut Keys

Mouse Usage

For creating screens using the editor software, use a two-button mouse as shown on the right.



◎ Click

Pressing the left button once is called a “click.” Clicking is used for selecting a menu item or an option.

◎ Double-click

Pressing the left button twice is called a “double-click.”

Double-clicking is used mainly for bringing up a dialog for a part or graphic that is placed on the screen.

◎ Right-click

Pressing the right button once is called a “right-click.” Right-clicking is used for canceling an action you have performed, and for bringing up the dialog for changing over the editing layer (refer to page 1-16).

◎ Drag

Moving the mouse while holding down the left mouse button is called “dragging.”

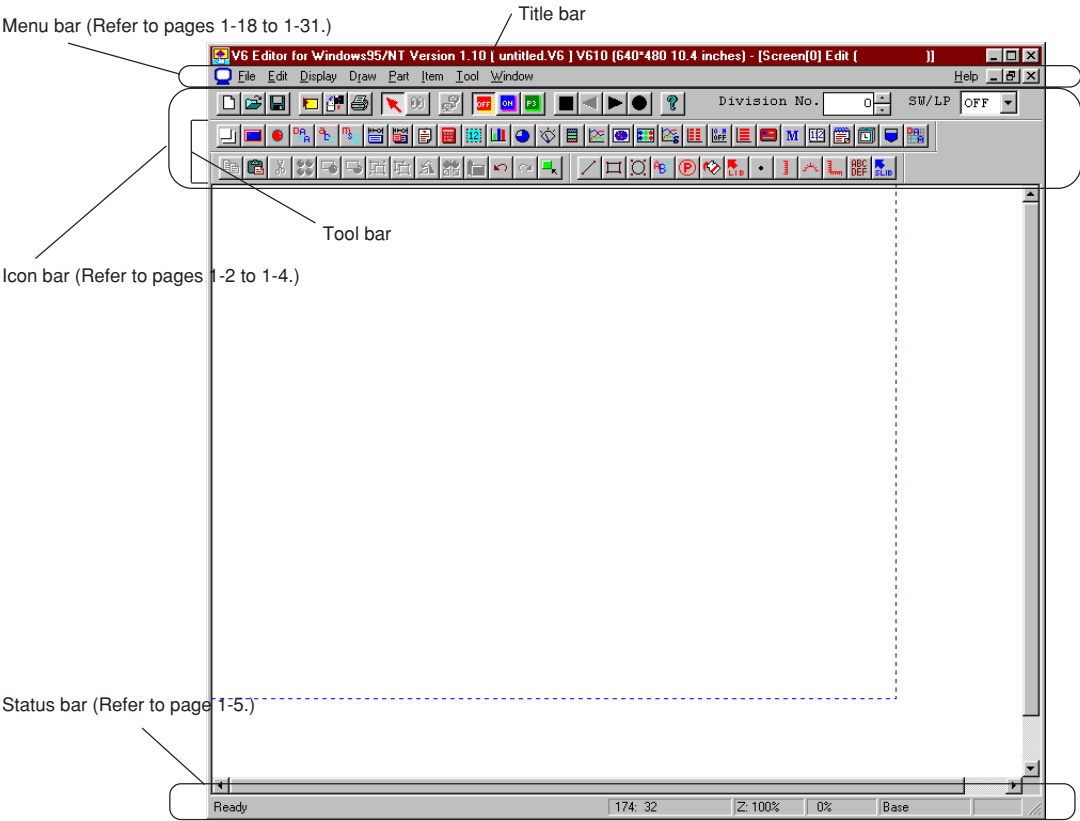
Short-Cut Keys

The following short-cut keys are available:

Keys	Function
CTRL + drag	Screen item copy
SHIFT + click	Selection of screen items one by one
SHIFT during dragging	Graphic frame display during movement
HOME CLR	Movement of the screen reference point to the upper left corner of the screen
CTRL + right-drag	Enlargement of the enclosed area
CTRL + ROLL UP or Page Down	Zooming in
CTRL + ROLL DOWN or Page Up	Zooming out
Right-click	Display of editing layer change menu
[→ ← ↑ ↓]	Mouse movement by one dot
[SHIFT] + [→ ← ↑ ↓]	Mouse movement by two dots

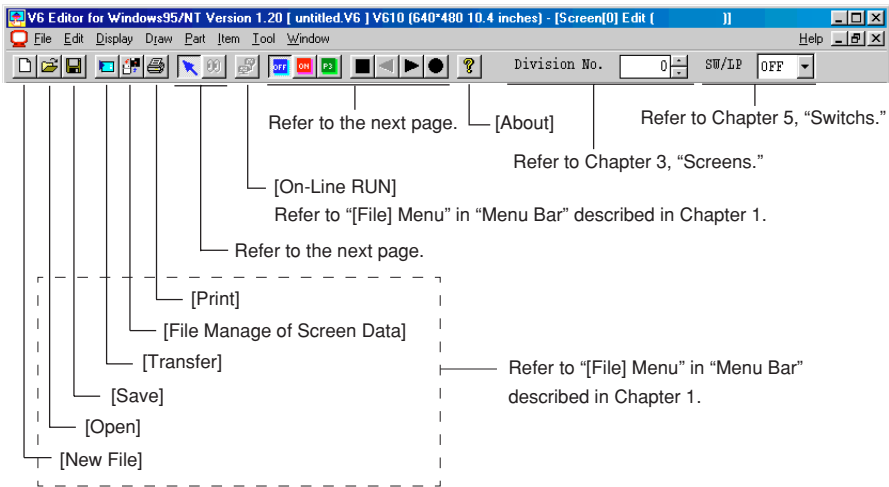
Screen Opening

Start the screen editor software and open a screen edit window. When a new edit window is opened, it appears as follows.



Icon Bar

The icon bar consists of the following icons.



(Select) and (Detail/Prop. Change) Icons

Use them to choose screen items or modify their properties.



1 2

1. [Select] icon

Click this icon to select screen items.

2. [Detail/Prop. Change] icon

Click this icon after selection of an item. The dialog of the item is displayed.

Colors, line type, tile, etc. can be modified for drawing items. Memory address, functions, etc. can be modified for parts.

Screen Change Icons

Use these icons for changing over screens.



1 2 3 4

1. [Screen Skip] icon

While this icon is clicked (ON), unregistered screens can be skipped during screen scrolling using the [Preview] or [Next] icon.

2. [Preview] icon

Clicking this icon brings up the previous screen.

3. [Next] icon

Clicking this icon brings up the next screen.

4. [Screen List] icon

Clicking this icon brings up the screen list. For more information on the list, refer to page 1-14.

(OFF), (ON), and (P3) Icons

Use these icons to change the state of switches and lamps. The depressed icon indicates the current state. The [OFF] icon is depressed as default.



1 2 3

1. [ON] icon

When this icon is depressed, a switch/lamp is turned on.

2. [OFF] icon

When this icon is depressed, a switch/lamp is turned off.

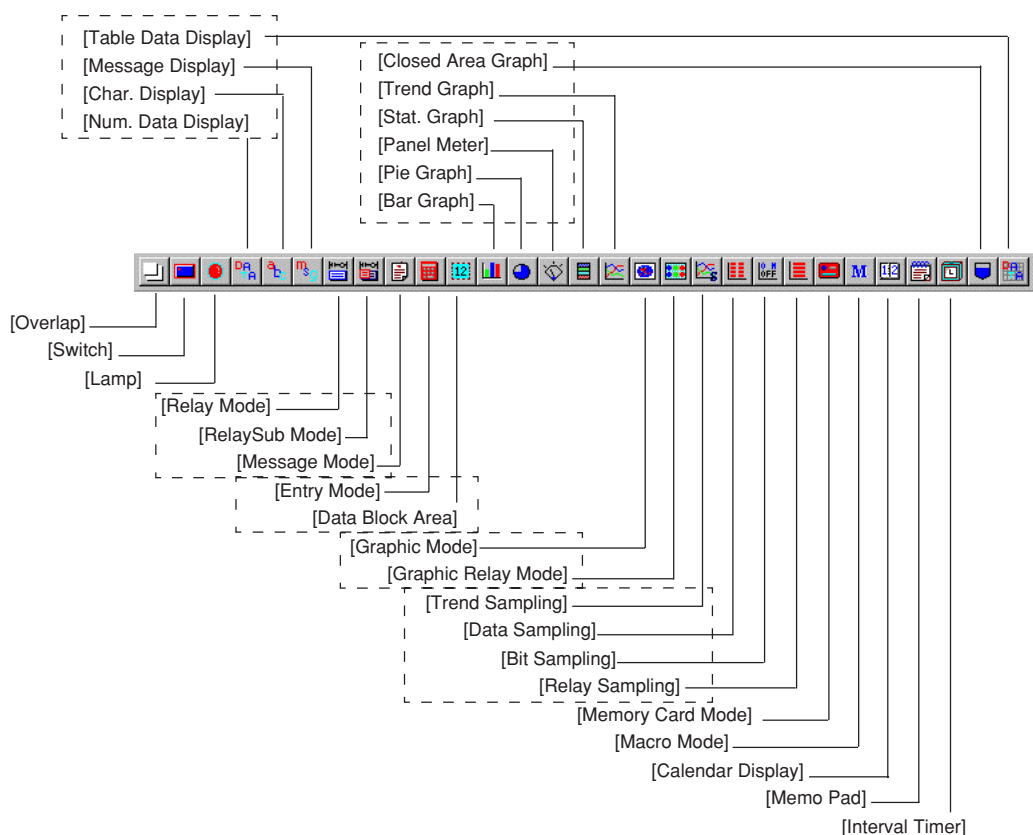
3. [P3] icon

When this icon is depressed, a switch/lamp is in the state of P3.

(When P3 is not valid for a switch or lamp, this icon indicates the OFF state.)

Tool Bar

For an explanation of each part in the bar, refer to the corresponding chapters.

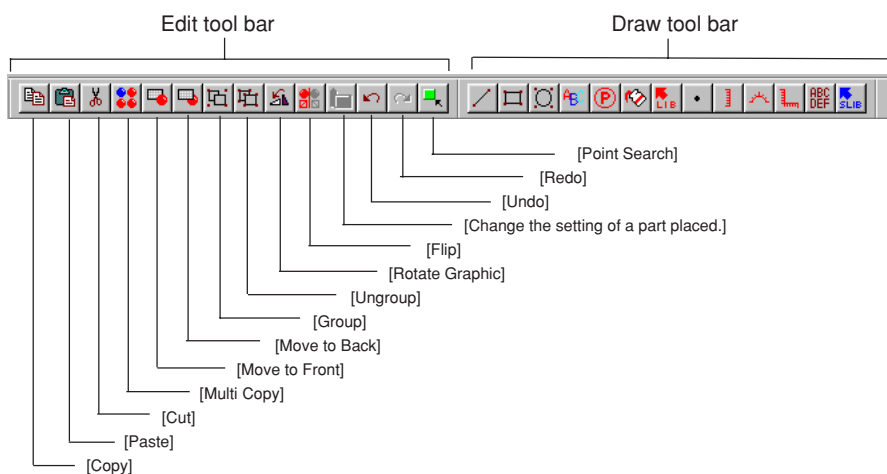


* Parts enclosed in a dotted box are explained in the same chapter.

Edit Tool Bar and Draw Tool Bar

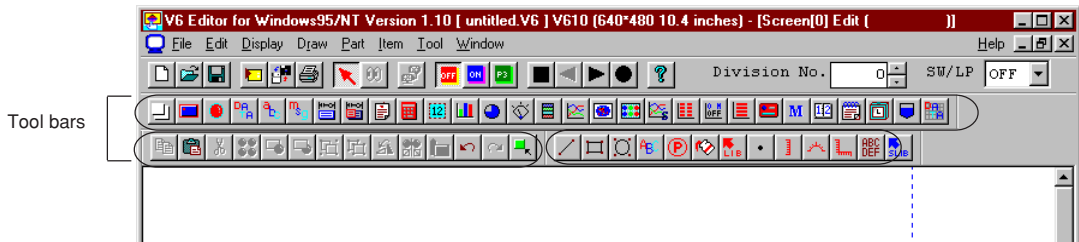
For the edit tool bar, refer to “[Edit] Menu” in “Menu Bar” described in Chapter 1.

For the draw tool bar, refer to Chapter 22, “Draw Tools.”



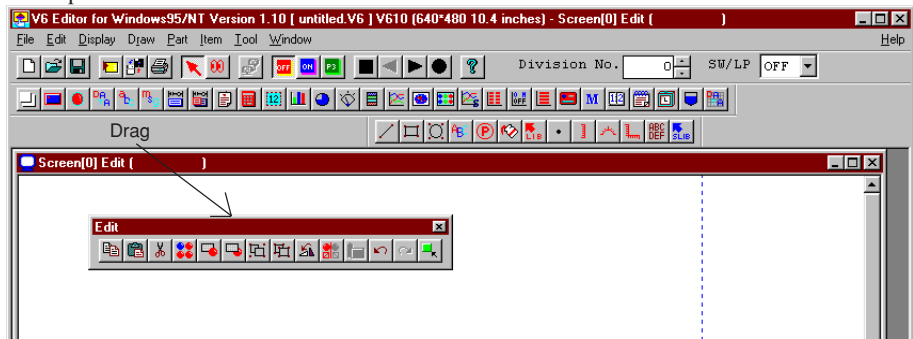
Tool Bar Usage

The tool bars appear as shown on the previous page as default. There are three tool bars.



The tool bars can be moved to desired positions.

Click any position (except icons) on a bar and drag. The box of the bar appears at the cursor. Release the mouse button in the desired position. The bar is moved to the position.



The shape of a tool bar can be altered to a vertical or box shape by dragging the bar edge.



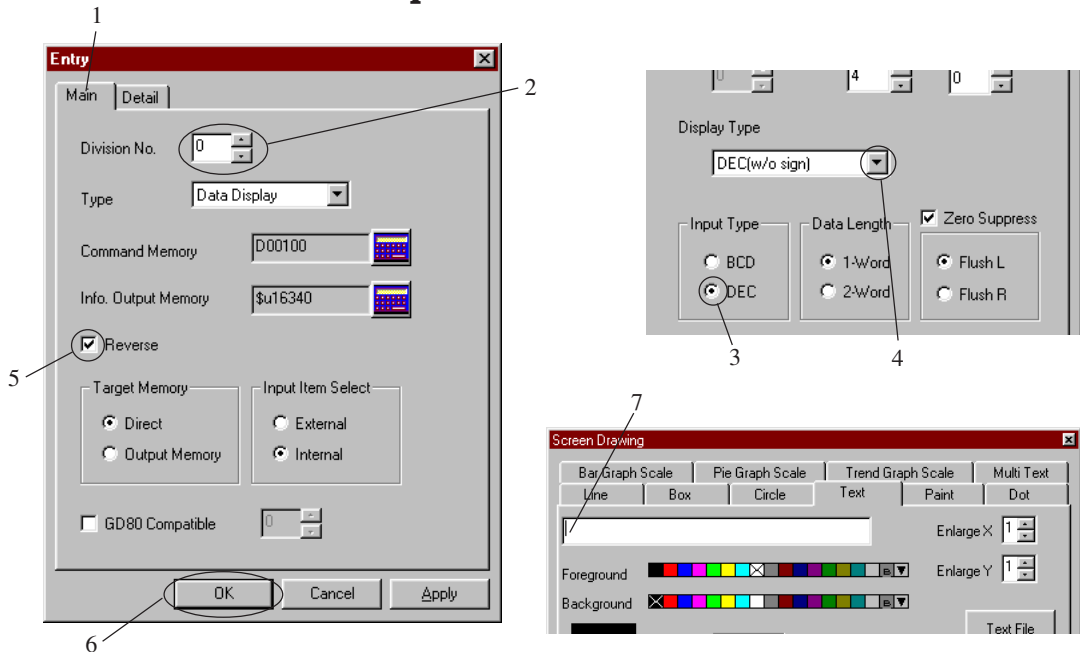
Status bar

The status bar indicates the following information.



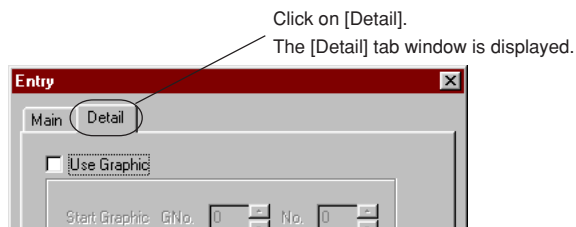
Setting and Operating Technique in Dialogs

Basic Components



1. Change-over tab

Clicking on a tab allows the corresponding tab window to be viewed.



2. Numerical data field

When setting or modifying numerical data, click the upward/downward arrow buttons. Some data fields allow direct numeral entry through the keyboard.

3. Option button

Select one option by clicking. When the button changes to ☒, the option is selected.

4. Arrow to show the drop-down list

Clicking this arrow shows the drop-down list. Select the desired option.

5. Check box

Clicking on a check box changes the box from ☐ to ☒ (checked). When a box is checked, it means that it is selected or “yes.”

6. Command button

Clicking a button, such as [OK], [Yes], [No], [Cancel], triggers the specified action.

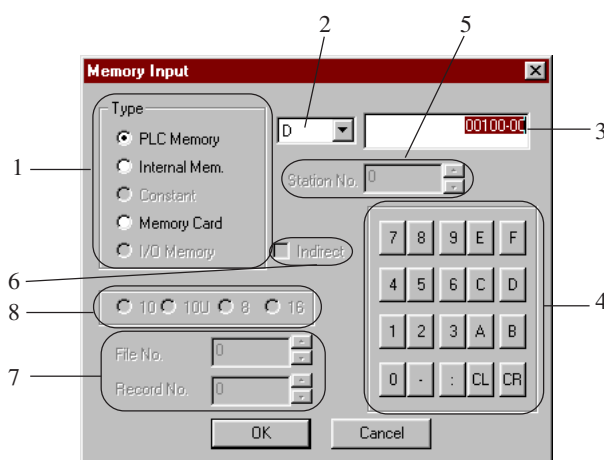
7. Text field

When the cursor is shown in a text field, characters can be entered.

The dialog can be moved by pointing to the title section and dragging.

Setting up Memory Addresses

When specifying a memory address in a dialog, click the calculator button on the right of the entry field. The following dialog is displayed.



1. Memory type select button

One memory type should be chosen from the following five options.

◆ PC

For using the PC memory

◆ Internal Mem.

For using the internal memory of Control Terminal

For information on use, refer to Chapter 15, "Internal Memory."

◆ Memory Card

For using the memory card

For information on use, refer to Chapter 13, "Memory Card Mode."

◆ Constant

For specifying a constant instead of memory

Constant setting is not available on all items.

◆ I/O Memory

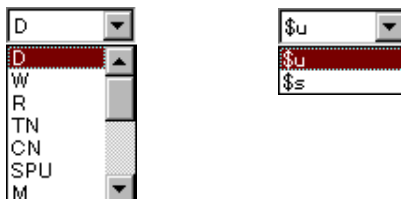
For using I/O communication, such as ZM-JPCN-1

For more information, refer to the communication interface instruction manual.

Depending on this selection, the content of the dialog will vary.

2. Device select box

This box becomes active when [PLC Memory], [Internal Mem.] or [I/O Memory] is chosen for [Type]. Clicking the arrow mark brings up the drop-down menu. Choose the desired device.

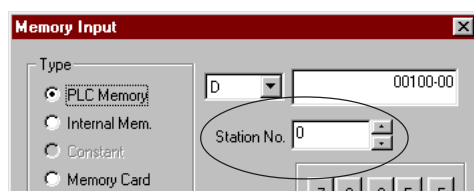


3. Entry field

Specify a memory address using the keypad in the dialog or the keyboard of the computer.

4. Keypad

The keypad allows direct entry to the above field.



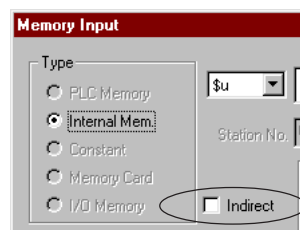
5. Station No.

This option becomes active when [1 : n] is chosen for [Connection] in the [Detail] tab window of the [Comm. Parameter] dialog.

6. Indirect

This option is available with memory setting when macro commands are used.

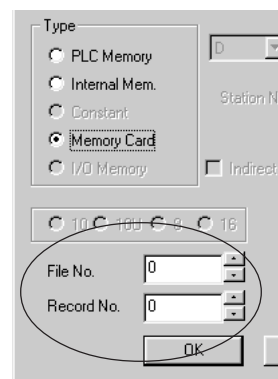
For more information, refer to Chapter 14, "Macro."



7. File No./Record No.

When [Memory Card] is chosen for the memory type, these numbers must be set up.

For more information on the memory card, refer to Chapter 13, "Memory Card Mode."



8. 10/10U/8/16

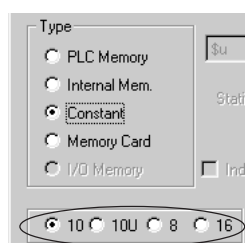
When [Constant] is chosen for the memory type, these options become active.

10 = decimal

10U = decimal without signs

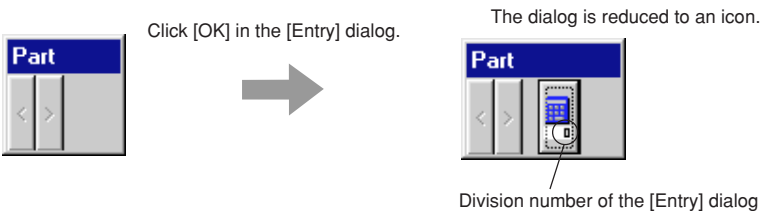
8 = octal

16 = hexadecimal



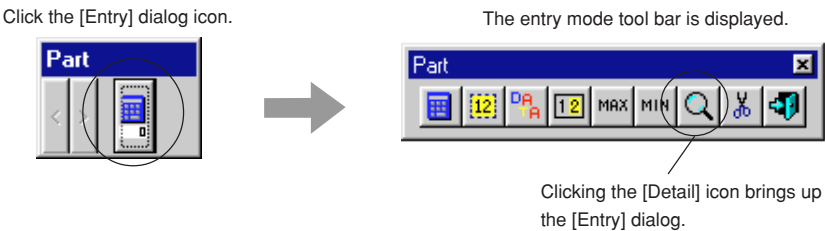
[Part] Auxiliary Tool Box of Dialog

When [OK] is clicked after data setting, some dialogs are reduced to icons and stored in [Part] auxiliary tool boxes. (Ex.: Mode dialogs, such as relay dialog, entry dialog, and bit sampling dialog)

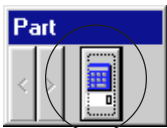


The division number of the dialog is indicated in the [Part] auxiliary tool box.

When checking or modifying the data of the dialog, click the icon in the [Part] auxiliary tool box. Its tool bar or dialog is displayed.



Click the icon.



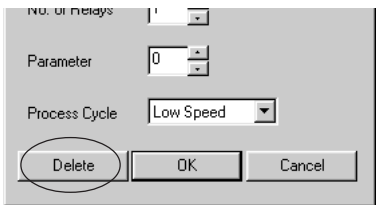
**Deletion or Copy of Icons
in the [Part] Auxiliary Tool Box**

Deletion of Icons

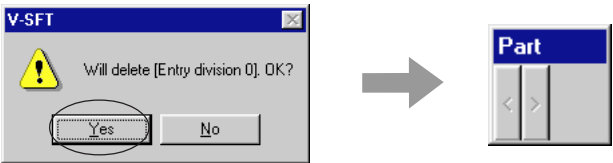
1. Click the icon to be deleted from the [Part] auxiliary tool box.
2. When its tool bar is displayed, click the [Delete] icon. When its dialog is displayed, click [Delete].



Or



3. The confirmation message appears. Click [Yes] when deleting the icon. The icon is deleted from the [Part] auxiliary tool box.



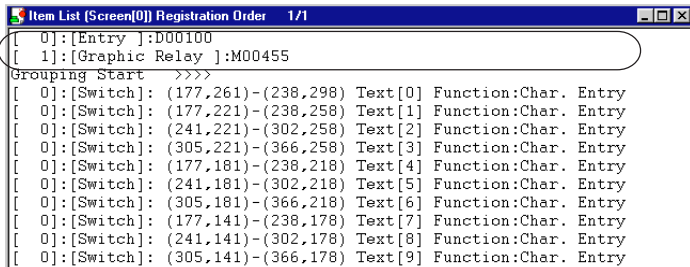
Copy of Icons

When copying an icon in the [Part] auxiliary tool box, bring up the item list.

1. Select [Item] list from the [Tool] menu.

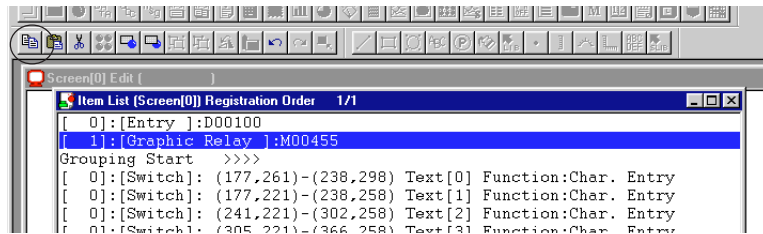
2. The [Item List] window is displayed.

Items containing no mouse coordinates correspond to icons in the [Part] auxiliary tool box.



3. Click the desired item. It is highlighted.

4. Select [Copy] from the [Edit] menu or click the [Copy] icon.



5. Pasting can be executed on either [Item List] or screen.

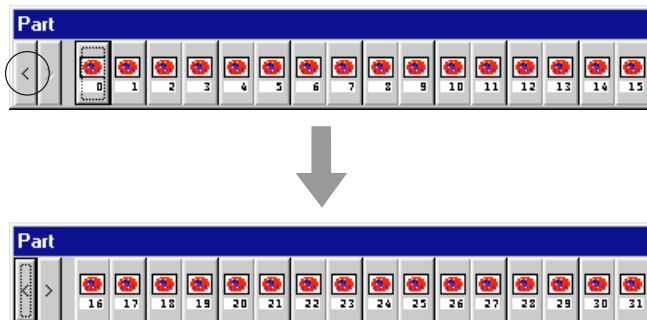
Select [Paste] from the [Edit] menu or click the [Paste] icon. The copy icon appears in the [Part] auxiliary tool box.



Deletion of icons is also possible on the [Item List].

Arrow Buttons in the [Part] Auxiliary Tool Box

When more than 16 icons are stored in a [Part] auxiliary tool box, extra icons are hidden. The arrow buttons, which have been deactivated, become active. Clicking the buttons shows the hidden icons.



About Parts

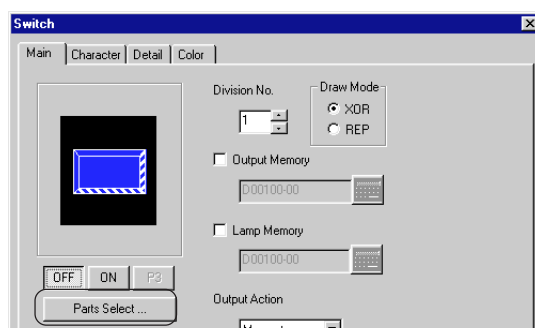
Selection and Placement of Parts

Parts of switches, lamps, and data display are registered in parts files.

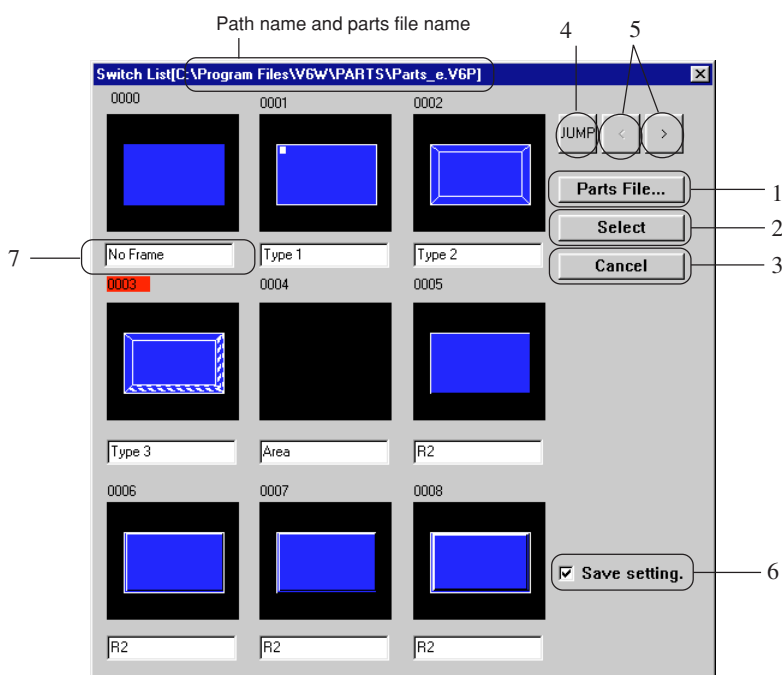
When these parts are required for creating a screen, select the desired parts from files and place them on the screen. Parts placed on the screen can be replaced with different parts.

Parts File (Ex.: Switch)

Clicking the [Switch] icon brings up the [Switch] dialog.



Click [Parts Select]. The [Switch List] window is displayed.



1. [Parts File]

Use this button to call up a different parts file.

Click this button. The [Select parts file.] dialog is displayed. Choose the desired file and click [Open]. The file is opened.

2. [Select]

By clicking a part in the [Switch List], it is highlighted in red.

Click [Select]. The part is shown in the [Switch] dialog.

3. [Cancel]

Clicking [Cancel] closes the parts file and brings up the [Switch] dialog.

4. [JUMP]

Clicking [JUMP] brings up the [Part Edit] dialog. Specify the desired part number and click [OK]. The part is selected.



5. [<] [>]

Click either button to scroll up/down the [Switch List].

6. [Save setting]

When this box is checked, part change is possible while the dialog data is saved.

Thus, the set division number, memory address, etc. remain the same.

When this box is unchecked, the dialog data is cleared.

7. Comment field

This field indicates the comment on the part.

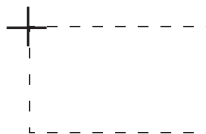
Comment can be entered only during part editing. Open the [Switch List] during part editing, and click this field. It becomes active for comment entry.

Parts Placement (Ex.: Switch)

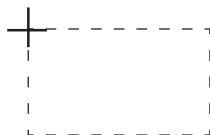
1. Click the [Switch] icon. The [Switch] dialog is displayed.

2. Click [Parts Select] and select the desired switch part.

3. Click [Place] in the [Switch] dialog. A dotted box and a mover tool appear in the screen edit window.



4. Click the mouse in the desired position. The switch is placed.

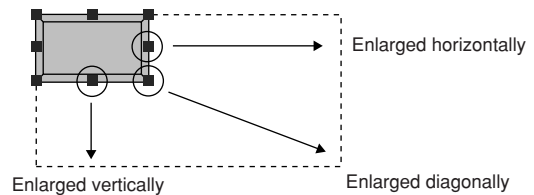


Clicking the mouse places switch part No. 2 on the screen.

Parts Usage

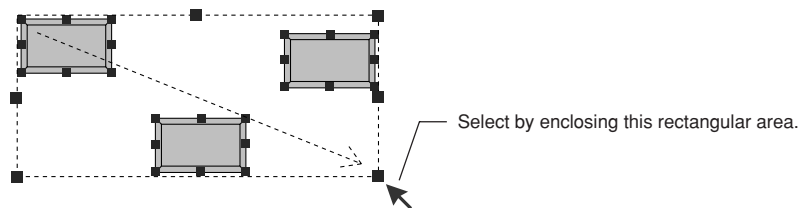
Parts Enlargement/Reduction

When a part is clicked, handles are shown all around, denoting that the part is selected. By dragging handles, the part can be enlarged or reduced.

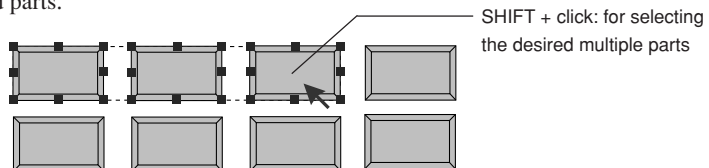


Parts Selection

⊙ When selecting multiple parts, drag the mouse enclosing all the desired parts from top left to the bottom right.



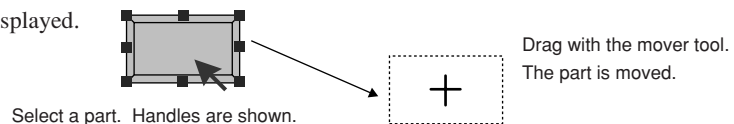
⊙ When selecting multiple parts individually, hold down the SHIFT key and click the desired parts.



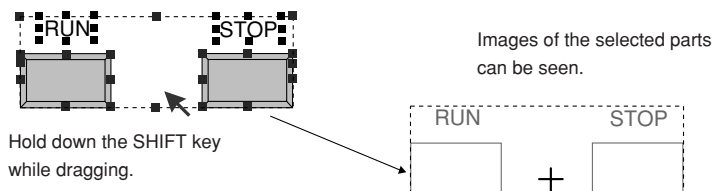
Parts Movement

While a mover tool is displayed, pressing an arrow key on the keyboard moves a part or graphic dot by dot.

⊙ Dragging the part when handles are shown moves the part. The mover tool is displayed.



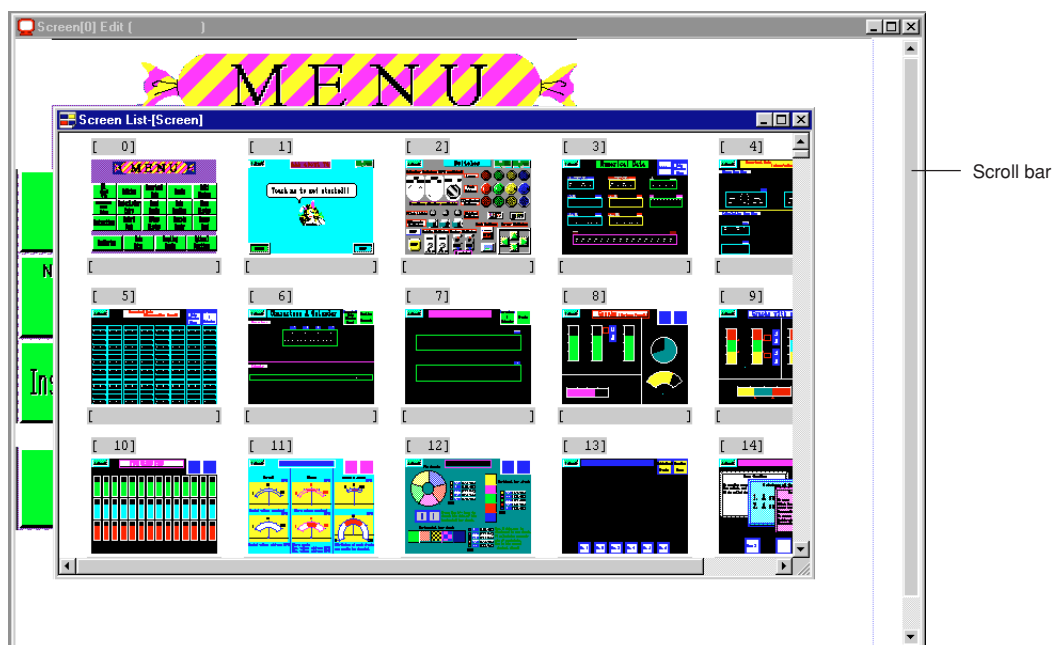
⊙ When moving multiple parts or graphics at one time, images of these parts cannot be seen. If you want to see the part images while moving, hold down SHIFT key while dragging. The frames of parts or graphics are shown.



Screen List

Screen List Usage

Click the [Screen List] icon or select [Screen List] from the [Tool] menu. The [Screen List] window is displayed.



The list of the screens (numbered from “0”) appears. To scroll hidden screens in the list into view, use the scroll bar.

When calling a screen, use [Jump] in the [Display] menu.

<Procedure>

1. Select [Jump] from the [Display] menu. The screen dialog is displayed.
2. Enter the screen number to be called, and click [OK].
3. One page of the screen list containing the specified screen at the top is displayed.

Calling a Screen

A screen can be called up in the following two manners:

◆ By double-clicking

Double-click the desired screen in the [Screen List] window. The screen is displayed over the list.

◆ By dragging

Tile the current screen edit window and the [Screen List] window.

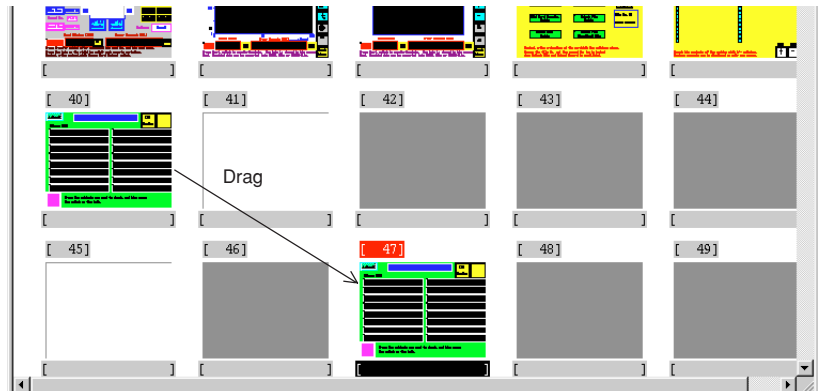
Click the desired screen in the [Screen List] window, and drag it to the screen edit window. The selected screen is displayed by releasing the mouse.

Screen Copy

Screens can be copied in the following two manners:

◆ By dragging

Click the desired screen in the [Screen List] window, and drag it to a copy destination box. The copy appears in the box by releasing the mouse.



◆ By copy & paste

Click the desired screen in the [Screen List] window. Click the [Copy] icon, or select [Copy] from the [Edit] menu.

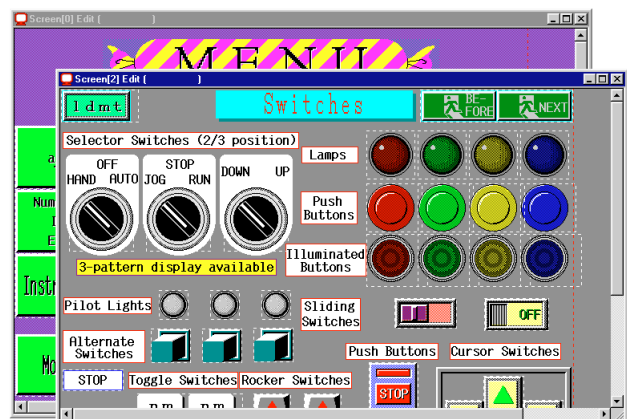
Click a copy destination box in the [Screen List] window. Click the [Paste] icon, or select [Paste] from the [Edit] menu. The copy appears in the box.

Display of Multiple Screens

Multiple screens can be displayed.

<Procedure>

1. Check the screen number currently being edited.
 2. Select [Screen] from the [Item] menu.
The [Screen] dialog is displayed.
 3. Enter the desired screen number and click [OK]. The specified screen edit window appears while overlapping with the current screen edit window.
- * When the screen number currently being edited is specified, no change occurs.

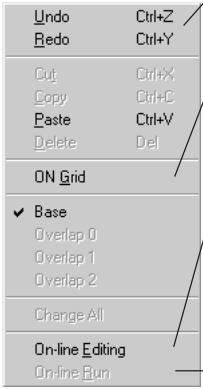


Right-clicking Menu

Right-clicking a mouse calls a menu which contains some commands. The display commands vary according to the screen.

When No Parts Are Selected:

Right-clicking calls the following menu.



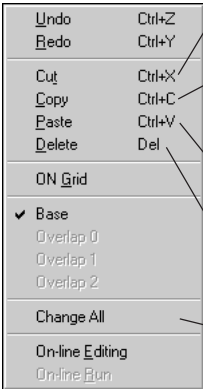
1. [Undo] [Redo]
Same as [Undo]/[Redo] in the [Edit] menu

2. [ON Grid]
When this command is clicked once, this menu item is checked. It means “on-grid editing.” When this menu item is clicked again, “on-grid editing” is canceled.

3. [On-line Editing]
This command is valid while Control Terminal is connected to a personal computer by a screen data transferring cable. When this command is clicked, the check mark appears. It means on-line editing. The command [On-line RUN] becomes valid. Clicking [On-line Editing] deletes its check mark. On-line editing is canceled. For more information on on-line editing, refer to Chapter 27, “Data Transference.”

4. [On-line RUN]
This command becomes valid in on-line editing. When it is clicked, only the screen data which has not been transferred yet is transferred to Control Terminal.

When a Part Is Selected:



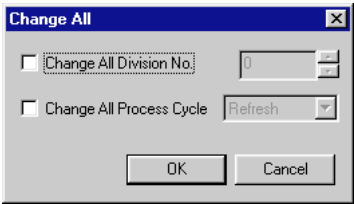
5. [Cut]
Same as [Cut] in the [Edit] menu

6. [Copy]
Same as [Copy] in the [Edit] menu

7. [Paste]
By clicking it, [Paste] becomes active.

8. [Delete]
Same as [Delete] in the [Edit] menu

9. [Change All]
This command is used to change division numbers or processing cycles of the parts placed on the screen. Click the desired parts and click this command. The [Change All] dialog is displayed.



Undo	Ctrl+Z
Redo	Ctrl+Y
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
ON Grid	
✓ Base	
Overlap 0	
Overlap 1	
Overlap 2	
Change All	
On-line Editing	
Online Run	

[Change All Division No.]
Check this item, and specify the division number for change.
[Change All Process Cycle]
Check this item, and select the process cycle for change.
After setting, click [OK]. The command is executed.

When a Normal Overlap is Placed:

10. [Base] [Overlap 0] [Overlap 1] [Overlap 2] (for changing over the editing layer)
Clicking each layer changes the editing layer to the selected one. The selected option is checked.

When a Table Data Display Part Is Selected (ZM-*2 Function):

This menu appears when a cell/cells in a table data display part is/are selected by right-clicking or right-dragging.

Align width
Align height
Align character
Cut
Copy
Paste
Insert
Delete
Detail Setting

11. [Align width]
All cells can be adjusted to the width of the top left cell in the selected cells.
12. [Align height]
All cells can be adjusted to the height of the top left cell in the selected cells.
13. [Align character]
The cells in a table can be adjusted so that the largest data item fits into a cell.

Menu Bar



[File] Menu

[New]

Opens a new file, and brings up the screen for editing.

[Open]

Opens an existing file for screen editing.

A screen data file for the ZM-30 series can be opened and converted into a file for the ZM series. For more information, refer to Chapter 26, “File Conversion.”

[Save]

Saves the current file. (If it is a new file, you must give a name to the file).

⊙ [Save As]

Saves the current file under a new or different name.

[Transfer]

Transfers data between the computer and Control Terminal.

For more information, refer to Chapter 27, “Data Transference.”

⊙ [On-line Editing]

Used for on-line editing.

[On-line RUN]

This command becomes active in on-line editing. When it is clicked, only the screen data which has not been transferred yet is transferred to Control Terminal.

⊙ [Printer Setting]

Used for printing a screen. Editing of margin, header, footer, etc. is available. For more information, refer to Chapter 28, “Printing.”

[Print]

Prints out files from the computer.

For more information, refer to Chapter 28, “Printing.”

⊙ [Present Window Printing]

Prints the window which is currently opened.

Set necessary data by clicking [Printer Setting] in advance.

[File Managing]

Used for copying screens, graphics, etc. between different screen data files. For more information, refer to Chapter 25, “File Management.”

⊙ [File Comment]

Used for attaching a comment on the screen being edited within 16 one-byte characters. The comment is also transferred with the screen data to Control Terminal.

⊙ [Change a Password]

Sets a password for a screen data file, or changes a set password.

⊙ [Parts Edit]

Used for setting, modifying, or registering parts. For more information, refer to Chapter 24, “Part Editing.”



[Edit] Menu

[Undo]

Cancels actions that you performed (up to 7 times).

[Redo]

Reverts the state before undoing (up to 7 times).

[Cut]

Cuts the selected item and moves it to the cut buffer.

[Copy]

Copies a part (or a graphic) to the cut buffer.

[Paste]

Pastes a part (or a graphic) in the cut buffer to the screen.

[Delete]

Deletes a part or a graphic (or parts or graphics) selected. Select a part or a graphic (or parts or graphics) to delete, and click this command.

[Multi Copy]

Refer to “[Multi Copy]” on the following page.

[Move to Front]

Moves a part or a graphic to the front when two or more parts or graphics are overlapping.

[Move to Back]

Moves a part or graphic to the back when two or more parts or graphics are overlapping.

[Group]

Groups the selected parts and/or graphics.

[Ungroup]

Ungroups the selected group of parts and/or graphics.

[Rotate Graphic]

Refer to “[Rotate Graphic]” on the following page.

[Flip]

Refer to “[Flip]” on the following page.

[Align]

Refer to “[Align]” on the following page.

[Table Data Display Editing]

Brings up the menu for table data display editing while a cell/cells in a table data display part is/are selected.

For more information, refer to “Table Data Display” described in Chapter 7, “Data Display.”

[Modify Part]

Brings up the [Modify Part] window. Select a part from the screen and click this command. Modify the part. For more information, refer to Chapter 24, “Part

Editing.”

[Detail Setting]

Used for property modification. Select a screen item and click this command. The dialog for property modification is displayed.

⊙ [Select Environment]

Refer to “[Select Environment]” on the following page.

⊙ [Division No. Setting]

Changes the division number indicated in the upper right corner.

⊙ [Screen Setting]

Used for specifying the screen back color, etc. For more information, refer to page 3-6 in Chapter 3, “Screens.”

⊙ [Edit OPEN Macro] [Edit CLOSE Macro] [Edit CYCLE Macro]

Used for setting macro for the opened screen. For more information, refer to page 3-8 in Chapter 3, “Screens.”

⊙ [Local Function Switch Setting]

Used for setting function switches on screens. For more information, refer to pages 2-10 and 2-11 in Chapter 2, “System Setting.”

⊙ [Select All]

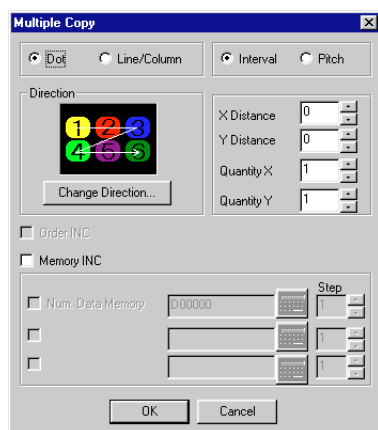
Selects all items placed on the screen.

⊙ [Delete All]

Deletes all items from the screen. Clicking this command displays the message “Will clear the screen. OK?” If OK, click [Yes].

(Multi Copy)

Select a part (or graphic) to copy (handles are shown around the part), and click this icon. The [Multi Copy] dialog is displayed.



[Dot] [Line/Column]

Choose either option for placing copied parts on the screen, by dots or by lines/columns.

[Direction]

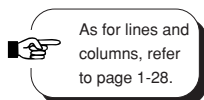
When the check box of [Memory INC] or [Order INC] is turned on (checked), it determines the direction of placing copied parts.

When changing the direction, click [Change Direction]. The [Select Direction] dialog is displayed. Choose the desired direction and click [OK]. The selected direction becomes valid.

[Interval] [Pitch]

Choose either option for placing copied parts on the screen, by pitch or at intervals. For more information, refer to the next page.

[X Distance] [Y Distance]



Specify distances along the X and Y directions for placing copied parts.

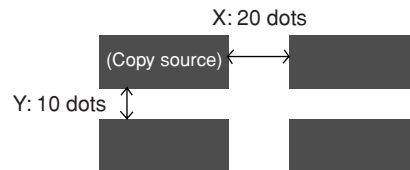
[Quantity X] [Quantity Y]

Specify the number of required copies. The copy source must be included in this number.

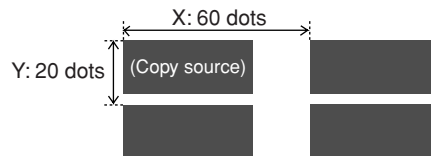
Ex.) When a solid box is multiple-copied:

[Interval] X Distance: 20 Y Distance: 10
 Quantity X: 2 Quantity Y: 2

Four boxes are placed as shown below:



[Pitch] X Distance: 60 Y Distance: 20
 Quantity X: 2 Quantity Y: 2



Four boxes are placed as shown below:

[Order INC]

This setting is effective for using a “data display” part as the copy source. When it is checked, the copied parts are incrementally numbered.

[Memory INC]

This setting is effective for switches, lamps, and data displays.

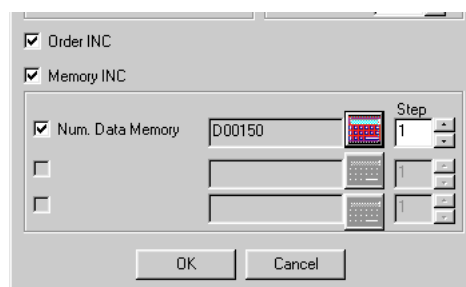
When several copies are made, memory is allocated in consecutive addresses to the copy source and the copies. The following [Memory] and [Step] become active.

◆ [Memory]

Specify the top memory address of the copy source.

◆ [Step]

Specify the number of bit/word increments for allocating memory addresses to the copy source and copies. When “1” is entered, the allocated addresses are incremented by one bit/word. When “2” is entered, the allocated addresses are



incremented by two bits/words.



(Rotate Graphic)

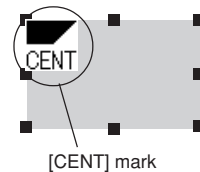
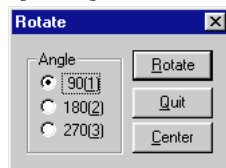
The following graphics can be rotated.

<Applicable graphics>

Line, continuous line, box, parallelogram, polygon, circle, arc, sector, ellipse, elliptical arc, paint (including frame), scale

<Procedure>

Select the desired graphic. Handles are shown around it. Click the [Rotate Graphic] icon. The following [Rotate] dialog is displayed. At the top left corner of the graphic, a [CENT] mark is indicated.



[Angle] (90/180/270)

Select the desired angle for rotation. The center of rotation is the position marked with [CENT].

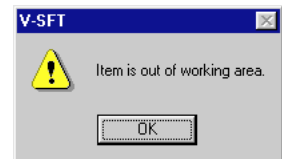
[Rotate]

Clicking this button rotates the selected graphic.

[Quit]

Clicking this button closes the [Rotate] dialog.

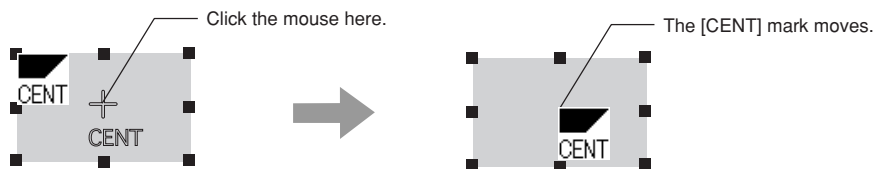
*** When rotating a graphic, the following message may be displayed because the graphic cannot be held in the screen space after rotation. In such a case, move the rotation center, or change the rotation angle.**



[Center]

When a graphic is selected, the rotation center is automatically located at the top left corner. If you want to change this position, click the [Center] button.

The following mouse pointer appears on the screen. Click the mouse on the desired position. The [CENT] mark moves to the position.



Multiple graphics can be rotated at one time.



(Flip)

The following graphics can be turned over oppositely to the specified axis.

<Applicable graphics>

Line, continuous line, box, parallelogram, polygon, circle, arc, sector, ellipse, elliptical arc, paint (including frame), scale

<Procedure>

Select the desired graphic. Click the [Flip] icon. The following [Flip] dialog is displayed.



[Direction](Vertical/Horizontal)

Select the axis to turn over the graphics.

[Position](Left/Right/Up/Down/Center)

Select the position of the graphic when turning over the graphic oppositely to the selected [Direction].

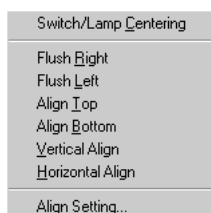
[Copy]

When the check box is turned on (checked), the graphic is copied at the reflected position with the original one remained.

When clicking [OK], the [Flip] function is executed.

(Align)

Parts can be aligned on the screen. The following pull-down menu is displayed.



 In the case of the ZM-41/70, the [Align] command is not effective for graphics.

◆ [Switch/Lamp Centering]

Characters on switches and lamps are center-aligned.

Select desired switches and lamps, and click this command.

*** This centering function is used only for characters that are entered in the [Switch] or [Lamp] dialog. If characters are placed as graphics, use [Align Setting] for centering.**

◆ [Flush Right] [Flush Left] [Align Top] [Align Bottom]

Aligns the selected parts as commanded.

◆ [Vertical Align]

Aligns the selected parts vertically.

◆ [Horizontal Align]

Aligns the selected parts horizontally.

◆ [Align Setting]

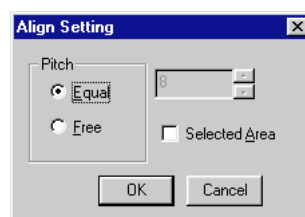
Brings up the [Align Setting] dialog.

[Pitch] (Equal/Free)

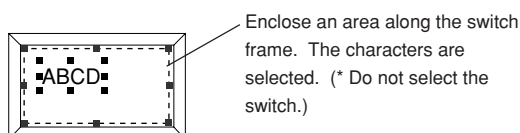
This selection determines the pitch for alignment.

[Selected Area]

When this option is checked, parts and/or graphics in the area enclosed by the mouse are all aligned.

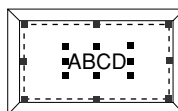


For example, if characters on a switch are placed as graphics, the above [Switch/Lamp Centering] does not work for centering the characters. When [Selected Area] is checked and an area (*) a little smaller than the switch is enclosed, a dotted box is displayed.



Click the [Align] icon. Since alignment commands become effective, select [Vertical Align] or [Horizontal Align]. Characters on the switch are then center-aligned.

When [Vertical Align] is clicked:



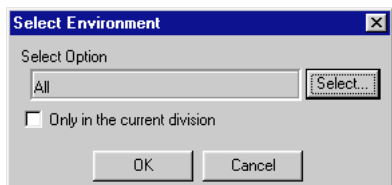
Characters are vertically aligned to this area. ([Horizontal Align] also works in the same manner.)

*** When the switch itself is enclosed together with characters, it is also aligned. When you want to align characters only, do not select the switch.**

(Select Environment)

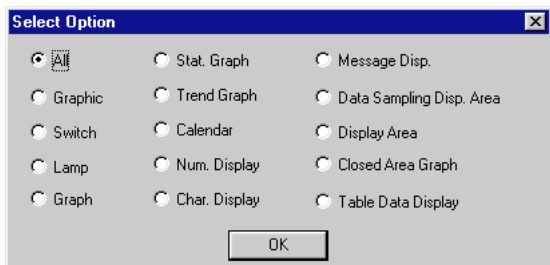
This command is used for editing screens or multi-overlaps. Items to be selected can be limited.

Clicking [Select Environment] displays the following dialog.



[Select Option]

[All] is chosen as default. Clicking [Select] brings up the [Select Option] dialog.



Choose a desired option. It is displayed in the [Select Option] field in the [Select Environment] dialog.

[Only in the current division]

A division number can be specified for selecting parts. When this command is checked, the selection is effective only in the current division.

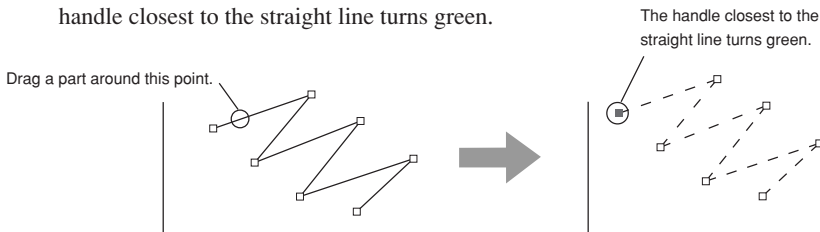


(Point Search) Icon

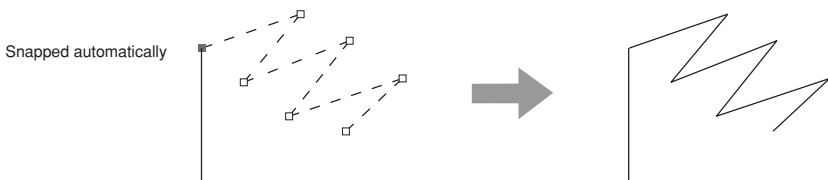
A graphic can be snapped to a different graphic with ease during drawing or screen editing. This icon is used for creating screens containing complicated graphics.

<Ex.> Connecting a continuous line to a straight line on a screen

1. Click the [Point Search] icon (depressed).
2. Click a part of the continuous line closest to the straight line, and drag it. The handle closest to the straight line turns green.



3. While dragging the continuous line to the straight line, the green handle is snapped to the straight line automatically.



[Display] Menu

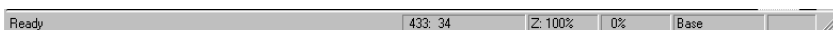


⊙ [Tool Bar]

Choose whether or not each tool bar is displayed. Clicking this command brings up the [Tool Bar] dialog. When any tool bar is not necessary, uncheck its box. It is deleted from the screen. Check the box again to show the bar.

⊙ [Status Bar]

This command is checked as default. The status bar is shown at the bottom of the editor screen.



Uncheck it when the status bar is not necessary.

⊙ [Jump]

Use this command for screen calling.



The previous screen is displayed.



The next screen is displayed.



When scrolling screens while this command is clicked, unregistered screens are skipped.



The status of a switch or lamp on the screen can be chosen. [OFF], [ON], or [P3] can be selected by clicking this command. Choose the desired one.

⊙ [Grid Display]

Clicking this command brings up grids. Uncheck this when grids are not necessary.

⊙ [ON Grid]

When this command is clicked once, this menu item is checked. It means “on grid editing”. When this menu item is clicked again, “on grid editing” is canceled.

⊙ [Grid Offset Position]

This command is valid when “Free” is chosen for [Grid Type] in the [Grid] tab window (of the [Display Environment] dialog). Click this command and then click the desired position on the screen. The grid offset position is determined.

⊙ [Zoom]

The screen display can be zoomed out or zoomed in. Choose the desired option from [75%], [100%], [200%], and [400%].

⊙ [Display Environment]

Refer to [Display Environment] on the following pages.

⊙ [Change All Display Environment]

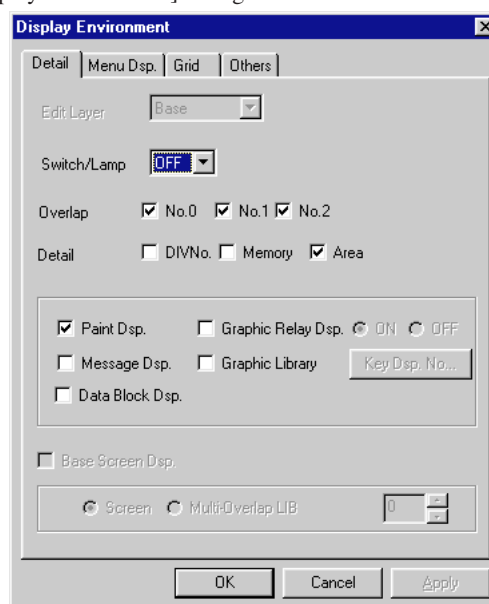
The setting of screen display environment can be changed. The setting becomes valid for all screens in common.

⊙ [Redraw]

Clicking this icon refreshes the screen display.

(Display Environment)

This command is chosen for setting screen display environment. Clicking it brings up the following [Display Environment] dialog.



◆ [Detail] tab window

[Edit Layer]

This option becomes active for screens with overlap setting. Select any of [Base] or [Overlap 0 ~ 2] for the screen you are going to edit.

[Switch/Lamp Dsp.]

Select from [ON], [OFF] and [P3] for the state of the switches or lamps displayed on the screen. The current status is indicated on the right of the status bar.

[Overlap]

This command is valid when normal overlaps are placed on the screen. Choose whether or not overlaps are displayed.

Check the box of the desired overlap number. Uncheck the box when display of the overlap is not necessary.

[Detail]

By checking a box, the details of the corresponding option are displayed.

[DIV. No.] Displays division numbers that each part is included in.

[Memory] Displays memory addresses assigned to each part.

[Area] Displays the area of each part with dotted line.

[Paint Dsp.]

When there is an item drawn using the [Paint] icon in the draw tool bar, it is displayed as painted. When this command is unchecked, only the “x” appears to indicate the paint start point.

[Graphic Relay Dsp.]

This option is valid only when the graphic relay mode is set. The ON/OFF status of the graphic relay can be checked.

[Message Dsp.]

This command is valid when the relay mode or message mode is set.

For the relay mode, relay mode messages are displayed in the display area (or on switch/lamp). For the message mode, page blocks or direct blocks can be displayed provided that [Block] is chosen for [Action Area] and [Internal] is chosen for [Command].

[Graphic Library]

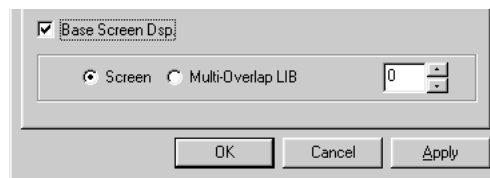
This command is valid when the entry mode or the graphic mode is set. For the entry mode, graphics registered in graphic library can be displayed on the character entry keys provided that [Use Graphic] is checked. For the graphic mode, graphics can be displayed provided that [Internal] is chosen for [Command].

[Data Block Dsp.]

This command is valid when the data block area is set on the screen. The initial block number is indicated on the screen provided that [Internal] is chosen for [Command].

[Base Screen Dsp.]

This command is valid during editing of graphic library, multi-overlap, or data block. When a screen or a multi-overlap should be displayed in editing, check this command.



◆ **[Menu Dsp.] tab window**

[Offset Mark Dsp.]

This command is valid during editing of graphic library or data block. Choose whether or not the offset mark is displayed on the screen.

[MLIB Mark Dsp.]

This command is valid when setting a call overlap or multi-overlap. Choose whether or not the MLIB mark is displayed on the screen to position the overlap.

[Handle Color]

The color of handles shown around items can be set.

◆ **[Grid] tab window**

[Grid Dsp.]

When this option is selected, grids are displayed.

[ON Grid]

When this option is selected, the mouse cursor is snapped to the nearest grid.

[Grid Color]

Select the desired grid color.

[Grid Type]

A grid type can be selected from the following four options.

[1-Byte] : The grids are based on the unit: 8 x 20 dots (the unit of one-byte character: 8 x 16 dots plus four Y-axis dots). The reference point is placed at coordinates (0, -3).

The maximum number of one-byte characters, which can be displayed on the one-byte character grids, depends on the Control Terminal model. Refer to the following when placing messages or texts on the screen.

Model	ZM-52D/ZM-72D/ZM-72T	ZM-72TS/ZM-82T/ZM-82D	ZM-41/70	ZM-42D/L, ZM-41D/L
Characters	80 characters x 24 lines	100 characters x 30 lines	80 characters x 24 lines	40 characters x 12 lines

[Switch] : When the ZM-41/70 is used, the switch operating area is determined based on the switch grids.

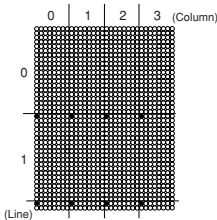
The grids are based on the unit: 16 x 20 dots (the unit of switch: 14 x 18 dots plus spaces: 2 x 2 dots). The reference point is placed at the coordinates (1, 1).

[Mode] : The mode grids are equivalent to the one-byte character grids, but their reference points differ.

The mode grids are based on the unit: 8 x 20 dots. The reference point is placed at (0, 0).

Lines and columns are used to indicate item positions (refer to the figure on the right).

When specifying overlap positions, etc. by external signals, indicate their column and line numbers.



[Free] : Your desired grids can be set by specifying the following options:

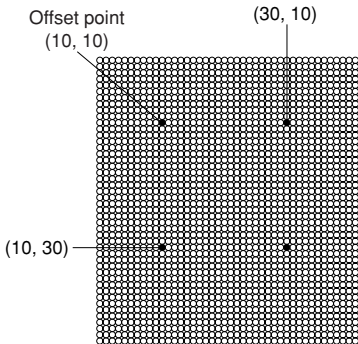
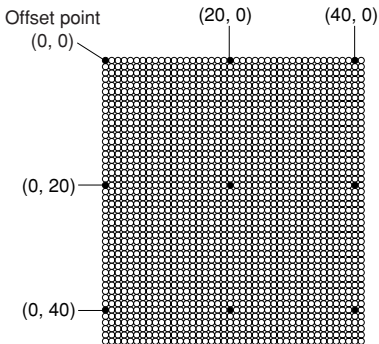
[X Offset] [Y Offset] [X Pitch] [Y Pitch]



Relationship between offset and pitch

Grids are placed from the offset point at intervals specified by X/Y pitches.

Ex. 1)	Ex. 2)
X Offset: 0	X Offset: 10
Y Offset: 0	Y Offset: 10
X Pitch: 20	X Pitch: 20
Y Pitch: 20	Y Pitch: 20



[Place switches on switch grids.]

When this option is checked, switches are placed based on the switch grids, irrespective of the set grid type.

◆ [Others] tab window

[Zoom] (75%/100%/200%/400%)

The screen display can be zoomed out or zoomed in.

[Interlock Text in the Switch]

When a switch, lamp, or calendar is enlarged/reduced while this command is checked, the text on the switch or lamp, or a calendar part of “YY MM DD hh mm ss SUN” is also enlarged/reduced. When this command is unchecked, the text or the calendar part is not changed in size.

[Limit of Edit Model Area]

When this command is checked, items can be moved within the available screen area of Control Terminal. When it is unchecked, items can be moved beyond the area.

[Make Back-up File]

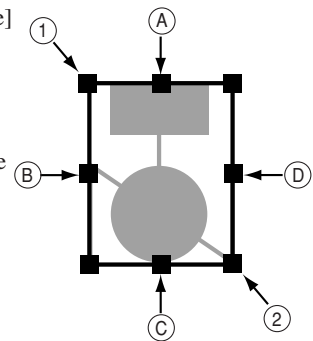
With this command checked, a backup file (with extensions “.bak”) is created automatically when a screen data file is saved. When this command is unchecked, no backup file is created.

[Enlarge items including circles in the opposite angle]

When this command is checked, the selected item can be enlarged/reduced only in the diagonal directions.

Dragging handle A or B results in dragging handle 1. Likewise, dragging handle C or D results in dragging handle 2.

When enlarging/reducing a graphic consisting of circles and lines (boxes), the graphic shape is not changed with this command.



[Draw] Menu

Refer to Chapter 22, “Draw Tools.”

[Parts] Menu

For details of each command, refer to the corresponding chapter.



[Item] Menu

- ◎ [Screen]
Choose this command for screen editing.
- ◎ [Graphic Library]
Choose this command for graphic library editing. For more information, refer to Chapter 11, “Graphic Display.”
- ◎ [Multi-Overlap]
Choose this command for multi-overlap editing. For more information, refer to Chapter 4, “Overlap.”
- ◎ [Data Block]
Choose this command for data block editing. For more information, refer to Chapter 9, “Entry Mode.”
- ◎ [Message]
Choose this command for message editing. For more information, refer to Chapter 8, “Message Display.”
- ◎ [Pattern]
Choose this command for pattern editing. For more information, refer to Chapter 22, “Draw Tools.”
- ◎ [Macro Block]
Choose this command for macro block editing. For more information, refer to Chapter 14, “Macro.”
- ◎ [Page Block]
Choose this command for page block editing. For more information, refer to Chapter 8, “Message Display.”
- ◎ [Direct Block]
Choose this command for direct block editing. For more information, refer to Chapter 8, “Message Display.”
- ◎ [Screen Block]
Choose this command for screen block editing. For more information, refer to Chapter 8, “Message Display.”
- ◎ [Tile]
Choose this command for tile editing. For more information, refer to Chapter 22, “Draw Tools.”
- ◎ [Data Sheet]
Choose this command for data sheet editing. For more information, refer to Chapter 20, “Data Sheet.”
- ◎ [Screen Library]
Choose this command for screen library editing. For more information, refer to Chapter 21, “Screen Library.”
- ◎ [System Setting]
Choose this command for system setting. For more information, refer to Chapter 2, “System Setting.”

[Tool] Menu

This menu contains commands useful for screen creation. For more information, refer to Chapter 23, “Tools.”

[Window] Menu

☉ [Cascade]

When multiple windows are displayed, they are cascaded.

☉ [Tile]

When multiple windows are displayed, they are tiled.

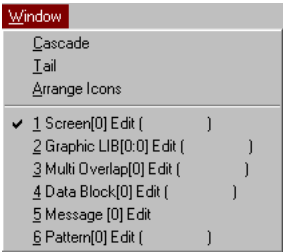
☉ [Arrange Icons]

When minimized windows are displayed, they are aligned.

☉ Window titles

When multiple windows are opened, their titles are indicated in the [Window] menu.

Clicking the title of a window brings it to the top.



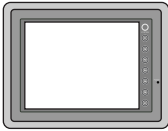
[Help] Menu

☉ [Topic Search]

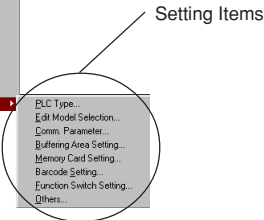
Clicking this command brings up the following help menu. The usage of the help menu is the same as that of Windows 95.

 [Version Information]

Clicking this command indicates the editor software information.



ZM Series



System Setting

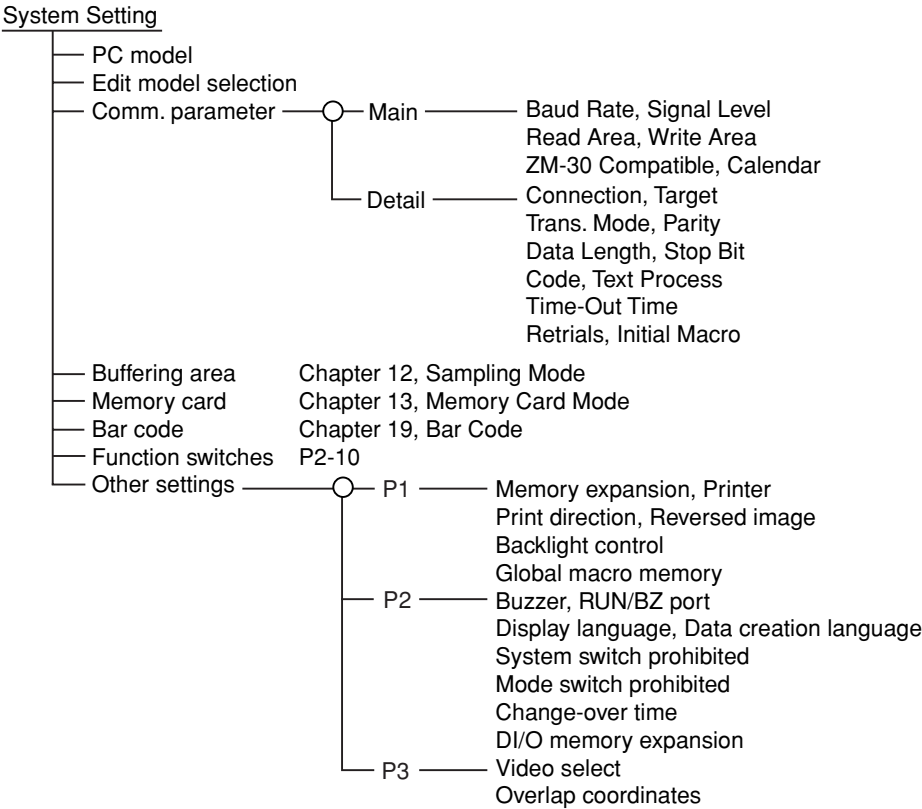
[System Setting] is performed before creating screen data.
In this chapter, system settings required for communicating with external apparatuses, such as PC model selection, communication parameter setting, are described.

2

System Setting

System Setting Items

Open a new or existing file and under [System Setting] of the [Edit] menu, there are various setting items.
Refer to the respective sections for more information on the contents of these menu items.



PC Models



Select the PC type that will connect to the Control Terminal.

The Control Terminal ZM Series is compatible with 19 PC manufacturers.

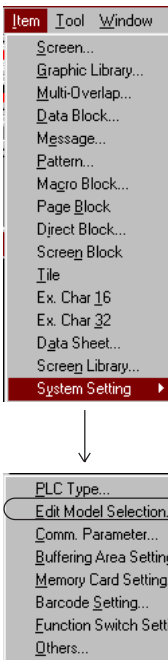
PC Models

1. Click [PC Model] from the [System Setting] pull-down menu in the [Edit] menu on the menu bar. The [PC Model] dialog is displayed.
2. [SHARP JW] is the default selection. When selecting another PC type, click the option button of the desired PC model.

<Model>	<Calendar>
SHARP JW Series	provided
SHARP JW100/70H COM Port	provided
SHARP JW20 COM Port	provided
MITSUBISHI AnA/N/U series	provided
MITSUBISHI QnA Series	provided
MITSUBISHI ACPU Port	provided
MITSUBISHI FX Series	provided
MITSUBISHI Net10	provided
MITSUBISHI QCPU Port	provided
MITSUBISHI FX series (A prt)	provided
MITSUBISHI AnA/N (JPCN1)	provided
OMRON SYSMAC C	depends on the model
OMRON SYSMAC C (JPCN1)	depends on the model
OMRON SYSMAC CV series	provided
HITACHI HIDIC-H	provided
HITACHI HIDIC-S10/2alpha	not provided
HITACHI HIDIC-S10/ABS	not provided
HITACHI HIDIC-S10 (JPCN1)	not provided
MATSUSHITA MEWNET	depends on the model
YOKOGAWA FA500	provided
YOKOGAWA FA-M3	provided
YASKAWA Memobus	not provided
TOYOPUC	provided
FUJI MICREX-F Series	provided
FUJI FLEX-PC Series	provided
FUJI FLEX-PC CPU	provided
FUJI FLEX-PC COM	provided
FUJI FLEX-PC (T)	provided
FUJI FLEX-PC CPU (T)	provided
FUJI MICREX-F T link	provided
FUJI FLEX-PC (JPCN1)	provided
KOYO SU/SG	provided
KOYO SR-T	provided
KOYO SR-T(K prt)	not provided
A.B PLC-5	not provided
A.B SLC500	provided
GE Fanuc 90 Series	not provided
GE Fanuc 90 Series (SNP-X)	not provided
TOSHIBA T Series	provided
TOSHIBA TC200	provided
SIEMENS S5/S7	not provided
SHINKO SELMART	provided
SAMSUNG SPC Series	not provided
KEYENCE KZ Series	not provided
LG MASTER-K10/60/200	not provided
LG MASTER-K500/1000	not provided
FANUC Power Mate	not provided

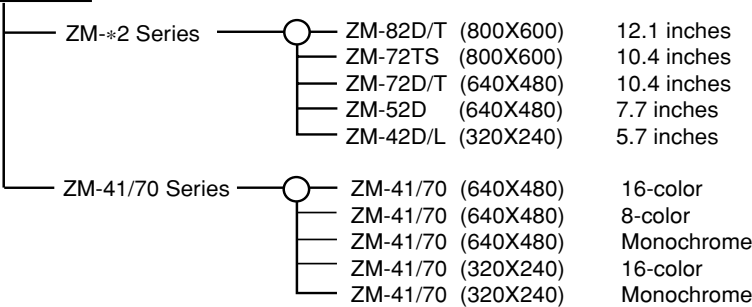
- * [Universal Serial] is for connecting a general-purpose computer. In this case, the computer is the master station, while the ZM Series is the slave station.
- * When the type or series is changed and [OK] is clicked, the [Inquiry] dialog always appears. This is a confirmation of whether or not you also wish to update [Comm. Parameter] settings to correspond with the other changes.

Edit Model Selection

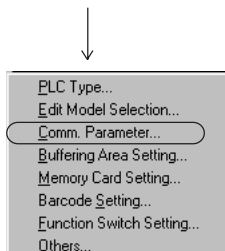
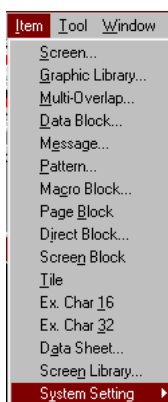


Select the ZM Series model to edit from the diagram below.

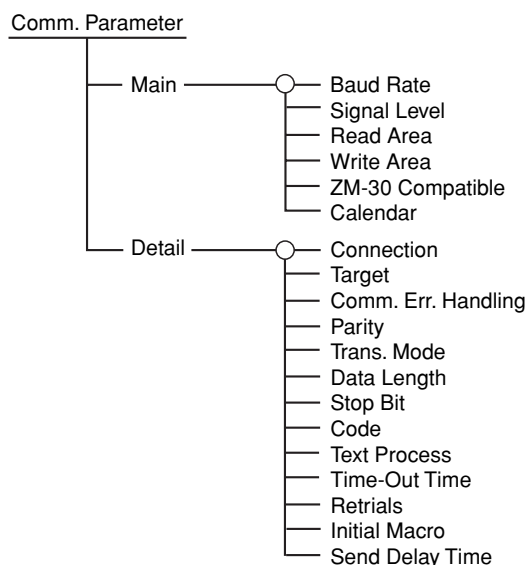
Edit model selection



Communication Parameter



Communication parameters must be set up in accordance with the selected PC model. These settings are important for determining whether the communication (RUN) between the ZM Series and the PC is made properly.



[Main] Tab Window

The following parameter settings are required.

◎Baud Rate

Select the baud rate for communication speed with the PC.
4800:9600:38400:57600:115K BPS

◎Signal Level

RS232C/RS422

Select the interface type for communication with the PC.

◎Read Area

To allow the ZM Series to appropriately change the screen display, the read area must be secured for receiving commands from the PC. For more information, refer to pages 2-24 and on.

◎Write Area

This is an area where the ZM Series information, such as the screen number or the buzzer state is written. For more information, refer to pages 2-29 and on.

◎Read/Write Area ZM-30 Compatible

When converting screen data files created on ZM-30 into those of the ZM Series, these areas must be allocated.

When this option is checked (☒) , ZM-30 compatibility is supported by securing 2 words each for [Read Area] and [Write Area]. The contents of these areas are in the same format as ZM-30.

*** Overlap ON/OFF commands and monitoring on the ZM Series (see pages 2-26 and 2-29) are available only for “overlap 0.”**

◎Calendar

When connected to a PC with an internal calendar, the calendar data of the PC is automatically read. Additionally, for revision, the PC calendar information is read at a rate of 1 day (ZM-*2) or 15 minutes (ZM-41/70)/time.

When the PC that is connected to does not have the calendar function, this memory setting becomes necessary. Calendar data is taken from the set memory in the ZM Series. Set the top memory of the calendar area. The memory is assigned as follows:

Memory	Contents
n	Year (BCD 0~99)
n+1	Month (BCD 1~12)
n+2	Day (BCD 1~31)
n+3	Hour (BCD 0~23)
n+4	Minute(s) (BCD 0~59)
n+5	Second(s) (BCD 0~59)
n+6	Day of the Week (0~6)

└ * 0: Sunday 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday

Calendar data is read into ZM Series at the leading edge of bit 11 (calendar setting) in the read area “n” (sub command/data).

At the leading edge of this bit, calendar data is taken, and afterwards the clock is activated by the counter in ZM Series.

In the case of a PC without an internal calendar, an error will occur in the clock data because calendar data is not automatically read when connecting to the PC and calendar data (ZM-*2: 1 day, ZM-41/70: 15 minutes/time) is not updated. It is recommended that accurate calendar data is taken by setting new data in the calendar area regularly, or by re-setting the calendar in the read area.

[Detail] Tab Window

The following parameter settings are required.

◎Connection

Choose the connection format between the ZM Series and the PC. Three formats are available, and depending on this selection, options in the [Comm. Parameter] dialog and other memory settings vary.

◆ [1:1]

When connecting one ZM Series to one PC (1 : 1), choose this option.



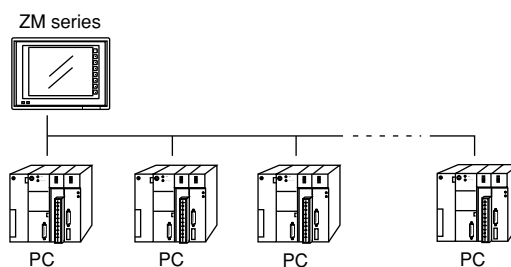
Note for [1:n]

1) You must set the PC memory for either [Read Area] or [Calendar] in the [Comm. Parameters] dialog.

2) Managing the Control Terminal when the PC is down
When a time-out is detected when communicating with the PC, communication is terminated until there is a change in the display screen of the Control Terminal. There is station number information for the PC that can no longer communicate in the Control Terminal internal system memory from 114 to 129.

◆ [1:n]

When connecting one ZM Series to multiple PCs (1 : n), choose this option. It is not necessary to set up [Target Port] (explained later) included in the [Comm. Parameter] dialog.

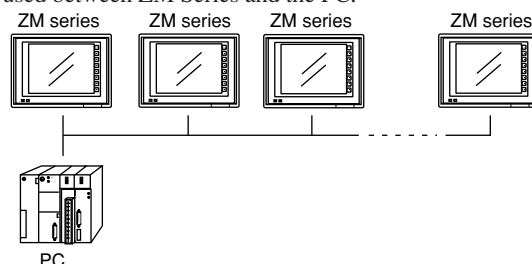


○Memory Setting

In the case of [1 : n], PC stations must be set up on respective dialogs for memory setting.

◆ [Multi-link] (n : 1)

When connecting multiple Control Terminals to one PC (n : 1), choose [Multi-link]. This connection should only be used for PCs which communicate via RS422 (RS485) with ports. For multi-link connection, 2-wire RS422 connection should be used between ZM Series and the PC.



○ [Setting...] button

When [Multi-link] is selected, the next option [Setting...] must also be set up. Clicking this button brings up the [Multi-link] dialog as shown below.

[Local Port] (1 - 32)

Specify the station number of ZM Series. If one station number is used twice or more for different Control Terminals being connected to one PC, the entire system does not work properly. Be sure to use one station number to a single Control Terminal.

[Send Delay Time] (unit: x 1 msec)

This option defines a time delay before starting communication with the ZM Series after a communication with the PC has been completed.

[Total] (2 - 32)

Specify the number of Control Terminals to be connected.

[Retry Cycle] (x 10)

If a problem arises in communication with a Control Terminal (the system is down), the Control Terminal is removed temporarily from communication targets. To check the restoration, an inquiry is given at intervals specified by [Retry Cycle].

This setting does not affect communication speed if no problem is occurring; however, if there is any problem, it affects the communication speed.

When the setting value is small:

It will not take a long time before the ZM Series is restored.

When the setting value is large:

It may take a longer time before the ZM Series is restored.

*** The same values must be entered for all [Send Delay Time] [Total] [Retry Cycle] of Control Terminals being connected in the same communication line.**

◎Target Port

Set up the station number of PC.

When [1 : n] is selected for [Connection], this setting is not required.

◎Comm. Error Handling

This option determines an error handling in case of communication error between the Control Terminal and the PC.

[Stop]

If any error has arisen in communication, the communication is stopped. When restoring, use the Retry switch (equipped on the error screen of Control Terminal).

[Continue]

If any error has arisen in communication, it is indicated at the top left corner on the Control Terminal screen. The Control Terminal conducts polling of the PC, and if OK, the error state is automatically reset.



"Polling" is to constantly monitor and check the state of the other station.

◎Data Length

7 bits/8 bits

Choose either data length for communication.

◎Stop Bit

1 bit/2 bits

Choose either stop bit for communication.

◎Parity

No/Odd/Even

Choose any of the parity options for communication.

◎Trans. Mode

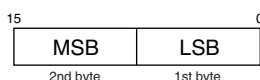
Trans. Mode 1/Trans. Mode 4

When PC has a transmission format setting, set the same on the Control Terminal.
(For Mitsubishi or Hitachi PCs, this setting must be used.)

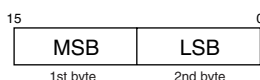
◎Text Processing

When processing characters, choose either option for arranging 1st/2nd bytes in one word.

◆ [LSB -> MSB]



◆ [MSB -> LSB]



◎Code

DEC/BCD

Choose either code, decimal (DEC) or binary coded decimal (BCD), for entering numerical data.

For some numerical data, such as those for data displays, data sampling in the sampling mode, this setting is not applied because BCD or DEC should be chosen for [Input Format].

◎Time-out Time (* 10 msec)

Specify a time for monitoring the receiving of responses from the PC. If no response is received within the specified time, retries are attempted.

◎Initial Macro

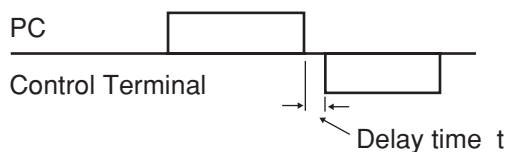
Specify the desired macro block number to be executed before starting communication between the Control Terminal and the PC. This macro block should have been created by macro block editing.

◎Retrials

Specify the number of retrial times in case of communication error. When the problem persists even after as many retrials as specified, the system regards it as an error, and will start the error handling routine as selected for [Comm. Error Handling].

◎Send Delay Time (* msec)

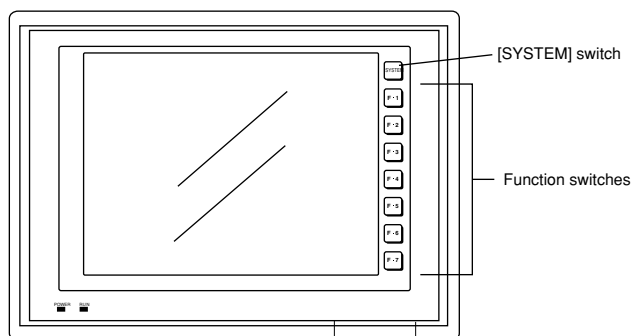
Set the delay time for receiving data from the PC and sending a reply to the PC. Generally, the default value is acceptable.



Function Switch Setting

Outline of Function Switches

On the front side of the Control Terminal, there are seven hard switches numbered [F•1] to [F•7], that are called function switches.



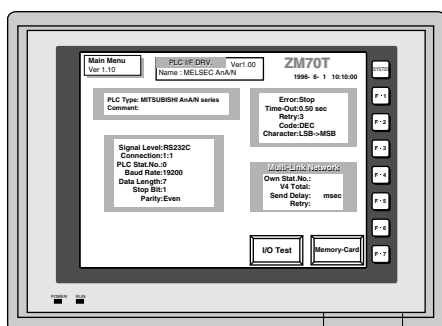
ZM series

Note

In the case of ZM-41D/L (small type), there are five hard switches numbered [F•1] to [F•5].

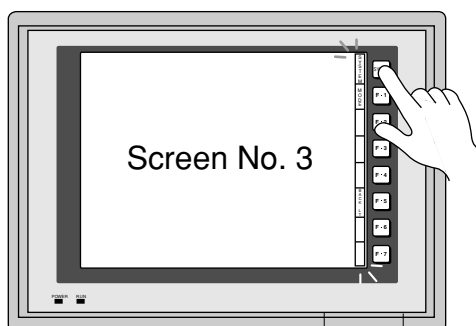
These switches are effective only while the ZM Series is running.

When the [SYSTEM] switch is pressed and the menu screen is displayed on the screen, these function switches work for switching RUN and STOP, adjusting the backlight, etc. (For more information on the menu called up by the [SYSTEM] switch, refer to “ZM-42/52/72/82 User's Manual Hardware version.”)



ZM series is in a stop.
(=The Main Menu is displayed.)

or



The menu called up by the [SYSTEM] switch is displayed.

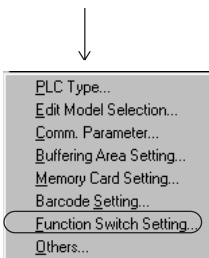
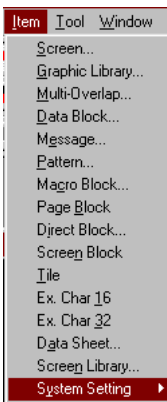
Each Screen

Local Function Switch Setting

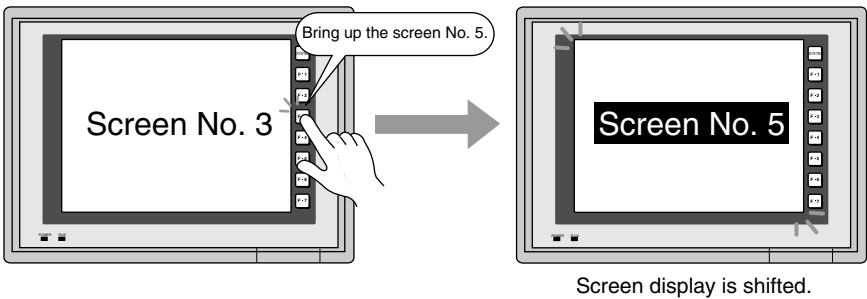


When the menu screen is not displayed by the [SYSTEM] switch while the Control Terminal is running, these function switches can work as defined by the user. The function switch setting is valid for all screens (global function switch setting). In the ZM-*2, it is also possible to define the function switch setting that is valid only for one screen (local function switch setting). If both the global and local function switch settings are made, the local function switch setting has priority in operation. (Refer to the menus shown on the left.) As shown above, it is possible to define function switches as performing an action, such as screen shift, hard copy, word operation, etc., in addition to the capability of outputting the ON state to the PC. Also “ON macro” or “OFF macro” function can be provided to these function switches in the same way as switches on the screen.

All Screens in Common
Global Function Switch
Setting



When the [F • 3] function switch is defined as a screen shift switch:



[Function Switch Setting] Dialog

Clicking [Function Switch Setting] under [System Setting] in the [Edit] menu brings up the [Function Switch Setting] dialog.

Options in the dialog are explained below:

[Use Function Switch]

When checked (☒) , the function switches [F•1] to [F•7] works in the user-defined way while the Control Terminal is running.

The following options become active when [Use Function Switch] is checked.

[Function]

The following functions can be provided to the switches:

- None
- Screen number
- Overlap number (ON/OFF/ALT)
- Hard copy
- Word operation
- Return
- Occupy

Note
When the setting [1/4] (ZM-41D/L) is made for [Edit Model Selection] in the [Other Setting] dialog, [F•1] to [F•5] become a possible setting, and the setting [F•6] or [F•7] cannot be used.

[Action]

This option becomes active when [Output Memory] is checked. This selection defines a data transfer mode to the target memory.

Momentary/Set/Reset/Alternate/Momentary W

[Output Memory]

Set the destination of output memory when the function switch is pressed. Enter a check mark ☒ and set the memory address number.

[Interlock]

Interlock of function switches can be set up.

When [Interlock] is checked (☒) , interlock function becomes effective, and the following three options become active.

◆ Memory

Specify a memory address for interlock.

◆ Condition

ON/OFF

Choose either ON or OFF of the data in the specified memory address for the condition for activating an interlock.

◆ When the switch is OFF:

Effective/Ineffective

Select whether interlock memory is effective or ineffective during switch deactivation when [Momentary (Momentary W)] is selected for [Action].

[Ineffective] is recommended.

[Use ON Macro]

If you want to execute a macro when a function switch is pressed, check this option. Then, click the [ON Macro Edit] button, and set up macro commands as desired on the macro block editing screen. (Refer to Chapter 14, “Macro.”)

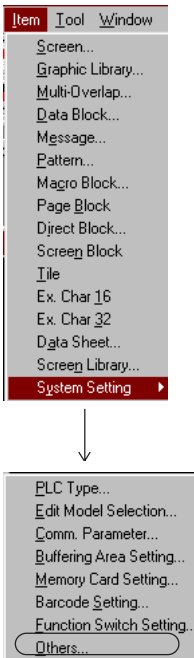
[Use OFF Macro]

If you desire to execute a macro when a function switch is released, check this option. Then, click the [OFF Macro Edit] button, and set up macro commands as desired on the macro block editing screen. (Refer to Chapter 14, “Macro.”)

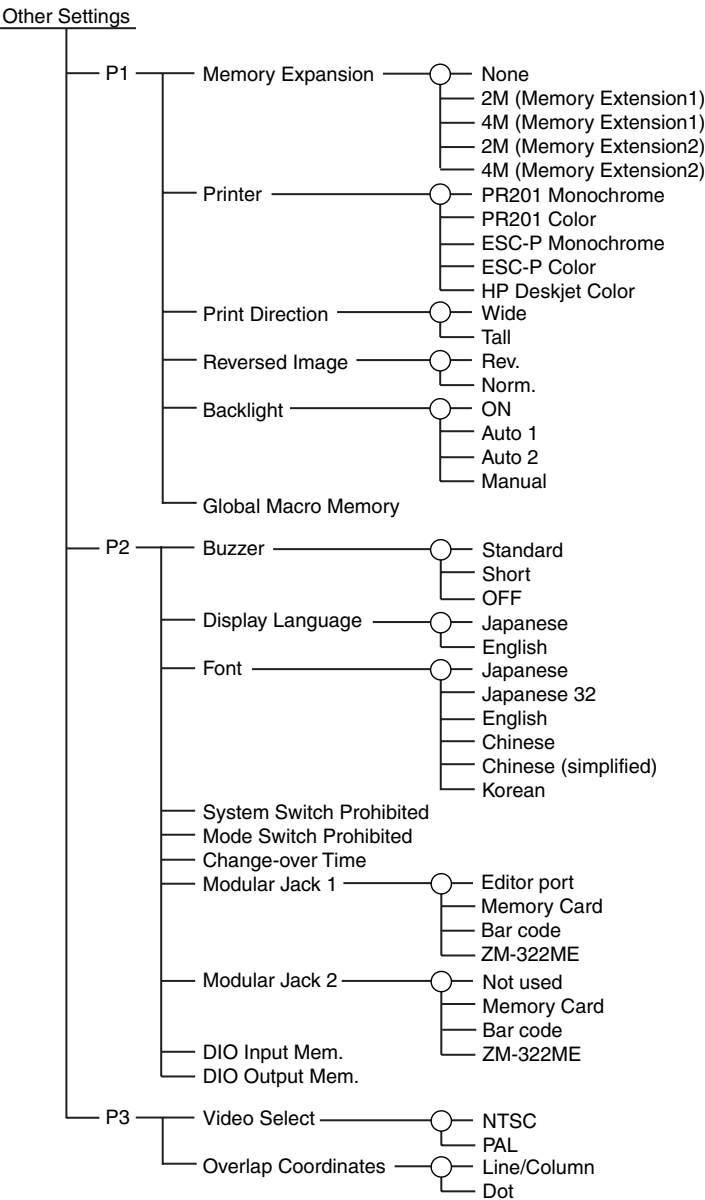
For more information on set-up, refer to Chapter 5, “Switch” because there are some items commonly used as “normal switch” parts.

Other Settings

This section describes settings related to the ZM Series hardware.



Note
When [1/4] (= ZM-41D/L) is chosen for [Edit Model], [Memory Expansion] is inactive.



[P1] Tab Window

The following items can be set:

- ☐ Memory Expansion
- ☐ Printer (to be connected to the Control Terminal)
- ☐ Print Direction
- ☐ Reversed Image
- ☐ Backlight
- ☐ Display (monochrome)
- ☐ Backlight Power ON Time Control
- ☐ Global Macro Memory

⊙ Memory Expansion

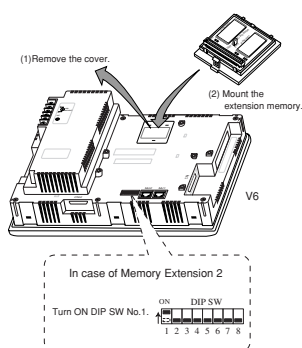
◆ ZM-*2

To expand memory, attach the optional memory expansion cassette. There are two types, the 2MB type and the 4MB type. However, ZM-42D/L cannot be expanded. There are two ways to use the memory cassette.

1) Memory Extension 1

The amount of memory is increased by the memory cassette as shown in the chart below *1.

2) Memory Extension 2



When you turn DIP SW No. 1 (left) located on the rear of the Control Terminal to ON, fonts, interface drivers, and screen data other than Control Terminal programs can be written. The amount of screen data will be as shown below.

To modify the screen data on a ZM-*2 in a remote area (overseas, etc.), modification can easily be performed by entering the modified data into a memory cassette at one's workplace, and then forwarding the memory cassette on to where the modification will take place.

Font \ ZM-*2	Standard	*1 Memory Extension 1 +2M	*1 Memory Extension 1 +4M	*2 Memory Extension 2 2M	*2 Memory Extension 2 4M
Japanese	1,179,648	3,260,416	5,357,568	1,703,936	3,801,088
Japanese32	786,432	2,867,200	4,964,352	1,179,648	3,276,800
English(Western Europe)	1,441,792	3,522,560	5,619,712	1,835,008	3,932,160
Chinese	1,310,720	3,391,488	5,488,640	1,703,936	3,801,088
Chinese (Simplified)	1,179,648	3,260,416	5,357,568	1,703,936	3,801,088
Korean	1,310,720	3,391,488	5,488,640	1,835,008	3,932,160

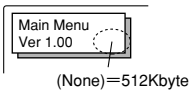
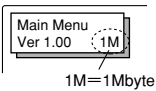
* 1 Capacity of the display data when the memory is extended and DIP SW NO.1 is set to OFF (standard)

* 2 Capacity of the display data when the memory is extended and DIP SW NO.1 is set to ON

◆ ZM-41/70

For the ZM-41/70 Series, select 512 KB and use 1 MB. 512 KB is the value when you select [None].

*** When the ZM-41/70 is equipped with FP-ROM of 512Kbytes, be sure to uncheck this option. To know whether your ZM-41/70 has 512Kbytes or 1Mbytes FP-ROM, check the local main screen. If "1M" is shown below the "LOCAL MAIN," it has 1Mbytes FP-ROM; if not, it has 512Kbytes FP-ROM.**



Note
When printing out by color printer, ZM-2 data can be printed out by only 16 colors .
If 128 colors are used, many colors are not printed out.

⊙ Printer

Select a printer type you are going to connect for printing data stored in the ZM Series or the screens that are displayed on the ZM Series during communication with the PC.

PR201	Monochrome
PR201	Color
ESC-P	Monochrome
ESC-P	Color
HP (PC level 3)	

⊙ Print Direction

Wide/Tall
Choose either direction of paper for printing from the ZM Series.

⊙ Reversed Image

Reverse/Normal
When hard-copying from the ZM Series, choose either reverse or normal image.

⊙ Backlight

Select the desired backlight setting.

[ON]

Always turns backlight on.

[Auto 1]

Turns the backlight on when bit 11 (backlight) in read area n + 1 (screen state command) is set (1: ON).
When this bit is reset (0: OFF), the backlight is turned off after a lapse of the time specified by [Backlight OFF Time] if all the following conditions are raised:

Conditions	• Bit 11 (backlight) of read area n + 1 (screen state command) is reset (OFF). • Screen display stands still. • All touch switches are turned off.

[Auto 2]

Turns backlight on when bit 11 (backlight) in read area n + 1 (screen state command) is set (1: ON).

When this bit is reset (0: OFF), the backlight is turned off after a lapse of the time specified by [Backlight OFF Time] if all the following conditions are raised:

Conditions	• Bit 11 (backlight) of read area n + 1 (screen state command) is reset (OFF). • All touch switches are turned off.

*** When the backlight is turned off, all the touch switches on the ZM Series are not effective, and no switch data will be output to the PC. With a touch on any part of the screen, the backlight is turned back on; however, no switch data will be output even if the touched part happens to be a switch. The first touch turns the backlight on, and only the switch operations that are made while the backlight on are written in the PC.**

[Manual]

Turns the backlight on and off by the [F•5] switch on the ZM Series.

When [Manual] is chosen, [Backlight Power ON Time Control] becomes effective.

When [Manual] is selected for [Backlight], [Backlight Power ON Time Control] becomes active for selection.

[OFF]

When the ZM Series is activated, the backlight is turned off.

[ON]

When the ZM Series is activated, the backlight is turned on.

◎Backlight Power ON Time Control

When [Manual] is chosen, [Backlight Power ON Time Control] becomes active.

[OFF]

When the ZM Series is activated, the backlight is turned off.

[ON]

When the ZM Series is activated, the backlight is turned on.

◎Backlight OFF Time

When [Auto 1] or [Auto 2] is chosen, [Backlight OFF Time] becomes active.

When [Auto 1] or [Auto 2] is chosen for [Backlight], the backlight is turned off after a lapse of a certain time when all the required conditions have been raised.

[Backlight OFF Time] specifies this time delay.

◎Display

This setting is effective for monochrome ZM Series.
Choose whether screen data created on the computer should be displayed in normal video or reverse video on the ZM Series. This setting defaults to [Normal].

Ex."ZM70L(monochrome blue mode as standard)

	On Editor (ZM-71SE)	On Control Terminal
Normal	Foreground color : white Background color : black 	Foreground color : blue Background color : white 
Reverse	Foreground color : white Background color : black 	Foreground color : white Background color : blue 

◎Global Macro Memory

At the leading edge of bit 8 in read area n + 1, the macro commands in the macro block number specified by this memory are executed. Refer to pages 2-26 and on.

[P2] Tab Window

Meanings of these options are explained below:

- Buzzer
- RUN Port (ZM-41/70)
- BZ Port (ZM-41/70)
- Display Language
- Font
- System Switch Prohibited
- Mode Switch Prohibited
- Change-over Time
- Modular Jack 1
- Modular Jack 2
- DIO Input/Output Mem.

◎Buzzer

Choose the desired length of buzzer sİ°6@is given when a switch is pressed.

- Standard : 100 msec
- Short : 10 msec
- OFF : no buzzer

◎RUN Port (ZM-41/70)

Set conditions for outputting signals from the RUN terminal on the rear of the ZM Series.

[RUN Signal]

Outputs signals from the RUN terminal on the rear while the ZM Series is in the RUN state.

[External]

Outputs signals to the RUN terminal only at the leading edge of bit 12 (outport 0) of read area n. When bit 12 is reset (0: OFF), no signals are output even if the ZM-41/70 is running.

◎BZ Port (ZM-41/70)

Set conditions for outputting signals from the BZ terminal attached to the rear of the ZM Series.

[BZ Signal]

Outputs signals from the BZ terminal while the ZM Series buzzer is sounding.

[External]

Outputs signals to the BZ terminal only at the leading edge of bit 13 (out port 1) of read area n. When bit 13 is reset (0: OFF), no signals are output even if buzzer is sounding.

◎Display Language

Japanese/English

Choose either Japanese or English to be used on the local main screen of the ZM Series. (This setting is available only with J (Japanese) version ZM Series.)

◎Font

Select one of the following five languages for transferring screen data files. The screen data capacity for the ZM-41/70 is limited to 1,109,904 bytes irrespective of language selection. For the ZM-*2, Japanese 32 is also available, which is a 32-dot font. If the enlargement factor is an even number, the 32-dot font is used to create a smooth typeface.

ZM-*2	Capacity
Japanese	1,179,648
Japanese 32	786,432
English	1,441,792
Chinese	1,310,720
Chinese (simplified)	1,179,648
Korean	1,310,720

ZM-41/70
Japanese
English
Chinese
Chinese (simplified)
Korean

Note

To reset [System Switch Prohibited], hold down the [SYSTEM] switch on the ZM Series, and press the [F•7] switch. The local main menu screen is displayed. In case of ZM-41D/L, hold down the [SYSTEM] switch on ZM-41D/L, and press the [F•5] switch. The local main menu screen is displayed.

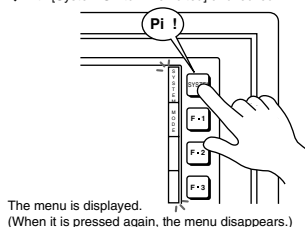
◎System Switch Prohibited

This is a setting for the [SYSTEM] switch mounted on the ZM Series hardware.

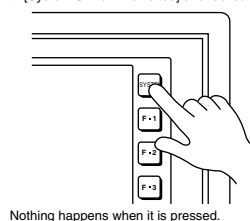
When this option is checked (☑), the [SYSTEM] switch is prohibited, and no menu is displayed if it is pressed. Also when this option is checked, the [Mode Switch Prohibited] option becomes gray, and is not effective.

When it is unchecked, the [SYSTEM] switch can be used as usual.

◆With [System Switch Prohibited] unchecked:



◆With [System Switch Prohibited] checked:

**Note**

To reset [Mode Switch Prohibited], press the [SYSTEM] switch on the ZM Series, to bring up the menu screen. Then, hold down the [F•1] switch (= mode) and press the [F•7] switch. The local main menu screen is displayed. In case of ZM-41D/L, press the [SYSTEM] switch, to bring up the menu screen. Then, hold down the [F•1] switch (= mode) and press the [F•5] switch. The local main menu screen is displayed.

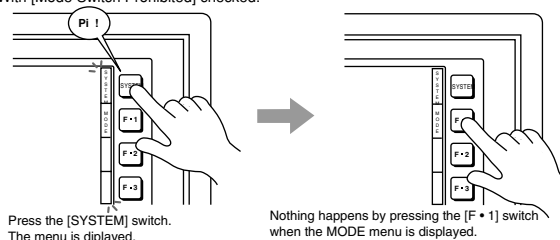
◎Mode Switch Prohibited

This is a setting for the [F•1] switch mounted on the ZM Series hardware. The [F•1] switch works as a mode select switch, and changes over RUN and STOP when the menu screen is displayed.

When this option is checked, the mode select switch is prohibited, and nothing happens if the [F•1] switch is pressed.

Also when the [System Switch Prohibited] option is checked, this option is not effective.

◆With [Mode Switch Prohibited] checked:

**Note**

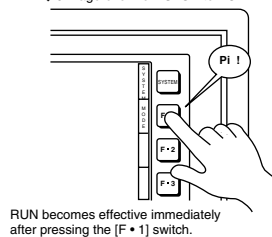
When you check-mark [System Switch Prohibited] or [Mode Switch Prohibited], [Change-over Time] becomes active. Accordingly, when you use the [F•7] (in the ZM Series, or [F•5] in ZM-41D/L) while holding down the [SYSTEM] switch or the [F•1] (= MODE) switch, if you don't press the switch and hold it for the entire change-over time, you will not return to the local main menu screen.

◎Change-over Time

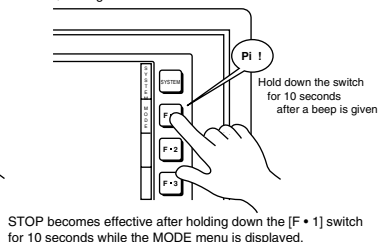
When changing over RUN and STOP, there is a possibility that an inadvertent contact with the [F•1] switch (= mode) wrongly activates the change-over. To avoid such a problem, it is possible to set up the switch change-over time. With this setting, the mode is changed only when the [F•1] switch is held down for the specified time.

Ex.) When "10" sec is specified for [Change-over]:

◆Change-over from STOP to RUN



◆Change-over from RUN to STOP



◎ Modular Port (ZM-*2)

◆ Modular Jack 1

Screen transmission can only be performed on this port.

[Editor port]

Default is set here.

This is set specifically as a port for data transmitted from personal computers, and can also be used for on-line editing and simulation.

When data transmission from a personal computer is initiated when the PC and the ZM-*2 are engaged in transmission, the ZM-*2 automatically goes to the data transmission screen.

When [Memory Card] or [Bar Code] is selected, the ZM-*2 cannot transmit unless it is in local screen status. Change to the local screen with [SYSTEM] + [F•1].

[Memory Card]

Set when connecting to the card recorder (ZM-1REC).

[Barcode]

Set when connecting to the bar code reader.

[ZM-322ME]

Set when connecting to the serial extension I/O (ZM-322ME).

◆ Modular Jack 2

This port cannot be used for screen data transmission.

[Not used]

Default is set here.

[Memory Card]

Set when connecting to the card recorder (ZM-1REC).

[Bar code]

Set when connecting to the bar code reader.

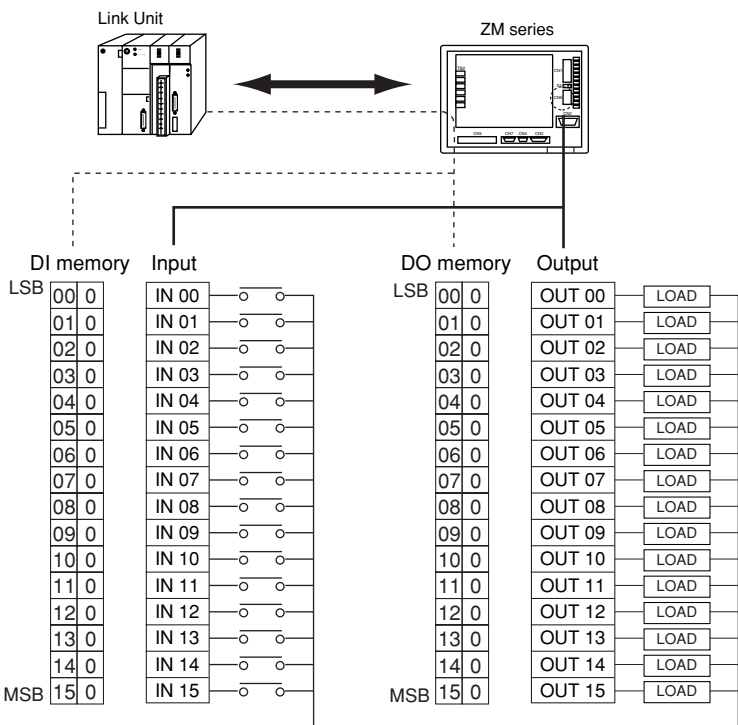
[ZM-322ME]

Set when connecting to the serial extension I/O (ZM-322ME).

◎DIO Input Mem./DIO Output Mem.

◆ Outline of DIO

An external I/O unit can be attached to the Control Terminal by using options. Switches, lamps, sensors, and other external devices can be attached to the external I/O unit, making it helpful in achieving a compact wiring.



DIO (direct I/O) is used with an image similar to that of the PC external I/O unit. However, because the R/W of the PC memory is performed via Control Terminal, there is a slight time lag. What sets this PC memory are the [DIO Input Memory] and the [DIO Output Memory].

◆ DIO Input Memory

The contents of [DIO Input Memory] are shown below:

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
IN 14	IN 12	IN 10	IN 08	IN 06	IN 04	IN 02	IN 00	IN 15	IN 13	IN 11	IN 09	IN 07	IN 05	IN 03	IN 01

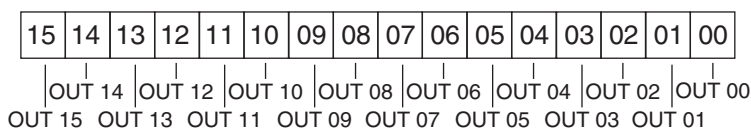
Data is input from the input connectors in the DIO connector to this [DIO Input Memory].

- ◎ ZM-#2 -> 00 ~ 15
- ◎ ZM-41/70 -> 00 ~ 07 Bits used

◆ DIO Output Memory

The relationship between [DIO Output Memory] and the output connector is shown in the following diagram.

◎ ZM-*2 -> 00 ~ 15
 ◎ ZM-41/70 -> 00 ~ 07 Bits used



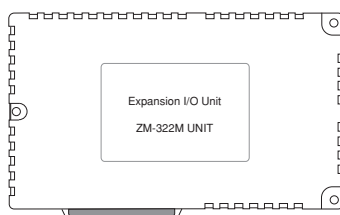
Data is output to the output connectors in the DIO connector at a command of this [DIO output memory] in PC.

*** This output must not be used for actions to be taken in case of emergency or urgency because of linkage.**

◆ DI/O Unit (Hardware)

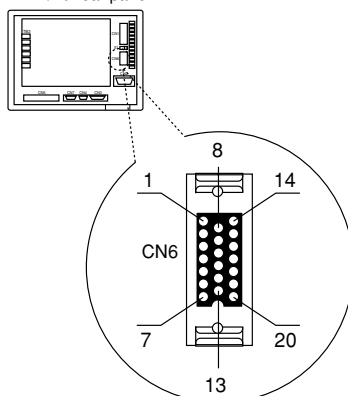
The ZM-*2 uses external I/O (ZM-322M or ZM-322ME) user options. For pin arrangement and other details, refer to the users manual for the external I/O unit.

*** When setting the serial extension I/O (ZM-322ME) on ZM-72D/T or ZM-82D/T, the serial extension I/O (ZM-322ME) has priority even if connecting the external I/O to ZM-72D/T or ZM-82D/T.**
The external I/O (ZM-322M) is available only to ZM-72D/T or ZM-82D/T.



On the option type of the ZM-41/70, there is a way to install the DIO connector (CN6). The pin arrangement of the CN6 are as follows:(order production).

ZM-41/70 rear panel



Pin No	Signal
1	IN COM(+)
2	IN 0
3	IN 1
4	IN 2
5	IN 3
6	IN 4
7	IN 5
8	IN 6
9	IN 7
10	NC
11	NC
12	OUT 0
13	OUT 1
14	OUT 2
15	OUT 3
16	OUT 4
17	OUT 5
18	OUT 6
19	OUT 7
20	OUT COM(0V)

[P3] Tab Window (ZM-*2)

Setting contents are as follows:

◆ Video Select

Set video input model.

- Ⓒ NTSC Japan, America
- Ⓒ PAL Southeast Asia, Europe

◆ Overlap Coordinates

Multi-overlap is an external command; select the unit of coordinate specification when overlap coordinates are specified externally.

Ⓒ Column/Line

Like the ZM-41/70, the overlap placement is in lines and columns. One 1-byte (16X20) dot is 1 unit on the basic grid.

Name	Dots	Lines	Columns
SVGA	800X600	00~99	00~29
VGA	640X480	00~79	00~23
1/4VGA	320X240	00~39	00~11

Ⓒ Dots

Multi-overlap coordinates can be specified in 1-dot units.

This setting is related to performing overlap movement on the macro command. Commands are shown in the diagram below. F1+1, and F1+2 are applicable.

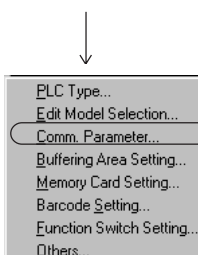
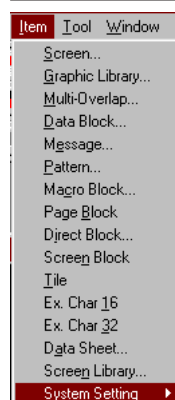
Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(OVLP_POS) F1 Overlap position change

F1+0	Overlap number to be moved
F1+1	Destination X coordinates
F1+2	Destination Y coordinates

System Memory



Note

Enter "0" for all the bits not used in the read area.

For communication between the ZM Series and the PC, two areas in the PC memory used exclusively for reading and writing must be set.

Setting procedure is accomplished by going to the [Edit] menu on the menu bar, and then to [System Setting]. Display the [Comm. Parameter] dialog and the [Main] tab window will appear.

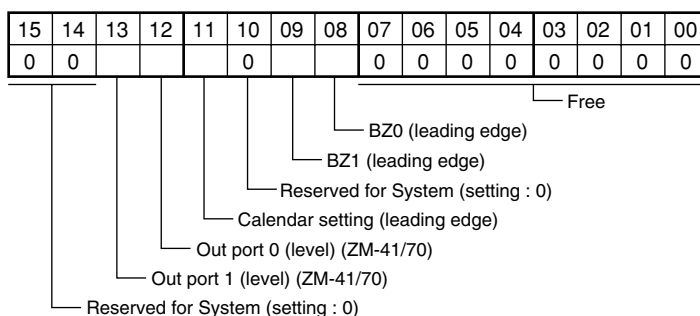
Read Area

At a command from the PC, the read area works to reflect it on the screen display. "0" should be entered for all bits that are not used in this area.

Memory is assigned as below:

Address	Name	Contents
n	RCVDAT	Sub command/data
n+1	SCRN_COM	Screen status command
n+2	SCRN_No	External screen number command

◆ RCVDAT (n) Sub command/data



◎ Bits 0-7 (free)

◎ Bits 8 and 9

BZ0 : A beep sounds at the leading edge.

BZ1 : Short beeps sound at the leading edge.



For ZM-41/70

In the [P2] tab window of the [Other Settings] dialog selected from the [System Setting] icon, when [BZ Signal] is selected for [BZ Port], a signal is output from the BZ terminal on the rear of the ZM-41/70 while a buzzer is sounding. (Refer to page 2-17.)

◎ Bit 10 (reserved for system)

Not used at present. Be sure to enter "0."

◎Bit 11 (calendar setting)

<When the Control Terminal is connected to a PC with calendar function>

When connected to a PC with an internal calendar, the calendar data of the PC is automatically read. Additionally, for revision, the PC calendar information is read at rate of 1 day (ZM-*2) or 15 minutes (ZM-41/70)/time. At the leading edge of bit 11, the calendar data from the PC can be read as desired, and thus, is used in situations such as one where the PC calendar has been modified.

<When the Control Terminal is connected to a PC without calendar function>

- 1) Allocate memory of the PC as the calendar area by specifying a memory address for [Calendar] in the [Comm. Parameter] dialog. (Refer to page 2-5.)
- 2) Set up calendar data as appropriate in the calendar area. (For more information on the calendar area, refer to page 2-5.)
- 3) At the leading edge of bit 11 (calendar setting) in this read area, calendar data is read from the memory address specified above.
In the case of a PC without an internal calendar, an error will occur in the clock data because calendar data is not automatically read when connecting to the PC, and calendar data (ZM-*2: 1 day, ZM-41/70: 15 minutes/time) is not updated.

It is recommended that accurate calendar data is taken by setting updated data in the calendar area regularly or by re-setting data in the read area.

*** If calendar data is forcibly read by setting this bit during constant sampling, timing may be shifted, disturbing the process. If this bit is set during sampling, we recommend resetting.**

◎Bit 12 (output 0) (ZM-41/70)

When [External] is selected for [RUN Port] in the [P2] tab window of the [Other Settings] dialog under [System Setting] of the [Edit] menu, and the output 0 bit (bit 12) is set, the RUN terminal is also turned on.

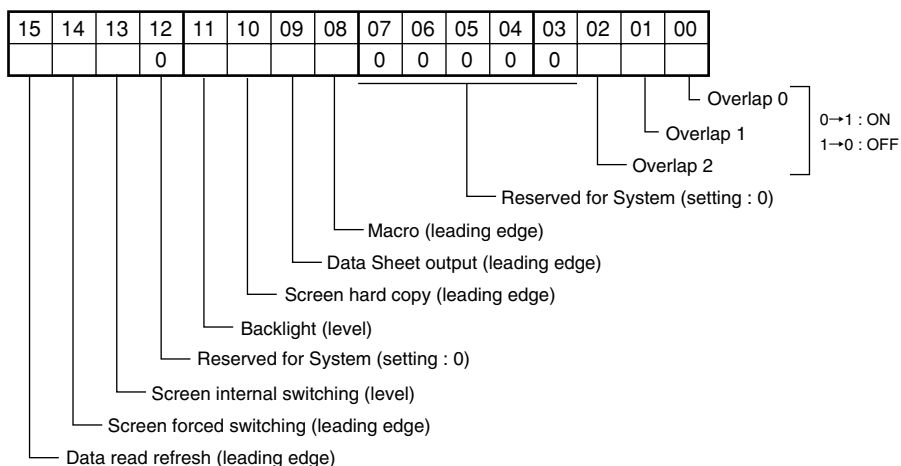
◎Bit 13 (output 1) (ZM-41/70)

When [External] is selected for [BZ Port] in the [P2] tab window of the [Other Settings] dialog under [System Setting] of the [Edit] menu, and the output 1 bit (bit 13) is set, the BZ terminal is also turned on.

◎Bits 14 & 15 (reserved for system)

Not used at present. Be sure to enter "0."

◆ SCRN_COM (n + 1) Screen status command



◎ Bits 0 - 2 (overlap 0 - 2)

Each bit from 0 to 2 corresponds to overlap 0 to 2, and the display/non-display of the overlap screen can be controlled using the leading edge for display and the falling edge for non-display action. For each screen, a maximum of three overlaps can be displayed at one time. However, multi-overlap cannot be displayed.

◎ Bits 3 - 7, 12 (reserved for system)

Not used at present. Be sure to enter "0."

◎ Bit 8 (macro execution)

At the leading edge of this bit, a macro defined by macro block editing is executed once. The macro block number to be executed is contained in the memory specified for [Global Macro Memory] in the [Other Settings] dialog under [System Setting]. (Refer to page 2-17.)

For more information on the global macro memory, refer to page 4-12.

◎ Bit 9 (data sheet output)

This bit becomes valid when the data sheet function is set. At the leading edge of this bit, the data sheet is printed out. For more information, refer to Chapter 20, "Data Sheet."

◎ Bit 10 (screen hard copy)

This takes effect when a printer is connected. At the leading edge, the screen hard copy starts to be printed.

It is also possible to print the screen hard copy using the [Hard Copy] switch (internal switch).

◎Bit 11 (Backlight)

When [Auto 1] or [Auto 2] is selected for [Backlight] in the [P2] tab window of the [Other Settings] dialog, this bit takes effect. (Refer to page 2-15.)

When this bit is set (1: ON), the backlight is always turned on. When this bit is reset (0: OFF), the backlight is turned off if all the requirements are satisfied.

◎Bit 13 (screen internal switching)

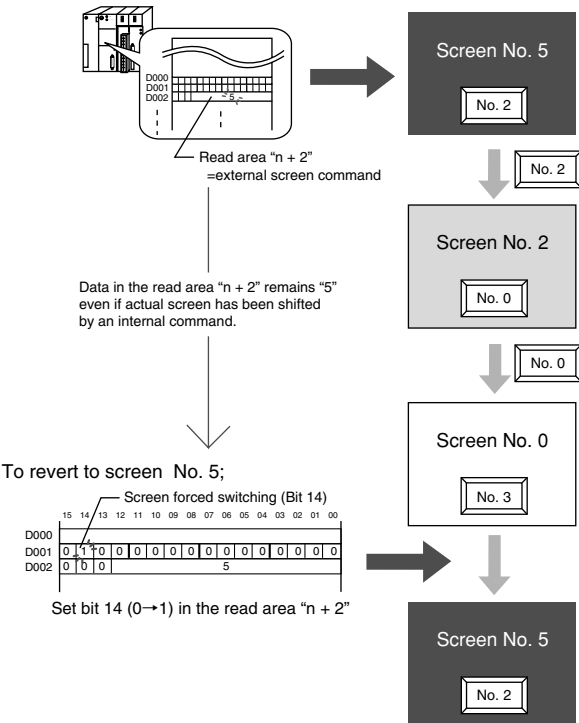
This bit controls screen shifting by internal switches.
“0” : Screen shifting by internal switches is allowed.
“1” : Screen shifting by internal switches is prohibited.

*** An “internal switch” means a switch you can create for internal processing within the Control Terminal, by selecting [Screen Call] or [Return] for [Function].**

◎Bit 14 (screen forced switching)

This bit is used when the screen number is specified from the PC and it is the same as that of the screen number that was previously specified.

If the screen display was once shifted by an internal switch, normally it cannot be returned to the former screen that was specified by an external command, because the external screen command number remains the same as before in read area n + 2 (explained later). In such a case, it is possible to forcibly shift the screen by setting bit 14 (1: ON).



◎ Bit 15 (data read refresh)

When this bit is set (1: ON), all data display items are refreshed at a high speed.

(This also applies even with the low-speed data display setting.)

This is used for scrolling pages in data display. (Refer to page 3-7.)

◆ SCRN_No. (n + 2) External screen number command

◎ Bits 0 - 12 (screen number command)

Specify the desired screen number in these bits.

Even after the screen display is shifted by an internal switch, it is possible to shift the screen by an external command from the PC. External commands have priority over internal switches.

◎ Bits 13 - 15 (reserved for system)

Not used at present. Be sure to enter "0."

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0													

└ Reserved for System (setting : 0)

└ Screen number

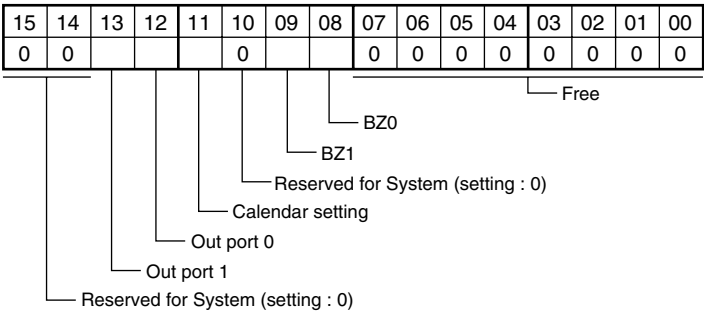
Write Area

The write area contains data written from the read area, such as the displayed screen number, overlap display status, buzzer sounding status, etc. and from the screen display. If you want to take up data from the write area, be sure to mask the data. Memory is assigned as below:

◆ CFMDAT (n)

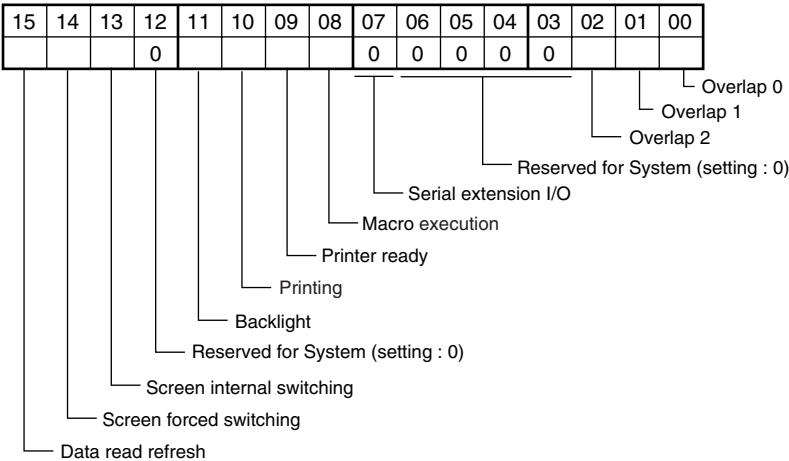
Address	Name	Contents
n	RCVDAT	Same as those in read area n
n+1	SCRN_COM	Screen status
n+2	SCRN_No	Displayed screen number

When the ZM Series has completed a display action, sub command/data in read area n (RCVDAT) is written into CFMDAT.



◆ SCRN_COM (n + 1) Screen status

Data of the screen status displayed on the ZM Series is written in this area.



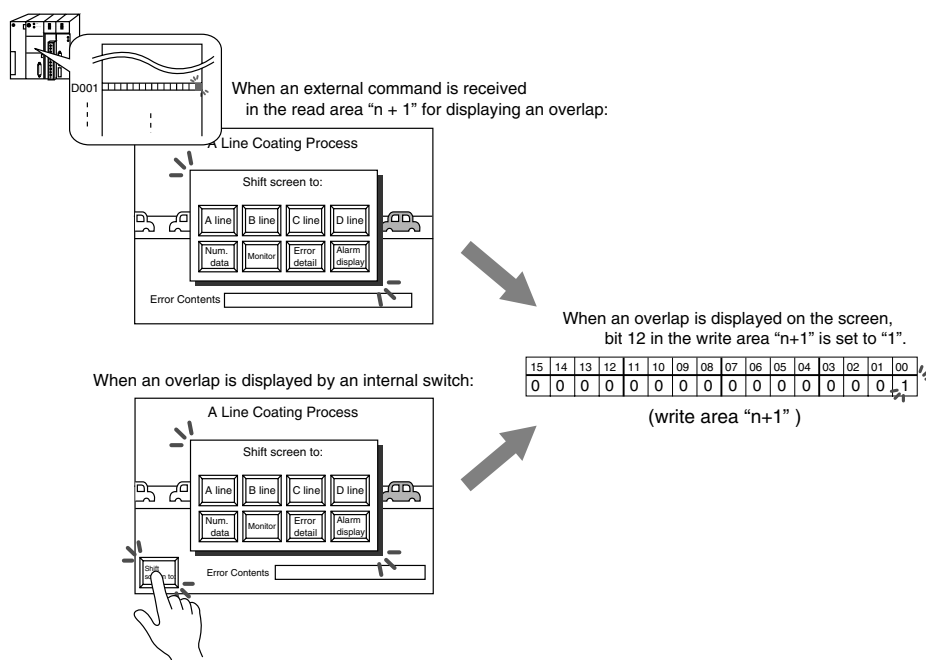
◎ Bits 0 - 2 (Overlap 0 - 2)

Data of the overlap status is written in these bits.

If any of overlaps 0 - 2 is displayed on the ZM Series, the corresponding bit is set (1: ON), and the others are reset (0: OFF).

Ex.) When any of bits 0 - 2 (overlap) in read area $n + 1$ is set and the corresponding overlap is brought up, the same bit in the write area is also set (1: ON).

If an overlap is brought up by an internal switch (Function: overlap = ON), the bit in read area $n + 1$ remains "0," but the one in the write area is set to "1."



◎ Bits 3 - 6 (reserved for system)

Not used at present. Be sure to enter "0."

◎ Bits 7 (Serial Extension I/O)

This bit indicates the state of the serial extension I/O connected to the ZM Series.

When this bit is reset to "0", the state is normal ; when it is set to "1", the error happens.

◎ Bit 8 (macro execution)

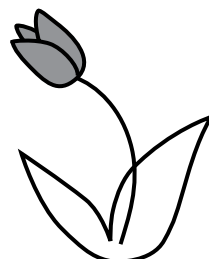
This bit indicates the status of bit 8 (macro execution) in read area $n + 1$. When the bit in the read area is set to "1," this bit shows "1"; when it is reset to "0," it shows "0."

◎ Bit 9 (printer ready)

This bit indicates the printer state connected to the ZM Series. When this bit is reset to "0", the printer is ready; when it is set to "1", it is not ready.

MEMO

Please use this page freely.



**ZM Series**

Screens

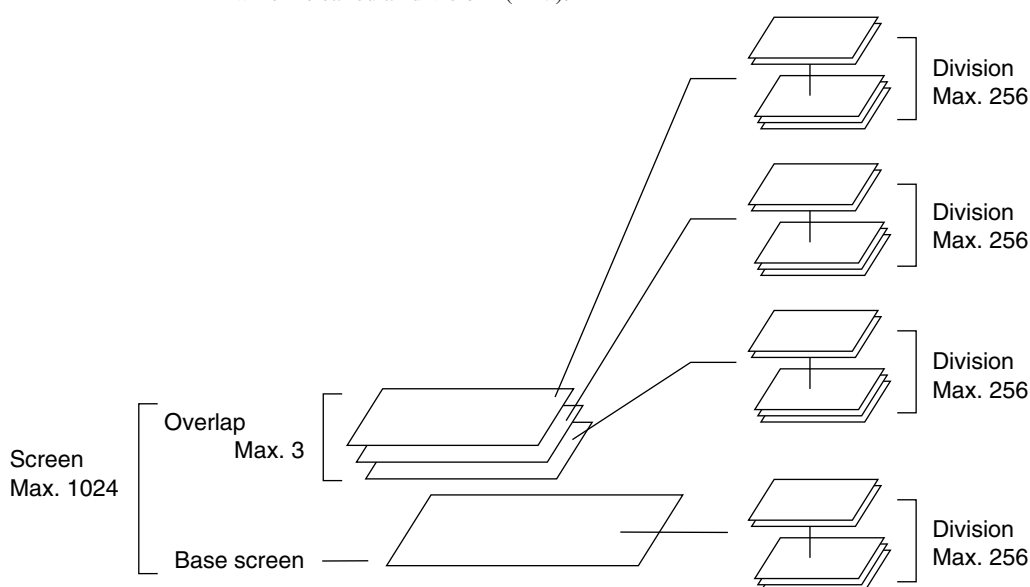
Each display of the ZM Series is called a “screen.” This chapter explains screen composition and options to be set up for each screen.

Also, the ZM Series’ rendering speed while reading the PC data is explained when screen data files are transferred to the ZM Series through communication with the PC.

Screen Composition

- ◎ One screen is composed of a base screen with a maximum of three layers. This layer is called an “overlap.”

The base screen as well as the overlaps are composed of multiple layers, each of which is called a “division” (DIV).



“Parts” refers to the elements that compose screens.

- ◎ A maximum of 1024 screens can be contained in one file.
- ◎ Screens can be created by drawing, placing switches, lamps, data display areas, graph display areas (for bar graphs, pie graphs and panel meters) and various mode parts (as shown below).

Relay, message, entry, graphic, graphic relay, sampling, memory card, macro, calendar, graph display (for statistic graphs and trend graphs)

The number of parts placeable on one screen is limited.

Parts Placement Limit

◎When placing parts on the screen, the number of parts that can be registered on 1 division. 1 layer (base screen, overlap 0-2) and 1 screen is limited or unlimited, depending on the parts. The limit and maximum number of each part is displayed in the chart below.

◎The limitation and the maximum number of the parts are as followings.

Parts	Division	Layer	Screen		
			ZM-52D,ZM-72D/T,ZM-82D/T	ZM-42D/L	ZM-41/70
Switch	None	None	768	192	500
Lamp	None	None	768	192	500
Numerical data display	None	None	Setting Memory		
Character display	None	None	Setting Memory		
Message display	None	None	Setting Memory		
Bar graph	None	None	Setting Memory		
Pie graph	None	None	Setting Memory		
Panel Meter	None	None	Setting Memory		
Mode display area	1	256	Setting Memory		
Relay	1	256	Setting Memory		
Relay-sub	1	256	Setting Memory		
Message	1	256	Setting Memory		
Entry	1	1	4		
Memopad	1	1	1		
Data block	1	4	4		
Data table	1	256	Setting Memory		
Statistic graph (bar)	1	256	Setting Memory		
Statistic graph (pie)	1	256	Setting Memory		
Trend graph	1	256	Setting Memory		
Closed area graph	None	None	Setting Memory		
Graphic relay	1	256	Setting Memory		
Trend sampling	1	256	Setting Memory		
Data sampling	1	256	Setting Memory		
Bit sampling	1	256	Setting Memory		
Relay sampling	1	256	Setting Memory		
Memory card	1	1	4 (*1)		
Macro	1	256	Setting Memory		
Interval timer	1	256	Setting Memory		
Calendar	1	256	Setting Memory		
Screen library	None	None	(*2)		

*1 Available with limitation in the function.

*2 When arranging the screen library on the screen, the parts registered on the screen library are subject to the same limit items displayed in the chart above. When arranging a screen library that has mode registered on it, it is necessary to select division numbers that have not mode registered.

"Setting Memory" in the previous page means the number of the memory which is read out in one screen. This does not mean "the number of the words used on a screen."

The setting memory depends on the PC type. Also the read area of the system setting is included in the setting memory, and counted as "1". Therefore, the maximum number of the setting memory is the number from which 1 subtracted in the table below.

Model	Number of the setting memory per screen
ZM-42D/L	256
ZM-52D	1,024
ZM-72D/T	1,024
ZM-82D/T	1,024
ZM-41/70	1,000

The way of counting of the setting memory is original, but these values are enough to create screens.

<Examples>

1. Count as 1 setting memory when using 10 words in a Relay mode.
2. Outputs of switches are not counted. Each lamp of the switches is counted as 1 setting memory.
3. Each data display is counted as 1 setting memory. If maximum value and minimum value are set, each memory is counted as 1.

Limits for One Screen



There are three overlap types: normal, call and multi overlaps. For more information, refer to Chapter 4, "Overlap."

1) Maximum Memory Use by One Screen

- Maximum possible use on a base screen is limited to: 128KB for ZM-*2, 64KB for ZM-41/70.
- The percent of use capacity for each screen, out of 100%, is displayed on the status bar (ZM-*2:128KB, ZM-41/70:64KB).

2) Entry mode, Memory card

One entry mode can be place on the base screen or on each overlap. (A maximum of 4 per screen)

3) Memo pad function

Only one can be placed on a screen.

Note

If any of the limit is exceeded per screen, the screen data file may be transferred, however, preset functions will not work properly. Be sure to create screens within the limits.

4) Screen library (ZM-*2 function)

Because there is no limit to the screen library when it is placed in division, it is recommended that one not use placement division numbers associated with the screen library of parts (which are limited), but instead begin with No. 100, which is rarely registered in the screen library of parts. Additionally, as with entry mode and memo pad functions, carefully place the registered screen library of parts (which are limited in how many can be registered on one screen) so that they fit within the sphere of limitation.

Division (DIV)



◎When placing parts on a division, the current division number is shown on the menu bar.

In the case of parts without limit in number, you don't need to worry; however, if you are placing a part with limit in number, you must check the current division number. If you want to place another part with limit in number, call up another division where no mode part is contained.

Division setting can play an important role. For example, parts should be linked in some cases.

◎Some parts do not work without a link.

(For example, "statistic graph" parts and "numerical data display" parts for %-display in the statistic graph, "relay mode" parts and "Roll Up/Roll Down switch" parts for scrolling up and down in the relay mode.

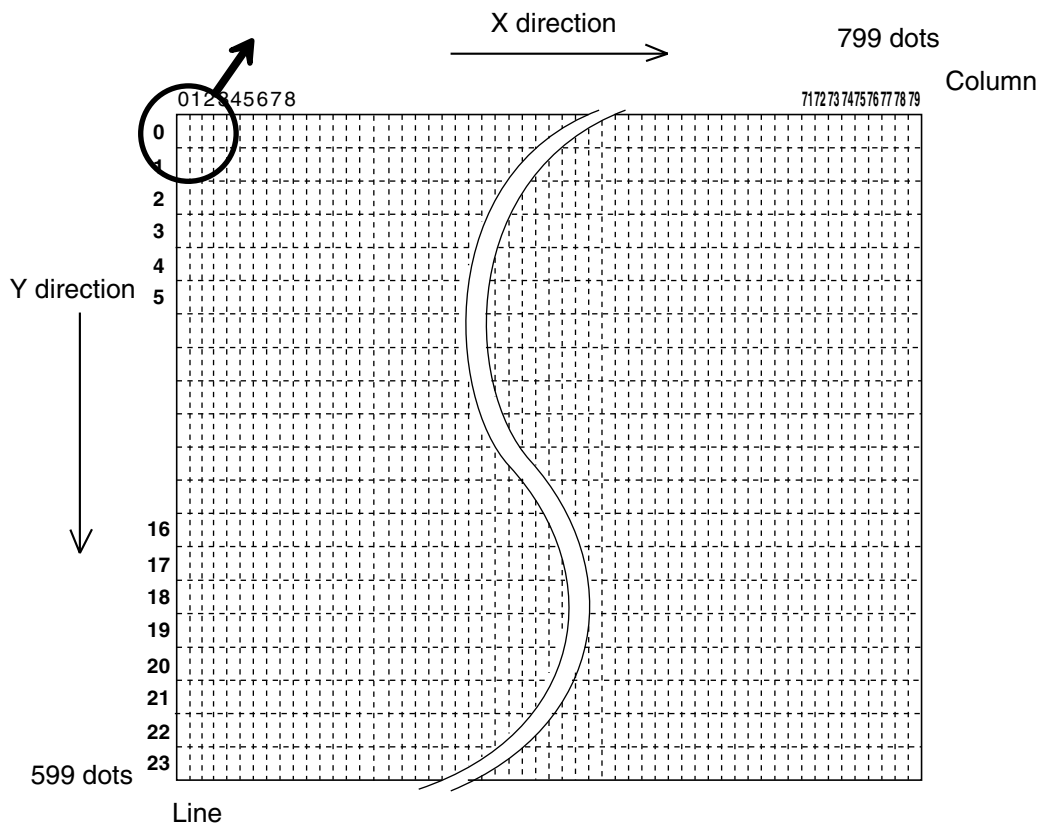
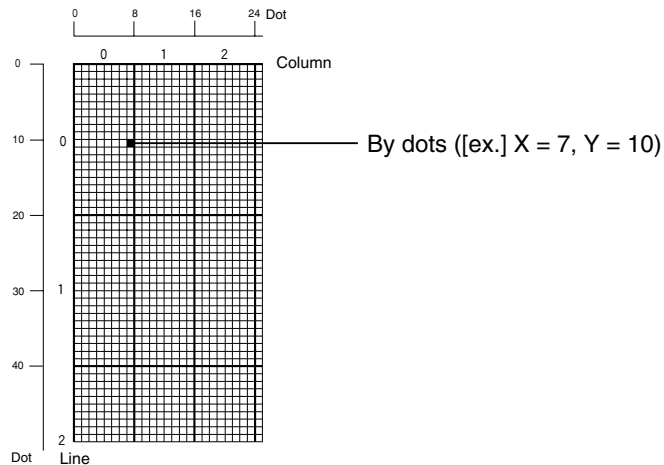
As a requirement for a link, "parts to be linked must be included in one division."

For a perfect link, other requirements must also be satisfied.

Refer to the corresponding sections for respective parts.

Screen Resolution

© The screen uses a (1/4VGA 320 x 240), VGA(640 x 480), SVGA(800 x 600) dot display device. It is possible to specify X/Y positions for (horizontal, vertical) by dots.



Screen Setting



Screen setting items can be accessed from the [Edit] menu on the menu bar. Among these items, options in the [Screen Setting] dialog are explained here.

◎ To bring up the [Screen Setting] dialog:

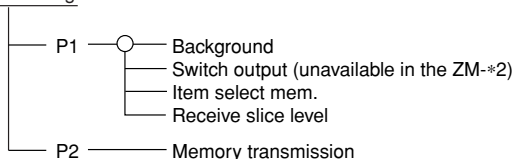
The dialog is displayed by selecting [Screen Setting] from the [Edit] menu on the menu bar.

◎ If a new file is opened, the setting of [Switch Output] in the last editing will be retained.

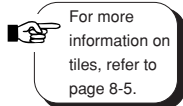
Screen Setting

The following items are included in the [Screen Setting] dialog:

Screen Setting



	Source PC memory	Target internal memory	Words
No.0			
⌋	⌋	⌋	⌋
No.15			



P1 Tab Window

[Background]

Select the desired background and tile pattern for the base screen. Among the 128 (ZM-*2) or 16 (ZM-41/70) colors, click on the color that corresponds for foreground color (FCL) and background color (BCL), respectively. The default value is black. (The ZM-*2's 320 x 240 dots: 16 colors.)

FCL selected here is used for parts or graphics with the [B] (flashing) selection as the alternate color when it is flashing.

There are eight patterns for selection of a tile pattern. (If you have created an original pattern, it can also be used.) Solid white is the default setting.

Background color becomes effective only when a tile other than solid white is selected.

Flashing (B) can be selected for the base screen, however it is not effective.

[Switch Output](unavailable in the ZM-*2)

This option determines whether to accept a single-switch or double-switch operation. When accepting a single-switch operation only, choose [1 Output]; when accepting a double-switch operation, choose [2 Output].

1-Output

The pressed switch is turned on/off. If two switches are accidentally pressed at the same time, both switches do not work. Likewise, if a switch and a section other than switches are pressed at the same time, it is not effective.

2-Output

The pressed switch(es) is (are) turned on/off. If two switches are pressed at the same time, both switches work as intended. If three or more switches are accidentally pressed at the same time, none of the switches work. Likewise, if a switch and a section other than switches are pressed at the same time, it is not effective.

 For more information on item selection, refer to Chapter 9, "Entry Mode/Data Display Selection (with interlock)." (page 15-73)

[Item Select Mem.]

Allocate memory for option selection when the entry target is placed on the base screen and is to be interlocked. Check this option and specify the memory address. If it is used without interlock, uncheck this option.

[Receive Slice Level]

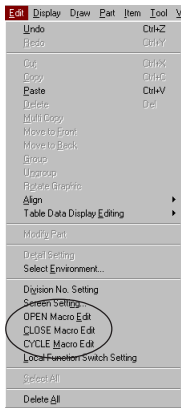
 "Scan time" is the time that PC conducts operation starting from step 0 and back to step 0.

1. Set the word count of PC data that the Control Terminal reads one time.
2. Depending on the PC that is used, the maximum number of words that can be read one time varies. If your setting exceeds that limit, the value reverts to the maximum that can be read one time for that PC. The default value is 40 words.
3. As for the speed of data display, it is recommended that the receive slice level be lowered for a PC with a fast scan time, and raised for a PC with a slow scan time.

P2 Tab Window (ZM-*2 Function)

[Memory Transmission]

When the screen is open, the necessary memory from the screen display is divided into 15 blocks and transmitted to the ZM-*2. When you mainly use PC memory for the macro, the display speed is slowed due to the fact that when you directly use PC memory in the macro command, a read to PC memory operation occurs. To avoid this, when the screen is open, make a copy of the necessary memory on the internal memory and execute macro command on the internal memory. Through this process, speed down can be decreased.



Macro

When opening/closing a screen or when a screen is open, it is possible to set up a macro function.

Refer to page 14-2 for information on macro command.

[OPEN Macro Edit]

Set the macro that is executed when the screen is opened.

Editing can be performed by going to [Open Macro Edit] under the [Edit] menu on the menu bar.

[CLOSE Macro Edit]

Set the macro that is executed when the screen is closed.

Editing can be performed by going to [CLOSE Macro Edit] under the [Edit] menu on the menu bar.

[CYCLE Macro Edit]

Set the macro that is executed while the screen is open.

Editing can be performed by going to [CYCLE Macro Edit] under the [Edit] menu on the menu bar.

Local Function Switch Setting

Function switch operations can be set at every screen. In this case, the function switch is referred to as the local function switch. Editing is possible by going to [Local Function Switch Setting] under the [Edit] menu on the menu bar. For details on settings, refer to “Function Switch Setting” (page 2-18) in Chapter 2, “System Setting.” Local function switch setting has priority over function switch setting of system settings.

Process Cycle

The screen display speed in communication between the ZM Series and the PC depends on the number of parts (mainly the memory amount read from PC) placed on the screen.

When displaying a greater amount of screen data, the display speed gets slower and switch response may not be brisk. In such a case, it is possible to speed up by differentiating between data to be viewed in real time and the others. This setting is available at the [Process Cycle] option for data.

[Process Cycle]



Refer to the figure on page 2-11.



The read area memory can be allocated by [Read Area] in the [Comm. Parameter] dialog. Refer to page 2-4.

- Ⓐ Choose the desired rendering cycle when data is read from the PC memory from [Refresh],[High Speed],and [Low Speed].

- Ⓑ About “cycle”

The ZM Series first makes an access to [Read Area] specified in the [Comm. Parameter] dialog, and then reads data from memory assigned for rendering an image on the screen. When the ZM Series has made all the operations for a screen, the image on the screen is complete. This whole operation is called a “cycle.”

- Refresh

All data is read from memory at the leading edge of bit 15 (data read refresh) in read area $n + 1$.

- High Speed

Data is read from memory at a unit of “cycle.”

- Low Speed

When [Low Speed] is chosen, frequency of cycles is determined, depending on the setting for [Receive Slice Level] in the [Screen Setting] dialog.

<Exceptions>

1. Irrespective of process cycle setting, all data is read from memory for rendering (the first cycle) when a screen is opened. With this operation, all screen data is displayed on the screen.
2. When [Internal] or [Memory Card] is chosen for [Memory], [High Speed] is automatically applied for cycles.

○Process cycle setting

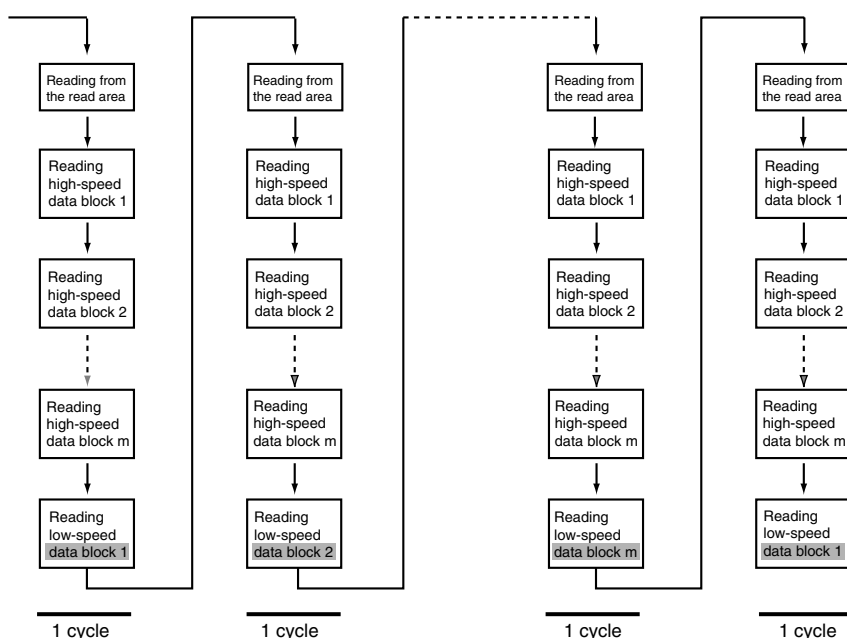
1. Choose [High Speed] for [Process Cycle]. If you feel the screen display speed is slow, change the [Process Cycle] setting, considering the total data amount on the screen, data types, functions, etc. Refer to “Processing in ZM Series.”
2. When [Refresh] is chosen, data is renewed only at the leading edge of bit 15 (data read refresh) in read area $n + 1$. Please note this.
3. For example, if dozens of data display areas are placed on the screen, you may feel that the screen display speed is too slow. To solve this problem, choose [Refresh] for data display areas of which data is seldom changed, and choose [Low Speed] for those of which data is changed but does not need to be reflected on the screen in real time.

