**MITSUBISHI**

**MITSUBISHI ELECTRIC**
ADVANCED AND EVER ADVANCING

GRAPHIC OPERATION TERMINALS
**MELSEC-GOT**

## USER'S MANUAL

F930GOT-BWD-E

**F930**

**Foreword**

- This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the communication facilities of F930GOT.

- Before attempting to install or use the communication facilities of F930GOT this manual should be read and understood.

- If in doubt at any stage of the installation of the communication facilities of F930GOT always consult a professional electrical engineer who is qualified and trained to the local and national standards which apply to the installation site.

- If in doubt about the operation or use of the communication facilities of F930GOT please consult the nearest Mitsubisi Electric distributor.

- This manual is subject to change without notice.

# GRAPHIC OPERATION TERMINAL F930GOT

## USER'S MANUAL

Manual number  : JY992D86101

Manual revision  : D

Date             : November 2000

**FAX BACK**

Mitsubishi has a world wide reputation for its efforts in continually developing and pushing back the frontiers of industrial automation. What is sometimes overlooked by the user is the care and attention to detail that is taken with the documentation. However,to continue this process of improvement, the comments of the Mitsubishi users are always welcomed. This page has been designed for you,the reader,to fill in your comments and fax them back to us. We look forward to hearing from you.

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Thank you for taking the time to fill out this questionnaire. We hope you found both the product and this manual easy to use.

### Guidelines for the Safety of the User and Protection of the graphic operation terminal

This manual provides information for the use of the Graphic Operation Terminal F930GOT. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows;

a) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.

b) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.

c) All operators of the completed equipment should be trained to use that product in a safe and coordinated manner in compliance to established safety practices. The operators should also be familiar with documentation which is connected with the actual operation of the completed equipment.

**Note :** Note: the term 'completed equipment' refers to a third party constructed device which contains or uses the product associated with this manual.

### Notes on the Symbology Used in this Manual

At various times through out this manual certain symbols will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of equipment. Whenever any of the following symbols are encountered its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

### Hardware Warnings

1) Indicates that the identified danger **WILL** cause physical and property damage.

2) Indicates that the identified danger could **POSSIBLY** cause physical and property damage.

3) Indicates a point of further interest or further explanation.

### Software Warnings

4) Indicates special care must be taken when using this element of software.

5) Indicates a special point which the user of the associate software element should be aware of.

6) Indicates a point of interest or further explanation.

- Under no circumstances will Mitsubishi Electric be liable responsible for any consequential damage that may arise as a result of the installation or use of this equipment.

- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.

- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

# 1. Introduction

This section describes the product configuration and the system configuration of the graphic operation terminal. Confirm diversified functions of each unit.

## 1.1 Outline

The graphic operation terminal (hereafter abbreviated to "GOT") is to be mounted on the face of a control panel or operation panel, and connected to the programming connector of an FX or A Series programmable controller (hereafter abbreviated to "PLC").
Various PLC devices can be monitored and the PLC data can be changed through the screen of the GOT.
There are several display screens built-in to the GOT which offer various functions. In addition, user-defined screens can be created.
The user defined-screens (user screens) and the built-in screens (system screens) have the following respective functions.



FX or A Series PLC

Programming connector

GOT main body
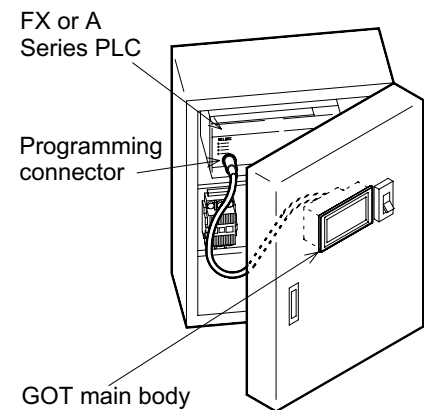
### User screens

- Screen display function
  User screens can be displayed, and the following functions can be assigned to each screen. The available screens can be limited using the security function.
  Both software packages, FX-PCS-DU/WIN-E (V.2.30 or later) for DU and SW□D5C-GOTRE-PACK (V.H or later) ("□" indicates a numeric not less than "1".) for GOT, can be used to create user screens.

  Display function
  1) Up to 500 user screens can be displayed. In screen creation, two or more screens can be overlaid or changed over arbitrarily.
  2) Simple graphics such as straight lines, circles and rectangles can be displayed, along with numbers, alphabets, Hiragana, Katakana and Kanji characters.

  Monitor function
  1) Set values and current values of word devices in the PLC can be displayed in numerics or bar graphs for monitoring.
  2) The specified range of the screen components can be displayed in reverse in accordance with the ON/OFF status of bit devices in the PLC.

  Data change function
  1) The numeric data being monitored can be changed.

  Switch function
  1) By manipulating the operation keys in the GOT, bit devices in the PLC can be set to ON and OFF. The display panel face can be assigned as touch keys to offer the switch function.

**System screens**

• Monitor function

  Device monitor
  1) The ON/OFF status of each device and the set value and the current value of each timer, counter and data register in the PLC can be monitored and changed.
  2) Specified bit devices can be forced ON or OFF.
     Unlike the monitor function described in the previous page, the screen data can be edited by inputting a desired device No. from the keyboard.

• Other functions
  Many other functions are built in.
  1) A real-time clock is built in, so the current time can be set and displayed.
  2) The GOT can function as an interface to enable data communication between the PLC and a personal computer in which the relay ladder creation software is running. At this time, the GOT screen can also be displayed.
  3) The screen contrast can be adjusted, and the buzzer sound can be turned on or off.

■**Important point**

Display screens can be created using the following software.

Screens for DU:
FX-PCS-DU/WIN-E (V.2.20 or later)

Screens for GOT-A900:
SW□D5C-GOTRE-PACK (V.H or later) ("□" indicates a numeric not less than "1".)

## 1.2    Function list

The functions described in the previous page are divided into four modes shown in table below.
The operator can use each function by selecting a corresponding mode.

*Table 1.1:*

| Mode | Function | Outline of function | Reference sections | Remarks |
|---|---|---|---|---|
| Screen mode | User screen display | Character display<br>• Characters such as alphabets, numbers, Kata-kana, Kanji and external characters are displayed.<br>• Japanese and English are displayed. | 3, 8, 9, 11 | Note 1 |
| | | Graphic display<br>• Graphics such as straight lines, circles and rectangles are displayed. | 3, 8, 9, 11 | |
| | | Monitor function<br>• Set values and current values of word devices (T, C, D, V and Z) in the PLC can be displayed in the form of numeric, bar graph, trend graph and panel meter.<br>• The color of specified area on the screen is inverted (between white and blue) in accordance with the ON/OFF status of bit devices (X, Y, M, S, T and C) in the PLC. | 3, 8, 9, 11 | |
| | | Data change function<br>• Set values and current values of word devices (T, C, D, V and Z) in the PLC can be changed in the form of numeric, bar graph, trend graph and panel meter. | 3, 8, 9, 11 | |
| | | Switch function<br>• The ON/OFF status of bit devices (X, Y, M, S, T and C) in the PLC can be controlled in the form of momentary, alternate and set/reset. | 3, 8, 9, 11 | |
| | | Screen changeover<br>• The display screen can be changed over from the PLC or a touch key. | 3, 10, 12 | |
| | | Recipe function (data file transfer)<br>• Data saved in the GOT can be transferred to the PLC. | 3, 9, 11 | |
| | | Security function (screen protection function)<br>• Only screens whose entry code level is equivalent to or lower than the entry code entered by the operator are displayed. (This function is available also in the system screens.) | 2 | |
| | | Alarm function<br>• The ON/OFF status of specified bit devices are monitored, and the number of times of occurrence and the occurrence time of alarms are displayed. Such alarm data can be saved as alarm history. | 7, 11 | |

**Table 1.1:**

| Mode | Function | Outline of function | Reference sections | Remarks |
|---|---|---|---|---|
| HPP mode | Device monitor | • The ON/OFF status of bit devices as well as current values and set values of word devices can be monitored using device Nos. | 4 | Note 1 |
| | Current value / set value change | • Current values and set values of word devices can be changed using device Nos. and comment expression. | | |
| | Forced ON/OFF | • Bit devices (X, Y, M, S, T and C) in the PLC can be forcedly set to ON or OFF. | | |
| | State monitor | • State (S) Nos. in the ON status are automatically displayed for monitoring. | | Valid in FX Series |
| | PC diagnosis | • The error information in the PLC can be read and displayed. | | Valid in FX Series |
| Test mode | Screen list | • User screens are displayed in the order of screen No. | 5 | |
| Other mode | Time switch | • A specified bit device can be kept ON for a specified period of time. | 6 | Note 2 |
| | PC transfer | • The screen data and the alarm history can be transferred between the GOT and the screen creation software. | | |
| | Printer output | • The alarm history can be output to a printer. | | |
| | Entry code | • The entry code to protect programs in the PLC can be registered. | | |
| | Environment setting | • The initial setting can be specified for the system language, the connected PLC, the serial transfer, the opening screen, the menu screen call, the current time, the backlight extinguishing time, the buzzer ON/OFF, the LCD contrast, the screen data clear, etc. | | |

Note 1:   External characters and comments can be created using the screen creation software (FX-PCS-DU/WIN-E).

Note 2:   The function is valid only when the FX-PCS-DU/WIN-E is used.

*   When the PLC is connected via a computer link unit, some functions are restricted.

## 1.3      Format of manual

### 1.3.1      Contents described in manual

This manual is described in the following format. Use each element of the format for index.

Example:

1)

2.        Startup

2)

2.1      Startup procedure

3)

2.1.1  GOT setup

4)

■Important point

▲ **MITSUBISHI**                                                2-1

1) Section title
   Sections 2 to 6 mainly describe operations. Sections 7 to 12 describe the contents required to create screens.

2) Title
   The title explains the contents of each paragraph.

3) Sub title

4) Important point
   Terms used in the text are explained and supplemented.

### 1.3.2      Abbreviations used in text

The following terms may be abbreviated in the text.

1) MELSEC FX or A Series unit may be abbreviated to "programmable controller" or "PLC".

2) The software kit to create display screens FX-PCS-DU/WIN-E or SW□D5C-GOTRE-PACK may be abbreviated to "software to create screens" or "screen creation software".

3) A general-purpose personal computer may be abbreviated to "PC"

4) A floppy disk may be abbreviated to "FD". A floppy disk drive may be abbreviated to "FDD".

5) The graphic operation terminal F930 Series may be abbreviated to "GOT".

6) Devices inside the PLC may be abbreviated to "X" (input), "Y" (output), "M" (auxiliary relay), "S" (state), "T" (timer), "C" (counter) and "D" (data register). Output contacts of X, Y, M, S, T and C may be called "bit devices".
   All of them may be called "devices".

## 1.4      Expressions and basic operations of operation keys

The operation keys are expressed as follows in the text.

### 1.4.1    Expressions of operation keys

1) Touch keys on the screen which are actuated when touched by fingers are enclosed with rectangular frame.

   | SCREEN MODE | , | HPP MODE |

2) Cursor control keys to be pressed may be expressed as follows.

   | ▲ | , | ▼ |  →  | ▲ , ▼ |

3) When a same key is pressed several times or a same operation is repeated, the following expression may be used.

   | ▲ |

4) When an arbitrary numeric within the range of 0 to 9 is to be entered, the following expression may be used.

   | 0 to 9 |

### 1.4.2    Basic operations

The common operations in the GOT are shown below.

② [DEVICE MONITOR] END

| DEV. | SET | ON | OFF | ▼ | ▲ |

⑧         ⑦   ⑦

③

⑨

| | | | | CLR |
|---|---|---|---|---|
| 6 | 7 | 8 | 9 | ▲ |
| 2 | 3 | 4 | 5 | ▼ |
| 0 | 1 | | - | ENT |

⑤

⑥   ④

① Function display
   The selected mode or function is displayed here.
② END key
   This key terminates the displayed function, and returns to the previous screen.
③ CLR (clear) key
   This key cancels the input of alphabets and numerics.
④ ENT (enter) key
   This key determines the input of alphabets and numerics.
⑤ Ten-key pad
   This pad allows to enter numerics.
⑥ - (minus) key
⑦ ▲ and ▼ (cursor control) keys
⑧ SET key
   When this key is pressed after an alphabet or numeric has been entered, the keyboard is displayed.
⑨ Input display
   This field displays a value input from keys.

## 1.5    System configuration

This paragraph describes connection of the GOT to a PLC and peripheral unit.

### 1.5.1    Enlarged view of connectors

A PLC and peripheral unit can be connected to the following connectors in the GOT.

1) Connectors in the GOT
    Connectors are provided on the rear face of the GOT.
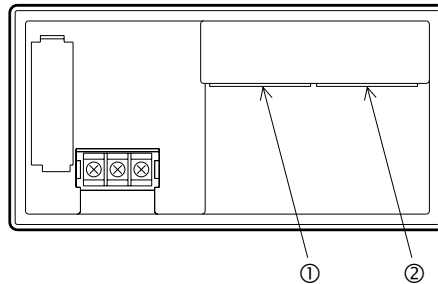


① PLC connector (RS-422 connector) D-sub, 9-pin, female
    This connector allows communication with an FX/A Series PLC.

② PC connector (RS-232C connector), D-sub, 9-pin, male
    This connector links a personal computer having the screen data created using the screen creation software to allow data transfer.
    When the RS-232C connector in the PC is the 9-pin type, use a data transfer cable FX-232CAB-1. When the RS-232C connector in the PC is the half-pitch, 14-pin type, use a data transfer cable FX-232CAB-2.
    This connector is used also when the $FX_{2N}$-232-BD is used for an $FX_{2N}$ Series PLC or when 1:N connection is adopted with "CPU PORT" in an FX/A Series PLC.


* When a PLC is connected via a computer link unit, use either of the connectors ① or ② above.

## 1.5.2 Connection of peripheral units of GOT

The figure below shows the system configuration required to use the GOT with peripheral units.

· Graphic operation terminal
  F930GOT-BWD-E
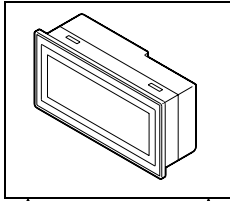
Data transfer
cable
F$_2$-232CAB-1
(3 m)

Disabled during
computer link
(RS-232C
communication)

Data transfer cable FX-232CAB-1 (3 m)
(when the RS-232C connector in the PC is 9-pin type),
Data transfer cable FX-232CAB-2 (3 m)
(when the RS-232C connector in the PC is half-pitch,
14-pin type) or
Data transfer cable F$_2$-232CAB-1 (3 m)
(when the RS-232C connector in the PC is 25-pin type)
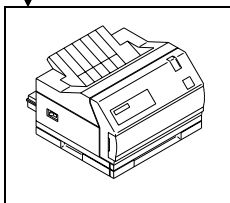
· Printer
  < Dedicated printers >
    GT-10A
    K6PR(-K), A7(N)PR
  < General-purpose printers >
    ESC/P
    Printer equipped with
    RS-232C interface

Prints out alarm
history and alarm
messages.
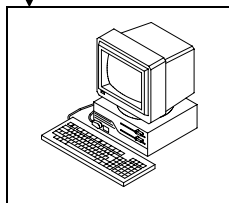
· General-purpose personal computer
  (screen creation software)
    FX-PCS-DU/WIN-E (V.2.20) or
    SW☐D5C-GOTRE-PACK (V.H or later)
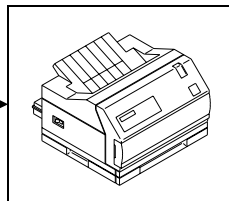
· Printer
  PC-PR201H or its equivalent
  ESC/P
  * A7(N)PR is available for
    the A7PHP/HGP.

Prints out screen
data.

Peripheral units of GOT

### 1.5.3    Connection of peripheral units of PLC

When a general-purpose personal computer is directly connected to the GOT, the two-port interface FX-2PIF (two-port interface function) is not required.

When one GOT and one peripheral unit for sequence program creation are used for one PLC, the two-port interface FX-2PIF is required. The system configuration required in this case is shown below.

| When the two-port interface FX-2PIF is used |

· Graphic operation terminal
  F930GOT-BWD-E

When the two-port interface function is used, the operation environment should be set for it.
(Refer to the description on "SERIAL PORT" on the SET-UP MODE screen.)

Data transfer cable FX-232CAB-1 (3 m) (when the RS-232C connector in the PC is 9-pin type),



Data transfer cable FX-232CAB-2 (3 m)
(when the RS-232C connector in the PC is half-pitch, 14-pin type) or
Data transfer cable F2-232CAB-1 (3 m)
(when the RS-232C connector in the PC is 25-pin type)

· Two-port
  interface
  FX-2PIF

Connection cable FX-40DU-CAB (3 m) or Connection cable FX-40DU-CAB-10M (10 m)

Program cable FX-20P-CAB (1.5 m)

Data transfer cable AC30R4 (3 m)

Data transfer cable FX-422CAB (0.3 m) or
Data transfer cable FX-422CAB-150 (1.5 m)

Data transfer
cable
FX-422CAB0

· FX0/FX0S/FX0N/FX2N/
  FX2NC Series

· FX/FX2C/ Series

· A Series (except QnA)
  (Refer to Paragraph 1.8.)
  Motion controller

| Programmable controller |

| Peripheral unit to create sequence programs |

· General-purpose
  personal computer

* A general-purpose personal computer can be directly
  connected, and both the GOT and the personal
  computer can be used at the same time (without
  using the FX-2PIF).

1 >

· Handy programming
  panel FX-10P/20P

2 >

(A Series cannot be used.)

· A7PHP/A7HGP
  A6GPP/A6PHP

The FX2N/FX2NC
Series can be used
in the instruction/
device range of the
FX2 Series.

3 >

## 1.6    Connection of PC

Use the following cable to connect a personal computer.
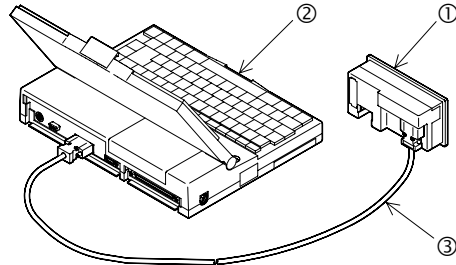


① F930GOT
② Personal computer
③ FX-232CAB-1,
   FX-232CAB-2 or
   F2-232CAB-1

Pin layout and connection diagram of transfer cables

- Transfer cable FX-232CAB-1
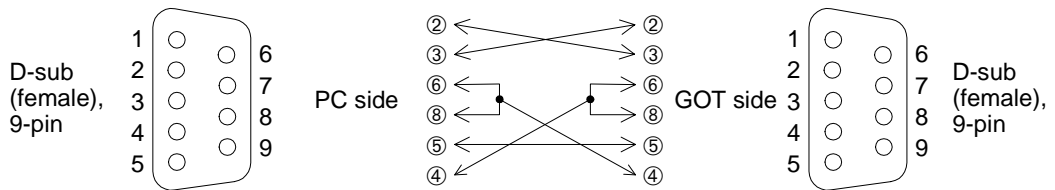


- Transfer cable FX-232CAB-2
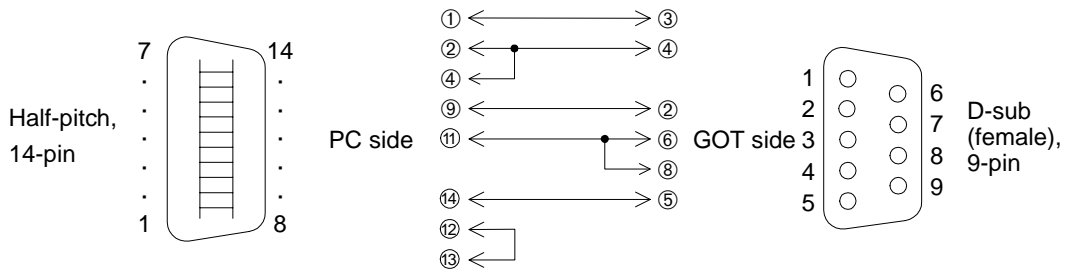


- Transfer cable F2-232CAB-1
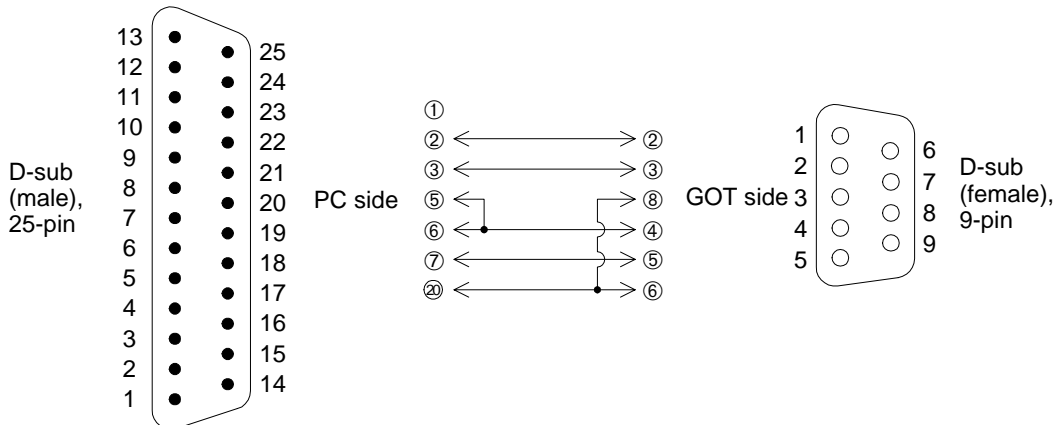
## 1.7 Connection of PLC

Set the connected PLC in "PLC TYPE" of "SET-UP MODE" described in Paragraph 2.2 or in the screen creation software.

*Table 1.2:*

| Connectable PLC | Connection type |
|---|---|
| MELSEC FX/FX2C/FX0/FX0S/FX0N/FX2N/FX2NC Series manufactured by MITSUBISHI | CPU direct (CPU PORT) |
| MELSEC A Series manufactured by MITSUBISHI | CPU direct (CPU PORT) or computer link (LINK PORT) |
| SYSMAC C Series manufactured by OMRON | Computer link (LINK PORT) |
| FLEX-PC N Series manufactured by FUJI ELECTRIC | |
| PLC manufactured by Allen-Bradely Co., Inc. | Described in Paragraph 13.3 |
| PLC manufactured by Siemens AG | To be available soon |
| Micro computer board | RS-232C port |

## 1.8     Connection of MELSEC FX/A Series (CPU PORT)

Connect the GOT to the programming connector in the PLC, and perform communication.
This communication method is easy because sequence programs, setting and interface are
not required once the connected PLC is set in the operation environment setting (on the SET-
UP MODE screen).

*Table 1.3:*

| Series name | |
|---|---|
| FX0/FX0S/FX0N/FX2N/FX2NC/FX/FX2C Series | CPU PORT (RS422)<br>(In 1:N connection, select "CPU PORT (RS232C)"<br>for the second and fourth GOTs.) |
| FX2N (when FX2N-232-BD is used) | CPU PORT (RS232C)<br>(In 1:N connection, select "CPU PORT (RS422)"<br>for the second and fourth GOTs.) |
| AnN, AnA, AnS, AnSJ, AnSH, A1SJH, A2C, A2CJ,<br>A0J2H, AnU, AnUS, A2USH, A1FXCPU | CPU PORT (RS422)<br>(In 1:N connection, select "CPU PORT (RS232C)"<br>for the second and fourth GOTs.) |
| Motion controller<br>A171SCPU-S3<br>A171SHCPU<br>A172SHCPU<br>A272UHCPU | CPU PORT (RS422)<br>(In 1:N connection, select "CPU PORT (RS232C)"<br>for the second and fourth GOTs.) |

Use the following cables in connection of the PLC.

1) Connection of the FX1/FX2/FX2C/A Series
2) Connection of the FX0/FX0S/FX0N/FX2N/FX2NC Series

1)                    2)
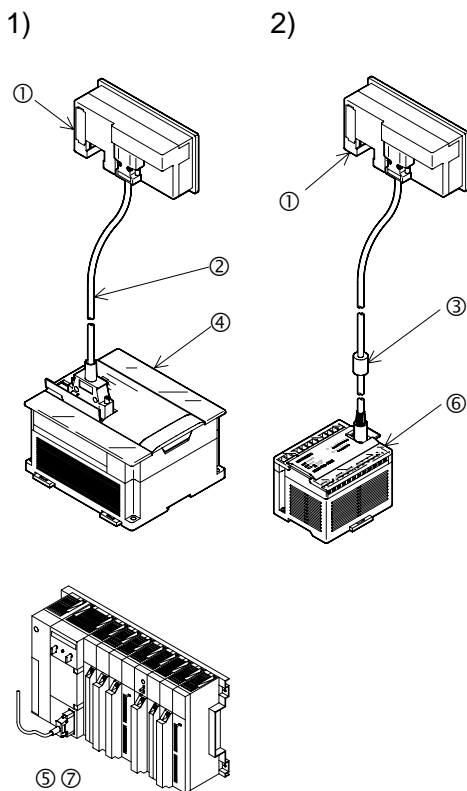


① F930GOT

② FX-40DU-CAB (3 m),
   FX-40DU-CAB-10M (10 m),
   FX-40DU-CAB-20M (20 m) or
   FX-40DU-CAB-30M (30 m)

③ FX-50DU-CAB0 (3 m),
   FX-50DU-CAB0-1M (1 m),
   FX-50DU-CAB0-10M (10 m),
   FX-50DU-CAB0-20M (20 m) or
   FX-50DU-CAB0-30M (30 m)

④ FX/FX2C Series PLC

⑤ A Series PLC
   AnN, AnA, AnS, AnSJ, AnSH, A1SJH, A2C,
   A2CJ, A0J2H, AnU, AnUS, A2USH, A1FX, CPU

⑥ FX0/FX0S/FX0N/FX2N/FX2NC Series PLC

⑦ Motion controller
   A171SCPU-S3, A171SHCPU, A172SHCPU,
   A272UHCPU

* If the screen mode is selected while cables are not connected, a communication error occurs.

**◆ MITSUBISHI**

Pin layout and connection diagram of connection cables
(Connection cables are offered as options.)

- Connection cables FX-40DU-CAB(-10M/-20M/-30M) and FX-50DU-CABL
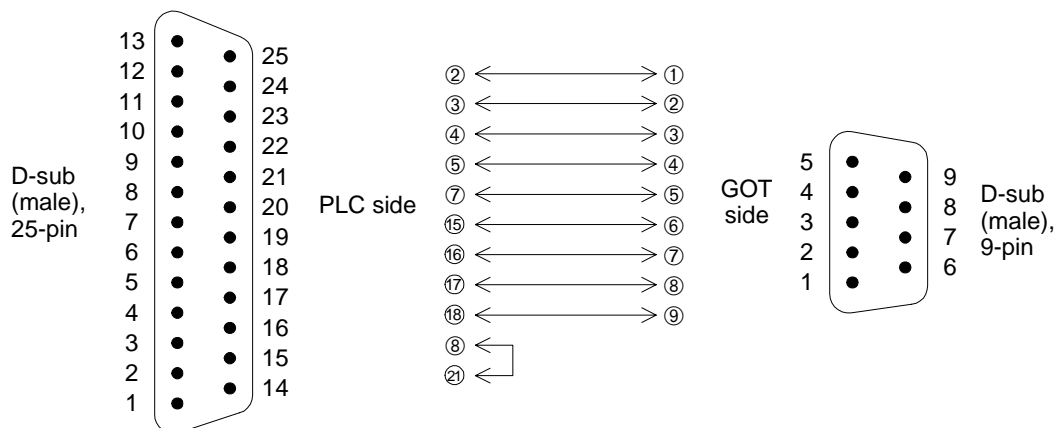


- Connection cable FX-50DU-CAB0(-1M/-10M/-20M/-30M)
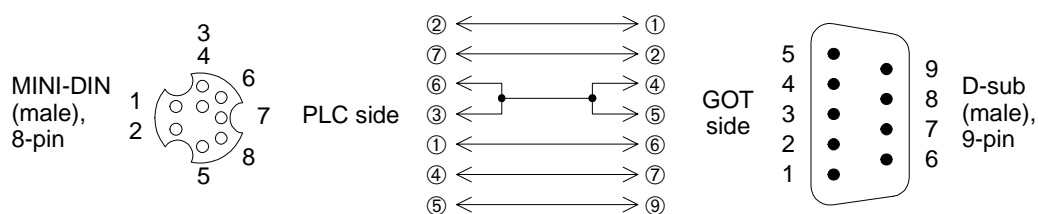
- In the case of CPU direct connection with the FX/A Series PLC, up to four GOTs can be connected to one PLC (1:N connection).
  **Select "CPU PORT (RS-232C)" or "CPU PORT (RS-422)" as the connection type.**

System configuration
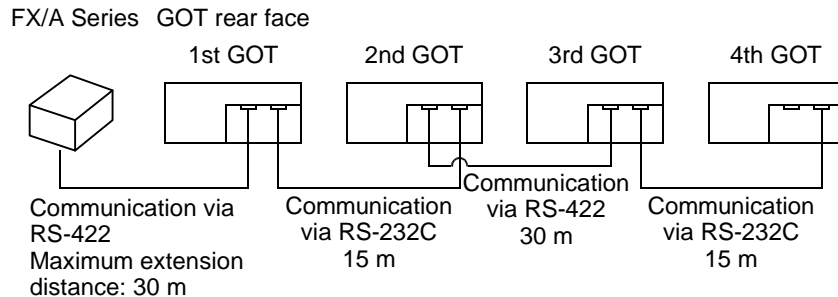


Note:
A peripheral unit of the GOT or a peripheral unit to create sequence programs cannot be used at the same time with the GOT except in the system configuration shown below using the FX2N-422-BD in the FX2N Series. Only either a peripheral unit or the GOT can be connected at a time.

Connection cable examples:
1st GOT: FX-50DU-CAB0 (equivalent to connection cable for the PLC)
2nd GOT: FX-232CAB-1 (3 m)
3rd GOT: Cable created by user (Refer to the connection diagram.)
4th GOT: FX-232CAB-1 (3 m)

Communication speed:
The communication speed (= baud rate) with the PLC becomes slower as the number of GOTs increases.

When the communication speed in the first GOT is supposed as "1",
2nd GOT: Communication speed in the 1st GOT $\times$ 2 (= 1/2 of that in the 1st GOT)
3rd GOT: Communication speed in the 2nd GOT $\times$ 2 (= 1/4 of that in the 1st GOT)
4th GOT: Communication speed in the 3rd GOT $\times$ 2 (= 1/8 of that in the 1st GOT)



Connection diagram
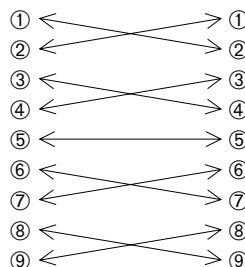
- In the FX2N Series, the connection shown above can be realized by using the FX2N-422-BD. In this case, a peripheral unit to create sequence programs can be connected to the programming connector in the FX2N.

- In the case of connection with the FX2N Series PLC, communication can be performed through CPU direct connection (RS-232C) by using the FX2N-232-BD.
  In this case also, up to four GOTs can be connected to one PLC (1:N connection).
  In connection of a peripheral unit to create sequence programs, use the programming connection in the FX2N main unit.

System configuration
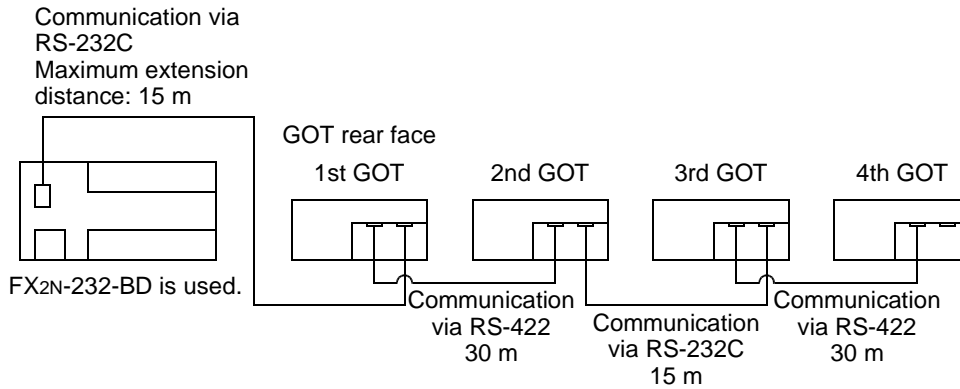


Connection cable examples:
1st GOT: FX-232CAB-1
2nd GOT: Cable created by user (Refer to the connection diagram.)
3rd GOT: FX-232CAB-1
4th GOT: Cable created by user (Refer to the connection diagram.)

Communication speed:
The communication speed (= baud rate) with the PLC becomes slower as the number of GOTs increases.

When the communication speed in the first GOT is supposed as "1",
2nd GOT: Communication speed in the 1st GOT $\times$ 2 (= 1/2 of that in the 1st GOT)
3rd GOT: Communication speed in the 2nd GOT $\times$ 2 (= 1/4 of that in the 1st GOT)
4th GOT: Communication speed in the 3rd GOT $\times$ 2 (= 1/8 of that in the 1st GOT)

Connection diagram

**<Cautions on connection of two or more GOT units>**
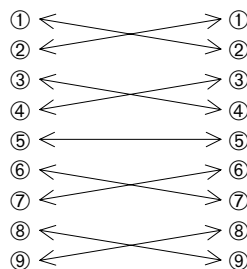
When two or more GOT units are connected to the FX/A/QnA Series PLC, communication is performed in the location sequence from the GOT unit nearest to the CPU (that is, in the sequence of the 1st, 2nd, 3rd and 4th GOT units).  Accordingly, when turning on the power of the GOT units for the first time, turn on the power from the one nearest to the CPU.

If the power cannot be turned on in the GOT units from the one nearest to the CPU, set the GOT units (in "SET-UP MODE") or the screen creation software so that communication is performed while the title screen display time is different by 2 to 3 seconds in each GOT unit.

Setting example: The title screen display time is different by 2 seconds in each GOT unit, and communication is started from the GOT unit nearest to the CPU.

FX/A/QnA　　　　　　　　Title screen display time (initial value: 4 sec)

1st GOT: 4 sec　　　2nd COT: 6 sec　　　3rd COT: 8 sec　　　4th COT: 10 sec
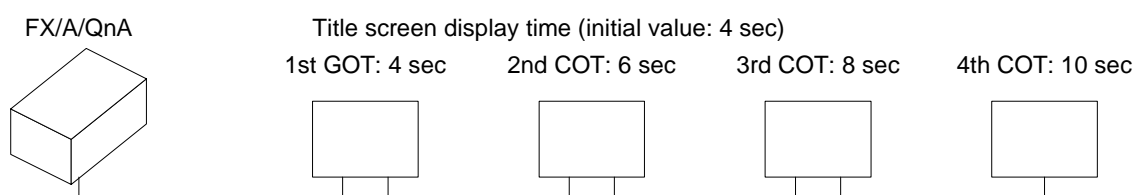
\* Perform the same setting without regard to the connection type (RS-232C or RS-422) of two or more GOT units.

## 1.9 Connection of MELSEC A Series (LINK PORT)

The GOT can be connected to the MELSEC A Series via a computer link unit shown below.

• Applicable PLC and computer link unit

< A Series >
AJ71UC24, A1SJ71UC24-R2/R4/PRF, A1SJ71C24-R2/R4/PRF, A1SCPUC24-R2, A2CCPUC24 (PRF)

System configuration



Programming connector is not used.

Refer to the figure on the right for connection diagram.

To computer link unit
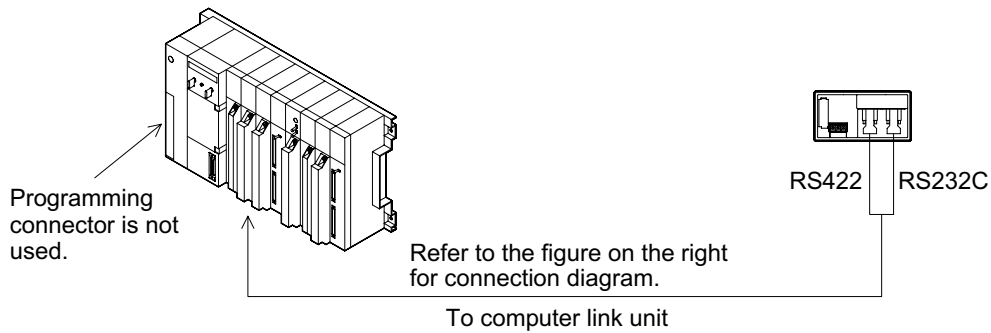
RS422  RS232C

• Connect the GOT to the computer link unit (PLC) as shown below.

In communication via RS-422



Terminal block

Computer link unit side (PLC side)

RDA ① 
RDB ⑥ 
SDA ② 
SDB ⑦ 
SG ⑤ 

GOT side

D-sub (male), 9-pin
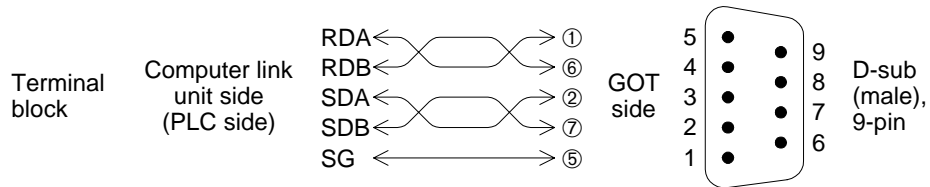
In communication via RS-232C
(Connection cable F2-232CAB is also available.)



D-sub, 25-pin

Computer link unit side (PLC side)

FG ① — ①
SD ② — ②
RD ③ — ③
RS ④ — ⑦
CS ⑤ — ⑧
DSR ⑥ — ⑥
SG ⑦ — ⑤
CD ⑧
DTR ⑳ — ④

GOT side

D-sub (female), 9-pin

In communication via RS-232C

| | Computer link unit side (PLC side) | | GOT side | |
|---|---|---|---|---|
| D-sub, 9-pin | CD ① | ① | | |
| | RD ② | ② | | D-sub (female), 9-pin |
| | SD ③ | ③ | | |
| | DTR ④ | ④ | | |
| | SG ⑤ | ⑤ | | |
| | DSR ⑥ | ⑥ | | |
| | RS ⑦ | ⑦ | | |
| | CS ⑧ | ⑧ | | |
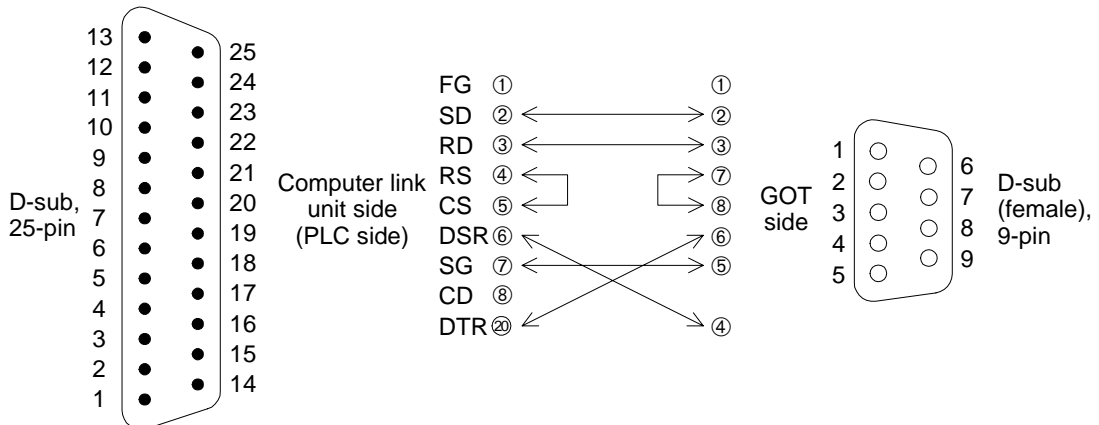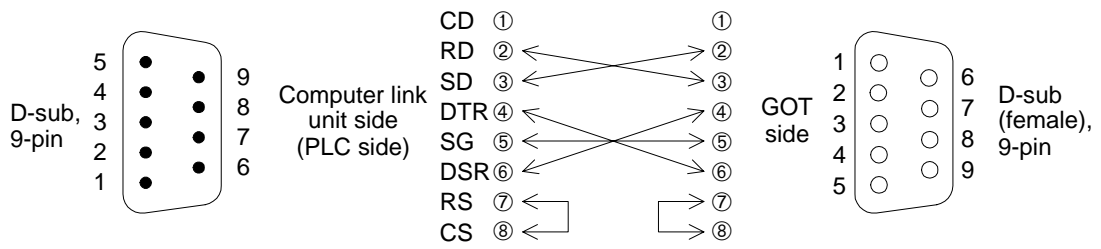
When the GOT is connected to the MELSEC A Series PLC via a computer link unit, the following setting is required.

- Setting of computer link unit
  Set the communication format of the computer link unit as shown below.

*Table 1.4:*

| Used port | When RS-422 is used | When RS-232C is used |
|---|---|---|
| Mode setting switch No. | 5<br>RS-422: Format 1<br>RS-232C: No-procedure | 1<br>RS-422: No-procedure<br>RS-232C: Format 1 |
| Transmission speed | 19200 bps | |
| Data bit | 7 bits | |
| Stop bit | 1 bit | |
| Parity bit | Even | |
| Sum check | Provided | |
| Write during run | Possible | |
| Station No. | 00 to 0F (in accordance with setting in GOT) | |

The GOT station No. can be set in "SET-UP MODE". (Refer to Paragraph 2.2.)

- Caution: When RS-232C is connected

  The GOT does not control CD signals. Accordingly, when the RS-232C is connected, the buffer memory in the computer link unit should be set so that CD signals are not checked.

  Example: When I/O signals in the computer link unit are 80 (H) to 9F (H)

  Write to buffer memory
  Computer link unit connection point

  X87 TO P  H8  H10B  K1  K1

  K1: CD terminal will not be checked.
  10B (H): CD terminal will be checked.
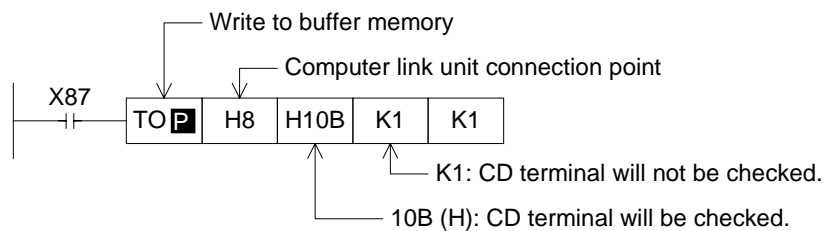
- Restriction in functions

  In connection via computer link unit, the following functions of the GOT are disabled.

  - Index registers (V and Z) cannot be monitored, and their current values cannot be changed.
  - When the RS-232C is connected for communication, the printer output function of the GOT is disabled.
  - The two-port interface function is disabled.

## 1.10    Connection of SYSMAC C Series

The GOT can be connected to the SYSMAC C Series PLC manufactured by OMRON via the following host link unit.

- Applicable PLC and host link unit

  < SYSMAC C Series >
  Host link unit is required be attached. Or a CPU with built-in interface for host link is required.

  System configuration

  

  To host link unit

  RS422    RS232C
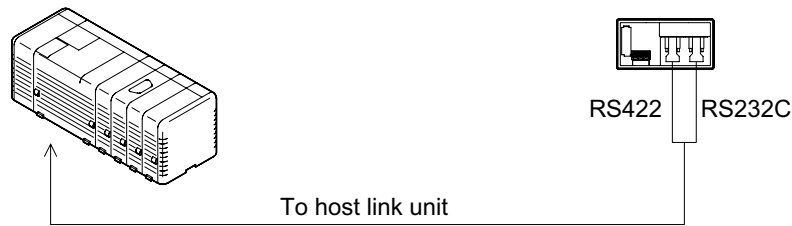
- Connect the GOT to the host link unit (SYSMAC C Series) as shown below.
  When the GOT is connected to any model not shown in the connection examples below, refer to the manual of each C Series link unit.

  In communication via RS-422
  Example of connection with the C200H-LK202-V1
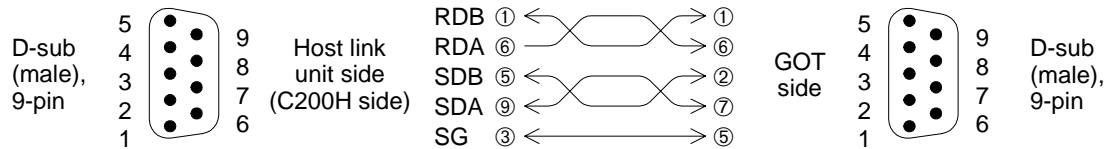
  

  In communication via RS-232C
  Example of connection with the C200H-LK201-V1
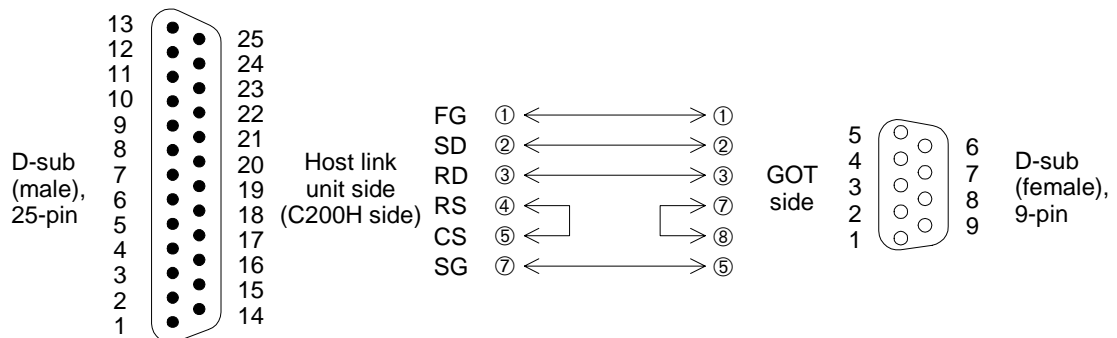
  

  In communication via RS-232C
  Example of connection with the CQM1 (with built-in RS-232C port)
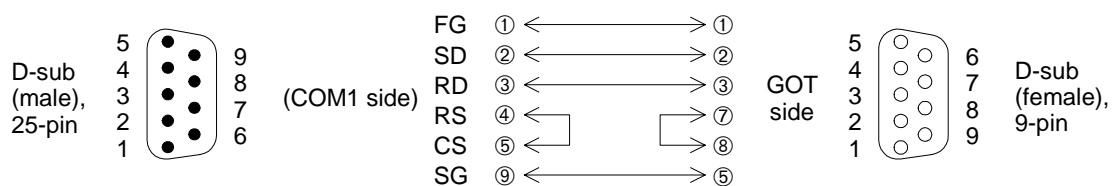
When the GOT is connected to the SYSMAC C Series PLC manufactured by OMRON, the following setting is required.

- Setting of host link unit
  Set the communication format of the host link unit as shown below.

*Table 1.5:*

| Used port | When RS-422 is used | When RS-232C is used |
|---|---|---|
| Transmission speed | 19200 bps | |
| Data bit | 7 bits | |
| Stop bit | 2 bit | |
| Parity bit | Even | |
| Communication mode | Host link mode | |
| Command level | Level 1, 2 or 3 | |
| Procedure | 1:N procedure | |
| Unit No. | 00 to 15 (BCD) (in accordance with setting in GOT) | |

↑
The GOT station No. can be set in "SET-UP MODE". (Refer to Paragraph 2.2.)

Only a model in which these set items are offered can be connected to the GOT.

Setting example:
Set the communication format while referring to setting examples of each C Series host link unit.

In the case of CQM1-CPU : Setting by data memory (DM)

*Table 1.6:*

| Set item | Set item | Remarks |
|---|---|---|
| Standard communication condition (RS-232C: DN6645) | 0001H | Mode specification: Host link<br>Communication condition: In accordance with DM6646 |
| Communication condition (RS-232C: DM6646) | 0304H | Transmission format: 7 data bits and 2 stop bits<br>Parity: Even    Transmission speed: 19,200 bps |
| Send delay time (RS-232C: DM6647) | 0000H (initial status) | 0 second |
| Unit No. (RS-232C: DM6648) | 00××H | ××: Two-digit BCD (in accordance with setting in GOT) |

In the case of host link unit attached to C200H base :
Setting by each switch (when C200H-LK201-V1/C200H-LK202-V1 is used)

- Setting of switches on front face
  (common between C200H-LK201-V1 and C200H-LK202-V1)

*Table 1.7:*

| Set item | Switch setting | | Remarks |
|---|---|---|---|
| Unit No. | SW1 | *1 | Upper digit BCD |
| | SW2 | *1 | Lower digit BCD |
| Transmission speed | SW3 | 6 | 19200 bps |
| Communication condition | SW4 | 2 | 7 ASCII bits and 2 stop bits<br>Parity: Even    Command level: 1, 2 or 3 |

*1  Equivalent to station No. setting in the GOT

- Setting of switches on rear face (C200H-LK201-V1)

***Table 1.8:***

| Set item | Switch setting | | Remarks |
|---|---|---|---|
| Procedure | DTP.SW No.3 | ON | 1:N procedure |
| 5 V power supply | DTP.SW No.4 | OFF | 5 V is not supplied. |
| CTS changeover | Selector switch | Upper side | External |

(C200H-LK202-V1)

***Table 1.9:***

| Set item | Switch setting | | Remarks |
|---|---|---|---|
| Procedure | Right selector switch | Lower side | 1:N procedure |
| Connection of terminal resistor | Left selector switch | Upper side | Provided |

• Cautions

Operation mode of the SYSMAC C Series
When changing the current value and the set value of each device in the C Series PLC, the PLC should be set to the monitor mode.
If the GOT is connected and the C Series PLC is started up in the running mode, the GOT automatically sets the PLC to the monitor mode so that the data can be changed.

***Table 1.10:***

| Mode of PLC at startup | GOT operation |
|---|---|
| Running mode | GOT changes over PLC from running mode to monitor mode to enable data change. |
| Monitor mode | PLC remains in monitor mode, and data change is enabled. |
| Program mode | PLC remains in program mode, and data change is enabled. |

- Forced setting to ON/OFF in the HPP mode (GOT function)

  In the HPP mode of the GOT, the forced ON/OFF function is available. This function is available also when the C Series PLC is connected as the host unit.
  However, have in mind that the forced ON/OFF function offers the following operation in the C Series PLC.

  *The forced setting/resetting function in the C Series PLC holds the current ON/OFF status without regard to a sequence program.
  The forced ON/OFF function described here sets a specified bit to ON/OFF. If a sequence program gives an ON/OFF command after that, the status of the specified bit device which has been forcedly set to ON/OFF is changed.
  Forced ON   : Data "1" is specified. (The specified bit is set to ON.)
  Forced OFF : Data "0" is specified. (The specified bit is set to OFF.)

• Restriction in functions
  When a host link unit is connected, the following GOT functions are disabled or restricted.

  - Because the GOT switch function (which sets a bit to ON/OFF) uses a host link command, FK command (which sets/resets multi-points forcedly), the switch function is not available in models which do not support the FK command.
  - The set value of timers (T) and counters (C) cannot be monitored nor changed.
  - When the RS-232C is connected for communication, the printer output function of the GOT is disabled.

## 1.11 Connection of FLEX-PC N Series

The GOT can be connected to the FLEX-PC N Series manufactured by FUJI ELECTRIC via a following link unit.

- Connection type   :LINK PORT (RS-422)
                               :LINK PORT (RS-232C)      Select either one by the environment set-
                               :CPU PORT (RS-232C)      ting or the software to create screens.

- Applicable PLC and link unit

  < FLEX-PC N Series >
  A link unit (general-purpose RS-232C/RS-485 interface module) is required to be attached.
  Or a CPU with built-in RS-232C interface is required.

- System configuration



RS422 | RS232C

To link unit or
built-in
RS-232C
interface
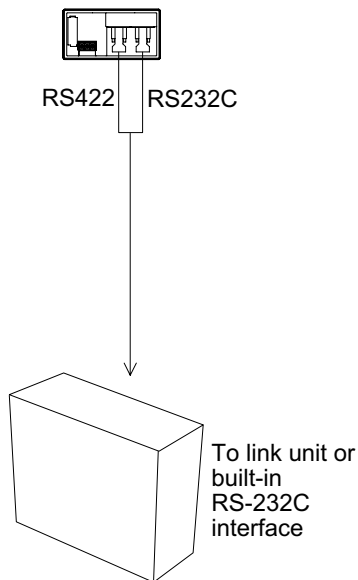
- Link unit
  - NB Series
    NB-RS1-AC
    NB-RS1-DC
  - NJ Series
    NJ-RS2
    NJ-RS4
  - NS Series
    NS-RS1
  - CPU with built-in RS-232C interface
    NJ-CPU-B16

- Connection diagram
  Connect the GOT to the link unit (PLC) as shown below.

In link connection (RS-422)
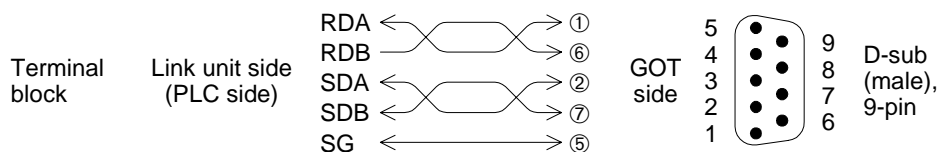


In link connection (RS-232C)
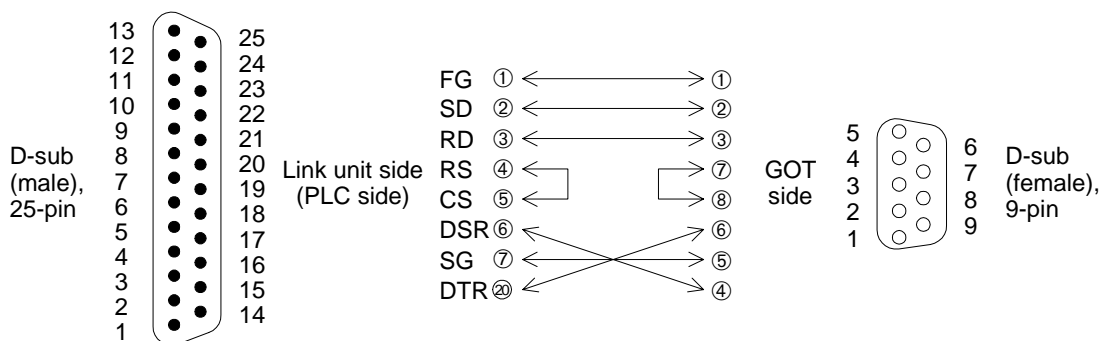


In connection of built-in RS-232C interface
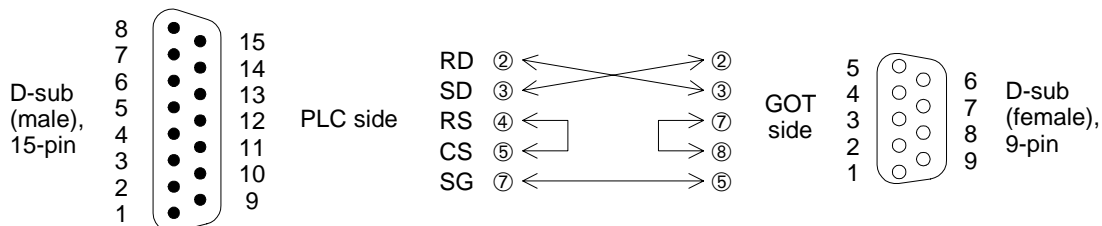
- When connecting the FLEX-PC N Series, the following setting is required in the link unit side.
  - Setting of link unit or built-in RS-232C interface

*Table 1.11:*

| Connection type of used port | RS-422 (LINK PORT) | RS-232C (LINK PORT) | RS-232C (CPU PORT) |
|---|---|---|---|
| Mode | 3: Set by command Start-stop synchronization, non-procedure | 1: Set by command Start-stop synchronization, non-procedure | — |
| Transmission speed | 19,200 (bps) | | |
| Data bit | 7 bits (JIS) | | 8 bits (HEX) |
| Parity bit | Even | | Odd |
| Station No. | 00 to 15 (in accordance with setting in GOT) | | — |

Setting example:
In the N Series, set the communication format while referring to setting examples shown below.

**In the case of NJ-RS4**
Switches on front face

*Table 1.12:*

| Set item | Description | | Remarks | |
|---|---|---|---|---|
| Mode | MODE SW | 3 | Set by command, start-stop synchronization | No-procedure |
| Station No. | Station No. setting switch × 10 | *1 | Upper digit | |
| | × 1 | *1 | Lower digit | |

*1 Align it with the station No. setting in the GOT.

Switches on rear face

*Table 1.13:*

| Set item | Description | | Remarks |
|---|---|---|---|
| Terminal resistor | Selector switch 1 | ON | Receive line is provided. |
| | Selector switch 2 | ON | Send line is provided. |
| Communication condition | DIP.SW | 1:OFF 2 to 8:ON | Set by switch 19,200 bps, 7 data bits, 1 stop bit, even parity |

**In the case of NJ-RS2**
Switches on rear face

*Table 1.14:*

| Set item | Description | | Remarks | |
|---|---|---|---|---|
| Mode | MODE SW | 1 | Set by command, start-stop synchronization | No-procedure |
| Communication condition | DIP.SW | 1:OFF 2 to 8:ON | Set by switch 19,200 bps, 7 data bits, 1 stop bit, even parity | |

**NJ-CPU-B16**    Setting by parameter (50H)

Parameter (50H): 0057H    Communication speed : 19,200 bps
                                          Stop bit                 : 1 bit
                                            Character length    : 8 bits
                                            Parity                   : Odd

- When connecting the FLEX-PC, have in mind the following restrictions.

    - The set values of timers (T) and counters (C) cannot be monitored nor changed.

    - When the RS-232C is connected for communication, the printer output function of the GOT is disabled.

## 1.12     Connection by general-purpose communication

The GOT can be connected to a general controller such as a micro computer board.
(The connected controller is hereafter referred to as "host (unit)".)

- Outline

  In general-purpose communication, the host unit is connected to the GOT via the RS-422/
  RS-232C, and functions as the parent station. Inside the GOT, there is a data area to hold
  word data and bit data. The host unit can read from and write to the data area using com-
  munication commands.
  The contents of display and control in the GOT are determined by the screen data created
  using the screen creation software in the personal computer. The screen data specifies the
  layout of objects displayed on the screen, and specifies actions to be performed by pressing
  of touch keys.
  The GOT is equipped with the function to display the word data in the form of numerics and
  bar graphs, the function to access the data for changing the status of the bit data using
  switches, etc. The target of access at this time is the data area inside the GOT. The data
  location to be accessed is specified by the screen data.
  Accordingly, to display the data stored in the host unit on the screen, the host unit should
  transfer the data to the data area inside the GOT using write commands. The transfer desti-
  nation is a location specified by the screen data. The data change result by manipulation of
  keys can be transferred from the data area inside the GOT to the host unit if the host unit
  gives read commands. In general-purpose communication, interrupt codes can be sent as
  change triggers.
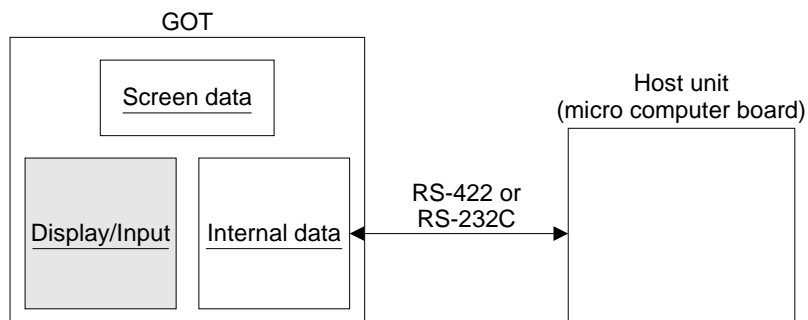
- Connection diagram

  Connect the GOT to the host unit as shown below.
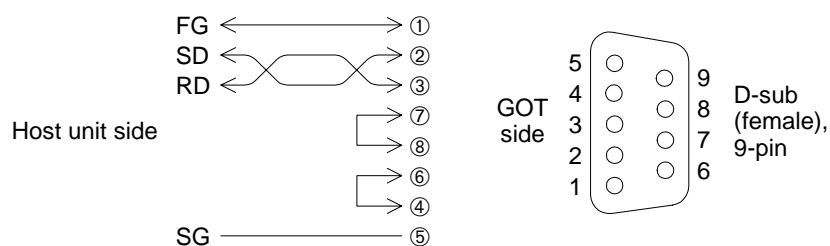


* Control lines RTS, CTS, DTR and DSR are not used.

- Communication setting

  The setting related to communication can be performed using the screen creation software or the GOT main body. (As to the screen creation software, refer to the operation manual of the software.)

  To use general-purpose communication, select "SET-UP MODE", "PLC TYPE" and "UNI-VERSAL" in this order in the GOT main body.

  To set the communication speed (baud rate), the data length, the stop bit length and the parity, select "SET-UP MODE" and "SERIAL PORT (RS-232C)" in this order in the GOT main body.

  Set each parameter to an either available value shown below.

***Table 1.15:***

| Baud rate | 19,200, 9,600, 4,800, 2,400, 1,200, 600 or 300 (bps) |
|---|---|
| Data length | 8 or 7bits |
| Stop bit length | 1 or 2bits |
| Parity | Even, odd or none |

- Communication procedure

  In communication between the GOT and the host unit, the host unit sends a command, and the GOT sends back a response. While the GOT is sending the response to the host unit, the GOT cannot receive new commands from the host unit.
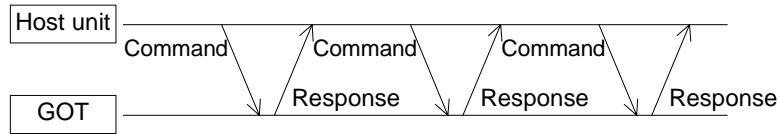
  

  When an error occurs, the GOT sends back a NAK code as a response. The contents of the error can be checked by reading a special memory.

  As an exception, when a notification of interrupt from the GOT is given, the GOT sends an interrupt code. However, while sending a response, the GOT does not send an interrupt code. In such a case, immediately after sending a response, the GOT sends an interrupt code. The GOT may send an interrupt code while receiving a command.
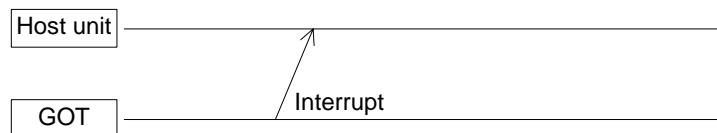
  

  When an event such as change in the ON/OFF status of a specific bit and screen changeover has occurred, the GOT sends an interrupt code. The table below shows the correspondence between the interrupt code and the event type.

***Table 1.16:***

| Event type | Interrupt code (hexadecimal) |
|---|---|
| M8000 is changed to ON.<br>M8000 is changed to OFF. | 50<br>51 |
| M8001 is changed to ON.<br>M8001 is changed to OFF. | 52<br>53 |
| ⋮ | |
| M8023 is changed to ON.<br>M8023 is changed to OFF. | 7E<br>7F |
| ⋮ | |
| M8049 is changed to ON.<br>M8049 is changed to OFF. | B2<br>B3 |
| Display screen is changed over. | 20 |
| Input of a numeric is completed. | 21 |
| Transfer of a data file is completed. | 22 |

- Transmission statement configuration

  Transmission statements sent and received between the GOT and the host unit are classified into the following three formats. Type 1 and Type 2 can replace each other. When the sum is not attached to a command, use Type 1. When the sum is attached, use Type 2.

### Type 1 (without the sum)

When a command is Type 1, a response to it will be Type 1 or Type 3.

| STX | Transmission data | CR |
|-----|-------------------|----|
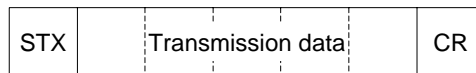
### Type 2 (with the sum)

The targets of the sum are the entire text and ETX. The result of addition (excluding STX) is converted into an ASCII code and sent. The sum consists of the upper digit and the lower digit in this order.
When a command is Type 2, a response to it will be Type 2 or Type 3.

| STX | Transmission data | ETX | Sum |
|-----|-------------------|-----|-----|
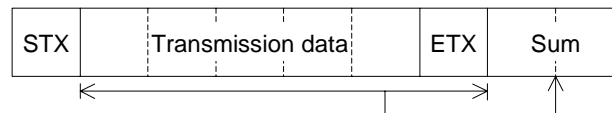
### Type 3

This type of format consists of only one character. This format is used for responses (ACK or NAK) and interrupt codes.

| Data |
|------|

The table below shows characters available in statements. Interrupt codes includes unused codes.

*Table 1.17:*

| | Character code (hexadecimal) |
|---|---|
| STX | 02 |
| ETX | 03 |
| CR | 0D |
| ACK | 06 |
| NAK | 15 |
| '0' to '9' | 30 to 39 |
| 'A' to 'F' | 41 to 46 |

| | Character code (hexadecimal) |
|---|---|
| Interrupt code | 20 to 2F |
| Interrupt code | 50 to 7F |
| Interrupt code | 80F to FF Valid only when data length is 8 bits |
| | |
| | |

• Command

Use the following commands for communication with the GOT.

- Read : Read the data stored in the GOT.

Command

| STX | '0' | Read address | Size | CR | Type 2 may be used. |

"0" at the head indicates a read command.

Read address:
Using ASCII codes, specify the head address (hexadecimal) of the data stored in the GOT. The read address should be specified in turn from the upper digit.

Size:
In the unit of byte, specify the size of the read data (01H to FFH). The maximum allowable size is 255 bytes.  "FFH" indicates 255 bytes. The size should be specified in the order of upper digit and lower digit (in ASCII codes). For example, enter "8 + A" to specify 8AH bytes (= 138 bytes).

Response

| STX | Data 1 | Data 2 | ································· | CR |

Data:
The data stored in the specified address is stored in turn.
One-byte data is converted into ASCII codes, and sorted in the order of upper digit and lower digit.

Example: When 2-byte data is read from the address 12EH (format = Type 2)

Command

| STX | '0' | '0' | '1' | '2' | 'E' | '0' | '2' | ETX | '6' | 'D' |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 02H | 30H | 30H | 31H | 32H | 45H | 30H | 32H | 03H | 36H | 44H |

Sum = 6DH

Response

| STX | '5' | 'A' | '3' | '8' | ETX | 'E' | '4' |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 02H | 35H | 41H | 33H | 38H | 03H | 45H | 34H |

Sum = E4H

Memory inside GOT

| 12E | 5A |
| 12F | 38 |

Each data is expressed in hexadecimal.

- Write : Overwrite the data stored in the GOT.

Command

| STX | '1' | Write address | Size | Data 1 | Data 2 | --------- | CR |
|-----|-----|---------------|------|--------|--------|-----------|-----|

Type 2 may be used.

"1" at the head indicates a write command.

Write address:
Using ASCII codes, specify the head address (hexadecimal) of the data stored in the GOT. The write address should be specified in turn from the upper digit.

Size:
In the unit of byte, specify the size of the write data (01H to FFH). The maximum allowable size is 255 bytes. "FFH" indicates 255 bytes. The size should be specified in the order of upper digit and lower digit (in ASCII codes).

Data:
Sort the write data in the ascending order of address.
Convert one-byte data into ASCII codes, and sort it in the order of upper digit and lower digit.
The maximum allowable number of data is 255 (510 after converted into ASCII codes).

Response

| ACK |
|-----|

---

Example: When 2-byte data is written to the address 120H (format = Type 2)

Command

| STX | '1' | '0' | '1' | '2' | '0' | '0' | '2' | '3' | 'E' | '7' | '5' | ETX | '3' | 'D' |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 02H | 31H | 30H | 31H | 32H | 30H | 30H | 32H | 33H | 45H | 37H | 35H | 03H | 33H | 44H |

Response

| ACK |
|-----|
| 06H |

Memory inside GOT

| 120 | 3E |
|-----|-----|
| 121 | 75 |

Each data is expressed
in hexadecimal.

120H stores the upper side of the word data D144. 121H stores the lower side of the word data D144. The value of D144 is 3E75H (= 15989).

---

• Memory map

The data stored in the GOT is classified into two types, word data (D) and bit data (M). An address is assigned to each data, and each data is laid out as follows.
When specifying data using the screen creation software, use the device (D or M). When specifying data from the host unit, use the address.

< Word data >

There are 4,096 word devices, and a serial No. (from 0 to 4,095) is assigned to each of them.
Each word data is stored in the order of upper side and lower side. In the case of a double word (32-bit) data, data is stored from the higher address to the lower address.

| | |
|---|---|
| 0000 | D0  (H) |
| 0001 | D0  (L) |
| 0002 | D1  (H) |
| 0003 | D1  (L) |
| ⋮ | |
| 1FFE | D4095  (H) |
| 1FFF | D4095  (L) |

< Bit data >

There are 2,048 bit devices, and a serial number (from 0 to 2,047) is assigned to each of them. Each address stores 8-bit data.

| | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|
| 2000 | M  7 | M  6 | M  5 | M  4 | M  3 | M  2 | M  1 | M  0 |
| 2001 | M 15 | M 14 | M 13 | M 12 | M 11 | M 10 | M  9 | M  8 |
| ⋮ | | | | | | | | |
| 20FF | M2047 | M2046 | M2045 | M2044 | M2043 | M2042 | M2041 | M2040 |

< Special memory >
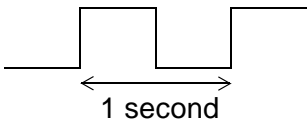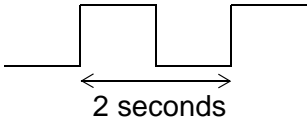
In addition, there are 16 word devices and 64 bit devices for special purpose in the GOT.

| | |
|---|---|
| 2100 | D8000 (H) |
| 2101 | D8000 (L) |
| 2102 | D8001 (H) |
| 2103 | D8001 (L) |
| ⋮ | |
| 211E | D8015 (H) |
| 211F | D8015 (L) |

| | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|
| 2200 | M8007 | M8006 | M8005 | M8004 | M8003 | M8002 | M8001 | M8000 |
| 2201 | M8015 | M8014 | M8013 | M8012 | M8011 | M8010 | M8009 | M8008 |
| 2202 | M8023 | M8022 | M8021 | M8020 | M8019 | M8018 | M8017 | M8016 |
| 2203 | M8031 | M8030 | M8029 | M8028 | M8027 | M8026 | M8025 | M8024 |
| 2204 | M8039 | M8038 | M8037 | M8036 | M8035 | M8034 | M8033 | M8032 |
| 2205 | M8047 | M8046 | M8045 | M8044 | M8043 | M8042 | M8041 | M8040 |
| 2206 | M8055 | M8054 | M8053 | M8052 | M8051 | M8050 | M8049 | M8048 |
| 2207 | M8063 | M8062 | M8061 | M8060 | M8059 | M8058 | M8057 | M8056 |

Each data indicates the following contents.

*Table 1.18:*

| Device | Description |
|---|---|
| M8000 to M8049 | Interrupt output<br>When the bit data status changes, the GOT sends an interrupt code to the host unit. When the data length is 7 bits, interrupt codes for M8024 to M8049 are not output. Even if the host unit overwrites this data, the GOT does not output interrupt codes. |
| M8050 | 1-second cycle clock<br><br>1 second |
| M8051 | 2-second cycle clock<br><br>2 seconds |
| M8052 to M8063 | Unused |
| D8000, D8001 | 32-bit counter of 100 ms<br>The time after the power is turned on is counted in the units of 100 ms. The lower word is stored in D8000. The upper word is stored in D8001. |
| D8002 | Contents of communication error<br>This device indicates the contents of an error occurred in communication with the host unit.<br>0: No error<br>1: Parity error<br>2: Framing error<br>3: Overrun error<br>4: Incorrect format of statement<br>5: Incorrect command |
| D8003 to D8015 | Unused |

- Program example

  This program writes "31,000" to D10, and "15,600" to D11. In hexadecimal, "31,000" is expressed as "7918H", and "15,600" as "3CF0H".

  D10 [          ]

  D11 [          ]

```
10'        Sample program
20'
500        T0=3000
           : ' Counter waiting for receive (to be adjusted in accordance with speed of computer)
530        ERFLG=0
610        STX$=CHR$(2)
620        CR$=CHR$(13)
630        ACK$=CHR$(6)
640        NAK$=CHR$(&H15)
1000    * DATASEND      : ' Send of statement
1010       CLOSE#1
1020       OPEN"COM1:"AS#1
1030       SENDDATA$="100140479183CF0"      : ' Send statement
1040       PRINT#1,STX$;SENDDATA$;CR$;
1100    * REC0      : ' Receive of first character
1110       RVCNT=1
1120       GOSUB *JYUSHIN
1130       IF ERFLG=99 THEN GOTO *ERRORFIN1
1140       BUF$=RCV$
1150       HED$=LEFT$(BUF$,1)
1160       IF HED$=ACK$ THEN GOTO *FIN
1170    * ERRORFIN1
1180       PRINT "Error code is sent back."
1190       GOTO *FIN
1700    * ERRORFIN1
1710       PRINT "No response"
2000    * FIN
2010       CLOSE#1
2020       END
2100    * JYUSHIN     : ' Waiting for receive
2110       FORI=1 TO T0
2120       RCV$=""
2130       IF LOC(1)=>RVCNT THEN GOTO *BUFIN
2140       NEXT
2150       IF RCV$=""THEN ERFLG=99
2160       RETURN
2200    * BUFIN    : ' Read of receive data
2210       RCV$=INPUT$(RVCNT,#1)
2220       RETURN
```

## 1.13    Save destination and backup of screen data

The following data is saved in the RAM or the flush memory of the GOT.
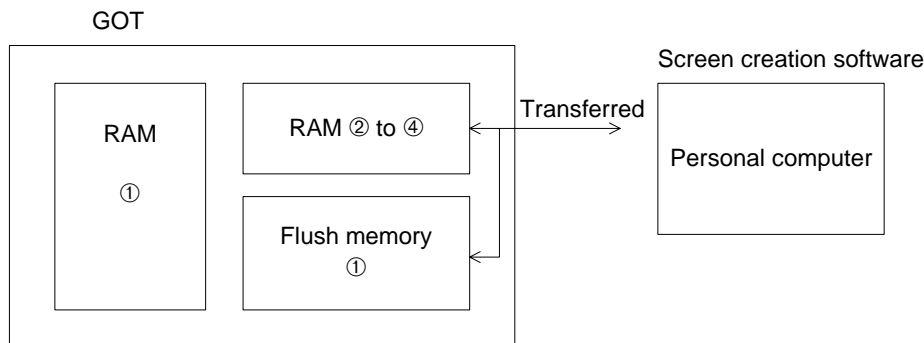


RAM area: Backed up by built-in battery.

1) Contents set in "SET-UP MODE" (described in Paragraph 2.2) in the GOT

2) Alarm history

3) Data collected by sampling

4) Current time


Flush memory area: Does not require any battery.

1) Data created by the screen creation software
   Screen data and data set in "SET-UP MODE", "ALARM MODE" and "SAMPLING MODE (SET CONDITION)"


• When the data is transferred between the screen creation software and the GOT, the data saved in the RAMs 2, 3 and 4 and the flush memory 1 is transferred.  The data saved in the RAM 1 is not transferred to the personal computer.

• The operation environment (SET-UP MODE) can be set in the GOT (saved in the RAM 1) or the screen creation software (saved in the flush memory 1), and the priority is given to the contents set later.
  When the operation environment is set in the GOT, the contents of the setting are saved in the RAM 1.  In this case, if the battery power becomes low, the saved data may be deleted or uncertain, and communication with the PLC may be disabled.
  It is recommended to set the operation environment in the screen creation software.

# 2.    Start up

This section describes the start up procedure from turning ON the power of the GOT to selection of the mode.
This section describes also the environment setting important to use of the GOT. Make sure to read this section carefully.

## 2.1    Start up procedure

This paragraph describes the start up procedure form turning ON the power of the GOT to selection of the mode.
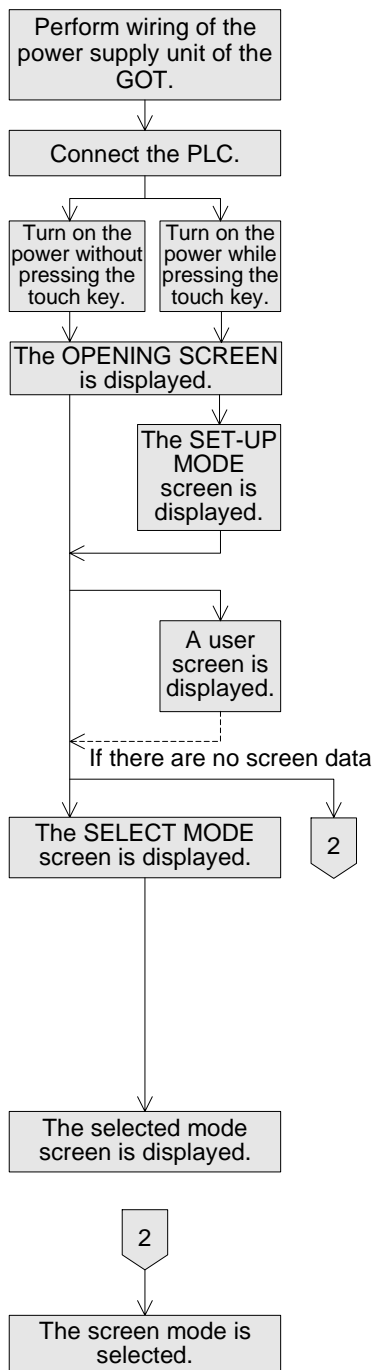
| | |
|---|---|
| Perform wiring of the power supply unit of the GOT. | • Perform wiring of the power supply unit of the GOT. |
| Connect the PLC. | • Connect the GOT and the PLC with an optional connection cable. |
| Turn on the power without pressing the touch key. / Turn on the power while pressing the touch key. | • Turn on the power of the GOT. When the power is turned on while the upper left corner (which functions as a touch key) of the screen of the GOT is pressed and held for 1 second or more, the SET-UP MODE screen is displayed. |
| The OPENING SCREEN is displayed. | • The OPENING SCREEN screen indicating the model name, the version, etc. is displayed for the period of time set in "OPENING SCREEN" on the SET-UP MODE screen. |
| The SET-UP MODE screen is displayed. | • On the SET-UP MODE screen, set the used mode, the connected PLC name, etc. The operation environment can be set on the OTHER MODE screen also. |
| A user screen is displayed. | • A user screen is displayed.  If there are no user screens, the next SELECT MODE screen is displayed. |

If there are no screen data

The SELECT MODE screen is displayed.    **2**

• The SELECT MODE screen is displayed.  Each menu item on the screen functions as a touch key.  When an item is pressed, the corresponding mode is selected.
  \* This SELECT MODE screen can be called also by pressing a corner of the screen set in "MAIN MENU CALL KEY" on the SET-UP MODE screen.

[SELECT MODE SCREEN]

| [SELECT MODE] | END |
|---|---|
| USER SCREEN MODE | ▼ |
| HPP MODE | |
| TEST MODE | ▲ |
| OTHER MODE | |

The selected mode screen is displayed.

• The selected mode screen is displayed.

**2**

The screen mode is selected.

• If the menu call key is not set in "MAIN MENU CALL KEY" on the SET-UP MODE screen, the screen mode (in which user screens are displayed) is selected.

## 2.2    Operation environment setting

The operation environment setting function performs initial setting important to operation of the GOT. The SET-UP MODE screen can be displayed by turning on the power while pressing and holding the upper left corner of the screen in accordance with "2.1 Start up procedure" or by selecting "OTHER MODE" on the SELECT MODE.
If an entry code has been registered using the security function (to protect screens), the operation environment can be set only when an entry code input by the user is equivalent to the registered entry code.

| Turn on the power while pressing and holding the upper left corner of the screen. |
| --- |

↓

| Set the system language. (Refer to the next page.) |
| --- |

↓

| Press the END key. |
| --- |

↓

| The SET-UP MODE screen is displayed as shown on the right. |
| --- |

[SET-UP MODE SCREEN]

| [SET-UP MODE] | END | — 11) |
| --- | --- | --- |
| 1) — LANGUAGE | ▲ | — 12) |
| 2) — PLC TYPE | | |
| 3) — SERIAL PORT (RS232C) | ▼ | — 12) |
| 4) — OPENNING SCREEN | | |
| 5) — MAIN MENU CALL KEY | | |
| 6) — SET CLOCK | | |
| 7) — SET BACKLIGHT | | |
| 8) — BUZZER | | |
| 9) — LCD CONTRAST | | |
| 10) — CLEAR USER DATA | | |
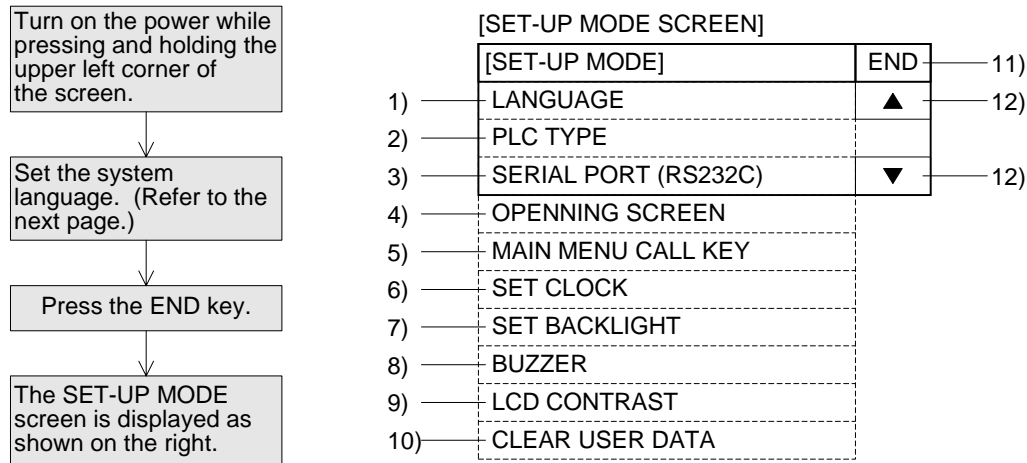
The areas enclosed with broken lines function as touch keys. (Broken lines are not actually displayed on the screen.)

1) LANGUAGE
   Allows to set the language displayed on the system screens such as Japanese and English.
2) PLC TYPE
   Allows to set the connected PLC type.
3) SERIAL PORT (RS232C)
   To be selected when a printer is connected to the GOT or when communication is performed between the GOT and a micro computer board.
4) OPENING SCREEN
   Allows to set the duration in which the OPENING SCREEN screen is displayed immediately after the power is turned on.
5) MAIN MENU CALL KEY
   Allows to set the position of the touch key which calls the SELECT MODE screen from the screen mode (in which user screens are displayed).
6) SET CLOCK
   Allows to set the time used in the time switch and the time display.
7) SET BACKLIGHT
   Allows to set the time at which the backlight automatically turns off.
8) BUZZER
   Allows to set the buzzer sound issued when a key is pressed.
9) LCD CONTRAST
   Allows to set the LCD brightness.
10)CLEAR USER DATA
   Deletes the user screen data.

**◆ MITSUBISHI**

11)END
Exits the SET-UP MODE screen.

12)Cursors
Change over the menu item on the SET-UP MODE screen.

■**Important point**

When the items 1) to 5), 7) and 8) are set in the GOT and the screen data created using the screen creation software is transferred, the operation environment setting selected in the screen creation software becomes valid. In such a case, set the operation environment in the GOT again or align from the beginning the setting of the items 1) to 5), 7) and 8) above with that in the screen creation software.

Each setting screen is displayed as shown below. On each screen, when the END key at the upper right corner is pressed after setting is completed, the SET-UP MODE screen is displayed.

[LANGUAGE]

| [LANGUAGE] | END |
|---|---|
| SYSTEM LANGUAGE: | |
| JAPANESE | |

— 1)

• Set the language used on the system screens and the user screens.

1) SYSTEM LANGUAGE
Allows to set the language displayed on the system screens and in error messages.
(Japanese or English)

[PLC TYPE]

| [PLC TYPE] | | END |
|---|---|---|
| PLC TYPE | FX SERIES | — 1) |
| CONNECTION | CPU PORT (RS422) | — 2) |
| STATION # | 0 0 | — 3) |

• Select the connected PLC type.

• The areas on the screen enclosed with solid lines function as touch keys. Every time a touch key is pressed, the displayed contents are changed over.

1) PLC TYPE
Allows to select any one among FX SERIES, A SERIES, C SERIES (manufactured by OMRON), N SERIES (manufactured by FUJI ELECTRIC) and UNIVERSAL (general-purpose communication).

2) CONNECTION
Allows to set the connection method of the PLC selected in 1) above.

- CPU PORT: The GOT is directly connected to the programming connector in the PLC (RS-422 or RS-232C). The FX Series, the A Series, a motion controller and the N Series are available.

- LINK PORT (RS-422): The GOT performs communication in accordance with RS-422 via a link unit. The A Series, the C Series and the N Series are available.

- LINK PORT (RS-232C): The GOT performs communication in accordance with RS-232C via a link unit. The A Series, the C Series and the N Series are available.

3) STATION #
Allows to set the station No. of the link unit connected to the GOT when "LINK PORT" is selected in 2) above.

[SELIAL PORT]

| [SELIAL PORT] | | | END |
|---|---|---|---|
| SPEED | 19200bps | PARITY | EVEN |
| DATA | 7BITS | | DSR/DTR |
| STOP | 1BITS | PRINTER | DON'T USE |

• Set the serial communication parameters for the printer used to print out alarm messages and sampling data.

• Make sure to set "PRINTER" to "USE" when a printer is connected. **When it is set to "USE", however, the two-port interface function is not available.**

• The areas enclosed with broken lines function as touch keys. Every time a touch key is pressed, the displayed contents are changed over.

• When "LINK PORT (RS-232C)" is selected on the PLC TYPE screen, any printer cannot be connected.

[OPENNING SCREEN]

| [OPENNING SCREEN] | | | | | | | END |
|---|---|---|---|---|---|---|---|
| DISPLAY TIME | | | | 4 SEC. | | | |
| 5 | 6 | 7 | 8 | 9 | - | ▲ | CLR |
| 0 | 1 | 2 | 3 | 4 | | ▼ | ENT |

- Set the duration in the unit of second in which the OPENING SCREEN indicating the model name, the version, etc. is displayed immediately after the power is turned on.
- When the touch key "DISPLAY TIME" which is enclosed with broken lines is pressed, the time can be set using the ten-key pad displayed at the bottom of the screen.
- Enter the desired display time using the ten-key pad displayed at the bottom of the screen, then press the ENT key to register the input time.
  * If "DISPLAY TIME" is set to "0". the screen mode is selected immediately after the power is turned on and a user screen is displayed.
  It is recommended to set 1 second or more for the FX Series and 4 seconds or more for the A Series.

[MAIN MENU CALL KEY]

| [MAIN MENU CALL KEY] | END |
|---|---|
| SELECT CALL KEY LOCATION | |

- Set the menu call key which changes over the screen mode (in which a user screen is displayed) to the SELECT MODE screen.
  The menu call key is mesh type, and $2 \times 2$ in size.
- One or two corners can be selected among the four corners of the screen.
- **When the menu call key is not set, only the screen mode is available. Any other mode is not available.**
- If another touch key is assigned to the corners to which the menu call key has been assigned, the main menu call function is disabled.

[SET CLOCK]

| [SET CLOCK] | | | | | | | END |
|---|---|---|---|---|---|---|---|
| 6 / 15 / 1999  22: 02: 38 | | | | | | | |
| 5 | 6 | 7 | 8 | 9 | - | ▲ | CLR |
| 0 | 1 | 2 | 3 | 4 | | ▼ | ENT |

- Set the time used in the time display and the time switch.
- When the date or time displayed on the screen is selected, the desired date or time can be entered using the ten-key pad displayed at the bottom of the screen.
  Enter the desired date or time, and press the ENT key to register it.

[SET BACKLIGHT]

| [SET BACKLIGHT] | | | | | | | END |
|---|---|---|---|---|---|---|---|
| OFF TIME | | 10 MIN | | | | | |
| 5 | 6 | 7 | 8 | 9 | - | ▲ | CLR |
| 0 | 1 | 2 | 3 | 4 | | ▼ | ENT |

- Set the time at which the display backlight turns off. When a touch key is not pressed or the user screen is not changed over within the specified OFF time, the backlight turns off.
- When "OFF TIME" is pressed, the OFF time can be set within the range from 1 to 99 minutes using the ten-key pad displayed at the bottom of the screen. Enter the desired time, and press the ENT key to register it.
- The service life of the backlight is 50,000 hours.
- The specified bit of the control device (system information) should be set to ON so that the backlight OFF function is enabled. (Refer to Paragraph 8.6.)

[BUZZER]

| [BUZZER] | END |
|---|---|
| ● BUZZER ON | |
| BUZZER OFF | |

- Set whether or not the buzzer is to sound when a key is pressed or an error occurs.
- Select "BUZZER ON" or "BUZZER OFF".

[LCD CONTRAST]

| [LCD CONTRAST] | END |
|---|---|
| ◄ ■ ► | |

- The LCD brightness can be set in 15 steps. When the "◄" key is pressed, the LCD becomes darker. When the "►" key is pressed, the LCD becomes brighter.

[CLEAR USER DATA]

| [CLEAR USER DATA] | END |
|---|---|
| OK TO CLEAR USER DATA? | |
| YES        NO | |

- The screen data stored in the GOT can be cleared.
- When "YES" is selected, the message "NOW CLEARING USER DATA" is displayed. While this message is displayed, any key is not accepted.
- When the message "DISPLAY SCREEN IS NOT AVAILABLE." is displayed, the screen data is cleared completely. At this time, the screen mode is automatically selected.

## 2.3     Each mode selection procedure

[SET-UP MODE SCREEN]

| [SET-UP MODE] | END |
|---|---|
| USER SCREEN MODE | ▲ |
| HPP MODE | |
| TEST MODE | ▼ |
| OTHER MODE | |

- If "MAIN MENU CALL KEY" has been set in "SET-UP MODE", when a specified touch key is pressed, the SELECT MODE screen shown on the left is displayed.
- The outline of each mode and the selection procedure are described below.

| USER SCREEN MODE |
|---|

| Production control |
| Number of products 1234 |
| Operation rate |
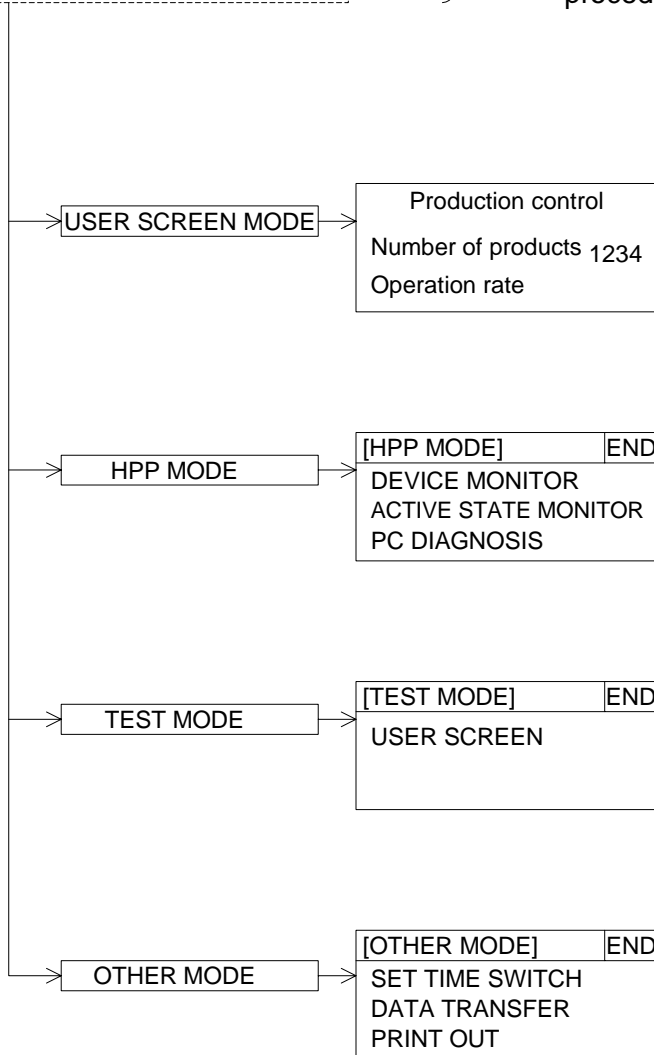
- USER SCREEN MODE (Refer to Sections 3, 8, 9, 10, 11 and 12.) A user screen is displayed. Characters such as alphabets, numbers, Katakana and Hiragana and simple graphic can be displayed.

| HPP MODE |
|---|

| [HPP MODE] | END |
|---|---|
| DEVICE MONITOR | |
| ACTIVE STATE MONITOR | |
| PC DIAGNOSIS | |

- HPP MODE (Refer to Section 4.) Bit devices and word devices in the PLC can be monitored. In addition, set values of T, C and D can be changed.

| TEST MODE |
|---|

| [TEST MODE] | END |
|---|---|
| USER SCREEN | |

- TEST MODE (Refer to Section 5.) The contents of the user screens can be confirmed. In addition, data files can be edited, and debugging can be performed.

| OTHER MODE |
|---|

| [OTHER MODE] | END |
|---|---|
| SET TIME SWITCH | |
| DATA TRANSFER | |
| PRINT OUT | |

- OTHER MODE(Refer to Section 6.) Setting of the time switch, printer output, entry code, operation environment, etc, can be performed.

## 2.4    Security function (screen protection function)

In the user screen mode, screens can be set so that they are only open to certain operators who know the entry code. General operators cannot perform unnecessary operations. This function is called security function (screen protection function).

1) Outline of security function
   To use the security function, the security level should be set for each user screen.
   Set the level within the range of 0 (lowest) to 15 (highest). When any entry code has not been registered, all screens can be displayed (In this case, the security level is "0".).
   An entry code can be set using the screen creation software.
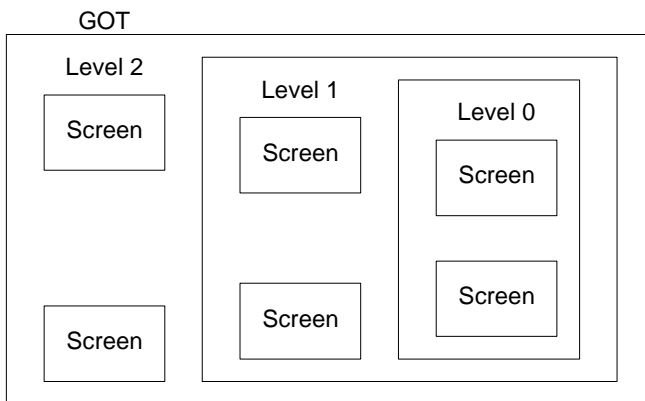


• An entry code can be set using up to 8 numeric characters.

By entering a correct code, the user can display and manipulate the screens whose security level is equivalent to or lower than the entered entry code.

2) Input of entry code
   To enter an entry code, the entry code input screen should be displayed.
   To display the entry code input screen, a touch key should be provided on the screen.



• **To set this touch key, enter "FF68" to the key code.**
• When the touch key is pressed, the entry code input screen is displayed.

• When a screen whose entry code level is higher is tried to be displayed, an alarm sound is issued three times. Set a touch key, and enter an entry code.
• When an entry code has been registered to the screen to be displayed at first in the screen mode (the screen No. 0 when screens have been created using the FX-PCS-DU/WIN-E or the screen No. 1 when screens have been created using the SW☐D5C-GOTRE-PACK), the entry code input screen is displayed even if a touch key to enter an entry code is not provided so that an entry code can be entered.

3) Reset of entry code
   To reset an entry code and return to the initial setting (in which security is valid), a touch key should be provided on the screen.

Screen example

```
┌─────────────────────────────────┐
│                                 │
│   ┌──────────────────┐          │
│   │ Reset of entry code │┄┄┄┄┄┄ Touch key
│   └──────────────────┘          │
│                                 │
└─────────────────────────────────┘
```
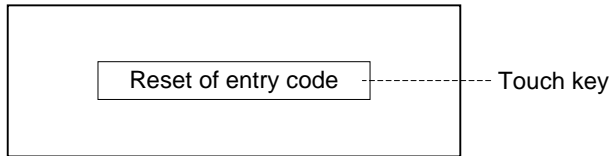
- To set this touch key, enter "FF69" to the key code.
- The entry code is reset also when the power of the F930GOT is turned off. When the power is turned on at the next time, the security is valid.
- It is recommended to lay out the entry code input key and the entry code reset key on the same screen.

4) Use example

```
┌──────────────────────────────────────────────────────────────┐
│ Level 4                                                        │
│ Entry code:  ┌────────────────────────────────────────────┐   │
│   444        │ Level 3                                     │   │
│              │ Entry code: ┌──────────────────────────┐    │   │
│              │   333       │ Level 2                   │    │   │
│              │             │ Entry code: ┌──────────┐  │    │   │
│              │             │   222       │ Level 1  │  │    │   │
│              │             │             │ Entry... │  │    │   │
│              │             │             │   111    │  │    │   │
│              │             │             │  ┌────┐  │  │    │   │
│              │             │             │  │Lvl0│  │  │    │   │
│ ┌────────┐   │ ┌────────┐  │ ┌────────┐  │  │... │  │  │    │   │
│ │Screen 5│   │ │Screen 4│  │ │Screen 3│  │  └────┘  │  │    │   │
│ └────────┘   │ └────────┘  │ └────────┘  │          │  │    │   │
└──────────────────────────────────────────────────────────────┘
```

(Levels: Level 4 Entry code: 444, Level 3 Entry code: 333, Level 2 Entry code: 222, Level 1 Entry code: 111, Level 0 Entry code: Not provided; Screen 5, Screen 4, Screen 3, Screen 2, Screen 1)
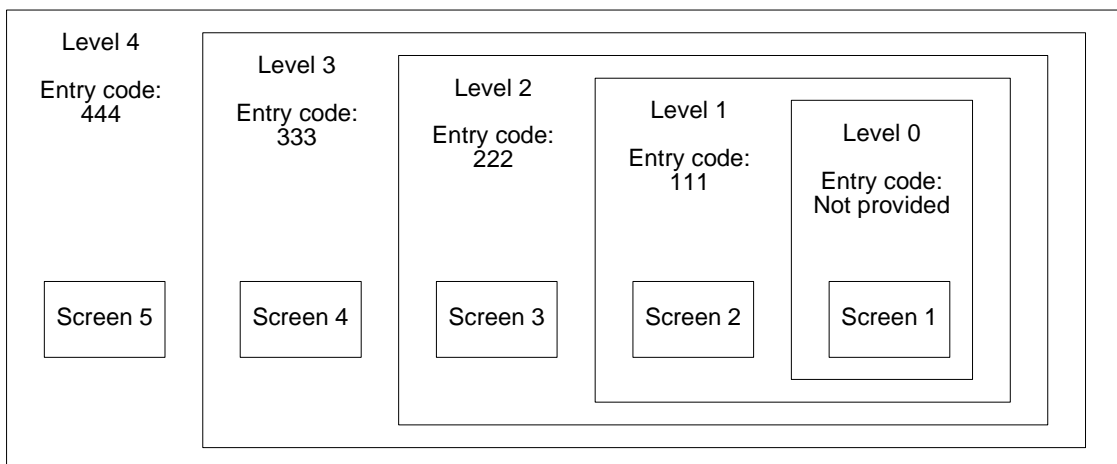
- Suppose that the security level is set in the screen creation software for Screens 1 to 5 shown above.
- In this case, Screen 1 is displayed when the power is turned on (Level 0).
- When an entry code "222" is entered, Screens 1 to 3 can be displayed and manipulated.
- When an entry code "444" is entered while Screens 1 to 3 are displayed, Screens 1 to 5 can be displayed and manipulated.
- When the entry code is reset while Screens 1 to 5 are displayed, Screen 1 is displayed (initial status).

\* In the use example shown above, the levels and the screen Nos. are consecutive for easy understanding. The levels and the screen Nos. are not necessarily consecutive.

   Example:   Screen 1   : Level 3
              Screen 2   : Level 7
              Screen 3   : Level 5
              Screen 10  : Level 2

- The system screens (screen Nos. 1000 and later) are treated as Level 15.

# MEMO

# 3.      Screen Mode

This section describes the screen mode in which user screens are displayed.
Confirm the outline of and the operating procedures in the screen mode.
For the contents related to the screen design, refer to Sections 7 to 11.

## 3.1      Outline of screen mode

In the screen mode, screens created by the user using the screen creation software are displayed. In addition, alarm messages are displayed.
On one display screen, characters, straight lines, rectangles, circles, etc. which are classified in accordance with their functions are combined and displayed.
When there are two or more user screens, they can be changed over using the operation keys in the GOT or using the PLC. (The user can set arbitrarily the condition to change over the screens and the screen to be displayed next.)
On one screen, the following elements can be displayed. (In the display example below, only a part of the available functions are used.)

<u>Example of display screen</u>
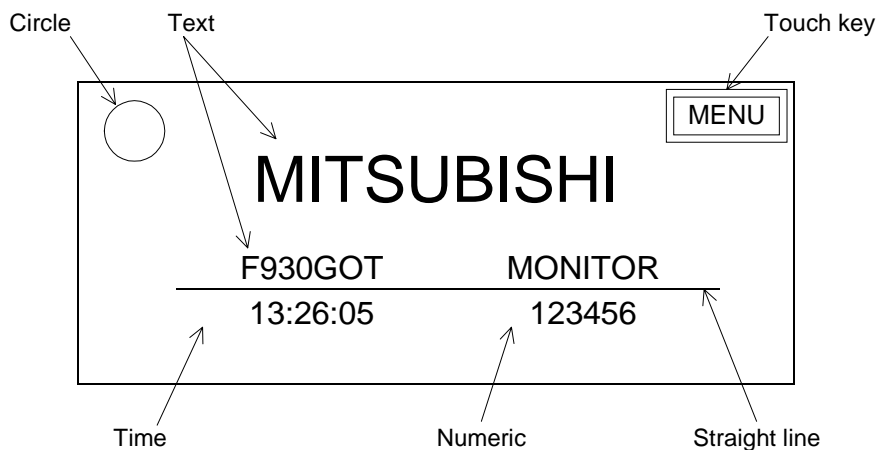
The functions used in the display example in the previous page can be mainly classified into four types.
The classified functions have the roles shown below.
(For the details of each function, refer to Sections 9 and 11.)

GOT                                                                                    PLC

| Display function | : This function displays the registered contents in the specified size in the specified position. Characters, external characters, straight lines, circles, etc. |

| Data display function | : This function monitors the contents of devices in the PLC in the specified size in the specified position. The specified area can be inverted by turning ON/OFF bit devices in the PLC. Numerics, bar graphs, indicators, etc. |

*1 The information inside the PLC is monitored.

Data is transferred to the PLC.

| Data transfer function | : This function turns ON/OFF specified devices in the PLC and overwrites the data when a specified input (operation key, touch key, etc.) is given. Touch keys, ten-key pad, etc. |

| Screen changeover function |
: This function sets the screen to be displayed next and the screen changeover condition.

*1 A part of the data display function can change set values and current values of word devices (T, C, D, Z and V) on the screen. The operating procedure is described in the next page.

## 3.2　Change of displayed data

Among the data displayed on the user screen, numeric data indicating set values and current values of word devices in the PLC can be changed by key operation.
In the screen creation software FX-PCS-DU/WIN-E, "Number" and "Ascii" can be changed. In the screen creation software SW☐D5C-GOTRE-PACK, "Numerical Input" and "Ascii Input" can be changed.

### 3.2.1　Common contents in data change

This paragraph describes the common contents in change of numeric data and ASCII code data.

- By touching a numeric or an ASCII code on the display screen, it can be changed.

  * In the FX-PCS-DU/WIN-E, "Number" and "Ascii" should have been set to "PERMIT". In the screen creation software SW☐D5C-GOTRE-PACK, "Numerical Input" and "Ascii Input" can be changed.

- A numeric character can be entered using two methods. In the first method, the keyboard for numeric input is always displayed. In the second method, the keyboard can be called when an input is required.

[When the keyboard is always displayed]

| OPERATION STATE MONITOR | | | | | | | | Cursor display |
|---|---|---|---|---|---|---|---|---|
| CURRENT VALUE 1 2 3 **4** 5 6 7 8 | | | | | | | | |
| 5 | 6 | 7 | 8 | 9 | - | ▲ | CLR | |
| 0 | 1 | 2 | 3 | 4 | | ▼ | ENT | |

- When a numeric or an ASCII code displayed on the screen is touched, the cursor is displayed and the numeric or the ASCII code can be changed using the displayed keyboard.
  When the SW☐D5C-GOTRE-PACK is used, "Project Unit" in "Auxiliary Setting" in "Common Setting" should have been set so that the key window is open.

- Press the CLR key to cancel the input. Press the ENT key to execute the input.

- When selecting another numeric or ASCII code, touch it on the screen or select it using the "▲" and "▼" keys.

[When the keyboard is called]　　Cursor display

| CURRENT VALUE 1 2 3 4 | 1 2 3 **4** | | | | CLR |
|---|---|---|---|---|---|
| | 6 | 7 | 8 | 9 | ▲ |
| | 2 | 3 | 4 | 5 | ▼ |
| | 0 | 1 | - | | ENT |

- If the keyboard is not displayed on the screen, when a numeric or an ASCII code displayed on the screen is touched, the ten-key pad is displayed as shown on the left so that numerics can be entered.

- To enter a numeric in hexadecimal or change the keyboard design, select an appropriate keyboard using the "Data Change" object.

- The keyboard is displayed at the lower right corner of the screen for the first time. By pressing the window movement part, the keyboard is moved to a position touched at the next time.

- When Katakana characters and alphabets are to be entered using ASCII codes, make sure that the keyboard to input Katakana characters and alphabets is always displayed on the screen. When the keyboard is used in the SW☐D5C-GOTRE-PACK, the keyboard should be created using the key codes for touch keys.
  When the keyboard is called, only 0 to 9 can be entered.

Data change condition: Numerics and bar graphs cannot be changed in the following cases.

1) GOT status

   a) While change is forbidden
      (when the screen is crated using the screen creation software FX-PCS-DU/WIN-E)
      When the data change target object is set to "FORBID", it cannot be changed.
      Countermeasures: Set the object to "PERMIT".

   b) When the input value is outside the range from the lower limit to the upper limit
      The upper limit and the lower limit are provided to indicate the allowable data setting
      range. If the input value is outside this range, it is not accepted.
      Countermeasures: Change the upper/lower limit value.

   c) When "****" is displayed on the screen
      When a device No. not present in the PLC is monitored, the numeric data is displayed as
      "****" on the screen.
      Countermeasures: Change the device No. whose numeric data is to be monitored on the
      screen.

      To take the countermeasures above, numeric setting should be changed in the screen
      creation software.

2) PLC status

   a) When an EPROM memory is mounted in the FX/A Series PLC, set values of timers and
      counters and current values of file registers cannot be changed.

   b) When an EEPROM memory is mounted in the FX Series PLC or while the FX/A Series
      PLC is running, set values of timers and counters and current values of file registers can-
      not be changed.

   c) When an entry code is registered in the FX/A Series PLC, set values of timers and
      counters and current values of file registers cannot be changed. Reset the entry code.

### ■Important point

Timing of data change for "Number" ("Numerical Input") and "Ascii" ("Ascii Input")

The data is changed in the PLC at the following timing.

When new data is entered and the ENT key is pressed, the new data is transferred to the PLC.
When the CLR key is pressed before the ENT key, the entered new data is ignored and the
existing data is kept registered.

Layout of "Number" ("Numerical Input") and "Ascii" ("Ascii Input")

A touch key can occupy 12 (horizontal direction) x 20 (vertical direction) dots. When a touch
key occupies an area equivalent to or more than the half of 12 x 20 dots, it is recognized as
touch key. When half- or full-width numerics and ASCII codes are laid out, a touch key may not
be recognized as touch key depending on its position. In such a case, change the layout, dis-
play the touch key with a frame or display the touch key in a size whose vertical dimension is
twice or larger. (Refer to Paragraphs 9.5.1 and 11.5.1.)

## 3.3     Numeric setting completion flag

When data is changed for "Number" ("Numerical Input") and "Ascii" ("Ascii Input"), the following devices become ON to notify setting of the completion flags.
At this time, the ID code is written to the PLC so that a device whose data is changed can be identified.

### 3.3.1     When FX-PCS-DU/WIN-E is used

1) Completion flag
   When a screen is created using the FX-PCS-DU/WIN-E, a control device (described in Paragraph 8.6.1) M○+5 becomes ON as the completion flag.

**Control device**

- M○+5
  "○" indicates the head control device No.
  For example, when the head control device is set to M10, M15 functions as the numeric setting completion flag.
  * Control devices can be set using the screen creation software.

**Operation**

- When a current or set value of a word device is changed using the following objects, the flag becomes ON.

  Object names :"Data Change" and "Keyboard"
  (The flag does not become ON when the "Data+1", "Data-1" or "Constant" object is used.)

  ON timing      : The flag becomes ON when the ENT key of the "Data Change" or "Keyboard" object is pressed. The flag does not become ON when any other key is pressed.
- While the touch key code is set to "000D" (Write destination device: Execute), M○+5 becomes ON in the same way when the touch key is pressed.
- Once the completion flag becomes ON, it remains ON. To set it to OFF, execute the RST (reset) instruction in a sequence program.

2) User ID
   The user ID is assigned to each "Number" and "Ascii" in the order of creation.
   The user ID is assigned from "1" to each "Number" and "Ascii" on each screen. When data is changed, the user ID is written to the control device D○+7.

**Control device**

- D○+7
  "○" indicates the head control device No.
  By checking the current value of D○+7, the user can know which "Number/Ascii" has been changed.

**3.3.2    When SW☐D5C-GOTR-PACK is used**

1) Completion flag
When a screen is created using the SW☐D5C-GOTRE-PACK, the system information (described in Paragraph 8.6.2) write device D○+4 b3 becomes ON as the completion flag.

**System information**

- D○+4 b3
"○" indicates the head write device No.

**Operation**

- When "Project Unit" in "Auxiliary Setting" in "Common Setting" in the screen creation software is set so that the key window is open and the ENT key is pressed on the ten-key window, the flag becomes ON.
- While the touch key code is set to "000D", the flag becomes ON when the touch key is pressed.
- Once the completion flag becomes ON, it remains ON. To set it to OFF, execute the RST (reset) instruction in a sequence program.

2) User ID
The user ID can be assigned to each "Numerical Input" and "Ascii Input" using the screen creation software.
The user can set arbitrarily the user ID within the range of 1 to 65535.
The user ID is written to the following device in the PLC.

**System information**

- D○+3
"○" indicates the head write device No.
By checking the current value of D○+3, the user can know which "Numerical Input/Ascii Input" has been changed.

# MEMO

# 4.     HPP Mode

In the HPP mode, devices can be monitored, and set values and current values can be changed from the GOT to the connected PLC.

## 4.1     Outline of HPP mode

This paragraph describes the operating procedure to change over to the HPP mode and each function available in the HPP mode.

### ◆Basic operation

```
┌──────────────────┐     ┌──────────┐     ┌──────────────────┐
│ The SELECT MODE  │ ──> │ HPP MODE │ ──> │ The HPP MODE     │
│ screen is        │     └──────────┘     │ screen is        │
│ displayed.       │                      │ displayed.       │
└──────────────────┘      Select "HPP     └──────────────────┘
   Paragraph 2.3          MODE" on          The screen shown
                          the screen.       below is displayed.
```
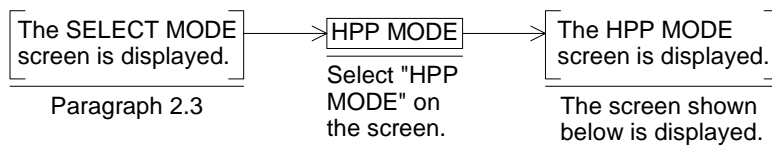
[HPP MODE MENU]

| [HPP MODE] | END |
|---|---|
| DEVICE MONITOR | —— 1) |
| ACTIVE STATE MONITOR | —— 2) |
| PC DIAGNOSIS | —— 3) |

- Among the following functions, 2) and 3) are valid only when the FX Series PLC is connected.

1) DEVICE MONITOR (Paragraph 4.2)
   The ON/OFF status and the set value/current value of arbitrary devices in the PLC can be monitored. In addition, the ON/OFF status can be forcedly set to ON/OFF and the set values/ current values can be changed.

2) ACTIVE STATE MONITOR (Paragraph 4.3)
   The state (S) Nos. in the ON status in the FX Series PLC are displayed.

3) PC DIAGNOSIS (Paragraph 4.4)
   The error information of the FX Series PLC is displayed.

- In the case of computer link connection, monitoring and the set value change range are restricted. For the details, refer to Section 1.

## 4.2     **DEVICE MONITOR**

The ON/OFF status and the set value/current value of arbitrary devices in the PLC can be monitored. In addition, the ON/OFF status can be forcedly set to ON/OFF and the set values/current values can be changed.

[DEVICE MONITOR]

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| | | | | | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

When "DEVICE MONITOR" is selected on the HPP MODE screen, the DEVICE MONITOR screen shown on the left is displayed.

Function keys are provided at the bottom of the screen. Each function key is actuated when touched.

DEVICE : Allows to specify the device No. to be monitored.

ON/OFF : Turns ON/OFF forcedly the specified device.

SET　　 : Executes change of the current value/set value.

### 4.2.1     **Device monitor**

Symbols such as X and Y can be displayed for monitoring.

Number of devices monitored and displayed on the screen

***Table 4.1:***

| **Bit device** | **Word device** |
|---|---|
| 4 devices/screen | 2 devices/screen (1 device/screen for timer and counter) |

◆**Basic operation**

The HPP MODE screen is displayed.
*Paragraph 4.4*

→ DEVICE → [Device symbol] → [Device No.] → ENT → ▼ Monitor a consecutive device. ▲

Enter a device symbol.

Move the cursor to a device which has been already registered.
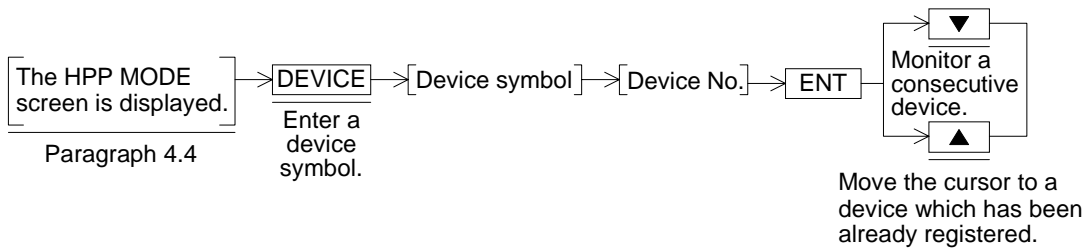
When the DEVICE key is pressed, the device symbol list is displayed as shown on the right. When a device symbol is entered, the device No. list is displayed as shown on the right.

| | | | | CLR |
|---|---|---|---|---|
| X | Y | M | S | ▲ |
| T | C | D16 | D32 | ▼ |
| Z | V | | | ENT |

| M 100 | | | | F | CLR |
|---|---|---|---|---|---|
| A | B | C | D | E | ▲ |
| 5 | 6 | 7 | 8 | 9 | ▼ |
| 0 | 1 | 2 | 3 | 4 | ENT |

◆**Operation example**

Monitor of the ON/OFF status of inputs X000 and X001 and monitor of the current value and the set value of timer T3.

Screen 1

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| X000 ─┤├─ | | | ▶ X001 ─┤├─ | | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

The HPP MODE screen is displayed.
Paragraph 4.1
→ DEVICE MONITOR
Select "DEVICE MONITOR" on the screen.
→ DEVICE → X →
Enter a device symbol "X".

→ 0 →
Select "X0".
→ ENT →
Display "X0" on the screen.
→ ▼ →
Display "X1" on the screen.
[Screen 1 is displayed.]

Screen 2

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| ▶ T 0 ─┤├─ | | | | CUR[ 10] | |
| RST( ) | | | | SET[ 100] | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

→ DEVICE → T → 3 → ENT →
Enter a device symbol "T".
Select "T3".
Display Screen 2.

The ON/OFF status of each monitored device is indicated as follows.

ON status    ─╢─

OFF status   ─┤├─

■**Important point**

1) Monitor function when timers and counters are indirectly specified

```
    ┤├          (T10)
                  D5
    ┤├          (C10)
                  D6
```
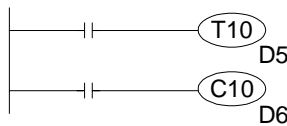
If a data register used for the set value of a timer/counter as shown in the program on the left, the contents of the data register is monitored as the set value of the timer/counter when monitoring is performed.
When the set value is changed (as described in the next page), the contents of the data register are overwritten.
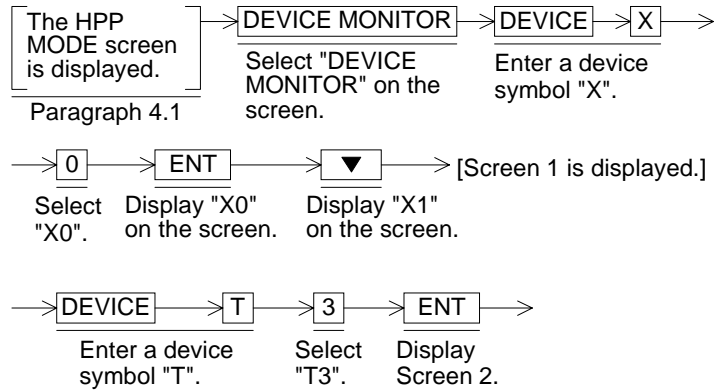
## 4.2.2 Changing of set values and current values of T, C and D

Set values and current values of word devices (T, C, D, V and Z) in the PLC can be changed.

### ◆Basic operation

| T/C/D monitor display | → | ▲,▼ | → | SET | → | ▼ | → | - | → | 0 to 9 | → | ENT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Read the values using the procedure described in the previous paragraph. | | Move the cursor to a device to be changed. | | Change the current value of D, T and C. *1 | | Change the set value of T and C. | | Enter the minus (-) sign. | | Enter a numeric. | | Execute change. |
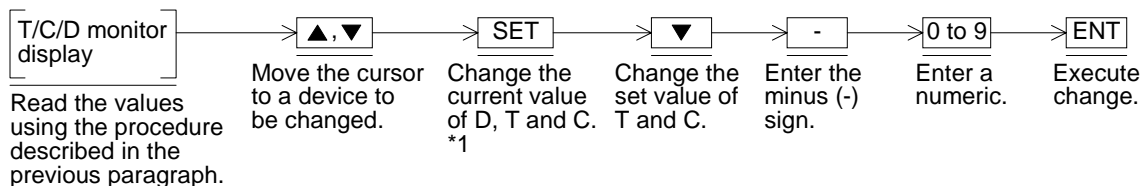
*1  When the SET key is pressed, the numeric input keyboard is displayed.

Numeric (decimal) input keyboard

The entered numeric is displayed.

|   |   |   |   | CLR |
|---|---|---|---|---|
| 6 | 7 | 8 | 9 | ▲ |
| 2 | 3 | 4 | 5 | ▼ |
| 0 | 1 | - | | ENT |
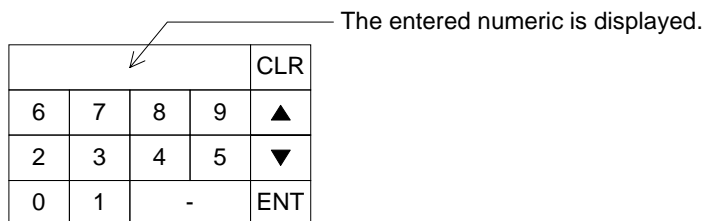
### ■Important point

1)  Changing of set values of T and C and file registers

They can be changed when a RAM is used as the memory in the PLC.
They cannot be changed when an EPROM or EEPROM cassette is used.

◆**Operation example**

Change of the current value of data register D0 from "300" to "200".

```
┌─────────────────┐      ┌─────────────────┐
│ The HPP MODE    │ ───→ │ DEVICE MONITOR  │ ──→
│ screen is displayed. │  └─────────────────┘
└─────────────────┘
   Paragraph 4.1           Select "DEVICE
                           MONITOR" on the
                           screen.
```

<Monitor of D0>
```
──→ │DEVICE│ ──→ │ D  │ ──→ │ 0 │ ──→ │ENT│ ──→
                 │ 16 │
     Enter element     Display the
     symbol "D16".     D0 monitor.
```

<Change of the current value of D0>
```
──→ │SET│ ──→ │2││0││0│ ──────────→ │ENT│
     Start       Execute change to      Register "200"
     change.     "200" from "300".      as new value.
                 Refer to Fig. 2.
```
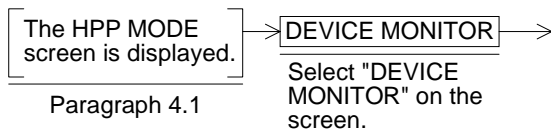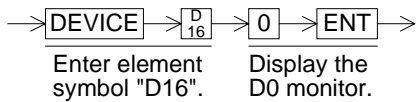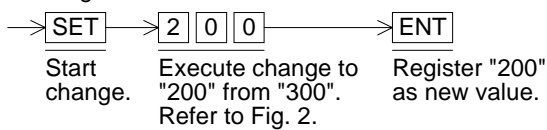
Fig. 1  Before change

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| ▶ D 0 | | | CUR [ | 300] | |
| | | | | | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

Fig. 2  After change

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| ▶ D 0 | | | CUR [ | 200] | |
| | | | | | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

◆**Operation example**

Change of the current value of T1 from "263" to "300", and change of the set value of T1 from "1000" to "1500".