Processing in ZM Series

Processing in the ZM Series is made in the following order.

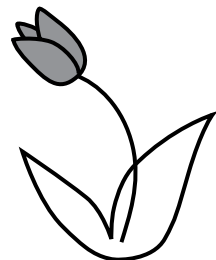
1. The ZM Series analyzes screen data to be read from the PC, and reads them in blocks of serial memory addresses.
2. All data is put into blocks for the specified process cycle.
[Refresh] [High Speed] [Low Speed]
Refer to the previous page.
3. The following are conditions for creating a block:
Data cannot be more than 5 words apart.
The number of words in a block must be within that specified by [Receive Slice Level] in the [Screen Setting] dialog.
When data meets the above conditions, they are put into one block; if not, they are separated into several blocks.
4. High-speed data blocks are read in every cycle for processing.
5. Low-speed data blocks are read one by one in a cycle for processing. The block number to be read next is renewed each time.

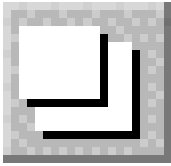
6. When bit 15 (data read refresh) is set (ON) in read area $n + 1$, all data is read irrespective of process cycle setting.
7. Data reading and displaying are executed at the same time. Two programs are running for these operations.
8. Writing is made in the interval between reading blocks. When a smaller value is set for [Receive Slice Level] in the [Screen Setting] dialog, switch response become brisk. Set up the most appropriate receive slice level by cut-and-try method.
9. When considering displaying speed of the screen, it is recommended to set up a smaller slice level for a shorter scan time of the PC, or a greater slice level for a longer scan time.



MEMO

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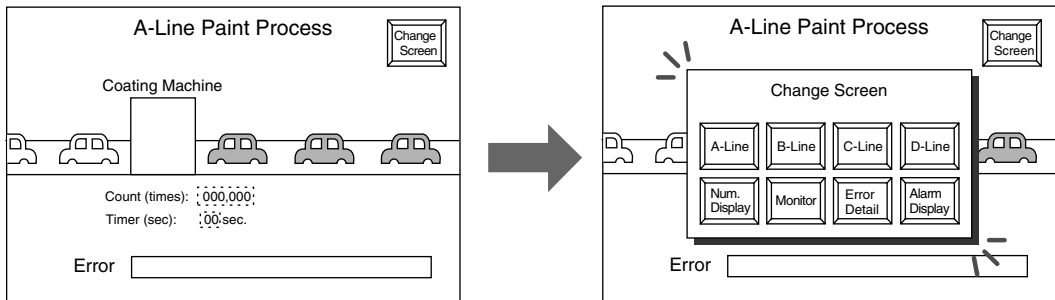


Overlap

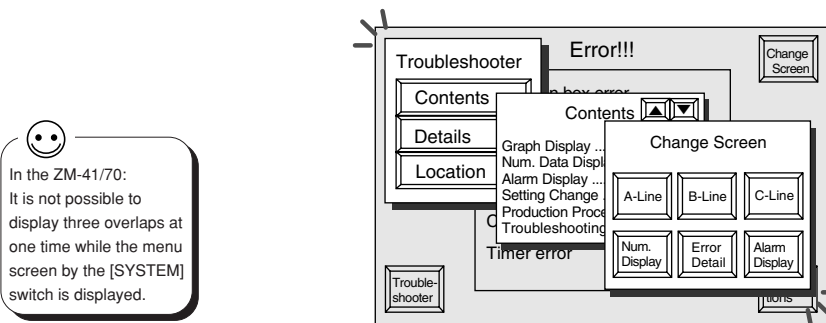
Outline of Overlap

Overlap Is:

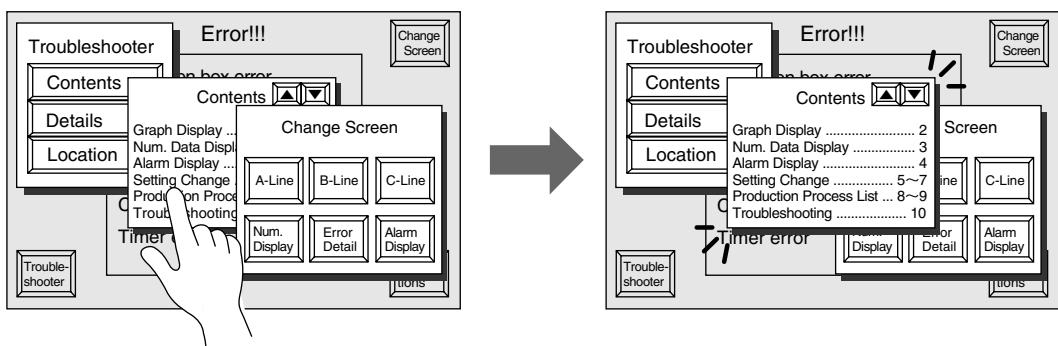
- ◎“Overlap” is a screen covering over a part of an ordinary screen, or the means to display this sectional screen.



- ◎A maximum of three overlaps can be displayed at one time on the base screen.



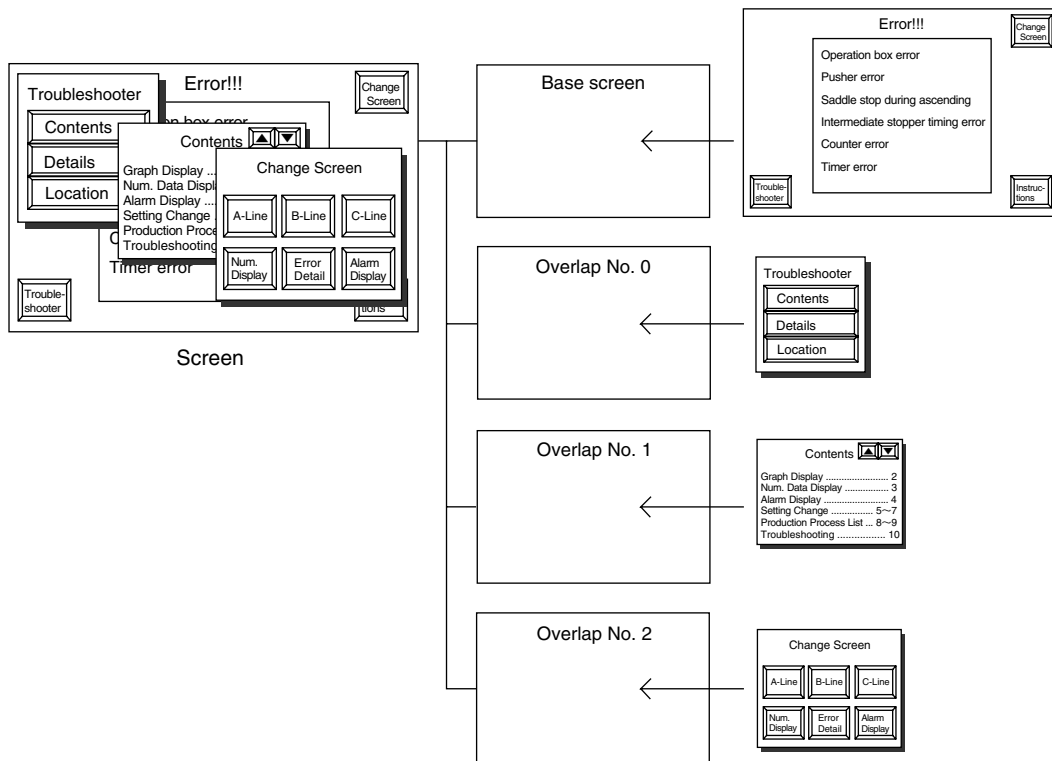
- ◎When several overlaps are displayed at the same time, it is possible to move one that is partly behind another overlap to the front with a touch.



Overlap and Screen

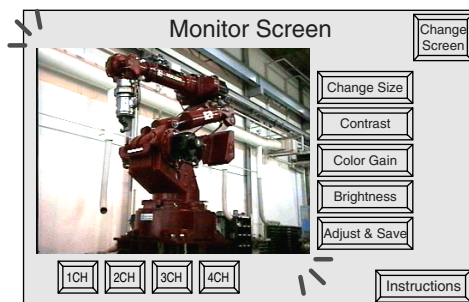
A maximum of three overlaps can be displayed on one screen. This is because overlap areas are secured preliminarily as screen components.

Like the base screen, each overlap can be composed of a maximum of 256 divisions (No. 0 - 255) and can therefore hold the same number of parts as the base screen.



Video Input (ZM-*2 Function)

- ◎ Video input function can only be used on the Control Terminal with video input device (options), ZM-72T/TS and ZM-82T.
- ◎ Images taken by video are displayed directly on one overlap area.



Overlap Display Formats

There are four display formats for overlap areas that belong to the property.

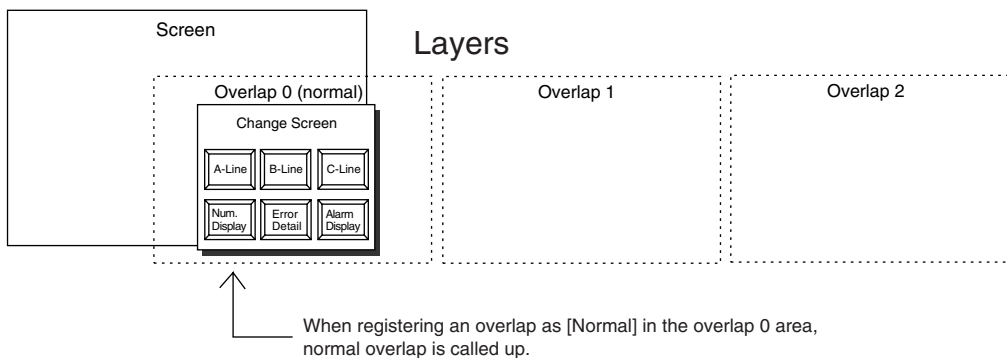
Overlap display

- Normal overlap area (Refer to pages 4-5 and on.)
- Multi-overlap area (Refer to pages 4-10 and on.)
- Call-overlap area (Refer to pages 4-14 and on.)
- Video Input (Refer to pages 4-16 and on.)

Normal Overlap

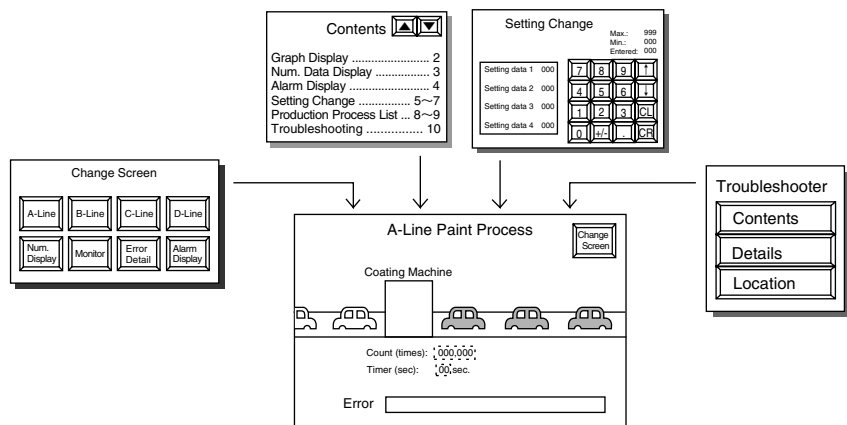
When an overlap is to be displayed on one specific screen, it is called “normal overlap.”

Use one of the three overlap areas (layers) on the screen, as a normal overlap area. A maximum of three sheets of normal overlap can be used on a screen.



Multi-overlap

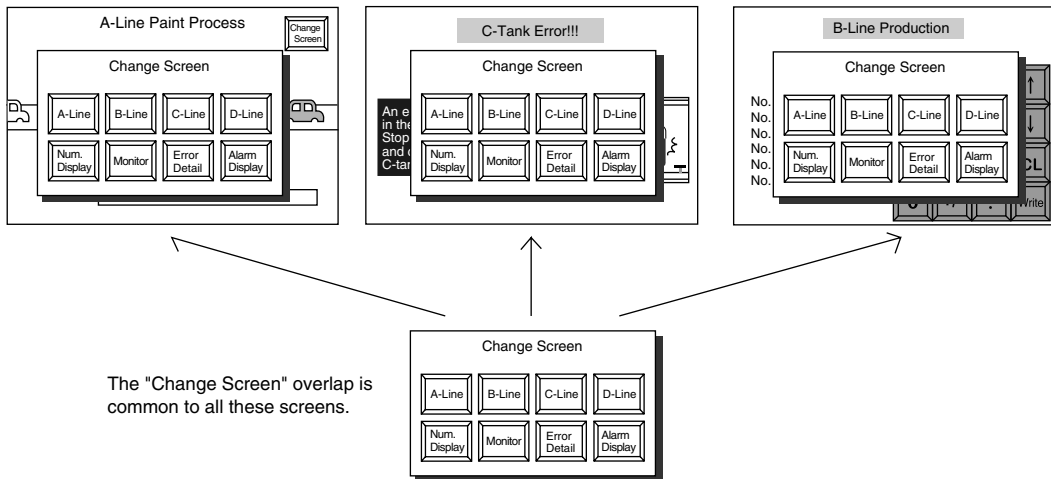
[Multi-overlap] is set when multiple overlap screens are displayed on the screen, or when more than three overlaps are displayed on the screen.



Call-overlap

The call-overlap format is used for a commonly used sectional screen, such as a menu screen, which should allow access from any screen display.

If you register once, you can use the overlaps on different screens an infinite number of times. Moreover, this also conserves memory.



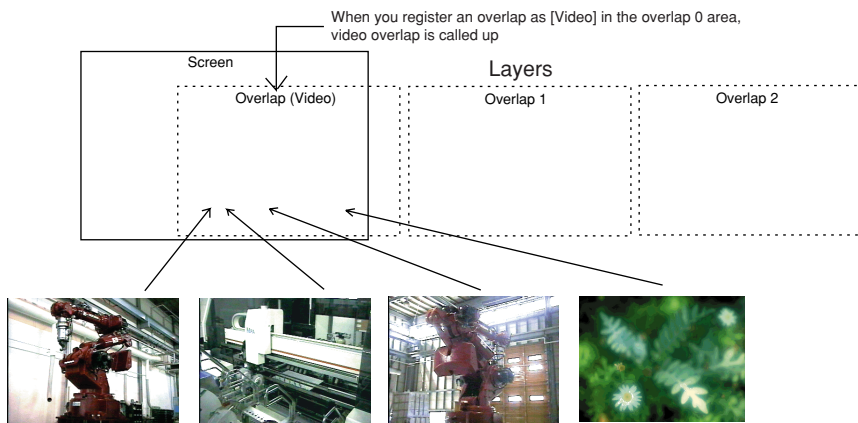
Video Input

Select [Video] to display the image taken by a video.

Use one of the three overlap areas (layers) on the screen as a video area.

Only one video area can be set on the screen.

By changing the channel, the image displayed on the video screen can be displayed on four channels.



When you have displayed the video, the image will always be displayed in the forefront of the screen. The overlap screen stacked on the very bottom of the video display cannot be brought to the forefront even by touching on the overlap screen.

Normal Overlap

Set one of the screen overlap layers for normal overlap, and then select overlap parts and place accordingly.

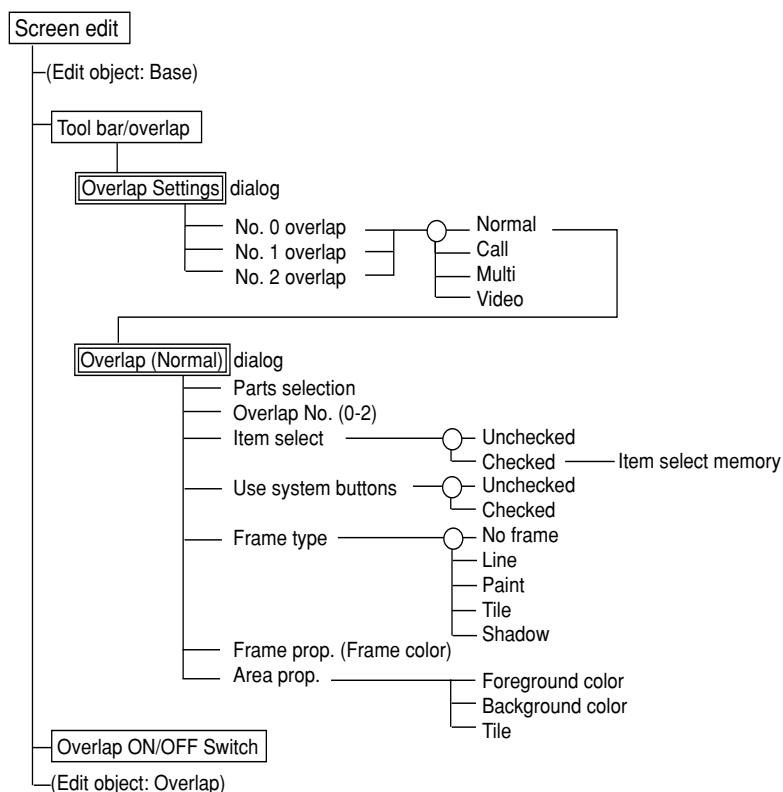


Setting Procedure

1. When you click on the [Overlap] icon on the tool bar, the [Overlap Setting] dialog is displayed.
 2. Check one of overlap No. 0 to 2, and click on [Normal].
 3. The [Overlap (Normal)] dialog is displayed.
 4. Set options on the [Overlap (Normal)] dialog and place the parts.
 5. When calling up an overlap by a switch, set the switch.
 6. Change to the overlap number that was selected for the edit layer (base, 0 to 2). In overlap, edit graphics or parts.
- ◎ To display the [Normal Overlap] dialog after placing an overlap on the screen, either double click on the overlap part, or, after clicking on the overlap part (the handles are displayed), click on the [Details/Prop. Change] icon.

 **Overlap Coordinates**
For ZM-#2
X,Y (0,0) is the origin point,
X and Y are coordinates at
intervals of 4 dots and 1 dot,
respectively.

For ZM-41/70
[Column/Line] Coordinates
(See page 1-28.)



Memory Set in Normal Overlap

Memory used when employing entry mode and selection item settings on the overlap

Selection Item	Set Memory	Options
Item Select	* Item Select Memory	PC Memory, Internal Memory, Memory Card

* The used words vary depending on the entry mode setting.

[Normal Overlap] Dialog

[Overlap No.]

This option determines the overlap area (No. 0 - 2) where the normal overlap is to be contained.

This is the same number as selected on the [Overlap Setting] dialog.

[Item Select]

This is required when using entry mode on the overlap. For more information, refer to Chapter 9, “Entry Mode.” (page 9-31)

[Use System Buttons]

When this option is checked (☒) , the overlap is equipped with the SYSTEM switch. For more information, refer to page 4-9.

[Frame Type]

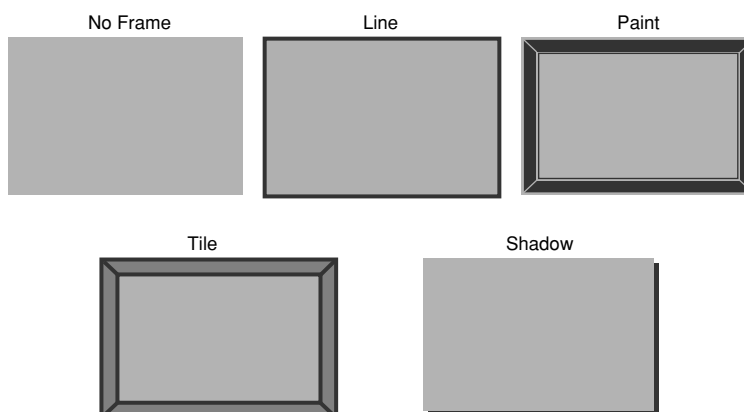
This option depends on the selection of parts type: standard (ZM-30 compatible) or other than standard (parts of your creation).

◆ Standard parts

[Frame Type]

Select the desired frame types from the options as shown below:

No frame/Line/Paint/Tile/Shadow



[Frame Prop.]

When a frame type other than [No frame] is chosen, the frame color can be selected.

[Area Prop.]

Color and tile pattern for the inside of the frame (= inside of overlap part) can be selected.

◆ Other than standard parts

[Frame Type]/[Frame Prop.]

These options are not available.

[Area Prop.]

Color and tile pattern for the inside of the frame (= inside of overlap part) can be selected.



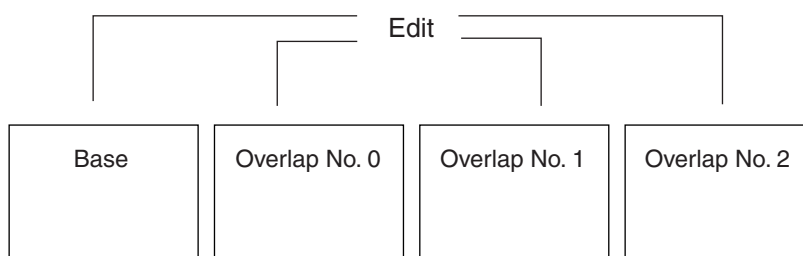
*** In the case of parts other than standard, only [Area Prop.] can be set up. When modifying parts of your own creation, select the overlap part (handles are shown), and click the [Modify Part] icon in the horizontal menu bar. The overlap part can be modified on the overlap editing screen.**

Editing in Overlap

When placing switch parts, mode parts or graphics on the normal overlap part, change over the editing layer.

Editing Layer

When creating a screen, you have to edit four components: base screen, overlap No. 0, overlap No. 1 and overlap No. 2.



Click the right mouse button.

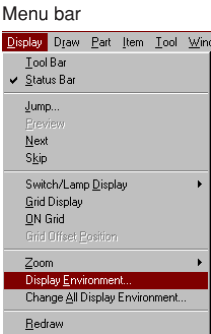
Undo	Ctrl+Z
Redo	Ctrl+Y
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
ON Grid	
✓ Base	
Overlap 0	
Overlap 1	
Overlap 2	
Change All	
On-line Editing	
On-line Run	

When starting, one of these layers is chosen for editing. The editing layer denotes the one that is currently chosen.

Changeover of Editing Layer

The following two methods are available:

1. Click the right mouse button and change the editing layer from the pull-down list.



2. Go to [Display Environment Setting] under the [Display] menu on the menu bar and bring up the [Display Environment] dialog. From there, go to [Detailed Setting] and then to change the editing layer.

- * **A layer change is performed when an overlap number is chosen.**
- * **When an overlap is selected for the editing layer, the modes placed on the selected overlap are indicated in the auxiliary tool box at the bottom left corner of the screen.**
When the editing layer is moved to the base screen, the modes on the base screen are indicated in the auxiliary tool box.

Displaying and Erasing Normal Overlap

To display or erase the normal overlap on the screen, the following two commands can be used.

 For more information on switches for displaying overlaps, refer to Chapter 5, "Switches." (pages 5-19, 5-20)

 For more information on the read area, refer to Chapter 2, "System Setting." (page 2-26)

- ◆ **Internal command**
The overlap is displayed or erased by pressing the switch (function: overlap) placed on the screen.
- ◆ **External command**
The overlap is displayed or erased by activation of a bit in the PC memory.

The overlap command memory area is allocated in the read area specified in the [Comm. Parameter] dialog. Bit 0 of read area $n + 1$ (screen status command) is for overlap No. 0, bit 1 for overlap No. 1 and bit 2 for overlap No. 2.

MSB															LSB	
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Read area $n + 1$

Leading edge: ON
Falling edge: OFF

Overlap No. 2
Overlap No. 1
Overlap No. 0

 Using macro, the normal and call-overlap can be displayed or eliminated. (OVLP_SHOW) command. Additionally, display location specification can also be performed. Refer to Chapter 14, "Macro."

At the leading edge of the bit, the corresponding normal overlap is displayed on the screen. Likewise, at the falling edge of the bit, it is erased from the screen.

Feature of Overlap — SYSTEM Switch

Irrespective of the display format (normal, call or multi), the feature of the SYSTEM switch is commonly available.

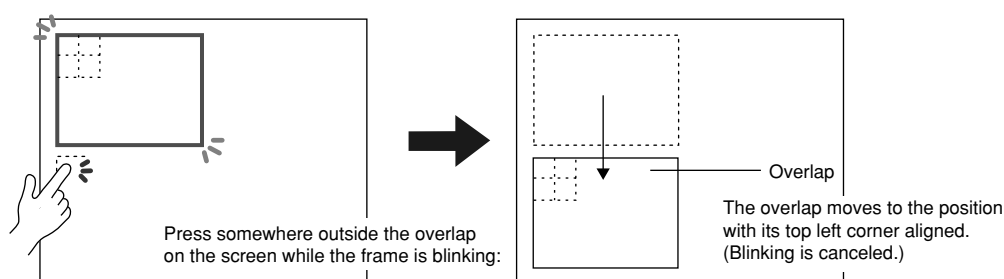
◆ The SYSTEM switch is:

a switch that can be set up on the overlap. The SYSTEM switch can work in two ways:

Move between overlaps

Pressing the top left corner (2 x 2 switch grids) of the overlap once makes the overlap frame flash.

While the overlap frame is flashing, pressing another position on the screen moves the overlap to the position, aligning the top left corner of the overlap part with it. (The frame stops flashing.)

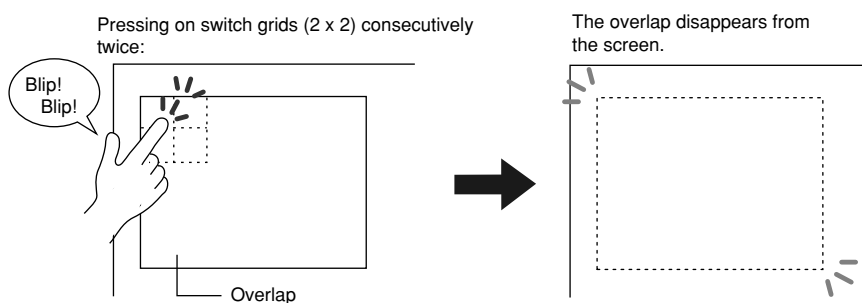


If a part of the overlap should extend off the screen, the ZM Series automatically adjusts the position closest to the pressed position but within the screen space.

To stop the overlap frame flashing, press the top left corner of the overlap again.

Erasing Overlap

Pressing the top left corner (2 x 2 switch grids) of the overlap twice consecutively (within one second) erases the overlap from the screen.



◆ SYSTEM switch setting

Settings for the SYSTEM switch function setting are made in the [Normal Overlap] dialog.

Multi-overlap

Multi-overlap is used to switch displays between multiple overlaps on one overlap layer.

To display multi-overlap, set one of the overlaps No. 0-2 to [Multi]. Display by switching to the multi-overlap screen created and saved in the multi-overlap area, or by specifying the number of an external device.

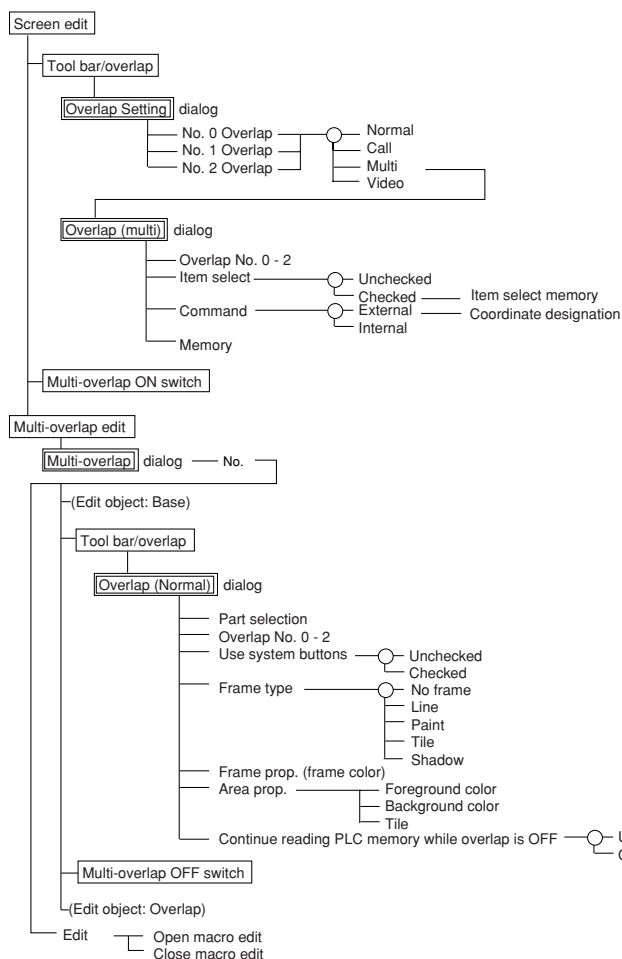
In the case of an external specification, conditions from multiple multi-overlaps can be combined and displayed.



Setting Procedure

<Screen Edit>

1. When you click on the [Overlap] icon on the tool bar, the [Overlap Setting] dialog is displayed.



2. Check one of the overlaps from No. 0-2, and then click [Multi].
3. The [Multi-overlap] dialog is displayed. Set options in the [Multi-overlap] dialog.
4. When you click [OK], the overlap icon appears in the [Part] auxiliary tool box.
5. When calling up the overlap by a switch, set the switch.

<Multi-overlap Edit>

6. Click on [Multi-overlap...] under the [Edit] menu. The [Multi-overlap] dialog is displayed.
7. Specify the number of the multi-overlap to be edited.
8. The multi-overlap edit window is displayed.
9. Click on the [Overlap] icon and make normal overlap settings.
10. Macro can be set using [Open Macro Edit] and [Close Macro Edit] under the [Edit] menu.

Memory Set in Multi-overlap

Memory that must be set:

Set Memory	Options
* Memory	PC Memory, Internal Memory, Memory Card

* The usable words vary in the following way:

For [Command] in the [Multi-overlap] dialog

[Internal] is set: 1 word

[External] is set: 2 words

When coordinate designation is checked: 4 words

Memory used when employing entry mode and selection item settings on the overlap:

Selection Item	Set Memory	Options
Item Select	* Item Select Memory	PC Memory, Internal Memory, Memory Card

* The used words vary depending on the entry mode setting.

[Multi-overlap] Dialog

[Overlap No.]

This option indicates the overlap area (No. 0 - 2) where the overlap is to be held.

This is the same number as selected on the [Overlap Setting] dialog.

[Item Select]

This is required when using entry mode on the overlap. For more information, refer to Chapter 9, "Entry Mode." (page 9-31)

[Command]

Choose either [Internal] or [External] for commanding the display/erase of multi-overlaps.

<Internal Command>

Overlaps can be displayed/erased by pressing the switches placed on the screen.

Use the following switches:

Action	Switch Function	Auxiliary Item
Multi-overlap display	Multi-overlap	Overlap, multi-overlap number, location
Multi-overlap erase	Overlap	OFF

<External Command>

The multi-overlap number to be displayed is commanded from the PC memory.

In this case, the placement position can also be specified by external commands.

Multi-overlap ON/OFF is determined by data contained in read area n + 1. The number specification and coordinates of the multi-overlap are as described in the following memory.

 For more information on switches, refer to Chapter 5, "Switches." (page 5-21)



Multi-overlap can be displayed using macro ([SET_MOVLPL] command). Refer to Chapter 14, "Macro."

[Memory]

Contents are shown below:

Memory	Contents	Command	Action
n	the number of the multi-overlap that is currently displayed the screen The default value is -1.	Internal, External	ZM->PLC
n + 1	the number of the overlap to be displayed	External	PLC->ZM
n + 2	multi-overlap X coordinates	External	PLC->ZM
n + 3	multi-overlap Y coordinates	External	PLC->ZM

Memory area n + 1 is used when [External] is chosen for [Command], while memory areas n + 2 and n + 3 are used when the box of [Coordinate Designation] is checked.

<Coordinate Designation>

When [External] is selected for [Command], coordinate designation is possible.

Overlap display position can be specified based on external commands. When the check box is unchecked (☐) , overlap is displayed in the location determined in multi-overlap edit. When the check box is checked (☒) , overlap display position can be specified by the X and Y coordinates of [Memory] that are described below.



Coordinate units at the time of coordinate designation

For the ZM-*2, you can set coordinate designation in units of [Column/Line] or in units of [Dots]. ZM-41/70 is limited to [Column/Line].

<Setting Method>

1. Click on the [Edit] menu, go to [System Setting], and then click on [Other Settings]. The [Other Settings] dialog is displayed.
2. In [Overlap Coordinates] of the [P3] tab window, select [Column/Line] or [Dots]. [Column/Line] is the default.

For [Dots], when the origin coordinate is (0, 0), the X coordinate will be in units of 4 dots, and the Y coordinate will be in units of 1 dot.

<Read Area n + 1 Memory>

For control of the multi-overlap ON/OFF, in read area n + 1 (screen status command) in the [Comm. Parameters] dialog, bit 0 is [Overlap No. 0], bit 1 is [Overlap No. 1], and bit 2 is [Overlap No. 2]. Each can be used as ON/OFF control memory.



Notes when displaying multi-overlap externally

1. Set the bit corresponding to the desired overlap number, specify the multi-overlap number to be displayed. The specified multi-overlap is displayed.
2. Unlike normal and call-overlap, when multi-overlap is displayed externally, it will still be displayed even after you switch to another screen and then return.

Multi-overlap Edit

The overlap that is displayed is registered as normal overlap in multi-overlap edit.

[Use System Button] and [Area Prop. (foreground color/background color/tile)] items are set in the same manner as the [Normal Overlap] dialog.

Refer to page 4-9.

[Continue Reading PC Memory When Set to OFF]

This setting item becomes active when you select multi-overlap.

When normal and call-overlap are selected, the reading of PC memory continues.

◆ Checked (Continue)

After the overlap screen is displayed on the screen, even in the event that the overlap screen is erased, information from that overlap screen can intentionally be left behind.

Because information is already being read, when that same overlap screen is displayed again, that screen's display is processed rapidly. However, the screen display when the overlap is not being displayed is slowed down.

◆ Unchecked (Discontinue)

When an overlap screen that has been read once is erased, its information is also completely erased. Thus, when displaying the same overlap screen again, the overlap display is slowed down somewhat. The screen is displayed smoothly.

Macro Setting in Multi-overlap Edit

Overlap parts registered in multi-overlap edit can be used with [Open Macro] or [Close Macro].

These macros can be executed when the registered overlap part is displayed on or erased from the screen.

<Setting Procedure>

In multi-overlap edit:

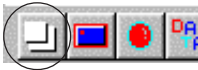


*** Overlaps defined as "normal" cannot be equipped with macro setting. For more information on macro setting, refer to Chapter 20, "Macro Mode."**

*** If you delete the multi-overlap that was set in open or close macro, be sure to delete the macro as well. If it is not deleted, an error will occur.**

Call-overlap

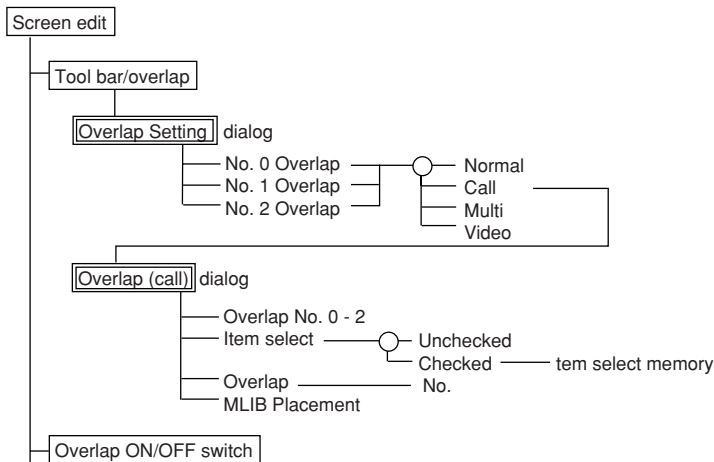
With multi-overlap, it is possible to display and switch between numerous multi-overlap screens on one overlap layer, but call-overlap is limited to only one screen. To display call-overlap, set one of the overlap layers (overlap No. 0-2) as call-overlap. In the overlap layer, set the overlap screen number that was created and registered in the multi-overlap area.



Setting Procedure

<Screen Edit>

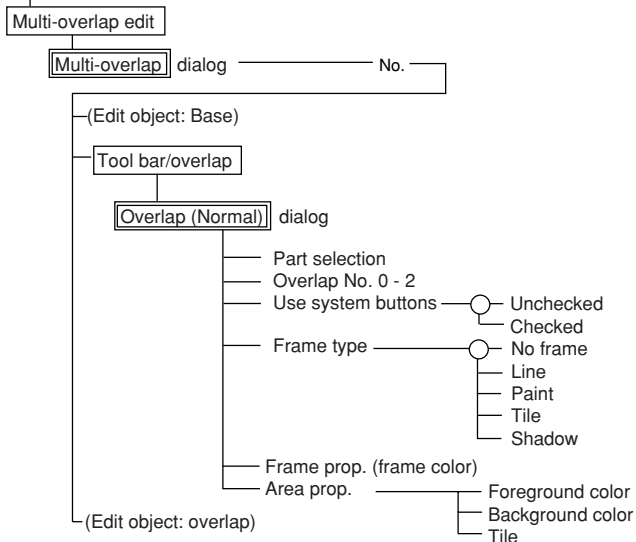
1. When you click on the [Overlap] icon above the tool bar, the [Overlap Setting] dialog is displayed.



2. Check one of the overlaps No.0-2 and click [Call]
3. The [Call-overlap] dialog is displayed. Set options in the [Call-overlap] dialog.
4. When you click [OK], the call-overlap icon appears in the [Part] auxiliary tool box.
5. When calling up an overlap by a switch, set the switch.

<Multi-overlap Edit>

6. Click on [Multi-overlap] under the [Edit] menu.
The [Multi-overlap] dialog is displayed.
7. Specify the number of the multi-overlap to be edited.
8. The multi-overlap edit window is displayed.
9. Click the [Overlap] icon and select normal overlap.



[Call-overlap] Dialog

[Overlap No.]

When [Call] is chosen, this option indicates the overlap area (No. 0 - 2) where the overlap is to be held. This is the same number as selected on the [Overlap Setting] dialog.

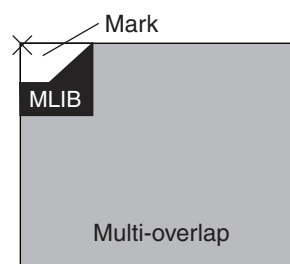
The number that was checked in the previous [Overlap Setting] dialog is taken as default.

[Item Select]

This is required when using entry mode on the overlap. For more information, refer to Chapter 9, “Entry Mode.” (page 9-31)

[MLIB Placement]

Specify the overlap placement. The relationship between the placement and the multi-overlap is, as shown in the diagram to the right, that the left corner of the mark becomes the left corner of the multi-overlap.



Call-overlap Display Control

There are two ways to call up or erase the call-overlap on the screen.

Internal

Overlap display commands are performed based on the switches created on the Control Terminal screen.

The usable switches are as follows.



For details about switches, refer to Chapter 5, “Switches” on pages 5-19 to 20.

Action	Switch Function	Auxiliary Item
Multi-overlap display	Overlap	ON
Multi-overlap erase	Overlap	OFF

External

Call-overlap ON/OFF are controlled by data in read area n + 1 (screen status command) in the [Comm. Parameters] dialog.

Bit 0 : [Overlap No. 0]

Bit 1 : [Overlap No. 1]

Bit 2 : [Overlap No. 2]

Each bit is used for the ON/OFF control memory. (leading edge: ON, falling edge: OFF)

Multi-overlap Registration

For the multi-overlap screen editing method, refer to “Multi-overlap Edit”. (page 4-13)

Video Input (Option) ZM-*2 Function

- ◎ The video input function can only be used on the ZM-72T and ZM-82T, which have the video input device.
- ◎ For video input, set one of the overlap layers on the screen as [Video].

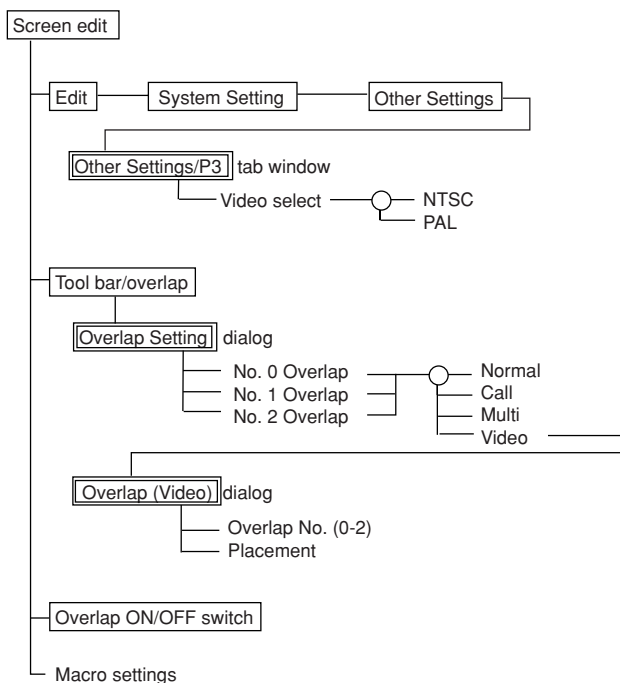
Setting Procedure

1. Set the signal format of the video to be used.

When you go to the [Edit] menu and click on [System Setting], and under that, select [Other Settings], the [Other Settings] dialog is displayed. Bring up the [P3] tab window and confirm that [Video Select] is [NTSC]. (If the communication method is PAL, select [PAL].)



2. Make Video settings on the screen.



- 1) When you click on the [Overlap] icon on the tool bar, the [Overlap Settings] dialog is displayed.

- 2) Check one of overlap No. 0-2 and click [Video].

- 3) The [Overlap (Video)] dialog is displayed. Set options in the [Overlap (Video)] dialog.

- 4) When you click [OK], the overlap icon is displayed in the [Part] auxiliary tool box.

The VIDEO mark is displayed on the screen.

- ◎ Once the video screen has been placed on the screen, click on the [Overlap] icon in the [Part] auxiliary tool box to make new settings for the [Overlap (VIDEO)] dialog.

3. When calling up the video screen by a switch, set the [Function: Overlap ON (OFF/ALT)] switch.

4. The video screen settings for switching channels, display screen size, contrast adjustment, changing screen location, etc., are controlled by the macro.

Overlap (Video) Dialog

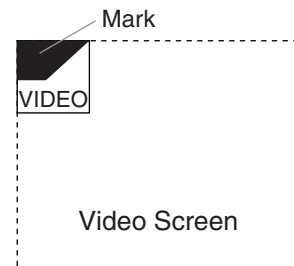
[Overlap No.]

This video screen determines which overlap area (No. 0-2) screen is called up.

The [Overlap No.] when the dialog is brought up is the number that was checked in the previous [Overlap Setting] dialog.

[Placement]

Specify the placement of the video screen. The relationship between placement and the video screen is, as shown in the diagram to the right, that the left corner of the mark becomes the left corner of the video screen.



Video Screen Display/Erase Method

The methods for displaying the video on the screen, and for erasing the screen, are the same as for normal overlap. However, [ICON] cannot be specified for [Action].

For details, refer to Chapter 5, “Switches” on page 5-19.

Moving the Video Screen

Video screen movement is specified in the macro [OVLP_POS] (overlap position change) command.

For information on macro [OVLP_POS], refer to Chapter 14, “Macro” on page 14-21.

Video Control (Size, Channel, Contrast, Etc.)

The settings for the video screen’s size specification (160X120, 340X240, 640X480 dots), channel selection (4 channels), dithering, brightness, contrast, color gain, and video adjustment, are all specified on the macro “VIDEO” (video screen control).

For information on macro “VIDEO,” refer to Chapter 14, “Macro” on page 14-21.

Overlap Size Limits

There is a limit to the size of a normal, call, or multi-overlap that can be displayed on one screen.

Set the size of the normal or call-overlap placed on the screen, or of the multi-overlap (when displaying several multi-overlaps, the maximum size displayed) so that the combined size does not exceed the maximum overlap size shown here.



In the ZM-41/70:
The max. overlap size is
741,376.

(Unit : byte)

Model	Max. Screen Size	Max. Overlap Size	*Max. Overlap Size (When Using Video)
ZM-52D	307,200	Area 1: 368,640 Area 2: 307,200 Total: 675,840	—————
ZM-72T		921,600	614,400
ZM-72D		921,600	—————
ZM-72TS ZM-82T	480,000	Area 1: 88,576 Area 2: 1,047,424 Total: 1,136,000	Area 1: 88,576 Area 2: 740,224 Total: 828,800
ZM-82D		Area 1: 88,576 Area 2: 950,272 Total: 1,038,848	

* The overlap size of a screen with video settings, etc.

○ Normal, call, and multi-overlap calculation method (unit: dots)

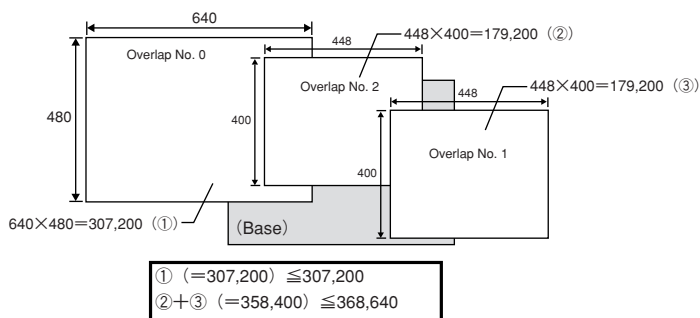
Overlap size = Overlap width x Overlap height

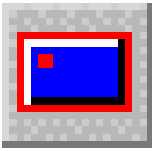
- Areas 1 and 2 are discontinued areas. Depending on the overlap size, there are cases when settings cannot be made on the overlap even if it falls within the total acceptable value. In this case, the error message [There is an error in the data. No. 54] is displayed on the Control Terminal. In the case of multi-overlap, the overlap becomes inactive and is not displayed.

If the limit is exceeded, reduce the size of the overlap.

<Example> For ZM-52D

If you have three normal overlaps shown below, the total size falls within range, and thus, there is no problem.



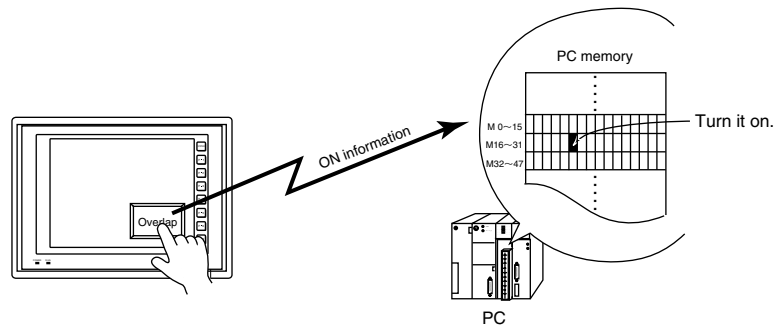


Switches

Outline of Switches

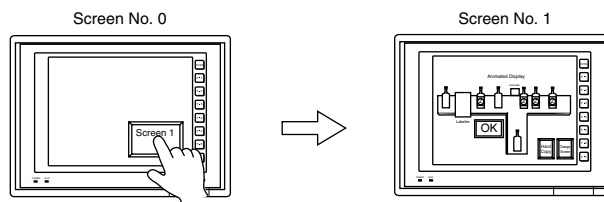
Basic Function of Switches

1. Sends ON/OFF information to the specified bit in the PC memory.

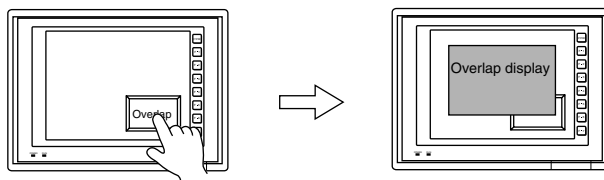


2. Can execute the following processing:

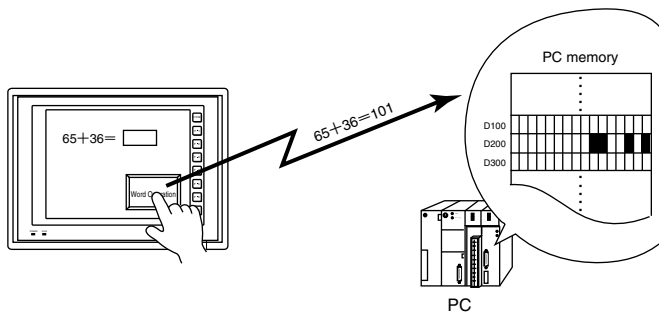
- A. Changing the screen display



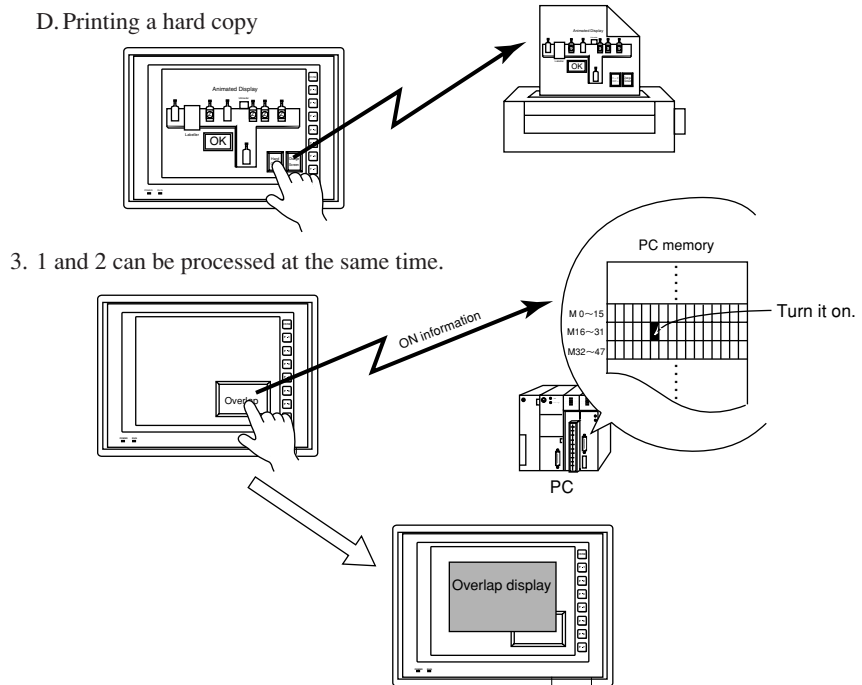
- B. Displaying an overlap



- C. Performing operations, and writing the results into the PC memory



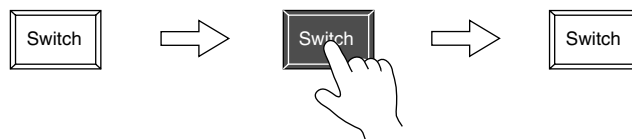
D. Printing a hard copy



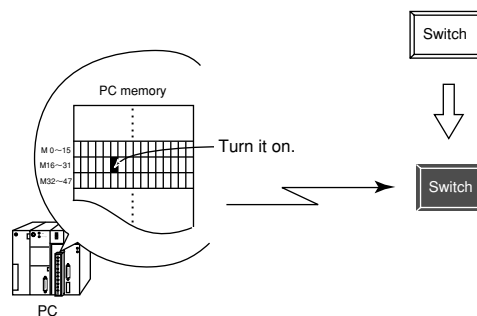
4. A macro can be executed when a switch is pressed or released.

Lamps in Switches

◎ Switches can be equipped with lamps, which light up (in ON color) when the switch is pressed and go off (in OFF color) when it is released.



◎ Lamp activation can be commanded from the PC memory.



◎ When lamp activation is commanded externally, it is also possible for one lamp to use three colors, such as STOP, READY and RUN.



Creating Switches



Do not use switches where they could cause injury to people or damage machinery. Moreover, do not use switches as emergency switches.

Outline of Switch Setting



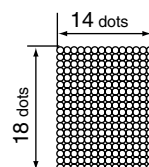
500 switches/screen
for the ZM-41/70

◎ Switch number

A maximum of 768 switch parts can be created on one screen. (ZM-42D/L: 192 switches)

◎ Minimum switch unit

14 x 18 dots



Switch Creating Procedure

1. When you click on the [Switch] icon on the tool bar, the [Switch] dialog is displayed.
2. Set the [Switch] dialog and place the switch parts.



◎ If you placed switch parts on the screen, display the [Switch] dialog by double clicking on the switch parts, or after clicking on switch parts (the handles are displayed), click on the [Detail/Prop. Change] icon.

◎ It is convenient to use [Multiple Copy] when creating a number of switches.

◎ ON/OFF/P3 display status is shown by the depressed status of the [ON], [OFF], and [P3] icon. If you want to modify the display status, select the icon that you want to display.

Notes on placing switches



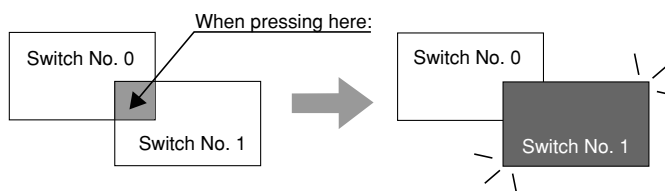
When placing two or more switches, do not allow them to overlap at all.

◎ If it is unavoidably necessary to do so:

Note that the overlapping area cannot be detected by the system and that the system recognizes it as the part of the switch placed later.

<Ex.>

When switches No. 0 and 1 have been created in the ascending order of the number: Pressing the overlapping area activates switch No. 1.



◎When placing switches on an overlap

If the following two conditions exist at the same time, “Error: Action area setting” will be given. Remove either condition.

- X size of the switch is minimal.
- The overlap position is shifted by 1-byte from the switch grids.

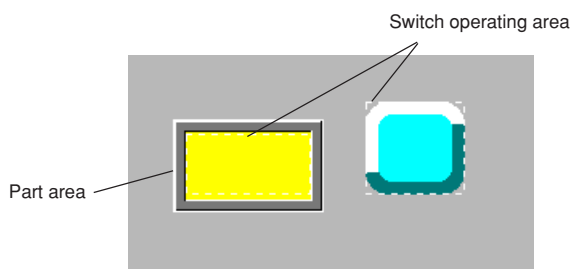
Confirmation of Switches in Display Environment

◎[Detail] tab window in the [Display Environment] dialog

Go to the [Display] menu, and select [Display Environment]. The following [Display Environment] dialog is displayed.

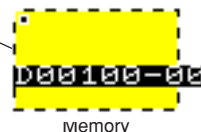
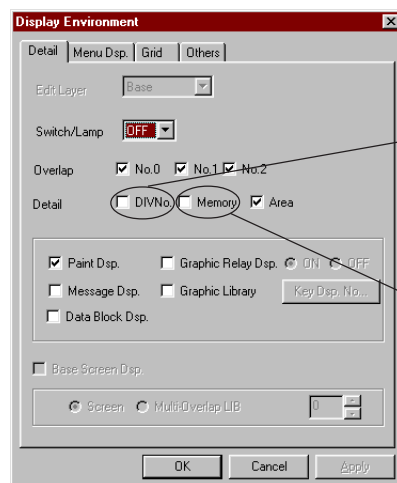
◎Switch area (operating area)

When [Area] is chosen for [Detail Display] in the [Detail] tab window, a dotted box is shown in the switch part indicating the switch operating area.



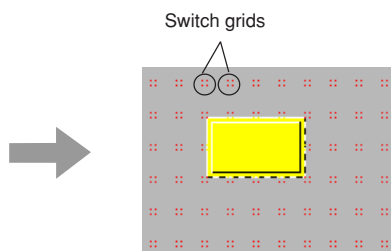
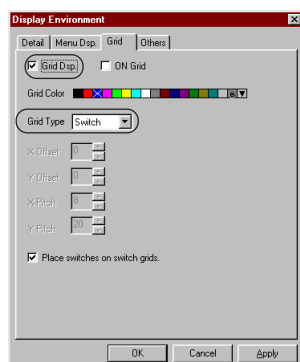
Pressing in the switch operating area activates the switch. The area outside the operating area in the switch is called “part area.” Pressing in this area does not activate the switch.

◎When you select [DIV No.] in the [Detail] tab window, each switch’s DIV number is displayed in the lower left, as shown below. When you select [Memory], the [Output Memory] and [Lamp Memory] set under the switch is displayed. As with [DIV No.] and [Area], or [Memory] and [Area], two items can be selected at the same time. ([DIV No.] and [Memory] cannot be selected at the same time.)



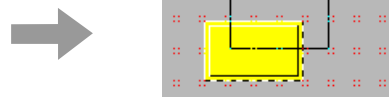
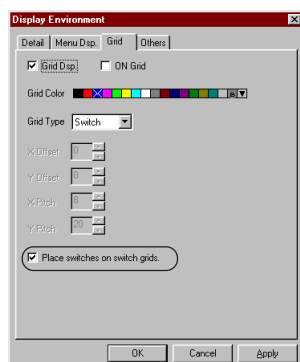
- ◎ Click on the [Grid] tab window in the [Display Environment] dialog. When you check [Grid Dsp.] and set [Grid Type: Switch], the switch grids shown in the diagram below are displayed on the screen.

For more information on switch grids, refer to page 1-28.



- ◎ [Snap on Switch Grids]

As default, [Snap on Switch Grids] is checked in the [Grid] tab window of the [Display Environment] dialog.



Switches can be enlarged/reduced in the unit of switch grids.

When [Snap on Switch Grids] is unchecked, switches can be enlarged/reduced in the unit of dots.



To freely place switches or perform enlargement and reduction without involving the switch grid, uncheck [Snap on Switch Grids].



When you uncheck [Snap on Switch Grids] for the ZM-41/70, the switch area (operating area) placement may slip as shown below. Take caution when performing movement, enlargement, and reduction.



Switch Output

There is a difference in the switch output between the ZM-*2 and the ZM-41/70.

◆ For ZM-*2

Only one switch can be pressed (fixed to 1 output).

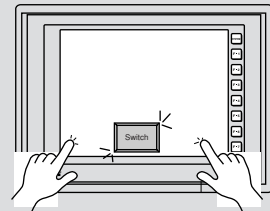
If a switch is pressed when another switch is held down, the later switch will not operate. Additionally, if a position out of the switch area is pressed, it will not operate.

However, if under [Function Switch Setting], even one is set as [Use Function Switch], pressing two different function switches is permitted. To set the function switch without using the screen, use the local function switch. For information on [Function Switch Setting], refer to pages 2-18 to 20.



The ZM-*2 switch resolution is of an analog type using resistance film. Do not press more than two switches on the screen at the same time.

When more than two switches on the screen are pressed at the same time, (two switches are pressed at the same time, two points out of the switch area are pressed at the same time, a point in the switch area and a point out of the switch area are pressed at the same time), if there is a switch in the center of the two points, that switch may be activated. Please be careful.



When two points are pressed at the same time, that switch may be activated.



◆ In the ZM-41/70:

For each screen, it is possible to set up whether a switch should activate when it is pressed alone or if two switches should activate when they are pressed at the same time.

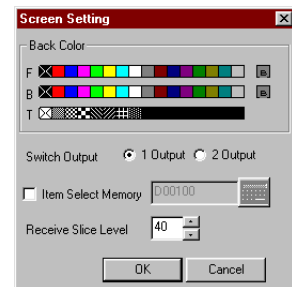
Click on [Screen Setting] under the [Edit] menu. The [Screen Setting] dialog is displayed. Set [1 Output] or [2 Output] for [Switch Output].

◎ When [1 Output] is chosen:

The pressed switch is turned on/off. If two switches are accidentally pressed at the same time, both switches do not work. Likewise, if a switch and a section other than switches are pressed at the same time, it is not effective.

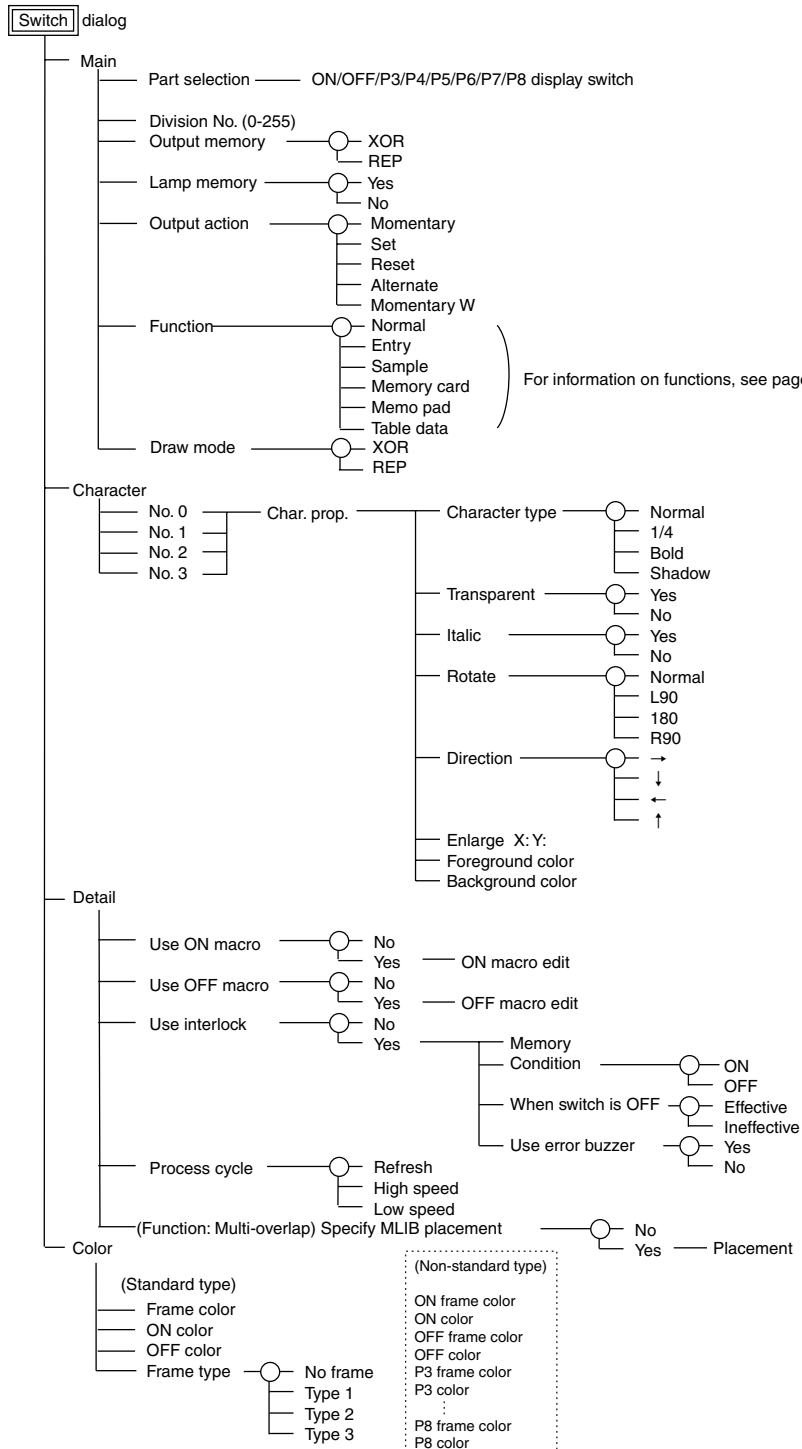
◎ When [2 Output] is chosen:

The pressed switch(es) is (are) turned on/off. If two switches are pressed at the same time, both switches work as intended. If three or more switches are accidentally pressed at the same time, none of the switches work. Likewise, if a switch and a section other than switches are pressed at the same time, it is not effective.



*** However, when an area is pressed that is out of the switch area on the screen, the switch will not run even if it is pressed, regardless of [1 Output] or [2 Output].**

[Switch] Dialog



Memory Set in Switches

Only use this memory if the following selection items have been set in the [Switch] dialog.

Selection Item	Set Memory	Options
☐ Output Memory	Output Memory	PC Memory, Internal Memory, Memory Card
☐ Lamp Memory	Lamp Memory	PC Memory, Internal Memory, Memory Card
☐ Use Interlock	Memory	PC Memory, Internal Memory, Memory Card
Use Interlock	Use Interlock	PC Memory, Internal Memory, Memory Card
Function/Word Operation	Operation Memory	PC Memory, Internal Memory, Memory Card
	Operand Memory	PC Memory, Internal Memory, Constant, Memory Card
	Output Memory	PC Memory, Internal Memory, Memory Card
	Comparison Memory	PC Memory, Internal Memory, Memory Card

*** The amount of usable lamp memory bits varies depending on whether the part is 2-notch or 3-notch. When it is 2-notch, use 1 bit. When it is 3-notch, use 2 bits.**



It is recommended that you perform switch selection after setting the [Division No.] that is displayed in the upper right of the menu bar.

[Main] Tab Window Setting

[Division No.]

- ◎ When you click on the [Switch] icon, the same number as the division number is automatically set on the upper right of the menu bar.
- ◎ Multiple switch parts can be placed in the same division number (Max. 500/screen).
- ◎ When using a switch that is linked to other parts, you must set the switch's number so that it is the same as the division number of the part that it is linked to. Whether or not to link to other parts is decided by [Function].

[Draw Mode]

Select [XOR] (Highlight) or [REP] (Replace).

◆ XOR

For standard parts

The ON color, OFF color, OFF frame color, and OFF character color are displayed as they were set. The ON frame color and ON character color are determined this way: the OFF color and ON color are XORed, then the resultant color is XORed with the OFF frame color and OFF character color.
(For details, refer to page 6-7.)

For non-standard parts

OFF color and OFF character color are displayed as you set them. ON color and ON character color are displayed by the XOR function. (For details, refer to page 6-10.)

◆ REP

Depict the color as it was set.

(For details, refer to page 6-11.)

[Output Memory] (Can be selected from PC, internal memory, or memory card.)

- Ⓒ Check this item when you want to write switch activation information to the PC memory, the internal memory or a memory card.
- Ⓒ When checked ☒, the memory used for writing that information can be set.
 - When the internal memory or a memory card is chosen, the processing speed will be faster.
 - When the PC memory is chosen:
 - Depending on whether the specified output memory address is bit-writable, the selection for [Output Action] should vary.
 - Refer to the PC instruction manual whether the memory is bit-writable or not.

[Lamp Memory]

When unchecked (☐) [Auto] is selected for the lamp. When checked (☒) [External] is selected. The [Lamp Memory] setting becomes active.

○ Auto (☐)

When the switch is pressed, the lamp lights up (in ON color) automatically, and when it is released, it goes off (in OFF color).

○ External (☒)

Depending on the bit activation of the [Lamp Memory] that was set (selected from PC memory, internal memory, or memory card), you can illuminate (ON color) or darken (OFF color.)

For [External], if the selected switch part is [3 Notch], the switch's internal lamp can be changed in three patterns, OFF - ON - P3 (pattern 3).

(See page 6-12, "Creating Pattern 3 Part Lamp.")



For parts of 3 patterns, external commands must be used (that is, the [Lamp Memory] box must be checked).



When the PC memory is used for [Lamp Memory], set up consecutive addresses for high-speed processing.

[Output Action]

◎ An item active when [Output Memory] is checked. Select which operation to write on [Output Memory].

Select from [Momentary (Momentary W)], [Set], [Reset], or [Alternate].

For details, refer to the chart below.

◎ Switch output action list

Switch action	Output processing
Set	When the switch is pressed, the specified bit is set (ON).
Reset	When the switch is pressed, the specified bit is reset (OFF).
Momentary (Momentary W)	When the switch is held down, the specified bit is set (ON), and when it is released, it is reset (OFF).
Alternate	Each time the switch is pressed, the specified bit is alternately set (ON) and reset (OFF).

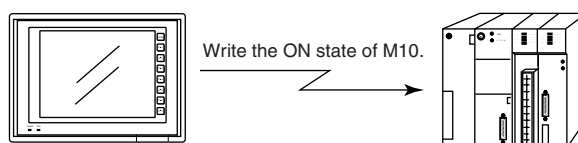
◎ [Momentary] and [Momentary W]

The switch works in the same way for both settings, but the processing method is different depending on the memory type.

◆ For bit-writable memory

When bit-writable memory is specified for [Output Memory], the operation result will be directly written on the bits of [Output Memory] as shown below, regardless of whether [Momentary] or [Momentary W] is chosen.

<Ex.> When [M10] is specified for [Output Memory]:



◆ For non-bit-writable memory

Switch activation is processed in the unit of bits within ZM-41/70, therefore, if the non-bit-writable memory is specified for [Output Memory], different processing methods are employed for the [Momentary]/[Momentary W] selection.



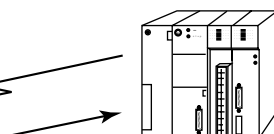
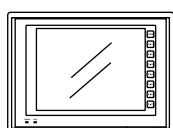
In the ZM-41/70:
When [2 Output] is chosen for [Switch Output] under [System Setting] and the same one word is allocated for both [Output Memory] setting, two outputs are available at the same time.

<<Processing when [Momentary] is chosen>>

<Ex.> When [D100-10] is specified for [Output Memory]:

1. Read data in D100

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0



2. Write data 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 while setting D100-10 to ON.

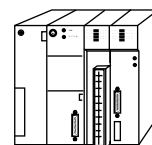
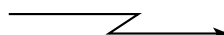
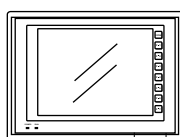
1. Data in the specified memory is read.
2. Results are written into the memory.

<<Processing when [Momentary W] is chosen>>

Results are directly written in one-word area of the specified memory. (Be sure to secure a one-word area.)

<Ex.> When [D100-10] is specified for [Output Memory]:

Write one-word data 0000010000000000
while setting D100-10 to ON.



 ZM-30 series handles switch output in the unit of words as momentary activation. Therefore, if data of ZM-30 is imported, it is recommended to choose [Momentary W].

- ⊙ For bit-writable memory, you can choose either [Momentary] or [Momentary W].
For non-bit-writable memory, it is recommended to choose [Momentary W] for a high-speed processing.

[Function]

- ⊙ Select the function to be provided to the switch, that is, how the switch should work when it is pressed.
- ⊙ Click the [Modify] button. The [Switch Function] dialog is displayed. When you press a tab, the tab window is displayed.
The [Switch Function] dialog has the following tab windows:

Normal	: For basic switch functions common to any switch
Entry	: For switches to be linked with a part in entry mode
Sampling	: For switches to be linked with a part in sampling mode
Memory Card	: For switches to be linked with a part in memory card mode
Memo Pad	: Only active when linked to the memo pad mode
Table Data	: Linked to entry mode when making the table data display an entry target in entry mode

- ⊙ List of switch functions
 - Respective switch functions are listed on the following pages.
 - When nothing is entered under the “Linked Part” column, the switch activates alone. When something is entered, the switch will not work unless a link is established with a corresponding part.
 - For more information, refer to the pages indicated.

Name	Auxiliary Item	Linked Part	See
	Contents		

◎ Normal

No	_____	_____	_____
	Activation of the specified bit in memory		
Screen call	Screen number	_____	P5-17
	Screen shift to the specified screen		
Hard copy	_____	_____	P5-18
	Print-out of displayed screen		
Overlap	Setting of ON/OFF/ALT/ICON Overlap No.	_____	P5-19
	Control of normal/MLIB overlap		
Multi-overlap	Multi number, overlap number	_____	P5-21
	Overlap coordinate		
	Multi-overlap control		
Word operation	WORD operation dialog	_____	P5-22
	Operation of memory data		
Plus block	_____	Message mode Graphic mode Data block mode Bit sampling	P8-32 P11-8 P9-19 P12-42
	Display of block numbered one greater		
Minus block	_____	Data sampling Trend sampling Memory card Memo pad	P12-31 P12-19 P13-16 P17-3
	Display of block numbered one less		
Roll up	_____	Relay mode Relay-sub Message mode Bit sampling	P8-10 P8-14 P8-32 P12-42
	Scrolling upward		
Roll down	_____	Data sampling Trend sampling Relay sampling Memory card mode	P12-31 P12-19 P12-47 P13-16
	Scrolling downward		
Block call	Block number	Message mode Data block area Graphic mode	P8-32 P9-19 P11-8
	Change of display block		
Mode	Display order	Relay mode Message mode Relay sampling	P8-10 P8-31 P8-10
	Display of corresponding messages		
Item select	_____	Entry mode	P9-33
	Entry select switch if data is placed in it		
Return	_____	_____	P5-17
	Clear in sampling buffer		
Reset	_____	Bit sampling Data sampling Trend sampling Memory card mode	P12-42 P12-31 P12-19 P13-16
	Return to the previous screen		
Occupy	_____	_____	P5-18
	Communication of 1 : 1 (only available with multi-link)		

◎ Entry

Character entry	_____	Entry mode	P9-35
	Entry of text on switches		
Write	_____		
	Write of entry data into memory		
Clear	_____		
	Clear of entry		
Toggle sign	_____		
	Inverse of entered sign (for numeric entry)		
Space	_____		
	Entry of one-byte space (for character entry)		
Backspace	_____		
	Backspace (for character entry)		
DEL	_____		
	Deletion of one character the cursor is sitting over (for char. entry)		
+1	_____		
	Increase by one the number the cursor is sitting over (for num. entry)		
-1	_____		
	Decrease by one the number the cursor is sitting over (for num. entry)		
RGT	_____		
	Move of cursor to the left (for character entry)		
LFT	_____		
	Move of cursor to the right (for character entry)		
UP	_____		
	Move of cursor to the previous option		
DW	_____		
	Move of cursor to the following option		
<	_____		
	Move to the previous screen page		
>	_____		
	Move to the following screen page		
Graphic library	Graphic library group number and number		
	Character change by GLIB reading		

◎ Sample

G return	_____	Bit sampling Data sampling Trend sampling	P12-42
	Return to the latest sampling data		P12-42
Display change	_____		P12-42
	Display change by ON/OFF	Bit sampling	
Print	_____	Bit sampling Data sampling	P12-42
	Print of sampling buffer data		P12-42
Layout Change (only available in ZM-s2)	_____	Bit sampling Relay sampling	P12-42
	Changes the display order of occurrence to begin with the oldest or to begin with the newest.		P12-42

◎ Memory card

File select	_____	Memory card mode	P13-16
	File selection available from the list		
Record select	_____		
	Record selection available from the list		
Card No. edit	Multi number		
	Edit mode available with the specified multi-overlap open		
Card name edit	Multi number		
	Edit available with the specified multi-overlap open		
File name edit	Multi number		
	File edit available with the switch lit		
Record name edit	Multi number		
	Record edit available with the switch lit		
Card format	_____		
	Formatting of memory cards		
Data transfer ZM > PLC	_____		
	Transfer of the selected record to PC		
Data transfer ZM < PLC	_____		
	Transfer of the selected record from PC		

◎ Memo Pad (ZM-*2 Function)

Pen color	Selects pen color	Memo pad	P17-3
	Pen color		
Pen thickness	Selects pen thickness (1 dot, 2 X 2 dots)		
	Pen thickness		
Draw a straight line	_____		
	Draws a straight line		
Area delete	_____		
	Deletes the memo pad in the selected area		
Delete all	_____		
	Deletes all memo pads on the screen		

◎ Table Data Display (ZM-*2 Function)

Move Cursor R	_____	Entry mode (table data display)	P9-30
	Moves the cursor right within the chart		
Move Cursor L	_____		
	Moves the cursor left within the chart		
Chart Move+	_____		
	Moves chart in the positive direction		
Chart Move-	_____		
	Moves chart in the negative direction		

About the [Character] Tab Window

For more information, refer to Chapter 6, “Lamp.”

[Detail] Tab Window

[Use ON Macro]

If you want to execute a macro when the switch is pressed, check this option (☑).

[ON Macro...] becomes active.

[ON Macro...]

Left-clicking [ON Macro...] brings up the macro block screen. Macro commands can be edited on this screen.

When you close the macro edit window, you will return to the [Switch] dialog.

For information on macro command, refer to Chapter 14, “Macro.”

[Use OFF Macro]

If you want to execute a macro when the switch is released, check this option (☑).

[OFF Macro...] becomes active.

[OFF Macro...]

Left-clicking [OFF Macro...] brings up the macro block screen. Macro commands can be edited on this screen.

When you close the macro edit window, you will return to the [Switch] dialog.

For information on macro command, refer to Chapter 14, “Macro.”

[Use Interlock]

Use a check mark to attach the interlock function to a switch. For [Use Interlock], the following items become active:

[Memory] (Select from PC memory, internal memory, or memory card)

Set interlock memory.

[Condition]

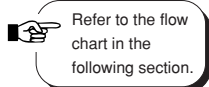
Select the [Memory] condition from the above item.

[ON] : If [Memory] is on, the switch will operate.

If [Memory] is off, the switch is prohibited.

[OFF] : If [Memory] is off, the switch will operate.

If [Memory] is on, the switch is prohibited.

**[When the switch is OFF] ([Effective]) or [Ineffective])**

A setting active when the switch's [Output Action] is [Momentary] or [Momentary W].

When you remove your hand from the switch that is turned on (= turn off), set whether or not the system should decide the condition set above.

[Effective] : Decide the condition even when the switch is off.

If the condition fails, the switch will not be turned off even when you remove your hand.

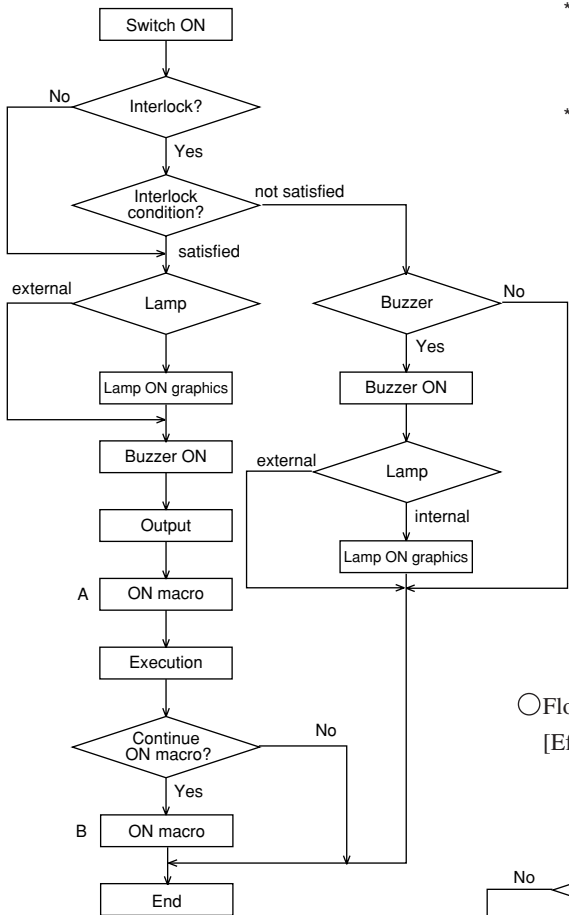
[Ineffective] : The interlock is inactive when the switch is off.

[Use Error Buzzer]

Set whether or not an error buzzer sounds when the switch is in a prohibited status because the interlock condition has failed.

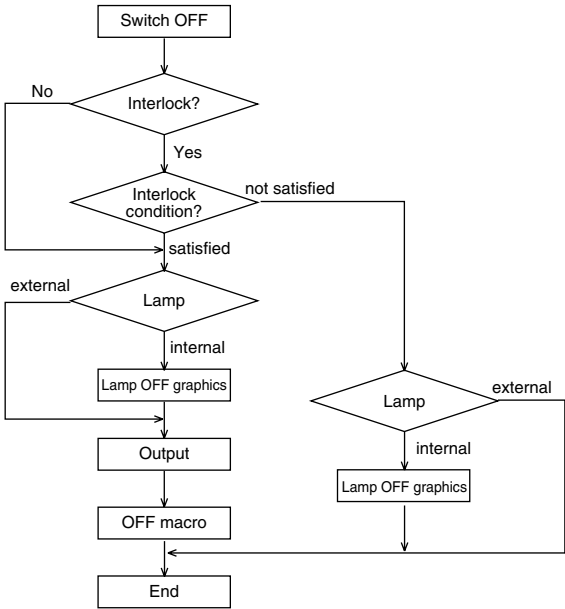
When [Use Error Buzzer] is unchecked (☐), the buzzer will not sound even if you press a prohibited switch. When [Use Error Buzzer] is checked (☑), the buzzer will sound when a prohibited switch is pressed.

○ Flow chart when the switch is pressed



- * ON macro B is started after ON macro A is finished with "SWRET."
- For more information on commands, such as "SWRET," refer to Chapter 14.
- * [Output Action] or [Macro] should be selected for execution.

○ Flow chart when [Momentary] is chosen and [Effective] is chosen for [When Switch is OFF]



[Process Cycle]
Refer to page 2-9.

About the [Color] Tab Window

For more details, refer to Chapter 6, "Lamp."

Switch Function Examples

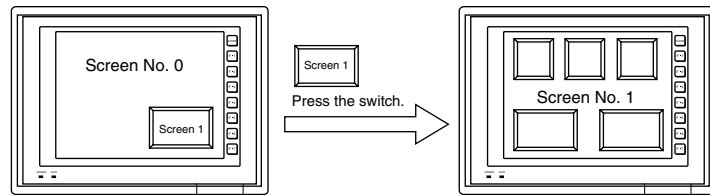
Switching the Screen (=screen, return)

Use the [Function: Screen] or [Function: Return] switch.

◎[Function: Screen]

Set the [Screen No.] as an auxiliary item.

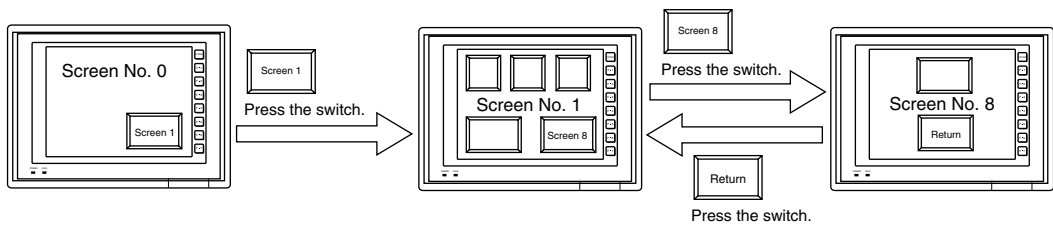
When you press the switch, you will change to the [Screen No.] screen that you specified.



◎[Function: Return]

For changing screen displays via external commands, refer to page 2-27.

When you press the switch, you will return to the screen that was displayed before the present screen was displayed. You can go up to 8 steps back. However, you cannot return to a screen that was changed and displayed externally.



- * **When the screen display reverts, the initial screen state is displayed, that is, the state when no scrolling nor block change has been commanded.**
- * **When the screen display is changed, all the switches and switch outputs are turned off. This is to prevent accidental activation of any switch which may be caused by inadvertent contact with the screen.**

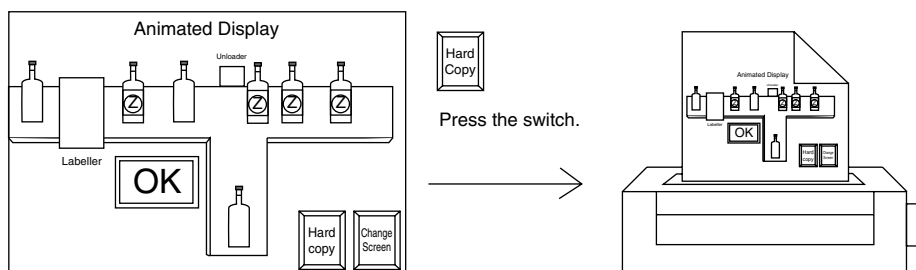
To Print out the Screen Display (= Hard Copy):

Use the [Function: Hard Copy] switch.

Set the [Function: Hard Copy] switch on the screen.

When you press that switch, the displayed screen is printed.

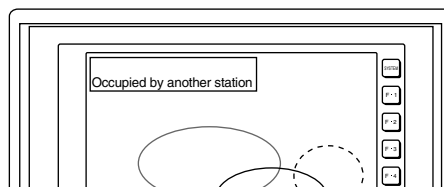
During printing, other operations on the screen will function.



When 0, that switch is also printed out. There are ways to print with an external command when you do not want to print out the switch. For details, refer to page 2-26.

Occupy

- 1) Only when [Multi-link] is chosen for [Connection] in the [Detail] tab window of the [Comm. Parameter] dialog, can [Occupy] be chosen.
- 2) In the case of multi-link, multiple Control Terminals are connected to one PC (n : 1). Selecting [Occupy] limits communication between one Control Terminal and the PC (1:1), while other Control Terminals are stopped. On the top left corner of these Control Terminals, "Occupied by other station" is displayed.



- 3) Pressing the switch of [Occupy] lights up the lamp-in-switch. (This lamp lights up even when "external" is chosen.) Pressing the switch again resets the occupied condition, and the lamp-in-switch is turned off. Communication is started between one PC and multiple Control Terminals again.

To Display Normal Overlap (= Overlap):

◎ Use the [Function: Overlap] switch.

There is a setting for [Action] and [Overlap No.] as auxiliary setting items.

For more information on overlaps, refer to Chapter 4, "Overlap."

◆ [Action]

Select from [ON], [OFF], [ALT], or [ICON].

For displaying overlaps via external commands, refer to page 4-8.

◆ [Overlap No.]

A maximum of three overlaps can be displayed on one screen. There is a setting for [Overlap No.] for each [Overlap] switch so that you can determine which switch acts for which overlap.

◎ There are three types of overlaps: normal, call and multi. The [Function: Overlap] switch is used for displaying normal overlaps and call-overlaps.

To display multi-overlap, refer to the next section, "Displaying Multi-overlap."



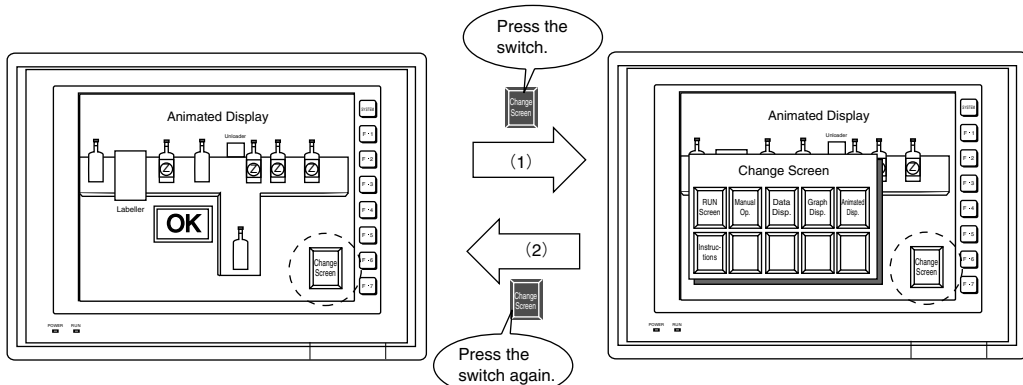
To erase multi-overlap, use the [Function: Overlap = OFF] switch.

Switch Action	Overlap Action
ON	When the switch is pressed, the overlap of the specified number is displayed.
OFF	When the switch is pressed, the overlap of the specified number is erased.
ALT	When the switch is pressed once, the overlap of the specified number is displayed, and when pressed again, it is erased.
ICON	1) Move by switch - Pressing the switch once makes the frame flash, and the switch can be moved. - Pressing a position on the screen moves the switch to the position. If a part of the overlap should extend off the screen, the ZM Series automatically adjusts the position closest to the pressed position but within the screen space. - When the switch is pressed again, the move mode is canceled. 2) Overlap display - Pressing the switch twice erases the switch, and the overlap of the specified number is displayed. - When the specified overlap disappears, the switch is displayed again. - If the overlap is equipped with the SYSTEM switch, pressing the top left corner of the overlap twice erases the overlap from the screen. - If it is not equipped with the SYSTEM switch, create a [Function: Overlap = OFF] switch with a number specification for erasing the overlap.



When pressing a switch twice, be sure to do so within 1 second. Tap it twice rhythmically.

<Ex. 1> For [Function: Overlap = ALT]



<Ex. 2>

When the overlap is displayed, the information that the switch was pressed is transmitted to the PC.

Set [Output Memory] in the [Function: Overlap = ON] switch.

Select [Momentary (W)], [Set], or [Alternate] for [Output Action].



For the ZM-41/70 Switch

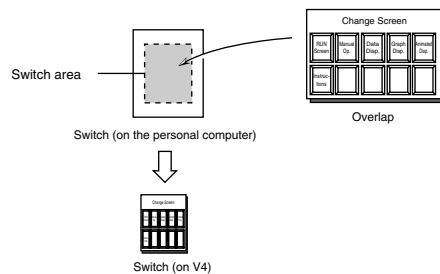
ICON2

When the switch function is set in overlap for the ZM-41/70, there is an [ICON2] action in addition to [ON], [OFF], [ALT], and [ICON]. Overlap operates the same as an icon.

The switch that was set loses its original form, and the overlap screen is depicted within the operating area of the switch that was set.

The overlap screen image is taken from the switch's picture.

(For example, if an animated graphic is set on the overlap, it is also animated for the switch.)



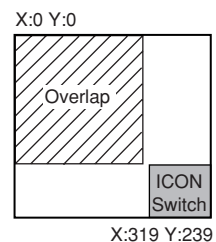
*** When setting an ICON2 switch, be sure to set [Snap on Switch Grids] in the [Display Environment] dialog.**

For the ZM-41D/L

ICON2 cannot be used on the ZM-41D/L.

Something to note when creating an ICON switch: Overlap and icon switch display location can be set anywhere, but there are limits in the area.

Place the created overlap and icon switches as shown in the diagram to the right, making sure that they are not layered on each other (put the upper left of the overlap in the X: 0, Y: 0 of the ZM-41D/L display area, and the lower right of the icon switch in X: 319, Y: 239). If they are layered, the icon will not be displayed. Design the area without layering.





For more information on multi-overlap edit, refer to Chapter 4, "Overlap." (pages 4-10 and on)

To Display Multi-Overlaps (= Multi-overlap):

Use the [Function: Multi-overlap] switch

There are settings for [Overlap No.], [Multi No.], and [Placement] as auxiliary items.

◆ [Overlap No.]

A maximum of three overlaps can be displayed on one screen. There is a setting for [Overlap No.] for each [Overlap] switch so that you can determine which switch acts for which overlap.

◆ [Multi No.]

For multi-overlap, the actual overlap screen should not be created and registered on screen, but, in multi-overlap edit.

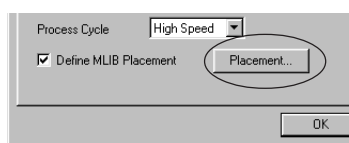
[Multi No.] sets which screen to call up among those which were registered within multi-overlap edit.

◆ [Placement]

You can set the display location of the overlap screen (of multi-overlap edit) when it is displayed on screen.

Bring up the [Detail] tab window of the [Switch] dialog.

For [☒MLIB Placement], the [Placement] button becomes active. When you click the [Placement] button, the mouse cursor is displayed.



Overlap Coordinates

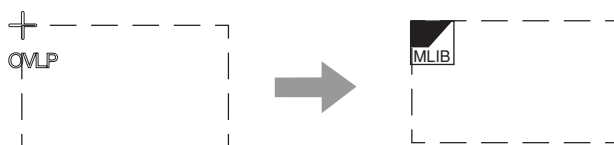
For ZM-22
(0,0) is the origin point, with 4-dot intervals in the X direction, and 1-dot intervals in the Y direction.

For ZM-41/70
[Mode] grid (line, column)
(See page 1-28.)

When you drag to the desired location on the screen, the rectangle that shows overlap size is displayed as a dotted line.

(Drag moves along overlap coordinates.)

When you release the mouse in the desired location, the MLIB mark is displayed on the screen. This mark belongs in the upper left of the overlap screen.



For [☐MLIB Placement], the overlap is displayed in the same location as multi-overlap edit.

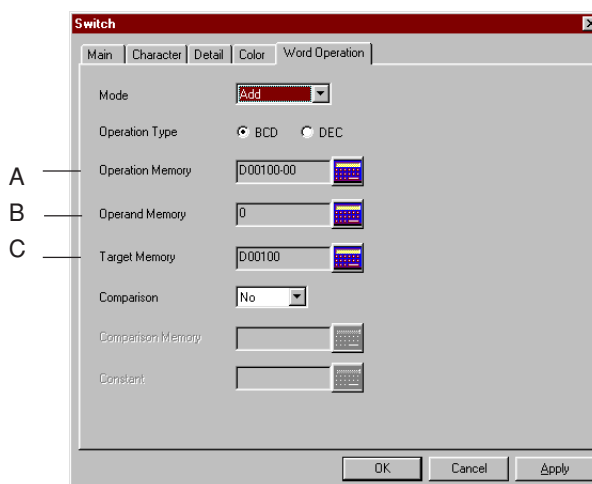


Use the [Function: Overlap = OFF] switch only when deleting multi-overlap. (Refer to pages 4-11 and 4-12 for how to delete externally.)

To Process Arithmetic Operation:

When the switch is pressed, a specified arithmetic operation should be processed.

In the [Main] tab window of the [Switch] dialog, select [Function: Word Operation] and click [OK]. The [Word Operat.] tab window is displayed. The contents are described as follows:



[Mode]

Select the desired operation mode from 8 options: transfer, add, subtract, multiple, divide, OR, AND, XOR. Refer to the table below.

Mode	Contents
Transfer (A > B)	The operation memory [A] is transferred to the operand memory [B].
Add (A + B → C) Subtract (A - B → C) Multiple (A * B → C) Divide (A / B → C)	The operation memory [A] and the operand memory [B] are arithmetically computed, and its result is written in the output memory [C]. In the case of divisions, the quotient is written in the output memory [C] and the remainder is written in [C + 1].
OR (A U B → C) AND (A ∩ B → C) XOR (A @ B → C)	The operation memory [A] and the operand memory [B] are logically computed, and its result is written in the output memory [C].

[Operation Format]

When [Add], [Subtract], [Multiple] or [Divide] is chosen for [Mode], choose BCD (binary coded decimal) or DEC (decimal) for the format for writing into the specified memory.

[Operation Memory [A]]

You can select from PC memory, internal memory, or memory card.

[Operand Memory [B]]

You can select from PC memory, internal memory, memory card, or constant.

[Output Memory [C]]

Active in instances other than [Mode: Transfer].

You can select from PC memory, internal memory, or memory card.

[Comparison]

◆ The default setting is [None].

◆ To make a comparison, choose one of [=], [Not =], [<], [>], [<=] or [>=] as the comparison expression. The following items become active:

[Comparison Memory]

You can choose from PC memory, internal memory, or memory card

[Constant]

Specify a constant.

Data in [Comparison Memory] is compared with that in [Constant] using the selected [Comparison].

If the result of comparison is true, it is written in the output memory [C] (if [Transfer] is chosen for [Mode], it is written in the operand memory [B].) If the result is false, it is ignored.

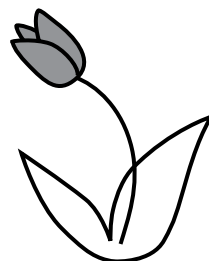
◎ If the value in the output memory [C] is changed by a command from PC, the internal memory or a memory card, the latter value has priority.

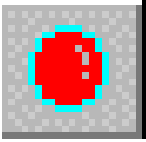
◎ Control Terminal processes operations in the following order:

- 1) Read out the operation memory and the operand memory.
- 2) Operation processing
- 3) The result is written in the output memory.

MEMO

Please use this page freely.

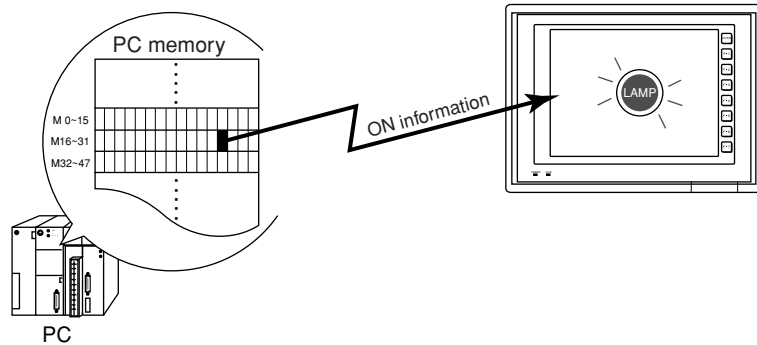




Lamp

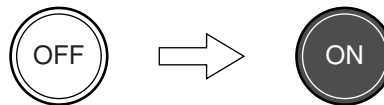
Outline of Lamp

◎ Lamps are turned on/off in response to bit activation in PC.

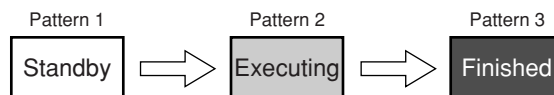


◎ Lamp colors to be used when a bit is set and reset can be specified.

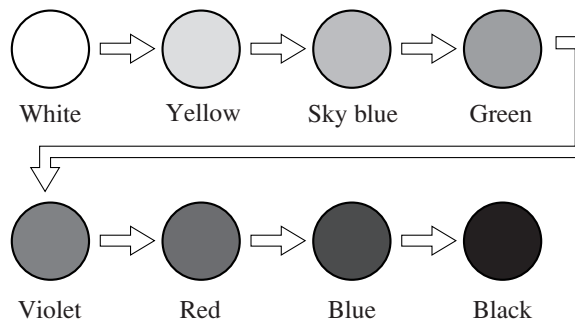
Different text can be displayed when the lamp is turned on and off (when [REP] is chosen for [Draw Mode]).



◎ It is also possible for one lamp to use three kinds of graphics and colors, such as “Standby,” “Executing” and “Finished” (=“3-notch”, “P3”).



◎ Also, it is possible for one lamp to use max. eight kinds of graphics and colors (=“8 notch”, “P8”).



Creating Lamps

Outline of Lamp Creation

- ◎ Total available number of lamps

A maximum of 768 lamps (ZM-42D/L : 192 lamps) can be created on one screen.

Lamp Creating Procedure

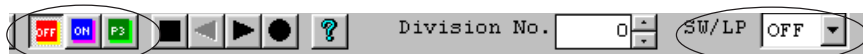
1. Click the [Lamp] icon in the tool bar. The [Lamp] dialog is displayed.
2. Set the [Lamp] dialog, and place the lamp part on the screen.

- ◎ When bringing up the [Lamp] dialog for the part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown) and then click the [Detail/Prop. Change] icon.



- ◎ When creating multiple lamps, the multiple-copy function is effective.

- ◎ In case of 2 or 3 notch lamps, the state of lamp display can be checked by clicking the [ON], [OFF], and [P3] icons. In case of 4 - 8 notch lamps, the state of lamp display can be checked by the [SW/LP] menu.



Double-click is allowed only when grouping the selected parts.

- ◎ All property changing

The color properties of selected lamps can be changed simultaneously.

1. Hold down the SHIFT key and click the desired parts.
2. Click the [Detail/Prop. Change] icon. The [Prop. Change of Switch/Lamp] dialog is displayed, and [Frame] and [Area] colors can be changed at the same time.

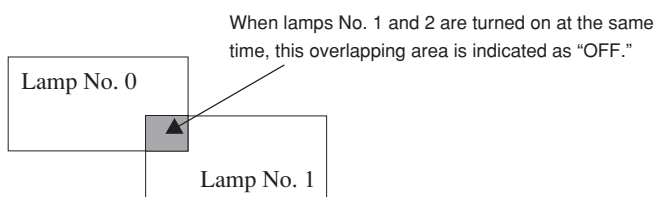
Notes on Placing Lamps



When placing two or more lamps, do not allow them to overlap at all.

If it is unavoidably necessary to do so:

The overlapping area will be turned off when lamps are turned on. This is because [ON]/[OFF] colors are the reversal of each other. Take this note into consideration when placing lamps.



[Lamp] Dialog

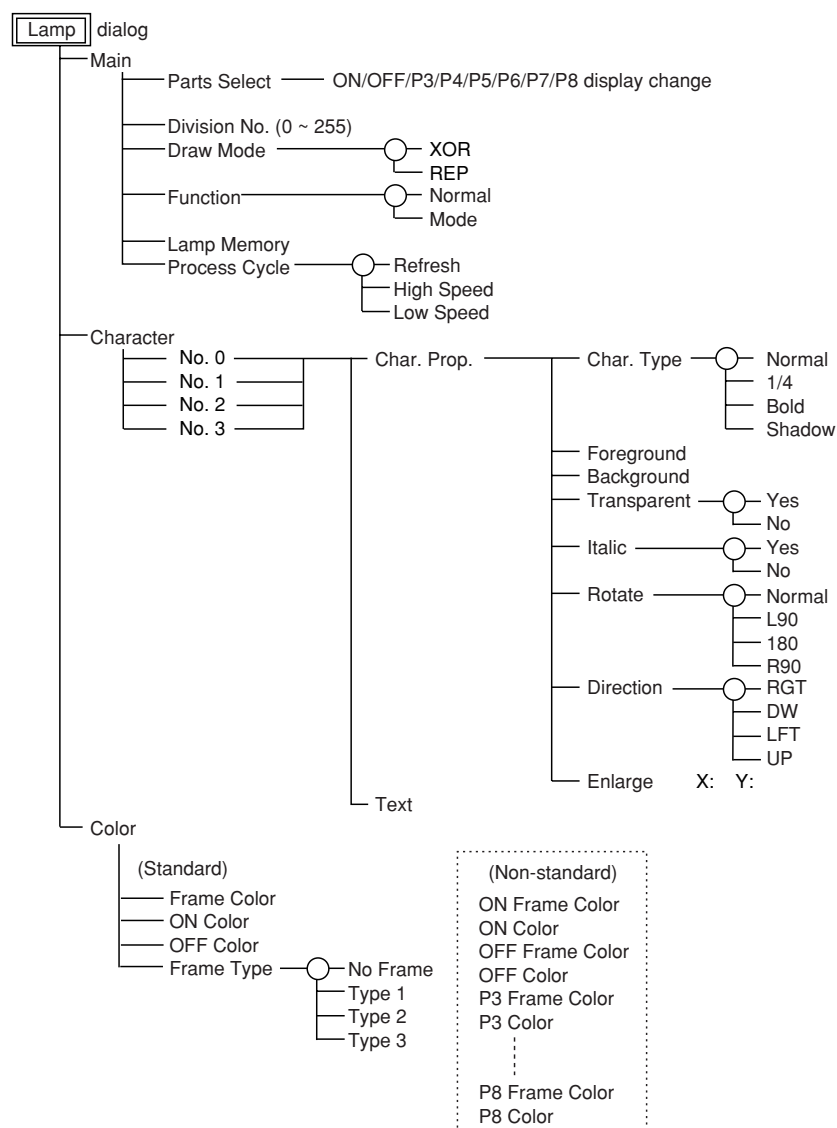
Lamp Memory

Setting memory	Options in the [Lamp] dialog
[Lamp Memory]	PC Memory, Internal Memory, Memory Card

The required number of bits depends on the notch number of selected part.

The notch number	2	3	4	5	6	7	8
Required bits	1	2	3	4	5	6	7

Tree Diagram for Lamp





500 lamps/screen
for the ZM-41/70

[Main] Tab Window

[Division No.]

The division number that is effective when the [Lamp] icon is clicked is automatically entered.

The total number of lamps on the screen cannot exceed 768 (ZM-42D/L : 192) ; therefore, you do not have to worry about the current division when placing lamps.

[Draw Mode]

◆ XOR (highlight)

When a standard part is chosen:

When the lamp is turned off, it is displayed in the OFF, frame and text colors as specified. When it is turned on, it is displayed in the ON color; however, the specified frame and text colors are XORed, respectively. (For more information, refer to page 6-7.)

When a non-standard part is chosen:

When the lamp is turned off, it is displayed in the OFF and text colors as specified. When the lamp is turned on, the ON and text colors are XORed with OFF colors. (For more information, refer to page 6-10.)

◆ REP (replace)

The specified colors are used. (For more information, refer to pages 6-9 and 6-11.)

[Function]

◆ Normal

The lamp works independently irrespective of other parts.

◆ Mode

Messages can be displayed on the lamp in a link with relay or message mode.

[Display Order]

When [Mode] is chosen, [Display Order] becomes active. Specify the order in displaying messages.

When using [Mode], refer to page 8-11 in Chapter 8, "Message Display."

[Lamp Memory] (PC Memory, Internal Memory, Memory Card)

Specify a memory address for illuminating the lamp.



For information on
the relation
between lamp
memory and lamp
drawing, refer to
page 6-12.



The internal memory
refers to memory of
the Control Terminal
ZM series available
for users.
Memory cards are
optional.



When [PC Memory] is chosen for multiple lamps, it is recommended that memory be allocated in consecutive addresses to increase the process speed.

[Process Cycle]

For information on processing cycle, refer to page 2-9.

[Character] Tab Window

Properties can be set for text Nos. 0 to 3. Set properties before text entry.

[No. 0 ~ No. 3]

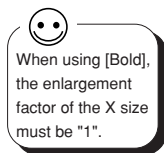
A maximum of four lines of text can be placed in one lamp.

Clicking in a text entry field brings up the text entry cursor.

Enter text within the X size of the lamp part.

[Char. Prop.] dialog

Set the following character property options.



[Char. Type]

Normal : Plain typeface is used.

1/4 : 8 x 8 dots (available for one-byte characters only)

Bold : Bold typeface is used (thick characters)

Shadow : Shadowed typeface is used.

[Foreground] [Background]

Specify character colors.

(The background color is used for the shadow section.)

[Transparent]

Check the box if you want to use transparency.

[Italic]

Check the box if you want to use italics.

[Rotate] (Normal/L90/180/R90)

When rotating text, choose an option except [Normal].

[Direction] (RGT/DW/LFT/UP)

Choose a text alignment direction.

[Enlarge]

Specify factors of enlargement for X and Y.

[Text]

Text can be selected from the text file. Clicking [Text] brings up the file reading dialog. Select the desired text file. (For more information, refer to page 22-10.)



When [REP] is chosen for [Draw Mode], text to be used when the lamp is on can be entered. Click [ON] beneath the lamp image in the [Main] tab window. The [Character] tab window becomes valid for ON lamp text. Different text can be displayed when the lamp is on and off.

Lamp Text Alignment

The text in a lamp will be center-aligned. If not, click the lamp part (handles are shown), select [Align] from the [Edit] menu, and click [Switch/Lamp Centering]. The text is center-aligned.

When two or more lines of text are set, clicking [Switch/Lamp Centering] brings up the [Pitch] dialog. Specify the desired pitch, and click [OK]. The lines of text are aligned. Clicking [Default] places the text in the default position.

[Color] Tab Window

◆ When a standard lamp part is chosen:

[Frame Color] [ON Color] [OFF Color]

Specify colors of a standard part.

[Frame Type] (No Frame/Type 1/Type 2/Type 3)

This option is available with standard lamp parts. Choose the desired type.

◆ When a non-standard lamp part is chosen:

[ON Frame Color] [ON Color] [OFF Frame Color] [OFF Color]

Specify colors of a part.

Which options can be set depends on the types of parts.

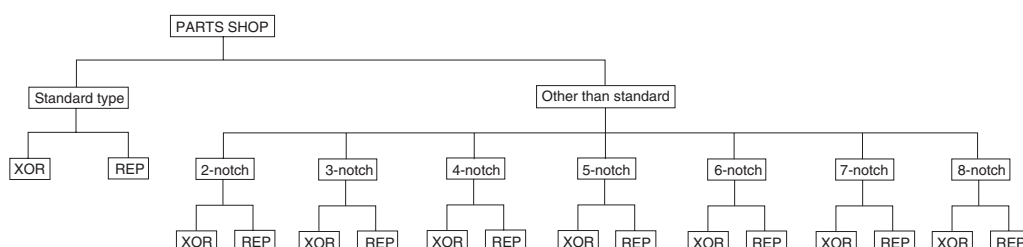
Lamp Colors

Depending on the part selected, setting procedure of the lamp colors (ON/OFF/P3/P4/P5/P6/P7/P8) varies.

There are standard and non-standard parts. Non-standard parts are divided into 2-notch and 3-notch, 4-notch, 5-notch, 6-notch, 7-notch and 8-notch types.

- 2-notch two patterns of ON/OFF
- 3-notch three patterns of ON/OFF/P3
- 4-notch three patterns of ON/OFF/P3/P4
- 5-notch three patterns of ON/OFF/P3/P4/P5
- 6-notch three patterns of ON/OFF/P3/P4/P5/P6
- 7-notch three patterns of ON/OFF/P3/P4/P5/P6/P7
- 8-notch three patterns of ON/OFF/P3/P4/P5/P6/P7/P8

The coloring procedure depends on selection of [XOR] or [REP] for [Draw Mode].

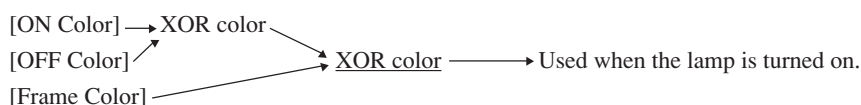


When Standard Part Is Chosen:

Draw Mode: XOR

Lamp Colors

It is possible to set [Frame Color], [ON Color], and [OFF Color].



[Frame Color]

Specify the frame color to be used when the lamp is turned off.

The frame color when the lamp is turned on cannot be set. The frame is displayed in a color determined by XOR operation.

[ON Color]

Specify the color to be used when the lamp is turned on. The lamp is displayed in the specified color.

[OFF Color]

Specify the color to be used when the lamp is turned off. The lamp is displayed in the specified color.

Text on Lamps

When [XOR] is chosen for [Draw Mode] in the [Lamp] dialog, only the text to be used when the lamp is off can be set. The same text consequently is used when the lamp is turned on. When the lamp is turned on, the text is displayed in a color determined by XOR operation as performed for the frame color.

In the case of lamp text created from [Draw] and [Text], it is displayed in the same manner.

Example

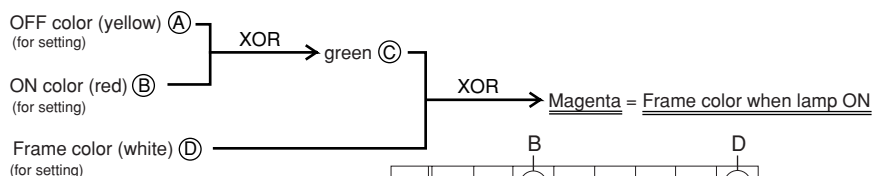
The following explains lamp colors when [XOR] is chosen for [Draw] mode.

★ OFF color: yellow

ON color: red

Frame color: white

Frame color to be used when the lamp is turned on:



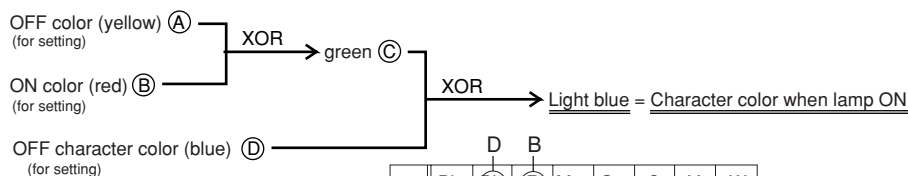
				B					D
	Bla	Blu	R	Mag	Gre	C	Y	W	
	Bla	Bla	Blu	R	Mag	Gre	C	Y	W
	Blu	Blu	Bla	Mag	R	C	Gre	W	Y
	R	R	Mag	Bla	Blu	Y	W	Gre	C
	Mag	Mag	R	Blu	Bla	W	Y	C	Gre
C	Gre	Gre	C	Y	W	Bla	Blu	R	Mag
	C	C	Gre	W	Y	Blu	Bla	Mag	R
A	Y	Y	W	Gre	C	R	Mag	Bla	Blu
	W	W	Y	C	Gre	Mag	R	Blu	Bla
				C					

★ OFF color: yellow

ON color: red

OFF character color: blue

Text color to be used when the lamp is turned on:



				D	B				
	Bla	Blu	R	Mag	Gre	C	Y	W	
	Bla	Bla	Blu	R	Mag	Gre	C	Y	W
	Blu	Blu	Bla	Mag	R	C	Gre	W	Y
	R	R	Mag	Bla	Blu	Y	W	Gre	C
	Mag	Mag	R	Blu	Bla	W	Y	C	Gre
C	Gre	Gre	C	Y	W	Bla	Blu	R	Mag
	C	C	Gre	W	Y	Blu	Bla	Mag	R
A	Y	Y	W	Gre	C	R	Mag	Bla	Blu
	W	W	Y	C	Gre	Mag	R	Blu	Bla
				C					



For the list of XOR colors, refer to page 11-24.

Bla: black Blu: blue R: red Mag: magenta Gre: green C: cyan Y: yellow W: white

Draw Mode: REP

Lamp Colors

It is possible to set [Frame Color], [ON Color], and [OFF Color].

[Frame Color]

Specify the frame color to be used when the lamp is turned on and off.

The same color must be used.

[ON Color]

Specify the color to be used when the lamp is turned on. The lamp is displayed in the specified color.

[OFF Color]

Specify the color to be used when the lamp is turned off. The lamp is displayed in the specified color.

Text on Lamps

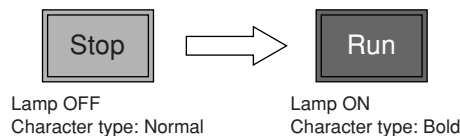
When placing text on a lamp for “REP” draw mode, the following two manners are available.

◆ Display of different text when the lamp is turned on and off:

Click [OFF] in the [Lamp] dialog. Set the text and property for the lamp turned off.

Click [ON]. Set the text and property for the lamp turned on.

Different text with different properties is displayed on the lamp when it is turned on and off.



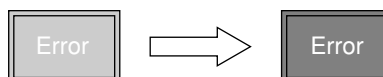
◆ Display of the same text when the lamp is turned on and off:

Click [OFF] in the [Lamp] dialog. Set the text and property for the lamp turned off.

Setting for the lamp turned on is not necessary.

The text is displayed on the lamp as specified when the lamp is turned off.

When the lamp is turned on, the same text with the same property is displayed.



Same text and property



When the color for the lamp turned on and the text color for the lamp turned off are the same, no text is displayed when the lamp is turned on.

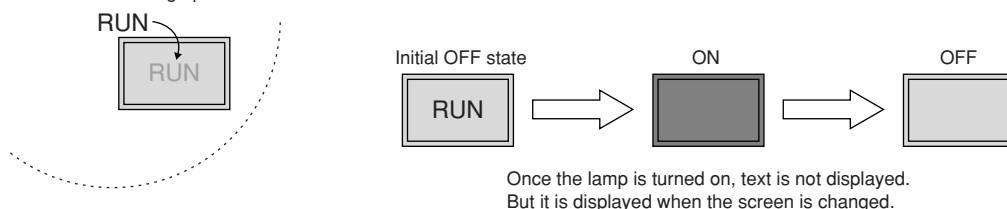
When text is entered by selecting [Draw] and [Text]:

Text is not displayed when the lamp is turned on.

Once the lamp is turned on, the text is not displayed unless the screen is changed.

When centering text created from [Draw] and [Text], refer to page 1-23.

Place text created as graphics.



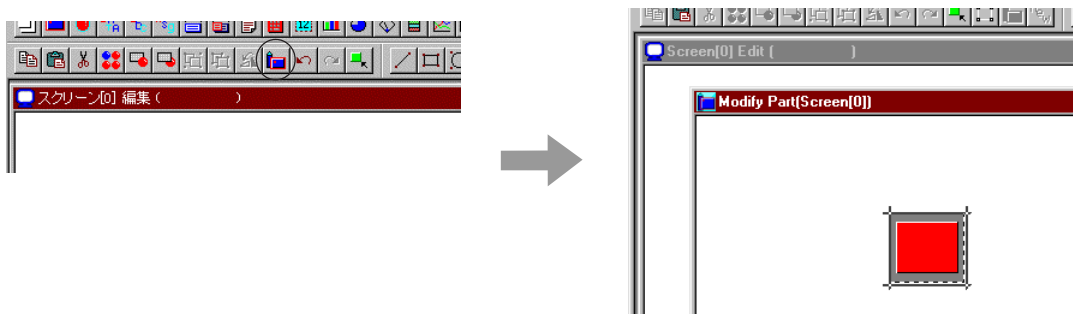
When Non-Standard Part is Chosen:

Lamp Colors

For non-standard lamp parts, [ON Frame Color], [ON Color], [OFF Frame Color], and [OFF Color] (as well as [P3 Frame Color] and [P3 Color] ~ [P8 Frame Color] and [P8 Color] for a 3-notch ~ 8-notch part) can be set at the maximum. However, which options are effective depends on lamp property. Open the [Prop. Change] dialog as follows for specifying lamp colors.

◆ Checking the lamp property

Click the desired lamp, and select [Modify Part] from the [Edit] menu. The [Modify Part] window is displayed.

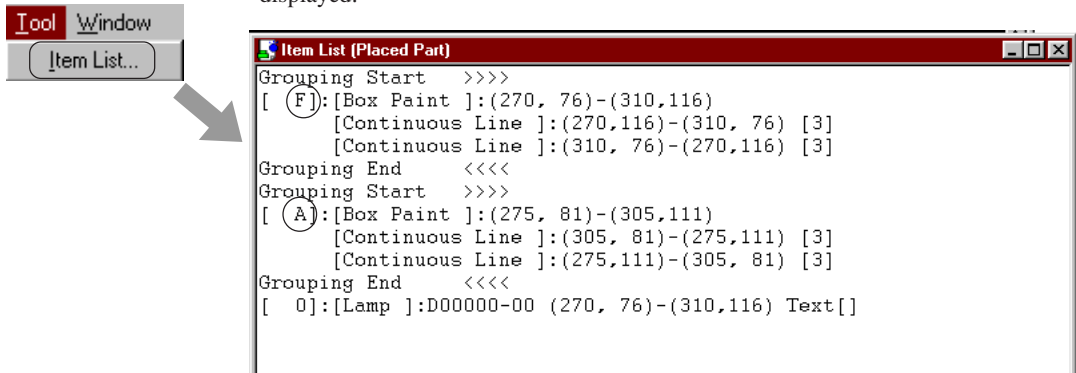


Open the [Prop. Change] dialog for the lamp. Color specification depends on the option setting in the lower right corner of the dialog.

- [Prop. Fixed] : Colors of the lamp cannot be specified in the [Lamp] dialog.
- [Frame] : Colors can be specified for [OFF Frame Color] and [ON Frame Color].
- [Area] : Colors can be specified for [OFF Color] and [ON Color].

[Item List] is also available instead of using the [Prop. Change] dialog.

Select the [Item List] from the [Tool] menu while the [Modify Part] window is displayed.



To know property, check if a character of the alphabet is indicated at the top of each part name.

[Prop. Fixed] : (None)
 [Frame] : F
 [Area] : A

Draw Mode: XOR

When the lamp is turned off, the OFF graphic is displayed; when it is turned on, the ON graphic colors are XORed with those of the OFF graphic.

When determining the ON graphic colors, check which colors should be XORed with the OFF graphic colors to realize your desired colors while referring to the XOR table (page 6-8).

Likewise, in the case of 3-notch parts, the P3 graphic colors are XORed with the OFF graphic colors.

Draw Mode: REP

When the lamp is turned off, the OFF graphic is displayed.

When it is turned on, the ON graphic is put on top of the OFF graphic.

When it is turned off next, the OFF graphic is put on top of the ON graphic.



Because the graphics are put on top of one another for “REP” draw mode, the graphic (painted, etc.) to cover up the former one is necessary each time the lamp is turned on and off, or it will result in overlapping graphics.

Both OFF and ON graphics must be box-painted (or circle-painted) to cover up the former one. They can be put on top of another without overlapping problem.

Likewise, when a part of 3-notch is used, the P3 graphic is put on top of the OFF or ON graphic. Be sure to paint the box (or circle) of the P3 graphic.

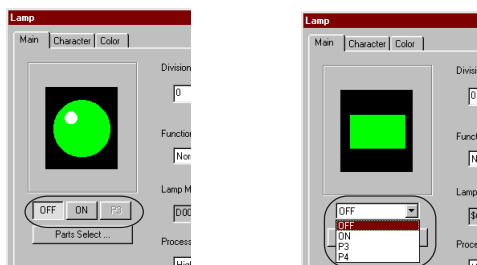
Text on Lamps

Refer to the explanation of placing text on standard lamp parts.

- ◆ When [XOR] is chosen for [Draw Mode] in the [Lamp] dialog, only the text to be used when the lamp is off can be set. The same text consequently is used when the lamp is turned on. When the lamp is turned on, the text is displayed in a color determined by XOR operation as performed for the frame color.
- ◆ When [REP] is chosen for [Draw Mode], text can be set in two manners. For more information, refer to page 6-9.

Relation between Lamp Memory and Drawing

- ◆ The standard lamp parts are 2-notch lamps.
The type of notch number can be checked by the following area of the [Lamp] dialog.



- ◆ The required number of bits depends on the notch number of selected part. The relation between [Lamp Memory] and drawing is as follows;

Lamp Memory (bit)								(Lamp memory = n)		Drawing	the notch number	
n+6	n+5	n+4	n+3	n+2	n+1	n						
0	0	0	0	0	0	0	0	OFF				
0	0	0	0	0	0	0	1	ON				2-notch
0	0	0	0	0	0	1	-	P3				3-notch
0	0	0	0	1	-	-	-	P4				4-notch
0	0	0	1	-	-	-	-	P5				5-notch
0	0	1	-	-	-	-	-	P6				6-notch
0	1	-	-	-	-	-	-	P7				7-notch
1	-	-	-	-	-	-	-	P8				8-notch

0 : OFF, 1 : ON, - : Ignored even if ON or OFF

<Ex.> When the following 3-notch lamp is placed on the screen and “M100” is specified for the lamp memory:



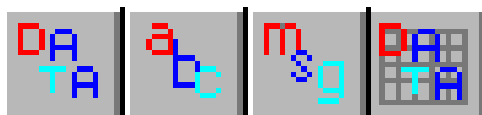
When “M100” is set (ON) by PC:



When “M101” is set (ON) by PC:



If you place multiple lamps on the screen allocating memory in consecutive addresses, check the notch number of selected parts. The required number of bits depends on the notch number.



Data Display

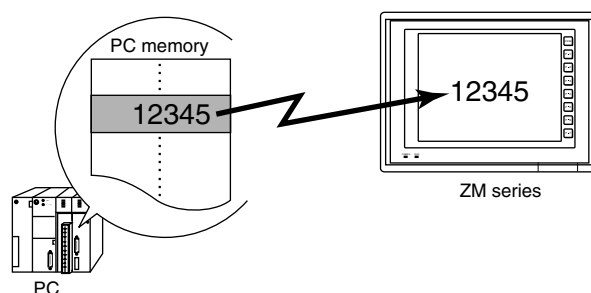
Outline of Data Displays

The “data display” function allows the Control Terminal ZM series to display data in the specified address in the PC memory and to reflect its changes in real time. This function can indicate data in numerals (numerical data display), in characters (character display), or in the form of messages (message display).

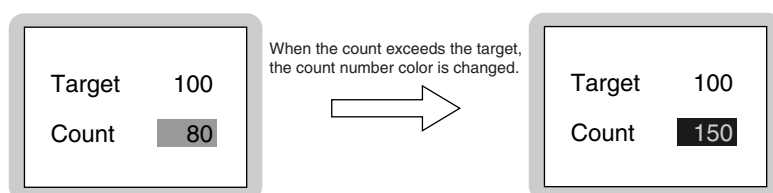
The ZM-*2 has the function to display tabulated data.

Outline of Numerical Data Display

- ◎ Numerical data read from PC is displayed in real time on the Control Terminal screen in any of the following formats: DEC (w/o sign); DEC (w/ -sign); DEC (w/ +/- -sign); HEX; OCT; BIN.

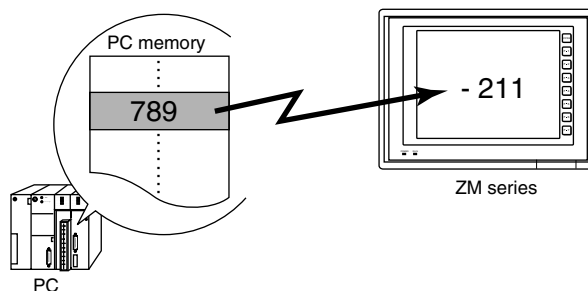


- ◎ It is possible to display data in a different color when it exceeds or falls short of the specified range. This setting can easily attract the operators’ attention to the situation.



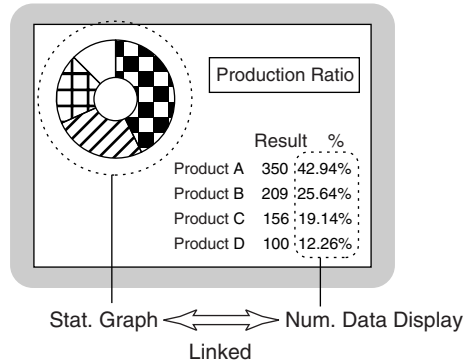
- ◎ It is possible to calculate data read from PC in Control Terminal, and to display its result on the Control Terminal screen.

Control Terminal executes the following calculation to read data “789” and displays the result.



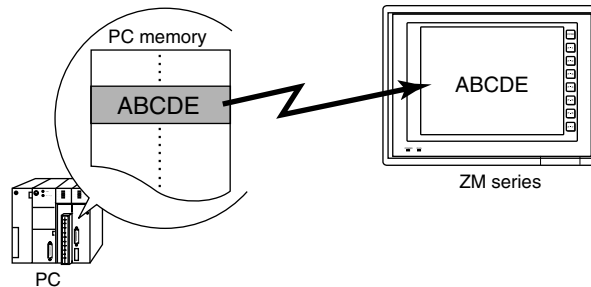
◎In addition to using of “numerical data display” ([Num. Data Display]) independently, it can also be linked with another part.

For example, in order to indicate data as a percent in the statistic graph as shown below, it is necessary to link [Num. Data Display] with [Stat. Graph]. Then % data automatically reflects changes along with the data in the statistic graph.



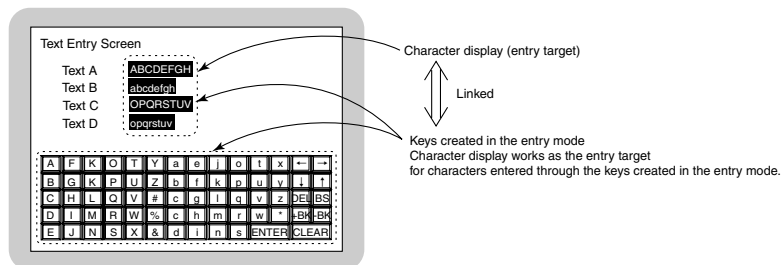
Outline of Character Display

◎Data read from PC is displayed in the form of characters on the Control Terminal screen in real time. ANK codes are put into one-byte characters, and Shift JIS codes are put into two-byte characters in case of Japanese.



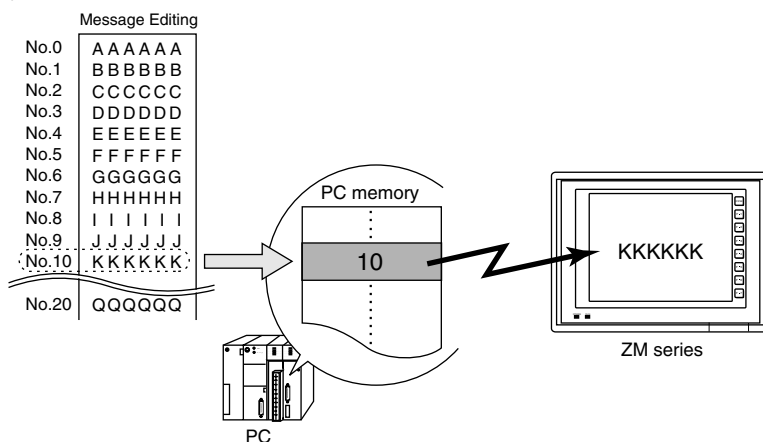
◎In addition to the above case, “character display” ([Char. Display]) can also be linked with another part.

For example, when a character key set up in the entry mode is pressed, the character is entered in the [Char. Display] part specified as “entry target.” This is possible by linking [Char. Display] with [Entry Mode].

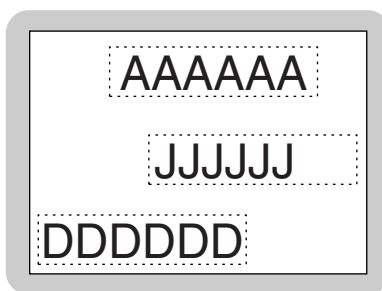


Outline of Message Display

- Required messages should be registered within Control Terminal preliminary. When a message number is specified in the PC memory, the corresponding message is displayed on the Control Terminal screen in real time.



- One-line message can be displayed in any position desired.



Outline of Table Data Display (ZM-*2 Function)

- Multiple data can be displayed in tabular form with ease.
- You can choose any from [Num. Data Display], [Char. Display], [Message Display] and [Text in Drawing] for data display.
- Property modification for multiple data displays is possible at one time.
- Average, maximum, minimum, and total values can be displayed.
- Table data display can be set as the entry target in the entry mode.

	No.1	No.2	No.3	No.4	No.5	Average
1	100	150	120	130	200	140
2	120	100	180	190	200	158
3	130	120	160	100	150	132
4	50	60	40	150	20	64

Outline of Data Display Setting



For the total memory capacity available for one screen, refer to page 2-2.

The maximum available number of [Num. Data Display], [Char. Display], [Message Display], and [Table Data Display] depends on the memory use of the screen. As long as memory is available, you can place as many data display parts as required.

Notes on Parts Placement

The procedure for placing a data display part differs when it is used independently or linked with another part. (Message display part cannot be linked with another part.)

Use of Data Display Part Independently

Click the required icon ([Num. Data Display], [Char. Display], or [Message Display]) in the tool bar. The corresponding dialog is displayed.

In the [Type] tab window for [Num. Data Display] and [Char. Display], specify [No] for [Display Function].

Use of Data Display Part Linked with Another Part

When setting a part to be linked, its tool bar is displayed. The tool bar contains the icons for setting numerical data and character display parts.

Ex.) Entry mode tool bar



Open the [Num. Data Display] dialog by clicking each icon for setting a numerical data display part.

When each icon is clicked in the entry mode tool bar, the dialog (for numerical data display or character display) to be displayed already has a link established with the entry mode.



Data setting for link with other parts

Whether or not link is established is recognized by the settings of [Division No.] and [Display Function] of data display parts.

◆ Parts that can be linked with [Num. Data Display]:

Entry mode, data block area, statistic graph, trend sampling, data sampling, bit sampling, memory card mode

◆ Parts that can be linked with [Char. Display]

Entry mode, bit sampling, memory card mode

When setting [Num. Data Display] or [Char. Display] from the tool bar (not from the tool bar of the linked part) :

In this case, the [Num. Data Display] or [Char. Display] dialog does not have any link with parts. Therefore, it is necessary to set up a link in the dialog. Be sure to correctly set [Division No.] and [Display Function].

Notes on Placing Data Display Parts on Switches/Lamps

Multiple data display parts can be placed on a switch or lamp. In this case, be sure to set transparency ([Transparent] checked) in each data display dialog. A slight flickering may occur on the Control Terminal screen when displayed data changes.

Simple Data Display

Simple data display parts that are not decorated with boxes or frames are available. They will be effective when a screen becomes low in memory because of many data display parts placed.

For more information, refer to page 7-25.

Numerical Data Display

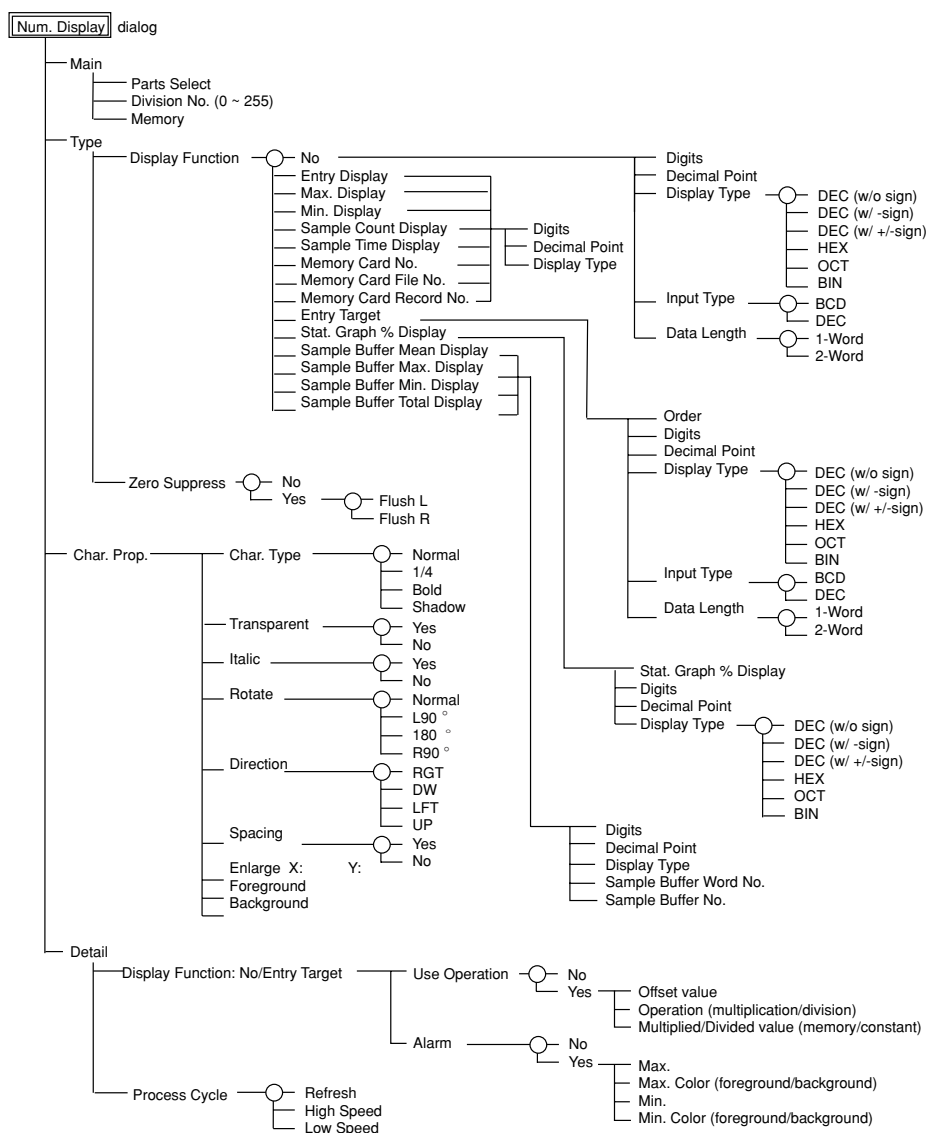
Setting Procedure of Numerical Data Display



1. Click the [Num. Data Display] icon in the tool bar. The [Num. Display] dialog is displayed.
2. Set the dialog and place the part on the screen.

⊙ When bringing up the [Num. Display] dialog for the part after its placement on the screen, double-click the part, or click the part (handles are shown) and then click the [Detail/Prop. Change] icon.

Tree Diagram for Numerical Data Display



Numerical Data Display Memory

Setting memory	Options in the [Num. Display] dialog
[Memory]	PC Memory, Internal Memory, Memory Card

Memory should also be set when [Entry Target] is chosen for [Display Function], and [Use Operation] and [Alarm] are checked.

(Main) Tab Window

[Division No.]

It is recommended to specify the same division number as displayed in the horizontal menu bar, then select a numerical data display part.

The internal memory refers to memory of the Control Terminal ZM series available for users. Memory cards are optional.

- ③ The division number that is effective when the [Num. Data Display] icon is clicked is automatically entered.
- ③ As many numerical data display parts as possible can be placed as long as memory is available. It is possible to place these parts and other parts in the same division.
- ③ If creating a numerical data display part linked with another part, they must be placed in the same division (exception: entry target). Whether the numerical data display part should be linked with a part can be chosen by the [Display Function] option.

[Memory] (PC Memory, Internal Memory, Memory Card)

Data contained in the specified memory area is displayed in numerals on the screen.

One numerical data display part can occupy two words at maximum. The number of digits that can be displayed from one- or two-word memory depends on [Display Type]. Refer to the explanation on the digits or display format.

(Type) Tab Window

[Display Function]

- ③ If [No] is chosen, the numerical data display part is not linked with anything, and can be used independently.

If any option other than [No] is chosen, the numerical data display part is equipped with the display function via a link with the selected type of part.

③ Relation of display functions and parts

Display function	Attached data	Linked part	Refer to:
No	_____	_____	this chapter
Entry Display	_____	Entry mode (numerals)	P9-10
Max. Display			P9-11
Min. Display			P9-11
Entry Target	Order		P9-9
Stat. Graph % Display	No. in Stat. Graph	Statistic graph	P10-18
Sample Count Display	_____	Trend Sampling	P12-16, 17
Sample Time Display		Data Sampling, Bit Sampling	P12-29, 39, 40
Memory Card No.	_____	Memory Card	P13-13
Memory Card File No.			
Memory Card Record No.			
Sample Buffer Mean Display	Sample Buffer Word No. Sample Buffer No.	Trend Sampling Data Sampling	P12-17, 18 P12-30
Sample Buffer Max. Display			
Sample Buffer Min. Display			
Sample Buffer Total Display			

[Digits]

Specify the number of digits for numerical data display. Depending on the [Display Type] selection, the available data range varies as shown on the right.

Type	Digits	Decimal point
DEC	1~10	0~9
HEX	1~8	—
OCT	1~11	—
BIN	1~32	—

If the decimal point is included in numbers, it need not be counted.

<Ex.> 99.0 -> 3 digits

[Decimal Point]

Specify the decimal place. When no decimal point is required, set “0.”

**If a value exceeding the set number of digits is keyed in:****In the case of DEC:**

Model	ZM-*2	ZM-41/70	ZM-30
Display	---	Numbers from the left	Numbers from the right
<Ex.> Data Length : 1-Word			
Digits : 3	---	123	234
Entered value : 1234			

In the case of HEX, OCT, or BIN**The numbers from the right are displayed.**

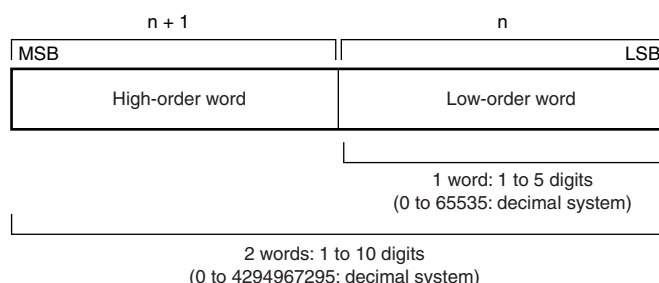
<Ex.>

When “1234” is keyed in while [HEX] is chosen for [Display Type], [1-Word] is chosen for [Data Length], and “3” is specified for [Digits], “234” is entered.

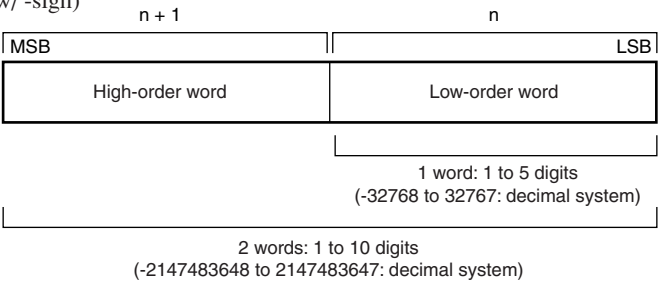
[Display Type]

Select the code for displaying data that is read in the code specified by [Input Type]. The available codes are: DEC (w/o sign); DEC (w/ -sign); DEC (w/ +/-sign); HEX; OCT; BIN.

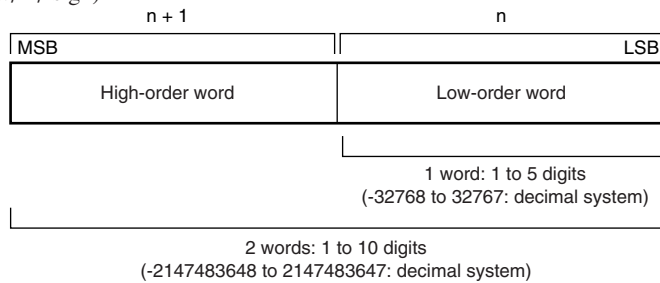
◆ DEC (w/o sign)



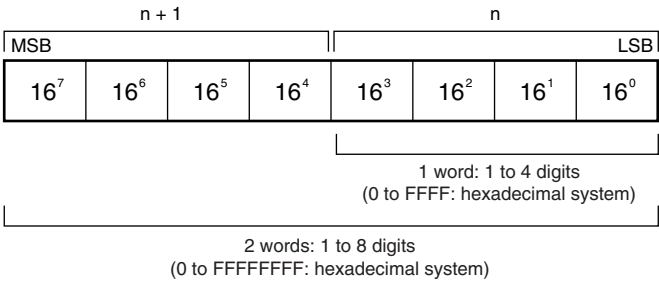
◆ DEC (w/ -sign)



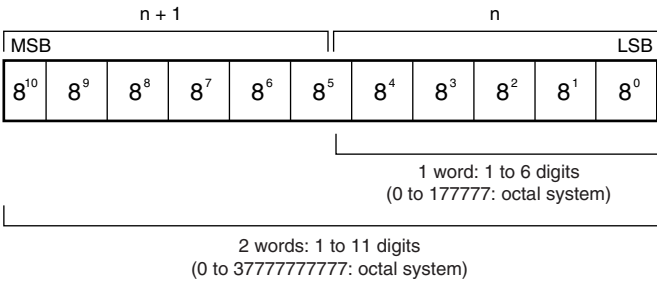
◆ DEC (w/ +/-sign)



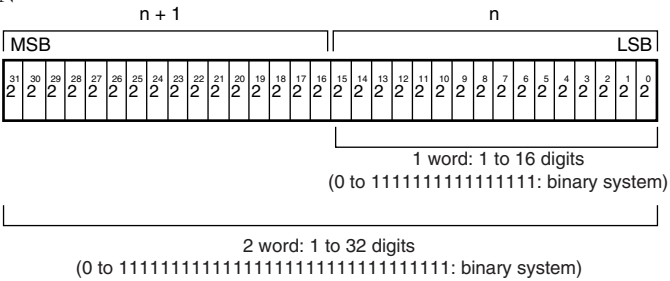
◆ HEX



◆ OCT



◆ BIN



[Input Type]

Choose either [BCD] or [DEC] for the code in the PC memory. For any other codes than the binary coded decimal system, choose [DEC].

☐ PC in BCD format:

OMRON C series, Sharp JW series, FUJI, Koyo SU/SG

☐ PC in BIN format:

Other models than listed above

[Data Length]

Choose one-word or two-word for data length to be used.

Depending on the [Display Type] selection, the available range of data varies. Refer to the following list for the selection.

☐ Code formats and available ranges

Code format	1-word range	2-word range
DEC (w/o sign)	0~65535	0~4294967295
DEC (w/ -sign)	-32768~32767	-2147483648~2147483647
DEC (w/ +/-sign)	-32768~+32767	-2147483648~+2147483647
HEX	0~FFFF	0~FFFFFFFF
OCT	0~177777	0~3777777777
BIN	0~1111111111111111	0~11111111111111111111111111111111

[Zero Suppress]

Choose whether to use the zero suppress function. When using the zero suppress function, check the box.

Ex.) For “000123” with flush-right alignment:

Space

With zero suppress : 123

Without zero suppress : 000123

[Flush L] [Flush R]

This setting is effective when [Zero Suppress] is checked.

Choose either flush-left or flush-right for aligning numbers.

Ex.) When “123” is shown in a “5-digit” data display area:

Flush-left : 123

Flush-right : 123

(Char. Prop.) Tab Window

[Char. Type]

Select from [Normal], [1/4], [Bold], and [Shadow].

- Normal : Numerals are displayed in the plain typeface.
- 1/4 : Numerals are displayed in 8 x 8 dots.
* This is not available for two-byte characters.
- Bold : Numerals are displayed in bold typeface.
- Shadow : Numerals are displayed with shadow.

For information on [Char. Type] in the [Char. Prop] tab window, refer to page 22-9.

[Transparent]

Transparency for text is chosen.

◆ In the case of a numerical data display part with [Foreground] and [Background] settings:

If the [Transparent] is checked, renewed data overlaps with the old one.

If the [Transparent] is unchecked, the old data is cleared by the background color and then data is drawn in the foreground color. Therefore, the new data can be drawn while the old data does not remain.

Numerical data display property can be modified using a macro: CHG_DATA command

You can choose whether or not to display data: DSP_DATA command

For more information, refer to Chapter 14, "Macro."

◆ With transparency

1234



When data is changed:

5678

◆ Without transparency

1234



When data is changed:

5678

Background color
Foreground color

◆ In the case of a numerical data display part with a painted box:

If the [Transparent] box is checked, the old data is cleared by the painted box and the data is drawn in the foreground color. Therefore, the new data can be drawn while the old data does not remain.

◆ With transparency

1234



When data is changed:

5678

◆ Without transparency

1234



When data is changed:

5678

Painted box
Background color
Foreground color



When [Shadow] is chosen for [Char. Type], transparency cannot be set. However, drawing is performed with transparency. If no painted box is provided, the new data overlaps with the old one.



In the case of a numerical data display part with painted box, it is recommended that you specify the box color for the background color ([Char. Prop.] tab window in the [Num. Display] dialog), and to uncheck [Transparent]. With transparency, flickering will occur when the displayed data changes. Also the display speed will decrease.



For a display part equipped with complicated graphics, the graphic property can be changed by selecting the [Change the setting of a part placed.]. Click the display part (handles are shown), and click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. For the editing procedure, refer to page 24-11.

[Italic]

If you want to use italics for numerals, check the box.

Ex.) [Italic] unchecked

12345

[Italic] checked

12345

[Char. Size] (1-Byte/2-Byte)

Choose one-byte or two-byte for numerals.

[Rotate]

Choose a rotation direction of numerals from [Normal], [L90], [180], and [R90].

A ◀ ▼ ▶

[Direction]

Choose a numeral alignment direction from [RGT], [DW], [LFT], and [UP].

→
12345

←
54321

5
4
3
2
1 ↑

1
2
3
4
5 ↓

[Spacing] (0 ~ 255)

If you want to set this option, check the box.

The distance between numerals can be specified in the unit of dots (0 to 255).

[Enlarge] (1 ~ 8 for both X and Y)

Specify a factor of enlarging numerals.

[Foreground] [Background]

Select the desired colors of numerals.

Background color
Foreground color
1234

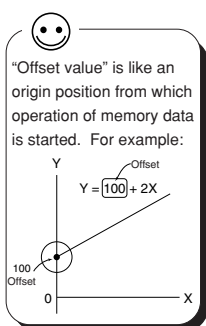
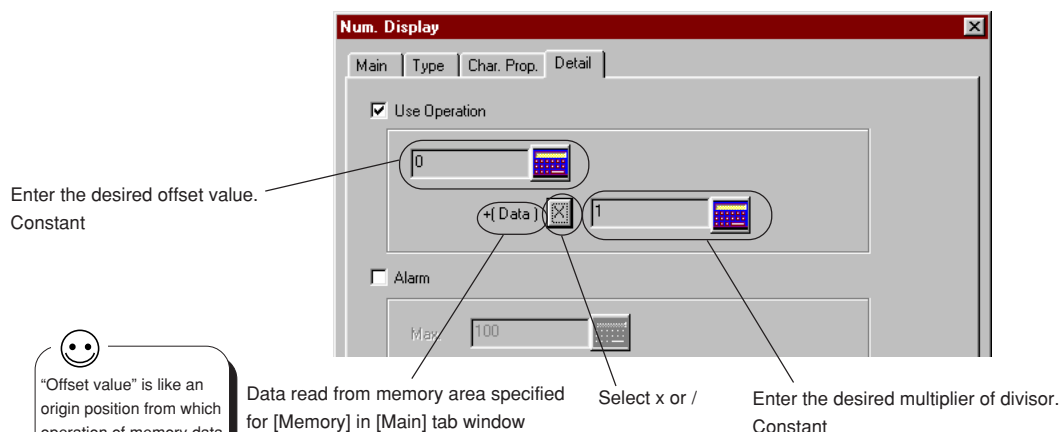


Clicking the numerical data display part displays handles around it. Dragging the handle enlarges or reduces the numerals as well as the part area.