<Monitor of T1>　　　　　　　<Change of the current value of T1>　　　　<Change of the set value of T1>

```
│DEVICE│ ─→│T│─→│1│─→│ENT│ ─→│SET│ ─→│3││0││0│ ─→│ENT│ ─→│SET│ ─→│▼│ ─→│1││5││0││0│ ─→│ENT│
```
Enter element    Display the      Start         Execute     Register     Start change     Execute change   Register
symbol "T".      T1 monitor.      change of     change to   "300" as     of the set       to "1500" from   "1500" as
                 Refer to         the current   "300" from  new value.   value of T1.     "1000".          new value.
                 Fig.1.           value of      "263".
                                  T1.
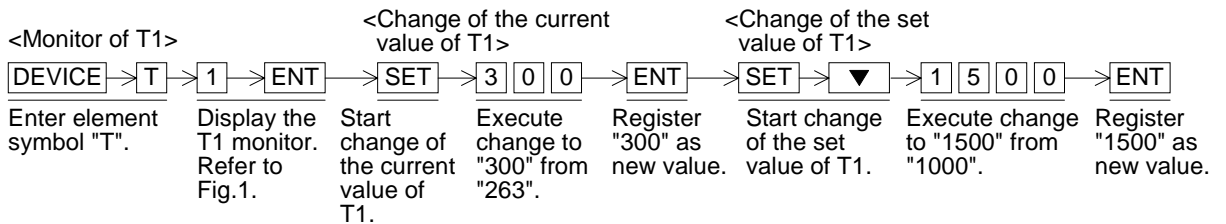
Before change

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| ▶ T 1 ─┤├ | | | CUR [ | 263] | |
| RST( ) | | | SET [ | 1000] | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

After change

| [DEVICE MONITOR] | | | | | END |
|---|---|---|---|---|---|
| ▶ T 1 ─┤├ | | | CUR [ | 300] | |
| RST( ) | | | SET [ | 1500] | |
| DEV. | SET | ON | OFF | ▼ | ▲ |

### 4.2.3    **Forced ON/OFF**

Bit devices (Y, M and S) and word devices (T and C) can be forcedly set to ON/OFF.
When T, C, D, V or Z is forcedly set to OFF, its current value is reset to "0".

◆**Basic operation**

```
┌─────────────┐      ┌──────┐                    ┌──────┐
│Y/M/S/T/C/D/V/Z│ ───▶│▲ , ▼ │ ──────────┬──────▶│  ON  │
│monitor display│     └──────┘            │       └──────┘
└─────────────┘   Move the cursor to a    │          ON
  Paragraph 4.1   device to be forcedly    │      ┌──────┐
                  set to ON/OFF.            └─────▶│ OFF  │
                                                   └──────┘
                                                      OFF
```
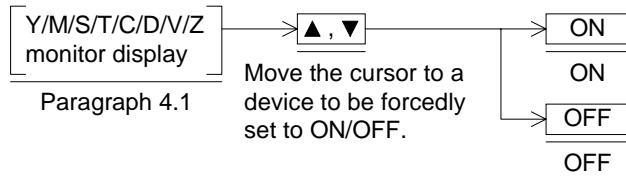
◆**Operation example**

Forced ON/OFF of output Y0 and auxiliary relay M0

```
┌──────────────┐   ┌────┐   ┌────┐   ┌────┐   ┌────┐   ┌─────┐   ┌────┐   ┌─────┐
│Display Y0/M0 │ ─▶│ ON │─▶│ ▼  │─▶│ ON │─▶│ ▲  │─▶│ OFF │─▶│ ▼  │─▶│ OFF │
│monitor using the│ └────┘  └────┘   └────┘   └────┘   └─────┘   └────┘   └─────┘
│procedure described│  ON    Move the   ON       Move the  OFF     Move the  OFF
│in Paragraph 4.2.1.│ Display the cursor to Display the cursor to          cursor to
└──────────────┘   ON screen 1. M0.  ON screen 2. Y0.             M0.
```

Screen 1                              Screen 2
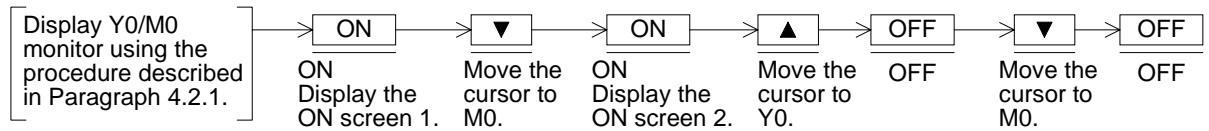
```
┌────────────────────────────┬────┐   ┌────────────────────────────┬────┐
│[DEVICE MONITOR]            │END │   │[DEVICE MONITOR]            │END │
│                            │    │   │                            │    │
│ ▶Y000 ─┤├      M 0  ─┤├     │    │   │  Y000 ─┤│├     ▶M 0  ─┤│├    │    │
│                            │    │   │                            │    │
├────┬────┬────┬────┬────┬───┤    │   ├────┬────┬────┬────┬────┬───┤    │
│DEV.│SET │ ON │OFF │ ▼  │ ▲ │    │   │DEV.│SET │ ON │OFF │ ▼  │ ▲ │    │
└────┴────┴────┴────┴────┴───┴────┘   └────┴────┴────┴────┴────┴───┴────┘
```

## 4.3    ACTIVE STATE MONITOR

Up to eight state Nos. in the ON status can be monitored.
This function is valid in the FX Series only.

◆**Basic operation**

```
┌─────────────────┐      ┌─────────────────┐
│ The HPP MODE    │ ───> │ ACTIVE STATE    │
│ screen is displayed. │  │ MONITOR         │
└─────────────────┘      └─────────────────┘
   Paragraph 4.1           Select "ACTIVE
                           STATE MONITOR".
```
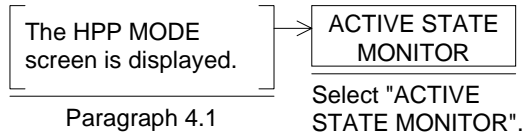
[ACTIVE STATE MONITOR]

```
┌─────────────────────────────┬──────┐
│ [ACTIVE STATE MONITOR]      │ END  │
├─────────────────────────────┴──────┤
│  S 100    S 200    S 300    ──┐1)   │
│  S 400    S 500    S 600      │     │
│  S 800    S 900               │     │
└─────────────────────────────────────┘
```

1) Active state
   State Nos. in the ON status are displayed in
   the list.

• When there are not state Nos. in the ON status, the message "NO ACTIVE STATE" is dis-
  played.
• When the special auxiliary relay M8047 (step ladder monitor valid) is not ON in the
  sequence program, the message "M8047 IS NOT ON" is displayed.
• When there are more than eight state Nos. in the ON status, eight Nos. are displayed from
  the smallest one in the ascending order. Excessive state Nos. are not displayed.

## 4.4　PC DIAGNOSIS

Error occurring in the PLC are diagnosed, and the error codes and the contents are displayed. This function is valid in the FX Series only. When the A Series PLC is connected, this menu item is not displayed on the screen.

### ◆Basic operation

```
┌────────────────────┐      ┌────────────────────┐
│ The HPP MODE       │ ───> │   PC DIAGNOSIS     │
│ screen is displayed.│      └────────────────────┘
└────────────────────┘       Select "PC DIAGNOSIS"
       Paragraph 4.1          on the screen.
```
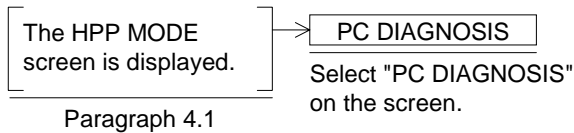
[PC DIAGNOSIS]

```
┌─────────────────────────────┬──────┐
│ [PC DIAGNOSIS]              │ END  │
├─────────────────────────────┴──────┤
│  NO PLC ERROR                       │
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

- The following error items are displayed.

  - I/O errors
  - Parameter errors
  - PC hardware errors
  - Syntax errors
  - PC/PP communication error
  - Program errors
  - Parallel link errors
  - Operation errors

- When there are no errors in the PLC, the message "NO PLC ERROR" is displayed.

- When there are errors, the following display is given.

```
┌─────────────────────────────┬──────┐
│ [PC DIAGNOSIS]              │ END  │
├─────────────────────────────┴──────┤
│ PC / PP COMMINICATION 6201          │
│ ERROR                               │
│ PARAMETER ERROR      6401←───── Error code
│ SYNTAX ERROR         6502  1010←── Step at which error has occurred
└─────────────────────────────────────┘
       ↑
 Contents of error
```

When errors in the PLC are reset, the message "NO PLC ERROR" is automatically displayed.
For the contents of errors, refer to the instruction manual of the PLC main body.

# 5. Test Mode

This section describes the test mode in which the user screen list can be displayed.

## 5.1 Outline of test mode

### ◆Basic operation

```
┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐
│ The SELECT MODE  │ ───> │    TEST MODE     │ ───> │ The TEST MODE    │
│ screen is        │      └──────────────────┘      │ screen is        │
│ displayed.       │        Select "TEST MODE"      │ displayed.       │
└──────────────────┘        on the screen.          └──────────────────┘
   Paragraph 2.3                                       The screen shown
                                                       below is displayed.
```

[TEST MODE]

```
┌────────────────────────────┬──────┐
│ [TEST MODE]                │ END  │
├────────────────────────────┴──────┤
│ USERSCREEN              ─── 1)     │
│                                    │
│                                    │
│                                    │
└────────────────────────────────────┘
```
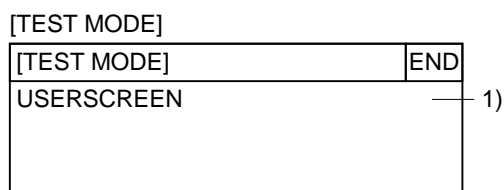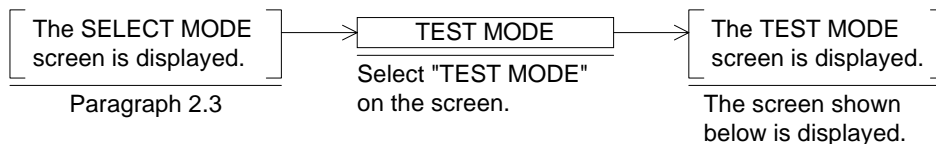
1) USER SCREEN
   The list of user screens displayed in the screen mode can be displayed.

## 5.2    USER SCREEN

When "USER SCREEN" is selected on the TEST MODE screen, the list of user screens displayed in the screen mode can be displayed.
Transferred screen data can be checked whether they are normal, and display images can be checked.

◆**Basic operation**

| The TEST MODE screen is displayed. | → | USER SCREEN | → | The screen list is displayed. |
|---|---|---|---|---|

Paragraph 5.1          Select "USER SCREEN" on the screen.          The screen shown below is displayed.
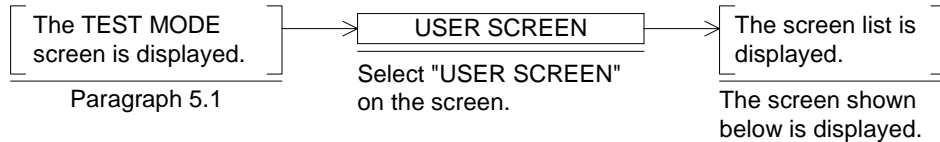
| < Common setting screen > | : Displays the screens written in the common setting in the screen creation software (when the FX-PCS-DU/WIN-E is used). |
|---|---|
| Individual screen | : When an area indicating a screen No. and a screen name is pressed, the corresponding screen is displayed.<br>When a screen contains incorrect data and cannot be displayed, "✕" is displayed on the side of the screen. |

♦ : Scroll the display by one line.

[USER SCREEN]

| [USER SCREEN] | END |
|---|---|
| 1  MENU | ▲ |
| 2  MONITOR (1) | |
| 3  MONITOR (2) | ▼ |

    1)        2)

1) Screen No.

2) Screen name

- When a screen to which "X" is added in the individual screen list is pressed, the message window "BAD OBJECT EXISTS." is displayed. In such a case, correct the screen using the screen creation software.

# 6.      Other Mode

This section describes the other mode in which convenient functions such as time switch, printer output and operation environment are offered.

## 6.1     Outline of other mode

### ◆Basic operation

| The SELECT MODE screen is displayed. | → | OTHER MODE | → | The OTHER MODE screen is displayed. |
|---|---|---|---|---|
| Paragraph 2.3 | | Select "OTHER MODE" on the screen. | | The screen shown below is displayed. |
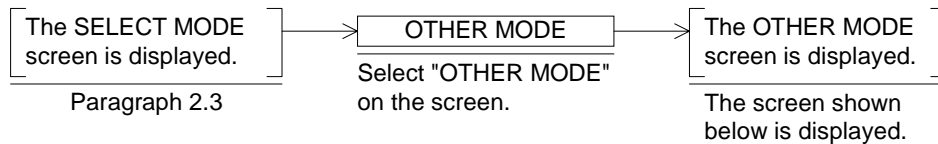
[OTHER MODE]

| [OTHER MODE] | END |
|---|---|
| SET TIME SWITCH | ▲ — 1) |
| DATA TRANSFER | — 2) |
| PRINT OUT | ▼ — 3) |
| ENTRY CODE | — 4) |
| SET-UP MODE | — 5) |

- In the other mode, the following functions are offered.

  1) SET TIME SWITCH
     Turns on the specified bit device during the specified period of time.
     This function is valid when the screen creation software FX-PCS-DU/WIN-E is used.

  2) DATA TRANSFER
     Transfers user screens and the alarm history between the screen creation software.

  3) PRINT OUT
     Prints out the alarm history.

  4) ENTRY CODE
     Registers an entry code to protect sequence programs in the PLC.

  5) SET-UP MODE
     Allows to set the environment required to operate the GOT such as the system language and the connected PLC.

## 6.2    SET TIME SWITCH

Set the time switch using the clock function built in the GOT.
This function turns on up to 8 consecutive bit devices when the specified day of the week and the specified time have come, and keeps them ON until the end time.
Target bit devices can be specified using the screen creation software FX-PCS-DU/WIN-E.
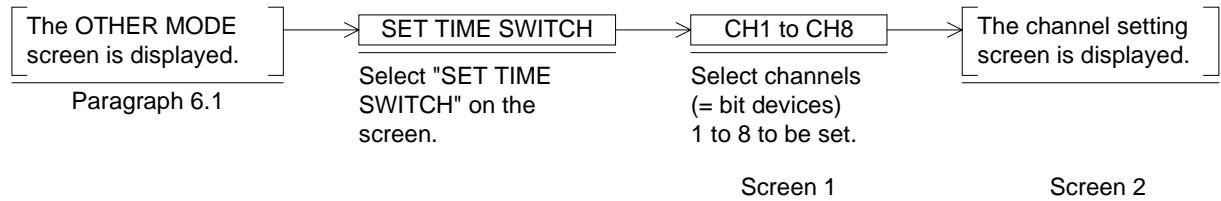
### ◆Basic operation

| The OTHER MODE screen is displayed. | → | SET TIME SWITCH | → | CH1 to CH8 | → | The channel setting screen is displayed. |
|---|---|---|---|---|---|---|
| Paragraph 6.1 | | Select "SET TIME SWITCH" on the screen. | | Select channels (= bit devices) 1 to 8 to be set. | | |
| | | | | Screen 1 | | Screen 2 |

Day of the week:
Select desired days of the week by pressing them.
"●" is added to selected days of the week.
When a day of the week marked with "●" is pressed again, selection is canceled.

START TIME:
Set the time at which the specified bit devices become ON.
The devices will remain ON from the start time to the end time on the selected days of the week.

END TIME:
If the end time is earlier than the start time, the specified bit devices remain ON until the following day (even if the day of the week of the following day is not selected).

(Example)

| [OTHER MODE MENU] | | | Screen 1 |
|---|---|---|---|
| [SET TIME SWITCH] | | | END |
| | | | |
| CH1 | CH2 | CH3 | CH4 |
| CH5 | CH6 | CH7 | CH8 |

1)

| [CHANNEL] | | | | | | Screen 2 |
|---|---|---|---|---|---|---|
| [SET TIME SWITCH] | | | | | | END |
| CH1 | SUN | MON | TUE | WED | THU | FRI | SAT |
| START TIME | | | | | | 15:12:10 |
| END TIME | | | | | | 15:15:12 |

1) Target bit device
   Specify up to 8 consecutive bit devices.

• In the setting on Screen 2, CH1 (M100) will remain ON from 15:12:10 to 15:15:12 on Monday to Friday.

## 6.3    DATA TRANSFER

The screen data and the alarm history can be transferred (read/written) between the GOT and a peripheral unit for screen creation (personal computer).

◆**Basic operation**

By the following operation, the DATA TRANSFER screen is displayed.
When the screen data is transferred from a personal computer to the GOT, the following screen is displayed also without regard to the screen displayed at that time. And when data transfer is finished, the screen No. 0 is displayed if the DU/WIN-E is used or the screen No. 1 is displayed if the screen creation software for the GOT-A900is used.

| The OTHER MODE screen is displayed. | → | DATA TRANSFER | → | The DATA TRANSFER screen is displayed. |
|---|---|---|---|---|
| Paragraph 6.1 | | Select "DATA TRANSFER" on the screen. | | The screen shown below is displayed. |

[DATA TRANSFER]

| [DATA TRANSFER] | END |
|---|---|
| GOT  ↔  PC | |
| | |
| WAITING | |
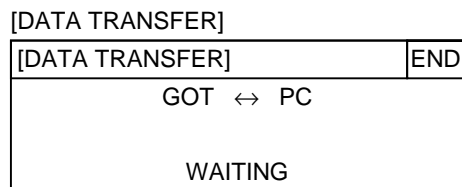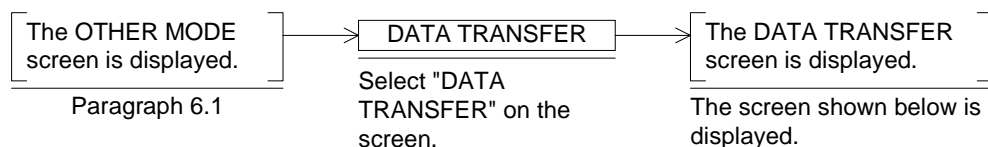
## 6.4    PRINT OUT

The alarm history can be printed.
Because the communication setting can be performed in accordance with each printer, diversi-
fied printers equipped with RS-232C interface can be used.
The communication setting for the printer can be performed in "SET-UP MODE" in the GOT or
using the screen creation software.

| | |
|---|---|
| Connect a printer. | • Connect a printer to the GOT, and power them up. |
| Perform the printout operation in the GOT. | • Manipulate the GOT, and select "PRINT OUT" on the OTHER MODE screen.<br>• Select the data to be printed out.<br>The alarm history can be printed. |
| Select the printout data and execute printout (procedure shown below). | |

◆**Basic operation**

| Printer output setting | ALARM HISTORY | NO | The PRINT OUT screen is displayed. |
|---|---|---|---|
| The screen shown below is displayed. | Select "ALARM HISTORY" on the screen. | When canceling the printout | The screen shown on the left is displayed again. |
| | | YES | |
| | | When starting the printout | |

[PRINT PUT]                              Screen

| [PRINT PUT] | END |
|---|---|
| ALARM HISTORY | |
| | |
| | |

## 6.5     ENTRY CODE

When an entry code is registered to the PLC, changes to the set values of timers and counters in the screen mode and the monitor mode are forbidden. However, the current values can be changed.

### ENTER

Allows to register an entry code to the PLC.
This entry code is shared by other peripheral units. Enter an 8-digit (FX Series) or 6-digit (A Series) hexadecimal number.
INPUT ENTRY CODE ○○○○○○○○
The entered entry code becomes effective when the power of the GOT is turned off, then turned on again.

### DELETE

Deletes the existing entry code. The existing entry code can be deleted only after it was entered.
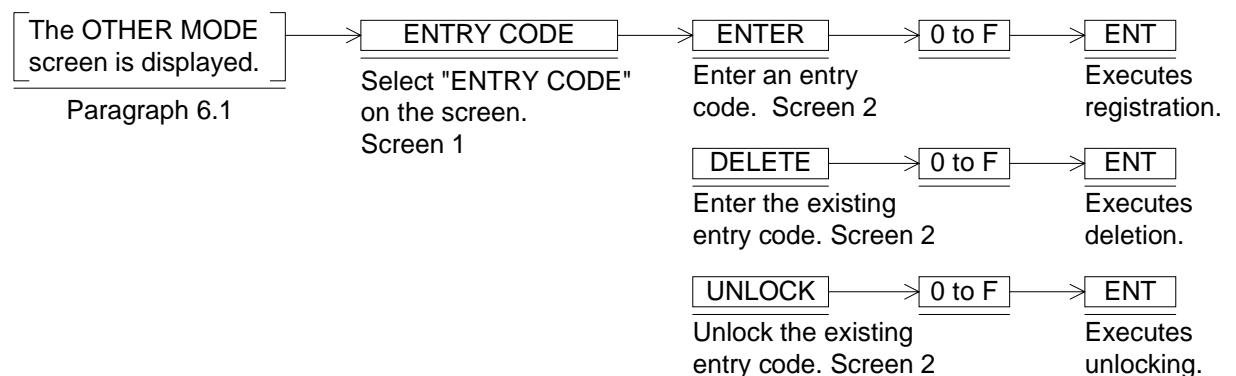
### UNLOCK

Unlocks temporarily the existing entry code. (The entry code is kept registered in the PLC.)
The unlock function is valid until the power of the GOT is turned off.

### Note:

**When you have forgotten the existing entry code, execute "all clear" in a peripheral unit. However, have in mind that all of the data including programs in the PLC are deleted by "all clear". It is recommended not to forget the entry code.**

◆**Basic operation**

| The OTHER MODE screen is displayed. | → | ENTRY CODE | → | ENTER | → | 0 to F | → | ENT |
|---|---|---|---|---|---|---|---|---|
| Paragraph 6.1 | | Select "ENTRY CODE" on the screen. Screen 1 | | Enter an entry code. Screen 2 | | | | Executes registration. |

| | | DELETE | → | 0 to F | → | ENT |
|---|---|---|---|---|---|---|
| | | Enter the existing entry code. Screen 2 | | | | Executes deletion. |

| | | UNLOCK | → | 0 to F | → | ENT |
|---|---|---|---|---|---|---|
| | | Unlock the existing entry code. Screen 2 | | | | Executes unlocking. |

[ENTRY CODE]                                      Screen 1

| [ENTRY CODE] | END |
|---|---|
| ENTER | |
| DELETE | |
| UNLOCK | |

[KEYBOARD]                                       Screen 2

| | | | | ■ | F | CLR |
|---|---|---|---|---|---|---|
| A | B | C | D | E | | ▲ |
| 5 | 6 | 7 | 8 | 9 | | ▼ |
| 0 | 1 | 2 | 3 | 4 | | ENT |

## 6.6     SET-UP MODE

Set the operation environment required to operate the GOT such as the system language and the connected PLC.
For the detailed setting contents, refer to "2. Start up".

◆**Basic operation**

| The OTHER MODE screen is displayed. | → | SET UP MODE | → | The SET UP MODE screen is displayed. |
|---|---|---|---|---|
| Paragraph 6.1 | | Select "SET UP MODE" on the screen. | | The screen shown below is displayed. |
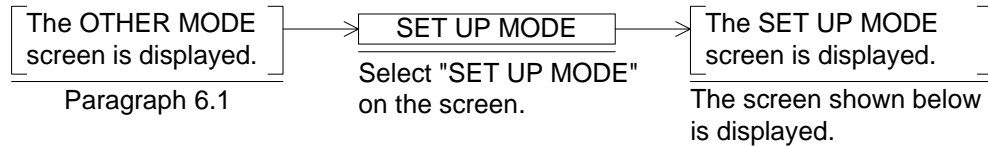
[SET-UP MODE]                    Screen 1

| [SET-UP MODE] | END | 11) |
|---|---|---|
| 1) LANGUAGE | ▲ | 12) |
| 2) PLC TYPE | | |
| 3) SERIAL PORT (RS232C) | ▼ | 12) |
| 4) OPENNING SCREEN | | |
| 5) MAIN MENU CALL KEY | | |
| 6) SET CLOCK | | |
| 7) SET BACKLIGHT | | |
| 8) BUZZER | | |
| 9) LCD CONTRAST | | |
| 10) CLEAR USER DATA | | |

Areas enclosed with broken lines indicate touch keys. (Broken lines are not actually displayed on the screen.)

1) LANGUAGE
   Allows to set the language such as Japanese and English used on the system screens.
2) PLC TYPE
   Allows to set the connected PLC type.
3) SERIAL PORT
   To be set when a printer is connected to the GOT or when communication is performed with a micro computer board.
4) OPENING SCREEN
   Allows to set the duration in which the opening screen is displayed immediately after the power of the GOT is turned on.
5) MAIN MENU CALL KEY
   Allows to set the positions of the touch key which calls the SELECT MODE screen in the screen mode (on which user screens are displayed).
6) SET CLOCK
   Allows to set the time used as the reference for the time switch and the time display.
7) SET BACKLIGHT
   Allows to set the time at which the backlight turns off after a continued idle period.
8) BUZZER
   Allows to set whether or not a buzzer sound is issued when a key is pressed.
9) LCD CONTRAST
   Allows to set the LCD contrast.
10) CLEAR USER DATA
   Deletes the entire user screen data.
11) END
   Terminates the operation environment setting.
12) Cursors
   Changes over selection of the menu item.

# 7.     Alarm Function

This section describes the alarm function in the GOT which monitors up to 256 specified consecutive bit devices and displays alarm messages created by the user on the screen or displays a specified screen when the monitored bit devices become ON.
The alarm function is very useful. By using the alarm function, alarm messages and the list of current alarms can be displayed, the alarm history can be stored, the machine status can be monitored, and troubleshooting can be facilitated.

## 7.1     Outline of alarm function

The GOT monitors up to 256 consecutive bit devices (X, Y, M, S, T and C) in the PLC which have been preliminarily specified as alarm devices.
Alarm devices can be assigned and alarm messages (comments) can be created using the screen creation software.

- When the FX-PCS-DU/WIN-E is used
  Alarm devices: Can be set in "Alarms" in "View".
  Alarm messages: Can be created in "Alarms" in "View".

- When the SW□5DC-GOTRE-PACK is used
  Alarm devices: Can be set in "Alarm History Common Setting" in "Common Setting".
  Alarm messages: Can be created in "Create Comment" in "Screen Creation Setting".

When an alarm device set by the screen creation software above becomes ON from OFF, a corresponding alarm message can be displayed and output to the printer in the screen mode (in which user screens are displayed).

### 7.1.1    Alarm function in screen mode

When an alarm has occurred (that is, when a specified alarm device becomes ON), the alarm can be notified by an operation shown in the table below.
The notification method varies depending on the used screen creation software. Check the table below.

- In the screen mode (while a user screen is displayed)

*Table 7.1:*

| Notification method | FX-PCS-DU/WIN | | SW☐D5C-GOTRE-PACK |
|---|---|---|---|
| Window display (comment window display) | ✓ | Either one can be selected. | ✓ Note 1 |
| Screen changeover (changeover of base screen) | ✓ | | ✓ Note 1 |
| Flow display | — | | ✓ |
| Printing by printer | ✓ | | ✓ |

\* Printing by printer is available except for the data transferred from the screen creation software.

Note 1: Displayed when the DETAIL key is pressed on the system screen.

1) Window display (comment window display)

In the case of FX-PCS-DU/WIN-E

If "window display" is selected as the alarm notification method, when an alarm device becomes ON, an alarm message corresponding to the alarm device is displayed on the user screen in the screen mode.

- Using the screen creation software, alarm messages can be created and alarm display positions can be selected among upper, medium and lower.



Message scroll key — Upper, Medium, Lower
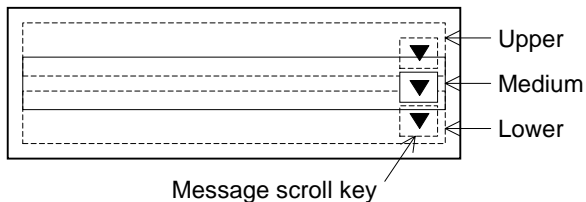
- An alarm message can be displayed in up to 10 full-width or 20 half-width characters.

- When two or more alarm devices have become ON, the alarm messages can be scrolled using the message scroll keys. When two or more errors have occurred in the system, the error messages are displayed in the same way.

- **When alarm devices have become OFF, the window is closed.**

- This window is displayed in the screen mode (while a user screen is displayed). When the display is changed over to a system screen, the window disappears. However, if an alarm device is ON, the window is displayed again when the display is changed over to a user screen (the screen mode) again.

In the case of SW☐D5C-GOTRE-PACK

By setting "Detail Display Destination" in "Basic Setting" in "Alarm History Common Setting" in the software to "Comment Window", detailed comment messages corresponding to alarm devices can be displayed.

In this case, the object "Alarm History" or "Alarm List" is displayed on the user screen, and detailed comment messages are displayed when a touch key whose key code has been set to "FFB8 (detailed display)" is pressed.

**Alarm history display   : Refer to Paragraph 11.3.5.**
**Alarm list display      : Refer to Paragraph 11.3.6.**

2) Screen changeover

If "screen changeover" is selected, when a specified alarm device becomes ON from OFF, a user screen displayed at that time in the screen mode is changed over to a screen of specified No. (When the SW☐D5C-GOTRE-PACK is used, a screen of specified No. is displayed when the DETAIL key is pressed.)
The display can be returned from the specified screen to the previous screen using the following procedure.

- In the case of FX-PCS-DU/WIN-E
  Set "Destination Screen" to "DU memory" in the "Change Screen" object of the changed-over screen.

- In the case of SW☐D5C-GOTRE-PACK
  Set "Destination Screen" to "Upper Hierarchy" in "Change Screen" of the changed-over base screen.

3) Printing

When an alarm has occurred, the date of occurrence and a corresponding alarm message can be printed.
Alarm messages should have been entered in half-width characters. The communication condition of the used printer should have been set in "SERIAL PORT" in "SET-UP MODE" in the GOT.

4) Flow display (valid when the SW☐D5C-GOTRE-PACK is used)

When an alarm device becomes ON, a corresponding alarm message is displayed at the bottom of the user screen.
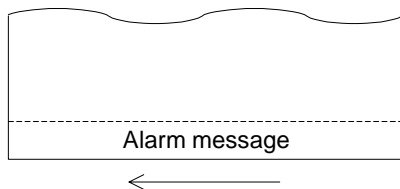


Alarm message

- A message is flown from the right to the left.
- When two or more alarms have occurred, corresponding messages are displayed in the ascending order of alarm device No.
- When alarm devices become OFF, alarm messages disappear.
- Alarm messages are displayed transparently on the user screen, so keys on the user screen are effective.

It can be set for each screen whether or not the flow display is to be performed by editing "Common Setting"-"Auxiliary Setting"-"Screen" in the screen creation software. (In the initial value, the flow display is effective.)

## 7.2     Operation when alarms have occurred

The figure below shows the outline of operation performed when alarms have occurred.
When a bit device assigned as an alarm device becomes ON (OFF→ ON), the GOT recognizes that an alarm has occurred.
When two or more alarms have occurred, the GOT recognizes them one by one in turn.
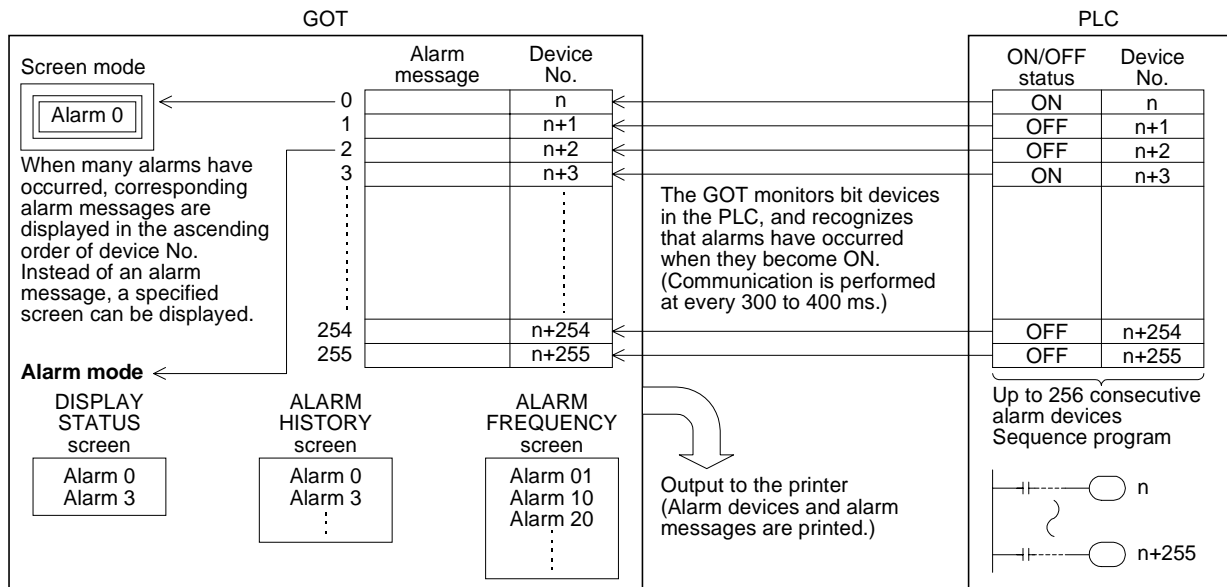


- The ON/OFF status of alarm devices are read every time communication is performed (at every 300 to 400 ms) between the GOT and the PLC when the FX-PCS-DU/WIN-E is used or at the time interval (variable within the range of 600 to 100 ms) set by "Monitor Cycle" in "Alarm History Common Setting" when the SW□D5C-GOTRE-PACK is used.

- Inside the GOT, in accordance with the contents set preliminarily in the screen creation software, alarm messages are displayed (overlaying on the user screen) or a specified screen is displayed in the screen mode, then alarm devices are stored in the history and their frequencies are counted in the alarm mode.

- When two or more alarms have occurred, they are stored in the ascending order of alarm device No. in the alarm list and stored in the alarm history in the order of occurrence.
  When the SW□D5C-GOTRE-PACK is used, the alarm history can be stored in the order of occurrence (from the oldest one) or in the reverse order of occurrence (from the latest one).

- In the alarm history and the alarm frequency, up to the following number of cases can be stored respectively. They are stored even if the power is turned off.

    - Alarm history: Up to 1,000 cases
      If 1,001 or more alarms have occurred, the record is updated while excessive alarms are deleted from the oldest one. (When the SW□D5C-GOTRE-PACK is used, it can be set so that excessive alarms are deleted from the latest one.)

    - Alarm frequency: Up to 32,767 cases
      Even if more alarms have occurred, 32,767 cases remain stored.

- If an alarm has occurred in any mode other than the screen mode, the occurrence history and the frequency are recorded. The display can be changed over to a specified screen, and the alarm can be output to the printer. (However, the alarm message does not overlay the base screen displayed at that time.)

## 7.3    Alarm history clear

This paragraph describes the operating procedure to clear the alarm history in the alarm mode.
The clear history function deletes both the alarm history and the alarm frequency result.

- By setting a control device (system information) to ON, the alarm history can be cleared from the PLC.

    When the screen creation software for DU (FX-PCS-DU/WIN-E) is used

    When the first bit (b0) of a control device becomes ON, the alarm history is cleared.

    When the contact input becomes ON, the alarm history is cleared.

    ┤├── ( M0 ) ----- When M0 is selected as the control device
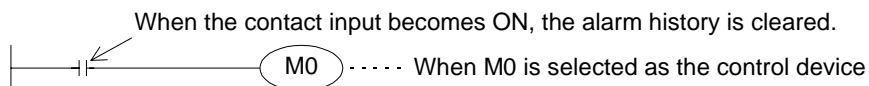
    When the screen creation software for GOT-A900 (SW☐D5C-GOTRE-PACK) is used

    When the first bit (b0) of the head read device (word device) becomes ON, the alarm history is cleared.

    M8000 : Always ON
    ┤├────| MOV | D10 | K1M10 |

    When the contact input becomes ON, the alarm history is cleared.

    ┤├──( M10 )
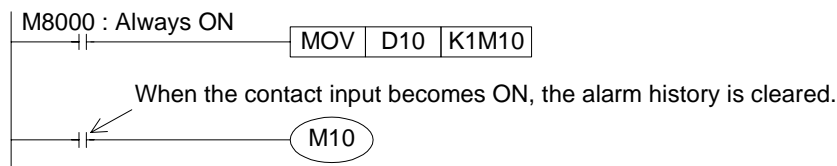
By using a device specified in "History Clear Trigger" in "Alarm History Common Setting" in the screen creation software, the alarm history can be cleared in the same way.

# 8.     Creation of Display Screens

Display screens for the F930GOT can be created using the screen creation software for DU and the screen creation software for GOT-A900 shown below.

- Software for DU
  FX-PCS-DU/WIN-E V2.30 or later (compatible with the Windows95)

- Software for GOT-A900
  SW☐D5C-GOTRE-PACK ("☐" indicates a numeric not less than 1.)
  (compatible with the Windows95 and the WindowsNT)

| a) | | b) | |
|---|---|---|---|
| Screen creation software for DU | ←——→ | F930GOT | ←——→ | Screen creation software for GOT-A900 |

a) Data can be read from and written to the F930GOT using the screen creation software for DU.

b) Data can be read from and written to the F930GOT using the screen creation software for GOT-A900.

This section describes the compatibility of data when these screen creation software are used. For the operating procedures for the software, refer to the software operation manual offered separately.

## 8.1    Outline of compatibility of screen data

Display screens for the F930GOT can be created using either the software for DU or the software for GOT-A900. The differences between these two are shown below.

| Screen creation software for DU (FX-PCS-DU/WIN-E) | | F930GOT | Screen creation software for GOT-A900 (SW1D5C-GOTRE-PACK) |
|---|---|---|---|
| a) Functions dedicated to DU | Indicator, Overlay Screen, Buzzer, Data Setting and Send Data Bank | | |
| | External character | | |
| | Sampling condition setting | | |
| | Time switch | | |
| | Device comment | | |
| b) Common functions | | Common area | |
| c) Functions dedicated to A900 | | | Line Freeform, Polygon, Sector, Arc, Scale and Paint |
| | | | Data List, Level and Part Movement |
| | | | Report |
| | | | Hard copy |
| | | | Voice |
| | | | Debug |
| | | | Window screen and station No. changeover |

a) Functions dedicated to the screen creation software for DU (Refer to Paragraph 8.1.1.)
These functions of the F930GOT are supported by only the screen creation software for DU.
These functions cannot be read nor written using the screen creation software for GOT-A900.

b) Common functions (Refer to Paragraph 8.1.2.)
These functions are supported by both the screen creation software for DU and the screen creation software for GOT-A900.
However, some function names are different and some functions are restricted in each software. Refer to "8.1.2  Common functions".

c) Functions dedicated to the screen creation software for GOT-A900 (Refer to Paragraph 8.1.3.)
These functions are supported by only the screen creation software for GOT-A900. They are not supported by the F930GOT nor the screen creation software for DU.

### 8.1.1    Functions dedicated to screen creation software for DU

The functions shown below are effective only when the screen creation software for DU is used.
These functions are not available when the screen creation software for GOT-A900 is used.

1) Screen display
   Lamp: The specified area on the screen can be inverted (Or colors can be replaced.).
   Buzzer: When a specified bit device in the PLC becomes ON, the GOT issues buzzer
         sound.
   Send Data Bank: When a specified touch key is pressed, the current value of a 16-bit data
                 register in the GOT is transferred to a data register (D) in the PLC.
   External character: Symbols of 16 x 16 bits created by the user can be displayed.

2) Sampling condition setting
   The condition of the sampling function explained in Section 5 can be set.
   *The condition can be set in the F930GOT main body.

3) Time switch
   The time switch function explained in Section 8 can be set.

4) Device comment
   This is the device monitor function in the HPP mode explained in Section 4. By using this
   function, comments can be displayed instead of device Nos.

■Important point

**Note : When the functions (1) to (4) above are used, they are treated as follows in the
         screen creation software for GOT-A900.**

   - Read of data to the software for GOT-A900
     The screen data excluding the functions (1) to (4) above is read.
     Even when the data is read, the screen data in the F930GOT main body is not changed.

   - Write of data to the F930GOT
     The function (1) to (4) above cannot be set.
     When data is written from the screen creation software for GOT-A900 to the F930GOT
     using the functions (1) to (4) above, the functions (1) to (4) in the F930GOT are deleted.
     Accordingly, the functions (1) to (4) should be set again using the screen creation soft-
     ware for DU.

Background color of screen

   • When the screen data created using the screen creation software for DU is read using the
     screen creation software for GOT-A900, every background color of the screen is converted
     into black.

   • In the screen creation software for GOT-A900, the background color is black in any case.
     To change the background color, paint the entire screen using the "Paint" object.

### 8.1.2    Common functions

The functions shown below are available in both the screen creation software for DU and the screen creation software for GOT-A900. The table below shows the difference in names in accordance with the setting contents of the set items (attributes).
When the functions shown below are read or written using the other software, their names are automatically converted.
**In this manual, different function names are used in accordance with the screen creation software from Section 9.**

Display function

| Name in screen creation software for GOT-A900 | Difference in set item (attribute) | Name in screen creation software for DU |
|---|---|---|
| Numerical Display | ←When setting is forbidden | Number |
| Numerical Input | ←When setting is permitted | |
| Ascii Display | ←When setting is forbidden | Ascii |
| Ascii Input | ←When setting is permitted | |
| Comment | In case of word device→ | Library Text |
| | In case of bit device→ | Text Indicator |
| Part Display | In case of word device→ | Library Image |
| | In case of bit device→ | Image Indicator |
| Lamp | | Label Indicator |
| Panelmeter | Shape displayed on screen is different. | Panel Meter Circle Graph |
| Clock | Japanese is not available in screen creation software for GOT-A900. | Date |
| | Japanese is not available in screen creation software for GOT-A900. | Time |
| Trend | Sampling is available in background processing. | Trend Graph (Sampling) |
| Line | | Trend Graph (Total) |
| Statistics | In case of bar graph→ | Proportional Bar Graph |
| | In case of circle graph→ | Proportional Pie Graph |
| Bar | Reference value is equivalent to upper or lower value. Only one data can be set at a time.→ | Bar Graph |
| Line | Line type cannot be selected.→ | Line |
| Rectangle | Line type cannot be selected.→ | Box |
| Circle | Ellipse is not available.→ | Circle |
| Bit map | ←Saved in parts file. | Image |
| Text | Name is different. | Text |

Make sure to read the next page also.

Key functions

| Name in screen creation software for GOT-A900 | Difference in set item (attribute) | Name in screen creation software for DU |
|---|---|---|
| Bit operation (bit momentary) | Names are different. | Switch (momentary) |
| (bit ALT) | | Switch (alternate) |
| (bit SET) | | Switch (set) |
| (bit RST) | | Switch (reset) |
| Base changeover | ←Bit condition, etc. cannot be converted. | Change Screen |
| Word operation (Indirect + Fixed value) | Names are different. | Increment |
| (Indirect + Fixed value) | | Decrement |
| (Fixed value) | | Write Constant |

Others

| Name in screen creation software for GOT-A900 | Difference in set item (attribute) | Name in screen creation software for DU |
|---|---|---|
| Parts | Only bit map is converted.→ | Image library |
| Comment | Names are different. | Text library |
| System information | ←Role of each device is different. | Control device |
| Pass word | Names are different. | Entry code |

• In detail setting (attribute) of each function, the set value/current value of word devices can be specified in the software for DU, and only the current value of word devices can be specified in the software for GOT-A900.

- The table below shows the settings specific to the screen creation software for GOT-A900 among the common items. These settings are not available in the F930GOT. (These settings are not supported by the screen creation software for DU, either.)

| | |
|---|---|
| **Display frame** | The display frame can be selected among only images built in the system software. (On the other hand, in the A900GOT Series, arbitrary images can be selected.) |
| **Arithmetic operation** | The arithmetic operation function is not supported except some objects. In Numerical Display and Numerical Input, arithmetic operation can be performed only while the gains and the offset are specified (that is, while the arithmetic operation formula is fixed). |
| **Display trigger** | Only "Always" is available as the display trigger except in some objects. In line graphs, the display trigger is used to specify the sampling cycle. |
| **Range specification** | The color and the blink attribute cannot be changed over by a value of a word device. Only the range in the normal status can be specified. |
| **Security** | The security in the unit of screen is available, but the security in the unit of object is not supported. The available number of security levels is 15 in the same way as the A900GOT. |
| **Multi-device monitor** | In objects (such as Line Graph) monitoring two or more devices, only consecutive devices can be assigned. Random assignment is not available. |

**8.1.3    Functions dedicated to screen creation software for GOT-A900**

The functions shown below are dedicated to the screen creation software GOT-A900. The functions are not supported by the F930GOT. (For the details of these functions, refer to the operation manual of the screen creation software for GOT-A900.)

1)  Screen display

Line Freeform    : Displays a line indicating a zigzag or polygon in one stroke.
                   In the F930GOT, two or more lines can be used to display such a figure.

Polygon          : Displays a polygon.
                   In the F930GOT, two or more lines can be used to display a polygon.

Sector           : Displays a sector.

Arc              : Displays an eclipse.

Scale            : Displays the scale for bar graphs and panel meters
                   In the F930GOT, the scale function is given to bar graphs and meters.

Paint            : Paints (fills) a specified area (which may be a polygon).
                   In the F930GOT, boxes and circles can be filled.

Data List        : Displays the data list in the form of table.

Level            : Displays the level within a specified image range.
                   In the F930GOT, the level can be expressed in the form of bar graph (box).

Part Movement  : Moves displayed parts on a specified trace.

2)  Printer output

Report           : Outputs the data to the printer in accordance with a specified format.

Hard Copy        : Outputs the display screen as it is to the printer.

3)  Voice output
    Voices can be output.
    In the F930GOT, buzzer sounds can be issued.

4)  Window screen
    A window can overlay the display screen.

5)  Station No. changeover
    When two or more A900GOT units access the PLC, the A900GOT unit No. which is to access the PLC can be specified.
    In the case of F930GOT, up to four units can access the PLC without specifying the station No.

## 8.2      Transfer of screen data

Pay rigid attention to the cautions below when the screen data created using the screen cre-
ation software for DU is read/written using the screen creation software for GOT-A900 or when
the screen data created using the screen creation software for GOT-A900 is read/written using
the screen creation software for DU.
If unavailable setting is contained in the screen data, an alarm message is displayed when the
screen data is read. In such a case, check the contents of the read screen data.

```
            a)                           b)
┌──────────────┐      ┌──────────┐      ┌──────────────────┐
│Screen creation│ <──> │ F930GOT  │ <──> │Screen creation   │
│software for DU│      │          │      │software for GOT-A900│
└──────────────┘      └──────────┘      └──────────────────┘
```
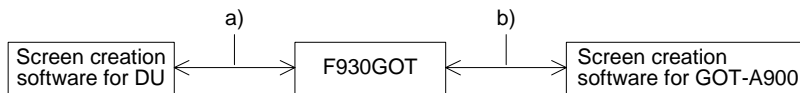
1) Screen data

• Read/write of the functions dedicated to the screen creation software for DU (Refer to Para-
  graph 8.1.1.)

   a) Software for DU:
      No problems are expected in both read and write.

   b) Software for GOT-A900:
      If the F930GOT has dedicated functions, such functions are not read.

• Setting of display screen changeover (Refer to Paragraph 8.1.2.)

   c) Software for DU:
      Names and contents of the functions are automatically converted into those used in the
      software.

   d) Software for GOT-A900:
      Names and contents of the functions are automatically converted into those used in the
      software.

• Functions dedicated to the screen creation software for GOT-A900 (Refer to Paragraph
  8.1.3.)

   e) Software for DU:
      These functions cannot be set in the F930GOT. (That is, these functions cannot be read
      nor written.)

   f) Software for GOT-A900:
      These functions cannot be set in the F930GOT. (That is, these functions cannot be read
      or written.)

2) Setting of display screen changeover

- Screen No. (Refer to Paragraph 8.4.2.)

    a) Software for DU:
       Screen Nos. are automatically converted into Nos. 0 to 499, then transferred (in both read and write).

    b) Software for GOT-A900:
       Screen Nos. are automatically converted into Nos. 1 to 500, then transferred (in both read and write).

    * **When the No. of a screen to be displayed is specified from the PLC, a converted screen No. is transferred to the F930GOT. Accordingly, the used sequence program is required to be changed.**

- Handling of common setting screen
    The contents set on the common setting screen in the screen creation software for DU are treated as the screen No. 501 in the screen creation software for GOT-A900.
    However, the screen No. 501 is treated as a user screen, so the contents of the screen No. 501 are not shared by all screens in the same way as the screen creation software for DU. The screen overlay function (overlap window 1 or 2) or the screen call function should be used so that the contents of the screen No. 501 are shared by all screens.

## 8.3    Use of data in FX-25DU/30DU-B-E

By using the screen creation software FX-PCS-DU/WIN-E, the screen data in the FX-25DU-E,
FX-30DU-B-E can be converted and used for the F930GOT.
The compatibility of the data in such a case is described below.

- How to use the screen data
  When the model is changed from 25DU/30DU to F930GOT using the FX-PCS-DU/WIN-E
  (V2.30 or later), the screen data is converted so that it can be used in the F930GOT.

- Cautions on conversion
  Pay close attention to the following cautions during conversion.

1) Alarm function
   The alarm notification method, "Overlap", "Change Screen" or "Print" can be selected for
   each alarm in the 25DU/30DU. In the F930GOT, only one alarm notification method can be
   selected for all alarms (That is, one alarm notification method is used for every alarm.).
   When the data in the 25DU/30DU is converted and used in the F930GOT, the alarm notifi-
   cation method selected in the head alarm device in the 25DU/30DU is adopted for every
   alarm.

2) Display of user screens

   a) Image, Library Image and Image Indicator
      When a black-and-white image is selected as an image to be used using the functions
      above, the image can be displayed in colors other than black and white in the 25DU/
      30DU by specifying the colors.
      In the F930GOT, the same operation can be performed using the "Indicator" function.

   b) Number and Ascii
      Only numerics and character codes can be changed on the display screen.
      Data can be changed while "Permit" is selected in "Number" and "Ascii". When a
      numeric or character code on the screen is touched, the keyboard for data change is dis-
      played to enable data change. (Each numeric and character code displayed on the
      screen, functions as a touch key.)

   c) Keyboard
      The display position of the keyboard for numerics and text can be moved on the screen in
      the F930GOT.

3) Screen changeover function
   In the F930GOT, if the key condition and the input condition are set to "Always" when the
   screen is changed over from the PLC (screen changeover using a control device in the
   PLC), the priority is always given to screen changeover by a control device in the PLC.
   Accordingly, if both the key condition and the input condition are set to "Always" in the set-
   ting of screen changeover in the 25DU/30DU, the setting of screen changeover or the used
   sequence program should be changed. (Refer to Sections 10 and 12.)

## 8.4    Concept on screen display

- To display a screen

  - Each screen should be created using characters and graphics.
    When the screen creation software for DU is used: Refer to Section 9.
    When the screen creation software for GOT-A900 is used: Refer to Section 11.

- To change over screens

  - Screen changeover should be set.
    When the screen creation software for DU is used: Refer to Section 10.
    When the screen creation software for GOT-A900 is used: Refer to Section 12.

### 8.4.1    Screen display position

The screen size is shown below.
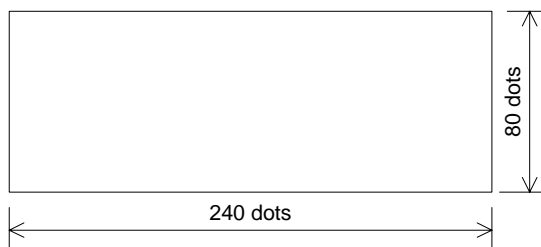


- The display position can be specified in the unit of dot.

### 8.4.2    Number of display screens and screen Nos.

- Up to 500 screens can be displayed.

- A screen No. is assigned to each display screen.
  When the screen creation software for DU is used: Nos. 0 to 499
  When the screen creation software for GOT-A900 is used: Nos. 1 to 500

  *   Though the first screen No. is different, it is automatically converted while it is read in accordance with the used software.

### 8.4.3    Number of display elements and data capacity

Each display element is managed as screen data. The allowable number of screens and capacity are restricted as shown below.

| Item | Description |
|---|---|
| **Total screen data size** | 256 KB (including user screens, external characters, etc.) |
| **Number of displayable screens** | User screens: Up to 500 screens<br>    FX-PCS-DU/WIN-E: Nos. 0 to 499<br>    SW☐D5C-GOTRE-PACK: Nos. 1 to 500<br>System screens: 16 screens (Nos. 1001 to 1030) |
| **Data size per screen** | Up to 16,000 byte |

### 8.4.4 Attribute of display element

The display elements shown in Paragraph 8.1.2 are equipped with detailed set items (attributes).
Representative attributes are explained below.

**Display position:**
Specify the X and Y coordinates of the display position.
Because the mouse is used for the screen creation software, coordinates specified by the mouse are registered.
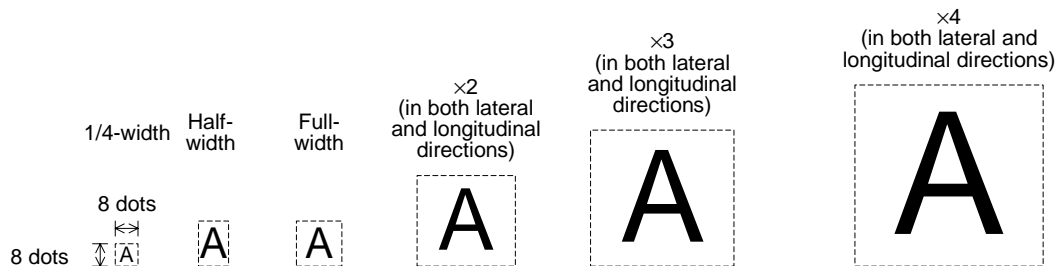
**Character size:**
Half-width character: 8 × 16 dots
Full width character: 16 × 16 dots
1/4-width character: 8 × 8 dots
×0.5 to ×4 of full-width size in the lateral and longitudinal directions: Available only in alphabets, numerics characters



**Color specification:**
Color: White, black, red, blue, yellow, green, purple and light blue
Black-and-white: Black and white

- FX-PCS-DU/WIN-E: Display color, background color, needle color and frame color

- SW□D5C-GOTRE-PACK: Character color, plate color and frame color

**Screen background color:**
FX-PCS-DU/WIN-E: Eight colors or two colors (black and white) can be specified.
SW□D5C-GOTRE-PACK: Only black can be specified.

**Device specification (specification of devices in the PLC):**

- Word device:
  Timer (T), counter (C), data register (D) and index register (V and Z) In the A Series, link register (W) and file register (R) are also available.

- Bit device:
  Input (X), output (Y), auxiliary relay (M), state (S), timer (T) and counter (C)
  In the A Series, F and B are also available.

**Upper/lower limit:**
Set the upper limit (maximum value) and the lower limit (minimum value) of displayed word devices.
Word devices are displayed within the range determined by the upper and lower limits.

## 8.5     Screen call function and overlay function

In the F930GOT, user screens can be overlaid.
The screen call function which allows to specify the screens to be overlaid using the screen creation software and the overlay function which allows to specify the screens to be overlaid from the PLC are available.

1) **Screen call function (For the details, refer to Paragraph 8.5.1.)**
   Screens to be overlaid can be specified preliminarily using the screen creation software.
   The base screen and up to five other screens can be overlaid at a time.

2) **Overlay function (For the details, refer to Paragraph 8.5.2.)**
   When screens to be overlaid are specified from the PLC (Refer to Sections 10 and 12.), the base screen and up to two other screens can be overlaid at a time.
   **When this overlay function is used together with the screen call function, the screen call function is effective only for the base screen. The screen call function is not effective for the second and third screens to be overlaid.**
   (If the screen call function is used for the second and third screens, the base screen selected in the screen call function is overlaid by the overlay function.)

• In each of the screen call function and the overlay function, when other functions such as touch keys and numeric change are displayed, such other functions are effective on all of the overlaid screens. If such other functions are displayed in a same position, a function on the top screen is effective.
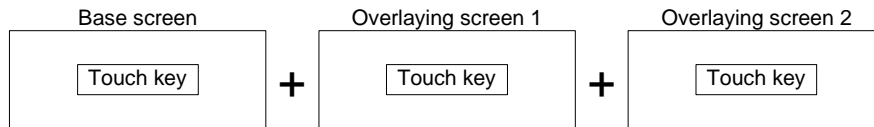


The base screen is located at the bottom.
If touch keys are displayed in a same position, the touch key on the overlaying screen 2 located at the top is
effective.

### 8.5.1   Screen call function

When the screen call function is used, screens are overlaid as shown below in accordance with the used screen creation software.

1) FX-PCS-DU/WIN-E for DU
   When this software is used, 500 user screens Nos. 0 to 499 and the common setting screen for all screens can be overlaid.
   The common setting screen for all screens (which is abbreviated as "common setting screen") is always overlaid by other screens.
   Accordingly, when the screen call function is used, the common setting screen, the base screen and up to four other screens (that is, up to 6 screens in total) can be overlaid.

Display example
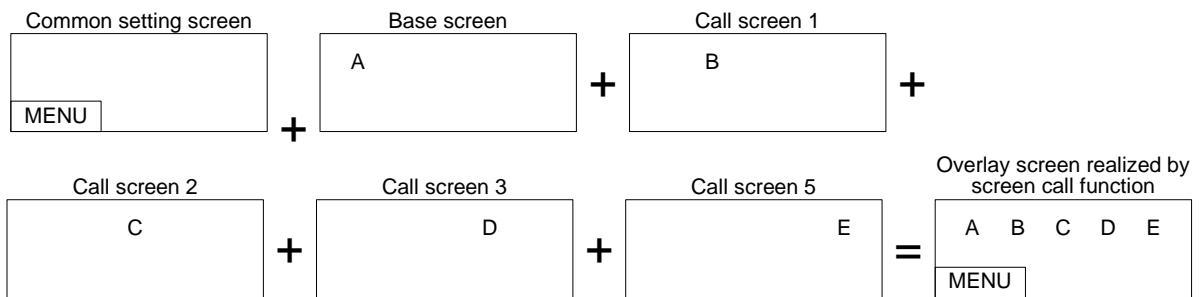


1) SW☐D5C-GOTRE-PACK for GOT-A900
   When this software is used, 500 user screens Nos. 1 to 500 can be overlaid.
   When the screen call function is used, the base screen and up to five other screens (that is, up to 6 screens in total) can be overlaid.

### 8.5.2 Overlay function

The base screen and up to two other screens (3 screens in total) can be overlaid. Perform the following setting in accordance with the used screen creation software.

1) Setting in the FX-PCS-DU/WIN-E
   Use control devices to realize screen overlay (Refer to Paragraph 8.6.1.).
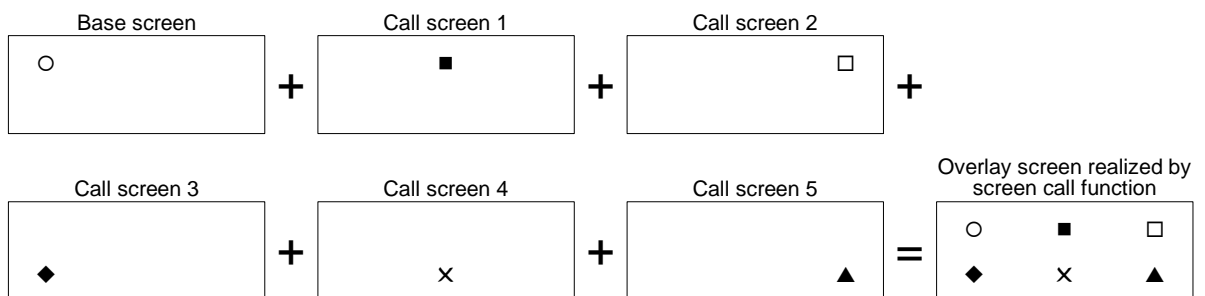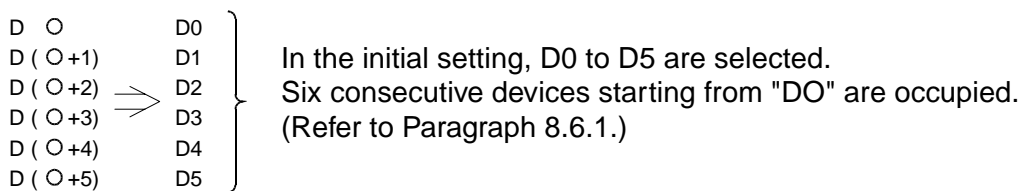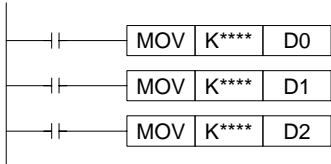   Bit devices and data devices are available as control devices. Only devices necessary for the overlay function are described here.

### Data register (D), timer (T) and counter (C)

The screen Nos. to be overlaid can be specified using the contents of word devices set as control devices. The screen Nos. of the screens currently displayed can be monitored in the PLC.

| | | |
|---|---|---|
| D ○ | D0 | |
| D ( ○ +1) | D1 | In the initial setting, D0 to D5 are selected. |
| D ( ○ +2) → | D2 | Six consecutive devices starting from "DO" are occupied. |
| D ( ○ +3) → | D3 | (Refer to Paragraph 8.6.1.) |
| D ( ○ +4) | D4 | |
| D ( ○ +5) | D5 | |

D0 to D2 specify the screen Nos. to be displayed. D3 to D5 specifies the screen Nos. of the screens currently displayed.

| F930GOT(FX-PCS-DU/WIN) | Sequence program |
|---|---|
| D0: Specifies the screen No. of the screen to be displayed as the first one.<br>D1: Specifies the screen No. of the screen to be displayed as the second one.<br>D2: Specifies the screen No. of the screen to be displayed as the third one. | ⊣⊢———— MOV \| K**** \| D0 <br> ⊣⊢———— MOV \| K**** \| D1 <br> ⊣⊢———— MOV \| K**** \| D2 <br><br>When overlay is not performed, enter "-1" to both D1 and D2. |
| D3: Stores the screen No. of the screen currently displayed.<br>D4: Stores the screen No. of the second screen when two or three screens are overlaid.<br>D5: Stores the screen No. of the third screen when three screens are overlaid. | **Monitoring in a peripheral unit**<br>User screen Nos. (0 to 500) and system screen Nos. (1,000 ~) are stored. When overlay is not performed, "-1" is stored in D4 and D5. |

■Important point

- In the FX-PCS-DU/WIN-E, three screens can be overlaid even if the "Overlay Screen" object is used. In this case, however, the overlay function described here is not available.

In screen overlay, the screen specified by a word device is treated as the base screen, and the screens specified by "DO +1" and "DO +2" overlay the base screen. When overlaying screens, make sure to set "Destination Screen" of the "Change Screen" object to "PLC data register" and write the screen Nos. to be overlaid to word devices (D+0, D+1 and D+2) as shown in the table below. **When screen overlay will not be performed, enter "-1" or "FFFF (H)" to word devices.**

| D+0 | D+1 | D+2 | |
|---|---|---|---|
| Screen No. | -1 | -1 | Base screen |
| Screen No. | Screen No. | -1 | Base screen + Overlaying screen 1 |
| Screen No. | -1 | Screen No. | Base screen + Overlaying screen 1 |
| Screen No. | Screen No. | Screen No. | Base screen + Overlaying screen 1 + Overlaying screen 2 |

In the description below, data devices set as initial values are used.
Data devices: D0, D1 and D2

a) No overlay

- Only the screen specified by the control word device D0 is displayed.

Screen specified by D0
(base screen)