(Detail) Tab Window

[Use Operation]

Check this box for calculating data in Control Terminal and for displaying its results.
When this box is checked, the following operation items become active.



<Ex.>

In this example, data read from PC is "789."

- [BCD] is chosen for [Input Type], but negative numbers should be indicated (negative number in the BCD format does not exist).
Choose either [DEC (w/ -sign)] or [DEC (w/ +/-sign)] for [Display Type].

Offset value + read data x multiplier = data displayed

$$\begin{aligned} [0] + (789) [x] [-1] &= -789 \\ \text{or } [-1000] + (789) [x] [1] &= -211 \end{aligned}$$

- Example of multiplication

Offset value + read data x multiplier = data displayed

$$\begin{aligned} [1000] + (789) [x] [1] &= 1789 \\ [0] + (789) [x] [100] &= 78900 \end{aligned}$$

- Example of division with decimal point

When "2" is entered for "Decimal Point" in the [Type] tab window, data read into Control Terminal is "7.89."

Offset value + read data / divisor = data displayed

$$[0] + (7.89) [/] [100] = 0.0789$$

Data is rounded down to the decimal place, and "0.07" is indicated.

○ Example of division without decimal point

Offset value + read data / divisor = data displayed

$$[0] + (789) [/] [-100] = -7.89$$

Data is rounded down to the decimal place, and “-7” is indicated.

Offset value + read data / divisor = data displayed

$$[200] + (789) [/] [100] = 207.89$$

Data is rounded down to the decimal place, and “207” is indicated.



When mathematical operations are used as shown above, their results are displayed on the screen. Therefore, check the setting for display format, digits, decimal points, etc.

[Alarm]

If you want to use a different color of data that exceeds or falls short of the specified range, check the [Alarm] box. When it is checked, [Max.] and [Min.] options become active.

◆ [Max.] (PC Memory, Internal Memory, Memory Card, Constant)

Set a maximum value. When the alarm value is fixed, specify a constant. If you want to change the alarm value, select the PC memory.

◆ [Max. Color Foreground/Background]

Select the desired color for the maximum value color to be displayed when data exceeds the range. When [B] is pressed, data flashes in the selected color.

◆ [Min.]

Set a minimum value. It is possible to specify an address in the PC memory, the internal memory, a memory card, or to specify a constant.

◆ [Min. Color Foreground/Background]

Select the desired color for the minimum value color to be displayed when data falls short of the range. When [B] is pressed, data flashes in the selected color.



If [Entry Target] is chosen for [Display Function] in the [Main] tab window, checking the [Alarm] box changes the settings of [Max.]/[Min.] into those for limiting the range for numerical value entry. For numerical value entry, refer to page 9-11 in Chapter 9, “Entry Mode.”

[Process Cycle]

For information on processing cycle, refer to page 2-9.

Character Display

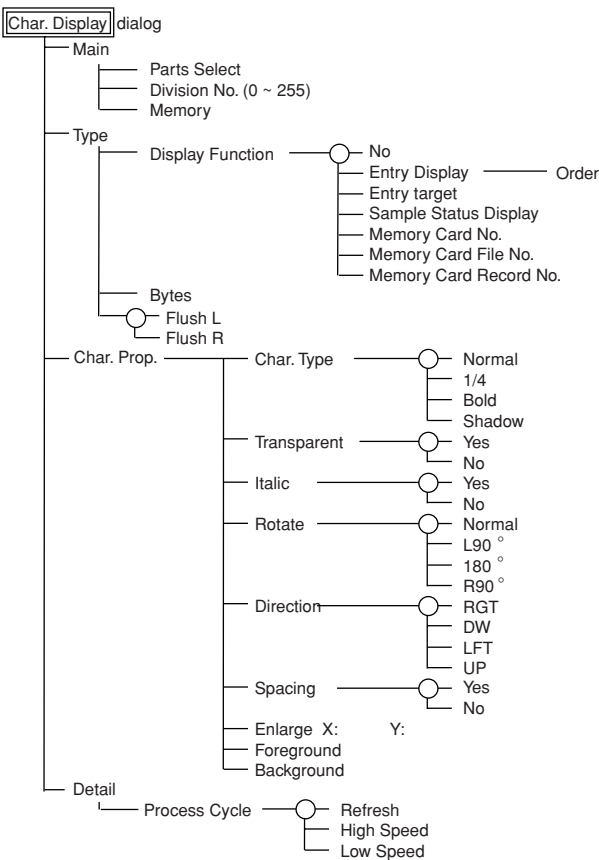
Setting Procedure of Character Display



- 1. Click the [Char. Display] icon in the tool bar. The [Char. Display] dialog is displayed.
- 2. Set the dialog and place the part on the screen.

◎When bringing up the [Char. Display] dialog for the part after its placement on the screen, double-click the part, or click the part (handles are shown) and then click the [Detail/Prop. Change] icon.

Tree Diagram for Character Display



The internal memory refers to memory of the Contorol Terminal ZM series available for users. Memory cards are optional.

Character Display Memory

Setting memory	Options in the [Char. Display] dialog
[Memory]	PC Memory, Internal Memory, Memory Card

The number of words depends on the setting for [Bytes].

(Main) Tab Window

[Division No.]

- ◎ The division number that is effective when the [Char. Display] icon is clicked is automatically entered.
- ◎ As many character display parts as possible can be placed as long as memory is available. It is possible to place these parts and other parts in the same division.
- ◎ If creating a character display part linked with another part, they must be placed in the same division. Whether the character display part should be linked with a part can be chosen by the [Display Function] option.

[Memory] (PC Memory, Internal Memory, Memory Card)

Data contained in the specified memory area is displayed in characters on the screen.

One-byte characters are processed as ANK codes, and two-byte characters are processed as Shift JIS codes (in the case of Japanese).

One-byte character	: 1/2 word (= 1 byte)	ANK code
Two-byte character	: 1 word (= 2 bytes)	Shift JIS code

(Type) Tab Window

[Display Function]

- ◎ If [No] is chosen, the character display part is not linked with anything, and can be used independently.
If any option other than [No] is chosen, the character display part is equipped with the display function via a link with the selected type of part.
- ◎ Relation of display functions and parts

Display function	Attached data	Linked part	Refer to:
No	————	————	this chapter
Entry Display	————	Entry mode (character)	P9-10
Entry Target	Order	Entry mode (character)	P9-9
Sample Status Display	————	Bit Sampling	P12-40
Memory Card Name Memory Card File Name Memory Card Record Name	————	Memory card mode	P13-14

[Order]

This option is effective only when [Entry Target] is chosen for [Display Function].
For more information, refer to page 9-10 in Chapter 9, “Entry Mode.”

[Bytes]

Specify the number of characters to be displayed. One character of the alphabet occupies one byte. The maximum available number of one-byte characters on a screen depends on the models of Control Terminal. (Refer to page 1-28.)

[Flush L] [Flush R]

Choose either flush-left or flush-right for aligning characters.

(Char. Prop.) Tab Window

For the options in the window, refer to page 7-11 “[Char. Prop.] Tab Window” in “Numerical Data Display.”

(Detail) Tab Window

[Process Cycle]

For information on processing cycle, refer to page 2-9.

Message Display

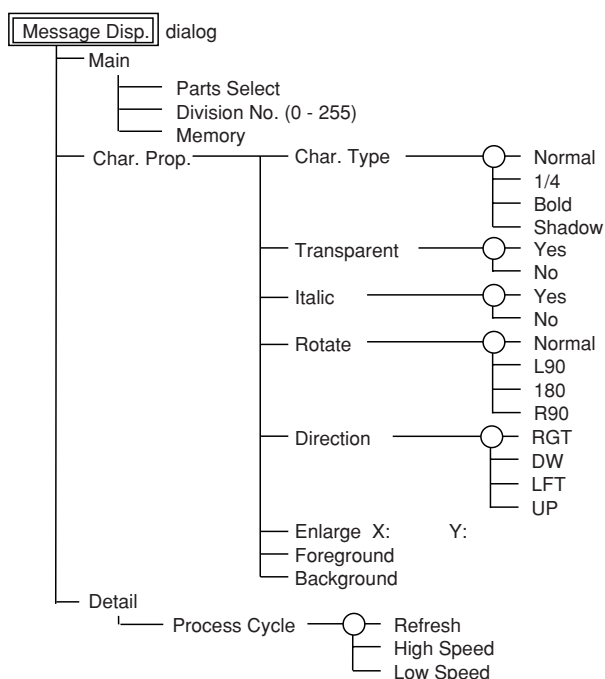
Setting Procedure of Message Display



1. Click the [Message Display] icon in the tool bar. The [Message Disp.] dialog is displayed.
2. Set the dialog and place the part on the screen.

◎ When bringing up the [Message Disp.] dialog for the part after its placement on the screen, double-click the part, or click the part (handles are shown) and then click the [Detail/Prop. Change] icon.

Tree Diagram for Message Display



Message Display Memory

Setting memory	Options in the [Char. Display] dialog
[Memory]	PC Memory, Internal Memory, Memory Card

(Main) Tab Window

[Division No.]

- ◎ The division number that is effective when the [Message Display] icon is clicked is automatically entered.
- ◎ As many message display parts as possible can be placed as long as memory is available. It is possible to place these parts and other parts in the same division.

[Memory] (PC Memory, Internal Memory, Memory Card)

Specify the desired message number that is already registered in memory.

One word is occupied by one message number.



To call up a message, specify the number in absolute addresses 0 to 6143. For the list of absolute addresses, refer to page 8-24.

Register messages in message editing. For more information, refer to page 8-5 in Chapter 8, “Message Display.”

(Char. Prop.) Tab Window

For the options in the window, refer to page 7-11 “[Char. Prop.] Tab Window” in “Numerical Data Display.”

(Detail) Tab Window

[Process Cycle]

For information on processing cycle, refer to page 2-9.



Notes on Message Display using the ZM-41/70

For messages that are to be called up in the same field, be sure to enter the same number of characters. If there are short messages, fill the blanks with spaces. This is because a short message is written over a long message, so a part of the previous message will not be erased if spaces are not entered.

Ex.)	<Line No.>	<Message>
	10	AAAAAAA
	11	BBBB
	12	BBBBUUU <-- Spaces

◎ When message No. 11 is specified after No. 10, “BBBBAAA” is shown.

◎ When message No. 12 is specified after No. 10, “BBB ” is shown.
(Three “As” on the right are erased with spaces.)

Table Data Display (ZM-*2 Function)

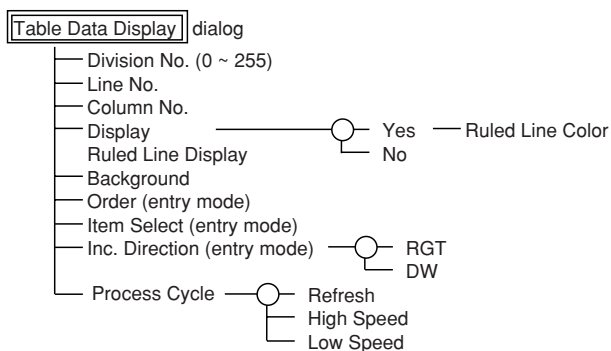


Table Data Display Part

Setting Procedure

1. Click the [Table Data Display] icon in the tool bar. The [Table Data Display] dialog is displayed.
([Normal] for [Display Function] and "5" for [Digit] are set as default for numerical data display.)
2. Set the dialog and place the table data display part on the screen.

◎ When bringing up the [Table Data Display] dialog for the part after its placement on the screen, double-click the part, or click the part (handles are shown) and then click the [Detail/Prop. Change] icon.



(Table Data Display) Dialog

[Division No.]

- ◎ The division number that is effective when the [Table Data Display] icon is clicked is automatically entered.
- ◎ As many table data display parts as possible can be placed as long as memory is available. It is possible to place these parts and other parts in the same division.

[Line No.]

Specify the number of lines of a table data display part.

[Column No.]

Specify the number of columns of a table data display part.

[Ruled Line Display]

Check the box when ruled lines should be displayed.

[Ruled Line Color]

Specify the color of ruled lines in a table data display part.

[Background]
Specify the color of the table data display part.

[Order]
This option becomes active when [Entry Target] is chosen for [Display Function].
For more information, refer to page 9-29 in Chapter 9, “Entry Mode.”

[Item Select]
This option becomes active when [Entry Target] is chosen for [Display Function].
For more information, refer to page 9-29 in Chapter 9, “Entry Mode.”

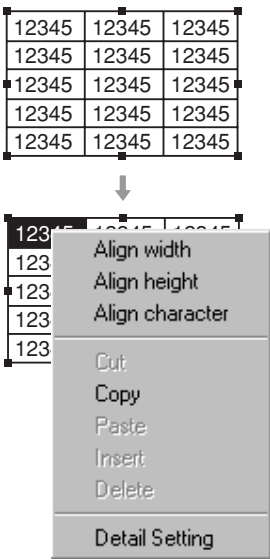
[Inc. Direction]
This option becomes active when [Entry Target] is chosen for [Display Function].
For more information, refer to page 9-29 in Chapter 9, “Entry Mode.”

[Process Cycle]
For information on processing cycle, refer to page 2-9.

Table Data Display Property Modification
Property Modification of One Data Cell

- 1. Click the table data display part. Handles are shown around the display part.
- 2. Specify the desired data cell for property modification using the mouse, and right-click. The cell is highlighted, and the pop-up menu is displayed (refer to page 7-24.)
- 3. Click [Detail Setting]. The [Table Data Display (Num. Display)] dialog is displayed.
- 4. Set the dialog as desired.

The table data display dialogs for the numerical data display, character display, message display, and text (draw) are available.



It is also possible to bring up the [Table Data Display (Num. Display)] dialog by double-clicking while the specified cell is highlighted.



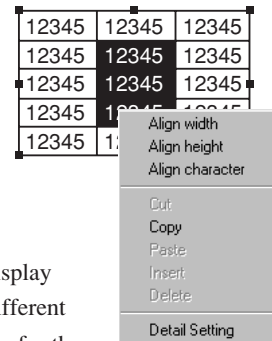
It is also possible to bring up the [Table Data Display (Num. Display)] dialog by double-clicking while the specified cells are highlighted.



As for the [Table Data Display (XXXX)], "(XXXX)" indicates the type of the display part: "Num. Display," "Char. Display," "Message Disp.," or "Text in Drawing."

Property Modification of Multiple Data Cells

1. Click the table data display part. Handles are shown around the table data display part.
2. Specify two or more desired cells by right-dragging. The cells are highlighted (as shown on the right). The pop-up menu is displayed at the same time (refer to page 7-24).
3. Select [Detail Setting] from the menu. The [Table Data Display (Num. Display)] dialog is displayed. When data cells of different types are selected, the [Table Data Display (XXXX)] dialog for the top left cell is displayed.



When the [Table Data Display (XXXX)] dialog has been set and [OK] is clicked, the setting is reflected through the remaining selected cells. (When [Memory Inc.] is not checked, the previous memory address setting is maintained.)

(Table Data Display

(Num. Display/Char. Display/Message Disp.) Dialog

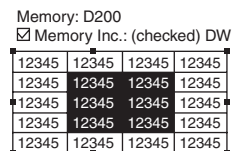
[Memory Inc.]

This option becomes active only when multiple data cells are selected.

Specify the direction for memory allocation.

[Memory]

Specify the top memory address.



Memory addresses are allocated to the selected data cells in the following order.

12345	12345	12345	12345
12345	D200	D203	12345
12345	D201	D204	12345
12345	D202	D205	12345
12345	12345	12345	12345

[Flush Left] [Flush Right] [Center]

When [Zero Suppress] is checked, these options become active. Select the desired one for data alignment.

[Start X/Y] [End X/Y]

When [Mean Display], [Max. Display], [Min. Display], or [Total Display] is chosen for [Display Function], specify the range of cells for calculation using these options.

<Ex.>

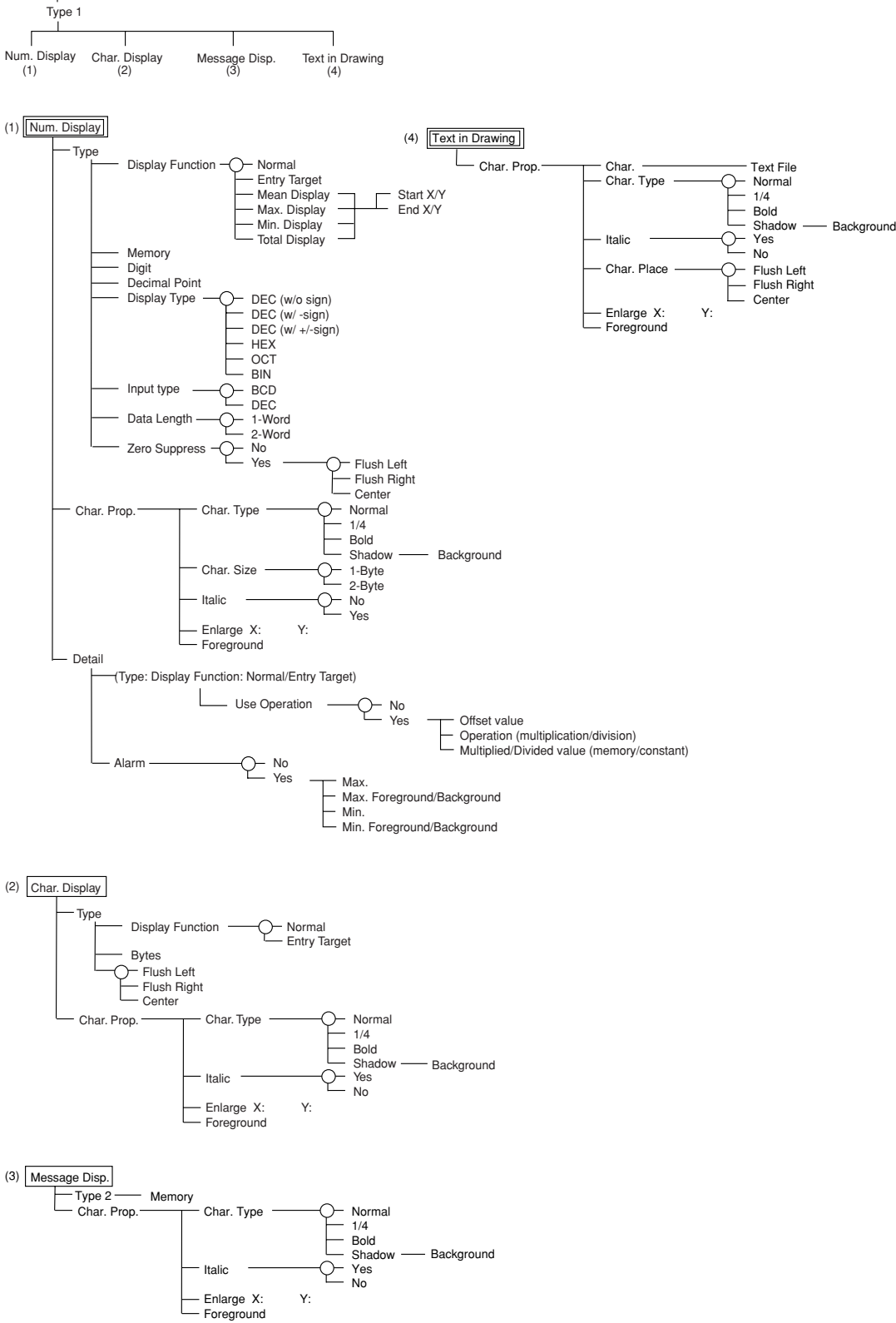
Cell addresses are allocated as follows to a table data display part (for numerical data display) consisting of five lines and three columns.

X:1,Y:1	X:2,Y:1	X:3,Y:1
X:1,Y:2	X:2,Y:2	X:3,Y:2
X:1,Y:3	X:2,Y:3	X:3,Y:3
X:1,Y:4	X:2,Y:4	X:3,Y:4
X:1,Y:5	X:2,Y:5	X:3,Y:5

12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345

Mean value display cell for the selected data
Display Function: Mean Display
Start X: 2, Y: 1
End X: 2, Y: 4

Table Data Display (Num. Display/Char. Display/Message Disp./ Text in Drawing) dialog



For more information on each dialog, refer to the following pages:

[Table Data Display (Num. Display)] dialog page 7-6

[Table Data Display (Char. Display)] dialog page 7-15

[Table Data Display (Message Disp.)] dialog page 7-18

(Table Data Display (Text in Drawing)) Dialog

[Char.]

Specify the desired text.

[Char. Place]

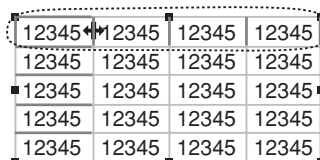
Choose from [Flush Left], [Flush Right], and [Center] for character alignment.

For information on the remaining options, refer to page 7-11 “[Char. Prop.] Tab Window” in “Numerical Data Display.”

Table Data Display Edit

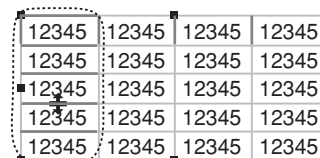
Change of Cell Height and Cell Width

- Ⓒ When changing the width of the cell, specify the demarcation line between the first and the second columns at the top using the mouse. The cursor changes into “.” Drag it until the cell is adjusted to the desired width.



12345	12345	12345	12345
12345	12345	12345	12345
12345	12345	12345	12345
12345	12345	12345	12345

- Ⓒ When changing the height of the cell, specify a demarcation line in the first column as shown. The cursor changes into “.” Drag it until the cell is adjusted to the desired height.



12345	12345	12345	12345
12345	12345	12345	12345
12345	12345	12345	12345
12345	12345	12345	12345

Right-Clicking Menu

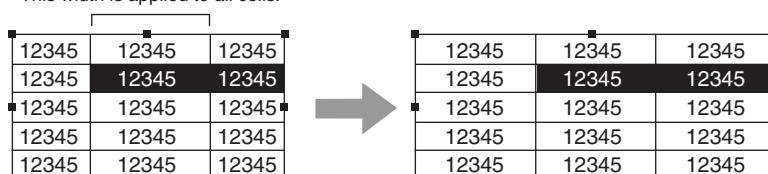
When cells are selected by right-clicking or right-dragging, the pop-up menu is displayed.

The same menu without [Detail Setting] is displayed when [Table Data Display Editing] is selected from the [Edit] menu.

- Ⓒ [Align width]

All cells are adjusted to the width of the top left cell in the selected cells.

This width is applied to all cells.



12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345

Align width
Align height
Align character
Out
Copy
Paste
Insert
Delete
Detail Setting

Ⓢ[Align height]

All cells are adjusted to the height of the top left cell in the selected cells.

This height is applied to all cells.

12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345

12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345
12345	12345	12345

Ⓢ[Align character]

The cell sizes in a table can be so adjusted that the largest data item fits into a cell. It is not necessary to specify the cell. Specify the table data display part (handles are shown). Select [Table Data Display Edit] from the [Edit] menu, and execute [Align character].

No.	12345	12345
1	12345	12345
2	123	12345
3	12345	12345
4	12345	12345

No.	12345	12345
1	12345	12345
2	12345	12345
3	12345	12345
4	12345	12345

- Ⓢ[Cut]

This command is used for editing lines or columns. The function is the same as that of [Cut] in the [Edit] menu.
- Ⓢ[Copy]

The function of this command is the same as that of [Copy] in the [Edit] menu. [Paste] becomes active after copy.
- Ⓢ[Paste]

The function of this command is the same as that of [Paste] in the [Edit] menu. When multiple columns or lines are pasted, the cell designated as the destination is placed at the top of the pasted data. A data area larger than the table cannot be pasted.
- Ⓢ[Insert]

This command is used for editing lines or columns. When lines are copied or cut (selected lines are highlighted), they are inserted above the designated destination. When columns are copied or cut, they are inserted on the left of the designated destination.
- Ⓢ[Delete]

This command is used for editing lines or columns. The function is the same as that of [Delete] in the [Edit] menu.
- Ⓢ[Detail Setting]

The dialog for table data display property change is displayed.

The [Cut], [Insert], and [Delete] commands are used for editing lines or columns.
<Ex.> Insert

Copy

Specify the destination for insertion.

Finished

	No.1	No.2
1	12345	12345
2	12345	12345
3	12345	12345
4	12345	12345

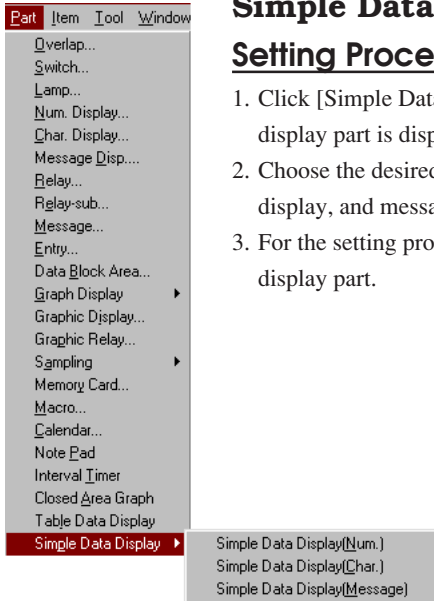
	No.1	No.2
1	12345	12345
2	12345	12345
3	12345	12345
4	12345	12345

	No.1	No.2	No.2
1	12345	12345	12345
2	12345	12345	12345
3	12345	12345	12345
4	12345	12345	12345

Simple Data Display (ZM-*2 Function)

Simple data display parts are not equipped with decoration, and differ from other data display parts (for numerical data, character data, and message) in the following ways:

1. It occupies about 70% of memory as compared with other data display parts.
2. Simple data display parts file is not provided (only one type available).
3. Shadow and transparency cannot be set for characters.



Simple Data Display

Setting Procedure

1. Click [Simple Data Display] in the [Parts] menu. The menu of the simple data display part is displayed.
2. Choose the desired option from the parts for numerical data display, character display, and message display. Its dialog is displayed.
3. For the setting procedures of the dialogs, refer to the former section of each data display part.



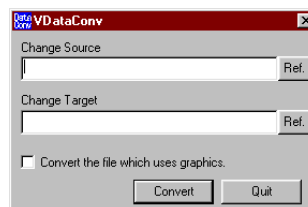
Data Display Conversion Utility (ZMDataConv)

All data display parts included in the ZM-*2 screen data files can be converted into simple data display parts using the data display conversion utility (ZMDataConv). Memory occupied by the screen data files is consequently reduced.

The file "ZMDataConv.exe" is included in the folder (ZM-71SE) established at the time of ZM-71SE installation.

Conversion Procedure

1. Double-click the [ZMDataConv.exe] icon. The [ZMDataConv] dialog is displayed.



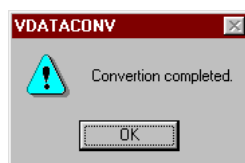
2. Specify the source file and target file for conversion. Files can be selected with ease by clicking [Reference].

3. About [Conversion of files including graphics]

- When the box is checked, data display parts including graphics are also converted into simple data display parts.
- When the box is unchecked, data display parts including graphics are not converted. Not as much memory can be saved as compared with the above case.

4. Click [Convert]. Conversion is executed.

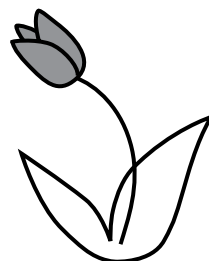
5. On completion, the message as shown on the right appears. Click [OK].

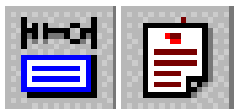


6. When quitting the data conversion utility (ZMDataConv), click [Quit].

MEMO

Please use this page freely.





Message Display (Relay/Message)

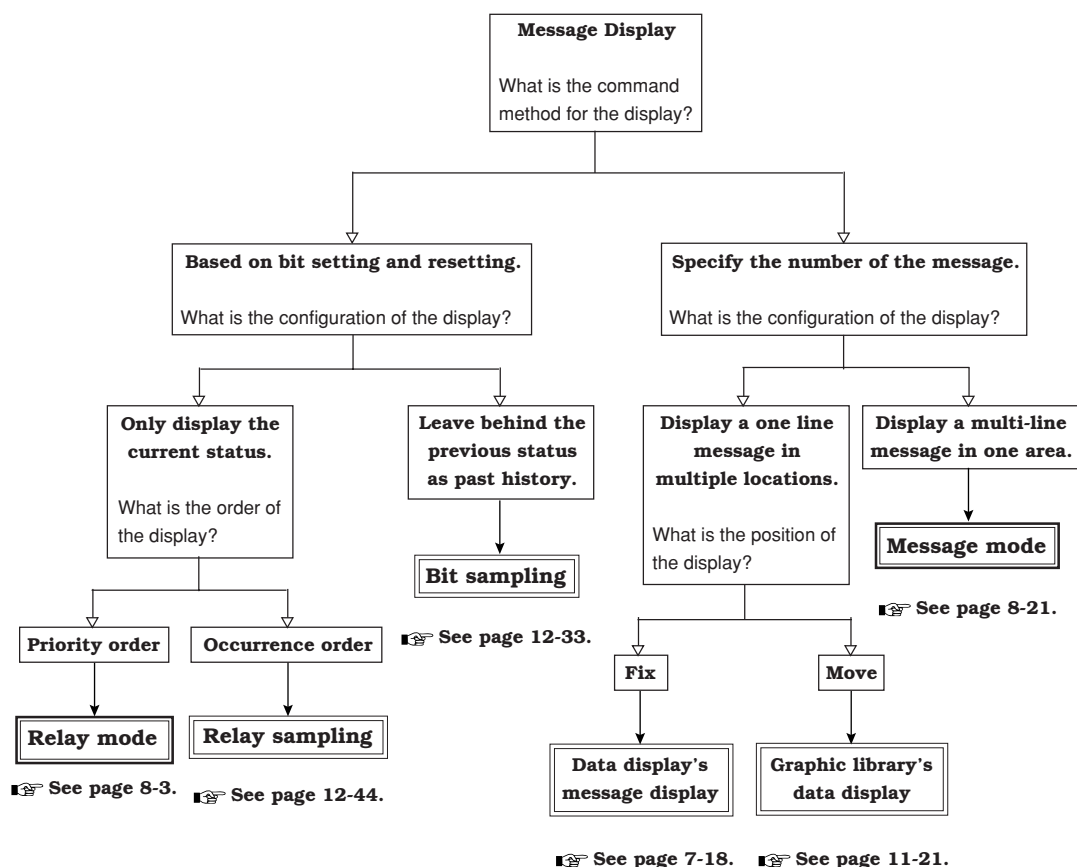
8

How to Display Messages

On the ZM Series, previously registered permanent text (= message) of a certain model can be displayed or switched on the screen, depending on the specified message number and whether or not the bit is set.

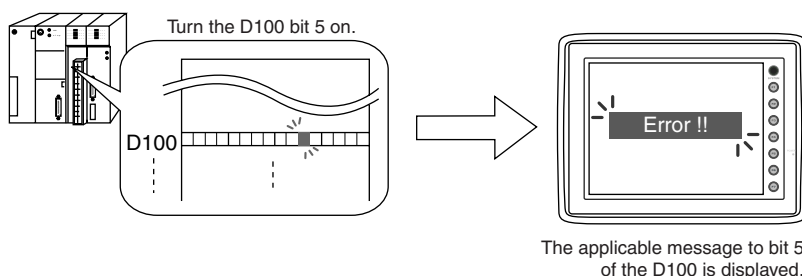
How to Display Messages

The message display function varies depending on your purpose and use.



Relay Mode

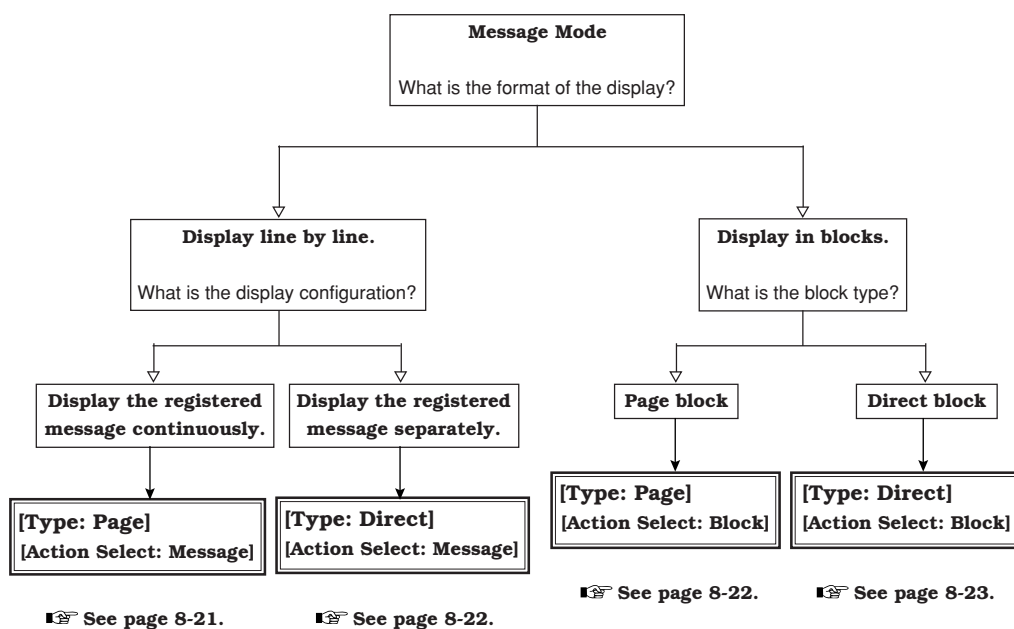
- ◎ A function for displaying or erasing messages on the screen by setting or resetting bits. When multiple bits are set, the messages are displayed in priority order.
- ◎ The detail display (=sub-display) of messages can be displayed at the same time.
(Relay sub)
The sub-display can be either a text display, or a graphic (picture) display.
- ◎ The sub-display can be shown on one screen. (Screen call)



Message Mode

A function for displaying messages on the screen by specifying the number of a message.

The display configuration of the message can be divided in several different ways.





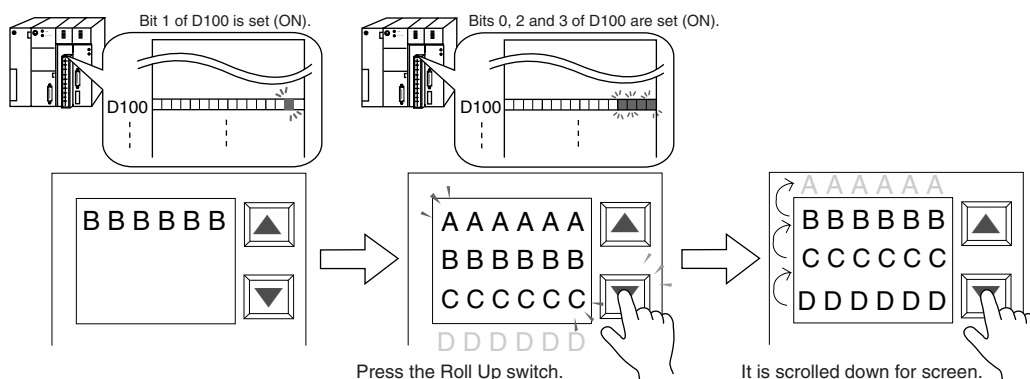
Relay Mode

8

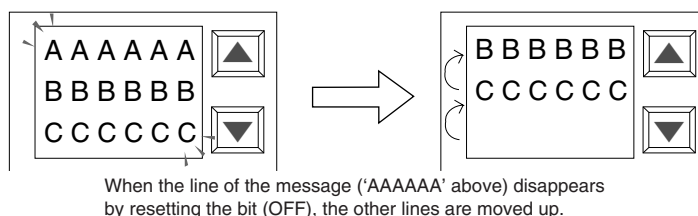
Relay Mode

Outline of Relay Mode

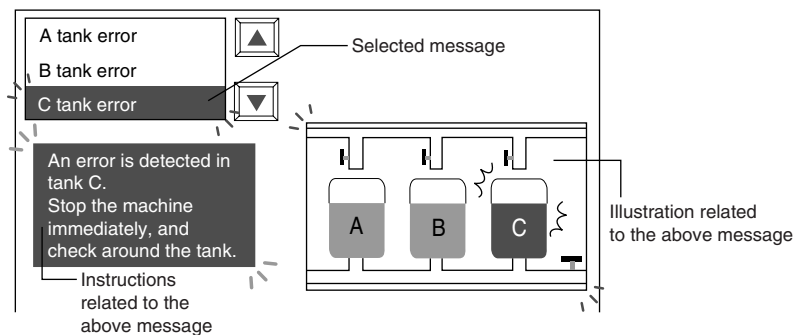
- ◎ Relay mode is the function for displaying or erasing messages on the screen by setting or resetting bits. When multiple bits are on, the messages are displayed in priority order.
- ◎ If multiple bits are set and the applicable messages are not restored in the screen display area, the messages can be scrolled through using the [Roll Up] and [Roll Down] switches.



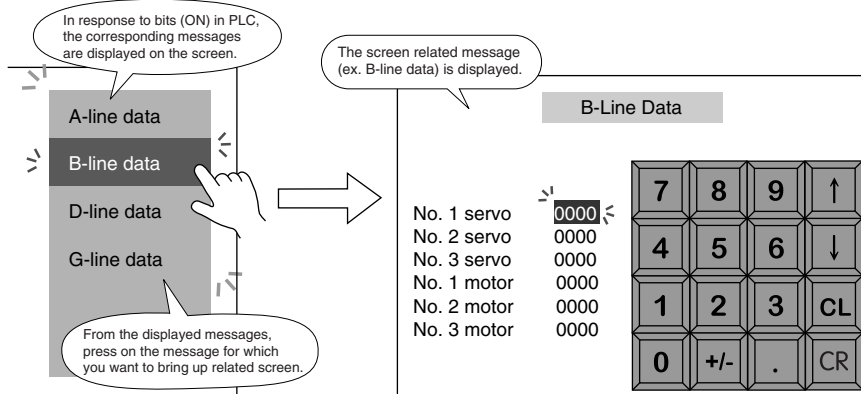
- ◎ When a bit is reset, the corresponding message disappears from the screen, and other messages are moved up.



- ◎ The detail display (= sub-display) of the messages can be displayed at the same time. The sub-display can be either a text display or a graphic (picture) display. For each 1 bit of relay mode data, a maximum of four sub-displays can be connected. (Relay sub)



- ◎ Also, it is possible to link a screen display to the message and to call it up when the bit is set (= screen-call function).



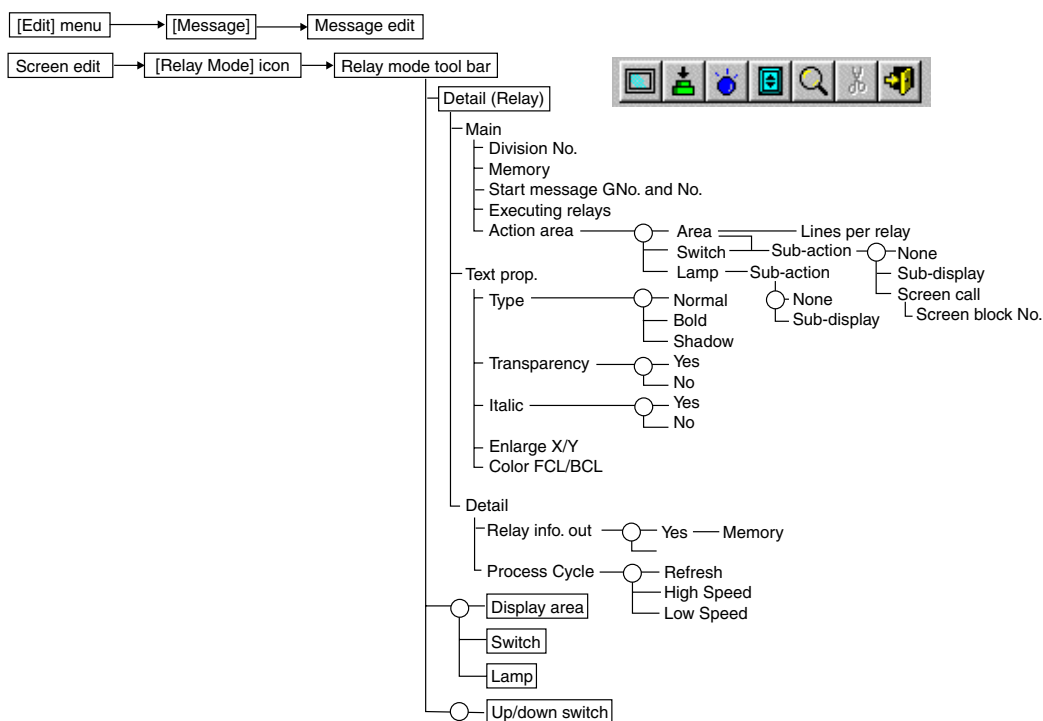
Relay Mode Setting Procedure

To set up relay mode, you have to work in two editing screens.

- ◎ Message registration in message edit

- ◎ Relay mode settings in screen edit

[Relay] dialog, display area, roll-up/down switches, etc.



Message Registration

First, register the message that you will display in message edit. Message edit is a different edit area from screen edit. In the message edit area, only a variety of messages are registered. The messages registered in message edit are used in either message mode or data display (= message display), not only in relay mode.

Composition of Message Editing

- ◎ The number of characters that can be registered per line in message edit varies depending on the edit model.



For ZM-*2

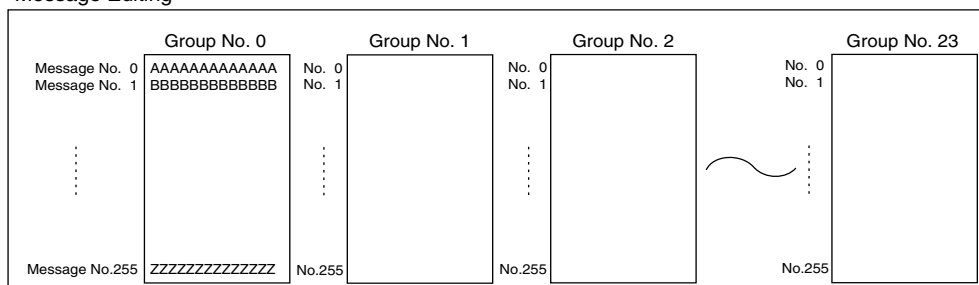
800 x 600 dots : max. 100 1-byte characters, max. 50 2-byte characters
 640 x 480 dots : 1-byte max. 80 1-byte characters, max. 40 2-byte characters
 320 x 240 dots : 1-byte max. 40 1-byte characters, max. 20 2-byte characters

For ZM-41/70

640 x 480 dots : max. 80 1-byte characters, max. 40 2-byte characters
 320 x 240 dots : max. 40 1-byte characters, max. 20 2-byte characters

- ◎ The message editing area is divided into 24 groups, each of which can contain a maximum of 256 message lines. Therefore, you can register a maximum of 24 groups x 256 lines = 6144 lines.

Message Editing



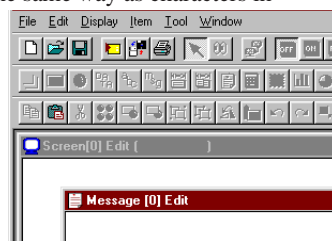
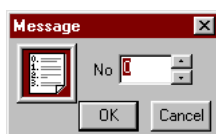
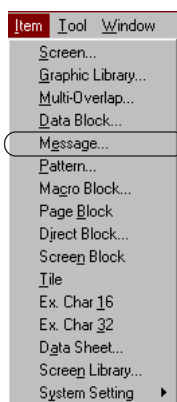
For more information on use of absolute addresses, refer to page 8-24.

- ◎ Each message has an address (message group No./message No.). With these addresses, the system recognizes the messages to be displayed.

*** Messages can also be expressed as absolute addresses. With absolute addresses, all messages are numbered consecutively without group numbers.**

Message Editing Procedure

Go to the [Edit] menu and click on [Message]. The dialog that specifies the group number is displayed. Specify the desired group number and click [OK]. The message edit window is displayed. Messages are entered in the same way as characters in graphics.





[Relay] Dialog

A dialog that must be set when using relay mode. It is displayed when you click on the [Detail] icon on the relay mode tool bar.

(Main) Tab Window

[Division No.]

Set a division number not registered in another mode. Usually, the division number currently being edited (displayed in the upper right corner of the screen) is automatically specified.

[Memory]

Command memory used to display a registered message on screen. The memory allocated to messages is a bit equivalent, and from top memory on, is automatically allocated in the same amount as [Executing Relays] (see the following section).

[Start Message GNo. and No]

Set the top message group number and message (line) number, registered in message edit, of the message that you will display in relay mode. The number of messages specified by [Executing Relays] are allocated sequentially in 1-bit increments in the [Memory] address, beginning with the specified start message (see previous section).

There is another way to display some messages in the order of time, called "Relay- sampling." For more information on this, to Chapter 12, "Sampling Mode," page 12-44.



Priority in displaying messages

Priority is given in displaying messages in relay mode. This is based on message numbers that are registered in message editing. The smaller numbers have a higher priority. This is the case for message numbers as well as group numbers. When messages are displayed on the screen, those of higher priority are displayed above.

[Execution Relays] (1 - 512)

Specify the number of relays (total number of bits for messages) to be used in this mode. The maximum available number is 512.

[Action Area]

Choose from [Area], [Switch] or [Lamp] for specifying the place where the message should be displayed on the screen.

Area : Shows messages on display area parts placed on screen.

Switch : Shows messages on switch parts placed on screen.

Switches are set in [Function: Mode]. Each switch has [Display Order] as an auxiliary item where you can specify which relay message to display on which switch.

When you do not set [Display Order], the messages are displayed in the same order that the switches were placed.

Lamp : Shows messages on lamp parts placed on screen.

Lamps are set in [Function : Mode]. As with switches, each lamp is set with the auxiliary item [Display Order].

[Lines per Relay] (1 - 24)

This option is effective when [Area] is chosen for [Action Area].

Specify the number of lines to be linked with one relay (= one bit).

[Sub-action]

◆ None

Choose [None] when using relay mode only.

◆ Sub-display

Choose this option when you want to relate a supplemental display with one bit of messages set up in relay mode (relay messages).

Set relay-sub mode as a linked mode.

◆ Screen Call

Choose this option when you want to call up a screen (for detailed information, for example) related to the displayed message. Specify the top screen block number corresponding to the relay message.

Set [Screen Block Edit] as a linked setting.

○ Block No.

When [Screen Call] is chosen for [Sub-action], this option becomes active.

Specify the top screen block number corresponding to the relay message.

(Text Prop.) Tab Window**[Type]**

Normal : Plain typeface

Bold : Bold typeface to be used for emphasis

Shadow : Typeface with shadow

[Transparency]

Transparency for messages can be chosen.

Check ☒ for transparent.

[Italic]

Messages can be italicized.

Check ☒ for italics.

[Enlarge X/Y] (Setting range: X: 1 ~ 8, Y: 1 ~ 8)

When [Area] is chosen for [Action Area], specify a factor for enlargement of message text in the display area part.

When "1" is specified for [Y], Y size equals one-byte character size.

[Foreground Color / Background Color]

Set the character color for the message that will be displayed.

(Detail) Tab Window

[Relay Info. Out]

Choose whether data of the message displayed or selected in relay mode should be output to the PC. If you want to output data, check the box, and specify the desired top memory address.

No ☐ Relay data output memory
 Yes ☒ Relay data output memory Top memory n

Memory is allocated as shown on the right.

◆ RLYCT (total number of ON relays)

The number of bits currently set to ON is written.

Memory	Contents
n	RLYCT
n + 1	SELNO
n + 2	RLYNO

◆ SELNO (selected relay No.)

When [Sub-display] is chosen for [Sub-action] in the [Main] tab window, the priority number of the relay message among those being displayed (starting from #1) is output.



Priority

When [Memory] is specified in the [Main] tab window, memory is allocated to each message. The memory bit number with the greatest priority is the smallest number, and as the bit number of memory allocated to the message increases, the priority decreases.

When [None] is chosen for [Sub-action], the ranking of priority (starting from "1") of the top message among those displayed is output.

◆ RLYNO (ON relay No.)

This is also effective for outputting data when [Sub-display] is chosen for [Sub-action] in the [Main] tab window.

The output data is the ordinal number of the highlighted message among messages displayed in relay mode (regarding the start message number as "0").

When [None] is chosen for [Sub-action], the ordinal number (counting the start message number as "0") of the top message among those displayed is output.

[Process Cycle]

A cycle setting for the ZM Series to read the PC data while it is communicating with the PC.

For details, please refer to Chapter 3, "Screen," page 3-9.



When the [Relay] dialog settings are concluded and you click [OK], the [Relay] icon is registered in the [Part] auxiliary tool box on the lower left corner of the screen.

To review the contents, or to delete the registered settings, refer to Chapter 1, "Basic Operation," page 1-9.



Display Area Parts

Outline of Display Area Parts

When settings are made in the [Main] tab window of the [Relay] dialog for [Action Area: Area], you must also set display area parts. Depending on whether or not the bit is set, the messages on screen will be shown on display area parts.

However, there will be no function if only display area parts are placed on screen.

There must be a setting that makes an association with the original [Relay] dialog.



Association is performed in [Division]. If you set display area parts with the same division number as the [Relay] dialog, it is recognized as a display area part for use in the relay mode.

Note When Placing Display Area Parts

The size of the display area parts placed on screen can be changed. In the relay mode, the lines of the messages displayed on screen vary depending on the Y size of the display area part. Please be careful when setting the size.

For facilitating size adjustment of the display area part, show one-byte grids on the screen. Each line of one-byte grids equals one line of relay message when “1” is specified for [Enlarge Y].



A minimum of [Lines per Relay] x [Enlarge: Y] lines must be secured for the Y size of display area parts.

When a part is placed, double-click the part, or select the part and click the [Prop. Change] icon. The [Mode Display Area] dialog is displayed for more settings.

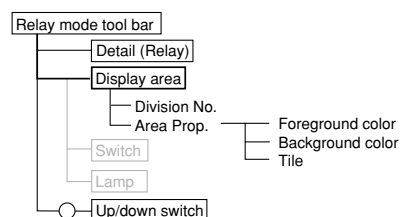
(Mode Display Area) Dialog

[Division No.]

Set the same division number as the division number specified in the original [Relay] dialog. It will then be associated with relay parts.

[Area Prop.]

Set the foreground color/background color/tile properties in [Area Prop.].



Changes of Settings for Display Area Parts

When changing properties of display area parts, select the part (handles are shown), and click the [Modify Part] icon.

Properties of the part can be changed on the screen.

For more information on part modification, refer to Chapter 24, “Part Editing.”

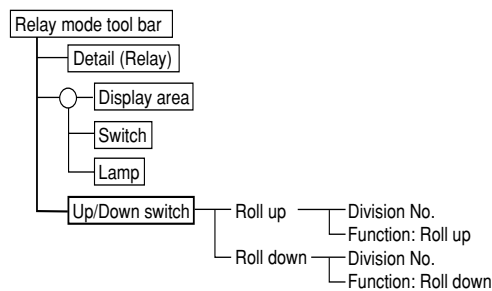


Message Scroll Up/Down

If the number of messages that you display exceeds the specified display range, the messages that are not shown can be displayed on the screen by scrolling up or scrolling down. Switch parts are used.

Click on the [Up/Down Switch] icon on the relay mode tool bar. Select either [Roll Up] or [Roll Down] from the pull-down menu that is displayed. If you choose [Roll Up], the [Function: Roll Up] switch is brought up, if you choose [Roll Down], the [Function: Roll Down] switch is brought up.

Notes on Setting Switch Parts



[Division No.]

So that you can determine which mode is linked to the roll-up/roll-down switch, set the same division number as the one specified in the [Relay] dialog of the link location.

[Function]

This option determines the function of the switch. Select [Function: Roll Up/Roll Down]. If the switch is one that was selected from the relay mode tool bar, the default for [Function] will be [Roll Up] or [Roll Down].

To Display Relay Messages on Switches or Lamps

A message based on a set bit can be displayed not only in display area parts, but can also be displayed on the switches or lamps placed on the screen.

The [Relay] dialog settings and switch parts (or lamp parts) are necessary for [Action Area: Switch (or Lamp)].

(Relay) Dialog Settings

[Action Area]

Select [Switch] (or [Lamp]).



When [Switch] or [Lamp] is chosen for [Action Area], [Lines per Relay] and [Enlarge] options are fixed to "1".

Switches as Action Area

One can easily make settings for a switch that displays a message by using the [Switch] icon located on the relay mode tool bar. When you click on the [Switch] icon on the relay mode tool bar, the [Function: Mode] switch is automatically brought up. Please note the following points when making switch settings.

[Division No.]

So that you can determine which mode switch is linked to which mode, set the same division number as the one specified in the [Relay] dialog of the link location.

[Function]

This option determines the function of the switch. Select [Function: Mode]. If the switch is one that was selected from the relay mode tool bar, the default will be [Function: Mode]. Set [Display Order] as an auxiliary item.

[Display Order]

When messages are to be displayed on the switches, specify the display order (priority) for each switch. According to the display order, relay messages are held in the switches.

For (Action Area: Lamp)

Click on the [Lamp] icon from the relay mode tool bar, and place it on the screen just as you did for switches. This lamp will automatically go to [Function: Mode]. Please note the following points when making lamp parts settings.

[Division No.]

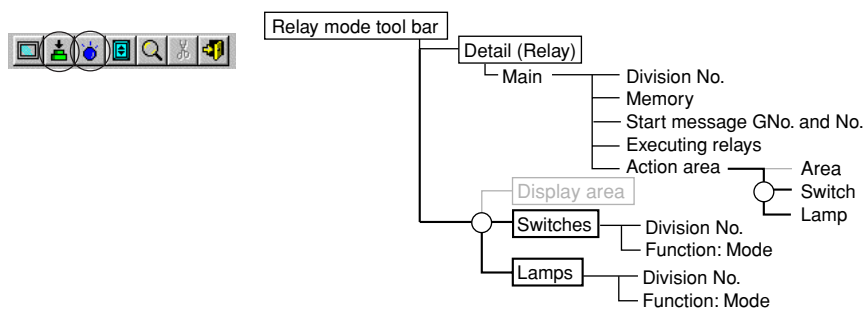
So that you can determine which mode lamp is linked to which mode, set the same division number as the one specified in the [Relay] dialog of the link location.

[Function]

This option determines the function of the switch. Select [Function: Mode]. If the lamp is one that was selected from the relay mode tool bar, the default will be [Function: Mode]. Set [Display Order] as an auxiliary item.

[Display Order]

When messages are to be displayed on the lamps, specify the display order (priority) for each lamp. According to the display order, relay messages are held in the lamps.





Displaying Detailed Explanation to Messages (Relay-sub function)

It is possible to link relay messages, that are displayed by setting bits, with detailed explanation using the relay-sub function. Original relay mode settings are necessary.

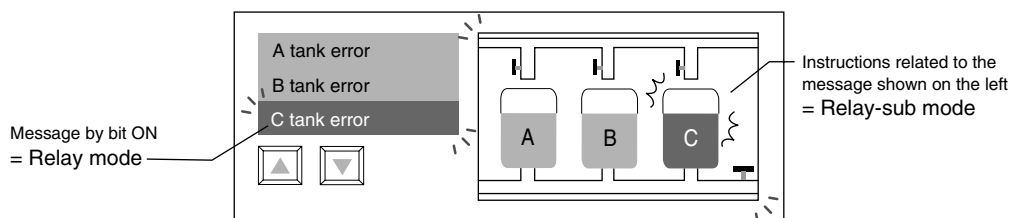


[Sub-action: Sub-display] must be selected in the [Relay] dialog.

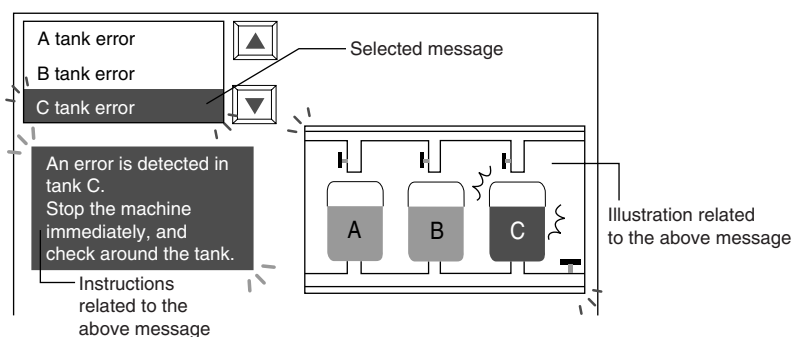
Outline of Relay-Sub Mode

◎ Relay-sub mode must be used together with relay mode.

Text or graphics can be called up for one bit of relay mode. For example, this function is useful for displaying detailed explanation or illustrations corresponding to an error message.

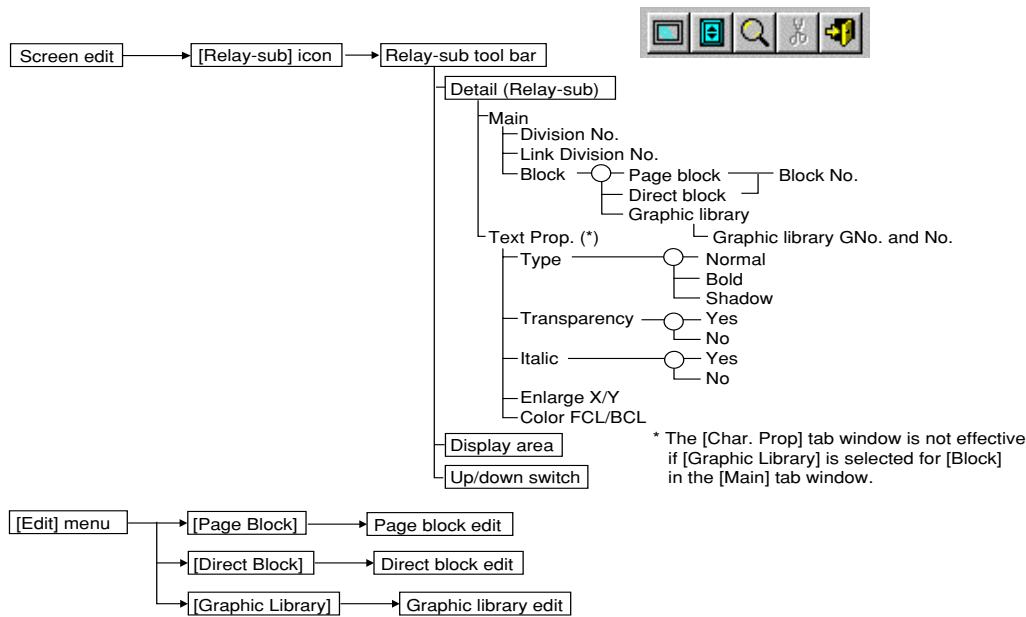


◎ A maximum of four sub-displays can be set up for one-bit of data. Therefore, supplemental explanations, additional messages or easy-to-see graphics can be displayed at one time.



(Relay -sub) Dialog

The setting that makes an association between relay mode and relay-sub mode can be made in the [Relay-sub] dialog. Click the [Detail] icon on the relay-sub tool bar. The [Relay-sub] dialog is displayed.



◆ [Main] tab window



[Division No.]

Set a division number not registered in another mode. Usually, the division number currently being edited (displayed in the upper right corner of the screen) is automatically specified.

[Link Division No.]

Relay-sub mode can only work when it is linked with relay mode. Set up the same division number as the corresponding relay mode.

With this option setting, the relay-sub mode is linked with the relay mode.

[Block]

Choose a form of sub-display from the following options:

- ☐ Page block
Use [Page Block] to display messages.
- ☐ Direct block
Use [Direct Block] to display messages.
- ☐ Graphic library
Use [Graphic Library] to display graphics.

For more information on page block edit, refer to page 8-25.

For more information on direct block edit, refer to page 8-27.

For more information on graphic library edit, refer to Chapter 11, "Graphic display."

[Block No.]

This option becomes active when [Page] or [Direct] is chosen for [Block].
Specify the top block number for assigning one page block or direct block to one-bit data. This top block number corresponds to the top message number of the relay messages. The later blocks correspond to the consecutive relay messages.

[Graphic Library] GNo. & No.

This option becomes active when [Graphic Library] is chosen for [Block].
Specify the group number and the number of the top graphics for assigning graphics to one-bit message in relay mode.
This top graphic number corresponds to the top message number of the relay messages. The later graphics correspond to the consecutive relay messages.

◆ [Text Prop.] tab window

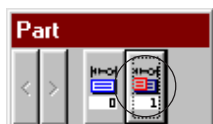
A setting item that is active only when [Page Block] or [Direct Block] is selected for [Block].

[Type]/[Transparency]/[Italic]/[Color]

For more information on these options, refer to page 8-7.

[Enlarge] (Setting range: X: 1 - 8, Y: 1 - 8)

Set the size of the displayed characters.



When the settings in the [Relay-sub] dialog are finished and you click on [OK], the [Relay-sub] icon is registered in the [Part] auxiliary tool box in the lower left corner of the screen. For information on how to review the contents or how to delete registered settings, refer to Chapter 1, “Basic Operation,” page 1-9.

Setting for “Sub-display” in the (Relay) Dialog

Note the following:

[Action Area]

You can choose as desired: [Area], [Switch] or [Lamp].

When [Area] is chosen, the switch function is automatically provided to the display area part where sub-display is to be held.

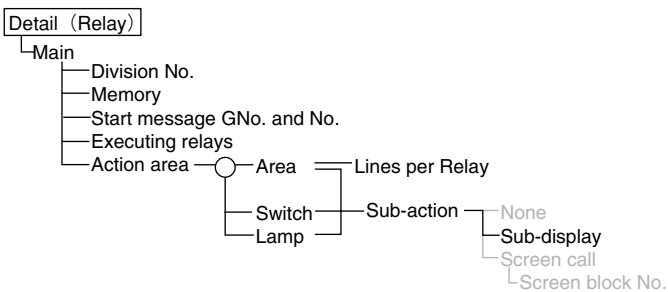
This is effective only when [Sub-display] or [Screen Call] is chosen for [Sub-action].

**Display Area Parts Switch Function**

To call up the contents of the sub-display in relay-sub mode when the relay message is shown in the display area, it is necessary to choose a 1 bit relay message with the cursor. For the ZM Series, the switch function is automatically furnished for display area parts. Thus, if you directly press the place where the message is being displayed, the cursor will move to that location. (You can also make selections using the roll-up/roll-down switches.)

[Sub-action]

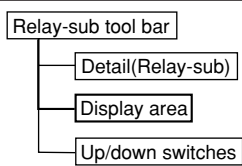
Choose [Sub-display]. The message displayed in relay mode is equipped with a display in relay-sub mode.



Display Area Part for Relay-Sub Mode



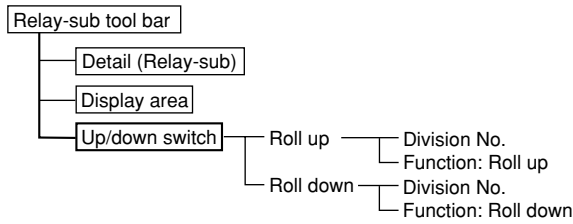
Messages and graphics registered for displays in relay-sub mode must be displayed in dedicated display area parts. For information on procedure of creating this display area part, refer to page 8-9.



Roll Up/Roll Down Switch for Relay-Sub Mode

An auxiliary switch only active when [Block: Page Block/Direct Block] is set in the [Relay-sub] dialog. A roll-up/roll-down switch only used when the sub-display messages exceed the bounds of the display area.

Click the [Up/Down Switch] icon on the relay-sub tool bar. Select either [Roll Up] or [Roll Down]. If [Roll Up] is selected, the [Function: Roll Up] switch is called up, and if [Roll Down] is selected, the [Function: Roll Down] switch is brought up. Additionally, please take note of the following setting items.



[Division No.]

So that you can determine which roll-up/roll-down switch is linked to which mode, set the same division number as the one specified in the [Relay] dialog of the link location.

[Function]

This option determines the function of the switch. Select [Function: Roll Up/Roll Down]. If the switch is one that was selected from the relay-sub tool bar, the default for [Function] will be [Roll Up] or [Roll Down].

Registering Messages for Sub-display

Messages to be used for sub-display must be created in message edit, and be re-registered in page block edit] or direct block edit. The registration method varies for each of the two types of [Block] mentioned above.

◆ Page Block

“Page block” extracts messages previously registered in message edit in its original registration order. It is suitable for long explanations, etc.

When you go to the [Edit] menu and click [Page Block], the page block edit window is displayed.

For information on [Page Block] construction and editing methods, refer to page 8-25.

◆ Direct Block

“Direct block” registers a number of lines of messages previously registered in message edit irrespective of the registration location number (=the group number or message number in message edit).

When you go to the [Edit] menu and click [Direct Block], the [Direct Block: Block Designation] dialog is displayed. When you specify the group and click [OK], the direct block edit window is displayed.

For information on [Direct Block] construction and editing methods, refer to page 8-26.

Registering Graphics for Sub-display

Register the pictures (=graphics) used for the sub-display in graphic library edit.

When you open the graphic library edit window, the edit status display on the tool bar changes from [Screen] to [Graphic LIB].

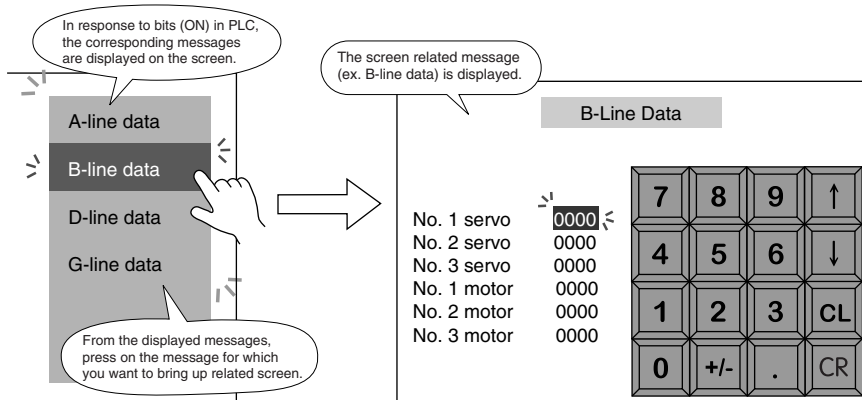
For information on graphic library edit, please refer to Chapter 11, “Graphic Display.”

Calling Screens from Messages (Screen-Call)

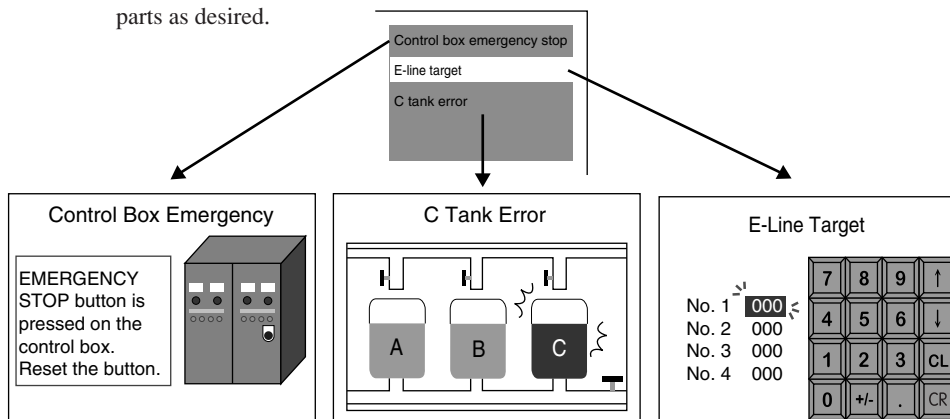
Outline of Screen-Call Function

Register the associated contents of a relay message to be displayed in advance. When a relay message is selected, the screen containing those associated contents is displayed. This function is called “screen call.”

You can create, register, and call up more detailed contents on the screen.

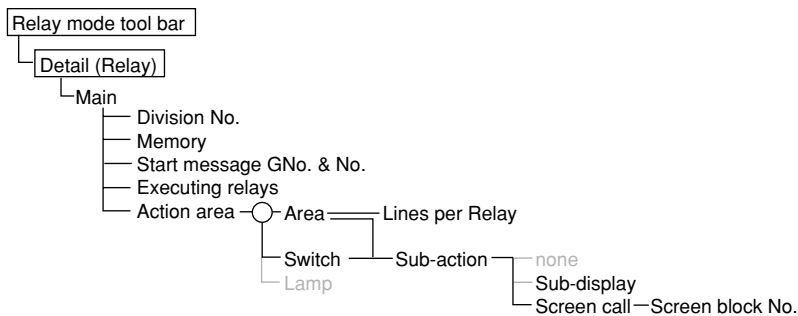


Screens to be called up are ordinary screen displays; therefore, you can set as many parts as desired.



(Relay) Dialog for Screen Call

The following setting items in the [Relay] dialog are necessary when using the screen call function.



[Action Area]

Either [Area], [Switch], or [Lamp] is acceptable.

When [Area] is chosen, the display area part is automatically equipped with the switch function. This is applied only when [Screen Call] or [Sub-display] is chosen for [Sub-action].

**Display Area Parts Switch Function**

When you have shown the relay message in the display area through the screen call function, display area parts are automatically furnished with the switch function.

When you directly press the location where the message is displayed, the screen call function is activated and the screen changes.

[Sub-action]

Choose [Screen Call].

[Screen Block] must be specified as an auxiliary item.

[Screen Block]

This option becomes active when [Screen Call] is chosen for [Sub-action].

Specify the top block number from which “screen blocks” should be started. This option determines which screen is to be displayed for what relay message.

Screen Block Editing

◆ Outline of screen blocks

When [Screen Call] is chosen for [Sub-action] in the [Relay] dialog, screen blocks must be specified.

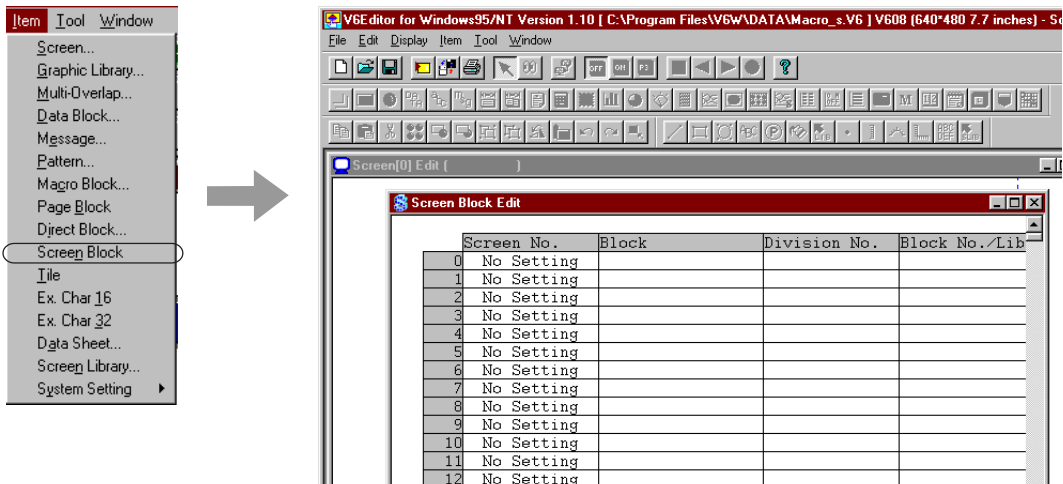
◎ “Screen blocks” are a group of screen displays prepared for relay mode, and are re-organized into the order of relay messages. Screen blocks are assigned to relay messages one by one.

◎ The same functions can be set on the screen used in [Screen Block] as can be set with a normal screen.

However, when using message mode (using [Page Block] or [Direct Block]), graphic mode, or the data block area mode on the screen, you must set the top number of the corresponding message, graphic, or data block in the original relay message.

◆ [Screen Block] dialog

When you go to the [Edit] menu and click [Screen Block], the screen block edit window is displayed.



The number on the left edge is the screen block number.
The setting contents for each number are shown below.

[Screen No.]

Specify the screen number to be used as a screen block.

[Block]

Choose the part type included in the screen that is specified for [Screen No.].

For more information on message mode, refer to page 8-21.

For more information on graphic mode, refer to Chapter 11, "Graphic Display."

For more information on entry mode and data block area mode, refer to Chapter 9, "Entry Mode."

- ☐ Page block/Direct block
These message blocks are available when message mode is selected. Choose [Page] or [Direct] in accordance with the blocks used in message mode on the specified screen.
- ☐ Graphic LIB
When graphic mode is used on the specified screen, choose [Graphic LIB].
- ☐ Data block
When [Block] or [Data Block Area] is chosen for [Type] in the [Entry] dialog, choose [Data].
- ☐ None
When no mode part is used on the specified screen, choose [None].

[Division No.]

This setting is necessary when something other than [No Designation] is selected For [Block].

Specify the same division number as the one where the mode selected by [Block] is registered.

[Block No./ Library No.]

This setting is necessary when something other than [No Designation] is selected for [Block].

Specify the block or library number of the contents that are applied to the sub-display of the original relay message.

[Same Screen]

Check this item when the original relay mode screen and the screen to be called up as [Screen Block] are the same.

For example, if several data blocks are linked to relay messages and are to be displayed on the same screen, a convenient way to modify them is by changing only the data block number.

Set only [Block No.] for [Screen Block] differently. The [Screen No.] should be the same. Register multiple screen blocks of [Same Screen]. Subsequently, the screen call function that changes the contents of the blocks to correspond to the relay is activated.

*** Set the previously described [Screen No.] to be the same as the relay mode screen number.**

With this, screen block settings are finished.



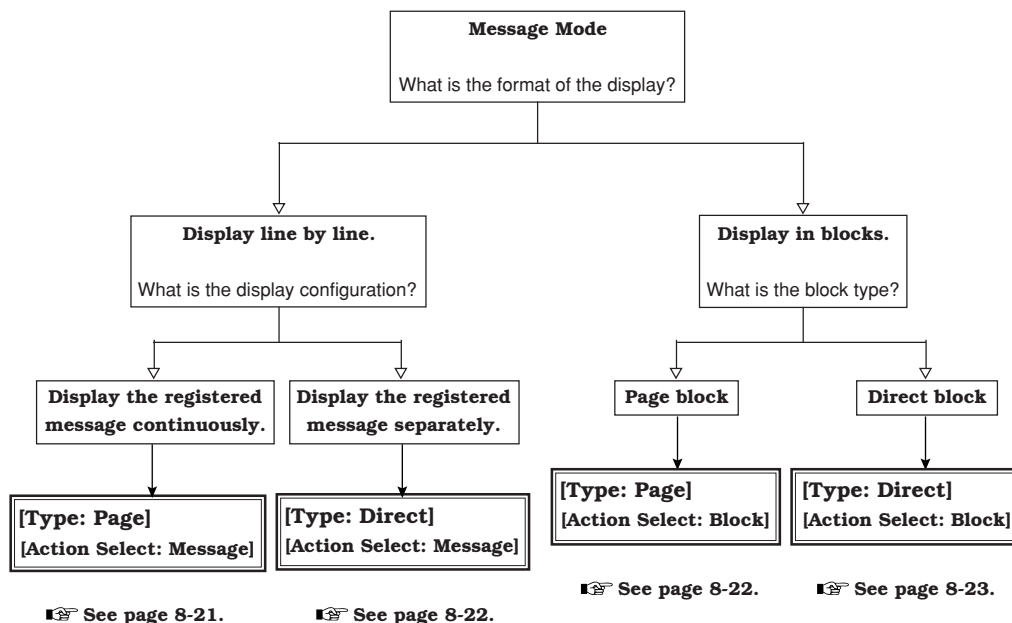
Message Mode

8

Message Mode

Outline of Message Mode

Displays in message mode can be illustrated as follows:



How to Specify the Message Number

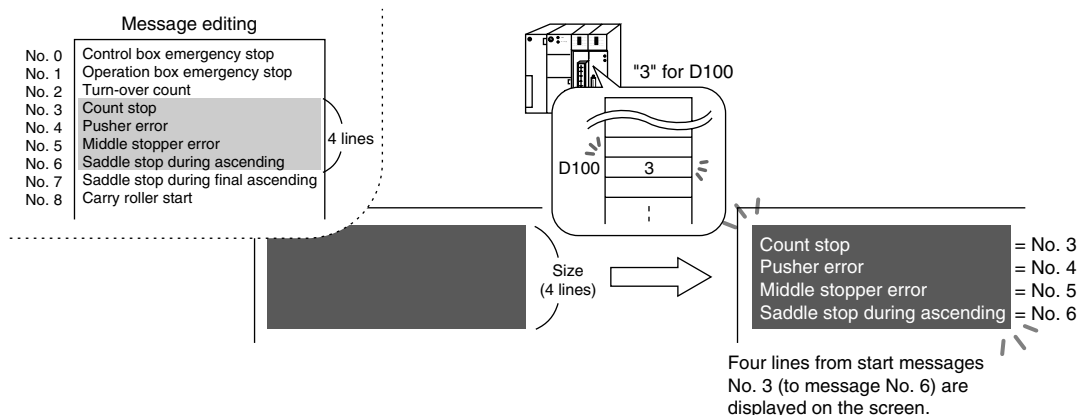
If you set [Action Select: Message] in the message mode, you must specify the number of the message that you will display.

A. [Type: Page]

Specify the line number of the top message that you will display. Several lines of the message which number you specified are continuously displayed within the area at the top of the screen.



For details, refer to page 8-29.

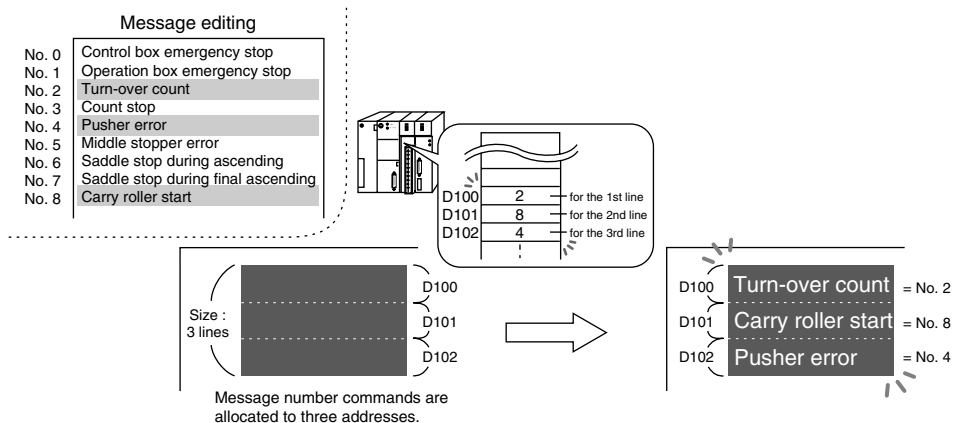


B. [Type: Direct]

One memory is automatically allocated to every one line in the message display area.
Specify the message number that you will display based on the allocated memory.
A message specified by the memory address is displayed on the screen.



For details, refer to page 8-29.



How to Specify the Block Number

If you set [Action Select: Block] in the message mode, specify the registered [Page Block] or [Direct Block] number of the message that you will display.

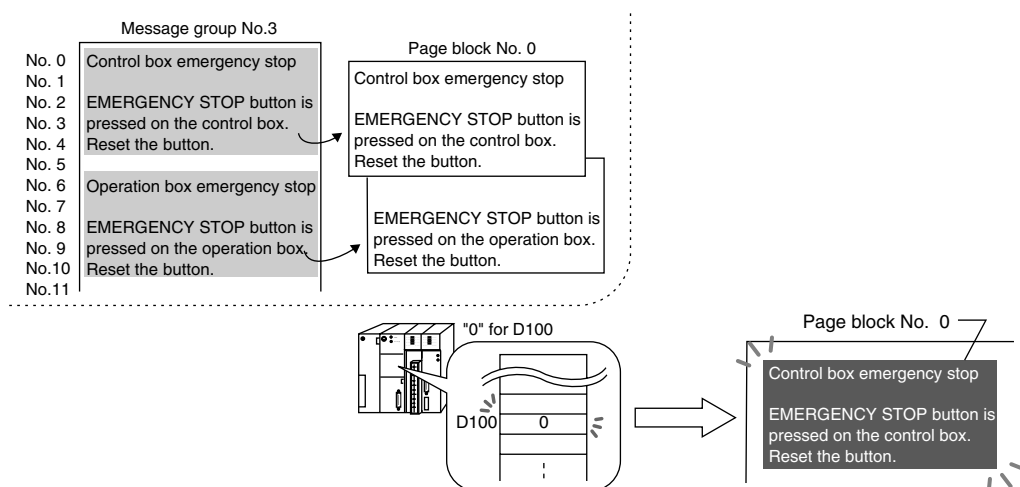
C. [Type: Page]

Register the message, that was previously registered in message edit, in [Page Block].

To display page block on the screen, there are two ways: with an internal command, or with an external command. For details, refer to page 8-29.



For information about page block, refer to page 8-25.

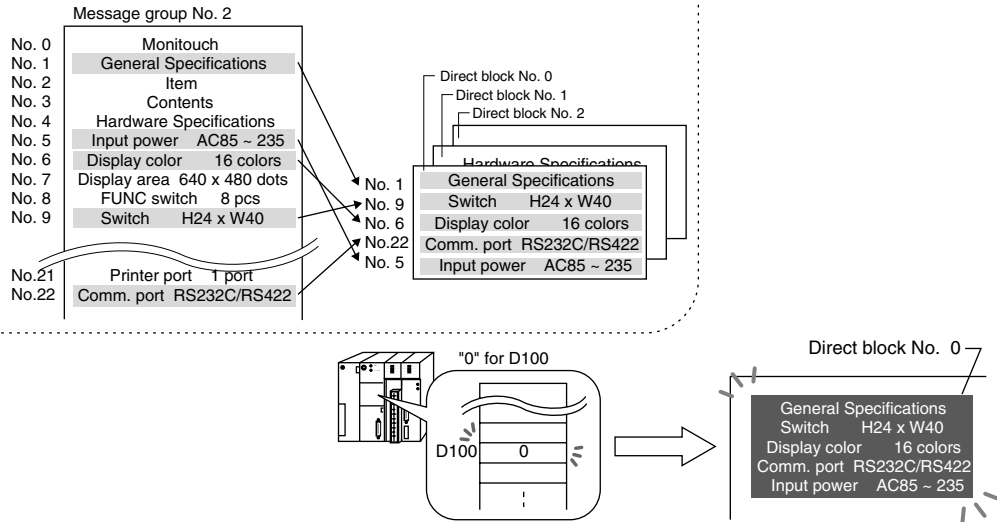


D. [Type: Direct]

Register the message, that was previously registered in message edit, in [Direct Block]. To display direct block on the screen, there are two ways: with an internal command or with an external command.



For details, refer to page 8-29. For information about direct block, see page 8-26.

**Setting Procedure for Message Mode**

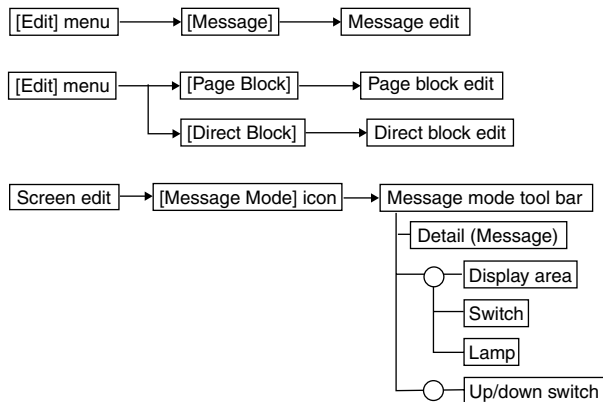
To set up message mode, you have to work in two or three editing screens.

◎ Message registration in message edit

◎ (When necessary)

Block registration in page block edit or direct block edit

◎ Message mode settings, [Message] dialog, display area, and switches, etc. in screen edit



Message Registration

To show messages on the screen, it is necessary to register them. Registration can be made in message editing.

Message editing is an editing area different from screen editing, and is to be used for registering and saving messages.

Registered messages can be used not only in the message mode, but also in the relay mode and for data displays (= message display).

About Message Editing

For more information, refer to page 8-5.

Each message is given an address (= message group number and message number).

From this address, the system can distinguish messages.

In addition to these addresses, messages are also given absolute addresses. Absolute addresses are consecutive numbers assigned all messages. Group numbers are not given.

For more information on absolute addresses, refer to page 8-30.

For more information on absolute addresses, refer to page 8-5.

Ordinary addresses (groups)		Absolute addresses	
Group No.	Message No.	Group No.	Message No.
0	0000~0255	(None)	0000~0255
1	0000~0255		0256~0511
2	0000~0255		0512~0767
3	0000~0255		0768~1023
4	0000~0255		1024~1279
5	0000~0255		1280~1535
6	0000~0255		1536~1791
7	0000~0255		1792~2047
8	0000~0255		2048~2303
9	0000~0255		2304~2559
10	0000~0255		2560~2815
11	0000~0255		2816~3071
12	0000~0255		3072~3327
13	0000~0255		3328~3583
14	0000~0255		3584~3839
15	0000~0255		3840~4095
16	0000~0255		4096~4352
17	0000~0255		4352~4607
18	0000~0255		4608~4863
19	0000~0255		4864~5119
20	0000~0255		5120~5375
21	0000~0255		5376~5631
22	0000~0255		5632~5887
23	0000~0255		5888~6143

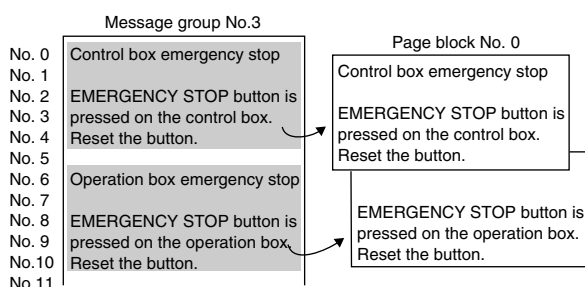
Block Registration

The blocks called [Page Block] and [Direct Block] can be displayed in message mode. An explanation of each of these blocks follows:

Page Block

◆ Outline of page block

“Page block” extracts messages previously registered in message edit in its original registration order.



This is useful for displaying an extended explanation or detailed troubleshooting information on the screen.

For editing page blocks, you have to be in page block edit.

◆ Page block construction

In page block editing, it is possible to register up to 1024 page blocks.

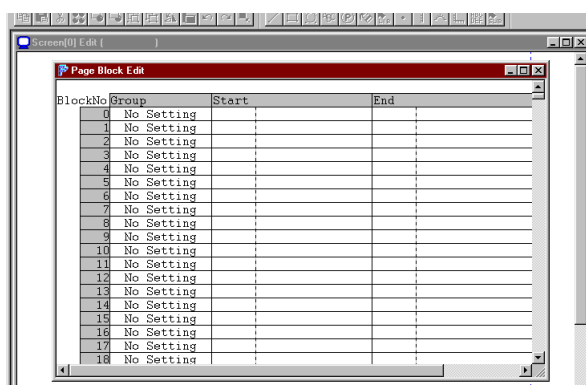
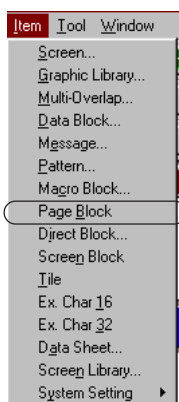
One page block can contain a maximum of 256 lines.

◆ How to Edit Page Block

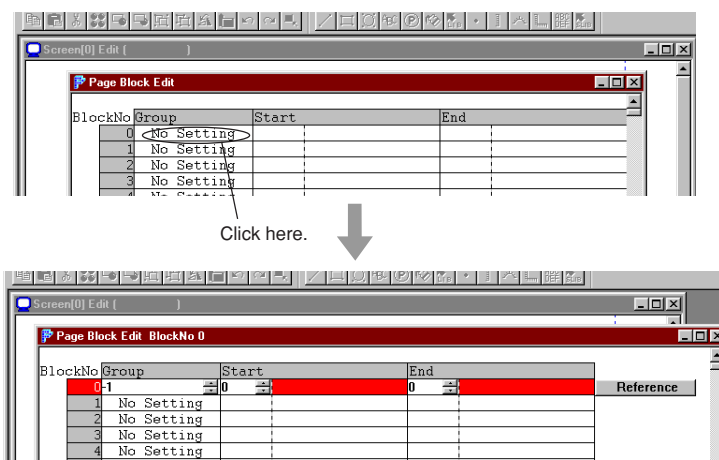


Page block uses messages registered in message edit for settings. Please be sure to register messages in message edit in advance.

Go to the [Edit] menu and click [Page Block]. The page block edit window is displayed.



When you click on the [Group: No Designation] column for each group number, the column will switch to the number specification column.



[Group]

Specify the registered group number of the message.

[Start]

Specify the top line number of the message that is extracted as a page block.

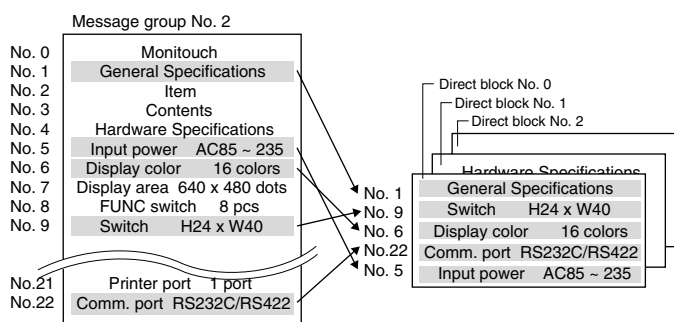
[End]

Specify the bottom line number of the message that is extracted as a page block.

Direct Block

◆ Outline of direct block

“Direct block” re-registers a number of lines of messages, previously registered in message edit, irrespective of the group number or registration order.



This is useful for bulleted lines or excerpts because the desired messages can be arranged in any order irrespective of message groups.

◆ Direct block construction

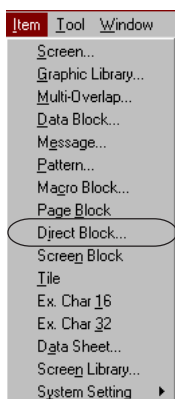
In direct block edit, it is possible to register up to 1024 direct blocks.

One direct block can contain a maximum of 256 lines.

◆ How to Edit Direct Block

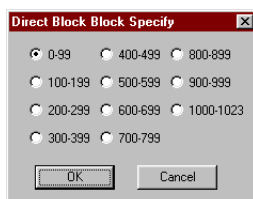


Direct block uses messages registered in message edit. Please be sure to register a message in [Message Edit] in advance.

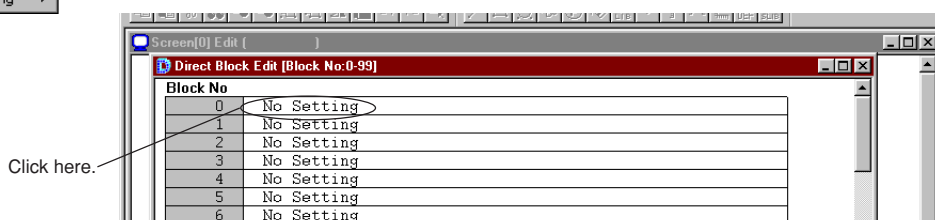


Go to [Edit Item] and click on [Direct Block].

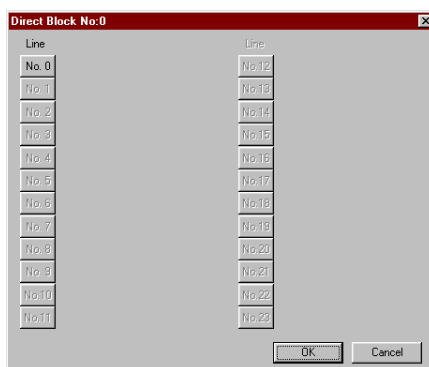
The [Direct Block: Block Designation] dialog is displayed. When newly registering, select [0-99] and click [OK].



The direct block edit [Block No. 0-99] window is displayed.



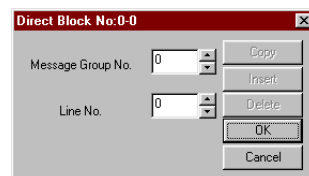
When you click on the [No Designation] column for each group number, that block number's edit dialog is displayed.



Go to [Line No.] and click on the [No. 0] button.

The [Direct Block No. 0-0] dialog is displayed.

Specify the 0th line message of block No. 0.

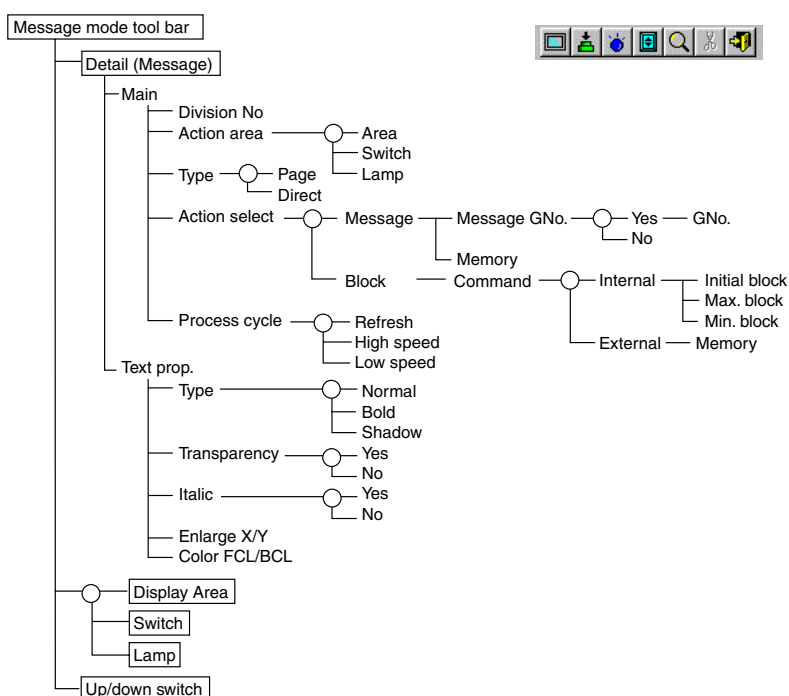


When you click [OK], the next button, the [No. 1] button becomes active.

When settings are completed, go to the [Direct Block No. 0-0] dialog and click [OK]. Other direct blocks are set in the same way.

[Message] Dialog

A dialog that must be set when using message mode. Click on the [Detail] icon on the message mode tool bar. The [Message] dialog is displayed.



(Main) Tab Window

[Division No.]

Set a division number where no mode has been registered. Usually, the division number currently being edited (displayed on the upper right of the screen) is automatically specified.

[Action Area]

Choose from [Area], [Switch] or [Lamp] for specifying the place where the message should be displayed on the screen.

[Area] : Displays messages in display area parts placed on the screen.

[Switch] : Displays messages in switch parts placed on the screen.

Switches are set in [Function: Mode]. Each switch has [Display Order] as an auxiliary item. You can specify which message line to display on which switch.

When [Display Order] is not set, messages are displayed in the order that switches were placed on screen.

[Lamp] : Displays messages in lamp parts placed on the screen.

Lamps are set in [Function: Mode]. For each lamp, as with switches, set [Display Order] as an auxiliary item.

[Type]

Select [Page] or [Direct]. The format of the message that you display varies depending on the combination with [Action Select].

[Action Select]

Select the format of the message that you display.

The display format varies depending on whether you selected [Page] or [Direct] for [Type].

◆ Message**[Type: Page]**

Use [Memory] (discussed later) to specify the line number of the top message that you will display. Several lines of the message which number you specified are continuously displayed within the area at the top of the screen.

[Type: Direct]

One memory is automatically allocated to every one line in the message display area. Specify the message number that you will display based on the allocated memory. A message specified by the memory address is displayed on the screen.

◆ Block**[Type: Page]**

Page blocks are displayed on the screen by an internal or external command. (Refer to [Command].)

[Type: Direct]

Direct blocks are displayed on the screen by an internal or external command. (Refer to [Command].)

[Command]

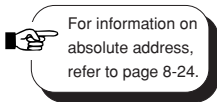
A setting that becomes active for [Action Select: Block].
Select how to call up blocks.

◆ Internal

The page block or direct block display can be changed with the [Function: Plus Block/Minus Block/Block Call] switch placed on the screen.

◆ External

Directly specify the page block or direct block number using [Memory], and display the corresponding block.

**[Message GNo]**

A setting active for [Action Select: Message]

◆ [Message GNo] checked

Specify the registered group number for the message you will display on the screen. The messages that can be displayed are limited to messages from the specified group.

◆ [Message GNo] unchecked

Specify the [Absolute Address] for the message you will display.
Messages in multiple groups as well as one group can be displayed.

[Memory]

When [Message] is chosen for [Action Select], or when [Block] and [External] are chosen, memory area must be secured.

The contents are shown below:

Memory n	MSB																LSB	
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		

Message No. 0000 - 6143
or block No. 0000 - 1023

The number of words used from the top of the [Memory] address varies based on the [Message] dialog setting.

◎ [Type: Page] and [Action Select: Message]

1 word

◎ [Type: Direct] and [Action Select: Message]

The words are based on the display area's Y size divided by the character enlargement factor value. [Memory] is allocated in sequential order at the top.

◎ [Action Select: Block] and [Command: External]

1 word

[Initial Block]/[Max. Block]/[Min. Block]

These options must be specified when [Block] and [Internal] are chosen for [Action Select] and [Command], respectively.

◆ Initial Block

This is the block to be displayed at first when the page or direct blocks are called up on the screen.

◆ Max. block

This is the greatest number of page or direct blocks to be used in the message mode.

◆ Min. block

This is the smallest number of page or direct blocks to be used in the message mode.

[Process Cycle]

Process cycle speed of communication between the ZM Series and the PC can be chosen.

For details, refer to Chapter 3, “Screen,” page 3-9.

(Text Prop.) Tab Window

For details, refer to page 8-7.



When you click on [OK] in the [Message] dialog, the [Message Mode] icon is registered in [Part] auxiliary tool bar in the lower left corner of the screen.



Display Area Part

Set display area parts when [Action Area: Area] is set in the [Main] tab window of the [Message] dialog. The message is displayed in the parts area.

Display area parts cannot work just by being placed. By establishing a link with the [Message] dialog, they can work as a part for message mode.

*** Association is performed based on [Division]. When you set display area parts with the same division number as the [Message] dialog, the display area parts are thus recognized as something to be used with message mode.**

For more information on display area parts, refer to page 8-9.



Display a Message on Switches (or Lamps)

A message displayed in message mode can be shown not only in display area parts, but also in the switches or lamps placed on screen.

Set the [Message] dialog in [Action Area: Switch (or Lamp)].

Set the switches or lamps placed on screen as [Function: Mode].

By setting them with the same division number, switch parts (or lamp parts) are recognized as areas to be used with message mode.

For details, refer to page 8-10.



Other Switches that can be used in Message Mode

The following switches are auxiliary switches for message mode.

Roll Up, Roll Down

A switch active when you go to the [Message] dialog and select [Action Select: Block].

Use when the page block or direct block messages displayed on the screen protrude out of the area.

Scroll through the block currently being displayed.

Plus Block, Minus Block, Block Call

A switch active when you go to the [Message] dialog to [Action Select: Block] and then to [Command: Internal].

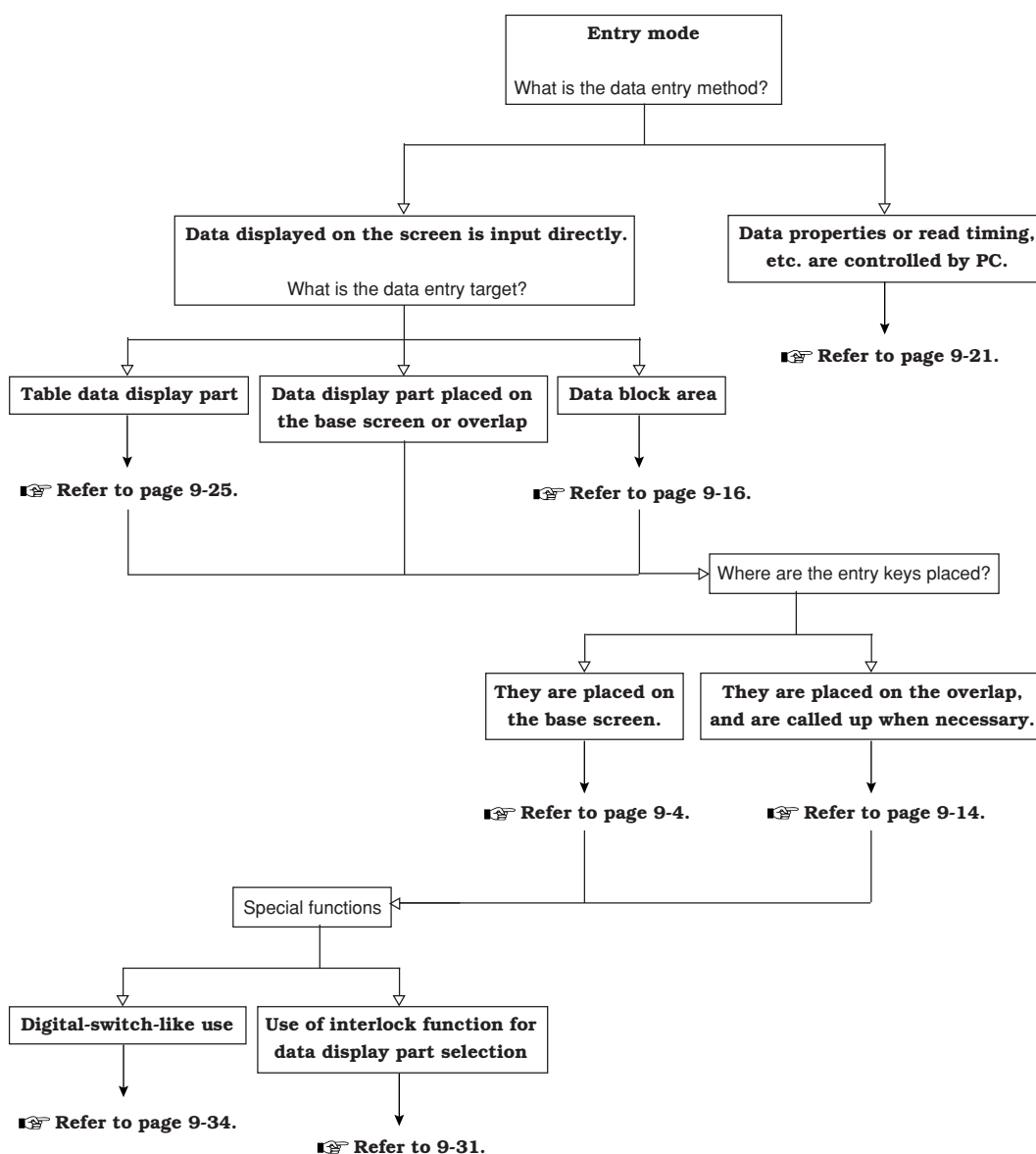
Used when switching the page block or direct block displayed on the screen.



Entry Mode

Entry Mode Usage

Entry mode can be used in several manners depending on data entry methods, data entry targets, editing procedure, etc. The following illustrates the usage of the entry mode. For more information, refer to the pages indicated below.



Outline of Entry Mode

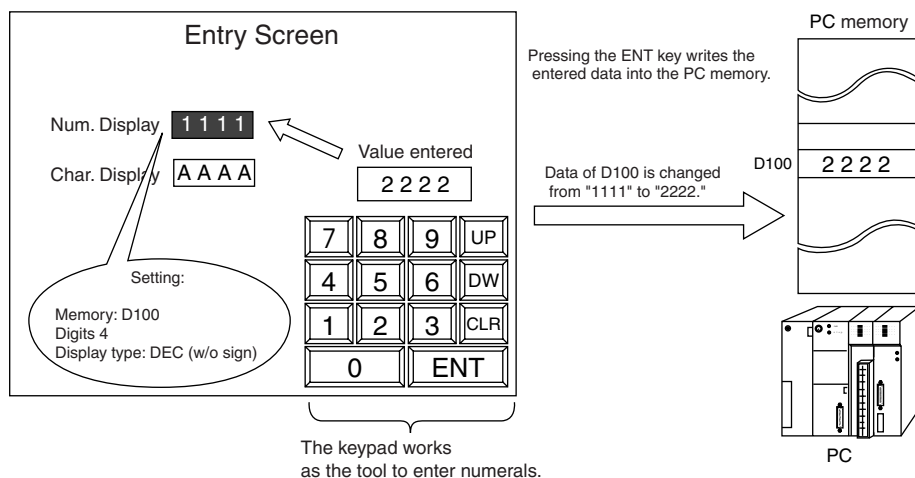
- ◎ When numerical data or characters (ANK, Shift JIS code, etc.) are to be written to the specified memory addresses, entry mode must be set.
- ◎ Entry mode allows operators to enter numerical data and characters on the same screen. The difference between them is their “entry targets.”
 - For numerical data : Numerical data display parts
 - For characters : Character display parts
- ◎ The following items must be set for entry mode:
 - Numerical data, character display, or table data display parts as entry targets
 - Switch parts to be used for entry (= keypad)
 - Entry mode settings for establishing a link between the entry targets and the switches

Applications of Entry Mode

When the Entry Target Is a Numerical Data Display Part:

- ◎ Numerical data entry (keypad mode)

Numerical data entry is called “keypad mode.” Switches for entering numerical data (keypad) should be placed on the screen, and numerical data display parts must be used for entry targets. When numerical data is entered through the keypad on the screen, it is directly written to the PC memory.



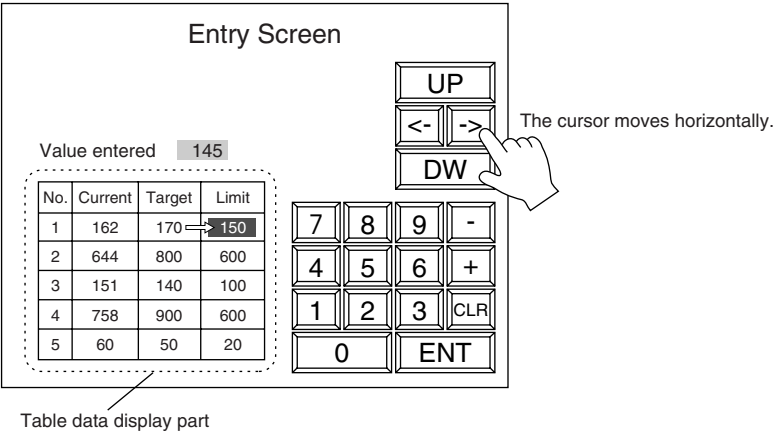
**When the Entry Target Is
a Character Display Part:**

- ◎ Entered data are regarded as characters. When characters are entered through the keypad on the screen, their character codes are directly written to the PC memory.
The following character codes are used:
One-byte characters ANK (ASCII)
Two-byte characters Shift JIS code
- ◎ When switches like a keyboard are created, it is possible to enter any character.

**When the Entry Target Is
a Table Data Display Part:**

- ◎ Numerical data or characters can be entered for a table when a table data display part is used. The keypad works as the tool to enter numerals for numerical data display parts, and works as the tool to enter characters for character display parts.
- ◎ For table display parts only, [Move Cursor R/L] or [Table Move +/-] is effective for [Function] for switch setting.

For more information on table data display setting, refer to page 9-25.



Direct Data Entry for Data Display Parts (= [Type: Data Display])

Data can be entered for numerical data or character display parts placed on the screen directly through the keypad.

Entry Screen

Number 1 0

Number 2 0

Number 3 0.0

Number 4 0.00

Text 1 AAAA

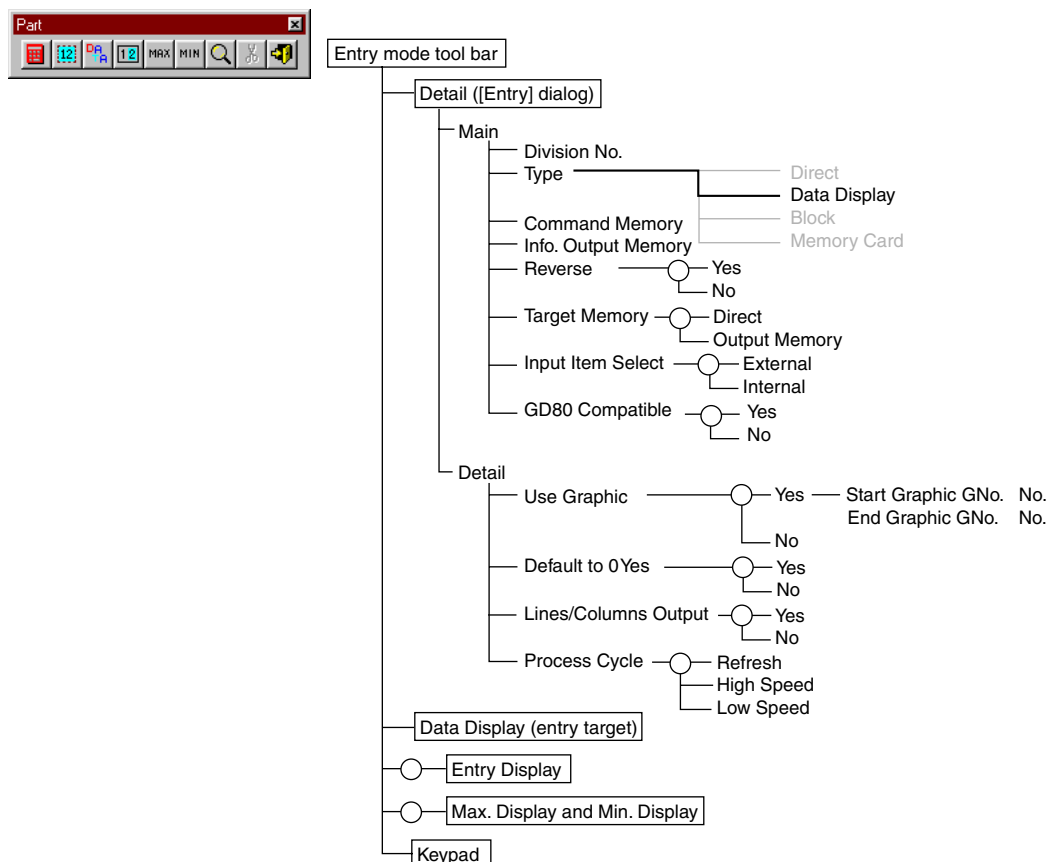
Max. value 9999

Min. value 0

Value entered 0

7	8	9	UP
4	5	6	DW
1	2	3	CLR
0	.	+/-	ENT

The following properties must be set for creating the screen shown above.



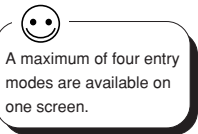


[Entry] Dialog Setting (Main) Tab Window

[Division No.] (0 ~ 255)

In one division, only one entry mode can be registered.

Switches (keypad) to be used in entry mode must be placed on the same division as the entry mode. One entry mode each can be registered on the base screen and overlaps 0 to 2.



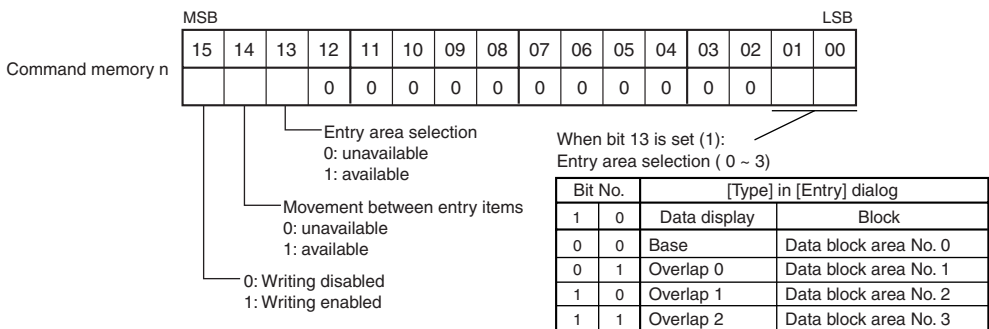
[Type]

Choose [Data Display]. Data display parts placed on the base screen or overlaps are used as entry targets.

[Command Memory]

This is used for controlling entry mode. The contents depend on the selection of [External] or [Internal] for [Input Item Select].

◆ Input Item Select: Internal



○ Entry area selection (bit 13)

When multiple data display parts are placed, the cursor is moved to the parts in order by pressing the Up/Down switch. Selection of the cursor movement area becomes possible by this bit.

0 : The cursor movement area cannot be specified using memory.

The cursor is moved to the areas in the following order:

1. on the base screen
2. on overlap 0
3. on overlap 1
4. on overlap 2

1 : The cursor can be moved in the specified area only. The area is specified by bits 0 and 1.

○ Movement between entry items (bit 14)

This bit determines whether or not to move the cursor automatically to the next display part after data entry.

0 : The cursor remains in the same position when the ENT key is pressed after data entry.

1 : The cursor moves to the next display part when the ENT key is pressed after data entry.

○ Writing enabled/disabled (bit 15)

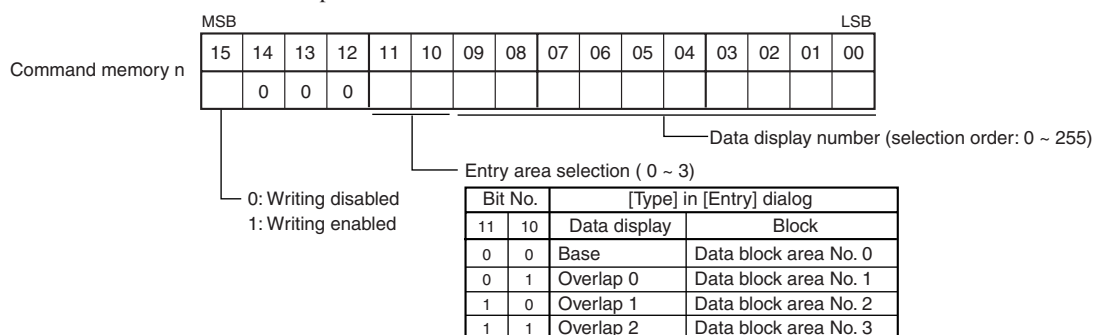
This bit determines whether or not the entry keys (keypad) work.

- 0 : Only switches for [Function: Roll Up/Roll Down] can work.
When other keys are pressed, an error buzzer sounds.
- 1 : Entry keys work normally.



**Bit 15 must be set (ON) for using the entry keys.
Set bit 15 of the command memory address when using entry mode.**

◆ Input Item Select: External



The following PC manufactures employ BCD code:
OMRON: C series
SHARP: JW series
FUJI: H series
KOYO: S series

○ Data display number (selection order) (bits 0 ~ 9)

When an entry target is selected, its order number is specified.

The number of bits to be used depends on the code (DEC or BCD).

DEC : Bits 0 to 7

BCD : Bits 0 to 9

○ Entry area selection (bits 10 and 11)

The entry area is selected by bits 10 and 11.

○ Writing enabled/disabled (bit 15)

This bit determines whether or not the entry keys (keypad) work.

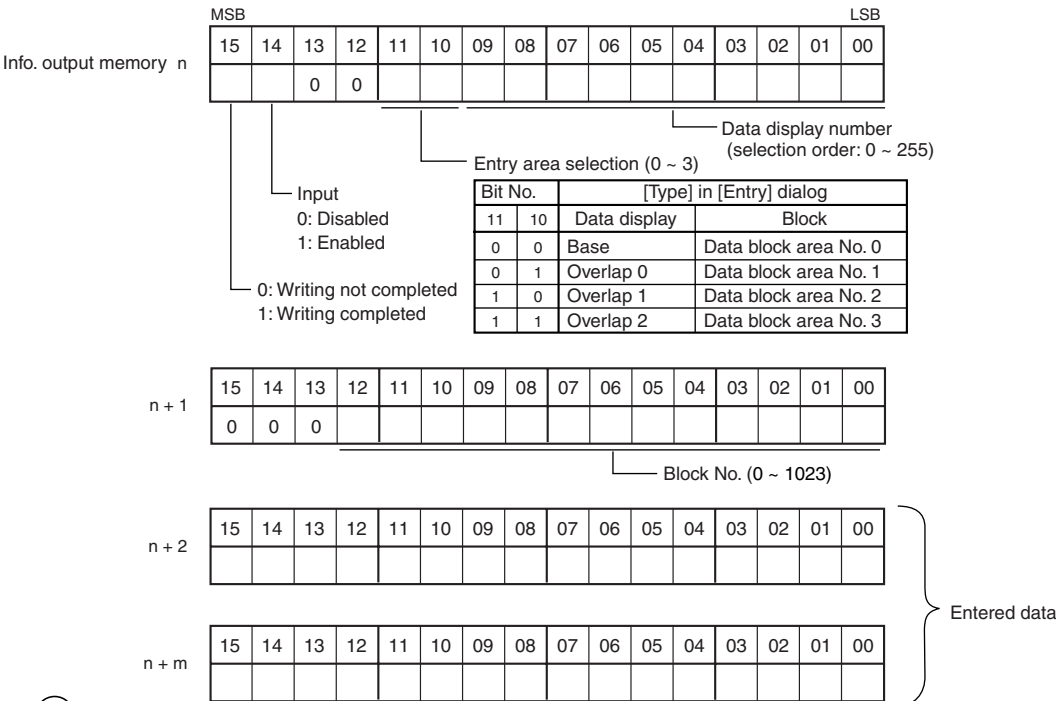
- 0 : Entry keys do not work. When pressed, and error buzzer sounds.
- 1 : Entry keys work normally.



**Bit 15 must be set (ON) for using the entry keys.
Set bit 15 of the command memory address when using entry mode.**

[Info. Output Memory] (information output memory)

This is used for outputting the status of entry mode.



☺
The following PC manufactures employ BCD code:
OMRON: C series
SHARP: JW series
FUJII: H series
KOYO: S series

- Data display number (selection order) (bits 0 ~ 9)
The selection order of data display parts used as entry targets is written.
The number of bits to be used depends on the code (DEC or BCD).
DEC : Bits 0 to 7
BCD : Bits 0 to 9
- Entry area selection (bits 10 and 11)
The current entry area number is written.
- Input (bit 14)
Input status is written.
Bit 14 of the entry mode for the area (base screen or overlap 0 ~ 2) being placed at the top is set (1). For the remaining areas, bit 14 is reset (0).
0 : Input is not possible.
1 : Input is possible.
- Writing completed (bit 15)
When the ENT key is pressed, data is written to memory, and this bit is set to "1" (ON). This bit remains set (ON) until the entry target moves to a different data display part.



The number of characters here is based on one-byte codes. Two one-byte characters occupy one word. Therefore, the number of words occupied can be calculated by dividing the number of characters by 2. If there is a remainder, it occupies one word.

<Ex.>

3 characters = 2 words

○ Block No. (n + 1)

When [Block] is chosen for [Type], the block number for the entry target is written to memory “n + 1.” Block number writing is not allowed when [Data Display] is chosen for [Type].

○ Entered data (n + 2 ~ n + m)

When [Output Memory] is chosen for [Target Memory] in the [Main] tab window of the [Entry] dialog, data is written.

- In the case of numerical data, 2 words are used (n + 2, n + 3)
- In the case of characters, as many words as characters are used (n + m).

[Reverse]

This option determines whether or not to highlight the data display part (in reverse video) currently selected as the entry target. This is effective when [Data Display] or [Block] is chosen for [Type].

[Target Memory]

This option is used for specifying the memory address to which data should be written.

◆ Direct

Data in the selected data display part is written directly to the specified memory address.

◆ Output Memory (= [Info. Output Memory])

In the case of numerical data, it is written to memory addresses “n (information output memory) + 2” and “n + 3.”

In the case of characters, as many words as characters are written to memory addresses starting from “n (information output memory) + 2.”

[Input Item Select]

Determine the method of data display part (entry target) selection.

◆ Internal

Up/Down switches are used for selection. The same division number must be specified for the Up/Down switches and in the [Entry] dialog to make the switches available.

◆ External

Bits 0 to 11 of the command memory address are used for specifying the entry area and the data display number. (Refer to page 9-6).

[ZM30 Compatible]

When screen data files of the ZM-30 series have been converted into the files for ZM series, the keypad mode for the ZM-30 series are converted into the entry mode, and [ZM30 Compatible] is checked automatically. Uncheck the box for creating screen data files for the ZM series. For more information, refer to Chapter 26, “File Conversion.”

(Detail) Tab Window

Notes

When using the graphic library for placing characters on entry keys, [XOR] must be chosen for [Draw Mode] in the switch dialog.

[Use Graphic]

This option lets you to use graphics for entry keys.

If it is not possible to place all the desired characters (numerals, characters in upper and lower cases, etc.) on one keypad, register these characters as graphics in the graphic library, and change them over on the keypad as required.

When [Use Graphic] is checked:

[Start Graphic GNo. & No.] / [End Graphic GNo. & No.]

Specify the range of graphics to be used in the entry mode. The graphics can be changed using the switches for [Function: Graphic Library] or [Function: Plus Block/Minus Block].

[Default to 0]

When a data display part as an entry display is placed, entered data is indicated in it temporarily before entry for the entry target.

When this box is checked, the following data is used for the entry display as default after data entry:

Numerical data entry → 0

Character entry → space

When this box is unchecked, the data in the entry target is indicated in the entry display.

[Lines/Columns Output]

This option is related to table data display. For more information, refer to page 9-28.

[Process Cycle]

For information on the processing cycle, refer to page 3-9 in Chapter 3, "Screens."



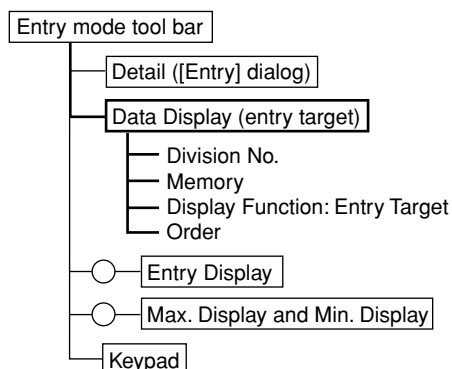
When [OK] is clicked after setting the [Entry] dialog, it is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen. When rechecking or deleting the settings of the dialog, refer to page 1-9 in Chapter 1, "Basic Operation."



Data Display Part as Entry Target

Set data display parts as entry targets.

Notes on setting are provided below.



[Division No.]

This number can be different from the division number specified in the [Entry] dialog.

[Memory]

When [Direct] is chosen for [Target Memory] in the [Entry] dialog, data is written to the address specified for [Memory]. Enter the desired address.

[Display Function]

Choose [Entry Target]. A link with the entry mode is established.

[Order]

This option becomes active when [Entry Target] is chosen for [Display Function].

Specify an ordinal number for selection/recognition of the entry target.

The cursor is moved to the entry targets in order by the Up/Down switches.

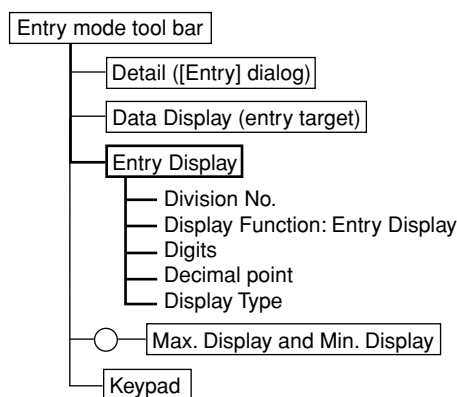
Data display parts as entry targets can be placed on any of the base screen and overlaps 0 to 2.



Data Display Part as Entry Display

It is possible to indicate the entered value in a temporary data display part called “entry display.” When setting such a part, [Entry Display] must be chosen for [Display Function]. If this part has not been set, data entered through keys is indicated directly in an entry target.

Notes on setting of entry displays are provided below.

**[Division No.]**

Specify the same division number as in the [Entry] dialog.

If not, the part cannot function as an entry display.

[Display Function]

Choose [Entry Display].

[Digits]

The number of digits set for entry display must be greater than that of entry target. If not, data for entry target exceeding the maximum number of digits for entry display cannot be held in the entry display part.

[Decimal Point]

When entry targets have the same settings of [Digits] and [Decimal Point], enter the same value of [Decimal Point] for the entry display.

In the case that the settings of [Digits] and [Decimal Point] differ for each entry target:

When there are entry targets for which [Decimal Point] is set, specify “1” for the entry display. When there is no entry target for which [Decimal Point] is set, specify “0” for the entry display.

[Display Type]

When entry targets have the same setting of [Display Type], specify the same for the entry display.

When the setting of [Display Type] differs for each entry target, choose the setting for the greatest number of digits.



Entry Data Range



Minimum and maximum displays can be set only for numerical data entry. They are not available for character display.

When the minimum and maximum data are set for an entry target, the range can be displayed on the screen.



Setting of minimum and maximum data for entry target

Minimum and maximum data can be set by checking [Alarm] in the [Detail] tab window for an entry target.

Notes on setting of minimum and maximum displays ([Display Function: Min. Display and Max. Display]) are provided below.

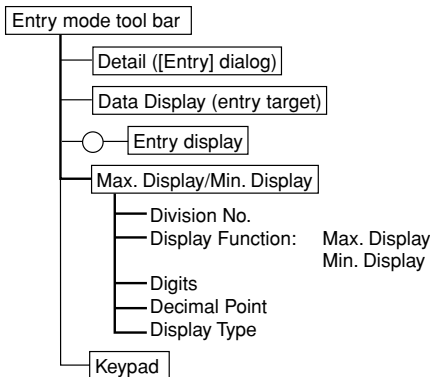
[Division No.]

Specify the same division number as in the [Entry] dialog.

If not, the part cannot function to indicate an entry data range.

[Display Function]

Choose [Max. Display] or [Min. Display].



[Digits]

The number of digits set for entry data range (minimum or maximum display) must be greater than that of entry target.

If not, data for entry target exceeding the maximum number of digits for entry data range cannot be entered.

[Decimal Point]

When entry targets have the same settings of [Digits] and [Decimal Point], enter the same value of [Decimal Point].

In the case that the settings of [Digits] and [Decimal Point] differ for each entry target:

When there are entry targets for which [Decimal Point] is set, specify “1.”

When there is no entry target for which [Decimal Point] is set, specify “0.”

[Display Type]

When entry targets have the same setting of [Display Type], specify the same.

When the setting of [Display Type] differs for each entry target, choose the setting for the greatest number of digits.

**Entry Keys (Keypad)**

A number of keys are required for entering numerals and characters in entry mode. For their creation, click the [Keypad] icon in the entry mode tool bar and choose the desired keypad part from the parts file, or create the necessary entry switches one by one.

Notes on setting are provided below.

[Division No.]

Specify the same division number as in the [Entry] dialog.

If not, the part cannot function as entry keys.

[Draw Mode]

Choose either [XOR] or [REP].

However, when [Use Graphic] is checked in the [Detail] tab window of the [Entry Dialog], choose [XOR] for the switches with the setting of [Function: Char. Entry].

Notes

When using the graphic library for placing characters on entry keys, [XOR] must be chosen for [Draw Mode] in the switch dialog.

[Function]

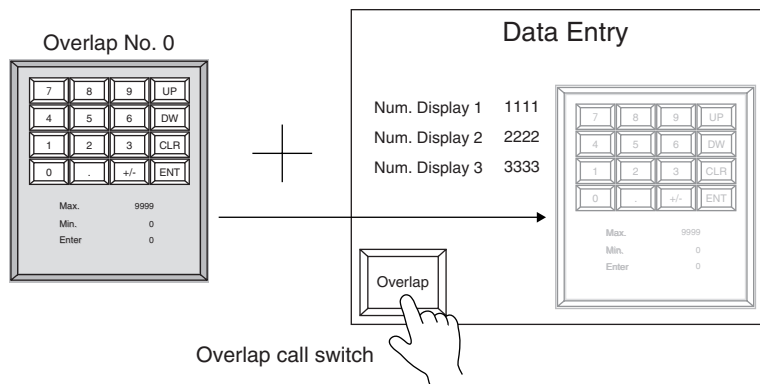
The following entry keys and switches are available in entry mode.

Function	Attached data	Action	ZM-*2	ZM-41/70
Char. entry	None	Numeral or character codes are entered.	○	○
Write	None	Entered data is written to the specified memory address.	○	○
Clear	None	Entered data is cleared.	○	○
Toggle sign	None	Entered sign is inverted (for numerical data entry).	○	○
Space	None	One-byte space is entered (for character entry).	○	○
Backspace	None	A character before the cursor is deleted (for character entry).	○	○
Delete	None	A character of the current cursor position is deleted (for character entry).	○	○
+1	None	The numeral of the current cursor position is increased by one (for numerical data entry).	○	○
-1	None	The numeral of the current cursor position is decreased by one (for numerical data entry).	○	○
<- (LFT)	None	The cursor is moved to the left.	○	○
-> (RGT)	None	The cursor is moved to the right.	○	○
(UP)	None	The entry target is moved to the data display part, which is decreased by one.	○	○
(DW)	None	The entry target is moved to the data display part, which is increased by one.	○	○
>>	None	The entry target is moved to the area, which is increased by one.	○	○
<<	None	The entry target is moved to the area, which is decreased by one.	○	○
Graphic Library	GNo & No	The specified graphic is displayed.	○	○
Plus block	None	The block/graphic number is increased by one.	○	○
Minus block	None	The block/graphic number is decreased by one.	○	○
Move cursor R	None	The cursor is moved to the right in a table data display part.	○	×
Move cursor L	None	The cursor is moved to the left in a table data display part.	○	×
Table move +	None	When there are multiple table data display parts, the cursor is moved to the table, which is increased by one.	○	×
Table move -	None	When there are multiple table data display parts, the cursor is moved to the table, which is decreased by one.	○	×

For more information on switch functions, refer to page 9-35.

Placement of Keypad on Overlap

It is possible to place a keypad on an overlap while entry targets are placed on the screen. The overlap can be called to the screen only when necessary.



Notes on Overlap Setting

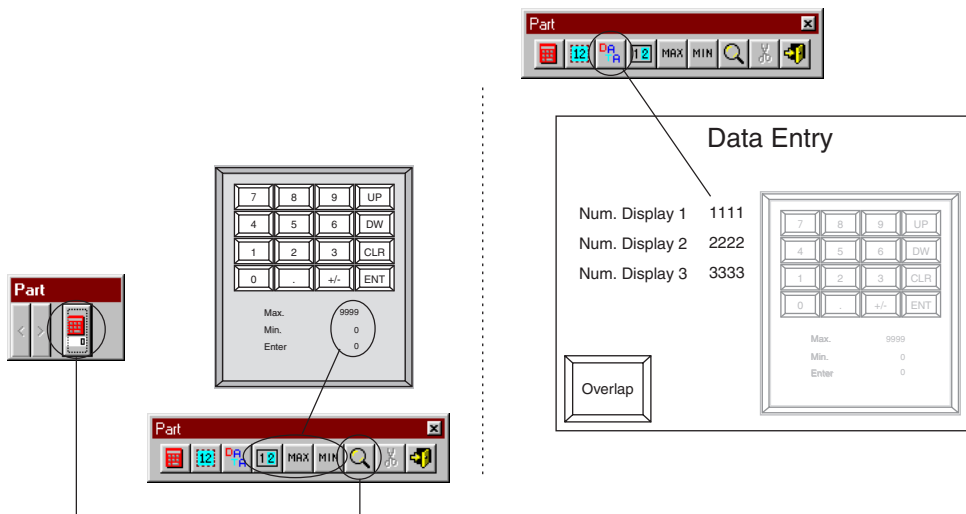
Take the following notes into consideration.

◎[Entry] dialog -> on an overlap

Set the [Entry] dialog (= [Detail] icon) on the overlap for the keypad, not on the screen (with data display parts).

◎[Entry Display], [Max. Display], and [Min. Display] parts

Place these parts also on the overlap for the keypad. (Their division numbers must be equivalent to those for the [Entry] dialog and the keypad.)



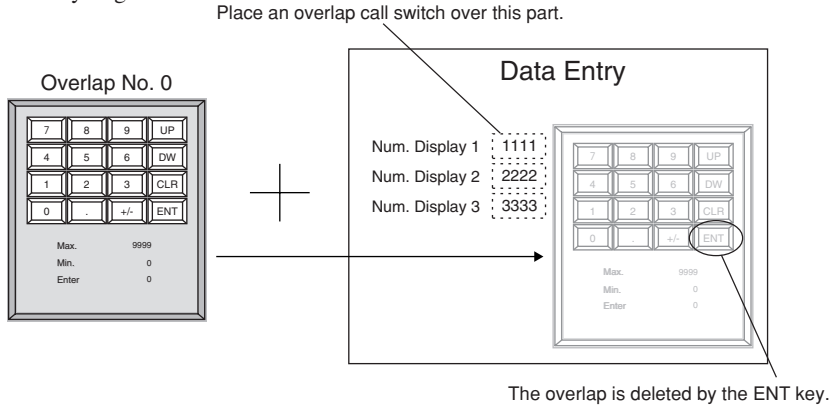
Notes

By specifying any values except "0" for the internal memory "\$s76," the overlap is not turned off by pressing the ENT key.

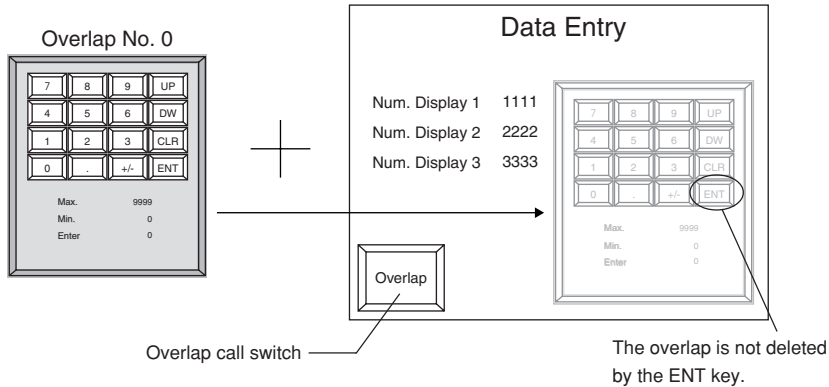
Overlap Types and Calling Method

Any of the normal overlap, "call overlap," or multi-overlap is available.

When the overlap should be deleted by the ENT key, place the overlap call switch over each entry target.



When the overlap should remain after pressing the ENT key, place the overlap call switch in a position separated from the entry targets.



The overlap call switch functions in varied manners depending on the overlap types.

○ Normal overlap or call-overlap

Choose [Overlap] for [Function] of the overlap call switch.

When the switch is pressed, the normal overlap is placed in the specified position, and the call-overlap is placed in the position set in the [Overlap (Call)] dialog.

○ Multi-overlap

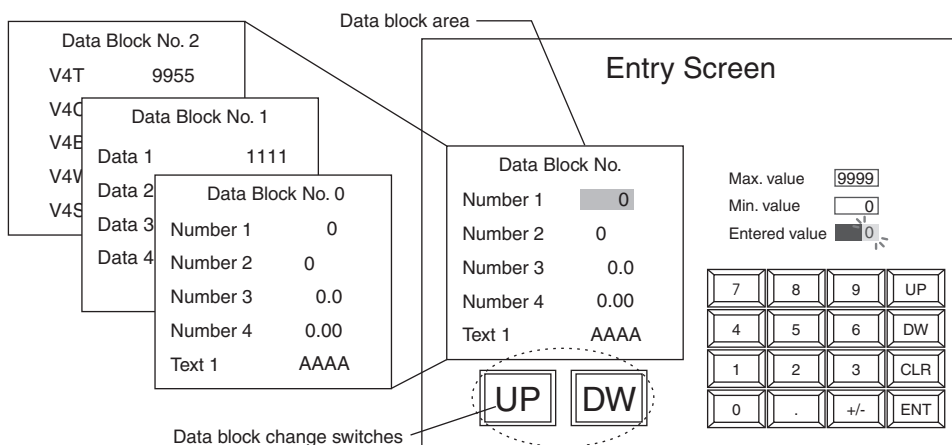
Choose [Multi-Overlap] for [Function] of the overlap call switch.

When the switch is pressed, the overlap is placed in the position set in the [Detail] tab window.

How to Change Over Entry Targets

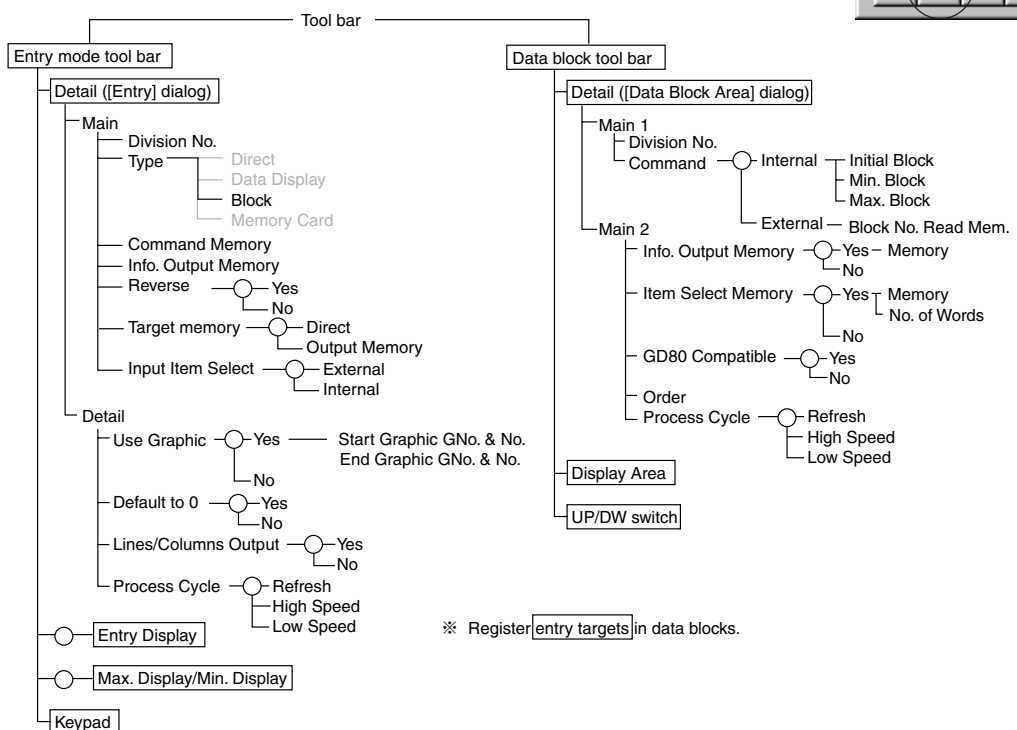
(= [Type: Block])

When there are too many display parts to be displayed on the screen at one time, they can be registered in data blocks and changed over.



Register data display parts for entry targets in data blocks, and choose [Block] for [Type] in the [Entry] dialog.

The following options are provided.



[Entry] Dialog Setting (Main) Tab Window

[Division No.] (0 ~ 255)

Set this option as explained in “[Main] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

[Type]

Choose [Block]. Register the data display parts as entry targets in data blocks.

The data block displayed on the screen can be changed over.

Up to 4 data block display areas can be set on one screen. If four data block areas are placed on the base screen, no data block area can be placed on overlaps 0 to 2.

[Command Memory] [Info. Output Memory] [Reverse]

[Target Memory] [Input Item Select]

Set these options as explained in “[Main] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

(Detail) Tab Window

[Use Graphic] [Default to 0] [Lines/Columns Output]

Set these options as explained in “[Detail] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

Data Display Part as Entry Display

Set the options for entry displays as explained in “Data Display Part as Entry Display” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

Entry Data Range



Minimum and maximum displays can be set only for numerical data entry. They are not available for character display.

When minimum and maximum data are set for an entry target, the range can be displayed on the screen.



Setting of minimum and maximum data for entry target

Minimum and maximum data can be set by checking [Alarm] in the [Detail] tab window for an entry target registered in a data block.

Notes on setting of minimum and maximum data displays ([Display Function: Min. Display and Max. Display]) are provided in “Entry Data Range” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

Entry Keys (Keypad)

Set entry keys as explained in “Entry Keys (Keypad)” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

[Data Block Area] Dialog Setting

(Main 1) Tab Window

[Division No.] (0 ~ 255)

Only one data block area can be set in one division. Therefore, choose a number different from the one for the [Entry] dialog. Up to four areas can be set for one entry mode.

[Command]

There are two command methods for changing over the data block to be displayed: [Internal] and [External].

◆ Internal

Data blocks are changed over by the switch for [Function: Plus Block/Minus Block/Block Call]. The division numbers set for the block change switch and the [Data Block Area] dialog must be the same to make the switch valid.

◆ External

The block number to be displayed in the data block area is commanded from the external memory. Specify a memory address for [Block No. Read Mem.].

[Block No. Read Mem.]

Data in this memory address specifies the block number to be displayed when [External] is chosen for [Command].

[Initial Block] [Min. Block] [Max. Block]

These options become active when [Internal] is chosen for [Command].

Specify the block number to be displayed first after the screen is opened, and specify the minimum and maximum numbers of the block numbers to be displayed for these options respectively.

(Main 2) Tab Window

[Info. Output Memory]

By checking this box, an information output memory address can be set. The block number currently being used as the entry target is written.

[Item Select]

By checking this box, an item select memory address can be specified.

The following [No. of Words] must be set for memory allocation. For more information on this option, refer to page 9-32.

[ZM30 Compatible]

When screen data files of the ZM-30 series have been converted into the files for ZM series, the keypad mode for the ZM-30 series are converted into the entry mode and data block area, and [ZM30 Compatible] is checked automatically. Uncheck the box for creating screen data files for the ZM series. For more information, refer to Chapter 26, "File Conversion."

[Order]

Up to four data block areas can be placed on one screen, and the order of area selection can be determined using this option.

[Process Cycle]

For information on the processing cycle, refer to page 3-9 in Chapter 3, “Screens.”

[Display Area] Dialog

Specify the same division number as that in the [Data Block Area] dialog.
This setting is required to display entry targets registered in data blocks on the screen.

Block Change Switch

When [Internal] is chosen for [Command] in the [Data Block Area] dialog, data block change switches are necessary. Choose [Plus Block], [Minus Block], or [Block Call] for [Function]. Specify the same division number as that in the [Data Block Area] dialog.

Entry Target



When [Type: Block] is set in the [Entry] dialog, the data display parts as entry targets ([Display Function]: [Entry Target]) must be placed in data blocks. They cannot be placed on the base screen or overlaps.

Notes on Entry Target Setting

[Division No.]

There is no special rule for link establishment.

[Memory]

Specify the desired memory address.

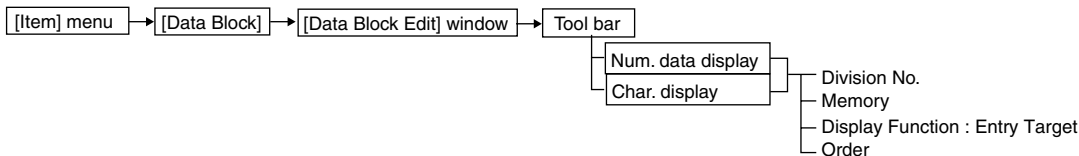
When [Target Memory: Direct] is set in the [Entry] dialog, data is written to this address directly.

[Display Function]

Choose [Entry Target]. A link is established with entry mode.

[Order]

Specify an ordinal number for selection/recognition of the entry target. The cursor is moved to the entry targets in order by the Up/Down switches.

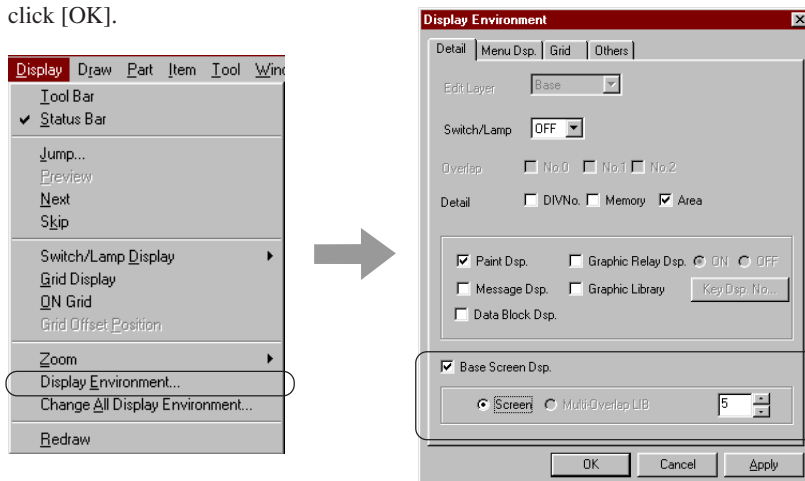


Notes on Entry Target Placement

◆ Display of the base screen or an overlap

When placing entry targets in data blocks, proceed with the operation while checking layouts on the screen.

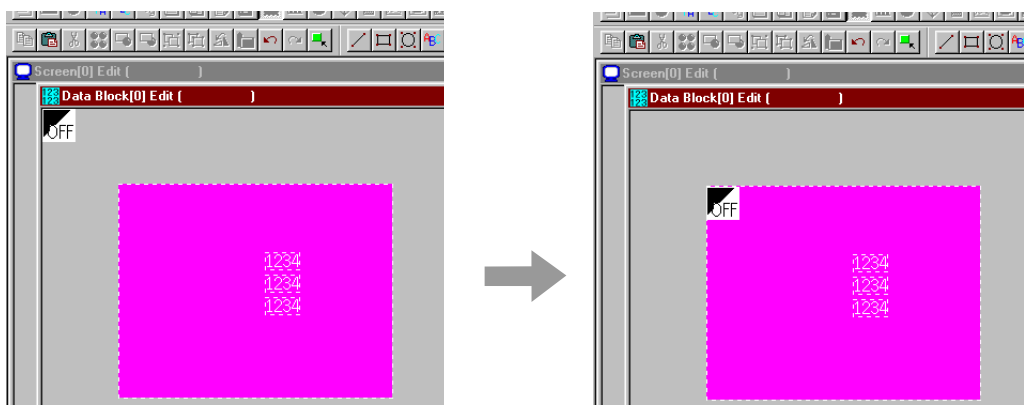
The base screen or an overlap can be brought up while a data block is displayed. Select [Display Environment] from the [Display] menu, and check [Base Screen Dsp.]. Specify the corresponding [Screen No.] or [Multi-Overlap LIB No.], and click [OK].



Place entry targets in data blocks. Also place text (created by selecting [Draw] and [Text]), etc. also in data blocks.

◆ Offset point setting

After placing entry targets in a data block, normally move the offset position from the top left corner of the data block edit window to the top left corner of the data block area.



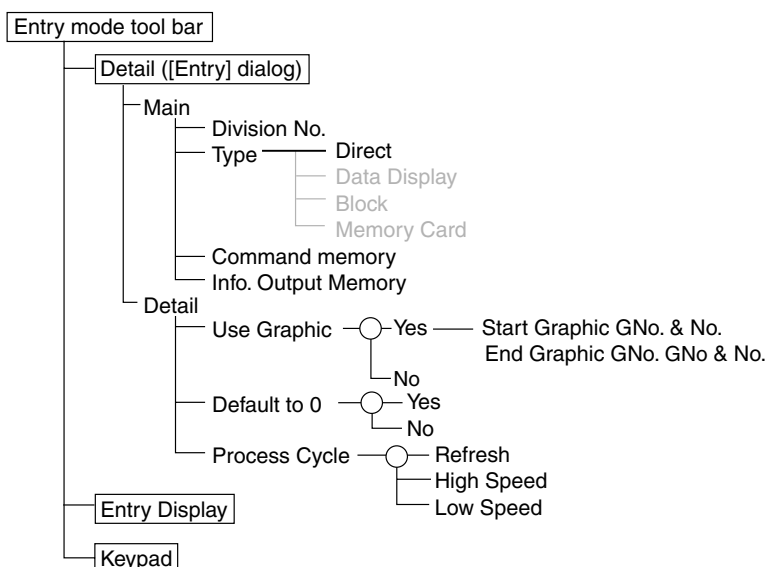
Offset position change is possible only for registered data blocks.