```
┌─────────────┐
│ A           │
│             │
│             │
└─────────────┘
```

b) Overlay of two screens

- Two screens specified by the control word devices D0 and D1 are displayed.

- Or two screen specified by the control word devices D0 and D2 can be displayed.

Screen specified by D0 (base screen) + Screen specified by D1 ⇨ Display screen
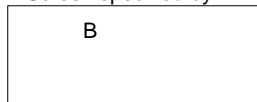
```
┌─────────────┐       ┌─────────────┐     ┌─────────────┐
│ A           │   +   │      B      │  ⇨  │ A     B     │
│             │       │             │     │             │
└─────────────┘       └─────────────┘     └─────────────┘
```
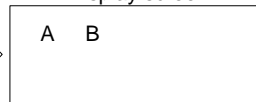
c) Overlay of three screens

- Three screens specified by the control word devices D0, D1 and D2 are displayed.
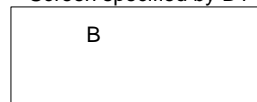
Screen specified by D0 (base screen) + Screen specified by D1 + Screen specified by D2 ⇨ Display screen
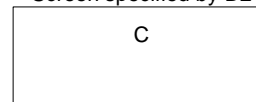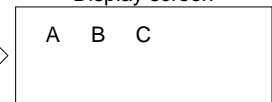
```
┌─────────────┐     ┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│ A           │  +  │      B      │  +  │      C      │  ⇨  │ A   B   C   │
│             │     │             │     │             │     │             │
└─────────────┘     └─────────────┘     └─────────────┘     └─────────────┘
```

- Example of screen overlay

Screen overlay: Each process is monitored. When a material has run short, the material name is displayed on the screen, and a message is displayed to notify necessity of supplement of the material.

   -Line selector switch
      Line 1 input: X0
      Line 2 input: X1

   -Sensor (for bolt count)
      Line 1 input: X2
      Line 2 input: X3

   -Supplement confirmation button: X4

## Program in PLC

Control devices
  Data devices: Word devices to specify screen Nos. to be overlaid

D 0          D0
D (0+1)  ⟹  D1
D (0+2)      D2

Line selector switch



In the program above, the line 1 is selected. Even if the line 2 is selected, screens can be overlaid in the same way.

Screen No. 0

```
┌─────────────────────────────┐
│ DRIVE PREPARATION           │
│ 1. PLEASE SELECT LINE 1     │
│    OR LINE 2                │
│   ┌─────────┐               │
│   │ START   │               │
│   └─────────┘               │
└─────────────────────────────┘
```

............ Touch key No. 0

- Screen currently being created
  After the switch line is selected, the next screen is displayed when the START key is pressed (= becomes ON). The registered setting of screen changeover is shared by all screens.

Setting shared by all screens (Change Screen)

| | Screen changeover condition | | Destination Screen | Save Current Screen |
|---|---|---|---|---|
| | Control Input | Bit Device | | |
| 1 | Touch key No. 0 | X0 | 1 | Not effective |
| 2 | Touch key No. 0 | X1 | 2 | Not effective |

PLC: X0 = ON
START key: ON

PLC: X1 = ON
START key: ON
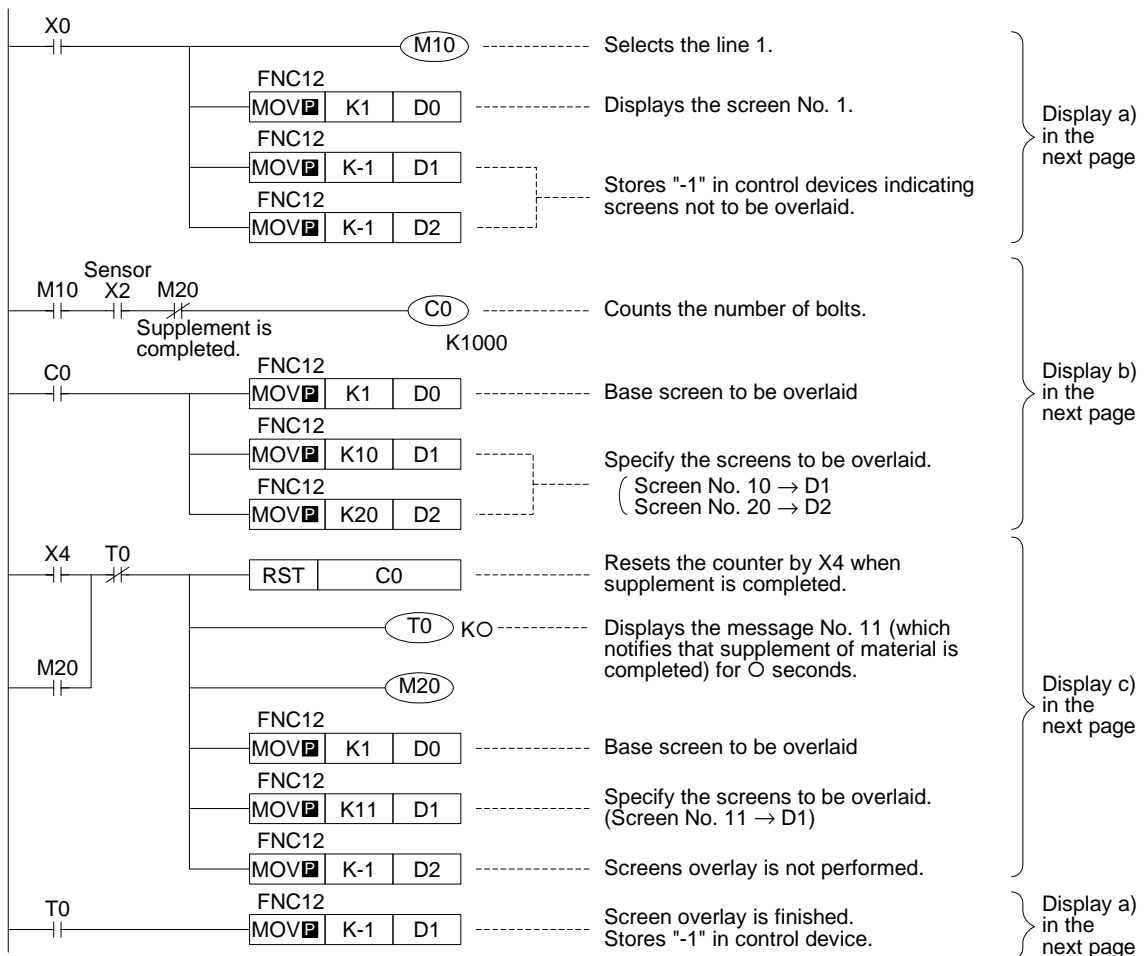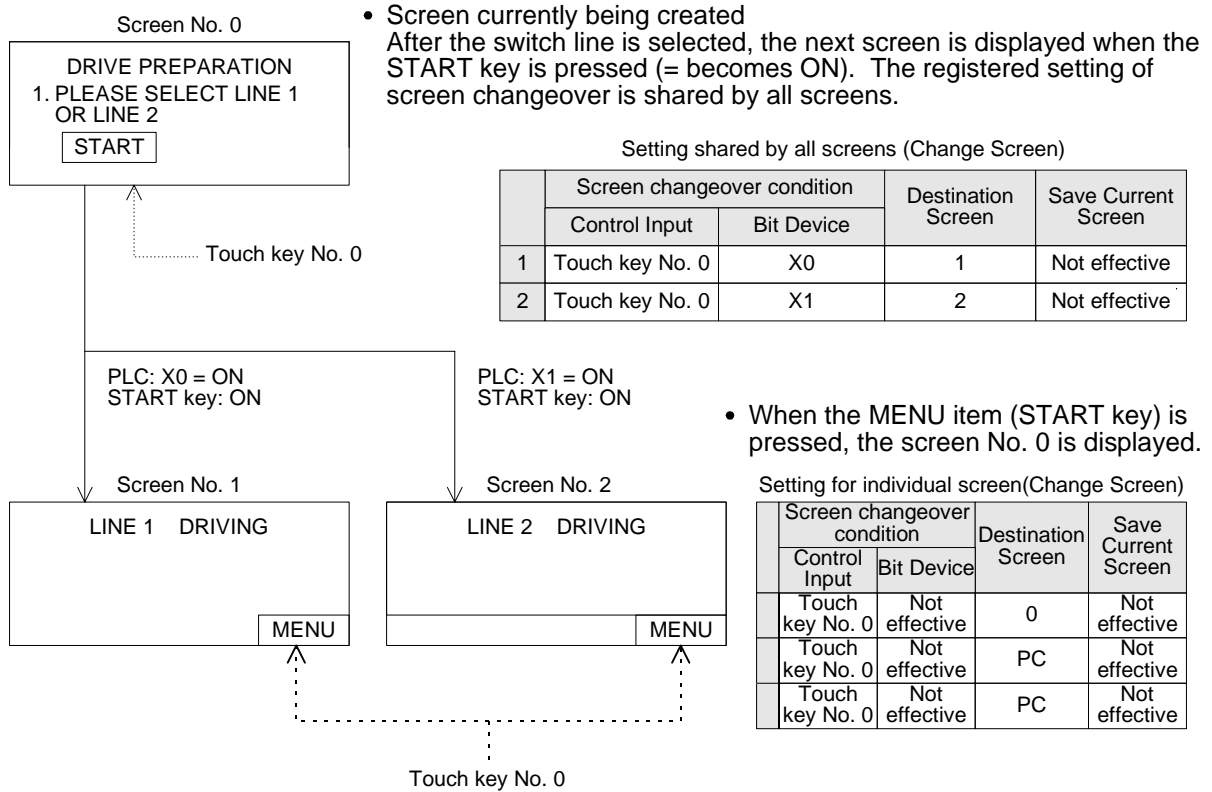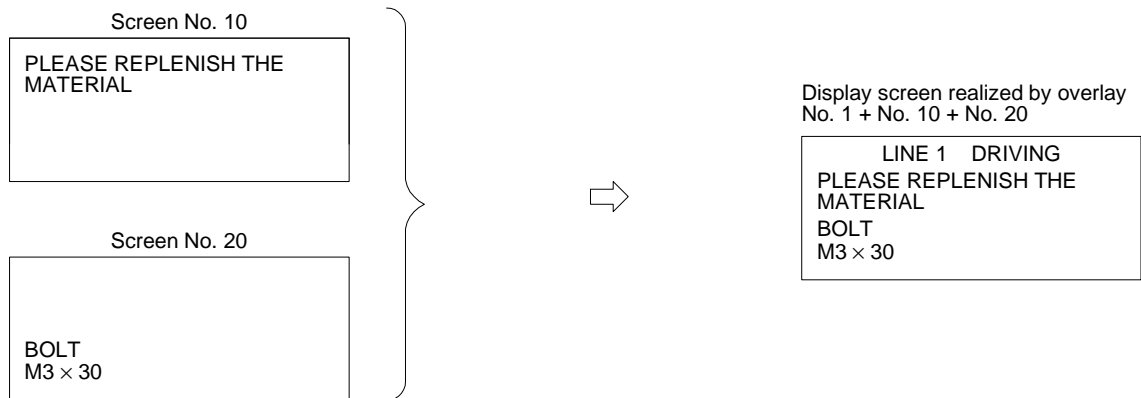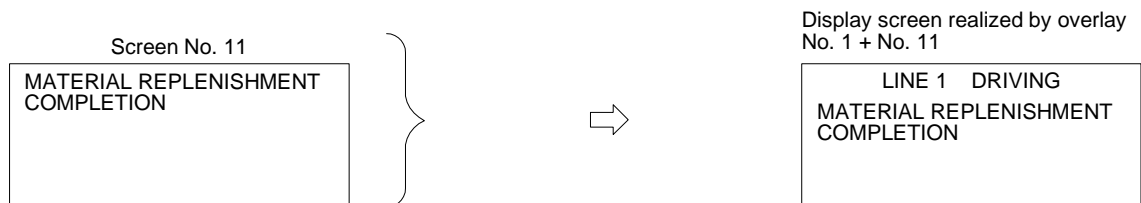
- When the MENU item (START key) is pressed, the screen No. 0 is displayed.

Screen No. 1

```
┌─────────────────────────────┐
│ LINE 1   DRIVING            │
│                             │
│              ┌────────┐     │
│              │ MENU   │     │
│              └────────┘     │
└─────────────────────────────┘
```

Screen No. 2

```
┌─────────────────────────────┐
│ LINE 2   DRIVING            │
│                             │
│              ┌────────┐     │
│              │ MENU   │     │
│              └────────┘     │
└─────────────────────────────┘
```

Setting for individual screen(Change Screen)

| | Screen changeover condition | | Destination Screen | Save Current Screen |
|---|---|---|---|---|
| | Control Input | Bit Device | | |
| | Touch key No. 0 | Not effective | 0 | Not effective |
| | Touch key No. 0 | Not effective | PC | Not effective |
| | Touch key No. 0 | Not effective | PC | Not effective |

Touch key No. 0

- Overlay of three screens: The screens Nos. 10 and 20 overlay the screen No. 1.
  In this overlay example, the line 1 (screen No. 1) is adopted.

Screen No. 10

```
┌─────────────────────────────┐
│ PLEASE REPLENISH THE        │
│ MATERIAL                    │
│                             │
│                             │
└─────────────────────────────┘
```

Screen No. 20

```
┌─────────────────────────────┐
│                             │
│                             │
│ BOLT                        │
│ M3 × 30                     │
└─────────────────────────────┘
```

⇨

Display screen realized by overlay
No. 1 + No. 10 + No. 20

```
┌─────────────────────────────┐
│     LINE 1   DRIVING        │
│ PLEASE REPLENISH THE        │
│ MATERIAL                    │
│ BOLT                        │
│ M3 × 30                     │
└─────────────────────────────┘
```

- Overlay of two screens: The screen No. 11 overlays the screen No. 1.

Screen No. 11

```
┌─────────────────────────────┐
│ MATERIAL REPLENISHMENT      │
│ COMPLETION                  │
│                             │
│                             │
└─────────────────────────────┘
```

⇨

Display screen realized by overlay
No. 1 + No. 11

```
┌─────────────────────────────┐
│     LINE 1   DRIVING        │
│ MATERIAL REPLENISHMENT      │
│ COMPLETION                  │
│                             │
└─────────────────────────────┘
```

◆ MITSUBISHI

2) Setting in the SW□D5C-GOTRE-PACK

In overlay, use word devices for "Change Screen".

Set the base screen No. and the overlaying screen (= overlap window) Nos. in accordance with the contents of the word devices set in "Change Screen".

Setting of word devices for screen changeover

Base screen:       Word device (The initial value is set to D0.)
Overlap screen 1:  Word device (The initial value is not set.)
Overlap screen 2:  Word device (The initial value is not set.)

The base screen, the overlap window 1 and the overlap window 2 can be specified using arbitrary word devices. (The word devices may not be consecutive.)

When overlay is not performed, enter "0" to the specified devices or perform setting so that overlap windows are not used.

The screen Nos. currently displayed can be checked using "Write Device" in "System Information" in the screen creation software. (Refer to Paragraph 8.6.)

Write devices: Head word device
                 "Head + 1" word device
                 "Head + 2" word device

The specified screens are overlaid as shown below.

| Base screen | Overlap window 1 | Overlap window 2 | |
|---|---|---|---|
| Screen No. | 0 | 0 | Base screen |
| Screen No. | Screen No. | 0 | Base screen + Overlap screen 1 |
| Screen No. | 0 | Screen No. | Base screen + Overlap screen 1 |
| Screen No. | Screen No. | Screen No. | Base screen + Overlap screen 1 + Overlap screen 2 |

a) No overlay

•Only the base screen is displayed.

Screen No. specifying the
base screen
(Base screen)

```
┌─────────────────────┐
│  A                  │
│                     │
│                     │
└─────────────────────┘
```
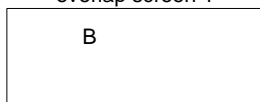
b) Overlay of two screens

•  Two screens specified by D0 and D1, the base screen and the overlap screen 1, are overlaid.

•  Or two screens specified by D0 (base screen) and D2 (overlap screen 2) can be overlaid.
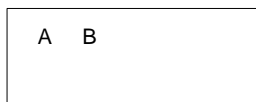
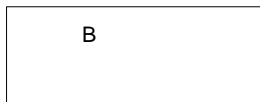| Screen No. specifying the base screen (Base screen) | | Screen No. specifying the overlap screen 1 | | Display screen |
|---|---|---|---|---|
| A | **+** | B | ⇨ | A    B |

c) Overlay of three screens

•  Three screens specified by D0, D1 and D21, the base screen, the overlap screen 1 and the overlap screen 2, are overlaid.
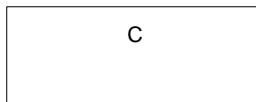
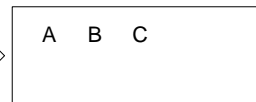| Screen No. specifying the base screen (Base screen) | | Screen No. specifying the overlap screen 1 | | Screen No. specifying the overlap screen 2 | | Display screen |
|---|---|---|---|---|---|---|
| A | **+** | B | **+** | C | ⇨ | A    B    C |

- Example of screen overlay

  Screen overlay: Each process is monitored. When a material has run short, the material name is displayed on the screen, and a message is displayed to notify necessity of supplement of the material.
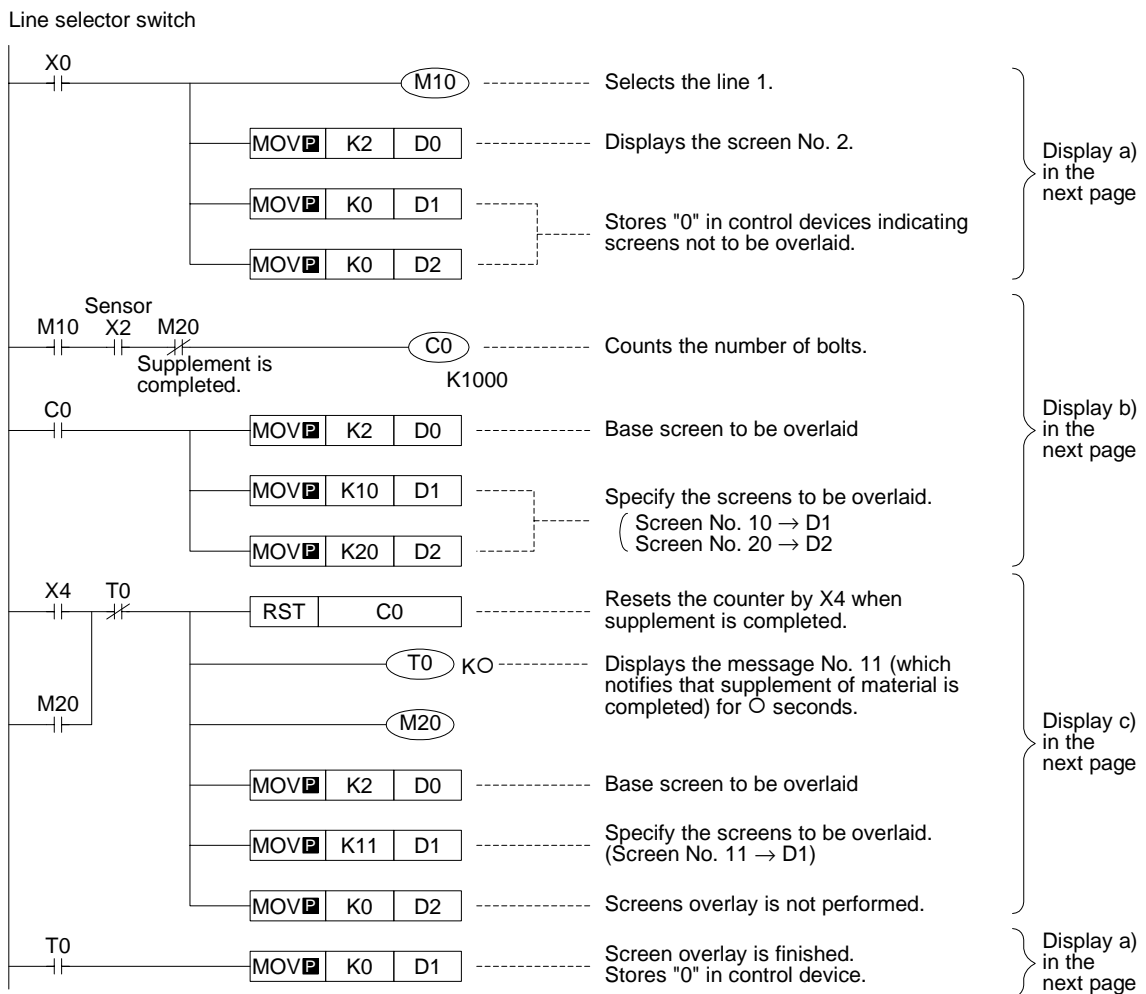
  - Line selector switch
    Line 1 input: X0
    Line 2 input: X1

  - Sensor (for bolt count)
    Line 1 input: X2
    Line 2 input: X3

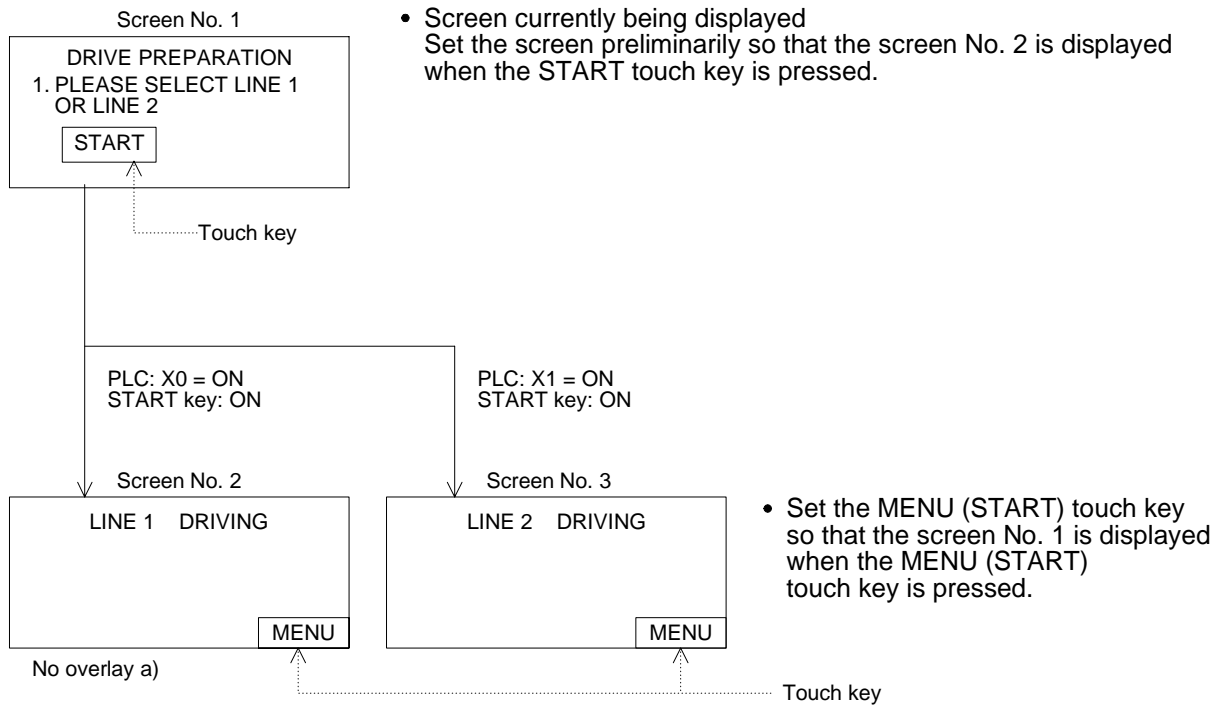  - Supplement confirmation button: X4

## Program in PLC

Screen changeover
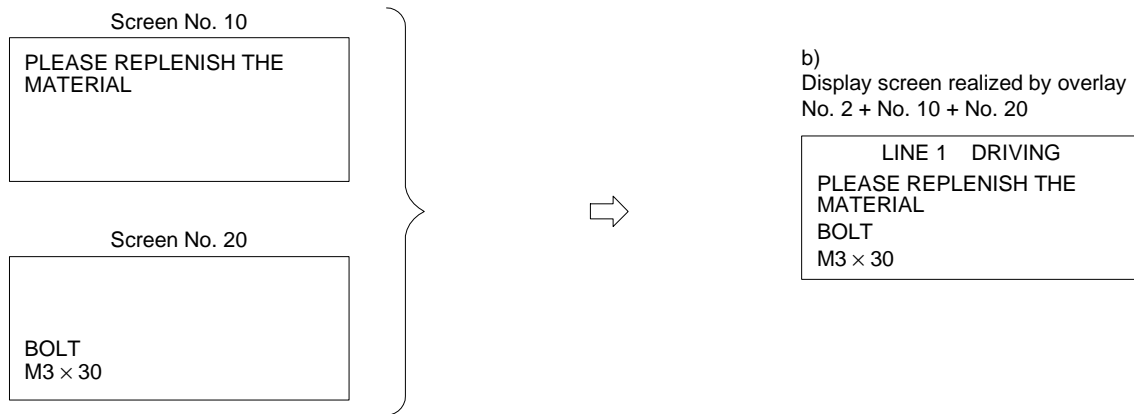  Word devices: Word devices to specify screen Nos. to overlay/be overlaid

Base screen                D0 ⎫
Overlap window 1 ⟹    D1 ⎬  Set them in "Change Screen" in "Common Setting" in the
Overlap window 2         D2 ⎭  SW☐D5C-GOTRE-PACK.

Line selector switch

X0 ───────────────────( M10 )   ------------ Selects the line 1.

        ─[ MOVP │ K2 │ D0 ]   ------------ Displays the screen No. 2.

        ─[ MOVP │ K0 │ D1 ]   ------┐
                                                          ├ Stores "0" in control devices indicating
        ─[ MOVP │ K0 │ D2 ]   ------┘       screens not to be overlaid.

Display a) in the next page

      Sensor
M10  X2   M20
─┤├──┤├──┤/├──────────( C0 )   ------------ Counts the number of bolts.
              Supplement is               K1000
              completed.

C0
─┤├─────[ MOVP │ K2 │ D0 ]   ------------ Base screen to be overlaid

        ─[ MOVP │ K10 │ D1 ]   ------┐   Specify the screens to be overlaid.
                                                          ├   ⎧ Screen No. 10 → D1
        ─[ MOVP │ K20 │ D2 ]   ------┘   ⎩ Screen No. 20 → D2

Display b) in the next page

X4   T0
─┤├──┤/├────[ RST │ C0 ]   ------------ Resets the counter by X4 when supplement is completed.

                    ( T0 ) K○   ---------- Displays the message No. 11 (which notifies that supplement of material is completed) for ○ seconds.
M20
─┤├────────( M20 )

        ─[ MOVP │ K2 │ D0 ]   ------------ Base screen to be overlaid

        ─[ MOVP │ K11 │ D1 ]   ------------ Specify the screens to be overlaid. (Screen No. 11 → D1)

        ─[ MOVP │ K0 │ D2 ]   ------------ Screens overlay is not performed.

Display c) in the next page

T0
─┤├────[ MOVP │ K0 │ D1 ]   ------------ Screen overlay is finished. Stores "0" in control device.

Display a) in the next page

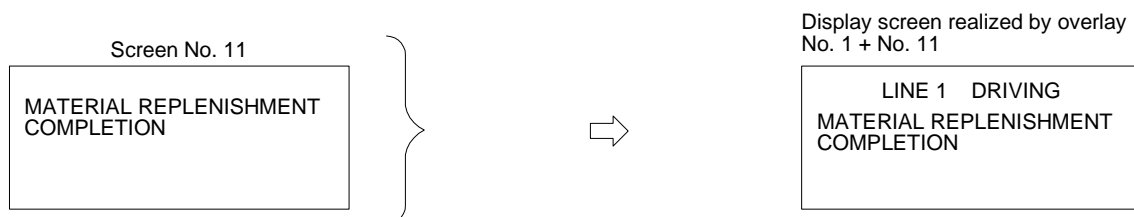In the program above, the line 1 is selected. Even if the line 2 is selected, screens can be overlaid in the same way.

Screen No. 1

```
DRIVE PREPARATION
1. PLEASE SELECT LINE 1
   OR LINE 2
  [ START ]
```

·········Touch key

- Screen currently being displayed
  Set the screen preliminarily so that the screen No. 2 is displayed
  when the START touch key is pressed.

PLC: X0 = ON                     PLC: X1 = ON
START key: ON                    START key: ON

Screen No. 2                     Screen No. 3

```
LINE 1   DRIVING                  LINE 2   DRIVING



            [ MENU ]                          [ MENU ]
```
No overlay a)

- Set the MENU (START) touch key
  so that the screen No. 1 is displayed
  when the MENU (START)
  touch key is pressed.

·········································· Touch key

- Overlay of three screens: The screens Nos. 10 and 20 overlay the screen No. 1.
  In this overlay example, the line 1 (screen No. 2) is adopted.

Screen No. 10

```
PLEASE REPLENISH THE
MATERIAL

```

Screen No. 20

```


BOLT
M3 × 30
```

b)
Display screen realized by overlay
No. 2 + No. 10 + No. 20

```
      LINE 1   DRIVING
PLEASE REPLENISH THE
MATERIAL
BOLT
M3 × 30
```

Overlay of two screens: The screen No. 11 overlays the screen No. 2.

Screen No. 11

```
MATERIAL REPLENISHMENT
COMPLETION

```

Display screen realized by overlay
No. 1 + No. 11

```
     LINE 1   DRIVING
MATERIAL REPLENISHMENT
COMPLETION

```

## 8.6 Control devices and system information

Devices are required to be assigned to change over the display screen of the GOT from the PLC and read the status information including the battery status in the GOT and the alarm occurrence data from the PLC. The term "control device" is used in the FX-PCS-DU/WIN-E. The term "system information" is used in the SW☐D5C-GOTRE-PACK.

### 8.6.1 Control device (setting in FX-PCS-DU/WIN-E)

• Bit devices: Eight bit devices (X, Y, M, S, T and C) in the PLC are occupied. M0 to M7 are specified when the GOT is shipped from the factory.

• Word devices: Seven word devices (D, T and C) in the PLC are occupied. D0 to D7 are specified when the GOT is shipped from the factory.

**Details of bit devices**

• Occupied bit devices are used for communication using ON/OFF signals.

**[ When the auxiliary relay M0 is assigned ]**

| Auxiliary relay | Contents of control | Reference paragraph |
|---|---|---|
| M0 | When this bit device becomes ON from OFF, the alarm history is cleared. | 7.3 |
| M1 | This bit device remains ON while a device assigned by the alarm function remains ON. | --- |
| M2 | When this bit device becomes ON, the backlight of the display screen is turned OFF after a specified time. | --- |
| M3 | Unused | --- |
| M4 | Unused | --- |
| M5 | This bit device becomes ON as a flag when setting of a number is completed. | 3.3 |
| M6 | This bit device becomes ON when the backup battery power of the GOT has dropped. | --- |
| M7 | Unused | --- |

*1 The PLC gives instructions to the GOT. Coils are turned on/off in programs in the PLC.

*2 The GOT transmits the information to the PLC. Contacts are used in programs in the PLC.

### Details of word devices

- Occupied word devices (which may be called data devices) are used to specify the screen Nos. to be displayed and confirm the screens currently displayed.

### [ When the data register D0 is assigned ]

| Data register | Contents of control | Reference paragraph |
|---|---|---|
| D0<br>D1<br>D2 | These word devices specify the screen Nos. to be displayed in the screen mode.<br>D0: Specifies the screen No. of the base screen displayed when only one screen is displayed.<br>D1: Specifies the screen No. of the overlaying screen 1 displayed when two screens are displayed.<br>D2: Specifies the screen No. of the overlaying screen 2 displayed when three screens are displayed. | 10.4.2<br>8.5 |
| D3<br>D4<br>D5 | These word devices store the screen Nos. of the screens currently being displayed in the screen mode.<br>D3: Stores the screen No. of the base screen currently being displayed.<br>D4: Stores the screen No. of the second screen currently being displayed.<br>D5: Stores the screen No. of the third screen currently being displayed. | 8.5 |
| D6 | This word device specifies a file No. to be read/written. | 9.8 |
| D7 | This word devices indicates the ID of the object whose input is completed. | 3.3 |

• Control devices execute the following operations.
When bit devices M0 to M7, data devices D0 to D6 are assigned

GOT                                                                    Sequence program

**Bit devices**

• When M0 becomes ON from OFF, the alarm history is cleared.                    ⬅         ┤├── (M0)

• M1 remains ON while a corresponding alarm device remains ON.                  ➡    M1 ┤├── ( )

• When M2 becomes ON, the backlight of the display screen becomes extinguished after a specified time.    ⬅         ┤├── (M2)

• M5 becomes ON when setting of a number is completed.                          ➡    M5 ┤├── ( )

• M6 becomes ON when the backup battery power of the GOT has dropped.           ➡    M6 ┤├── ( )
• M3, M4, M7 is not used.

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Word devices**

• D0 to D2

| 2 | | |
| | 1 | |
| | | 0 |

Screens of the screen Nos. stored in D0 to D2 are displayed. When screen overlay is not performed, "-1" is stored.        ⬅

┤├── | MOV | K0 | D0 |
┤├── | MOV | K1 | D1 |
┤├── | MOV | K2 | D2 |

• D3 to D5

| 5 | | |
| | 4 | |
| | | 3 |

Screen Nos. of the screens currently displayed are stored in D3 to D5.
**User screens Nos. 0 to 499 and system screens No. 1000 and later are available.
When screen overlay is not performed, "-1" is stored in D4 and D5.**        ➡

D0 to D2 specify the screen Nos. of screens to overlay/be overlaid.

D3 ⎫
D4 ⎬ D3 to D5 store the screen Nos. of screens currently displayed.
D5 ⎭

• D6 stores a data file No.                                                     ⬅    ┤├── | MOV | K0 | D6 |

• D7 indicates the ID No. of an object.

ID | ○ ○ ○ |                                                                    ➡

D7 stores the ID No. of a manipulated object.

D7 | ○ ○ ○ |

### 8.6.2    System information (setting in software for GOT-A900)

The following word devices can be specified as system information devices for read and write.

- Read devices:
  One or two 16-bit word devices are occupied.
  (The number of occupied devices can be changed using the screen creation software.)
  No devices are set when the F930GOT is shipped from the factory.

- Write devices:
  Five 16-bit word devices are occupied.
  (Fifteen word devices are occupied in principle in the screen creation software. However, write devices not used in the F930GOT can be used as general word devices.)
  No devices are set when the F930GOT is shipped from the factory.

**Details of read devices**

- Head of specified word devices:
  Reads the GOT information to its bits 0 to 2 (b0 to b2).
  "Head +1" of specified word devices:
  Specifies the recipe No. to be read from/written to the PLC using the recipe function.

**[ When the data register D10 is assigned ]**

| Data register | | Contents of control | Reference paragraph |
|---|---|---|---|
| D10 | b0 | When b0 becomes ON from OFF, the alarm history in the GOT is cleared. | 7.3 |
| | b1 | When b1 becomes ON, the backlight of the display screen becomes extinguished after a specified time. | --- |
| D11 | | Specifies the recipe No. to be read from/written to the PLC using the recipe function. | 11 |

### Details of write devices

• Head to "Head +4" of specified word devices: Store the screen Nos. currently displayed.
  "Head +5" of specified word devices: Turns ON/OFF its bits 0 to 3 (b0 to b3) to control the
  GOT.

**[ When the data register D20 is assigned ]**

| Data register | | Contents of control | Reference paragraph |
|---|---|---|---|
| D20 D21 D22 | | These data registers store the screen Nos. currently displayed in the screen mode.<br>D20: Stores the screen No. of the base screen currently displayed.<br>D21: Stores the screen No. of the second screen (overlap window 1) when two screens are overlaid.<br>D22: Stores the screen No. of the third screen (overlap window 2) when three screens are overlaid. | 8.5 |
| D23 | | Stores the ID of an object whose input is completed. | 3.3 |
| D24 | b0 | b0 remains ON while a device assigned in the alarm function remains ON. | 6.2 |
| | b1 | Unused | --- |
| | b2 | b2 becomes ON when numeric input is completed. | 3.3 |
| | b3 | b3 becomes ON when the backup battery power of the GOT has dropped. | --- |
| D25 to D34 | | Unused (They can be used as general word devices in sequence programs.) | --- |

- Devices assigned for system information execute the following operations.

When read devices : D10 (b0 to b1 are developed to M10 to M12.)
                           D11                                                              are assigned.
Write devices         : D20 to D24 (b0 to b3 are developed to M20 to M23.)

GOT                                                                  Sequence program

**Read devices**

Always ON

| MOV | D10 | K1M10 |

- When M10 becomes ON from OFF, the alarm history is cleared.

M10

- When M11 becomes ON, the backlight of the display screen becomes extinguished after a specified time.

M11

M12 to M13 is not used (unusable).

- D11 stores the recipe No.

| MOV | K0 | D11 |

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Write devices**

- D20 to D22

```
5
  4
    3
```

The screen Nos. of screens currently displayed are stored in D20 to D22.
**User screens Nos. 0 to 499 and system screens No. 1000 and later are available.
When screen overlay is not performed, "0" is stored in D21 and D22.**

D20 ⎫  The screen Nos. of
D21 ⎬  screens currently
D22 ⎭  displayed are written to
        them.

- D23 stores the ID No. of an object.

ID [ ○ ○ ○ ]

The ID No. of a manipulated object is stored in D23.

D23 [ ○ ○ ○ ]

Always ON

| MOV | D24 | K1M20 |

- M20 remains ON while an alarm device remains ON.

M20

- M22 becomes ON when change of numeric data is completed.

M22

- M23 become ON when the backup battery power of the GOT has dropped.

M23

# MEMO

# 9.    Creation of Display Screens (FX-PCS-DU/WIN-E)

This section describes elements in constructing user screens using the screen creation software for DU (FX-PCS-DU/WIN-E).
Created user screens are displayed in the screen mode (described in Section 3). For specification of screens to be displayed, refer to Section 10.

## 9.1    Element list

Elements for constructing screens are referred to as "Objects" in the screen creation software for DU.

### ◆Display example

The figure below shows an example of screen display.
Only a few some objects are used in the example below.
Some objects are displayed on the screen, and others are not. Some objects are only available in certain models.
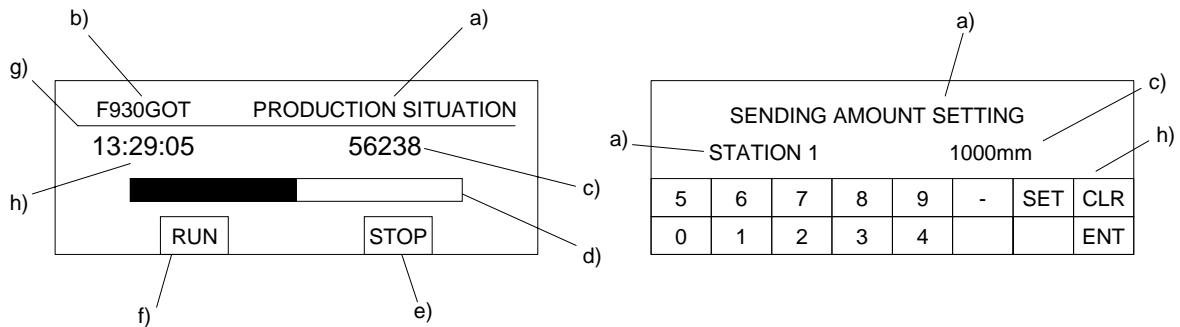


**Display objects : Display the data in a specified size in a specified position.**

| Object name | Description | Use example |
|---|---|---|
| **Text** | Displays alphabets, numerics, Katakana, Hiragana, Kanji (JIS level 1), symbols, external characters created by the user or symbols created by the user. (External characters can be registered using the screen creation software.) External characters are available only in the screen creation software for DU. | a), b) |
| **Line** | Displays a line connecting specified two points. | f) |
| **Box** | Displays a box on the screen. | --- |
| **Filled Box** | Displays a boxed filled with a specified color on the screen. | --- |
| **Circle** | Displays a circle on the screen. | --- |
| **Filled Circle** | Displays a circle filled with a specified color on the screen. | --- |
| **Image** | Displays an image stored in the image library in a specified position on the screen. | --- |
| **Date** | Displays the year, month, day and day of the week. | --- |
| **Time** | Displays the hour, minute and second. | g) |

Data display objects: Display the contents of devices in the PLC.

| Object name | Description | Use example |
|---|---|---|
| **Library Text** | Displays a text stored in the text library. The text to be displayed can be specified using a word device (T, C, D, V or Z). | --- |
| **Number** | Displays a word device (current value/set value of timer/counter or D, V or Z) in the PLC in a specified position for monitoring. | c) |
| **Bar Graph** | Displays a word device (current value/set value of timer/counter or D, V or Z) in the PLC in a specified position in the form of bar graph for monitoring. | d) |
| **Circle Graph** | Displays a word device (current value/set value of timer/counter or D, V or Z) in the PLC in a specified position in the form of circle graph for monitoring. | --- |
| **Proportional Bar Graph** | Displays up to 8 consecutive word devices in the form of proportional bar graph. | --- |
| **Proportional Pie Graph** | Displays up to 8 consecutive word devices in the form of proportional pie graph. | --- |
| **Panel Meter** | Displays a word device in the form of panel meter. | --- |
| **Indicator** | Inverts a specified area on the screen by setting to ON/OFF a bit device in the PLC. | --- |
| **Label Indicator** | Displays specified characters when a specified bit device becomes ON. | --- |
| **Text Indicator** | Displays two types of texts alternately in accordance with the ON/OFF status of a bit device in the PLC. Texts stored in the text library can be specified for display. | --- |
| **Image Indicator** | Displays two types of images alternately in accordance with the ON/OFF status of a bit device in the PLC. Images stored in the image library can be specified for display. | --- |
| **Overlay Screen** | Allows a specified screen to overlay another screen when a bit device in the PLC becomes ON or OFF. | --- |
| **Library Image** | Displays an image stored in the image library. The image to be displayed can be specified using a word device (T, C, D, V or Z). | --- |
| **Trend Graph (Sampling)** | Displays word devices in the PLC sampled at a constant time interval in the form of trend graph. Up to 4 devices can be displayed. | --- |
| **Line Graph** | Acquires the data stored in a word device at each specified timing, displays a line graph of the acquired data within the display range, then allows scroll of the line graph. | --- |
| **Ascii** | Allows a character code to be specified from the PLC, and displays a corresponding character such as alphabet, numeric, Katakana, Hiragana and Kanji. The shift JIS code and ASCII code are available as character codes. | --- |

Data transfer objects: Transfer data when a key is pressed.

| Object name | Description | Use example |
|---|---|---|
| **Switch** | Controls the ON/OFF status of a bit device in the PLC from a touch key. | --- |
| **Touch Key** | Allows a specified area on the screen to function as a key when pressed.<br>The "Touch Key" object is usually combined with a function offered for touch keys such as "Switch" and "Data Setting". | e) |
| **Send Data Bank** | Stores the data on up to 4,000 data registers in the PLC.<br>When a specified input is given, data can be read from or written to corresponding data registers. | --- |
| **Write Constant** | When a specified touch key is pressed, set data is written to a word device in the PLC. | --- |
| **Data Setting** | Allows to change a specified word device in the PLC.<br>When a key is pressed, the ten-key pad is displayed on the screen so that a specified numeric can be changed using this key pad. | --- |
| **Increment** | Adds "1" to the data of a specified word device in the PLC. | --- |
| **Decrement** | Subtracts "1" from the data of a specified word device in the PLC. | --- |
| **Keyboard** | Displays the keyboard dedicated to numeric change on the screen. | h) |
| **Buzzer** | Issues buzzer sound in the GOT in accordance with the ON/OFF status of a bit device in the PLC. | --- |

Screen changeover object

| Object name | Description | Use example |
|---|---|---|
| **Change Screen** | Allows to specify the screen changeover condition, the changeover destination, etc. | --- |

## 9.2     Registration of object

In the screen creation software for DU, objects can be registered (for screen creation) to all screens or only one screen at a time.

- **Setting for all screens (common setting)**
  An object registered in the setting for all screens is shared by all screens. By one registration operation of an object, the object is registered to all screens.
  **Available objects**: All objects

- **Setting for individual screen**
  An object can be registered for an individual screen at a time. Only the functions of the object registered on the screen currently displayed in the screen mode are effective. When the display screen is changed over, objects registered on the newly displayed screen become effective.
  **Available objects**: All objects

- The figure below shows the relationship between the setting for all screens and the setting for individual screen.
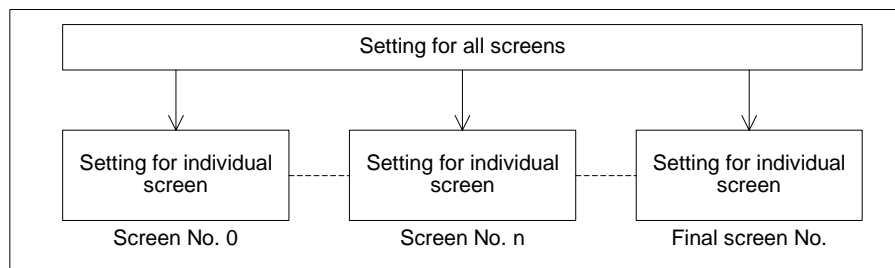


On the screen displayed in the screen mode, both objects registered in the setting for all screens and the objects registered in the setting for individual screen are effective.

■Important point

When an object is registered in the setting for all screens, it acts as if one screen overlays by the screen call function.

## 9.3      Display objects

This paragraph describes in details the objects related to display of characters and images on the screen.

### 9.3.1     Text

An object used to display characters is called "Text". The "Text" object is used to give messages indicating the operation status and the error status to the operator.

◆**Contents of setting**

| Attribute | Contents of setting |
|-----------|---------------------|
| Position | Enter the X and Y coordinates of the start point in the unit of dots. |
| Bg, Text and Bg Transparent | Enter the background color and the text color. (Initial values: White and black) When "Bg Transparent" is made effective with a check mark, the setting of "Bg" is not effective. |
| Character Size | Enter the width (W) and the height (H). The available sizes are ×0.5, ×1, ×2, ×3 and ×4. |
| Shift | The text can be shifted to the right, the left or the center. |
| Text | Enter the characters to be displayed. Available characters are alphabets, numerics, Katakana, Hiragana and Kanji (JIS level 1 and external characters). The text may occupy two or more lines. |

◆**Display example**

Bg (background color)
(The broken line is not actually displayed.)

ERROR            W: ×2,
                 H: ×2, text color

CHECK THE MOTOR  W: ×1,
                 H: ×1, text color
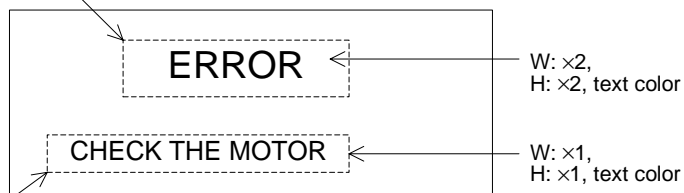
Bg (background color)
(The broken line is not actually displayed.)

**9.3.2    Line**

The "Line" object displays a line on the screen.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Start Position | Enter the X and Y coordinates of the start point of the line in the unit of dot. |
| End Position | Enter the X and Y coordinates of the end point of the line in the unit of dot. |
| Color | Enter the display color. (Initial value: Black) |

◆**Display example**

• A line is drawn in solid line.

Example:
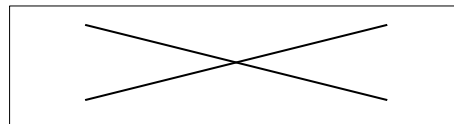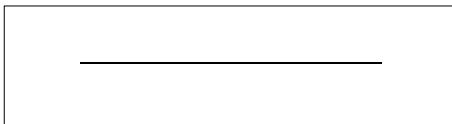


• Use a line to draw a polygon except square and rectangle.

**9.3.3    Box**

The "Box" object displays a rectangle having specified two diagonal points.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Start Position | Enter the X and Y coordinates of one diagonal point in the unit of dot. |
| End Position | Enter the X and Y coordinates of the other diagonal point in the unit of dot. |
| Color | Enter the display color. (Initial value: Black) |

◆**Display example**

- A square or rectangle is drawn in solid line.

Example:
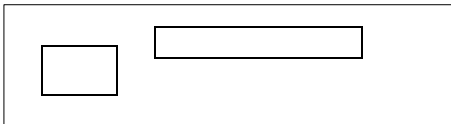


- Use a line to draw a rectangle whose one angle is not 90° or a rectangle whose one edge is not horizontal nor vertical.

**9.3.4    Filled Box**

The "Filled Box" object displays a filled rectangle having specified two diagonal points.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Start Position | Enter the X and Y coordinates of one diagonal point in the unit of dot. |
| End Position | Enter the X and Y coordinates of the other diagonal point in the unit of dot. |
| Frame and Fill | Enter the frame color and the filling color. (Initial values: Black and white) |

◆**Display example**
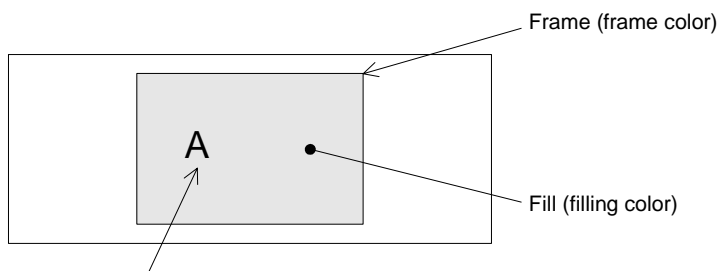


- When the "Text" or "Number" object is combined, fill the box at first, then create an object to be displayed on it. If the "Filled Box" object is created later, the text or the number is hidden under it.

- Use a line to draw a rectangle whose one angle is not 90 degrees or a rectangle whose one edge is not horizontal nor vertical.

■**Important point**

- Filling of entire screen
  When the entire screen is to be filled, it is recommended to specify the screen color in the header setting in the screen creation software.

**9.3.5    Circle**

The "Circle" object displays a circle on the screen.

◆**Contents of setting**

| Attribute | Contents of setting |
|-----------|---------------------|
| Position | Enter the X and Y coordinates of the center position in the unit of dot. |
| Radius | Enter the radius in the unit of dot. |
| Circle | Enter the display color. (Initial value: Black) |

◆**Display example**

• A circle is displayed in continuous line.

Example:



Circle (frame color)
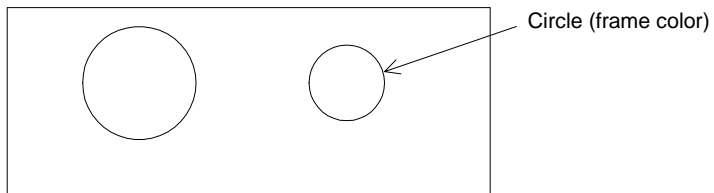
• Use the "Filled Circle" object to display a circle whose inside is filled.

**9.3.6    Filled Circle**

The "Filled Circle" object displays a filled circle on the screen.

◆**Contents of setting**

| Attribute | Contents of setting |
|-----------|---------------------|
| Position | Enter the X and Y coordinates of the center in the unit of dot. |
| Radius | Enter the radius in the unit of dot. |
| Circle and Fill | Enter the circle color and the filling color. (Initial values: Black and white) |

◆**Display example**



Circle (circle color)

A

Fill (filling color)
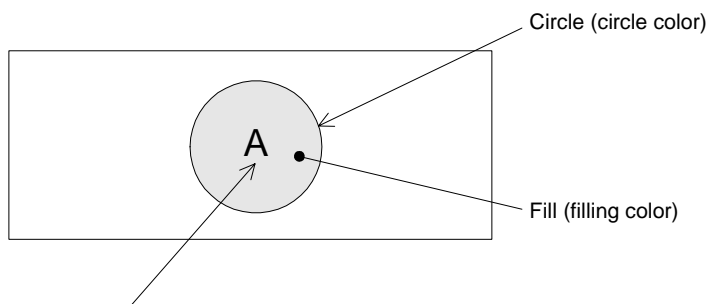
- When the "Text" or "Number" object is combined, fill the circle at first, then create an object to be displayed on it. If the "Filled Circle" object is created later, the text or the number is hidden under it.

**9.3.7 Image**

The "Image" object displays an image set in the image library on the screen.

**◆Contents of setting**

| Attribute | Contents of setting |
|-----------|---------------------|
| Position | Enter the X and Y coordinates of the start point in the unit of dot. |
| Bg and Fg | Enter the background color and the image color. (Initial values: White and black) |
| No. | Enter the image No. of an image in the image library to be displayed. |

**◆Display example**

| "Image" object | |
|---------------|-------|
| Image No. | No.50 |

Image library
Image No. 50
100 × 100

Display screen

Start point
(The black point is not actually displayed.)
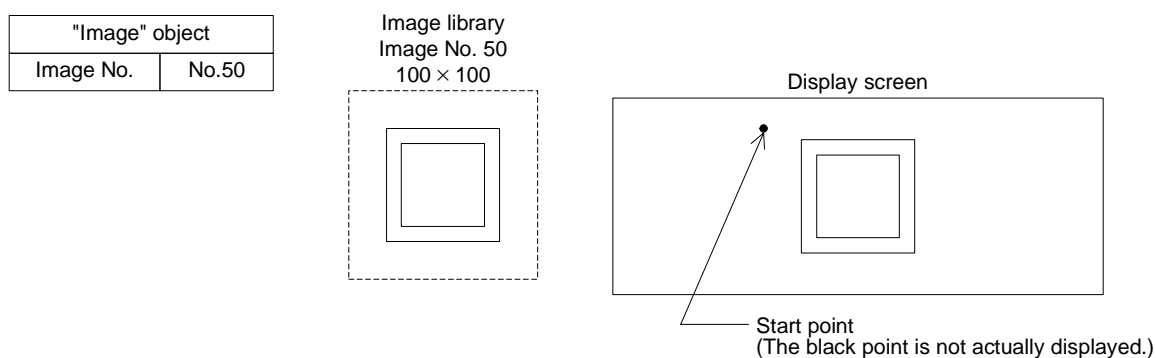
- The specified image stored in the image library (described in Paragraph 9.7) is displayed from the specified start point.

- The image is displayed in the same size as that of the image stored in the image library.

- Images can be registered to the image library using the screen creation software.

### 9.3.8    Date and time

The "Date/Time" object displays the year, month, day, day of the week and time on the screen.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Bg and Text | Enter the background color and the text color. (Initial values: White and black) |
| Character Size | Enter the width (W) and the height (H) of characters. The available sizes are ×0.5, ×1, ×2, ×3 and ×4. |
| Format | Select the display format. |
| Frame | Select the display frame. (Initial value: No frame) |
| Frame Color | Enter the display frame color. The area inside the frame is filled with the background color. |

◆**Display example**

Date

    Standard European format   :31/DEC/1998(THU)

    Short European format      :31/DEC/1998

    Standard USA format       :DEC/31/1998(THU)

    Short USA format         :DEC/31/1998

Time

    Standard English format   :12:00:30

    Short English format       :12:00

■**Important point**

• Displayed date and time
  The date and the time set in the operation environment setting in the GOT main body are displayed.

◆ MITSUBISHI

## 9.4     Data display objects

This paragraph describes in details the data display objects which display the contents of devices in the PLC.

### 9.4.1     Library Text

The "Library Text" objects displays a text stored in the text library on the screen in accordance with the current value or the set value of a word device (T, C, D, V or Z).
Because two or more texts can be displayed on one screen, the number of screens can be saved.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Bg and Text | Enter the background color and the text color. (Initial values: White and black) | |
| Character Size | Enter the width (W) and the height (H) of characters.The available sizes are ×0.5, ×1, ×2, ×3 and ×4. | |
| Word Device | Enter a word device in the PLC which stores a text No. to be displayed. Enter "Data Size" and "Displayed Value (Current or Preset)" also. | |
| Start No. | The monitor value plus this start No. is regarded as the text No. of a text to be displayed. | |
| Frame | Select the frame to be displayed around the text. (Initial setting: No frame) | ← 1) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | |

1) Frame: Displayed around the text

| Display form | | | | |
|---|---|---|---|---|
| | No frame | Single frame | Double frame (keyboard) | Double frame (trimming) |

◆**Display example**

• The displayed text is changed in accordance with the ON/OFF status of the limit switches L1 to L3 provided in the carrying line shown below.
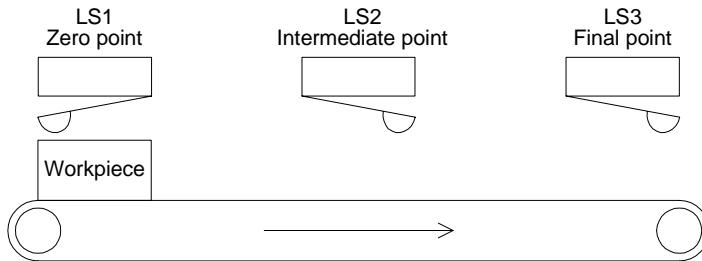


• The "Library Text" object is used in this example. To specify the text No. stored in the text library, the data register D10 is used.

- Library Text

> Word Device    : D10
>
> Data Size      : 16 bits
>
> Displayed Value : Current

- Text library



• Sequence program



• Display in the F940GOT



When the switch LS1 becomes ON, "Zero point" is displayed.
When the switch LS2 becomes ON, "Intermediate point" is displayed.
When the switch LS3 becomes ON, "Finished" is displayed.
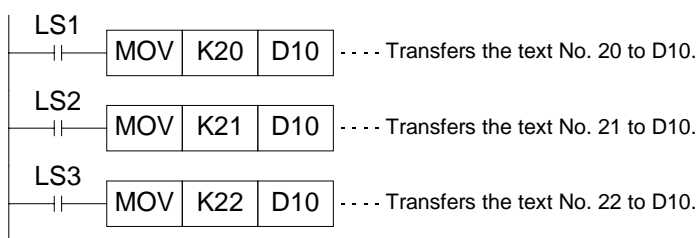
The display start point is fixed without regard to the length of the displayed text.
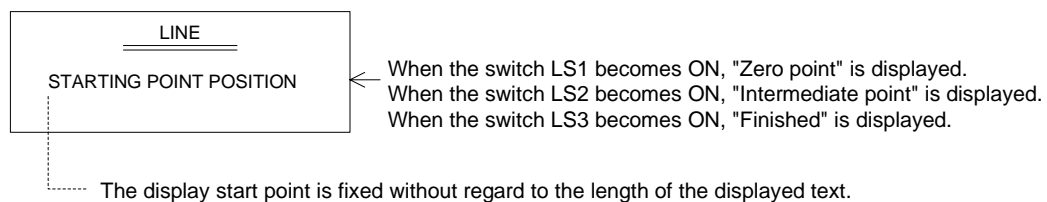
**9.4.2　Number**

The "Number" object displays the data stored in a word device in the PLC.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Bg and Fg | Enter the background color and the numeric color. (Initial values: White and black) | |
| Character Size | Enter the width (W) and the height (H) of characters. The available sizes are ×0.5, ×1, ×2, ×3 and ×4. | |
| Digits and Deci-mal Point At | Enter the total number of digits.<br>Enter the number of digits after decimal point. | ←1) |
| Format | Set the numerical display format. (Initial value: None) | ←2) |
| Word Device | Enter a word device whose data is to be displayed as a numeric.<br>Enter "Data Size" and "Displayed value (Current or Preset)" also. | |
| Style | Select the numeric format among "Decimal (with/without sign)", "Decimal (leading 0) (with/without sign)", "Hexadecimal", "Octal", "Binary" and "Real". | ←3) |
| Shift | Select the layout among "Right", "Center" and "Left". | ←4) |
| Gain 1, Gain 2 and Offset | (Monitor value × Gain 1 / Gain 2) + Offset<br>The result of this arithmetic operation is displayed. | ←5) |
| Data Changeable | Set whether or not the data of the specified device can be changed using the keys. | ←6) |
| Minimum Value and Maximum Value | Set the lower limit and the upper limit of a numeric which can be entered to a word device while "Data Changeable" is made effective with a check mark. Select "Direct" (to enter a desired value) or "Indirect" (to enter a desired data register). | ←7) |
| User ID and Des-tination ID | These attributes are effective while "Data Changeable" is made effective with a check mark.<br>Enter an object to be displayed next when a cursor control key is pressed. | ←8) |
| Frame | Select the frame to be displayed around the numeric. (Initial setting: No frame) | |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | |

1) Digits

- Maximum allowable number of digits: 12 (Each of "-" (minus sign) and a decimal point is counted as one digit.
  Example:)

High-speed counter　　　　C235 (32 bits)

-2147483648　to　-2147483648

11 digits　　　　10 digits

If data whose number of digits exceeds the maximum allowable number of digits is specified to be displayed, "?" is displayed.

### Number of digits after decimal point (Decimal Point At)

- Enter the number of digits after a decimal point for a case where a decimal point is displayed.
  Example: When the displayed numeric is "2000"

|  |  |
|---|---|
| 2000: Decimal Point At = 0 | 20.00: Decimal Point At = 2 |
| 200.0: Decimal Point At = 1 | 2.000: Decimal Point At = 3 |

2) Format

When the display format is set, a numeric is displayed as follows.
A half-width character "#" in the specified format is replaced with a numeric in actual display. Characters except "#" are displayed as they are.

Example: ##.#ms -> A numeric of three digits is displayed. 12.3ms

The number of "#" in the specified format is regarded as the total number of digits, and the number of digit after decimal point is regarded as "0".

3) Style

- Decimal (leading 0), Decimal or Hexadecimal

- When "Decimal (leading 0)" is selected, "0" is displayed in upper digits up to the specified total number of digits.
  Example:
  When the total number of digits is set to 7 and the number of digits after decimal point is set to 2

  0012.34
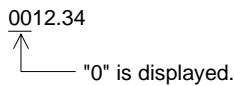
  "0" is displayed.

- A numeric is displayed horizontally.

4) Shift

- When the number of digits of a numeric to be displayed is smaller than the value set to "Digits", the numeric is automatically shifted to the position set here.

  Example: When "Digits" is set to "9" and the displayed numeric has 3 digits

  Start point

  | Right  | : |   |   |   |   |   |   | 1 | 2 | 3 |
  | Center | : |   |   |   | 1 | 2 | 3 |   |   |   |
  | Left   | : | 1 | 2 | 3 |   |   |   |   |   |   |
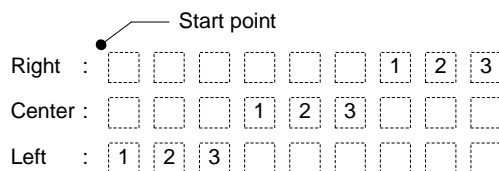
5) Gain 1, Gain 2 and Offset
   The value obtained by the calculation "(Monitor value ✕ Gain 1 / Gain 2) + Offset" is displayed.

   Example: When the monitor value is 1000 (current value of D100), "Gain 1" is set to 10, Gain 2 is set to 2 and "Offset" is set to 3
   (1000 ✕ 10 / 2) + 3 = 5003 -> "5003" is displayed.
   When a numeric is entered (Refer to Section 3.), the result of the following arith metic operation is stored in the specified word device.
   (Input value - Offset) / Gain 1 ✕ Gain 2

6) Data Changeable

   • When this attribute is made effective (with a check mark), data can be changed if the "Increment", "Decrement", "Data Setting" or "Keyboard" object is combined.

   • For the operating procedure, refer to Paragraph 3.2.

7) Minimum Value and Maximum Value
   Specify the input range adopted when "Data Changeable" is made effective.

8) User ID (Refer to Paragraph 3.3.)
   A serial No. is automatically assigned to each registered "Number" object in the order of registration.
   By checking this No., the changed "Number" object can be detected.
   When input is completed, the user ID No. of the changed "Number" object is stored in the control device "DO+7".

   **Destination ID**
   This attribute allows to specify the change order of "Number" objects.
   By entering the user ID No., the change order can be arbitrarily specified.

◆**Display example**