When [Direct] Is Chosen for [Type]:

The entry format, the number of digits, the decimal point position, etc. are externally commanded via the memory address.

Numerical data is written to the information output memory addresses “n + 2” and “n + 3.”

Characters are written to the information output memory addresses starting from “n + 2.”



[Entry] Dialog Setting

(Main) Tab Window

[Division No.] (0 ~ 255)

Set this option as explained in “[Main] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

[Type]

Choose [Direct].

The entry format, the number of digits, the decimal point position, etc. are externally commanded via the memory address.

Numerical data is written to the information output memory addresses “n + 2” and “n + 3.”

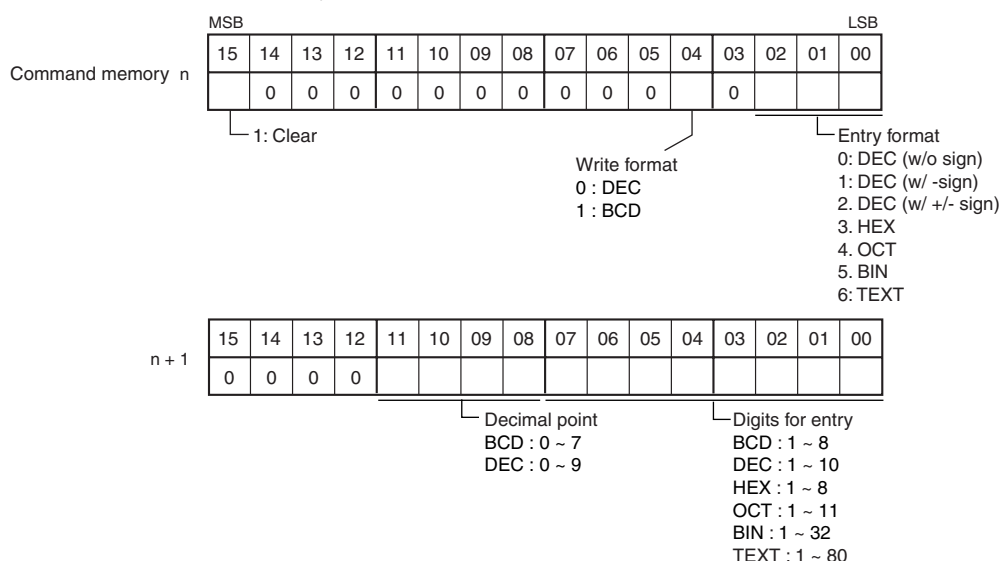
Characters are written to the information output memory addresses starting from “n + 2.”



When [Direct] is chosen for [Type], set data display parts as entry displays ([Display Function: Entry Display]). If not, operation will not be carried out normally.

[Command Memory]

The entry format, the number of digits, the decimal point position, etc. are specified via the memory address.



○ Entry format (bits 0 ~ 2)

This specifies data format to be used for entry.

Bit No.			Entry format
02	01	00	
0	0	0	DEC (w/o sign)
0	0	1	DEC (w/ -sign)
0	1	0	DEC (w/ +/-sign)
0	1	1	HEX
1	0	0	OCT
1	0	1	BIN
1	1	0	TEXT

○ Write format (bit 4)

This specifies data format to be used for writing data to “n (information output memory) + 2 ~.” When BCD is chosen, “0” is entered for negative values. Remember this when using “BCD.”

○ Clear (bit 15)

This bit is used for clearing the data from the entry display part.

0: The data indicated in the entry display part remains.

1: Entering “0” clears the current numerical data.

Entering a space (ANK 20H) clears the current characters.

Entry is prohibited.

○ Digits for entry (n + 1 bits 0 ~ 7)

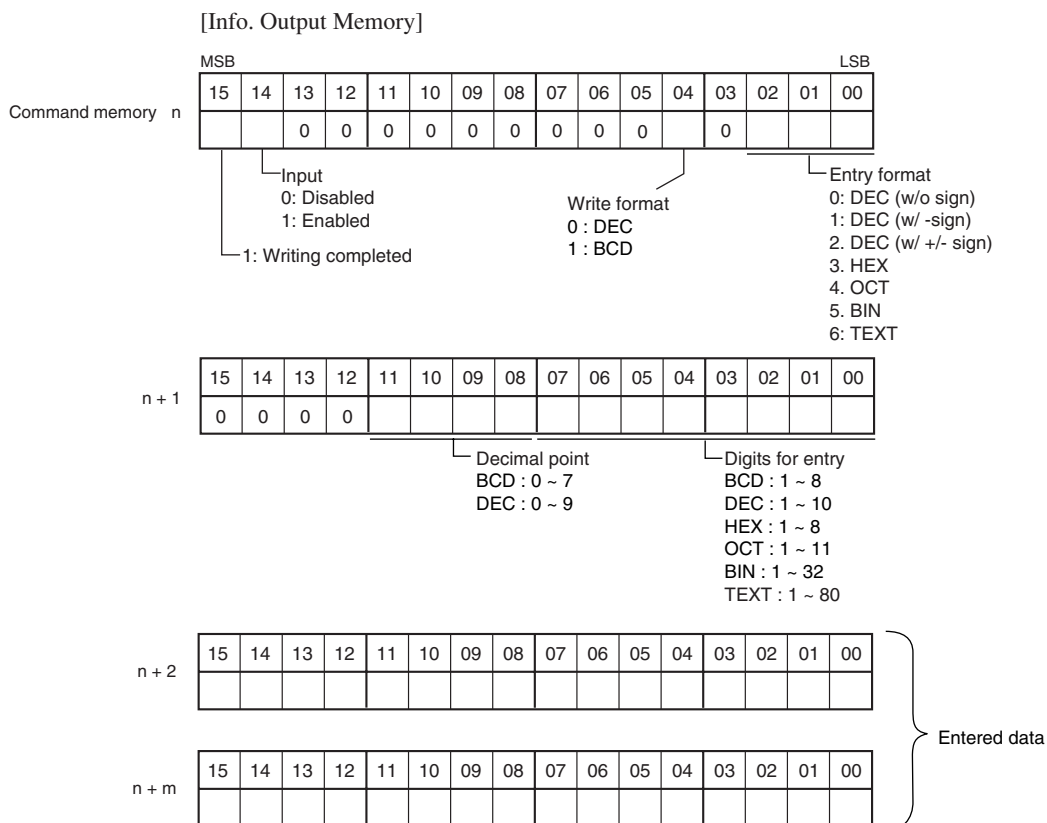
“0 to 80” can be specified. The number of required bits depends on the code (DEC or BCD) and the PC manufacture.

DEC: Bits 0 to 6

BCD: Bits 0 to 7

○ Decimal point (n + 1 bits 8 ~ 11)

Up to 10 digits can be displayed in DEC. Therefore “9” is the maximum value for the decimal point position.



- Entry format, write format (bits 0 ~ 2 and 4)
Data specified in the command memory address is written.



The number of characters here is based on one-byte codes. Two one-byte characters occupy one word. Therefore, the number of words occupied can be calculated by dividing the number of characters by 2. If there is a remainder, it occupies one word.

<Ex.>

Three characters = 2 words

- Input (bit 14)
Input status is written.
Bit 14 of the entry mode for the area (base screen or overlap 0 ~ 2) being placed at the top is set ("1"). For the remaining areas, bit 14 is reset (0).
0 : Input is not possible.
1 : Input is possible.
- Writing completed (bit 15)
When the ENT key is pressed, this bit is set to "1" (ON).
- Digits for entry, decimal point (n + 1 bits 0 ~ 7 and 8 ~ 11)
Data specified in the command memory address is written.
- Entered data (n + 2 ~ n + m)
In the case of numerical data, two words are used for writing. If only one word is used, "0" is entered for the other word.
In the case of characters, as many words as there are characters are used.

(Detail) Tab Window

[Use Graphic] [Default to 0] [Lines/Columns Output]

Set these options as explained in “[Detail] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

Data Display Part as Entry Display



When [Direct] is chosen for [Type], set data display parts as entry displays ([Display Function: Entry Display]). If not, operation will not be carried out normally.

Set entry displays as explained in “Data Display Part as Entry Display” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

Entry Keys (Keypad)

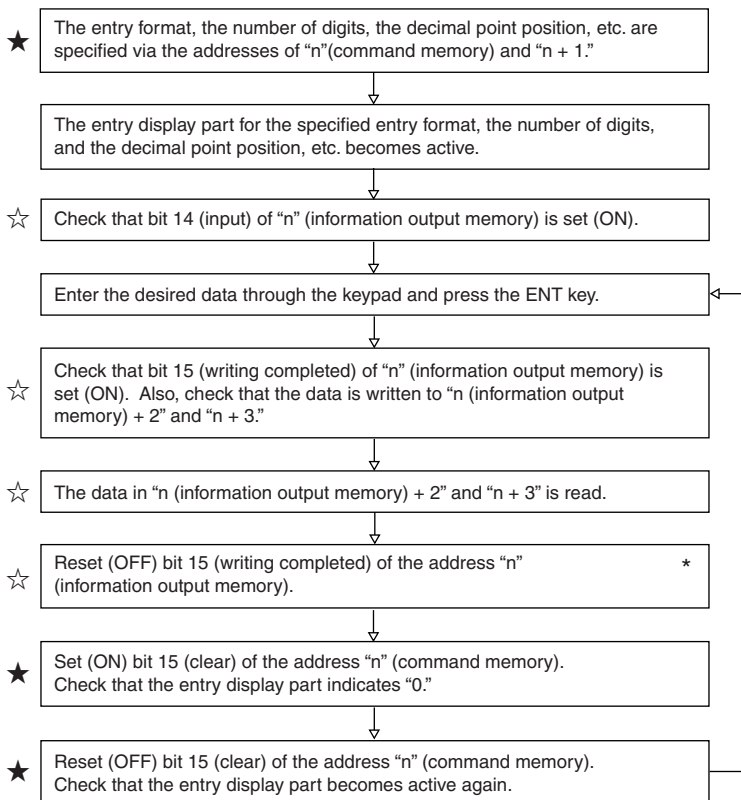
Set entry keys as explained in “Entry Keys (Keypad)” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).”

Data Reading Steps

When [Direct] is chosen for [Type], data is read using the following steps.

★: Command memory

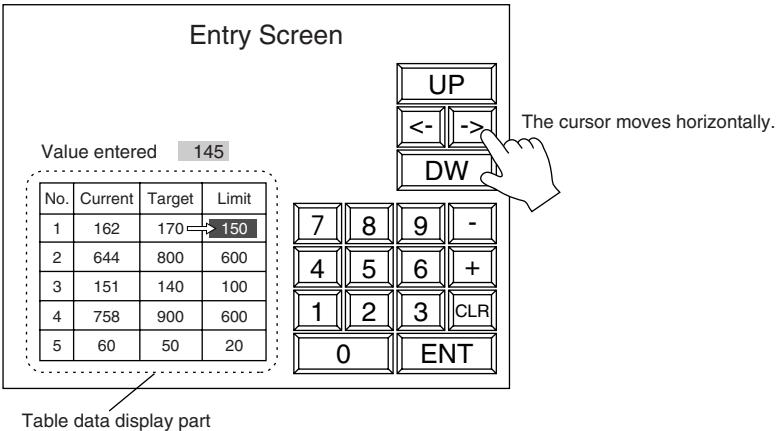
☆: Information output memory



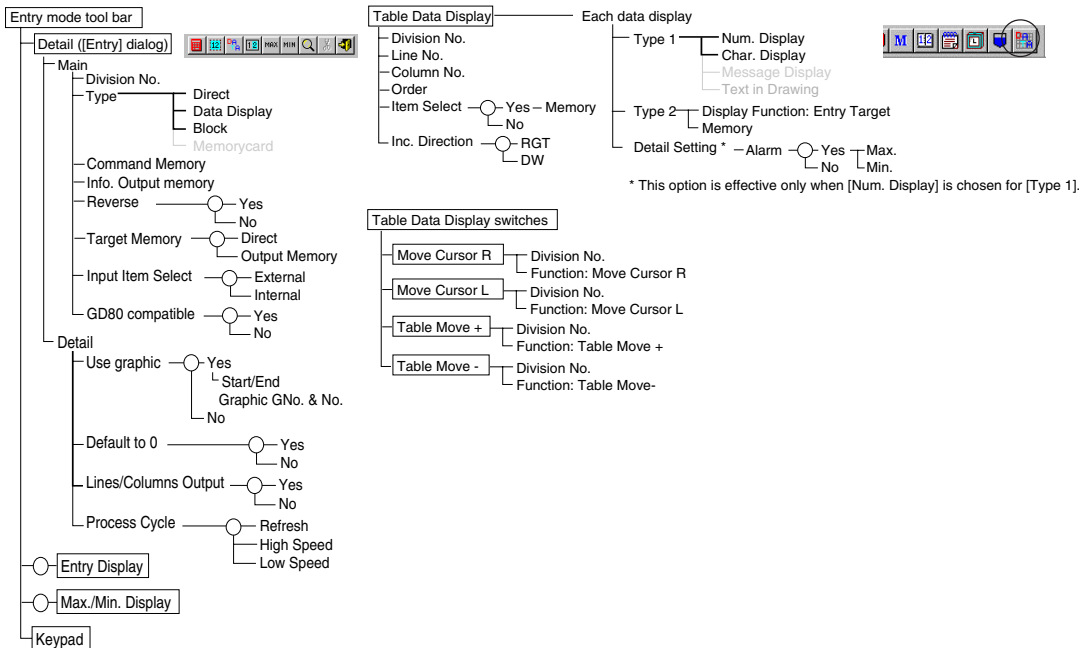
* Once bit 15 of the address "n" (information output memory) is set, it is not reset automatically.

Entry for Table Data Display Part (ZM-*2 Function)

Data indicated in a table data display part can be changed directly through the keypad. Table display part can contain both numerical data and characters. [Entry Target] must be chosen for [Display Function] for using data displays an targets in entry mode.



Set the following options for table data display parts.



[Entry] Dialog Setting (Main) Tab Window



[Division No.] (0 ~ 255)

Specify the number equivalent to the division number set for the entry keys and data display part.

[Type]

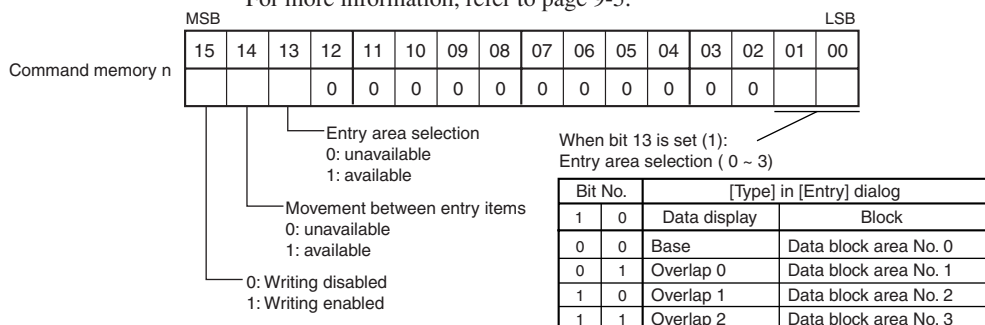
Choose from [Data Display], [Block], and [Direct].

[Command Memory]

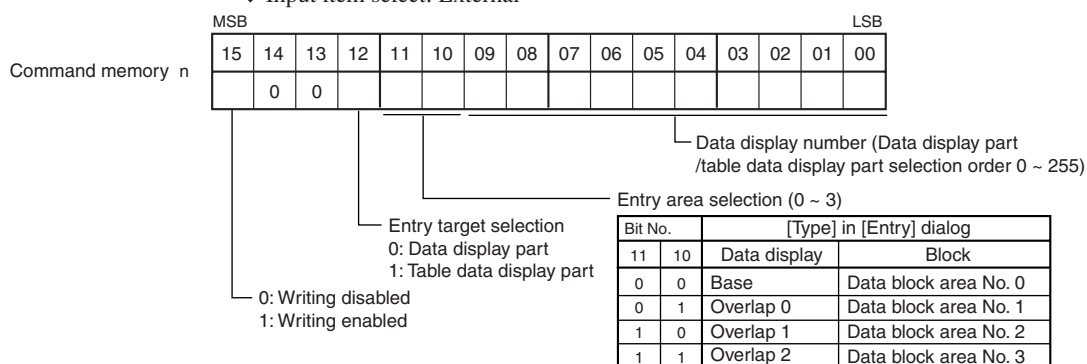
This is used for controlling entry mode. The contents depend on the selection of [Internal] or [External] for [Input Item Select].

◆ Input item select: Internal

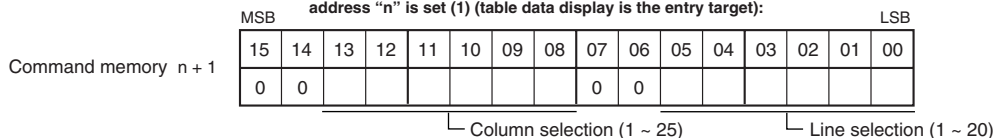
For more information, refer to page 9-5.



◆ Input item select: External



* This address becomes effective when bit 12 of the command memory address "n" is set (1) (table data display is the entry target):



○ Data display number (selection order) (bits 0 ~ 9)

The contents vary by bit 12 of the command memory address "n."

Bit 12 is reset (0): The order of data display parts ([Display Function: Entry Target]) becomes effective.

Bit 12 is set (1): The order of table data display parts becomes effective.

○ Entry area selection (bits 10 and 11)

The entry area is chosen by bits 10 and 11.

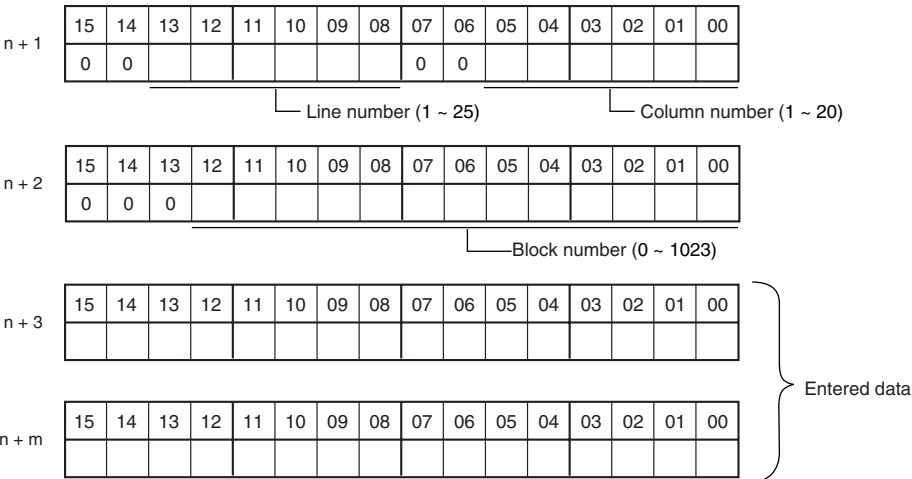
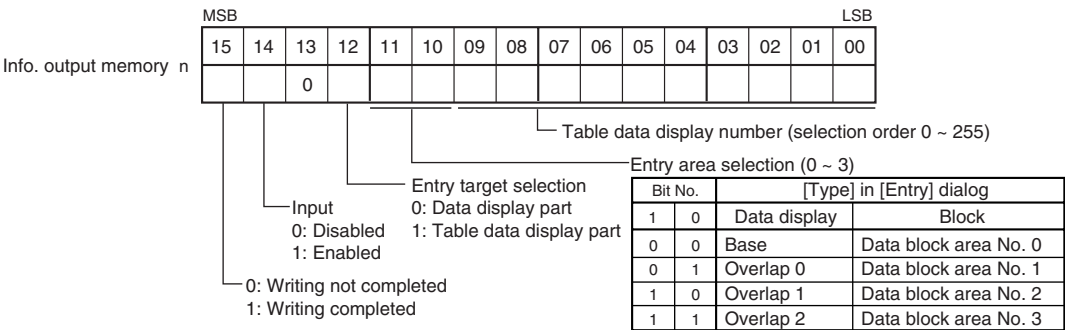
- Entry target selection (bit 12)
The entry target is chosen.
0: Data display part
1: Table data display part
- Writing enabled/disabled (bit 15)
This bit determines whether or not entry keys (keypad) work.
0: Entry keys do not work. When pressed, an error buzzer sounds.
1: Entry keys work normally.
- Line selection/column selection (n + 1)
These bits become active when bit 12 of command memory “n” is set (1).
Numerical or character display cells ([Display Function: Entry Target]) in a table are designated by line Nos. 1 to 20 and column Nos. 1 to 25.

[Info. Output Memory]

The contents depend on setting/resetting of bit 12 of the command memory “n.”

Bit 12 reset (0): The contents are the same as the information output memory when [Data Display] is chosen for [Type].

Bit 12 set (1): Refer to the following:



- Table data display number (selection order) (bits 0 ~ 9)
The order of the selected table data display part is written.
- Entry area selection (bits 10 and 11)
The current entry area number is written.
- Entry target selection (bit 12)
This bit becomes active when [Lines/Columns Output] is checked in the [Detail] tab window of the [Entry] dialog.
When a table data display is selected as an entry target, this bit is set (1). (This bit remains reset (0) when a data display part is selected.)
- Input (bit 14)
0: Input is impossible. For more information, refer to page 9-7.
1: Input is possible.
- Writing completed/not completed (bit 15)
When the ENT key is pressed, data is written to memory, and this bit is set to “1.”
This bit remains set until the entry target moves to a different item.
- Line number/Column number (n + 1)
These bits become active when [Lines/Columns Output] is checked in the [Detail] tab window of the [Entry] dialog.
The line and column numbers of the selected table data cell are output.
- Block number (n + 2)
These bits become active when [Block] is chosen for [Type] in the [Entry] dialog.
The block number containing the currently selected table data display part is written.
- Entered data (n + 3 ~ n + m)
When [Output Memory] is chosen for [Target Memory] in the [Main] tab window of the [Entry] dialog, data entered for these addresses are output.

[Reverse] [Target Memory] [Input Item Select]

Set these options as explained in “[Main] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).” Refer to page 9-8.

(Detail) Tab Window

[Use Graphic] [Default to 0] [Process Cycle]

Set these options as explained in “[Detail] Tab Window” in the section of “Direct Data Entry for Data Display Parts (= [Type: Data Display]).” Refer to page 9-9.

[Lines/Columns Output]

This option becomes active when table data displays are entry targets.

When the box is checked, the line and column numbers of the selected table data cell are written to the information output memory.

When the box is unchecked, no data is written.

Table Data Display Setting

When using cells in a table data display part as entry targets, set the part while taking the following notes into consideration.



[Division No.]

Any desired division number can be specified normally. However, when using the special function of the table data display, the division number must be different from that of the entry mode. For more information, refer to the following page.

[Order]

When there are multiple table data display parts, determine the selection order number.

[Item Select]

This option becomes active when [Internal] is chosen for [Input Item Select] in the [Entry] dialog. If an interlock function should be provided for selecting entry targets from a table using the cursor, check this option and set the interlock memory.

[Inc. Direction] (RGT/DW)

This option becomes active when [Entry Target] is chosen for [Display Function] of table cells. The cursor is moved in the specified direction.

Refer to the following for setting cells in tables.



For editing and setting procedures of cells in tables, refer to page 7-21 in Chapter 7, "Data Display."

(Type 1) Tab Window

Choose [Num. Display] or [Char. Display].

(Type 2) Tab Window

[Display Function]

Choose [Entry Target].

[Memory]

Data is written to the specified memory address through the entry keys.

(Detail Setting) Tab Window

[Alarm]

This option becomes active when [Num. Display] is chosen in [Type 1] tab window. By checking the box, the minimum and maximum data can be set for each entry target.

Switches for Table Data Display

For table data displays as entry targets, the following switches can be used in addition to the normal entry mode switches. Take the following notes into consideration when setting the switches.

[Division No.]

Specify the same division number as in the [Entry] dialog.

If a different division number is entered, the switch does not work correctly.

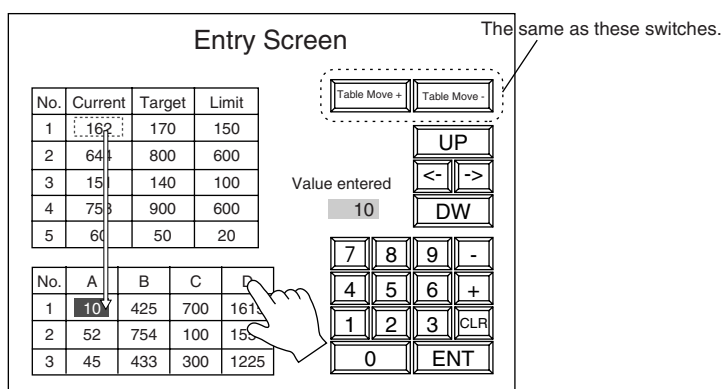
[Function]

The following switches are provided only for the table data display.

Function	Attached data	Contents	ZM-*2	ZM-41/70
Move Cursor R	None	The cursor is moved to the right in a table data display part containing entry targets.	○	×
Move Cursor L	None	The cursor is moved to the left in a table data display part containing entry targets.	○	×
Table move +	None	When there are several table data display parts containing entry targets, the cursor is moved to the table data display part, which is increased by one.	○	×
Table move -	None	When there are several table data display parts containing entry targets, the cursor is moved to the table data display part, which is decreased by one.	○	×

Special Function for Table Data Display

The special function is provided for data table display parts containing entry targets. When cells in the top line of a table are specified as text (created from [Draw] and [Text]) displays, pressing the top line moves the cursor to the top entry target cell in the table. This function is the same as the Table Move +/- switches.



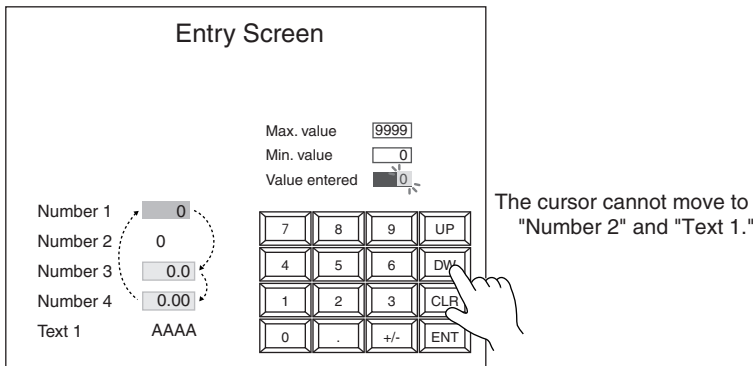
Pressing the top line moves the cursor to the top entry target cell in the table.



The above function is not effective when the same division number is chosen for table data display parts and the entry mode, nor is it effective when table data display parts are placed in data blocks ([Type: Block] is set in the [Entry] dialog).

Item Select Function

- ◎The cursor can be moved to specified entry targets only, or it can be locked to prohibit entry target selection. These operations are set by the “item select function.”



- ◎The item select function becomes available when [Data Display] or [Block] is chosen for [Type], and [Internal] is chosen for [Input Item Select] in the [Entry] dialog.
When [External] is chosen for [Input Item Select], this function is not available.
- ◎For using the item select function, set the item select memory, or use a switch for which [Item Select] is chosen for [Function] in the [Switch] dialog.

Item Select Memory Setting

The entry target selection command is given from the item select memory address. The memory address setting method depends on editing layers selected for placing entry targets.

When Entry Targets Are Placed on the Base Screen:

Select [Screen Setting] from the [Edit] menu. The [Screen Setting] dialog is displayed. Check [Item Select Memory]. The desired memory address can be specified.

When Entry Targets Are Placed on Overlaps:

- ◆ Normal overlap
Double-click the overlap with entry targets. The [Overlap (Normal)] dialog is displayed. Check [Item Select Memory]. The desired memory address can be specified.
- ◆ Call-overlap or multi-overlap
Bring up the [Overlap (Call)] or [Overlap (Multi)] dialog. Check [Item Select]. Setting of item select memory becomes available.

When Entry Targets are Placed in Data Blocks:

The [Data Block Area] dialog must be set for using a data block. In the dialog, open the [Main 2] tab window, and check [Item Select]. The desired memory address can be specified.

Also specify [No. of Words] for the item select memory.

When Entry Targets are Table Data Display Parts:

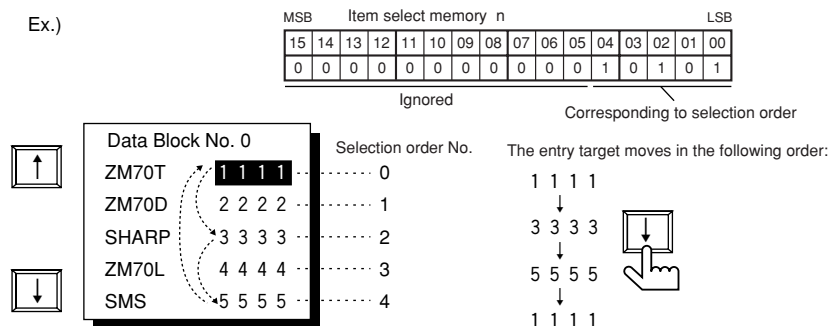
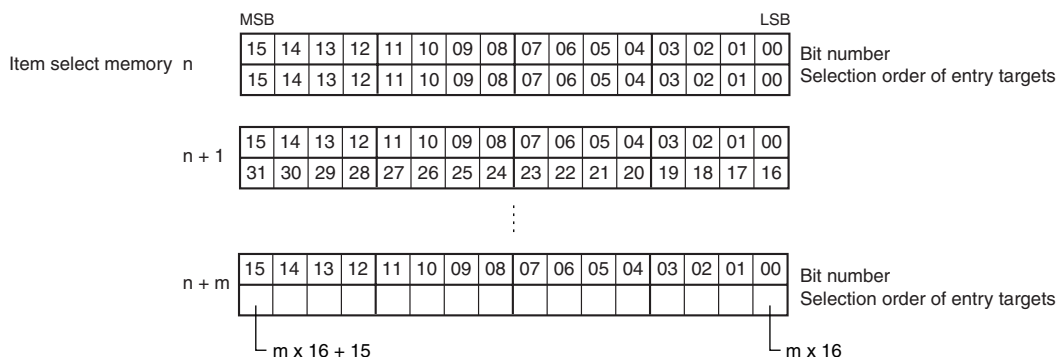
Check [Item Select] in the [Table Data Display] dialog for setting a memory address. The address specified is also effective when table data display parts are placed on the base screen or in data blocks. (Refer to the following page.)

Contents of Item Select Memory

For Numerical Data/Character Display Parts

as Entry Targets

The memory addresses specified for [Item Select Memory] are linked with the selection order of entry targets as shown below:



For Cells in Table Data Display Part as Entry Targets

Check [Item Select] in the [Table Data Display] dialog, and specify the desired memory address.

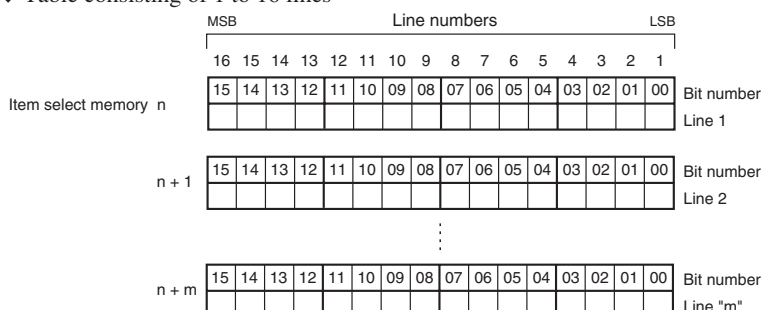
The memory contents vary depending on tables consisting of 1 to 16 lines or more.

*** In this case, you need not be concerned with the selection order of data display parts.**

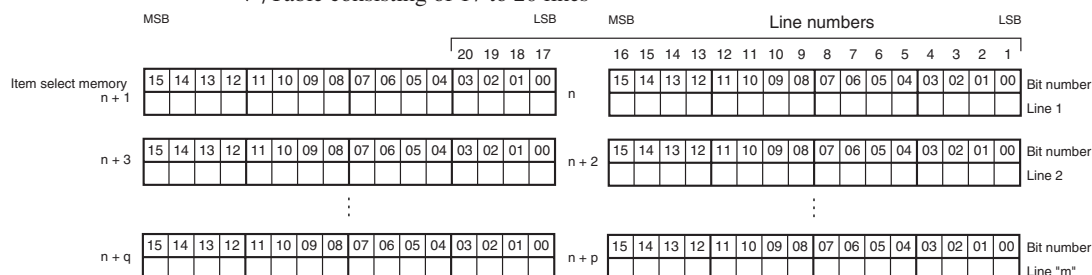
Notes

Line and column numbers of a table are fixed, irrespective of settings of cells. When a table includes or does not include cells for entry targets, or when it includes only cells for text (created from [Draw] and [Text]) displays, the line and column numbers do not change.

◆ Table consisting of 1 to 16 lines



◆ /Table consisting of 17 to 20 lines



For a table consisting of 1 to 16 lines, one word is used for one line. For a table consisting of 17 or more lines, 2 words are used for one line.

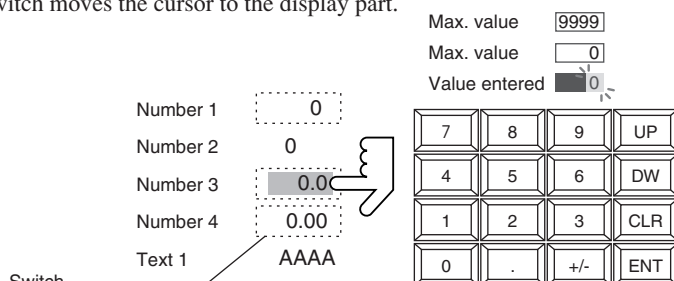
The total number of words required for the item select memory is calculated by multiplying the number of words per line by the number of lines.

Item Select Switch

When using an item select switch (for which [Item Select] is chosen for [Function] in the [Switch] dialog), place it over each data display part (entry target). Pressing the switch moves the cursor to the display part.

Notes

Item select switches ((Function: Item Select)) must be placed on the editing layer (base screen or overlaps 0 to 2) for which the [Entry] dialog is set. Otherwise, the switches do not work.



Pressing a switch moves the cursor to the corresponding data display part.

Digital-switch

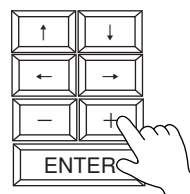
It is possible to change the numeral in a digit in numerical data display part. This is like setting data using a digital switch.

The numeral in a digit can be increased/decreased.

0 5 0 1

2 0 8 0

1 2 6 9



Switches for Digital-switch

The following switches are effective for digital-switch.

Name	Function
Write	A value increased/decreased by one is written to the specified memory address.
Clear	Entered data is cleared.
+1	The numeral of the current cursor position is increased by one.
-1	The numeral of the current cursor position is decreased by one.
LFT	The cursor is moved to the left.
RGT	The cursor is moved to the right.
UP	The entry target is moved to the data display part, which is decreased by one.
DW	The entry target is moved to the data display part, which is increased by one.

Notes on Setting

Take the following notes into consideration when setting the switches.

- ◎ Do not place numerical data display parts as entry displays ([Display Function: Entry Display]) on the screen. Otherwise, the digital-switch function becomes invalid.
- ◎ For numerical data display parts as entry targets, do not set the zero suppress function (uncheck [Zero Suppress]).
- ◎ In the [Entry] dialog, uncheck [Reverse]. If checked, the digital-switch function does not work correctly.



The above three conditions must be met for using the digital-switch function correctly.

Notes on the Digital-switch Function

- ◎ When the numeral in a digit is increased from “0” to “9” using the “+1” switch, pressing the switch next indicates “0” again. The digit on the left is not increased by one then.
(Ex. Increasing the extreme right digit: 0009 Press “+1” switch. 0000)
Likewise, when the numeral in a digit is decreased from “9” to “0” using the “-1” switch, pressing the switch next indicates “9” again. The digit on the left is not decreased by one then.
(Ex. Decreasing the extreme right digit: 1010 Press “-1” switch. 1019)
- ◎ The ENT switch must be pressed after numeral change in each digit. If the ENT switch is not pressed and the cursor is moved to a different digit, the numeral in the previous digit is not written to the specified address.

Switch Functions

The following switches are available in entry mode.

Character Entry

Numerals or character codes indicated on the switches are entered.

Data to be written depends on the types of data display parts (entry targets).

☐ Numerical data display

When the entry target is a numerical data display part, numerals (in the DEC, HEX, etc. format) are entered irrespective of one-byte or two-byte codes.

☐ Character display

When the entry target is a character display part, characters on the switches are entered in codes. ANK codes are entered for one-byte characters, and Shift JIS codes are entered for two-byte characters.

Ex.) One-byte “1” and “2” entry keys are pressed:

For a numerical data display part “12” is written (if in the DEC format).

For a character display part ANK code “H3231” is written.

Two-byte “1” and “2” entry keys are pressed:

For a numerical data display part “12” is written (if in the DEC format).

For a character display part Shift JIS codes “H8250” and “H8251” are written.

Write

When the ENT key is pressed, entered data is written to the specified memory address.

If there is an error in entry or the key is locked, an error buzzer sounds and writing is not processed.

Clear

Data entered through character entry key is cleared. After clearing, the data display part will look different, depending on whether it is a numerical data or character display. “0” is indicated in a numerical data display part, and nothing is indicated in a character display part.

When writing the cleared data, press the ENT key.

Toggle Sign

When the entry target is a numerical data display part, and a code with signs is used, this switch is available. If it is pressed for any other entry target, an error buzzer sounds. By pressing it before an entered value is written, the sign is changed to the inverted sign.


Switch repeat function

= Holding down the switch repeats the switch operation.

Space

This is effective when the entry target is a character display part. It enters one-byte space (ANK code "20H"). Spaces can be written by pressing the ENT key.

Repeat function is available, and is useful for entering spaces successively.

Backspace

This is effective when the entry target is a character display part. The character before the cursor is deleted.

When flush-left is set for a character display part, deleting one character moves the cursor to the left by one character.

When flush-right is set, deleting one character moves the cursor to the right by one character.

The data after a character/characters deletion is written using the ENT key.

Repeat function is available, and is useful for deleting several characters successively.

*** When an entry display part is placed, the cursor is moved in accordance with the selection of [Flush L] or [Flush R] for the part.**

Delete (DEL)

This is effective when the entry target is a character display part. The character under the cursor is deleted.

When flush-left is set for a character display part, deleting one character moves the characters located to the right of the cursor to the left by one character while the cursor is stationary.

When flush-right is set for a character display part, deleting one character moves the cursor and the characters located to the left of the cursor to the right by one character.

The data after a character/characters deletion is written by the ENT key.

Repeat function is available, and is useful for deleting several characters successively.

*** When an entry display part is placed, the cursor is moved in accordance with the selection of [Flush L] or [Flush R] for the part.**

+1/-1

This is effective when the entry target is a numerical data display part.

The numeral under the cursor is increased or decreased by one.

Be sure that [Zero Suppress] is unchecked and [Entry Display] is not chosen for the numerical data display part. If these conditions are not met, an error buzzer will sound.

Repeat function is available.

LFT (<-)/RGT (->)

This is effective when the entry target is a character display part. The cursor is moved to the right or left respectively.

This is also effective when using +1 and -1 switches in a numerical data display part.

The cursor can be moved to the desired digits.

Repeat function is available.



For more information on "+1" and "-1" keys, refer to page 9-34 "Digital-switch-like Use."

Item Selection (UP/DW)

The entry target is moved to the data display part, which is increased or decreased by one.

Repeat function is available.

Entry area selection (>>/<<)

When entry targets are placed on the base screen and overlaps 0 to 2 or in several data blocks, the cursor can be moved among them using these keys.

Pressing ">>" moves the cursor in the order of the base screen and overlaps 0 to 2.

Pressing "<<" moves the cursor in the reverse order.

Repeat function is available.

Graphic Library (Plus/Minus block)

Displaying all necessary alphanumerics and strings of characters on the same keyboard may be difficult within the limited screen space. In such a case, by registering these characters in the graphic library, only the selected graphic can be displayed. The graphic library or plus/minus block switches are used for graphic change.

○ Using the graphic library switch

Specify the desired graphic number and its group number to call it.

○ Using the plus block and minus block switches

The range of the graphics to be called is specified in the [Detail] tab window of the [Entry] dialog. Pressing the plus block switch brings up the graphic, which is increased by one. Pressing the minus block switch brings up the graphic, which is decreased by one.

Move Cursor R/L

These switches are effective when a table display part contains entry targets. The cursor is moved to the right or left in the table.

Repeat function is available.

Table Move +/-

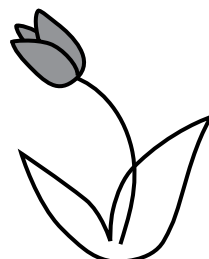
These switches are effective when table data display parts contain entry targets.

The cursor is moved to a different table using the switches.

When the cells in the top line are used for the display of text created from [Draw] and [Text], pressing the top line functions in the same manner.

MEMO

Please use this page freely.





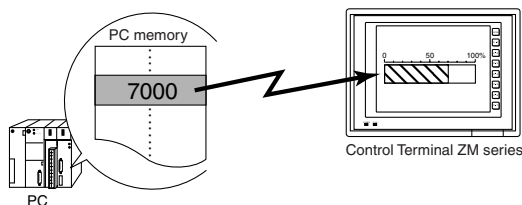
Graph Display

Graph Display Outline

Data in the PC memory can be displayed in a graph. Changes in data can be visualized.

◎Types of graphs

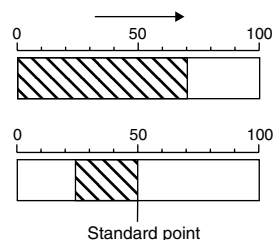
- Bar graph
- Pie graph
- Panel meter
- Statistic graph (bar, pie)
- Trend graph
- Closed area graph



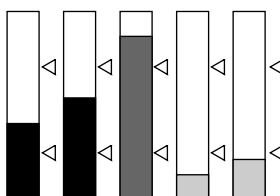
Bar Graph Outline

- ◎Data in the specified address of the PC memory can be expressed in a bar graph.

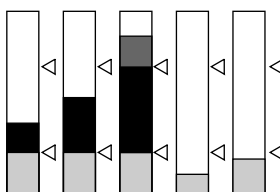
It is possible to extend the bar from the desired standard point.



- ◎When data in the PC memory exceeds or falls short of the range specified, the graph color can be changed to alert the operator.

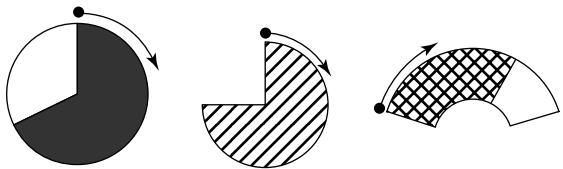


As shown below, it is possible to indicate a bar graph in several colors.

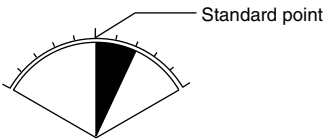


Pie Graph Outline

◎Data in the specified address of the PC memory can be expressed in a pie graph, extending the graph clockwise from the start point.



It is also possible to extend the graph from the desired standard point.



◎When data in the PC memory exceeds or falls short of the range specified, the graph color can be changed to alert the operator.

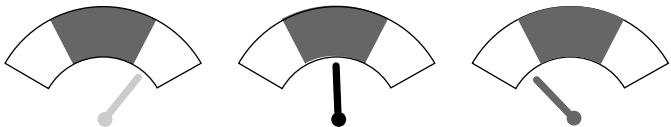


Panel Meter Outline

◎Data in the specified address of the PC memory can be expressed in the form of an analog meter.



◎When data in the PC memory exceeds or falls short of the range specified, the indicator color can be changed.



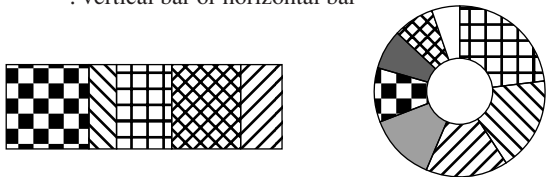
Statistic Graph Outline

◎Percentages of data contained in multiple addresses in the PC memory can be expressed in a statistic graph.

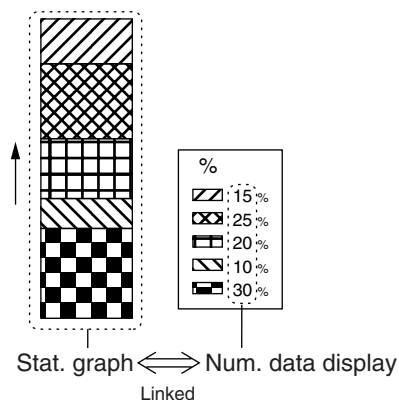
◎Two types of statistic graphs are available: bar graph and pie graph.

a. Bar graph : vertical bar or horizontal bar

b. Pie graph



- ◎ One statistic graph can be divided into a maximum of eight sections.
- ◎ It is also possible to indicate percentages in numerals. The statistic graph must be linked with numerical data display parts.

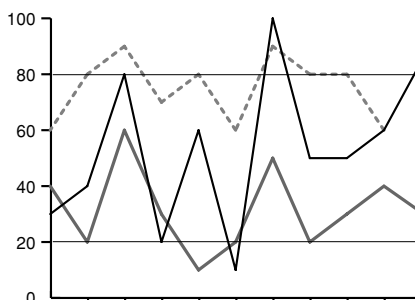


Trend Graph Outline

- ◎ Data in consecutive addresses of the PC memory can be expressed in a line graph.
- ◎ Subsidiary lines can be drawn for easier recognition of data change.
- ◎ A maximum of 16 trends (lines) can be displayed.
- ◎ Negative values can be used.

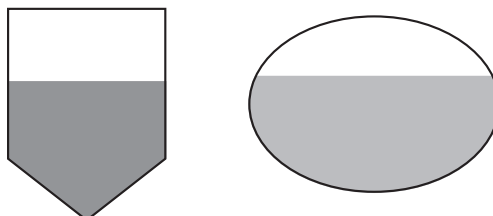
In the ZM-41/70, a maximum of eight trends (lines) can be displayed.

When displaying data in a line graph, the trend sampling function is also available. Refer to Chapter 12, "Sampling Mode."



Closed Area Graph Outline (ZM-*2 Function)

- ◎ Changes in a closed area, such as a tank, can be expressed in a closed area graph.



- ◎ When data of an area exceeds or falls short of the range specified, the graph color can be changed.



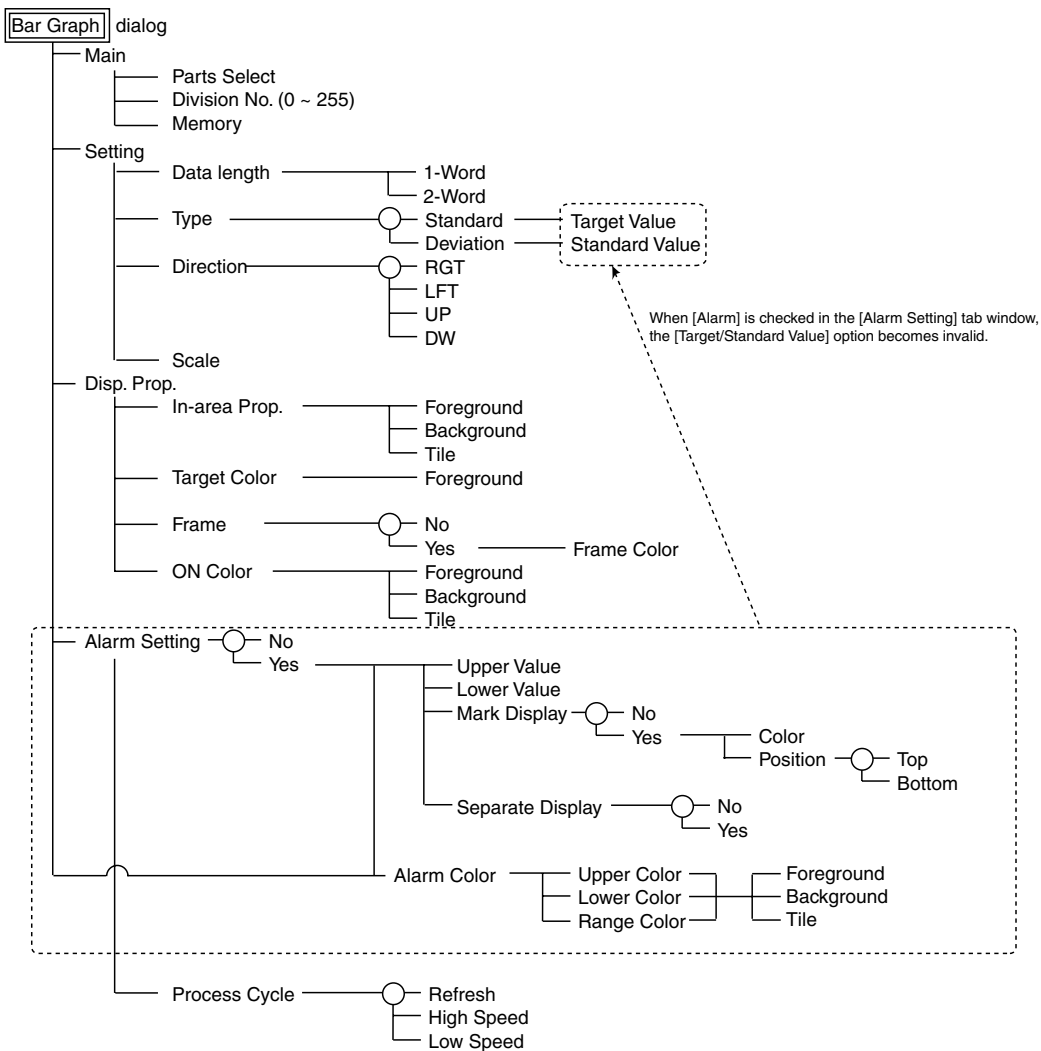
Bar Graph

Bar Graph Setting Procedure



- Set the [Bar Graph] dialog and place the bar graph part on the screen.
- Ⓐ Click the [Bar Graph] icon in the tool bar. The [Bar Graph] dialog is displayed.
 - Ⓑ To bring up the [Bar Graph] dialog for the graph part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown), and then click the [Detail/Prop. Change] icon.

Tree Diagram for Bar Graph



Bar Graph Memory

Type: Standard		Type: Deviation		Options in [Bar Graph] dialog
No alarm setting	With alarm setting	No alarm setting	With alarm setting	
Memory	Memory	Memory	Memory	PC, Internal, Memory Card
Target value	Upper value	Standard value	Range value	PC, Internal,
————	Lower value	————	Standard value	Constant, Memory Card

(Main) Tab Window

[Division No.]

- Ⓐ The division number that is used when the [Bar Graph] icon is clicked is automatically entered.
- Ⓑ As many bar graphs as desired can be set in one division. It is also possible to place them in a division where other parts are already set.

[Memory] (PC Memory, Internal Memory, Memory Card)

Data in this memory address is shown in the graph in real time. The data in this address is called the “current value.”

(Setting) Tab Window

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory.

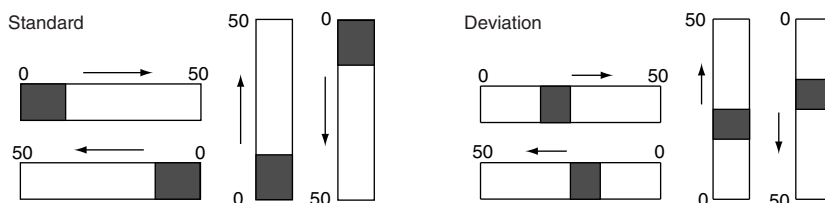
[Type]

Choose either [Standard] or [Deviation].

- Standard : The bar extends from the minimum value toward the maximum value to the current value.
- Deviation : Determine the standard value in the graph. The bar extends from the standard value to the current value.

[Direction]

Choose from [RGT], [LFT], [UP], or [DW] to select the direction for drawing the graph.



[Scale]

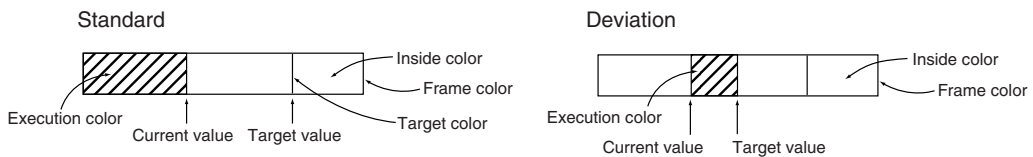
Specify the minimum and maximum values for the range of the graph. Negative values can be entered.

[Target Value] [Standard Value] (PC , Internal Memory, Memory Card, Constant)

When [Standard] is chosen for [Type], the option name reads [Target Value]; when [Deviation] is chosen, it reads [Standard Value]. When the value changes, choose the PC memory; when it is fixed, choose [Constant].

* When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set [Target Value].

(Disp. Prop.) Tab Window



[In-area Prop.]

Specify the colors inside the graph. The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

[Target Color]

This option becomes active when [Standard] is chosen for [Type] in the [Setting] tab window.

* When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.

[Frame]

Choose whether or not to draw a frame around the bar graph. When this box is checked, a frame is drawn.

[Frame Color]

This option becomes active when the [Frame] box is checked. Choose the desired color.

[ON color]

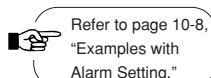
Choose colors to paint the bar to the current value. The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

* When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.



To change the draw properties (other than the frame or inside colors of the graph part), select the part (handles are shown), and then click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. (For more information, refer to page 24-14.)

(Alarm Setting) Tab Window



[Alarm]

If you want to show the bar in a different color when data in the specified memory address exceeds or falls short of the range specified, check this box.

[Upper Value] [Lower Value] / [Range Value] [Standard Value]

When [Standard] is chosen for [Type] in the [Setting] tab window, these options read [Upper Value] and [Lower Value]; when [Deviation] is chosen for [Type], they read [Range Value] and [Standard Value].

[Upper Value] [Lower Value]

[Lower Value] specifies the lower limit of data, and [Upper Value] specifies the upper limit of data.

[Range Value] [Standard Value]

[Standard Value] specifies the standard value.

[Range Value] specifies a data range from the standard value in both directions.

[Mark Display]

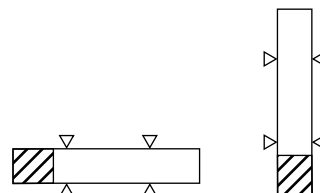
Check this box when you want to indicate the upper and lower limits using ☒ marks.

[Color]

When the [Mark Display] box is checked, this option becomes active. Choose the desired color for the mark.

[Position]

When the [Mark Display] box is checked, this option becomes active. Choose either [Top] (left) or [Bottom] (right) for placing marks.



[Separate Display]

The bar is shown in separate colors: [Lower Color], [Range Color], and [Upper Color] specified in [Alarm Color] tab window when this option is checked.

[Process Cycle]

For information on the processing cycle, refer to page 2-9.

(Alarm Color) Tab Window

[Upper Color]

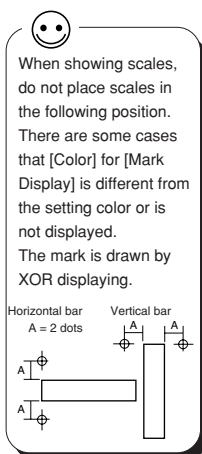
Color to be used when the current value exceeds the upper limit

[Lower Color]

Color to be used when the current value falls short of the lower limit

[Range Color]

Color to be used between the upper and lower limits

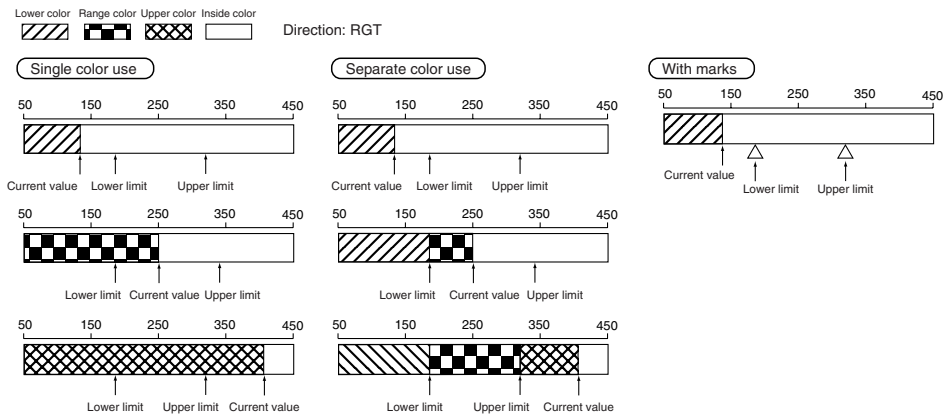


For each option, choose the desired colors for [Foreground] and [Background].
The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

Examples with Alarm Setting

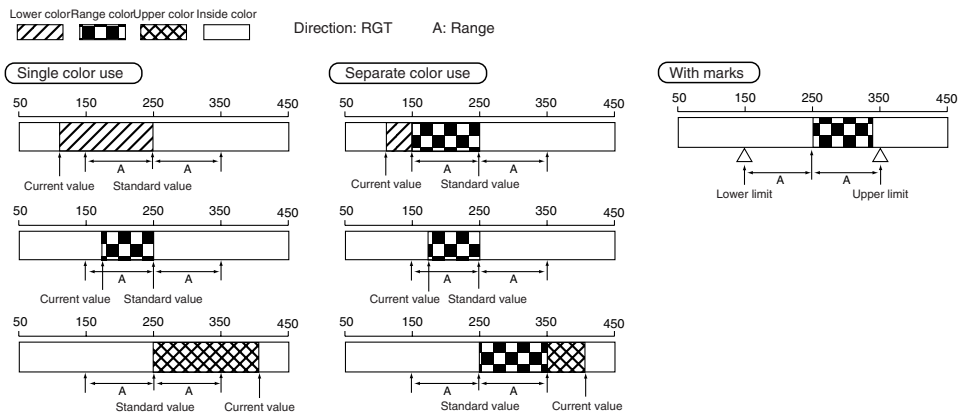
◆ Type: Standard

Alarm: checked



◆ Type: Deviation

Alarm: checked



Pie Graph

Pie Graph Setting Procedure

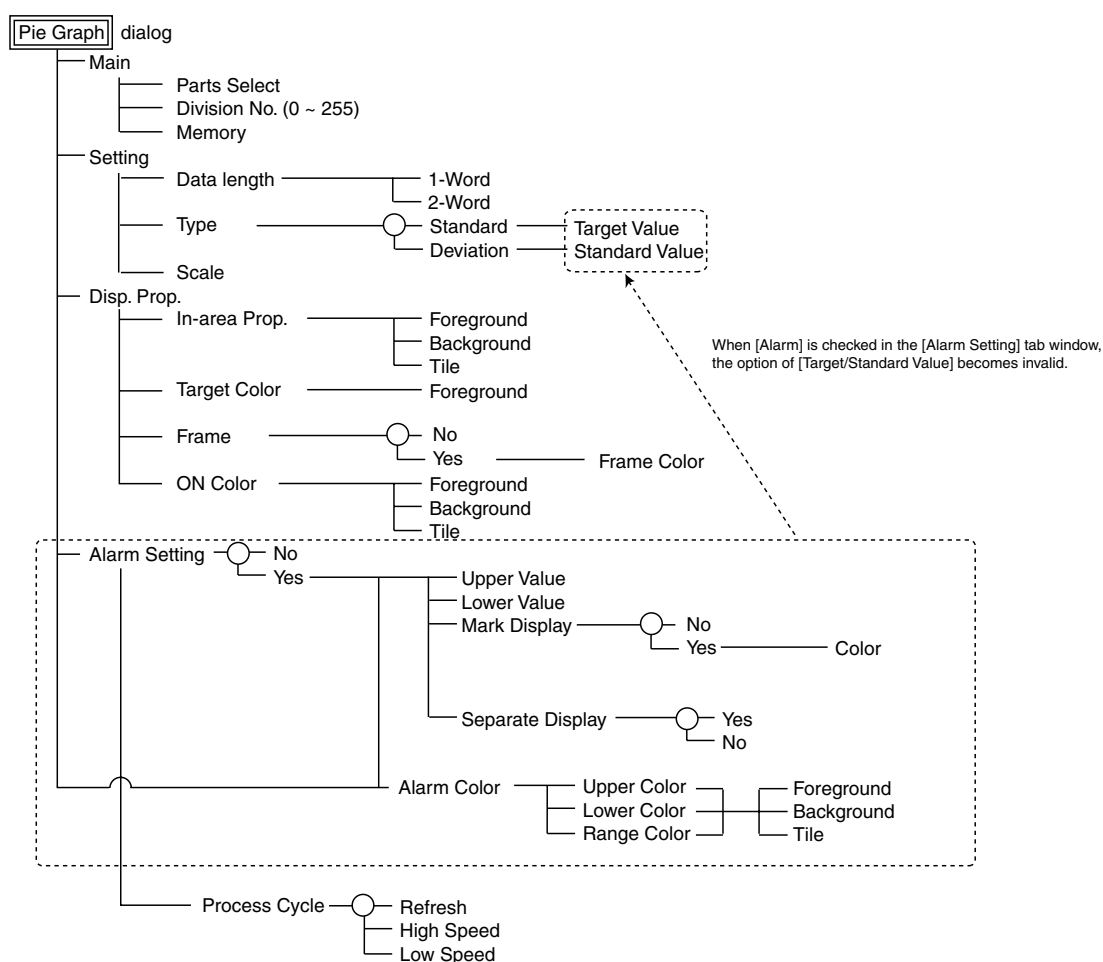
Set the [Pie Graph] dialog and place the pie graph part on the screen.



① Click the [Pie Graph] icon in the tool bar. The [Pie Graph] dialog is displayed.

② To bring up the [Pie Graph] dialog for the graph part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown), and then click the [Detail/Prop. Change] icon.

Tree Diagram for Pie Graph



Pie Graph Memory

Type: Standard		Type: Deviation		Options in [Pie Graph] dialog
No alarm setting	With alarm setting	No alarm setting	With alarm setting	
Memory	Memory	Memory	Memory	PC, Internal, Memory Card
Target value	Upper value	Standard value	Range value	PC, Internal,
_____	Lower value	_____	Standard value	Constant, Memory Card

(Main) Tab Window

[Division No.]

- Ⓒ The division number that is used when the [Pie Graph] icon is clicked is automatically entered.
- Ⓒ As many pie graphs as desired can be set in one division. It is also possible to place them in a division where other parts are already set.

[Memory] (PC Memory, Internal Memory, Memory Card)

Data in this memory address is shown in the graph in real time. The data in this address is called the “current value.”

(Setting) Tab Window

[Data Length]

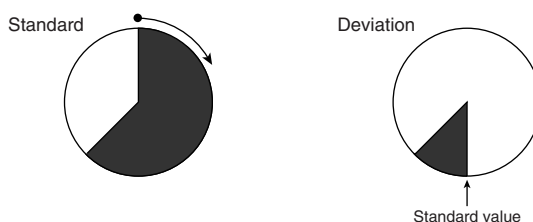
Choose either 1-word or 2-word for the data length of the specified memory.

[Type]

Choose either [Standard] or [Deviation].

Standard : The sector extends from the minimum value toward the maximum value to the current value.

Deviation : Determine the standard value in the graph. The sector extends from the standard value to the current value.



[Scale]

Specify the maximum and minimum values for the range of the graph. Negative values can be entered.

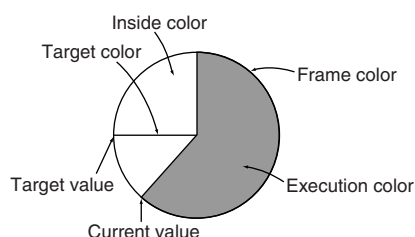
[Target Value] [Standard Value] (PC, Internal Memory, Memory Card, Constant)

When [Standard] is chosen for [Type], the option name reads [Target Value]; when [Deviation] is chosen, it reads [Standard Value].

When the value changes, choose the PC memory; when it is fixed, choose [Constant].

- * When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set [Target Value].

(Disp. Prop.) Tab Window



[In-area Prop.]

Specify the colors inside the graph.

The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

[Target Color]

This option becomes active when [Standard] is chosen for [Type] in the [Setting] tab window. Specify the desired foreground color for

the target value.

- * When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.

[Frame]

Choose whether or not to draw a frame around the pie graph. When this box is checked, a frame is drawn.

[Frame Color]

This option becomes active when the [Frame] box is checked. Choose the desired color.



In the ZM-41D/L, the option box of [Frame] should be checked. If not checked, the foreground color for [In-area Prop.] is automatically regarded as [Frame Color].

[ON color]

Choose colors to paint the sector to the current value. The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

- * When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.



To change the draw properties (other than the frame or inside colors of the graph part), select the part (handles are shown), and then click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. (For more information, refer to page 24-15.)

(Alarm Setting) Tab Window

[Alarm]

If you want to show the sector in a different color when data in the specified memory address exceeds or falls short of the range specified, check this box.

[Upper Value] [Lower Value] / [Range Value] [Standard Value]

When [Standard] is chosen for [Type] in the [Setting] tab window, these options read [Upper Value] and [Lower Value]; when [Deviation] is chosen for [Type], they read [Range Value] and [Standard Value].

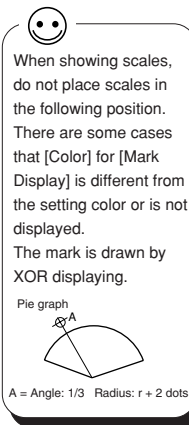
[Upper Value] [Lower Value]

[Lower Value] specifies the lower limit of data, and [Upper Value] specifies the upper limit of data.

[Range Value] [Standard Value]

[Standard] specifies the standard value.

[Range Value] specifies a data range from the standard value in both directions.



[Mark Display]

Check this box when you want to indicate the upper and lower limits using $\triangle$ marks.

[Color]

When the [Mark Display] box is checked, this option becomes active. Choose the desired color for the mark.

[Separate Display]

The sector is shown in separate colors: [Lower Color], [Range Color], and [Upper Color] specified in [Alarm Color] tab window when this option is checked.

[Process Cycle]

For information on the processing cycle, refer to page 2-9.

(Alarm Color) Tab Window

[Upper Color]

Color to be used when the current value exceeds the upper limit

[Lower Color]

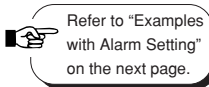
Color to be used when the current value falls short of the lower limit

[Range Color]

Color to be used between the upper and lower limits

For each option, choose the desired colors for [Foreground] and [Background].

The [Background] option becomes active when any pattern other than pattern 0 (extreme left) is chosen for [Tile].



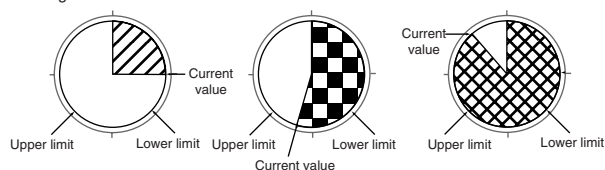
Examples with Alarm Setting

◆ Type: Standard Alarm: checked

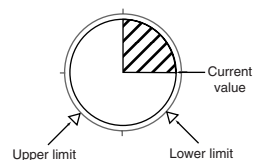
Lower color Range color Upper color Inside color



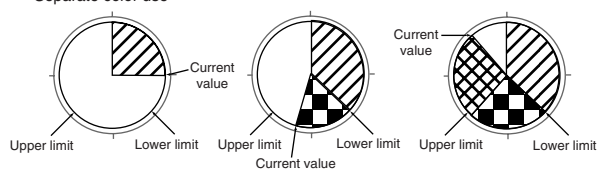
• Single color use



• With marks



• Separate color use



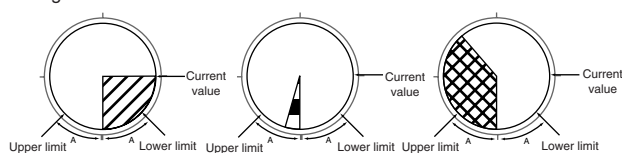
◆ Type: Deviation Alarm: checked

Lower color Range color Upper color Inside color

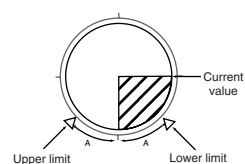


A: Range

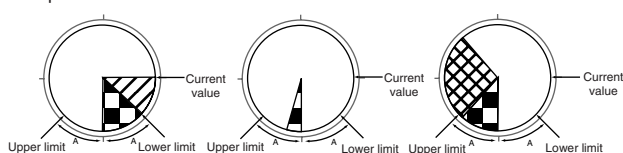
• Single color use



• With marks

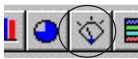


• Separate color use



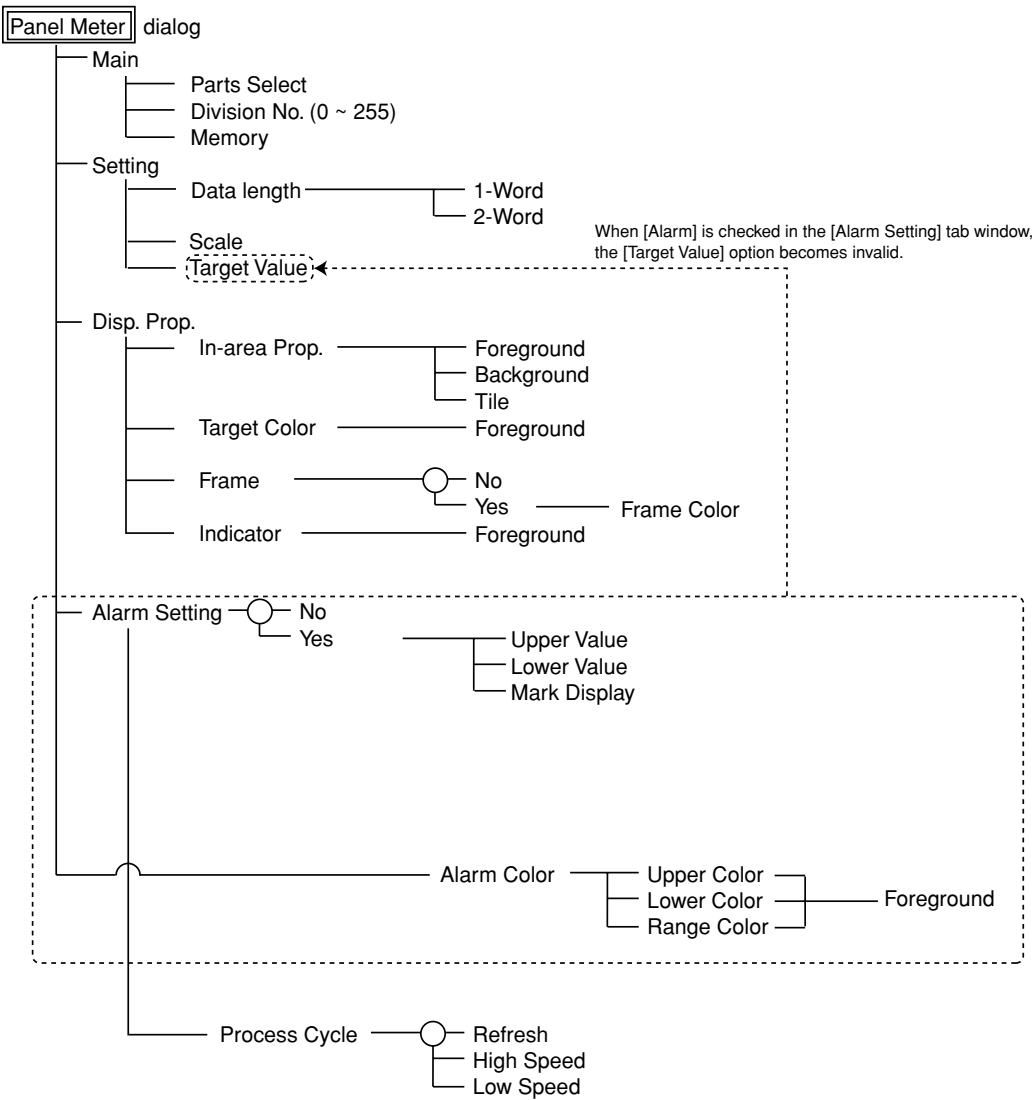
Panel Meter

Panel Meter Setting Procedure



- Set the [Panel Meter] dialog and place the panel meter part on the screen.
- Ⓒ Click the [Panel Meter] icon in the tool bar. The [Panel Meter] dialog is displayed.
 - Ⓒ To bring up the [Panel Meter] dialog for the panel meter part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown), and then click the [Detail/Prop. Change] icon.

Tree Diagram for Panel Meter



Panel Meter Memory

Standard		Options in [Panel Meter] dialog
No alarm setting	With alarm setting	
Memory	Memory	PC Memory, Internal Memory, Memory Card
Target value	Upper value	PC Memory, Internal Memory,
—	Lower value	Constant, Memory Card

(Main) Tab Window

[Division No.]

- ◎ The division number that is used when the [Panel Meter] icon is clicked is automatically entered.
- ◎ As many panel meters as desired can be set in one division. It is also possible to place them in a division where other parts are already set.

[Memory] (PC Memory, Internal Memory, Memory Card)

Data in this memory address is shown in the graph in real time. The data in this address is called the “current value.”

(Setting) Tab Window

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory.

[Scale]

Specify the maximum and minimum values for the range of the graph. Negative values can be entered.

[Target Value]

Choose an address in the PC memory, the internal memory, or a memory card. Also, a constant can be used.

When the value changes, choose the PC memory; when it is fixed, choose [Constant].

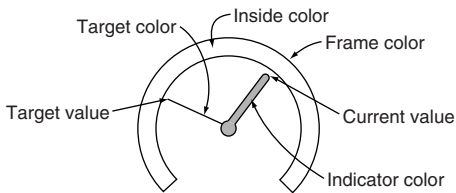
* When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.

(Disp. Prop.) Tab Window

[In-area Prop.]

Specify the colors inside the graph.

The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

**[Target Color]**

Specify the desired foreground color for the target value.

* **When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.**

[Frame]

Choose whether or not to draw a frame around the panel meter.

When this box is checked, a frame is drawn.

[Frame Color]

This option becomes active when the [Frame] box is checked. Choose the desired color.

[Indicator]

Choose the indicator color for the current value.

* **When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.**



To change the draw properties (other than the frame or inside colors of the graph part), select the part (handles are shown), and then click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. (For more information, refer to page 24-18.)

(Alarm Setting) Tab Window

[Alarm]

If you want to show the graph in a different color when data in the specified memory address exceeds or falls short of the range specified, check this box.

[Upper Value] [Lower Value]

[Lower Value] specifies the lower limit of data, and [Upper Value] specifies the upper limit of data.

[Color] for [Mark Display]

Choose the desired color for the mark color.

[Process Cycle]

For information on the processing cycle, refer to page 2-9.

(Alarm Color) Tab Window

[Upper Color]

Color to be used when the current value exceeds the upper limit

[Lower Color]

Color to be used when the current value falls short of the lower limit

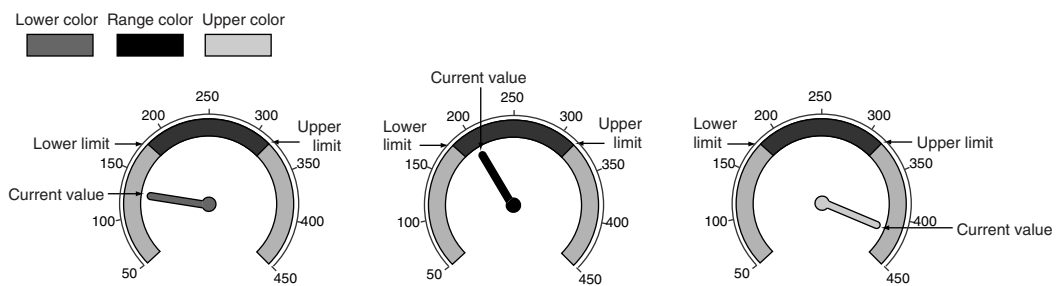
[Range Color]

Color to be used between the upper and lower limits

For each option, choose desired colors for [Foreground] and [Background].

The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

Examples with Alarm Setting



Statistic Graph (bar, pie)

Statistic Graph (bar, pie) Setting Procedure

Set the [Stat. Bar (or Pie) Graph] dialog and place the statistic graph (bar or pie) part on the screen.

- ◎ Click the [Stat. Graph] icon in the tool bar. The statistic graph tool bar is displayed.
- Clicking the [Stat. Bar Graph] icon brings up the [Stat. Bar Graph] dialog. Likewise, clicking the [Stat. Pie Graph] icon brings up the [Stat. Pie Graph] dialog.



Statistic graph tool bar

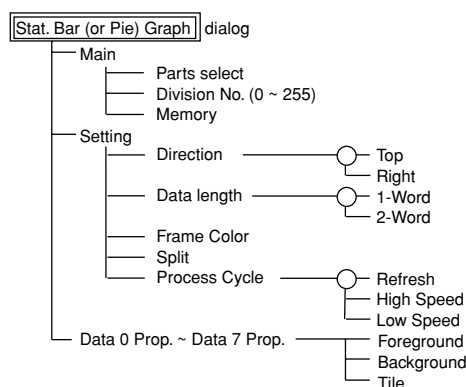
- ◎ To bring up the [Stat. Bar (or Pie) Graph] dialog for the graph part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown), and then click the [Detail/Prop. Change] icon.
- ◎ Percentages for the statistic graph can be indicated using the numerical data display parts. There are two methods for setting up numerical data display parts.
- ◆ Select the [% Display] icon from the statistic graph tool bar.
This method is recommended because this numerical data display part is already linked with the statistic graph. This can reduce the chance of making mistakes.
 - ◆ Click the [Num. Data Display] part in the tool bar.
This method is used for creating numerical data display parts when the statistic graph tool bar has been closed.
Note that these numerical data display parts are not linked with the statistic graph.



To establish a link between numerical data display part and statistic graph:

- Specify the same division number for the numerical data display part and the statistic graph.
- In the [Num. Display] dialog for the numerical data display part, choose [Stat. Graph % Display] for [Display Function], and specify a value for [No. in Stat. Graph].

Tree Diagram for Statistic Graph (bar, pie)



Statistic Bar Graph Memory

Setting memory	Options in the [Stat. Bar (or Pie) Graph] dialog
Memory	PC Memory, Internal Memory, Memory Card

$$\text{Required memory} = [\text{Data Length}] \times [\text{Split}]$$

(Main) Tab Window

[Division No.]

- Ⓒ The division number that is used when the [Stat. Bar (or Pie) Graph] icon is clicked is automatically entered.
- Ⓒ Only one statistic graph can be set in one division. It is not possible to place it in a division where a part with a number limit has already been placed. When a part without a number limit (such as pie graph and bar graph) has been placed in a division, a statistic graph can be placed in the same division.

[Memory] (PC Memory, Internal Memory, Memory Card)

Specify the top memory address to be used for the statistic graph.

Memory in consecutive addresses is automatically allocated to the statistic graph.

The required number of words (memory) can be calculated using the following equation:

$$\text{Required memory} = [\text{Data Length}] \times [\text{Split}]$$

(Setting) Tab Window

[Direction]

Choose from [Top (vertical)], or [Right (horizontal)] to select the direction for drawing the graph.

* This option is not active for the statistic pie graph.

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory. The number of memory addresses to be allocated depends on this selection. Refer to the explanation on [Memory].

[Frame Color]

Choose the frame color of the statistic graph.

[Split] (2 ~ 8)

Specify the number of partitions.

The number of memory addresses to be allocated depends on this setting. Refer to the explanation of [Memory].

[Process Cycle]

For information on the processing cycle, refer to page 2-9.

(Data 0 (~7) Prop.) Tab Windows

◎ These tab windows are for setting properties of the respective divisions of the statistic graph.

◎ As many data properties as specified for [Split] can be set.

[Foreground] [Background] [Tile]

Choose the desired colors for draw properties, and choose the desired tile pattern.



To change the draw properties (other than the frame or inside colors of the graph part), select the part (handles are shown), and then click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. (For more information, refer to page 24-18.)

Trend Graph

Trend Graph Setting Procedure

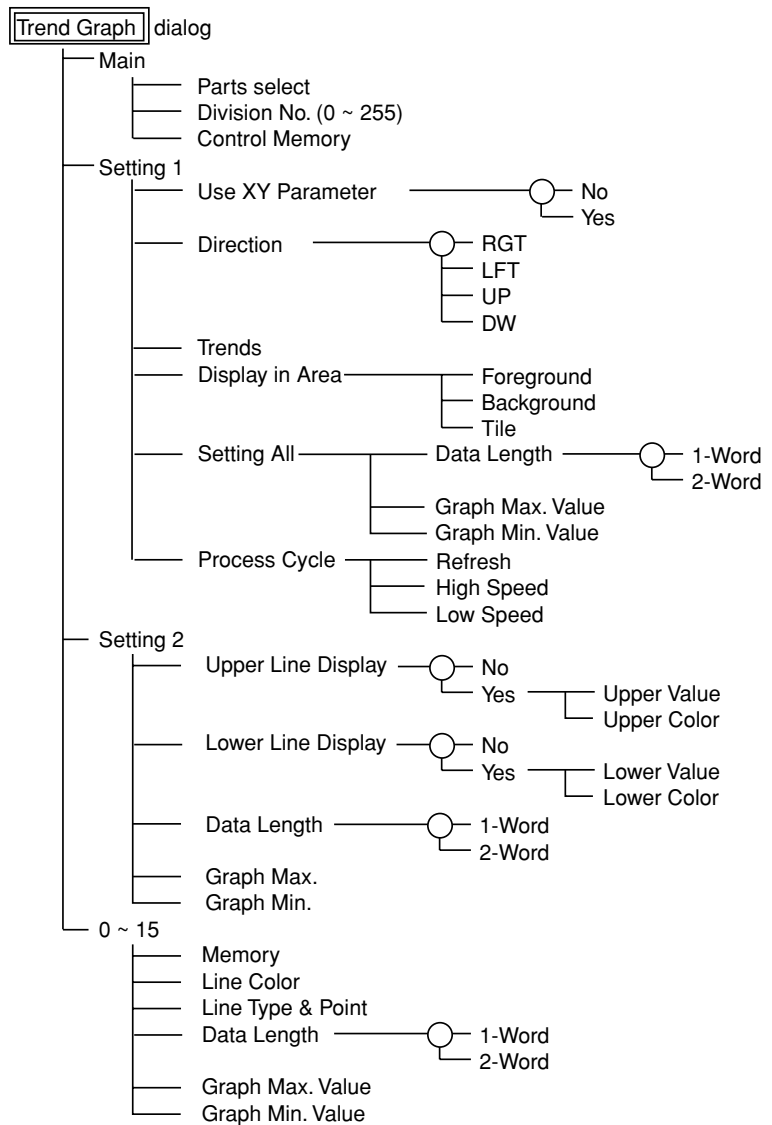
Set the [Trend Graph] dialog and place the trend graph part on the screen.

① Click the [Trend Graph] icon in the tool bar. The [Trend Graph] dialog is displayed.

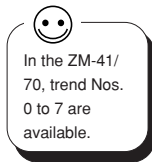
② To bring up the [Trend Graph] dialog for the graph part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown), and then click the [Detail/Prop. Change] icon.



Tree Diagram for Trend Graph



Trend Graph Memory



Setting memory		Options in the [Trend Graph] dialog
Control Memory		PC Memory, Internal Memory, Memory Card
No. 0	Memory	
No. 15	Memory	

Control memory: 1 word

Required memory per trend line

= [Data Length] x [Trends] (number of plot points)

(Main) Tab Window

[Division No.]

- ⊙ The division number that is used when the [Trend Graph] icon is clicked is automatically entered.
- ⊙ Only one trend graph can be set in one division. It is not possible to place it in a division where a part with a number limit has already been placed.

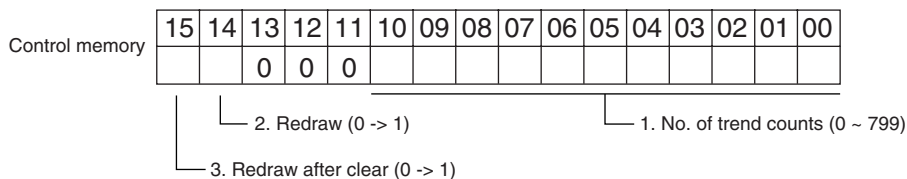
Notes

Be sure to reset the bits not in use to "0" in the control memory.

[Control Memory] (PC Memory, Internal Memory, Memory Card)

This is the memory area to be used for controlling the trend graph.

The contents are as follows:



1. No. of trend counts

- ⊙ The specified number of display counts is drawn.
 - ⊙ From the control memory, the number of display counts is obtained.
- The trend graph is drawn by reading data for the trend lines (Nos. 0 ~ 15) as specified in respective tab windows by the number of display counts.
- When the number of display counts increases, this operation is repeated.
- (When the number decreases, a different operation is made.)

2. Redraw

- ⊙ Trend lines are redrawn at the edge of 0 -> 1 by the specified number of trend counts.
- ⊙ Drawing is performed over the previous one without clearing the trend graph area.

3. Redraw after clear

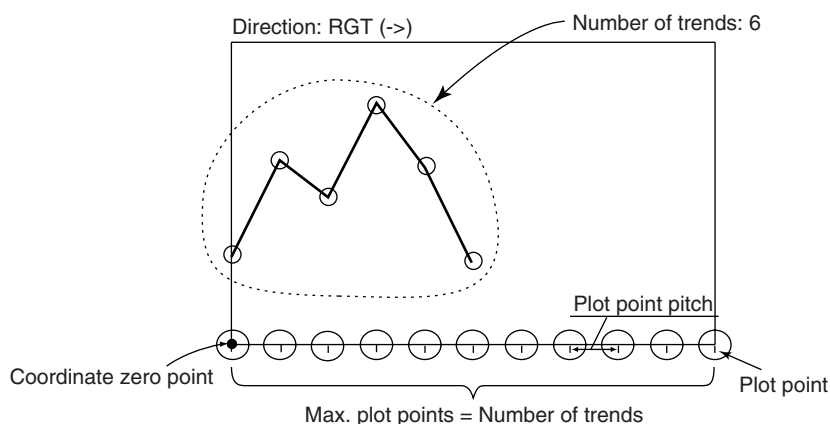
- ⊙ Trend lines are redrawn at the edge of 0 -> 1 by the specified number of trend counts.
- ⊙ Drawing is performed after clearing the trend graph area.



◎ Notes on redrawing

- When redrawing, choose either “2. Redraw” or “3. Redraw after clear.” Note the difference of these options.
- If the interval between redrawing is too short, the trend graph may not be redrawn even at the edge of 0 → 1.
- Data once displayed in the trend graph cannot be changed unless the redrawing command is given.

(Setting 1) Tab Window



[Use XY Parameter]

Choose whether or not to use XY parameters. Use XY parameters to set the plot point pitch as desired. To use default plot points placed at equal intervals, do not use XY parameters.

- When XY parameters are not used (with the box unchecked):

The pitch of plot points is automatically calculated within Control Terminal.
For this memory allocation, refer to page 10-26.

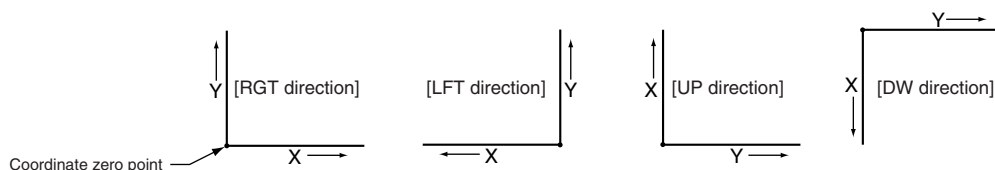
- When XY parameters are used (with the box checked):

The pitch of plot points can be specified in units of dots from the trend graph zero position.

For this memory allocation, refer to page 10-27.

[Direction]

Choose the desired direction for drawing the trend lines.





In the ZM-41/70,
from 3 to 639
plot points
([Trends]) are
available.

[Trends] (3 ~ 799)

Specify the desired maximum number of plot points.

[Display in Area]

For the inside of the trend graph, set [Foreground], [Background], and [Tile]. The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

[Setting All]

Use the [Setting All] function to set the same data for [Data Length], [Graph Max. Value], and [Graph Min. Value] of trend line Nos. 0 to 15.



The [Setting All] function is used for trend lines for which [Trend Display] is checked in their respective tab window Nos. 0 to 15.



In the ZM-41/70, the
[Setting All] function is
used for trend lines for
which [Trend Display]
is checked in their
respective tab window
Nos. 0 to 7.

1. Click tabs of [0] to [15], and check the [Trend Display] option.
2. Open the [Setting 1] tab window. Click [Setting]. The [Setting All] dialog is displayed.
3. Set the options.

[Data Length]

The specified data length is applied to the memory to be used for the selected trend line Nos. 0 to 15. Choose 1-word or 2-word.

[Graph Max. Value] [Graph Min. Value]

Specify the maximum and minimum values for data calculation.

4. Click [OK]. The specified [Data Length], [Graph Max. Value], and [Graph Min. Value] are used for the selected trend line Nos. 0 to 15.

[Process Cycle]

For information on the processing cycle, refer to page 2-9.



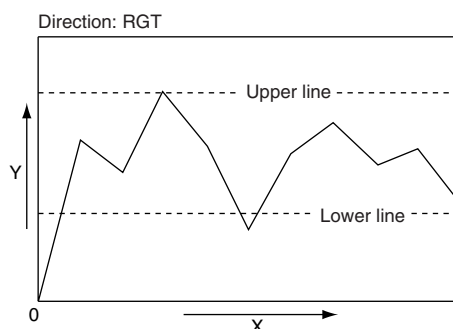
To change the draw properties (other than inside colors of the graph part), select the part (handles are shown), and then click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. (For more information, refer to page 24-20.)

(Setting 2) Tab Window

[Upper Line Display] [Lower Line Display]

It is possible to draw two lines for reference in the trend graph display area.

If you want to draw only one line, check either box. If you want to draw two lines, check both boxes. If you do not need any lines, leave these boxes unchecked.



When the box is checked, the following options become active.

[Upper Value] (or [Lower Value])

Determine the position of the line by specifying a constant or an address in the PC memory, the internal memory, or a memory card.

[Upper Color] (or [Lower Color])

Choose the desired color for the upper or lower line.

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory address.

[Graph Max.] [Graph Min.] (PC Memory, Internal Memory, Memory Card, Constant)

Scales can be attached for reference of drawing the upper and lower lines.

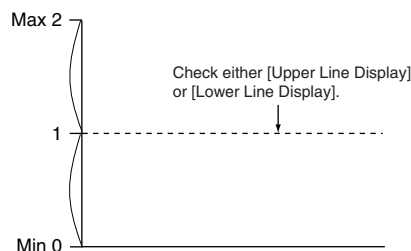
Negative values can also be specified.

Ex.)

When drawing a subsidiary line in the center of the display area:

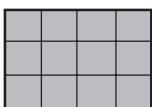
Upper Line Display	: checked
Upper Value	: 1
Graph Max.	: 2
Graph Min.	: 0

The graph appears as shown on the right:



When drawing two or more subsidiary lines or grids:

1. Draw the desired lines or grids in graphic library editing.
2. Go back to the screen edit window.
3. Click the trend graph (handles are shown). Click the [Change the setting of a part placed.] icon.
4. The [Modify Part] window is displayed. Click the [Graphic Call] icon, and call the graphic.
5. Close the [Modify Part] window, and go back to the screen edit window.



[Graph Max.] and [Graph Min.] are used as reference for drawing lines, irrespective of the trend data range. Thus even for a graph with a wide data range (0 to 1000, for example), specifying data as in the above example is appropriate for attaching scales as reference for drawing the upper/lower lines.

(0) to (15) Tab Windows

 In the ZM-41/70, up to 8 trend lines can be drawn in one trend graph.

[Trend Display]
A maximum of 16 trend lines can be drawn.
In the tab window of the trend line to be displayed, check the [Trend Display] option. When this option is checked, the following options become active:

[Memory]
Data in this memory address is read for drawing the trend line. As many consecutive addresses as there are plot points ([Setting 1]) must be allocated in the PC memory, the internal memory or a memory card.

[Line Color]
Choose the color of the line (or dots).

[Line Type & Point]
Choose either a solid line or a dotted line. When using a solid line, choose from 6 options; when using a dotted line, choose from 4 options.

[Data Length]
Choose either 1-word or 2-word for the data length of the memory.

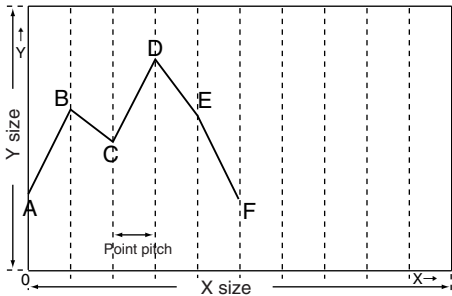
In ZM-*2:
When specifying [Graph Max. Value] or [Graph Min. Value] as [PC Memory], the values will be displayed at the timing of "redraw" or "redraw after clear".

[Graph Max. Value] [Graph Min. Value]
(ZM-*2: PC, Internal, Constant, Memory Card ZM-41/70: Constant only)
Specify the maximum and minimum values for data calculation.
* Do not specify "0" for both [Graph Max. Value] and [Graph Min. Value]. Doing so will result in an error.

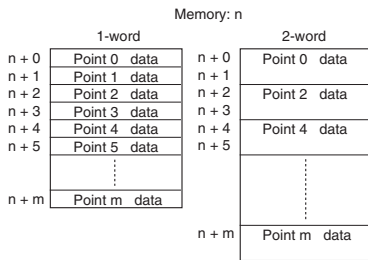
Memory Allocation without XY Parameters

©When XY parameters are not used, the required plot point pitch is automatically calculated within Control Terminal as described below:

Plot point pitch (dots) = X size (dots) / (the number of plot points - 1)
(Control Terminal adjusts the data so that no remainder will be left.)



◎Memory allocation



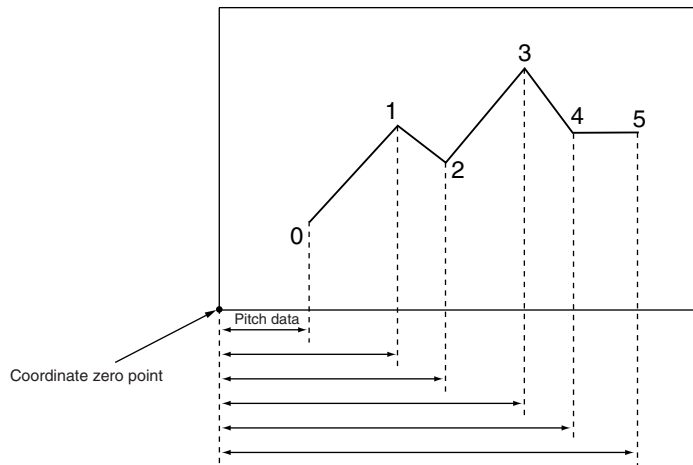
As many consecutive addresses as there are trends (plot points) specified in the [Setting 1] tab window are allocated, starting from the one specified for [Memory] in the [0] to [15] tab window.

Memory allocation depends on the data length: 1-word or 2-word.

For example, when data length = 1-word, top memory = D100, the number of plots = 11, memory address D100 to D110 are used.

Memory Allocation with XY Parameters

◎When XY parameters are used, pitch data can be determined by the distance from the trend graph zero position in units of dots.

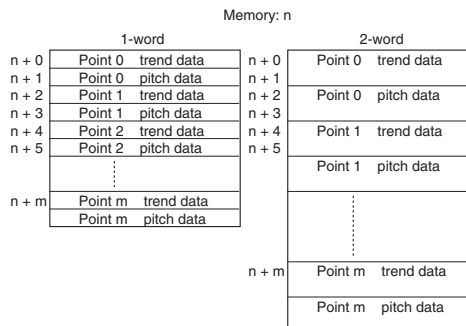


◎Memory allocation

As many consecutive addresses as there are trends (plot points) specified in the [Setting 1] tab window are allocated. Each data of the plot point is followed by the pitch data. Memory is allocated from the address specified for [Memory] in the [0] to [15] tab windows.

Memory allocation depends on the data length: 1-word or 2-word.

For example, when data length = 1-word, top memory = D100, the number of plot points = 11, memory addresses D100 to D121 are used.



Closed Area Graph (ZM-*2 Function)

Closed Area Graph Setting Procedure

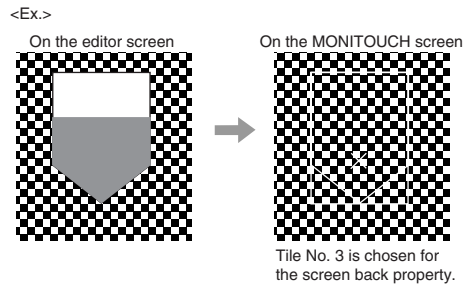


Set the [Closed Area Graph] dialog and place the graph part on the screen.

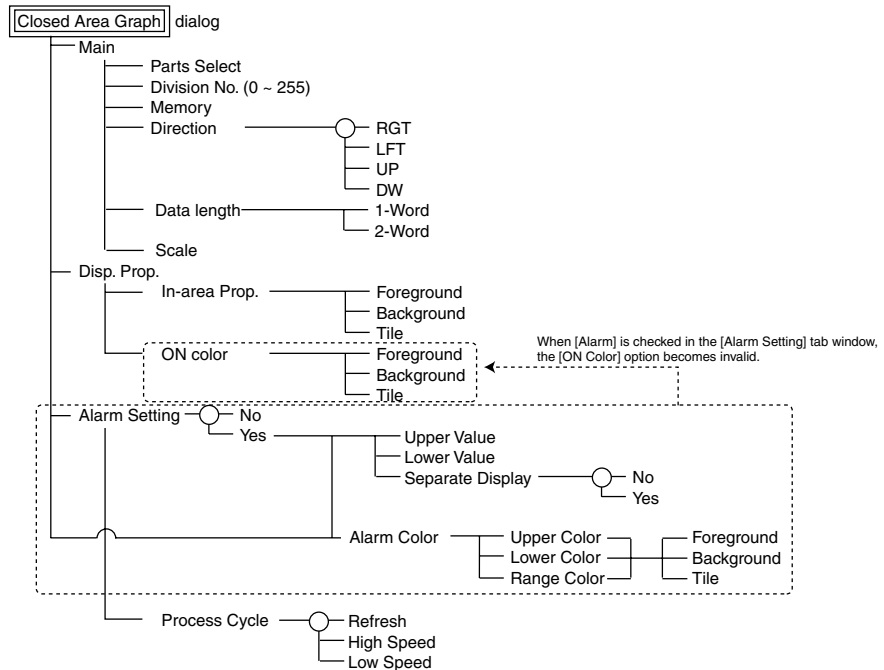
- Ⓐ Click the [Closed Area Graph] icon in the tool bar. The [Closed Area Graph] dialog is displayed.
- Ⓑ To bring up the [Closed Area Graph] dialog for the graph part after its placement on the screen, double-click the part, or select it by clicking once (handles are shown), and then click the [Detail/Prop. Change] icon.

Notes on Placement of Closed Area Graph

- Ⓐ If a tile pattern (except pattern 0) is chosen for a screen back property or an overlap, a closed area graph placed on the screen will not be drawn correctly. The same problem will occur by placing a closed area graph on a graphic using a tile pattern.
- Ⓑ If the same line color is used for a closed area graph and the screen back color, the graph will not be drawn correctly.



Tree Diagram for Closed Area Graph



Closed Area Graph Memory

No alarm setting	With alarm setting	Options in [Closed Area Graph] dialog
Memory	Memory	PC Memory, Internal Memory, Memory Card
———	Upper Value	PC Memory, Internal Memory,
———	Lower Value	Constant, Memory Card

(Main) Tab Window

[Division No.]

- Ⓒ The division number that is used when the [Closed Area Graph] icon is clicked is automatically entered.
- Ⓒ As many closed area graphs as desired can be set in one division. It is also possible to place them in a division where other parts are already set.

[Memory] (PC Memory, Internal Memory, Memory Card)

Data in this memory address is shown in the graph in real time. The data in this address is called the “current value.”

[Direction]

Choose from [RGT], [LFT], [UP], and [DW] for the direction of drawing the graph.

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory.

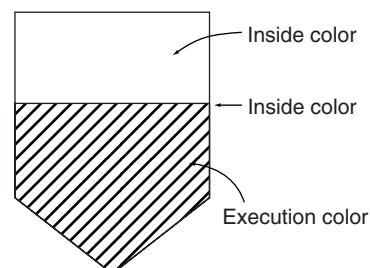
[Scale]

Specify the minimum and maximum values for the range of the graph. Negative values can be entered.

(Disp. Prop.) Tab Window

[In-area Prop.]

Specify the colors inside the graph.
The [Background] option becomes active when any pattern other than tile pattern 0 (extreme left) is chosen for [Tile].



[ON color]

Choose colors to paint the graph to the current value. The [Background] option becomes active when any pattern other than tile pattern 0 (extreme left) is chosen for [Tile].

* When checking [Alarm] in the [Alarm Setting] tab window, it is not necessary to set this option.



To change the draw properties (other than the inside colors of the graph part), select the part (handles are shown) and then click the [Change the setting of a part placed.] icon. The [Modify Part] window is displayed. (For more information, refer to page 24-21.)

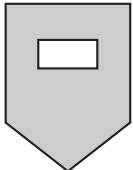
(Alarm Setting) Tab Window

[Alarm]

If you want to show the closed area graph in a different color when data in the specified memory address exceeds or falls short of the range specified, check this box.



For a closed area graph containing a part as shown below, the [Separate Display] option is not available.



[Upper Value] [Lower Value]

[Lower Value] specifies the lower limit of data, and [Upper Value] specifies the upper limit of data.

[Separate Display]

The closed area graph is shown in separate colors: [Lower Color], [Range Color], and [Upper Color] specified in [Alarm Color] tab window.

[Process Cycle]

For information on the processing cycle, refer to page 2-9.

(Alarm Color) Tab Window

[Upper Color]

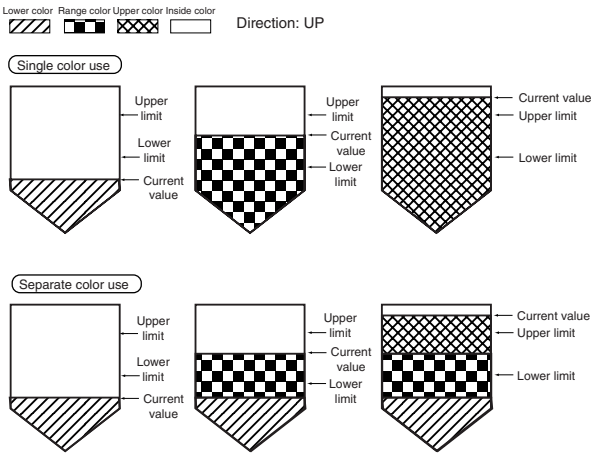
Color to be used when the current value exceeds the upper limit

[Lower Color]

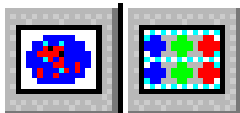
Color to be used when the current value falls short of the lower limit

[Range Color]

Color to be used between the upper and lower limits



For each option, choose the desired colors for [Foreground] and [Background].
The [Background] option becomes active when any tile pattern other than pattern 0 (extreme left) is chosen for [Tile].

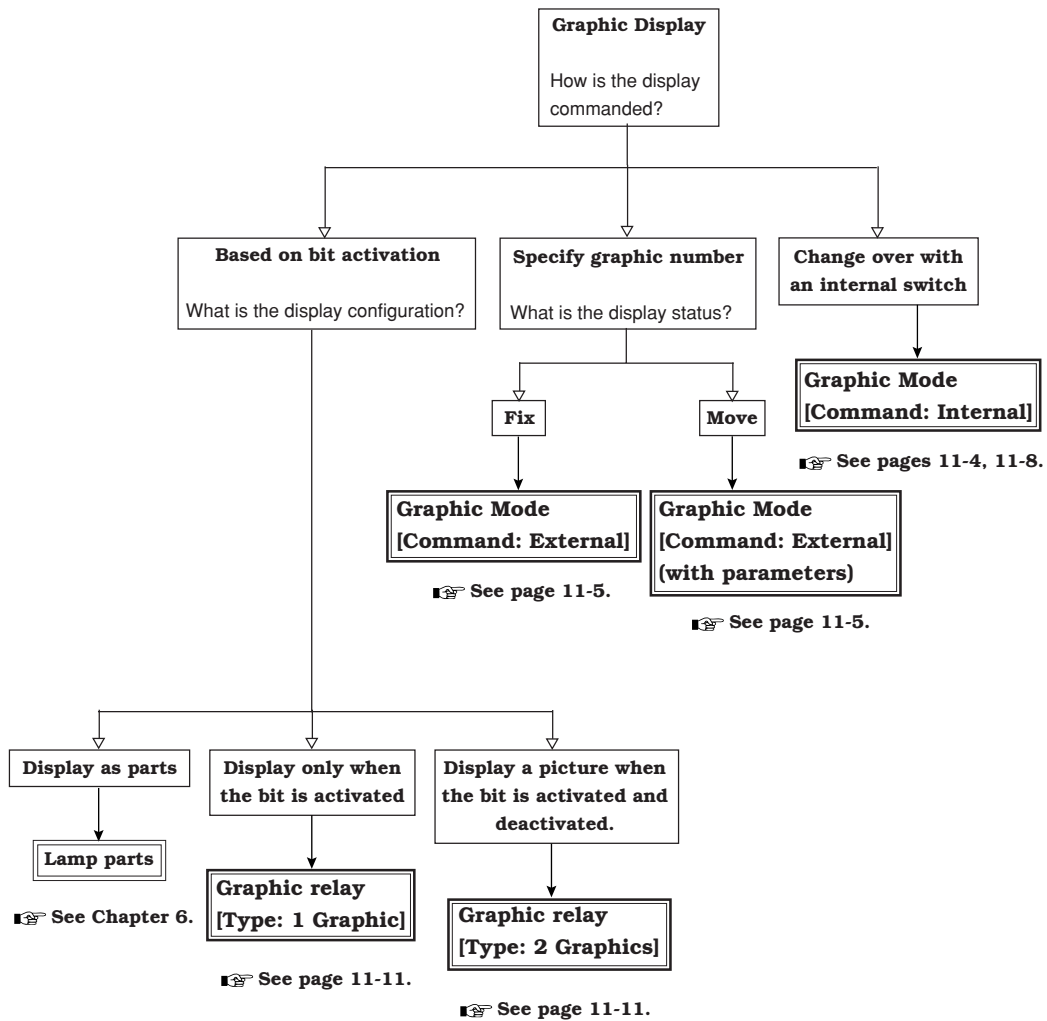


Graphic Display

The Control Terminal can display or change a variety of pre-registered graphics on the screen based on bit activation and the graphic number specification.

Displaying Graphics

The graphic display function can be used in a variety of ways depending on one's purpose.



Graphic Mode

Display by specifying the diagram or the character number that was registered in the PC memory. Or, change the display by pressing the internal change over switch.

Graphic Relay Mode

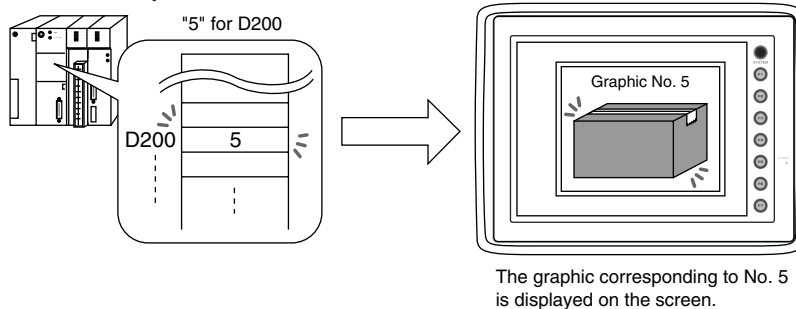
The applicable diagrams or characters can be displayed on screen depending on whether or not the PC bit is activated.



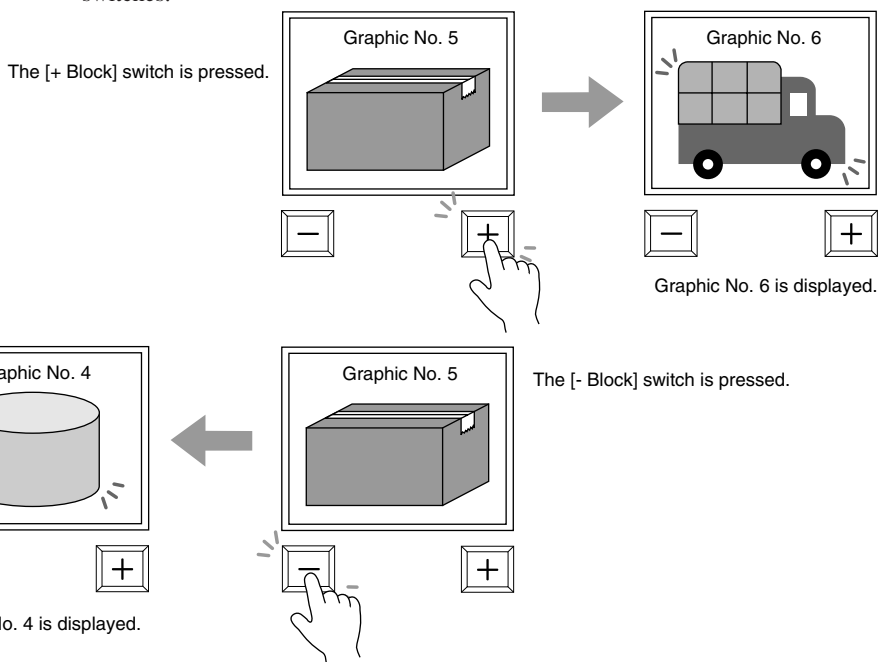
Graphic Mode

Outline of Graphic Mode

- ◎ The registered graphics or texts can be brought up by commanding the number from the PC memory.



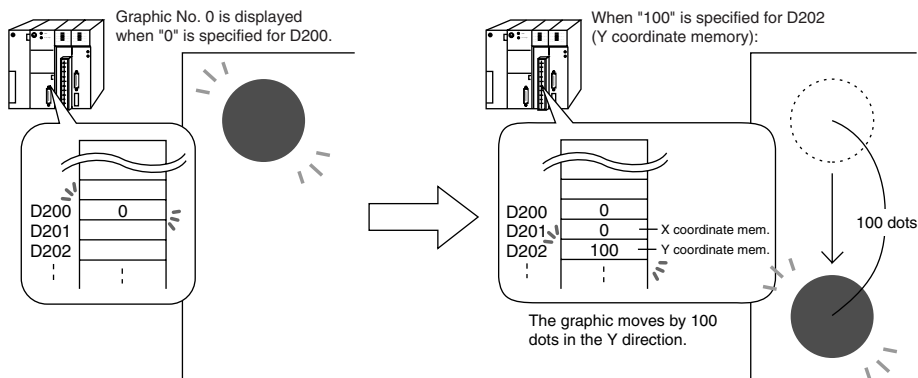
- ◎ It is possible to give commands for showing graphics or texts using internal switches.



◎When graphics or texts are specified from the PC memory, it is possible to animate or transform them.

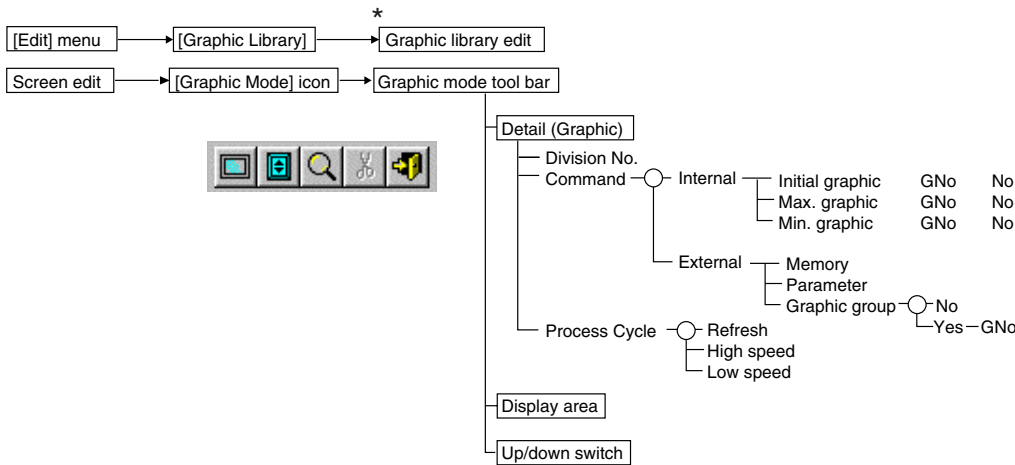
If you want to animate or transform graphics or texts, set up parameters for these items in graphic library edit. The required memory addresses are allocated for animation and transformation.

For more information on parameters, refer to page 17-5.



Setting Up Graphic Mode

Refer to the following setting procedures to use graphic mode.

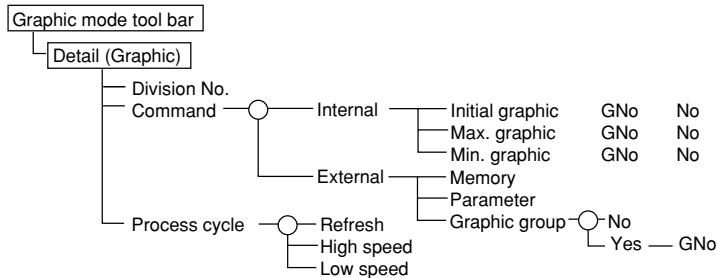


* For information on graphic library edit, see page 11-15.



[Graphic] Dialog

A tab window that must be set when using graphic mode. Click on the [Graphic Mode] icon. When you click on the [Detail] icon in the graphic mode tool bar, the [Graphic] dialog is displayed.



[Division No.]

Set a division number where no mode has been registered. Usually, the division number currently being edited (displayed in the upper right corner of the screen) is automatically specified.

[Command]

Choose either [Internal] or [External] for the commanding method of displaying the registered graphics (diagrams, texts, etc.).

◆ Internal

Change the graphic display using internal change-over switches placed on the screen (= [+ Block], [- Block] switches, etc.).

**When this method is used, it is not possible to move or transform the graphics.**

◆ External

The graphic number is specified by the PC and displayed on screen. Set command memory. When [External] is chosen, the graphics can be moved or transformed.

When (Internal) is chosen:

[Initial Graphic GNo & No]

Specify the graphic (group number and graphic number) to be displayed first when the relevant screen is opened during communication with the PC. The initial graphic must be located between the min. and max. graphics (explained below).

[Max. Graphic GNo & No]

Specify the graphic (group number and graphic number) of the greatest number among those to be displayed on the screen.

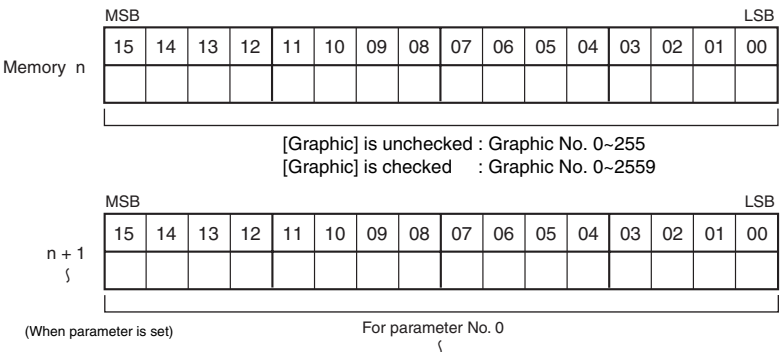
[Min. Graphic GNo & No]

Specify the graphic (group number and graphic number) of the smallest number among those to be displayed on the screen.

When (External) is chosen:

[Memory]

Memory used to specify the registered graphic number. It is possible to choose from PC memory, internal memory, or the memory card. The specified graphic number varies depending on the [Graphic] setting described below. The memory is allocated as follows:



[Parameter]

Parameters are required when moving or transforming the graphics. Specify the total number of parameters provided to the graphics you are going to use in graphic mode. From this total and parameter numbers, memory allocation is determined.

For example:

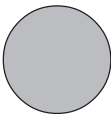
The following parameters are set up for the graphic in the graphic library.

Set the circle as below:

[Action: Animate]

[Center X: Incremental + Input Parameter No. 1]

[Center Y: Incremental + Input Parameter No. 2]



The following settings are made in the [Graphic] dialog:

[Command: External]

[Memory: D300]

[Parameter: 2 (because parameter No. 1 and No. 2 are set)]

From the above settings, memory is allocated as shown below:

D300	Graphic number specification memory	} 2 words are secured because "2" is specified for [Parameter].
D301	Center X coordinate change memory	
D302	Center Y coordinate change memory	

[Graphic]

The setting varies depending on whether the box is checked or unchecked. Additionally, the graphic number specified in the above mentioned [Memory] varies based on this setting.

◆ When [Graphic] is checked

Set the [GNo] (Group number = 0 - 9).

The graphic displayed on the screen is limited to a graphic within the specified group number. Specify a graphic number (0-255) in one group in memory.

◆ When [Graphic] is unchecked

Specify the graphic number to be displayed as an [Absolute Address]. It is thus possible to select graphics from more than one group. The range of the graphic numbers specified in [Memory] is from 0 to 2559.



Absolute addresses of the graphic numbers are as shown below:

Groups are specified separately		Absolute Address	
Group No.	Graphic No.	Group No.	Graphic No.
0	0000~0255	(none)	0000~0255
1	0000~0255		0256~0511
2	0000~0255		0512~0767
3	0000~0255		0768~1023
4	0000~0255		1024~1279
5	0000~0255		1280~1535
6	0000~0255		1536~1791
7	0000~0255		1792~2047
8	0000~0255		2048~2303
9	0000~0255		2304~2559

[Process Cycle]

Sets the cycle for the Control Terminal to read PC data when it is communicating with the PC.

For more information refer to Chapter 3, “Screen” on page 3-9.



When you finish setting the [Graphic] dialog and click [OK], the graphic mode icon is registered in the lower left corner of the screen.

To review the contents, or to delete the registered settings, refer to Chapter 1, “Basic Operation” on page 1-9.



Display Area Part

Outline of display area part

Display area parts are the areas where graphics are displayed in graphic mode. For the setting [Command: Internal], you must display graphics in display area parts.



For the setting [Command: External], it is possible to display graphics without display area parts. However, there are instances when the previous picture remains even after the picture is changed.

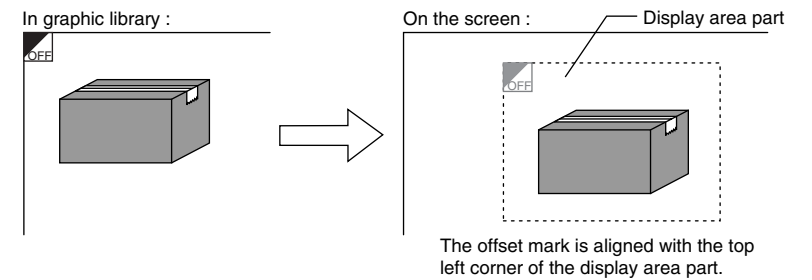
Setting procedure of display area part

Click the [Display Area] icon on the graphic mode menu bar. Display area part is called up as a list. Select the desired part and place it on screen.

◆ Change size

The placed display area part must be adjusted to fit the graphic mode display area size. The [Offset] location in the graphic library fits in the upper left corner of the display area part on screen.

Considering this position, determine the size of the display area part.



◆ Change properties

Property changes of the placed display area part are performed in the [Mode Display Area] dialog described below.

The [Mode Display Area] dialog is displayed by either double clicking on the display area part placed on screen, or by clicking on that part and then clicking on the [Detail Prop. Change] icon.

For more information on the [Modify Part] icon, refer to Chapter 24, "Part Editing" on page 24-3.

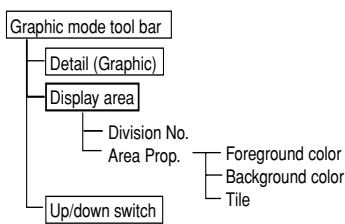
However, when changing properties other than area properties (the outer frame, for example), click on parts, and then click on the [Modify Part] icon.

When making detailed modifications, click on this icon.

Mode Display Area Dialog

[Division No.]

The display area part to be linked with graphic mode must be set with the same division number as the original [Graphic] dialog. It thus becomes associated with the parts used in graphic mode.



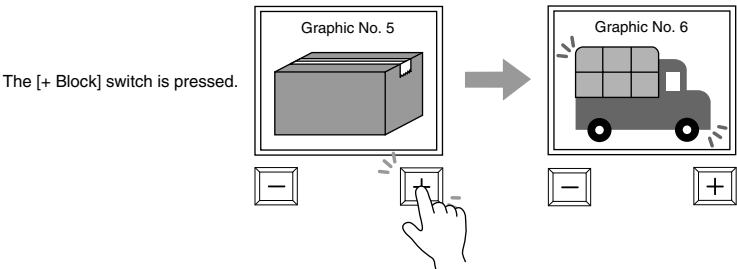
[Area Prop.] (Foreground color/background color/tile)

It is possible to change inside properties in display area parts.



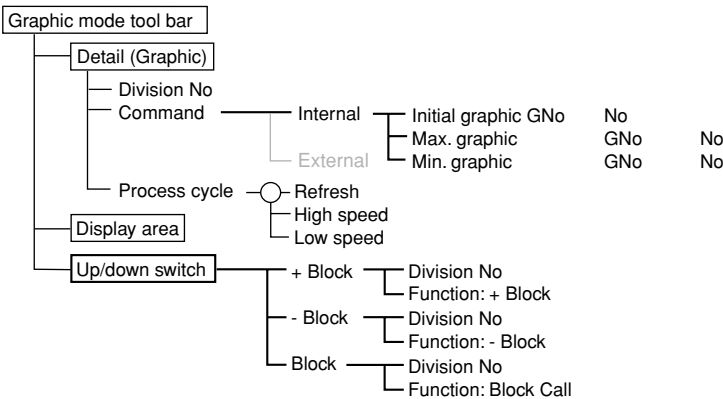
Changing Displayed Graphics with Switches

The graphic display is changed with either the [Function: + Block], the [Function: - Block], or the [Function: Block Call] switch.



You must select [Command: Internal] in the [Graphic] dialog.

Click on the [Up/Down Switch] on the graphic mode menu bar. When you click on [+ Block], the [Function: + Block] switch is automatically called up. Other functions are called up in the same manner.



Note When Setting Switch Parts

[Division No]

Set switches with the same division number as the [Graphic] dialog of link destination so that you can determine which switch is linked to which mode.

[Function]

The switch functions are given below:

[+ Block]

Switches to the next graphic.

[- Block]

Switches to the previous graphic.

[Block Call]

There is a [Block No.] as an auxiliary item. (In this case, because this is the graphic mode, this means a graphic number.) When this switch is pressed, the graphic which number you specified is called up.



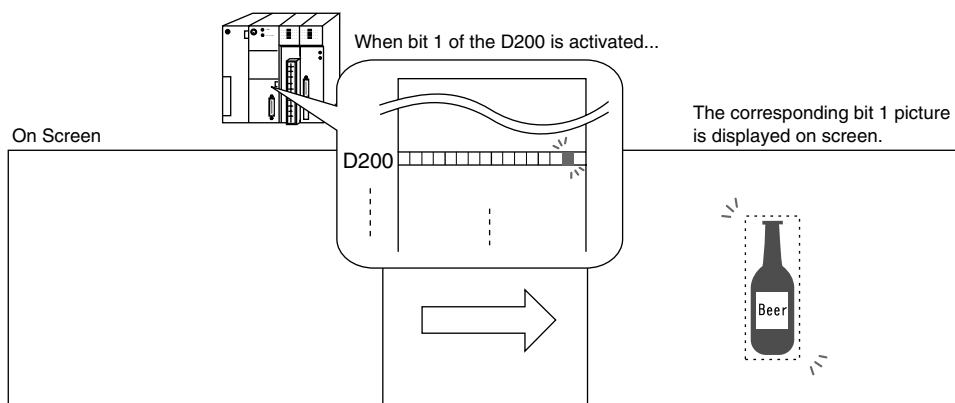
Graphic Relay Mode

Outline of Graphic Relay Mode

The registered graphics or texts can be displayed by setting or resetting bits in the PC memory. There are two types of graphic relay mode.

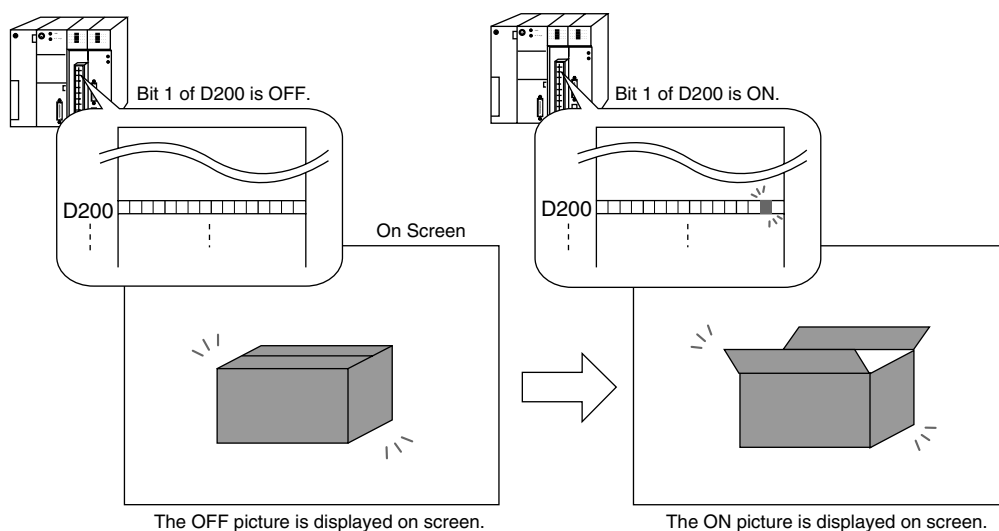
◎[Type: 1-graphic]

When a bit is set (ON), the corresponding graphic is displayed; when it is reset (OFF), it is erased.



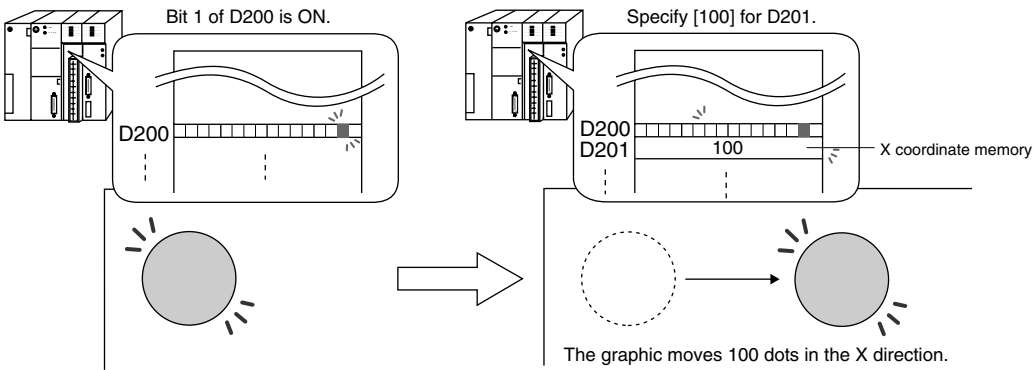
◎[Type: 2-graphic]

Two graphics are assigned to one bit. When the bit is set (ON), the ON graphic is displayed; when it is reset (OFF), the OFF graphic is displayed.



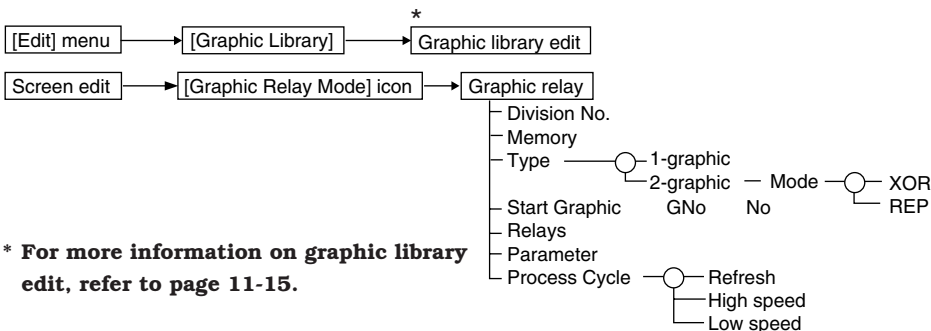
For details on how to specify [Parameter], refer to page 11-14.

◎ It is possible to animate or transform both [1-graphic] and [2-graphic] graphics or texts.
To do this, specify parameters when graphics are registered in graphic library edit.
Based on parameters, command memory is secured for animation or transformation.



Graphic Relay Mode Setting Procedure

Refer to the following setting procedure when using graphic relay mode.



* For more information on graphic library edit, refer to page 11-15.

[Graphic Relay] Dialog

When using graphic relay mode, options in this [Graphic Relay] dialog must be set up.
Click the [Graphic Relay Mode] icon. The [Graphic Relay] dialog is displayed.

[Division No.]

Set a division number where no mode has been registered. Usually, the division number currently being edited (displayed in the upper right corner of the screen) is automatically specified.

[Memory]

Command memory that displays the registered graphic on the screen.
Select from PC memory, internal memory, and memory card.

Here, graphics are automatically assigned in bit units beginning (from the top) with the memory bit that you specify, which acts as [Start Graphic GNo & No]. Memory assignment varies based on [1-graphic] or [2-graphic] type, as described in the next section. For more details, refer to the following section, [Start Graphic].

[Type]

Select how you will display graphics.

◆ [1-graphic]

When a PC memory bit is set (ON), the corresponding graphic is displayed; when it is reset (OFF), the graphic disappears.

◆ [2-graphic]

Two graphics are assigned to one PC memory bit. When the bit is set (ON), the ON graphic is displayed; when it is reset (OFF), the OFF graphic is displayed. A graphic is always displayed whether the bit is set or reset.

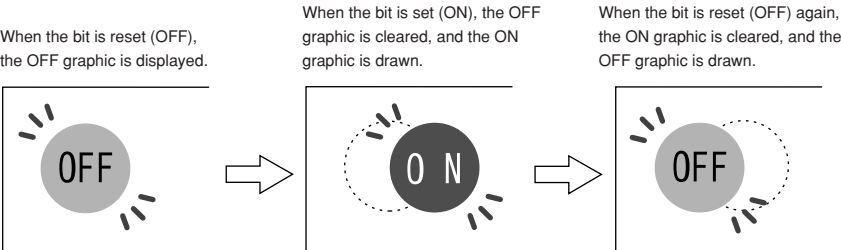
[Mode]

When [2-graphic] is chosen for [Type], this option becomes active. Choose [XOR] or [REP] for changing graphic display by bit activation.

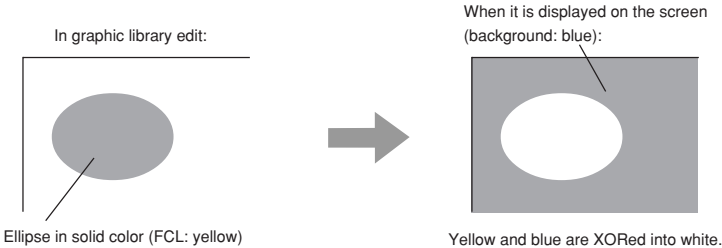
◆ [XOR]

When the bit is reset (OFF), the OFF graphic is displayed. When it is set (ON), the OFF graphic is cleared, and the ON graphic is drawn.

When the bit is reset again, the ON graphic is cleared, and the OFF graphic is drawn.



With XOR setting, the graphic color is XORed with the colors of the base screen. Therefore, the graphic is displayed in the base color which has been XORed (see page 11-24), rather than the color specified in editing.

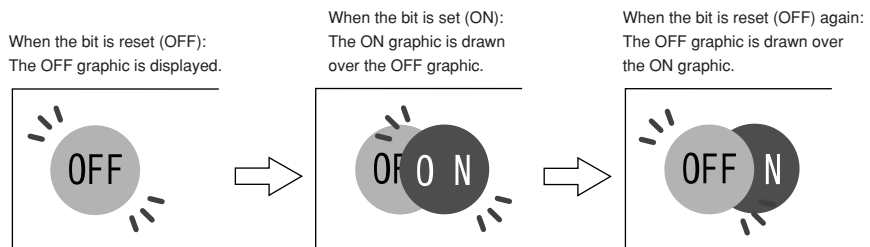


For information on displaying the color specified in editing, even when in [XOR] mode, refer to page 11-25.

◆ [REP]

When the bit is reset (OFF), the OFF graphic is displayed. When it is set (ON), the ON graphic is drawn over the OFF graphic.

When the bit is reset again, the OFF graphic is drawn over the ON graphic.



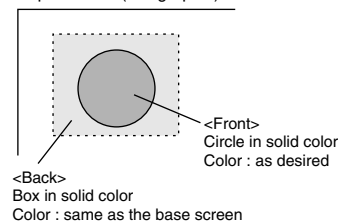
With REP setting, the graphic color is not XORed, and is shown in the original color. However, note that the previous graphic remains on the screen when the next graphic is drawn.



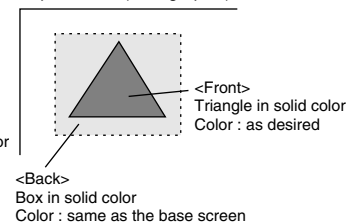
To clear the previous graphic, place a box in a solid color a little larger than the graphic.

Graphic library editing :

Graphic No. 0 (ON graphic)



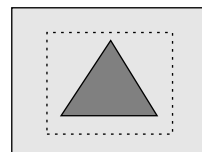
Graphic No. 1 (OFF graphic)



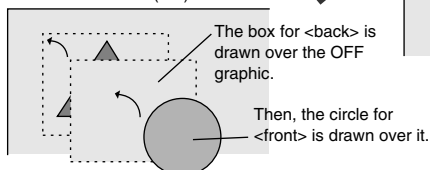
When one graphic is drawn over another and a box in a solid color is drawn, the new graphic is displayed over the box. As a result, the previous graphic is cleared.

On the screen

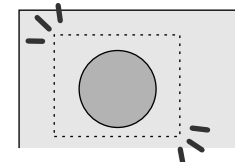
When the bit is reset (OFF), the OFF graphic is displayed.



When the bit is set (ON) :



As the result, the OFF graphic is cleared, and the ON graphic is drawn.



Even with [REP] setting, the graphic color is XORed if [Animate] is chosen for [Action] under [Parameter].

[Start Graphic GNo & No]

When assigning graphics (that will be displayed) in bit units beginning with top memory, specify the top graphic library group number and the graphic number. Depending on the selection of [1-graphic] or [2-graphic], graphic assignment varies as explained below.

<Ex.> [Memory: D200], [Start graphic: GNo. 0 No. 3]

◆ [Type: 1-graphic]

	MSB															LSB			
Bit number of D200	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00			
Graphic number in group No. 0 (bit ON)	...	...	...	15	14	13	12	11	10	9	8	7	6	5	4	3			

When bit 8 of D200 is set (ON), graphic No. 11 is displayed on the screen. When bit 3 of D200 is set, graphic No. 6 is displayed.

◆ [Type: 2-graphic]

	MSB															LSB			
Bit number of D200	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00			
Graphic number in group No. 0 (bit ON)	...	...	29	27	25	23	21	19	17	15	13	11	9	7	5	3			
(bit OFF)	...	...	30	28	26	24	22	20	18	16	14	12	10	8	6	4			

When bit 4 of D200 is reset (OFF), graphic No. 12 is displayed on the screen; when it is set (ON), graphic No. 11 is displayed.

Likewise, when bit 9 of D200 is reset (OFF), graphic No. 22 is displayed on the screen; when it is set (ON), graphic No. 21 is displayed.

[No. of Relays] (1 - 512)

Specify the number of relays (the total number of bits assigned for graphics) to be used.

<Ex.> [Memory: D200], [Start graphic: GNo. 0 No. 0], [No. of Relays: 12]

◆ [Type: 1-graphic]

	MSB															LSB			
Bit number of D200	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00			
Graphic number in group No. 0 (bit ON)	×	×	×	×	11	10	9	8	7	6	5	4	3	2	1	0			

There are 12 relays available; therefore, it is possible to assign 12 graphics to these bits.

◆ [Type: 2-graphic]

	MSB															LSB			
Bit number of D200	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00			
Graphic number in group No. 0 (bit ON)	×	×	×	×	22	20	18	16	14	12	10	8	6	4	2	0			
(bit OFF)	×	×	×	×	23	21	19	17	15	13	11	9	7	5	3	1			

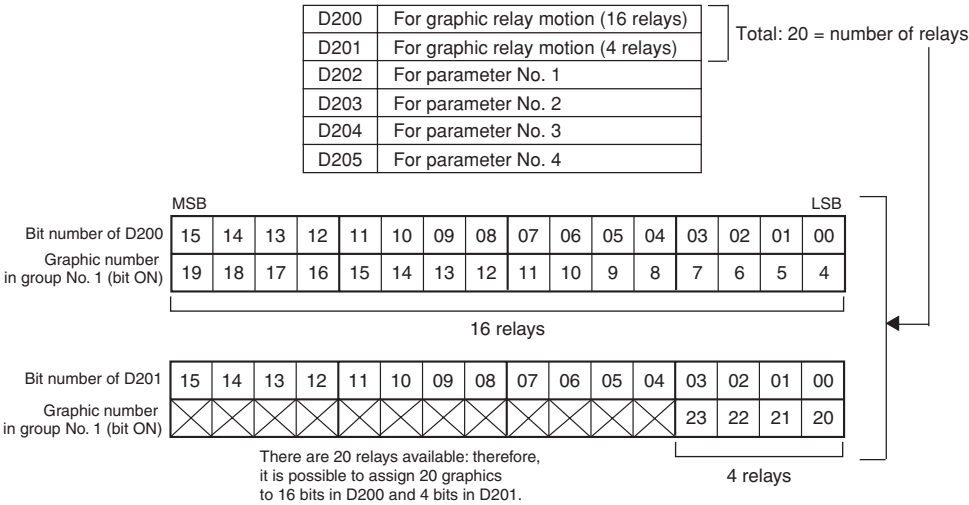
There are 12 relays available; therefore, it is possible to assign 24 graphics to these bits.

[Parameter]

Parameters are required when moving or transforming graphics. Specify the total number of parameters provided to the graphics you are going to use in graphic relay mode. From this total and parameter numbers, memory allocation is determined.

<Ex.> Memory : D200
Type : 1-graphic
Start graphic GNo. 1 No. 4
No. of Relays : 20
Parameter : 4

Memory is allocated as given below:



[Process Cycle]

Choose from [Refresh], [High Speed] and [Low Speed] for data read cycles during communication with the PC.

For more information, refer to Chapter 3 “Screen” on page 3-9.



When all settings have been completed in the [Graphic Relay] dialog and you click [OK], the graphic relay mode icon is registered in the lower left corner of the screen. For information on reviewing the contents or erasing settings, refer to Chapter 1, “Basic Operation” on page 1-9.

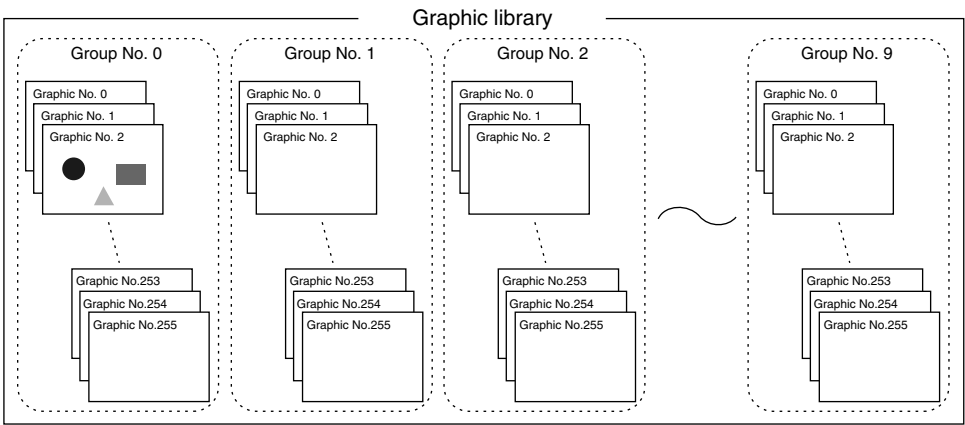
Registering Graphics (Graphic Library)

Graphics and texts must be registered in the graphic library before calling them up for display.
Graphic library is an area to keep graphics and texts separate from screen editing.

The graphics and texts registered in the graphic library can be used not only in graphic mode and graphic relay mode, but also for drawing on the screen.

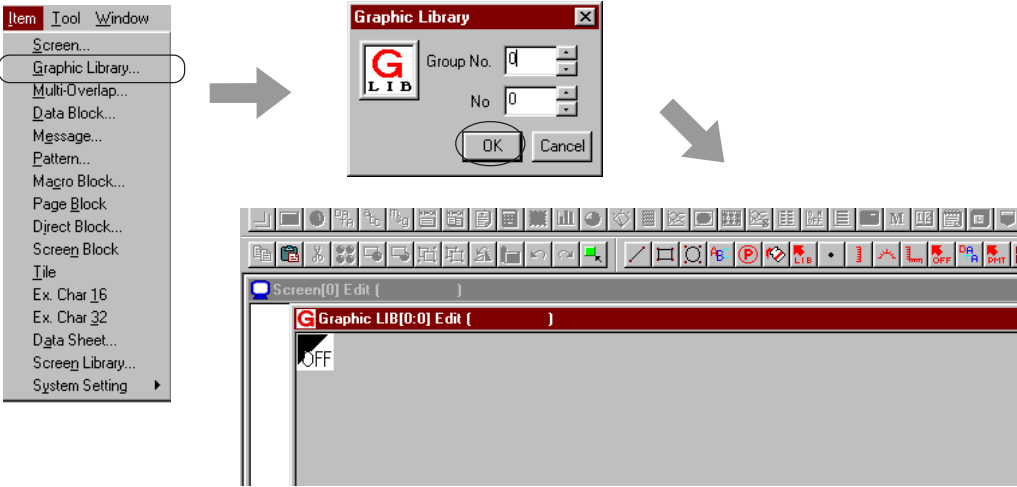
Structure of Graphic Library

The graphic library has 10 sections. Each section is called a “group” and can contain up to 256 graphics. Therefore, 10 groups x 256 = 2560 graphics can be registered.



Editing Graphic Library

Go to the [Edit] menu and click on [Graphic Library].
The [Graphic Library] dialog is displayed.
Specify [Group No.] and [Graphic No.] and click [OK].
The graphic library edit window is displayed.



Offset

Outline of offset

“Offset” is the reference position which is used for:

◎[Graphic Call]

Calls up a graphic registered in graphic library to the screen or to another graphic library.

◎Graphic mode, graphic link, etc.

Displays a graphic on screen when communicating with the PC.

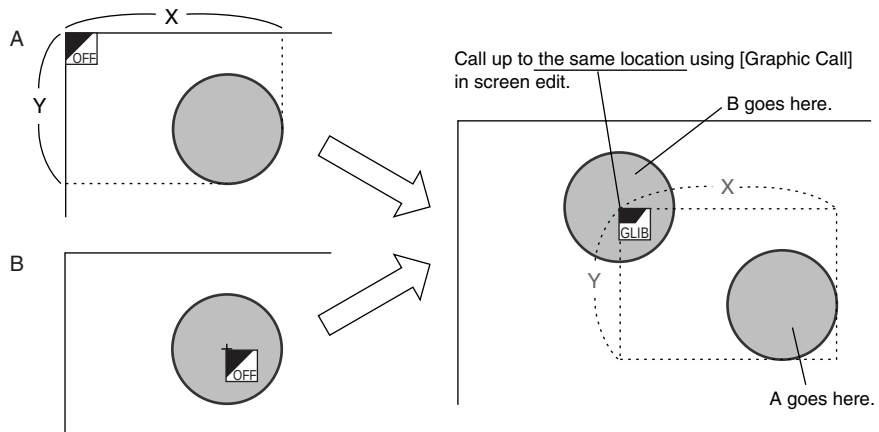
The mark that shows the offset position is displayed in the graphic library edit window.

For details on using [Graphic Call], refer to Chapter 22, “Draw Tools” on page 22-14.

<Ex.> [Graphic Call]

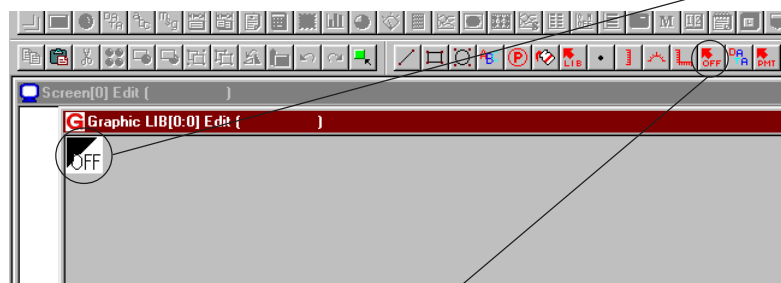
When graphics with different offset locations are called up to the same position on screen, they are displayed in different locations.

2 offset settings in graphic library.



Offset setting procedure

1. Open the graphic library edit window. The default placement for offset is (0, 0).



2. Go to the drawing tool bar and click the [Offset] icon.

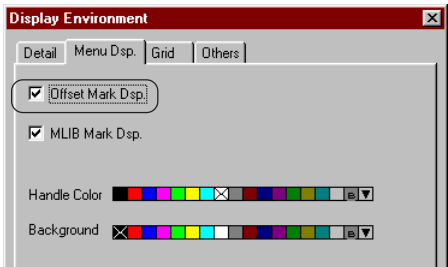
- 3. A mouse cursor like the one below is displayed. Click on the desired location.
- 4. The offset mark is displayed at that location.



If no graphic is registered, it is not possible to change the offset location. Be sure to set offset after registering a graphic.



If no offset mark is displayed on the screen, [Offset Mark Display] may be unchecked in the [Menu Display] tab window of the [Display Environment] dialog (go to the [Display] menu, and click [Display Environment Setting]). In this case, check [Offset Mark Display].

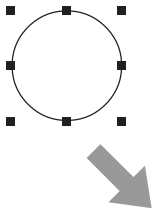


[Parameter]
Outline of Parameter

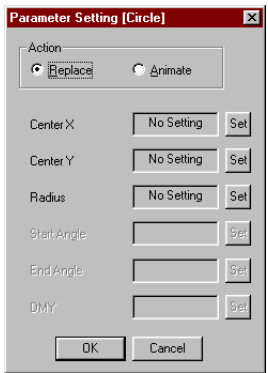
It is necessary to secure memory when moving or transforming diagrams on the screen. Additionally, it is necessary to secure data display memory when changing display values that are registered in graphic library. [Parameter] is the setting that secures this memory.

Setting Parameter

Select a graphic and then set its parameter.



- 1. Register a graphic in graphic library.
- 2. Click on a graphic to select it. (handles are shown)
- 3. Go to the drawing tool bar and click on the [Parameter] icon. The [Parameter Setting] dialog is displayed.



The [Parameter Setting] dialog's setting items vary depending on the type of graphic selected. For information about the corresponding setting items for each graphic, see page 11-19.

(Parameter Setting) Dialog

[Action]

◆ [Replace]

When changing graphics, the new one is placed over the previous one. Therefore, the previous one remains on the screen.



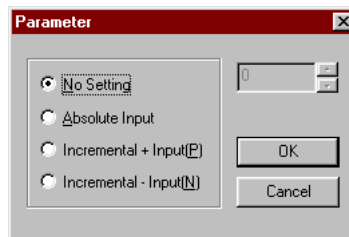
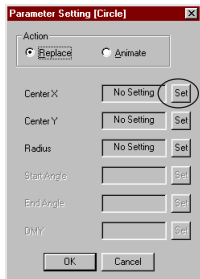
◆ [Animate]

When changing graphics, the previous one is cleared, and the new one is placed on screen. Therefore, only the new one remains on the screen.



About setting items

Setting items vary depending on the type of graphic that you chose (for details, see the next page). When you go to a setting item and click on the [Set] button, a [Parameter] dialog like the one below is displayed.



◆ [No Setting]

No memory area is allocated for parameters.

◆ [Absolute Input]

When you want to change a graphic, specify the value for change in absolute coordinates.

Absolute coordinates are (0, 0) for the top left corner of the screen, and (639, 479) for the lower right corner (or (319, 239) and (799, 599).)

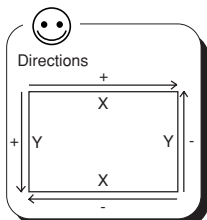
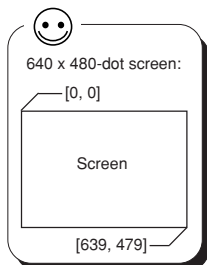
◆ [Incremental Coordinate + Input]

When this option is selected, incremental coordinates in the plus direction should be used for changing the graphic. Incremental coordinates are expressed by the distance from the reference position (0, 0) of the graphic. The graphic is moved by the incremental amount in the plus direction.

When a positive coordinate value is specified, the graphic changes in a positive direction from the reference position.

◆ [Incremental Coordinate - Input]

When this option is selected, incremental coordinates in the minus direction should be used for changing the graphic. Incremental coordinates are expressed by the distance from the reference position (0, 0) of the graphic. The graphic is moved by the incremental amount in the minus direction. When a positive coordinate value is specified, the graphic changes in a minus direction from the reference position. When a minus coordinate value is specified, the graphic changes in a positive direction from the reference position.



◆ (Parameter) No. (1-63)

The above three methods, [Absolute Input], [Incremental Coordinate + Input], and [Incremental Coordinate - Input] are all equipped with parameter numbers as auxiliary items.

Parameter numbers are used to allocate memory for changing the graphic when it is displayed.

Parameter Setting Items

Parameter setting is not available with scales, chamfered boxes (for ZM-*2) and multi-text (for ZM-*2).

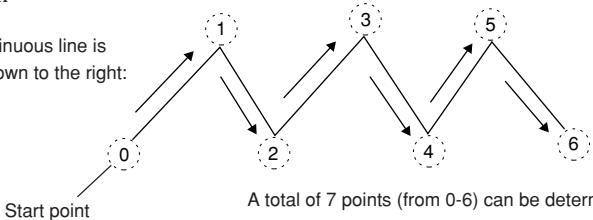
Graphic	Parameters	Ref.
Line	Start point, end point	
Continuous line	Point 0 (- n) coordinates	1)
Box	Start point, end point	
Parallelogram	Start point, PX2, PY2, PX3, PY3	2) *2
Polygon	Center coordinates, radius, start angle, number of angles	*2
Circle	Center coordinates, radius	
Arc	Center coordinates, radius, start angle, end angle	
Sector	Center coordinates, radius, start angle, end angle	
Ellipse	Center coordinates, X radius, Y radius	
Elliptical arc	Center coordinates, X radius, Y radius	
Elliptical fan	Center coordinates, X radius, Y radius	*1
Text	Start point (coordinates of the first character)	*2
Data display	Start point (bottom left coordinates of the first numeral)	*3
Pattern	Start point (top left coordinates), pattern No.	3)
Paint	Start point	4) *2
Library call	Start point, library number	
Dot	Start point	

- *1 **Elliptical fan only corresponds to the Control Terminal ZM-*2. It does not exist for the Control Terminal ZM-41/70.**
- *2 **For the Control Terminal ZM-*2, when [Action : Animate] is selected, paint is not depicted.**
For the Control Terminal ZM-41/70, [Paint] for parallelogram or polygon, [Character Type: Shadow] for text, and paint are not depicted when [Action: Animate] is selected.
- *3 **For information on data display parameters, see page 11-22.**

1) Continuous line

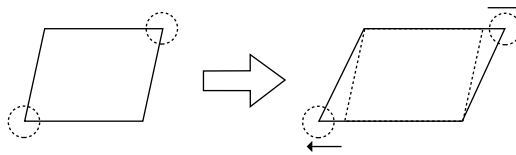
◆ Points 0 - n

When a continuous line is drawn as shown to the right:

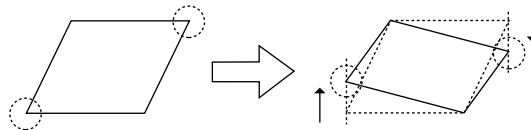


2) Parallelogram

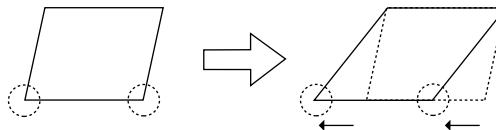
◆ PX2



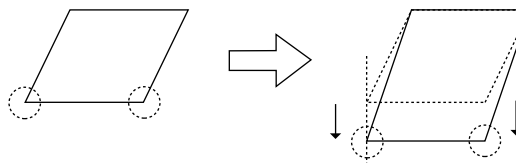
◆ PY2



◆ PX3



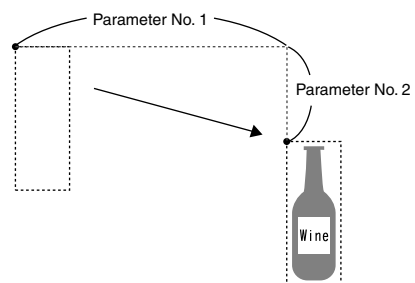
◆ PY3



3) Pattern

◆ Start point

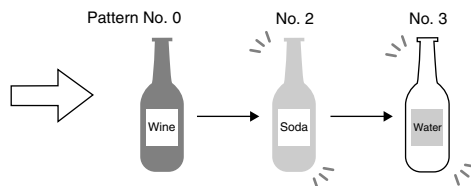
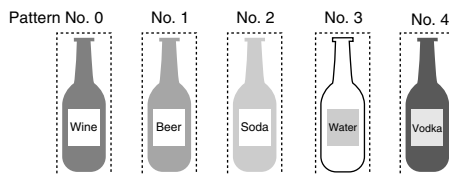
In parameter setting
[Start point X: Parameter No. 1]
[Start point Y: Parameter No. 2]



◆ (Pattern) No.

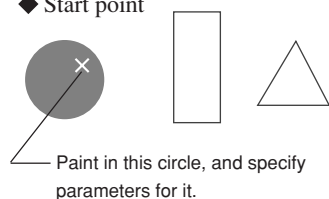
Bring up the [Parameter Setting] dialog for
pattern No. 0 and set a parameter for [No].

When the pattern number is commanded from the
parameter memory for [No], patterns are switched over.



4) Paint

◆ Start point



When the start point coordinate is altered by a
command from the parameter memory, the pattern
at the position is painted. (In this case, only REP
is available; therefore, the previous paint remains.)

Data Display

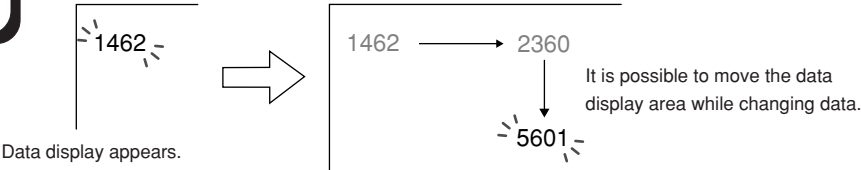
Outline of data display in the graphic library

It is possible to use data display parts in the graphic library in the same way as those on the screen.

Data display parts can be utilized in the following ways.

It is possible to display data on the screen only when necessary by using macro. For details, refer to Chapter 14, "Macro."

- ◎ Show data displays only when they are required.
- ◎ Move data displays on the screen.

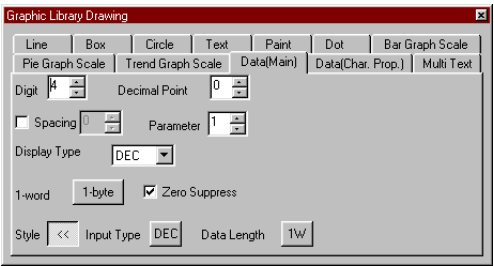


Data Display Setting Procedure

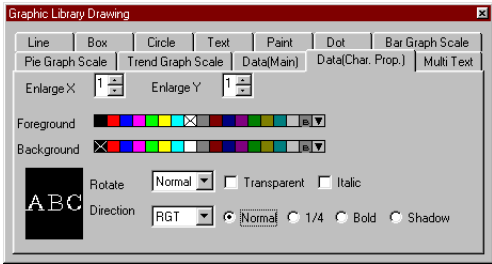
1. Open the graphic library edit window.
Go to the drawing tool bar and click on the [Data Display] icon.



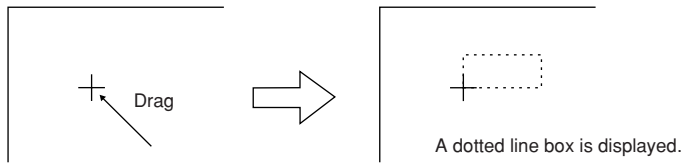
2. A [Graphic Library Drawing] dialog like the one below is displayed.
The contents of the [Data (Main)] tab window are as shown below.



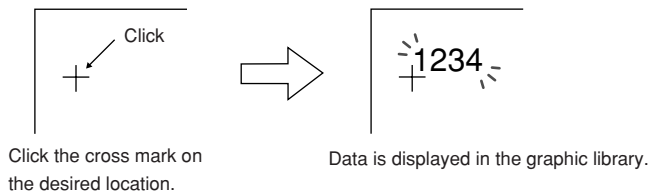
3. The contents of the [Data (Char. Prop.)] tab window are as shown below.



4. When you finish setting 2 and 3, drag the mouse on to the screen. A dotted line box is displayed.



5. Click on the desired location. The location where you click becomes the lower left corner where the data display is shown.



Parameter Setting for Data Display Parts

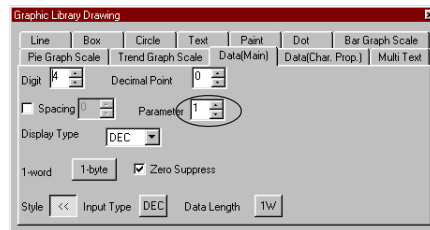
For more information on parameters, refer to pages 17-5 on.

To show the data display registered in graphic library normally, it is necessary to set [Parameter] in two locations.

○[Data (Main)] tab window

Set a value for [Parameter]. This number indicates the order of addresses when memory was allocated to data display values.

In this case, "memory" refers to that specified for graphic mode or graphic relay mode.

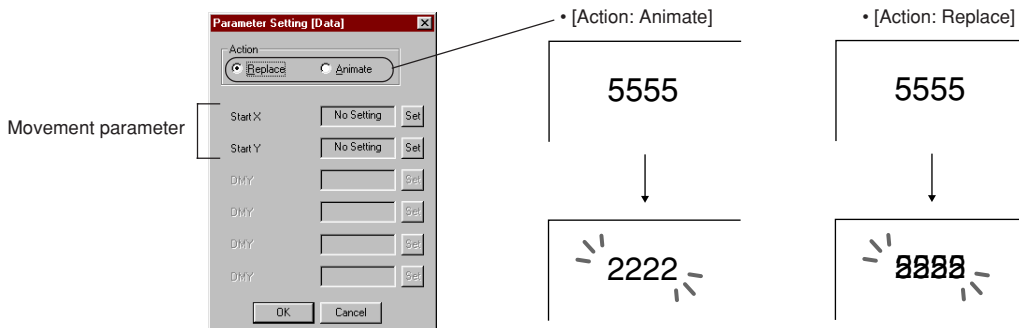


○[Parameter Setting] Dialog

You must set [Action] as [Animate]. Additionally, parameters used for moving data display are secured here.



When you select [Replace] and the value is changed, the previous data is preserved and the new data is saved.



Graphic Colors

Classification of Display Modes

When graphics are displayed on the screen, there are two types of display modes: XOR and REP.

- ◆ XOR Graphic colors are XORed with the colors of the base screen.
- ◆ REP Original graphic colors are shown.

This is determined by the settings for the mode or parameters. Refer to the following tables.

<Graphic mode>		In graphic library editing:		
In screen editing:	Graphic registration	No parameters	With parameters Action: animate	With parameters Action: replace
	Graphic mode			
	Command: internal	REP	_____	_____
	Command: external	REP	XOR	REP

<Graphic relay mode>		In graphic library editing:		
In screen editing:	Graphic registration	No parameters	With parameters Action: animate	With parameters Action: replace
	Graphic mode			
	Type: 1-graphic	XOR	XOR	XOR
	Type: 2-graphic			
Mode: XOR		XOR	XOR	XOR
Mode: REP		REP	XOR	REP

 **For the Contrl Terminal ZM-*2, when the graphics to be displayed are [Paint] graphics, they cannot be displayed in XOR colors.**

 **For the Control Terminal ZM-41/70, when the graphics to be displayed are [Parallelogram, Paint], [Polygon, Paint], [Text, Type: Shadow], or [Paint], they cannot be displayed in XOR colors.**

XOR Colors

When graphic colors are XORed with the colors of the base screen, the following colors take effect:

Graphic color (in case of 16 colors)

Color on the base screen (in case of 16 colors)		Bla	Blu	R	Mag	Gre	C	Y	W	Gra	NB	Mah	Mar	PG	SB	Ca	SC
	Bla	Bla	Blu	R	Mag	Gre	C	Y	W	Gra	NB	Mah	Mar	PG	SB	Ca	SC
	Blu	Blu	Bla	Mag	R	C	Gre	W	Y	NB	Gra	Mar	Mah	SB	PG	SC	Ca
	R	R	Mag	Bla	Blu	Y	W	Gre	C	Mah	Mar	Gra	NB	Ca	SC	PG	SB
	Mag	Mag	R	Blu	Bla	W	Y	C	Gre	Mar	Mah	NB	Gra	SC	Ca	SB	PG
	Gre	Gre	C	Y	W	Bla	Blu	R	Mag	PG	SB	Ca	SC	Gra	NB	Mah	Mar
	C	C	Gre	W	Y	Blu	Bla	Mag	R	SB	PG	SC	Ca	NB	Gra	Mar	Mah
	Y	Y	W	Gre	C	R	Mag	Bla	Blu	Ca	SC	PG	SB	Mah	Mar	Gra	NB
	W	W	Y	C	Gre	Mag	R	Blu	Bla	SC	Ca	SB	PG	Mar	Mah	NB	Gra
	Gra	Gra	NB	Mah	Mar	PG	SB	Ca	SC	Bla	Blu	R	Mag	Gre	C	Y	W
	NB	NB	Gra	Mar	Mah	SB	PG	SC	Ca	Blu	Bla	Mag	R	C	Gre	W	Y
	Mah	Mah	Mar	Gra	NB	Ca	SC	PG	SB	R	Mag	Bla	Blu	Y	W	Gre	C
	Mar	Mar	Mah	NB	Gra	SC	Ca	SB	PG	Mag	R	Blu	Bla	W	Y	C	Gre
	PG	PG	SB	Ca	SC	Gra	NB	Mah	Mar	Gre	C	Y	W	Bla	Blu	R	Mag
	SB	SB	PG	SC	Ca	NB	Gra	Mar	Mah	C	Gre	W	Y	Blu	Bla	Mag	R
	Ca	Ca	SC	PG	SB	Mah	Mar	Gra	NB	Y	W	Gre	C	R	Mag	Bla	Blu
	SC	SC	Ca	SB	P	Mar	Mah	NB	Gra	W	Y	C	Gre	Mag	R	Blu	Bla

Bla: black Blu: blue R: red Mag: magenta Gre: green C: cyan Y: yellow W: white
Gra: gray NB: navy blue Mah: mahogany Mar: maroon PG: pine green SB: slate blue Ca: camel SC: silver-color



XOR Operation

ZM-41/70 uses the following 16 colors. Each color has its identification code as given below:

Color	Code	Color	Code
Black	0000	Gray	1000
Blue	0001	Navy blue	1001
Red	0010	Mahogany	1010
Magenta	0011	Maroon	1011
Green	0100	Pine green	1100
Cyan	0101	Slate blue	1101
Yellow	0110	Camel	1110
White	0111	Silver-color	1111

"A color is XORed with another color" means that each number of color codes are XORed.

* **This concept is exactly the same for 128 colors of the Control Terminal ZM-*2. (However, they are not listed on this chart.)**

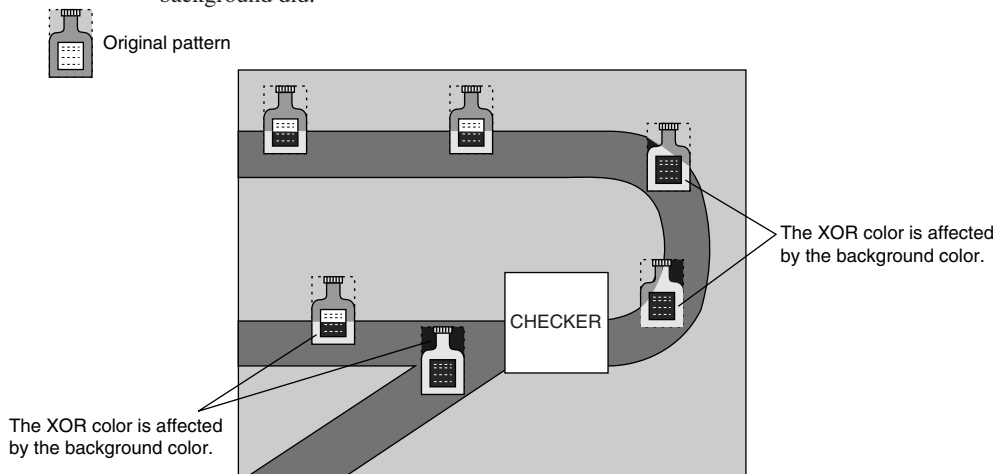


For the Control Terminal ZM-*2, there is a method to display colors in the same hue that you created them in (not XORed) even though you are displaying in XOR. (In the case of transparent color patterns.) For details, see the next page.

Canceling the XOR Display (ZM-*2 Function)

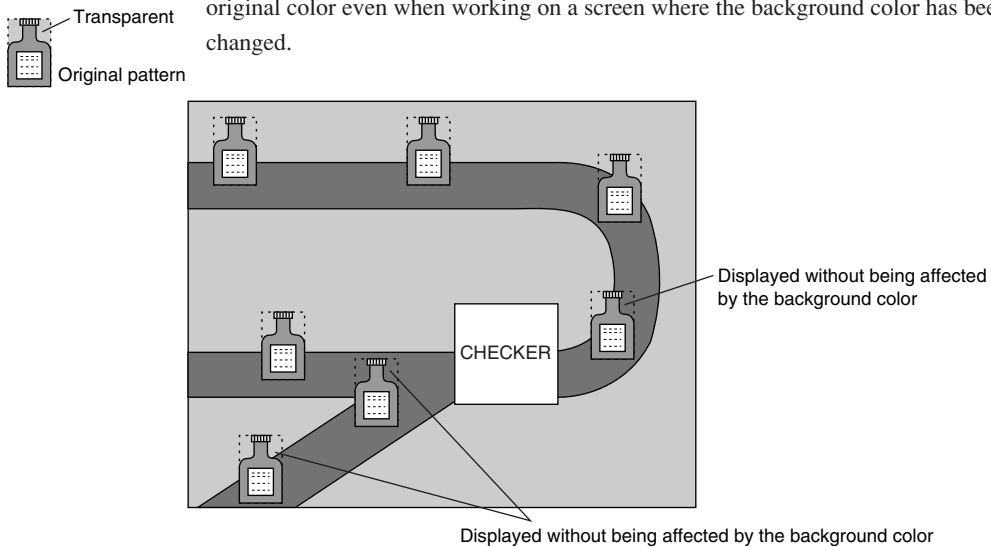
Normally, because things like [Animate] that took place on the graphic display were all XORed, it was impossible to display colors on the screen in the same colors that you initially created them in (when the colors were other than black).

Additionally, because the XOR color was affected by the base color, when animation was performed on multiple background colors, the color changed whenever the background did.



For the ControlTerminal ZM-*2, as a result of an improvement made in the [XOR display], a new transparent pattern function has been added so that colors can be displayed just as they were originally created.

When you set a transparent pattern for a graphic, it is possible to move graphics in the original color even when working on a screen where the background color has been changed.



This function must use the pattern ([With Transparent] checked).

The necessary settings are as follows:

◎Pattern edit

Registration of a transparent pattern.

◎Graphic library edit

Set pattern location and parameters.

◎Screen edit

The modes when display and animation are active for transparent patterns are as shown below:

- Graphic Mode

When set as [Command: External].

- Graphic Relay Mode

Set [Mode: XOR] as [Type: 1-graphic] or [Type: 2-graphic].

In Pattern Edit



You must make a setting in the [Transparent] dialog.

For information on pattern edit and registration, refer to Chapter 22, “Draw Tools” on page 22-20.

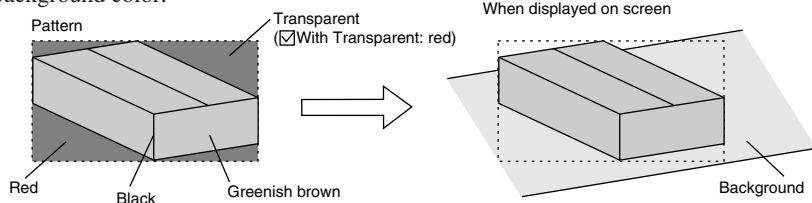
Transparent



Only one “transparent” color can be used for a single pattern. It is not possible to use multiple “transparent” colors in one pattern.

“Transparent” means that when a pattern is placed on the screen, locations not necessary for display are hidden so that the pattern can be displayed in the actual registered rectangle size.

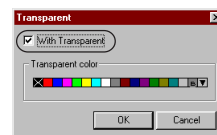
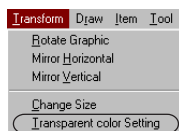
For example, for a pattern like the one below, the perimeter color is set as “transparent.” Consequently, when this pattern is displayed on the screen, the perimeter is transparent, and what is actually displayed in the perimeter is the background color.



If this pattern is used, dots other than those set as “transparent” will be displayed in the same color that they were registered in, regardless of whether the background changes.

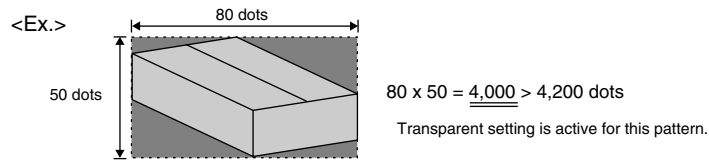


To determine whether or not a pattern previously registered includes a transparent setting, go to the [Transform] menu on the pattern edit window and click on [Transparent Color Setting]. If there is a check mark in [With Transparent] of the [Transparent] dialog, the pattern has been set as “transparent.”



Pattern Size

Transparent setting for a pattern is only active when the pattern size does not exceed 4,088 dots. If this size is exceeded, it is automatically rendered inactive and the registered color of the pattern is XORed with the background before it is displayed.



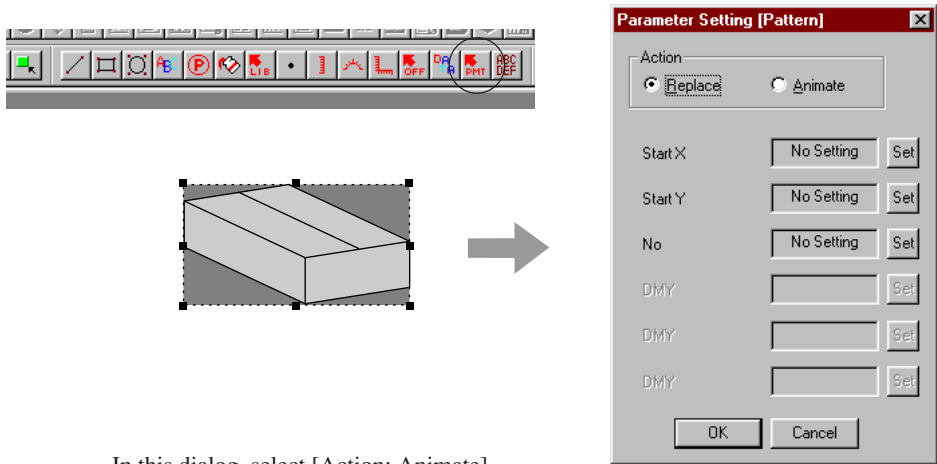
It is possible to display a maximum of 64 patterns ([With Transparent] checked) on one screen (however, this must fall within the usage limit of 256KB). If this limit is exceeded, transparent setting is automatically rendered inactive and the registered color of the pattern is XORed with the background before it is displayed.

In Graphic Library Edit

Register the created pattern in graphic library edit.

Parameter Setting

When moving a transparent pattern (Action: Animate), you must make [Parameter] settings in the graphic library. Select the pattern placed in graphic library and click on the [Parameter] icon. The [Parameter Setting [Pattern]] dialog is displayed.



In this dialog, select [Action: Animate].

If you are not going to move transparent patterns, the default [Action: Replace] is acceptable.

11
Canceling the XOR Display (ZM-*2 Function)

In Screen Edit

Use either the graphic mode or the graphic relay mode.



It is possible to display a maximum of 64 transparent patterns on one screen (however, this must fall within the usage limit of 256KB). If this limit is exceeded, transparent setting is automatically rendered inactive and the registered color of the pattern is XORed with the background before it is displayed.

Graphic Mode

You must set [Command: External] in the [Graphic] dialog.

When you want to change and display several types of graphics, it is recommended that you place display area parts.

Graphic Relay Mode

Perform the following settings for graphic relay mode.

◆ Set [Type: 1-graphic]

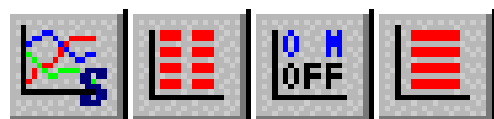
Depending on whether the transparent pattern is displayed, it is possible for the display that is usually XORed to be displayed in its registered color.

◆ Set [Type: 2-graphic], [Mode: XOR]

It is necessary to set [Type: 2-graphic] when changing between two types of graphics. In this case, be sure to set [XOR], not [Mode: REP].



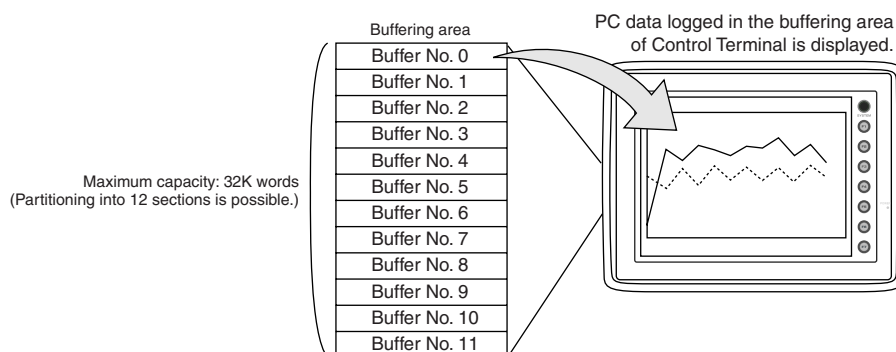
If you set a transparent pattern to be displayed in [REP], there is a possibility that it will not be displayed normally.



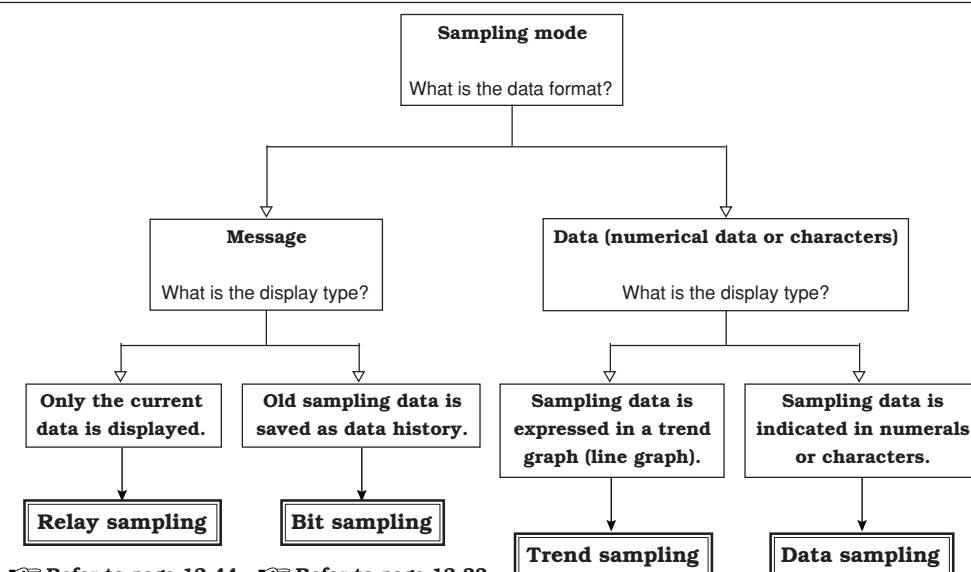
Sampling Mode

Outline of Sampling Mode

The Contrl Terminal ZM series incorporates a buffering area. During communication, data received from the PC memory can be logged in the buffering area, and be displayed using sampling mode explained in this chapter.



Sampling Mode Types



☞ Refer to page 12-44. ☞ Refer to page 12-33.

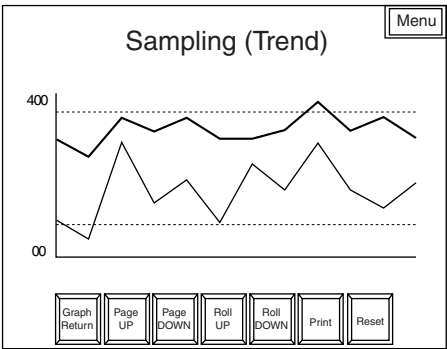
☞ Refer to page 12-10. ☞ Refer to page 12-21.

There are four display types in sampling mode.

◎Trend sampling

Sampling data is expressed in a trend graph (line graph).

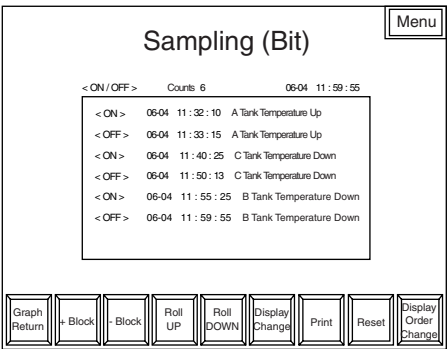
(Refer to pages 12-10 and beyond.)



◎Bit sampling

ON/OFF edges of bits are indicated with messages.

(Refer to pages 12-33 and beyond.)



◎Data sampling

Sampling data is indicated in numerals or characters.

(Refer to pages 12-21 and beyond.)

The display shows a table titled "Sampling (Data)". The table has 8 columns labeled No. 1 through No. 8. The data is as follows:

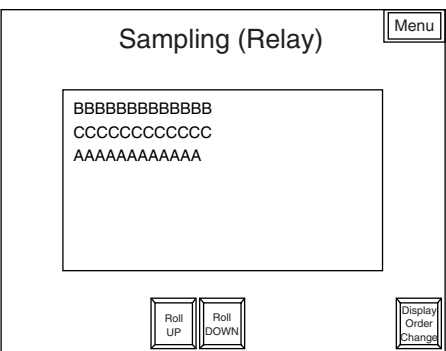
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
102	150	191	250	303	408	515	787
111	156	196	255	310	410	526	712
108	159	199	254	311	412	533	742
106	145	198	253	312	411	555	798
113	148	188	252	313	407	548	742
111	140	180	251	314	406	521	739
115	153	193	248	315	411	569	746
113	142	183	253	313	403	577	786
118	158	198	248	313	418	598	741

A "Menu" button is in the top right corner. Below the table is a row of buttons: Graph Return, + Block, - Block, Roll UP, Roll DOWN, Print, and Reset.

◎Relay sampling

Activation of bits is indicated by messages in the order of occurrence.

(Refer to pages 12-44 and beyond.)



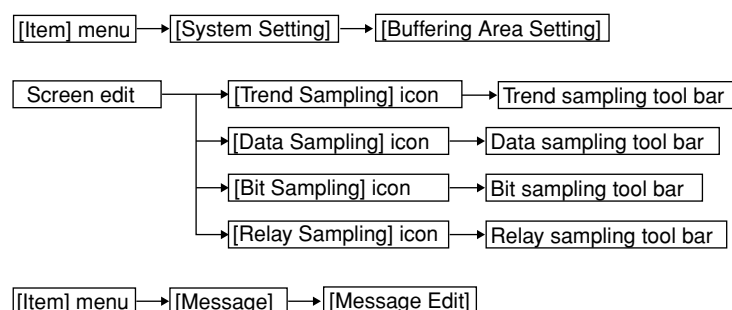
Setting Outline of Sampling Mode

Sampling mode is set using two or three steps.

- ◎ Set the buffering area by selecting [Buffering Area Setting] from [System Setting].
- ◎ Set of the sampling mode (dialog, display area, switches) in screen editing.

(For bit sampling or relay sampling)

- ◎ Register messages in message editing.



Buffering Area Setting

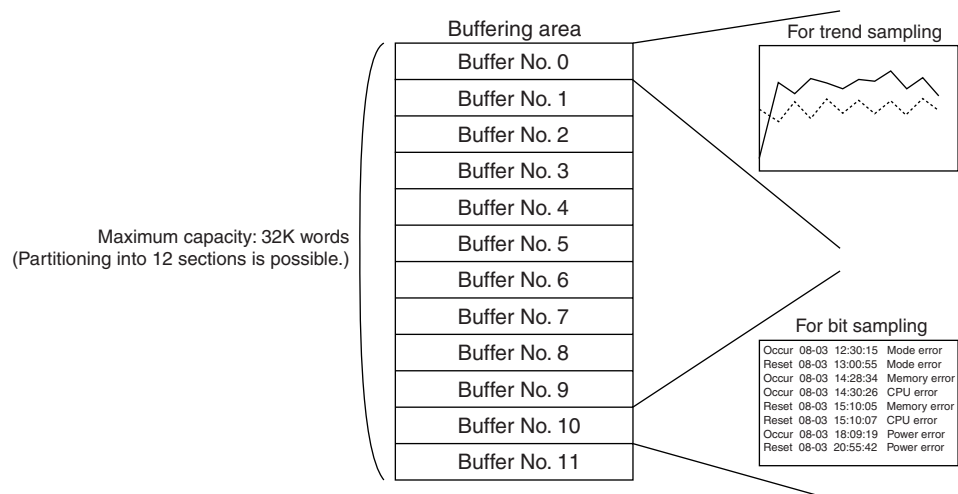
The buffering area for storing data from the PC memory must be set in advance for using sampling mode.

Buffering Area Composition

- ◎ The maximum capacity of the buffering area is 32K words.
- ◎ The buffering area can be partitioned into 12 sections (buffers).

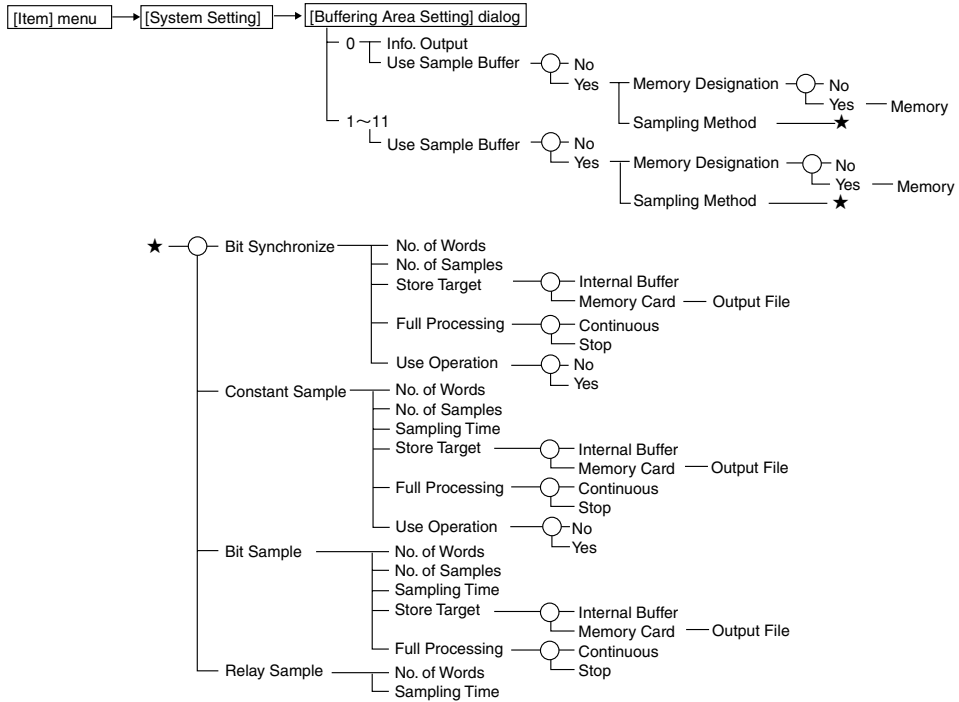
Buffers in the buffering area can store data sampled in different methods.

Size: Maximum 32K words (Partitioning into 12 buffers is possible.)



Buffering Area Setting Procedure

Select [System Setting] from the [Item] menu, and click [Buffering Area Setting]. The [Buffering Area Setting] dialog is displayed.



[Buffering Area Setting] Dialog

[Info. Output] (PC Memory, Internal Memory, Memory Card)

Buffer data is stored in the specified memory address.

When using buffer Nos. 0 - 3, only one word is allocated.

When using buffer Nos. 4 - 7, two words are allocated.

When using buffer Nos. 8 - 11, three words are allocated.

The following explains the contents of the information output memory address “n.”

Info. Output Memory		Contents	
n		Sampling buffer data Nos. 0 to 3	
n + 1		Sampling buffer data Nos. 4 to 7	
n + 2		Sampling buffer data Nos. 8 to 11	

MSB																LSB			
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00				
F1	F0	D	T	F1	F0	D	T	F1	F0	D	T	F1	F0	D	T				
n				Buffer No. 3				Buffer No. 2				Buffer No. 1				Buffer No. 0			
n + 1				Buffer No. 7				Buffer No. 6				Buffer No. 5				Buffer No. 4			
n + 2				Buffer No. 11				Buffer No. 10				Buffer No. 9				Buffer No. 8			

T: Input trigger is output.

D: Specified buffer contains data.

F0: Specified buffer is 90% full.

F1: Specified buffer is full.

[Use Sample Buffer]

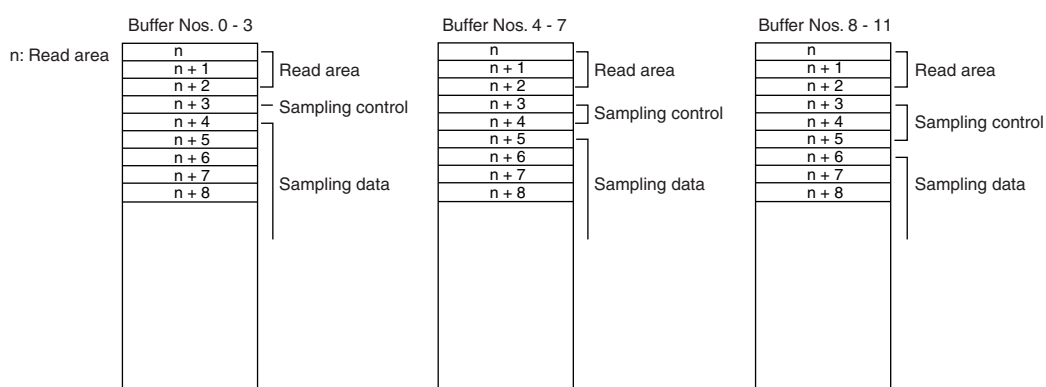
When the [Use Sample Buffer] option is checked, the following options become active. When the buffering area is not used, uncheck the option. The active options are explained below.

[Memory Designation]

When this option is checked, the memory address for sampling can be specified. Data in this memory address is sampled.

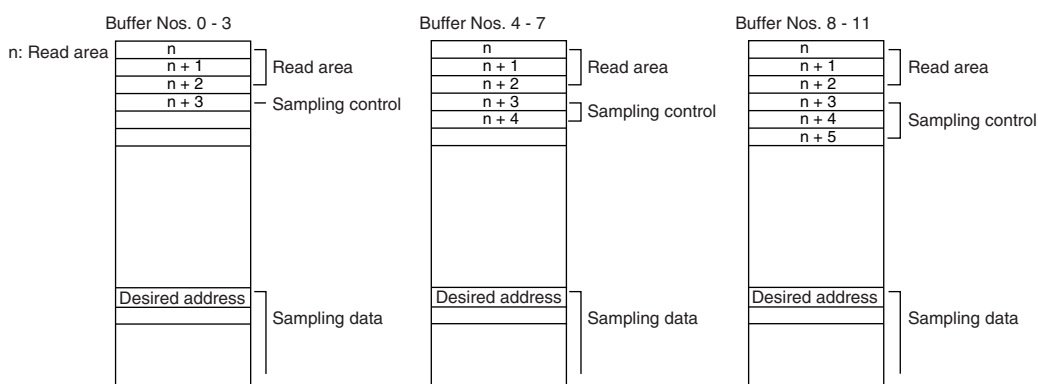
◆ When [Memory Designation] is unchecked:

Sampling memory addresses are allocated following the sampling control memory.



◆ When [Memory Designation] is checked:

Desired sampling memory addresses can be specified.





Sampling control memory

Sampling control memory is automatically allocated for a maximum of 3 memory words following the read area memory “n + 3” (specified in the [Comm. Parameter] dialog from [System Setting] in the [Item] menu) by checking the [Use Sample Buffer] option in the [Buffering Area Setting] dialog.

MSB																LSB	
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
0	0	R	T	0	0	R	T	0	0	R	T	0	0	R	T		
Sampling control memory																	
= Read area n + 3				Buffer No. 3				Buffer No. 2				Buffer No. 1				Buffer No. 0	
n + 4				Buffer No. 7				Buffer No. 6				Buffer No. 5				Buffer No. 4	
n + 5				Buffer No. 11				Buffer No. 10				Buffer No. 9				Buffer No. 8	

Notes

In this control memory, specify [0] for all bits not in use.

R: Reset

When this bit is set (1), the buffering area is cleared and no sampling occurs. When this bit is reset (0), sampling is started. (This is not so in relay sampling.)

T: Trigger

This is effective only when [Bit Synchronize] is selected. Data is sampled at the edge of [0 -> 1].

*** The number of words to be allocated depends on the number of buffers. (Refer to “[Memory Designation]” on the previous page.)**
When no buffering area is used, memory addresses from “n + 3” can be used for other purposes.

[Sampling Method]

The following four sampling methods are available. Data is sampled in the selected method, and can be displayed in the corresponding sampling mode.

Sampling method	Applicable sampling mode
Bit Synchronize	Data sampling
Constant Sampling	Trend sampling
Bit Sampling	Bit sampling
Relay Sampling	Relay sampling

◆ Bit Synchronize

Data is sampled at the edge of 0 -> 1 of bits (specified as “T: trigger”) in the sampling control memory.

Applicable sampling mode: data/trend sampling

MSB																LSB	
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
0	0	R	T	0	0	R	T	0	0	R	T	0	0	R	T		
Sampling control memory																	
= Read area n + 3				Buffer No. 3				Buffer No. 2				Buffer No. 1				Buffer No. 0	
n + 4				Buffer No. 7				Buffer No. 6				Buffer No. 5				Buffer No. 4	
n + 5				Buffer No. 11				Buffer No. 10				Buffer No. 9				Buffer No. 8	

ON/OFF edge of corresponding bits ☐ of each buffer

◆ Constant Sample

Data is sampled at the specified intervals.

Applicable sampling mode: data/trend sampling

◆ Bit Sample

Data is sampled at the edge of 0 -> 1 of each bit.

Applicable sampling mode: bit sampling

◆ Relay Sample

Data is sampled in the order of bit activations. When a bit is reset (OFF), data is removed from the buffering area. In the buffering area, data of the ON bits are stored in order of occurrence.

Applicable sampling mode: relay sampling



Specify "No. of Samples" as the number larger than the Y size of the display area in sampling mode. Otherwise, the linked switches (Roll-Up, Reset, etc.) will be ineffective.

[No. of Words] (Up to 32K words available)

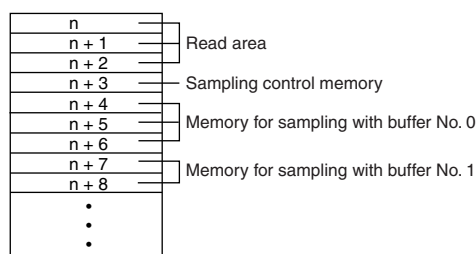
Specify the number of words to be sampled.

As many addresses as there are specified words must be allocated.

When [Bit Sample] or [Relay Sample] is chosen for [Sampling Method], one word corresponds to 16 bits.

<Memory allocation example>

Buffer No. 0	Buffer No. 1
Memory Designation: unchecked	Memory Designation: unchecked
No. of Words: 3	No. of Words: 2



[Sampling Time] (0 ~ 65,535 seconds)

Specify the desired interval between samplings (except for "Bit Synchronize").

When "0" is specified for [Sampling Time], sampling is made at every cycle.

[No. of Samples]

Specify the number of samplings (except for relay sampling).

[Store Target]

Specify an address for storing sampled data (except for relay sampling).

◆ Internal Buffer (Maximum capacity: 32K words)

Sampled data is stored in the buffering area within the Control Terminal ZM series, and is cleared when the system is turned off.

◆ Memory Card

If optional memory cards are used, this option is available. Even when the system is turned off, the sampled data is stored in the memory card.

When [Memory Card] is chosen, the [Output File] option becomes active.

Specify the desired file number.



Memory cards are optional.

[Full Processing]

This option determines what happens when the specified number of samplings has been exceeded (except for relay sampling).

◆ Stop

Sampling stops when the specified number of samplings has been exceeded.

◆ Continuous

Sampling continues while discarding old sampling data when the specified number has been exceeded.

[Use Operation]

This option is used for bit synchronizing or constant sampling.

When the mean or total value of data stored in the buffering area should be indicated on the screen, check this option. For more information, refer to pages 12-17 and 12-30.

Notes

Sampling at extremely short intervals ("0," "1," etc. is specified for [Sampling Time]) increases the number of PLC data reading times. In such a case, the Control Terminal ZM series will be slow in processing depending on screen data. To avoid a problem like this, it is recommended that the [Memory Designation] option be unchecked (refer to page 12-5).

Buffering Area Capacity

The maximum buffer capacity is 32K words.

Depending on the sampling method, buffering area size calculation varies as below:

◆ Bit Synchronize

1 sampling = Specified number of words + 2 words

Buffer size = Number of samples x 1 sampling

◆ Constant Sample

1 sampling = Specified number of words + 2 words

Buffer size = Number of samples x 1 sampling

◆ Bit Sample

1 sampling = 3 words

Buffer size = Number of samples x 1 sampling

◆ Relay Sample

Buffer size = Number of words x 16 x 3 words

Setting Examples of Buffering Area

Set up buffers as given below:

Buffer No. 0

Information output memory : D500
 Use sample buffer : checked
 Memory designation : unchecked
 Sampling method : Bit sample
 No. of words : 2
 Sampling time : 0 sec.
 No. of samples : 1000
 Store target : Internal buffer
 Full processing : Continuous

Buffer No. 2

Use sample buffer : unchecked

Buffer No. 3

Use sample buffer : checked
 Memory designation : unchecked
 Sampling method : Constant sample
 No. of words : 8
 Sampling time : 1 sec.
 No. of samples : 1500
 Store target : Internal buffer
 Full processing : Continuous
 Use operation : unchecked

Buffer No. 1

Use sample buffer : checked
 Memory designation : unchecked
 Sampling method : Relay sample
 No. of words : 3
 Sampling time : 0 sec.

Buffer No. 4

Use sample buffer : checked
 Memory designation : unchecked
 Sampling method : Bit synchronize
 No. of words : 4
 No. of samples : 500
 Store target : Internal buffer
 Full processing : Continuous
 Use operation : unchecked

Memory addresses are allocated as shown below:

Sampling control

Sampling control

Buffer No. 0	Data 0 (bit 0 ~ 15)
	Data 1 (bit 6 ~ 31)
Buffer No. 1	Data 0 (bit 0 ~ 15)
	Data 1 (bit 6 ~ 31)
	Data 2 (bit 32 ~ 47)
Buffer No. 3	Data 0
	Data 1
	Data 2
	Data 3
	Data 4
	Data 5
	Data 6
	Data 7
Buffer No. 4	Data 0
	Data 1
	Data 2
	Data 3



Buffer sizes used are shown below:

Buffer No. 0 = $1000 \times 3 = 3000$

Buffer No. 1 = $3 \times 16 \times 3 = 144$

Buffer No. 3 = $1500 \times (8 + 2) = 15000$

Buffer No. 4 = $500 \times (4 + 2) = 3000$

In this example, the total use is 21,144 words.



Trend Sampling



The trend graph function can also be used for expressing data in a line graph.

Outline of Trend Sampling

- ◎ Data stored in the specified buffer is expressed in a trend graph (line graph).
- ◎ Unless the user clears the buffering area, the Control Terminal ZM series stores sampled data and can display them any time. Renewed data is also reflected in real time.
- ◎ A maximum of 16 lines can be displayed in a trend graph.

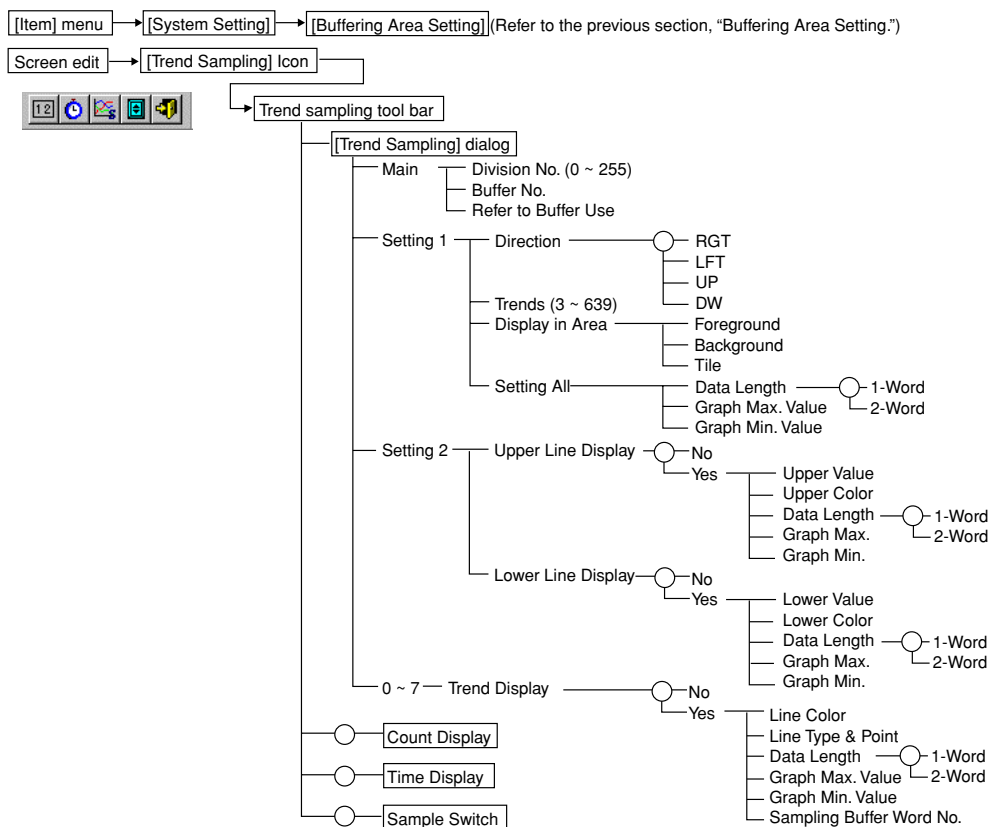


In the case of the ZM-41/70, a maximum of 8 lines can be displayed in a trend graph.

Trend Sampling Setting Procedure

The [Buffering Area Setting] dialog and the options from the [Trend Sampling] icon must be set to use trend sampling.

Click the [Trend Sampling] icon in the tool bar. The trend sampling tool bar is displayed. Set trend sampling by clicking the respective icons.



[Trend Sampling] Dialog

Click the [Trend Sampling] icon in the trend sampling tool bar. The [Trend Sampling] dialog is displayed. Set the dialog and place the trend sampling part on the screen. When bringing up the dialog for the part after its placement on the screen, double-click the part. The dialog is displayed.

(Main) Tab Window

[Division No.]

- ◎ The division number that is used when the trend sampling part is placed on the screen is automatically entered.
- ◎ Only one trend sampling mode can be set in one division. It is not possible to place it in a division where a part with a number limit has already been placed.
- ◎ When creating switches or data display parts linked with trend sampling, they must be placed in the same division.

[Buffer No.]

Specify the desired buffer number. The memory address specifying the data for sampling depends on this buffer number.

[Refer to Buffer Use]

Clicking this option brings up the [Buffering Area Setting] dialog for the buffer number specified for [Buffer No.]. The set data can be rechecked or modified.

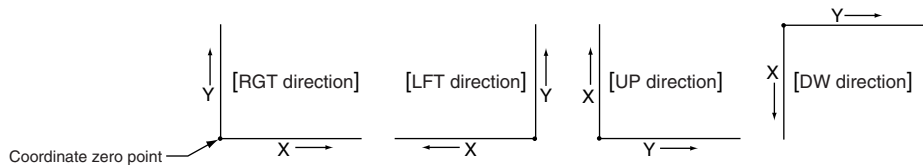
*** For trend sampling, check that [Bit Synchronize] or [Constant Sample] is chosen for [Sampling Method].**

After setting or confirming the [Buffering Area Setting] dialog, click [OK] or [Cancel]. The [Trend Sampling] dialog is displayed again.

(Setting 1) Tab Window

[Direction]

Choose the desired direction for drawing the trend lines from [RGT], [LFT], [UP], and [DW].



[Trends]

Specify the desired maximum number of plot points.

Setting range depends on the models of the Control Terminal ZM series.



For 320 x 240 dots: 3 to 319

For 640 x 480 dots: 3 to 639

For 800 x 600 dots: 3 to 799

*** Do not specify a value larger than the X size (dots) of the selected trend sampling part. Trend lines will not be drawn correctly.**

[Display in Area] (Foreground, Background, Tile)

For the inside of the trend sampling area, choose the desired foreground and background colors and tile pattern. The [Background] option becomes active when a tile pattern 1 to 15 is chosen.

[Setting All]

When setting the same data for [Data Length], [Graph Max. Value] and [Graph Min. Value] of trend line Nos. 0 to 15 (Nos. 0 to 7 for the ZM-41/70), it is convenient to use this function. The trend line numbers of [Trend Display] boxes which are checked in respective tab windows can be set in a batch.

**[Setting All] setting procedure**

1. Click the tabs of [0] to [15], and check the [Trend Display] box.
2. Open the [Setting 1] tab window. Check [Setting]. The [Setting All] dialog is displayed.

[Data Length]

Choose either [1-Word] or [2-Word].

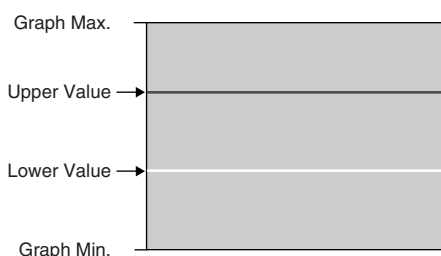
[Graph Max. Value] [Graph Min. Value]

Specify the maximum and minimum value for data calculation. For more information, refer to page 12-14.

3. Set the above options.
4. Click [OK]. The specified [Data Length], [Graph Max. Value], and [Graph Min. Value] are used for the selected trend line Nos. 0 to 15.

(Setting 2) Tab Window

Set the options for drawing subsidiary lines.



[Upper Line Display] [Lower Line Display]

- ⊙ It is possible to draw two lines for reference in the trend sampling area.
- ⊙ If you want to draw only one line, check the [Upper Line Display] or [Lower Line Display] box. If you want to draw two lines, check both boxes.
- ⊙ When the box is checked, the following options become active.

[Upper Value] [Lower Value] (PC Memory, Internal Memory, Memory Card, Constant)

Determine the position of the line.

[Upper Color] [Lower Color]

Choose the desired line color for the line.

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory address of the line.

[Graph Max.] [Graph Min.] (PC Memory, Internal Memory, Memory Card, Constant)

Scales can be attached for reference of drawing the upper and lower lines. A negative value can be specified.

Notes

If data is transferred to the Control Terminal while the same value is set for [Graph Max.] and [Graph Min.], an error arises.

(0) to (15) Tab Windows

These tab windows include options for setting up drawing properties and memory addresses.

[Trend Display]

In the tab window of the trend line to be displayed, check [Trend Display] box.
When this box is checked, the following options become active.

[Line Color]

Choose the color of trend lines.

[Line Type & Point]

Choose either a solid line or a dotted line. In the case of a solid line, choose from 6 options; in the case of a dotted line, choose from 4 options.

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory.

Notes

If data is transferred to the Control Terminal while the same value is set for [Graph Max. Value] and [Graph Min. Value], an error arises.

[Graph Max. Value] [Graph Min. Value]

(ZM-*2: PC, Internal, Constant, Memory Card ZM-41/70: Constant only)

Specify the maximum and minimum values for data calculation.

- * When specifying [Graph Max. Value]/[Graph Min. Value] as memory (except [Constant]), the graph max./min. values is reflected at the same time when the graph is displayed or the macro command [TREND_REFRESH] is executed.

For more information on the [TREND_REFRESH] command, refer to page 14-12.

[Sample Buffer Word No.]

In regard to the words entered for [No. of Words] in the [Buffering Area Setting] dialog, specify the word address to be referred to for displaying sampled data.

<Ex.>

“8” is specified for [No. of Words] in the [Buffering Area Setting] dialog.

When you want to sample data of the 3rd word in the buffering area, specify “2” for [Sample Buffer Word No.].

• Data length: 1-word

	Address
1st word	0
2nd word	1
3rd word	2
4th word	3
5th word	4
6th word	5
7th word	6
8th word	7

• Data length: 2-word

	Address
1st word	0
2nd word	
3rd word	2
4th word	
5th word	4
6th word	
7th word	6
8th word	

In this example, the same address should be specified for either data length.

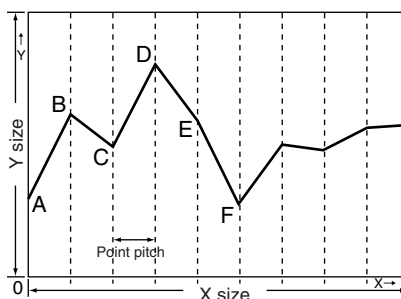
Trend Sampling Area and Plot Points

The Cnontrol Terminal ZM series calculates the size of the point pitches for drawing a trend graph as follows:



$$\text{Point pitch (dots)} = \text{X size (dots)} / (\text{Trends} - 1)$$

(The minimum point pitch is 1 dot.)



<Ex. 1>

Suppose that the X size of the trend sampling area is “270 (dots)” and [Trends] is “10”:

$$270 \text{ (dots)} / (10 - 1) = 30$$

The point pitch is “30.”



When the size of the trend graph part is adjusted after setting of [Trends], the adjustment is performed so that there is no remainder.

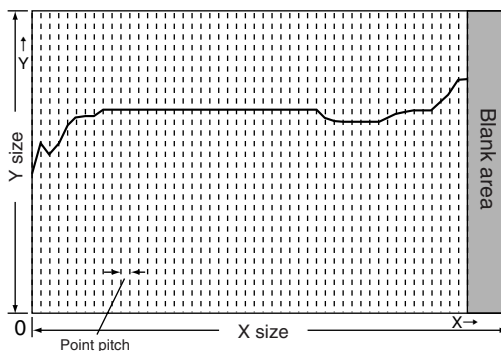
If the value for [Trends] is changed after the trend graph part is placed and changed in size, there may be a remainder. The dots of the remainder will be specified as the blank area.

<Ex. 2>

Suppose that the X size of the trend sampling area is “278 (dots)” and [Trends] is “50”:

$$278 \text{ (dots)} / (50 - 1) = 5 \text{ with a remainder of } 33$$

The point pitch is “5,” and the remainder “33” is the X size of the blank area.



The X size of a trend sampling area can be checked easily by selecting [Item List] from the [Tool] menu.

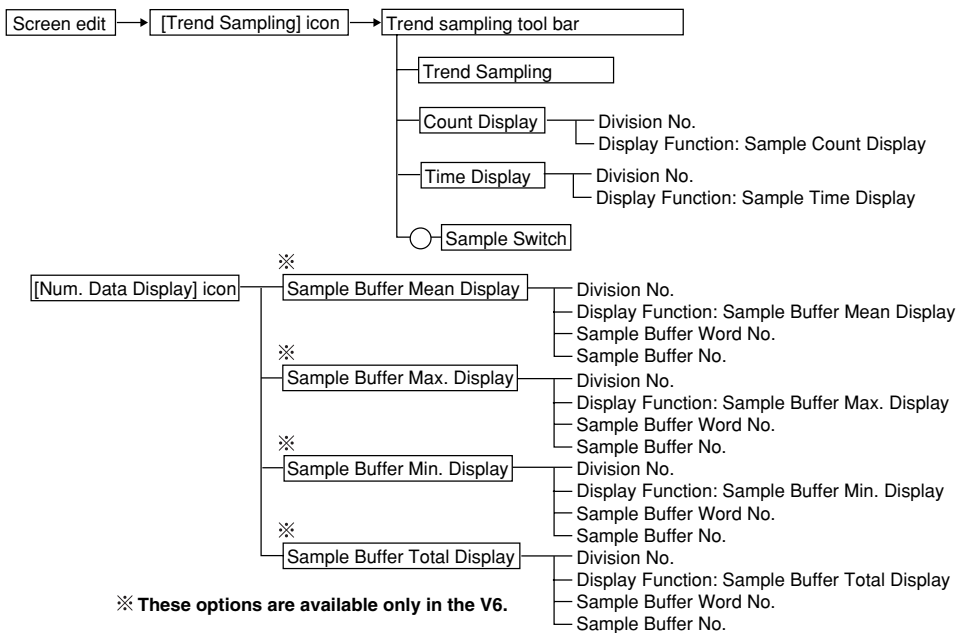
Data Display Function for Trend Sampling

There are some display functions for trend sampling available in any models of the Control Terminal ZM series and some that work only in the ZM-*2.

Data Display Function Setting Procedure

The sampling count display and sampling time display functions are available in any models of the Control Terminal ZM series. Click their respective icons in the trend sampling tool bar to use these functions.

When using the display functions available only in the ZM-*2, click the [Num. Data Display] icon in the tool bar.

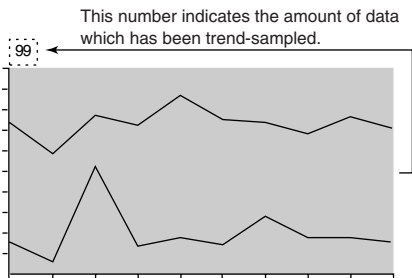


Sampling Count Display

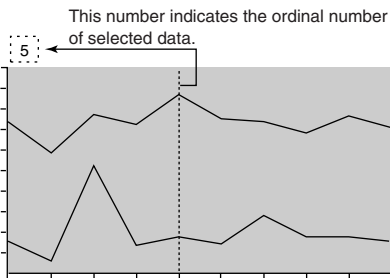
◆ Outline

The total number of data sampled or the ordinal number of the selected data element among those sampled can be indicated. The procedure for selecting data is explained in the following section, “Switches for Trend Sampling.”

Normal:



When selected:



◆ Notes on Sampling Count Display Setting

[Division No.]

Specify the same division number used for the trend sampling part.

[Display Function]

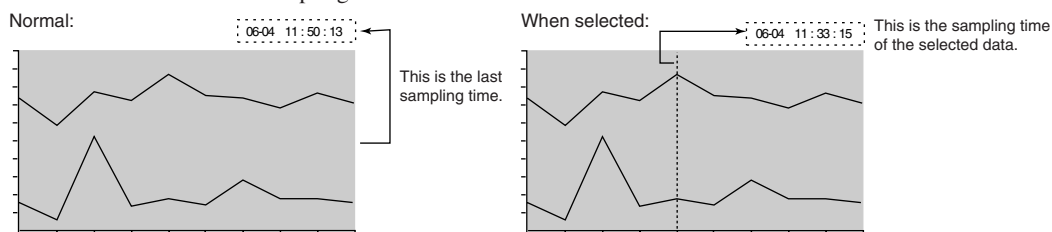
Choose [Sample Count Display].

This option is chosen as default when the dialog is displayed by clicking the [Count Display] icon in the trend sampling tool bar.

Sampling Time Display

◆ Outline

This function can indicate the last sampling time or that of the selected data element. The procedure for selecting data is explained in the following section, “Switches for Trend Sampling.”



◆ Notes on Sampling Time Display Setting

[Division No.]

Specify the same division number used for the trend sampling part.

[Display Function]

Choose [Sample Time Display].

This option is chosen as default when the dialog is displayed by clicking the [Time Display] icon in the trend sampling tool bar.

[Digits]

Depending on the setting for [Digits], the sampling time is indicated in the following format:

Less than 8 digits	no display
From 8 digits up to 14 digits	hour : minute : second
15 digits or greater	month - date, hour : minute : second



The mean, minimum, maximum, and total data of sampled data can be stored in the internal memory. For more information, refer to Chapter 14, “Macro.”

Mean, Min., Max. and Total Data Display Functions

◆ Outline

The mean, minimum, maximum, and total data of sampled data in the buffering area can be displayed.

Calculation is performed in the Control Terminal ZM series and the result is stored in two words. Results are stored in the Control Terminal ZM series only, and can be displayed on the screen.



These mean, minimum, maximum, and total data display functions are available only in the ZM-*2.

◆ Notes on Mean, Minimum, Maximum, and Total Data Display Setting

[Division No.]

Specify the same division number used for the trend sampling part.

[Display Function]

Choose from [Sample Buffer Mean Display], [Sample Buffer Max.

Display], [Sample Buffer Min. Display], or [Sample Buffer Total Display].

[Digits]

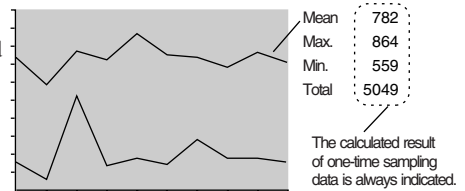
Data within 2 words can be displayed correctly. Determine the number of digits based on the data in the target buffer.

[Sample Buffer Word No.]

This option is the same as [Sample Buffer Word No.] in the [Trend Sampling] dialog. Specify the word address in the buffer used for calculation.

[Sample Buffer No.]

This option is the same as [Buffer No.] in the [Trend Sampling] dialog. Specify the buffer number for sampled data display.



When the data of [Sample Buffer Mean Display], [Sample Buffer Max. Display], [Sample Buffer Min. Display], or [Sample Buffer Total Display] should be displayed, check [Use Operation] in the [Buffering Area Setting] dialog for the buffer number specified for calculation. Otherwise, calculation and data display will not be carried out correctly.

◆ Notes on Mathematical Operations



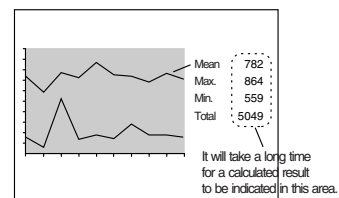
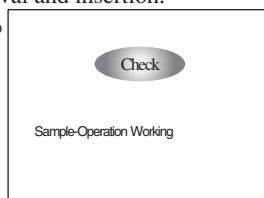
When sampled data is stored in the ZM-*2 for card interface and the ZM-1REC is not used, time is saved because reading of data from ZM-1REC is not necessary.



During the reading of data from ZM-1REC, bit 15 (sampling data operation) of the I/F memory address "n" specified in [Memory Card Setting] is set (ON).

- Calculations are performed based on the data sampled from the start until the present. When [Continuous] is chosen for [Full Processing] in the [Buffering Area Setting] dialog, the actual calculated result may disagree with the value displayed on the screen.
- If a result exceeds 2 words after calculation of [Sample Buffer Mean Display] or [Sample Buffer Total Display], an overflow occurs and correct data may not be obtained.
- When sampled data is stored in a memory card via a card recorder ZM-1REC ([Memory Card] is chosen for [Store Target] in the [Buffering Area Setting] dialog) and also when [Use Operation] is checked in the [Buffering Area Setting] dialog, ZM-*2 must read data from the ZM-1REC for performing calculations. Therefore, it will take a long time to change from the STOP to the RUN state. During data reading, the message "Sample-Operation Working" is displayed on the ZM-1REC screen. A condition like this may occur after memory card removal and insertion.

ZM-2 start-up



Switches for Trend Sampling

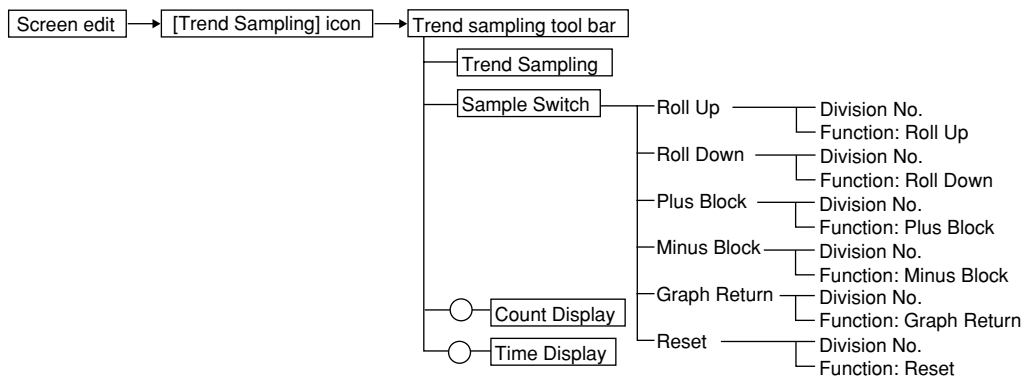
In trend sampling, switches for scrolling, resetting, etc. are used.

Switch Setting Procedure

Click the [Sample Switch] icon in the trend sampling tool bar. The pull-down menu is displayed. Clicking each option brings up the [Switch] dialog.

When [Roll Up] is clicked, [Roll Up] is chosen for [Function] in the [Switch] dialog.

Likewise, when [Minus Block] is clicked, [Minus Block] is chosen for [Function] in the dialog.



Notes on Switch Setting

[Division No.]

Specify the same division number used for the trend sampling part.

[Function]

Specify the desired switch function. The following switches are available in trend sampling.

When a switch function is chosen from the pull-down menu of the [Sample Switch] icon in the trend sampling tool bar, the same function is automatically chosen for [Function] in the [Switch] dialog.

Roll Up	Scrolls by one data element toward the most recent entry. If all data cannot be held in the graph, one data element at a time scrolls into view.
Roll Down	Scrolls by one data element toward the oldest entry. If all data cannot be held in the graph, one data element at a time scrolls into view.
Plus Block	Scrolls by one page toward the most recent entry.
Minus Block	Scrolls by one page toward the oldest entry.
Graph Return	Returns to the most recent graph display when it is pressed while flashing. Flashing is canceled as well as the selection.
Reset	When the switch is pressed once, it is turned on. Pressing it again within 2 seconds clears the buffering area. Sampling restarts immediately after clearing. If not pressed again within 2 seconds, the switch is turned off, and resetting is nullified.

Sampled Data Display By Switches



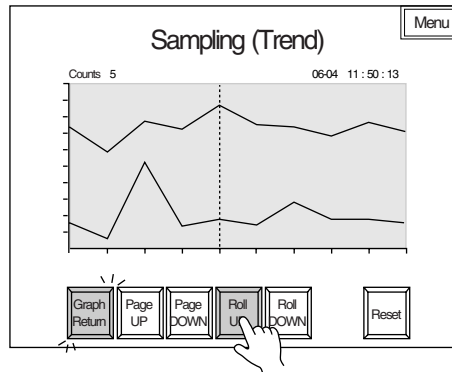
Unless the user clears the buffering area, the Control Terminal ZM series stores sampled data and can display them any time. Renewed data is also reflected in real time.

The first page of the trend sampling graph is shown if the screen display is shifted during sampling. To allow operators to view hidden data elements, [Roll Up], [Roll Down], [Plus Block], [Minus Block], and [Graph Return] switches are used.

The switches work as below:

1. Press the [Roll Up], [Roll Down], [Plus Block], or [Minus Block] switch.
2. A dotted vertical line is drawn at the center of the graph. (This is called a cursor.)

The [Graph Return] switch flashes alternately between ON/OFF colors.



The data specified by the cursor can be displayed in numerals using a macro command. For more information, refer to Chapter 14, "Macro."

3. When the sampling count/time display is set up as described in "Data Display Function for Trend Sampling," the count number or the sampling time of the selected data element is indicated. (If no data element is selected, the total number of samplings or the last sampling time is indicated.)
4. Pressing the flashing [Graph Return] switch returns the graph display to the most recent display.

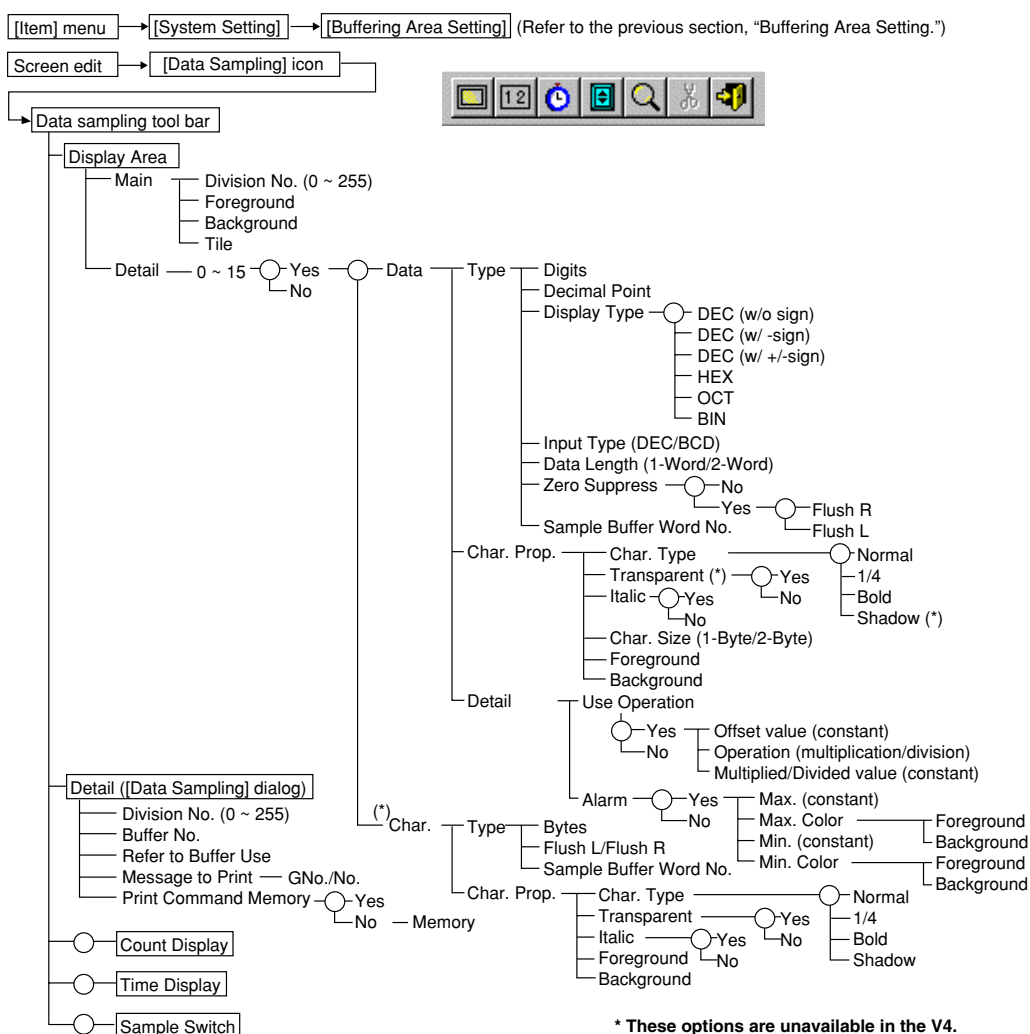


Data Sampling

Outline of Data Sampling

- ◎ Sampled data stored in the specified buffer is expressed in numerals or characters.
- ◎ A maximum of 16 (8 in the case of ZM-41/70) data can be displayed in one display area.
- ◎ Unless the user clears the buffering area, the Control Terminal ZM series stores sampled data and can display them any time. Renewed data is also reflected in real time.

Data Sampling Setting Procedure



- ◎The [Buffering Area Setting] dialog and the options from the [Data Sampling] icon must be set to use data sampling.
- ◎Click the [Data Sampling] icon in the tool bar. The data sampling tool bar is displayed. Set data sampling by clicking the respective icons.

[Data Sampling] Dialog

Click the [Detail] icon in the data sampling tool bar. The [Data Sampling] dialog is displayed.

The icon of the registered [Data Sampling] dialog is stored in the [Part] auxiliary tool box. When bringing up the dialog, click the icon to bring up the data sampling tool bar, and click the [Detail] icon.

The [Data Sampling] dialog contains the following options.

[Division No.]

- ◎The division number that is used when the [Data Sampling] dialog is opened is automatically entered.
- ◎Only one data sampling mode can be set in one division. It is not possible to place it in a division where a part with a number limit has already been placed.
- ◎When creating sampling display areas, switches, or data display parts linked with data sampling, they must be placed in the same division.

[Buffer No.]

Specify the desired buffer number. The memory address specifying the data for sampling depends on this buffer number.

[Refer to Buffer Use]

Clicking this option brings up the [Buffering Area Setting] dialog for the buffer number specified for [Buffer No.]. The set data can be rechecked or modified.

*** For data sampling, check that [Bit Synchronize] or [Constant Sample] is chosen for [Sampling Method].**

After setting or confirming the [Buffering Area Setting] dialog, click [OK] or [Cancel]. The [Data Sampling] dialog is displayed again.

[Message to Print]

- ⊙ By pressing the sampling print function switch or activating the bit for [Print Command Memory] (refer to the relevant explanation), sampled data stored in the buffer specified for [Buffer No.] can be printed out in the form of data sampling.
- ⊙ The header lines for printing out these data can be printed by registering the message in message editing. For this option, specify the group and line numbers of the top message.



Message Registration

- ⊙ The specified top message is indicated as the header line. If you want to use two or more lines for the header, delimit the line using one-byte “\” (“\” is not printed.)
- ⊙ The header line is printed on top of each page.
- ⊙ On the line following the header, specify the positions to indicate counts, time, and sampled data. Settings can be made by one-byte “C,” “T,” and “0” to “15.”

C : Print position of counts

T : Print position of time

0 to 15 : Print position of data No. 0 to 15

Data is left-aligned with the specified position.

C	T	0	1
↓	↓	↓	↓
0	0	12345	12345

The sampling count and time display parts must be placed on the screen in advance for printing out the data.

<Ex.> Register messages in line No. 0 in group No. 2.

Message ground No. 2 edit

Title	Sampling Count	Time	----- Line 1 ----- No. 1	----- Line 2 ----- No. 2	----- Line 3 ----- No. 3	----- Line 4 ----- No. 4
Print position	C	T	0	1	2	3



It is printed as shown below:

Sampling Count	Time	----- Line 1 -----		----- Line 2 -----	
		No. 1	No. 2	No. 3	No. 4
1	06-04 13:14:20	1234	4562	1111	224
2	06-04 13:34:20	2457	2346	3464	456
3	06-04 13:54:20	1240	6548	5648	984
4	06-04 13:74:20	4563	7683	6713	777
⋮	⋮	⋮	⋮	⋮	⋮
50	06-04 15:14:20	9997	8764	8127	265

Notes

Specify "0" for all the bits in the print command memory not in use.

[Print Command Memory] (PC Memory, Internal Memory, Memory Card)
When print command is given externally, check this box.
Specify the desired memory address.

Memory n	MSB															LSB	
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Print out (0 -> 1)



When [OK] is clicked after setting the [Data Sampling] dialog, the dialog is reduced to an icon and stored in [Part] auxiliary tool box in the lower left corner of the screen. To recheck the set data or delete the icon, refer to page 1-9 in Chapter 1, "Basic Operation."

[Sampling Display Area] Dialog

Click the [Display Area] icon in the data sampling tool bar. The [Sampling Display Area] dialog is displayed.
Place the desired part on the screen. When modifying the data of the part, double-click it. The corresponding [Sampling Display Area] dialog is displayed.

(Main) Tab Window

- [Division No.]
- Ⓒ The division number that is used when a sampling display area part is placed on the screen is automatically entered.
 - Ⓒ The sampling display area part can only work when a link is established with the [Data Sampling] dialog. For this reason, the division number for this part must be the same used for the [Data Sampling] dialog.

[Foreground] [Background] [Tile]

Choose colors for [Foreground] and [Background] for the inside of the sampling display area. The [Background] option becomes active when a tile pattern 1 to 15 is chosen.

(Detail) Tab Window

- Ⓒ In one sampling display area, up to 16 (8 in the case of the ZM-41/70) data samplings can be displayed. Property setting is used for each data sampling.
 - Ⓒ In the ZM-*2, numerical data and also characters can be displayed.
Click the desired data sampling number in the window. The [Data] and [Char.] buttons become active. Clicking [Data] brings up the [Data] dialog, and clicking [Char.] brings up the [Char.] dialog.
- * Only numerical data display is available in the ZM-41/70.

◆ [Data] dialog

<Type> tab window

[Digits]

Specify the number of digits for numerical

data display. Depending on the [Display Type] selection, the available data range varies as shown on the right. If the decimal point is included in numbers, it does not need to be counted.

<Ex.> 99.9 3 digits

Type	Digits	Decimal point
DEC	1~10	0~9
HEX	1~8	—
OCT	1~11	—
BIN	1~32	—

[Decimal Point]

Specify the decimal place. When no decimal point is required, enter “0.”

[Display Type]

Select the code for displaying data that is read in the code specified by [Input Type]. The available codes are DEC (w/o sign), DEC (w/ -sign), DEC (w/ +/- sign), HEX, OCT, and BIN.

[Input Type]

Choose either [BCD] or [DEC] for the code in the PC memory. For codes other than the binary coded decimal system, choose [DEC].

[Data Length]

Choose either 1-word or 2-word for the data length of the specified memory.

*** Depending on the [Display Type] selection, the available range of data varies. Refer to the following list for the selection.**

[Display Type] and available ranges

Code type	1-word range	2-word range
DEC (w/o sign)	0~65535	0~4294967295
DEC (w/ -sign)	-32768~32767	-2147483648~2147483647
DEC (w/ +/-sign)	-32768~+32767	-2147483648~+2147483647
HEX	0~FFFF	0~FFFFFFFF
OCT	0~177777	0~3777777777
BIN	0~1111111111111111	0~11111111111111111111111111111111

[Zero Suppress]

Choose whether to use the zero suppress function.

When this option is checked, the options [Flush R] and [Flush L] become active.

[Flush L] [Flush R]

Choose either flush-left or flush-right for aligning numerals.

[Sample Buffer Word No.]

In regard to the words entered for [No. of Words] in the [Buffering Area Setting] dialog, specify the word address to be referred to for displaying sampled data. For more information, refer to the relevant explanation on page 12-14, “Trend Sampling.”

<Char. Prop> tab window

[Char. Type]

Choose from [Normal], [1/4], or [Bold].

Normal: One-byte or two-byte characters are used for numerals in the plain typeface.

1/4 : A one-byte character is displayed in a 1/4 (8 x 8 dots) size.

*** This is not available for two-byte characters.**

Bold : Numerals are displayed in bold typeface.

Shadow: Numerals are displayed with shadow. Shadow is painted in the background color.

*** The [Shadow] option is not available in the ZM-41/70.**

[Foreground] [Background]

Choose the desired foreground and background colors of numerals.

[Transparent] [Italic]

If you want to use transparency or italics, check the corresponding box.

*** The [Transparent] option is not available in the ZM-41/70.**

[Char. Size]

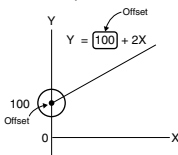
Choose either 1-byte or 2-byte characters for displaying numerals.



Characters can be sized up to 1 x 1.



"Offset value" is the origin position from which operation of memory data is started. For example:



<Detail> tab window

[Use Operation]

Check this box for calculating data in the Control Terminal ZM series and for displaying its result.

When this box is checked, the mathematical operation items (offset value, multiplication [x]/division [/], multiplier or divisor) become active.

*** When using operation, only the result of the specified mathematical operation is shown. Check the settings for [Display Type], [Digits], and [Decimal Point] to be sure they are correct.**



When both [Use Operation] and [Alarm] are selected, the maximum and minimum value colors are used for the results of the mathematical operations.

[Alarm]

If you want to use a different color for data that exceeds or falls short of the specified range, check the [Alarm] box. When it is checked, the following options become active.

[Max.] and [Min.] (PC Memory, Internal Memory, Memory Card, Constant)

When the [Alarm] box is checked, enter [Max.] and [Min.] values.

[Max. Color Foreground/Background] [Min. Color Foreground/Background]

Select the desired colors for the maximum value (to be displayed when data exceeds the range) and for the minimum value (to be displayed when data falls short of the range). When [B] is pressed, data flashes in the selected color.

◆ [Char.] dialog



It is not possible for the ZM-41/70 to display characters in data sampling. The [Char.] dialog is used only for the ZM-*2.

<Type> tab window

[Bytes]

Specify the number of characters to be displayed.

[Flush R] [Flush L]

Choose either flush-left or flush-right for aligning characters.

[Sample Buffer Word No.]

In regard to the words entered for [No. of Words] in the [Buffering Area Setting] dialog, specify the word address to be referred to for displaying sampled data.

For more information, refer to the relevant explanation on page 12-14, “Trend Sampling.”

<Char. Prop.> tab window

[Char. Type]

Choose from [Normal], [1/4], [Bold], or [Shadow].

For the explanation of these types, refer to page 12-26.

[Transparent]

If you want to use transparency for displaying characters, check this box.

[Italics]

If you want to use italics, check this box.

[Foreground] [Background]

Choose the desired colors of characters.

When [Transparent] is checked, the [Background] option is not active.



Characters can be sized up to 1 x 1.

Size Setting of Sampling Display Area Part

To check how many lines can be held in the sampling display area, follow these steps:

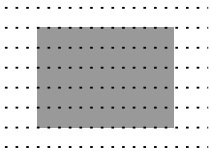
1. Click [Display Environment] in the [Display] menu. The [Display Environment] dialog is displayed.

2. Open the [Grid] tab window and set as shown below:

Grid Dsp.: checked Grid Type: 1-Byte

The one-byte character grids are shown.

The sampling display area can be enlarged or reduced in units of dots. Consider the number of sampled data and lines for display.



Display position can be moved horizontally by selecting one section of data (handles are shown) and dragging.

If you want to move it beyond the display area, enlarge the sampling display area.



When one section of data is selected (handles are shown), clicking the [Delete] icon deletes the sampling display area. Keep this in mind to avoid unnecessary deletion.



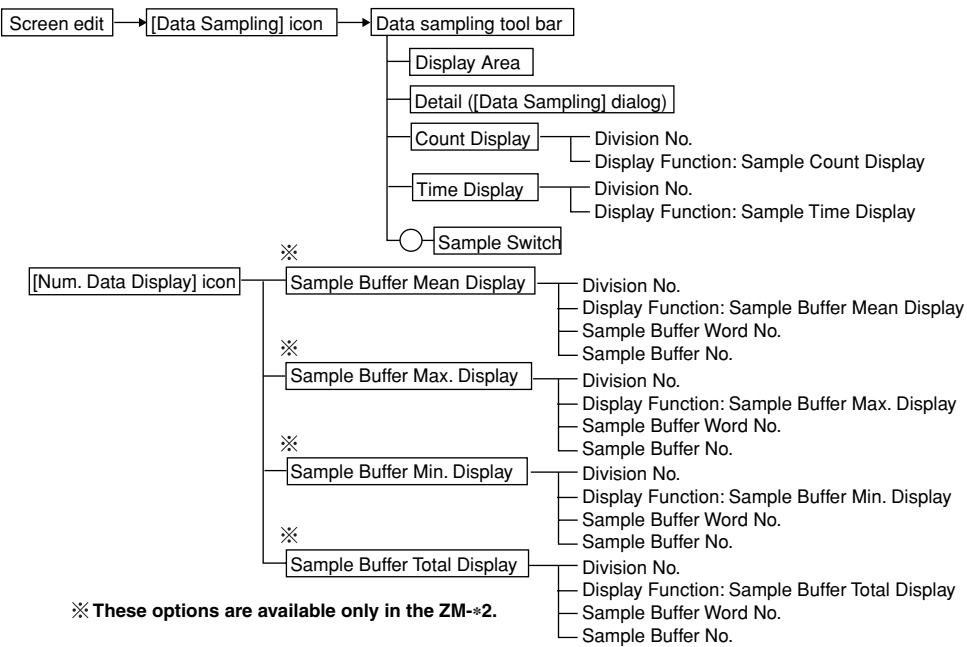
Data Display Function for Data Sampling

There are some display functions for data sampling available in any models of Control Terminal ZM series and some that work only the ZM-*2.

Data Display Function Setting Procedure

The sampling count display and sampling time display functions are available in any models of the Control Terminal ZM series. Click their respective icons in the data sampling tool bar to use these functions.

When using the display functions available only in the ZM-*2, click the [Num. Data Display] icon in the tool bar.



Sampling Count Display

◆ Outline

The total number of data sampled or the ordinal number of the selected data element among those sampled can be indicated. The procedure for selecting data is explained in the following section, “Switches for Data Sampling.”

Normal:

This number indicates how many data have been sampled.

5

102	150	191	250	303	408	515
111	156	196	255	310	410	526
108	159	199	254	311	412	533
106	145	198	253	312	411	555
113	148	188	252	313	407	548

When selected:

This number indicates the ordinal number of selected data.

2

102	150	191	250	303	408	515
111	156	196	255	310	410	526
108	159	199	254	311	412	533
106	145	198	253	312	411	555
113	148	188	252	313	407	548

◆ Notes on Sampling Count Display Setting

[Division No.]

Specify the same division number used for the [Data Sampling] dialog.

[Display Function]

Choose [Sample Count Display].

This option is chosen as default when the dialog is displayed by clicking the [Count Display] icon in the data sampling tool bar.

Sampling Time Display

◆ Outline

This function can indicate the last sampling time or that of the selected data element. The procedure for selecting data is explained in the following section, “Switches for Data Sampling.”

Normal:

This is the last sampling time.

06:04 11:50:13

102	150	191	250	303	408	515
111	156	196	255	310	410	526
108	159	199	254	311	412	533
106	145	198	253	312	411	555
113	148	188	252	313	407	548

When selected:

This is the sampling time of the selected data.

06:04 11:33:15

102	150	191	250	303	408	515
111	156	196	255	310	410	526
108	159	199	254	311	412	533
106	145	198	253	312	411	555
113	148	188	252	313	407	548

◆ Notes on Sampling Time Display Setting

[Division No.]

Specify the same division number used for the [Data Sampling] dialog.

[Display Function]

Choose [Sample Time Display].

This option is chosen as default when the dialog is displayed by clicking the [Time Display] icon in the data sampling tool bar.

[Digits]

Depending on the setting for [Digits], the sampling time is indicated in the following format:

Less than 8 digits	no display
From 8 digits up to 14 digits	hour : minute : second
15 digits or greater	month - day, hour : minutes : second

 The mean, minimum, maximum, and total data of sampled data can be stored in the internal memory. For more information, refer to Chapter 14, "Macro."

Mean, Min., Max., and Total Data Display Functions

◆ Outline

The mean, minimum, maximum, and total data of sampled data in the buffering area can be displayed. Calculation is performed in the Control Terminal ZM series and the result is stored in two words. Results are stored in the Control Terminal ZM series only, and can be displayed on the screen.



These mean, minimum, maximum, and total data display functions are available only in the ZM-*2.

◆ Notes on Mean, Minimum, Maximum, and Total Data Display Setting

[Division No.]

Specify the same division number used for data sampling.

[Display Function]

Choose from [Sample Buffer Mean Display], [Sample Buffer Max. Display], [Sample Buffer Min. Display], or [Sample Buffer Total Display].

[Digits]

Data within 2 words can be displayed correctly. Determine the number of digits based on the data in the target buffer.

[Sample Buffer Word No.]

This option is the same as [Sample Buffer Word No.] in the [Data Sampling] dialog. Specify the word address in the buffer used for calculation.

[Sample Buffer No.]

This option is the same as [Buffer No.] in the [Data Sampling] dialog. Specify the buffer number for sampled data display.

Mean
Max.
Min.
Total

101
120
95
2052

The calculated result of one-time sampling data is always indicated.

102	150	191	250	303	408	515
111	156	196	255	310	410	526
108	159	199	254	311	412	533
106	145	198	253	312	411	555
113	148	188	252	313	407	548



When the data of [Sample Buffer Mean Display], [Sample Buffer Max. Display], [Sample Buffer Min. Display], or [Sample Buffer Total Display] should be displayed, check [Use Operation] in the [Buffering Area Setting] dialog for the buffer number used for calculation. Otherwise, calculation and data display will not be carried out correctly.

◆ Notes on Mathematical Operations

Refer to the explanation on page 12-18.

Switches for Data Sampling

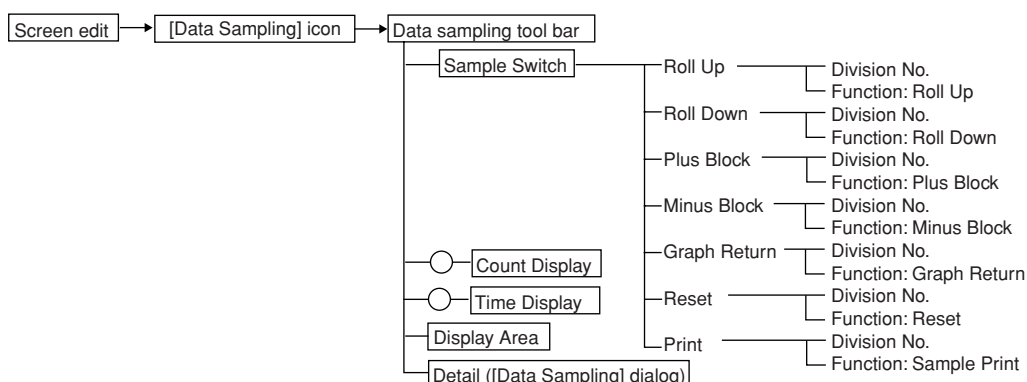
In data sampling, switches for scrolling, resetting, etc. are used.

Switch Setting Procedure

Click the [Sample Switch] icon in the data sampling tool bar. The pull-down menu is displayed. Clicking each option brings up the [Switch] dialog.

When [Roll Up] is clicked, [Roll Up] is chosen for [Function] in the [Switch] dialog.

Likewise, when [Print] is clicked, [Sample Print] is chosen for [Function] in the dialog.



Notes on Switch Setting

[Division No.]

Specify the same division number used for [Data Sampling] dialog.

[Function]

Specify the desired switch function. The following switches are available in data sampling.

When a switch function is chosen from the pull-down menu of the [Sample Switch] icon in the data sampling tool bar, the same function is automatically chosen for [Function] in the [Switch] dialog.

Roll Up	Scrolls by one data element toward the most recent entry. If all data cannot be held in the display area, one data element at a time scrolls into view.
Roll Down	Scrolls by one data element toward the oldest entry. If all data cannot be held in the display area, one data element at a time scrolls into view.
Plus Block	Scrolls by one page toward the most recent entry.
Minus Block	Scrolls by one page toward the oldest entry.
Graph Return	Returns to the most recent data display when it is pressed while flashing. Flashing is canceled as well as the selection.
Reset	When the switch is pressed once, it is turned on. Pressing it again within 2 seconds clears the buffering area. Sampling restarts immediately after clearing. If not pressed again within 2 seconds, the switch is turned off, and resetting is nullified.
Sample Print	Outputs all data stored in the specified buffer to the printer.

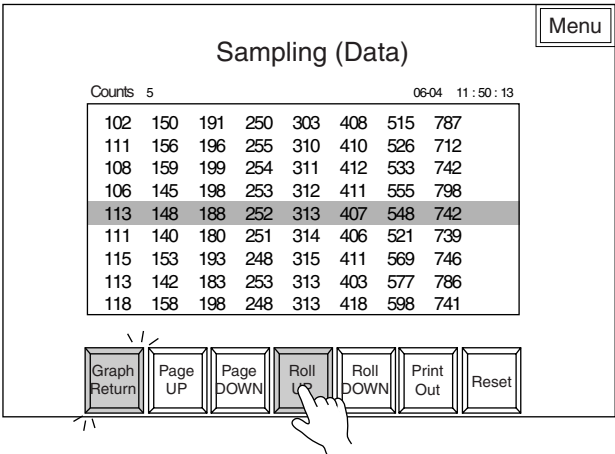
Sampled Data Display By Switches

The first page of the data sampling display is shown if the screen display is shifted during sampling. To allow operators to view hidden data elements, [Roll Up], [Roll Down], [Plus Block], [Minus Block], and [Graph Return] switches are used.

The switches should work as below:

- 1. Press the [Roll Up], [Roll Down], [Plus Block], or [Minus Block] switch.
- 2. A data element at the middle of the display area is selected. (A cursor appears.)
The [Graph Return] switch flashes alternately between ON/OFF colors.

The data specified by the cursor in the display area can be separately indicated using a macro command. For more information, refer to Chapter 14, "Macro."



- 3. When the sampling count/time display is set up as described in "Data Display Function for Data Sampling," the count number or the sampling time of the selected data element is indicated. (If no data element is selected, the total number of samplings or the last sampling time is indicated.)
- 4. Pressing the flashing [Graph Return] switch returns the display to the most recent display.



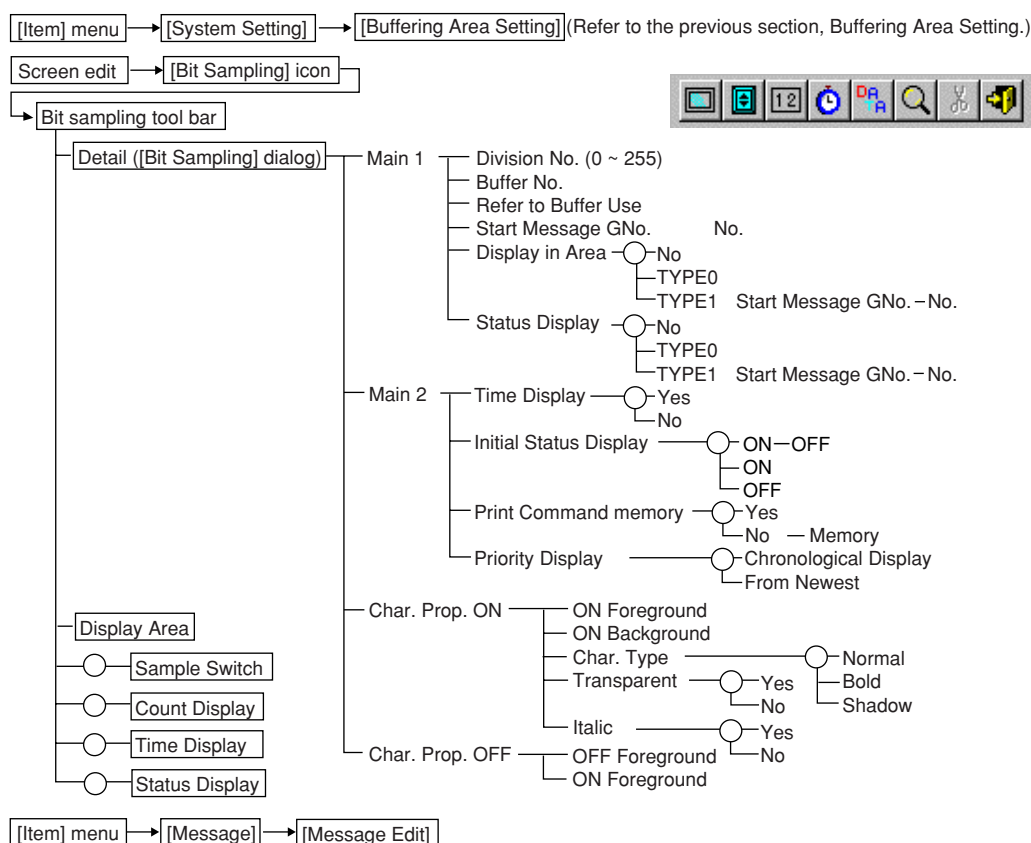
Bit Sampling

Outline of Bit Sampling

- ◎ Alarm messages and sampling times are stored in the specified buffer by bit setting/ resetting, and are displayed on the screen.
- ◎ Unless the user clears the buffering area, the Control Terminal ZM series stores and displays sampled data. In bit sampling, bringing up messages for both bit ON and OFF, or only for bit ON, or only for bit OFF is possible using switches.

Bit Sampling Setting Procedure

- ◎ The [Buffering Area Setting] dialog and the options from the [Bit Sampling] icon must be set to use bit sampling.
Messages to be displayed must be registered in message editing.
- ◎ Click the [Bit Sampling] icon in the tool bar. The bit sampling tool bar is displayed.
Set bit sampling by clicking the respective icons.



[Bit Sampling] Dialog

Click the [Detail] icon in the bit sampling tool bar. The [Bit Sampling] dialog is displayed.

The icon of the registered [Bit Sampling] dialog is stored in the [Part] auxiliary tool box. When bringing up the dialog, click the icon to bring up the bit sampling tool bar, and click the [Detail] icon.

The [Bit Sampling] dialog contains the following options.

(Main 1) Tab Window

[Division No.]

- Ⓐ The division number that is used when the [Bit Sampling] dialog is opened is automatically entered.
- Ⓑ Only one bit sampling mode can be set in one division. It is not possible to place it in a division where a part with a number limit has already been placed.
- Ⓒ When creating bit sampling display areas, switches, or data display parts linked with bit sampling, they must be placed in the same division.

[Buffer No.]

Specify the desired buffer number. The bits specifying the data for sampling depend on this buffer number.

[Refer to Buffer Use]

Clicking this option brings up the [Buffering Area Setting] dialog for the buffer number specified for [Buffer No.]. The set data can be rechecked or modified.

*** For bit sampling, check that [Bit Sample] is chosen for [Sampling Method].**

After setting or confirming the [Buffering Area Setting] dialog, click [OK] or [Cancel]. The [Bit Sampling] dialog is displayed again.

[Start Message]

Register messages connected to bits in the specified buffer in message editing.

In this field, specify the group and line numbers of the start message to be connected to bit 0 in the specified buffer.

For message registration procedure in message editing, refer to Chapter 8, "Message Display."

[Display in Area]

When bringing up the contents of bit sampling, bit activations (ON/OFF) can be indicated at the extreme left. Choose from [No], [TYPE0] or [TYPE1]

◆ No

Nothing is shown.

06-04	11 : 32 : 10	A Tank Temperature Up
06-04	11 : 33 : 15	A Tank Temperature Up
06-04	11 : 40 : 25	C Tank Temperature Down
06-04	11 : 50 : 13	C Tank Temperature Down

◆ TYPE0

<ON> and <OFF> are indicated in one-byte characters.

Display in Area [TYPE0] →

< ON >	06-04	11 : 32 : 10	A Tank Temperature Up
< OFF >	06-04	11 : 33 : 15	A Tank Temperature Up
< ON >	06-04	11 : 40 : 25	C Tank Temperature Down
< OFF >	06-04	11 : 50 : 13	C Tank Temperature Down

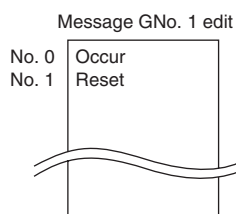
◆ TYPE1

◎ Two different messages for bit ON and OFF should be registered in message editing. When a bit is set or reset, the corresponding message is indicated.

◎ When [TYPE1] is chosen, the [Start Message] option becomes active.

Specify the group and line numbers of the start message. The start message number is used for bit ON, and the following message is for bit OFF.

<Ex.> Start Message in the dialog: GNo. "1" No. "0"



Display in Area (TYPE1)

Occur	06-04	11 : 32 : 10	A Tank Temperature Up
Reset	06-04	11 : 33 : 15	A Tank Temperature Up
Occur	06-04	11 : 40 : 25	C Tank Temperature Down
Reset	06-04	11 : 50 : 13	C Tank Temperature Down

[Status Display]

The status display indicates which contents are being shown: bit ON, bit OFF or bit ON/OFF. Choose from [No], [TYPE0], or [TYPE1].

◆ No

Nothing is shown.

← Status Display (No)

06-04	11 : 32 : 10	A Tank Temperature Up
06-04	11 : 33 : 15	A Tank Temperature Up
06-04	11 : 40 : 25	C Tank Temperature Down
06-04	11 : 50 : 13	C Tank Temperature Down

◆ TYPE0

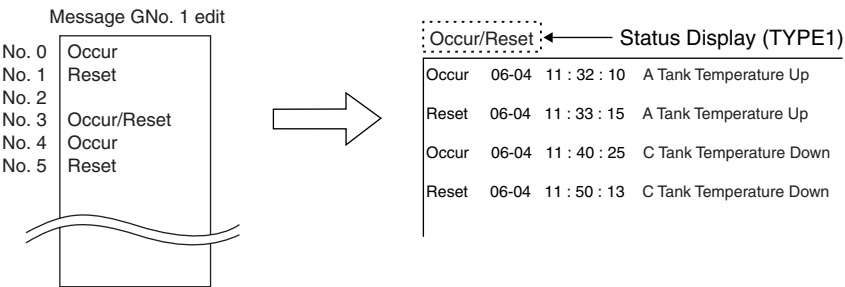
<ON/OFF>, <ON>, or <OFF> are indicated in one-byte characters.

<ON/OFF>		← Status Display (TYPE0)		
< ON >	06-04	11 : 32 : 10	A Tank Temperature Up	
< OFF >	06-04	11 : 33 : 15	A Tank Temperature Up	
< ON >	06-04	11 : 40 : 25	C Tank Temperature Down	
< OFF >	06-04	11 : 50 : 13	C Tank Temperature Down	

◆ TYPE1

When [TYPE1] is chosen, the [Start Message] option becomes active. Specify the group and line numbers of the start message. The start message number is used for <ON/OFF>. The following message is used for <ON>, and the next message is used for <OFF>.

<Ex.> Start Message in the dialog: GNo. “1” No. “3”



A character display part is used for the status display. Unless a character display part ([Display Function: Sample Status Display]) is placed, no status display is available.

For more information on [Character Display] parts, refer to page 18-40.

(Main 2) Tab Window

[Time Display]

When you want to indicate the sampling time, check this box. It is indicated in the following format: day, hour : minute : second. The number of characters is 15 (one-byte).

When time display is selected:

Occur	06-04	11 : 32 : 10	A Tank Temperature Up
15 1-byte characters (cannot be changed)			
Reset	06-04	11 : 33 : 15	A Tank Temperature Up
Occur	06-04	11 : 40 : 25	C Tank Temperature Down
Reset	06-04	11 : 50 : 13	C Tank Temperature Down
		hour : min : sec	
		month - day	

When time display is not selected:

Occur	A Tank Temperature Up
Reset	A Tank Temperature Up
Occur	C Tank Temperature Down
Reset	C Tank Temperature Down

[Initial Status Display]

This option determines the status display to be used when the screen is opened.

- ◆ ON-OFF Indicates ON/OFF of all bits sampled.
- ◆ ON Indicates ON of the bits sampled.
- ◆ OFF Indicates OFF of the bits sampled.

Notes

Specify "0" for all the bits in the print command memory not in use.

[Print Command Memory] (PC Memory, Internal Memory, Memory Card)

When printing should be started externally, check this box.

Specify the desired memory address.

MSB										LSB					
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Memory n		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Print out (0 -> 1)

[Priority Display]

Choose the message display order in bit sampling.

Chronological Display : Messages are displayed in order of occurrence from old to new.

From Newest : Messages are displayed in order of occurrence from new to old.



This option is available in the ZM-*2 only, and not available in the ZM-41/70.

(Char. Prop. ON/OFF) Tab Window

[ON Foreground/Background] [OFF Foreground/Background]

Specify the foreground and background colors for messages to be used when a bit is set and reset.

[Transparent]

When transparency is required, check this box.

[Char. Type]

Choose from [Normal], [Bold], or [Shadow].

Normal: One-byte or two-byte characters are used in the plain typeface.

Bold : Characters are displayed in bold typeface.

Shadow: Characters are displayed with shadow.

Shadow is painted in the background color.



Characters can be sized up to 1 x 1.

[Italic]

If you want to use italics, check the box.



When [OK] is clicked after setting the [Bit Sampling] dialog, the dialog is reduced to an icon and stored in [Part] auxiliary tool box in the lower left corner of the screen. For more information, refer to page 1-9 in Chapter 1, "Basic Operation."

Display Area Part

Outline of Display Area Part

The display area part in bit sampling indicates messages by bit setting and resetting.
The part must be linked with the [Bit Sampling] dialog.

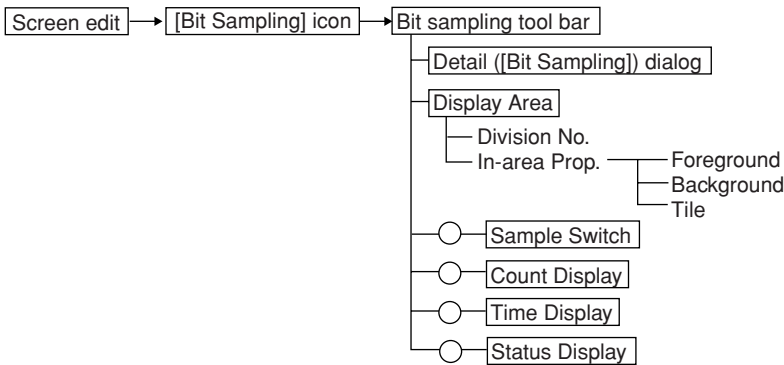
Notes on Display Area Part Placement

The display area part size can be changed, but the size of the characters is fixed in bit sampling. Consider the number of characters to be displayed when determining the size of the part.

The one-byte character grids are useful to determine the display area part size.
The grids can be set in the [Display Environment] dialog selected from the [Display] menu. For more information, refer to page 1-28 in Chapter 1, “Basic Operation.”

(Display Area) Dialog

After a display area part has been placed on the screen, the [Display Area] dialog for the part can be displayed by double-clicking it, or select the area part (handles are shown) and then click the [Detail/Prop. Change] icon.
The dialog contains the following options.



[Division No.]
Specify the same division number used for the [Bit Sampling] dialog. The display area part is linked with bit sampling.

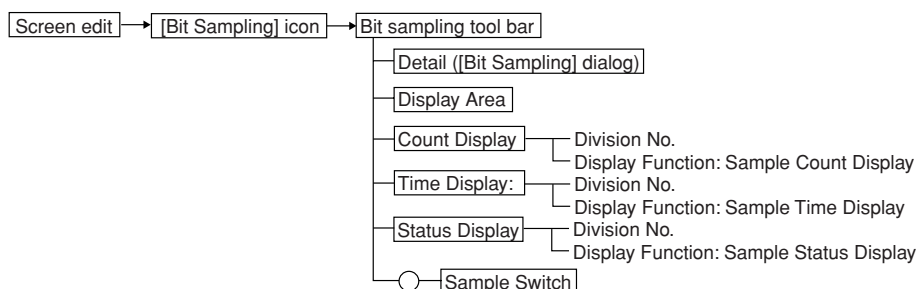
[In-area Prop.]
Choose foreground and background colors for the inside of the display area part.
The [Background] option becomes active when a tile pattern 1 to 15 is chosen.

Data Display Function for Bit Sampling

The sampling status, count, and time display functions are available with bit sampling. The sampling status display function indicates the status of sampling, the count display function indicates the number of samplings, and the time display function indicates the time recorded when the data was sampled.

Data Display Function Setting Procedure

Click the [Count Display], [Time Display], or [Status Display] icon in the bit sampling tool bar. The corresponding dialog is displayed.

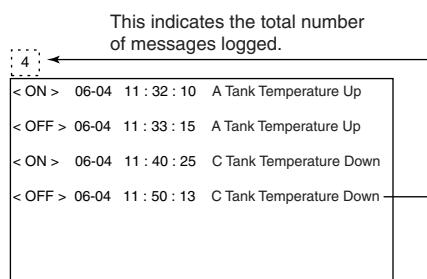


Sampling Count Display

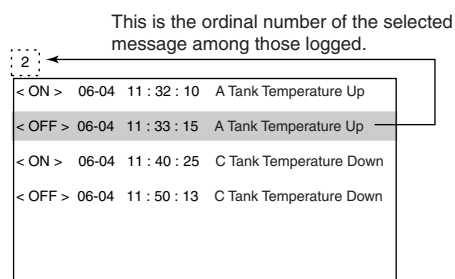
◆ Outline

The total number of data sampled or the ordinal number of the selected data element among those sampled can be indicated. The procedure for selecting data is explained in the following section, “Switches for Bit Sampling.”

Normal:



When selected:



◆ Notes on Sampling Count Display Setting

Note the following.

[Division No.]

Specify the same division number used for the [Bit Sampling] dialog.

[Display Function]

Choose [Sample Count Display].

This option is chosen as default when the dialog is displayed by clicking the [Count Display] icon in the bit sampling tool bar.

Sampling Time Display

◆ Outline

This function can indicate the last sampling time or that of the selected data element. The procedure for selecting data is explained in the following section, “Switches for Bit Sampling.”

Normal:

This is the last sampling time.

	06-04	11:50:13	
< ON >	06-04	11:32:10	A Tank Temperature Up
< OFF >	06-04	11:33:15	A Tank Temperature Up
< ON >	06-04	11:40:25	C Tank Temperature Down
< OFF >	06-04	11:50:13	C Tank Temperature Down

When selected:

This is the sampling time of the selected data.

	06-04	11:33:15	
< ON >	06-04	11:32:10	A Tank Temperature Up
< OFF >	06-04	11:33:15	A Tank Temperature Up
< ON >	06-04	11:40:25	C Tank Temperature Down
< OFF >	06-04	11:50:13	C Tank Temperature Down

◆ Notes on Sampling Time Display Setting

Note the following.

[Division No.]

Specify the same division number used for the [Bit Sampling] dialog.

[Display Function]

Choose [Sample Time Display].

This option is chosen as default when the dialog is displayed by clicking the [Time Display] icon in the bit sampling tool bar.

[Digits]

Depending on the setting for [Digits], the sampling time is indicated in the following format:

Less than 8 digits	no display
From 8 digits up to 14 digits	hour : minute : second
15 digits or greater	month - date, hour : minutes : second

Sampling Status Display

◆ Outline

The sampling status display indicates which contents are being shown: bit ON, bit OFF, or bit ON/OFF.

This function is defined by the [Status Display] option in the [Bit Sampling] dialog (page 18-35). The position or property of this area is set in the [Char. Display] dialog as a character display part linked with bit sampling.

< ON / OFF >	
< ON >	06-04 11:32:10 A Tank Temperature Up
< OFF >	06-04 11:33:15 A Tank Temperature Up
< ON >	06-04 11:40:25 C Tank Temperature Down
< OFF >	06-04 11:50:13 C Tank Temperature Down

◆ Notes on Sampling Status Display Setting

[Division No.]

Specify the same division number used for the [Bit Sampling] dialog.

[Display Function]

Choose [Sample Status Display].

This option is chosen as default when the dialog is displayed by clicking the [Status Display] icon in the bit sampling tool bar.

[Bytes]

This setting depends on the option selection for [Status Display] in the [Bit Sampling] dialog.

When [No] is chosen, the sampling status display function becomes invalid.

When [TYPE0] is chosen, enter “8” for [Bytes].

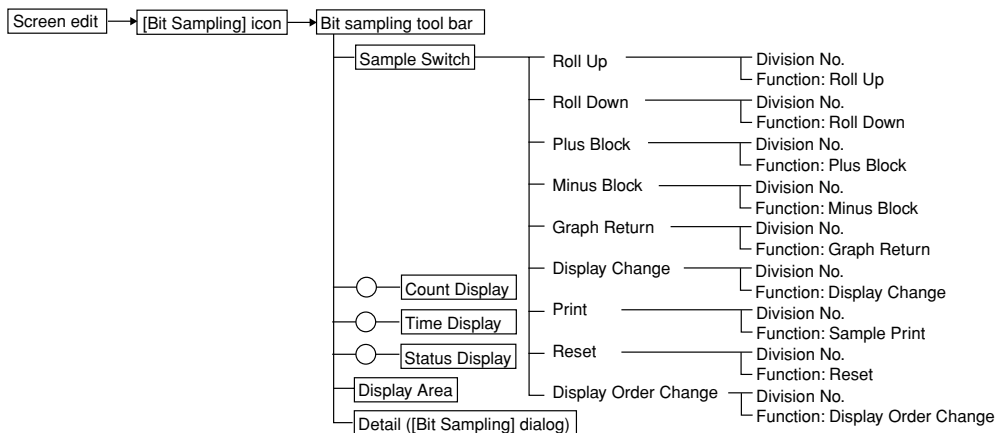
When [TYPE1] is chosen, enter the number of bytes required for messages for bit ON/OFF.

Switches for Bit Sampling

In bit sampling, switches for scrolling, resetting, etc. are used.

Switch Setting Procedure

Click the [Sample Switch] icon in the bit sampling tool bar. The pull-down menu is displayed. Clicking each option brings up the [Switch] dialog.



Notes on Switch Setting

[Division No.]

Specify the same division number used for [Bit Sampling] dialog.

[Function]

Specify the desired switch function. The following switches are available in the bit sampling mode.

When a switch function is chosen from the pull-down menu of the [Sample Switch] icon in the bit sampling tool bar, the same function is automatically chosen for [Function] in the [Switch] dialog.



There is a switch function which is available in the ZM-*2 but unavailable in the ZM-41/70.

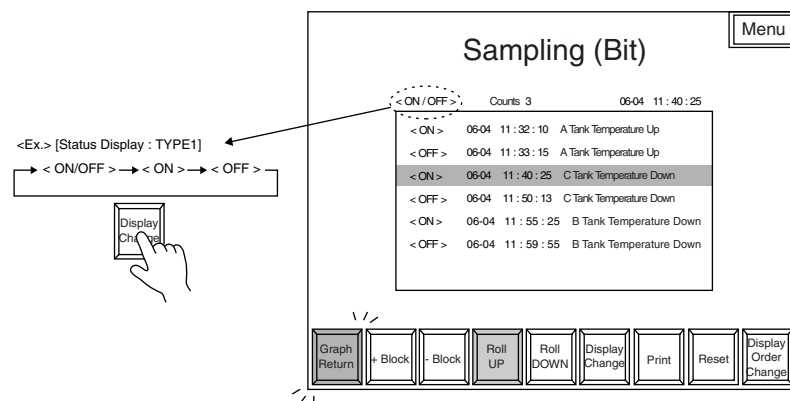
Name	Function	ZM-*2	ZM-41/70
Roll Up	Scrolls by one data element toward the most recent entry. If all data cannot be held in the display area, one data element at a time scrolls into view.	☐ ☐	☐
Roll Down	Scrolls by one data element toward the oldest entry. If all data cannot be held in the display area, one data element at a time scrolls into view.	☐	☐
Plus Block	Scrolls by one page toward the most recent entry.	☐	☐
Minus Block	Scrolls by one page toward the oldest entry.	☐	☐
Graph Return	Returns to the most recent bit sampling display when it is pressed while flashing. Flashing is canceled as well as the selection.	☐	☐
Display Change	Changes over the status display for ON, OFF, or ON/OFF.	☐	☐
Sample Print	Outputs all data stored in the specified buffer to the printer.	☐	☐
Reset	When the switch is pressed once, it is turned on. Pressing it again within 2 seconds clears the buffering area. Sampling restarts immediately after clearing. If not pressed again within 2 seconds, the switch is turned off, and resetting is nullified.	☐	☐
Display Order Change	Changes over data display order. Each time the switch is pressed, the data is displayed in order of occurrence (from old to new) or in the reverse order (from new to old).	☐	×

Sampled Data Display By Switches

The first page of the bit sampling display is shown if the screen display is shifted during sampling. To allow operators to view hidden data elements, [Roll Up], [Roll Down], [Plus Block], [Minus Block], and [Graph Return] switches are used. Also the [Display Change] switch for the status display change and the [Display Order Change] switch for data display order change are available.

The switches work as below:

1. Press the [Roll Up], [Roll Down], [Plus Block], or [Minus Block] switches.
2. A data element at the middle of the display area is selected. (A cursor appears.)
The [Graph Return] switch flashes alternately between ON/OFF colors.
3. When the sampling count/time display is set up as described in “Data Display Function for Bit Sampling,” the count number or the sampling time of the selected data element is indicated. (If no data element is selected, the total number of samplings or the last sampling time is indicated.)
4. When the sampling status display is set up as described in “Data Display Function for Bit Sampling,” the display contents can be changed by the [Display Change] switch. (When the screen is opened, the contents specified for [Initial Status Display] in the [Bit Sampling] dialog are displayed.)





Relay Sampling

Outline of Relay Sampling

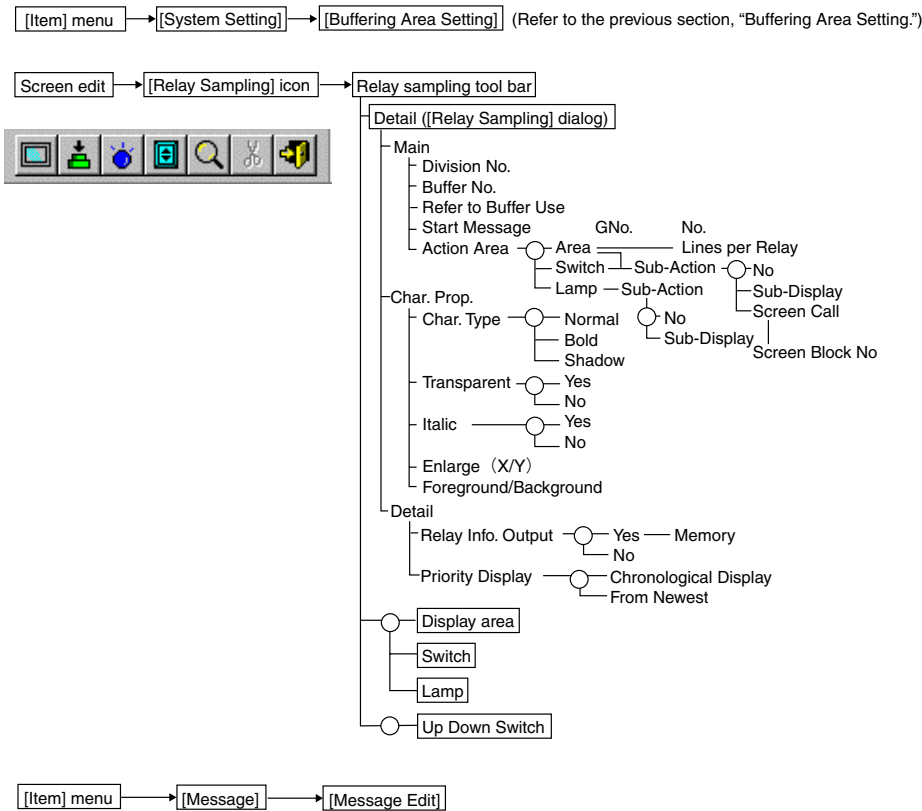
Bit activations are indicated with messages in order of occurrence.

Relay Sampling Setting Procedure

◎The [Buffering Area Setting] dialog and the options from the [Relay Sampling] icon must be set to use relay sampling.

Messages to be displayed must be registered in message editing.

◎Click the [Relay Sampling] icon in the tool bar. The relay sampling tool bar is displayed. Set relay sampling by clicking the respective icons.



[Relay Sampling] Dialog

Click the [Detail] icon in the relay sampling tool bar. The [Relay Sampling] dialog is displayed.

The icon of the registered [Relay Sampling] dialog is stored in the [Part] auxiliary tool box. When bringing up the dialog, click the icon to bring up the relay sampling tool bar, and click the [Detail] icon.

The [Relay Sampling] dialog contains the following options.

(Main) Tab Window

Options included in the [Main] tab window of the [Relay Sampling] dialog are almost the same as those in the [Relay] dialog. Therefore, only different options are explained here. For other options, refer to the explanation on the [Main] tab window of the [Relay] dialog on page 8-6 in Chapter 8, “Message Display.”

◆ Options not used in the relay mode

[Buffer No.]

Specify the desired buffer number. The bits specifying sampling data are determined by this buffer number.

[Refer to Buffer Use]

Clicking this option brings up the [Buffering Area Setting] dialog for the buffer number specified for [Buffer No.]. The set data can be rechecked or modified.

* For relay sampling, check that [Relay Sample] is chosen for [Sampling Method].

After setting or confirming the [Buffering Area Setting] dialog, click [OK] or [Cancel]. The [Relay Sampling] dialog is displayed again.

[Memory] [Executing Relays] (in the [Relay] dialog)

The [Memory] and [Executing Relays] options are not included in the [Relay Sampling] dialog. But the data for the options can be set in relay sampling by specifying a buffer number in the [Buffering Area Setting] dialog.

A memory address can be specified by checking [Memory Designation] in the [Buffering Area Setting] dialog. If an address is specified, the message specified for [Start Message GNo. & No.] corresponds to the bit in the address.

The number of executing relays is determined by the setting of [No. of Words] in the [Buffering Area Setting].

For more information, refer to page 12-47, “Differences between Relay Mode and Relay Sampling Mode.”

[Time Display]

When this box is checked, the occurring time can be displayed with the message.
(For more information, refer to page 12-48.)

(Char. Prop.) Tab Window

Set the properties of characters to be displayed. Options in the window are the same as those in the [Relay] dialog. Refer to page 8-7 in Chapter 8, “Message Display.”

(Detail) Tab Window**[Relay Info. Output]**

This is the same as the one included in the [Relay] dialog. Refer to page 8-8 in Chapter 8, “Message Display.”

**[Priority Display]**

Choose the data display order in relay sampling.

Chronological Display : Data is displayed in order of occurrence from old to new.

From Newest : Data is displayed in order of occurrence from new to old.



This option is available only in the ZM-*2.

When [OK] is clicked after setting the [Relay Sampling] dialog, the dialog is reduced to an icon and stored in [Part] auxiliary tool box in the lower left corner of the screen. For more information, refer to page 1-9 in Chapter 1, “Basic Operation.”

Display Area Part

Set the relay sampling display area part in the same manner used in the relay mode. Only a display area part for which [Area] is chosen for [Action Area] is valid. The division of the part must be the same as that for the [Relay Sampling] dialog. For more information, refer to page 8-9 in Chapter 8, “Message Display.”

Switches for Relay Sampling

In relay sampling, switches for scrolling, etc. are used.

Switch Setting Procedure

Click the [Sample Switch] icon in the relay sampling tool bar. The pull-down menu is displayed. Clicking each option brings up the [Switch] dialog.

Notes on Switch Setting

[Division No.]

Specify the same division number used for [Relay Sampling] dialog.

[Function]

Specify the desired switch function. The following switches are available in relay sampling.

When a switch function is chosen from the pull-down menu of the [Sample Switch] icon in the relay sampling tool bar, the same function is automatically chosen for [Function] in the [Switch] dialog.



There is a switch function available in the ZM-*2, but unavailable in the ZM-41/70.

Name	Function	ZM-*2	ZM-41/70
Roll Up	Scrolls by one data element toward the most recent entry. If all data cannot be held in the display area, one data element at a time scrolls into view.	☐	☐
Roll Down	Scrolls by one data element toward the oldest entry. If all data cannot be held in the display area, one data element at a time scrolls into view.	☐	☐
Mode	This switch becomes available when [Switch] is chosen for [Action Area] in the [Relay Sampling] dialog. The display area part is changed to the area for message display.	☐	☐
Display Order Change	Changes over data display order. Each time the switch is pressed, the data is displayed in order of occurrence (from old to new) or in the reverse order (from new to old).	☐	☒

Differences between Relay Mode & Relay Sampling Display of Messages

◎ Display order

◆ Relay mode

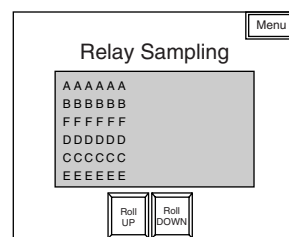
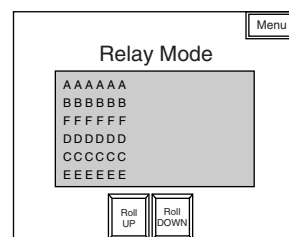
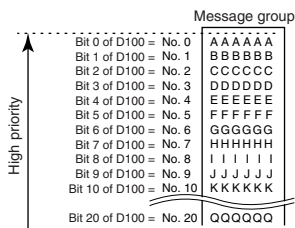
In relay mode, messages are displayed in order of priority (a smaller message number has priority).

◆ Relay sampling mode

In relay sampling mode, messages are displayed in order of occurrence.

<Ex.> If the following bits are set in order:

- Bit 0 of D100 = ON
- Bit 1 of D100 = ON
- Bit 5 of D100 = ON
- Bit 3 of D100 = ON
- Bit 2 of D100 = ON
- Bit 4 of D100 = ON



⊙Time Display

◆Relay mode

Only messages are displayed. The occurrence time cannot be displayed.

◆Relay sampling mode

The occurrence time can be displayed with the message.

15-byte characters
(cannot be changed)

06-04	11:33:15	AAAAAA
06-04	11:33:15	BBBBBB
06-04	11:33:15	FFFFFF
06-04	11:33:15	DDDDDD
06-04	11:33:15	CCCCCC
06-04	11:33:15	EEEEEE

└ month - day └ hour : minute : sec

Setting Procedure

⊙Memory and executing relays

For assigning registered messages to bits in the PC memory, the top memory address as well as the number of executing relays for determining the number of bits are set as follows.

◆Relay mode

Specify the desired memory address directly for [Memory] in the [Relay] dialog. As many memory bits as execution relays are assigned automatically from the specified memory.

<Ex.> Memory: D100 Start Message: GNo. 0 No. 0
 Executing Relays: 40 Relays per Line: 1
Messages are assigned to D100, D101, and D102.

	MSB																LSB	
Bit number in D100	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
Message number	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		

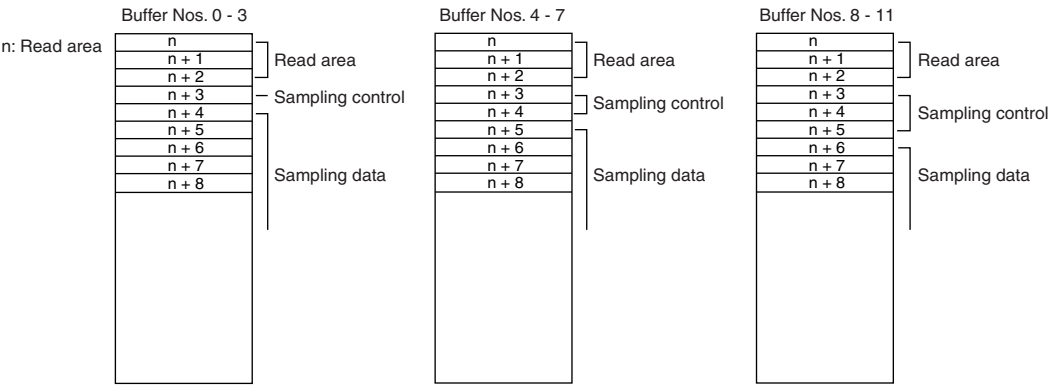
	MSB																LSB	
Bit number in D101	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
Message number	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16		

	MSB																LSB	
Bit number in D102	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
Message number	/	/	/	/	/	/	/	/	/	39	38	37	36	35	34	33	32	

◆Relay sampling

The memory address is specified by [Buffer No.].

○When [Memory Designation] is not checked, the memory address following the sampling control memory are used for the start memory.



- When [Memory Designation] is checked, the specified memory address is used for the start memory.

Memory bits are automatically assigned by the unit of words from the start memory.

<Ex.> In the [Buffering Area Setting] dialog

Memory Designation (checked): D100

No. of Words: 3

In the [Relay Sampling] dialog

Buffer No. : 0

Start Message : GNo. 0 No. 0

Relays per Line : 1

	MSB															LSB				
Bit number in D100	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00				
Message number	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				

	MSB															LSB				
Bit number in D101	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00				
Message number	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16				

	MSB															LSB				
Bit number in D102	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00				
Message number	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32				

When set up as shown above, bits in D100, D101, and D102 are assigned, and 48 relays (number of words x 16) are used for execution.

◎ Setting of processing cycle

◆ Relay mode

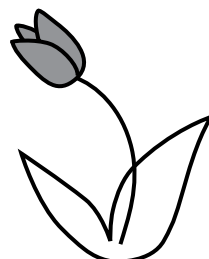
Choose from [Refresh], [High Speed], or [Low Speed] for [Process Cycle] in the [Detail] tab window of the [Relay] dialog.

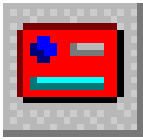
◆ Relay sampling mode

Specify the desired cycle time for [Sampling Time] in the [Buffering Area] dialog. When "0" is specified, it is read at every cycle.

MEMO

Please use this page freely.





Memory Card Mode (optional)

The memory card mode is an optional function. The function is not available in all the Control Terminal ZM series. Refer to the following table for the Control Terminal models available with memory cards or necessary peripheral units.

(O: Memory card mode available X: Memory card mode unavailable)

	Standard	With built-in memory card unit
ZM-82T/D/ZM-72T/D	ZM-1REC	O
ZM-52D	ZM-1REC	
ZM-42D/L	ZM-1REC	
ZM-41/70	X	O
ZM41D/T	X	

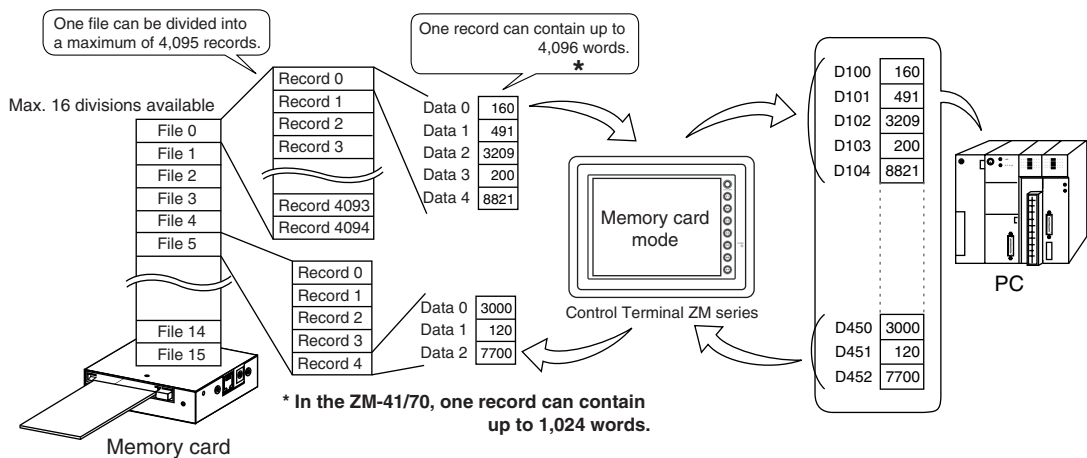
Memory Card Mode Outline

Memory card mode has two major functions: memory manager and data logging.

For more information on the memory manager function, refer to page 13-19.

Memory Manager Function

Memory cards can be used as external storage media for PC. Data can be written or read out at any time required. Each memory card can contain 16 files, and each file can be divided into 4,095 records. Data is stored in the records.



It is possible to store records in a block from PC into a memory card, or to read them from the memory card to PC.

Since a large capacity of data can be stored in memory cards, it is not necessary to allocate memory in PC for storage purpose.



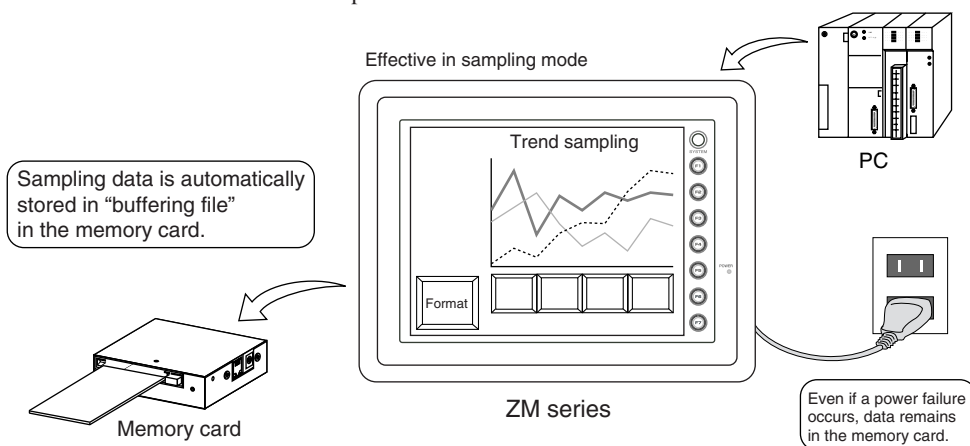
For more information on the data logging function, refer to page 13-23.

Data Logging Function

The data logging function is used when sampling mode is used.

When sampling mode is set up without using memory cards, data in the buffering area in the Control Terminal ZM series is cleared if a power failure occurs.

However, if data is stored in memory cards instead of the buffering memory, it is kept intact even after a power failure.



Memory Cards

Available Types of Memory Cards

For the memory manager function and the data logging function, use “SRAM” cards. Use the SRAM cards. 256 KB, 512 KB, 1 MB, 2 MB, and 4 MB types are available. Type is JEIDA (version 4.0 or more) or equivalent is available.

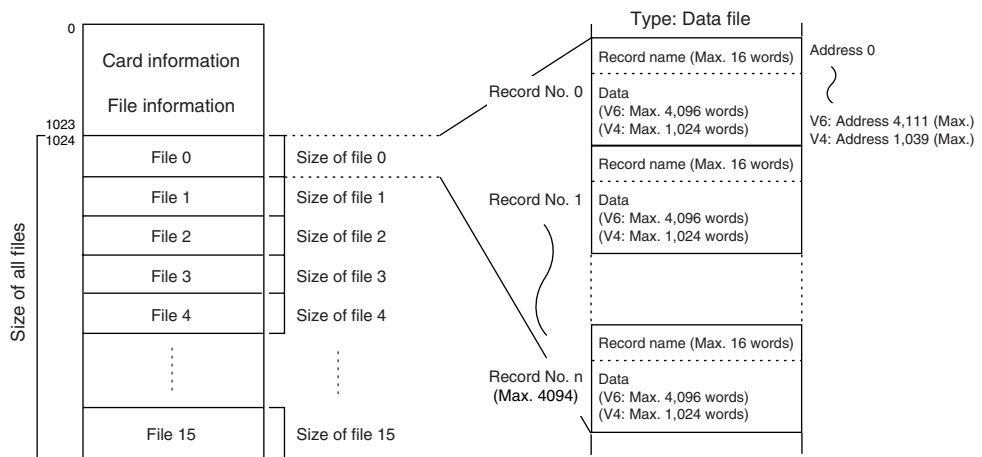


Memory cards for up to 1 MB are available in the ZM-41/70.

Memory Card Map

The first 1,024 words in the memory card are used for card and file information. The 1,025th word and after are used for files.

When setting files, they must not exceed the range obtained by subtracting 1,024 words from the memory capacity.



Calculation of File Size

Depending on the file type, the calculation method varies.

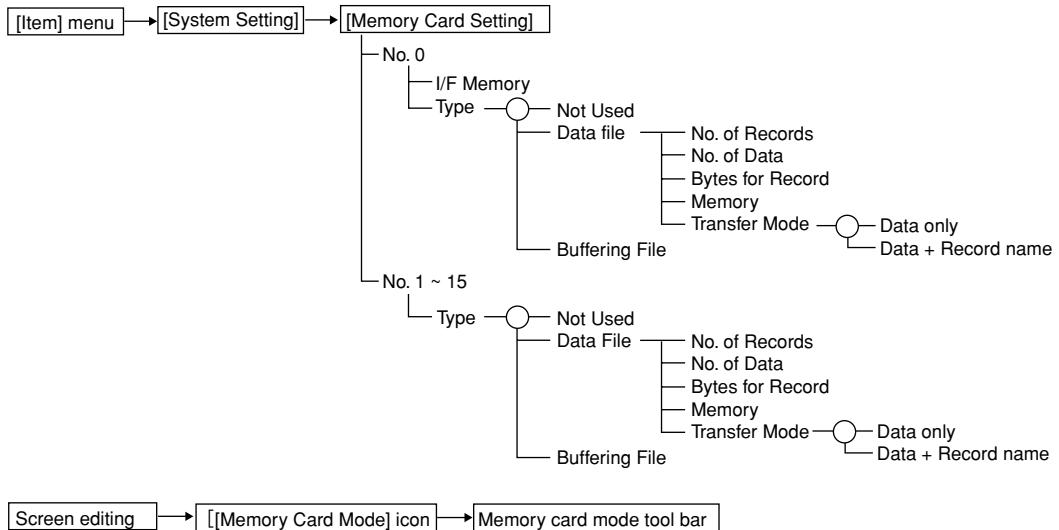
- ◆ In the data file (unit: words)
 - File size = (bytes of record name / 2 + data number) x record number
- ◆ In the buffering file (Unit: words)
 - ☐ Bit synchronize
 - File size = (word number of sampled data + 2) x sampling times
 - ☐ Constant sampling
 - File size = (word number of sampled data + 2) x sampling times
 - ☐ Bit sampling
 - File size = 3 x sampling times

*** Relay sampling cannot be used for buffering files.**

Memory Card Mode Setting

Memory card mode is set using two steps.

- ① Set the memory card in the [Memory Card] dialog selected from [System Setting].
- ② Set the memory card mode (memory card dialog, display area, switch, etc.) in screen editing.



Memory Card Setting Procedure

When memory cards are used, set the [Memory Card] dialog. From the setting in this dialog, memory cards are formatted.

[Memory Card] Dialog

Select [System Setting] from the [Item] menu, and click [Memory Card Setting]. The [Memory Card] dialog is displayed.

The dialog contains the following options.

[I/F Memory]

Specify the top memory address to which memory card status is written.

Memory is allocated as follows:

I/F memory	Contents
n	CFM_STAT
n+1	CFM_ERRNo
n+2	CFM_CARDNo
n+3	CFM_FILENo
n+4	CFM_RECDNo
n+5	CFM_TRFIN



Irrespective of memory card mode setting, the newest data is written into “CFM_STAT” (n) and “CFM_ERRNo” (n + 1). Other memory addresses become effective only when memory card mode is set up on the screen.

A. CFM_STAT (n)

MSB								LSB							
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
	0	0	0	0	0	0	0		0	0	0	0	0	0	
Sampling data operation								Battery voltage				Error			

Bit No.	Contents	Description
0	Error	When an error related to the memory card has occurred, this bit is set to “1” (ON). The error contents are stored in “CFM_ERRNo” (n + 1).
1 to 6	Not used	These bits must be reset to “0.”
7	Battery voltage	When battery voltage of the memory card decreases, this bit is set to “1” (ON). Replace the battery as soon as possible.
8 to 14	Not used	These bits must be reset to “0.”
15	Sampling data operation	This bit is active when [Use Operation] is checked in the [Buffering Area Setting] dialog for the data logging function. If operation of data in the buffering area is being performed at the time of memory card data reading, this bit is set to “1” (ON).

B. CFM_ERRNo (n + 1)

When bit 0 of “CFM_STAT” (n) is set (an error has occurred), an error number (for error contents) is stored in “CFM_ERRNo” (n + 1). Respective error numbers indicate the following contents:

Error No.	Contents
1	There is an error in the memory card I/F board.
2	The memory card recorder is not connected.
3	An error has arisen during communication between the MONITOUCH V series and the recorder.
4	No memory card is inserted.
5	Memory card format is different from the setting data. (Or the memory card is not formatted.)
6	Memory card capacity is smaller than the setting data.
7	The memory card is not compatible.
10	Attempted to write to a memory card of FLASH ROM.
11	The memory card is write-protected.
12	There is an error in writing data to the memory card.

C. CFM_CARDNo (n + 2)

The current memory card number is stored.

D. CFM_FILENo. (n + 3)

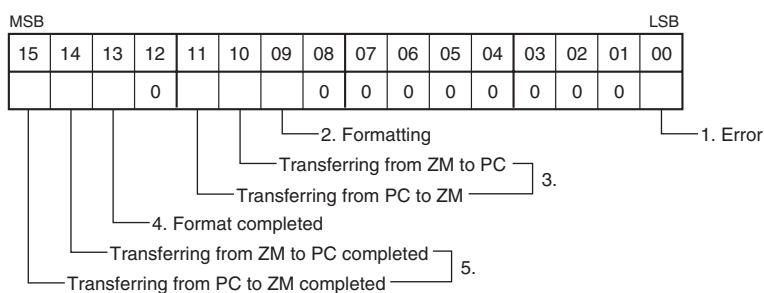
The selected or transferred file number is stored.

E. CFM_RECNo (n + 4)

The selected or transferred record number is stored.

F. CFM_TRFIN (n + 5)

Formatting or data transferring condition between the Control Terminal ZM series (= memory card) and PC is stored. Details are shown below:



Bit No.	Contents	Description
0	Error	When an error has occurred during formatting or transferring, this bit is set to "1." Bits for (2) "formatting" and (3) "transferring" remain "1," and bits for (4) "format completed" or (5) "transferring completed" remain "0."
1 to 8	Not used	These bits must be reset to "0."
9	Formatting	While formatting, this bit is set to "1."
10	Transferring from ZM to PC	While transferring, this bit is set to "1."
11	Transferring from PC to ZM	While transferring, this bit is set to "1."
12	Not used	This bit must be reset to "0."
13	Format completed	When formatting has been completed, this bit is set to "1."
14	Transferring from ZM to PC completed	When transferring has been completed, this bit is set to "1." The file or record number transferred can be checked with "CFM_FILENo" (n + 3) and "CFM_RECNo" (n + 4). After checking that transferring has been completed, reset bit 14.
15	Transferring from PC to ZM completed	When transferring has been completed, this bit is set to "1." The file or record number transferred can be checked with "CFM_FILENo" (n + 3) and "CFM_RECNo" (n + 4). After checking that transferring has been completed, reset bit 15.

[Type]

Specify the types of files into which the memory card can be divided.
Choose from the following three options.

◆ [Not Used]

Files are not used.

◆ [Data File]

This is a file type required for the memory manager function.

◆ [Buffering File]

This is a file type required for the data logging function.

The following options become active when [Data File] is chosen for [Type].

[No. of Records]

Specify the number of records to divide a file. 1 to 4,095 can be specified.

[Bytes for Record]

Specify the maximum number of characters for giving names to records in the range of 0 to 32.

When displaying or editing record names, refer to this number of bytes.

Notes

The maximum available number for [No. of Data] varies depending on the model of the Control Terminal ZM series.

[No. of Data]

Specify the number of words to be recorded. 1 to 4,096 can be specified in the ZM-*2, and 1 to 1,024 can be specified in the ZM-41/70.

[Memory]

When transferring data from the memory card to PC, specify the top memory address for storing data in the PC memory.