```
                    ┌─────────────────────────────────────┐
                    │           HEATING TIME              │
                    │── LINE 1              89.6  s ──     │
"Text" object ──────│── LINE 2             126.3  s ──     │──── "Number" object
                    │                                     │
                    └─────────────────────────────────────┘
```
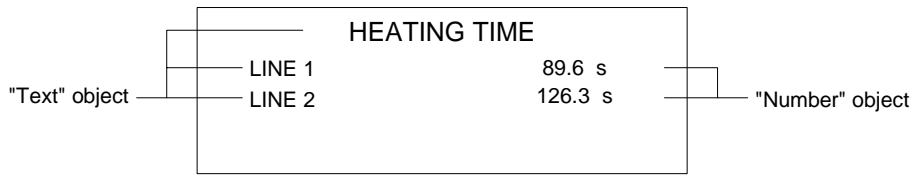
### 9.4.3　Bar Graph

The "Bar Graph" object displays the value of a specified word device (current value/set value of T or C or D, V or Z) in the PLC in the form of bar graph.
A numeric which is rather difficult to understand in the form of number can be displayed in the form of bar graph so that it can be easily understood at a glance.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Size | Enter the width (W) and the height (H) of the bar graph in the unit of dot. The allowable minimum value is 8 W x 16 H. | |
| Bg and Fg | Enter the background color and the display color. (Initial values: White and black) | |
| Graph Type | Select the graph type among "Right" (left → right), "Up" (down → up), "Left" (right → left) and "Down" (up → down). | 1) |
| Word Device | Enter a word device whose value is to be displayed in the bar graph. Enter "Data Size" and "Displayed value (Current or Preset)" also. | |
| Minimum Value and Maximum Value | Enter the minimum value (0%) and the maximum value (100%) of the data. "Direct" (to enter a value directly) or "Indirect" (to enter a data register) can be selected. | 1) |
| Ticks | Enter the number of ticks on the scale attached to the bar graph. | 2) |
| Scale Position | Select the position among "Right", "Up", "Down" and "Left". | 2) |
| Frame | Select the frame displayed around the bar graph. (Initial value: No frame) | |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | |

1) Graph Type

- Bar graph type
  Right (left → right)Up (down → up)
  Left (right → left)Down (up → down)

- The value entered to "Minimum Value" is regarded as the 0% value. The value entered to "Maximum Value" is regarded as the 100% value. The value of the specified word device is represented in %.
  If the value of the specified word device is outside the range specified by "Minimum Value" and "Maximum Value", a diagonal line is drawn in the bar graph.

Example:

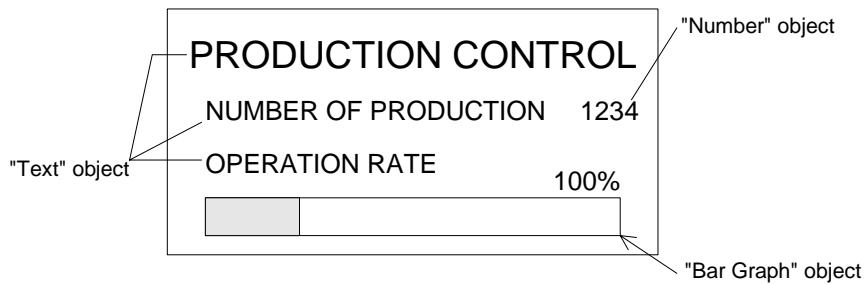Word Device: D1
Minimum Value: 1000
Maximum Value: 3000

Graph Type: Right (left → right)

D1        1500                       D1        0

Ticks

Minimum Value   Current value of   Maximum Value
(1000)          word device     (3000)
              (1500 = 25%)

(When the value of the word device is
smaller than "Minimum Value)

Graph Type: Up (down → up)

Ticks          Maximum Value

Minimum    Current value of
Value       word device
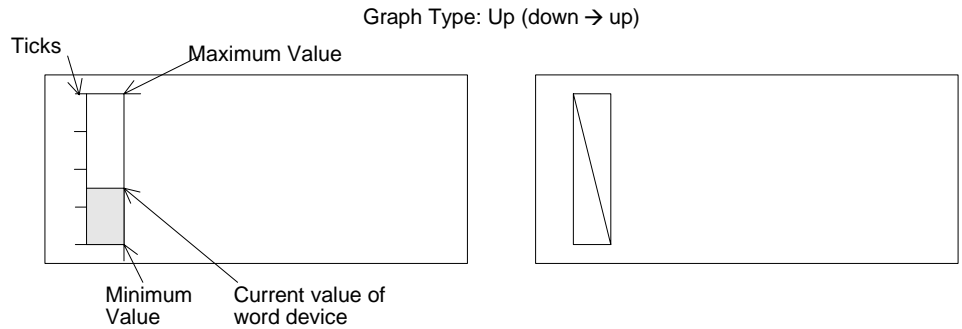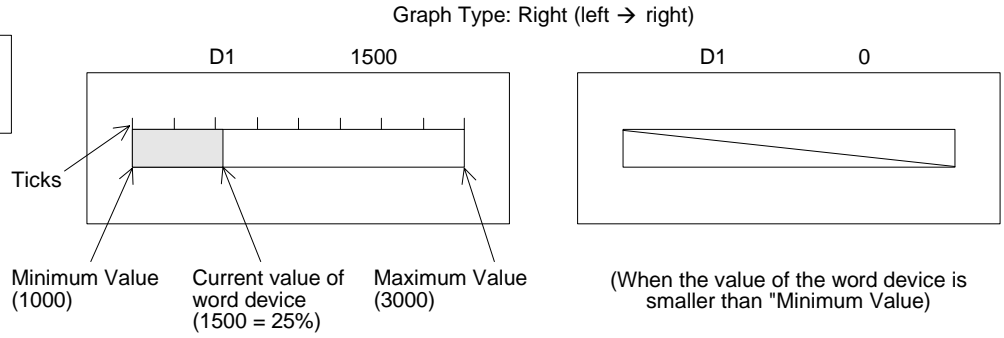
In the case of "Left" (right → left) or "Down" (up → down), the "Maximum Value" position and the "Minimum Value" position is exchanged each other from the positions shown on the right.

The area from 0% to 100% is filled
with the background color (Bg).

The area indicating the current value
is filled with the display color (Fg).

## 2) Ticks and Scale Position

Graph Type: Right (left → right)

Scale Position: Up
(upper edge)

Left  Right

Scale Position: Down
(lower edge)

Ticks: The interval among ticks is equivalent.

Graph Type: Up (down → up)

Up

Ticks:
The interval among ticks
is equivalent.

Down

Scale Position: Left  Scale Position: Right
(left edge)    (right edge)

◆**Display example**

"Number" object

PRODUCTION CONTROL

NUMBER OF PRODUCTION  1234

OPERATION RATE

"Text" object

100%

"Bar Graph" object

**9.4.4　Circle Graph**

The "Circle Graph" object displays the current value or the set value of a specified word device in the PLC.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates of the center in the unit of dot. | |
| Radius | Enter the radius in the unit of dot. The allowable minimum value is 16 dots. | |
| Bg and Fg | Enter the background color and the display color. (Initial values: White and black) | |
| Start Position | Select the start position among "Top", "Right", "Bottom" and "Left". | |
| Direction | Select "Clockwise" or "Counterclockwise". | ←1) |
| Word Device | Enter a word device whose value is to be displayed in the circle graph. Enter "Data Size" and "Displayed value (Current or Preset)" also. | |
| Minimum Value and Maximum Value | Enter the minimum value (0%) and the maximum value (100%) of the data. "Direct" (to enter a value directly) or "Indirect" (to enter a data register) can be selected. | |
| Ticks | Enter the number of ticks of the scale attached to the circle graph. | |
| Frame | Select the frame displayed around the circle graph. (Initial value: No frame) | ←2) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | ←3) |
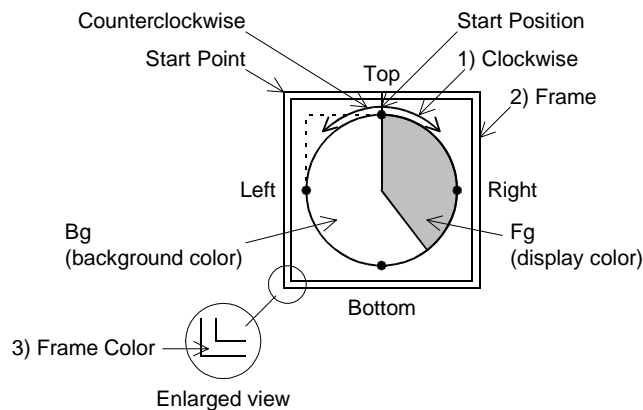


◆**Display example**

When "Start Position" is set to "Top" and "Direction" is set to "Clockwise"
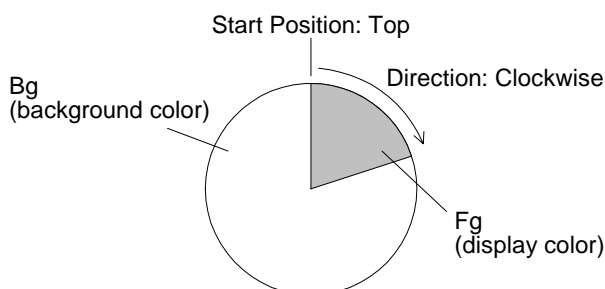
### 9.4.5 Proportional Bar Graph

The "Proportional Bar Graph" object displays the current value of specified word devices in the form of proportional bar graph as the ratio against 100%.

◆**Contents of setting**

| Attribute | Contents of setting | |
|-----------|---------------------|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Size | Enter the width (W) and the height (H) of the bar graph in the unit of dot. | |
| Graph Type | Select the graph type between "Vertical" and "Horizontal". | |
| Word Device | Enter the top word device in the PLC from which consecutive word devices are to be displayed in the proportional bar graph.<br>Enter "Data Size" also. | ← 1) |
| Nbr Of Devices | Enter a numeric from 1 to 8 as the number of word devices to be displayed in the proportional bar graph. | ← 1) |
| Bar 1, Bar 2, Bar 3, Bar 4, Bar 5, Bar 6, Bar 7, Bar 8 and Bar Frame | Enter the display color of each data and the bar frame color. | ← 2) |
| Ticks | Enter the number of ticks on the scale attached to the proportional bar graph. | ← 3) |
| Frame | Select the frame displayed around the proportional bar graph. (Initial value: No frame) | ← 4) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | ← 4) |

1) Word Device (head data register)

Start Point

2) Bg (background color)

2) Bar Frame (bar frame color)

| DATA1 | DATA2 | DATA3 | DATA4 | DATA5 | DATA6 | DATA7 | DATA8 |
|-------|-------|-------|-------|-------|-------|-------|-------|

2) Data color (Bar 1 to Bar 8)

3) Ticks

4) Frame Color

Enlarged view

◆**Display example**

Bar Frame (bar frame color)

| DATA1 | DATA2 | DATA3 | DATA4 | DATA5 | DATA6 |
|-------|-------|-------|-------|-------|-------|
| D100 | D101 | D102 | D103 | D104 | D105 |

*1

*1 The display size in the horizontal direction is regarded as 100%. The ratio of each data against 100% is represented.
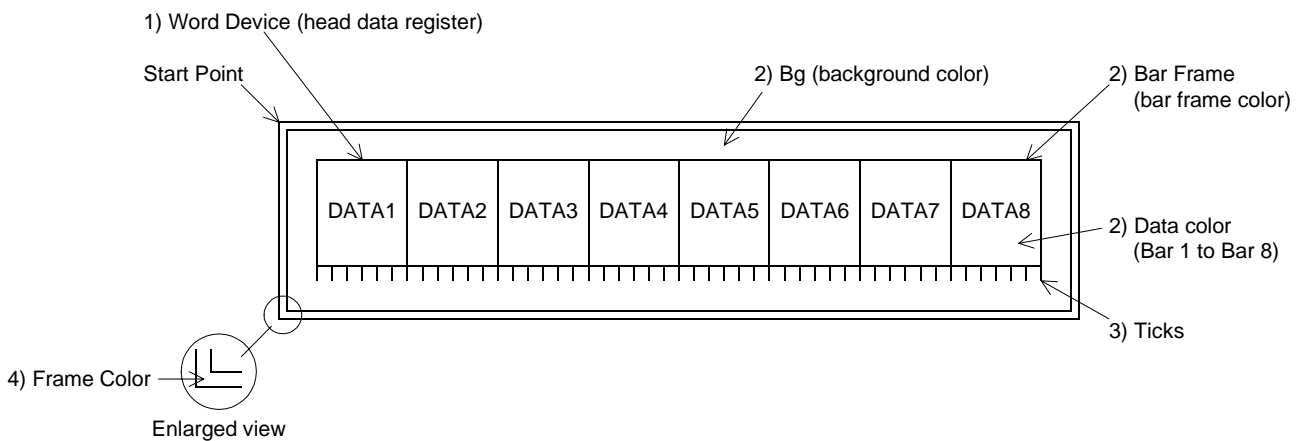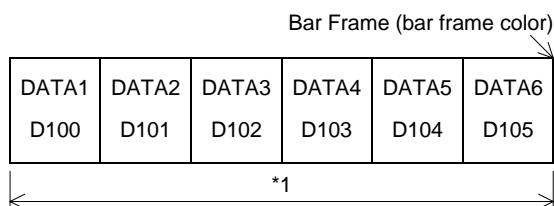
Setting example:
Word Device: D100
Nbr Of Devices: 6

▲ **MITSUBISHI**

### 9.4.6    Proportional Pie Graph

The "Proportional Pie Graph" object displays the current value of specified word devices in the form of proportional pie graph as the ratio against 100% (= 360×).

◆**Contents of setting**

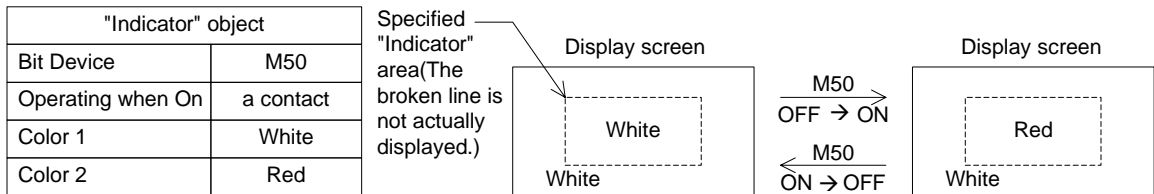| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates of the center in the unit of dot. | |
| Radius | Enter the radius in the unit of dot. | |
| Word Device | Enter the top word device from which the specified number of consecutive word devices are displayed in the proportional pie graph.<br>Enter "Data Size" also. | ← 1) |
| Nbr Of Devices | Enter a numeric from 1 to 8 as the number of word devices to be displayed in the proportional pie graph. | ← 1) |
| Pie 1, Pie 2, Pie 3, Pie 4, Pie 5, Pie 6, Pie 7, Pie 8 and Circle | Enter the display color of each data and the circle frame. | ← 2) |
| Ticks | Enter the number of ticks of the scale attached to the proportional pie graph. | |
| Frame | Select the frame displayed around the proportional pie graph. (Initial value: No frame) | ← 3) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | ← 3) |
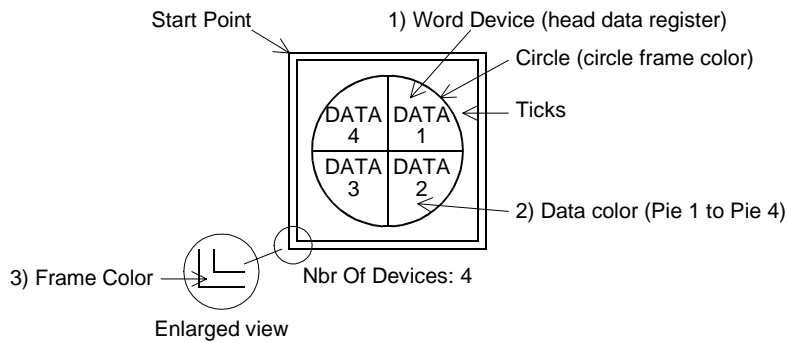


◆**Display example**

Setting example:
  Word Device: D200
  Nbr Of Devices: 3
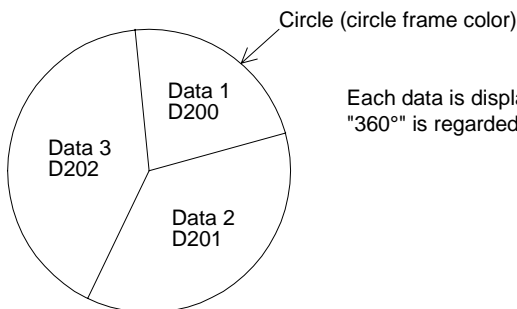


Each data is displayed clockwise from the top of the circle from the data 1 (D200). "360°" is regarded as 100%.  The ratio of each data against 100% is represented.

### 9.4.7 Panel Meter

The "Panel Meter" object displays the value of a specified word device in the form of panel meter.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Size | Enter the width (W) and the height (H) in the unit of dot. The "vertical:horizontal" ratio is fixed to "3:4". | |
| Bg and Fg | Enter the background color and the display color. (Initial values: White and black) | ← 1) |
| Needle | Enter the needle color. | ← 2) |
| Word Device | Enter a word device whose value is to be displayed in the form of panel meter. Enter "Data Size" and "Displayed value (Current or Preset)" also. | |
| Minimum Value and Maximum Value | Enter the minimum value (0%) and the maximum value (100%). "Direct" (to enter a direct value) or "Indirect" (to enter a data register) can be selected. | |
| Ticks | Enter the number of ticks of the scale attached to the panel meter within the range of 2 to 11. | ← 3) |
| Frame | Enter the frame displayed around the panel meter. (Initial setting: No frame) | ← 4) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | ← 4) |



Start Point    1) Fg (display color)

1) Bg (background color)

3) Ticks

3) Frame Color    2) Needle

Enlarged view

◆**Display example**



Fg (display color)

Bg (background color)

Ticks: 10
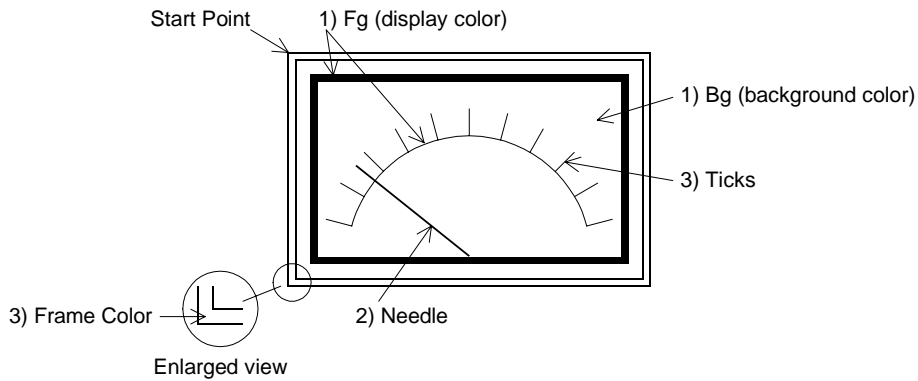
Needle
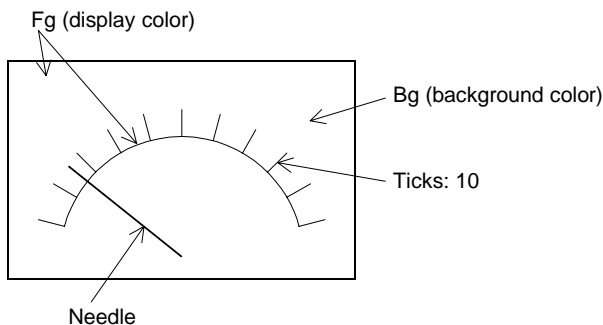
**9.4.8    Indicator**

The "Indicator" object exchanges the display color and the background color within in the specified area on the screen in accordance with the ON/OFF status of a specified bit device.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Size | Enter the width (W) and the height (H) in the unit of dot. |
| Color 1 and Color 2 | Enter the colors to be exchanged.  (Initial values: Black and white) |
| Bit Device | Enter a bit device to be referred to (positive logic or negative logic). |

◆**Display example**

 - When any object is not located within the area specified for the "Indicator" object

| "Indicator" object | |
|---|---|
| Bit Device | M50 |
| Operating when On | a contact |
| Color 1 | White |
| Color 2 | Red |

Specified "Indicator" area(The broken line is not actually displayed.)

Display screen

White

White

M50
OFF → ON

M50
ON → OFF

Display screen

Red

White

· When M50 becomes ON (a contact), the color of the specified area is exchanged between the color 1 and the color 2 of the "Indicator" object.

● Create the "Indicator" object so that it is located at the top in the display.
(Create an object whose color is to be exchanged at first, then create the "Indicator" object.)

**9.4.9    Label Indicator**

The "Label Indicator" object changes over the displayed image ("Library Image" object) in accordance with the ON/OFF status of a specified bit device.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Size | Enter the width (W) and the height (H) in the unit of dot. | |
| Bit Device | Enter a bit device to be referred to. | ← 1) |
| Label | Enter a text to be displayed inside the indicator.<br>The character size can be specified. | ← 2) |
| Label Color | Enter the color of the text. (Initial value: Black) | ← 3) |
| Off: Frame and Fill | Enter the indicator frame color and the indicator area color displayed while the specified bit device is OFF. (Initial values: Black and white) | ← 4) |
| On: Frame and Fill | Enter the indicator frame color and the indicator area color displayed while the specified bit device is ON. (Initial values: Black and white) | ← 5) |
| Frame | Select the frame. (Initial value: No frame)<br>The frame is displayed in "Off: Frame" color or "On: Frame" color. | ← 6) |



1) Bit Device

OFF          6) Frame          ON          2) Label (text)

START          START

3),4) Label Color and Off: Frame (text color and indicator frame color)          Off: Fill (indicator area color)          3),5) Label Color and On: Frame (text color and indicator frame color)          On: Fill (indicator area color)
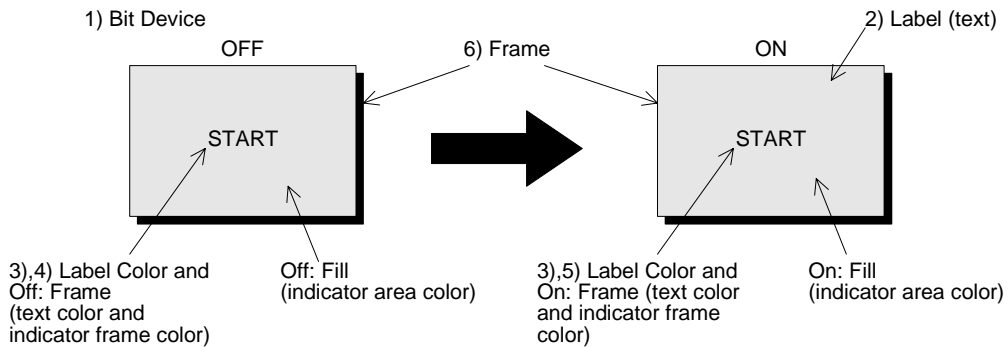
**9.4.10    Text Indicator**

The "Text Indicator" object changes the displayed text in accordance with the ON/OFF status of a specified bit device (X, Y, M, S, T or C) in the PLC. Texts to be displayed can be entered directly or selected using the text No. stored in the text library.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Bg and Text | Enter the background color and the display color. (Initial values: White and black)<br>The background color can be entered for the ON status and the OFF status respectively. |
| Character Size | Enter the width (W) and the height (H) of characters. The available sizes are x0.5, x1, x2, x3 and x4. |
| Bit Device | Enter a bit device to be referred to. |
| Text Off | Enter a text No. or text itself to be displayed while the specified bit device is OFF. |
| Text On | Enter a text No. or text itself to be displayed while the specified bit device is ON. |
| Frame | Select the frame displayed around the text. (Initial setting: No frame) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. |

◆**Display example**

| "Text Indicator" object | |
|---|---|
| Bit Device | Y0 |
| Text On | 10 |
| Text Off | 11 |

- Sequence program

```
      X0
   ───┤ ├───────────( Y0 )
```

TEXT LIBRARY

  0   CHECK

  9   MOTOR DRIVE
10   DRIVING
11   STOPPING
12   CYLINDER OFF

└── Text No.
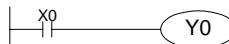
- GOT screen

While Y0 is ON
The text No. 10 stored in the text library is displayed.
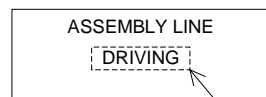
ASSEMBLY LINE
DRIVING

While Y0 is ON
The text No. 10 stored in the text library is displayed.

ASSEMBLY LINE
STOPPING
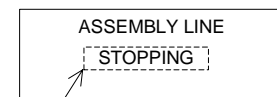
Text (display color)
Bg (background color) (The broken line is not actually displayed.)
"ASSEMBLY LINE" is displayed using the "Text" object.
The displayed text can be changed over on the same screen.

- In the example above, the displayed texts are specified using the text No. stored in the text library. Instead of this method, a text to be displayed while the specified bit device is ON and a text to be displayed while the specified bit device is OFF can be entered directly.

### 9.4.11    Image Indicator

The "Image Indicator" object changes over the displayed image in accordance with the ON/ OFF status of a bit device (X, Y, M, S, T or C) in the PLC. Images to be displayed can be entered directly or selected using the image No. stored in the image library.

◆**Contents of setting**

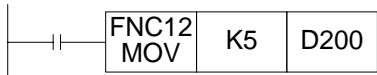| Attribute | Contents of setting |
|-----------|---------------------|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Bg and Fg | Enter the background color and the display color. (Initial values: White and black) |
| Bit Device | Enter a bit device to be referred to. |
| Image Off | Enter the image No. of an image to be displayed while the specified bit device is OFF. |
| Image On | Enter the image No. of an image to be displayed while the specified bit device is ON. |

◆**Display example**

| "Image Indicator" object | |
|---------|------|
| Bit Device | M0 |
| Image On | 20 |
| Image Off | 30 |

Image library
Image No. 20
50 W × 50 H dots

Display start point

Display screen

While M0 is ON, the image No. 20 is displayed.
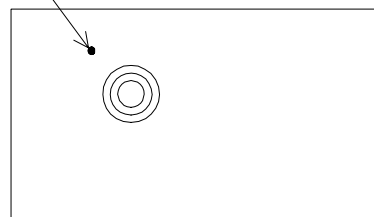
Image No. 30
100 W × 100 H dots

Display start point
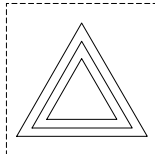
While M0 is ON, the image No. 30 is displayed.
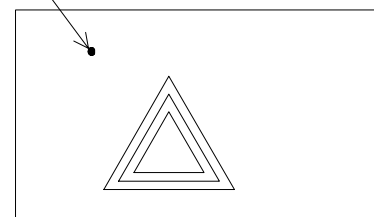
### 9.4.12   Overlay Screen

The "Overlay Screen" object allows a specified screen to overlay the screen currently displayed while a certain bit device is ON.

◆**Contents of setting**

| Attribute | Contents of setting |
|-----------|---------------------|
| Bit Device | Enter a bit device to be referred to. |
| Screen No. | Enter a screen No. to overlay the current screen. |

◆**Display example**

| "Overlay Screen" object | |
|-----------|-----------|
| Bit Device | M10 |
| Screen No. | No.10 |

Screen currently displayed

LINE  No.1

Screen No. 10

DRIVING

M10 ON

LINE  No.1

DRIVING

- When M10 becomes ON, the screen No. 10 overlays the current screen.
  When M10 becomes OFF, screen overlay is stopped and only the current screen is displayed.
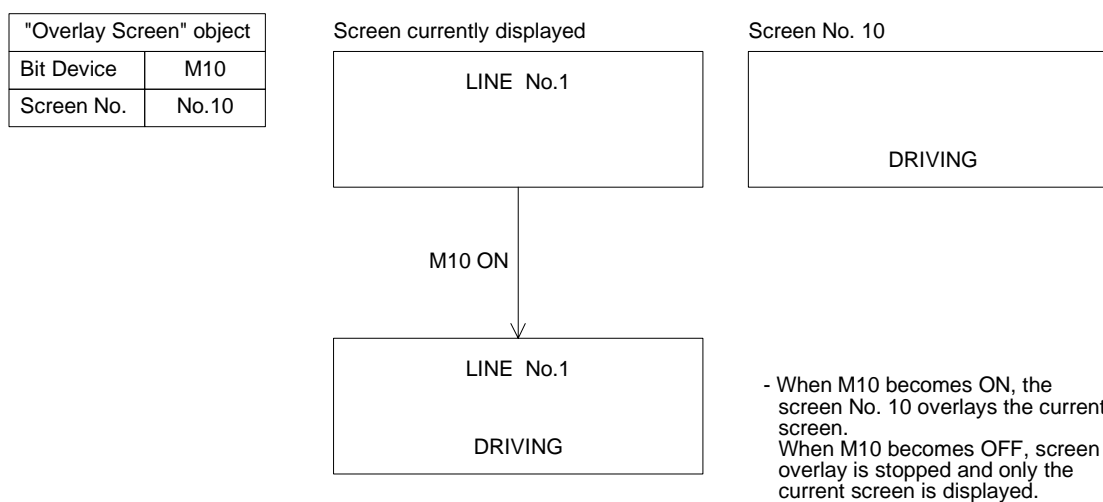
- Up to three screens can be displayed by screen overlay including the current screen. When screen overlay is performed using a control device, screens cannot be overlaid.

- All objects provided on overlaid screens are effective. If touch keys are displayed in a same position, the priority is given to the key on the top screen.

**9.4.13   Library Image**

The "Library Image" objects displays an image stored in the image library in accordance with the current value or the set value of a specified word device (T, C, D, V or Z).
Because two or more images can be displayed on one screen, the number of screens can be saved.

◆**Contents of setting**

| Attribute | Contents of setting |
|-----------|---------------------|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Bg and Fg | Enter the background color and the display color. (Initial values: White and black) |
| Word Device | Enter a word device storing an image No. to be displayed. Enter "Data Size" and "Displayed value" (Current of Preset) also. |
| Start No. | The monitored value plus this start No. are regarded as the image No. of an image to be displayed. |

◆**Display example**

| "Library Image" object | |
|------------------------|--------|
| Bit Device | D200 |
| Data Size | 16 bits |
| Displayed value Current | Current |
| Start No. | 0 |
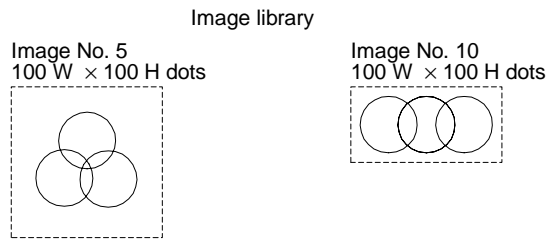
Image library

Image No. 5
100 W × 100 H dots

Image No. 10
100 W × 100 H dots

Sequence program

| FNC12 MOV | K5 | D200 |
|-----------|----|----|

The image No. 5 is transferred to the image specification device D200.

Start point            Display screen

| FNC12 MOV | K10 | D200 |
|-----------|-----|----|

The image No. 5 is transferred to the image specification device D200.

Start point            Display screen
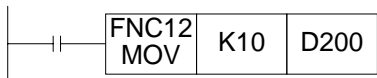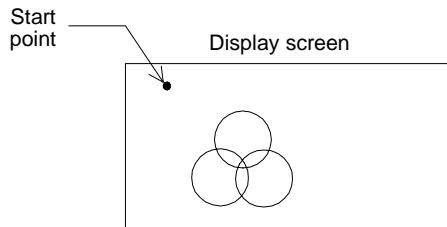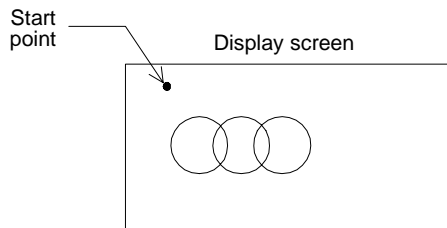
- The image No. 5 or 10 is displayed in accordance with the executed sequence program.

- Both the images No. 5 and 10 are displayed from the same start position.

- Each image is displayed in the same size as stored in the image library.

- In the example above, if "Start No." is set to "10", the image No. 15 (5 + 10) and the image No. 20 (10 + 10) are displayed alternately.
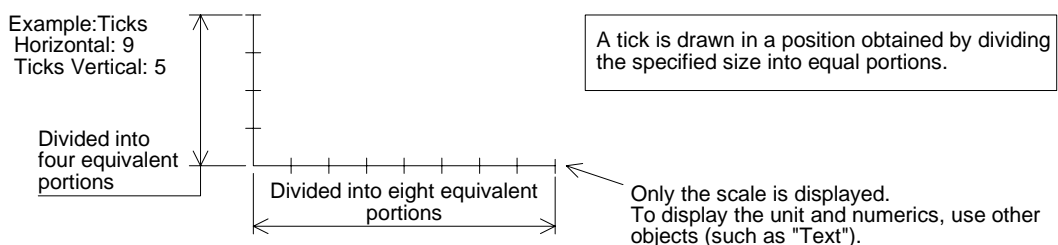
### 9.4.14   Trend Graph (Sampling)

The "Trend Graph (Sampling)" object acquires the current value of up to four 16-bit data registers in the PLC at a specified time interval, and displays the acquired values in the form of trend graph.

◆**Contents of setting**

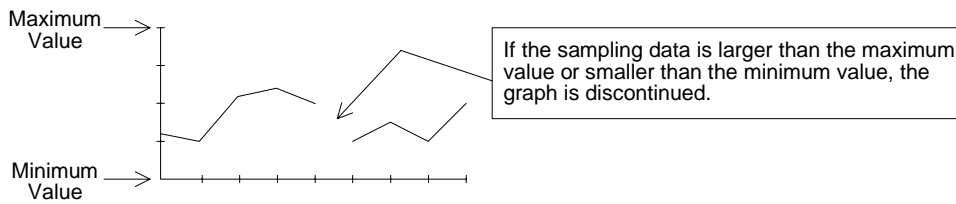| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Size | Enter the width (W) and the height (H) in the unit of dot. | |
| Scale Color | Enter the scale color. (Initial value: Black) | |
| Word Device | Enter the head of consecutive word devices to be sampled.<br>Enter "Data Size" also. | |
| Sampl. Cycle | Enter the sampling cycle within the range of 1 to 65,535 seconds). | |
| Direction | Select "Right" or "Left". | |
| Shown Devices | Enter the line type and the line color indicating four word devices. | ←3) |
| Ticks Horizontal | Enter the number of ticks of the scale in the horizontal direction within the range of 2 to 50. | ←1) |
| Ticks Vertical | Enter the number of ticks on the scale in the vertical direction within the range of 2 to 50. | ←1) |
| Minimum Value and Maximum Value | Enter the minimum value (0%) and the maximum value (100%) of the graph. "Direct" (to enter a value directly) or "Indirect" (to enter a device) can be selected. | ←2) |
| Save Result in Memory | Set whether or not the sampling result is to be saved in the memory. Sampling is continued even if the display screen is changed over. | |
| Clear Trigger | Enter a bit device which clears the data saved in the memory (None/OFF/ON). | |
| Frame | Select the frame displayed around the trend graph. (Initial setting: No frame) | ←4) |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | ←4) |

1) Ticks

- Enter the number of ticks on the scale in the horizontal and vertical directions respectively. The available range is 2 to 10 in both directions.
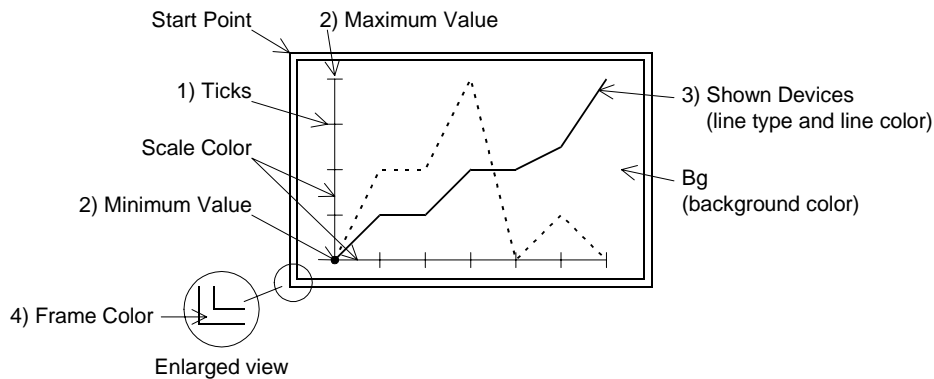
2) Minimum Value and Maximum Value

- Set the sampling data range to be displayed in the vertical axis.



If the sampling data is larger than the maximum value or smaller than the minimum value, the graph is discontinued.
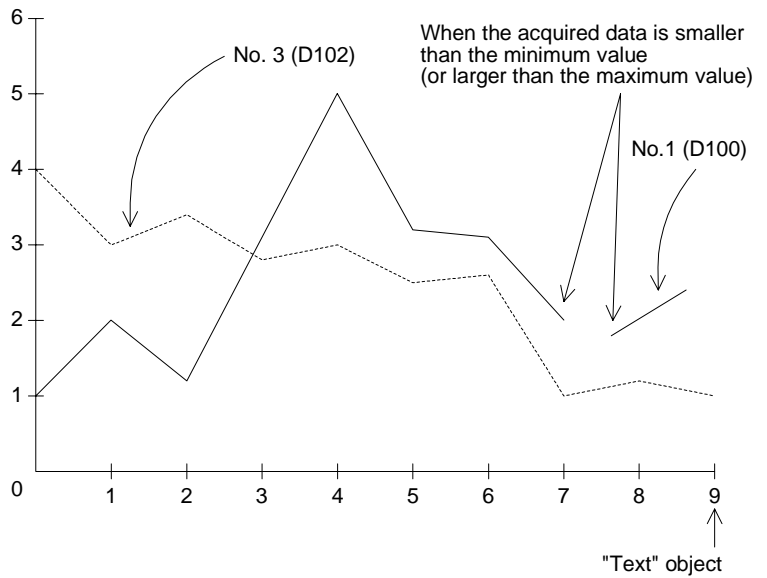
3) Shown Devices

- Select the line type for each trend graph.

- Select the line type for four data registers starting from the one specified in "Word Device".
  None      : Trend graph is not displayed. (Sampling is performed.)
  Unbroken : Trend graph is displayed in continuous line (– — — — –).
  Broken    : Trend graph is displayed in broken line (- - - - - - -).
  Dotted    : Trend graph is displayed in dotted line ( · · · · · · · · · ).
  Dashed   : Trend graph is displayed in alternate long and short dash line (— · — · —).

- A desired color can be assigned to each line.



Enlarged view

◆**Display example**

| "Trend Graph (Sample)" object | |
|---|---|
| Word Device | D100 |
| Sampl. Cycle | 3 |
| Ticks Horizontal | 10 |
| Ticks Vertical | 7 |
| Minimum Value | 0 |
| Maximum Value | 1000 |
| Shown Device: No. 1 | Solid   Red |
| Device: No. 1 | None |
| Device: No. 1 | Dotted Blue |
| Device: No. 1 | None |
| Scale Color:Black | |



No. 3 (D102)

When the acquired data is smaller than the minimum value (or larger than the maximum value)

No.1 (D100)

"Text" object

- The word devices D100 to D103 are sampled every 3 seconds, and trend graphs are displayed.

- Numerics 0 to 9 in the scale are created using the "Text" object.

- If the data acquired by sampling is smaller than the minimum value or larger than the maximum value, it is not displayed in the graph and the graph is discontinued.

- When the line type is set to "None", the graph is not displayed on the screen.

### 9.4.15   Trend Graph (Total)

The "Trend Graph (Total)" object displays the current value of consecutive word devices in up to four lines.

◆**Contents of setting**

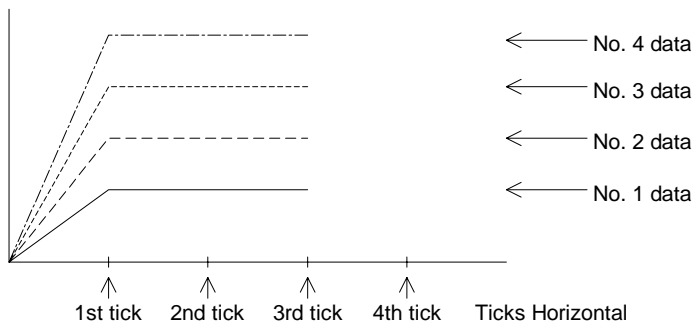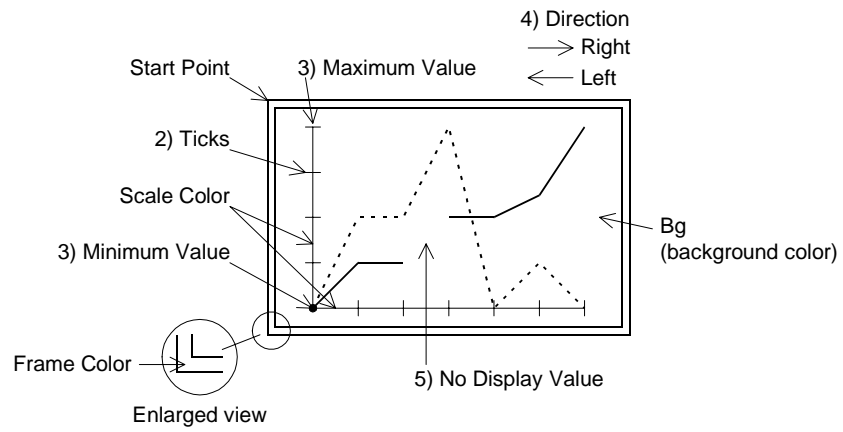| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Size | Enter the width (W) and the height (H) in the unit of dot. | |
| Scale Color | Enter the scale color. (Initial value: Black) | |
| Word Device | Enter the head of consecutive word devices. (The current value is displayed for timers and counters.) Enter "Data Size" also. | ←1) |
| Direction | Select "Right" or "Left". | ←4) |
| Shown Devices | Enter the type and the color of up to four lines. | ←4) |
| Ticks Horizontal | Enter the number of ticks of the scale in the horizontal direction within the range of 2 to 50. | ←2) |
| Ticks Vertical | Enter the number of ticks of the scale in the vertical direction within the range of 2 to 50. | ←2) |
| Minimum Value and Maximum Value | Enter the minimum value (0%) and the maximum value (100%) of the graph. "Direct" (to enter a value directly) or "Indirect" (to enter a device) can be selected. | ←3) |
| No Display Value | When the acquired data is equivalent to a value entered here, the acquired data is not displayed. | ←5) |
| Frame | Select the frame displayed around the trend graph. (Initial setting: No frame) | |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | |

1) Word Device

Word devices as many as the number of lines multiplied by the number of ticks in the horizontal direction of the scale are displayed in the form of trend graph.
The number of word devices sown at each tick is equivalent to the number of lines specified in "Shown Devices".

Assignment of word devices to points in trend graph

| Word device | D | D+1 | D+2 | D+3 | D+4 | D+5 | D+6 | D+7 | ⋯⋯ |
|---|---|---|---|---|---|---|---|---|---|
| Line No. | No.1 | No.2 | No.3 | No.4 | No.1 | No.2 | No.3 | No.4 | ⋯⋯ |
| Tick in horizontal axis | 1st tick | | | | 2nd tick | | | | ⋯⋯ |

MITSUBISHI

### 9.4.16  Ascii

The "Ascii" object displays characters corresponding to specified word devices (T, C, D, V or Z). Arbitrary characters can be displayed on one base screen.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. | |
| Bg and Text | Enter the background color and the display color. (Initial values: White and black) | |
| Character Size | Enter the width (W) and the height (H) of characters. The available sizes are x0.5, x1, x2, x3 and x4. | |
| Word Device | Enter the head of word devices storing character codes to be displayed. | |
| Data Length | 1 word (16 bits) corresponds to one full-width character or two half-width characters.<br>Up to 12 words (= 12 full-width characters or 24 half-width characters) can be displayed.<br>  *1 Consecutive devices only can be specified.<br>  *2 Each of high-speed counters C200 to C255 occupies 32 bits, and is regarded as 2 words.<br>The text length shall be up to 20 words. | |
| Data Changeable | Set whether or not the data can be changed using keys. | |
| User ID<br>Destination ID | These IDs are effective when "Data Changeable" is made effective.<br>An object to be displayed next when a cursor control key is pressed. | Refer to Paragraph 3.3. |
| Frame | Select the frame displayed around the characters. (Initial setting: No frame) | |
| Frame Color | Enter the frame color. The area inside the frame is filled with the background color. | |

Alphabets, numerics, etc. which can be specified using shift JIS codes (for Japanese) or ASCII codes (for half-width characters) (For character codes, refer to the appendix.)

◆**How to specify character codes**

- Refer to the Appendices for further details about ASCII.

- Reading the ASCII table
  This section describes how to read ASCII using the Appendix as an example.
  One ASCII character is displayed by combining both the vertical and horizontal axes.
  .....The vertical axis shows the last digit of the code.
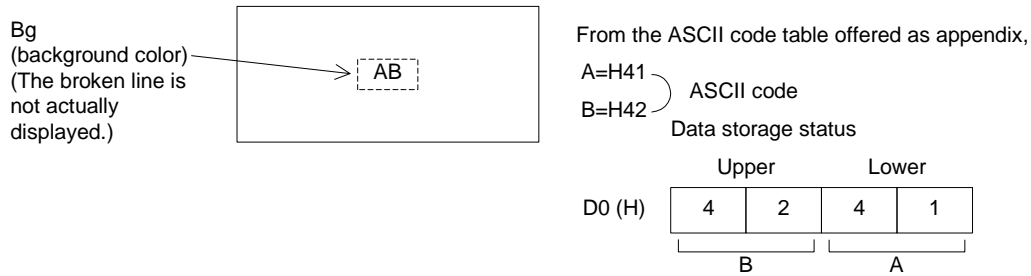
Example  Select "A" Horizontal axis H40  Vertical axis 1 →   ASCII H41 (hexadecimal expression)
             Select "b" Horizontal axis H50  Vertical axis 1 →   ASCII H62 (hexadecimal expression)

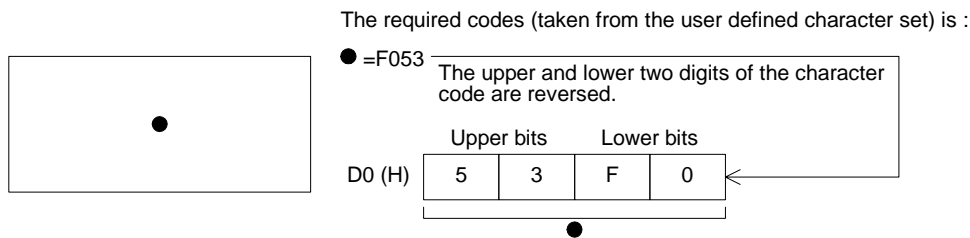| Lower Bit \ Heigher Bit | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 0 | | (SP) | 0 | @ | P | @ | p |
| 1 | | ! | 1 | A | Q | a | q |
| 2 | | " | 2 | B | R | b | r |
| 3 | | # | 3 | C | S | c | s |

◆**Storage of word device**

• Character codes are stored in word devices in the PLC. The stored data is displayed from the lower 8 bits as shown below.
  Example 1     : When two half-width characters (ASCII codes) are displayed
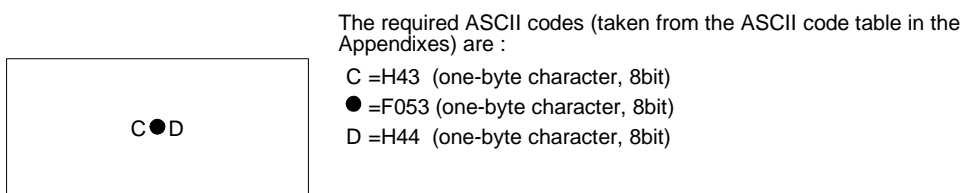  Word Device : D0
  Data Length  : 1

Bg (background color) (The broken line is not actually displayed.) →  AB

From the ASCII code table offered as appendix,

A=H41  
B=H42  } ASCII code

Data storage status

| | Upper | | Lower | |
|---|---|---|---|---|
| D0 (H) | 4 | 2 | 4 | 1 |
| | B | | A | |

- A character to be displayed at first should be specified using lower 8 bits.

Example 2     : When one full-width character is displayed
Word Device : D0
Data Length  : 1

The required codes (taken from the user defined character set) is :

● =F053

The upper and lower two digits of the character code are reversed.

| | Upper bits | | Lower bits | |
|---|---|---|---|---|
| D0 (H) | 5 | 3 | F | 0 |
| | | ● | | |

Example 3     : When one full-width character and two half-width characters are displayed
Word Device : D0
Data Length  : 2 (D0 and D1)

The required ASCII codes (taken from the ASCII code table in the Appendixes) are :

C =H43 (one-byte character, 8bit)
● =F053 (one-byte character, 8bit)
D =H44 (one-byte character, 8bit)

How the data is stored :

| | Upper bits | | Lower bits | |
|---|---|---|---|---|
| D0 (H) | F | 0 | 4 | 3 |
| D1 (H) | 4 | 4 | 5 | 3 |

2-word designation →

| | Upper bits | | Lower bits | |
|---|---|---|---|---|
| D0 (H) | 43 | F0 | 53 | 44 |
| | C | ● | | D |

■**Important point**

When the character code is set to "H0" (either for full-width or half-width), characters after that are not displayed on the screen.
To insert space in a text, store "H8140" (for full-width) or "H20" (for half-width) to the specified word device.
To display an external character registered in the screen creation software, store "F040" to "F0C0" to the specified word device.
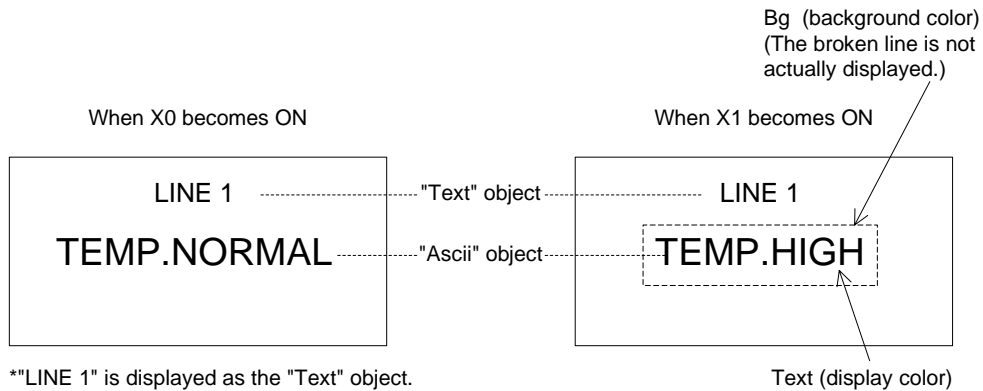
◆**Display example**

- "RUN" or "STOP" are displayed as the "Ascii" objects using three data registers D100 to D102.
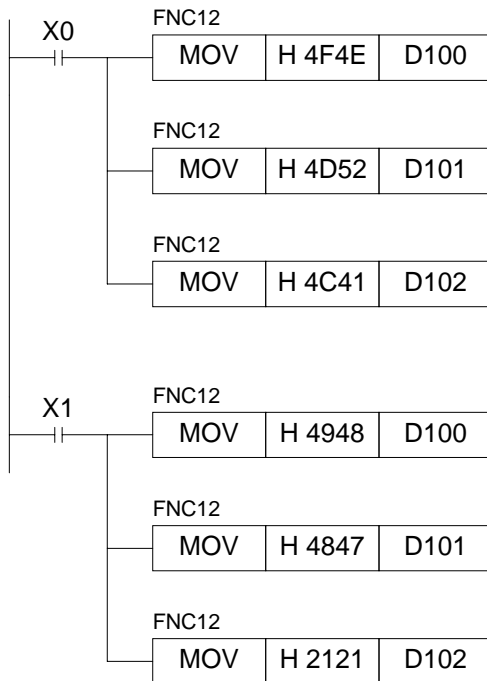  When X0 becomes ON, "NORMAL" is displayed.
  When X1 becomes ON, "HIGH!!" is displayed.

  - "Ascii" object
    Character Size: W: ×2, H: ×2
    Word Device: D100
    Data Length: 3

  - Display



Bg (background color)
(The broken line is not actually displayed.)

When X0 becomes ON

LINE 1 ┈┈┈┈ "Text" object ┈┈┈

TEMP.NORMAL ┈┈ "Ascii" object ┈┈

When X1 becomes ON

LINE 1

TEMP.HIGH

*"LINE 1" is displayed as the "Text" object.

Text (display color)

  - Sequence program



| | Upper | Lower | |
|------|-------|-------|-----|
| D100 | 4F | 4E | (H) |
| D101 | 4D | 52 | (H) |
| D102 | 4C | 41 | (H) |

Storage status of data registers

| | Upper | Lower | |
|------|-------|-------|-----|
| D100 | 49 | 48 | (H) |
| D101 | 48 | 47 | (H) |
| D102 | 21 | 21 | (H) |

Storage status of data registers

■**Important point**

The "Ascii" object displays specified texts on one screen as shown above. Accordingly, the screen is not required to be changed over or to be overlaid.

## 9.5  Data transfer objects

This paragraph describes in details the objects which turn on/off bit devices and change word devices in the PLC. The objects described in this paragraph are combined with touch keys on the screen.

The following functions can be assigned to touch keys.

- Switch
- Send Data Bank
- Write Constant
- Increment
- Decrement
- Data Setting
- Change Screen

Buzzer (Only this object has nothing to do with touch keys.)

### 9.5.1    Touch Key

A specified area on the screen can be set as a touch key which functions as an operation key when pressed.

The "Touch Key" object allows to specify an area which functions as a touch key. To each touch key, functions offered by the objects "Switch", "Send Data Bank", "Write Constant", "Increment", "Decrement", "Data Setting" or "Change Screen" can be assigned.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Size | Enter the width (W) and the height (H) in the unit of dot. |
| Reverse On Touch | Set whether or not the touch key frame is changed over when pressed (None/Key/Bit). When "Bit" is selected, specify a bit device for changeover. |
| Trigger | Enter a bit device which makes the touch key effective. |
| Key Code | Enter a 16-bit hexadecimal value. It is used as a code when a character is entered or when a special operation is performed. |
| Auto repeat and Simul. press | Set the operation. |
| Label | Enter a text to be displayed inside the touch key. The character size can be specified. |
| Label Color | Enter the label color. (Initial value: Black) |
| Key Type | Select the touch key frame shape. |
| Frame Color | Enter the display color and the background color. (Initial values: Black and white) For the background color, enter the color in the ON status and the color in the OFF status respectively. |

1) Size
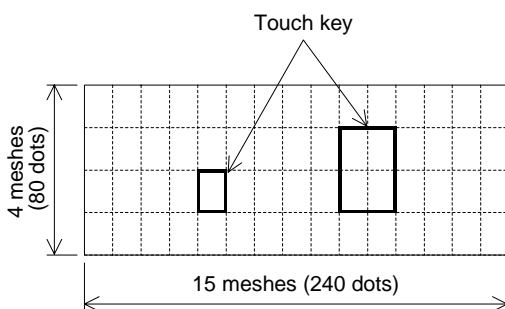


- The entire screen is divided into "meshes" as shown on the left. The touch key area can be specified in the unit of mesh.

- The entire screen consists of 15 W x 4 H meshes. One mesh consists of 16 x 20 dots.

- Broken lines are not actually displayed on the screen.

• A touch key can be set in the unit of dot. When more than a half of a mesh is set as a touch key, the mesh is recognized as the touch key.



Specified touch key area

This mesh does not function as the touch key because only less than a half of this mesh is specified as the touch key.

This mesh functions as the touch key because more than a half of this mesh is specified as the touch key.
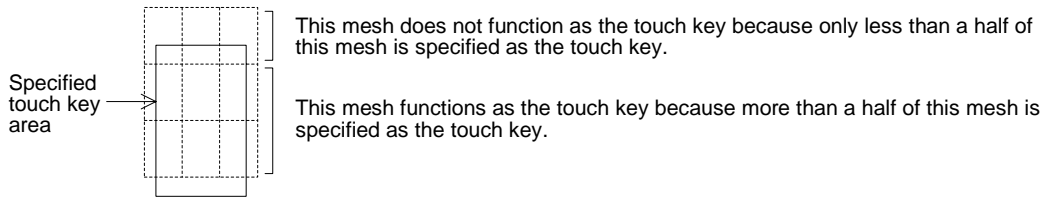
2) Reverse On Touch
   When this item is made effective, the touch key is reversed instantaneously when pressed.

3) Trigger
   Enter a bit device in the PLC. (Initial value: None)
   The touch key is effective only while this bit device remains ON.

4) Key Code
   When a key code is entered, the touch key is dedicated to registration of entry code for the security function or display of the system screen.

| Mode/screen | Function screen display | Key code |
|---|---|---|
| HPP mode | DEVICE MONITOR screen | FF11 |
| | BFM MONITOR screen | FF12 |
| SELECT MODE screen | | FF14 |
| Other mode | SET CLOCK screen | FF64 |
| Entry code registration screen | | FF68 |
| Entry code reset | | FF69 |

For other key codes, refer to the appendix.

5) Auto repeat and Simul. press
   Auto repeat: Repeats the ON/OFF operation at a constant cycle while the touch key is pressed and held.
   Simul. press: Specifies whether or not the touch key is effective when it is pressed simultaneously together with another touch key.
   Only two keys can be made effective when pressed simultaneously.
   Three or more keys cannot be made effective when pressed simultaneously.
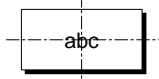
6) Label

Enter a text to be displayed inside the touch key.

Up to 20 full-width characters or 40 half-width characters can be displayed.
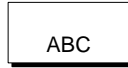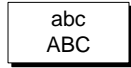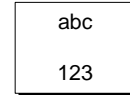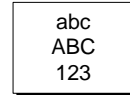
<Display example:>

-In the case of 1 line    -In the case of 2 lines                      -In the case of 3 lines

abc                      abc          ABC                          abc          abc
                         ABC                                       ABC          123
                                                                   123

When a text is           When the first and                        When the second line is
located in the center    third lines are blank                     blank and texts are
                         and a text is                             displayed in the first and
                         displayed in the                         third lines respectively
                         second line

If a text is longer than the touch key, the text is extruded.

abcdABCD1234

When a text is displayed in 1 line

7) Key Type

- Select whether or not the area specified as the touch key is enclosed with a frame.

- Select "No frame" or select one among the following five frames.

| Frame shape | | | | | | |
|---|---|---|---|---|---|---|
| | No frame | Shaded | Double frame (keyboard) | Double frame (trimming) | Double frame (shaded) | Double frame (bold) |

8) Additional functions

The following functions can be assigned to a touchkey.

- Switch (Refer to Paragraph 9.5.2.)
- Increment (Refer to Paragraph 9.5.5.)          Two or more of these functions can be
- Decrement (Refer to Paragraph 9.5.6.)          set to a touch key.
- Write Constant (Refer to Paragraph 9.5.4.)

- Send Data Bank (Refer to Paragraph 9.5.3.)     Only one of these function can be set
- Data Setting (Refer to Paragraph 9.5.7.)       to a touch key.
- Change Screen (Refer to Paragraph 9.5.9.)      (The functions above can be com-
                                                 bined.)

◆**Use example 1**

1) Relationship between the common setting for all screens and the setting for individual screens
   A touch key registered in the common setting is displayed in the same size and same position in any screen.
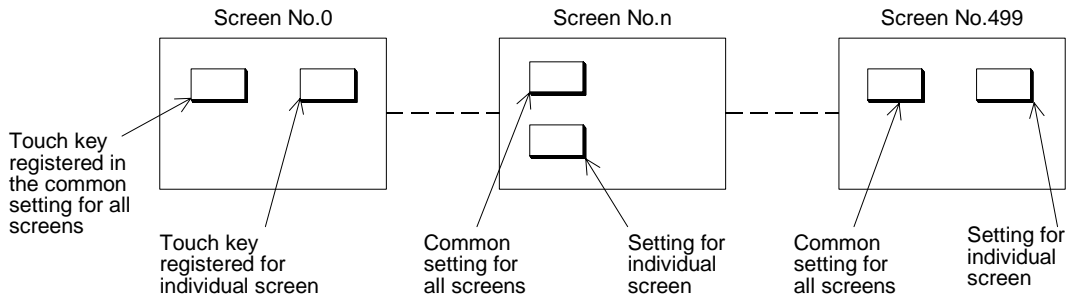


To display a name on a touch key, register a desired name using the "Text" or "Ascii" object.

Note: If a touch key registered in the common setting for all screens and a touch key registered for individual screen are displayed in the same position, the priority is given to the former one. Pay close attention in specifying the key area.

◆**Use example 2**

Example: When the "Touch Key" and "Indicator" objects are combined
         On the screen, "START" is displayed as the "Text" object.

1) When the touch key is pressed, the switch function assigned to the touch key sets Y0 to ON. The output form of Y0 is set to "Alternate".

2) The touch key area is inverted by the "Lamp" object so that turning on of the switch can be confirmed.

| "Switch" object | |
|---|---|
| Control Input | Touch Key |
| Bit Device | Y0 |
| Operation | Alternate |

| "Indicator" object | |
|---|---|
| Bit Device | Y0 |
| Operating when | a On |
| Display color | White |
| Background color | Black |
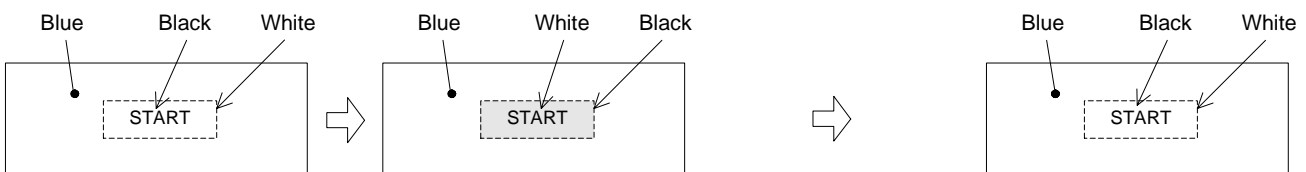


- Press the START touch key.

- The area enclosed with broken line is specified as the "Indicator" object.

- By the switch function assigned to the touch key, Y0 becomes ON.
  By the indicator function, the touch key color is changed from white into black. Even if pressing of the START touch key is released, Y0 remains ON because its output form is alternate, and the indicator remains in the changed status (= white text in black background).

- When the START touch key is pressed again, Y0 becomes OFF and the indicator is returned to the former status (= black text in white background).

### 9.5.2    Switch

The "Switch" object allows a touch key in the GOT to control the ON/OFF status of a bit device in the PLC.
The "Switch" object offers the switch function as a pushbutton switch, etc.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Control Input | Enter a key name which actuates the switch function. |
| Bit Device | Enter a bit device to be driven by the key specified in "Control Input". |
| Operation | Select the operation mode among "Momentary", "Alternate", "Set" and "Reset". |

1) Operation

- Select the output operation mode.

    Momentary : Turns on/off the controlled bit device in accordance with the ON/OFF status of the control input key.

    Alternate : Turns on/off the controlled bit device every time the control input key becomes ON from OFF.

    Set : Forces ON forcedly the controlled bit device when the control input key becomes ON. The controlled bit device remains ON until a reset input is given.
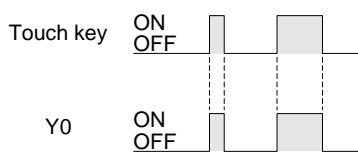
    Reset : Forces OFF forcedly the controlled bit device when the control input key becomes ON.
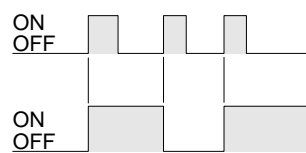
**Operation examples of "Momentary" and "Alternate"**

When a touch key is pressed, Y0 in the PLC is output.

- Switch    Control Input: 0 key
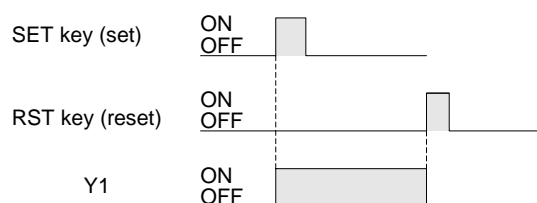            Bit Device: Y0



**Operation examples of "Set" and "Reset"**

When the SET key is pressed, Y1 is set. When the RST key is pressed, the Y1 is reset.

- Switch    Control Input: SET key, RST key
            Bit Device: Y1 (set), Y1 (reset)

## ■Important point

1) Controlled bit device
   If "Operation" is set to "Momentary", the controlled bit device becomes OFF when the display screen is changed over.
   If the "Switch" object is registered in the common setting for all screens, it is effective on all screens.

2) If two or more keys are pressed simultaneously
   If two or more switch functions are registered, and two keys are simultaneously pressed both functions will be executed.
   If three or more keys are pressed simultaneously, only the first two pressed will be effective.

3) If two or more functions are assigned to one touch key
   Two or more switch functions can be registered to one touch key.

4) If screens are overlaid
   If screens are overlaid using control devices, the screen call function or the "Overlay Screen", the switch functions are effective on all of the base screen and the overlaying screens. If switches are overlaid, the switch on the top screen is effective. Pay close attention so that switches do not are not overlaid.

Example
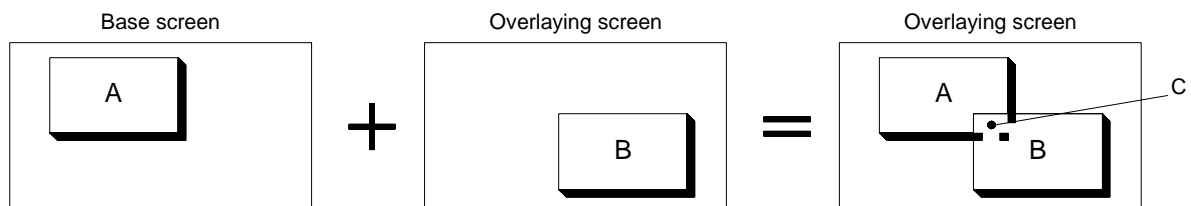


Composed screen realized by overlay

In the switch areas A and B on the composed screen realized by overlay, each switch is effective. However, if the area C is pressed, the switch B located on the top is effective.

**9.5.3    Send Data Bank (recipe function)**

The GOT can store up to 4,000 16-bit data corresponding to data registers in the PLC. By giving a command through a touch key, the data can be read from/written to the PLC. For data files, refer to "9.6  Data file".

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Control Input | Enter a key which actuates data transfer. |
| Bank No. | Enter a data file No. to be transferred.<br>Select "Direct" or "Indirect". |
| Function | Select "DU → PLC" or "PLC → DU". |

1) Bank No.
   Enter a file No created using the screen creation software (when selecting "Direct").
   Or file No. can be specified using a control device "D0+6" (when selecting "Indirect").

2) Function
   Specify the data file transfer direction.
   DU → PLC: Writes data stored in a data file in the GOT to a data register in the PLC.
   PLC → DU: Writes data stored in a data register in the PLC to a data file in the GOT.

■**Important point**

- Data file transfer condition
  "✔" indicates that transfer is enabled.

| PLC | FX Series | | A Series | |
|---|---|---|---|---|
| **PLC memory type** | ✔:RAM            ✗:EPROM  *1<br>✗:EEPROM<br><br>*1    When the read/write destination is a data register, data can be transferred without regard to the memory type. | | ✔:RAM            ✔:EPROM | |
| **PLC operation status** | ✔:RUN | ✔:STOP | ✔:RUN | ✔:STOP |
| **GOT memory type** | ✔:Flush memory | | ✔:Flush memory | |
| **PLC entry code** | ✗:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered | ✗:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered |

### 9.5.4    Write Constant

The "Write Constant" object writes a fixed constant to the PLC when a touch key is pressed.

The "Write Constant" object is convenient: When it is used, sequence programs such as transfer instructions are not required.

### ◆Contents of setting

| Attribute | Contents of setting |
|---|---|
| Control Input | Enter a key which actuates write of a constant. |
| Constant | Enter a fixed value to be written to a word device. |
| Word Device | Enter a word device to which the fixed value is written.<br>Enter "Data Size" and "Changed Value" (Current or Preset) also. |

### ■Important point

1) Write constant to a timer/counter
   Even if "0" is written to the current value or set value of a timer/counter, the output contact in the PLC is not reset. (Though the current value or set value becomes 0, the output contact does not become OFF.)
   To reset a timer/counter, execute an RST instruction in the sequence program or reset the timer/counter using the switch function.

2) Data file transfer condition
   "✔" indicates that transfer is enabled.

| PLC | FX Series | | A Series | |
|---|---|---|---|---|
| **PLC memory type** | ✔:RAM          ✘:EPROM   *1<br>✘:EEPROM<br><br>*1    When the read/write destination is a data register, data can be transferred without regard to the memory type. | | ✔:RAM          ✔:EPROM | |
| **PLC operation status** | ✔:RUN | ✔:STOP | ✔:RUN | ✔:STOP |
| **GOT memory type** | ✔:Flush memory | | ✔:Flush memory | |
| **PLC entry code** | ✘:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered | ✘:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered |

### 9.5.5    Increment

The "Increment" object adds "1" to the data of a specified word device when a touch key is pressed.

◆**Contents of setting**

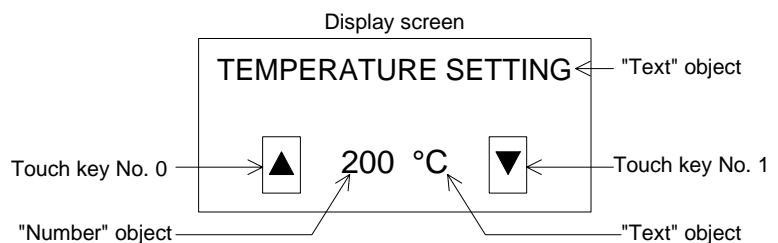| Attribute | Contents of setting |
|-----------|---------------------|
| Control Input | Enter a key which actuates increment. |
| Word Device | Enter a word device to which 1 is added.<br>Enter "Data Size" and "Changed Value" (Current or Preset) also. |
| Constant | Enter a constant to be added.  (Initial value: 1) |

◆**Use example**

1) Increment/decrement of the "Number" object

- "1" is added to or subtracted from the data of the "Number" object displayed on the screen.

| "Number" object | |
|-----------------|--|
| Word Device | D100 |
| Digits | 3 |
| Decimal Point At | 0 |
| Data Size | 16 bits |
| Displayed value | Current |
| Style | Decimal |
| Data Changeable | Effective (with a check mark) |
| Minimum Value | 50 |
| Maximum Value | 300 |

| "Increment" object | |
|--------------------|--|
| Control Input | Touch key No. 0 |
| Word Device | D100 |
| Data Size | 16 bits |
| Displayed value | Current |

| "Decrement" object | |
|--------------------|--|
| "Decrement" object (Control Input) | Touch key No. 1 |
| Word Device | D100 |
| Data Size | 16 bits |
| Displayed value | Current |

- "▲" and "▼" on the touch keys are created using the "Text" object.

- Every time the touch key No. 0 (▲) is pressed, "1" is added to the current value of the "Number" object (D100). Every time the touch key No. 1 (▼) is pressed, "1" is subtracted from the current value of the "Number" object (D100).

- When the current value of D100 becomes larger than the maximum value or smaller than the minimum value, the error message "SET NUMBER IS INCORRECT." is displayed.

- The touch key No. is automatically assigned to each touch key when the touch key is created.



Display screen

TEMPERATURE SETTING ← "Text" object

Touch key No. 0 → ▲  200  °C  ▼ ← Touch key No. 1

"Number" object — — "Text" object

- When "Data Changeable" is made effective for the "Number" object, the data of the "Number" object can be directly changed.  (Refer to Paragraph 3.3.)When the "Number" object is touched, the ten-key pad is displayed.

■**Important point**

Refer to the "Decrement" object described in the next paragraph.

### 9.5.6    Decrement

The "Decrement" object subtracts "1" from the data of a specified word device when a touch key is pressed.
The contents of setting are equivalent to those for the "Increment" object.

#### ◆Contents of setting

Equivalent to those for the "Increment" object.

#### ■Important point

1) Data change condition
    "✔" indicates that data change is enabled.

| PLC | FX Series | | A Series | |
|---|---|---|---|---|
| **PLC memory type** | ✔:RAM       ✗:EPROM *1 <br> ✗:EEPROM <br> *1  When the read/write destination is a data register, data can be transferred without regard to the memory type. | | ✔:RAM      ✔:EPROM | |
| **PLC operation status** | ✔:RUN | ✔:STOP | ✔:RUN | ✔:STOP |
| **GOT memory type** | ✔:Flush memory | | ✔:Flush memory | |
| **PLC entry code** | ✗:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered | ✗:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered |

### 9.5.7    Data Setting

The "Data Setting" object displays automatically the ten- or sixteen-key pad (keyboard) and allows to change the set value or the current value of a specified word device when a specified touch key is pressed.
Because the key pad is displayed only when it is required, the screen can be used efficiently.
The "Data Setting" object is called the keyboard call type. The "Keyboard" object described later is called the keyboard resident type. These objects can be used in accordance with the situation.

◆**Contents of setting**

| Attribute | Contents of setting | |
|---|---|---|
| Control Input | Enter a key which displays the keyboard. | |
| User ID | Enter the user ID of an object whose data is to be changed. | ←3) |
| Position | Enter the keyboard display position. | ←2) |
| Keyboard Type | Enter the keyboard type. | ←1) |

1) Position
   Enter the X and Y coordinates of the start point from which the keyboard is displayed.

2) Keyboard Type