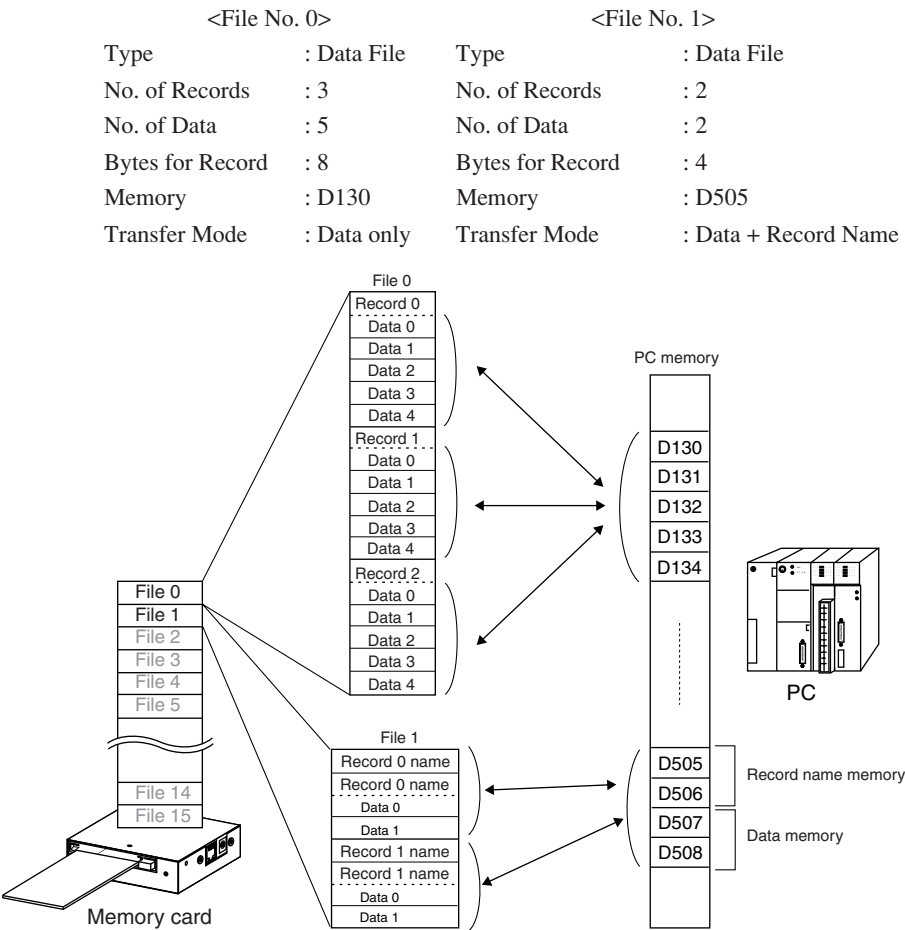
[Transfer Mode]

When transferring data between the memory card and PC, the minimum unit is a “record.” Data in each record is read or written. Choose either [Data only] or [Data + Record Name].

One file has been created. When editing a file other than this, click the tab in the [Memory Card] dialog. The corresponding tab window is opened.

Memory Card Setting Example

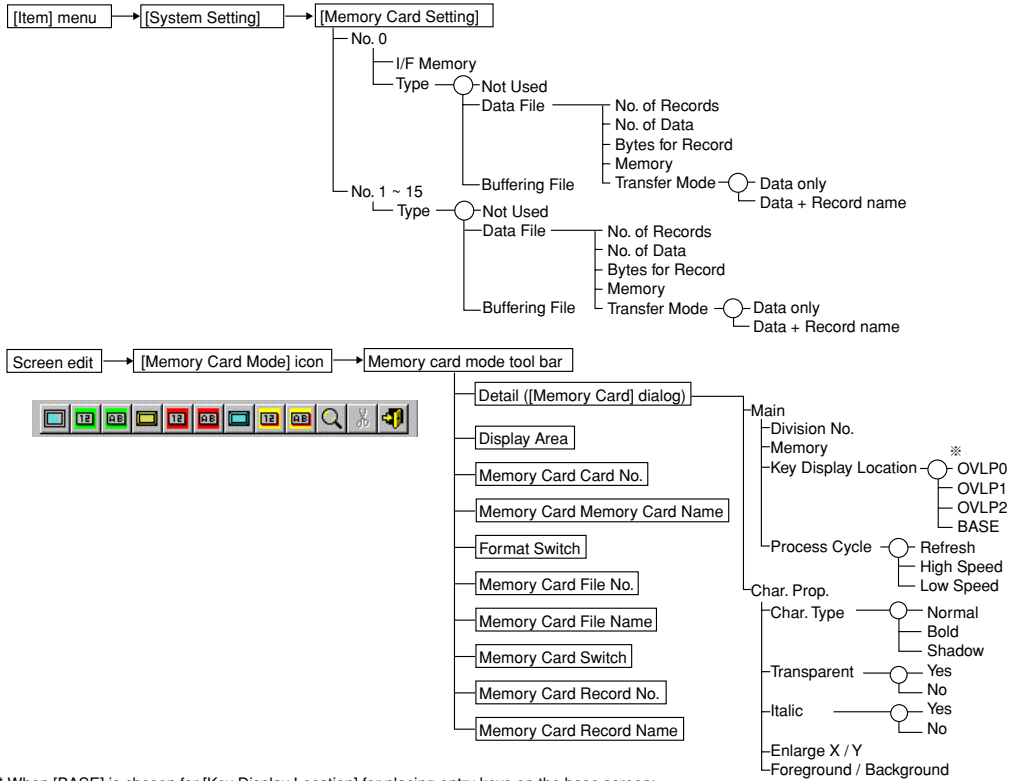
When the options in the [Memory Card] dialog are set as this example, the area divisions in the memory card and their relationship with the PC memory can be illustrated as shown below:



Memory Manager Function

Memory Manager Function Setting Procedure

The following settings are required for using the memory manager function.



* When [BASE] is chosen for [Key Display Location] for placing entry keys on the base screen:

Screen edit → [Entry Mode] icon → Entry mode

* When [OVLP0/1/2] is chosen for [Key Display Location] for placing entry keys on a normal overlap:

Screen edit → [Overlap] icon → [Normal] → [Overlap (Normal)] dialog
 — [Editing layer change: OVLP0/1/2] → [Entry Mode] icon → Entry mode

* When [OVLP0/1/2] is chosen for [Key Display Location] for placing entry keys on a multi-overlap or call-overlap.

Screen edit → [Overlap] icon → [Multi (or Call)] → [Overlap (Multi/Call)] dialog

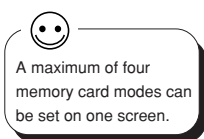
Multi-overlap edit → [Overlap] icon → [Overlap (Normal)] dialog
 — [Editing layer change: OVLP0] → [Entry mode] icon → Entry mode

When editing file or record names in the memory card, entry mode must be set. The setting procedure varies for placing entry keys on the base screen and on an overlap.

[Memory Card] Dialog



This dialog must be set for using the memory manager or data logging function. Click the [Detail] icon in the memory card mode tool bar. The [Memory Card] dialog is displayed.



(Main) Tab Window

[Division No.]

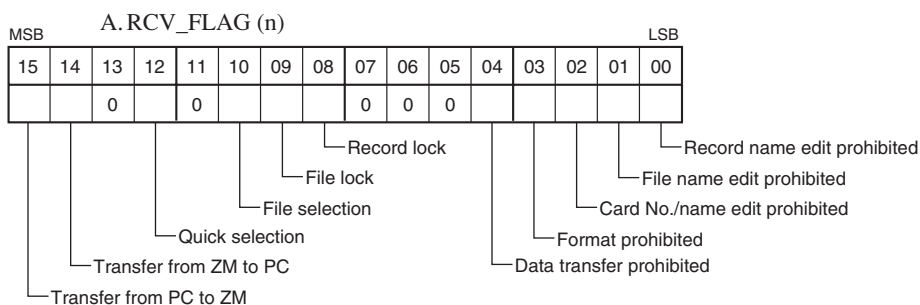
In one division, only one memory card mode can be registered.

Each of the base screen and overlaps 0 to 2 can contain one memory card mode.

[Memory]

When transferring data between the Control Terminal ZM series and PC, specify the top memory address in PC for data storage. The contents are as shown below:

Memory	Memory name	Function
n	RCV_FLAG	Mode operation command
n+1	RCV_FILENo	File number designation
n+2	RCV_RECDDNo	Record number designation



Bit No.	Contents	Description
0	Record name edit prohibited	Record name edit is prohibited.
1	File name edit prohibited	File name edit is prohibited.
2	Card No./name edit prohibited	Card number and name edit is prohibited.
3	Format prohibited	Memory card formatting is prohibited.
4	Data transfer prohibited	Data transfer between the Control Terminal ZM series (memory card) and PC is prohibited.
5 ~ 7	Not used	These bits must be reset to "0."
8	Record lock	The use of [Record Select] switch is prohibited.
9	File lock	The use of [File Select] switch is prohibited.
10	File selection	In the display area part: [0]: Only the files for [Type: Data File] are displayed. [1]: All files are displayed.

Bit No.	Contents	Description
11	Not used	This bit must be reset to "0."
12	Quick selection	When bit 14 or bit 15 is set to "1," while this bit is set, data is transferred upon selection of a record in the MONITOUCH V series.
13	Not used	This bit must be reset to "0."
14	Transfer from ZM to PC	Data is transferred from the Control Terminal ZM series (memory card) to PC at the edge of [0 -> 1]. When transferring has been completed, bit 14 of "CFM_TRFIN" (I/F memory n + 5) is set to "1." After transfer, reset this bit to "0."
15	Transfer from PC to ZM	Data is transferred from PLC to the Control Terminal ZM series (memory card) at the edge of [0 -> 1]. When transferring has been completed, bit 15 of "CFM_TRFIN" (I/F memory n + 5) is set to "1." After transfer, reset this bit to "0."

B. RCV_FILENo (n + 1)

This bit is used to specify a file number from PC when bit 9 (file lock) or bit 8 (record lock) of "RCV_FLAG" (n) is set to "1." File numbers can be specified from PC, not on the screen.

*** When [Not Used] or [Buffering File] is chosen for [Type] of the specified file number, the file number cannot be selected.**

C. RCV_RECDDNo (n + 2)

This bit is used for specifying a record number from PC when bit 8 (record lock) of "RCV_FLAG" (n) is set to "1." Record numbers can be specified from PC, not on the screen.

Unlike a selection by the [Record Select] switch, the record number specified is displayed on top of the display area.

[Key Display Location]

OVLP0 (= overlap 0)/OVLP1/OVLP2/BASE

When editing memory card number and name, file name, and record name, choose where to place the entry keys from overlaps 0 to 2 or the base screen. Only one place can be chosen.

[Process Cycle]

Choose the cycle for the Control Terminal ZM series to read data from PC during communication.

For more information, refer to page 3-9 in Chapter 3, "Screens."

(Char. Prop.) Tab Window

Set properties of characters for display in the display area. For more information, refer to page 8-7 in Chapter 8, “Message Display.”



When [OK] is clicked upon completion of setting of the [Memory Card] dialog, the dialog is reduced to an icon and stored in [Part] auxiliary tool box in the lower left corner of the screen. To recheck the set data or delete the icon, refer to page 1-9 in Chapter 1, “Basic Operation.”

[Display Area] Dialog



File names and record names stored in the memory card can be listed in the display area part in the memory manager function. Click the [Display Area] icon in the memory card mode tool bar to set the part.

Display Area Part Setting

The display area part must be linked with memory card mode to work as the display area for the memory manager function. Specify the same division number as in the [Memory Card] dialog.

For setting or editing procedure of display area parts, refer to page 8-9 in Chapter 8, “Message Display.”

Display Area Function

◆ Display of file names and record names

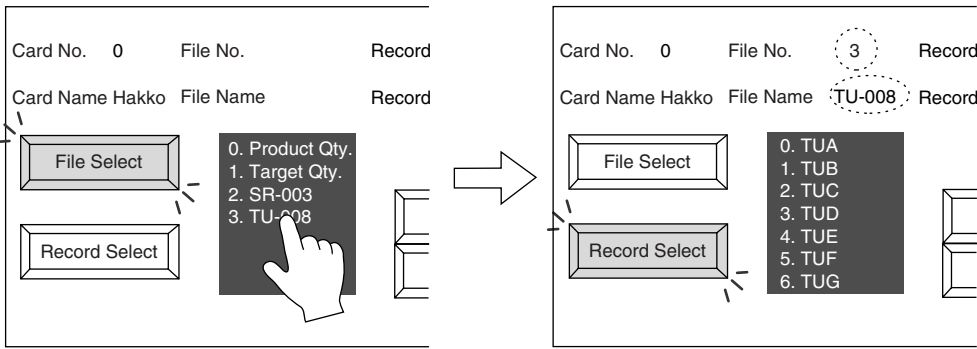
File names and record names can be listed in the display area part. To scroll the hidden part into view, use the Roll Up/Down switch or Plus/Minus Block switch with the same division number.

◆ Selection of files and records

Press the desired file or record in the display area part to choose it.

Since the display area part is equipped with a switch function, pressing a file or a record in the part allows its automatic selection.

The Y size of each switch is based on the Y enlargement factor specified for the characters in the display area part.

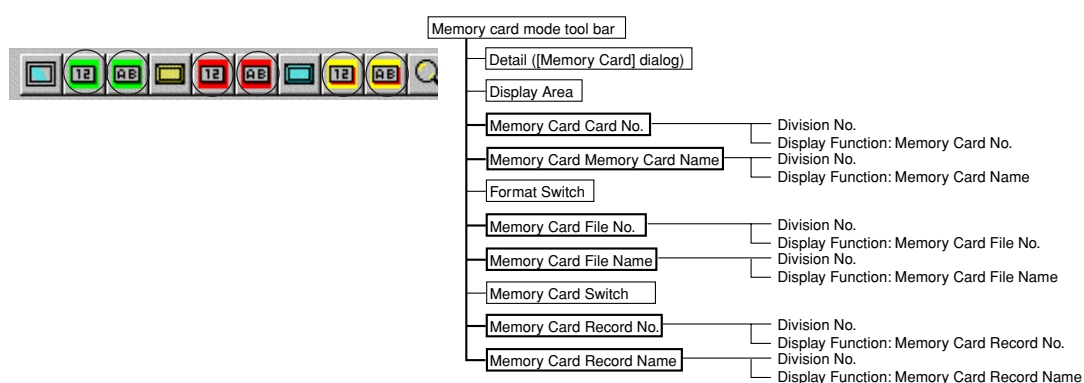


Data Display for Memory Manager Function

With the memory manager function, it is possible to show the memory card number and name, file number and name, and record number and name on the screen. For number display, use numerical data display parts; for name display, use character display parts.

Procedure of Data Display Function Setting

Choose the desired icon from [Memory Card Card No.], [Memory Card Memory Card Name], [Memory Card File No.], [Memory Card File Name], [Memory Card Record No.], and [Memory Card Record Name] in the memory card mode tool bar. The corresponding dialog is displayed.



(Memory Card Card No.) (Memory Card File No.) (Memory Card Record No.)

◆ Outline

The memory card, file, and record numbers in use or currently selected can be indicated on the screen with the memory manager function.

Card No.	12	File No.	3	Record No.	6
Card Name	ECM	File Name	Target value	Record Name	SDY-K

◆ Notes on setting

When setting the numerical data display parts, note the following:

[Division No.]

Specify the same division number as in the [Memory Card] dialog.

[Display Function]

Choose from [Memory Card No.], [Memory Card File No.], or [Memory Card Record No.].

When the desired display function is clicked in the memory card mode tool bar, the function is automatically chosen as default in the dialog to be opened.

[Digits]

- ◎ When [Memory Card No.] is chosen for [Display Function]:
Because the available card numbers are 0 to 255, specify in the range of “1” to “3.”
- ◎ When [Memory Card File No.] is chosen for [Display Function]:
Because the available file numbers are 0 to 15, specify “1” or “2.”
- ◎ When [Memory Card Record No.] is chosen for [Display Function]:
Because the available record numbers are 0 to 4,094, specify in the range of “1” to “4.”

If a smaller number than required is specified, numbers will not be shown correctly.

(Memory Card Memory Card Name) (Memory Card File Name) (Memory Card Record Name)

◆ Outline

The memory card, file, and record names in use or currently selected can be indicated on the screen with the memory manager function.

Card No. 12	File No. 3	Record No. 6
Card Name ECM	File Name Target value	Record Name SDY-K

◆ Notes on setting

When setting the character display parts, note the following:

[Division No.]

Specify the same division number as in the [Memory Card] dialog.

[Display Function]

Choose from [Memory Card Name], [Memory Card File Name], or [Memory Card Record Name].

When the desired display function is clicked in the memory card mode tool bar, the function is automatically chosen as default in the dialog to be opened.

[Bytes]

For card, file, and record name editing, specify the desired number of bytes within the range of 0 to 32.

*** For record names, [Bytes for Record] is specified for each file in the [Memory Card] dialog; therefore, select the greatest number of bytes for the files.**

Switches for Memory Manager Function

Switches for file or record selection in the memory card or data transfer from PC to the memory card are available with the memory manager function.

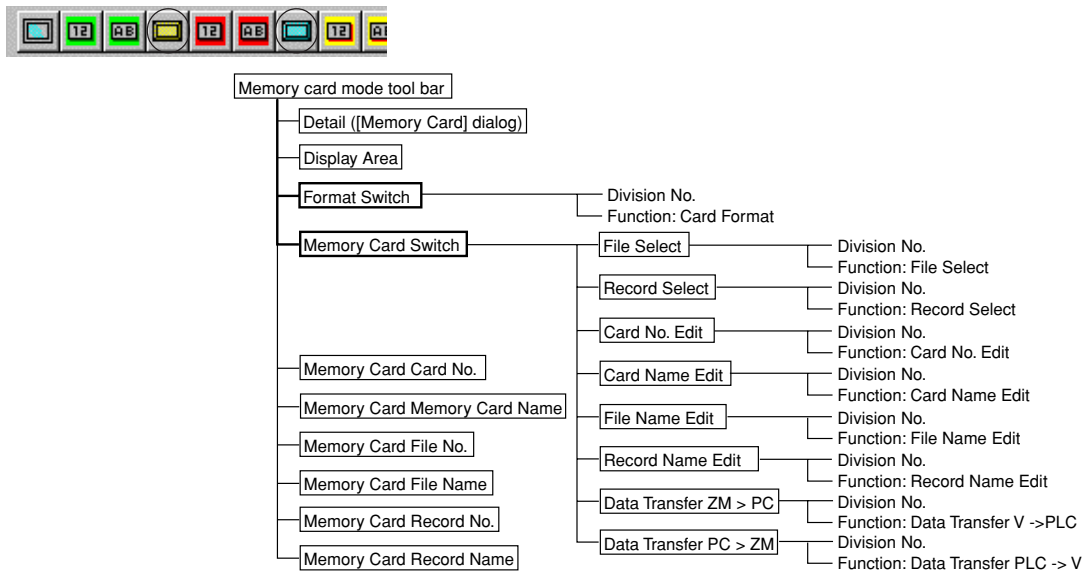
Switch Setting Procedure

The switches used in memory card mode are classified into two categories: the ones exclusively used in memory card mode and those available in memory card mode.

◆ Exclusive use in memory card mode

By clicking [Format Switch] in the memory card mode tool bar, the [Switch] dialog indicating [Card Format] for [Function] is opened.

Clicking the [Memory Card Switch] icon brings up the pull-down menu. By clicking the desired option, the [Switch] dialog indicating the same option for [Function] is opened.



◆ Switches available in memory card mode

Click the [Switch] icon in the tool bar. Choose the desired switch part. Specify [Roll Up], [Roll Down], [Plus Block] or [Minus Block] for [Function].

*** When creating a switch from the [Switch] icon in the tool bar, an option must be chosen for [Function] by the operator.**

Notes on Switch Setting

[Division No.]

Specify the same division number as in the [Memory Card] dialog.

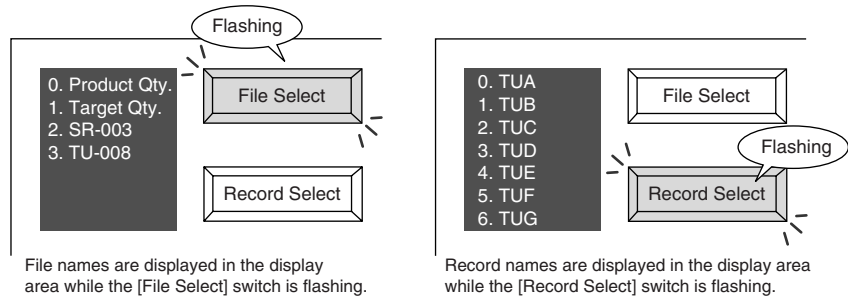
[Function]

The following switch functions are available in memory card mode.

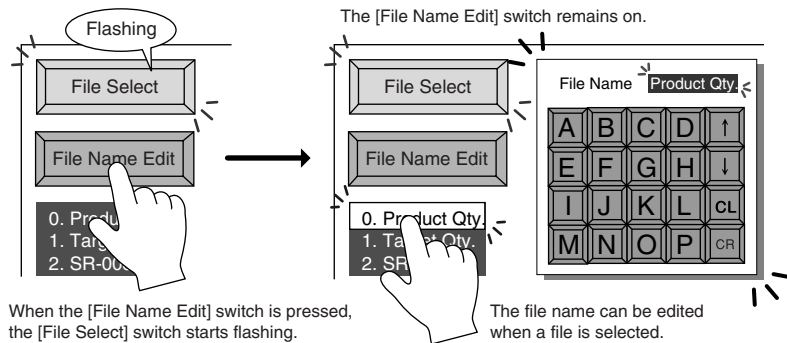
Card Format	Pressing this switch formats the memory card as specified in the [Memory Card] dialog. * This switch is required for the data logging function as well.
File Select	When file names in the memory card are displayed, this switch starts flashing. Pressing on a file name selects it.
Record Select	This switch is active when a file has been chosen. Pressing this switch brings up record names in the display area. The switch starts flashing. Pressing on a record name selects it. The switch keeps flashing.
Card No. Edit Card Name Edit	Attached data: multi-overlap number/ MLIB placement position Press the corresponding switch when you want to start editing card numbers or names. When the entry keys (entry mode) are placed on the base screen, the keys can be used. When the entry keys (entry mode) are placed on an overlap, the overlap is called up and the keys can be used. * The settings of the multi-overlap number and the MLIB placement position become active only when the entry keys (entry mode) are placed on the multi-overlap.
File Name Edit	Attached data: Multi-overlap number/ MLIB placement position When this switch is pressed, it is turned on. At the same time, the [File Select] switch starts flashing, indicating that a file can be selected. When a file is selected while the [File Name Edit] switch is turned on, the file name can be edited using entry keys. Pressing this switch turns it on, and pressing the switch again turns it off. (The switch is not active during file name or record name editing.) * The settings of the multi-overlap number and the MLIB placement position become active only when entry keys (entry mode) are placed on the multi-overlap.
Record Name Edit	Attached data: Multi-overlap number/MLIB placement position When this switch is pressed, it is turned on. When a record is selected while the [Record Name Edit] switch is turned on, the record name can be edited using entry keys. Pressing this switch turns it on, and pressing the switch again turns it off. (The switch is not active during file name or record name editing.) * The settings of the multi-overlap number and the MLIB placement position become active only when the entry keys (entry mode) are placed on the multi-overlap.
Data Transfer ZM -> PC	This switch is active only when a record in the memory card is selected. The selected record is transferred from the memory card to PLC. The data is stored in the memory address specified for [Memory] in the [Memory Card] dialog.
Data Transfer PC -> ZM	This switch is active only when a record in the memory card is selected. As many data in the selected record as specified is transferred from PLC to the memory card. The number of data to be transferred is specified by the [No. of Data] option in the [Memory Card] dialog. The data is stored in the memory address specified for [Memory].
Roll Up	Pressing this switch scrolls up file or record names one by one in the display area.
Roll Down	Pressing this switch scrolls down file or record names one by one in the display area.
Plus Block	Pressing this switch scrolls up pages of file or record names in the display area.
Minus Block	Pressing this switch scrolls down pages of file or record names in the display area.
Reset	When "11" or "12" is stored in the I/F memory address "n + 1" (specified in the [Memory Card] dialog), pressing this switch clears the data in "n + 1." (The error bit of "n" remains set.)

Examples of Switch Operations

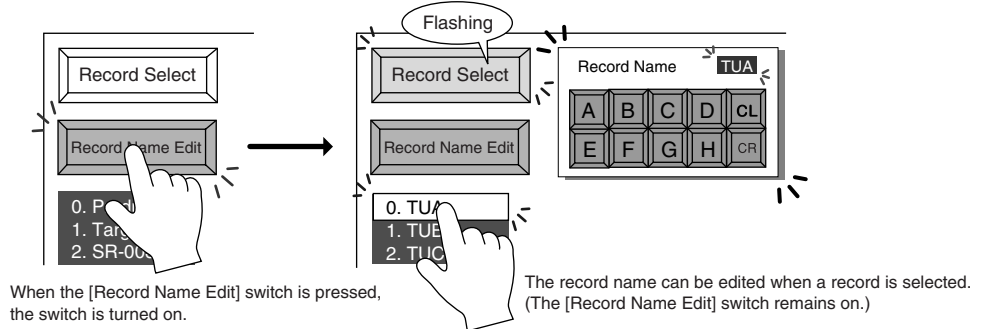
◆ [File Select] and [Record Select] switches



◆ [File Name Edit] switch



◆ [Record Name Edit] switch



Entry Key (Entry Mode) Setting

When using the memory manager function, card numbers and file names can be edited on the screen provided that the entry mode is set.

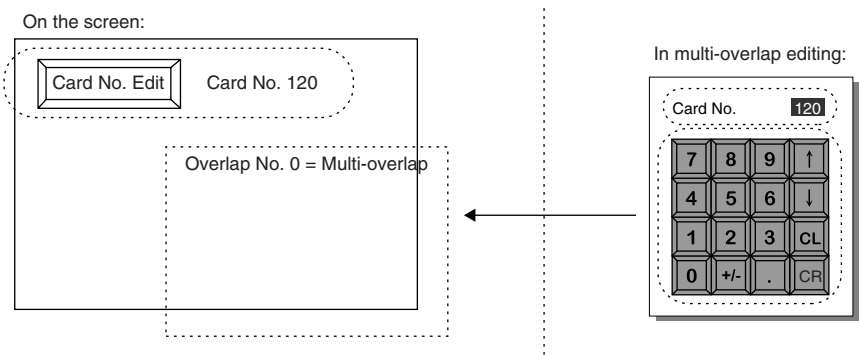
Place entry keys on the base screen or an overlap. For an overlap, choose [Normal], [Call], or [Multi] from the [Overlap Setting] dialog.



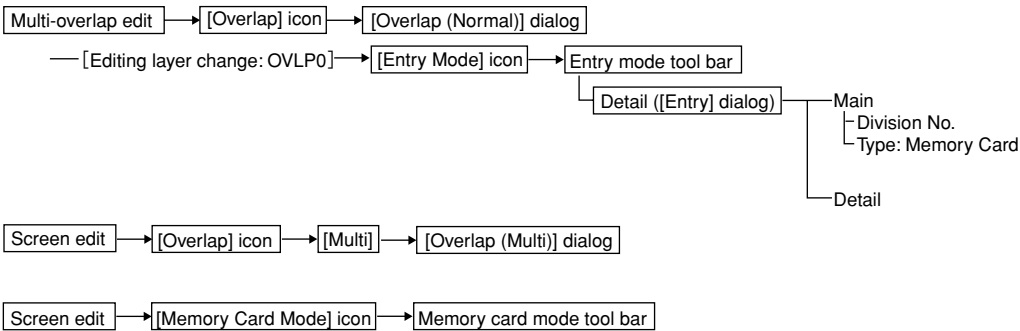
Entry keys can be placed in one location for one memory card mode.

Placing Entry Keys on Multi-Overlap

To allow operators to edit card numbers or file names (by pressing the [Card No. Edit] or [File Name Edit] switch), an overlap in entry mode must be set in multi-overlap editing. The overlap equipped with entry keys is brought up when the switch is pressed, and is cleared when the editing has been completed.

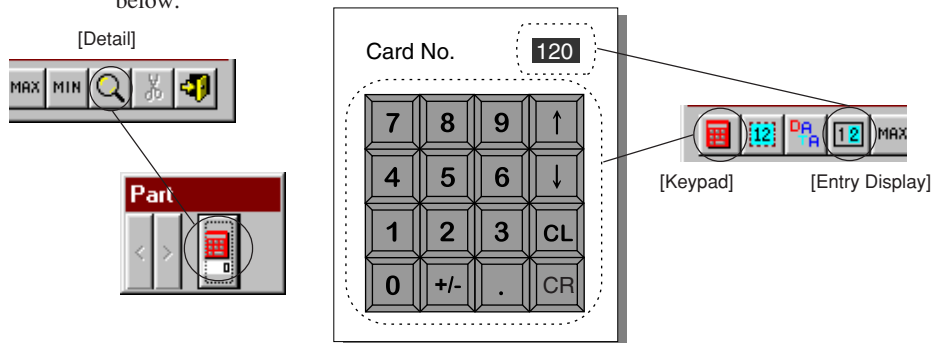


◆ Setting procedure



◆ Setting in multi-overlap editing

After an overlap part has been placed, set entry mode on the overlap as explained below.



◎ [Keypad] icon (= entry keys)

Click the [Keypad] icon in the entry mode tool bar. Choose the desired part and place it on the overlap.

*** The same division number as in the [Entry] dialog must be used for all entry key switches.**



◎ [Entry Display] icon

Click the [Entry Display] icon in the entry mode tool bar. The pull-down menu is displayed.

To call up the overlap for number edit, choose [Numerical Data]. To call up the overlap for name edit, choose [Character].

*** The same division number as in the [Entry] dialog must be used for all entry display parts.**



◎ [Entry] dialog

Set the dialog on the same editing layer and in the same division as entry keys. Note the following.

[Division No.]

Specify the same division number as specified for entry keys and entry display parts.

[Type]

Choose [Memory Card]. The entry mode for memory card mode is set up.

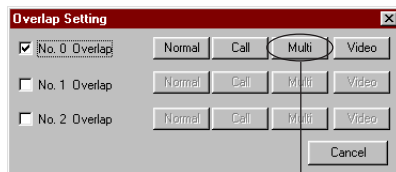
◆ Setting on the screen

The following two settings are necessary on the screen.

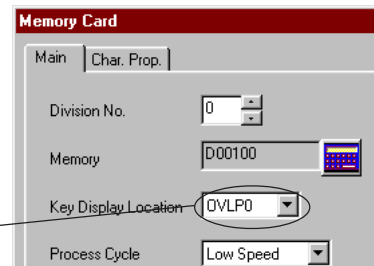
◎ Overlap setting

To call up an overlap on the screen, an overlap setting must be made for the screen. Be sure to choose [Multi] for [Type].

For more information on overlap setting, refer to page 4-11 in Chapter 4, “Overlap.”



These items are related.



◎ Memory card mode setting

○ [Key Display Location] in the [Memory Card] dialog

Choose from [OVLP0], [OVLP1], or [OVLP2], for which [Multi] is chosen in the [Overlap setting] dialog.

Entry keys can be placed only in one position. (It is not possible to use entry keys on both the base screen and an overlap in one memory card mode.)



When [OVLP0 to OVLP2] is chosen for [Key Display Location] and [OK] is clicked, the [Overlap (Multi)] dialog is automatically displayed. Set appropriately, or if not required, click [Cancel].

○ Switches for memory card mode

[Card No. Edit] [Card Name Edit] [File Name Edit] [Record Name Edit]

When entry keys are placed on a multi-overlap, these four switches work as “multi-overlap call switches.” Therefore, each switch must be equipped with a multi-overlap number and an MLIB placement position.

The setting procedure of these switches is the same as used for a switch for [Function: Multi-Overlap].

Placing Entry Keys on Call-Overlap

The setting procedure is almost the same as that for placing on a multi-overlap.

The following explains the different points.

◆ Setting on the screen

◎ Overlap setting

Choose [Call] in the [Overlap Setting] dialog. An MLIB placement position must be set.

For overlap setting procedure on the screen, refer to page 4-15 in Chapter 4, “Overlap.”

◎Memory card mode setting

○[Key Display Location] in the [Memory Card] dialog

Choose from [OVLP0], [OVLP1], or [OVLP2] for which [Call] is chosen in the [Overlap Setting] dialog.

○Switches for memory card mode

[Card No. Edit] [Card Name Edit] [File Name Edit] [Record Name Edit]

These four switches function as “call-overlap call switches.”

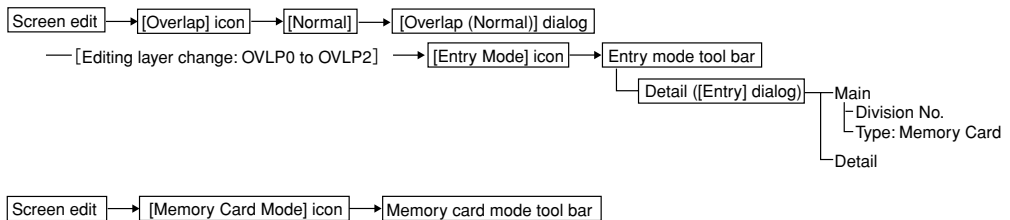
The attached data - multi-overlap number and MLIB placement position - is not valid.

Placing Entry Keys on Normal Overlap

To allow operators to edit card numbers or file names (by pressing the [Card No. Edit] or [File Name Edit] switch), an overlap in entry mode must be set in overlap editing.

The overlap equipped with entry keys is brought up when the switch is pressed, and is cleared when the editing has been completed.

◆ Setting procedure



◆ Setting on the screen

◎Registration of a normal overlap

Set entry mode for the overlap. The setting procedure is the same as that for setting on a multi-overlap.

◎Memory card mode setting

○[Key Display Location] in the [Memory Card] dialog

Choose from [OVLP0], [OVLP1], or [OVLP2] for which [Normal] is chosen in the [Overlap Setting] dialog.



When [OVLP0 to OVLP2] is chosen for [Key Display Location] and [OK] is clicked, the [Overlap (Multi)] dialog is automatically displayed. Click [Cancel].

○Switches for memory card mode

[Card No. Edit] [Card Name Edit] [File Name Edit] [Record Name Edit]

When entry keys are placed on an overlap, these four switches work as “overlap call switches.” The attached data - multi-overlap number and MLIB placement position - is not valid.

Placing Entry Keys on Base Screen

Entry keys become available by pressing the [Card No. Edit] or [File Name Edit] switch. Entry mode and memory card mode are set on the same screen. The following settings are required.

◆ Entry mode setting

Set entry mode. The setting procedure is the same as that for setting on a multi-overlap.

◆ Memory card mode setting

Note the following points.

◎ [Key Display Location] in the [Memory Card] dialog

Choose [BASE].

◎ Switches for memory card mode

[Card No. Edit] [Card Name Edit] [File Name Edit] [Record Name Edit]

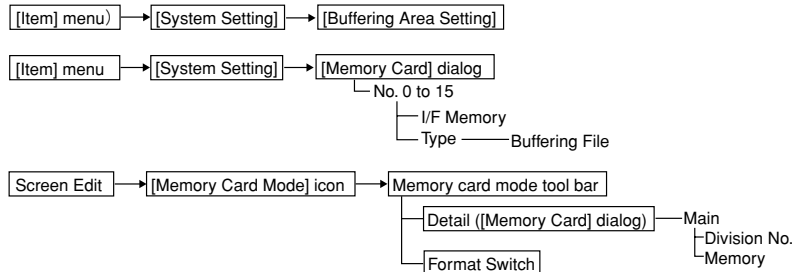
Entry keys can be used by pressing these switches.

The attached data - multi-overlap number and MLIB placement position - is not valid.

Data Logging Function

Data Logging Function Setting Procedure

The following settings are required for using the data logging function.



Memory Card and Buffering Area Settings

The [Buffering Area Setting] dialog and [Memory Card] dialog from [System Setting] must be set for using the data logging function.

Buffering Area Setting

Choose [Memory Card] for [Store Target]. Specify a file number for [Output File]. When setting [Output File], choose the same number as the file number in the [Memory Card] dialog (refer to the following explanation).

Memory Card Setting

Choose [Buffering File] for [Type] in the [Memory Card] dialog selected from [System Setting]. The file number for which [Buffering File] is chosen must be specified for [Output File] in the [Buffering Area Setting] dialog.

Memory Card Mode Setting

The following memory card mode settings are required for the data logging function.

◆ [Card Format] switch

It is necessary to format the memory cards. Set the [Card Format] switch by clicking the [Format Switch] icon in the memory card mode tool bar. Specify the same division number as in the [Memory Card] dialog mentioned below.



Formatting can only be executed by pressing the [Card Format] switch.

◆ [Memory Card] dialog setting

The [Memory Card] dialog must be set to operate the [Card Format] switch correctly.

Memory card formatting is permitted or prohibited via the memory address specified for [Memory].

Specify the same division number as in the [Card Format] switch.

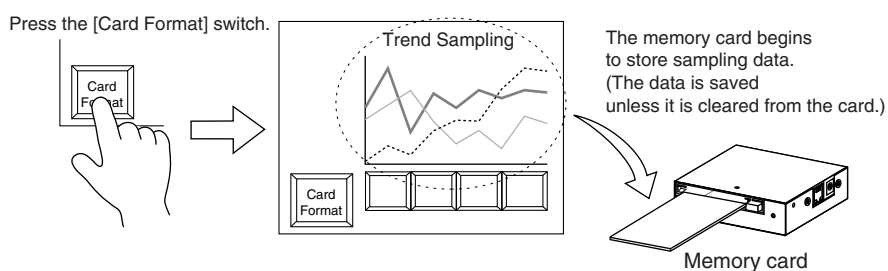
Sampling Mode Setting

The data logging function is available for the following three types in sampling mode: trend sampling, data sampling, and bit sampling.

Sampling mode and memory card mode can be set on the same screen or on different screens.

For more information on sampling mode setting, refer to Chapter 12, “Sampling Mode.”

When the memory card is formatted by pressing the format switch, sampling mode operation starts. Since the data in the memory card remains intact unless the user resets or formats the card, the data displayed on the screen can be saved even if there is a power failure. (When the memory card is removed from the Control Terminal ZM series, the sampling data disappears from the screen temporarily.)





Macro

Macro Set-up

Macro is a function for composing programs with the ZM-#2's commands. Macro can be used in the following conditions:

The following macros are available for use.

☐ Screen

The three different types of macro to be executed when the screen is opened, closed, and while the screen is open are:

OPEN macro
CLOSE macro
CYCLE macro

☐ Multi-overlap

The macros to be used when the screen displays or erases a multi-overlap are:

OPEN macro
CLOSE macro

☐ Switch

Macros to be used when the operator touches or releases the switch are:

ON macro
OFF macro

☐ Macro mode

There are two different modes of macro to be executed when the corresponding bit of the PC memory changes from 0 to 1 (leading edge) or from 1 to 0 (falling edge):

ON macro
OFF macro

☐ Function switch

The macros to be used when the operator touches or releases the function key are:

ON macro
OFF macro

☐ Global macro

The macros which are edited in "Macro Block" edit can be executed when the bit in read area $n + 1$ changes from 0 to 1 (leading edge).

For information on global macro settings, see page 2-17.

Macro Commands

Table of Macro Commands

ARITHMETIC OPERATIONS (page 14-3)

Command	Contents
ADD	Addition $F0 = F1 + F2$
SUB	Subtraction $F0 = F1 - F2$
MUL	Multiplication $F0 = F1 \times F2$
DIV	Division $F0 = F1 / F2$
MOD	The remainder $F0 = F1 \% F2$
MAX	Maximum $F0 = \text{MAX}(F1, C:F2)$
MIN	Minimum $F0 = \text{MIN}(F1, C:F2)$
AVG	Average $F0 = \text{AVG}(F1, C:F2)$
SUM	Sum $F0 = \text{SUM}(F1, C:F2)$

LOGICAL OPERATIONS (page 14-5)

Command	Contents
AND	Logical product $F0 = F1 \text{ I } F2$
OR	Logical add $F0 = F1 \text{ \& } F2$
XOR	Exclusive OR $F0 = F1 \text{ ^ } F2$

BIT PROCESSING (page 14-7)

Command	Contents
BSET	Bit setting (F0 Bit No.)
BCLR	Bit resetting (F0 Bit No.)
BINV	Bit inversion (F0 Bit No.)

BRANCH INSTRUCTION (page 14-10)

Command	Contents
CMP	Compare IF($F0=F1$) LBnn
TST	Logical product comparison IFZ ($F0\&F1$) LBnn
JMP	Jump JMP LBnn
LABEL	Label LBnn:F0
CALL	Macro call CALL F0
FOR	Loop position between FOR and NEXT
NEXT	FOR F0: NEXT
RET	Finish macro processing
;	Comment

SWITCHES (page 14-12)

Command	Contents
WAIT	Wait
SWRET	Finish macro processing SWRET

VIDEO (page 14-21)

Command	Contents
VIDEO	Video MEMORY F0

TREND SAMPLING (page 14-12)

Command	Contents
TREND REFRESH	Change scales of trend sampling

CONVERT (page 14-6)

Command	Contents
BCD	BCD convert $F0 = F1 \text{ BCD}$
BIN	BIN convert $F0 = F1 \text{ BIN}$
CWD	CWD convert from single-word to double-word $F0 = F1 \text{ D<-W}$
CVP	DEC -> PC convert $F0 = F1 \text{ PC<-}$
CVB	PLC -> DEC convert $F0 = F1 \text{ <-PC}$
SWP	MSB, LSB convert $F0 \text{ C:F1}$
CHR	Strings -> CODE convert $F0 = "$

SHIFT (page 14-8)

Command	Contents
SHL	Shift left $F0 = F1 \ll F2$
SHR	Shift right $F0 = F1 \gg F2$

TRANSMIT (page 14-9)

Command	Contents
MOV	Transmit $F0 = F1$
BMOV	Block transmit $F0 = F1 \text{ C:F2B (BMOV)}$
FILL	Transmit all $F0 = F1 \text{ C:F2 (FILL)}$

SYS COMMAND (page 14-13)

Command	Contents
SET_SCRN	Screen number setting
SET_MOVL	Multi-overlap setting
OVLP_SHOW	Overlap On/Off
OVLP_POS	Overlap position setting
GET_TIME	Get the system time
STA_TIME	Start the timer
CHK_TIME	Check the time of the timer
GET_CLND	Get the calendar
SET_CLND	Calendar setting
GET_SMPL	Get sampled data
GET_SCUR	Get the cursor point of sampling
SET_BUFNO	Buffer number setting
GET_MSG	Get the message
STA_LIST	Print out the data sheet
OUT_ENQ	Interrupt via serial port
DSP_DATA	Display/not display the data display (=numeric data)
CHG_DATA	Change the property of the data display (=numeric data)
GET_XY	Get the X and Y coordinates
SET_BZ	Buzzer ON/OFF

Explanation of Macro Commands

What follows is a detailed explanation of how macro commands can be used.

Arithmetic Operations

ADD

The result of F1 plus F2 is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

ADD: Addition $F0=F1+F2$

SUB

The result of F1 minus F2 is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

SUB: Subtraction $F0=F1-F2$

MUL

The result of F1 multiplied by F2 is moved to F0 (with plus or minus sign).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

MUL: Multiplication $F0=F1 \times F2$

DIV

The result of F1 divided by F2 is moved to F0 (with plus or minus sign).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

DIV: Division $F0=F1 / F2$

MOD

The remainder of F1 divided by F2 is moved to F0 (with plus or minus sign).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

MOD: Remainder $F0=F1 \% F2$

◎MAX

The result of comparing the words of F1 and F2 and moving the greater number to F0. If F2 is memory, the memory value becomes the word count.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2	○		○			○

MAX: Maximum $F0=MAX (F1 \ C: F2)$ C: Maximum 512 words

◎MIN

The result of comparing the words of F1 and F2 and moving the smaller number to F0. If F2 is memory, the memory value becomes the word count.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2	○		○			○

MIN: Minimum $F0=MIN (F1 \ C: F2)$ C: Maximum 512 words

◎AVG

The result of averaging the words of F1 and F2 is moved to F0. If F2 is memory, the memory value becomes the word count.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2	○		○			○

AVG: Average $F0=AVG (F1 \ C: F2)$ C: Maximum 512 words

◎SUM

The result of adding the words of F1 and F2 is moved to F0. If F2 is memory, the memory value becomes the word count.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2	○		○			○

SUM: Sum $F0=SUM (F1 \ C: F2)$ C: Maximum 512 words

○Logical Operations

◎AND

The result of F1 ANDed with F2 is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

AND: Logical product **F0=F1 & F2**

◎OR

The result of F1 ORed with F2 is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

OR: Logical add **F0=F1 | F2**

◎XOR

The result of F1 XORed with F2 is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○		○	○

XOR: Exclusive OR **F0=F1 ^ F2**

○Convert

◎BCD

F1 binary data converted to BCD is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2						

BCD: BCD convert

F0=F1 BCD

◎BIN

F1 BCD data converted to binary data is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2						

BIN: BIN convert

F0=F1 BIN

◎CWD

When the sign of F1 data is expanded, the double-word result is placed in F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2						

CWD: Convert from single-word
to double-word

F0=F1 D<-W

◎CVP

F1 PC-format data converted to binary data is placed in F0. (Applicable to the PC in Yaskawa and Fuji.)

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2						

CVP: Convert from PC to DEC

F0=F1 PLC<-

◎CVB

F1 binary data converted to the PC-format data is placed in F0. (Applicable to the PC in Yaskawa and Fuji.)

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○				○	○
F2						

CVP: Convert from DEC to PC

F0=F1 <-PLC

◎SWP

The high- and low-order words are swapped and are placed in F0. F1 designates the number of words.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○			○
F2						

SWP: LSB <----> MSB

F0=F1 (SWAP)

◎CHR

The characters located between the [' '] are converted with the shift JIS code and moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	
F1						
F2						

CHR: Character -> code convert

F0=' Character '

○Bit Processing

In bit processing, the method which the devices with non-bit-writable memory (check-marked devices in “Hardware Specifications”) employ to write on are as follows:

1. 1 word specified by a bit is read.
2. The word that is read turns the bit ON, OFF, or inverts it, and then the word is ORed.
3. The ORed word is written on the PC.

After (1.) is performed, even if the bit in the same word from the sequence program is changed, when action (3.) occurs, the word is written as it was in (1.).

◎BSET

The memory bit located in F0 is set (ON).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○	○		○	○	
F1						
F2						

BSET: Bit set

F0 (ON)

◎BCLR

The memory bit located in F0 is reset (OFF).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○	○		○	○	
F1						
F2						

BCLR: Bit reset

F0 (OFF)

◎BINV

The memory bit located in F0 is inverted.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○	○		○	○	
F1						
F2						

BINV: Bit invert

F0 (INV)

○SHIFT

◎SHL

Result of F1 logical-shifted to the left (by the number specified in F2) is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○			

SHL: Left shift

F0=F1<<F2

◎SHR

Result of F1 logical-shifted to the right (by the number specified in F2) is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	○
F1	○		○		○	○
F2	○		○			

SHR: Right shift

F0=F1>>F2

○Transmit

◎MOV

F1 is moved to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○	○		○	○	○
F1	○	○	○	○	○	○
F2						

MOV: Transmit

F0=F1 = F2

◎BMOV

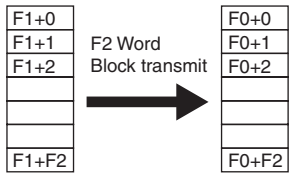
Words from F1 are moved to F2 and transmitted in a block to F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○	○		○	○	
F1	○	○		○	○	
F2	○	○				

BMOV: Block transmit

F0=F1 C; F2(BMOV)



* Cannot use PC memory in both F0 and F1 at the same line.
Use internal memory in F0 or F1.

◎FILL

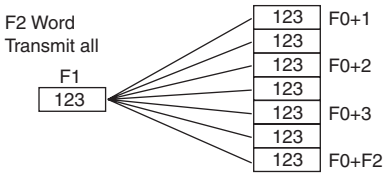
Words from F1 are moved to F0. F2 designates the number of words.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○				○	
F1	○		○			
F2	○		○			

FILL: Transmit all

F0=F1 C; F2(FILL)



○ Branch Instruction

◎ CMP

If the comparison result of F0 and F1 satisfies the specified condition (with signs), a jump to F2 label takes place. The maximum LB setting is 128 (ZM-*2) and 32 (ZM-41/70).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○		○		○	○
F1	○		○		○	○
F2			○			

CMP: Compare

IF (F0 (conditions) F1) LBF2

Conditions

==	equal
!=	different
<	less than
>	greater than
<=	less than or equal to
>=	greater than or equal to

◎ TST

If the result of F0 ANDed with F1 is [0], a jump to F2 label takes place. The maximum LB setting is 128 (ZM-*2) and 32 (ZM-41/70).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○		○		○	○
F1	○		○		○	○
F2			○			

TST: 0 compare

IFZ (F0 & F1) LBF2

Conditions

IFZ : 0

IFNZ : Other than 0

◎ JMP

Unconditional jump to F0 label takes place. The maximum LB setting is 128 (ZM-*2) and 32 (ZM-41/70).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0			○			
F1						
F2						

JMP: Unconditional jump

JMP LBF0

◎ LABEL

The destination for [CMP], [TST] and [JMP] is shown. The maximum LB setting is 128 (ZM-*2) and 32 (ZM-41/70).

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0			○			
F1						
F2						

LABEL: Label No.

LABEL F0

◎CALL

The macro block specified in F0 is executed.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○		○			
F1						
F2						

CALL: Macro block number specification **CALL F0**

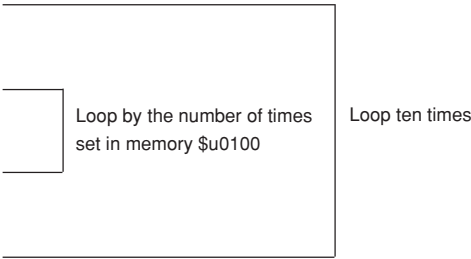
◎FOR/NEXT

Loop is conducted between FOR and NEXT by the number of times set in F0.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	○		○			
F1						
F2						

FOR: FOR ~ NEXT **FOR F0**



◎RET

Macro processing is terminated.

RET terminates the macro block which was triggered by the CALL command, and returns to the original sequence. [RET] may be omitted at the end of the macro.

◎(;) Comment

A comment line can be inserted.

No command processing is required.

○Switches

◎SWRET

SWRET is used in the switch ON macro, and it acts the same as RET. In switch ON macro, the switch function is executed following execution of ON macro. However, when a SWRET command is included in the ON macro, macro processing is interrupted. After a switch function is executed, then the macro after the SWRET command is executed.

◎WAIT (ZM-41/70)

A switch function is executed when the macro that is running is interrupted by the SWRET command described above. The switch function enters internal memory data, and when using this memory (during macro execution) after issuing a SWRET command, the line following SWRET is WAIT. WAIT command makes the macro programs stop until the switch function is finished. If there is no WAIT command, the memory value may not be correct due to internal processing.

<Ex.> The result of the entered value by the [ENT] key (address : \$u100) multiplied by 100 (address : \$u200) is written into the PC memory (address : D160).

Entry Screen

Max. value 9999

Min. value 0

Value entered 123

Data 1 123

7	8	9	UP
4	5	6	DW
1	2	3	CLR
0	.	+/-	ENT

ON macro of the [ENT] switch

SWRET

WAIT

\$u200=\$u100

\$u200=\$u200×100

D160=\$u200

When the value, [123], is entered by the [ENT] key, the value, [12300] is written into the address [D160]. If there is not [WAIT] command in the above ON macro, the correct value cannot be written into D160.

○Trend Sampling

◎TREND REFRESH

This command changes scales of trend sampling.

Usable Devices						
	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0			○			
F1			○			
F2						

TREND REFRESH F0 : F1

F1+0	Layer (0~3)
F1+1	Division No. (0~255)

◎SYS

Calculation SYS F0 F1
 Description According to information taken from the Control Terminal ZM-*2, an action specified in F0 is requested to the Control Terminal ZM-*2 through the internal memory specified in F1.



Click the F0 box to bring up a system call list like the one to the right.

System call list	Contents
SET_SCRN	Screen setting *
SET_MOVL	Multi-overlap setting in the ZM-41/70 : *
OVLP_SHOW	Overlap ON/OFF in the ZM-41/70 : *
OVLP_POS	Overlap position change in the ZM-41/70 : *
GET_TIME	Get the system time
STA_TIME	Start the timer
CHK_TIME	Check the time of the timer
GET_CLND	Get the calendar
SET_CLND	Calendar setting
GET_SMPL	Get sampled data
GET_SCUR	Get the cursor point of sampling
SET_BUFNO	Set the system memory (\$S) buffer number
GET_MSG	Get the message from within the message group
STA_LIST	Print out the data sheet
OUT_ENQ	Interrupt via serial port
DSP_DATA	Numerical display ON/OFF
CHG_DATA	Change numerical display properties
GET_XY	Get the circumference coordinates
SET_BZ	Buzzer ON/OFF

* Screen OPEN/CLOSE cannot be executed by macro. Moreover, this system call is not immediately executed, but rather, is executed when the entire macro has been completed.

Only one system call is active for each window. If there is already a call for a window, any other system calls for the same window are ignored.

Additionally, if [SET_MOVL] is executed for Overlap No. 0 and [OVLP_SHOW] is given for the same overlap, the latter is ignored.

Details of System Calls

◎SET_SCRN

Set the screen number that will be displayed.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(SET_SCRN) F1 Screen number specification

F1+0	Screen number to be displayed

◎SET_MOVLP

Set multi-overlap.

(Multi-overlap set-up is limited to an internal command.)

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(SET_MOVLP) F1 Multi-overlap setting

F1+0	Overlap number to be displayed
F1+1	Multi-overlap number
F1+2	X coordinates for overlap placement
F1+3	Y coordinates for overlap placement

◎OVLP_SHOW

Set ON/OFF for the overlap.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(OVLP_SHOW) F1 Overlap ON/OFF

F1+0	Overlap number to be displayed
F1+1	0: OFF 1: ON

◎OVLP_POS

Set the overlap position.

The Control Terminal ZM-*2 coordinates can be selected in units of lines, columns, or dots. To set, go to the [Edit] menu and click on [System Setting].

For details, see page 2-31.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(OVLP_POS) F1 Overlap position change

F1+0	Overlap number to be moved
F1+1	Destination X coordinates
F1+2	Destination Y coordinates

◎GET_TIME

Obtains timer value which progresses +1 by 10 msec. after turning on the Control Terminal ZM*2. The timer value is data in double-word without signs. The time in the double-word format is located in F1.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(GET_TIME) F1 Get system time by 10 msec

F1+0	Count double-word without signs
F1+1	

◎STA_TIME/CHK_TIME

STA_TIME starts the timer.
The 10 msec-interval system clock is used for the timer.
Time-up is checked using CHK_TIME.
Time base is in the 10-msec. increments.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

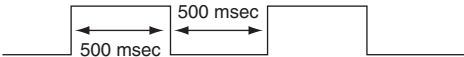
(STA_TIME) F1 Timer setting

F1+0	Time-up flag (<-V)
F1+1	Timer type
F1+2	Time-up interval
F1+3	Timer start time (<-V)

<Ex. 1>
Create a 500-msec interval pulse.
Set \$u00210 at a 500-msec increment.

Open macro
 SYS (STA_TIME) \$U00200
 \$U00201=1 (W) Timer type setting
 \$U00202=50 (W) Time-out time at 500 msec

Cycle macro
 SYS (CHK_TIME) \$U00200
 IF (\$U00200) != 0) LB00
 RET
 ;
 LB00
 \$U00210=\$U210+1



◎GET_CLND

Get the calendar data.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(GET_CLND) F1

Get calendar data

F1+0	Year (4 digits, 2 digits, ZM-41/70 is fixed at 4 digits)
F1+1	Month
F1+2	Day
F1+3	Hour
F1+4	Minute
F1+5	Second
F1+6	Day of the Week (active for ZM-41/70, inactive for ZM-+2)

◎SET_CLND

Set the value in F1 for the use of system calendar. When possible, also make the PLC calendar settings.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(SET_CLND) F1

Calendar setting

F1+0	Year (4 digits, 2 digits, ZM-41/70 is fixed at 4 digits)
F1+1	Month
F1+2	Day
F1+3	Hour
F1+4	Minute
F1+5	Second
F1+6	Day of the Week (active for ZM-41/70, inactive for ZM-+2)
F1+7	PLC Station number (1 : n connection time)

◎GET_SMPL

Store sampling data in user memory.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(GET_SMPL) F1

Get sampling data

F1+0	Sampling buffer number
F1+1	Sampling number
F1+2	Stored memory number

Stored memory No. n

Inactive data

Buffer data
of the specified
sampling number

n+0	Special data
n+1	Special data
n+2	Sampling data
n+m	Sampling data

◎GET_SCUR

Stores the cursor point displayed by sampling mode. When the cursor is not displayed, store the newest sampling point.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(GET_SCUR) F1 Sampling cursor point

F1+0	Window No.
F1+1	DIV No. (0-255)
F1+2	Cursor status
F1+3	Cursor point
F1+4	Cursor Address

Window number
0: Base
1: Overlap 0
2: Overlap 1
3: Overlap 2

[n + 0], [n + 1]

Set the window number and division number which are set with sampling mode.

[n + 2]

Stores the cursor display status.

“0” means that “the cursor is not displayed.”

[n + 3], [n + 4] store the newest sampling information.

“1” means that “the cursor is displayed.”

[n + 3], [n + 4] store cursor information.

[n + 3]

The cursor point stores the value used for the GET_SMPL sampling number.

[n + 4]

Used for comparing whether or not the cursor point taken by the cursor address is the same as the previous cursor point.

If the cursor point does not change and the address of the cursor changes, the data will change.

If the cursor point changes and the address of the cursor does not change, the data will not change.

◎SET_BUFNO (ZM-*2 Function)

Set the buffer number at the Control Terminal ZM-*2 user memory (\$S) address 177. Each word’s average value, maximum value, minimum value, and total are stored in addresses 180-434. (See page 15-6.)

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(SET_BUFNO) F1 Buffer number setting

F1+0	Buffer No. 0~11

◎GET_MSG

Use shift JIS code to store a message from the message group at the top of F1+1 memory.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(GET_MSG) F1

Message -> internal memory

F1+0	Message number to be loaded
F1+1	Memory address to be used for writing

◎STA_LIST (See pages 20 and on.)

Print out data sheets.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(STA_LIST) F1

Data sheet print out

F1+0	Start page number of data sheet
F1+1	The number of data sheets to be printed

◎OUT_ENQ

Active when connection mode is (1 : 1) via serial port.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(OUT_ENQ) F1

Interruption setting

F1+0	ENQ No (10H to 2FH)
F1+1	Type 0: Words 1: Characters
F1+2	The number of data to be sent
F1+3	Top memory address number
F1+4	0: Non-wait 1: Wait

• Type (F1+1)

To send character (A)

Type	Memory contents
Word	34H31H
Character	41H

• Wait (F1+4)

Non-wait:

Execute next macro.

Wait:

Execute next macro
after data has been sent.

Active when the PC type is MITSUBISHI Net 10.

F1+0	Always "0"
F1+1	Network specification: 2
F1+2	System code
F1+3	Network number

This macro should not be used in anything except OPEN macro of screen setting.
If it is used, the network will change as soon as it is executed, and an error will occur.

<Ex.>

Change the data display properties of DIV No. 1 of the base screen.

Type : DEC -> HEX

Digits : 4 digits -> 3 digits

Character color: The macro to change white into green is:

\$u32=0(w)	No-display selection
SYS (DSP_DATA) \$u30	Numerical data not displayed
\$U0022=3	type HEX
\$U0023=H0004	Foreground color: green
	Background color: black
SYS(CHG_DATA)\$u20	Change display properties.
\$u32=1	Display selection
SYS(DSP_DATA)\$u30	Numerical data displayed

◎GET_XY

Calculate X/Y coordinates from radius, angle and center coordinates.

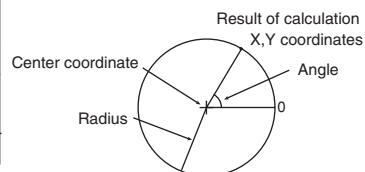
Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(GET_XY) F1

X, Y coordinates of the desired point
on the circumference (absolute coordinates)

F1+0	Radius
F1+1	Angle (by 0.1 degrees)
F1+2	Center X coordinate
F1+3	Center Y coordinate
F1+4	Result of the calculation, X coordinate
F1+5	Result of the calculation, Y coordinate



◎SET_BZ

Controls buzzer.

Usable Devices

	Internal Mem.	PC Memory	Const.	Memory Card	Indirect Set	W Word
F0	Command					
F1	○				○	

(SET_BZ) F1

Buzzer control

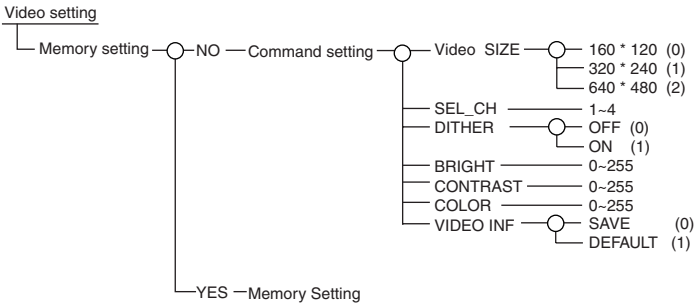
F1+0	0: Normal	1: Error buzzer

Video Display

Set the size of the video window, the input port, brightness, and contrast.
For information on creating a video window, refer to overlap setting (page 4-16).

◎ Video settings are as shown below.

There are two methods, command setting and memory setting. They cannot be used at the same time.



Video MEMORY F0

Memory

F0+0	Command number
F0+1	Setting value

Command name	Command No.	Setting Value
Video SIZE	0	0:160X120; 1:320X240; 2:640X480
SEL_CH	1	Channel No.1~4
DITHER	2	0:OFF; 1:ON
BRIGHT	3	0~255
CONTRAST	4	0~255
COLOR	5	0~255
VIDEO INF	6	0:SAVE; 1:DEFAULT

○ VIDEO SIZE (DEFAULT 320 x 240)

Set the video window size.
The size can be 160 x 120, 340 x 240, or 640 x 480 dots.

○ SEL_CH (DEFAULT 0CH)

Set the channel for the input port.

○ DITHER

Adjust image quality on the video screen.

○ BRIGHT (Standard 171)

Adjust brightness on the video screen.

○ CONTRAST (Standard 24)

Adjust contrast on the video screen.

○ COLOR (Standard 44)

Adjust color on the video screen.

○ VIDEO INF

Size, brightness, contrast, and color can be set in memory for each screen. When the command is executed, it is possible that the Control Terminal ZM-*2 will lock-up for 1 second.

Video INF	SAVE	Write the current settings in memory.
Video INF	DEFAULT	Return to the default value.

◎Get information from the video window

Video window information is stored in the system memory address \$S170-174 as shown in the chart below. It is possible to confirm setting contents.

Address	Contents
\$S170	Video channel number
\$S171	Video dither
\$S172	Video brightness
\$S173	Video contrast
\$S174	Video darkness of color

<Ex. 1> Command Type

To change a macro to input channel No. 2 with window size 640 x 480 dots, make the following settings:

Video SEL_CH2	Channel 2 selection
Video SIZE 640*480	Window size setting
Video INFSAVE	Save the changes in memory.

<Ex. 2> Using Memory

To change a macro to input channel No. 2 with window size 640*480 dots, the settings will be as follows when F0 is \$U00100:

To specify input channel No. 2,

\$U00100=1(W)	Command (SEL_CH)
\$U00101=2(W)	Port 2CH
Video MEMORY \$U00100	Execute command.

To change the video window,

\$U00100=0(W)	Command (Video SIZE)
\$U00101=2(W)	640 x 480 dots
Video MEMORY \$U00100	Execute command.

To save in memory,

\$U00100=6(W)	
\$U00101=0(W)	
Video MEMORY \$U00100	

Indirect Designation Memory

Ⓒ The internal user memory should be used for indirect designation memory.

Ⓒ Indirect designation memory setting

○ Internal Memory
PC address (within 16 bits)

	15	MSB	8	7	LSB	0
n+0	Model			Memory Type		
n+1	Memory number (address)					
n+2	Expansion code			Bit designation		
n+3				Station number		

○ PC memory address (16-32 bits)

	15	MSB	8	7	LSB	0
n+0	81			Memory Type		
n+1	Memory number (address)					
n+2						
n+3	Expansion code			Bit designation		
n+4				Station number		

○ Memory card

	15	MSB	8	7	LSB	0		
n+0	02H				File number			
n+1	Word address within a record							
n+2	Record number							
n+3								

- Model
- 00: Internal memory
 - 01: PC memory within 16 bits
 - 81: PC memory over 16 bits
 - 02: Memory card

- Memory Type
- Internal memory
- \$u (user memory) : 00
 - \$s (system memory) : 01

- PC Memory
- Memory type varies depending on which PC type you use.
- Set the usable memory TYPE number for each PC. Refer to "User's Manual-Hardware version."

- Memory Card 00
- Expansion Code
- Set when the SPU memory slot number of a Mitsubishi PC and a Yokogawa PC CPU number are specified.
- <Ex.>
- Mitsubishi for Slot No. 0: 00
 - Mitsubishi for Slot No. 1: 01
 - Yokogawa for CPU No. 1: 00
 - Yokogawa for CPU No. 2: 01

- Station Number
- Specify a station number when connecting to a multi-drop.
- Use 3 words for 1 : 1 or multi-link.

- Word Address within a Record
- Refer to the memory card map on page 19-3.

Ⓒ When accessing a word from the PC memory, the word in n + 2 is usually "0" even for memory that doesn't use an expansion code.

<Example> Accessing a Mitsubishi PC D165

n	Model: 1 (PC memory)Memory type: 0	[100H]
n+1	Memory No.: 165	[165]
n+2	Expansion code: None Bit Designation: None	[0]

- ◎When accessing the bit-writable memory, such as the Mitsubishi M Relay, the following setting is necessary.

Word access: M Relay/16 for memory address, bit designation: 0

Bit access: M Relay/16 for memory address

Bit designation: M Relay % remainder 16

<Ex.> Accessing an M Relay 20

$20/16 = 1 \dots 4$ (remainder)

n Model : 1 (PLC memory) Memory type: 6 [106H]

n+1 Memory No.: 1 [1]

n+2 Expansion code: None Bit designation: 4 [4]

Notes on Macro Commands

- ◎The macro function is operated in the decimal system with signs.

- ◎Up to 256 lines (commands) can be set for one macro.

- ◎A maximum of executable lines in one macro is 5,000. If this is exceeded, the macro is forcibly terminated.

- ◎When addresses in the PC memory are specified for the MOV or BMOV command, the Control Terminal accesses the PC memory every time it is required; the processing speed may become slower. To solve this problem, the following method is recommended.

<Ex.>

Line No. 0	D200=\$u200 (W)
Line No. 1	D201=\$u200 (W)
Line No. 2	D202=\$u200 (W)
Line No. 3	D203=\$u200 (W)
Line No. 4	D204=\$u200 (W)

In the above example, the Control Terminal goes and writes data to D200 as commanded in line No. 0, then goes and writes data to D201 as commanded in line No. 1, and so on. Communications must frequently occur, which will result in a prolonged processing time. To shorten the communications time, give a command as shown below:

Line No. 0 D200=\$u200 C:5 (BMOV)

Macro Block Edit

◎ Macro blocks can be created by selecting [Macro Block] from the [Edit] menu, and be executed under the following conditions:

(1) Macro blocks can be executed by a CALL command set up in screens, multi-overlaps, call-overlaps, switches, macro mode, function switch setting, etc. (A RET command returns the operating sequence to the original macro.)
Refer to page 14-11.

(2) Macros created in macro block edit can be executed at the leading edge of bit 8 in read area n+1 for system setting. The block number to be executed must be specified for [Global Macro Memory] in the [Other Settings] tab window of the [System Setting] dialog.



For more information on read area n+1 and global macro memory for system setting, refer to Chapter 2.

◎ A maximum of 1024 macro blocks can be created.

◎ Up to 256 lines (commands) can be set for one macro.

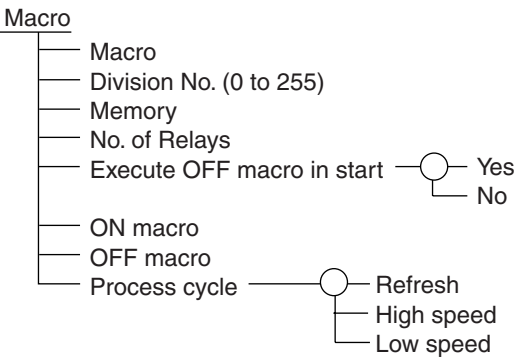
Macro Mode

- ◎The macro mode is a function that activates the ON macro or OFF macro when the corresponding bit of the PC memory changes from 0 to 1 (leading edge) or from 1 to 0 (falling edge), respectively.

Setting the [Macro] Dialog

<Setting Procedure>

- ◎To set the macro mode, click on the macro icon on the parts tool bar so that the [Macro] dialog is displayed.
- ◎To reset the macro mode after the [Macro] dialog is closed, click on the macro icon in the [Part] auxiliary tool box, and the [Macro] dialog will be displayed.



Macro Mode

[Division No.]

- ◎Usually, the division number [DIV] shown in the menu bar is automatically specified when the [Macro] icon is clicked.
- ◎One division can hold one macro mode. It is not possible to set up macro mode on a division where a part with a number limit has already been placed. Thus, it is necessary to select a division number (0 to 255) not already in use.

[Memory]

The macro is executed when the bit in this memory is set (ON) or reset (OFF).

[No. of Relays]

Specify the number of bits to trigger the macro. Up to 32 relays are possible. The relay number specified here is common to both the ON macro and OFF macro. For example, the relay number “10” allows a maximum of 10 ON macros and 10 OFF macros. In this case, 10 bits must be allocated.

[Execute OFF Macro at Start]

This item is valid when a screen or a multi-overlap which contains macro mode is open.

☐ Selected (checked)

When the bit of [Memory] is ON, the macros in [ON Macro] will be executed.

☐ Not selected (unchecked)

When the bit of [Memory] is OFF, the macros in [OFF Macro] will be executed.

[ON Macro...]

The same number of ON macros as specified for [No. of Relays] can be set.

1. To edit an ON macro, enter a number in the text field on the right of [ON Macro...].
2. Click [ON Macro...] to open the editing screen.
Click the [close] icon to return to the [Macro] dialog.

[OFF Macro...]

The same number of OFF macros as specified for [Relays] can be set.

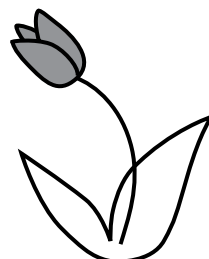
1. To edit an OFF macro, enter a number in the text field on the right of [OFF Macro...].
2. Click [OFF Macro...] to open the editing screen and edit.
Click the [close] icon to return to the [Macro] dialog screen.

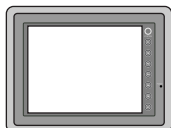
**[Process Cycle]**

Refer to page 5-8 for more information on the processing cycle.

MEMO

Please use this page freely.



**ZM Series**

Internal Memory

15

Internal Memory

The internal memory is memory in the Control Terminal which is available to the user. With this internal memory, the Control Terminal can operate quickly because it is not necessary to transfer to or receive data from the PC. Combining the internal memory with the [Function] switch gives additional high functionality without the PC.

Memory Type

There are two different types of internal memory.

◎User memory

This is a read/write memory that can be used freely.

ZM-41/70 setting range: 0 to 4095 (4096 words)

ZM-*2 setting range: 0 to 16383 (16384 words)

◎System memory

This is a read/write memory used by the system.

This memory is used for data communication to and from the Control Terminal, and is mainly necessary for macros.

Do not use any unused area of this memory because it may be employed as the system's memory in the future.

Setting range: 0 to 511 (512 words)

Notes

- (1) The internal memory works with "DEC" no matter what numeric code is set in the communication parameter settings (except items for which the numeric code is specified individually.)
- (2) Character processing depends on how [Text Process] in the [Comm. Parameters] dialog in [System Setting] is set.
- (3) When the power is shut down (reset), the internal memory data is erased.

System Memory

Address	Contents			
0	Screen number			
1				
2	Overlap 0	Display	0: OFF	1: ON
3	Overlap 0	Display position X		
4	Overlap 0	Display position Y		
5	Overlap 0	Multi-overlap number		
6	Overlap 1	Display	0: OFF	1: ON
7	Overlap 1	Display position X		
8	Overlap 1	Display position Y		
9	Overlap 1	Multi-overlap number		
10	Overlap 2	Display	0: OFF	1: ON
11	Overlap 2	Display position X		
12	Overlap 2	Display position Y		
13	Overlap 2	Multi-overlap number		
14				
15				
16	Printer status			
17	Backlight			
18				
19				
20	Buffer 0	Number of bufferings specified		
21	Buffer 0	Number of bufferings		
22	Buffer 0	Number of bufferings executed		
23	Buffer 1	Number of bufferings specified		
24	Buffer 1	Number of bufferings		
25	Buffer 1	Number of bufferings executed		
26	Buffer 2	Number of bufferings specified		
27	Buffer 2	Number of bufferings		
28	Buffer 2	Number of bufferings executed		
29	Buffer 3	Number of bufferings specified		
30	Buffer 3	Number of bufferings		
31	Buffer 3	Number of bufferings executed		
32	Buffer 4	Number of bufferings specified		
33	Buffer 4	Number of bufferings		
34	Buffer 4	Number of bufferings executed		
35	Buffer 5	Number of bufferings specified		
36	Buffer 5	Number of bufferings		
37	Buffer 5	Number of bufferings executed		
38	Buffer 6	Number of bufferings specified		
39	Buffer 6	Number of bufferings		
40	Buffer 6	Number of bufferings executed		

Address	Contents		
41	Buffer 7	Number of bufferings specified	
42	Buffer 7	Number of bufferings	
43	Buffer 7	Number of bufferings executed	
44	Buffer 8	Number of bufferings specified	
45	Buffer 8	Number of bufferings	
46	Buffer 8	Number of bufferings executed	
47	Buffer 9	Number of bufferings specified	
48	Buffer 9	Number of bufferings	
49	Buffer 9	Number of bufferings executed	
50	Buffer 10	Number of bufferings specified	
51	Buffer 10	Number of bufferings	
52	Buffer 10	Number of bufferings executed	
53	Buffer 11	Number of bufferings specified	
54	Buffer 11	Number of bufferings	
55	Buffer 11	Number of bufferings executed	
56			
57			
58			
59			
60			
61			
62			
63			
64	Setting the switch repeat function	1: repeat	* 1
65	Setting the switch repeat function	1: repeat prohibited	* 1
66	Setting the repeat of switch macro	1: repeat	* 1
67			
68			
69			
70			
71			
72	Result of system call	0: OK	
73	Result of switch function	0: OK 1: NG	
74			
75			
76	Other than 0: keypad overlap AUTO OFF prohibited (user setting)		
77			
78			
79			
80	Universal serial	Switch output 0	Output codes 0 to 15
81	Universal serial	Switch output 1	Output codes 16 to 31
82	Universal serial	Switch output 2	Output codes 32 to 47
83	Universal serial	Switch output 3	Output codes 48 to 63

* 1: Effective when switch ON macro is set.

Address	Contents
84	Universal serial Switch output 4 Output codes 64 to 79
85	Universal serial Switch output 5 Output codes 80 to 95
86	Universal serial Switch output 6 Output codes 96 to 111
87	Universal serial Switch output 7 Output codes 112 to 127
88	Universal serial Switch output 5 Output codes 128 to 143
89	Universal serial Switch output 5 Output codes 144 to 159
90	Universal serial Switch output 5 Output codes 160 to 175
91	Universal serial Switch output 5 Output codes 176 to 191
92	Universal serial Switch output 5 Output codes 192 to 207
93	Universal serial Switch output 5 Output codes 208 to 223
94	Universal serial Switch output 5 Output codes 224 to 239
95	Universal serial Switch output 5 Output codes 240 to 255
96	
97	
98	
99	
100	
101	
102	
103	
104	
105	
106	
107	
108	
109	
110	
111	
112	
113	
114	When connecting 1 : n PC down information (station number 32 to 47)
115	When connecting 1 : n PC down information (station number 48 to 63)
116	When connecting 1 : n PC down information (station number 64 to 77)
117	When connecting 1 : n PC down information (station number 80 to 95)
118	When connecting 1 : n PC down information (station number 96 to 111)
119	When connecting 1 : n PC down information (station number 112 to 127)
120	When connecting 1 : n PC down information (station number 128 to 143)
121	When connecting 1 : n PC down information (station number 144 to 159)
122	When connecting 1 : n PC down information (station number 160 to 175)
123	When connecting 1 : n PC down information (station number 176 to 191)
124	When connecting 1 : n PC down information (station number 192 to 207)
125	When connecting 1 : n PC down information (station number 208 to 223)
126	When connecting 1 : n PC down information (station number 224 to 239)
127	When connecting 1 : n PC down information (station number 240 to 255)

Address	Contents
128	When connecting 1 : n PC down information (station number 0 to 15)
129	When connecting 1 : n PC down information (station number 16 to 31)
130	
131	
132	Cycle time
133	
134	
135	
136	
137	
138	
139	
140	Reserved for system
141	Reserved for system
142	Reserved for system
143	Reserved for system
144	Reserved for system
145	Reserved for system
146	Reserved for system
147	Reserved for system
148	Reserved for system
149	Reserved for system
150	
151	
152	
153	
154	
155	
156	
157	
158	
159	
160	Calendar Month
161	Calendar Month
162	Calendar Day
163	Calendar Hour
164	Calendar Minute
165	Calendar Second
166	Calendar Day of the Week
167	
168	
169	

Address	Contents
170	Video Select channel number
171	Video Dither 0 : OFF 0 : ON
172	Video BRIGHT
173	Video CONTRAST
174	Video COLOR
175	
176	
177	Sampling buffer number
178	Overflow flag
179	Overflow flag
180	Buffer word 0 Average (lower)
181	Buffer word 0 Average (upper)
182	Buffer word 0 Maximum (lower)
183	Buffer word 0 Maximum (upper)
184	Buffer word 0 Minimum (lower)
185	Buffer word 0 Minimum (upper)
186	Buffer word 0 Sum (lower)
187	Buffer word 0 Sum (upper)
188	Buffer word 1 Average (lower)
189	Buffer word 1 Average (upper)
190	Buffer word 1 Maximum (lower)
191	Buffer word 1 Maximum (upper)
192	Buffer word 1 Minimum (lower)
193	Buffer word 1 Minimum (upper)
194	Buffer word 1 Sum (lower)
195	Buffer word 1 Sum (upper)
196	Buffer word 2 Average (lower)
197	Buffer word 2 Average (upper)
198	Buffer word 2 Maximum (lower)
199	Buffer word 2 Maximum (upper)
200	Buffer word 2 Minimum (lower)
201	Buffer word 2 Minimum (upper)
202	Buffer word 2 Sum (lower)
203	Buffer word 2 Sum (upper)
204~211	Buffer word 3 Average, maximum, minimum, sum
212~219	Buffer word 4 Average, maximum, minimum, sum
220~227	Buffer word 5 Average, maximum, minimum, sum
228~235	Buffer word 6 Average, maximum, minimum, sum
236~243	Buffer word 7 Average, maximum, minimum, sum
244~251	Buffer word 8 Average, maximum, minimum, sum
252~259	Buffer word 9 Average, maximum, minimum, sum
260~267	Buffer word 10 Average, maximum, minimum, sum
268~275	Buffer word 11 Average, maximum, minimum, sum

Address	Contents
276~283	Buffer word 12 Average, maximum, minimum, sum
284~291	Buffer word 13 Average, maximum, minimum, sum
292~299	Buffer word 14 Average, maximum, minimum, sum
300~307	Buffer word 15 Average, maximum, minimum, sum
308~315	Buffer word 16 Average, maximum, minimum, sum
316~323	Buffer word 17 Average, maximum, minimum, sum
324~331	Buffer word 18 Average, maximum, minimum, sum
332~339	Buffer word 19 Average, maximum, minimum, sum
340~347	Buffer word 20 Average, maximum, minimum, sum
348~355	Buffer word 21 Average, maximum, minimum, sum
356~363	Buffer word 22 Average, maximum, minimum, sum
364~371	Buffer word 23 Average, maximum, minimum, sum
372~379	Buffer word 24 Average, maximum, minimum, sum
380~387	Buffer word 25 Average, maximum, minimum, sum
388~395	Buffer word 26 Average, maximum, minimum, sum
396~403	Buffer word 27 Average, maximum, minimum, sum
404~411	Buffer word 28 Average, maximum, minimum, sum
412~419	Buffer word 29 Average, maximum, minimum, sum
420~427	Buffer word 30 Average, maximum, minimum, sum
428~435	Buffer word 31 Average, maximum, minimum, sum
436	
437	
438	
439	
440	
441	
442	
443	
444	
445	
446	
447	
448	
449	
450	
451	
452	
453	
454	
455	
456	
457	
458	

Address	Contents
459	
460	
461	
462	
463	
464	
465	
466	
467	
468	Memory Card Card No.
469	Memory Card Card Name
470	Memory Card File Name No. 0
471	Memory Card File Name No. 1
472	Memory Card File Name No. 2
473	Memory Card File Name No. 3
474	Memory Card File Name No. 4
475	Memory Card File Name No. 5
476	Memory Card File Name No. 6
477	Memory Card File Name No. 7
478	Memory Card File Name No. 8
479	Memory Card File Name No. 9
480	Memory Card File Name No. 10
481	Memory Card File Name No. 11
482	Memory Card File Name No. 12
483	Memory Card File Name No. 13
484	Memory Card File Name No. 14
485	Memory Card File Name No. 15
486	
487	
488	
489	
490	
491	
492	
493	
494	
507	
508	
509	
510	
511	

◎Address \$s0

Contains the current screen number.

◎Address \$s2 to 13

Contains the current overlap status.

n + 0 (Display status)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Overlap										Display status					
0: none 1: present										0: OFF 1: ON					

n + 1 (X coordinate)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
X coordinate display dot: 0~799															
column/line : 0~99															

n + 2 (Y coordinate)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Y coordinate display dot: 0~599															
column/line : 0~29															

n + 3 (multi-overlap number)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
multi-overlap number															
when not using multi-overlap [-1]															

◎Address \$s16

Contains the current printer status.

n + 0 (Printer status)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Printer										0: Not printing					
0: READY 1: BUSY										1: Printing					

◎Address \$s17

Contains the current backlight status.

n + 0 (Back light status)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0: OFF 1: ON															

◎Addresses \$s20 to 55

Contain sampling buffer conditions.

n + 0 The number of samplings specified is contained.

n + 1 The number of samplings located in the buffer is contained.

n + 2 The number of samplings executed is contained.

This area is added [+1] for each sampling. The user can confirm the number of samplings executed by setting [0] here before sampling is started.

◎Address \$s64

With this address, it is possible to add a repeat function to the switch ON macro. To do so, set a number other than [0] in the address \$s64 for the first macro command.

◎Address \$s65

With this address, it is possible to prohibit the repeat function of a switch ON macro. To do so, set a number other than [0] in the address \$s65 for the macro. If the switch has a repeat function, the macro can prohibit the repeating action.

◎Address \$s66

With this address, it is possible to repeat a switch ON macro.

Set a number other than [0] in the address \$s66 for the macro.

Ex. Set the switch ON macro as shown below.

\$u100=\$u100+1

\$u66=1

RET

When the switch is pressed, \$u100 is incremented.



Before executing the ON macro, the ZM Series system clears the addresses \$s64 to 66 to [0]. For these addresses, set [1] as necessary.

The macro cannot repeat the switch function if it is not possible (e.g. when the block number has reached the maximum value by the "+ Block" switch).

◎Address \$s72

Contains the result of the system call.

When the system call is completed successfully, [0] is set. If not, [Other Than 0] (usually -1) is set (e.g. the second screen setting).

◎Address \$s73

Contains the result of the switch function.

When the switch has operated successfully, [0] is set. If not, [Other Than 0] (usually -1) is set.

When the switch function differs from the macro result, refer to this address to determine whether or not the switch operated successfully.

ⒸAddresses \$s80 to 95

Settings

- 1. Type: Universal serial
- 2. The switch output memory designates these addresses.
- 3. Switch action: Momentary

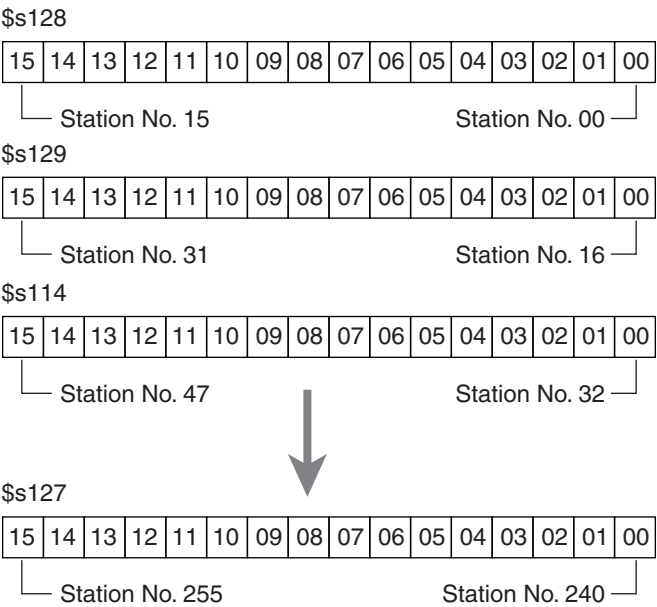
Action

- 1. Both addresses and bits are converted to codes before loading them in the system write memory.
- 2. If switch interrupt is possible, it is executed.

ⒸAddresses \$s128, 129, 114-127

When the connection mode is [1 : n], and time-out is detected in the communication with the PC, [1] is set on the related bit. After that, it is not possible to communicate with the PC on the same screen.

When the screen display changes, all bits in these addresses will be cleared to [0] to enable communication with the PC on the screen.



ⒸAddress \$s132

This address contains cycle time (units: 10m sec.)
For information on what 1 cycle is, refer to page 3-11.

◎Address \$s160-166 (ZM-*2 Function)

This address contains the calendar. It is possible to print out the calendar when the data sheet is printed out.

◎Address \$s170-174 (ZM-*2 Function)

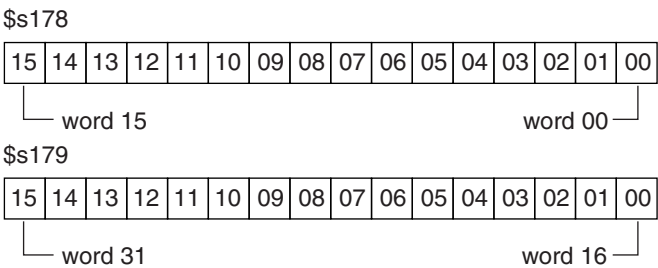
Information about the channel number used by the video window, brightness, contrast, darkness of color, etc. is written here.

◎Address \$s177 (ZM-*2 Function)

Set the number for the buffer that confirms average, maximum, minimum, and sum buffer data. The setting uses the macro command (SET_BUFNO). The average, maximum, minimum, and sum data are stored in address \$s180-434.

◎Address \$s178, 179 (ZM-*2 Function)

When the buffer individual word sum overflows, the bit that corresponds to words 0-31 becomes 1.



◎Address \$s180-435 (ZM-*2 Function)

The average, maximum, minimum, and sum for the 32 words of inner buffer words 0-31 is stored in the order shown in the diagram below.

◎Address \$s468-485 (ZM-*2 Function)

When using \$s468-485 in [MOV] command of macro programs, the contents of the addresses (refer to page 15-8) can be written or read.

<Ex.>

1) \$u100=\$s468

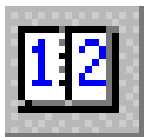
The memory card number is written into one word (\$u100).

2) \$u101=\$s469

The 32 characters for the memory card name are written into 16 words (\$u101~\$u116). (If the memory card name is specified as 8 characters, 16 words will be written.)

3) \$u117=\$s470

The 32 characters for the file name of the memory card are written into 16 words (\$u117~\$u132). (If the file name is specified as 6 characters, 16 words will be written.)



Calendar

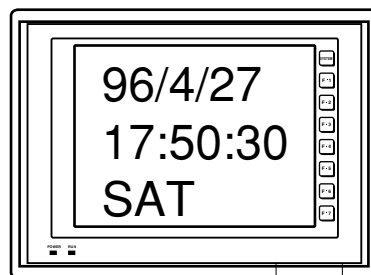
Calendar Setting

16

Calendar Setting

Calendar Display

- ◎ Set “calendar” parts to display the “year, month, day, hour, minute, second, day of the week” clock on the Control Terminal ZM-*2 screen.



- ◎ It is possible to set one calendar part for one division on each screen. The maximum number of calendar parts that can be placed on each screen is 256.

Setting Calendar Data



For ZM-41/70
The calendar display from the PC that has the calendar function is automatically revised every 15 minutes.

- ◎ PC with calendar function

The ZM-*2 automatically reads the PC's inner calendar data and displays it on the screen.

1. When the Control Terminal ZM-*2 is connected to the PC, it reads the PC calendar data and sets the calendar.
2. Following that, calendar data is automatically revised every day (when the date changes) from newly read PC calendar data.

- ◎ PC without calendar function

Set calendar memory. When connected, calendar memory is read, and then displayed using the Control Terminal ZM-*2 internal clock. It is necessary to revise calendar data regularly.



For information on setting calendar memory, refer to Chapter 2, “System Setting” on page 2-5.

1. Go to the [Edit] menu and click on [System Setting]. Then, click on the [Comm. Parameter] dialog and set calendar memory.



2. When the Control Terminal ZM-*2 connects to the PC, it reads the calendar memory data set in (1) and sets the calendar.
3. Following that, the calendar runs based on the Control Terminal ZM-*2 internal clock.
4. Because automatic calendar revision does not occur as it does with the PC that contain the calendar function, a small amount of clock error will occur. It is recommended that accurate calendar data is maintained by regularly updating data in the calendar memory and by setting bit 11 (ON) in the read area.

For ZM-41/70
Because timing is disturbed when performing constant sampling, there are instances when accurate sampling cannot be performed. When setting bit 11 of the read area "n," it is recommended that you reset sampling.

Correcting Calendar Data

Follow these steps to correct calendar data that has become different from the actual time.

- (1) Correct data in the calendar memory.

ⓈPC with calendar function

Correct time-data in the calendar memory of the PC.

ⓈPC without calendar function

Write correct time-data in the PC memory specified for [Calendar] in the [Comm. Parameter] dialog in [System Setting].
- (2) At the leading edge of bit 11 (calendar setting) of the read area "n" that was set in the [Comm. Parameter] dialog, the PC calendar data is read.
Refer to Chapter 2 "System Setting" on page 2-25.

The calendar can be corrected using the macro.
Refer to "Calendar Display" in the tutorial manual.

Setting [Calendar] Dialog

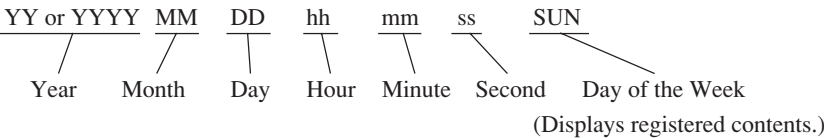
- ⓈThe [Calendar] dialog determines how to display the calendar.

Setting Procedure



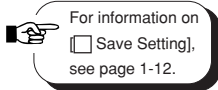
- To set the [Calendar] dialog, click on the [Calendar] icon on the parts tool bar.
- To reset the calendar after placing calendar parts on the screen, double-click on the [Calendar] area so that the [Calendar] dialog is displayed.

Display on the PC



Calendar Parts

◎ Select calendar parts.



Calendar parts consist of areas of “hour, minute, and second,” areas of “year, month, and day,” and areas of two level display. Additionally, there is an area for punctuation marks like “:” and “-.”

If you check [Save Setting] in the calendar list window when selecting calendar parts, and then proceed to select parts, there are instances of the selected parts being placed on the screen in a disrupted condition. To avoid disrupting the shape of the parts that are placed on screen, it is recommended that you do not check [Save Setting] in the calendar list window, but rather, leave it in unchecked status when selecting parts.

◎ How to delete one portion of the calendar parts information (YY MM DD hh mm ss SUN) display.

<Ex.> To delete day of the week.

1. Go to the [Calendar] dialog to the [Week] tab window and uncheck [Display].

☒ Display ---> ☐ Display



Note that if you select “SUN” (day-of-the-week display) (handles are displayed), and then go to the [Edit] menu and click on the [Delete] icon, calendar parts will be deleted.



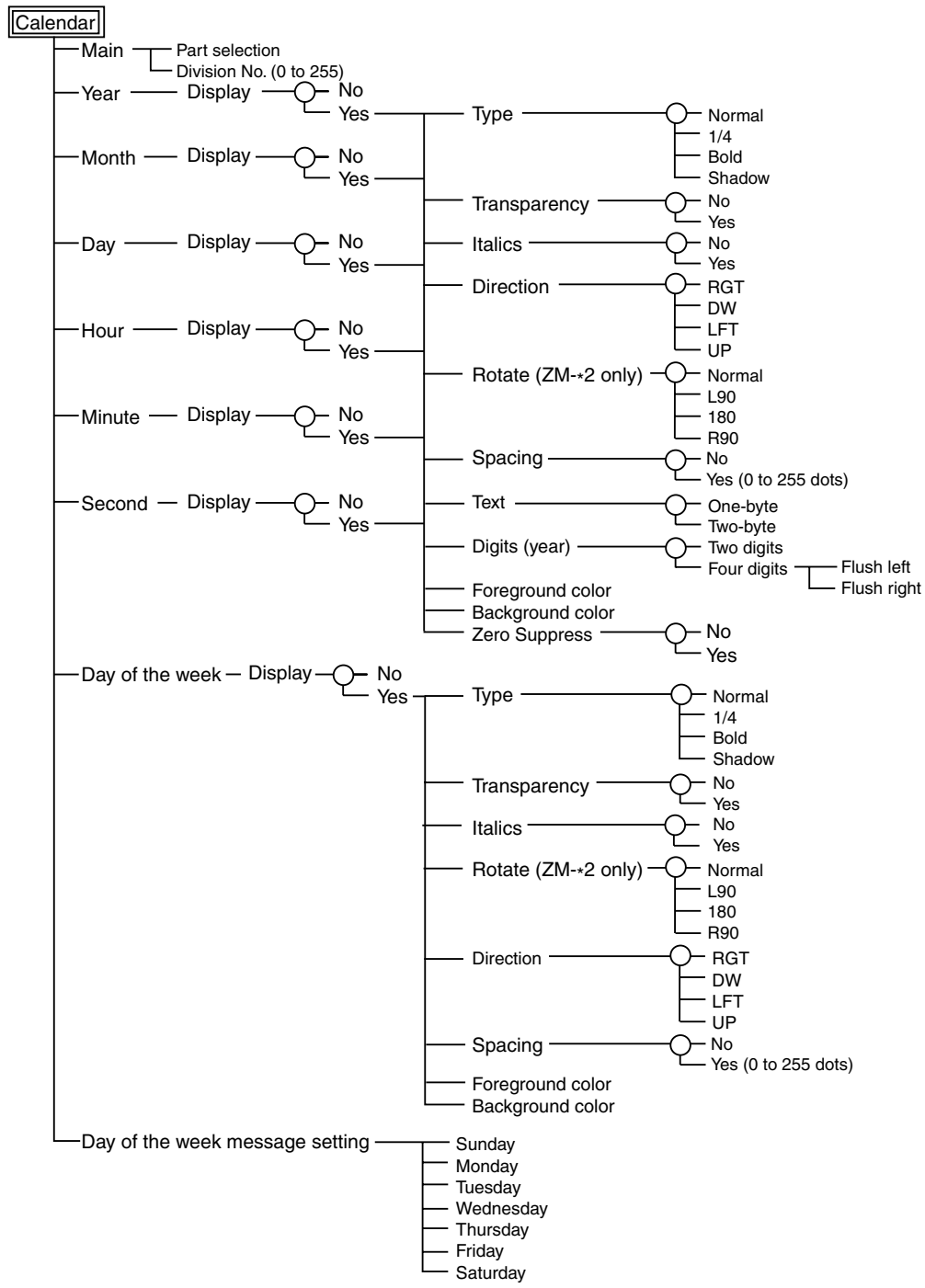
2. Even if you delete the day-of-the-week display, calendar areas and punctuation marks will remain intact. Use the [Modify Part] icon to standardize the areas or delete punctuation like “().”

◎ Enlarge Calendar Parts

Click on calendar parts and drag the handles. YY MM DD hh mm ss SUN are enlarged, but the punctuation marks (, : , / for example) are not. To enlarge punctuation marks, use the [Modify Part] icon.



When you want to change the calendar parts display, click on the [Modify Part] icon when a calendar part is selected (handles are displayed). You will enter the window where display modification is possible. (For details, refer to page 24-25.)



[Calendar] Dialog (Main) Tab Window

[Division No.]

- Ⓐ Usually, placing the calendar part on the screen automatically enters the same division number as [DIV] in the horizontal menu bar.
- Ⓑ One calendar part is allowed per division. It is not possible to set up macro mode on a division where a part with a number limit has already been placed. Therefore use a division number (No. 0 to 255) in which no mode part has been placed.

(Year) Tab Window

Display in western calendar.

[Display]

To display the year, click the check box ☒.

Necessary options for displaying the year are as follows:

[Char. Type]

Select a typeface from among [Normal], [1/4], [Bold], [Shadow].

- Ⓐ Normal One-byte or two-byte characters as specified
- Ⓑ 1/4 (8 X 8 dots) 1/4-sized character
 - * **1/4 not available for two-byte characters (two-byte codes).**
- Ⓒ Bold Bold typeface is used.
- Ⓓ Shadow Shadow typeface is used. Background color is used as shadow.

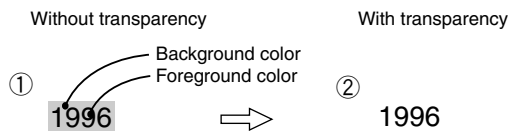
See page 22-9 for information about character properties.

Foreground color
Background color



[Transparent]

Select to make year characters transparent.



[Italic]

Choose whether to italicize the year characters.

Check the box to italicize.

<Example>

Unchecked

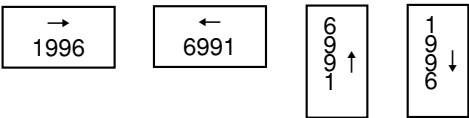
1999

Checked

1999

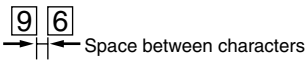
[Direction]

Select a display direction of the characters from [RGT, DW, LFT, UP].



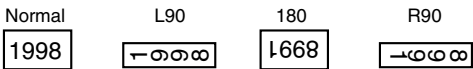
[Spacing]

Set the space between characters in units of dots (range: 0 to 255).



[Rotate] (ZM-*2 only)

Select character rotation from [Normal], [L90], [180], [R90].



[Text]

Specify either one-byte or two-byte for the year characters.

[Digits]

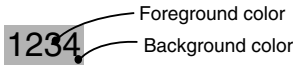
This option applies to year only.

Select either two digits or four digits to indicate the year.

e.g. Two digits indicates the year 1998 as “98,” four digits, as “1998.”

[Color]

Choose a color for FCL (foreground color) and BCL (background color) from 16 options with [B] setting



[Zero Suppress] [Flush Left/Flush Right]

These are not effective for the year indication.

(Month), (Day), (Hour), (Minute), (Second) Tab Window

Time is displayed in 24-hour time.

Set the options in tab windows for month, day, hour, minute and second in the same manner. See instructions for [Zero Suppress] and [Flush Left/Flush Right] below.

[Zero Suppress]

Check the box to make zero suppress effective for indication of month (day, hour, minute, second).

Make selections when the zero suppress display is checked.

<Ex.> [Zero Suppress] determines the indication of January, "01" or "1."

With zero suppress : 1

Without zero suppress ineffective : 01

[Flush Left/Flush Right]

This option determines the direction of aligning characters to left or right.

* **[Flush Left/Flush Right] is only effective when [Zero Suppress] is selected.**

<Ex.> Month data has two digits. January is indicated as:

Flush left :

Flush right :

☐ indicates the space for two digits.

(Day of the Week) Tab Window

☉ Check [Display] and the necessary items will be displayed. Settings are made just as they are for the [Year] tab window.

☉ It is possible to choose how to express the days of the week.

Click on [Week] tab. Click on the box for the appropriate day and enter the corresponding text. Up to thirteen one-byte characters (six two-byte characters) can be entered in the [Day-of-Week Message Setting] dialog.

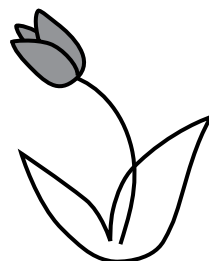
☉ The initial setting is programmed to display all the days of the week, but it is possible to select only the day of the week that you wish to display.

☐ : No Display

☒ : Display

MEMO

Please use this page freely.





Memo Pad Function (ZM-*2 Function)

Outline of the Memo Pad Function

The memo pad function is available with the ZM-*2 as explained below:

◎Message board function

The message board function is available for leaving daily messages in a workshop, etc. This is particularly useful for exchanging messages among operators working in shifts.

◎Pen input

Message entry is made simple by writing on the screen directly with the special pen.

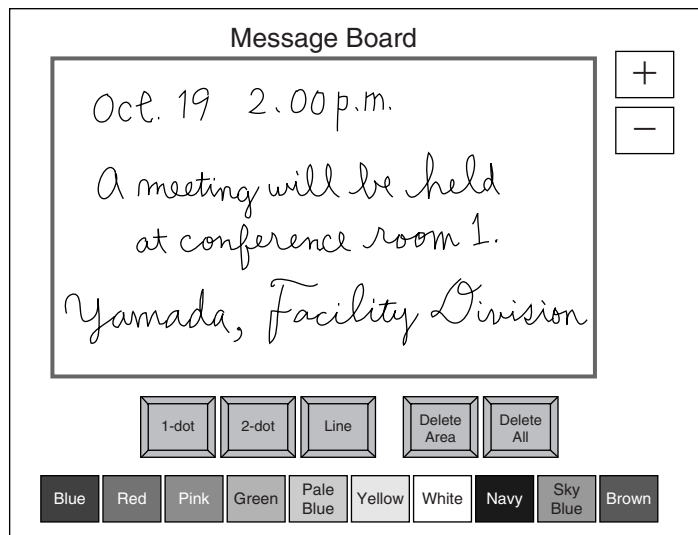
◎128 colors available

A maximum of 128 pen colors are available.

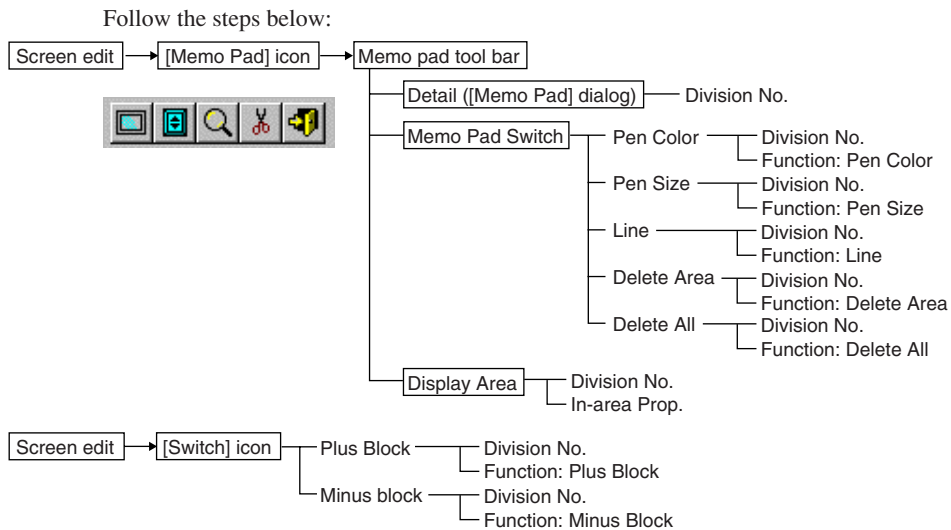
Any color can be chosen from them using the switches.

◎Up to 8 memo pad areas

Memo pad areas are common to every screen. When a message is written in a memo pad area on a screen, it can be shown on any other screens while Control Terminal is turned on. Up to 8 memo pad areas are available.



Memo Pad Function Setting Procedure



[Memo Pad] Dialog



When using the memo pad function, this dialog must be set.
Click the [Memo Pad] icon. The memo pad tool bar is displayed. Click the [Detail] icon. The [Memo Pad] dialog is displayed.

[Division No.]
Specify a division number that is not chosen for other modes.
*** Only one memo pad function can be used on one screen.**

[Display Area] Dialog



Set the memo pad display area. This area must be placed on the screen for using the memo pad function. Note the following when setting the options for the area.

[Division No.]
For establishing a link with the memo pad function, specify the number equivalent to the division number in the [Memo Pad] dialog.

[In-area Prop.]
Set the display area property.

The colors set for this option are stored in the memo pad memory area of the ZM-*2 as the memo pad data.

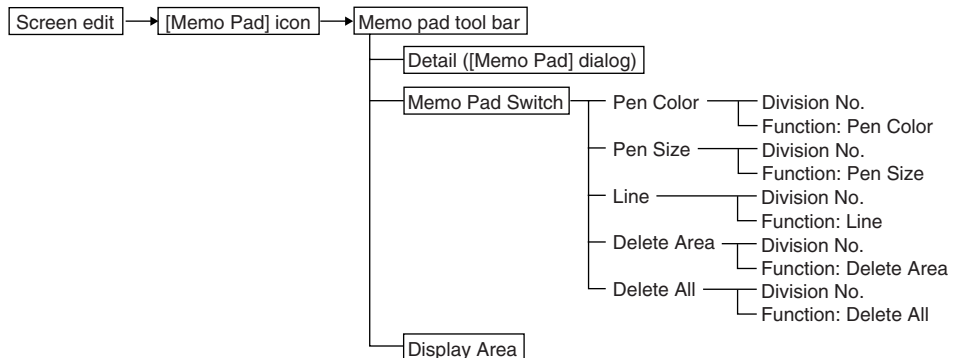
Switches for Memo Pad Function

Switch Setting Procedure

Switches for Exclusive Use in Memo Pad Function

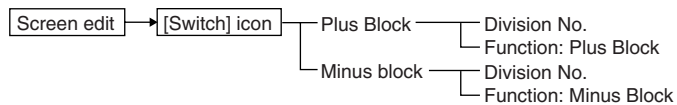


Click [Memo Pad Switch] icon in the memo pad tool bar. The pull-down menu for the switch is displayed. By clicking each option, the [Switch] dialog is displayed.



Switches Available in Memo Pad Function

Click the [Switch] icon in the tool bar. In the [Switch] dialog, specify the desired option for [Function] and place the switch on the screen.



Notes on Switch Setting

[Division No.]

Specify the number equivalent to the division number in the [Memo Pad] dialog.

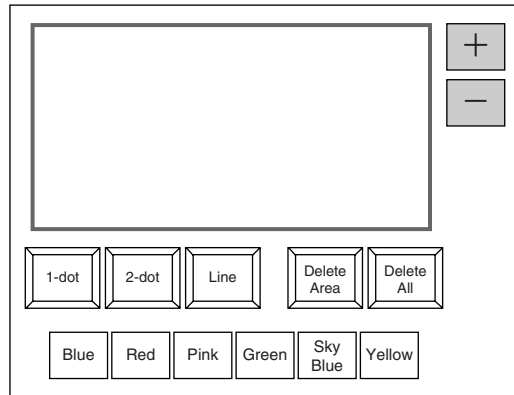
[Function]

Specify the function of the switch. The following functions are used for the memo pad function:

Pen Color (128 colors)	Pen colors can be specified. Choose a color by pressing the desired switch.
Pen Size (1-dot/2-dot)	1-dot or 2-dot can be chosen for the pen size. Choose either one by pressing the switch.
Line	The function of this switch is changed each time it is pressed. When the switch is pressed first, the pen becomes available for writing linear lines. When it is pressed again, the pen becomes available for free writing.
Delete Area	When the switch is pressed first, the enclosed area is deleted. When it pressed again, the delete function is canceled.
Delete All	When this switch is pressed, the contents of the memo pad area are deleted completely.
Plus Block	The next memo pad area (up to 8 pcs.) is displayed.
Minus Block	The previous memo pad area (up to 8 pcs.) is displayed.

Memo Pad Usage

Suppose that the following screen has been created. This section explains how to use the memo pad function using the screen.



1. Specify the pen size. Press the “2-dot” switch.



When the screen is opened first, “1-dot” is always chosen as default.

2. Specify a pen color. Press the “Blue” switch.

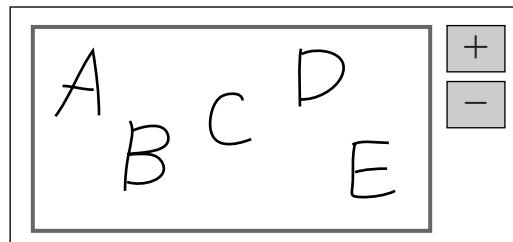


When the screen is opepd first, “white” is always chosen as default.

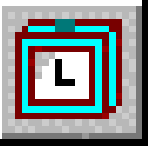
3. Specify the pen state. The pen should be set free for writing messages. Thus, do not press the “Line” switch.
4. Write a desired message within the memo pad area.



Use the special pen for writing messages.



5. When deleting the written message, press the “Delete All” switch.
6. When deleting a part of the written message, press the “Delete Area” switch (ON), and enclose the desired part. The part is deleted. On completion, press the “Delete Area” switch to turn it off.
7. When writing a linear line, press the “Line” switch (ON).
A linear line can be drawn by moving the pen on the memo pad area.
To cancel the function to draw linear lines, press the switch again.
8. Pressing the “+” switch brings up a new memo pad area (up to 8 pcs. available).
Pressing the “-” switch brings up the previous memo pad area.

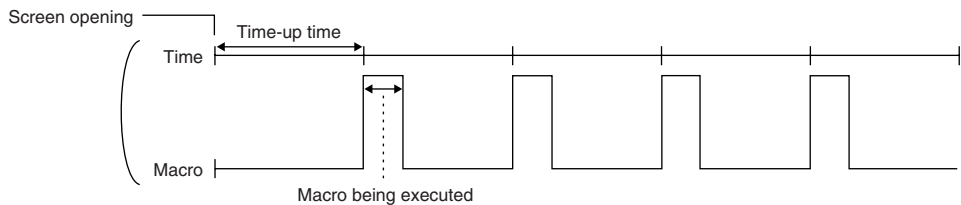


Interval Timer (ZM-*2 Function)

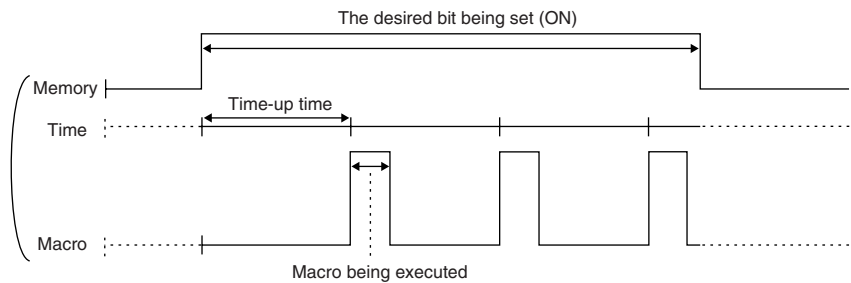
Outline of Interval Timer

The interval timer has the following functions.

- ◎ After the screen is opened, the specified macro is executed at intervals of the set time.

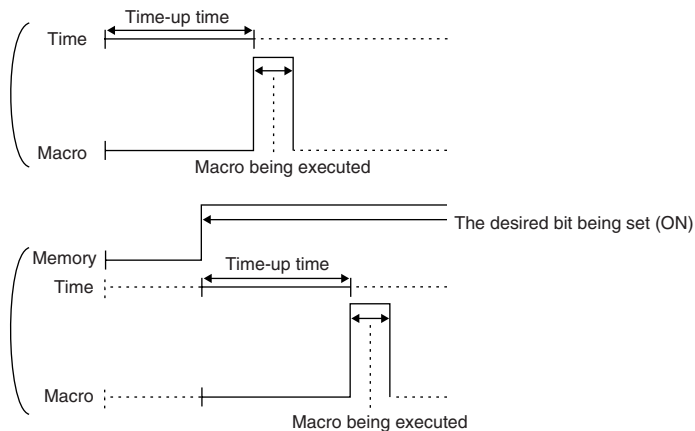


- ◎ After the desired bit is set (ON), the specified macro is executed at intervals of the set time. (This function is valid only while the bit is set.)



- ◎ The desired macro is executed one time when the set time has elapsed after opening the screen or setting the desired bit.

After opening of the screen or setting of the desired bit (ON), the desired macro is executed once when the set time has elapsed.

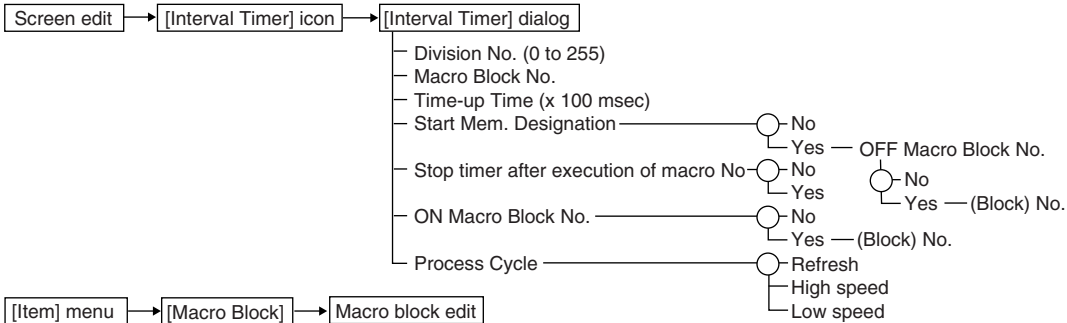


Setting Procedure of Interval Timer

The procedure is basically divided into the following two steps.

Interval timer setting in screen editing

Macro block editing by choosing [Macro Block] from the [Item] menu.



Interval Timer Setting

[Interval Timer] Dialog

The [Interval Timer] dialog must be set for using the interval timer. Clicking the [Interval Timer] icon brings up the dialog.

[Division No.]

Specify a number not used for other modes. The division number specified in current editing is normally entered.

[Macro Block No.]

Specify the number of the macro block which is to be executed at intervals of the time set for [Time-up Time] (refer to the following) .

Note

[Time-up Time] might not be correct according to the contents of the screen.

[Time-up Time] (x 100 msec)

After the screen is opened, a macro is executed at intervals of the time set for this option. The macro for execution is specified for [Macro Block No.] (refer to the above).

When “0” is specified for [Time-up Time], a macro is executed at every cycle.



When [Start Mem. Designation] is checked , the timer remains off even after the screen has been opened and the time set for [Time-up Time] has elapsed (refer to the following).

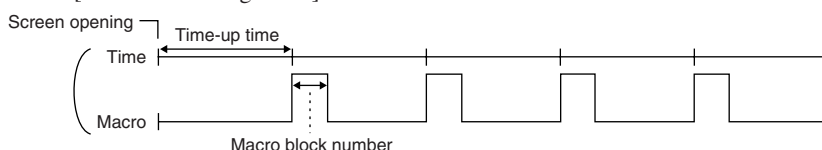
[Start Mem. Designation]

The start memory can be specified by checking this option.

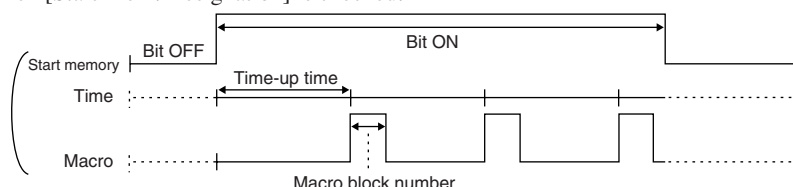
Only while the start memory bit is set to “1,” a macro is executed at intervals of the time set for [Time-up Time].

When the bit is set to “0,” the time set for [Timer-up Time] is not counted.

When [Start Mem. Designation] is unchecked:



When [Start Mem. Designation] is checked:



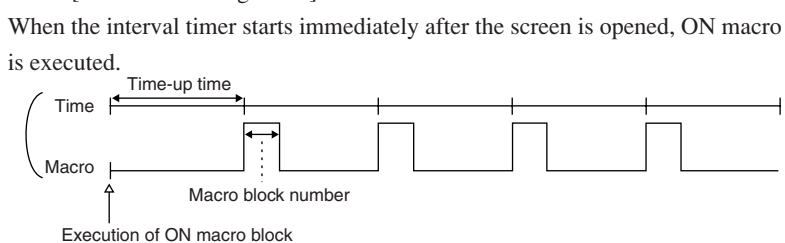
[Stop timer after execution of macro]

This option determines whether or not the timer remains activated when the time set for [Time-up Time] has elapsed and a macro has been executed. When the box is checked, the timer is stopped after one execution of a macro. When the box is unchecked, the timer restarts counting on completion of a macro execution after the set time has elapsed.

[ON Macro Block No.]

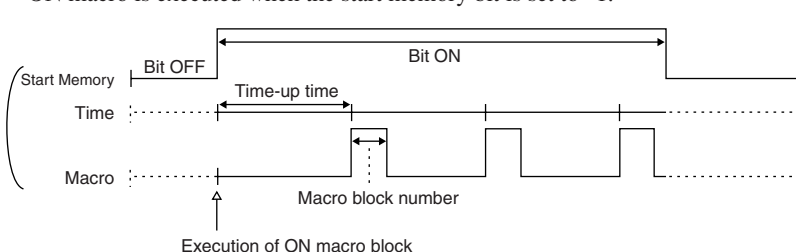
This option determines whether or not a macro is executed on start-up of the interval timer. Check the box to specify a macro block number. When the macro is executed depends on the setting of [Start Mem. Designation].

When [Start Mem. Designation] is unchecked:



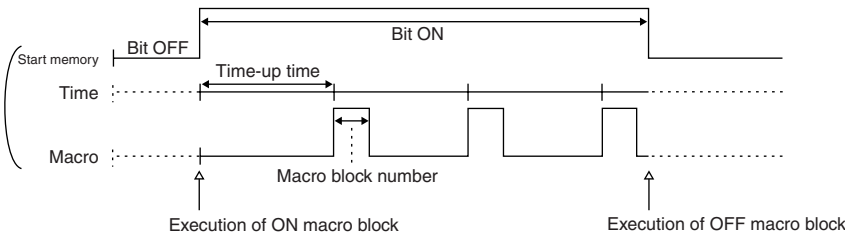
When [Start Mem. Designation] is checked:

ON macro is executed when the start memory bit is set to "1."



[OFF Macro Block No.]

This option becomes active only when [Start Mem. Designation] is checked. The option determines whether or not a macro is executed when the start memory bit is reset (“1” to “0”). By checking the box, a block number can be specified. This option is useful for clearing the internal memory, etc. used for a macro.



[Process Cycle]

A cycle for reading the PC data from the Control Terminal can be set. For more information, refer to page 3-9 in Chapter 3, “Screens.”

Macro Block Edit

Macros to be executed by the interval timer must be registered in macro block editing. Macro block editing is started from selecting the corresponding command from the [Item] menu. For the editing procedure, refer to Chapter 14, “Macro.”

Interval Timer Examples

Screen Change Switch

This section explains how to create a switch which must be held down for 5 seconds for screen change. The switch is set in screen editing and macro block editing.

Screen Edit (Ex.: Screen No. 0)

⊙Switch	⊙Interval timer mode
Output Memory: M100	Division No.: 0
Output Action: Momentary	Macro Block No.: 0
	Time-up Time: 50 (= 5 seconds)
	Start Mem. Designation: M100
	Stop timer after execution of macro: unchecked
	ON Macro Block No.: unchecked
	OFF Macro Block No.: unchecked
	Process Cycle: Low Speed

Pressing the switch sets memory “M100” (ON). In five seconds, macro block No. 0 is executed.

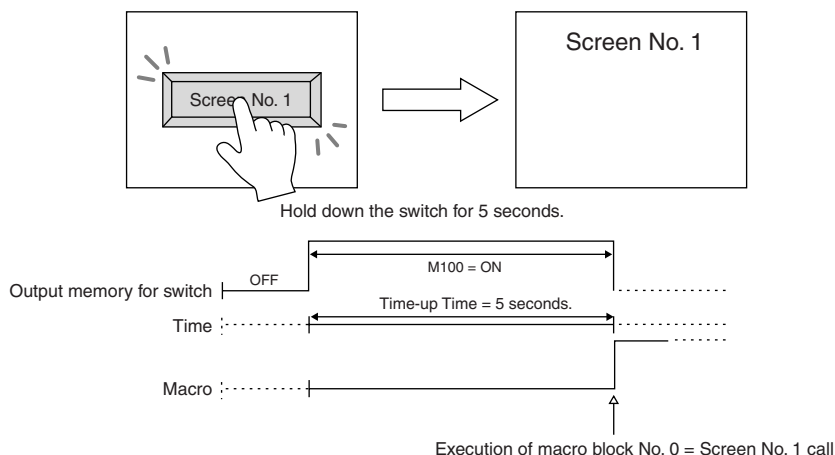
Macro Block Editing (Ex.: Macro block No. 0)

Line No. 0	\$u00100 = 1
Line No. 1	SYS (SET_SCRN) \$u00100



The above command is a system call command to bring up screen No. 1.

With the above setting, the switch on screen No. 0 must be held down for 5 seconds to bring up screen No. 1.



Graphic Movement on Screen

When a graphic is displayed on the extreme right of the screen, a macro can be executed to move it to the left.

Screen Edit

⊙ Graphic relay mode Division No.: 0 Memory: \$u100-00 Type: 1-Graphic Start Graphic GNo.: 0 No.: 0 No. of Relays: 1 Parameter: 1 Process Cycle: Low Speed ⊙ Switch Output Memory: \$u100-00 Lamp Memory: \$u100-00 Output Action: Alternative	⊙ Interval timer mode Division No.: 1 Macro Block No.: 1 Time-up Time: 0 Start Mem. Designation: \$u100-00 Stop timer after execution of macro: unchecked ON Macro Block No.: unchecked OFF Macro Block No.: unchecked Process Cycle: Low Speed



Pressing the switch sets or resets memory “\$u100-00.”
When “\$u100-00” is set (ON), graphic No. 0 in group No. 0 is displayed and macro block No. 1 is executed at every cycle.
Since [Parameter] is set in the graphic relay mode, “\$u101” becomes the memory for the parameter.

Graphic Library Editing

(Ex.: Graphic No. 0 in group No. 0)

Place the following graphic on the screen, and specify the X parameter.

Graphic No. 0 in group No. 0



Pattern No. 0



<Parameter setting>
Action : Animate
Start X : Incremental - 1
(Incremental input in the minus direction 1)

Macro Block Edit (Ex.: Macro block No. 1)

Line No. 0 \$u00101 = \$u00101 + 1 (W)
Line No. 1 IF (\$u00101 = 640) LB00 (W)
Line No. 2 RET
Line No. 3 LB00:
Line No. 4 \$u00101 = 0 (W)

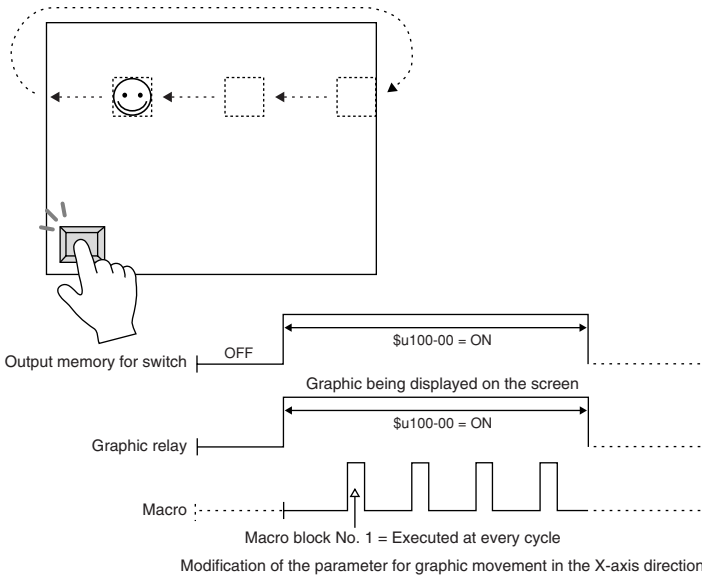


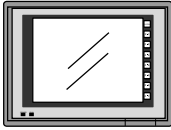
The above is the setting for a macro to modify the X-axis parameter for the graphic start point.

When the count on the X axis has been increased to 640 dots (maximum), the count is cleared and then is increased again. The graphic is moved from the right to the left by this process.

Transfer the above screen data to the ZM-*2 for check.

Press the switch. The graphic is displayed on the extreme right, and starts moving to the left. Press the switch. The graphic is turned off. Press the switch again. The graphic appears in the last position, and moves to the left.

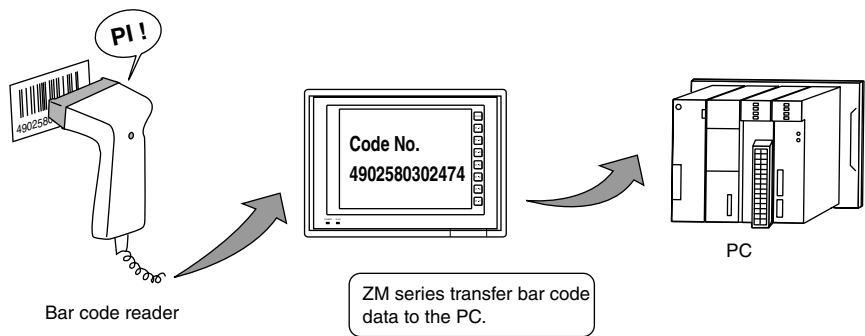




Bar Code (ZM-41/70 Optional)

Outline of Bar Code

ZM-41/70 reads bar code data and removes the control codes before writing them in the PC memory as ASCII codes. With this feature, all information in the bar code is transferred to the PC immediately. The ZM Series can display the transferred bar code data on its screen.



Setting Bar Codes

Connecting the Bar Code Reader

◎Bar code entry connector

- ZM-41/70 Connector pin (D-Sub 9-pin socket)
- ZM-*2 Modular jack 1, 2 (standard)

Connect the bar code reader to the connector to transfer the bar code reader's signal to ZM series.

◎There is no handshake communication between them. (The bar code reader is not synchronized with the ZM Series.)

◎Note

Depending on the bar code reader type, the applicable connecting cable differs. Please supply an appropriate conversion cable on your own.

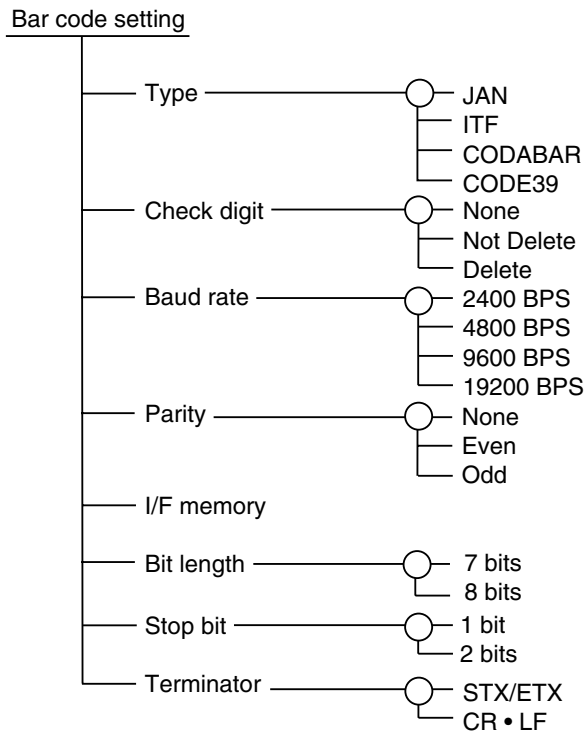
○For ZM-*2

Modular jack plugs and cables are available from Sharp. Refer to page 19-6.

[Bar Code Setting] Dialog

- ◎ In the [Bar Code Setting] dialog, set up the protocol for communication between the bar code reader and the Control Terminal ZM-*2. Follow the bar code reader's manual.
- ◎ When you go to the [Edit] menu, then to [System Setting] and select [Bar Code

☒ Use Bar Code



Setting], the [Bar Code Setting] dialog is displayed.

[Use Bar Code]

Click the check box for [Use Bar Code] when using the bar code reader. The following options become active.

[Type]

Specify the type of bar code reader from:

1. JAN (UPC, EAN)
2. ITF (Interleaved 2 of 5)
3. CODABAR (NW7)
4. CODE39

[Check Digit]
Choose from [None], [Not Delete] or [Delete].

[Baud Rate]
Choose a baud rate from 2400, 4800, 9600 or 19200 BPS.

[Parity]
Choose from [None], [Even] or [Odd].

[I/F Memory]
Specify the top address of the PC memory containing bar code data.
Memory contents are shown below:

[Bit Length]
Choose either 7 bits or 8 bits.

[Stop Bit]
Choose either 1 bit or 2 bits.

[Terminator]
Choose either STX/ETX or CR•LF.

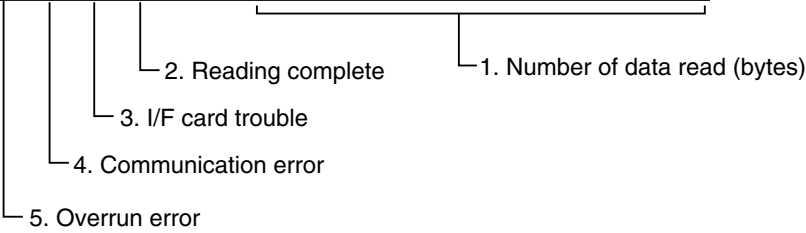
<<I/F memory>>
Memory contents are as follows:

Memory	Contents
n	Flag/number of data read
n+1	Data read
.	
.	
.	
.	
.	
n+m	

(1) Flag/Number of data read (n)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
				0	0										

Note
Any bit which is not used in the flag/number of data memory should be set as [0].



1) Number of data (bits 0 to 9)

The number of data (bytes) is written in this area. The data is written from address $n + 1$. (The NULL code "0" is placed at the end of the data.)

2) Reading complete (bit 12)

When data is written in the PC memory, bit 12 (reading complete) shows [1].

Read the data, and reset the bit to [0] in order to make it recognizable when the next one block of data is written. (Also when an error has occurred.)

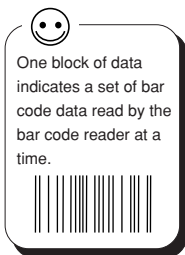
*** After data is received from the bar code reader and written on I/F memory, the I/F memory (n+0) reading complete bit (bit 12) is set as [1]. Confirm this on the PC, and after data is taken, reset the [Reading Complete] bit to [0].**

3) I/F card error (bit 13)

When there is an error on the I/F card, bit 13 shows [1]. Locate and correct the problem.

4) Communication error (bit 14)

When an error has occurred in the communication between the bar code reader and the Control Terminal ZM-*2, bit 14 shows [1]. This means the block of data was not transferred to the PC properly. Handle the error on the PC side.



5) Overrun error (bit 15)

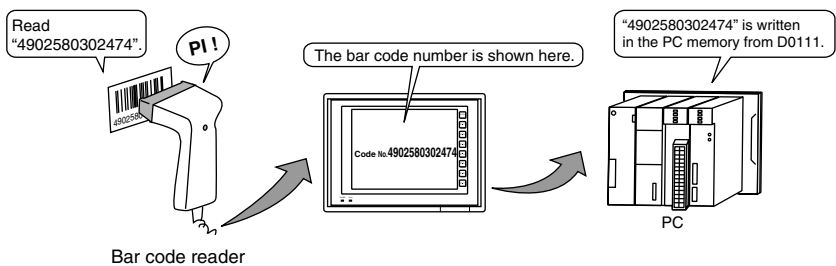
When ZM-*2 receives one block of data from the bar code reader before transferring the previous block of data to the PC, bit 15 shows [1]. The new block of data replaces the previous one in ZM-*2 as well as the number of data (bits 0 - 9). Handle the error on the PC side.

(2) Data (from $n + 1$)

Bar code data is stored in these areas in ASCII code.

Bar Code Setting Example

Follow these steps to display bar code data received from the PC on the screen:



◎Setting Procedure

Setting [Bar Code Setting] and [Character Display]

1. When you go to the [Edit] menu and then to [System Setting] and click on [Bar Code Setting], the [Bar Code Setting] dialog is displayed.

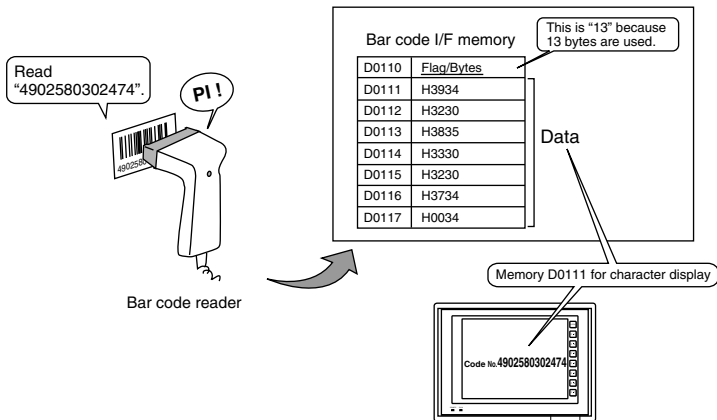
Refer to the bar code reader manual and make settings in the [Bar Code Setting] dialog. (See page 19-2.)

In this example, specify "D0110" for [I/F Memory] in the [Bar Code Setting] dialog.

2. To display the contents of the bar code that was read, set the character display.
When you click on the [Character Display] icon, the [Character Display] dialog is shown. Set options in the dialog. Refer to "Character Display" in Chapter 7, "Data Display."

○Notes on settings

- 1) In this example, specify "D111" for [Memory] in the [Character Display] dialog because bar code data is stored from "n (I/F memory) + 1."
- 2) Specify the number of bytes of bar code data for [Byte].

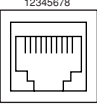


Connecting Contorol Terminal ZM-*2 and Bar Code Reader

This is an explanation of the wiring used to connect the ZM-*2 modular jack (MJ1 • 2) and the bar code reader.

◎Modular jack pin arrangement and signal name

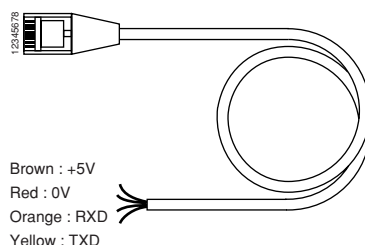
The pin numbers and signal names are as shown in the following diagram.

MJ1/2	Pin No.	Signal	Output power supply Max. 150mA
	1	Not use	
	2	Not use	
	3	+5V	
	4	+5V	
	5	0V	
	6	0V	
	7	RXD	
	8	TXD	

◎Cable that is to be used (available from Sharp)

Length 2 m

Equipped with modular plug

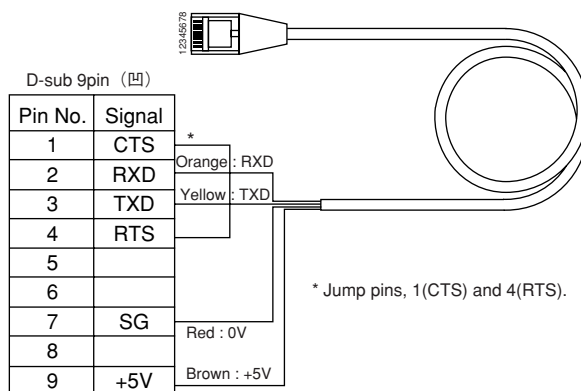


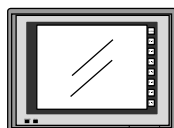
◎Notes concerning connection

For bar code scanners controlling CTS and RTS, it may be necessary to use a jumper between CTS and RTS to maintain proper operation.

○For a bar code reader used with ZM-41/70

Perform the wiring shown in the diagram below.

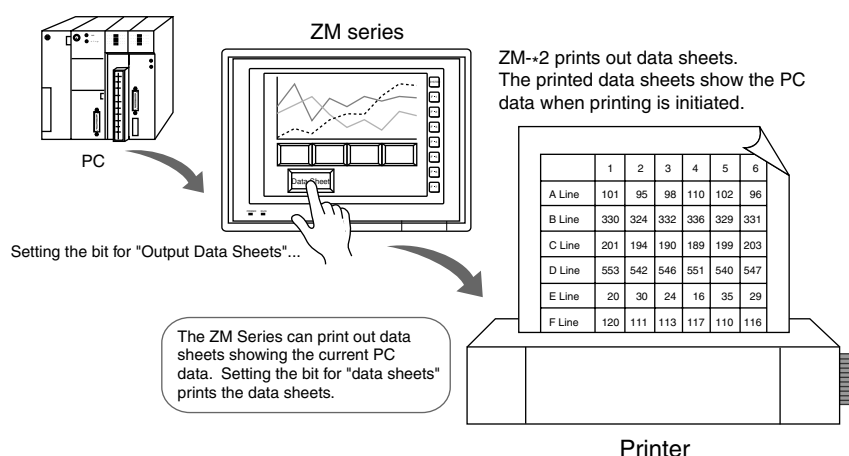


**ZM Series**

Data Sheets

Outline of the Data Sheet Function

- ◎The data sheet function makes it possible to print out the PC data (numeric data and characters) just transferred to the Control Terminal ZM-*2 and displayed on the ZM-*2 screen when the ZM-*2 communicates with the PC. This function also makes it possible to print out the data that is not shown in the ZM-*2 display.



- ◎The print screen is formatted in [Data Sheet] in the ZM-*2 screen data file.

Line or square

	1	2	3	4	5	6
A Line	ABC	123	123	123	123	123
B Line	ABC	123	123	123	123	123
C Line	ABC	123	123	123	123	123
D Line	ABC	123	123	123	123	123
E Line	ABC	123	123	123	123	123
F Line	ABC	123	123	123	123	123

Data display (numeric data)

Data display (characters)

Setting Data Sheets

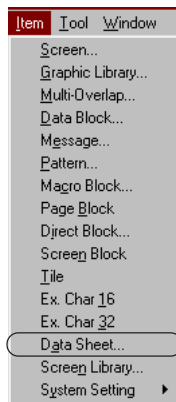
Data Sheet Setting Procedure

To print out data sheets, make the following settings.

Settings are performed in the same area on the base screen where lines, squares, numeric data, and characters are placed.

Go to the [Edit] menu and click on [Data Sheet] for data sheet editing.

Once you are in data sheet editing, go to the [Edit] menu and click on [Data Sheet Setting] to make settings such as paper size, number of lines, and number of characters per line.

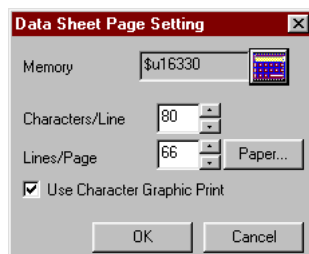


Data sheet edit command

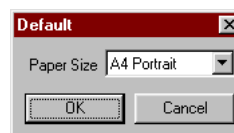


Image of data sheet to be printed out

	1	2	3	4	5	6
A Line	123	123	123	123	123	123
B Line	123	123	123	123	123	123
C Line	123	123	123	123	123	123
D Line	123	123	123	123	123	123
E Line	123	123	123	123	123	123
F Line	123	123	123	123	123	123
G Line	123	123	123	123	123	123
H Line	123	123	123	123	123	123
I Line	123	123	123	123	123	123
J Line	123	123	123	123	123	123
K Line	123	123	123	123	123	123



Paper size and number of lines are decided with this setting.

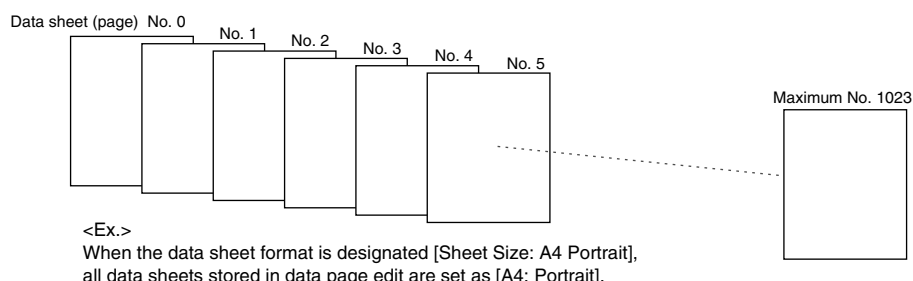


Data Sheet Edit

For data sheet editing, go to the [Edit] menu and click on [Data Sheet].

◆ Data sheet construction

It is possible to create and register a maximum of 1024 data sheets. Specify the data sheet size and direction in [Data Sheet Page Setting].



◆ Data Sheet Page Setting

To set paper size, number of characters, and number of lines, go to the [Edit] menu on the menu bar and click on [Data Sheet Setting]. Make the following settings in the [Data Sheet Page Setting] dialog that appears:

[Memory]

This determines the first page of printing. The details of the memory are as follows:

Address	Contents	Action
n	Beginning print page	-> V
n + 1	Number of pages to be printed	-> V

[Characters/Line] (16 to 152)

This determines the number of the characters per line on the data sheet.

[Lines/Page] (2 to 108)

This determines the number of the lines per page on the data sheet.

[Sheet Size]

This determines the sheet size and the printing direction.

[Use Character Graphic Print]

When this item is checked, charts can be printed out clearly. The specified number of lines also changes. How this relates to the print out paper is shown below.

Paper size	Characters	Lines	Number of lines when character graphic is used
A4 Portrait	80	66	108
A4 Landscape	114	40	64
15-inch Landscape	136	64	64

The space between lines is as shown in the diagram below.

◎Standard



◎Using Character Graphic



◆ Edit tools that can be used in data sheet edit are described below.



1) [Line] icon

Continuous line is not available. Additionally, the line can only be depicted horizontally or vertically.

*** It is not possible to draw a diagonal line.**



2) [Box] icon

Only the [Paint Out: No] square is available.



3) [Characters] icon

Character enlargement is limited to 2 (width) x 1 (height) or 1 (width) x 1 (height).



4) [Display Data] icon

Only the numeric display can be placed on the data sheet. Setting the character space and the parameter numbers is not possible. As with characters, numeric display enlargement is limited to 2 (width) x 1 (height) or 1 (width) x 1 (height).

5) Calendar Display

The calendar is arranged the following way in the system memory address \$S160-166:

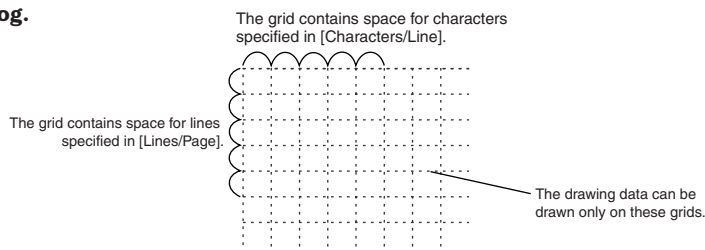
Address	Contents
\$S160	Calendar Year
\$S161	Calendar Month
\$S162	Calendar Day
\$S163	Calendar Hour
\$S164	Calendar Minute
\$S165	Calendar Second
\$S166	Calendar Day of the Week (0-6)

Note

To show grids, go to the [Display] menu and click on [Show Grids].

For all icon functions above, the color setting is fixed as [White].

*** When the data sheet format is created in data sheet page edit, the drawing data can be drawn only on the grid that is specified for [Characters/Line] and the [Lines/Page] in the [Data Sheet Page Setting] dialog.**



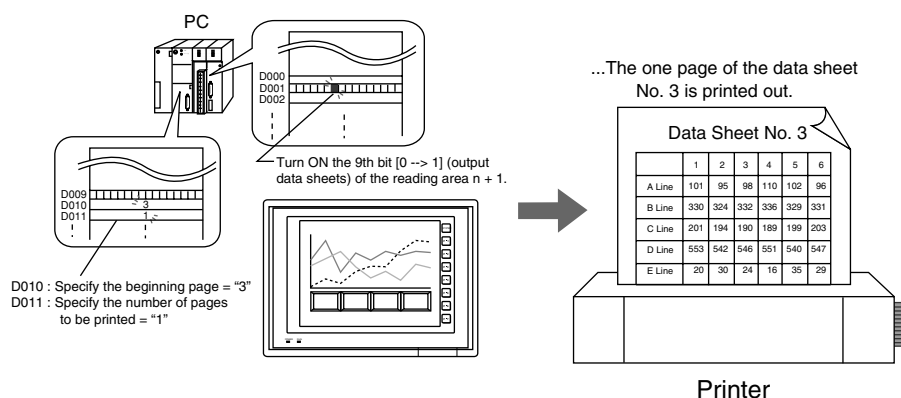
Printing Data Sheets

There are two methods for printing out data sheets.

◎ Command from reading area $n + 1$.

The leading edge of bit 9 (output data sheets) of the reading memory $n + 1$ prints out the data sheets.

Addresses n and $n + 1$ of [Memory] in the [Data Sheet Page Setting] dialog accessed from the [Edit] menu designate the beginning page and the number of sheets to be printed.

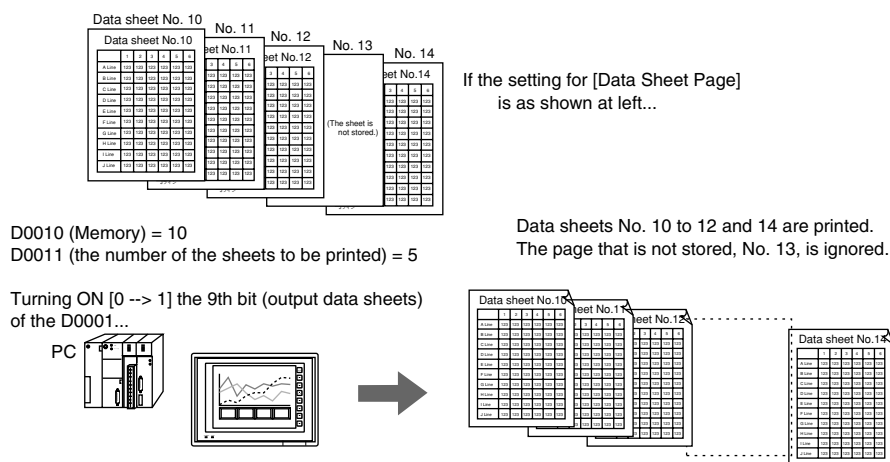


*** When [Memory] $n + 1$ (number of pages) is "0," the printer will not print any data sheet.**

If a data sheet number for a data sheet that is not yet stored is specified, a sheet with that number cannot be printed.

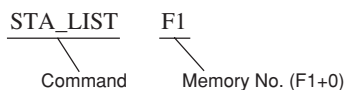
Example) Reading area = D0000

Beginning page specification memory = D0010



◎Commanding by macro.

Command “data sheet print-out” by using the system-call macro. The first page and the number of the sheets to be printed are designated by the specified area of the macro internal memory.



F1+0	Number of the beginning page of data sheets to be printed
F1+1	Number of data sheets to be printed

For details on the macro, refer to Chapter 14, “Macro.”

Printed Data Sheet

All characters and lines on the data sheet screen are handled as text. Therefore, the data sheet screen of the ZM-71SE differs slightly from the printed out data sheet in appearance.

<Ex.>

If the following screen is created in data sheet edit with the V-SFT:

No. 0	data
No. 1	data
No. 2	data
No. 3	data



The following data sheet will be printed out:

No. 0	data
No. 1	data
No. 2	data
No. 3	data

<Ex.>

On the V6, when items that [Use Character Graphic Print] are checked,

No. 0	data
No. 1	data
No. 2	data
No. 3	data



the display of the V6 is printed in the following way:

No. 0	data
No. 1	data
No. 2	data
No. 3	data

No. 0	data
No. 1	data
No. 2	data
No. 3	data



No. 0	data
No. 1	data
No. 2	data
No. 3	data

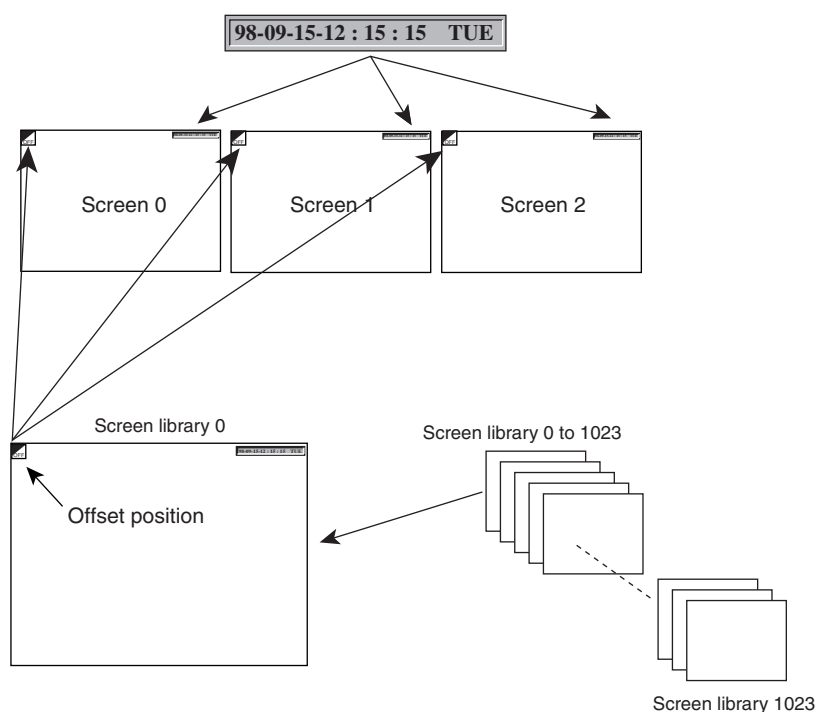


Screen Library

Outline of Screen Library (ZM-*2 Function)

Switches, lamps, modes, etc. that are used often or screens consisting of them can be registered as screen libraries, and can be placed on the base screen or overlaps. Once screen libraries have been created, the registered items can be placed on any screen.