```
                       7   8   9  CLR
        123.56         4   5   6   ▲
                       1   2   3   ▼
     CHANGED DATA         0    -  ENT
```

3) User ID
   Enter the ID No. of the "Number" or "Ascii" object whose data is to be changed. The object having this ID can now be changed.

■**Important point**

Data change
The data can be changed without using the "Data Setting" function. When the displayed "Number" or "Ascii" object is touched, the ten-key pad is displayed to enable data change. (Refer to Paragraph 3.3.)
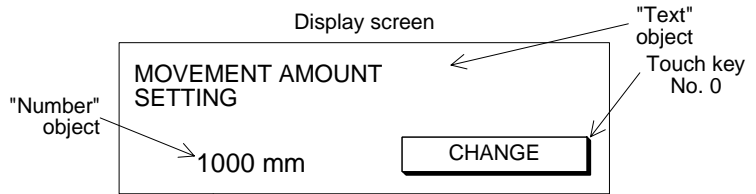
◆**Display example**

- The keyboard manipulation procedure is described below using an example.

  Display example:

  - The data of the "Number" object set as follows is changed.

| "Data Setting" object | |
|---|---|
| Control Input | Touch key No. 0 |
| Word Device | D100 |
| Data Size | 16 bits |
| Changed Value | Current |
| Keyboard Type | DEC8x4 (8x4 mesh for decimal input) |

| "Number" object | |
|---|---|
| Digits | D100 |
| Decimal Point At | 6 |
| Displayed value Current | 0 |
| Data Size | 16 bits |
| Changed Value | Current |
| Style | Decimal |
| Data Changeable | Effective (with a check mark) |
| Minimum Value | -20000 |
| Maximum Value | 20000 |

Display screen

"Text" object
Touch key No. 0

"Number" object

```
MOVEMENT AMOUNT
SETTING

1000 mm        [ CHANGE ]
```
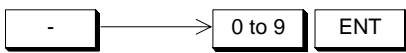
[ CHANGE ]

- When the touch key No. 0 is pressed, the keyboard is displayed in the specified position.
- Characters "CHANGE TRAVEL" on the touch key is created using the "Text" object.
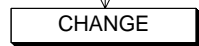
- When the "Number" object is pressed, its lowest digit is highlighted to indicate that data can be changed.

- Enter a new data using the keyboard.
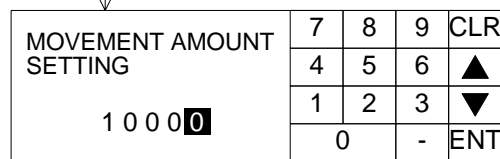
| - | → | 0 to 9 | ENT |
|---|---|---|---|

When entering a minus data　　Enter a desired new data.

Press the CLR or ENT key to register the input and clears the keyboard from the screen.

Confirm the new value is displayed in the "Number" object in which the cursor is located.

```
MOVEMENT AMOUNT     | 7 | 8 | 9 | CLR |
SETTING             | 4 | 5 | 6 | ▲   |
                    | 1 | 2 | 3 | ▼   |
      10000         |   0   | - | ENT |
```

■**Important point**

1) Rule on data change

- When changing the data, make sure to display the "Number" object whose "Word Device" is equivalent to "Word Device" of the "Data Setting" object on the same screen. The following restriction is imposed on data change.

  1) "Data Changeable" of the "Number" object should be made effective with a check mark when the "Number" object is registered. If it is not made effective, the keyboard is not displayed even when the touch key to call the keyboard is pressed.

  2) The data of the "Number" object can be changed within the range determined by "Minimum Value" and "Maximum Value".

  3) When a hexadecimal value (H) is displayed on the screen, make sure to use the keyboard for hexadecimal input. When a decimal value is displayed, any keyboard can be used.

2) Timing of data change

- When the ENT key is pressed, the entered data is written to the PLC. The condition for data change is equivalent to that for the "Increment" and "Decrement" objects. Even while data is changed, monitors for numerics, bar graphs, etc. on the screen are operating.

**9.5.8    Keyboard**

The "Keyboard" object displays a keyboard for numerical input used to change the data of the "Number" object.
The "Keyboard" object always displays a keyboard on the screen. On the other hand, when the "Data Setting" object is used, a keyboard is displayed only when it is called.
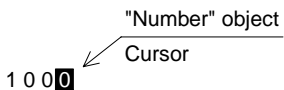
◆**Contents of setting**

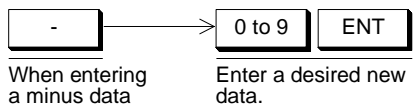| Attribute | Contents of setting |
|---|---|
| Position | Enter the X and Y coordinates in the unit of dot. |
| Type | Select the keyboard type. |

◆**Use example**

The keyboard manipulation procedure is described below.

• When the displayed "Number" object is pressed, its lowest digit is highlighted to indicate that it can be changed.

```
                    "Number" object
                   ⟋  Cursor
        1 0 0 0
```

• When there are other "Number" objects, move the cursor to a "Number" object whose data is to be changed next.
  Enter a new data using the keyboard.

```
    ┌──────┐              ┌──────┐   ┌──────┐
    │  -   │  ──────────> │ 0 to 9│   │ ENT  │
    └──────┘              └──────┘   └──────┘
   When entering          Enter a desired new
   a minus data           data.
```

■**Important point**

1) Rule on data change

- When changing the data, make sure to display the "Number" object whose "Word Device" is equivalent to "Word Device" of the "Data Setting" object on the same screen. The following restriction is imposed on data change.

    4) Data Changeable" of the "Number" object should be made effective with a check mark when the "Number" object is registered. If it is not made effective, the keyboard is not displayed even when the touch key to call the keyboard is pressed.

    5) The data of the "Number" object can be changed within the range determined by "Minimum Value" and "Maximum Value".

    6) When a hexadecimal value (H) is displayed on the screen, make sure to use the keyboard for hexadecimal input. When a decimal value is displayed, any keyboard can be used.

2) Timing of data change

- When the ENT key is pressed, the entered data is written to the PLC. The condition for data change is equivalent to that for the "Increment" and "Decrement" objects. Even while data is changed, monitors for numerics, bar graphs, etc. on the screen are operating.

3) Data change condition
   "✔" indicates that data change is enabled.

| PLC | FX Series | | A Series | |
|---|---|---|---|---|
| **PLC memory type** | ✔:RAM        ✘:EPROM  *1<br>✘:EEPROM<br><br>*1   When the read/write destination is a data register, data can be transferred without regard to the memory type. | | ✔:RAM        ✔:EPROM | |
| **PLC operation status** | ✔:RUN | ✔:STOP | ✔:RUN | ✔:STOP |
| **GOT memory type** | ✔:Flush memory | | ✔:Flush memory | |
| **PLC entry code** | ✘:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered | ✘:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered |

**9.5.9** **Change Screen**

The "Change Screen" object changes over the currently displayed screen to a specified screen.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Control Input | Enter a key which actuates screen changeover. |
| Bit Device | Enter a bit device which actuates screen changeover. |
| Destination Screen. | Specify the changeover destination.<br>Select one among "Direct", "PLC data register" and "DU memory". |
| Save Current Screen in DU-Memory | Set whether or not the screen No. before changeover is to be stored in the memory. |

◆**Use example**

Refer to "10. Change Over of Display Screen".

**9.5.10　Buzzer**

The "Buzzer" object issues buzzer sounds in the GOT when a specified bit device in the PLC becomes ON.

◆**Contents of setting**

| Attribute | Contents of setting |
|---|---|
| Bit Device | Enter a bit device to be referred to. |
| Mode | Select one among "One Time", "Three Times" and "Continuous". |

◆**Contents of operation**

One Time: When a specified bit device becomes ON from OFF, a short buzzer sound is issued once (in the same way as when a key is pressed).
Three Times: When a specified bit device becomes ON from OFF, a short buzzer sound is issued three times (in the same way as when an error has occurred).
Continuous: When a specified bit device becomes ON from OFF, buzzer sound is issued continuously.

■**Important point**

• Sequence program
If the ON time of a specified bit device is extremely short (such as in a high-speed input or a device converted into a pulse), the GOT may not recognize the ON status.

The GOT refers to the ON/OFF status in the PLC at every 200 to 300 ms. A bit device specified in the "Buzzer" object should remain ON for 300 ms or more.

## 9.6     Text library

The text library stores texts to be displayed by the "Library Text" and "Text Indicator" objects. The text library data is stored in the flush memory.

- Texts stored in the library can be created using the screen creation software. The figure below shows the Text Library screen.

a) No.                                                        b) Text
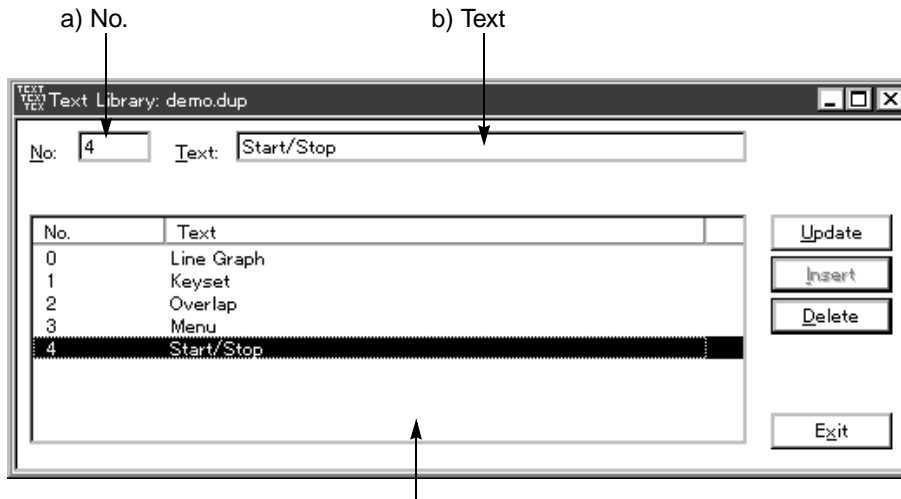


The Nos. and character strings already registered are displayed in the list.

a) No.
   A registration No. assigned to each registered text is used to display the "Library Text" and "Text Indicator" objects in the F930GOT.
   Up to 2,000 texts (Nos. 0 to 1999) can be registered in the library.

b) Text
   Enter a text to be registered in the library.
   Up to 10 full-width characters (Kanji of JIS level 1, Katakana, Hiragana, alphabets, numerics and symbols) and 20 half-width characters (Katakana, alphabets, numerics and symbols) can be entered to each text.

■**Important point**

In the "Library Text" and "Text Indicator" objects, "W (width)" and "H (height)" of the character size can be set to × 1 to × 4 respectively.
When "H" is set to "× 0.5" for alphabets, numerics or Katakana characters, characters are displayed in the size whose height is a half of the half-width size.  At this time, make sure to enter half-width characters to a text to be registered in the text library. If a text consisting of full-width characters is registered in the text library and displayed in the size "W: × 0.5, H: × 0.5" on the screen, it cannot be displayed correctly.

## 9.7     Image library

The image library stores images to be displayed by the "Library Image", "Image Indicator" and "Image" objects.  The image library data is stored in the flush memory.

•   Images stored in the library can be displayed in the form of list in "Image Library", "View" in the screen creation software. The figure below shows the Image Library screen.

b) No.              c) Comment              a) Image display area
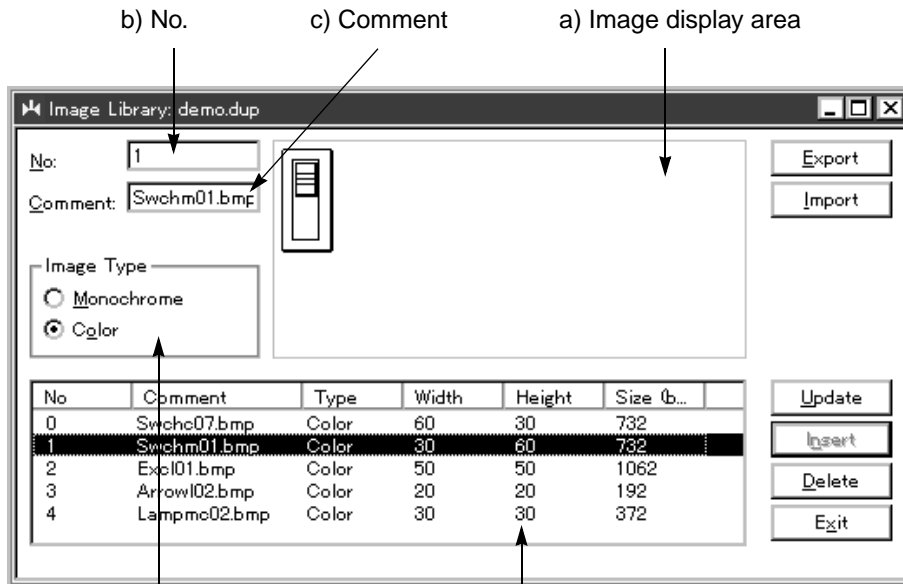


Displays the color type of the graphic displayed on the right area.

The Nos., comments, types and sizes already registered are displayed in the list.

a) Image display area
   An image stored in the image library is displayed.

b) No.
   A registration No. assigned to each registered image is used to display the "Library Image", "Image Indicator" and "Image" objects in the F930GOT.
   Up to 2,000 images (Nos. 0 to 1999) can be registered in the library.

c) Comment
   The comment shown here can be used to estimate the contents of an image.

## 9.8　　Data file

Data files store the data to be transferred by the "Send Data Banks" object.

• Data files can be created using the screen creation software. The figure below shows the Data Banks screen to create data files.



a) Head Address　　　b) Number of Banks　　　c) Bank Size

f) Operating when (write trigger)

g) Operating when (read trigger)

d) Bank Value　　　　e) Format

The data values of the data file registered are displayed in the table.

How to look at the table

• Longitudinal axis (data register)
  Displays from the head address entered by the bank size entered.
• Lateral axis (bank)
  Displays from 0 to the number of banks entered.

a) Head Address
   Enter the head No. of data registers in the PLC used to transfer the data between the GOT and the PLC.
   To clear all of the registered contents, enter "0".
   In the FX Series PLC, file registers (D1000 to D2999, D6000 to D7999) can be specified also. (The file register specifications vary depending on the model and the version. Before setting, confirm the device range of the connected PLC.)

b) Number of Banks
   Enter the number of data files.

c) Bank Size
   Enter the number of data saved in one file.

d) Bank Value
   Enter the data value using a decimal or hexadecimal value in accordance with the setting of "5) Format". A value within the range which can be set by word devices in the PLC can be entered.
   In the FX Series PLC, a value in the 16-bit range which can be set to word devices can be entered. (Decimal value: -32,768 to +32,767, hexadecimal value: 0 to FFFF)

e) Format
   Select "Decimal" or "Hexadecimal" as the format of data displayed in the registered data file list and entered to "Bank Value".

f) Operating when (write trigger)
   Enter a bit device in the PLC which triggers data transfer (write) from a file register in the F930GOT to a data register in the PLC.

g) Operating when (read trigger)
   Enter a bit device in the PLC which triggers data transfer (read) from a data register in the PLC to a file register in the F930GOT.

■**Important point**

• Available number of files and data size
  A value within the range of 1 to 4000 can be entered to b) Number of Banks and c) Bank Size.
  However, the number of files is limited as follows, and less than 4,000 files may be available.

  - **Bank Size x Number of Banks shall be equivalent to or less than 4,000.**

  - **Data register (D) in the PLC shall be more than "Bank Size".**

  Example: In the FX PLC (There are 1,000 data registers from D0 to D999.)

  Bank Size: 3000
  Number of Banks: 1          Cannot be set.  (Because the bank size is 3,000 while the number of
  Head Address: D0            registers in the PLC is 1,000.)

# 10.    Changeover of Display Screen (FX-PCS-DU/WIN-E)

The previous Section 9 describes creation of one screen.
Section 10 describes how to change over two or more screens.
Screen changeover can be arbitrarily specified using operation keys in the GOT or from the PLC.

## 10.1    Outline of changeover of display screen

In the F940GOT, up to 500 screens can be created. A number from 0 to 499 is assigned to each screen to control each screen.
A screen to be displayed next after the currently displayed screen should be specified using operation keys in the GOT or from the PLC.



Screen changeover specified from GOT (operation key) or PLC
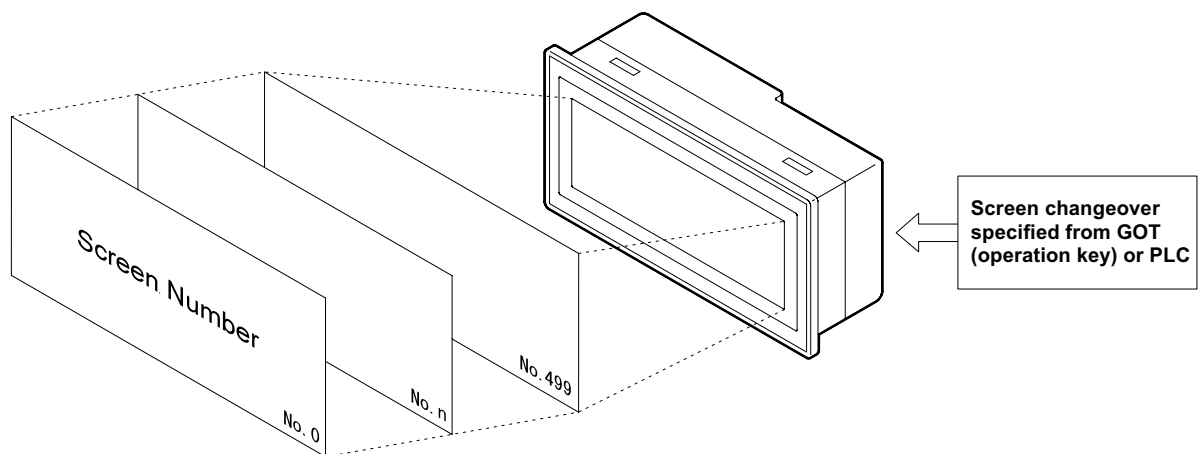
Not only user screens (No. 0 to 499) but also system screens (No. 1001 to 1030) in the alarm mode or the other mode can be displayed. (Refer to Paragraph 10.6.)

■**Important point**

1) Creation of the user screen No. 0
   In the screen mode in which user screens are displayed, the screen No. 0 is always displayed immediately after the power is turned on.
   Accordingly, the screen No. 0 should be created. If the screen No. 0 is not registered, the error message "DISPLAY SCREEN IS NOT AVAILABLE." is displayed.

2) Screen Nos. may not be consecutive.
   The screen Nos. may not be consecutive in such a way as "0, 1, 2, 3 . . ."
   When there is a possibility that some screens may be inserted in the future, inconsecutive screen Nos. can be used.
   However, it is recommended to use consecutive screen Nos. because mistakes may be reduced in screen changeover when screen Nos. are consecutive.

## 10.2     "Change Screen" object

Use the "Change Screen" object to change over screens.
The "Change Screen" object is important. It allows to specify a screen to be displayed next after the currently displayed screen when the trigger condition (operation key in the GOT and bit device in the PLC) is satisfied.

### 10.2.1   Contents of setting

In the "Change Screen" object, the following three main items are to be set.

1) Condition
   Set the condition which triggers screen changeover.

2) Destination Screen
   Set the destination screen to be displayed when the trigger condition is satisfied.

3) Save Current Screen
   Set whether or not the screen No. of the currently displayed screen is to be stored in the memory before screen changeover.


### Condition

Set the condition to trigger screen changeover.
An operation key in the GOT and a bit device in the PLC can be set here. When both of them are satisfied, the display screen is changed over.

| Set item | | Description | |
|---|---|---|---|
| **Control Input (in GOT)** | **Touch key** | Common setting for all screens: Touch keys Nos. 50 to 99<br>Setting for individual screen: Touch keys Nos. 0 to 49 | 50 keys in total |
| | **None** | There is no condition for operation key. | |
| **Bit Device (in PLC)** | **Bit device** | Bit device X, Y, M, S, T or C (a contact or b contact) | |
| | **None (Always Change)** | There is no condition for PLC. | |

When both "Control Input" and "Bit Device" are satisfied, the display screen is changed over.

**Destination Screen**

Set the specification method of the destination screen to be displayed after the currently displayed screen.

When 1] Condition is satisfied, the screen is displayed in accordance with the specification method set here.

| Set item | Description |
|---|---|
| Direct | When this item is selected, the No. of a screen to be displayed next (one among user screens N0. 0 to 499 and system screens No. 1001 to 1030) can be entered here directly. |
| PLC data register | When this item is selected, a screen (one among the screens Nos. 0 to 499 and 1001 to 1030) stored in control devices (data registers D+0 to D+2) in the PLC is displayed next.<br>\* The control devices can be selected using the screen creation software. |
| DU memory | When this item is selected, a screen stored in the memory in the GOT is displayed next. |

**Save Current Screen**

Set whether or not the screen No. of the currently displayed screen is to be stored in the memory before screen changeover. To save it, add a check mark.

The screen No. saved by this function is regarded as the screen No. to be displayed when "DU memory" is selected in "2) Destination Screen".
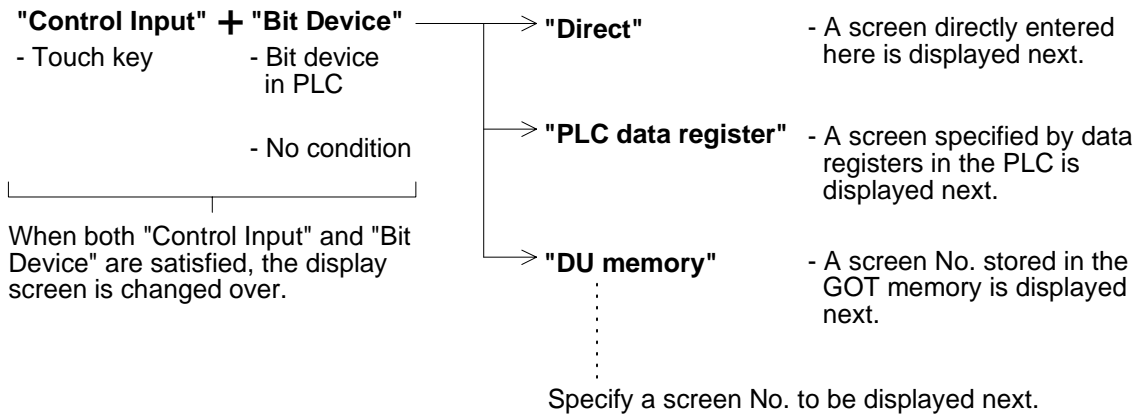
### 10.2.2   Operation of screen changeover

The "Change Screen" object can be registered for each individual screen or for all screens (common setting).

- Registration of the "Change Screen" object

  - Setting for individual screens
    The setting is effective only while the registered screen is displayed.
    Up to 50 objects in total can be registered including the "Change Screen", "Switch", "Send Data Bank", "Increment", "Decrement" and "Data Setting" objects.
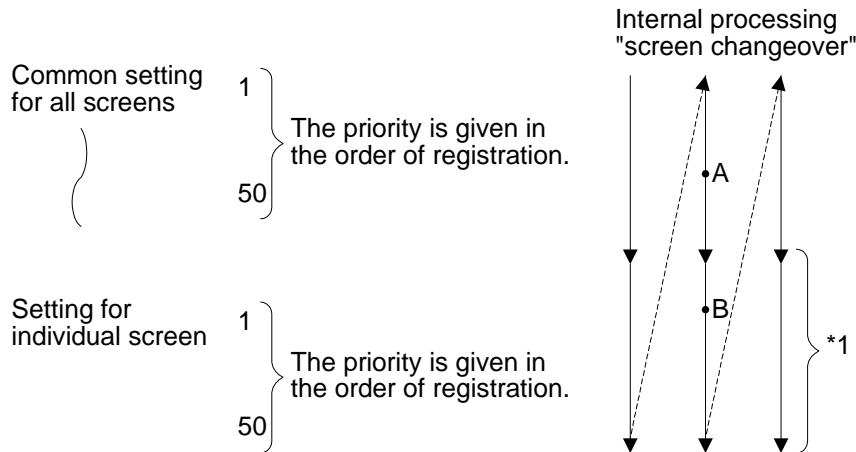
  - Common setting for all screens
    The setting is effective on any screen.
    Up to 50 objects in total can be registered including the "Change Screen", "Switch", "Send Data Bank", "Increment", "Decrement" and "Data Setting" objects.

    \*   Up to 50 objects in total can be registered including the setting for individual screen and the common setting for all screens.

**Condition**

"Control Input" **+** "Bit Device"
- Touch key      - Bit device in PLC

            - No condition

When both "Control Input" and "Bit Device" are satisfied, the display screen is changed over.

**"Direct"**      - A screen directly entered here is displayed next.

**"PLC data register"**      - A screen specified by data registers in the PLC is displayed next.

**"DU memory"**      - A screen No. stored in the GOT memory is displayed next.

Specify a screen No. to be displayed next.

## 10.2.3   Timing of screen changeover

Inside the GOT, whether or not the screen changeover condition specified by the "Change Screen" object is satisfied, it is checked in the order of the common setting for all screens and the setting for individual screens. When the specified condition is satisfied, the next screen is displayed.

Common setting for all screens    1
50

The priority is given in the order of registration.

Setting for individual screen    1
50

The priority is given in the order of registration.

Internal processing "screen changeover"

A

B

*1

- For example, even if the screen changeover condition for individual screen is satisfied at the point A earlier than satisfaction of the screen changeover condition for all screens at the point B, the priority is given to the common setting for all screens and the screen specified by the common setting for all screens is displayed.
  If two or more screen changeover conditions are satisfied at the same time, the screen is changed over in accordance with the setting of an object with highest priority.

  *3 When screen changeover is performed, the "Change Screen" object for the previous individual screen is replaced with the "Change Screen" object for the new individual screen.

- Screen changeover is performed in accordance with the priority as described above.
  If the screen changeover condition is equivalent, the object registered later is ignored.

## 10.3    Screen changeover by touch key

This paragraph describes screen changeover using a touch key.

When a touch key is used for screen changeover, the screen display is changed over to the specified destination when the touch key becomes ON. Enter an arbitrary touch key to "Control Input" in "Condition". Select "Direct" in "Destination Screen", and enter a desired screen No. to "Screen No."

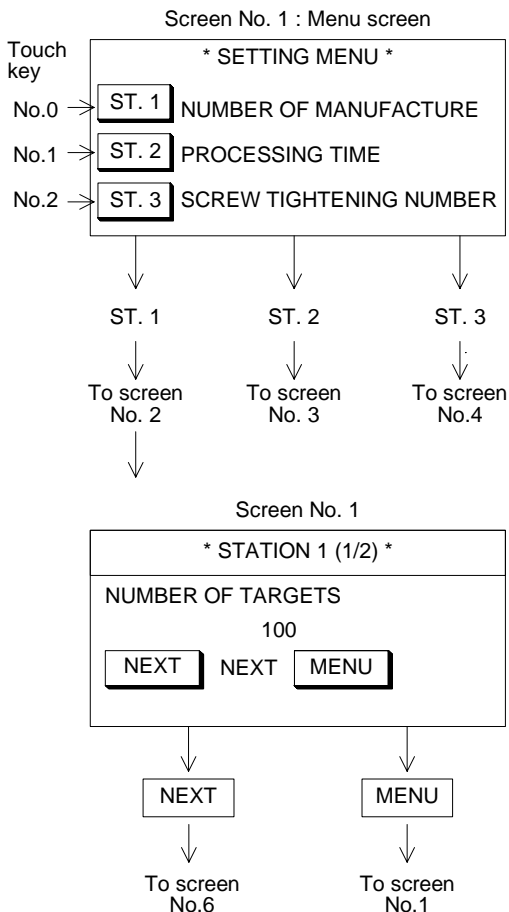| Set item | Description |
|---|---|
| **Control Input (in GOT)** | Available touch keys<br>Common setting for all screens: Touch keys Nos. 50 to 99 ⌉<br>Setting for individual screen: Touch keys Nos. 0 to 49 ⌋ 50 keys in all |
| **Bit Device** | Do not select "Bit Device".  (Do not enter any bit device No.) |
| **Screen No.** | Enter the screen No. of a screen to be displayed next among user screens Nos. 0 to 499 and system screens Nos. 1001 to 1030. |

**Example of screen changeover using touch keys**

- Examples of screen changeover using touch keys are shown below. Set the "Change Screen" object for all screens (common setting) and for individual screen.

   - Common setting for all screens
     In this example, the screen No. 0 is displayed from any screen when the MENU key is pressed.
     Characters "MENU" are displayed by the "Text" object.

|  | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|  | **Control Input** | **Bit Device** |  |  |
| **1** | Touch key No. 50 | Not specified | 0 | Not effective |

For screen changeover by screen No. stored in memory, refer to Paragraph 11.5.

   - Setting for individual screen

Screen No. 1 : Menu screen

Touch key

No.0 → ST. 1    * SETTING MENU *

ST. 1 → NUMBER OF MANUFACTURE

No.1 → ST. 2    PROCESSING TIME

No.2 → ST. 3    SCREW TIGHTENING NUMBER

ST. 1        ST. 2        ST. 3

To screen No. 2    To screen No. 3    To screen No.4

Screen No. 1

* STATION 1 (1/2) *

NUMBER OF TARGETS

100

NEXT    NEXT    MENU

NEXT        MENU

To screen No.6    To screen No.1

- Screen No. 0 is created, and screen changeover is set as follows.
  Screen No. 0 is a menu screen.
  When either of the ST. 1 to ST. 3 keys is pressed, a corresponding screen is displayed.

|  | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|  | **Control Input** | **Bit Device** |  |  |
| **1** | Touch key No. 0 | Not specified | 1 | Not effective |
| **2** | Touch key No. 1 | Not specified | 2 | Not effective |
| **3** | Touch key No. 2 | Not specified | 3 | Not effective |

- Characters "ST. 1" to "ST. 3" are displayed by the "Text" object.

- Screen changeover for screen No. 1 is set as follows.

|  | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|  | **Control Input** | **Bit Device** |  |  |
| **1** | Touch key No. 0 | Not specified | 1 | Not effective |

- When the "▼" key is pressed, screen No. 6 is displayed without regard to the ON/OFF status of bit devices in the PLC.

- When the MENU key is pressed, screen No. 0 is displayed in accordance with the setting of the "Change Screen" object set for all screens.

■**Important point**

1) Change of displayed data
   If "100" on screen No. 1 is a "Number" object, the value "100" can be changed. (Refer to Paragraph 3.2.)

2) Specification of touch key
   When selecting "Control Input" in "Condition", enter a desired touch key No.
   A touch key No. starting from 0 is assigned automatically for each screen in the order of creation.
   On the common screen, a touch key No. starting from 50 is assigned.

## 10.4     Screen changeover from PLC

From the PLC, the display screen can be changed over using bit devices and word devices (data registers).
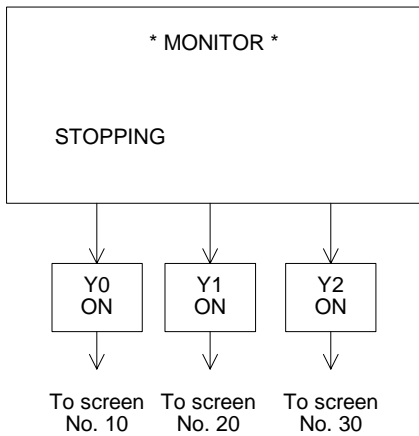
### 10.4.1    Screen changeover using bit devices

This paragraph describes the method to display a specified screen when a bit device (X, Y, M, S, T or C) becomes ON or OFF.

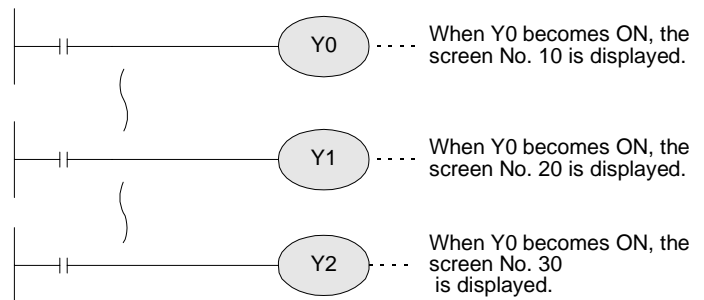| Set item | Description |
|---|---|
| **Control Input** | Do not enter any touch key. |
| **Bit Device** | Make "Bit Device" effective with a check mark, and enter a desired bit device (X, Y, M, S, T or C).<br>In "Active when", select "On" (a contact) or "Off" (b contact). |
| **Screen No.** | Enter the screen No. of a screen to be displayed next among user screens (Nos. 0 to 499) and system screens (Nos. 1000 to 1030). |

**Display of screen by bit device**

- An example of screen changeover by ON/OFF of a bit device in the PLC is shown below. In this example, the "Change Screen" object is set for an individual screen.

    - Setting for individual screen

```
┌─────────────────────────────┐
│        * MONITOR *           │
│                             │
│                             │
│   STOPPING                   │
│                             │
└─────────────────────────────┘
```

- Screen No. 0 is created, and the "Change Screen" object is set as follows.

| | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
| | **Control Input** | **Bit Device** | | |
| **1** | Not specified | Y0/On | 10 | Not effective |
| **2** | Not specified | Y1/On | 20 | Not effective |
| **3** | Not specified | Y2/On | 30 | Not effective |

```
┌──────┐   ┌──────┐   ┌──────┐
│  Y0  │   │  Y1  │   │  Y2  │
│  ON  │   │  ON  │   │  ON  │
└──────┘   └──────┘   └──────┘
```

To screen   To screen   To screen
No. 10      No. 20      No. 30

- Example of sequence program



```
──┤ ├──────────────( Y0 )     When Y0 becomes ON, the
                               screen No. 10 is displayed.

──┤ ├──────────────( Y1 )     When Y0 becomes ON, the
                               screen No. 20 is displayed.