◎ In the following example, a calendar part is registered as screen library 0, and the part is placed on each screen.

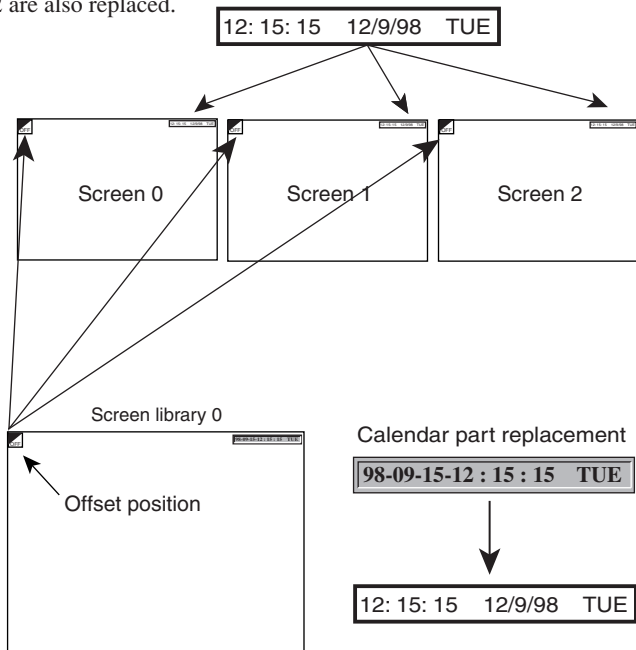


- Memory used by a Sharp's standard calendar part is about 300 bytes.
When the calendar parts are placed on three screens directly, 900 bytes are used.
 $300 \times 3 = 900$ bytes
- When a 300-byte calendar part is registered in a screen library and the part is placed on a screen, 315 bytes and 7 bytes are used respectively. Thus the total number of bytes for placing the parts on three screens:
 $315 + 7 + 7 + 7 = 336$ bytes
By using the screen library, 564 bytes ($900 - 336 = 564$) are saved.

*** Use of the screen library saves memory.**

- ◎ Should a part registered in a screen library be replaced after it has been placed on screens, replace it in the screen library only. The parts on the screens are also replaced simultaneously.

When the calendar part of screen library 0 has been replaced, the parts on screens 0 to 2 are also replaced.



*** Screen library is available for management of parts on screens.**



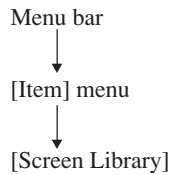
Notes on use of screen library

Depending on mode type, only one mode can be registered in one division. Should such a mode in a screen library be placed on the screen, make sure that the division numbers of the mode and the screen are not the same. To avoid this problem, screens on which screen library items will be placed have division Nos. 100 and higher. (Division Nos. 100 and higher are not supposed to be used generally.)

Also, there are cases in which only one mode (entry mode, memory card mode) can be used on one layer, and in which only one function (memo pad function, etc.) can be used on one screen. Take the above note into consideration when placing such an item in a screen library on the base screen or overlaps.

Screen Library Registration

The screen library edit window is displayed in the following steps:



Up to 1024 screen libraries (Nos. 0 to 1023) can be registered.



The parts that can be registered in screen libraries are almost the same as the parts for the screens.

1. The following parts can be placed on screens, but cannot be registered in screen libraries.

- Overlap
- OPEN macro
- CLOSE macro
- CYCLE macro
- Local function switch setting

2. Remarks

Nesting of different screen libraries is not possible.

3. Memory for screen library

A maximum of 128 KB memory is available with one screen library.

Limits for Part Use

When arranging the screen library on the screen, the parts registered on the screen library are subject to the same limit items.

When arranging a screen library that has mode registered on it, it is necessary to select division numbers that have not mode registered.



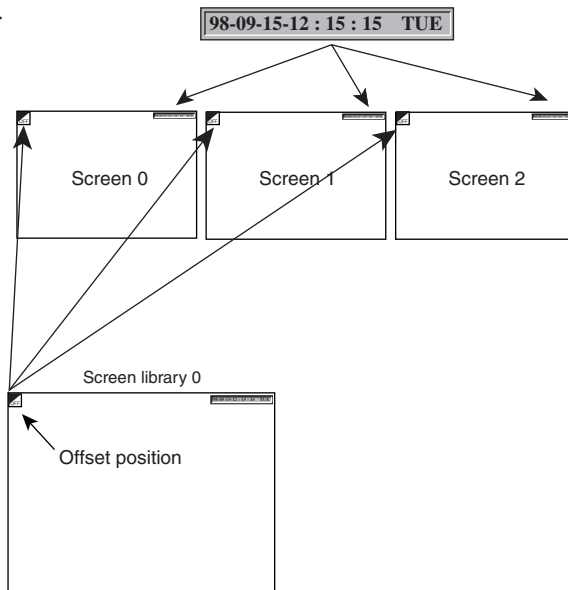
For more information about "parts placement limit on a screen", refer to page 3-2.

Offset Position for Screen Library Placement

In screen library editing, determine the offset position according to the placement position on the screen.

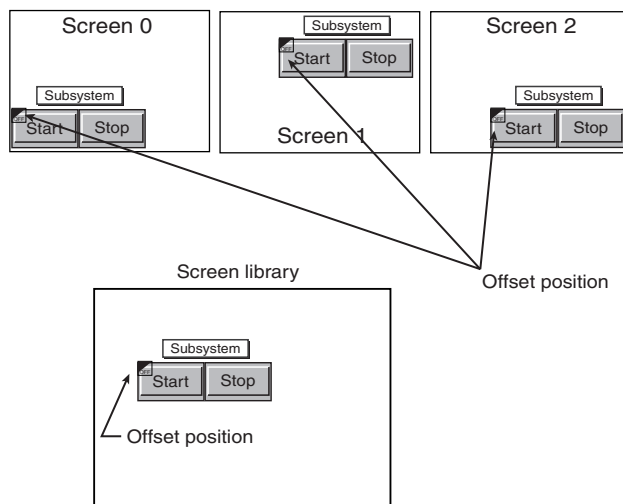
1. Placing offset marks at the reference point (top left corner)

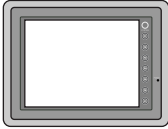
Should calendar parts be placed in the same positions on multiple screens as shown below, it is recommended that the offset marks be placed at the reference points.



2. Placing offset marks freely

Should the same parts be placed in varied positions on multiple screens as shown below, it is recommended that each offset mark be placed in the vicinity of the part. Parts can be placed more easily.



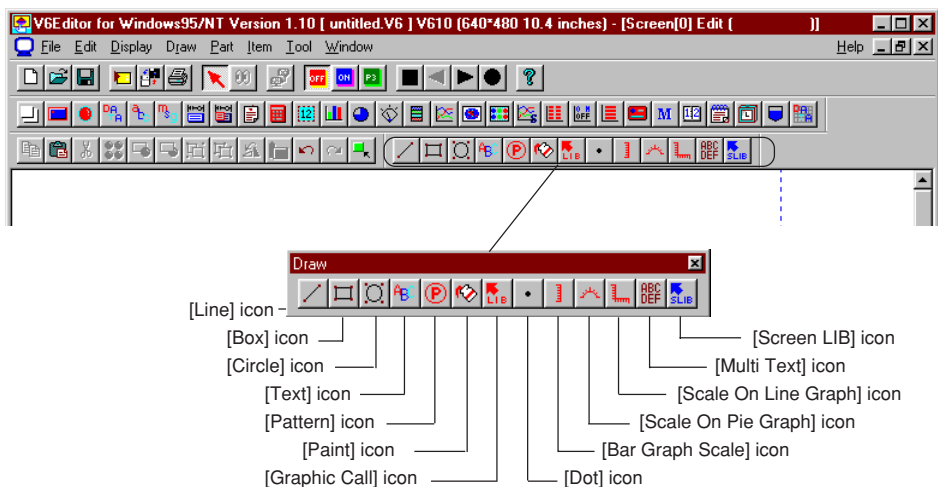
**ZM Series**

Drawing Tools

In this chapter, drawing tools are explained.

Drawing Tool Bar

Start up the editor and open the screen edit. The drawing tool bar is displayed underneath the icon bar on the right.

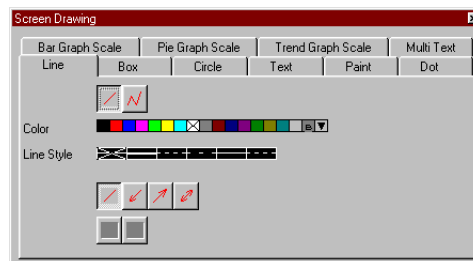


Click on the desired icon. The [Screen Draw] dialog is displayed.



Line

Clicking the [Line] icon brings up the following tab window:



When you drag the mouse while holding down the SHIFT key, it is possible to draw a horizontal (or vertical) line.

Single Line

Choose this icon when drawing a single line. Here you can specify whether or not arrows are attached to the ends of lines, and if so, the type of arrow.

Drag the mouse from the start point to the end point.

*** Before dragging, select a color, a line type, and an arrow type.**

Continuous lines

Choose this icon when drawing continuous lines.

1) Click on the start point, and move the cross-shaped cursor to the end of the first line.

2) Click on the end point of the first line. The initial straight line is drawn.

Start point    1st point on line

3) Move the cross-shaped cursor to the end of the second line.

4) Click on the end point of the second line. The second straight line is drawn.

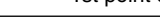
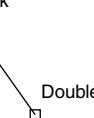
Start point    1st point on line
  2nd point on line
Click 

5) Repeat these steps to the “nth line as desired.

6) To erase the line that you drew, click the right mouse button.

7) At the end point, double-click the mouse. Continuous lines are terminated.

* **A maximum of 32 points can be included.**

Start point    1st point on line
  2nd point on line
  3rd point on line
Click    End point
Double-click 

Color

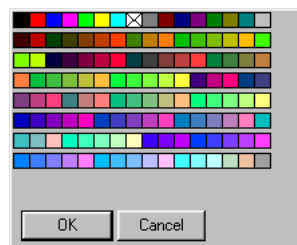
Click the desired color from 128 options. The default color is white.

* [B] denotes flashing. Flashing corresponds to the following 16 colors.


 For the ZM-41D/L and
 ZM-70, select from 16
 colors.

Black Blue Red Violet Green Sky blue Yellow White
 Silver-color Yellowish green Pale blue Deep green Purple Dark red Indigo Gray

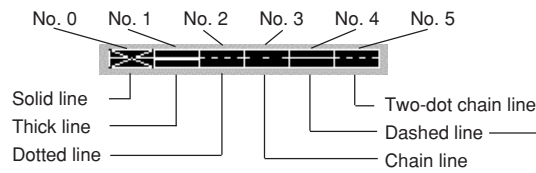
When you select a color and click
 [OK], the color of the line that you
 selected is displayed in the [Screen
 Drawing] dialog.



◎Line type

Select the desired line type from 6 options. The default type is a solid line (No. 0).

*** For continuous lines, thick line (No. 1) cannot be used.**

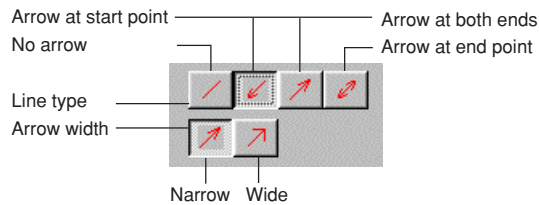


Note that while this is depicted as a straight line on the screen, it is depicted as a dashed line on the Control Terminal.

◎Arrow setting

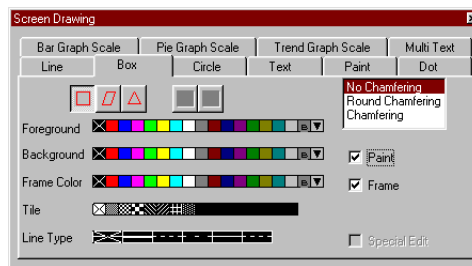
This setting is active when the [Single Line] icon is selected.

Choose from the following options. The default setting is "no arrow."



Box

Click the [Box] icon in the drawing tool bar. The following [Box] tab window is displayed.

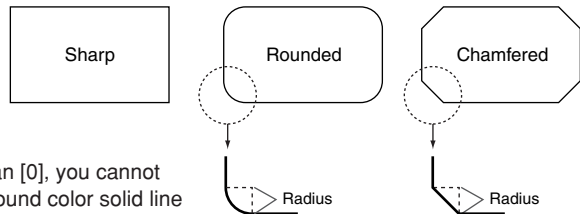


For ZM-41/70
Rounding and
chamfering settings
cannot be used.

Box (=Rectangle)

Select this icon when drawing a box shape. Drag the mouse from the start point (top left corner) to the end point (bottom right corner), and a box will be drawn.

It is also possible to set the shape of the box corners (sharp, rounded, chamfered) and the radius.



Note about Planed R

1. If you set a tile pattern other than [0], you cannot select the frame type. A foreground color solid line frame is automatically depicted.
2. For the following settings, XOR cannot be used:
 - when a tile other than [0] is set
 - when frame is checked (☑) for tile [0]
 (For example, if you set a tile other than [0] for [Graphic Relay Mode/1 Graphic], you cannot display a frame with rounded corners even if you select it.)

Parallelogram

Select this icon when drawing a parallelogram.

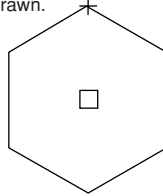
- 1) Drag the mouse from the start point (top left corner) to the end point of the upper side.
- 2) Then, move the cross-shaped cursor to the end point (bottom right corner).
- 3) Click the mouse. The desired parallelogram can be drawn.

Polygon

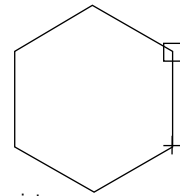
Select this icon when drawing a polygon.

- 1) Select the display method type from the icon.

 When you select the left icon and drag the mouse from the center to a corner, a regular polygon is drawn.



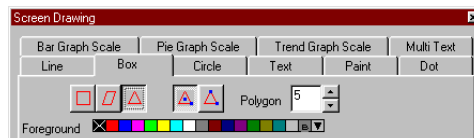
 When you select the left icon and drag the mouse from the start point to the end point, a regular polygon is drawn.



 : Start point

 : End point

- 2) Enter the number of angles. The default value is "5."



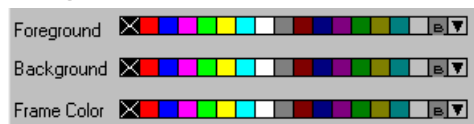
- 3) Drag the mouse from the start point to the end point. The desired regular polygon can be drawn.

◎ Foreground color, background color, frame color

Select the desired color. The default color is white.

* **[B]** denotes flashing.

 For more information on 16 colors, refer to page 22-2.



◎ Paint, Frame

There are three types:

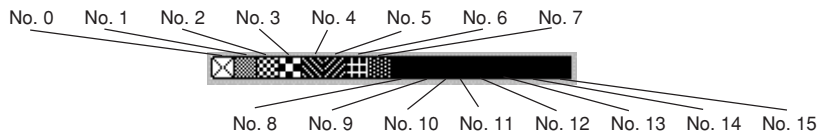
- ☐ Paint
- ☒ Paint & ☐ Frame
- ☒ Paint & ☒ Frame



For information about user registered tile patterns, see page 22-26.

◎ Tile

There are 16 types of tile patterns that can be used, 8 default types and 8 user registered types. The default is solid white.



For more information on line types, refer to page 22-3.

◎ Line type

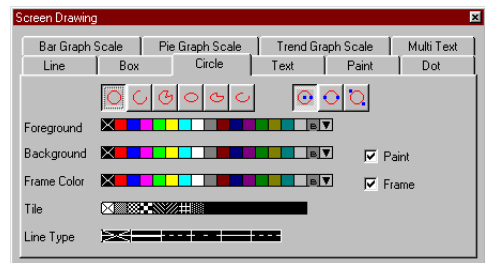
Select the desired line type from 6 options. The default type is solid line (No. 0).

* **For [Box] (rounded), [Parallelogram], and [Polygon], thick line (No. 1) cannot be used.**



Circle

Click the [Circle] icon on the drawing tool bar. The following [Circle] tab window is displayed.



○ Circle

Select this icon when drawing a circle.

Drag the mouse from the start point to the end point. The desired circle can be drawn.

○ Arc

Select this icon when drawing an arc.

Drag the mouse from the start point via a point to the end point, and click.

○ Sector

Select this icon when drawing a sector.

Drag the mouse from the start point to the end point, and click.

○ Ellipse

Select this icon when drawing an ellipse.

Drag the mouse from the start point to the end point. The desired ellipse can be drawn.

○ Elliptical arc

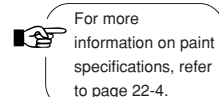
Select this icon when drawing an elliptical arc.

Drag the mouse from the start point to the end point, and click.

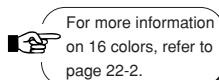
○ Elliptical sector

Select this icon when drawing an elliptical sector.

Drag the mouse from the start point to the end point, and click.

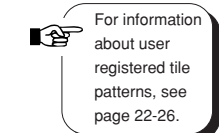


- ☉ Paint, Frame
Check the necessary settings.

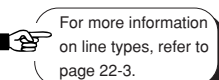


- ☉ Foreground color, background color, frame color
Select the desired color. The default color is white.

* **[B] denotes flashing.**



- ☉ Tile
There are 16 types of tile patterns that can be used, 8 default types, and 8 user registered types. The default is solid white.



- ☉ Line type
Select the desired line type from 6 options. The default type is a solid line (No. 0).
* **For circles, thick line (No. 1) is not available.**



Examples of drawing circles

◆ Circle

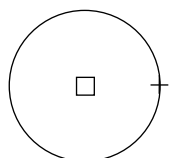
Click the [Circle] icon, and select any of the icons shown on the left: Radius, Diameter or Diagonal. Drag the mouse from the start point to the end point. When the mouse button is released, a circle is drawn.



[Radius]/[Diameter]/
[Diagonal] icons

○ Radius

Drag the mouse from the center for the radius.

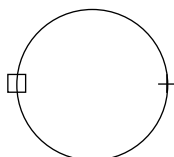


□ : Start point + : End point

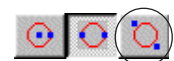


○ Diameter

Drag the mouse from one side to the other for the diameter.

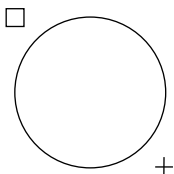


□ : Start point + : End point



○ Diagonal

Drag the mouse from the start point to the end point. A circle is drawn as you drag the mouse.



□ : Start point + : End point



◆ Arc

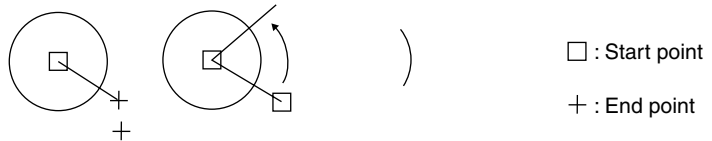
Click the [Arc] icon, and choose either icon shown on the left: Center & 2 Points, or 3 Points. Drag and click the mouse as described below.



○ Center & 2 Points

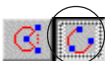
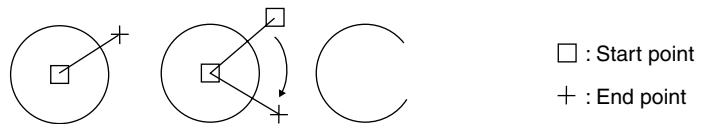
(Counter-clockwise specification)

1. Drag the mouse from the center to the desired radius, and release the mouse button. Move the cursor to the start point of the arc, and click.
2. Move the cursor counter-clockwise along the arc, and click on the end point of the arc.
3. An arc is drawn. (The section drawn counter-clockwise remains as an arc.)



(Clockwise specification)

1. Drag the mouse from the center to the desired radius and release the mouse button. Move the cursor to the start point of the arc, and click.
2. Move the cursor clockwise along the arc, and click on the end point of the arc.
3. An arc is drawn. (The section drawn clockwise is removed from the circle to create an arc.)



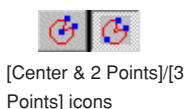
○ 3 Points

1. Drag from the start point to the second point. Release the mouse button.
2. Click the mouse at the third point.
3. An arc passing the specified three points is drawn.



◆ Sector

Click the [Sector] icon, and choose either icon shown on the left: Center & 2 Points, or 3 Points. Drag and click the mouse as shown below.



The method of display is identical to that for [Arc] as described above. Only the icons are different.



◆ Ellipse

Click the [Ellipse] icon, and select either icon shown on the left: Diagonal, or Major Radius. Drag the mouse from the start point to the end point. When the mouse button is released, an ellipse is drawn.



[Diagonal]/[Major Radius] icon



◆ Elliptical arc

Click the [Elliptical Arc] icon, and choose either icon shown on the left: Diagonal & 2 Points, or Center & 2 Points. Drag and click the mouse as described below.

□ : Start point + : End point

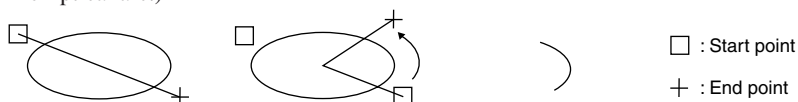


[Diagonal & 2 Points]/[Center & 2 Points]

○ For diagonal & 2 points

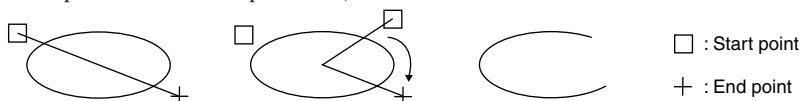
(Counter-clockwise specification)

1. Drag the mouse from the center to the desired size, and release the mouse button. Move the cursor to the start point of the elliptical arc, and click.
2. Move the cursor counter-clockwise along the elliptical arc, and click on the end point of the elliptical arc.
3. An elliptical arc is drawn. (The section drawn counter-clockwise remains as an elliptical arc.)



(Clockwise specification)

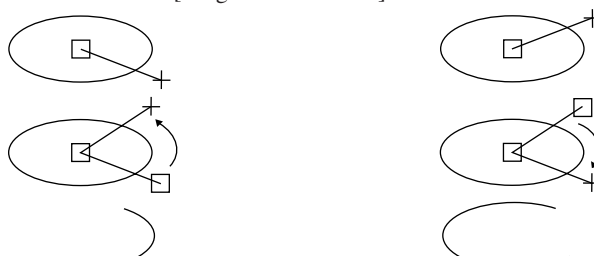
1. Drag the mouse from the center to the desired size and release the mouse button. Move the cursor to the start point of the elliptical arc, and click.
2. Move the cursor clockwise along the elliptical arc, and click on the end point of the elliptical arc.
3. An elliptical arc is drawn. (The section drawn clockwise is removed from the ellipse to create an elliptical arc.)



[Center & 2 Points]/[3 Points] icons

○ For center & 2 points

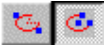
Except for the fact that the start point is the center of an ellipse, the display method is the same as for [Diagonal & 2 Points].





◆ Elliptical arc sector

Click the [Elliptical Arc Sector] icon and choose either icon show on the left: Diagonal & 2 Points or Center & 2 Points. Drag and click the mouse.



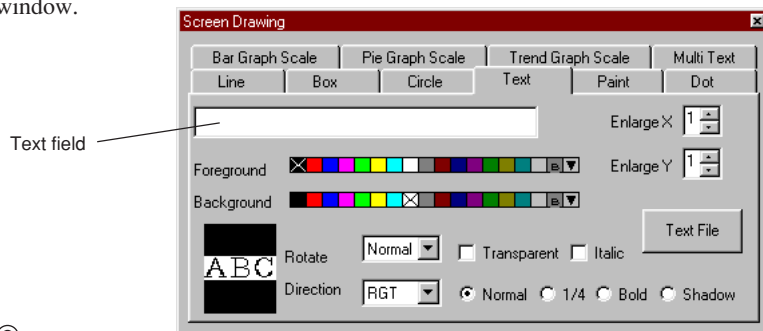
[Center & 2 Points]/[3 Points] icons

The method of display is identical to that for [Elliptical Arc] as described above. Only the icons are different.



Text

Clicking the [Text] icon in the drawing tool bar brings up the following [Text] tab window.



◎ Text entry

1. Enter characters as desired using the keyboard.
2. When you drag the mouse on the screen, a box with a dotted line frame is displayed.
When you release the mouse at the desired location, text is displayed on screen.

◎ Text Properties

- ☐ Foreground/background color Specify the desired color.
- ☐ Enlargement X or Y can be specified.
- ☐ Rotation Select from [Normal/L90/180/R90].
- ☐ Direction Select from RGT, DW, LFT, UP.
- ☐ Transparency Set whether transparency should apply to the text placed on graphics.



The number of characters that can be entered per line, and the number of lines, varies depending on the character display of the model that you are using. See Chapter 1, "Basic Operation" on page 1-28.

- Yes Text on graphics is only displayed in the foreground color.
- No Text on graphics is displayed in both foreground/background colors.
- ☐ Italic Select whether or not to italicize text.
- ☐ Type Normal, 1/4, Bold, Shadow

*** [1/4] can only be used with 1-byte characters.**

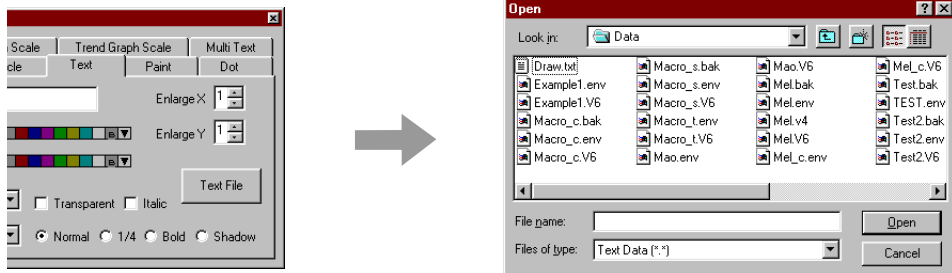
Bold characters are only active when the X enlargement factor is [1].

- ☐ Enlargement X or Y can be specified.

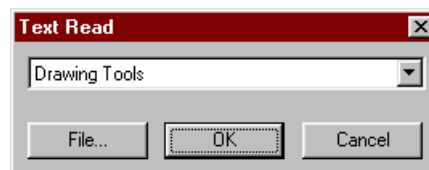
◎Text file

Text file data can be imported.

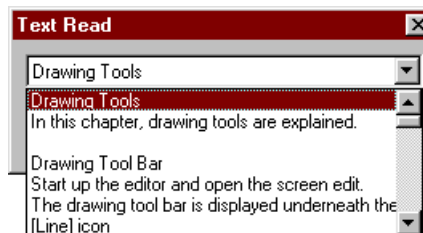
1. Click on the [Text File] button in the [Text] tab window. The [Open File] dialog is displayed.



2. Select a text file to import and click [Open]. The [Read Text] dialog is displayed. Here you can confirm the text in the text file.



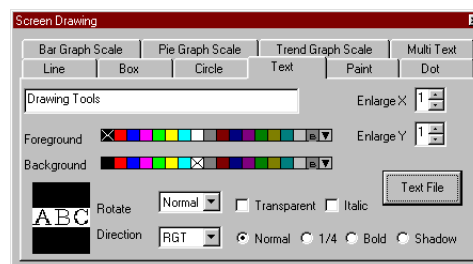
3. If the text that is displayed is not necessary, click on the pull down menu. The following lines of text can be reviewed this way so that you can search for the necessary text.



4. Once you have selected the text to import, click the [OK] button.

Text is imported into the text box in the [Text] tab window.

*** However, the editor processes lines of text in the text file in lines of characters. The maximum amount of characters that can be read on one line varies depending on the model's character display. (See page 1-28.)**



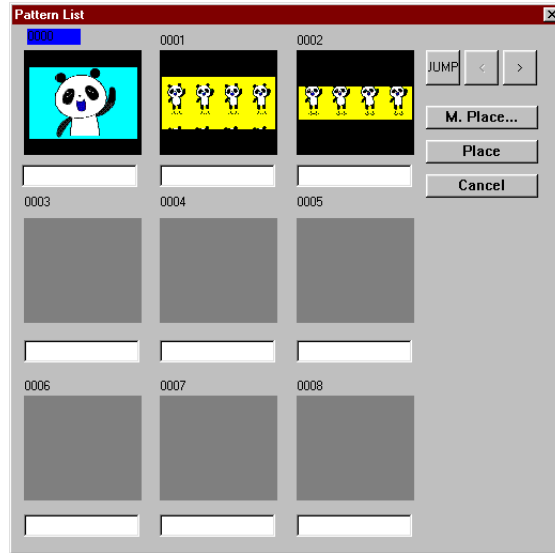


Pattern

Place the pattern registered in pattern edit.

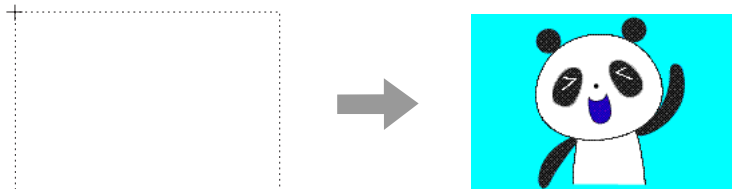
Click on the [Pattern] icon on the drawing tool bar. The [Pattern List] dialog shown below is displayed.

For information on registering patterns, refer to page 22-20.



◎Place

Select the desired pattern, and click [Place]. The cross-shaped cursor is displayed on the screen.

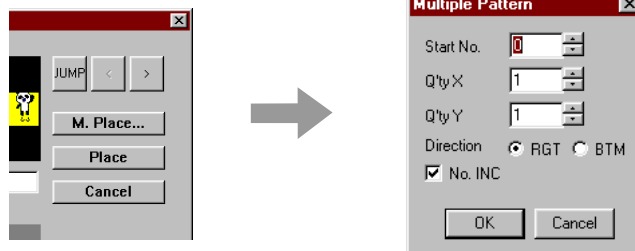


When you drag the mouse, a dotted line box is shown. When you release the mouse at the desired location, the pattern is placed there.

◎M(ulti)-Place

This is useful for placing multiple registered patterns in alignment.

Click the [M. Place] button. The [Multi-Pattern] dialog shown below is displayed.



The following options are included in the dialog.

[Start No.]

Specify the top pattern number to be placed.

[Q'ty X/Y]

Specify the quantity of patterns along the X axis and the Y axis.

[Direction RGT/BTM]

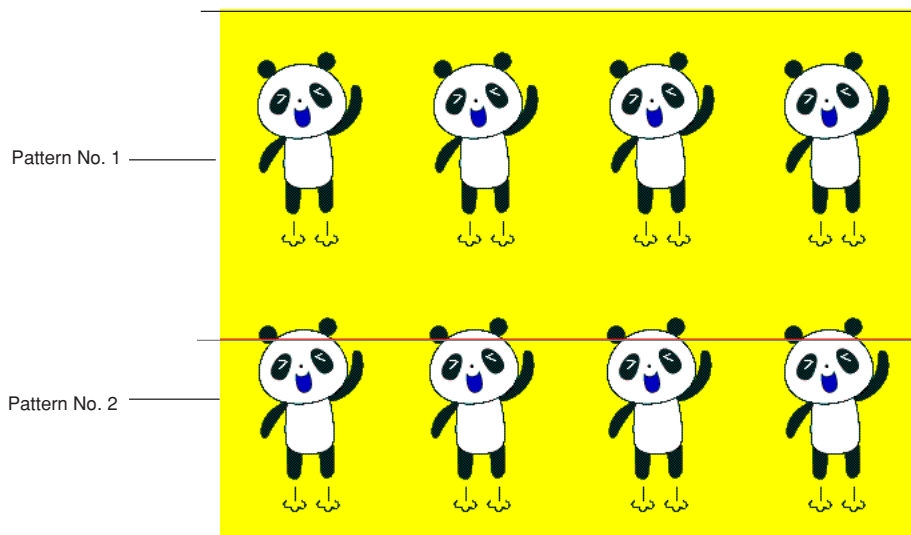
Choose either direction of aligning patterns in multi-placement.

[No. INC]

Check this box when placing patterns increasing the number by one. When this is not checked, the same patterns are copied for multi-placement.

Click [OK]. When you drag the cross-shaped cursor on screen, a dotted line box is displayed. When you click on the desired location, multiple patterns are displayed in alignment.

This is useful when merging and placing automatically segmented bitmap data.



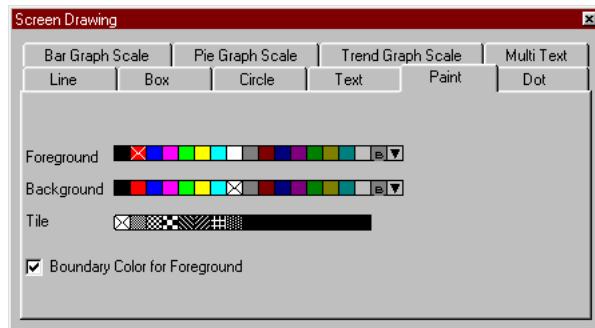
⊙ Cancel

Clicking [Cancel] closes the [Pattern List] dialog.



Paint

Clicking the [Paint] icon in the drawing tool bar brings up the following dialog:



◎ Foreground color, background color

Click on the desired color. The default color is white.

* **[B] indicates flashing. (Flashing corresponds to 16 colors.)**

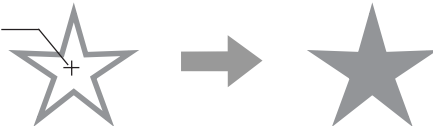
◎ Tile

There are 16 types of tiles that can be used, 8 default types and 8 user registered types. The default color is solid white.

◎ Boundary Color for Foreground Color

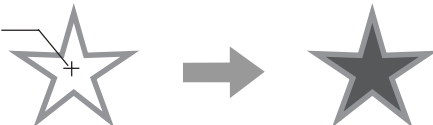
When the paint foreground color and boundary color are the same and this box is checked (☒) , a paint operation is performed.

When you click here to paint in the same foreground color as the boundary color...

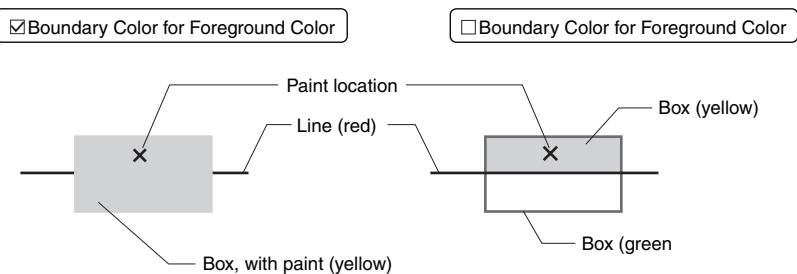


When this box is unchecked (☐) , a paint operation can be performed even if the foreground color is different from the boundary color.

Paint in a color different from the boundary color.



When a box is drawn above a line and painted, it will look like this:



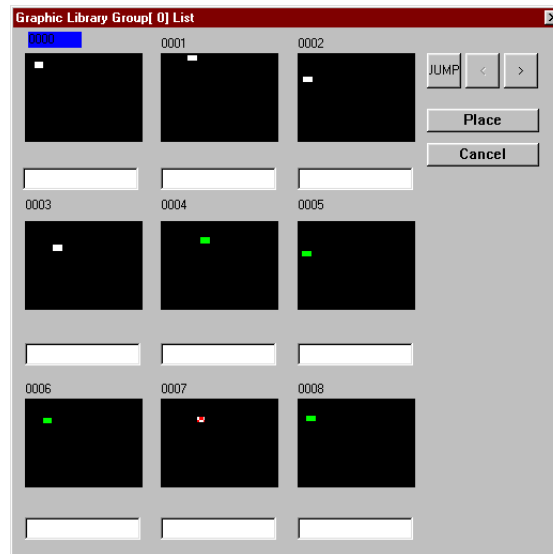
For more information on 16 colors, refer to page 22-2.



Graphic Call

A command that allows graphics registered in graphic library editing to be called up as draw screens.

1. Click the [Graphic Call] icon in the drawing tool bar. The [Graphic Library List] dialog is displayed.



2. Select a graphic (from the list) and click on [Place].
3. The mouse with an accompanying [LIB] display is shown on screen. When you click on the desired location, the graphic is placed on the screen along with the [LIB] mark.

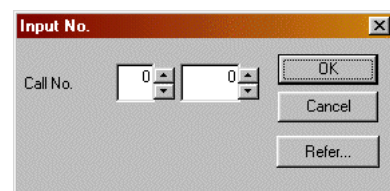


The reference placement position is determined by the [Offset] location specified in graphic library edit.

4. When you want to change the graphic library number after placement, double click after selecting the [GLIB] mark.

The following dialog is displayed. Enter the desired GNo. and No. and click [OK].

When you click on the [Refer] button, the graphic library list is displayed.

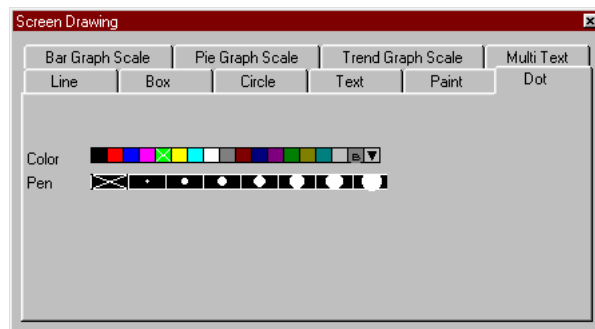


For information on graphic library edit, refer to page 11-15.



Dot

Click the [Dot] icon in the drawing tool bar. The [Dot] dialog below is displayed.



For more information
on 16 colors, refer to
page 22-2.

◎Color

Click on the desired color. The default color is white.

* **[B] denotes flashing. Flashing corresponds to the following 16 colors.**

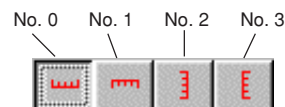
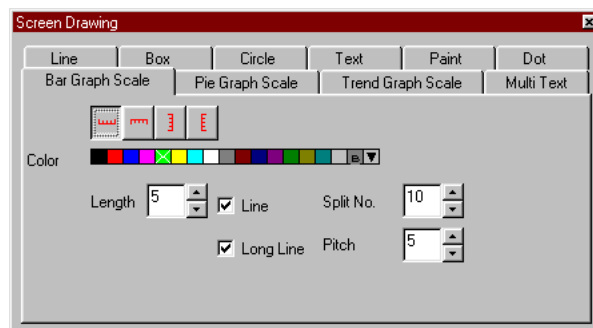
◎Pen

There are 8 different dot sizes to choose from.



Bar Graph Scale

Click on the [Bar Graph Scale] icon on the drawing tool bar. The [Bar Graph Scale] dialog is displayed as shown below.



◎Type

Select the desired scale type from the following four options. The default is pattern No. 0.

◎Color

Choose the desired color. The default color is white.

* **[B] denotes flashing. (Flashing only applies to 16 colors.)**



For more information
on 16 colors, refer to
page 22-2.

◎ Short Mark Length

Specify the length of short gradation marks. Directly enter the number, or click the Up/Down buttons.

◎ Line

When this option is checked (☒) , the line is drawn. When it is unchecked (☐) , the line is not drawn.

◎ L(ong). Line

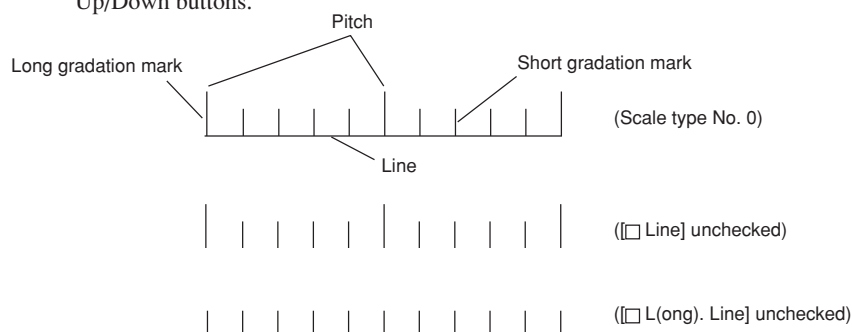
When this option is checked (☒) , long gradation marks are attached at the specified pitches. When it is unchecked (☐) , they are not attached.

◎ Divisions

Specify the number of divisions of the scale. Directly enter the number, or click the Up/Down buttons.

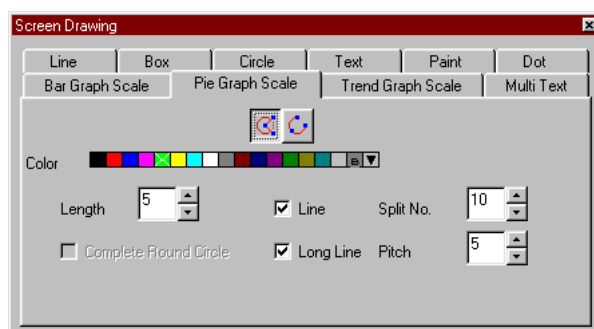
◎ Pitch

Specify the pitch of long gradation marks. Directly enter the number, or click the Up/Down buttons.



Pie Graph Scale

Click the [Pie Graph] icon on the drawing tool bar. The [Pie Graph Scale] tab window is displayed as shown below.



◎ Shape

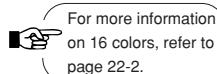
[Arc] or [Circle] can be used. It is possible to select a drawing method.



◎ Color

Click on the desired color. The default color is white.

* [B] denotes flashing. (Flashing only applies to 16 colors.)



⊙ Short Mark Length

Specify the length of short gradation marks. Directly enter the number, or click the Up/Down buttons.

⊙ Put into a Circle

This option is not active as default. Draw an arc first, and double-click or select the arc. Then, click the [Prop. Change] icon. This dialog is displayed when this option is active. When this option is checked, the arc becomes a circle.

⊙ Line

When this option is checked (☒) , the line is drawn. When it is unchecked (☐) , the line is not drawn.

⊙ L(ong). Line

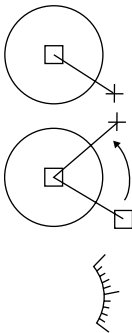
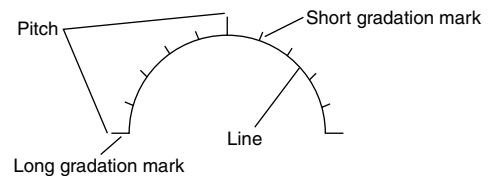
When this option is checked (☒) , long gradation marks are attached at the specified pitches. When it is unchecked (☐) , they are not attached.

⊙ Divisions

Specify the number of divisions of the scale. Directly enter the number, or click the Up/Down buttons.

⊙ Pitch

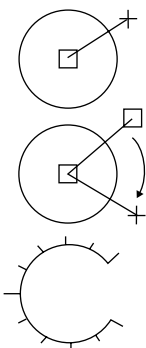
Specify the pitch of long gradation marks. Directly enter the number, or click the Up/Down buttons.



Displaying Pie Graph Scale

(Counter-clockwise specification)

1. Drag the mouse from the center to the desired radius, and release the mouse button. Move the cursor to the start point of the arc, and click.
2. Move the cursor counter-clockwise along the arc, and click on the end point of the arc.
3. A scale for the pie graph is drawn from the two points that were clicked. (The section drawn counter-clockwise remains as a scale for the pie graph.)



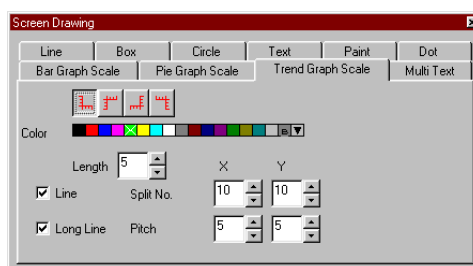
(Clockwise specification)

1. Drag the mouse from the center to the desired radius, and release the mouse button. Move the cursor to the start point of the arc, and click.
2. Move the cursor clockwise along the arc, and click on the end point of the arc.
3. A scale for the pie graph is drawn from the two points that were clicked. (The section drawn clockwise is removed from the circle to create a scale for the pie graph.)



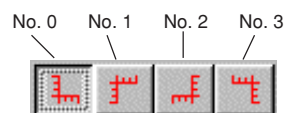
Trend Graph Scale

Click the [Trend Graph Scale] icon on the drawing tool bar. The [Trend Graph Scale] tab window is displayed as shown below.



◎Type

Select the desired scale type from the following four options. The default is pattern No. 0.



◎Color

Choose the desired color. The default color is white.

* [B] denotes flashing. (Flashing only corresponds to 16 colors.)

◎Short Mark Length

Specify the length of short gradation marks. Directly enter the number, or click the Up/Down buttons.

◎Line

When this option is checked (☒) , the line is drawn. When it is unchecked (☐) , the line is not drawn.

◎L(ong). Line

When this option is checked (☒) , long gradation marks are attached at the specified pitches. When it is unchecked (☐) , they are not attached.

◎Divisions

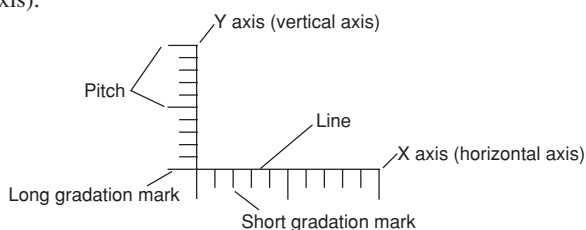
Specify the number of divisions of the scale. Directly enter the number, or click the Up/Down buttons.

Separate divisions can be specified for the X axis (horizontal axis) and the Y axis (vertical axis).

◎Pitch

Specify the pitch of long gradation marks. Directly enter the number, or click the Up/Down buttons.

Separate pitches can be specified for the X axis (horizontal axis) and the Y axis (vertical axis).



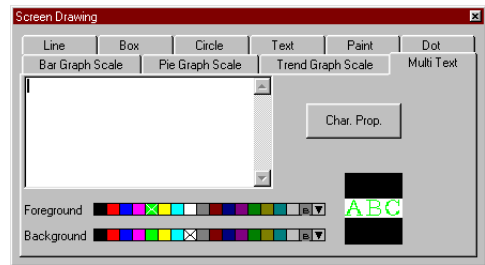
For more information on 16 colors, refer to page 22-2.



For ZM-41/70
Multi-text input is not
available.

Multi-Text

Text cannot be drawn for more than one line at a time, but when multi-text is used, multiple lines can be drawn at one time. Multiple lines are classified as one item with common character properties.



◎ Entering multiple lines

Use the return key to move to the next line.

◎ Text properties

For items other than the ones described below, refer to [Text/Text Prop.] on page 22-9.

- ☐ Alignment Select either left, center, or right for text alignment.
- ☐ Line Spacing Set the space between lines. Default is [4].



For ZM-41/70
Screen library is not
available.

Screen Library

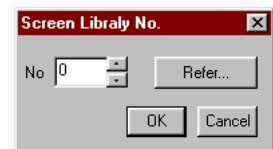
A command that calls up a screen registered in screen library edit as a draw screen.

1. Click the [Screen LIB] icon on the drawing tool bar. The [Screen Library List] dialog is displayed.
2. Select a screen to be placed from the list and click on [Place].
3. A mouse with an accompanying [SLIB] display is shown on the screen.
When you click on the desired location, the screen is placed along with the [SLIB] mark.



The reference placement position is determined by the [Offset] location specified in screen library edit.

4. When you want to change the screen library number after, double-click after selecting the [SLIB] mark.
The following dialog is displayed. Enter the desired number and click [OK].
When you click the [Refer] button, the screen library list is displayed.



For information on how to edit the screen library, refer to Chapter 21, "Screen Library."

Pattern Editing

Outline of Patterns

A “pattern” is a diagram displayed in units of dots.
The size of each pattern can be specified units of dots. The maximum size depends on the model’s screen resolution.

Model	ZM-52D/ZM-71D/ZM-72T	ZM-72TS/ZM-82T/ZM-82D	ZM-41/70	ZM-42D/L,ZM-41D/L
Display characters horizontal x vertical (dots)	640 x 480	800 x 600	640 x 480	320 x 240

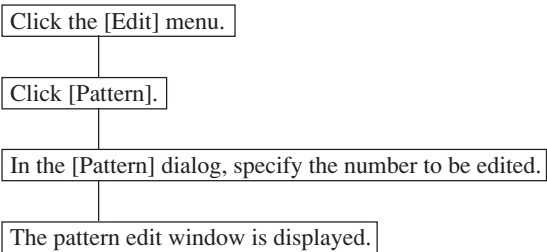


For ZM-41/70
One pattern is limited to
a capacity of 32K bytes.

Due to the fact that one pattern is limited to a capacity of 128K bytes, the pattern is automatically divided if 128K bytes are exceeded.
Due to the fact that diagrams are drawn in units of dots, this edit function is extremely useful when registering small diagrams or detailed pictures. A maximum of 256 patterns can be registered.

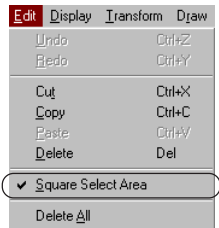
Pattern Editing Procedure

Follow these steps for editing/registering patterns:



Pattern Edit Tools

The pattern drawing/editing tools are displayed in the pattern edit window. A detailed explanation of each individual tool follows.



(Edit) Menu

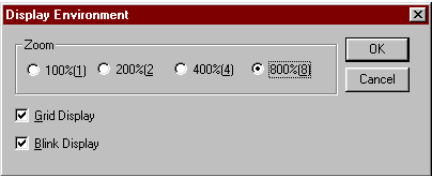
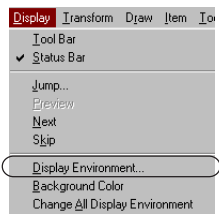
 [Square Select Area]

A tool used to select the pattern area on the screen. When you drag the mouse over the pattern, it is enclosed in a box frame. The enclosed range can be copied or deleted.

(Display) Menu

⊙ [Display Environment Setting]

The following dialog is displayed.



[Zoom] (100%/200%/400%/800%)

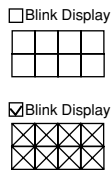
Select zoom in % for display. Default is 800%.

[Grid Display]

Select whether or not to display grid lines in the background.

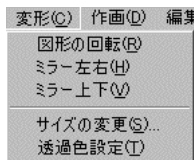
[Blink Display]

It is possible to distinguish the color set to flash on the pattern. When unchecked (☐) , the color set to flash is indistinguishable from the normal color.



◎ [Background Color Setting]

When editing the pattern, it is possible to view the actual screen background color. When you click on this item, the [Color Setting] dialog is displayed. Select the desired color and click [OK]. The pattern edit window perimeter color changes.

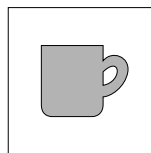


(Transform) Menu

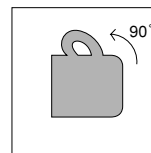
 [Rotate Graphic]

Clicking this icon rotates the registered pattern by 90°.

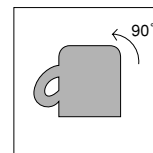
Draw an image.



Click the icon. The image is rotated by 90°.



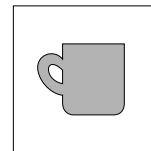
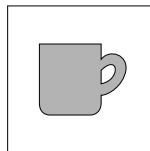
Click the icon again. The image is rotated by 90° from the 90° rotation position.



◎ [Mirror Horizontal]

Clicking this icon flips the registered pattern horizontally.

Draw an image.

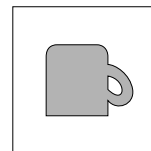
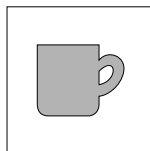


Click the icon. The image is flipped horizontally.

◎ [Mirror Vertical]

Clicking this icon flips the registered pattern vertically.

Draw an image.



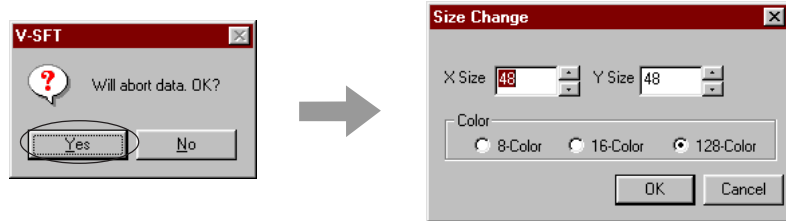
Click the icon. The image is flipped vertically.

◎[Size Change]

Be sure to set [Size Change] when registering the pattern.

When you click this item, the confirmation dialog is displayed.

Click [Yes]. The [Size Change] dialog shown below is displayed.



The available setting ranges are as follows:

Width (X)	: 1 ~ 640	Height (Y)	: 1 ~ 480
Color	: 8-color/16-color		



If this setting is made during pattern editing or when a pattern has been completed, the created pattern data is deleted. Keep this in mind.

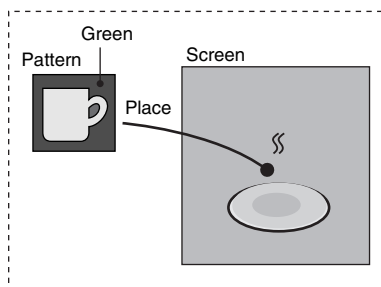
◎[Transparent Setting] (ZM-*2 Function)

For the ZM-41/70, when a pattern was animated in the graphic relay mode and the screen background color was set as something other than [Black], the pattern was displayed in the XORed color. For the ZM-*2, the actual pattern color is displayed if transparency is set as the same color as the pattern background color. (When the pattern is placed on the screen, set the color that you do not want to display as transparent.)

Only one color can be set as transparent for each pattern.

When setting a color as transparent, the transparent color is reflected even when placement is not animated. However, take care to draw the pattern so that it falls within the 4088 dot size limit (pattern size = X size x Y size).

<Example> When a pattern is created and placed on screen, it differs in the following ways depending on whether or not a color is set as transparent.



☒ With Transparent: Green

Screen



☐ With Transparent: Green

Screen

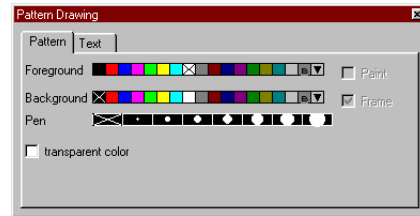


(Draw) Menu

[Pencil]

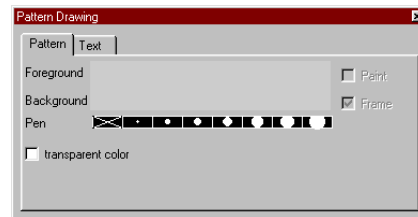
Depict the foreground color by dragging while holding down the left mouse button, and the background color by dragging while holding down the right mouse button.

Clicking this icon causes the [Pattern] tab window to be displayed. You can choose from three types, [Foreground Color], [Background Color], and [Pen]. When you drag the mouse over the pattern edit window, the contents that you selected are displayed in dots.



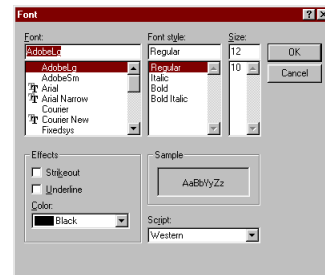
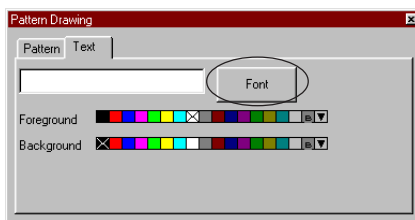
[Eraser]

Clicking this icon causes the [Pattern] tab window to be displayed.



[Text]

Clicking this icon causes the [Text] tab window is displayed. It is possible to select either [Foreground Color], [Background Color], or [Font]. When you click on [Font], choose a font available for use on Windows 95/98/NT.



[Line]

Clicking this icon causes the [Pattern] tab window to be displayed. [Foreground Color] and [Pen] are active. Dragging the mouse causes a straight line to be drawn.

[Box]

Clicking this icon causes the [Pattern] tab window to be displayed. You can make settings for [Foreground Color], [Background Color], [Paint], [Frame], and [Pen]. Dragging the mouse causes a box to be drawn.

[Circle]

Clicking this icon causes the [Pattern] tab window to be displayed.

You can make settings for [Foreground Color], [Background Color], [Paint], [Frame], and [Pen].

Dragging the mouse causes a circle to be drawn.



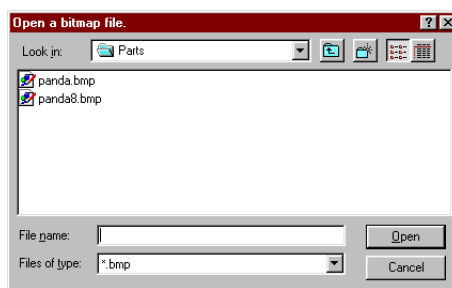
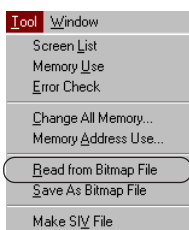
Clicking this icon causes the [Pattern] tab window to be displayed.

Only [Foreground Color] is active. When you drag the mouse over the pattern edit window, the enclosed area is painted.

(Tool) Menu

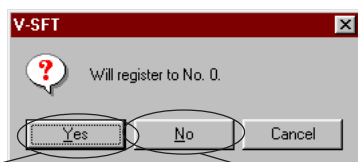
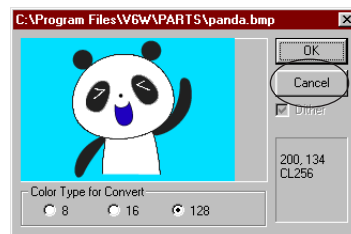
◎ [Read From Bitmap File]

Read a pattern from a bitmap file (extension [.bmp]). Clicking this item causes the [Open Bitmap File] dialog to be displayed.



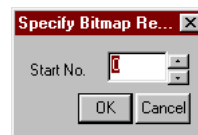
Select the desired file and click [Open]. A dialog showing an image like the one to the right is displayed. Click [OK].

A confirmation dialog like the one below is displayed.



When you click [Yes], bitmap data is imported.

When you click [No], the following [Specify Bitmap Read No.] dialog is displayed.



When you enter the top number to be imported and click [OK], bitmap data is imported.

◎[Select a Bitmap File to Save]

Put the picture from the pattern that is currently open in the bitmap file (extension terminal [.bmp]). Clicking this item causes the [Select a Bitmap File To Save] dialog to be displayed.

Attach a name to the file and click [Save].

The pattern data is saved as a bitmap.

How to Place Patterns

Patterns registered in pattern edit can be placed on screen or in the graphic library. Use the [Pattern] icon on the drawing tool bar.

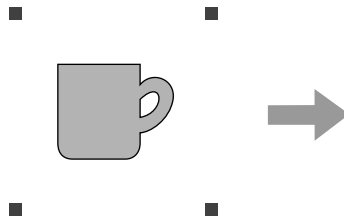


For details, refer to page 22-11.

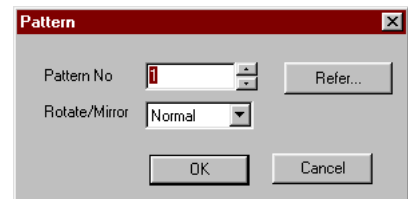
After placement, the [Pattern No.] can be changed and [Rotate/Mirror] operations can be performed.

After double clicking on the placed pattern, or selecting with handles and clicking on the [Detail/Prop. Change] icon, the [Pattern] tab window used to make settings is displayed.

For the ZM-41/70
[Rotate/Mirror] cannot
be set if either pattern
size X or Y exceeds
48 dots.



Either double click directly on the pattern, or click on the [Detail/Prop. Change] icon.



Size of Placed Patterns

◎The size of placed patterns can not be reduced. The enlargement is possible by integer.

◎If a pattern is less than 128K bytes, the maximum possible size setting is 640 dots horizontal and 480 dots vertical. However, if a [Rotate/Mirror] operation is performed on a pattern on screen or in the graphic library, the size is limited to less than 4088 dots (pattern size = X size x Y size).

◎When animation is used on a picture from a pattern in graphic mode or graphic relay mode, patterns that are less than 4088 dots tend to be depicted more smoothly.

◎If you do not use the above mentioned functions, it is possible to edit and display a pattern that exceeds 4088 dots. However, if this is the case, the pattern will be processed as a bitmap rather than a pattern.

For information about
importing bitmap data,
refer to page 22-24.

◎Note that even if a pattern's size does not exceed 4088 dots, if the pattern is enlarged on the screen or in the graphic library it may exceed 4088 dots, and thus be subject to the limitations described above.

Tile Editing

Outline of Tiles

For painting a part of graphics, the paint pattern can be selected from among eight preset types and eight patterns that you register yourself.

When creating a tile pattern, fill in dots in an 8 x 8 area, which is the minimal unit of a tile.

On the screen, the white-filled dots are regarded as FCL (foreground color), and black dots are regarded as BCL (background color).

Tile Editing Procedure

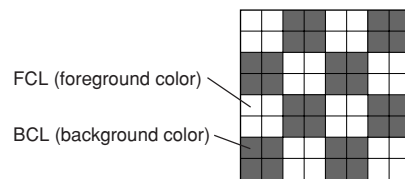
Follow these steps to edit and register tiles.

In tile edit, fill in dots in white.

Click on the [Edit] menu.

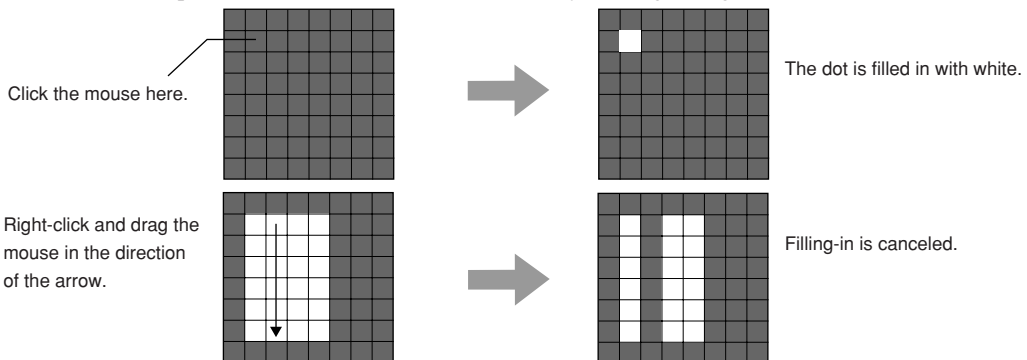
Click on [Pattern]

The tile edit window is displayed.

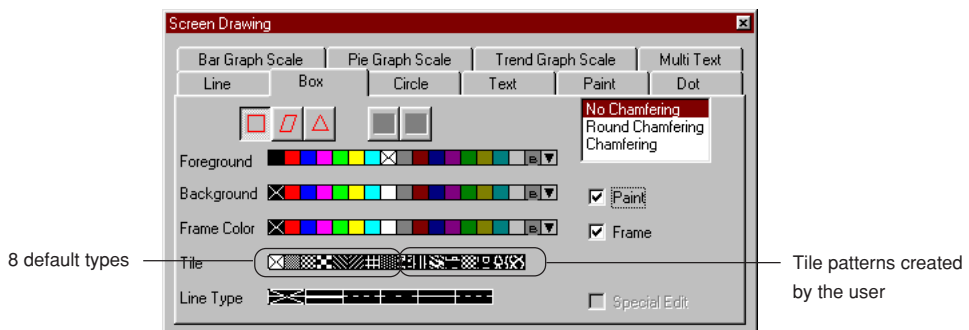


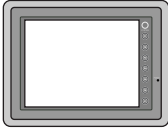
Tile Editing Tools

When the tile edit window is displayed, the mouse becomes a drawing mouse for tile edit. By clicking, you can display in dots. The color is limited to [White]. It is possible to delete dots that were drawn by clicking the right mouse button.



When editing a screen or graphic library, tile patterns are added to the drawing tool bar as well as to the [Box] or [Paint] tab windows.





ZM Series

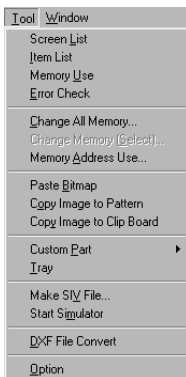
Tools

The [Tool] menu provides useful tools for screen creation.

Outline of Tools

Functions of Tools

The tools with the following functions are provided:



Screen List	The list of the screens is displayed.
Item list	The list of all items placed on screens is displayed.
Memory Use	Memory used by screens is displayed.
Error Check	Files are checked for errors.
Change All Memory	All memory addresses allocated to files are changed.
Change Memory [Select]	The memory addresses of the selected items are changed.
Memory Address Use	PC memory addresses used in files are displayed.
Paste Bitmap	Bitmap files are imported into screen data files.
Copy Image to Pattern	Screen images are registered as patterns.
Copy Image to Clip Board	Screen images are copied to the clipboard.
Custom Part	Custom parts are registered.
Tray	Parts to be used often are stored in trays.
Make SIV File	Data tables (SIV files) are created for the simulator.
Start Simulator	The simulator starts and the simulator initial screen is displayed.
DXF File Convert	DXF files are imported into screens.
Option	The "Auto-Save" function can be specified.

Tool Function 1: Screen List

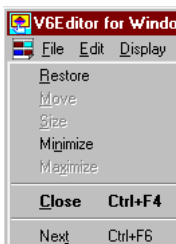
Created screens can be listed.

In the list, screens can be copied or deleted, or comments can be attached to screens.

Operation Procedure

Opening/Closing the Screen List

1. Select [Screen List] from the [Tool] menu.
[Screen List - [Screen]] is displayed.
2. When closing the list, click the icon on the extreme left of the menu bar, and select [Close] from the pull-down menu.



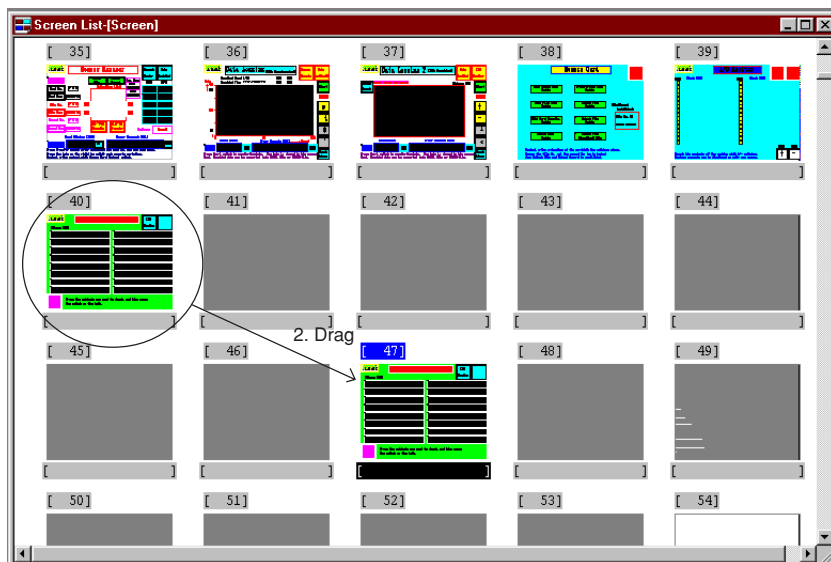
By double-clicking a screen in the list, jumping to the screen edit window is possible.

Screen Copy or Deletion

1. Click the screen to be copied or deleted. The screen number is highlighted in red.
2. For copy, drag the screen to the target box. If the target box already contains a screen, the message, “Data has already existed in [n]. Will overwrite?” appears.

1. Click

2. Drag



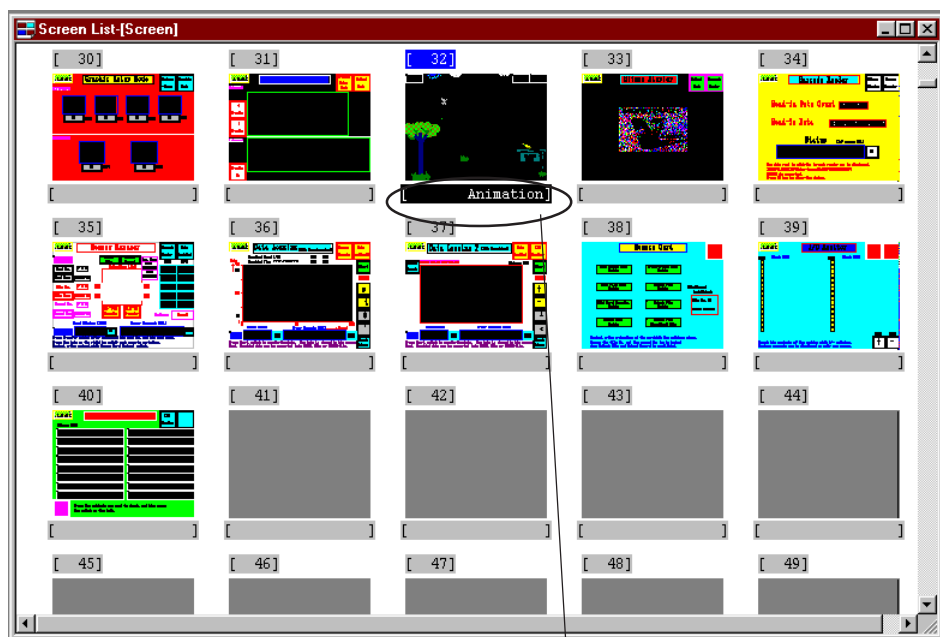
3. For deletion, press the DEL key or select [Delete] from the [Edit] menu while the desired screen number is highlighted. The message “Will delete [No. n]?” appears.

4. Click [OK]. The screen is deleted.

Attaching Screen Comments

1. When attaching a comment, click the entry field under the desired screen. The cursor appears in the box.

2. Enter a comment using no more than 16 one-byte (or 8 two-byte) characters.



Comment entry field

Tool Function 2: Item List

Parts, graphics, and modes placed on created screens can be listed.

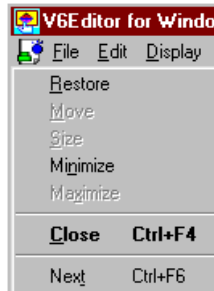
Operation Procedure

Opening/Closing the Item List

1. Select [Item List] from the [Tool] menu.

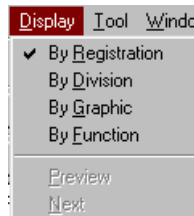
The item list is displayed.

2. When closing the list, click the icon on the extreme left of the menu bar, and select [Close] from the pull-down menu.



Format Change of the Item List

1. While the item list is displayed, click the [Display] menu.



2. Select the desired option from the pull-down menu.

[By Registration]

Screen items are displayed in the order of registration.

<Ex.>

```
[Box Paint ]:(188,301)-(361,337)
[Box Paint ]:(188,261)-(361,297)
[Box Paint ]:(188,221)-(361,257)
[Box Paint ]:(188,181)-(361,217)
[Box Paint ]:(188,141)-(361,177)
[Box Paint ]:(188,101)-(361,137)
[Box Paint ]:(172, 3)-(456, 39)
[Char ]:(232, 38) [Direct Command Entry]
[Box ]:(171, 2)-(457, 40)
[ 0]:[Num. Display ]:D00270 (247,112)-(311,128) Function:No
[ 0]:[Num. Display ]: (475,130)-(559,146) Function:Entry Display
[ 0]:[Entry ]:D00260
[ 0]:[Num. Display ]:D00271 (247,152)-(311,170) Function:No
[ 0]:[Num. Display ]:D00272 (232,192)-(316,208) Function:No
[ 0]:[Num. Display ]:D00273 (232,232)-(313,248) Function:No
[ 0]:[Num. Display ]:D00274 (233,271)-(313,287) Function:No
[Char ]:(194, 75) [Entry Data]
[Char ]:(261, 93) [(D270'D275)]
[Char ]:( 10,456) []
[Char ]:(596,157) [D260]
[Char ]:( 5,397) [Code, digit and decimal point is specified by]
[ 0]:[Num. Display ]:D00275 (234,311)-(314,327) Function:No
[ 0]:[Switch]: ( 1, 1)-( 88, 41) Text[] Function:Screen Call :0
[Char ]:(586,123) [Tenkey]
[Char ]:(405,146) [Entry]
[Char ]:( 5,417) [the address assigned in PLC.]
[Char ]:( 5,436) [The data entered by the tenkey can be stored in 1
```

[By Division]

Screen items are displayed in the order of division numbers.

<Ex.>

```
[ 0]:[Switch]: (145,121)-(260,161) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: (145,161)-(260,201) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: (145,201)-(260,241) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: ( 14,341)-(129,381) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: ( 14,381)-(129,421) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (142,301)-(257,341) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (142,341)-(257,381) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (142,381)-(257,421) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (286,341)-(401,381) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: (286,381)-(401,421) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: (414,301)-(529,341) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: (414,341)-(529,381) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: (414,381)-(529,421) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: ( 1, 1)-( 88, 41) Text[] Function:Screen Call :0
[ 0]:[Switch]:D00000-00 (401, 1)-(558, 78) Text[Multi] Function:Screen Call
[ 0]:[Switch]:D00000-00 (561, 1)-(638, 78) Text[Direct] Function:Screen Call
[ 0]:[Data Block Area ]
[ 0]:[Display Area ]: ( 10, 82)-(270,242)
[ 1]:[Data Block Area ]
[ 1]:[Display Area ]: (282, 82)-(542,242)
[ 2]:[Data Block Area ]
[ 2]:[Display Area ]: ( 10,269)-(270,429)
[ 3]:[Data Block Area ]
[ 3]:[Display Area ]: (283,269)-(543,429)
```

[By Graphic]

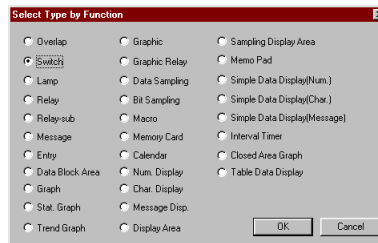
Only graphic data is displayed.

<Ex.>

```
[Box Paint ]:(138, 3)-(465, 39)
[Char ]:(205, 38) [Multi Tenkey]
[Box ]:(137, 2)-(466, 40)
[Char ]:( 4,453) [Touch any data to display the tenkey.]
[Char ]:( 4,474) [Different tenkey can be displayed corresponding to each data blc
[Box ]:( 9, 81)-(270,242)
[Box ]:( 9,268)-(270,429)
[Box ]:(282,268)-(543,429)
[Box ]:(281, 81)-(542,242)
[Char ]:( 10, 77) [Multi Data 0]
[Char ]:(283, 78) [Multi Data 1]
[Char ]:(283,264) [Multi Data 3]
[Char ]:( 10,264) [Multi Data 2]
[Char ]:(135, 78) [(D190' )]
[Char ]:(404, 79) [(D205' )]
[Char ]:(135,264) [(D220' )]
[Char ]:(408,264) [(D235' )]
[Char ]:(594,339) [D170]
[Char ]:(579,322) [Memory]
[Char ]:(579,305) [Tenkey]
```

[By Function]

Only the data of the selected function is displayed.



Choose a function from the [Select Type by Function] dialog.

```
[ 0]:[Switch]: (289,201)-(404,241) Text[] Function:Multi Overlap :0:0:M:32
[ 0]:[Switch]: (417,201)-(532,241) Text[] Function:Multi Overlap :0:0:M:32
[ 0]:[Switch]: (417,161)-(532,201) Text[] Function:Multi Overlap :0:0:M:32
[ 0]:[Switch]: (289,161)-(404,201) Text[] Function:Multi Overlap :0:0:M:32
[ 0]:[Switch]: (289,121)-(404,161) Text[] Function:Multi Overlap :0:0:M:32
[ 0]:[Switch]: (417,121)-(532,161) Text[] Function:Multi Overlap :0:0:M:32
[ 0]:[Switch]:M00105 (561,341)-(638,418) Text[Write] Function:No Function :0:0:M:31
[ 0]:[Switch]: ( 17,121)-(132,161) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: ( 14,301)-(129,341) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (286,301)-(401,341) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: ( 17,161)-(132,201) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: ( 17,201)-(132,241) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: (145,121)-(260,161) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: (145,161)-(260,201) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: (145,201)-(260,241) Text[] Function:Multi Overlap :0:0:M:31
[ 0]:[Switch]: ( 14,341)-(129,381) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: ( 14,381)-(129,421) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (142,301)-(257,341) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (142,341)-(257,381) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (142,381)-(257,421) Text[] Function:Multi Overlap :0:0:M:33
[ 0]:[Switch]: (286,341)-(401,381) Text[] Function:Multi Overlap :0:0:M:34
[ 0]:[Switch]: (286,381)-(401,421) Text[] Function:Multi Overlap :0:0:M:34
```

Tool Function 3: Memory Use

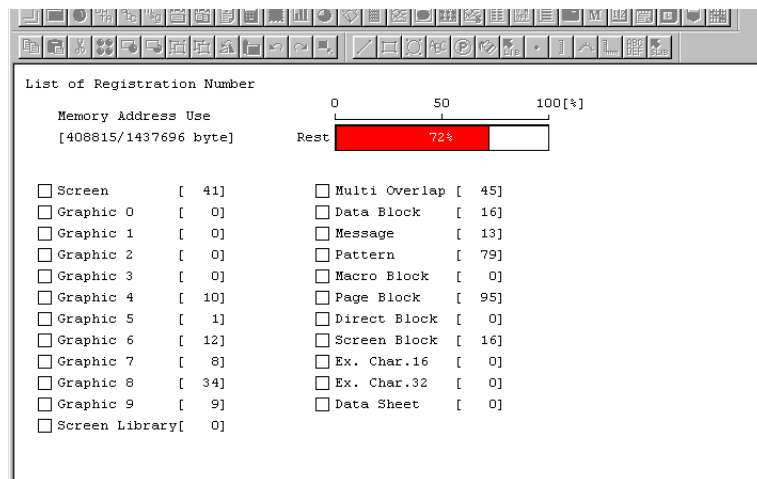
The list indicating the remaining available memory and items registered in screen data files can be displayed. The detailed list of each item can also be displayed.

Operation Procedure

Opening/Closing the List of Memory Use

1. Select [Memory Use] from the [Tool] menu.

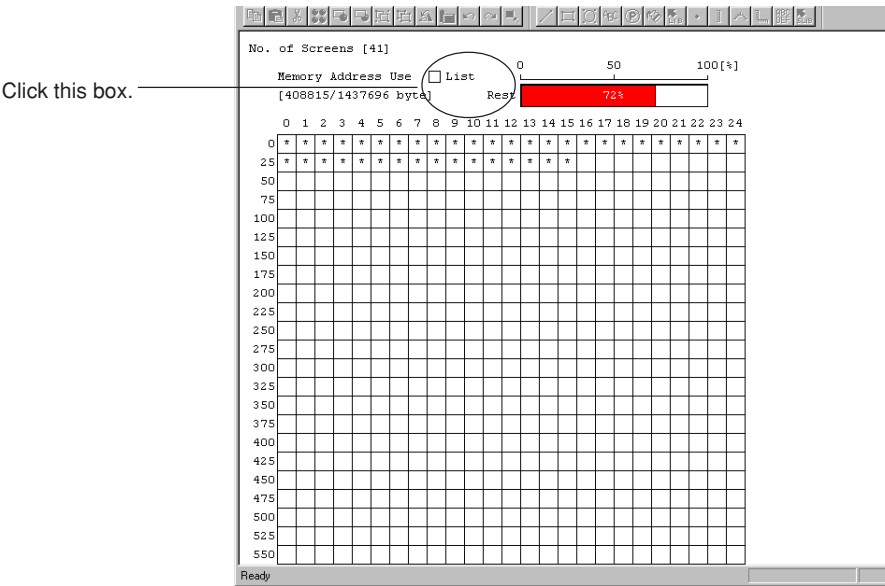
[List of Registration Number] is displayed in the [List of Memory Use] window.



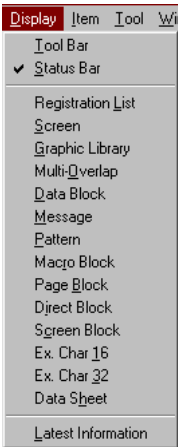
2. When closing the window, click the icon on the extreme left of the menu bar, and select [Close] from the pull-down menu.

Bringing Up the Detailed List of Edit Item

- 1. While [List of Registration] is displayed, click the box of the desired item.
- 2. [No. of (selected item)] is displayed. The registered boxes are shown with an “*.”
- 3. When going back to [List of Registration Number], click the [List] box.



<Display change>
The list of the desired item can also be chosen from the [Display] menu.



Tool Function 4: Error Check

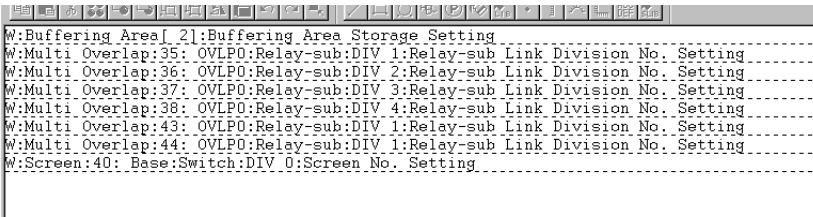
The files can be checked for errors.

Operation Procedure

Error Check

1. Select [Error Check] from the [Tool] menu.
Error check starts automatically.
2. The check result is indicated in the [Error Check] window.

Contents of the (Error Check) Window



```
W:Buffering Area[ 2]:Buffering Area Storage Setting
W:Multi Overlap:35: OVLPO:Relay-sub:DIV 1:Relay-sub Link Division No. Setting
W:Multi Overlap:36: OVLPO:Relay-sub:DIV 2:Relay-sub Link Division No. Setting
W:Multi Overlap:37: OVLPO:Relay-sub:DIV 3:Relay-sub Link Division No. Setting
W:Multi Overlap:38: OVLPO:Relay-sub:DIV 4:Relay-sub Link Division No. Setting
W:Multi Overlap:43: OVLPO:Relay-sub:DIV 1:Relay-sub Link Division No. Setting
W:Multi Overlap:44: OVLPO:Relay-sub:DIV 1:Relay-sub Link Division No. Setting
W:Screen:40: Base:Switch:DIV 0:Screen No. Setting
```

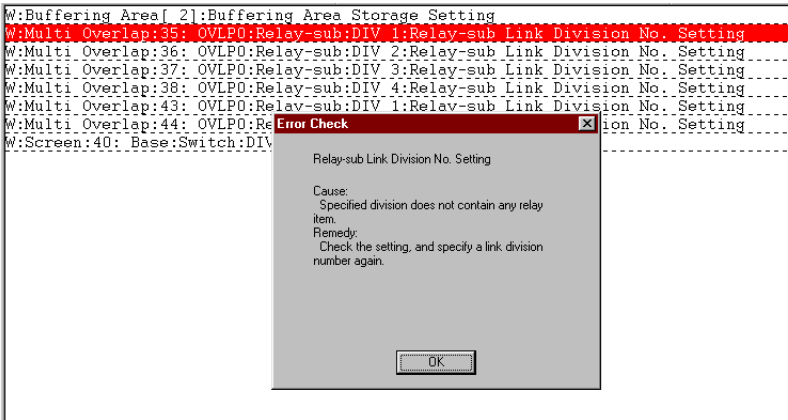
Each line indicates the following data:

Error/warning, edit item, number, layer, item, division No., check point

See the bottom line, for example.

It signals you to recheck the settings of the top and bottom lines of trend sampling No. 1 used on the base of screen No. 44.

By double-clicking a line, the [Error Check] dialog is displayed. The possible cause and remedy are explained.



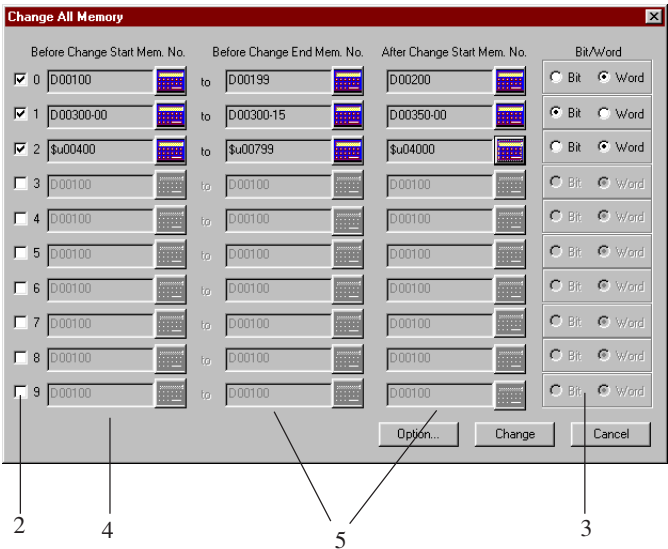
Tool Function 5: Change All Memory

Memory addresses allocated to screens can be changed simultaneously. Up to 10 different memory ranges can be set.

Operation Procedure

Memory Address Change

1. Select [Change All Memory] from the [Tool] menu. The [Change All Memory] dialog is displayed.

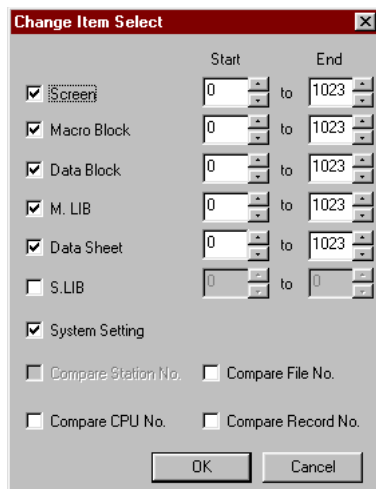


2. Check a box. Memory number setting becomes available.
3. Choose [Bit] or [Word]. Memory change is performed in units of bits or words.
4. Click the calculator icon at [Before Change Start Mem. No.]. Enter the first address of the memory addresses to be changed.
5. Likewise, enter the last address of the memory addresses to be changed for [Before Change End Mem. No.]. Enter the desired first address after change for [After Change Start Mem. No.] in the same manner.
6. Click [Change]. Change is executed according to the setting of the [Change Item Select] dialog to be displayed by clicking [Option]. As default, memory address change is executed for all items on all screens. (Refer to the next page.)

(Change Item Select) Dialog

It is possible to limit items for changing memory addresses.

1. Click [Option] in the [Change All Memory] dialog. The [Change Item Select] dialog is displayed.



2. When there is no limit of items, uncheck all the box. Number setting for each item in the dialog becomes invalid.
3. When there is a limit, check the box of the desired item and specify numbers for [Start] and [End].



<Other options in the [Change Item Select] dialog>

◆ [Compare Station No.]

This option is effective for communication between one Control Terminal and multiple PCs. When the memory addresses after changes are compared with those before changes, station numbers are also checked.

◆ [Compare CPU No.]

Choose this option for setting the CPU number of PC.

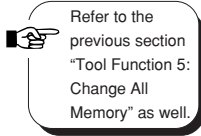
◆ [Compare File No.] [Compare Record No.]

Choose these options for specifying addresses in the memory card.

Tool Function 6: Change Memory (Select)

Memory addresses of the selected screen items can be changed simultaneously.

Operation Procedure Memory Change



1. Select items for memory address change.
2. Select [Change Memory [Select]] from the [Tool] menu. Error check starts automatically.
3. Click a box. Memory number setting becomes available.
4. Choose [Bit] or [Word]. Memory change is performed in units of bits or words.
5. Click the calculator icon at [Before Change Start Mem. No.]. Enter the first address of the memory addresses to be changed.
6. Likewise, enter the last address of the memory addresses to be changed for [Before Change End Mem. No.]. Enter the desired first address after change for [After Change Start Mem. No.] in the same manner.

About (Option)

By clicking [Option], only the following options becomes valid (refer to the previous page).

- [Compare CPU No.]
- [Compare File No.]
- [Compare Record No.]

These options are not checked as default.

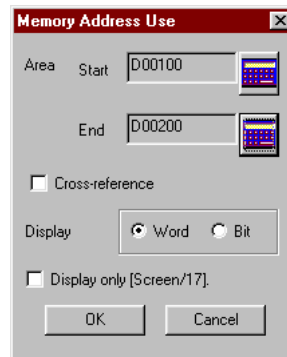
Tool Function 7: Memory Address Use

Memory addresses used for screens can be listed.

Operation Procedure

Display of Memory Address Use List

1. Select [Memory Address Use] from the [Tool] menu. The [Memory Address Use] dialog is displayed.



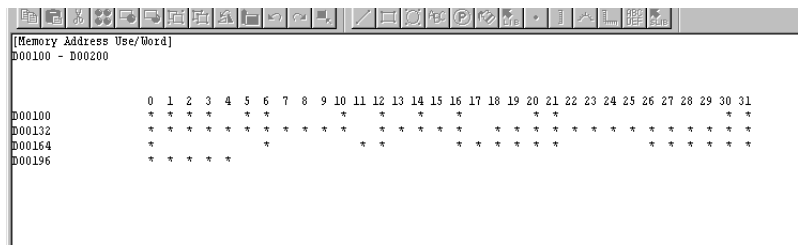
2. Specify the first address of the memory addresses to be displayed for [Start]. Also, specify the last address for [End].
3. Click [Word] or [Bit] for [Display Type].



About

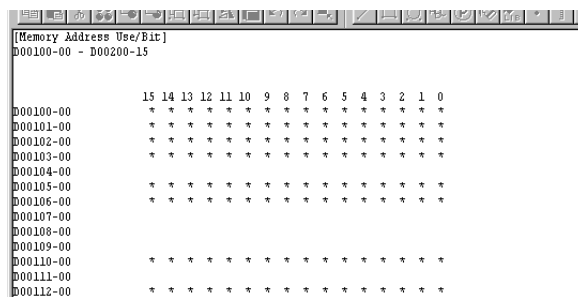
1. Double-clicking an asterisk mark brings up the screen or dialog to which the memory address is allocated.
2. By locating the cursor on an asterisk mark, the address is indicated on the status bar.

◆ When [Word] is chosen for [Display Type]:

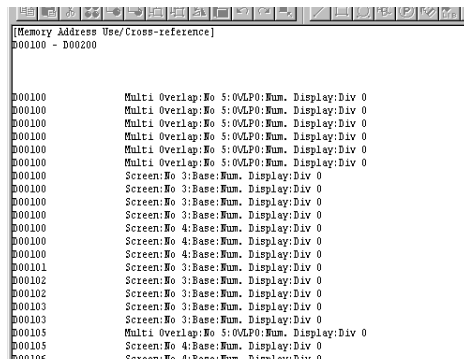


Memory addresses in use are marked with an “*.”

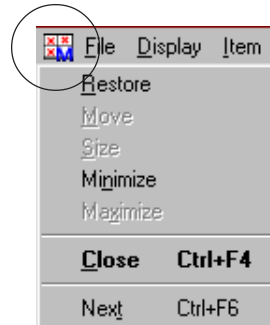
◆ When [Bit] is chosen for [Display Type]:



4. Check [Cross-reference]. The details of the items to which memory addresses are allocated are displayed.

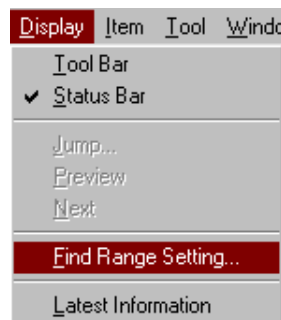


5. Check [Display only [Screen/n]]. Only the screen data is displayed.
6. Click [OK]. The list of [Memory Address Use] is displayed.
7. When closing the list, click the icon on the extreme left of the menu bar, and select [Close].



Retrieval Range Change

While the list is displayed, select [Find Range Setting] from the [Display] menu. The [Memory Address Use] dialog is displayed again. Specify the desired range.



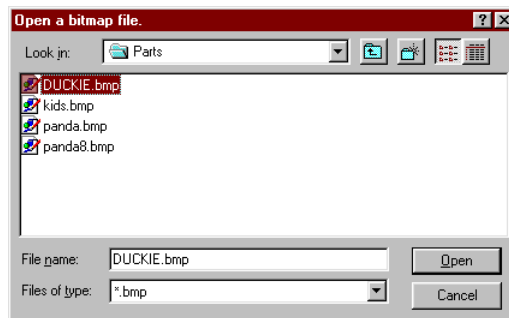
Tool Function 8: Paste Bitmap

By specifying a bitmap file (with extensions “.BMP”), the bitmap can be pasted to the screen and at the same time, it is imported into pattern editing.

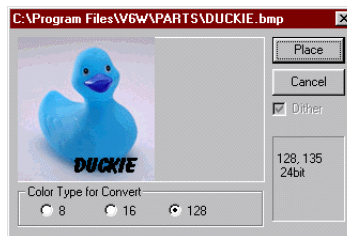
Operation Procedure

Pasting a Bitmap

1. Select [Paste Bitmap] from the [Tool] menu. The [Open a bitmap file] dialog is displayed.



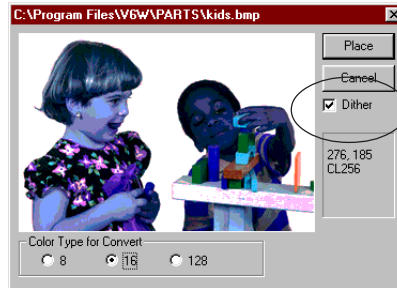
2. Click the desired bitmap file and then [Open]. The bitmap can be previewed in the dialog.



3. The bitmap size is indicated in the dialog.
Choose the desired number of colors from [Color Type for Convert].
4. Click [Place]. A mover tool and a dotted box of the bitmap size are displayed on the screen.
5. Click the mouse in the position for placing the bitmap. It is pasted to the screen.
The same bitmap can be pasted repeatedly by clicking the mouse while the mover tool appears on the screen. Note that the bitmap is registered in pattern editing automatically each time it is pasted.

About (Dither)

By clicking [Dither], dithering can be performed to make the colors of the bitmap closer to the original. When the number of colors of a bitmap is within 256 and [8-Color] or [16-Color] is chosen for [Color Type for Convert], this function becomes available.



When the original data is 24-bit and when [128-Color] is chosen for [Color Type for Convert], color correction is performed automatically. (The menu becomes invalid in the dialog.)



When the size of a bitmap file is too large, it is partitioned automatically and stored in several boxes when it is registered in pattern editing.

The capacity of one box differs between the ZM-*2 and ZM-41/70 as follows:

ZM-*2	: 128 KB
ZM-41/70	: 32 KB

When the ZM-41/70 is used, more boxes are necessary for storing a bitmap file as compared with the case of the ZM-*2.

Tool Function 9: Copy Image to Pattern



The following edit items can be registered as patterns:

- Screen
- Graphic library
- Multi-overlap
- Data block
- Screen library

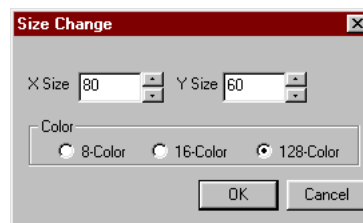
The screen being displayed on the computer can be registered as a pattern.

Screen patterns can be pasted to switches to explain the switches, pasted to a main menu screen, or in other varied ways.

Operation Procedure

Screen Registration as a Pattern

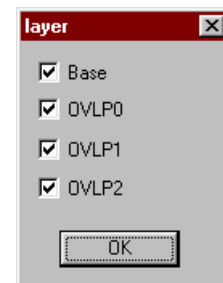
1. Bring up the desired screen.
2. Select [Copy Image to Pattern] from the [Tool] menu. The [Size Change] dialog is displayed.



When a normal overlap is placed on the screen, the [Layer] dialog appears first. Choose the editing layer which can be displayed. After setting this dialog, the [Size Change] dialog is displayed.

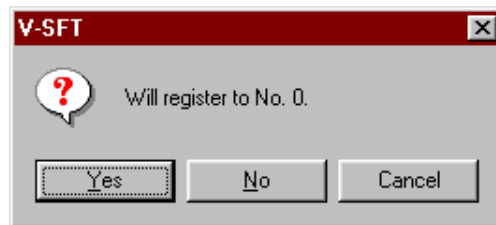
<Ex.>

The above setting is for a screen with three normal overlaps.

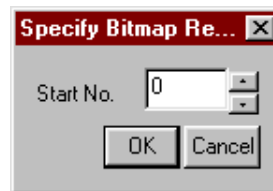


3. Specify [X Size] and [Y Size] of the pattern. They can be set to the screen sizes.
4. Choose the number of colors of the pattern.

ZM-41/70	8 or 16 colors
ZM-*2	8, 16, or 128 colors
5. Click [OK]. The message “Will Register to No. n” appears. When the registration destination is O.K., click [Yes]. When the destination is changed, click [No].



Clicking [No] brings up the [Specify Bitmap Read] dialog. Specify the desired number.



Tool Function 10: Copy Image to Clip Board



The following edit items can be copied to the clipboard.

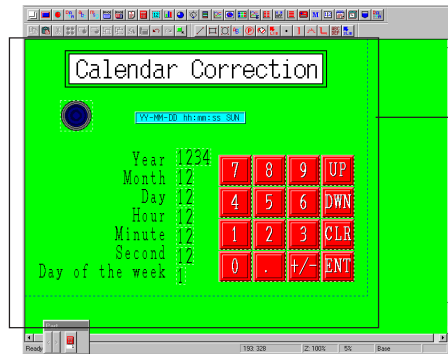
- Screen
- Graphic library
- Multi-overlap
- Data block
- Screen library

The screen being displayed on the computer can be copied to the clipboard. The copied images can be imported into word processing software, etc.

Operation Procedure

Copy of Screen Image to Clipboard

1. Bring up the desired screen on the computer.
2. Select [Copy Image to Clip Board] from the [Tool] menu. The screen is copied to the clipboard automatically.



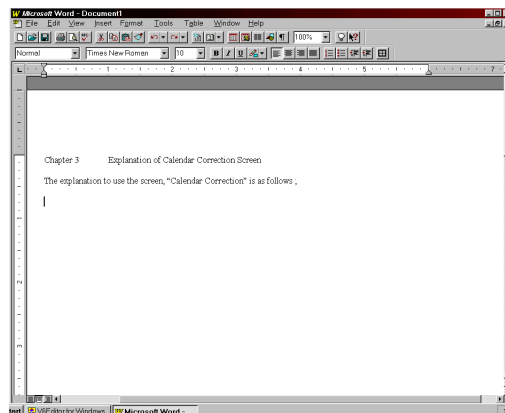
This area is copied.

Import of Screen Image into Word Processing Software

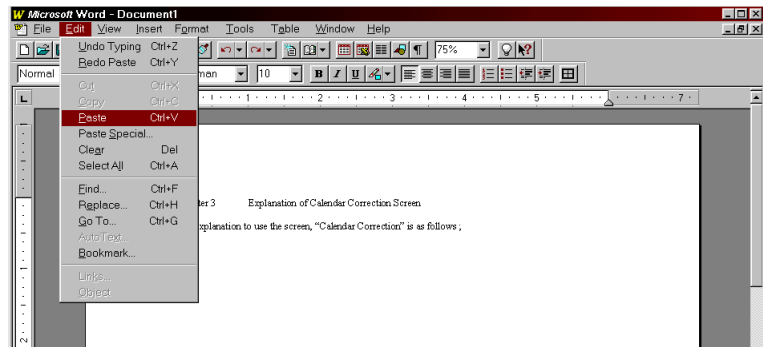
Microsoft Word is a trademark of Microsoft Corporation.

Ex.) This section explains how to paste a ZM-*2 screen to a Microsoft Word screen.

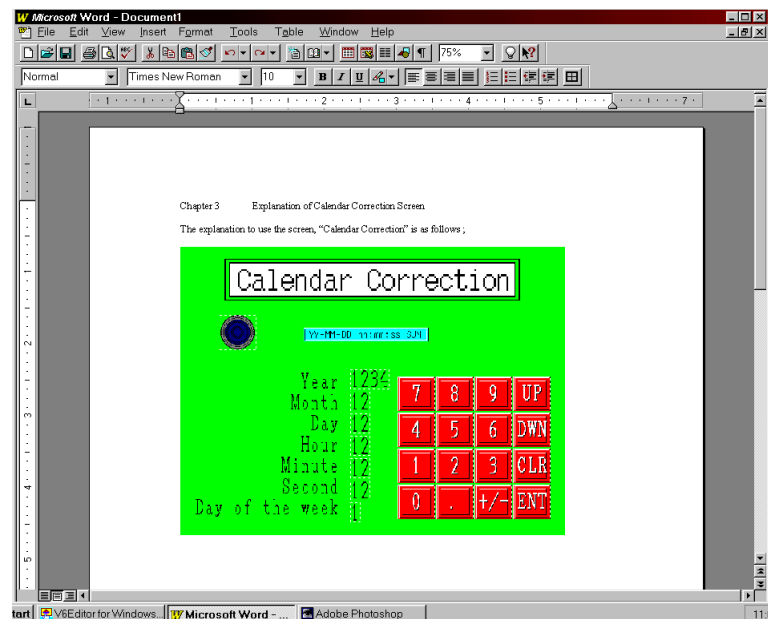
1. Copy the desired screen to the clipboard as explained above.
2. Start the Word software.
3. Move the cursor to the position to place the copy.



4. Select [Paste] from the [Edit] menu.



5. The copy image is displayed on the Word screen. The size of the image can be changed by dragging a handle.



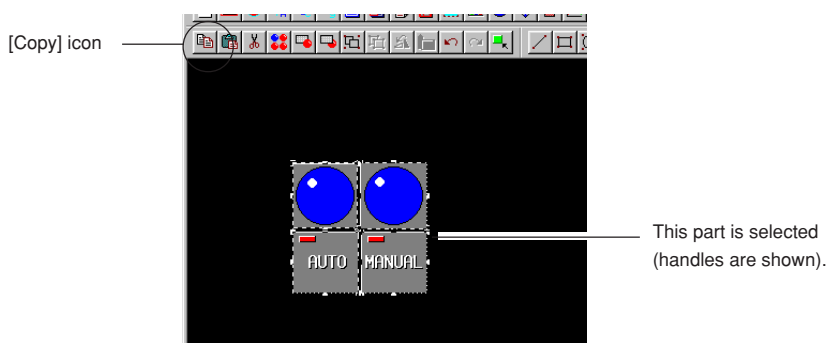
Tool Function 11: Custom Part

A maximum of 512 patterns of parts can be registered in the custom parts file (with extensions “.zmF/z7F”). The file is independent of screen data files, and registered parts can be used for creating screens.

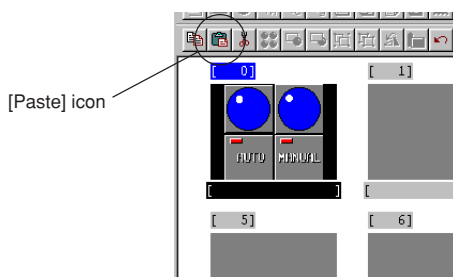
Operation Procedure

Registration in Custom Parts File

1. In a screen edit window, choose a part to be registered as a custom part and copy it.
When copying, click the [Copy] icon, choose [Copy] from the right-clicking menu, or choose [Copy] from the [Edit] menu.



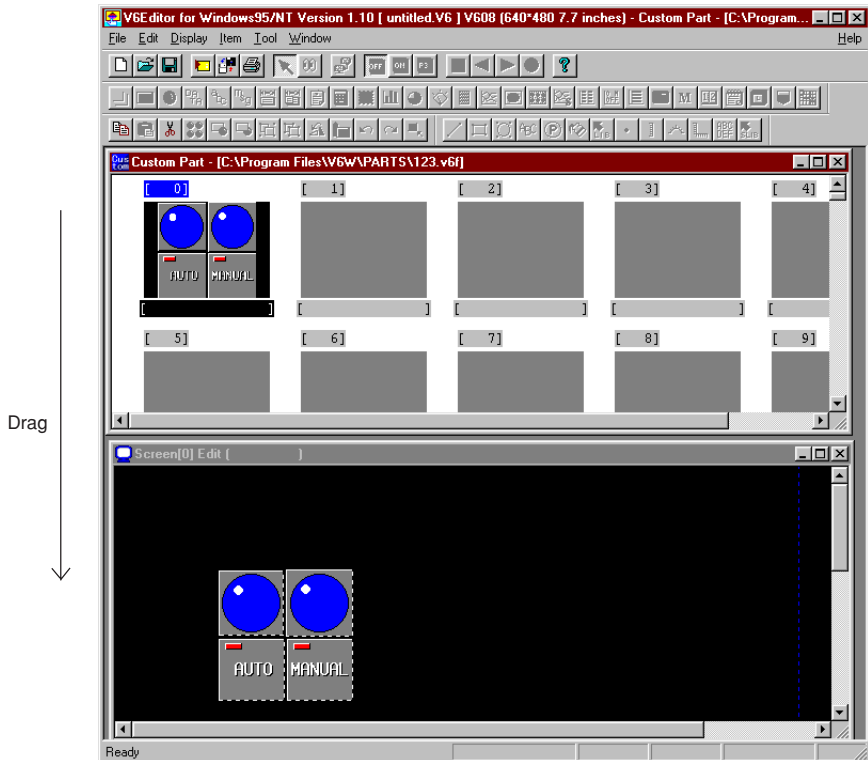
2. Select [Custom Part] from the [Tool] menu, and click [New].
3. 512 boxes are displayed in the [Custom Part] window.
4. Click the box for registration. Its number is highlighted in red. Paste the copy part to the box. When pasting, click the [Paste] icon, choose [Paste] from the right-clicking menu, or choose [Paste] from the [Edit] menu.



5. Click the [Save] icon for saving the file. The message, “Will save custom part file [untitled]?” appears.
6. Click [Yes]. The [Select custom parts file to save] dialog is displayed. Specify the file name and click [Save].
7. To delete the registered custom parts, click the box for deletion, and push the [Delete] key or click [Delete] on the [Edit] menu.

Pasting a Custom Part to the Screen

1. Select [Custom Part] from the [Tool] menu and then click [Open].
2. The [Select custom parts file] dialog is displayed. Choose a file and click [Open].
3. The [Custom Part] list is displayed. Select [Tile] from the [Window] menu. The list and the screen edit window are tiled.



4. Drag the desired custom part from the list to the screen edit window.

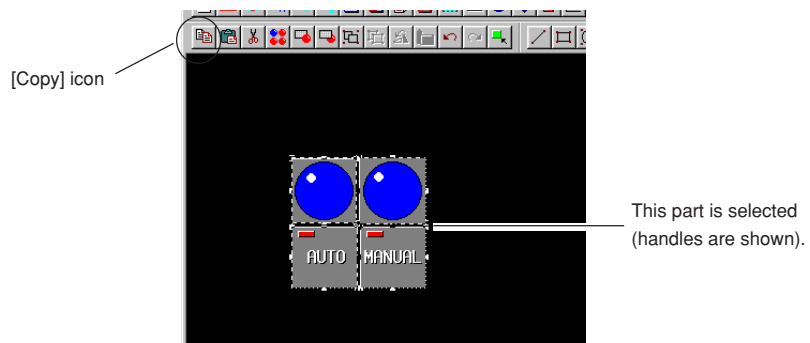
Tool Function 12: Tray

Parts or graphics can be stored in 15 trays. Since the trays are registered in the environment file (with extensions “*.env”), they can be used any time until the file is deleted.

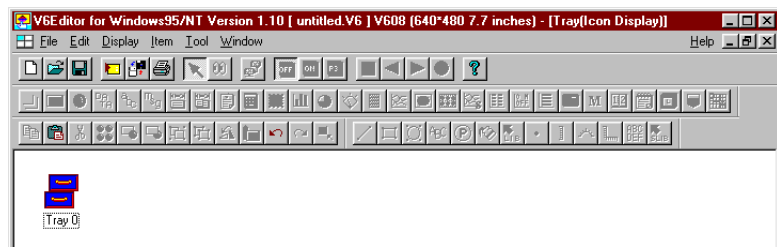
Operation Procedure

Registration/Deletion in/from Trays

1. In a screen edit window, choose a part or graphic to be registered in a tray and copy it. When copying, click the [Copy] icon, choose [Copy] from the right-clicking menu, or choose [Copy] from the [Edit] menu.



2. Select [Tray] from the [Tool] menu. The [Tray (Icon Display)] window is displayed.
3. Paste the copy part or graphic to the tray window. When pasting, click the [Paste] icon, choose [Paste] from the right-clicking menu, or choose [Paste] from the [Edit] menu. The copy is reduced to an icon and displayed in the window.



4. When deleting a tray icon, click it and press the DEL key, or select [Delete] from the [Edit] menu.

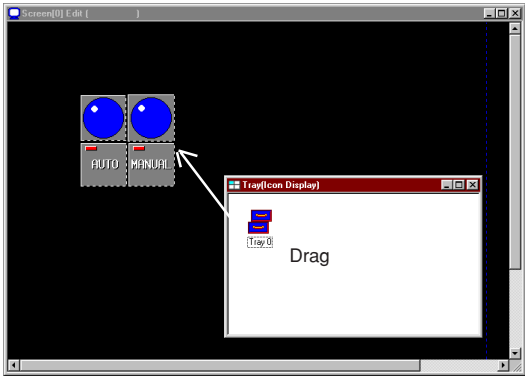


<Short-cut key>

1. Tile the screen edit window and the tray (icon display) window.
2. Choose a part for registration from the screen edit window.
3. While holding down the CTRL key, drag the chosen part to the tray window.

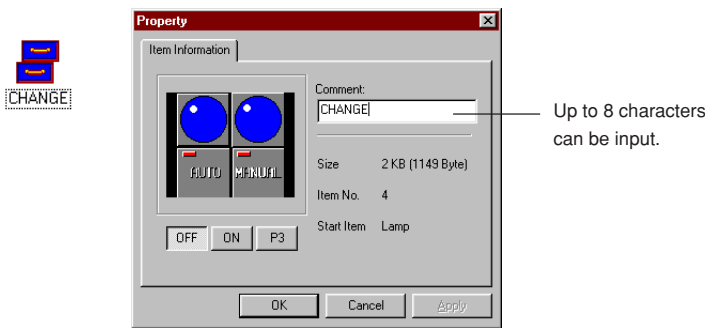
Pasting Part in Tray to Screen

- 1. Tile the screen edit window and the tray window.
- 2. Drag the tray icon of the desired part to the screen edit window. The part is pasted to the window.



Tray File Display Change

- ◆ Right-click a tray icon and select [Property]. The [Property] dialog is displayed. The information on the registered part and its image are displayed. When necessary, attach a comment to the [Comment] field.



- ◆ The tray file can be displayed in four manners. Choose an option from the [Display] menu.

 [Large Icon] Large tray icons are displayed.

 [Small Icon] Small tray icons are displayed.

[List] All tray icons are listed.

[Detail] The number of registered parts and bytes, and the top part of each tray are displayed.

Name	Size	No. of Items	Start Item
 Tray0	2 KB	4	Lamp

Tool Function 13: Make SIV File

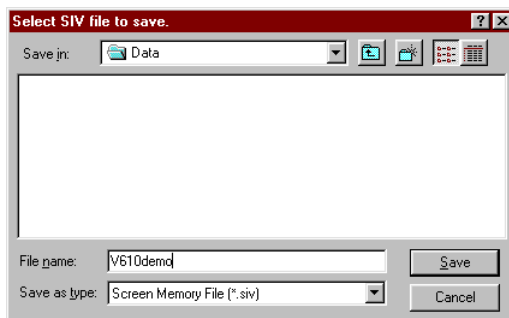
An SIV file can be created for use by the simulator.

The SIV file stores only addresses used for created screens. When the simulator reads the file, the SIV file in data table format can be created.

Operation Procedure

SIV File Creation Procedure

1. Open a screen data file for creating an SIV file.
2. Select [Make SIV File] from the [Tool] menu. The [Select SIV file to save] dialog is displayed.
3. Specify the desired file name (with extensions “*.SIV”) to be stored.
The name is displayed in the file name entry field.



4. Click [Save]. The message “SIV file is made.” appears.



Tool Function 14: Start Simulator

ZM-71SE can make the simulator start by this command.

For more information about the simulator, refer to "Simulator Instruction Manual."

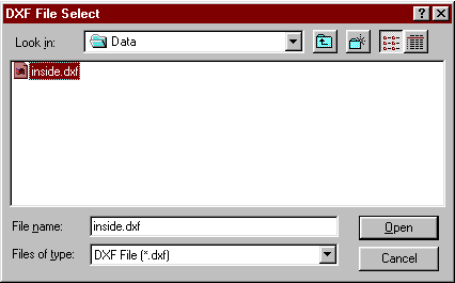
Tool Function 15: DXF File Convert

A DXF file can be imported into a screen data file as graphic data.

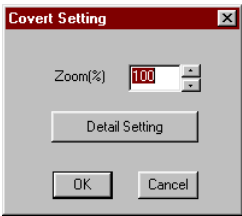
Operation Procedure

Import of DXF File

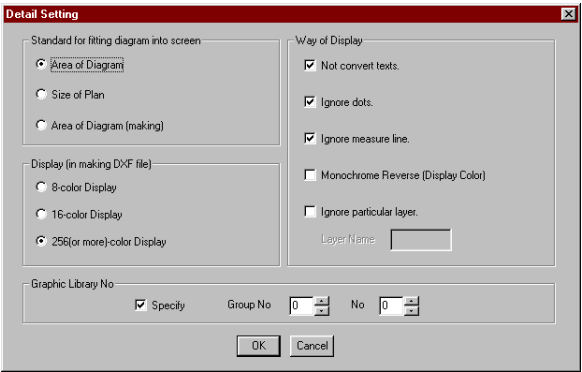
- 1. Select [DXF File Convert] from the [Tool] menu.
The [DXF File Select] dialog is displayed.



- 2. Choose the desired DXF file and click [Open].
The [Convert Setting] dialog is displayed.



- 3. Specify [Zoom] in the range of 10% to 250%.
- 4. When setting conditions for file import, click [Detail Setting]. The following options are selected as default.



◆ [Detail Setting] options

[Standard for fitting diagram into screen]

Area of Diagram	Only areas containing graphics are read during file import.
Size of Plan	Drawing sizes are read during file import.
Area of Diagram (making)	If the graphics could not be read in the above manner, the ZM-71SE sets an area and the data within the area is read.

[Display (in making DXF file)]

8-color Display 16-color Display 256 (or more)-color Display	Choose the option specified for DXF file creation.

[Way of Display]

Not convert texts.	Choose whether or not text in DXF file is converted. (1 character is converted into 16 x 16 dots.)
Ignore dots.	Choose whether or not dots as graphics are ignored.
Ignore measure line.	Choose whether or not the dimension lines in DXF file are ignored.
Monochrome Reverse (Display Color)	Choose whether or not inverting to black-on-white is executed. (When a file is imported into the ZM-71S, white-on-black or some other color line is used for display as default.)
Ignore particular layer.	Choose whether or not layers not to be converted are specified. Specify the names of such layers instead of their numbers.

[Graphic Library No.]

Specify	When blocks are used in a DXF file, choose whether or not they are registered in the graphic library.

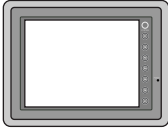
- After setting, click [OK].
- Click [OK] in the [Convert Setting] dialog. File conversion starts.
- On completion, the data size is displayed on the screen with a broken line. Drag the mouse to the pasting position, and click it.

Tool Function 16: Option

The "Auto-Save" function can be selected in this menu.
If [Auto-Save] is checked, the screen data file will be saved automatically at regular intervals.
Also, the interval time (10~60 minutes) can be specified.



*** When each macro window (switch ON/OFF macro, OPEN/CYCLE/CLOSE macro, macro mode) is opened, the "Auto-Save" function does not work.**

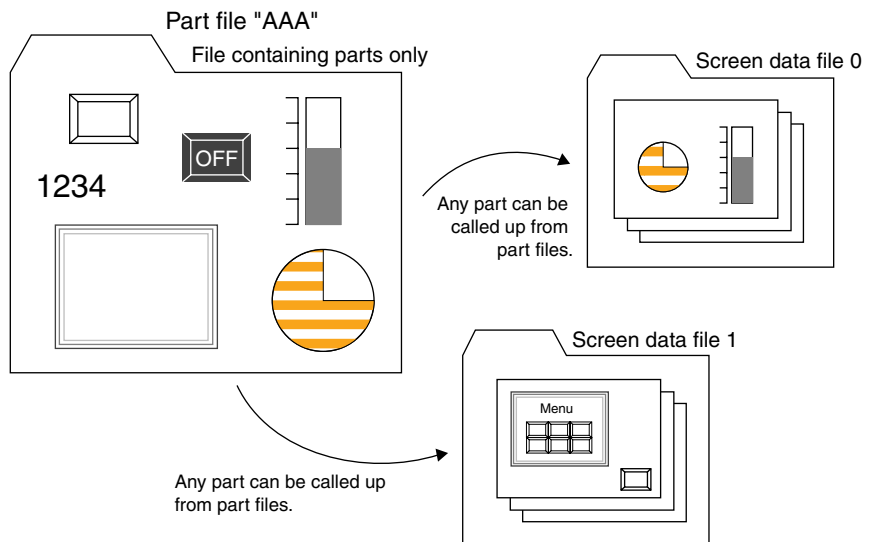
**ZM Series**

Part Editing

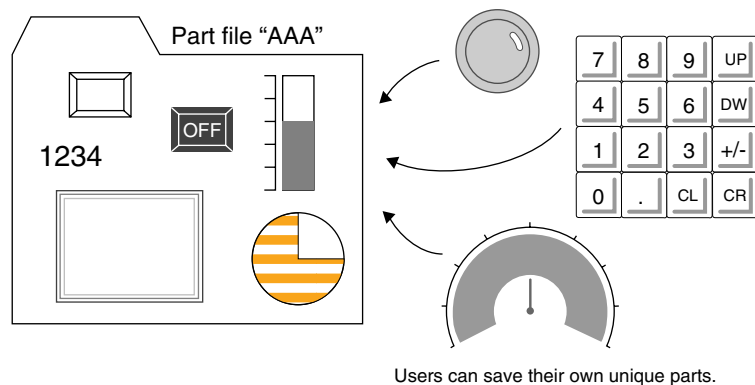
Outline of Parts

All items making up screens, such as switches, lamps, numerical data, and overlaps, are called “parts” and are saved in “part files.”

The “part file” is an independent file and is separate from screen data files. Any part can be copied from part files to screen data files at any time. The same part can be placed in different screen data files.



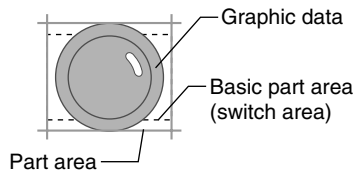
Users can create and save their own parts together with the standard parts originally saved in part files. With this feature, the user can easily create a screen by using parts of their own design, such as switches and graphs.



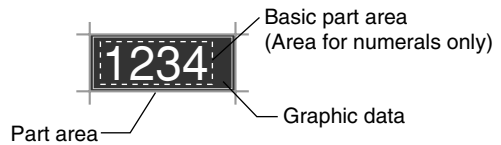
Components of Parts

Parts saved in a part file may be different in shape but have common components. A part is basically composed of three different elements: a “basic part area,” “part area,” and “graphic data.” The “basic part area” is the area which possesses the part’s function. The “part area” is the area covering the whole part, which is equivalent to the part’s size.

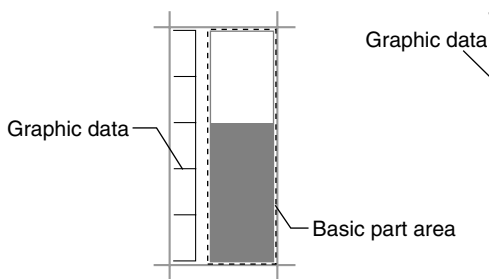
◆ Switch part ◆



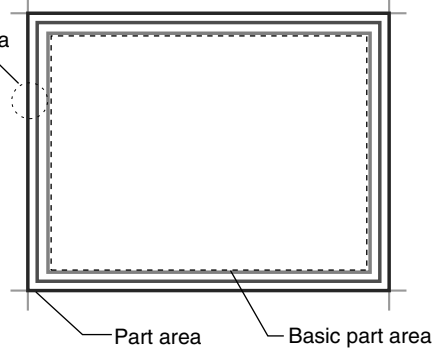
◆ Num. data display part ◆



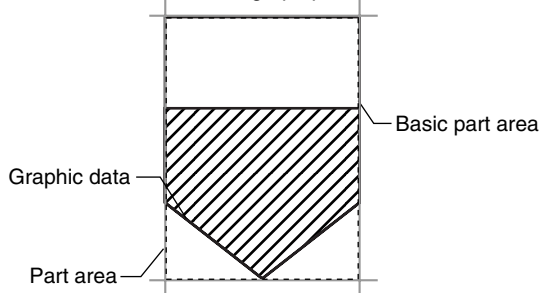
◆ Bar graph part ◆



◆ Display area part ◆



◆ Closed area graph part ◆



Modifying Parts (In screen data files)

Outline of Modifying Parts

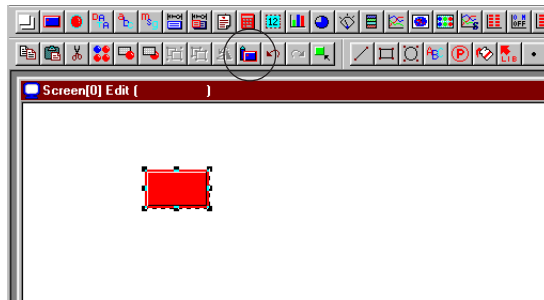
This section describes the procedure for modifying parts.

It is possible to slightly modify parts in screen editing, keeping the original parts stored in the part file unchanged.

Parts Modifying Procedure

Click a part placed on the screen. Handles are shown around it.

Click the [Change the setting of a part placed.] icon in the tool bar.



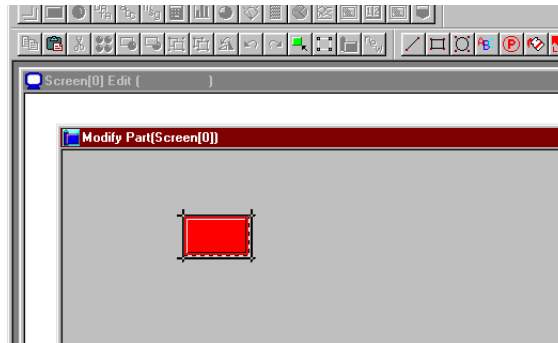
The [Modify Part] window is displayed.

Modify the part. Adjust the frame to fit the modified part if necessary.

The part modifying procedure is almost the same as the part editing procedure.

For more information, refer to "<[Modify Part] window>" in "Editing Procedures for Each Part" described in this chapter.

Refer to "Creating Lamps" in the Tutorial Manual.



After the part has been modified, close the [Modify Part] window. The former screen edit window is displayed. The modified part is shown on the screen.



How to save a part in a part file after modifying it in screen editing:

1. Copy the desired part.
2. Open a part file, and bring up the edit window of the copied part .
3. Paste the copied part to the target window for registration.
4. Click [Save] or [Save As] to save the part.

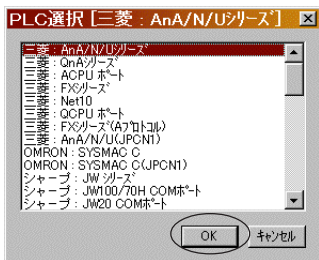
Creation and Storage of Part Files

Creating Part Files

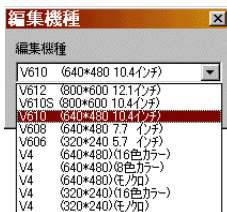
Follow the steps below.

<Creating a new file>

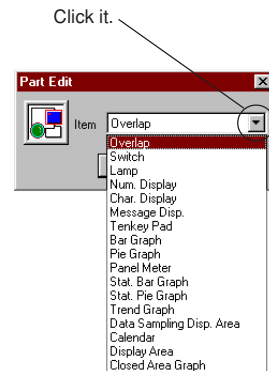
1. Select [Parts Edit] from the [File] menu, and click [New].
2. The [Select PC Type] dialog is displayed.
Choose the PC model to be used for the screen data file for the part file you are going to create.
Click [OK].



3. The [Edit Model] dialog is displayed. Choose the correct model and click [OK].



4. The [Part Edit] dialog is displayed. Choose the part to be edited and click [OK].
Click this button.



5. The [Part [0] Edit] window for the selected part is displayed.



6. When an existing file is opened, click the [Screen List] icon. Double-click the target box for registration. The corresponding [Part Edit] window is displayed.
7. To change a part for modification in the [Part Edit] window, click the desired part icon.



The [Part Edit] dialog is displayed.



Specify the desired number and click [OK].

The [Part Edit] window indicating the specified number is displayed.

8. Create a part. (Refer to “Editing Procedures for Each Part” described in this chapter.)

○ Outline

<<[Part Edit] window>>

[New Part] icon

[Modify Part] icon

<<[Modify Part] window>>

Modify a part.

Icons, edit menu options, or right-clicking menu options for the selected part are displayed.

<<[Part Edit] window>>

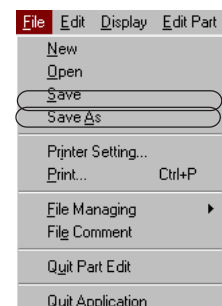


The base color of the [Part Edit] window can be changed so that the image of the part can be obtained when it is placed on the screen.

Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed. Open the [Menu Dsp.] tab window. Choose the desired color for [Background]. (Refer to page 24-31.)

Saving and Closing Part Files

1. For a new part file, select [Save] or [Save As] from the [File] menu. Give the file a name.
2. When overwriting an existing file, select [Save] from the [File] menu.
3. Select [Quit Part Edit] from the [File] Menu. This step completes part editing.
By selecting [Quit Application], the editor is terminated.



Editing Procedures for Each Part

Editing Overlap Parts

In overlap parts, the “basic part areas” equal the “part areas” in size.

Editing Procedure

Procedure to edit and register a new part is explained below:

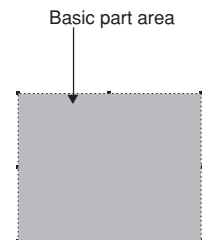
<[Overlap Part Edit] window>

1. Check that the edit window indicating the selected registration number is opened.



[New Part] icon

2. Click the [New Part] icon. A dotted box and a mover tool appear.
3. Click the mover tool in the desired position. A new overlap part is placed in the window.
4. Double-click the overlap part. The [Overlap (Normal)] dialog is displayed. Set the dialog as desired.



Basic part area



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.



[Modify Part] icon

5. Select the overlap part. Click the [Modify Part] icon.

<[Modify Part] window>

6. The [Modify Part] window for the overlap part is opened. Edit the part or change its size.



Points

- Frame adjustment cannot be used for overlap parts because they have no frames.
- No graphic outside the basic part area is active. Draw graphics within the area.
- A basic part area color can be specified in the [Overlap] dialog.

8. After editing the part, close the [Modify Part] window.

<[Overlap Part Edit] window>

9. The former [Overlap Part Edit] window is displayed. The modified overlap appears in the window.

Editing Switch/Lamp Parts

Editing procedures for switches and lamps are almost the same. Unlike other parts, when either a switch or lamp part is created, different displays for ON and OFF (and P3) should be created.

2-Notch/3-Notch

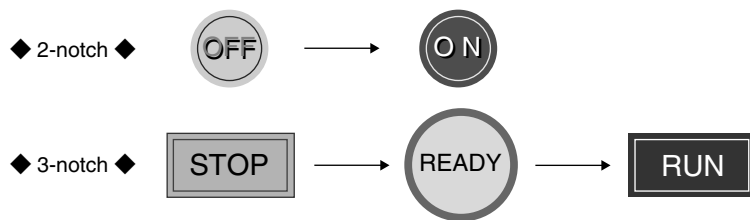
Two different displays for ON and OFF or three different displays are required for switch or lamp parts. They are handled as “2-notch” or “3-notch” respectively.

When a part is created in part editing, choose either “2-notch” or “3-notch” for the part.



Note that once the “2-notch” or “3-notch” has been chosen, it cannot be changed later.

For a 2-notch switch or lamp part, two different displays for ON and for OFF should be created. For a 3-notch part, three different displays are required.

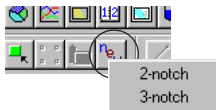
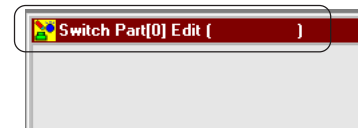


Editing Procedure (Ex. 2-notch switch part)

The procedure to edit and register a new part is explained below:

<[Switch Part Edit] Window>

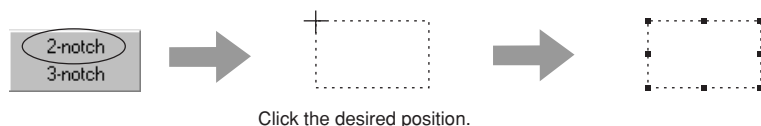
1. Check that the edit window indicating the selected registration number is opened.



2. Click the [New Part] icon. [2-notch] or [3-notch] can be chosen.
3. Click [2-notch].

A dotted box and a mover tool appear in the window.

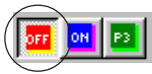
4. Click the mover tool in the desired position.
A new switch part is placed in the window.



5. Double-click the placed part. The [Switch] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.



6. Create the OFF display of the switch.

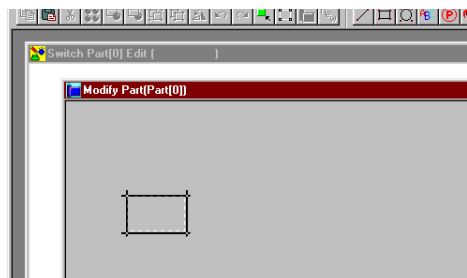
Check that the [OFF] icon is depressed. If not, click the icon.

7. Select the switch part. Click the [Modify Part] icon.



<[Modify Part] window>

8. The [Modify Part] window for the switch part is opened. Edit the part or change its size.

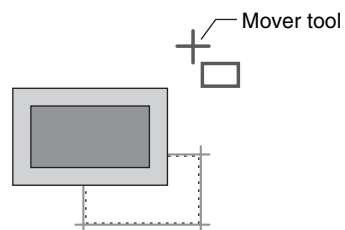
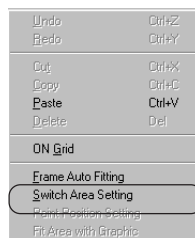


Points

◆ “Switch area” setting

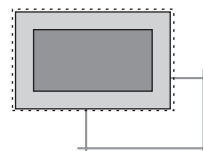
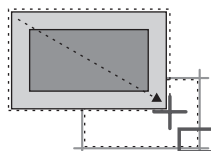
A switch part contains a “switch area.” Pressing here activates the switch. This area can be moved in switch part editing.

Select [Switch Area Setting] from the [Edit] menu. (Or, right-click the mouse and select [Switch Area Setting] from the pop-up menu.) The mover tool appears as shown below.



The switch area can be moved to the desired position by dragging the mover tool.

Drag the mover tool while fitting it to the switch part.



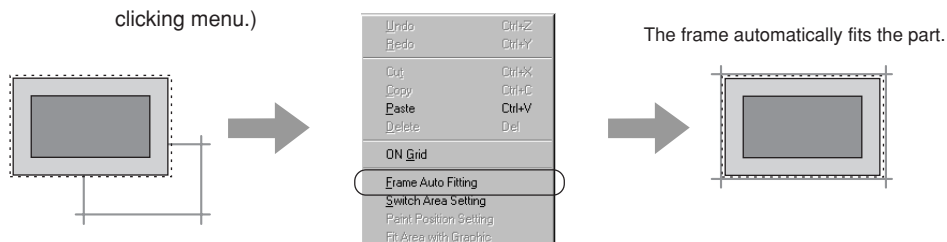
The switch area is moved to the position.

◆ Part frame setting

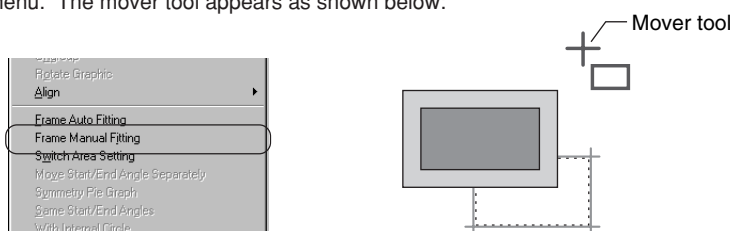
In a switch part, the graphic size may differ from the switch area. If an irregular graphic is drawn for a switch part, the switch area may not fit the graphic. The part frame can be adjusted to fit the whole part in this situation.

The part frame can be set either automatically or manually.

When fitting a frame to a part automatically, select [Frame Auto Fitting] from the [Edit] menu. (Or, click the [Frame Auto Fit] icon, or choose [Frame Auto Fitting] from the right-clicking menu.)



A frame can be set manually as desired. Select [Frame Manual Fitting] from the [Edit] menu. The mover tool appears as shown below:



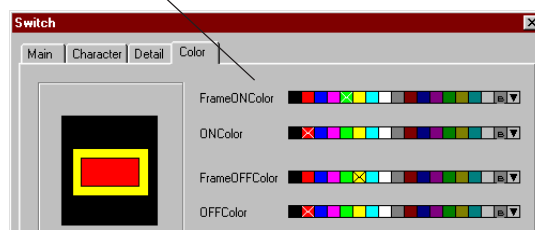
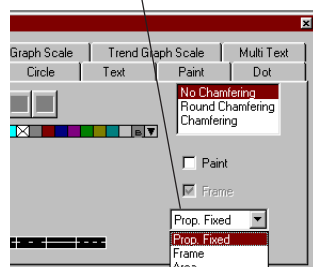
Drag the mover tool to the desired position. The frame is placed in the position.

◆ Frame or area property for the graphic

When creating ON and OFF displays for a switch/lamp part, their colors can be changed directly from the [Switch/Lamp] dialog by designating the ON/OFF graphics as frame property ([Frame]) or area property ([Area]) .

Refer to the following table.

Part graphic property	In the [Switch/Lamp] dialog
When creating OFF display	[Frame] [OFF Frame Color]
	[Area] [OFF Color]
When creating ON display	[Frame] [ON Frame Color]
	[Area] [ON Color]



* The above function is also used for 3-notch switch or lamp parts.

◆ Switch grids

As default, [Place switches on switch grids.] is checked. Switches are placed and enlarged/reduced, or switch areas are moved along switch grids.

In the ZM-41/70, switch areas can be moved only along switch grids. Keep [Place switches on switch grids.] checked. In the ZM-*2, switches can be moved dot by dot, irrespective of switch grids. To do this, select [Display Environment] from the [Display] menu, open the [Grid] tab window, and uncheck [Place switches on switch grids.].

◆ Preparation for creating the ON display of a switch part

When creating a switch part, the ON display is placed on top of the OFF display. When the ON or OFF state of a switch is distinguished only by color change, the ON and OFF displays of the switch must be in the same position.

To create the ON display after the OFF display has been created, copy the OFF display in the [Part Modify] window, then paste the copied display to the [Part Modify] window for the ON display and finish it as the ON display.

10. After editing the OFF display, copy the display for creating the ON display.

11. Close the [Part Modify] window.

The former [Switch Part Edit] window is displayed. The OFF display as created appears in the window.

<[Switch Part Edit] window>

12. Create the ON display of the switch.

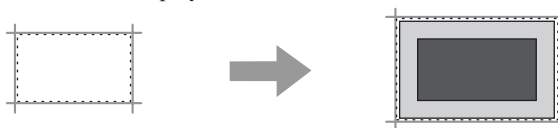
Click the [ON] icon in the tool bar.

13. Click the switch part, and click the [Modify Part] icon.

<[Modify Part] window>

14. The [Modify Part] window is opened. Paste the copied OFF display to the window.

Edit the part for the ON display.



After editing, reset the part frame by choosing [Frame Auto Fitting].

15. Close the [Modify Part] window. The former [Switch Part Edit] window is displayed. The ON display as created appears in the window.

*** Whether or not the created switches or lamps appear as desired in the ON, OFF, and P3 displays depends on the [Draw Mode] selection between [XOR] and [REP].**

For a 3-notch part, the same procedure is used except that editing “P3” display is required.

Editing Data Display Parts

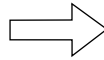
There are three different types of data display parts: “numerical data display,” “character display,” and “message display.” However, the editing procedure is the same for all of them.

Editing Example (Ex. Numerical data display part)

The procedure to edit and register a new part is explained below:

<[Num. Display Part Edit] window>

1. Check that the edit window indicating the selected registration number is opened.
2. Click the [New Part] icon.
A dotted box and a mover tool appear in the window.
3. Click the mover tool in the desired position. A new numerical data display part is placed.
4. Double-click the part.



The top left corner of the part moves to the clicked position.

The [Num. Display] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.



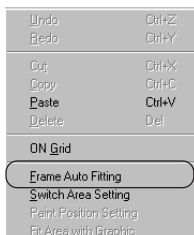
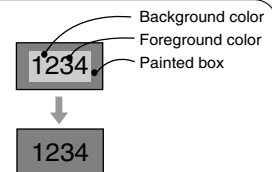
5. Select the numerical data display part by clicking. Click the [Modify Part] icon.

<[Modify Part] window>

6. The [Modify Part] window for the numerical data display part is displayed. Edit the part or change its size.



For a numerical data display part with a painted box, it is recommended that the box color be specified for [Background] in the [Char. Prop.] tab window of the [Num. Display] dialog and that [Transparent] be unchecked. With [Transparent] checked, a flickering will occur on the Control Terminal screen when the data on the display part is changed, and the data display speed will be slow.



7. After editing the part, click the [Frame Auto Fit] icon. The frame automatically fits the part.



8. Close the [Modify Part] window.

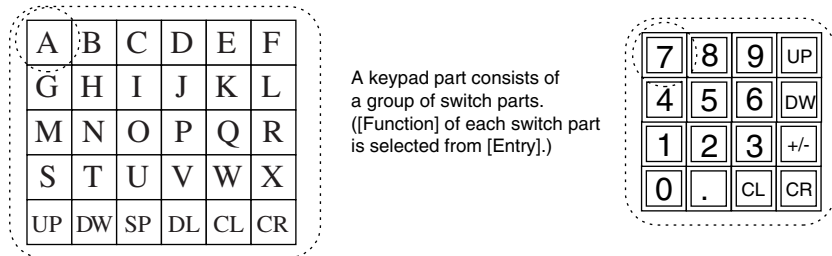
<[Num. Display Part Edit] window>

9. The former edit window is displayed. The modified numerical data display part appears in the window.

Editing a Keypad

The keypad for inputting numerals or characters consists of numerous individual switch parts, but is registered in the part file as a single part.

Therefore, to create and register a keypad part, each individual part should be created, following the procedure explained in “Editing Switch/Lamp Parts” and should be grouped into one part.

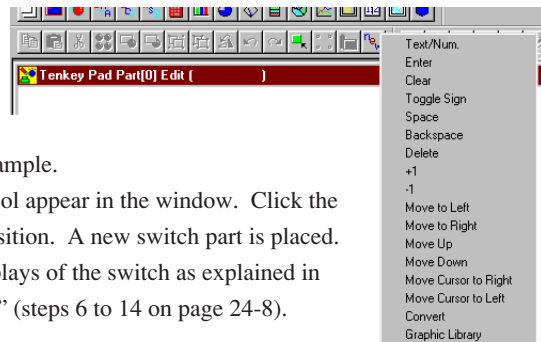


When creating a switch for a keypad, there is no option for choosing “2-notch” or “3-notch.” (The parts for the keypad must be “2-notch.”) However, a function must be chosen from the switch function pull-down menu.

Editing Procedure

The procedure to edit and register a new part is explained below:

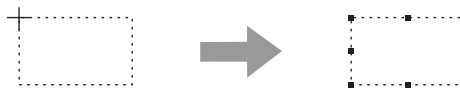
1. Check that the edit window indicating the selected registration number is opened.
2. Click the [New Part] icon. The function pull-down menu is displayed.



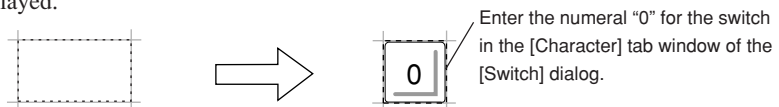
3. Choose [Text/Num.], for example.

A dotted box and a mover tool appear in the window. Click the mover tool in the desired position. A new switch part is placed.

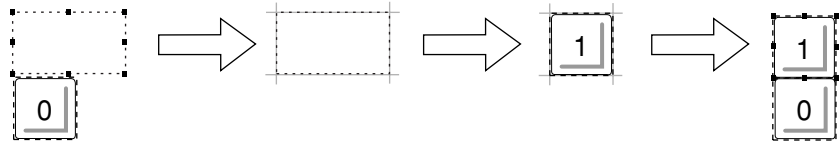
4. Create the ON and OFF displays of the switch as explained in “Editing Switch/Lamp Parts” (steps 6 to 14 on page 24-8).



5. After editing the switch, close the [Modify Part] window. The former edit window is displayed.



6. Create additional switches for a keypad. Follow steps 3 to 5.



Points

◆ Characters on a keypad

When [Text/Num.] is selected from the switch function pull-down menu, enter characters/numerals for the switches in the [Character] tab window of the [Switch] dialog. When a switch is pressed, the character or numeral of the switch is recognized.

Characters/numerals registered in the graphic library can also be used for switches in screen editing. (Refer to page 9-9 in Chapter 9, "Entry Mode.") In this case, however, the character or numeral is not recognized when a switch is pressed.

◆ Multiple Copies

When creating a keypad consisting of the same-shape switches, create one switch and copy it using the multi-copy function. Then set their functions and characters/numerals in the [Switch] dialog.



Several switch parts for a keypad are registered as a keypad part. When placing a keypad part in screen editing, the switch parts are grouped. To relocate the switch parts, ungroup a keypad part into single parts.

Editing Graph Parts

There are seven different types of graph parts, “bar graph,” “pie graph,” “panel meter,” “statistics graph (bar),” “statistics graph (pie),” “trend graph,” and “closed area graph.” To create these graph parts, follow their individual procedures.

Bar Graph Editing Procedure

The procedure to edit and register a new part is explained below:

<[Bar Graph Part Edit] window>

1. The edit window indicating the selected registration number is opened.

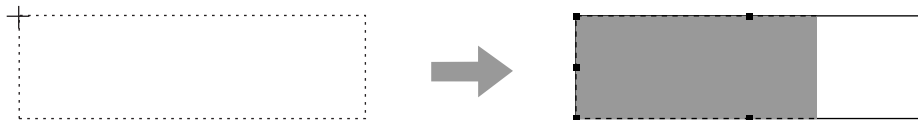
2. Click the [New Part] icon.

The bar graph type pull-down menu is displayed.

3. Choose [Horizontal Bar RGT], for example.

A dotted box and a mover tool appear in the window.

4. Click the mover tool in the desired position. A new graph part is placed.



5. Double-click the part. The [Bar Graph] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

6. Select the bar graph part. Click the [Modify Part] icon.



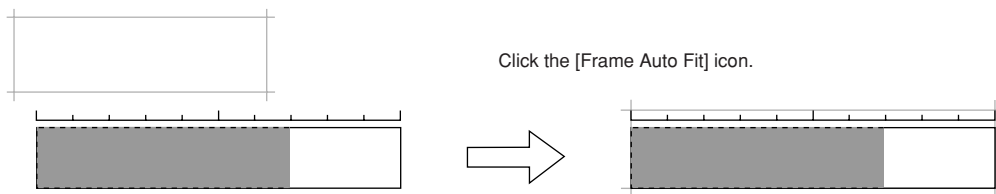
<[Modify Part] window>

7. The [Modify Part] window for the bar graph part is displayed. Edit the part or change its size.

8. After editing the part, click the [Frame Auto Fit] icon.

The frame automatically fits the part.

9. Close the [Modify Part] window.



<[Bar Graph Part Edit] window>

10. The former edit window is displayed. The modified bar graph part appears in the window.

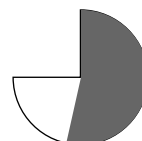
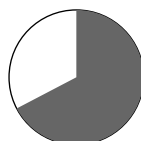
Pie Graph Editing Procedure



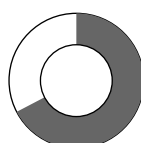
Pie graph types

The following types of pie graph parts are available.

- Without internal circle, Symmetry
- Without internal circle, Complete Round
- Without internal circle, Asymmetry



- With internal circle, Symmetry
- With internal circle, Complete Round
- With internal circle, Asymmetry



The procedure to edit and register a new part is explained below:

<[Pie Graph Part Edit] window>

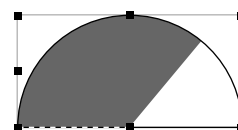
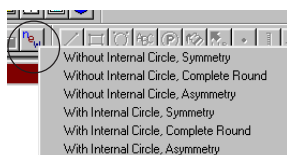
1. Check that the edit window indicating the selected registration number is opened.
2. Click the [New Part] icon.

The pie graph type pull-down menu is displayed.

3. Choose [Without Internal Circle, Symmetry], for example.

A dotted box and a mover tool appear in the window.

4. Click the mover tool in the desired position. A new pie graph part is placed.



5. Double-click the part. The [Pie Graph] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

6. Select the pie graph part. Click the [Modify Part] icon.



<[Modify Part] window>

7. The [Modify Part] window for the pie graph part is displayed. Edit the part or change its size.

8. After editing the part, click the [Frame Auto Fit] icon.

The frame automatically fits the part.

9. Close the [Modify Part] window.

<[Pie Graph Part Edit] window>

10. The former edit window is displayed. The modified pie graph part appears in the window.

Notes

The pie graph has a size limit.

The radius of a pie graph without internal circle must be 16 dots or more.

The inside radius of a pie graph with internal circle must be 10 dots or more, and the difference between the inside and outside radii must be 16 dots or more.



Points

Icons for editing pie graph parts

In the window for editing pie graph parts, unique icons appear in the tool bar.



A. [Move start/end angles separately.]

B. [Symmetry]

D. [With Internal Circle]

C. [Same start end angles.]

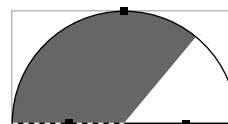
A. [Move start/end angles separately.]

There are “start angles “ and “end angles” for all pie graphs except circles. These angles can be changed freely when the graph is edited.

Click icon A and click the part area of the pie graph. Handles are shown around the part.

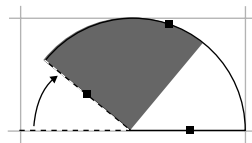


Click this icon.

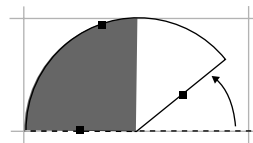


Click the part.
Handles are shown.

Drag either handle on “start angle” or “end angle” to the desired size.



Drag the start angle to change it.



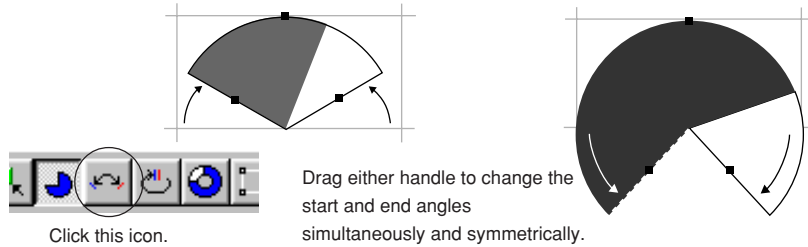
Drag the end angle to change it.

B. [Symmetry]

Unlike icon A, this icon changes “start angle” and “end angle” simultaneously and symmetrically.

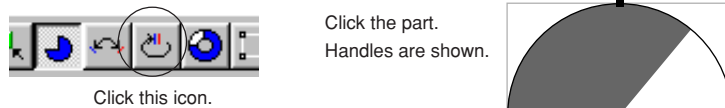
Click icon B, and click the part area of the pie graph. Handles are shown around it.

Drag either handle to change both angles simultaneously and symmetrically. (Refer to the figures on the next page.)

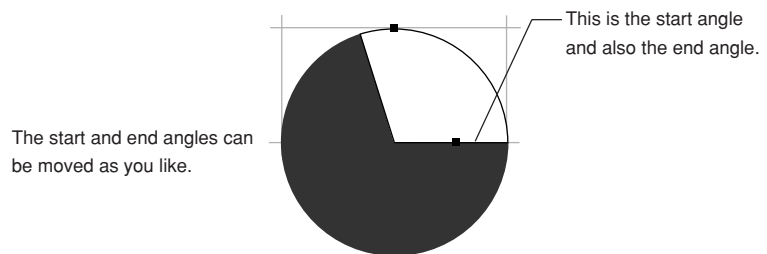


C. [Same start end angles.]

Click icon C and click the part area of the pie graph part.



Handles are shown around the part. Drag either “start angle” or “end angle.” They are put together. The sector becomes a complete circle.

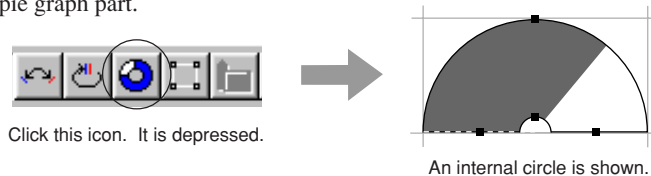


(The “start angle” moves to the “end angle.”)

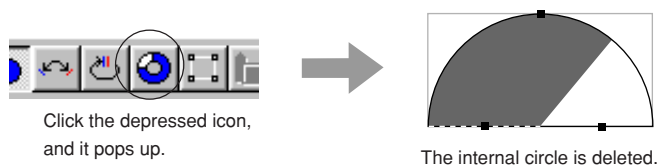
D. [With Internal Circle]

The circle at the center of the pie graph is called the “internal circle.” The graph looks like a donut. This circle can be created or deleted as you like.

Click icon D once. The icon is depressed, and an internal circle (hole) is created in the pie graph part.



Click the depressed icon D. It pops up. The internal circle (hole) is deleted.



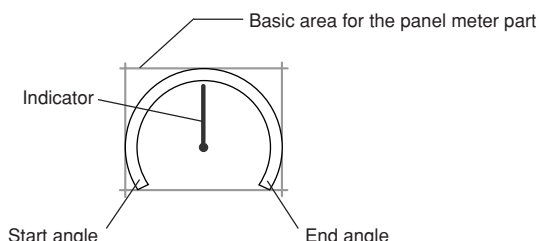
Notes

The panel meter has a size limit.
 The inner radius must be 10 dots or more.
 The difference between the inner and outer radii must be 16 dots or more.

Panel Meter Editing Procedure

Basically, the panel meter composition is similar to the pie graph. The pie graph indicates the value with execution color, but the panel meter uses an indicator.

Both “start angle” and “end angle” can be changed in the same manner as in pie graphs.



The panel meter always has an internal circle. The [With Internal Circle] icon is, therefore, inactive when the panel meter is edited.

The procedure for editing and registering panel meter parts is the same as used for pie graph. Refer to the example for editing pie graphs explained previously (page 24-25).

Statistic Graph (Bar) Editing Procedure

The procedure to edit and register a new part is explained below:

<[Stat. Bar Graph Part Edit] window>

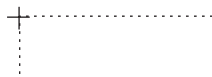
1. The edit window indicating the selected registration number is opened.
2. Click the [New Part] icon.

The statistic graph (bar) type pull-down menu is displayed.

3. Choose [Horizontal Bar Graph], for example.

A dotted box and a mover tool appear in the window.

4. Click the mover tool in the desired position. A new graph part is placed.



5. Double-click the part. The [Stat. Bar Graph] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

6. Select the statistic graph part. Click the [Modify Part] icon.

<[Modify Part] window>



7. The [Modify Part] window for the statistic graph (bar) part is displayed. Edit the part or change its size.

8. After editing the part, click the [Frame Auto Fit] icon.

The frame automatically fits the part.

9. Close the [Modify Part] window.

<[Stat. Bar Graph Part Edit] window>

10. The former edit window is displayed. The modified statistic graph (bar) part appears in the window.

Statistic Graph (Pie) Editing Procedure

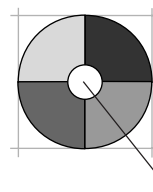
There is only one type of statistic graph (pie), [With Internal Circle, Complete Round].

Unlike pie graphs, there are no options such as the sector or other types for statistic graph (pie).

The procedure for editing statistic graph (pie) parts is the same as used for statistic graph (bar) parts. Refer to the previous section, “Statistic Graph (Bar) Editing Procedure.”

Notes

The statistic graph (pie) has a size limit.
The inner radius must be 10 dots or more.
The difference between the inner and outer radii must be 16 dots or more.



Statistic graph (pie) part

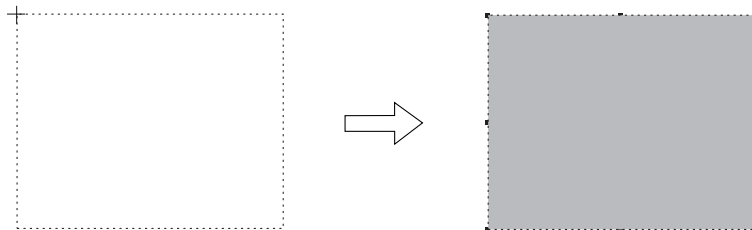
Always equipped with internal circle

Trend Graph (Trend Sampling) Editing Procedure

The part registered in this section is used for trend graphs and also for display area parts for trend sampling mode.

<[Trend Graph Part Edit] window>

1. Check that the edit window indicating the selected registration number is opened.
2. Click the [New Part] icon.
A dotted box and a mover tool appear in the window.
3. Click the mover tool in the desired position. A new graph part is placed.



4. Double-click the part. The [Trend Graph] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

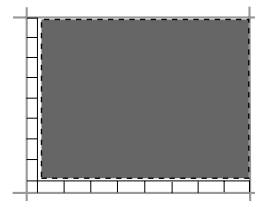
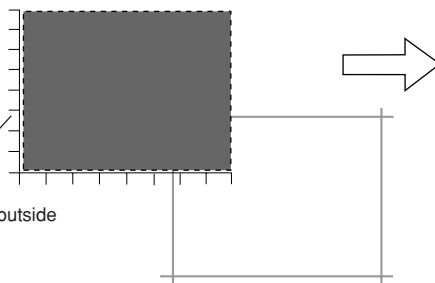
5. Select the trend graph part. Click the [Modify Part] icon.

<[Modify Part] window>

6. The [Modify Part] window for the trend graph part is displayed. Edit the part or change its size.
7. After editing the part, click the [Frame Auto Fit] icon.
The frame automatically fits the part.
8. Close the [Modify Part] window.



Attach scales to the outside of the graph part.



The frame automatically fits the graph with scales in size.

<[Trend Graph Part Edit] window>

9. The former edit window is displayed. The modified trend bar graph part appears in the window.

Closed Area Graph Editing Procedure

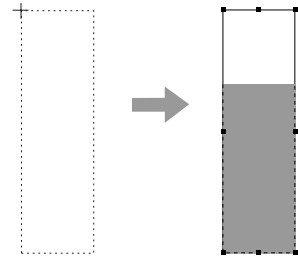
The procedure to edit and register a new part is explained below:



[New Part] icon

<[Closed Area Graph Part Edit] window>

1. The edit window indicating the selected registration number is opened.
2. Click the [New Part] icon.
A dotted box and a mover tool appear in the window.
3. Click the mover tool in the desired position. A new graph part is placed.
4. Double-click the part. The [Closed Area Graph] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

Select the closed area graph part by clicking. Click the [Modify Part] icon.



<[Modify Part] window>

5. The [Modify Part] window for the closed area graph part is displayed. Edit the part or change its size.

○Editing steps

1. Draw a closed area graphic using [Line], [Box], or [Circle] in the [Draw] menu.

Useful tools:

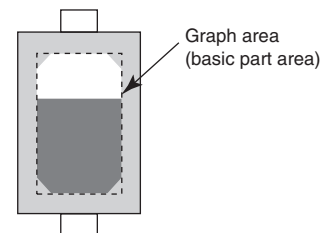
[Point Search] (Refer to page 1-24.)

[Enlarge items including circles in the opposite angle] (Refer to page 1-29.)

2. Set the graph area (basic part area) with a dotted box.

The graph area is recognized as a graph.

Move the graph area (dotted box) to the closed area graphic. Adjust to the desired size by dragging a handle.



If you want to use the graphic as a graph area, right-click the mouse and choose [Fit Area with Graphic] from the pop-up menu.

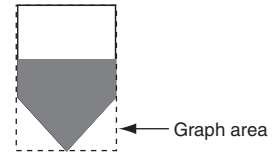
The max. size of a closed area graphic is W x H = 65,536 bytes.
(V606: 32,267 bytes)

[Item List] from the [Tool] menu is used to select desired graphic items (refer to pages 23-4 and 23-5).



[Fit Area with Graphic]

The graph area snaps into the drawn graphic.



3. Right-click the mouse, and select [Paint Position Setting].



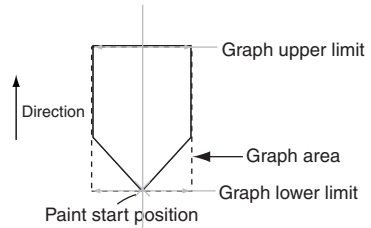
[Paint Position Setting]

Determine the start position for painting a closed area graph.

Select [Paint Position Setting] from the right-clicking menu.

Move the cursor to the graph area and click it. Drag the cursor and release the mouse in the target position.

(The paint start position "X" is moved along the horizontal line 1 dot above the graph lower limit.)



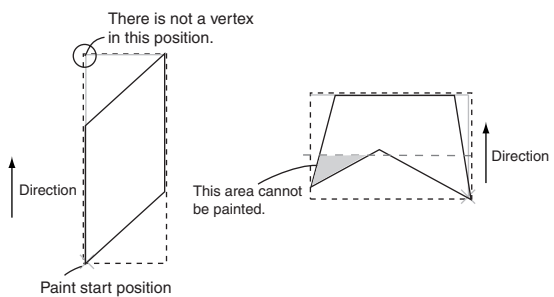
If painting is not performed correctly after the paint start position has been determined, raise the lower limit of the graph area by 1 dot and set the position again.

When confirming the paint start position, open the [Detail] tab window in the [Display Environment] dialog (from the [Display] menu) and uncheck [Paint Dsp.]. Click [OK]. The paint start position is indicated with "X."

If a closed area graphic does not have a vertex in the vertical direction from the paint start position, the graphic cannot be painted correctly.

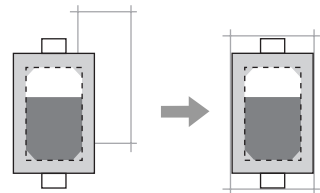
Also, a graphic containing partitioned areas cannot be painted correctly while painting is performed vertically from the start position. (Refer to the figures on the right.)

<Ex.>



6. After editing the part, click the [Frame Auto Fit] icon. The frame automatically fits the part. (Refer to the figure on the right.)

7. Close the [Modify Part] window.

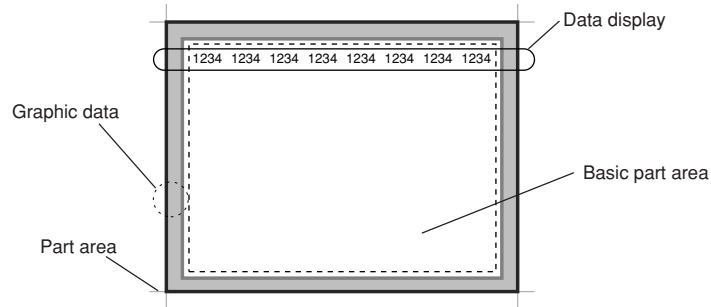


<[Closed Area Graph Part Edit] window>

8. The former edit window is displayed. The modified closed area graph part appears in the window.

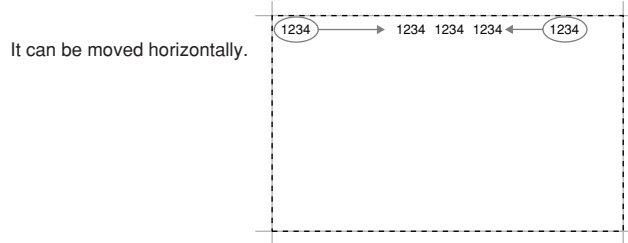
Editing Display Area Parts for Data Sampling

Display area parts for data sampling are required for “data sampling” in the “sampling mode.” A display area part for data sampling consists of a “basic part area,” “graphic data,” and “data display.”

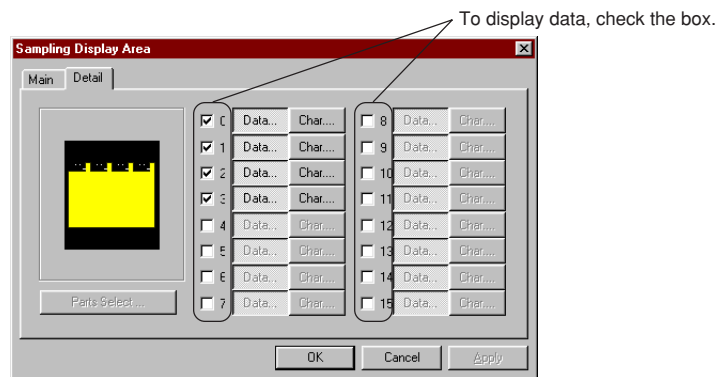


This “data display” differs from “data display part.” It exists only in a display area part for data sampling. Data displays are located on the top line of the basic part area. (The position can be changed horizontally.)

A maximum of 8 data displays can be placed in a part.



Whether or not to display data is determined in the [Sampling Display Area] dialog.



Editing Procedure

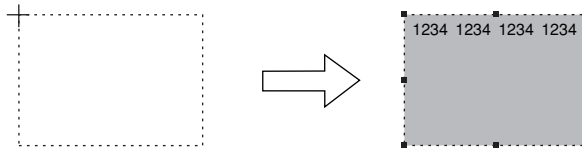
The procedure to create a new display area part including four items of data for data sampling is explained below:

<[Data Sampling Disp. Area Part Edit] window>

1. The edit window indicating the selected registration number is opened.
2. Click the [New Part] icon.

A dotted box and a mover tool appear in the window.

3. Click the mover tool in the desired position. A new data sampling display area part is placed.



4. Double-click the part. The [Sampling Display Area] dialog is displayed. Set the dialog as desired.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

5. Select the display area part. Click the [Modify Part] icon.



<[Modify Part] window>

6. The [Modify Part] window for the data sampling display area part is displayed. Edit the part or change its size.

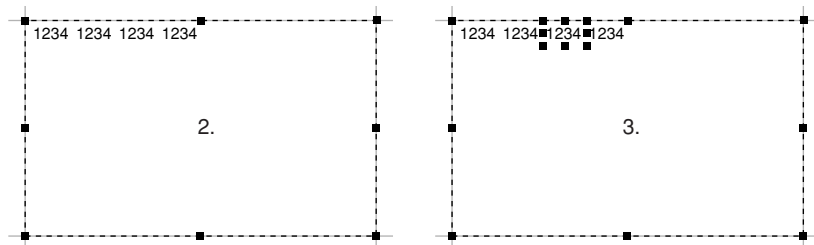


Points

Changing the position of data

Data shown in the part (data sampling display area part) can only be moved horizontally.

1. Click the data sampling display area part. Handles are shown around the part.
2. Click the desired data to select it. Handles are shown around the data.
3. Drag the selected data to the desired position.



7. After editing the part, click the [Frame Auto Fit] icon.

The frame automatically fits the part.

8. Close the [Modify Part] window.

<[Data Sampling Disp. Area Part Edit] window>

9. The former edit window is displayed. The modified display area part appears in the window.

Editing Calendar Parts

A calendar part can consist of all calendar items (year, month, day, hour, minute, second, and day of the week). It is also possible to create individual parts in order to use them separately.

This is one calendar part.

20/06/98 17 : 20 : 15 Saturday

6 / 20 Saturday

These are separate calendar parts.

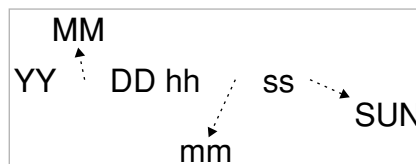
17 : 20

Composition of Calendar Parts

The calendar part consists of several calendar items.

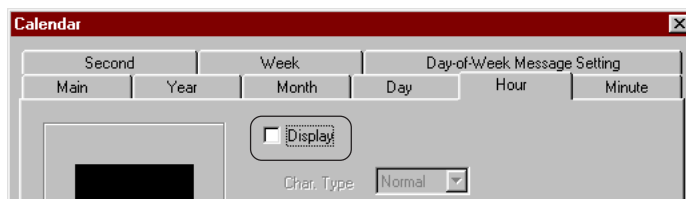
Each calendar item can be enlarged or moved separately within the part area.

Any calendar item can be moved within the part area of the calendar part.



Calendar items can be moved only within the area of the calendar part.

Determine whether or not to display calendar items of year, month, day, hour, minute, second, and day of the week in the [Calendar] dialog.



When [Display] is unchecked in the tab window of a calendar item, the item is not displayed.

Editing Procedure

The procedure to edit and register a new calendar part consisting of “year,” “month,” and “day” is explained below:

<[Calendar Part Edit] window>

1. Click the [Screen List] icon. In the screen list window, double-click the desired box for registration.

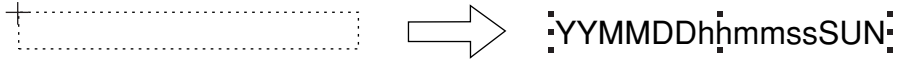
- The [Calendar Part Edit] window indicating the selected registration number is opened.



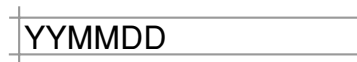
- Click the [New Part] icon.

A dotted box and a mover tool appear in the window.

- Click the mover tool in the desired position. A new calendar part is placed.



- Double-click the calendar part. The [Calendar] dialog is displayed. To delete unnecessary items from the part, open the [Hour], [Minute], [Second], and [Week] tab windows one by one and uncheck [Display] in each window. Clicking [OK] deletes [hh], [mm], [ss], and [SUN] from the calendar part.



The dialog for each part cannot be set after the [Modify Part] window is opened. Set the dialog before opening or after closing the window.

- Enlarge the calendar part if necessary. Click the part and drag its handle until the part is enlarged as desired.
- Select the calendar part. Click the [Modify Part] icon.

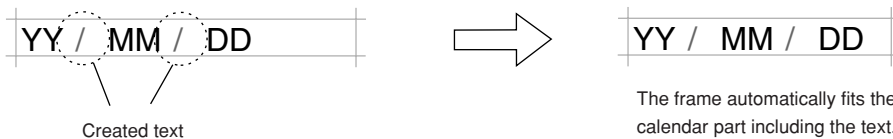


<[Modify Part] window>

- The [Modify Part] window for the calendar part is displayed. Edit the part or change its size.

- After editing the part, click the [Frame Auto Fit] icon.

The frame automatically fits the part.



- Close the [Modify Part] window.

<[Calendar Part Edit] window>

- The former edit window is displayed. The modified calendar part appears in the window.

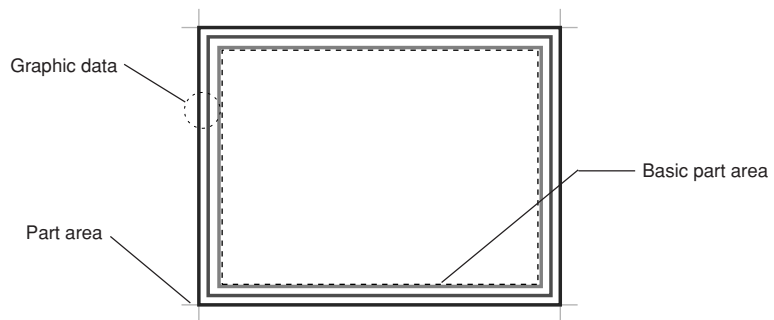
Editing Display Area Parts

The display area part is used in relay mode or in message mode to display messages, or in graphic mode to display graphics.

Editing Procedure

The procedure for editing display area parts is almost the same as used for overlap parts. Refer to the procedure explained on page 24-5.

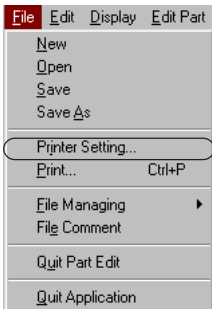
However, the frame setting is used for display area parts. Unlike overlap parts, the “basic part area” and the “part area” of the display area part are independent. This makes it necessary to reset the frame in editing.



Print-Out the Part (Part file)

An explanation of how to print out the contents of the part file is provided below.

Printing Procedure (Option Setting) Dialog



1. While a part edit window is opened, select [Printer Setting] from the [File] menu.
2. The [Option Setting] dialog is displayed.

[Screen Output]

Part graphics are printed.

[List Output]

Items set for parts are printed.

[Table Print]

The table of parts is printed.

When this option is checked, the

[Screen Output] and [List Output] options are not active.

[Reverse]

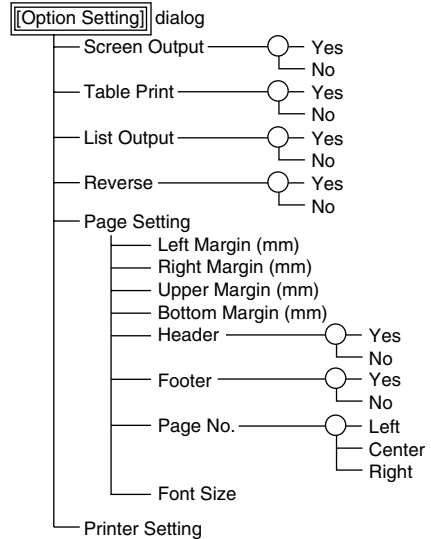
The parts are printed in reverse video.

[Page Setting]

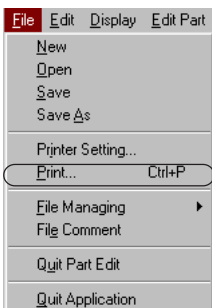
Set the margins, and header and footer lines.

[Printer Setting]

Set the printer mode, paper size, and portrait or landscape mode.

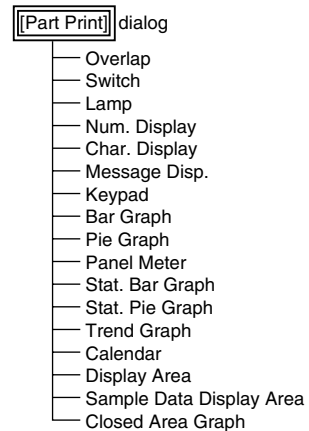


After setting, click [OK].



Printing

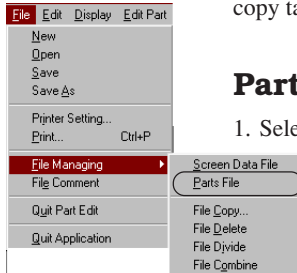
1. After specifying the above settings, execute printing.
Select [Print] from the [File] menu.
2. The [Part Print] dialog is displayed.
Check the necessary options for printing.
Specify the starting part number and ending part number for [Start] and [End] respectively.
3. Click [Print] at the bottom of the dialog.
Printing starts.



Part File Management

Parts from different part files can be copied into other files.

Close the current file. Copying is performed by bringing up the copy source file and copy target file windows.



Part File Managing Procedure

1. Select [File Managing] from the [File] menu, and click [Parts File].

2. The [File Manage (Part)] dialog is displayed.

Specify the desired files for [Copy Source No.] and [Copy Target No.], and click [OK].

3. The item selection pull-down menu is displayed. Choose [Switch], for example. Click [OK].

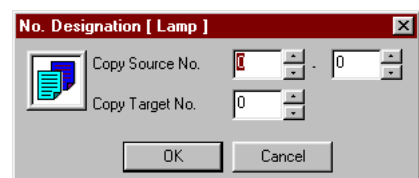
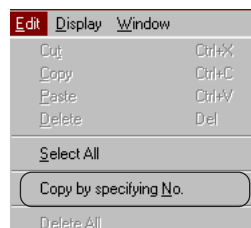
4. The copy source and target file windows are displayed. The source file window is placed above the target file window.

5. Drag the desired part from the copy source file window to the target file window. Copying is executed.

Multiple parts are selected simultaneously by clicking the first part, and then while holding down the SHIFT key, clicking the last part.

6. If you want to copy different parts, select [Change Display] from the [Display] menu. The item selection dialog is displayed. Choose the desired part and click [OK].

7. In addition to copying by dragging as explained above, copying by designating part numbers is also possible. Select [Copy by Specifying No.] from the [Edit] window. The item selection dialog is displayed. Choose the desired part and click [OK]. The [No. Designation] dialog is displayed. Specify the desired numbers for [Copy Source No.] and [Copy Target No.].



8. To save the copied parts, select [Copy Target Save] or [Copy Target Save As] from the [File] menu.

9. To quit, select [Quit File Managing] from the [File] menu.

Part Editing Menu

Use the following commands to create new parts or to edit existing parts.

In a Part Edit Window

(File) Menu

⊙[New]

Choosing this command creates a new part file.

⊙[Open]

Choosing this command brings up an existing part file name list.

⊙[Save]

Choosing this command saves the most recent version of the opened part file and deletes its previous contents.

[Save As]

Choosing this command saves the opened part file with a new file name, different from the original.

⊙[Printer Setting]

Choosing this command allows you to specify the settings for printing a part file.

For more information, refer to page 24-28.

⊙[Print]

Choosing this command prints out the part files. For more information, refer to page 24-28.

⊙[File Managing]

Choosing this command allows you to copy parts between part files. For more information, refer to page 24-29.

⊙[File Comment]

Choosing this command allows you to attach a comment to the opened part file using no more than 16 one-byte characters.

⊙[Quit Part Edit]

Choosing this command closes the part edit window.

⊙[Quit Application]

Choosing this command quits the editor.

(Edit) Menu

The he [Edit] menu commands are the same as those for screen data files, except for the [Place New Part] command.

⊙[Place New Part]

A new part is placed in the opened part edit window. The [New Part] icon functions in the same manner.

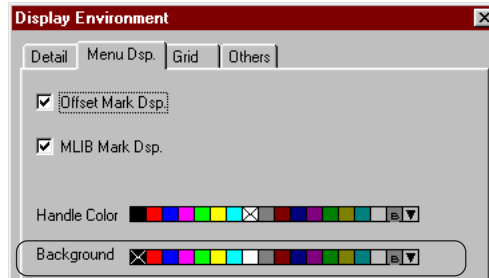


(Display) Menu

The [Display] menu commands are the same as those for screen data files, except for the [Display Environment] command.

◎[Display Environment]

Open the [Menu Dsp.] tab window in the [Display Environment] dialog. The [Background] option can be used to change the base color of a part edit window.



(Edit Part) Menu

◎[Overlap]

Choosing this command allows you to edit overlap parts.

◎[Switch]

Choosing this command allows you to edit switch parts.

◎[Lamp]

Choosing this command allows you to edit lamp parts.

◎[Num. Display]

Choosing this command allows you to edit numerical data display parts.

◎[Char. Display]

Choosing this command allows you to edit character display parts.

◎[Message Disp.]

Choosing this command allows you to edit message display parts.

◎[Key Pad]

Choosing this command allows you to edit keypad parts.

◎[Bar Graph]

Choosing this command allows you to edit bar graph parts.

◎[Pie Graph]

Choosing this command allows you to edit pie graph parts.

◎[Panel Meter]

Choosing this command allows you to edit panel meter parts.

◎[Stat. Graph]

Choosing this command allows you to edit statistic graph (bar) parts.

◎[Stat. Pie Graph]

Choosing this command allows you to edit statistic graph (pie) parts.

◎[Trend Graph]

Choosing this command allows you to edit trend graph parts.

⊙[Data Sampling Disp. Area]

Choosing this command allows you to edit display area parts for data sampling.

⊙[Calendar]

Choosing this command allows you to edit calendar parts.

⊙[Display Area]

Choosing this command allows you to edit display area parts.

⊙[Closed Area Graph]

Choosing this command allows you to edit closed area graph parts.

(Item) Menu

⊙[PC Type]

Specify the PC model for the screen data file when using a part file in the screen data file.

⊙[Edit Model Selection]

Specify the model of Control Terminal for the screen data file when using a part file in the screen data file.

(Tool) Menu

The [Tool] menu commands are the same as those for screen data files, except for the [Open File for Reference] command.

⊙[Open File for Reference]

This command is used when choosing [Pattern] or [Graphic Call] from the [Draw] menu in part editing.

Part files do not contain graphics or patterns. However, graphics or patterns exist in screen data files using part files. Therefore, it is possible to use graphics or patterns for creating parts.

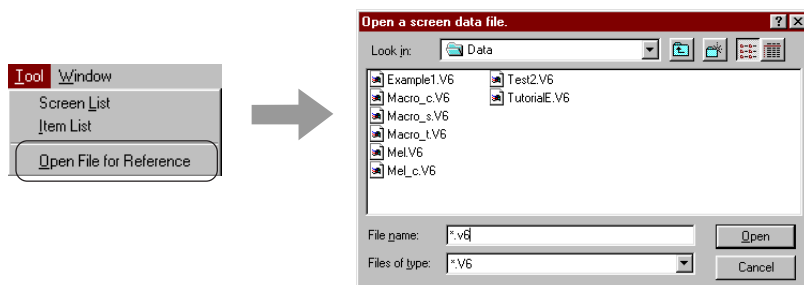
Graphics or patterns in a screen data file can be referred to and used in the part edit window using the [Open File for Reference] command.

Click [Open File for Reference], and choose the desired screen data file.

Graphics in the selected screen data file can be called up when [Graphic Call] or [Pattern] is selected from the [Draw] menu in part editing.

(Window) Menu

The [Window] menu commands are the same as those for screen data files.



In a [Modify Part] Window

(File) Menu

⊙[Quit Part Modifying]

Clicking this command closes the [Part Modify] window and brings up the former part edit window.

(Edit) Menu

The [Edit] menu commands are the same as those for screen data files, except for the following commands.

⊙[Frame Auto Fitting]

When a graphic is too large to fit in the part area, click this icon to enlarge the frame so that it fits the whole part including the graphic. The [Frame Auto Fit] icon functions in the same manner.

(This command is inactive for overlap parts because graphics cannot extend beyond the part areas.)

⊙[Frame Manual Fitting]

The frame of a part can be adjusted manually using the mouse. For more information, refer to page 24-9.

⊙[Switch Area Setting]

This command is used to reset the switch area (operating area). For more information, refer to page 24-8.

⊙[Move Start/End Angle Separately]

This command is used to adjust pie graph or panel meter part angles. The [Move start/end angles separately.] icon functions in the same manner. For more information, refer to page 24-16.

⊙[Symmetry Pie Graph]

This command is used to symmetrically adjust pie graph or panel meter part angles. The [Symmetry] icon functions in the same manner. For more information, refer to page 24-16.

⊙[Same Start/End Angles]

This command is used to modify pie graph or panel meter part shape forming a complete circle. The [Same start end angles.] icon functions in the same manner. For more information, refer to page 24-17.

⊙[With Internal Circle]

This command is used to add or delete an inner circle to or from a pie graph. The [With Internal Circle] icon functions in the same manner. For more information, refer to page 24-17.

(Display) Menu

The [Display] menu commands are the same as those for part edit windows.

(Draw) Menu

The [Draw] menu commands are the same as those for screen data files.

(Tool) Menu

Ⓒ[Item List]

When modifying a part including complicated graphics, the contents of the part are known from the [Item List] window.

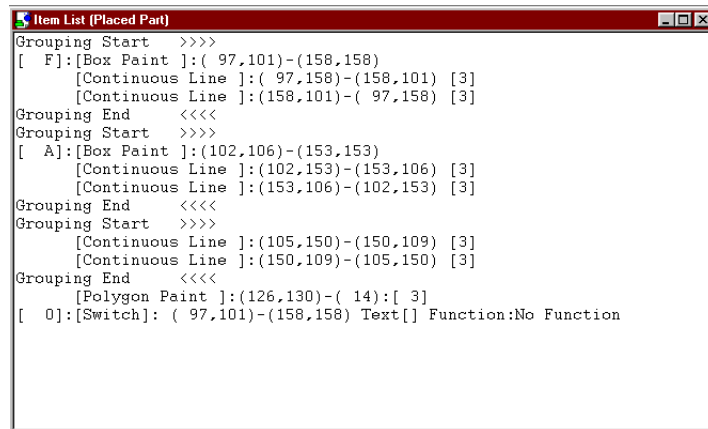
The part and graphic data are indicated separately in the list. This list is useful for changing only graphic properties, etc.



The items of the switch part are listed.



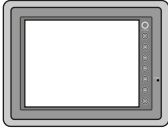
Open the [Item List] window to edit this switch part.



Click the item whose property is to be changed, and click the [Detail/Prop. Change] icon. The property can be changed with ease.

(Window) Menu

The [Window] menu commands are the same as those for screen data files.

**ZM Series**

File Conversion

Convert an existing screen file for use on a more advanced model.

Conversion is automatically carried out only when changes are made in edit model settings.

In addition, a ZM-41/70 parts file can be converted for use on the Control Terminal ZM-*2.

Outline of File Conversion

Converting a Screen Data File

A screen is automatically converted based on changes in the edit model settings for the screen data file. The following three conversions are possible:

1. ZM-30 -> ZM-41/70
2. ZM-30 -> ZM-*2
3. ZM-41/70 -> ZM-*2



File conversion is upwardly compatible.

ZM-*2 -> ZM-41/70, ZM-*2 -> ZM-30, ZM-41/70 -> ZM-30 conversions cannot take place.

Parts File Conversion

Convert a ZM-41/70 parts file (extension [.zmp]) to a ZM-*2 parts file (extension [.z7p])

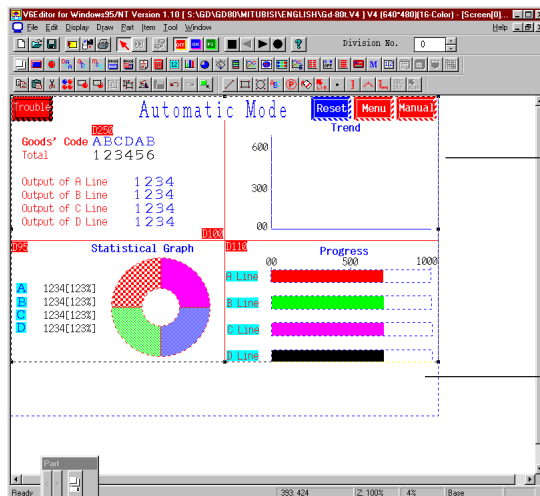
Notes When Converting Files

1. Screen Size

When changing screen data from ZM-30 to ZM-41/70 and ZM-41/70 to ZM-*2, vacant spaces may appear depending on the respective sizes.

If this occurs, size can easily be adjusted by making the entire screen a group and then scaling, as described below.

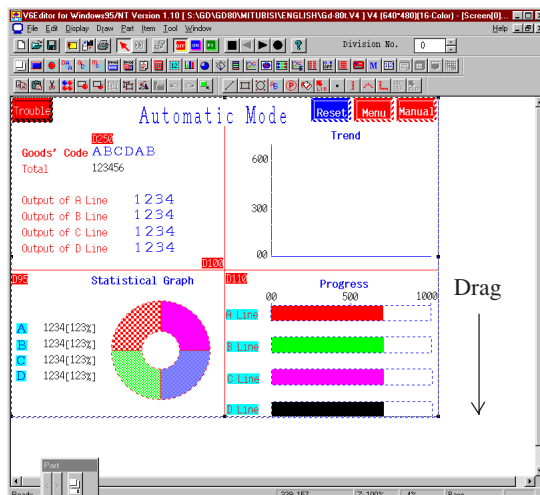
1. After deleting the switch and the screen grid, select all the items on the screen and make them a group.



Drag the mouse from the upper left of the screen to the lower right of the screen and select all items on the screen. Handles will appear for all the items. Then, when you click on the [Group] icon, the screen will be enclosed in a dotted line rectangle with handles.

Because a conversion is being made from the ZM-30 to the ZM-41/70, an 80 dot space is created.

2. Drag the handles of the items that you put in a group to adjust the screen size.



2. Limits on the Screen Data File Capacity

- ◆ When converting from the ZM-30, or from the ZM-41/70 to the ZM-*2, the file size increases the following amounts:

ZM-30 -> ZM-41/70	average 50%-60%
ZM-30 -> ZM-*2	average 80%-100%
ZM-41/70 -> ZM-*2	average 20%

- ◆ Depending on the font used on the ZM-*2, the amount of screen data that can be downloaded varies.

The amount of screen data that can be stored when each font is used is as follows:

	Memory Cassette		
	None	2MB	4MB
Japanese 1	1,179,648	3,260,416	5,357,568
Japanese 2	786,432	2,867,200	4,964,352
English	1,441,792	3,522,560	5,619,712
Korean	1,310,720	3,391,488	5,488,640
Chinese (Simplified)	1,179,648	3,260,416	5,357,568
Chinese (Classical)	1,310,720	3,391,488	5,488,640

(Unit: bytes)



When screen data exceeds the maximum capacity during conversion, a “total byte error” occurs. If this happens, decrease the amount of screen data by decreasing the number of screens, etc.

Furthermore, if you go ahead and transmit without decreasing screen data, a “transmission cannot occur because screen data is too large” message is displayed.

Conversion From ZM-30

Outline of the ZM-30 Conversion

It is possible to convert a Control Terminal ZM-30 screen data file into a usable ZM-41/70 or ZM-*2 screen data file.

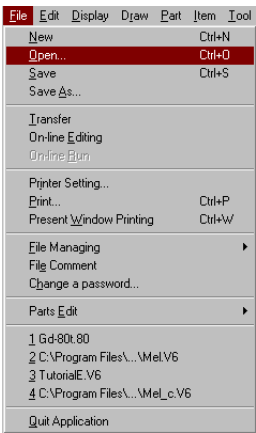
Conversion is performed automatically so that the conditions for use on the ZM-30 remain the same after the file is converted.

Consequently, one might notice a slight change in the file settings after conversion has taken place.

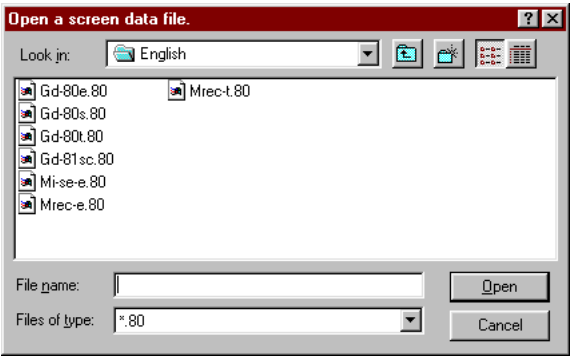
Conversion Method

The conversion method is described below.

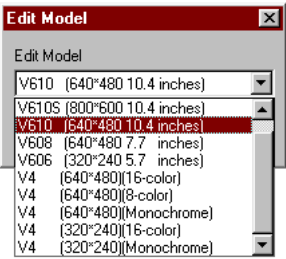
1. Go to the [File] menu and click [Open].



2. The [Open Screen Data File] dialog is displayed.
Change the [File Type] to [*.*80].



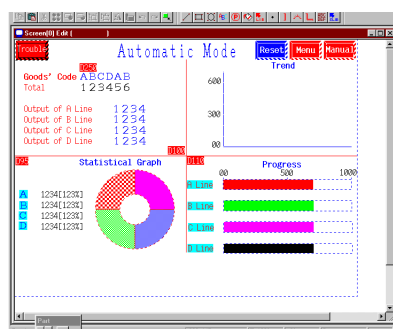
3. Specify the ZM-30 screen data file to convert and click [Open]. The [Edit Model] dialog is displayed.



4. Select the model that will be used after conversion and click [OK].

Depending on the model selected, a conversion will be made to either a ZM-41/70 or a ZM-*2 screen data file.

A ZM-30 screen file is converted to a ZM-41/70 screen file and displayed on the screen.



Details of Conversion from ZM-30 to ZM Series

◆ Screen size

640 X 400 dots → 640 X 480 dots/800 X 600

- * **For a 640 X 480 machine, a 80-dot vacant space will be created on the bottom of the screen.**

For a 800 X 600 machine, a 160-dot vacant space will be created on the right of the screen, and a 200-dot vacant space will be created on the bottom of the screen.

◆ System settings

◎ Communication parameters

Baud rate 2400 bps, 1200 bps → 4800 bps

Read/Write area ZM-30 Compatible → Checked (☑)

- * **However, bit 12 (overlap) of the read area n + 1 will be [Edge], not [Level].**

◎ When the universal serial is in use

Reading area converted to \$u4000.

Write area converted to \$u4016.

Calendar area converted to \$u4032.



For detailed information on the read/write area, refer to Chapter 2, "System Settings" on page 2-24.

Note

When converting ZM-30 data into ZM-*2 data, screen library can not be converted.

◆ Screen

Screen with only background color → Data is deleted

Screen with only background graphics → Present

Screen with both background color and graphics → Present

◆ Overlap

◎ Normal overlap

The normal overlap screen created in the DIV 0, which is also created on a screen with no data set on its base screen, is registered with the same number as the ZM-30 screen number in multi-overlap edit.

In any other case (data is set on the base screen or stored someplace other than DIV 0), the overlap is registered on the screen as [Type: Normal].

- * **When the [Background Library Setting] is set on the overlap screen, [Graphic Call] is set in the upper left corner of the overlap parts.**

◎ Multi-overlap

The multi-overlap is stored as [Type: Multi] in overlap No. 0 on the screen.

◆ Switch/Lamp

◎ Frame type: graphics

[Graphic Call] is automatically set on the screen for creating/editing switch/lamp parts.

◎ Function: Multi-overlap

The check is removed from the check box for [MLIB Placement]. “0” is set for the auxiliary item [Overlap No.]. The number of the screen of the ZM-30 where the normal overlap screen was created is set for [Multi No.]. There is no need to specify [Select Key Pad], which was needed in the ZM-30.

◎ Function: Input (ZM-30: Keypad switch)

0 to 9	->	Char. Entry
ENT (writing)	->	Write
CLR (clear)	->	Clear
-/+ (inverted sign)	->	Toggle Sign
. (decimal point)	->	Char. Entry
UP (up)	->	UP
DWN (down)	->	DW

◎ Function: Memory card (ZM-30: Memory card switch)

Up within list	->	Roll down
DW within list	->	Roll up
Selection complete	->	(No function)

◎ The following become [Output Memory] checked (☑) in the ZM Series:

Normal

Block

+ Block -> Output action: Momentary

- Block

Mode

Bit operation	Set	->	Set
	Reset	->	Reset
	Momentary	->	Momentary
	Alternate	->	Alternate

◆ Relay mode

- ⊙ [Relay Information Output] is [Yes]. Depending on which division number is set, information is output from the following addresses:

DIV 0	Write area n + 5
DIV 1	Write area n + 8
DIV 2	Write area n + 11
DIV 3	Write area n + 14

- ⊙ The display area part is placed in the same division as the [Relay] dialog.
- ⊙ The character properties of the relay are set as [Type: Normal], [With Transparent] (unchecked). The [Char. Color] is the same color as the color for the ZM-30 [Display].

◆ Relay-sub mode

- ⊙ The [Link Division No.] takes the same number as the division number of the relay mode which is placed on the same screen.
- ⊙ The display area part is placed in the same division as the [Relay Sub] dialog.
- ⊙ The character properties of the relay are set as [Type: Normal], [With Transparent] (unchecked). The [Char. Color] is the same color as the color for the ZM-30 [Display].

◆ Page mode/Direct mode

- ⊙ Both are converted to the message mode.
- ⊙ The display area part is placed in the same division as the [Message] dialog.

◆ Keypad mode

- ⊙ The keypad mode is converted to the entry mode.
- ⊙ The contents of [Command Memory] are the same as they were for the ZM-30.
- ⊙ The write area n + 2 is automatically specified for [Info. Out Mem].
- ⊙ For [HEX Key: Yes], the [Use Graphics] in the [Detail] tab window is checked and the graphic numbers corresponding to [Start / End Graphics] are used.
- ⊙ The [Default to 0] in the [Detail] tab window is unchecked.

⊙ Type: Direct

The write area n + 2 is automatically specified for [Info. Out Mem]. The subsequent functions in the [Main] tab window become ineffective.
For displaying numerals on the screen, the [Display Function: No] is set.

⊙ Type: Indirect

- [Type: Display Data] is set.
- [Write Memory: Out Memory] is set.
- [Input Item Select: External] is set.
- When [ZM-30 Compatible] is checked (☒) and there is an overlap on the previous ZM-30 screen, the division number for the overlap of the ZM-30 is set. When there is no overlap, "4" is set.

*** Users should not change this item.**

- To display numerals on the screen, the [Display Function: Entry Target] is set and the number combining the division number of the ZM-30 and data display numbers is automatically set in [Order].

Data display conversion for [Type: Indirect]

ZM-30		ZM-41/70
DIV. No.	Data No.	Selected Order
0	0-31	0-31
1	0-31	32-63
2	0-31	64-95
3	0-31	96-127

◎Type: Block

- [Type: Block] is set.
- [Target Memory: Out Memory] is set.
- [Input Item Select: Internal] is set.
- The settings for the keypad block are set in DIV 4 as settings for the data block area mode. The [+ Block] switch and the [- Block] switch are set in DIV 4 as well.
- When [Entry Display: Setting] and [Range Display: checked] have been set for the GD-80, both settings will be set in the division of the entry mode as the [Display Function: Entry Display] and [Display Function: Max. (Min.) Display] parts.
- * **Settings other than [Digits: 1], [Type: Normal] and [Italic: No] are set the same as those for the ZM-30.**
- [Data Block Area] mode settings.

Division No.	: 4
Commands	: Internal
Initial Block, Min. Block	: (Set the number of [Start].)
Max. block	: Same as above
Item Select	: Unchecked

(If necessary, take the same memory as the [Memory] n + 1 in the [Entry] dialog and set “two words.”)

GD-80 Compat.	: Yes

◎Type: Block Direct

- [Type: Block] is set.
- [Target Memory: Direct] is set.
- [Input Item Select: Internal] is set.
- The settings for the keypad block are set in DIV 4 as settings for the data block area mode. The [+ Block] switch and the [- Block] switch are also set in DIV 4.
- When [Entry Display: Setting] and [Range Setting: checked] have been set for the ZM-30, both settings will be set in the division of the [Entry] mode as [Display Function: Entry Display] and [Display Function: Max. (Min.) Display].
- * Settings other than [Digits: 1], [Type: Normal] and [Italic: No] are set the same as those for the ZM-30.

- Data block area mode settings

Division No. : 4

Command : (The same as the keypad block commands
for the ZM-30.)

- * **When the command is [Command: External], the settings for the [Block No. Reading Memory] are the same as for [Command Memory] in the [Entry] dialog.**

Items Select : unchecked

(Specify the same memory as the memory $n + 1$ in the [Entry] dialog
and choose [2-word].)

ZM-30 Compat. : Yes

⊙Type: Multi

- [Type: Block] is set.
- [Target Memory: Direct] is set.
- [Input Item Select: Internal] is set.
- The settings for the keypad block are made in DIV 4 as settings for data block area mode. The [+ Block] switch and the [- Block] switch are set in DIV 4 as well.
- Data block area mode settings

Division No. : 4

Command : (The same as the keypad block commands
for the ZM-30.)

- * **When the command is [Command: External], the settings for [Block No. Read (Memory)] are the same as those for [Memory] in the [Entry] dialog. When the overlap screen containing the keypad is stored in another screen and multi-overlap is in use, this [Block No. Read (Memory)] is temporarily set in the [\$u4000 (internal memory)]. Be sure to change it from “\$u4000” to “(Keypad) Memory n.”**

Item Select : unchecked

(Specify the same memory as the memory $n + 1$ in the [Entry] dialog
and choose [2-word].)

ZM-30 Compat.: Yes

- * **The characters in the keypad [0] to [9] and [.] are converted to the drawing characters on the screen. [0] to [9] and [.] are also stored in [Char. Entry...] in the [Switch] dialog in one-byte character format. The characters within the switch are placed off the screen so that they do not cover the drawing characters.**

◆ Character Entry mode

- ⊙It is converted to the entry mode.
- ⊙[Type: Data Display] is set.
- ⊙The contents of [Memory] is the same as the ZM-30.
- ⊙The write area $n + 2$ is automatically specified for the [Info. Out Mem].
- ⊙[Target Memory: Direct] is set.
- ⊙[Input Item Select: Internal] is set.

- ⊙ [Use Graphics] in the [Detail] tab window is checked and contains the graphic number corresponding to [Start Graphics] and [End Graphics].
- ⊙ [Default to 0] in the [Detail] tab window is unchecked.
- ⊙ For the displayed characters, the same number as the [Entry] mode dialog is set for [Division No.], and [Display Function: Entry Target] is set.

◆ Graph mode

When the drawing for the bar graph or panel meter part which the [Point] was set in the ZM-30 is created in the ZM-41/70, scales are automatically attached. (The [Short Axis Length] is “4.”)

◆ Trend mode

- ⊙ It is displayed in a graph.
- ⊙ The beginning memory of the No. 0 of the ZM-30 is set in [Control Memory] of the ZM-41/70. The beginning memory $n + 1$ for each of the graph numbers of the ZM-30 are set in the memory for each graph number of the ZM-41/70.
- ⊙ For [Frame: Yes], the frame is automatically drawn when the drawing is created for the trend graph part. However, the frame is drawn larger than the ZM-30's by one dot in each direction.
The display directions are...

[up]	: X-1, Y+1
[down]	: X-1, Y-1
[right]	: X-1, Y+1
[left]	: X+1, Y+1
- ⊙ When [Library] is specified, the corresponding graphic is drawn by [Graphic Call] in the ZM-41/70.

◆ Statistics graph mode

- ⊙ It is displayed in a graph.
- ⊙ One division of the ZM-30 can contain four different graphs. ZM-41/70 supplies four different division numbers to these graphs as below.

DIV No.	0				1				2				3			
Graph No.	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
V DIV No.	0	10	11	12	1	20	21	22	2	30	31	32	3	40	41	42

- ⊙ For [Achievement: Yes], the display numeric part for [Display Function: No] is set in the same division number as the statistics graph. The memory for the numerical display part is automatically set corresponding to [Memory] for the statistics graph.
- ⊙ When [%: Yes], the numerical display parts for [Display Function: Display Statistics Graph %] are set in the same division number as the statistics graph.

◆ Sampling mode

- ⊙ Trend sampling
 - The conversion process is the same as the [Trend] mode.
 - The numerical display part for [Display Function: Display Sample Count], [Digits: 3] and [Character Type: 1/4] is set at the position to display the counts of sampling.

⊙ Data sampling

The count is not displayed.

⊙ Buffering area settings

For [Mode: BSMPL (bit sampling)], the [Sampling Type: Bit Sampling] is set for ZM-41/70. The [Sampling Time] that is necessary for ZM-41/70 is automatically set at “5” seconds.

◆ Display data

⊙ For [Receiving Type: Display Character], the data is converted to the display characters part in the ZM-41/70.

⊙ For [Receiving Type: Calendar], the data is converted to the calendar mode in ZM-41/70. The characters of messages for the day of the week in the ZM-30 are not converted and not stored in the [Message Settings] in the [Calendar] dialog of ZM-41/70. The user is requested to store the message for the day of the week separately.

⊙ For [Receiving Type: KeyPad Block], the data is stored in division 4 as the [Data Block Area] mode.

◆ Keypad block

⊙ The keypad block is set in the data block edit. All display data in it becomes [Display Function: Entry].

⊙ In the [Detail] tab window in the dialog of all display data, [Alarm: Yes] is set. Both [Max. Value Color] and [Min. Value Color] automatically become the same color as that for [Char. Color] in the [Char. Prop.] tab window.

◆ Graphic library edit

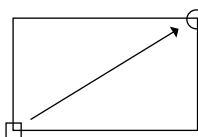
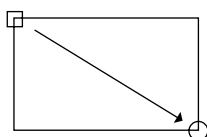
⊙ Parameters

For the ZM-30, the parameters for the square drawn in the graphic library differ with how the square is drawn.

*** Besides the “square paint” and the “bold square”:**

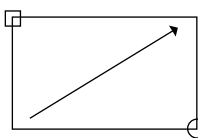
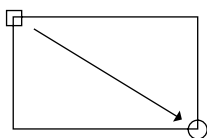
For both squares drawn in the ZM Series, the start point is the upper left and the end point is the lower right.

For the left square, the start point is the upper left; the end point, the lower right.



For the right square, the start point is the lower left; the end point, the upper right.

For the ZM-41/70, the [Start Point] is the upper left; the [End Point], the lower right, however the square is drawn.



Converting From ZM-41/70

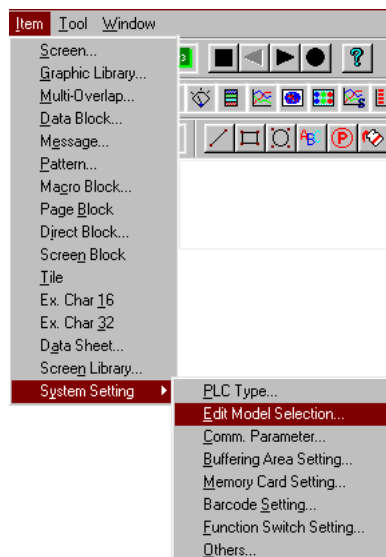
Outline of ZM-41/70 Conversion

It is possible to convert a ZM-41/70 screen data file into a usable ZM-*2 screen data file. Conversion is performed automatically so that the conditions for use on the ZM-41/70 remain the same after the file is converted.

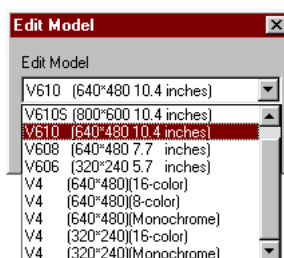
Conversion Method

The conversion method is shown below.

1. Open the ZM-41/70 screen data file that you want to convert.
2. Go to the [Edit] menu and select [System Setting].
3. Click on [Edit Model Selection]. The [Edit Model] dialog is displayed.



4. Select the model to be used after conversion and click [OK]
The file is converted to a ZM-*2 screen data file.



Notes on Conversion from ZM-41/70

Overlap

◎Size limits

The max. overlap size of ZM-41/70 is 741,376 bytes.

The max. overlap size of ZM-52D is 675,840 bytes.

If the ZM-41/70 screen data which has some overlaps is converted into the ZM-52D screen data, there is some possibility that overlap is not displayed normally on ZM-52D because of the differences of the max. overlap size between ZM-41/70 and ZM-52D. For more information about the size limits of overlap, refer to page 4-18.

Switch

◎The ZM-*2 has analaog type switches. (In the ZM-41/70: digital type)

◎Switch output

In the ZM-41/70, the switch output can be specified for [1 Output] or [2 Output].

In the ZM-*2, only one switch can be pressed. However, if under [Function Switch Setting], pressing two different function switches is permitted.

If the ZM-41/70 screen data which is set as [2 Output] is converted into the ZM-*2 screen data, all the switches on ZM-*2 except the function switches never be set simultaneously.

◎[Function : ICON2]

In the ZM-*2, switches do not have the function [ICON2].

When the [Function : ICON2] switch is converted into ZM-*2, the [Function] is changed into [ICON].

RUN/BZ signal

The ZM-41/70 has RUN input and RUN/BZ outputs in the terminal blocks.

The ZM-*2 does not have the above terminal blocks. The setting menu for RUN/BZ port does not exist in case of ZM-*2 data.

Converting a Parts File

Outline of Parts File Conversion

Convert a ZM-41/70 parts file to a usable ZM-*2 parts file.

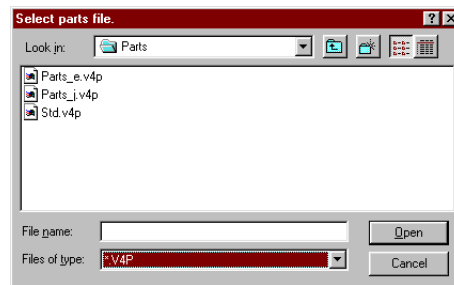


Depending on the conversion, the file size may increase as much as 20%.

Conversion Method

The conversion method is described below.

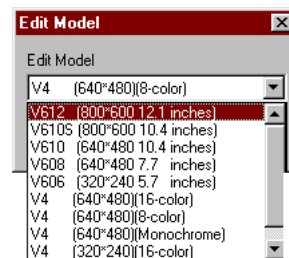
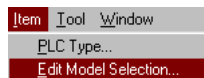
1. Go to the [File] menu, select [Parts Edit] and click on [Open]. The [Select Part] dialog is displayed.



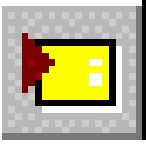
2. In the [Select Part] dialog, change the [Part Model] to [*.zmp] and click [OK].
3. The [Part Edit] dialog is displayed. Here, the part model is not important; just click [OK]. The part edit window is displayed.



4. Go to the [Edit] menu and click on [Edit Model Selection]. The [Edit Model] dialog is displayed.



5. Change the model type to one from the ZM-*2 series. (As long as it is a ZM-*2 series model, any one is acceptable.) After conversion, click [OK]. The dialog disappears and the extension of the part file name on the title bar becomes [.z7p].



Data Transference

Data Transfer to ZM-*2

Screen data created on a computer can be transferred to the ZM-*2 or to a ZM-1REC (memory card).

Preliminaries

Data Transferring Cable

When transferring data from a computer to the ZM-*2, use Sharp's ZM-80C cable.

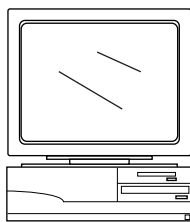


The ZM-80C cable is equipped with a conversion connector. Use the cable without the conversion connector for a DOS/V computer.

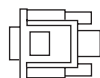
ZM-*2 and Computer Connection

Connect the ZM-80C cable to the D-sub 25-pin connector on the back of the ZM-*2 when connecting the ZM-*2 to a computer.

Personal computer



D-sub 9pin



ZM-80C

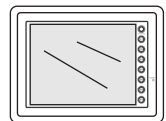


MJ1



Modular
8pin

ZM-*2 series

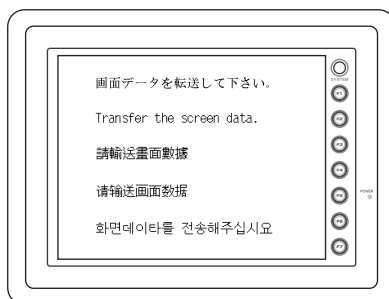


The screen data transfer port for the ZM-*2 is "MJ1."

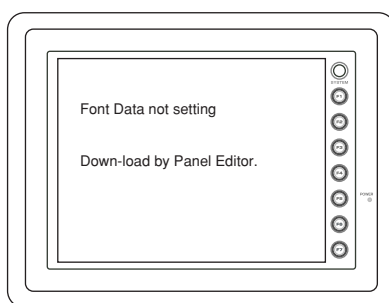
ZM-*2 Preparation

When the ZM-*2 is first turned on after being unpacked, the following screen is displayed. Start data transfer to the ZM-*2 in this state.

*** When a screen data file has been transferred to the ZM-*2, the following screen does not appear.**



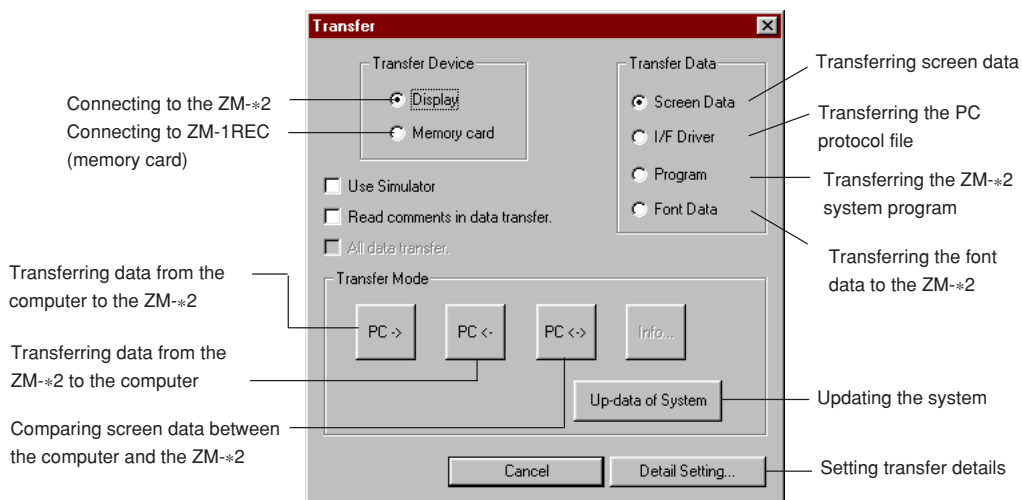
*** If the data transfer to the ZM-*2 is aborted, the following screen appears. Transfer the data again.**



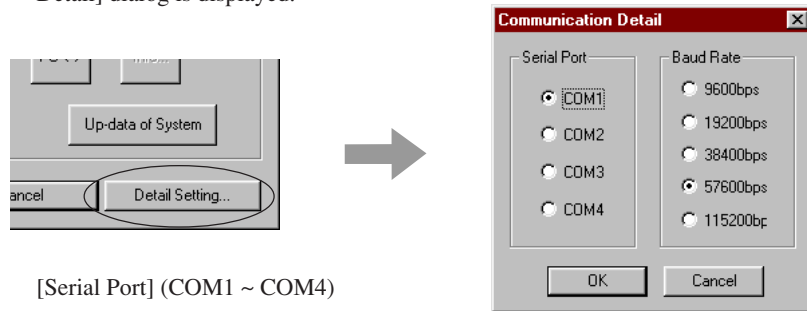
Transferring Procedure

The transferring procedure on the editor is as follows:

1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.



2. The transfer details must be set. Click [Detail Setting]. The [Communication Detail] dialog is displayed.



[Serial Port] (COM1 ~ COM4)

Choose the computer port.

[Baud Rate] (9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps)

Choose the data transfer rate between the computer and the ZM-*2.

(This option is not used for setting data transfer rate between PC and the ZM-*2.)

*** The baud rate at 115,200 bps is not used for all computers. Choose [57600 bps] in such a case.**

3. After setting, click [OK]. Go back to the [Transfer] dialog.

Transferred Data

Four kinds of files can be transferred to the ZM-*2.

Ⓐ Screen data

ZM-*2 screen data

Ⓑ PC protocol file (= I/F driver file)

Choose and transfer the I/F driver file appropriate for the PC model (specified for the screen data).

Ⓒ ZM-*2 system program

The system program depends on the model of the ZM-*2 series.

Ⓓ Font data

Font data to be displayed on the ZM-*2

Screen Data Transfer

Screen data can be transferred in the following ways:

- Ⓐ Transfer from the computer to the ZM-*2 (downloading)
- Ⓑ Transfer from the ZM-*2 to the computer (uploading)
- Ⓒ Transfer for data comparison between the computer and the ZM-*2
- Ⓓ System updating

Data Transfer From the Computer to the ZM-*2

1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.

2. Choose [Display] for [Transfer Device], and [Screen Data] for [Transfer Data].
Uncheck [Use Simulator] and [Read comments in data transfer.].



[Use Simulator]

With the simulator software provided, screen data in the RUN state can be checked between the ZM-*2 and a computer, without connecting the ZM-*2 to PC.

[Read comments in data transfer.]

Check this option for transferring screen data from the ZM-*2 to the computer.

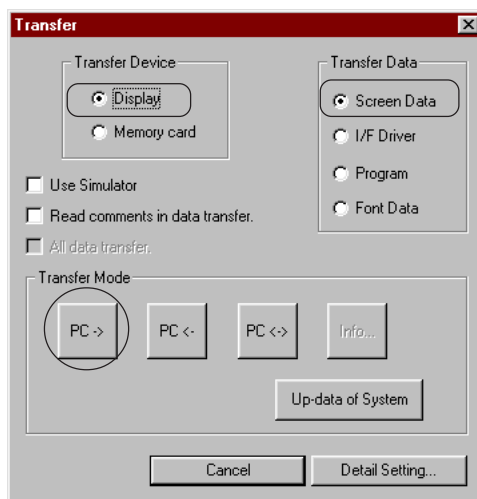
If a screen data file has comments on screens or graphics, the comments are not transferred to the ZM-*2 during data transfer. The comments remains in the screen data file stored in the computer.

The next time data is transferred from the ZM-*2 to the computer, the comments in the screen data file will be deleted by overwriting.

By checking [Read comments in data transfer.], the comments will not be deleted from the screen data file.

3. Start the data transfer.

Click [PC ->] for [Transfer Mode]. Data is transferred.

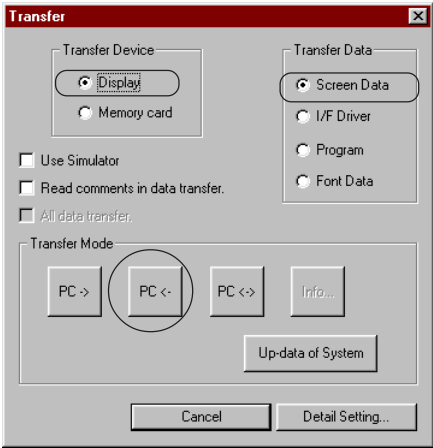


4. The message, “Transferring Data” is displayed on the local main screen of the ZM-*2 during the data transfer, and it disappears when the transfer is complete.

Data Transfer from the ZM-*2 to the Computer

1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
2. Choose [Display] for [Transfer Device], and [Screen Data] for [Transfer Data].

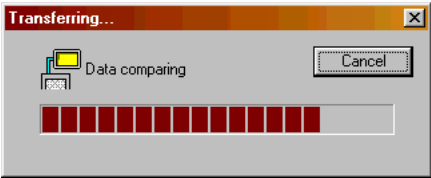
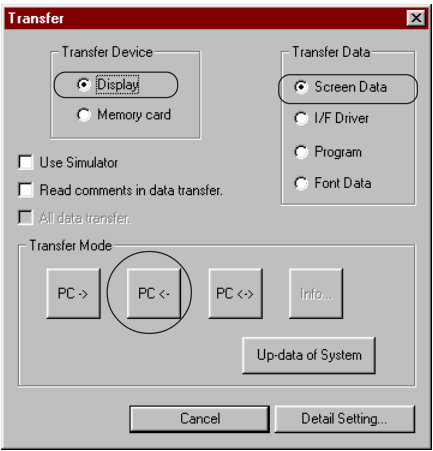
3. Start the data transfer.
Click [PC <-] for [Transfer Mode]. Data is transferred.



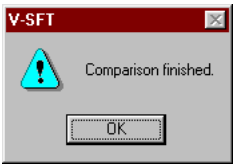
4. The message, “Transferring Data” is displayed on the local main screen of the ZM-*2 during the data transfer.
5. Data from the ZM-*2 is displayed on the editor screen when the transfer is complete.

Data Comparison between the Computer and the ZM-*2

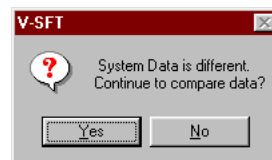
1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
2. Choose [Display] for [Transfer Device], and [Screen Data] for [Transfer Data].
3. Start the data comparison.
Click [PC <->] for [Transfer Mode]. Comparison starts.
4. The message, “Transferring Data” is displayed on the local main screen of the ZM-*2 during the data comparison. The dialog showing “Data comparing” appears on the editor screen.



5. When the comparison is complete and no discrepancy is found between the ZM-*2 data and the computer data, the following message appears on the editor screen.



If a discrepancy is found, the message as shown on the right appears halfway through the data comparison.



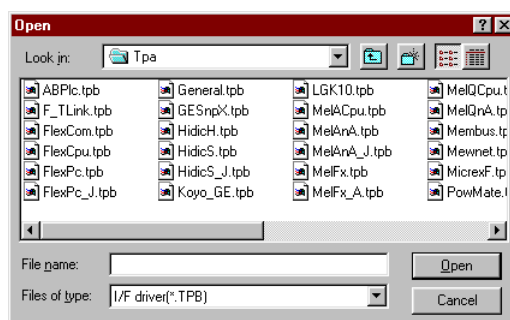
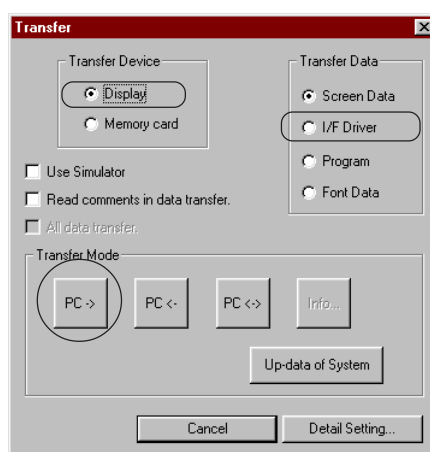
PC Protocol File (= I/F Driver File) Transfer



Transfer the PC protocol file (to be referred to as “I/F driver file” hereafter) when the editor version is updated.

Choose and transfer the I/F driver file (with extensions “.TPB”) appropriate for the PC model connected to the ZM-*2.

1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
2. Choose [Display] for [Transfer Device], and [I/F Driver] for [Transfer Data].
3. Start the data transfer.
Click [PC ->] for [Transfer Mode].
4. The [Open] dialog is displayed.



Choose the required I/F driver file and click [Open].

*** For PC models and I/F driver file names, refer to page 27-16.**

5. Transfer starts. The message, “Transferring Data” is displayed on the local main screen of the ZM-*2 during the data transfer. The dialog showing “I/F driver transferring” appears on the editor screen.
6. The version of the transferred I/F driver file is displayed on the screen when the transfer is complete .

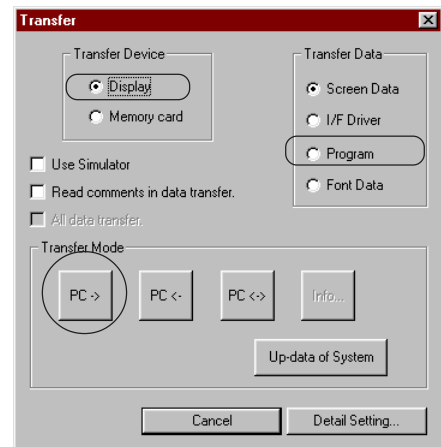
Font Data Transfer

The font data to be displayed on the ZM-*2 is automatically transferred with screen data files. Therefore, transferring operation for font data is not normally necessary.

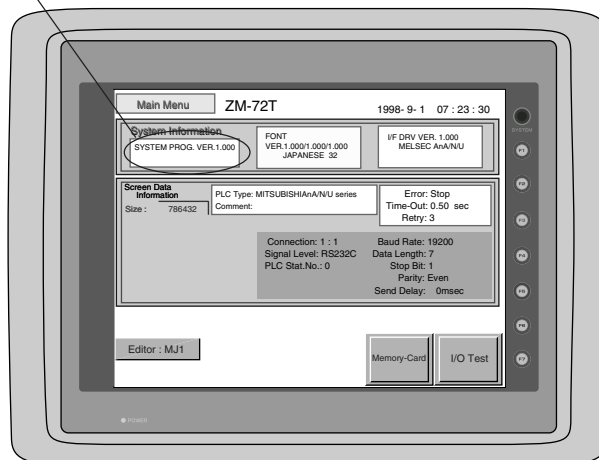
ZM-*2 System Program Transfer

When the ZM-*2 system program has been updated, it is necessary to transfer the program to the ZM-*2. Choose and transfer the program file (with extensions “.PRG”) for the ZM-*2.

1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
2. Choose [Display] for [Transfer Device], and [Program] for [Transfer Data].
3. Start the data transfer.
Click [PC ->] for [Transfer Mode].



4. The [Open] dialog is displayed.
Choose the required program file and click [Open].
5. Transfer starts. The message, “Transferring Data” is displayed on the local main screen of the ZM-*2 during the data transfer.
6. The version of the transferred program is displayed on the screen when the transfer is complete.



Never turn off the ZM-*2 during the system program transfer.

System Updating

[Up-date of System] is used to update the system.

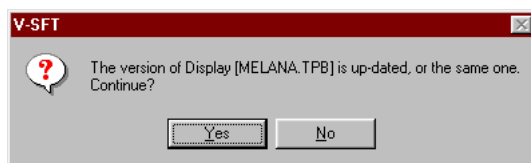
When the editor software has been updated, the system program file and the I/F driver file to be transferred to the ZM-*2 need to be updated as well. By executing [Up-date of System], all the necessary files (except screen data files) for the V6 are updated simultaneously.



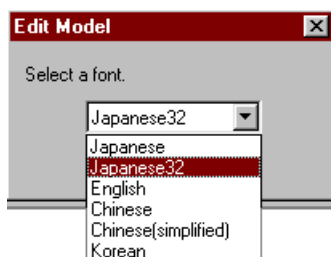
All necessary data is transferred to the ZM-*2 at one time by executing [Up-date of System]. The transfer takes a very long time.

Follow these steps:

1. Click [Up-date of System] in the [Transfer] dialog. The transfer starts.
2. If the same program, or a more recent version of the program being transferred, already exists in the ZM-*2, the following message appears. By clicking [No], the transfer is canceled and the next program is transferred.



3. When the font selection dialog as shown below appears, choose a font to be displayed on the ZM-*2. For more information, refer to page 2-18 in Chapter 2, "System Setting."



4. The ZM-*2 returns to the original state when the transfer is complete.



Never turn off the ZM-*2 during the system updating.

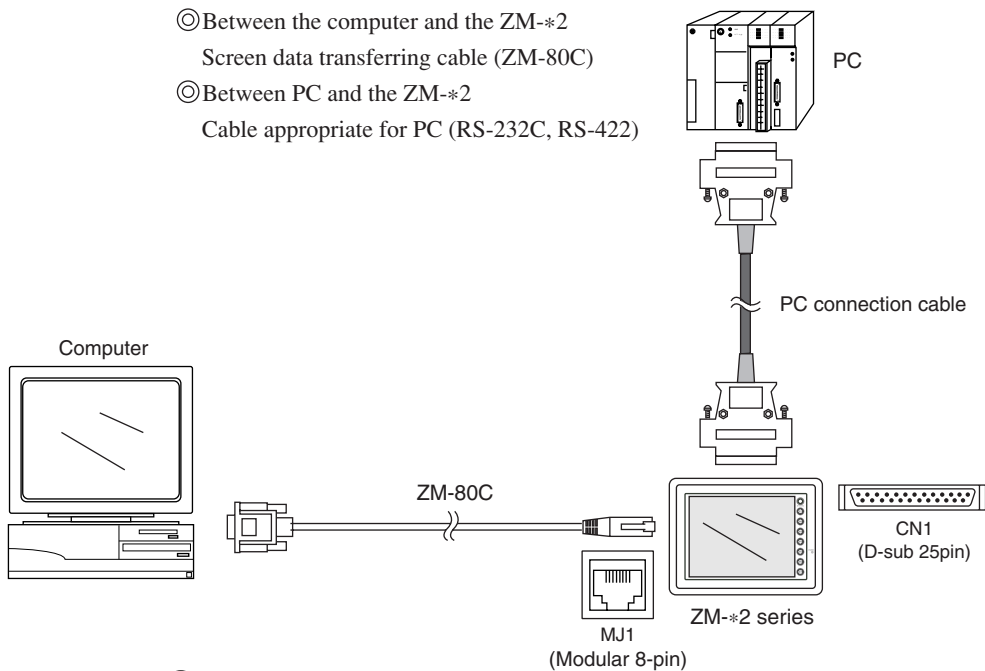
On-line Editing

Screen data files can be edited on the computer while the ZM-*2 is communicating with PC. Since only modified screen data is transferred to the ZM-*2, transfer time is shortened.

Preliminaries for On-line Editing

Connect the ZM-*2, the computer, and PC using the cables as shown below:

- ① Between the computer and the ZM-*2
Screen data transferring cable (ZM-80C)
- ② Between PC and the ZM-*2
Cable appropriate for PC (RS-232C, RS-422)

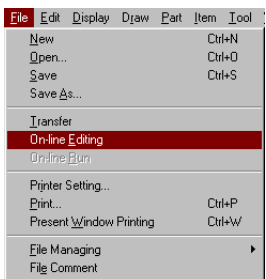


When [Editor port] is chosen for [Modular Jack 1] in the [Others] dialog opened from [System Setting], the RUN/local main mode can be changed on the ZM-*2 side automatically.

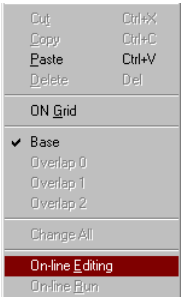
On-line Editing Procedure

On-line editing is performed in screen editing. Open the desired screen data file in advance.

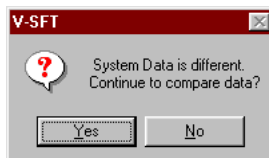
1. Select [On-line Editing] from the [File] menu. Or, right-click the mouse and choose [On-line Editing] from the pop-up menu.



Or right-click.



2. If there is a discrepancy between the screen data in the ZM-*2 and the screen data being edited on the computer, the following inquiry dialog appears. When no discrepancy is found, on-line editing is started (step 4).



3. If transferring the screen data to the ZM-*2 is allowed, click [Yes].
On-line editing is started after the data transfer.
4. After on-line editing is started, the [ON-line RUN] icon become active.



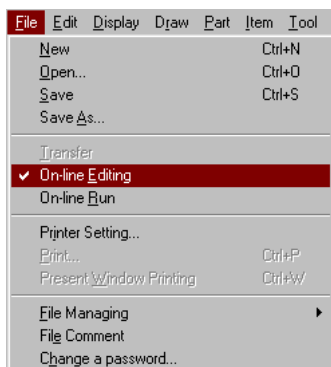
5. When the screen or window is changed during on-line editing, the modified data is automatically transferred from the computer to the ZM-*2.
6. Aside from the automatic transfer mentioned above, you can transfer modified data by clicking [On-line RUN] icon.

Escaping from On-line Editing

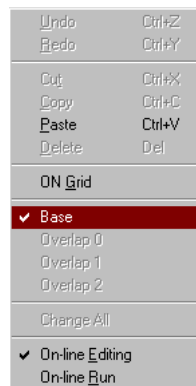
When escaping from on-line editing and going back to normal editing, the procedure is the same as used for starting on-line editing.

Select [On-line Editing] from the [File] menu, or right-click the mouse and choose [On-line Editing] from the pop-up menu.

The [On-line RUN] icon becomes inactive in the tool bar.



Or right-click.



Data Transfer to ZM-41/70

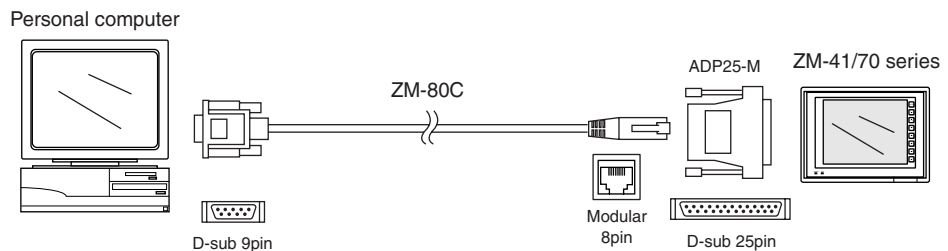
Screen data created on a computer can be transferred to the ZM-41/70 or to a ZM-1REC.

Preliminaries

Data Transferring Cable and Connection

◎ When a ZM-80C cable is used:

Use the ADP25-M conversion connector attached to ZM-80C for connection between the modular jack and the D-sub 25-pin connector (male) for the ZM-41/70. Such a conversion connector is not necessary for a DOS/V computer.

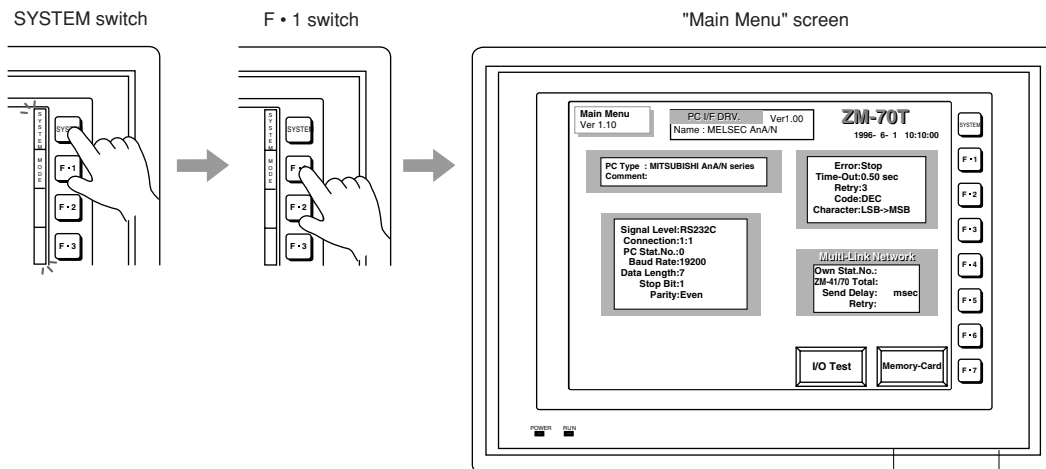


Use "CN1" for the ZM-41/70, and use "CN2" for the ZM-41D/L.

ZM-41/70 Preparation

Bring up the local main screen on the ZM-41/70.

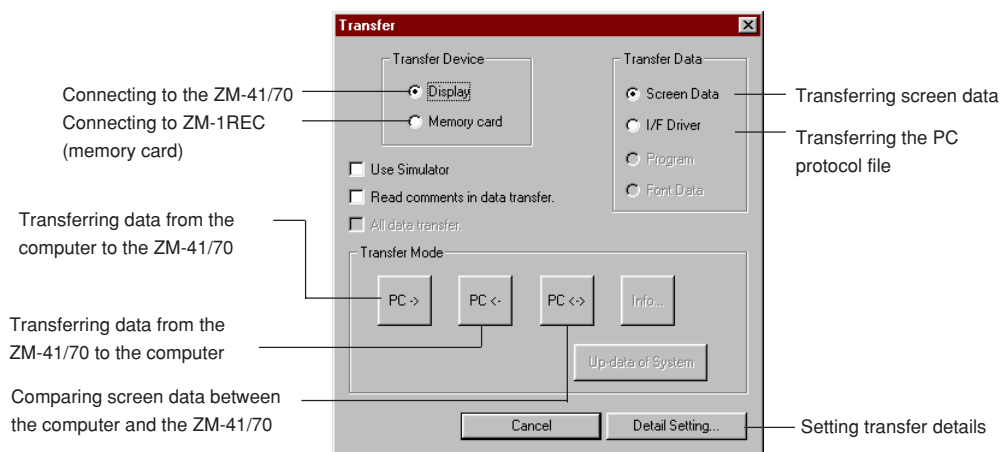
Press the [SYSTEM] switch and then press the [F • 1] switch on the right side of the ZM-41/70 panel. The local main screen appears. The ZM-41/70 is brought to the STOP state.



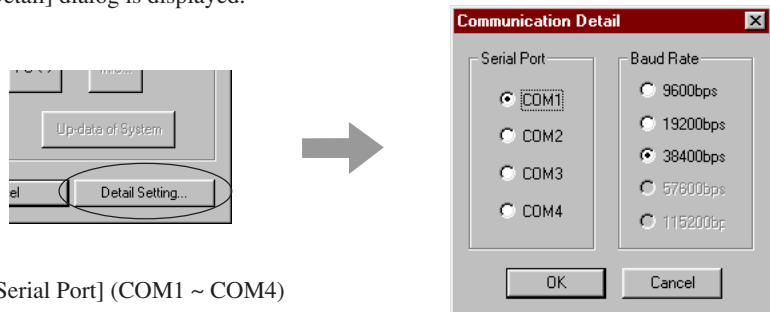
Transferring Procedure

The transferring procedure on the editor is as follows:

1. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.



- The transfer details must be set. Click [Detail Setting]. The [Communication Detail] dialog is displayed.



[Serial Port] (COM1 ~ COM4)

Choose the computer port.

[Baud Rate] (9600 bps, 19200 bps, 38400 bps)

Choose the data transfer rate between the computer and the ZM-41/70.

*** This option is not used for setting the data transfer rate between PC and the ZM-41/70.**

- After setting, click [OK]. Go back to the [Transfer] dialog.

Transferred Data

Two kinds of files can be transferred to the ZM-41/70.

Ⓢ Screen data

ZM-41/70 screen data

Ⓢ PC protocol file (= I/F driver file)

Choose and transfer the I/F driver file appropriate for the PC model (specified for the screen data).

Screen Data Transfer

Screen data can be transferred in the following ways:

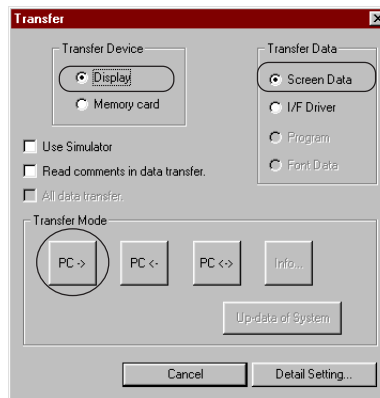
- Ⓢ Transfer from the computer to the ZM-41/70 (downloading)
- Ⓢ Transfer from the ZM-41/70 to the computer (uploading)
- Ⓢ Transfer for data comparison between the computer and the ZM-41/70

Data Transfer From the Computer to the ZM-41/70

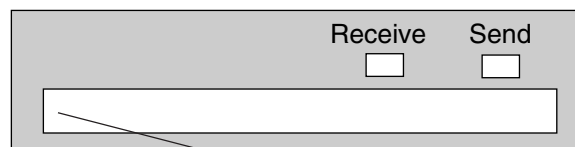
- Check that the local main screen is displayed on the ZM-41/70.
- Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
- Choose [ZM-41/70] for [Transfer Device], and [Screen Data] for [Transfer Data].
Uncheck [Use Simulator] and [Read comments in data transfer].
For more information on [Use Simulator] and [Read comments in data transfer.], refer to page 27-4.

4. Start the data transfer.

Click [PC ->] for [Transfer Mode]. Data is transferred.



5. The main local screen of the ZM-41/70 indicates the data transferring state during the data transfer. The [Receive] and [Send] lamps light up alternately.



"Flash ROM programming" is displayed in the window, and then disappears when the data transfer is complete.

6. "Flash ROM programming" is displayed in the window, and then disappears when the data transfer is complete.

Data Transfer from the ZM-41/70 to the Computer

1. Check that the local main screen is displayed on the ZM-41/70.

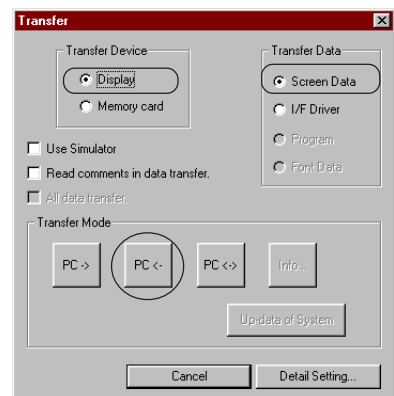
2. Select [Transfer] from the [File] menu.

The [Transfer] dialog is displayed.

3. Choose [ZM-41/70] for [Transfer Device], and [Screen Data] for [Transfer Data].

4. Start the data transfer.

Click [PC <-] for [Transfer Mode]. Data is transferred.



5. The main local screen of the ZM-41/70 indicates the data transferring state during the data transfer. The [Receive] and [Send] lamps light up alternately.
6. Data from the ZM-41/70 is displayed on the editor screen when the data transfer is complete.

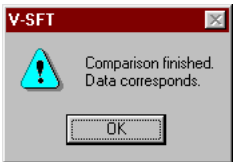
Data Comparison between the Computer and the ZM-41/70

- 1. Check that the local main screen is displayed on the ZM-41/70.
- 2. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
- 3. Choose [ZM-41/70] for [Transfer Device], and [Screen Data] for [Transfer Data].
- 4. Start the data comparison.

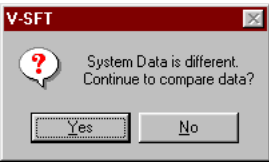
Click [PC <->] for [Transfer Mode]. The comparison starts.

- 5. The main local screen of the ZM-41/70 indicates the data transferring state during the data comparison. The dialog showing “Data comparing” is displayed on the editor screen.

- 6. When the comparison is complete and no discrepancy is found between the ZM-41/70 data and the computer data, the following message appears on the editor screen.



If a discrepancy is found, the message as shown below appears halfway through the data comparison.



PC Protocol File (= I/F Driver File) Transfer

Transfer the PC protocol file (to be referred to as “I/F driver file” hereafter) when the ZM-71SE version is updated.

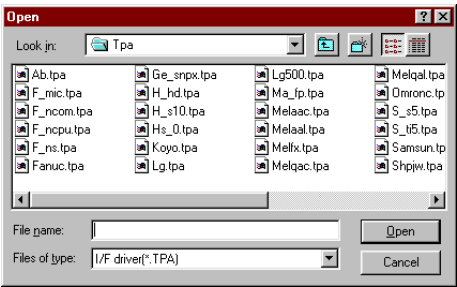
Choose and transfer the I/F driver file (with extensions “.TPA”) appropriate for the PC model connected to the ZM-41/70.

- 1. Check that the local main screen is displayed on the ZM-41/70.
- 2. Select [Transfer] from the [File] menu. The [Transfer] dialog is displayed.
- 3. Choose [ZM-41/70] for [Transfer Device], and [I/F Driver] for [Transfer Data].
- 4. Start the data transfer.

Click [PC ->] for [Transfer Mode].

- 5. The [Open] dialog is displayed.

Choose the required I/F driver file and click [Open].



**PC models and I/F driver names**

For ZM-*2(.TPB)

For ZM-41/70 (.TPA)

* For more information,
refer to the hardware
specifications.

SHARP	JW Series		
SHARP	JW100/70H COM Port	Sharp	Shpjw
SHARP	JW20 COM Port		
MITSUBISHI	AnA/N/U series	MELANA	Melaal
MITSUBISHI	QnA Series	MELQNA	Melqal
MITSUBISHI	ACPU Port	MELACPU	Melaac
MITSUBISHI	FX Series	MELFX	Melfx
MITSUBISHI	Net10	MELANA	Melaal
* MITSUBISHI	QCPU Port	MELQCPU	Melqac
MITSUBISHI	FX series (A prt)	MELFX_A	
MITSUBISHI	AnU/AnA/AnN (JPCN1)	MELANA_J	
OMRON	SYSMAC C	SYSMAC	Omronc
OMRON	SYSMAC C (JPCN1)	SYSMAC_J	
OMRON	SYSMAC CV series	SYSMACFS	
HITACHI	HIDIC-H	HIDICH	H_hd
HITACHI	HIDIC-S10/2alpha	HidicS	H_s10
HITACHI	HIDIC-S10/ABS		
HITACHI	HIDIC-S10 (JPCN1)	HIDICS_J	
MATSUSHITA	MEWNET	MEWNET	Ma_fp
YOKOGAWA	FA500	YOKOGAWA	Yg
YOKOGAWA	FA-M3		
YASKAWA	Memobus	MEMOBUS	Ymem
TOYOPUC		TOYOPUC	Toyopc
FUJI	MICREX-F Series	Micrex F	F_mic
FUJI	FLEX-PC Series	FLEXPC	F_ns
FUJI	FLEX-PC CPU	FLEXCPU	F_ncpu
FUJI	FLEX-PC COM	FLEXCOM	F_ncom
FUJI	FLEX-PC(T)	FLEXPC	F_ns
FUJI	FLEX-PC CPU (T)	FLEXCPU	F_ncpu
FUJI	MICREX-F T link	F_TLINK	
FUJI	FLEX-PC (JPCN1)	FLEXPC_J	
KOYO	SU/SG	KOYO_GE	Koyo
KOYO	SR-T		
KOYO	SR-T (K prt)	KOYO_K	
A. B	PLC-5	ABPLC	Ab
A. B	SLC500		
GE Fanuc	90 Series	KOYO_GE	Ge_snp
GE Fanuc	90 Series (SNP-X)	GESNPX	
TOSHIBA	T Series	TOSHIBA	Tshiba
TOSHIBA	TC200	TOSHIBAC	
SIEMENS	S5/S7	SIMS	S_s5
SHINKO	SELMART	MELANA	Melaal
SAMSUNG	SPC Series	SAMSUNG	Samsun
KEYENCE	KZ Series	SYSMAC	Omronc
LG	MASTER-K10/60/200	LGK10	Lg
LG	MASTER-K500/1000	LGK500	Lg500
FANUC	Power Mate	POWMATE	Fanuc
Universal serial (for simulator)		general	Hs_0
(for Simulator)		UNIPLC	Uniplc

6. Data transfer starts.

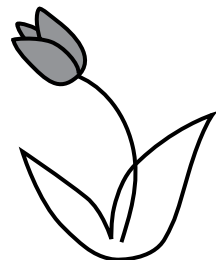
The main local screen of the ZM-41/70 indicates the data transferring state.

The dialog showing “I/F driver transferring” appears on the editor.

7. “Flash ROM programming” is displayed in the window, and then disappears when the data transfer is complete.

MEMO

Please use this page freely.





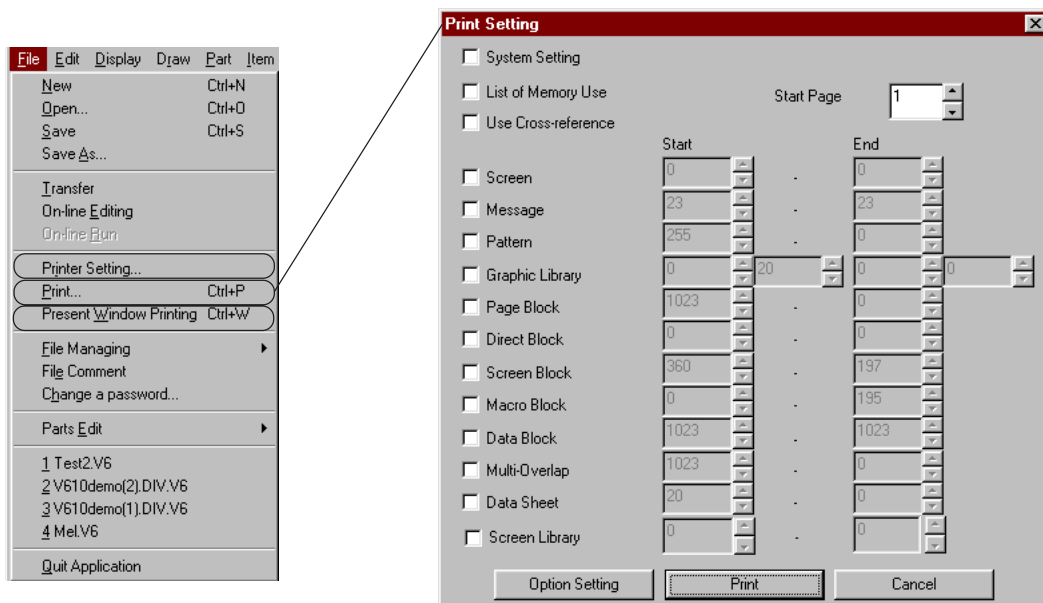
Printing

Screen data created on the computer can be printed out. Printed data can assist you when writing ladder software or user's manuals.

Procedure

Follow these steps for printing out screen data.

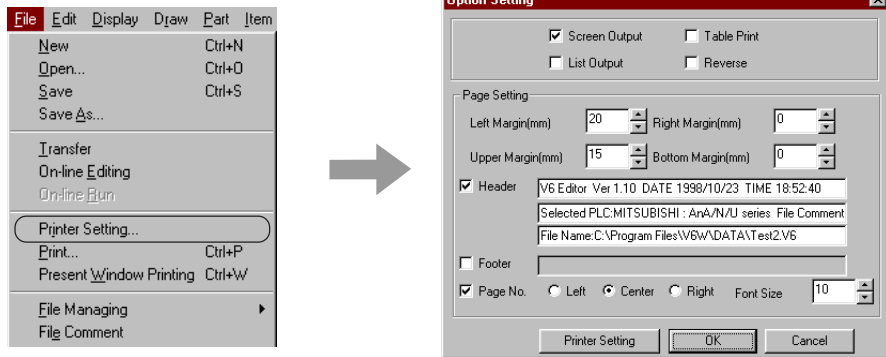
1. Connect a printer to the computer.
Check that the printer is available with Windows 95/98/NT and can be connected to the computer.
2. Select [Printer Setting] from the [File] menu. The [Option Setting] dialog is displayed.
Set printing environment data in the dialog. For more information, refer to page 28-2.
3. Select [Print] from the [File] menu. The [Print Setting] dialog is displayed. Choose the ranges of the items for printing, and start printing. For more information, refer to page 28-3.



Only the currently opened window can be printed out. For more information, refer to page 28-5.

[Option Setting] Dialog

Select [Printer Setting] from the [File] menu. The [Option Setting] dialog containing the following options is displayed.



[Screen Output] (Refer to page 28-6.)

Screen images are printed.

[List Output] (Refer to page 28-6.)

Items set for the screen are printed.

[Table Print] (Refer to page 28-6.)

The table of screen images is printed.

When this option is checked, the [Screen Output] and [List Output] options are not active.

[Reverse]

The screens are printed in reverse video.

Options Under (Page Setting)

[Left Margin] [Right Margin] [Upper Margin] [Bottom Margin]

Enter the desired values for each option.

The size of the printed screen depends on the settings of [Left Margin] and [Right Margin].

[Header]

This option is checked as default.

The PC type and file name are indicated automatically.

The header setting can be changed as desired.

When the box is unchecked, printing is executed without a header.

[Footer]

This option is unchecked as default.

When a footer should be printed, check the box.

[Page No.] (Left/Center/Right)

Page numbers are printed in any of the three positions. When page numbers should not be printed, uncheck the box.

[Font Size]

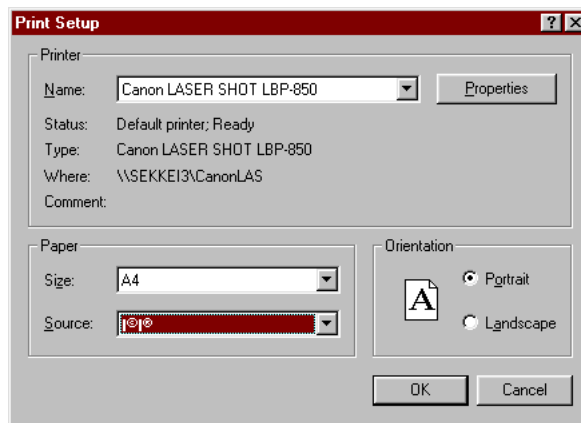
Set this option to determine the character size.

The default value is "10."

(Print Setup) Dialog

Clicking [Printer Setting] brings up the [Print Setup] dialog.

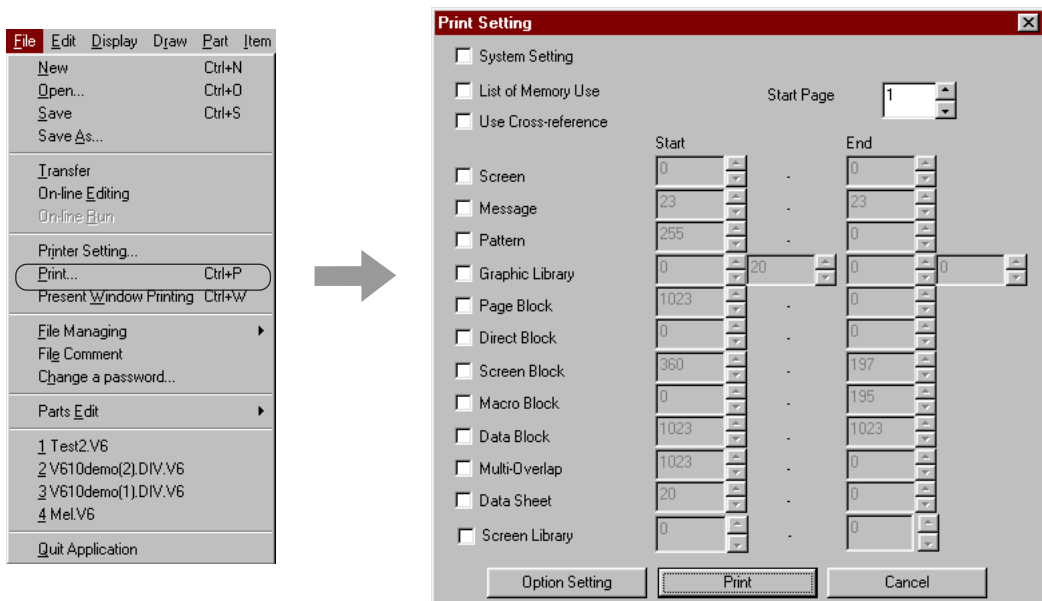
Set paper size, and portrait or landscape mode.



On completion, click [OK].

[Print Setting] Dialog

Select [Print] from the [File] menu. The [Print Setting] dialog is displayed as follows:



[System Setting] (Refer to page 28-7.)

Click this option for printing the system setting data. The tile list is also printed out.

[List of Memory Use]

Memory use by screens and screen edit items is printed.

[Use Cross-reference] (Refer to page 28-7.)

Memory addresses are printed to the following items.

◆ Message

When messages are printed, memory addresses used in relay mode are also printed.

◆ Graphic Library

When graphic library is printed, memory addresses used in graphic relay mode are also printed.

◆ Page, direct, and screen blocks

When page, direct or screen blocks are printed, or when relay-sub mode is used, the corresponding memory addresses are also printed.

[Screen]

Check the box when printing screen images or items set for the screens.

Settings in the range of 0 to 1023 are valid.

[Message]

Messages grouped by edit numbers are printed.

Settings in the range of 0 to 23 groups are valid.

[Pattern]

Patterns are printed.

Settings in the range of 0 to 255 are valid.

[Graphic Library]

Graphic library is printed.

Settings in the range of 0 to 9 groups and 0 to 255 graphic numbers are valid.

[Page Block] [Direct Block] [Screen Block] [Macro Block] [Data Block]**[Multi-Overlap] [Data Sheet] [Screen Library]**

The specified items are printed.

Settings in the range of 0 to 1023 are valid.

[Start Page]

Specify the first page number to be printed.

(Option Setting) Button

Clicking this button brings up the [Option Setting] dialog. For an explanation of the options, refer to "[Option Setting] Dialog."

(Print) Button

Click this button. Printing is executed as specified.

Printing the Currently Opened Window (ZM-*2 Function)

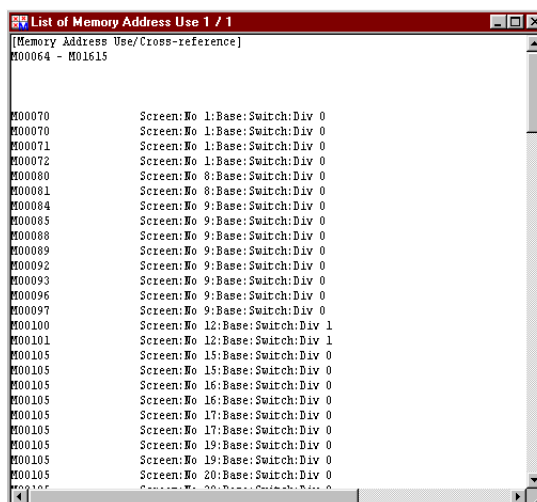


Set the options in the [Option Setting] dialog in advance. (Select [Printer Setting] from the [File] menu).

Select [Present Window Printing] from the [File] menu. At the same time, a printing start command is given and the currently opened window is printed out as specified in the [Option Setting] dialog.

When the [Memory Address Use] List Is Opened

The [Memory Address Use] list is displayed on the editor window as follows:



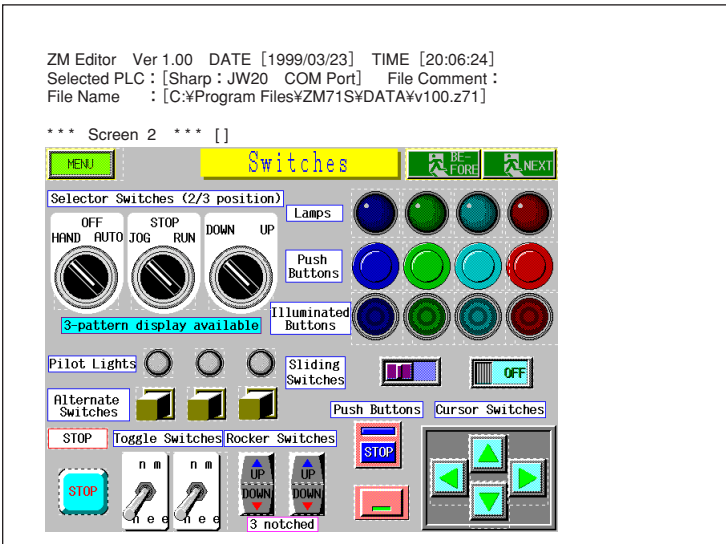
However, it is printed out as below by clicking [Present Window Printing].

```
ZM Editor Ver 1.00 DATE [1999/03/23] TIME [20:06:24]
Selected PLC : [Sharp : JW20 COM Port] File Comment :
File Name : [C:\Program Files\ZM71\S\DATA\*v100.z71]
[Memory Address Use/Cross reference]
0000000-001777
```

```
0000240 Macro Block : No 1 : Line 2 : F1
0000241 Macro Block : No 1 : Line 2 : F1
0000242 Macro Block : No 1 : Line 2 : F1
0000243 Macro Block : No 1 : Line 2 : F1
0000244 Macro Block : No 1 : Line 2 : F1
0000245 Macro Block : No 1 : Line 2 : F1
0000246 Macro Block : No 1 : Line 2 : F1
0000247 Macro Block : No 1 : Line 2 : F1
0000250 Macro Block : No 1 : Line 2 : F1
0000251 Macro Block : No 1 : Line 2 : F1
0000252 Macro Block : No 1 : Line 2 : F1
0000253 Macro Block : No 1 : Line 2 : F1
0000254 Macro Block : No 1 : Line 2 : F1
0000255 Macro Block : No 1 : Line 2 : F1
0000256 Macro Block : No 1 : Line 2 : F1
0000257 Macro Block : No 1 : Line 2 : F1
```

Printing Examples

By [Screen Output]:



By [List Output]:

ZM Editor Ver 1.00 DATE [1999/03/23] TIME [20:06:24]
Selected PLC : [Sharp : JW20 COM Port] File Comment :
File Name : [C:\Program Files\ZM71S\DATA\v100.z71]

*** Screen 2 *** []

[Screen Setting]
Background FCL : 8 Blink : No BCL : 8 Blink : No Tile : 0
Item Select Memory : No
Transfer of PLC Memory : Not Use
Receive Slice Level : 40
OPEN Macro Not Use
CLOSE Macro Not Use
CYCLE Macro Not Use
Local Function Switch Not Use

[Base]
[DIV No 0] Switch Coordinate : (1, 1) - (88, 41)
[OFF Char.]
[ON Char.]
Function : Screen Call

By [Table Print]:

ZM Editor Ver 1.00 DATE [1999/03/23] TIME [20:06:24]
Selected PLC : [Sharp : JW20 COM Port] File Comment :
File Name : [C:\Program Files\ZM71S\DATA\v100.z71]

List of Multi Overlap

[0] []

Monitors			
Numeric Data	Numeric Data Alarm	Numeric Data Speed	Characters & Calendar
Graphs	Graphs Alarm Display	Graphs Display Speed	Graphs Panel Meter
Statistic Graphs	Trend Display		

[1] []

Data Entry			
Numeric Data Entry	Multi Data Entry	Multi Tonkey	Direct Command Entry
Switches & Parts	Characters & Numeric Data Entry	Units Conversion	

By [System Setting]:

```
ZM Editor Ver 1.00 DATE [1999/03/23] TIME [20:06:24]
Selected PLC : [Sharp : JW20 COM Port] File Comment :
File Name : [C:\Program Files\ZM71S\DATA\100.z71]

*** System Setting ***
Selected PLC : ACPU Port
File Name : D:\Mel.V6
File Comment :

[Type] V608 (640 * 480 7.7inch)

[Memory Addition] (Non)

[Comm. Parameter]
Connection : 1 : 1
Comm. Error Handling : Stop
Local No. : 0
Data Length : 8-bit
Parity : Odd
```

By [Use Cross-reference]:
For messages

```
ZM Editor Ver 1.00 DATE [1999/03/23] TIME [20:06:24]
Selected PLC : [Sharp : JW20 COM Port] File Comment :
File Name : [C:\Program Files\ZM71S\DATA\100.z71]

*** Message Group 0 ***
Group No. : 0
(== 0==) Relay M00150 [Emergency Stop Control Box]
(== 1==) Relay M00151 [Emergency Stop Op. Box]
(== 2==) Relay M00152 [Direction Count]
(== 3==) Relay M00153 [Product Count]
(== 4==) Relay M00154 [Pusher Trouble]
(== 5==) Relay M00155 [Mid stopper timing]
(== 6==) Relay M00156 [Over Run Layer]
(== 7==) Relay M00157 [Carry Roll Start]
(== 8==) Relay M00158 [Saddle Up Stop]
(== 9==) Relay M00159 [Saddle Up End]
(== 10==) Relay M00160 [Empty Palette Waiting]
(== 11==) Relay M00161 [Carry Roll Position]
(== 12==) Relay M00162 [Carry Roll Rev. Over]
```

Cross-reference

For graphic library

Cross-reference

ZM Editor Ver 1.00 DATE [1999/03/23] TIME [20:06:24]
Selected PLC : [Sharp : JW20 COM Port] File Comment :
File Name : [C:\Program Files\ZM71S\DATA\100.z71]

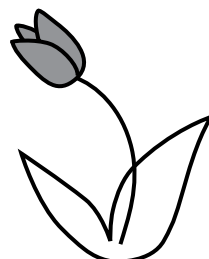
*** Graphic Library GNo : 4 No : 0 [] *** Graphic Relay Used Memory : D00482-00

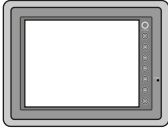
OFF



MEMO

Please use this page freely.



**ZM Series**

Error Display

There are two different types of errors:

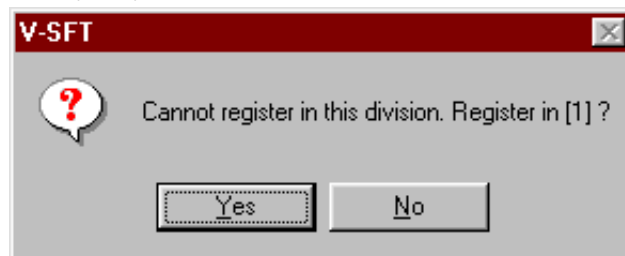
- (1) Errors caused on the PC when a screen is created.
- (2) Errors caused on the ZM Series when an error is found in the data.

Errors Caused on the PC

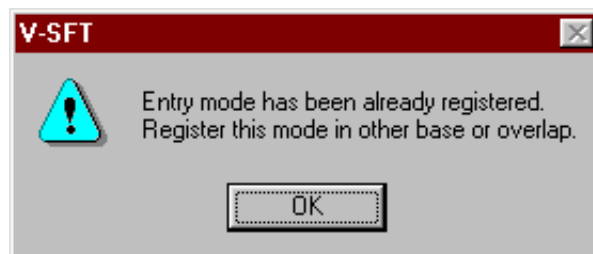
when a Screen is Created

When a rule is violated when creating a screen, the following type of message is displayed. Correct the error as indicated by the message.

<Ex.> When you try to set two modes in one division.



<Ex.> When you try to set multiple entry modes in one layer.



In addition, when you go to the menu bar to [Tool] and execute [Error Check] and an error is found in the screen creation data, an error list and solution procedure is displayed.

Error Check

Check a file for errors during editing.

◎ Procedure

Go to the menu bar to [Tool], and select [Error Check].

○ When no error is found

An [Error Check Complete] message is displayed.

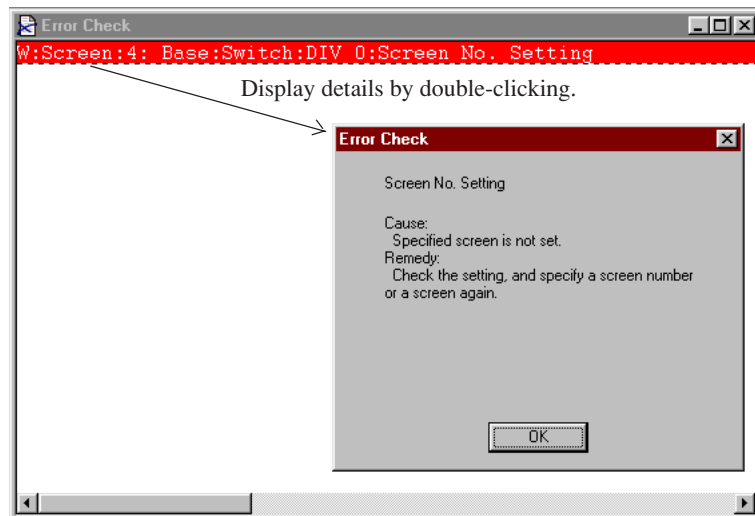
○ When an error is found

An error list like the one below is displayed.

○ Detail chart

When you select an item and double click, the [Detail] window is displayed.

Fix the problem as indicated by the contents of the chart.



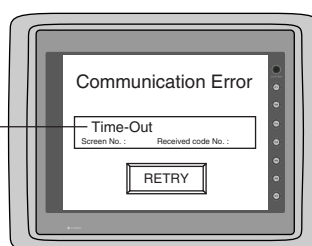
Errors Caused on the ZM Series when an Error is Found in the Data

Error messages displayed on the ZM Series are

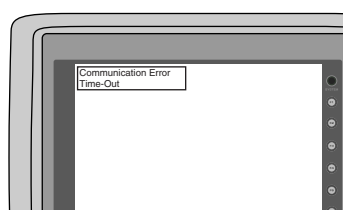
- 1) Communication error
- 2) Check
- 3) Warning
- 4) System error
- 5) The touch switch is not working etc...

Communication error

This portion of the message changes.



When you go to [Comm. Parameter], bring up the [Detail] tab window and set [Continue] for [Comm. Error Handling], a screen like the one shown below is displayed.
(See page 4-7.)



Error Message	Contents	Solution
Error code received	An error code was sent to the link unit by the CPU of the PC.	Solve the problem by examining the CPU error code.
Break	The PC's SD (TXD) is stuck in low level.	Examine the connection between the PC's SD (TXD) and the ZM-*2's RD (RXD).
Framing	Although the stop bit must be (1), it is detected as (0).	Data may be disrupted because of noise. Fix noise. Check cables and wiring. Confirm communication parameters.
Overrun	After one character is received, the next character is received before internal processing is completed.	Confirm communication parameters. Data may be disrupted because of noise. Fix noise.
Parity	An error occurred in parity check.	Data may be disrupted because of noise. Fix noise. Check cable wiring.
Time-Out	Although a request is sent for transmission to the PC, an answer is not returned within the required amount of time.	Check communication parameters. Data may be disrupted because of noise. Fix noise Check cable wiring.
Check Code	The check code in the PC response was not correct.	Check communication parameters. Data may be disrupted because of noise. Fix noise.

Error Message	Contents	Solution
Format	The code of the received data is invalid.	Check 1, 2, 3 described below.
Compare (applicable to HIDIC S10)	Transmission data and received data are different.	Check 1, 2, 3 described below.
NAK (applicable to A B type PC)	An NAK code is received.	Check 1, 2, 3 described below.
TNS discrepant (applicable to A B type PC)	Transmitted TNS data and received TNS data are not in agreement.	Check 1, 2, 3 described below.
Communication error	An unclear communication error is detected.	Check 1, 2, 3 described below.
Invalid CPU model (applicable to Mitsubishi CPU)	The PC currently being supported does not have a corresponding CPU.	Confirm whether or not the CPU that you are using can be used with the ZM Series.
Invalid memory (applicable to Mitsubishi CPU)	You specified an address that exceeds the memory range of the PC that you are linked to.	Check the type and range of memory that you set.
Count error (applicable to Mitsubishi CPU/Q link unit)	The expected data amount is different from the count value.	Check 1, 2, 3 described below.
Command error (applicable to Mitsubishi CPU/Q link unit)	The response code differs from the expected code.	Check 1, 2, 3 described below.
Invalid cassette (applicable to Mitsubishi ACPU)	This cassette is not included in the memory cassettes currently being supported.	Contact the technical support department.
Password error (applicable to Mitsubishi QCPU)	The password is incorrect.	Contact the technical support department.

○Solutions

- 1) Confirm link unit settings.
(After making settings, cut power to the PC.)
- 2) Go to editor (ZM-71SE) and confirm [Comm. Parameter] settings under [System Setting].
- 3) If errors only occur from time to time, it is possible that there is a noise based communication error.

*** If you still cannot solve the error even after following the suggestions above, contact the technical support department.**

Error Messages for Network Communication

○Fuji JPCN-1, Hitachi HIDIC-S10 α JPCN-1, Omron JPCN-1

Error Message	Contents	Measures
JPCN-1 I/F Board Error	I/F board for JPCN-1 has an error.	Contact the technical support department.
Stat. No. out of range	The setting of station number by switches is not within the setting limits (1~127).	Specify the station number within the setting limits (1~127).
Network Link Error	Cannot connect to the master station in the network.	Check the condition of the master station (PC). Check the connection of the network .
Network I/O Access Err	Control Terminal is about to access the word devices which are unacceptable for the setting number of input/output words.	Check the memory for the network I/O in the screen data file.

○Mitsubishi A series JPCN-1

Error Message	Contents	Measures
JPCN-1 I/F Board Error	I/F board for JPCN-1 has an error.	Contact the technical support department.
Stat. No. out of range	The setting of station number by switches is not within the setting limits (1~127).	Specify the station number within the setting limits (1~127).
Network Link Error	Cannot connect to the master station in the network.	Check the condition of the master station (PC). Check the connection of the network .
Network I/O Access Err	Control Terminal is about to access the word devices which are unacceptable for the setting number of input/output words.	Check the memory for the network I/O in the screen data file.
Word Writing to Sp. Relay	Control Terminal is about to write the special relay (M9000~) in one word. Note : In case of JPCN-1 communication, the special relay is regarded as bit-writable memory.	Do not write the special relay in one word.

- 15: Data sheet page
- 16: Multi-overlap
- 17: Screen
- 18: Function switch
- 19: Screen library
- 50: PC program data check
- 90: Detect errors during RUN

○ Sub item number

The sub item number shows the number of the editing screen detecting the error.

- A message group number is displayed for a message.
- A linear number of the library is displayed for graphic library.

Graphic group number x 256 + sub group number

○ Error numbers

ZM-*2	ZM-41/70	Error No.	Contents	Remedies
◎	◎	3	The version of the editor does not match the version of the Control Terminal.	Check both versions and contact the technical support department.
◎	×	10	The I/F board and the communication driver software do not match.	Send again after reconfirming the driver.
◎	◎	11	The PC for data setting does not match the I/F driver.	Check the type of the PC and transfer the I/F driver again.
◎	◎	12	The version of the I/F driver does not match the version of data.	Please check both versions and contact our technical support department.
◎	◎	13	The version of the I/F driver does not match the version of the Control Terminal.	Please check both versions and contact our technical support department.
×	◎	14	The I/F driver is not one that is used with the Control Terminal.	Check whether the I/F driver is one that can be used with the Control Terminal.
◎	◎	15	The display language of the Control Terminal does not match the language used for the created data.	Check the type of ZM-*2 and the language used for the created data.
◎	×	17	Unknown network I/O No. The I/O number exceeds the possible range of use.	Reset with a number that falls in the possible range of use.

ZM-#2	ZM-41/70	Error No.	Contents	Remedies
⊙	×	18	When connected to 1 + n, the read area, write area, and calendar memory settings are all made into internal memory.	Set the read area and calendar memory settings on the PC.
⊙	⊙	20	Exceeds the max. 32K words capacity for the buffering area. (Internal Buffer)	Correct the data size so that the buffering area falls within the 32K words limit.
⊙	⊙	21	Exceeds the max. 128 words capacity for bit sampling.	Reduce the total number of words for bit sampling to less than 128 words.
⊙	⊙	22	The buffer number specified in the sampling mode has not been set.	Set the buffer number in the [Buffering Area Setting] dialog under [System Setting].
⊙	⊙	23	All memory cards have different capacities. You have exceeded the capacity of the memory card that you are using.	Reset within the limits of your memory card.
⊙	⊙	24	In the buffering area settings, when the memory card is selected, the output file number can also be set. The specified output file number is also specified for another file.	Check the output file number and reset if necessary.
⊙	×	28	The modular function is set as the same communication port as MJ1 and MJ2.	The modular communication port setting (MJ1, MJ2) is the same.
⊙	⊙	30, 31	The amount of registered items is too great.	Reduce the number of items.
⊙	⊙	32	The amount of data that uses memory exceeds the regular number.	Reduce the amount of data.
⊙		33	The number of switches set on the screen, including overlap switches and lamps, exceeds the maximum amount (ZM-52D,ZM-72D/T,ZM-82D/T: 768, ZM-42D/L: 125, ZM-41/70: 500).	Reduce the number of switches and lamps.

ZM-#2	ZM-41/70	Error No.	Contents	Remedies
◎	◎	34	The amount of data using memory exceeds the regular number of work memory.	Reduce the amount of data.
◎	×	39	The amount of data for one screen exceeds 128Kbytes.	Reduce the amount of data.
◎	◎	46	Memory setting error (memory cannot be used/exceeds the memory range)	Check the memory settings.
◎	◎	53	In the setting for call overlap, an overlap number that is not registered in multi-overlap edit has been specified.	Specify an overlap number registered in multi-overlap edit.
◎	◎	54	The overlap area is larger than the screen. The overlap uses too much memory. (Refer to page 4-18.)	Reset the overlap area to fit within the screen area. Reduce the overlap area size.
◎	◎	60	Switch operating area error	Reset the switch operating area.
◎	◎	63	Up to four data blocks can be created in one screen. The selection order should be specified when these data blocks are created. The same order has been specified for different groups of data blocks.	Check that the same order is not specified for different groups of data blocks and reset if necessary.
◎	◎	65	The scale or graph is not set correctly in the settings for trend graphs or trend sampling.	Correct the settings for both [Scale Max. Value] and [Scale Min. Value] or both [Graph Max. Value] and [Graph Min. Value] in the dialog.
◎	◎	68	The display area is insufficient for the area (in lines) which is displayed by one relay (one bit).	Check the [Lines/Relay] in the [Relay] dialog and enlarge the display area if necessary.
◎	◎	69	A pattern size larger than the screen has been specified.	Reset the pattern.

ZM-#2	ZM-41/70	Error No.	Contents	Remedies
☉	☉	70	Excessive data sheet columns/lines	Check the data sheet columns/lines, and reset if necessary.
☉	×	71	The parts for a closed area graph exceed 64KB (ZM-42D/L: 32KB).	Reduce the size of the parts.
☉	☉	81	Macro: FOR-NEXT command number is wrong.	Correct the FOR-NEXT command.
☉	☉	82	Macro: There are two different commands for the same label number.	Delete or correct the label command being used for two different commands.
☉	☉	83	Macro: There is no destination label for the jump.	Change or create the destination label.
☉	☉	84	Macro: Invalid memory	Change macro.
☉	☉	90	You attempted to use a screen library that is not registered.	Check the screen library number.
☉	×	100	ZM-30 compatibility is not available for the input mode when the universal serial is selected.	Change settings for the entry mode.
☉	☉	210	A memory card has been selected as the destination for the data in the sampling mode even though memory cards are not available for this model.	Specify the edit model or the memory card setting again.
☉	☉	211	A memory card has been selected as the destination for the data in settings other than the sampling mode even though memory cards are not available for this model.	Specify the edit model or the memory card setting again.

Note

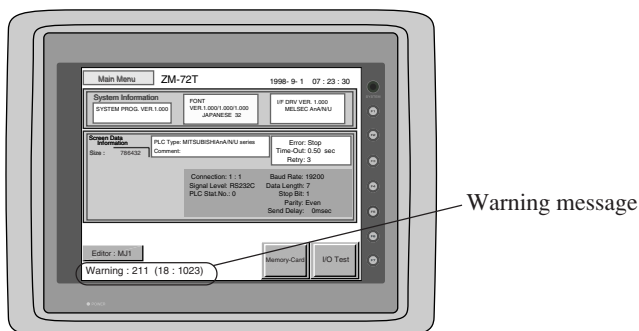
Aside from the error numbers described above, the following error numbers also exist. However, these errors do not usually occur.

If one of the following error numbers is displayed, contact technical support.

- * 23: Memory card file number error
- * 40: Group byte count error
- * 41: Flag error
- * 42: Function ITEM error
- * 43: Function ITEM end error
- * 44: Group ITEM end error
- * 45: Over offset range
- * 47: DIV number error (specified repeatedly)
- * 50: Message too long (over 256 bytes)
- * 52: Overlap number error (other than 0 to 2)
- * 55: Multi-overlap header
- * 56: Defined graphic command
- * 57: Graphic ITEM error
- * 58: Graphic execution error
- * 59: Switch function error
- * 61: Over the statistical graph's % display number
- * 62: Excessive multi-overlap data
- * 64: Data display element number over
- * 66: Radius of the hole is 0
- * 67: Trend number is ≤ 0
- * 80: Undefined macro command error
- * 84: Invalid memory
- * 85: Macro: Undefined system call.
- * 200: One item byte count error (ZM-41/70)
- * 201: Total byte count error

WARNING

There are some instances when an error screen like the one below is displayed on the local main screen during transmission. This warning error is a caution message. For information about the caution message, refer to “Error Details and Solutions” on page 29-6. In addition, this warning message appears for any error item after No. 200.



System Error

When a system error is detected, the following error screens are displayed.



Error : XX

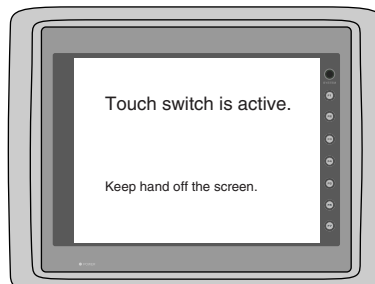
- No. 1 : Watch dock timer error
- No. 2 : Graphic error (ZM-41/70)
- No. 4 : Definition interruption error (ZM-41/70)
- No. 6 : System call error (ZM-41/70)
- No. 7 : Undefined command error (ZM-41/70)
- No. 9 : Sum check error (ZM-41/70)
- No. 10 : Task set-up error (ZM-41/70)
- No. 11 : Switch table error
- No. 30 : Request for displaying full error (ZM-*2)
- No. 31 : Memory allocation system error (ZM-*2)
- No. 32 : General exceptions/MMU address system error (ZM-*2)
- No. 33 : RTOS system error (ZM-*2)
- No. 34 : Memory error (ZM-*2)
- No. 35 : Inaccurate memory error (ZM-*2)

The source of the error could be one of the following three problems. Contact the technical support department.

- (1) Hardware problem
- (2) Program crash due to noise
- (3) Bad program

Touch Switch Activated

If the power is turned off while a touch switch is activated, the following error screen is displayed.



Remove your hand from the screen.

Index

A

About [Dither]	23-15
Absolute addresses	
Graphic library	11-6
Message editing	8-5, 8-24
Align	1-19, 1-24
[Selected area]	1-24
All Memory Changing	23-9
Alternate	
On-line editing	1-16
Overlap	5-19
Switch output	5-10
Animation	11-5, 11-14, 11-17, 11-25

B

Backlight	2-15
Bar code	19-1
Bar code setting	19-2
Bar code type	19-2
Baud rate	19-3
Bit length	19-3
Check digit	19-3
I/F memory	19-3
Parity	19-3
Stop bit	19-3
Terminator	19-3
Connecting	19-1, 19-6
Details for I/F memory	
Communication error	19-4
Flag/number of data read	19-3
I/F card error	19-4
Number of data	19-4
Overrun error	19-4
Reading complete	19-4
Outline	19-1
Setting example	19-5
Bar graph	
[Bar Graph] dialog	10-4
[Memory]	10-5
[Separate Display]	10-7
Bar graph scale	22-15
Examples with alarm setting	10-8
Bit sampling	
[Buffer No.]	12-34
[Display in Area]	12-35
[Initial Status Display]	12-37
Outline	12-2, 12-33
[Print Command Memory]	12-37
[Priority Display]	12-37
[Refer to Buffer Use]	12-34
[Start Message]	12-34

[Status Display]	12-35
Switches for bit sampling	12-41
[Time Display]	12-36
Bitmap placing	22-11
Box	
Paint, frame	22-4
Planned R	22-3
Buffering area	
Capacity	12-8
Composition	12-3
[Full Processing]	12-8
[Info. Output]	12-4
[Memory Designation]	12-5
[No. of Samples]	12-7
[No. of Words]	12-7
[Sampling Method]	12-6
[Sampling Time]	12-7
Setting examples	12-9
[Store Target]	12-7
[Use Operation]	12-8
[Use Sample Buffer]	12-5

C

Calendar	
[Calendar] dialog	16-5
Correcting calendar data	16-2
Call-overlap	4-14
Centering	
Switch/Lamp	6-6
Change all	
Change all division no.	1-17
Change all process cycle	1-17
Memory	23-9
Change memory (select)	23-11
Character display	7-15
[Bytes]	7-16
[Memory]	7-16
[Order]	7-16
Circle drawing	22-5
Click	1-1
Closed area graph (ZM-*2 function)	
[Closed Area Graph] dialog	10-28
Notes on placement	10-28
Paint position setting	24-22
Color	22-2
Column and line	1-29, 3-5
Communication parameter	2-4
Continuous lines	22-2
Copy image to clip board	23-18
Copy image to pattern	23-16
Custom part	23-20

D

Data display	
[Data Length]	7-10
[Decimal Point]	7-8
[Digits]	7-8
[Display Function]	7-7
[Display Type]	7-8, 7-10
BIN	7-9
DEC (w/ +/-sign)	7-9
DEC (w/ -sign)	7-9
DEC (w/o sign)	7-8
HEX	7-9
OCT	7-9
[Memory]	7-7
[Transparent]	7-11
[Zero Suppress]	7-10
Data display conversion utility (VDataConv)	7-26
Data sampling	
[Buffer No.]	12-22
[Message to Print]	12-23
Outline	12-2, 12-21
[Print Command Memory]	12-24
[Refer to Buffer Use]	12-22
Sampling display area	12-24
Char	12-27
Data	12-25
Size	12-27
Switches for data sampling	12-31
Data sheet	
Edit tools	20-4
[Box]	20-4
Calendar Display	20-4
[Characters]	20-4
[Display Data]	20-4
Grid display	20-4
[Line]	20-4
Outline	20-1
Page setting	20-3
[Characters]	20-3
[Lines]	20-3
[Memory]	20-3
[Sheet Size]	20-3
Space between lines	20-4
[Use Character Graphic Print]	20-3
Printing	20-5
Command from memory	20-5
Commanding by macro	20-6
Setting procedure	20-2
Digital-switch-like use	9-34
Direct block	8-26

Display area

Data block area	9-19
Graphic mode	11-6
Memory card mode	13-12
Message mode	8-31
Relay mode	8-9
Display environment	1-27
Display language	2-18
Division	3-2
Double-click	1-1
Drag	1-1
DXF file convert	23-25

E

Edit model selection (ZM series)	2-3
Editing layer	
Changeover of editing layer	4-7
Outline of editing layer	4-7
Entry display	9-10
Entry key	9-12
Placement on overlap	9-14
Switch function	9-35
Entry mode	
[Command Memory]	9-5
Data block area	9-18
[Block No. Read Mem.]	9-18
[Command]	9-18
[Division No.]	9-18
[ZM30 Compatible]	9-18
[Info. Output Memory]	9-18
[Initial Block]	9-18
[Item Select]	9-18
[Max. Block]	9-18
[Min. Block]	9-18
[Order]	9-19
[Default to 0]	9-9
[ZM30 Compatible]	9-8
[Info. Output Memory]	9-7
[Input Item Select]	9-8
[Lines/Columns Output]	9-9
[Reverse]	9-8
Switch function	9-35
Table data display	9-25
[Target Memory]	9-8
[Type]	9-5, 9-17
[Type : Direct]	9-21
[Type: Block]	9-16
[Type: Data Display]	9-4
[Use Graphic]	9-9
Writing enabled	9-6

Entry target	9-9
Table data display	9-29
[Type : Block]	9-19
Error check	23-8, 29-2
Error display	29-1
Errors on the PC	29-1
Errors on the ZM Series	29-3
Communication error	29-3
Screen data error	29-6
System error	29-12
Touch switch activated	29-12
Warning	29-11
Expansion memory (memory cassette)	2-14
External I/O unit	2-21

F

File conversion	26-1
Conversion from ZM-30	26-4
Character entry mode	26-9
Display data	26-11
Graph mode	26-10
Graphic library edit	26-11
Keypad block	26-11
Keypad mode	26-7
Overlap	26-5
Page mode/Direct mode	26-7
Relay mode	26-7
Relay-sub mode	26-7
Sampling mode	26-10
Screen	26-5
Screen size	26-5
Statistics graph mode	26-10
Switch/Lamp	26-6
System settings	26-5
Trend mode	26-10
Converting from ZM-41/70	26-12
Converting parts file	26-14
Notes on converting files	26-2
File management	25-1
File copy	25-13
File deletion	25-14
File division and combination	25-15
File combination	25-16
File division	25-15
File management functions	25-1
Files for file management	25-1
Part file	24-29, 25-10
Screen data file	25-3
Flow chart when the switch is pressed	5-16
Function switch	2-10

G

Global macro memory	2-17
Graphic call	22-14
Graphic color	11-23
Graphic library	11-15
Data display	11-21
Offset	11-16
Parameter	11-17
Graphic mode	11-2
[Command]	11-4
[Graphic]	11-5
[Initial Graphic GNo & No]	11-4
[Max. Graphic GNo & No]	11-4
[Memory]	11-5
[Min. Graphic GNo & No]	11-4
[Parameter]	11-5
Switch to change graphics	11-8
Graphic relay mode	11-9
[Memory]	11-10
[Mode : REP]	11-12
[Mode : XOR]	11-11
[No. of Relays]	11-13
[Parameter]	11-14
[Start Graphic GNo & No]	11-13
[Type: 1-graphic]	11-9, 11-11
[Type: 2-graphic]	11-9, 11-11
Grid	1-29
1-Byte	1-29
Free	1-29
Mode	1-29
Switch	5-5

I

I/F driver	27-6, 27-15
List	27-16
Internal memory	
Memory type	
System memory	15-1
User memory	15-1
System memory	15-1
1 : n PC down info	15-11
Backlight info	15-9
Buffer info	15-10
Calendar info	15-12
Cycle time	15-11
MAX, MIN, AVG, SUM of buffer data	15-12
Overlap info	15-9
Printer info	15-9
Screen No.	15-9
Switch repeat function	15-10
Universal serial switch output mem.	15-11
Video window info	15-12

User memory	15-1
Interval timer	18-1
[Division No.]	18-2
[Macro Block No.]	18-2
[OFF Macro Block No.]	18-4
[ON Macro Block No.]	18-3
[Start Mem. Designation]	18-2
[Stop timer after execution of macro]	18-3
[Time-up Time]	18-2
Item list	23-4
Item select	9-31
Item select memory	9-32
Item select switch	9-33
Overlap	4-6, 4-11, 4-15
Item select mem.	3-7

K

Keypad	9-12
Placement on overlap	9-14
Switch function	9-35

L

Lamp	
[Draw Mode]	6-4
[Lamp Memory]	6-4
Limits for one screen	
Maximum memory use by one screen	3-3
Parts placement limit	3-2
Local function switch setting	3-8

M

Macro	14-1
Interval timer	18-1
Multi-overlap edit	4-13
Macro block	14-25
Macro commands	
Explanation	
Arithmetic operations	14-3
Bit processing	14-7
Branch instruction	14-10
Convert	14-6
Logical operations	14-5
MAX, MIN, AVG, SUM	14-4
SHIFT	14-8
Switches	14-12
System calls	14-13
Transmit	14-9
Indirect designation memory	14-23
Macro block edit	14-25
Macro mode	14-26
Notes on macro commands	14-24

System calls	
Buzzer control	14-20
Calendar	14-16
Coordinates (sin, cos)	14-20
Data sheet	14-18
ENQ (universal serial)	14-18
Num. display (color, ON/OFF)	14-19
Overlap	14-14
Sampling	14-16
Screen	14-14
Timer	14-15
Table of macro commands	14-2
Video display	
Get info. from video window	14-22
Video setting	14-21

Macro set-up

Function switch	14-1
Global macro	14-1
Macro mode	14-1
Multi-overlap	
CLOSE macro	14-1
OPEN macro	14-1
Screen	
CLOSE macro	14-1
CYCLE macro	14-1
OPEN macro	14-1
Switch	
OFF macro	14-1
ON macro	14-1

Max. data display

Data sampling	12-30
Trend sampling	12-17

Maximum display

Mean data display	
Data sampling	12-30
Trend sampling	12-17

Memo pad

Switches for Memo Pad	17-3

Memory address use

23-12	

Memory card

Size	13-3
Type	13-3

Memory card mode

Data display for memory manager	13-13
Data logging function	13-2, 13-23
Editing keys for No. and name	13-18
on base screen	13-22
on call-overlap	13-20
on multi-overlap	13-18
on normal overlap	13-21
Format switch	13-16, 13-23

[Key Display Location]	13-11
[Memory]	13-10
Memory card editor	13-2, 13-24
Memory manager function	13-1, 13-9
Outline	13-1
Switches for memory manager	13-15
Memory card setting	
[Bytes for Record]	13-7
[I/F Memory]	13-4
[Memory]	13-7
[No. of Data]	13-7
[No. of Records]	13-7
[Transfer Mode]	13-7
[Type]	13-7
Memory INC	1-21
Memory transmission	3-7
Memory use	23-6
Message display	7-18
[Memory]	7-19
Message editing	
Editing procedure	8-5
Structure	8-5, 8-24
Message mode	
[Action Area]	8-28
[Action Select]	8-29
[Command]	8-29
[Initial Block]	8-30
[Max. Block]	8-30
[Memory]	8-30
[Message GNo]	8-30
[Min. Block]	8-30
[Type]	8-29
Min. data display	
Data sampling	12-30
Trend sampling	12-17
Minimum display	9-11
Mode lamp	
Message mode	8-31
Relay mode	8-11
Mode switch	2-19
Message mode	8-31
Relay mode	8-10
Modular port	2-20
Momentary	
Switch output	5-10
Multi copy	1-20
Multi-overlap	4-10
[Command]	4-11
[Coordinate Designation]	4-12
[Memory]	4-12
Multi-text	22-19

N

Normal overlap	4-5
Number of characters	1-28
Numerical data entry	9-2

O

Occupy	5-18
OFF/ON/P3 Icons	1-3
Offset	
Graphic library	11-16
On-line editing	
for ZM-41/70	27-17
for ZM-*2	27-9
1 Output or 2 Output of switch	5-6
Operation	
Switch	5-22
Outline of lamp	6-1
Outline of lamp creation	6-2
Outline of switches	5-1
Overlap	
[Item Select]	4-6, 4-11, 4-15
External command	
Call-overlap	4-15
Multi-overlap	4-11
Normal overlap	4-8
Internal command	
Call-overlap	4-15
Multi-overlap	4-11
Normal overlap	4-8
Overlap display by switch	
Multi-overlap	5-21
Normal overlap	5-19

P

Page block	8-25
Paint	22-13
Panel meter	
Displaying pie graph scale	22-17
Examples with alarm setting	10-17
[Panel Meter] dialog	10-14
[Memory]	10-15
Parameter	
Absolute input	11-18
Incremental coordinate + input	11-18
Incremental coordinate - input	11-18
Setting items	11-18
Part auxiliary tool boxes	1-9
Part editing	
Bar graph	24-14
Calendar	24-25
Closed area graph	24-21

Data display	24-11
Data sampling display area	24-23
Display area	24-27
Keypad	24-12
Lamp	24-7
Overlap	24-6
Panel meter	24-18
Pie graph	24-15
Statistic graph (bar)	24-18
Statistic graph (pie)	24-19
Switch	24-7
Trend graph	24-20
Trend sampling	24-20
Part file	
Creation and storage	24-4
File management	24-29
New file	24-4
Printing	24-28
Parts	
Selection and placement of parts	1-11
Paste bitmap	23-14
Pattern	
[Background Color Setting]	22-21
Pattern editing	22-20
Place	22-11
[Size Change]	22-22
Size of placed patterns	22-25
[Transparent Setting] (ZM-*2 Function)	22-22
[Transparent Setting] (ZM-*2 function)	11-26
Pie graph	
Examples with alarm setting	10-13
[Pie Graph] dialog	10-9
[Memory]	10-10
[Separate Display]	10-12
Pie graph scale	22-16
PC models	2-2
Point search	1-25
Print	
Data sheet	20-1
Print out by switch	5-18
Screen hard copy	2-26
Setting	2-15
Printer	2-15
Printing	
Part file	24-28
Printing currently opened window	28-5
Printing from PC	28-1
[Option Setting] dialog	28-2
[Print Setting] dialog	28-3
Priority in displaying messages	8-6

R

Read area	2-24
Relay mode	
[Action Area]	8-6
[Execution Relays]	8-6
[Lines per Relay]	8-7
[Memory]	8-6
[Relay Info. Out]	8-8
[Start Message GNo. & No]	8-6
[Sub-action]	8-7
Screen call	8-7, 8-18
Sub-display	8-7, 8-15
Relay sampling	
[Buffer No.]	12-45
Differences from relay mode	12-47
[Executing Relays]	12-45, 12-48
[Memory]	12-45, 12-48
Outline	12-2, 12-44
[Priority Display]	12-46
[Refer to Buffer Use]	12-45
[Relay Info. Output]	12-46
Switches for relay sampling	12-46
[Time Display]	12-46
Relay-sub	8-12
[Block]	8-13
[Link Division No.]	8-13
REP	11-23
Graphic mode	11-23
Graphic relay mode	11-12, 11-23
Lamp	5-8, 6-4
Reset	
Switch output	5-10
Right-click	1-1
Rotate	1-22

S

Sampling control memory	12-6
Sampling count display	
Bit sampling	12-39
Data sampling	12-39
Trend sampling	12-16
Sampling mode	12-1
Bit sample	12-7
Bit sampling	12-2
Bit synchronize	12-6
Constant sample	12-7
Data logging function	13-23
Data sampling	12-2
Outline	12-1
Relay sample	12-7
Relay sampling	12-2

Trend sampling	12-2	Setting up memory addresses	1-7
Type	12-1	Short-cut keys	1-1
Sampling status display		Simple data display (ZM-*2 Function)	7-26
Bit sampling	12-40	SIV file creation	23-24
Sampling time display		Size limits	4-18
Bit sampling	12-40	Statistic graph (bar, pie)	
Data sampling	12-29	[Stat. Bar (or Pie) Graph] dialog	10-18
Trend sampling	12-17	[Memory]	10-19
Screen	3-1	Sub-display	8-12
Screen block	8-18	Switch	
[Block No./ Library No.]	8-20	[Lamp Memory]	5-9
[Block]	8-19	[Momentary] and [Momentary W]	5-10
[Division No.]	8-20	[Output Action]	5-10
[Same Screen]	8-20	Function	5-11
[Screen No.]	8-19	ICON	5-19
Screen change Icons	1-3	ICON2	5-20
Screen composition		Macro	
Base screen	3-1	OFF macro edit	5-15
Overlap	3-1	ON macro edit	5-15
Screen font	2-18	Operation	5-22
Screen library	21-1	Use interlock	5-15
Limits for part use	21-3	Switch operating area	5-4
Outline	21-1	Switch part area	5-4
Placement and offset	21-4	Switching the screen	
Registration	21-3	Internal commands	5-17
Screen resolution		System setting	2-1
Column and line	3-5	Backlight	2-15
Dot	3-5	Auto 1	2-15
Screen setting		Auto 2	2-16
Background	3-6	Backlight OFF time	2-16
Item select mem.	3-7	Backlight power ON time control	2-16
Local function switch setting	3-8	Manual	2-16
Macro		Buzzer	2-17
CLOSE macro edit	3-8	BZ port	2-18
CYCLE macro edit	3-8	Change-over time	2-19
OPEN macro edit	3-8	Communication parameter	
Memory transmission	3-7	Baud rate	2-4
Process cycle		Calendar	2-5
High speed	3-9	Code	2-9
Low speed	3-9	Comm. error handling	2-8
Refresh	3-9	Connection	2-6
Processing in ZM Series	3-10	Data length	2-8
Receive slice level	3-7	ZM-30 Compatible	2-5
Screen-call	8-17-8-21	Initial macro	2-9
Scroll		Parity	2-8
Message mode	8-32	Read area	2-4
Relay mode	8-10	Retrials	2-9
Relay-sub	8-15	Send delay time	2-9
Select environment	1-25	Signal level	2-4
Set		Stop bit	2-8
Switch output	5-10	Target port	2-8

Text processing	2-8	Printer ready	2-30
Time-out time	2-9	Printing	2-31
Trans. mode	2-8	Screen status (n+1)	2-29
Write area	2-4	Screen switching	2-31
DIO unit	2-22	SYSTEM switch	4-9
DIO input memory	2-21	[Use System Buttons]	4-6
DIO output memory	2-22	System switch	2-19
Display	2-17	System updating	27-8
Display language	2-18		
Edit model selection	2-3	T	
Expansion memory		Table data display (ZM-*2 function)	
Expansion memory 1	2-14	[Table Data Display] dialog	7-20
Expansion memory 2	2-14	Mean/Max./Min./Total display	7-22
Function switch		Property modification of multiple data cells	7-22
Outline	2-10	Table data display (XXXX)dialog	7-22
Setting	2-11	Table data display edit	7-24
Global memory	2-17	Change of cell height and cell width	7-24
Mode switch prohibited	2-19	Ruled line color	7-20
Modular port	2-20	Table data display property modification	7-21
Outline of DIO	2-21	Text	
Overlap coordinates	2-23	Text file	22-10
PC models	2-2	3-notch	6-1
Printer		Tool	23-1
Print direction	2-15	Total data display	
Printer type	2-15	Data sampling	12-30
Reversed image	2-15	Trend sampling	12-17
Read area		Transference	
Backlight	2-27	Cable	27-1, 27-11
Calendar setting	2-25	Data transfer to ZM-41/70	27-11
Data read refresh	2-28	Data transfer to ZM-*2	27-1
Data sheet output	2-26	I/F driver	27-6, 27-15
External screen No. command (n+2)	2-28	PC protocol file	27-6, 27-15
Macro execution	2-26	System program	27-7
Output	2-25	System updating	27-8
Overlap status	2-26	Tray	23-22
RCVDAT (n+0)	2-24	Trend graph	
Screen hard copy	2-26	Lines for reference	10-25
Screen status command (n+1)	2-26	Point and pitch	10-23
Screen switching	2-27	[Trend Graph] dialog	10-21
RUN port	2-17, 2-18	[Control Memory]	10-22
Screen font	2-18	[Setting All]	10-24
Screen font and capacity	2-18	Trend graph scale	22-18
System switch prohibited	2-19	Trend sampling	
Video select (NTSC, PAL)	2-23	[Buffer No.]	12-11
Write area		[Data Length]	12-13
Backlight	2-31	[Direction]	12-11
CFMDAT (n+0)	2-29	[Display in Area]	12-12
Data read refresh	2-31	[Graph Max.]	12-13
Displayed screen number (n+2)	2-31	[Graph Max. Value]	12-14
Macro execution	2-30	[Graph Min.]	12-13
Overlap status (0-2)	2-30	[Graph Min. Value]	12-14

[Line Color]	12-14
[Line Type & Point]	12-14
[Lower Color]	12-13
[Lower Line Display]	12-13
[Lower Value]	12-13
Outline	12-2, 12-10
[Refer to Buffer Use]	12-11
[Sample Buffer Word No.]	12-14
[Setting All]	12-12
Size	12-15
Switches for trend sampling	12-19
[Trend Display]	12-14
[Trends]	12-12
[Upper Color]	12-13
[Upper Line Display]	12-13
[Upper Value]	12-13

V

Video input (option) ZM-*2 function	4-16
Moving the video screen	4-17
Video control	4-17
Video screen display/erase method	4-17
Video select	2-23

W

Write area	2-29

X

XOR	11-23
Canceling XOR Display	11-25
Graphic mode	11-23
Graphic relay mode	11-11, 11-23
Lamp	5-8, 6-4
XOR color	11-11, 11-24

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