──┤ ├──────────────( Y2 )     When Y0 becomes ON, the
                               screen No. 30
                               is displayed.
```

- If either of Y0, Y1 and Y2 (a contact) becomes ON while screen No. 0 is displayed, a corresponding screen is displayed.

**10.4.2   Screen changeover by data**

The display screen can be changed over by specifying the screen No. using a word device (Only data registers are available.) in the PLC.

| Set item | Description |
|---|---|
| **Control Input Bit Device** | Do not enter any touch key or bit device. |
| **Destination Screen: PLC data register** | Specify a desired screen No. using a data register (control word device) for screen specification in the PLC.<br>The data register can be set using the screen creation software. The initial value is D0.<br>When the data in the register is changed, screen changeover is performed and the specified screen is displayed. |

**Example of screen changeover by data register**

- An example of screen changeover by a data register (word device) is shown below.
  The "Change Screen" object is set for all screens (common setting).
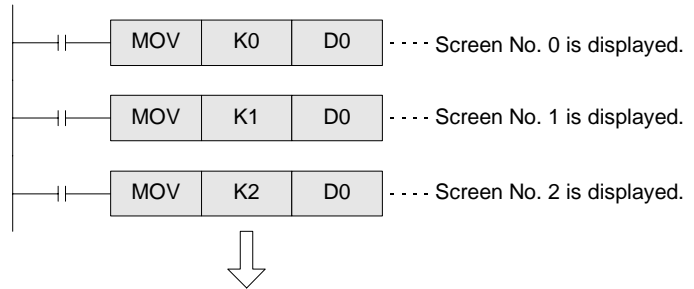
  - Common setting for all screens
    The display is changed over to
    a screen having the No. speci-
    fied by a data register in the
    PLC without using the screen
    changeover condition.

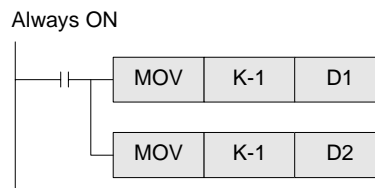|   | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|   | Control Input | Bit Device | | |
| 1 | Touch key No. 50 | Not specified | 0 | Not effective |

Screen No. 0

Displayed when D0 becomes 0.
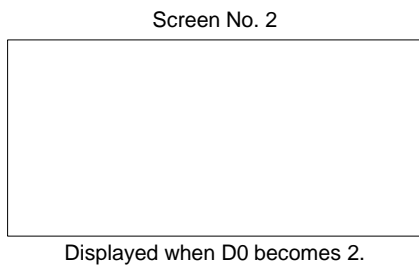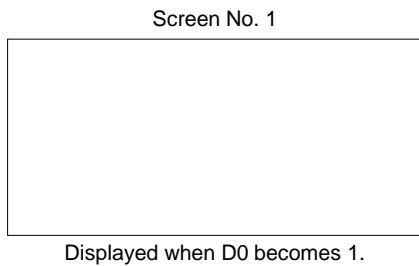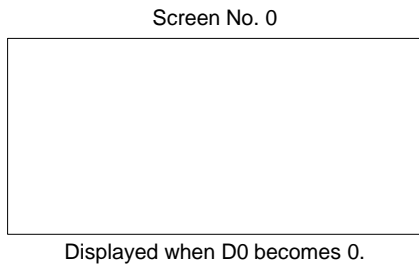
- Immediately after the GOT has been put into screen mode, the screen No. 0 is always displayed.
  When the sequence program shown below is executed, the screen is changed over.

- Example of sequence program

| MOV | K0 | D0 | ···· Screen No. 0 is displayed. |
| MOV | K1 | D0 | ···· Screen No. 1 is displayed. |
| MOV | K2 | D0 | ···· Screen No. 2 is displayed. |

Though all of screens to be displayed can be specified from the PLC, the sequence program becomes long when many screens are specified.

Screen No. 1

Displayed when D0 becomes 1.

- When screens will not be overlaid, enter "-1" to D1 and D2.

Always ON

| MOV | K-1 | D1 |
| MOV | K-1 | D2 |

Screen No. 2

Displayed when D0 becomes 2.

■**Important point**

- Combination of other types of screen changeover
  When screen changeover by data registers is used together with screen changeover by an other method (bit devices or touch keys), the priority is always given to screen changeover by data registers ("PLC data register") if both "Control Input" and "Bit Device" are not set because the changeover condition is not given.
  When using different types of screen changeover together, refer to "10.7 Application of screen changeover".
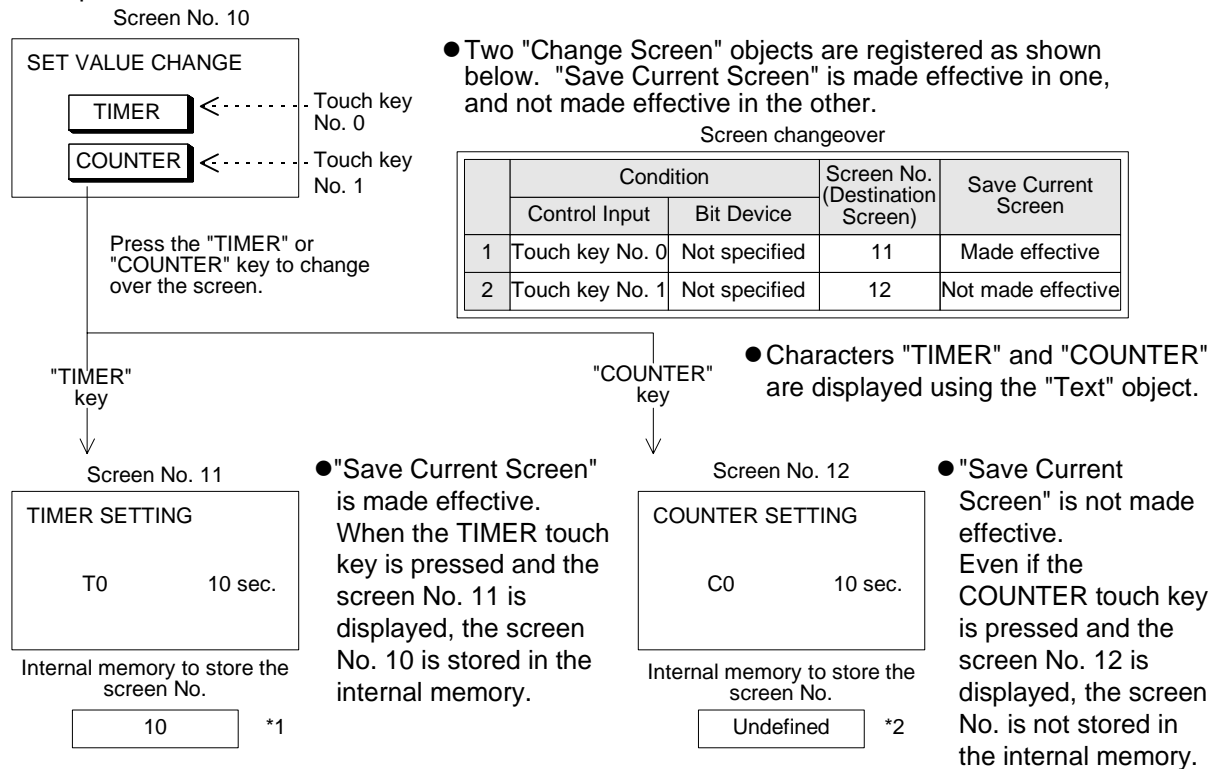
## 10.5    Screen changeover by screen No. stored in memory

This paragraph describes the method to display a screen stored in the memory using the screen No. storage function.
The screen No. storage function can be set in the "Change Screen" object.
Only when "Save Current Screen" of the "Change Screen" object is made effective with a check mark, a screen No. displayed just before screen changeover is stored in the memory in the GOT.
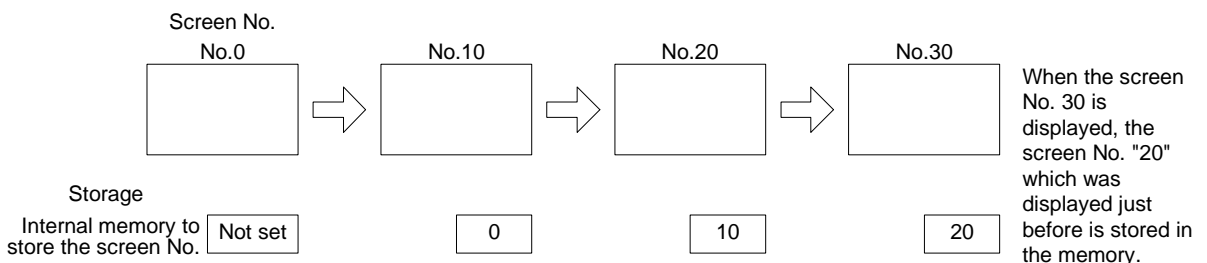
Example

Screen No. 10

SET VALUE CHANGE

TIMER   < · · · · · ·  Touch key No. 0

COUNTER   < · · · · · ·  Touch key No. 1

Press the "TIMER" or "COUNTER" key to change over the screen.

● Two "Change Screen" objects are registered as shown below. "Save Current Screen" is made effective in one, and not made effective in the other.

Screen changeover

| | Condition | | Screen No. (Destination Screen) | Save Current Screen |
| | Control Input | Bit Device | | |
|---|---|---|---|---|
| 1 | Touch key No. 0 | Not specified | 11 | Made effective |
| 2 | Touch key No. 1 | Not specified | 12 | Not made effective |

"TIMER" key

"COUNTER" key

● Characters "TIMER" and "COUNTER" are displayed using the "Text" object.

Screen No. 11

TIMER SETTING

T0        10 sec.

Internal memory to store the screen No.

10        *1

● "Save Current Screen" is made effective. When the TIMER touch key is pressed and the screen No. 11 is displayed, the screen No. 10 is stored in the internal memory.

Screen No. 12

COUNTER SETTING

C0        10 sec.

Internal memory to store the screen No.

Undefined        *2

● "Save Current Screen" is not made effective. Even if the COUNTER touch key is pressed and the screen No. 12 is displayed, the screen No. is not stored in the internal memory.

*1 **Contents stored in the screen No. storage memory**
    The screen No. storage memory in the GOT can store only one screen at a time. Accordingly, when "Save Current Screen" is made effective on a newly displayed screen, the contents of the memory is updated.
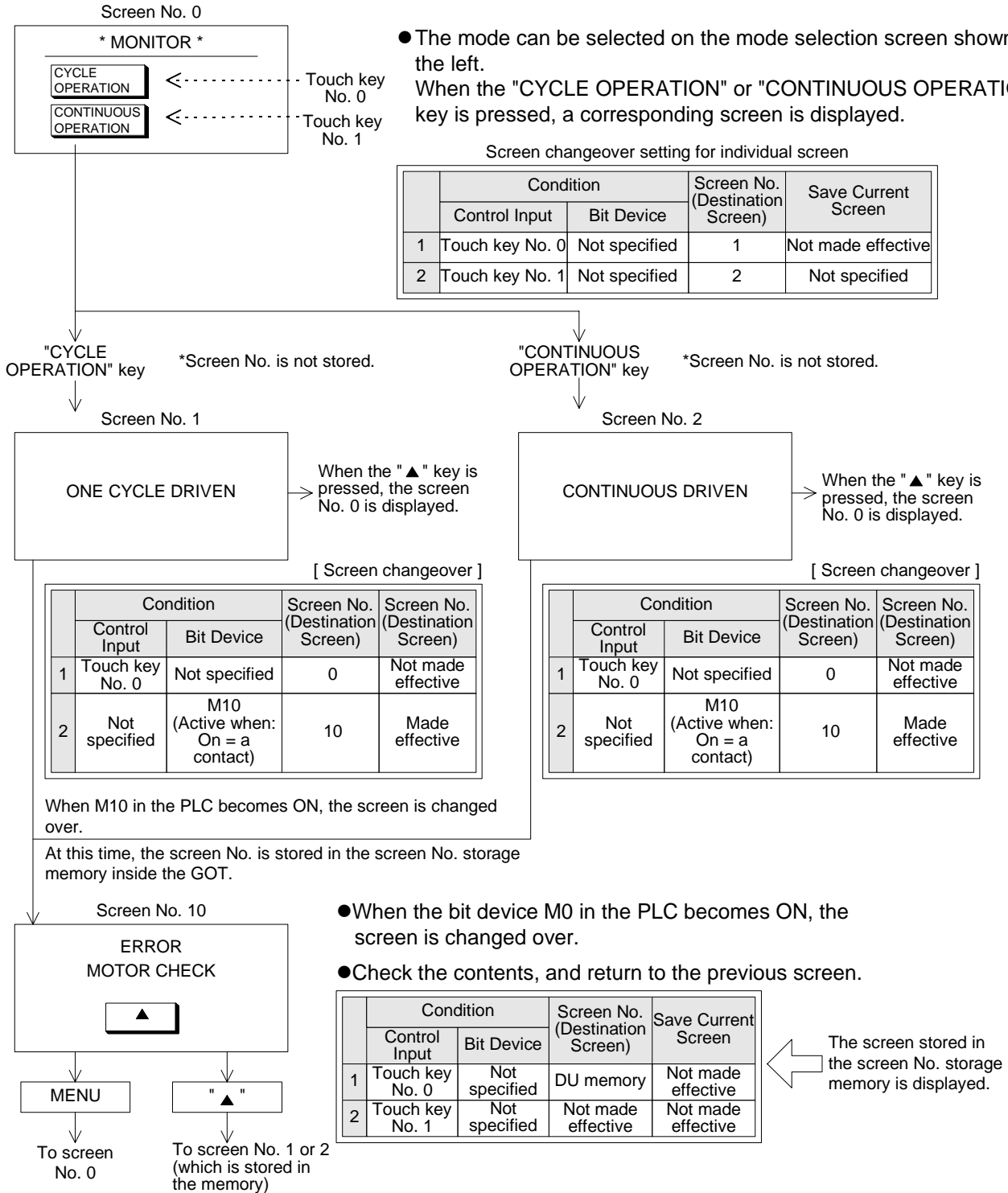    Example: Suppose that the screens are changed over as follows.

Screen No.

No.0    No.10    No.20    No.30

When the screen No. 30 is displayed, the screen No. "20" which was displayed just before is stored in the memory.

Storage

Internal memory to store the screen No.    Not set    0    10    20

*2 **Keeping of the contents stored in the screen No. storage memory**
    The contents stored in the screen No. storage memory is kept only while the power is turned on in the GOT main body. When the power is turned off, the memory is cleared.

**Example of screen changeover by screen No. stored in memory:**

An example of screen changeover by screen No. stored in memory is shown below.
In the example below, an abnormality occurs in the machine in the operation mode, an error message is displayed, then the previous screen is displayed.

Screen No. 0

* MONITOR *

CYCLE
OPERATION  ◄ ---------- Touch key No. 0

CONTINUOUS
OPERATION  ◄ ---------- Touch key No. 1

● The mode can be selected on the mode selection screen shown on the left.
When the "CYCLE OPERATION" or "CONTINUOUS OPERATION" key is pressed, a corresponding screen is displayed.

Screen changeover setting for individual screen

| | Condition | | Screen No. (Destination Screen) | Save Current Screen |
|---|---|---|---|---|
| | Control Input | Bit Device | | |
| 1 | Touch key No. 0 | Not specified | 1 | Not made effective |
| 2 | Touch key No. 1 | Not specified | 2 | Not specified |

"CYCLE OPERATION" key    *Screen No. is not stored.

"CONTINUOUS OPERATION" key    *Screen No. is not stored.

Screen No. 1

ONE CYCLE DRIVEN

When the " ▲ " key is pressed, the screen No. 0 is displayed.

[ Screen changeover ]

| | Condition | | Screen No. (Destination Screen) | Screen No. (Destination Screen) |
|---|---|---|---|---|
| | Control Input | Bit Device | | |
| 1 | Touch key No. 0 | Not specified | 0 | Not made effective |
| 2 | Not specified | M10 (Active when: On = a contact) | 10 | Made effective |

When M10 in the PLC becomes ON, the screen is changed over.

At this time, the screen No. is stored in the screen No. storage memory inside the GOT.

Screen No. 2

CONTINUOUS DRIVEN

When the " ▲ " key is pressed, the screen No. 0 is displayed.

[ Screen changeover ]

| | Condition | | Screen No. (Destination Screen) | Screen No. (Destination Screen) |
|---|---|---|---|---|
| | Control Input | Bit Device | | |
| 1 | Touch key No. 0 | Not specified | 0 | Not made effective |
| 2 | Not specified | M10 (Active when: On = a contact) | 10 | Made effective |

Screen No. 10

ERROR

MOTOR CHECK

[ ▲ ]

MENU

" ▲ "

To screen No. 0

To screen No. 1 or 2 (which is stored in the memory)

● When the bit device M0 in the PLC becomes ON, the screen is changed over.

● Check the contents, and return to the previous screen.

| | Condition | | Screen No. (Destination Screen) | Save Current Screen |
|---|---|---|---|---|
| | Control Input | Bit Device | | |
| 1 | Touch key No. 0 | Not specified | DU memory | Not made effective |
| 2 | Touch key No. 1 | Not specified | Not made effective | Not made effective |

The screen stored in the screen No. storage memory is displayed.

Use the screen No. storage function when one screen has been specified among two or more screens, and the screen that was displayed prior to the screen changeover is to be displayed again.

## 10.6    Changeover to system screen

Function screens built in the GOT such as the HPP MODE screen, the SAMPLING MODE screen, the ALARM MODE screen and the OTHER MODE screen can be displayed as user screens.

### 10.6.1    Display of system screen

This paragraph describes the method to display a system screen as a user screen (that is, display a system screen in the screen mode) and the caution on this method.

* **A system screen can be displayed by specifying a corresponding screen No. using the "Change Screen" object. In this case, "Save Current Screen" should be made effective so that the previous user screen can be displayed after the system screen.**

Touch key
No. 0

Screen No. 0

```
          * MENU *
     DEVICE MONITOR   <┈┈┈
```

"DEVICE MONITOR"

Screen No. 1001
DEVICE MONITOR screen

```
[ DEVICE MONITOR ]        END



DEVICE   ON    OFF    ▲   ▼
SET   COMMENT DEC/HEX
```
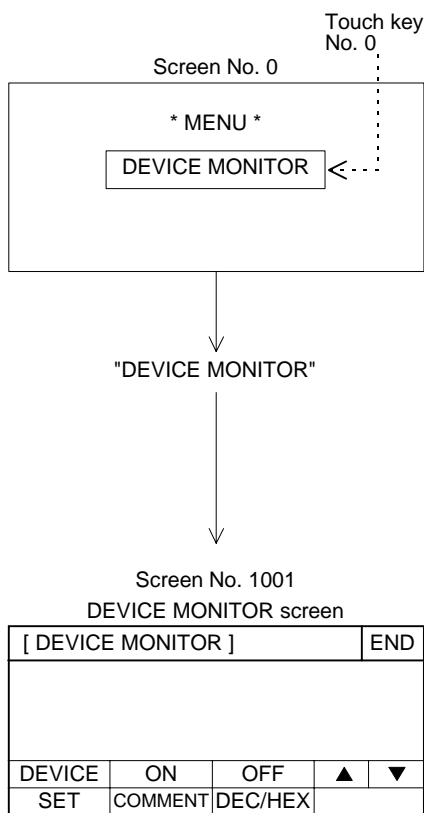
* Screen No. 0 is created as follows.
  The "Change Screen" object is set so that screen No. 1001 (DEVICE MONITOR screen) is displayed when the touch key No. 0 (DEVICE MONITOR) is pressed.

|   | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|   | Control Input | Bit Device |   |   |
| 1 | Touch key No. 0 | Not specified | 1001 | Not effective |

Make sure to set "Save Current Screen" effective.

* For the operating procedures of each system screen, refer to description on each mode.

* When the END key is pressed, the previous screen (screen No. 0 in this example) is displayed again.

For the system screen No., refer to the appendix.

## 10.7     Application of screen changeover

This paragraph describes an application example of screen changeover.

**Example of screen changeover by touch key in the GOT and word device in the PLC**

- In the example below, screen changeover by touch key and screen changeover by word device in the PLC are used together.

  - Common setting for all screens
    The "Change Screen" object is set so that screen No. 0 is displayed when the MENU key is pressed.
    This setting is suitable to read a certain screen such as the menu screen.
    Characters for menu items are displayed using the "Text" object.

When the MENU key is pressed, the menu screen (screen No. 0) is displayed.

|   | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|   | Control Input | Bit Device | | |
| 1 | Touch key No. 50 | Not specified | 0 | Not effective |

  - Setting for individual screen
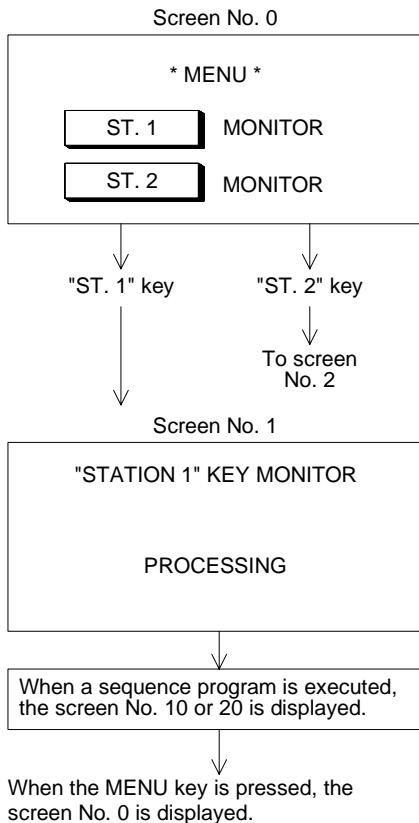
Screen No. 0

* MENU *

ST. 1     MONITOR

ST. 2     MONITOR

"ST. 1" key      "ST. 2" key

To screen No. 2

Screen No. 1

"STATION 1" KEY MONITOR

PROCESSING

When a sequence program is executed, the screen No. 10 or 20 is displayed.

When the MENU key is pressed, the screen No. 0 is displayed.

- Screen No. 0 is created, and the "Change Screen" object is set as follows.

|   | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|   | Control Input | Bit Device | | |
| 1 | Touch key No. 0 | Not specified | 1 | Not effective |
| 2 | Touch key No. 1 | Not specified | 2 | Not specified |

- It is set so that screen No. 1 is displayed by a data register (word device) in the PLC.
  The initial value of the data register for screen changeover is D0.

|   | Condition | | Screen No. (Direct) | Save Current Screen |
|---|---|---|---|---|
|   | Control Input | Bit Device | | |
| 1 | Not specified | M100 | PLC data register | Not effective |

**If "Bit Device" is not specified, both "Control Input" and "Bit Device" are not specified. Accordingly, the screen is changed over immediately by a data register in the PLC.
For the condition to make screen changeover by data register effective, enter "Control Input" or "Bit Device" as shown in the program example 1 in the next page.**

Continued in sequence program examples on the next page.

- Sequence program examples

Example 1:          When the specified condition is given, the screen is changed over.
                    (A touch key may be entered as a trigger instead of a bit device.)

```
──┤↑├──────────────────────────────(M100)  - - - - - Screen changeover condition (bit device)

              FNC12
      ┌────┬─────┬─────┐
      │MOV │ K10 │ D0  │  - - - - -  The screen No. 10 is displayed.
      └────┴─────┴─────┘
```
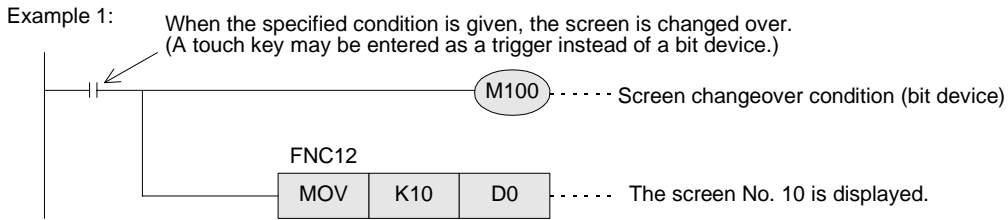
Example 2: When it should be confirmed that screen changeover has been securely performed by the specified
           condition, make a program shown below.

```
M8000       FNC10
──┤├───┬─┤CMP│ D0 │ D3 │ M101 ├
       │
       │      FNC12
   M102│
──┤├───┴─┤RST│ M100 ├

Screen
changeover
condition

──┤├──────┤MOV│ K10 │ D0 ├

         ┤SET│ M100 ├
```

D0 - - - Specifies the screen No. of a changeover
         destination screen.
D3 - - - Stores the screen No. of a screen currently
         being displayed.

When the data of D0 becomes equivalent to the
data of D3, it means that screen changeover by
word device in the PLC is completed.  At this time,
M100 is reset.

When the screen changeover condition is given, the
changeover destination screen No. is specified and
M100 is set.

## Combination of the "Switch" object and the "Change Screen" object

- There may be a case in which one touch key is required to function both as a switch and a control input for screen changeover.
  In such a case, the "Switch" object and the "Change Screen" object can be used together.

# MEMO

# 11.     Creation of Display Screen (SW☐D5C-GOTRE-PACK)

This section describes the elements constructing user screens created using the screen cre-
ation software for GOT-A900 (SW☐D5C-GOTRE-PACK).
Created user screens are displayed in the screen mode described in Section 3. For specifica-
tion of screens to be displayed, refer to Section 12.

## 11.1     Element list

The elements constructing user screens are referred to as "Figures" and "Objects" in the
screen creation software for GOT-A900 (SW☐D5C-GOTRE-PACK).

### ◆Display example

The figures below show display examples of the screen.
Only some objects are used in the examples below. Have in mind some objects are displayed
on the screen and others are not.
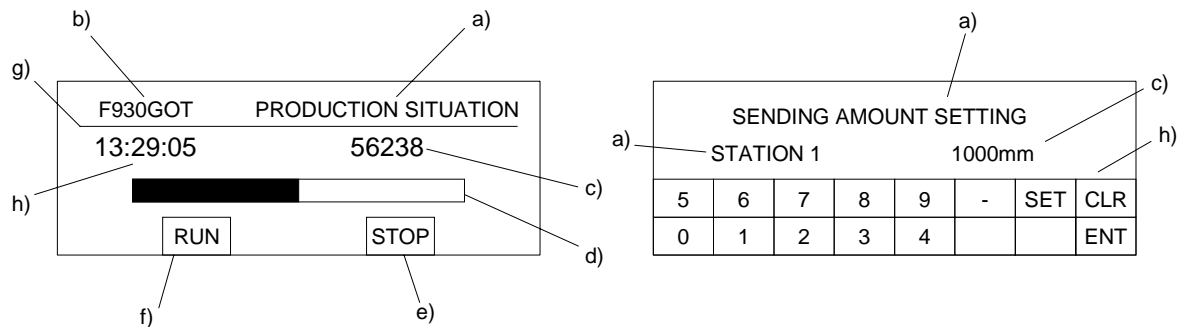


Figures: Display figures and characters in specified positions.

| Figure | Description | Use example |
|---|---|---|
| **Text** | Displays characters such as alphabets, numerics, Katakana, Hiragana and Kanji (JIS level 1) and symbols. | a), b) |
| **Line** | Displays a straight line connecting specified two points. | f) |
| **Rectangle** | Displays a rectangle whose every edge is 90^. The rectangle can be filled. | |
| **Circle** | Displays a circle. The circle can be filled. | |
| **Figure Data** | Displays a figure in the BMP or DXF format. | |

### ■Important point

Refer to detailed set items of each figure/object (Refer to the HELP file in the creation software
file for the attribute.), then set each figure/object.

---

◢◣ **MITSUBISHI**

Objects: Display and allow to change the contents of devices in the PLC.
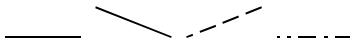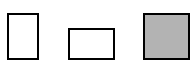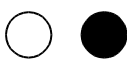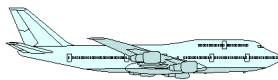
| Function | Description | Use example |
|---|---|---|
| **Numerical Display** | Displays the data stored in a word device in the form of numeric. | c) |
| **Ascii Display** | Regards the data stored in consecutive word devices as character codes (ASCII codes or shift JIS codes), and displays a corresponding text. | - |
| **Clock** | Displays the clock data stored in the F930GOT in the form of "time/date". | g) |
| **Comment** | Displays a comment in accordance with the ON/OFF status of a bit device or a specified range of a word device. A displayed comment may occupy two or more lines. | - |
| **Alarm History** | Displays the contents of the alarm history stored in the F930GOT. | - |
| **Alarm List (user alarm)** | Displays comments in accordance with bit devices in the ON status in the order of priority. | - |
| **Part Display** | Displays parts in accordance with the ON/OFF status of a bit device or the data of a word device. A figure in the BMP file format can be displayed as a part. | - |
| **Lamp** | Changes the lighting color of a lamp in accordance with the data of a device. | - |
| **Panelmeter** | Displays the data of a word device in the form of panel meter as a ratio against the minimum and maximum values. | - |
| **Line** | Acquires the data stored in a word device at each specified timing, displays a line graph of the acquired data within the display range, then allows scroll of the line graph. | - |
| **Trend** | Acquires the data of two or more word devices at a time, and displays the acquired data in the form of trend graph. | - |
| **Bar** | Displays the data stored in two or more word devices in the form of bar graph. | d) |
| **Statistics** | Acquires the data of two or more word devices, and displays the acquired data in the form of statistical graph indicating the ratio of the data of each word device against the entire data. | - |
| **Touch Key** | Turns on/off a bit device, allows to change the data of a word device or changes over the screen display when touched. | e) |
| **Numerical Input** | Writes an arbitrary numeric to a specified word device. | c) |
| **Ascii Input** | Writes an arbitrary character code to a specified word device. | - |

## 11.2    Figure display function

The table below shows the type and the attribute of displayable figures.

1) Available types
   The table below shows the type of displayable figures and characters.

| Figure | Display example | Available attributes |
|---|---|---|
| Line |  | Line Style and Line Color |
| Rectangle |  | Line Color and Foreground |
| Circle |  | |
| Figure data in BMP/DXF format | <br>This is a display example of a BMP file. | - |
| Text | ABC ABC abc abc | Character color, size and shift |

1) Available attributes
   The table below shows available attributes.

| Attribute | Display example |
|---|---|
| Line Style (Only continuous line is available for a circle.) | Continuous ——————— ,    Broken — — — — — · ,    Dotted ------------------ ,<br>Alternate long and short dash line —— · —— — — ,<br>Alternate long and two short dashes line —— - - —— - - , |
| Line Width | ——— 1 dot |
| Color | White or black (If the black is specified, becomes blue.) |
| Foreground | *All specification except the black are displayd in white. |

## 11.3     Data display function

The ON/OFF status of bit devices in the PLC and the current value of word devices in the PLC can be displayed.

### 11.3.1    Display of numerics

The "Numerical Display" object displays the data of word devices in the PLC in the form of numeric.

◆**Contents of setting**

1)  Number of digits

  •   Maximum allowable number of digits: 12 (Each of a minus sign (-) and a decimal point is counted as 1 digit.)

| High-speed counter | | C235 (32 bits) | If data whose number of digits exceeds the maximum allowable |
|---|---|---|---|
| -2147483648 | to | -2147483648 | number of digits is specified to be displayed, "?" is displayed. |
| 11 digits | | 10 digits | |

**Number of digits after decimal point**

  •   Enter the number of digits after a decimal point for a case where a decimal point is displayed.
      Example: When the displayed numeric is "2000"
      2000: Number of digits after decimal point = 0
      200.0: Number of digits after decimal point = 1
      20.00: Number of digits after decimal point = 2
      2.000: Number of digits after decimal point = 3

1)  Style

  •   Select one style for decimal with sign, decimal without sign, hexadecimal, octal, binary and real.

  •   Zero suppression
      When the zero suppression function is not used, "0" is displayed in each blank digit position to the left of the data. The number of "0" is displayed  will depend on the specified total number of digits.
      Example:
      When the total number of digits is set to 7 and the number of digits after decimal point is set to 2
      00012.34:"0" is displayed in these digits.

  •   A numeric is displayed horizontally.

2) Shift

- When the number of digits of a numeric to be displayed is smaller than the specified total number of digits, the numeric is automatically shifted to the right, the center or the left in accordance with the setting.
  Example: When the specified total number of digits is set to 9 and the displayed numeric is a 3-digit value
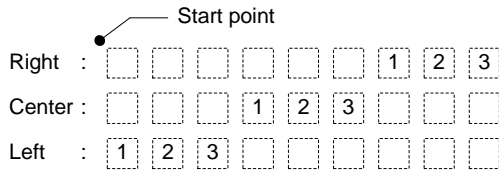


3) Gain 1, gain 2 and offset
The value obtained by the calculation "(Monitor value x Gain 1 / Gain 2) + Offset" is displayed.
Example: When the monitor value is 1000 (current value of D100), the gain 1 is set to 10, the gain 2 is set to 2 and the offset is set to 3
$(1000 \times 10 \div 2) + 3 =$ "5003" is displayed.

◆**Display example**
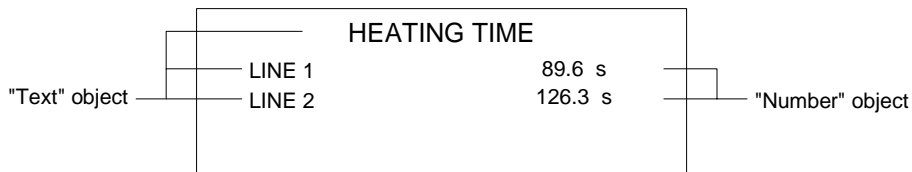


■**Important point**

- Display of numerics for timers and counters
  When a device whose numeric is to be displayed is set to a timer or counter, its current value is displayed.
  To display the set value of a timer/counter, specify indirectly the set value of a timer/counter to be displayed as shown below, then display the value of the specified data register.



When T0 is specified as a device whose numeric is to be displayed, the current value of T0 is displayed.
When D10 is specified as a device whose numeric is to be displayed, the set value of T0 is displayed.
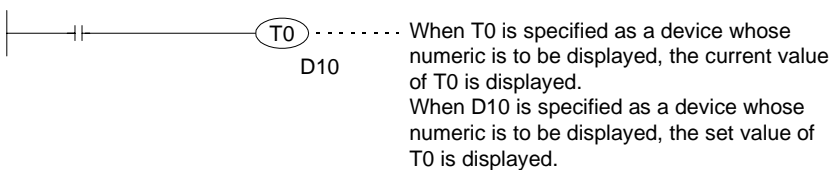
### 11.3.2   ASCII code display function

The "Ascii Display" object displays characters corresponding to specified word devices (T. C, D, V or Z) in the PLC.
Arbitrary characters can be displayed on one base screen.

◆**Contents of setting**

Alphabets, numerics, etc. which can be specified using shift JIS codes (for Japanese) or ASCII codes (for half-width characters) (For character codes, refer to the appendix.)

◆**How to specify character codes**

• Refer to the Appendices for further details about ASCII.

• Reading the ASCII table
  This section describes how to read ASCII using the Appendix as an example.
  One ASCII character is displayed by combining both the vertical and horizontal axes.
                                    .....The vertical axis shows the last digit of the code.

Example  Select "A" Horizontal axis H40  Vertical axis 1 →   ASCII H41 (hexadecimal expression)
         Select "b" Horizontal axis H50  Vertical axis 1 →   ASCII H62 (hexadecimal expression)

| Lower Bit \ Heigher Bit | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 0 | | (SP) | 0 | @ | P | @ | p |
| 1 | | ! | 1 | A | Q | a | q |
| 2 | | " | 2 | B | R | b | r |
| 3 | | # | 3 | C | S | c | s |

### ◆Storage of word device

• Character codes are stored in word devices in the PLC. The stored data is displayed from the lower 8 bits as shown below.
Example 1   : When two half-width characters (ASCII codes) are displayed
Word Device : D0
Data Length  : 1



Bg
(background color)
(The broken line is
not actually
displayed.)

From the ASCII code table offered as appendix,
A=H41
B=H42
ASCII code
Data storage status

| | Upper | | Lower | |
|---|---|---|---|---|
| D0 (H) | 4 | 2 | 4 | 1 |
| | B | | A | |

- A character to be displayed at first should be specified using lower 8 bits.

Example 2   : When one full-width character is displayed
Word Device : D0
Data Length  : 1



The required codes (taken from the user defined character set) is :
● =F053
The upper and lower two digits of the character code are reversed.

| | Upper bits | | Lower bits | |
|---|---|---|---|---|
| D0 (H) | 5 | 3 | F | 0 |

●

Example 3   : When one full-width character and two half-width characters are displayed
Word Device : D0
Data Length  : 2 (D0 and D1)



C●D

The required ASCII codes (taken from the ASCII code table in the Appendixes) are :
C =H43  (one-byte character, 8bit)
● =F053 (one-byte character, 8bit)
D =H44  (one-byte character, 8bit)

How the data is stored :

| | Upper bits | | Lower bits | | | | Upper bits | | Lower bits | |
|---|---|---|---|---|---|---|---|---|---|---|
| D0 (H) | F | 0 | 4 | 3 | 2-word | D0 (H) | 43 | F0 | 53 | 44 |
| D1 (H) | 4 | 4 | 5 | 3 | designation | | C | ● | | D |

### ■Important point

When the character code is set to "H0" (either for full-width or half-width), characters after that are not displayed on the screen.
To insert space in a text, store "H8140" (for full-width) or "H20" (for half-width) to the specified word device.

◆**Display example**

"RUN" or "STOP" are displayed as the "Ascii Display" objects using three data registers D100 to D102.
When X0 becomes ON, "RUN" is displayed.
When X1 becomes ON, "STOP" is displayed.

- "Ascii Display" object (Specification example in the edit mode)
  Character size        : W: ×2, H: ×2
  Character attribute : Rotate
  Word device           : D100
  Data length           : 3

- Display

Bg  (background color)
(The broken line is not
actually displayed.)

When X0 becomes ON                              When X1 becomes ON

```
+---------------------------+          +---------------------------+
|        LINE 1 -------------|-- "Text" object --|------- LINE 1   |
|                            |          |                          |
|   TEMP.NORMAL ------------ | -- "Ascii" object -- |  TEMP.HIGH   |
|                            |          |                          |
+---------------------------+          +---------------------------+
```

*"LINE 1" is displayed as the "Text" object.                Text (display color)

- Sequence program

```
X0      FNC12
 ||─────[ MOV │ H 4F4E │ D100 ]
 │
 │      FNC12
 ├─────[ MOV │ H 4D52 │ D101 ]
 │
 │      FNC12
 └─────[ MOV │ H 4C41 │ D102 ]
```

Storage status of data registers

|      | Upper | Lower |     |
|------|-------|-------|-----|
| D100 | 4F    | 4E    | (H) |
| D101 | 4D    | 52    | (H) |
| D102 | 4C    | 41    | (H) |

```
X1      FNC12
 ||─────[ MOV │ H 4948 │ D100 ]
 │
 │      FNC12
 ├─────[ MOV │ H 4847 │ D101 ]
 │
 │      FNC12
 └─────[ MOV │ H 2121 │ D102 ]
```

Storage status of data registers

|      | Upper | Lower |     |
|------|-------|-------|-----|
| D100 | 49    | 48    | (H) |
| D101 | 48    | 47    | (H) |
| D102 | 21    | 21    | (H) |

■**Important point**

The "Ascii Display" object displays specified texts on one screen as shown above. Accordingly, the screen is not required to be changed over nor screens are not required to overlay/be overlaid.

**11.3.3　Clock display function**

The "Clock" object displays the date and the time of the clock built in the F930GOT

◆**Contents of setting**

Date: YY/MM/DD
　　　 DD/MM/YY
　　　 MM/DD/YY(One of them can be selected.)

Time:　HH:MM (fixed)

◆**Display example**

Date: 98/11/2 (YY/MM/DD)
　　　 2/11/98 (DD/MM/YY)
　　　 11/2/98 (MM/DD/YY)

Time:　16:28

■**Important point**

• Displayed date and time
  The displayed date and time are equivalent to those set in the operation environment setting
  in the GOT main body.

• The current clock data in the F930GOT cannot be transferred to the PLC.
  When controlling the time in the PLC, use the RTC (real-time clock) function of the PLC.

### 11.3.4　Comment display function

The "Comment" object displays specified texts in accordance with the ON/OFF status of a bit device (X, Y, M, S, T or C) in the PLC or the current value of a word device (D, T or C).
Texts entered directly (available only for bit devices) or texts created in "Create Comment" in the screen creation software can be displayed.

◆**Contents of setting**

1) Specification method
   Bit device (X, Y, M, S, T or C)
   Word device (D, T, C or GD)

2) Display contents

   Bit device:
   Text to be displayed while a specified bit device is ON
   Text to be displayed while a specified bit device is OFF
   (Enter directly a text to be displayed. Or specify the comment No. created in "Create Comment". Refer to Paragraph 11.7)

   Word device:
   The comment No. can be specified using the current value of a specified word device.

   Display color:
   Enter the color of text to be displayed.
   The color for the ON status and the color for the OFF status can be entered respectively.
   When the ON/OFF status is not changed, the color set in the comment list is used.

   Creation of comment:
   A comment to be displayed in accordance with the specified comment No. can be created in "Create Comment" in "Screen Setting" of the screen creation software.

◆**Display example**

| Comment | |
|---|---|
| Bit device | Y0 |
| Comment No. for ON status | 10 |
| Comment No. for OFF status | 11 |

```
COMMENT

 0  CHECK
 :  :
 :  :
 9  MOTOR DRIVE
10  DRIVING
11  STOPPING
12  CYLINDER OFF
    ↑
```
Comment No.
(Refer to Paragraph 11.7.)

• Sequence program

```
      X0
  ─┤ ├──────────( Y0 )
```

• GOT screen

While Y0 is ON
The comment No. 10 is displayed.

```
 ASSEMBLY LINE
 ┌ ─ ─ ─ ─ ─ ┐
 ¦  DRIVING  ¦
 └ ─ ─ ─ ─ ─ ┘
        ↖
```

While Y0 is OFF
The comment No. 11 is displayed.

```
 ASSEMBLY LINE
 ┌ ─ ─ ─ ─ ─ ┐
 ¦  STOPPING ¦
 └ ─ ─ ─ ─ ─ ┘
       ↖
```
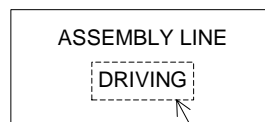
Display color (text color) and background color (The broken line is not actually displayed.)

Characters "ASSEMBLY LINE" are displayed using the "Text" object. On the same screen, displayed characters can be exchanged between "RUNNING" and "STOPPED".
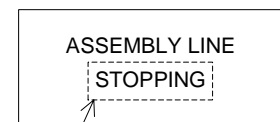
• In the example above, comments registered in the comment list are displayed. Instead of entering the comment Nos., texts to be displayed in the ON/OFF status can be entered directly.

• When a word device is specified, the current value of the word device is regarded as the comment No. to be displayed.

### 11.3.5 Alarm history display function

When an alarm device set in the screen creation software becomes ON, a message corresponding to the alarm device as well as the date and time at which the alarm device became ON are displayed on a user screen. The date and time at which the alarm device became OFF can be also displayed.

◆**Contents of setting**

Common setting: Equivalent to the setting displayed in the alarm mode described in Section 6
Basic setting: Figure (with a frame), frame color, color inside frame and title color

Display setting : Number of display lines (of alarm history), sort (from the oldest one/from the latest one), character size and recovery column (whether or not the recovery column is to be displayed)_Display format: Title (which may be changed)

Width (display size in the horizontal direction: full-width x width)

Color (The display color and the title color are set in the basic setting.)

Contents (Date, time and characters can be specified.)

Characters (to be displayed when characters are selected as contents)

◆**Display example**

Display frame

| OCCURRED | MESSAGE | REST |
|---|---|---|
| 98/12/25 15:00:00 | MOTOR 1 STOP | 16:00 |
| 98/12/26 14:30:00 | MOTOR 1 STOP | 15:00 |
| 98/12/26 16:40:00 | MOTOR 1 STOP | 17:00 |

Title
Number of display lines: 3
Date when the alarm device became ON
Time when the alarm device became ON
Time when the alarm device became OFF
Comment created in "Create Comment" in the screen creation software
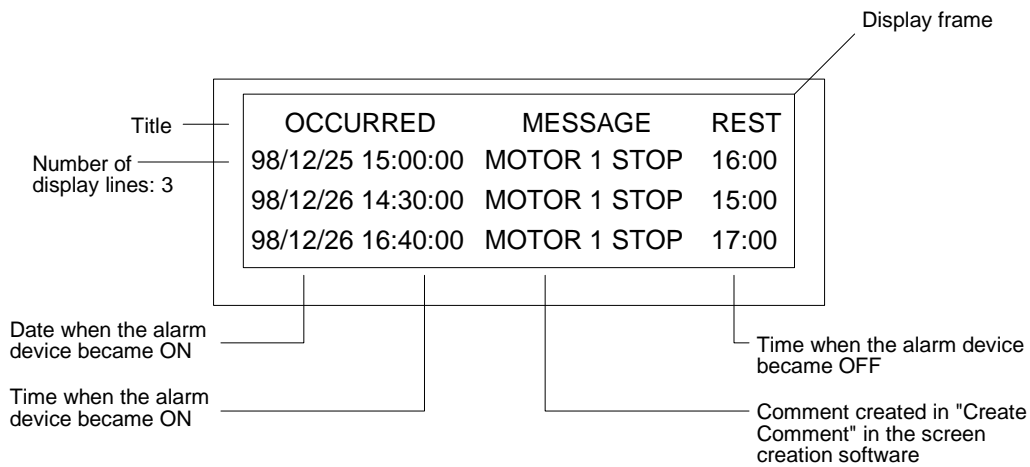
- Combination of touch keys

  If touch key is placed on an alarm history screen and assigned a key code from the table below, it will perform its respective operation, also shown in the table.

  Key codes used for the alarm history display function

| Key code | Operation |
|----------|-----------|
| FFB0 | Displays the cursor. |
| FFB1 | Deletes the cursor. |
| FFB2 | Moves the cursor upward. |
| FFB3 | Moves the cursor downward. |
| FFB8 | Displays the detailed information of the alarm selected by the cursor. |

When a touch key to which "FFB8" (detailed information display function) is assigned, the alarm message (comment window) or the base screen is changed over, and the detailed information is displayed.

To display the detailed information, "Detail Display Destination" in "Alarm History Common Setting" of the screen creation software should be preliminarily set to "Comment Window" or "Base Screen".

- When "Comment Window" is selected

  When this button is pressed, the detailed display window is closed.

  DETAILS

  - Move the cursor to an alarm message to be displayed in detail, and press the DETAIL key. Then, the detailed display window is open as shown on the left.

  - A comment in the comment list specified by "Detail Display No." in "Alarm History Common Setting"-"Device Monitor"-"Edit" of the screen creation software is displayed.

- Changeover of the base screen

  A screen specified by "Detail Display No." in "Alarm History Common Setting"-"Device Monitor"-"Edit" of the screen creation software is displayed.

### 11.3.6    Alarm list display function

When a specified device becomes ON, a corresponding message is displayed.
By using the alarm list display function, the setting different from that in the alarm mode described in Section 6 or in the alarm history display function can be performed.

◆**Contents of setting**

Basic setting      : Figure (with a frame), frame color, color inside frame and display size

Display setting   : Number of devices (When a device specified here becomes ON, a corresponding message is displayed.)

                      Storage of number of occurrences (The number of times of becoming ON of a specified device can be stored in a word device.)

                      Head comment No. (No. of comment created in "Create Comment" in the screen creation software)

                      Number of displayed comments (When two or more comments are displayed, they are displayed in the ascending order of device No.)

                      Display order (ascending/descending)

Option            : Detailed display (comment window/changeover of base screen)

                      Save in memory (Even while the alarm list function is not displayed on the screen, the ON/OFF status of alarm devices can be acquired.)

                      Date/time display (The date/time when a specified device became ON can be displayed.)

◆**Display example**



Frame

A comment corresponding to a specified alarm device which is created in "Create Comment" in the screen creation software is displayed. — MOTOR 1 STOP
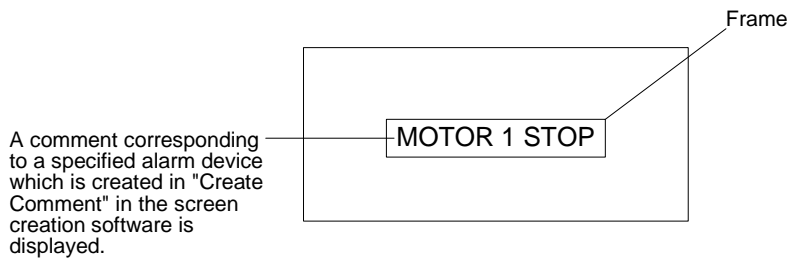
- Combination of touch keys
  If a touch key on the alarm list is assigned with a key code from the table below, it will perform its respective operation, also shown in the table.

  Key codes used for the alarm list display function

| Key code | Operation |
|----------|-----------|
| FFB0 | Displays the cursor. |
| FFB1 | Deletes the cursor. |
| FFB2 | Moves the cursor upward. |
| FFB3 | Moves the cursor downward. |
| FFB8 | Displays the detailed information of the alarm selected by the cursor. |
| FFBB | Resets the alarm in a line in which the cursor is located" |

When a touch key to which "FFB8" (detailed information display function) is assigned, the alarm message (comment window) or the base screen is changed over, and the detailed information is displayed.
To display the detailed information, "Detail Display Destination" in "Alarm List Display Setting" of the screen creation software should be preliminarily set to "Comment Window" or "Base Screen".

- When "Comment Window" is selected

When this button is pressed, the detailed display window is closed.
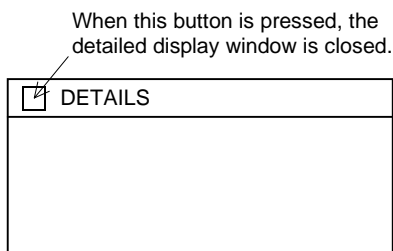
DETAILS

- Move the cursor to an alarm message to be displayed in detail, and press the DETAIL key. Then, the detailed display window is open as shown on the left.

- A comment in the comment list specified by "Detail Display No." in "Alarm List Display Setting"-"Detail Display Setting" of the screen creation software is displayed.

- Changeover of the base screen
  A screen specified by "Detail Display No." in "Alarm List Display Setting"-"Option" of the screen creation software is displayed.

### 11.3.7  Part display function

The "Part Display" object displays figures in accordance with the ON/OFF status of bit devices in the PLC and the current value of word devices in the PLC.
By using the part display function, figures created by the user can be displayed.

◆**Contents of setting**

1) Specification method
   Bit device (X, Y, M, S, T or C)
   Word device (D, T, C or GD)

2) Contents of display

   Bit device:
   Part No. of a figure to be displayed while a specified bit device is ON
   Part No. of a figure to be displayed while a specified bit device is OFF

   Word device:
   Part No. of a figure which is equivalent to the current value of a specified word device

   Creation of displayed figure:
   Figures can be created and registered using the screen creation software.
   Figures can be stored in BMP files, etc.

◆**Display example**



| Part Display | |
|---|---|
| Device | M0 |
| Part No. for ON status | 20 |
| Part No. for OFF status | 30 |

Part No. 20
50 W × 50 H dots

When M0 becomes ON, the part No. 20 is displayed.

Display start point     Display screen

Part No. 30
100 W × 100 H dots

When M0 becomes ON, the part No. 20 is displayed.

Display start point
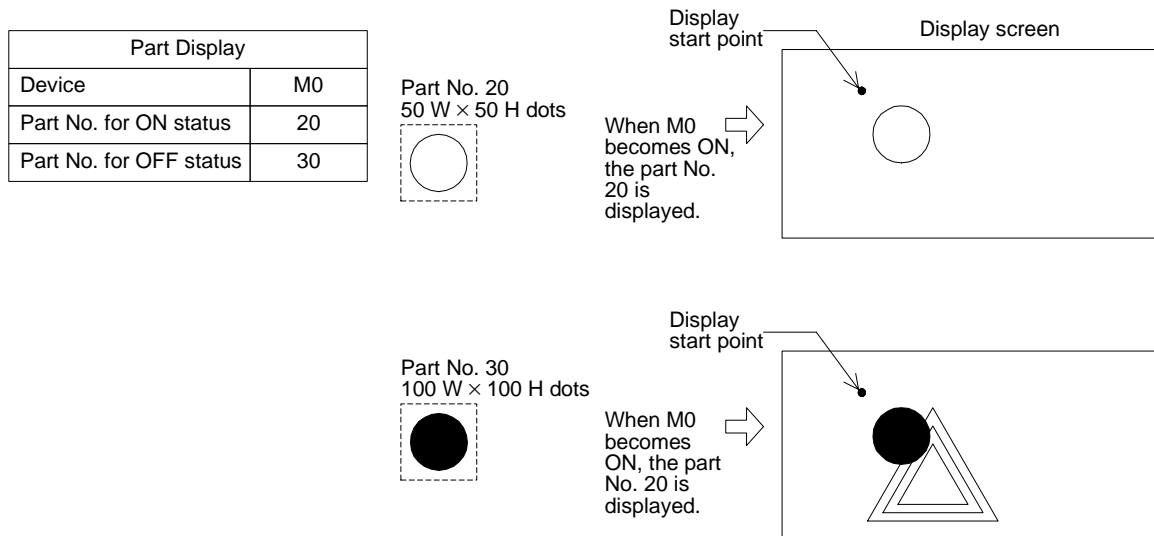
- The specified part is displayed in the same size as registered in the screen creation software.

**11.3.8   Lamp display function**

The "Lamp" object changes over the displayed figure in accordance with the ON/OFF status of a specified bit device in the PLC.
By using the lamp display function, figures built in the screen creation software can be displayed.

◆**Contents of setting**

1) Specification method
   Bit device (X, Y, M, S, T or C)

2) Contents of display

   Bit device : Figure to be displayed when a specified bit device becomes ON
                Figure to be displayed when a specified bit device becomes OFF
                Displayed figure: Register a figure to be displayed using the screen creation software.
                A figure can be selected among figures built in the screen creation software.

   Text        : Text can be displayed inside a figure.

   Color       : The text color, the frame color and the background color can be specified.

◆**Display example**

When a bit device is specified
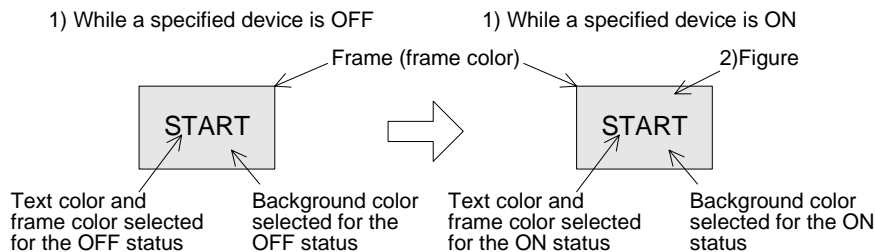


■**Important point**

Display of figures created by the user

   To display figures created by the user, use the part display function described in the previous paragraph.

### 11.3.9   Panel meter display function

The "Panelmeter" object displays the current value of a word device in the form of panel meter.

◆**Contents of setting**

1) Specification method
   16-bit or 32-bit word device (D, T, C or GD)

2) Contents of display

   Meter type          :Circle

   Number of ticks :Ticks are provided on the panel meter.

   Color               :The meter needle color, the frame color, etc. can be specified.

• The meter needle is moved clockwise.

◆**Display example**
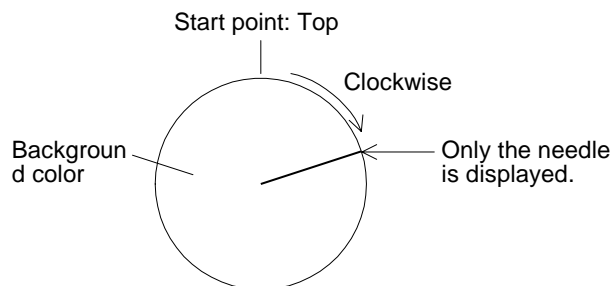
## 11.4    Graph display function

Specified word devices can be displayed in the form of graph.

- Trend graph: Paragraph 11.4.1

- Line graph: Paragraph 11.4.2

- Bar graph: Paragraph 11.4.3

- Statistics graph: Paragraph 11.4.4
  Bar graph
  Pie graph

### 11.4.1   Trend graph

The "Trend" object displays the current value of consecutive word devices in up to four lines.

◆**Contents of setting**

Display direction    : Right or left

Number of lines      : 1 to 4

Number of points    : 1 to 50

Monitored devices  : 16-bit or 32-bit word devices (D, T, C or GD)

Line type            : ——————— , ---------- , — — — — — , —— - —— — , —— - - —— - ·

Color                : Graph color, frame color, scale color

◆**Display example**

1) Word device
   The current value of word devices as well as a certain amount of historical data is displayed in the form of a trend graph.
   The number of word devices shown at each tick is equivalent to the specified number of lines.

   Assignment of word devices to points in trend graph

| Word device | D | D + 1 | D + 2 | D + 3 | D + 4 | D + 5 | D + 6 | D + 7 | ····· |
|---|---|---|---|---|---|---|---|---|---|
| Line No. | No.1 | | | | No.2 | | | | ····· |
| Tick in horizontal axis | 1st tick | 2nd tick | 3rd tick | 4th tick | 1st tick | 2nd tick | 3rd tick | 4th tick | ····· |



←—— No. 4 data

←—— No. 3 data

←—— No. 2 data

←—— No. 1 data

1st tick   2nd tick   3rd tick   4th tick   Ticks Horizontal
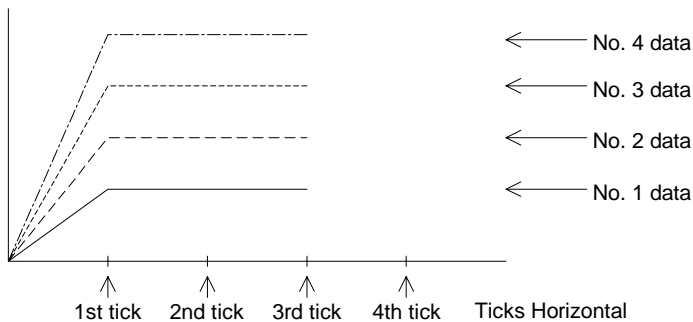
### 11.4.2  Line graph

The "Line" object acquires the current values of up to four 16-bit data registers in the PLC at a specified time interval, and displays the acquired data in the form of line graph.

◆**Contents of setting**

Display direction    : Right or left

Number of lines     : 1 to 4

Number of points    : 1 to 50

Monitored devices  : 16-bit or 32-bit word devices (D, T, C or GD)

Line type            : —————— , ---------- , — — — — — — , —— · —— · —— , —— · · —— · ·

Color               : Graph color, frame color, scale color

Display condition    : Constant cycle (which can be set arbitrarily in the unit of 100 ms)

◆**Display example**

| "Trend Graph (Sample)" object | |
|---|---|
| Word Device | D100 |
| Display condition | 30 |
| Ticks Horizontal | 10 |
| Ticks Vertical | 7 |
| Minimum Value | 0 |
| Maximum Value | 1000 |
| Shown Device: No. 1 | Continuous Red |
| Device: No. 2 | Dotted Blue |
| Device: No. 3 | None |
| Device: No. 4 | None |
| Scale Color:Black | |
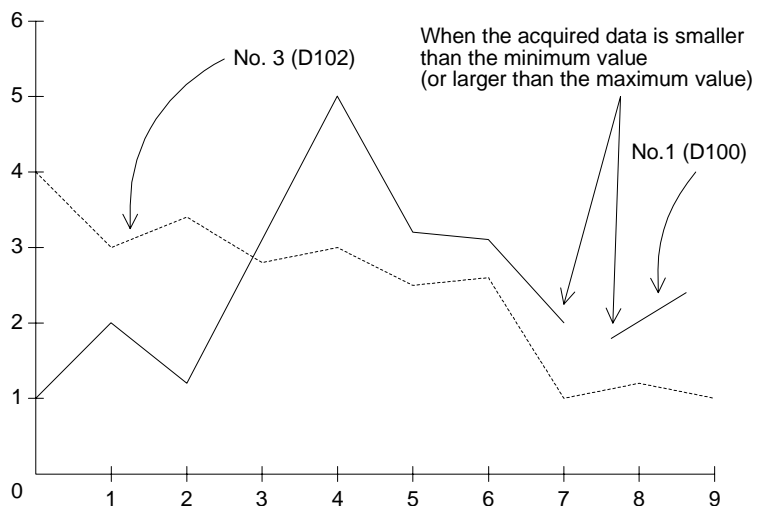
- Word devices D100 and D101 are acquired at every 3 seconds, and displayed in the form of line graph.

- If the acquired data is smaller than the minimum value (0) or larger than the maximum value (1000), it is not displayed in the graph and the graph is discontinued.

■**Important point**

Sampling time
It is recommended to set the sapling time to 1 second or more.

### 11.4.3   Bar graph

The "Bar" object displays a word device in the PLC in the form of bar graph.
A numeric which is rather difficult to understand in the form of number can be displayed in the form of bar graph so that it can be easily understood at a glance.

◆**Contents of setting**

Display direction ：Vertical or horizontal

Monitored device：Word device (T, C, D or GD)

Number of ticks   : 2 to 11

Color                  : Graph color, frame color and scale color

- Bar graph type: Horizontal (left -> right) or vertical (down -> up)

- The entered minimum value is regarded as 0%, and the entered maximum value is regarded as 100%. The acquired data is represented in % against 100%.
  If the acquired data is larger than the maximum value or smaller than the minimum value, a diagonal line is drawn in the bar graph.

Graph Type: Right (left → right)

Word Device: D1
Maximum Value: 3000
Minimum Value: 1000
Reference value:1000

D1                1500

Ticks

Minimum Value (1000)

Current value of word device (1500 = 25%)

Maximum Value (3000)

D1                0

(When the value of the word device is smaller than "Minimum Value)

Graph Type: Up (down → up)

Ticks          Maximum Value

Minimum Value

Current value of word device
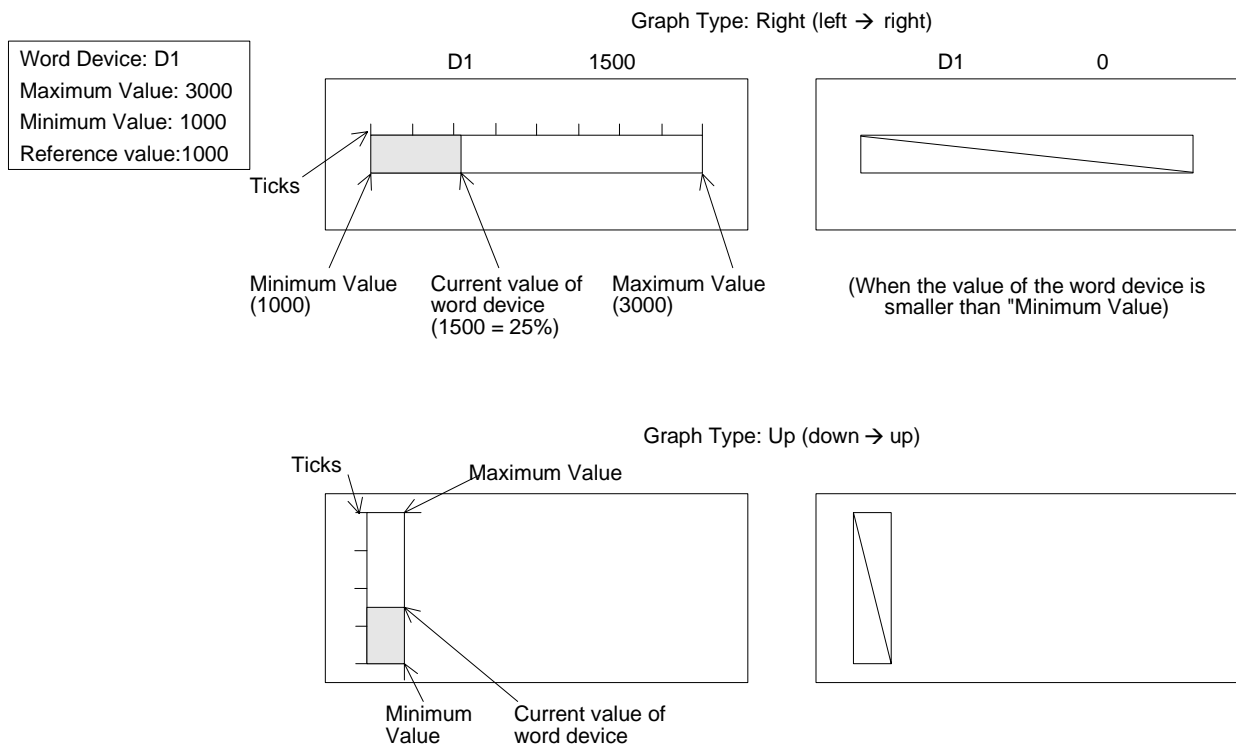
The bar graph is displayed from the specified reference value position.

The area from 0% to 100% is filled
with the background color (Bg).

The area indicating the current value
is filled with the display color (Fg).
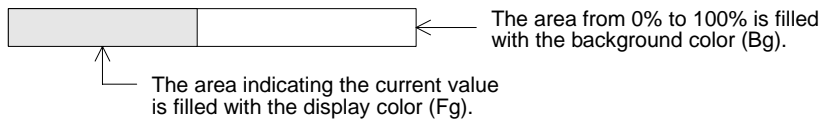
## Number of ticks and scale position

Graph Type: Right (left → right)

Left　　　　　　　　　　　　　Right

Scale Position: Down
(lower edge)

Ticks: The interval among ticks is equivalent.

Graph Type: Up (down → up)

Up

Ticks:
The interval among ticks
is equivalent.

Down

Scale Position: Left
(left edge)

## ◆Display example

PRODUCTION CONTROL

"Number" object

NUMBER OF PRODUCTION　　1234

OPERATION RATE

"Text" object

100%
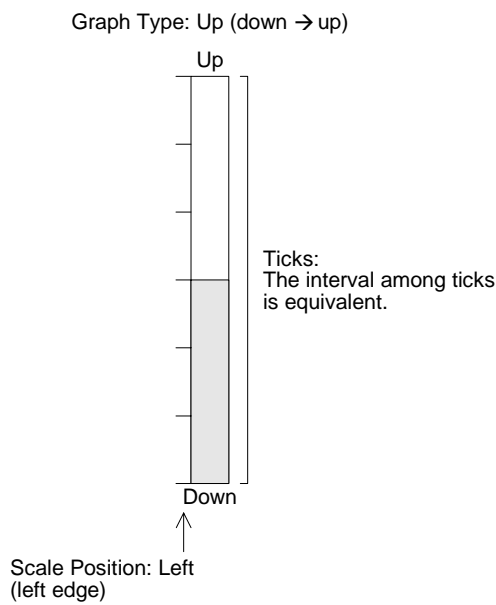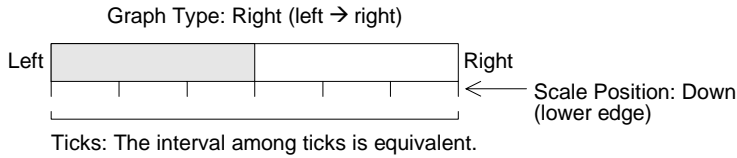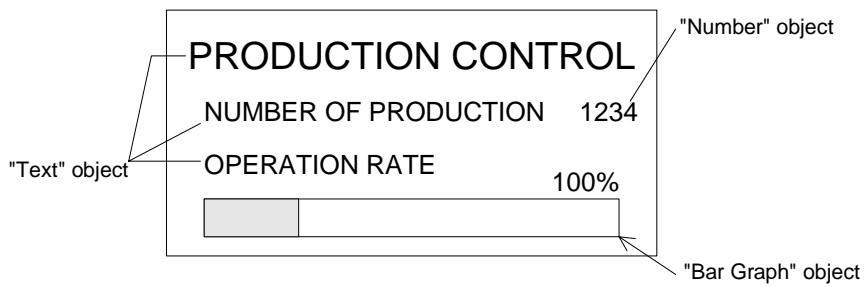
"Bar Graph" object

### 11.4.4　Statistics graph display function

The "Statistics" object displays the current value of specified word devices in the form of statistical bar graph or pie graph as the ratio against 100%.

◆**Contents of setting**

Graph type　　　　 : Bar graph or pie graph
Monitored devices : Word devices (D, T, C or GD)
Color　　　　　　　 : Graph color and scale color

◆**Display example**

Setting example: Bar graph

　　Head word device　: D100
　　Number of devices : 6
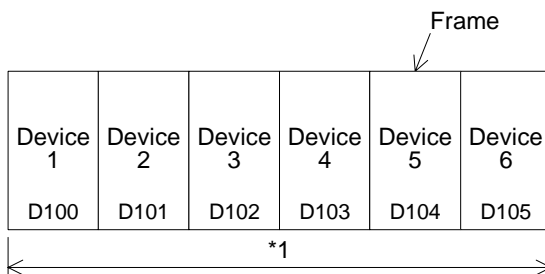


*4 The specified width is regarded as 100%. The ratio of the current value of each device is displayed in %.

Setting example: Pie graph

　　Head word device　: D200
　　Number of devices : 3
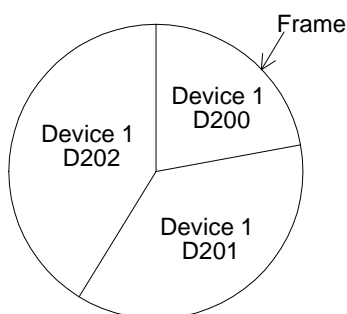


A point located at the top of the circle is regarded as the start point. From the device 1 (D200 in this example), each device is displayed clockwise.
"360°" is regarded as 100%. The ratio of the current value of each device against 100% is represented.

## 11.5    Touch keys

• Touch keys offer the following functions

| Function | Description | Reference section/ paragraph |
|---|---|---|
| Bit function | Turns on/off a bit device when touched. | 11.5.2 |
| Word function | Allows to change the value of a word device when touched. | 11.5.3 |
| Base screen changeover func- tion | Changes over the base screen when touched. | 12 |
| Numerical/ASCII input key cre- ation function | Allows to create keys to enter numerics and ASCII codes. | 11.5.4 |

• Two or more functions shown above can be assigned to one touch key. In such a case, the priority is given to the assigned functions as follows.

| Contents of function | Quantity | Priority given when two or more functions are assigned |
|---|---|---|
| Bit momentary | 20 | First priority |
| Bit SET | 20 | |
| Bit RST | 20 | |
| Bit ALT | 20 | ↓ |
| Word SET | 20 | |
| Base screen changeover | 1 | |
| - | 50 maximum | Last priority |

## 11.5.1  Common items for all touch keys

This paragraph describes the common contents shared by each function assigned to touch keys.

1) Size
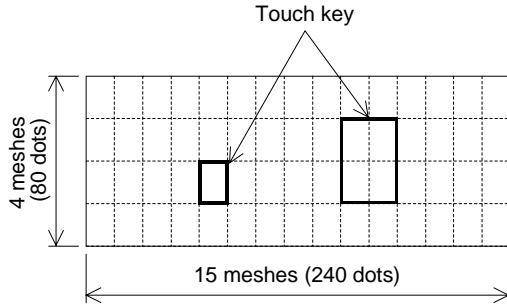


Touch key

4 meshes (80 dots)

15 meshes (240 dots)

• The entire screen is divided into "meshes" as shown on the left. The touch key area can be specified in the unit of mesh.

• The entire screen consists of 15 W x 4 H meshes. One mesh consists of 16 x 20 dots.

• Broken lines are not actually displayed on the screen.

• A touch key can be set in the unit of dot. When more than a half of a mesh is set as a touch key, the mesh is recognized as the touch key.



Specified touch key area

This mesh does not function as the touch key because only less than a half of this mesh is specified as the touch key.

This mesh functions as the touch key because more than a half of this mesh is specified as the touch key.
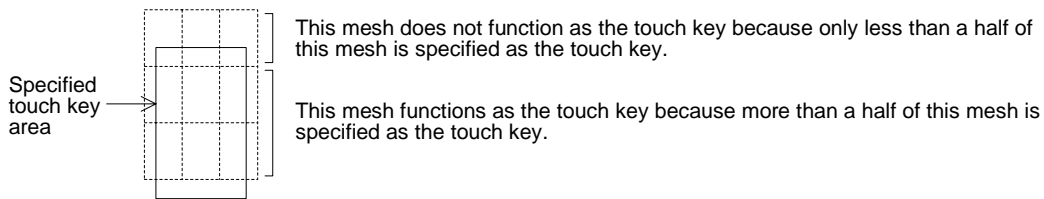
1) Display changeover

Key : When a specified position is touched, the display frame, the text and the color can be changed.

Bit : When a specified bit device becomes ON or OFF, the display frame, the text and the color can be changed.

2) Figure

• Select whether or not the area specified as the touch key is enclosed with a frame.

• Select "No frame" or select one among the following five frames.

| Frame shape | | | | | | |
|---|---|---|---|---|---|---|
| | No frame | Shaded | Double frame (keyboard) | Double frame (trimming) | Double frame (shaded) | Double frame (bold) |

• By turning on/off the touch switch, the displayed figure and color can be specified.

3) Text

Enter a text to be displayed inside the touch key.

Up to 20 full-width characters or 40 half-width characters can be displayed.

&lt;Display example:&gt;

-In the case of 1 line　　-In the case of 2 lines　　　　　　　　　　　　-In the case of 3 lines
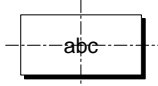
When a text is
located in the center
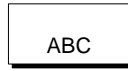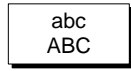
When the first and
third lines are blank
and a text is
displayed in the
second line
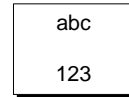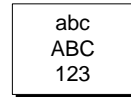
When the second line is
blank and texts are
displayed in the first and
third lines respectively

If a text is longer than the touch key, the text is extruded.

abcdABCD1234

When a text is displayed in 1 line

4) Operation setting

Bit device　　: When the touch key is pressed, a specified bit device is turned on or off. (Paragraph 11.5.2)

Word device: When the touch key is pressed, the current value of a specified word device can be changed. (Paragraph 11.5.3)

Base screen: When the touch key is pressed, the display screen is changed over. (Section 12)

5) Simultaneous press

Set whether or not the touch key is effective when it is pressed simultaneously together with another touch key.

Only two keys can be made effective when pressed simultaneously.

Three or more keys cannot be made effective when pressed simultaneously.

6) Trigger

Always : The touch key always offers the assigned functions.

ON　　 : While a specified bit device is ON, the touch key offers the assigned functions.

OFF　　: While a specified bit device is OFF, the touch key offers the assigned functions.

### 11.5.2 Bit function

The bit function allows a touch key in the GOT to control the ON/OFF status of a bit device in the PLC.
The bit function allows a touch key to act as a switch such as a pushbutton switch.

◆**Contents of setting**

1) Operation mode

- Select one among the following output operation modes.

Bit momentary: Turns on/off the controlled bit device in accordance with the ON/OFF status of the control input key.

Bit ALT      : Turns on/off the controlled bit device every time the control input key becomes ON from OFF (alternate type switch).

Bit SET      : Forces ON the controlled bit device when the control input key becomes ON. The controlled bit device remains ON until a reset input is given.

Bit RESET    : Forces ON the controlled bit device when the control input key becomes ON.

**Operation examples of "Momentary" and "Bit ALT"**

When a touch key is pressed, Y0 in the PLC is output.

-Switch    Control input: Touch key
            Controlled bit device: Y0
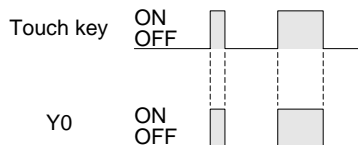
When "Operation" is set to "Momentary"        When "Operation" is set to "Alternate"

Touch key  ON / OFF

Y0  ON / OFF
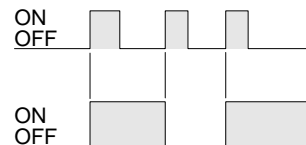
**Operation examples of "Bit SET" and "Bit RST"**

When the SET key is pressed, Y1 is set. When the RST key is pressed, the Y1 is reset.

- SwitchControl input: SET key, RST key
  Controlled bit device: Y1 (set), Y1 (reset)
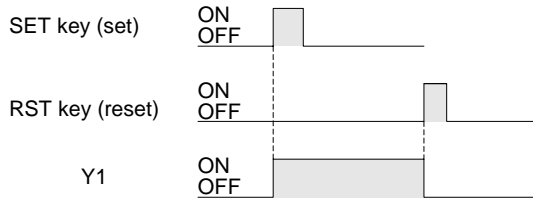


■**Important point**

1) Controlled bit device
   If "Operation" is set to "Momentary", the controlled bit device becomes OFF when the display screen is changed over.

2) If two or more keys are pressed simultaneously
   If two or more switch functions are registered, and two keys are pressed, both functions will be executed.
   If three or more keys are pressed simultaneously, only the first two pressed will be effective.

3) If objects are assigned to one touch key
   If two or more switch functions are assigned or another object is assigned to one touch key, the priority is given to a function/object registered earlier (while the screen is created).

4) If screens are overlaid
   If screens are overlaid using control devices or the screen call function, the switch functions are effective on all of the base screen and overlaying screens. If switches are overlaid, the switch on the top screen is effective. Pay rigid attention so that switches do not are not overlaid.
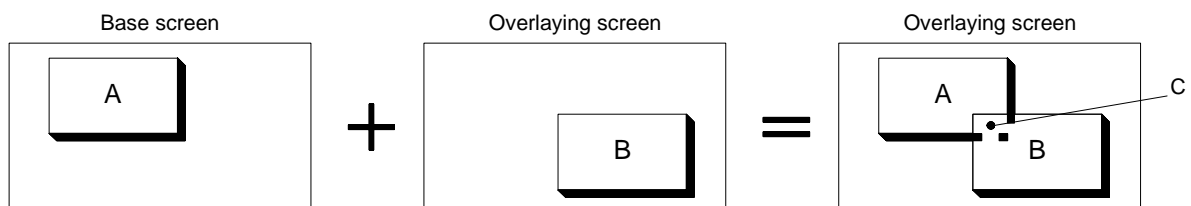
Example



In the switch areas A and B on the composed screen realized by overlay, each switch is effective. However, if the area C is pressed, the switch B located on the top is effective.

### 11.5.3   Word function

The word function writes a fixed constant to the PLC when a touch key is pressed.
The word function is convenient: When it is used, sequence programs such as transfer instructions are not required.

#### ◆Contents of setting

Word device     : D, T, C or GD

Operation type: Fixed value (A specified constant is written to a word device.)
                     Indirect (The current value of a specified word device is written.)

#### ■Important point

1) Write of a constant to a timer/counter
Even if "0" is written to the current value or set value of a timer/counter, the output contact in the PLC is not reset. (Though the current value or set value becomes 0, the output contact does not become OFF.)
To reset a timer/counter, execute an RST instruction in the sequence program or reset the timer/counter using the bit function.

2) Constant write condition
"✔" indicates that write of constant is enabled.

| PLC | FX Series | | A Series | |
|---|---|---|---|---|
| **PLC memory type** | ✔:RAM      ✘:EPROM   *1 <br> ✘:EEPROM <br><br> *1    When the read/write destination is a data register, data can be transferred without regard to the memory type. | | ✔:RAM      ✔:EPROM | |
| **PLC operation status** | ✔:RUN | ✔:STOP | ✔:RUN | ✔:STOP |
| **GOT memory type** | ✔:Flush memory | | ✔:Flush memory | |
| **PLC entry code** | ✘:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered | ✘:While entry code is registered (while write is inhibited) | ✔:While entry code is unlocked or is not registered |

### 11.5.4   Creation of keys to enter numerics and ASCII codes

This function sets a touch key as a key to enter a numeric/ASCII code.

◆**Contents of setting**

Key code: Refer to the key code list shown in the appendix.

- When a key code shown in the appendix is assigned to a touch key, a corresponding numeric or alphabet (ASCII code) can be entered by pressing the touch key.

- When entering ASCII codes (described in Paragraph 11.6.2), touch keys to which key codes are assigned should be laid out to create the keyboard for ASCII code input.

## 11.6    Data input function

The ON/OFF status of bit devices and the current value of word devices in the PLC can be displayed.

### 11.6.1    Numerical input function

The data of word devices in the PLC can be displayed in the form of numerics.

◆**Contents of setting**

1) Number of digits

- Maximum allowable number of digits: 12 (Each of "-" (minus sign) and a decimal point is counted as one digit.)

| High-speed counter | | C235 (32 bits) |
| :---: | :---: | :---: |
| -2147483648 | to | -2147483648 |
| 11 digits | | 10 digits |

If data whose number of digits exceeds the maximum allowable number of digits is specified to be displayed, "?" is displayed.

**Number of digits after decimal point**

- Enter the number of digits after a decimal point for a case where a decimal point is displayed.

   Example: When the displayed numeric is "2000"

   2000: Number of digits after decimal point = 0
   200.0: Number of digits after decimal point = 1
   20.00: Number of digits after decimal point = 2
   2.000: Number of digits after decimal point = 3

2) Style

- Select one style among decimal with sign, decimal without sign, hexadecimal, octal, binary and real.

- Zero suppression
   When the zero suppression function is not used, "0" is displayed in each digit position to the left of the data. The number of "0"′s will depend on the specified total number of digits.
   Example:
   When the total number of digits is set to 7 and the number of digits after decimal point is set to 2
   0012.34 ← "0" is displayed in these digits.

- A numeric is displayed horizontally.

3) Shift
- When the number of digits of a numeric to be displayed is smaller than the specified total number of digits, the numeric is automatically shifted to the right, the center or the left in accordance with the setting.
  Example:
  When the specified total number of digits is set to 9 and the displayed numeric is a 3-digit value

```
                       ┌── Start point
                       •
Right   :  □ □ □ □ □ □ [1] [2] [3]

Center  :  □ □ □ [1] [2] [3] □ □ □

Left    :  [1] [2] [3] □ □ □ □ □ □
```
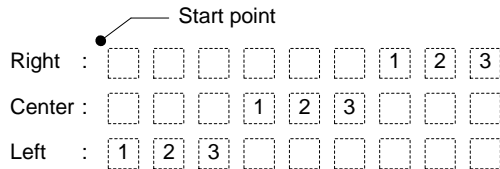
4) Gain 1, gain 2 and offset
The value obtained by the calculation "(Monitor value x Gain 1 / Gain 2) + Offset" is displayed.
Example:
When the monitor value is 1000 (current value of D100), the gain 1 is set to 10, the gain 2 is set to 2 and the offset is set to 3
$(1000 \times 10 \div 2) + 3 \rightarrow$ "5003" is displayed.

5) User ID (Refer to Paragraph 3.3.)
An ID can be assigned to the numerical input function.
When a device data specified by the "Numerical Input" object is changed (by pressing of the ENT key), the ID No. is stored in the write device "DO+3" in the system information. By checking this ID No., the changed "Numerical Input" object can be detected.
Make sure to assign an ID different from IDs for other numerical inputs.

**Destination ID**
This attribute allows to specify the change order of "Numerical Input" objects.

### 11.6.2  ASCII code input function

The ASCII code input function allows to specify and change characters using word devices (T, C, D, V or Z) in the PLC. Arbitrary characters can be displayed and changed on one base screen.

◆**Contents of setting**

Alphabets, numerics, etc. which can be specified using shift JIS codes (for Japanese) or ASCII codes (for half-width characters) (For character codes, refer to the appendix.)

◆**How to specify character codes**

- Refer to the Appendices for further details about ASCII.

- Reading the ASCII table
  This section describes how to read ASCII using the Appendix as an example.
  One ASCII character is displayed by combining both the vertical and horizontal axes.
  .....The vertical axis shows the last digit of the code.

Example  Select "A" Horizontal axis H40  Vertical axis 1 →  ASCII H41 (hexadecimal expression)
          Select "b" Horizontal axis H50  Vertical axis 1 →  ASCII H62 (hexadecimal expression)

| Heigher Bit / Lower Bit | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 0 | | (SP) | 0 | @ | P | @ | p |
| 1 | | ! | 1 | A | Q | a | q |
| 2 | | " | 2 | B | R | b | r |
| 3 | | # | 3 | C | S | c | s |

◆**Storage of word device**

- Character codes are stored in word devices in the PLC. The stored data is displayed from the lower 8 bits as shown below.
  Example 1    : When two half-width characters (ASCII codes) are displayed
  Word Device : D0
  Data Length  : 1

Bg
(background color)
(The broken line is
not actually
displayed.)

→ AB

From the ASCII code table offered as appendix,

A=H41 ⎫
B=H42 ⎬ ASCII code

Data storage status

|       | Upper |   | Lower |   |
|-------|-------|---|-------|---|
| D0 (H)| 4     | 2 | 4     | 1 |
|       | B     |   | A     |   |

- A character to be displayed at first should be specified using lower 8 bits.

Example 2    : When one full-width character is displayed
Word Device : D0
Data Length  : 1

The required codes (taken from the user defined character set) is :

● =F053

The upper and lower two digits of the character code are reversed.

|       | Upper bits |   | Lower bits |   |
|-------|------------|---|------------|---|
| D0 (H)| 5          | 3 | F          | 0 |
|       |            | ● |            |   |

Example 3    : When one full-width character and two half-width characters are displayed
Word Device : D0
Data Length  : 2 (D0 and D1)

The required ASCII codes (taken from the ASCII code table in the Appendixes) are :

C =H43  (one-byte character, 8bit)
● =F053 (one-byte character, 8bit)
D =H44  (one-byte character, 8bit)

C ● D

How the data is stored :

|       | Upper bits |   | Lower bits |   |
|-------|------------|---|------------|---|
| D0 (H)| F          | 0 | 4          | 3 |
| D1 (H)| 4          | 4 | 5          | 3 |

2-word designation →

|       | Upper bits |    | Lower bits |    |
|-------|------------|----|------------|----|
| D0 (H)| 43         | F0 | 53         | 44 |
|       | C          | ●  |            | D  |

■**Important point**

When the character code is set to "H0" (either for full-width or half-width), characters after that are not displayed on the screen.
To insert space in a text, store "H8140" (for full-width) or "H20" (for half-width) to the specified word device.

◆**Display example**

"RUN" or "STOP" are displayed as the "Ascii Display" objects using three data registers D100 to D102.
When X0 becomes ON, "RUN" is displayed.
When X1 becomes ON, "STOP" is displayed.

- "Ascii Display" object (Specification example in the edit mode)
  Character size        : W: ×2, H: ×2
  Character attribute : Rotate
  Word device           : D100
  Data length            : 3
- Display



Bg  (background color)
(The broken line is not actually displayed.)

When X0 becomes ON

When X1 becomes ON

LINE 1 ---------------- "Text" object ---------------- LINE 1

TEMP.NORMAL ---------- "Ascii" object ---------- TEMP.HIGH

*"LINE 1" is displayed as the "Text" object.

Text (display color)

- Sequence program



| | Upper | Lower | |
|---|---|---|---|
| D100 | 4F | 4E | (H) |
| D101 | 4D | 52 | (H) |
| D102 | 4C | 41 | (H) |

Storage status of data registers

| | Upper | Lower | |
|---|---|---|---|
| D100 | 49 | 48 | (H) |
| D101 | 48 | 47 | (H) |
| D102 | 21 | 21 | (H) |

Storage status of data registers

■**Important point**

The "Ascii Display" object displays specified texts on one screen as shown above. Accordingly, the screen is not required to be changed over or to be overlaid.

## 11.7    Creation of comment

Comments (texts) displayed by the comment display function, the alarm list display function and the alarm history display function can be created.
The comment list data is stored in the flush memory built in the F930GOT.


- Comments can be created in "Draw" in "Comment" in the screen creation software.

    Screen of screen creation software



a) No.

b) Comment    c) Text color
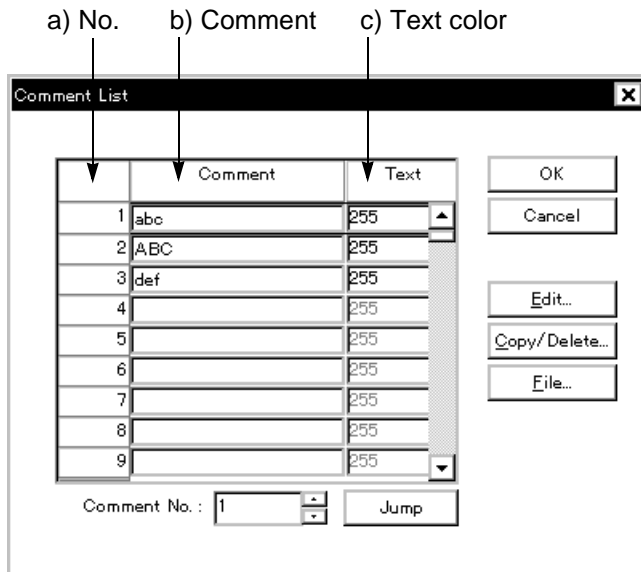
a)  No.
    This is an ID No. used by the comment display function, the alarm list display function and the alarm history display function. Comments Nos. 0 to 32767 can be registered.

b)  Comment
    Enter a text to be registered in the comment list.
    Up to 256 full-width characters (Kanji at JIS level 1, Katakana, Hiragana, alphabets, numerics and symbols) or up to 512 half-width characters are available for one comment.

c)  Text color
    Enter the text color.
    If the text color attribute is changed in the comment display function, the priority is given to that. The color set on this screen is ignored.

## 11.8    Recipe function

The GOT have built-in registers which correspond to 4,000 16-bit word devices in the PLC. By setting to ON/OFF a bit device in the PLC, the data in the GOT can be read from/written to a specified word device in the PLC.
By using the recipe function, the initial setting data such as machine processing data and positioning data can be transferred to the PLC.

- The recipe function can be set in "Recipe" in "Common" in the screen creation software.

   Screen of screen creation software



a) Recipe No.

b) Recipe Name
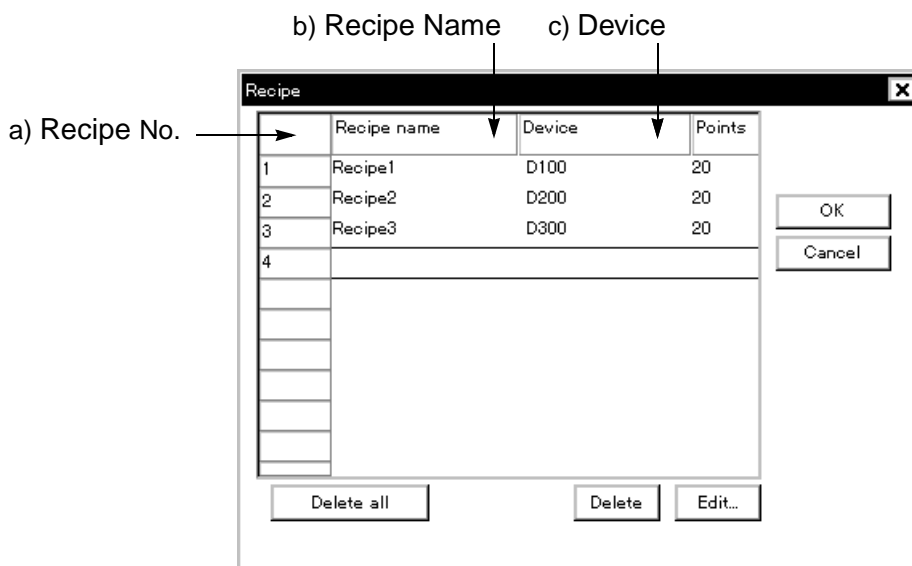
c) Device

a) Recipe No.
   This is a recipe file No. Two or more recipe files can be created as far as the total number of devices is 4,000 or less.

b) Recipe Name
   Enter an arbitrary recipe name.
   The recipe name is used to facilitate recognition of each recipe in the screen creation software. The recipe name cannot be displayed on the GOT screen.

c) Device
   Enter the head of word devices in the PLC to which the data in the GOT is transferred.
   Word devices starting from the head word device as many as the specified number of devices (4) Number) are occupied.
   Devices can be set using the EDIT key 5).

1) Number

Enter the number of devices to which the data in the GOT is to be transferred.

The number of devices (1 to 4,000) set for the recipe No. 1 is used for all other recipes starting from the recipe No. 2.

2) EDIT key (for detailed setting)

This key allows to set each recipe file in details.

1　Contents of operation
Set 2) Recipe Name, 3) Device and 4) Number.

2　Read trigger
When a specified bit device becomes ON or OFF, the contents of word devices starting from the one set in 3) Device as many as the number set in 4) Number are transferred to the memory built in the GOT.

3　Write trigger
When a specified bit device becomes ON or OFF, the data set in "4 Receipt device" are transferred to word devices starting from the one set in 3] Device.

4　Recipe device
Enter the value of a device to be written to the PLC.
When data is read using "2 Read trigger", this value is overwritten by the read value.

*3 The write trigger cannot be omitted. The read trigger can be omitted when read is not required.

# 12. Creation of Display Screens (SW☐D5C-GOTRE-PACK)

The previous Section 11 describes creation of one screen.
Section 12 describes how to change over two or more screens.
Screen changeover can be arbitrarily specified using operation keys in the GOT or from the PLC.

## 12.1 Outline of changeover of display screen

In the F930GOT, up to 500 screens can be created. A number from 1 to 500 is assigned to each screen to control each screen.
A screen to be displayed next after the currently displayed screen should be specified using operation keys in the GOT or from the PLC.
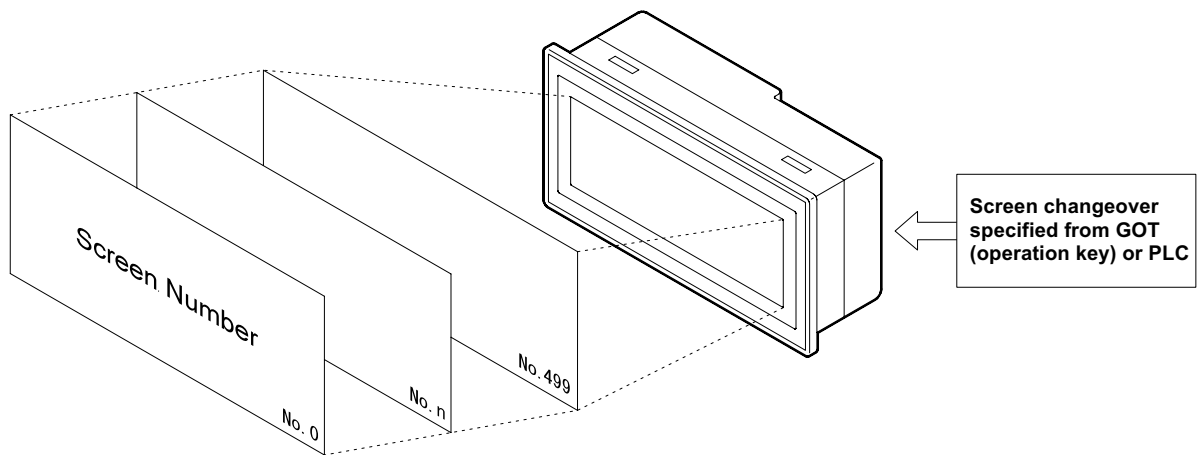


Not only a user screen (No. 1 to 500) but also a system screen (No. 1001 to 1030) in the alarm mode or the other mode can be displayed.

■**Important point**

1) Creation of the user screen No. 1
   In the screen mode screen No. 1 is always displayed immediately after the power is turned on.
   Accordingly, screen No. 1 should be created. If screen No. 1 is not registered, the error message "DISPLAY SCREEN IS NOT AVAILABLE." is displayed.

2) Screen Nos. may not be consecutive.
   The screen Nos. may not be consecutive in such a way as "1, 2, 3 . . ."
   When there is a possibility that some screens may be inserted in the future, inconsecutive screen Nos. can be used.
   However, it is recommended to use consecutive screen Nos. because mistakes will be less frequent in screen changeover when screen Nos. are consecutive.

## 12.2     Changeover of display screen

To changeover the display screen, perform the following setting using the screen creation software.

### 12.2.1     Contents of setting

1)  Changeover of the base screen (set in "Change Screen" in "Common Setting" in the screen creation software)
    Specify the screen No. of a screen to be displayed using the current value of a word device in the PLC.
    Even if the screen is not changed over from the PLC, this setting is registered in the screen data and occupies one word device.

2)  Screen changeover using a touch key (set in "Operation Setting" in "Touch Key" in the screen creation software)
    The screen is changed over when a touch key is pressed.
    The screen No. of a screen be displayed can be directly specified (fixed value) or the previous screen displayed (upper hierarchy).

### 12.2.2     Contents of screen changeover operation

Screens are changed over as follows.

1)  Changeover of the base screen
    Common setting can be performed for all screens. This common setting is effective while a user screen (No. 1 to 500) is displayed. As the initial value, the data register D0 is assigned. When the current value of the data register D0 (initial value) or another specified register is overwritten by a sequence program, the display screen is changed over.

2)  Screen changeover using a touch key
    Setting for each user screen (No. 1 to 500) can be performed.
    For each screen, up to 50 touch keys can be registered.

Outline of screen changeover
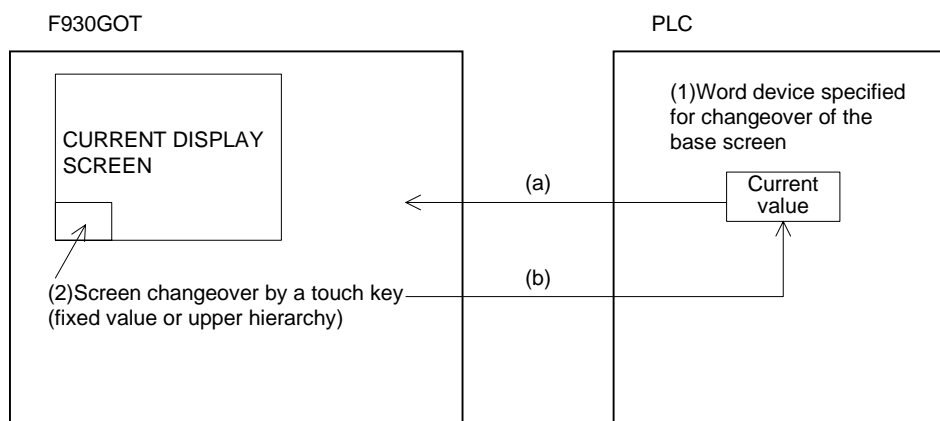


a)  The F930GOT always monitors the current value of a word device set for "1) Changeover of the base screen", and displays a screen corresponding to the monitored current value.

b)  If "2] Screen changeover using a touch key" is set, when the touch key is pressed, the F930GOT writes automatically the fixed value (directly entered value) or the upper hierarchy value (previously displayed screen No.) to a word device specified for "1) Changeover of the base screen" and displays a screen corresponding to the written value.

## 12.3    Changeover of base screen (changeover from PLC)

The screen No. of a screen to be displayed can be specified using the current value of a word device (D, T or C) in the PLC.
The word device can be set in "Change Screen" in "Common Setting" in the screen creation software. By performing this setting only once, a screen to be displayed next can be specified from the PLC for any screen because the setting is effective to all screens.

### 12.3.1   Outline of changeover of base screen

- The setting for changeover of the base screen can be performed using the screen creation software.


   Setting for screen changeover

   Base screen        : Whose screen No. is equivalent to the current value of a word device D, C or T (initial value = D0)

   Overlap window 1:Screen overlaying the base screen (initial value = none)

   Overlap window 2:Screen overlaying the overlap window 1 (For screen overlay, refer to Paragraph 8.5.2.)


   Example: When the word device D0 is used to change over the base screen

   D0: Current value

   | 1 |          | 10 |          | 20 |

   Screen No. 1 is displayed.          Screen No. 10 is displayed.          Screen No. 20 is displayed.
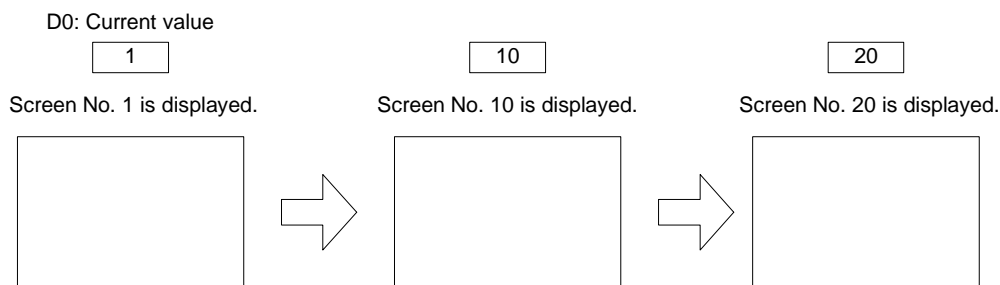
- When the display screen is changed over using a touch key as described in the next paragraph, the screen No. specified by the touch key is stored as the current value of the word device specified for "changeover of the base screen".
  However, when a system screen (No, 1001 to 1030) is displayed using a touch key, the screen No. is not stored. For changeover to a system screen, refer to Paragraph 12.5.


■**Important point**

Word device used to specify the base screen
If a word device used to specify the base screen, is not located in the battery backup area (keep area, latch area), when the power of the PLC is turned off or when the PLC becomes the stop status, the current value of the word device becomes 0. In this case, the error message "DISPLAY SCREEN IS NOT AVAILABLE." is displayed because the user screen starts from the screen No. 1. It is recommended to use a word device in the battery backup area.

## 12.3.2   Example of changeover of the base screen

- An example of changeover of the base screen is shown below.
  Setting for changeover of the base screen (in "Change Screen" in Common Setting" in the screen creation software)

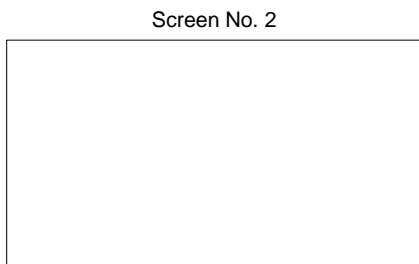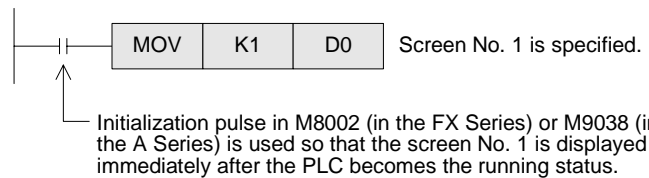  Base screen        : D0 (initial value)

  Overlap window 1: Not set (Screen overlay will not be performed.)

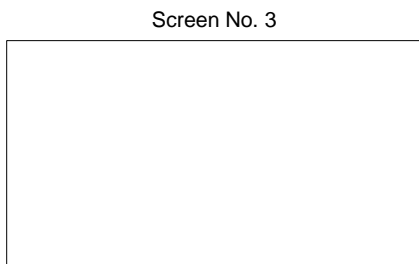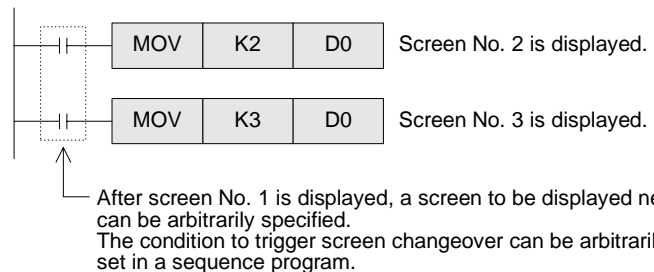  Overlap window 2: Not set (Screen overlay will not be performed.)
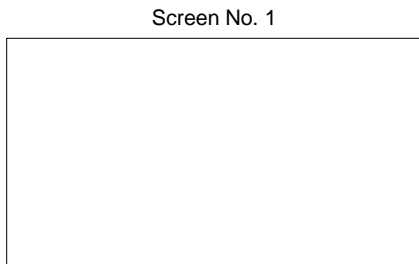
Screen No. 1

Displayed when D0 becomes 1.

•Immediately after the GOT becomes the screen mode, screen No. 1 is always displayed. (If the screen No. 1 has not been created, the error message "DISPLAY SCREEN IS NOT AVAILABLE." is displayed.)

| MOV | K1 | D0 |   Screen No. 1 is specified.

Initialization pulse in M8002 (in the FX Series) or M9038 (in the A Series) is used so that the screen No. 1 is displayed immediately after the PLC becomes the running status.

Screen No. 2

Displayed when D0 becomes 2.

•When the sequence program shown below is executed, the screen is changed over in accordance with the specification.

| MOV | K2 | D0 |   Screen No. 2 is displayed.

| MOV | K3 | D0 |   Screen No. 3 is displayed.

After screen No. 1 is displayed, a screen to be displayed next can be arbitrarily specified.
The condition to trigger screen changeover can be arbitrarily set in a sequence program.

Screen No. 3

Displayed when D0 becomes 3.

- In this example, the word device D0 used to specify the base screen, is not located in the battery backup area. Accordingly, if the screen mode is selected in the GOT while the PLC is in the stop status, the error message "DISPLAY SCREEN IS NOT AVAILABLE." is displayed. If the error message is not desired, use a word device in the battery backup area.

## 12.4 Screen changeover by touch key

To change over the display screen using a touch key provided on the screen, two methods are available. In the fixed value method, the screen No. of a screen to be displayed next can be directly entered. In the upper hierarchy method, the previously displayed screen is displayed next.

Touch key ─────┬── Fixed value     :Allows to enter the screen No. of a screen to be displayed next.
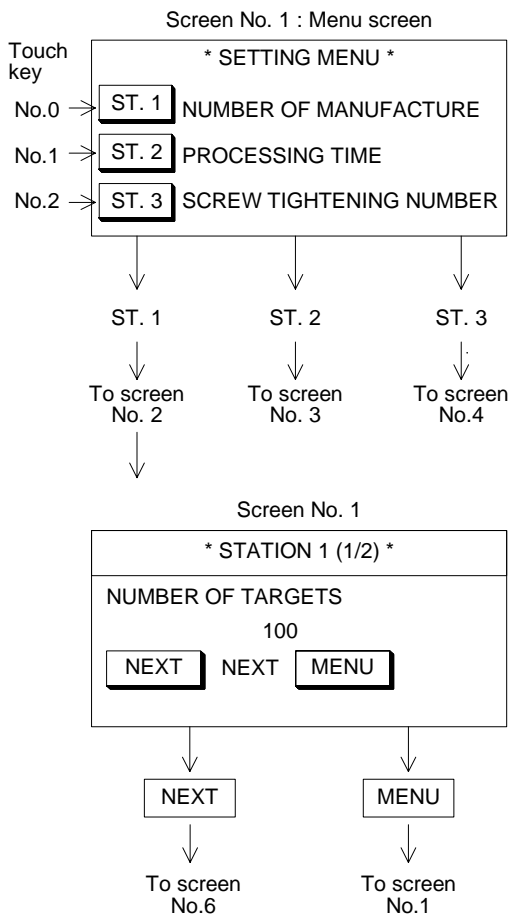                └── Upper hierarchy :Returns to the previous screen.

- Only one method (fixed value or upper hierarchy) can be assigned to one touch key. (A function other than the screen changeover function such as the bit ON/OFF function can be assigned to a touch key to which either the fixed value method or the upper hierarchy method has been assigned.)

- Touch keys can be set for each screen.

### 12.4.1 Changeover using a fixed value

When a touch key is pressed, the screen set to the touch key is displayed.

Touch key (fixed value):Enter one among the following screen Nos.
Screen Nos. 1 to 500 (user screen)
Screen Nos. 1001 to 1030 (system screen):Refer to the appendix.

Example of screen changeover using touch keys

Screen No. 1 : Menu screen

```
Touch            * SETTING MENU *
key
No.0 → [ ST. 1 ]  NUMBER OF MANUFACTURE
No.1 → [ ST. 2 ]  PROCESSING TIME
No.2 → [ ST. 3 ]  SCREW TIGHTENING NUMBER
```

```
   ST. 1         ST. 2         ST. 3
     ↓             ↓             ↓
  To screen     To screen     To screen
   No. 2         No. 3         No.4
     ↓
```

Screen No. 1

```
        * STATION 1 (1/2) *

   NUMBER OF TARGETS
           100
   [ NEXT ]   NEXT   [ MENU ]
```

```
   [ NEXT ]        [ MENU ]
      ↓               ↓
  To screen       To screen
    No.6            No.1
```

- Screen No. 1 is created, and screen changeover is set so that a corresponding screen is displayed when either of the ST. 1 to ST. 3 keys is pressed.

  ST. 1 key :Fixed value = 2
  ST. 2 key : Fixed value = 3
  ST. 3 key : Fixed value = 4

  *    Characters "ST. 1" to "ST. 3" are set as touch keys or "Text" objects.

- When the ST. 1 key is pressed, the screen No. 2 is displayed in accordance with the assigned fixed value.

  NEXT key  : Fixed value = 6
  MENU key  : Fixed value = 1

  When the MENU key is pressed, the screen No. 1 is displayed in accordance with the assigned fixed value. Or the previous screen is displayed in accordance with the upper hierarchy specification described in the next paragraph.

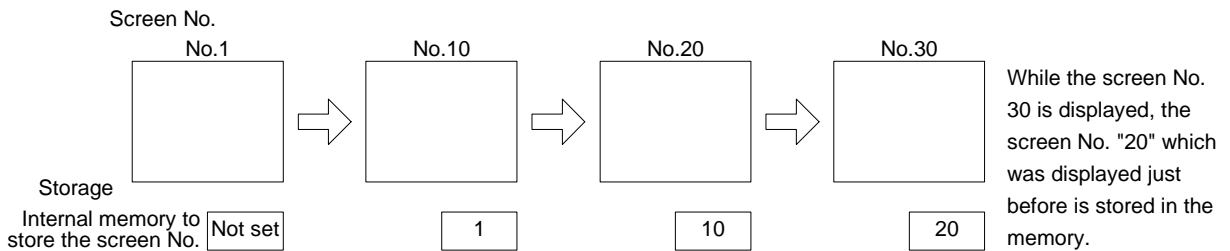### 12.4.2   Changeover to upper hierarchy

By pressing a touch key provided on the screen, the previous.
This function is useful to return to the previous screen in such a case that an abnormality had occurred in the machine and an error message was displayed. (Refer to Paragraph 13.6.)

Touch key (upper hierarchy):Enter one among the following screen Nos.

Screen Nos. 1 to 500 (user screen)
Screen Nos. 1001 to 1030 (system screen):Refer to the appendix.

#### Contents stored in the screen No. storage memory

The GOT has one screen No. storage memory which stores the previous screen without regard to the setting at that time.

Example: Suppose that the screens are changed over as follows.

Screen No.

| No.1 | | No.10 | | No.20 | | No.30 | While the screen No. 30 is displayed, the screen No. "20" which was displayed just before is stored in the memory. |

Storage
Internal memory to store the screen No.

| Not set | | 1 | | 10 | | 20 |

#### Keeping of the contents stored in the screen No. storage memory

The contents stored in the screen No. storage memory is kept only while the power is turned on in the GOT main body. When the power is turned off, the memory is cleared.

Example of screen changeover to upper hierarchy

Screen No. 10

MENU

TIMER

Press the TIMER key to change over the screen.

TIMER key

Screen No. 10

TIMER SETTING

T0          10sec.

MENU

Internal memory to store the screen No.

10
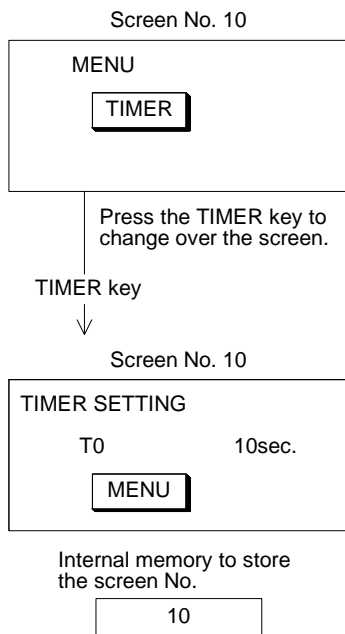
•The screen No. 10 is set so that it will be changed over to the screen No. 11 or the screen No. 12 in accordance with the fixed value assigned to the touch keys.

TIMER key       : Fixed value = 11

COUNTER key : Fixed value = 12

•The screen No. 11 is set so that it will be returned to the previous screen (screen No. 10) in accordance with the upper hierarchy setting assigned to the touch key.

MENU key: Upper hierarchy

## 12.5　Changeover to system screen

Function screens built in the GOT such as the HPP MODE screen, the SAMPLING MODE screen, the ALARM MODE screen and the OTHER MODE screen can be displayed as user screens.

### 12.5.1　Display example of system screen

This paragraph describes the method to display a system screen as a user screen (that is, display a system screen in the screen mode) and the caution on this method.

- A system screen can be displayed by specifying a corresponding screen No. shown in the next page. In this case, the following setting is required so that the previous user screen can be displayed after the system screen.

1) When a system screen is displayed as the base screen (from the PLC)



Screen No. 1

Screen No. 1001
[ DEVICE MONITOR screen ]

[ DEVICE MONITOR ]　　　END

| DEVICE | ON | OFF | ▲ | ▼ |
| SET | COMMENT | DEC/HEX | | |

Return to the user screen No. + "END" key
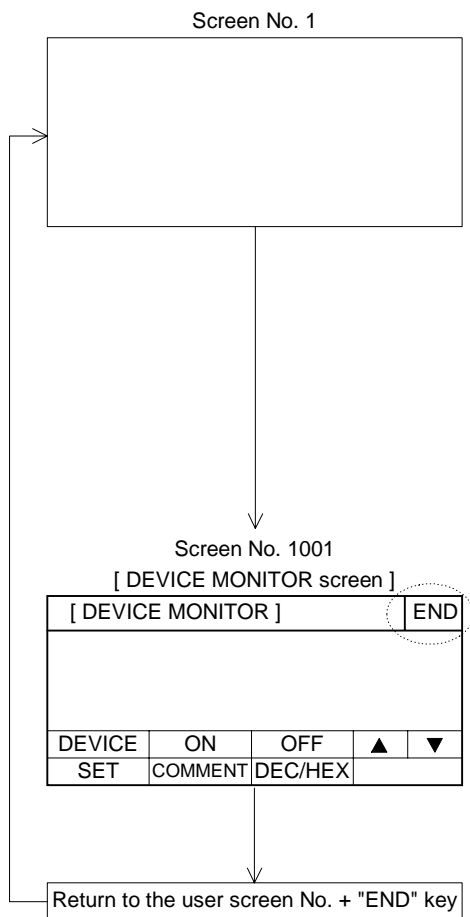
•When the sequence program shown below is executed while the screen No. n is displayed, the screen No. 1001 (DEVICE MONITOR screen) is displayed.

　-Word device to change over the base screen of the GOT: D0

　-Sequence program

| MOV | K1001 | D0 |

The screen No. 1001 is specified.
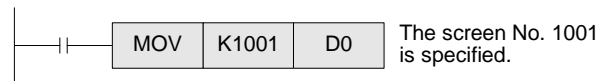
•To return to the previously displayed user screen from a system screen, execute a program which specifies the screen to be returned and press the END key provided at the upper right corner of the system screen. Then, the previous user screen is displayed again.

| MOV | K○○○ | D0 |

Word device for changeover
Screen No. of a screen to be displayed next (user screen No.).
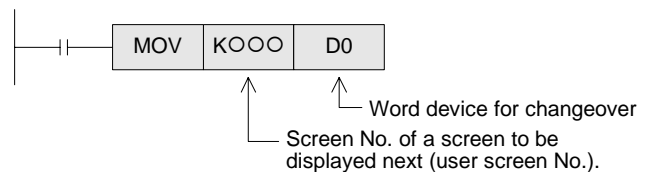
- A sequence program to return to a user screen can be executed at any time while a system screen is displayed.

1) When a system screen is displayed using a touch key

- Specify a desired screen No. within the range of Nos. 1001 to 1030 in the same way as specification of a user screen.

- When the END key provided at the upper right corner of the system screen is pressed, the previous user screen is automatically displayed again. (That is, the setting to return to the previous screen is not required.)

## 12.6 Application of screen changeover

This paragraph describes application examples of screen changeover.

### 12.6.1 Application example 1

In the example below, an abnormality occurs in the machine in the operation mode, an error message is displayed, then a previous screen is displayed.

Changeover of the base screen
Word device specifying the changeover destination: D0 (initial value)
⋯⋯It is registered as the common setting for all screens.



Screen No. 1

\* MONITOR \*

CYCLE OPERATION

CONTINUOUS OPERATION
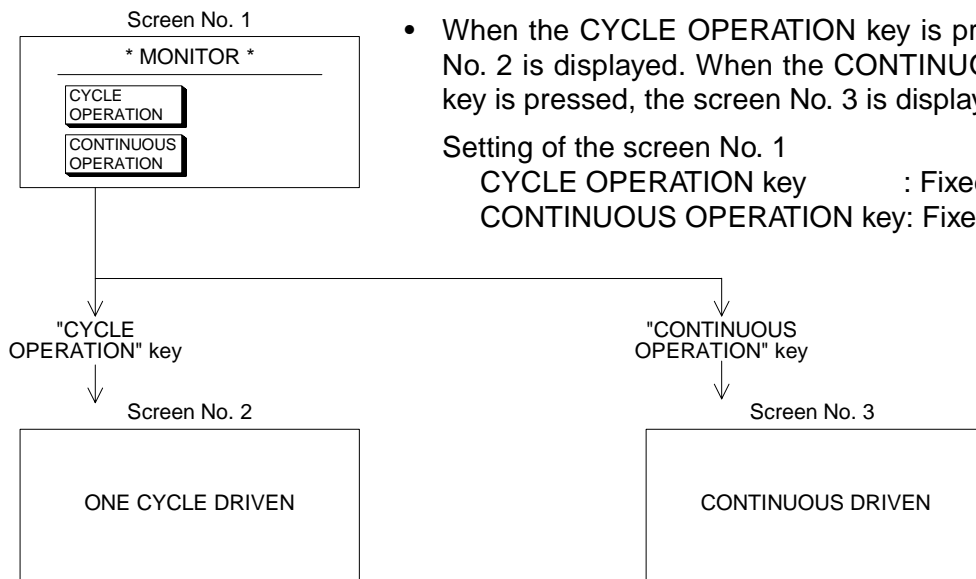
- When the CYCLE OPERATION key is pressed, the screen No. 2 is displayed. When the CONTINUOUS OPERATION key is pressed, the screen No. 3 is displayed.

  Setting of the screen No. 1
  CYCLE OPERATION key          : Fixed value = 2
  CONTINUOUS OPERATION key: Fixed value = 3

"CYCLE OPERATION" key

"CONTINUOUS OPERATION" key

Screen No. 2

ONE CYCLE DRIVEN

Screen No. 3

CONTINUOUS DRIVEN

- When the program shown in the next page is executed while the screen No. 2 or 3 is displayed, the screen No. 10 is displayed by the base screen changeover function.

Screen No. 10

ERROR
MOTOR CHECK

▲

"▲"

To the screen No. 2 or 3
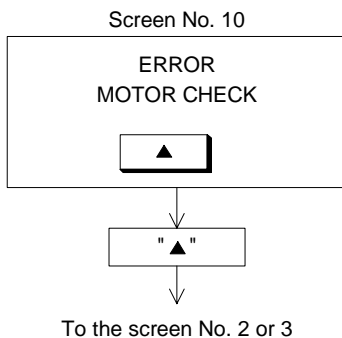
- •To return to the previous screen (screen No. 2 or 3) from the screen No. 10, use the upper hierarchy function of a touch key.

  Setting of the screen No. 10
  PREVIOUS key: Upper hierarchy

- When the previous screen is to be displayed, as shown in this example, use the upper hierarchy function on a touch key.

- Program example for application example 1

Initialization pulse

| MOV | K1 | D0 |
|-----|-----|-----|

FX Series: M8002
A Series : M9038

- Set the program so that the initial screen No. 1 is displayed immediately after the GOT becomes the screen mode.

| MOV | K10 | D0 |
|-----|-----|-----|

Provide a contact to notify abnormality.

- When an abnormality has occurred, K10 is transferred to D0 and the screen No. 10 is displayed.
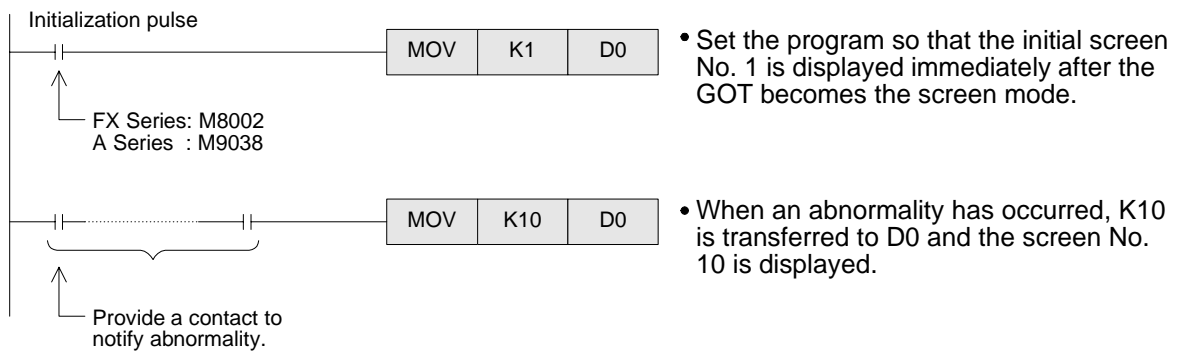
### 12.6.2   Application example 2

In the example below, changeover of the base screen and screen changeover using touch keys is combined.

Changeover of the base screen
Word device specifying the changeover destination: D0 (initial value)
⋯⋯It is registered as the common setting for all screens.

Screen No. 1

```
            * MENU *

     ┌─────────┐
     │  ST. 1  │     MONITOR
     └─────────┘
     ┌─────────┐
     │  ST. 2  │     MONITOR
     └─────────┘
```

ST. 1 key          ST. 2 key

To screen
No. 3

Screen No. 2

```
     STATION 1 MONITOR


        PROCESSING
```

When a sequence program is executed,
screen No. 10 or 20 is displayed.
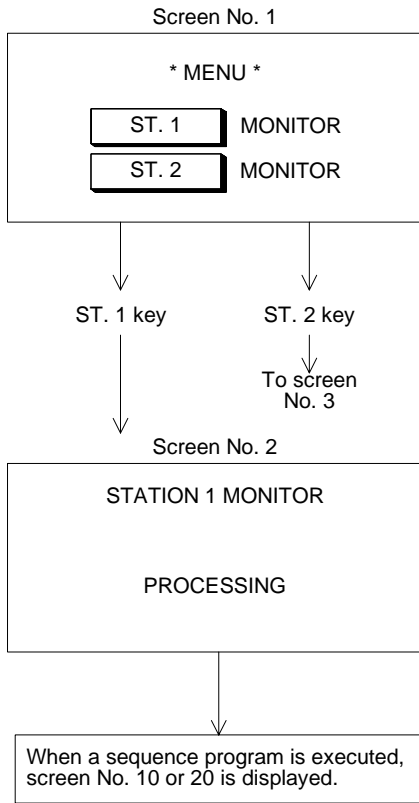
- When the ST. 1 key is pressed, screen No. 2 is displayed. When the ST. 2 key is pressed, the screen No. 3 is displayed.

  Setting of screen No. 1
  ST. 1 key : Fixed value = 2
  ST. 2 key : Fixed value = 3

- When the sequence program shown below is executed while screen No. 2 is displayed, the screen No. 10 or 20 is displayed by the base screen changeover function.

- Program example for application example 2

Initialization pulse

| MOV | K1 | D0 |

• No. 1

FX Series: M8002
A Series : M9038

| MOV | K10 | D0 |

• Screen No. 10 is displayed

| MOV | K20 | D0 |

• Screen No. 20 is displayed

Interlock is required so that the screen is not changed over to screen No. 10 or 20 while screen No. 1 is displayed.
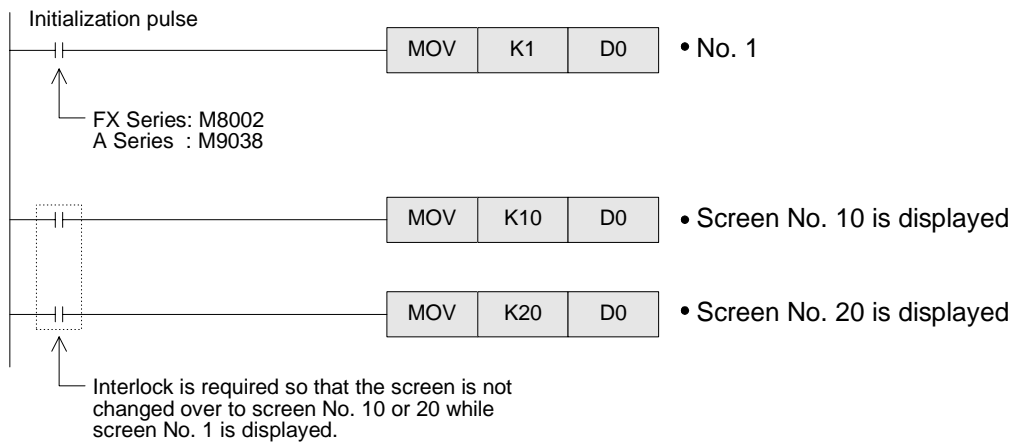
# 13.　　Additional Functions (in V.2.00 or later)

This section describes the functions added in V.2.00 or later.

## 13.1　　Outline of additional functions

- Applicable version

| Product model name | Version | Remarks |
|---|---|---|
| F930GOT-BWD-E | V.2.00 | |

To use the additional functions, the following screen creation software is required.
SW□D5C-GOTR-PACK　: V.G (manufactured in April, 1999)
FX-PCS-DU/WIN-E　　　: V.2.30 or later

- Contents of additional functions

1) Connection of bar code reader → Paragraph 13.2
   The ASCII code data from a bar code reader can be stored in word devices in the PLC by way of the F930GOT.

2) Connection of the SLC500 Series PLC manufactured by Allen-Bradley → Paragraph 13.3
   The CPU (RS-232C) in the SLC 500 Series PLC can be connected.

   * When the connected PLC is set to RS-232C, a bar code reader cannot be connected at the same time.
   While the screen data is transferred from a personal computer or while output to a printer is performed in the other mode in the GOT, communication with a bar code reader is disabled.

3) Connection of the MELSEC-QnA Series PLC → Paragraph 13.4
   CPU direct connection (RS-422) or computer link unit connection (RS-422/232C) is available.

4) Additional key codes available in alarm history objects → Paragraph 13.5

5) Ten-key window display position can be specified. → Paragraph 13.6

6) Additional status monitoring function → Paragraph 13.7
   Bit devices in the PLC can be set to ON/OFF, specified bit devices can be set to ON/OFF at a constant cycle, and constants can be written.

7) Additional touch key and indicator figures → Paragraph 13.8

8) Additional shading patterns → Paragraph 13.9

## 13.2    Connection of bar code reader

### 13.2.1    Connection

- System configuration
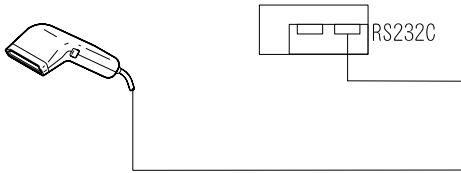
- Connection
  F930GOT: RS-232C connector



| | |
|---|---|
| 1:Unused | 6:DSR |
| 2:RD(RXD) | 7:RTS |
| 3:SD(TXD) | 8:CTS |
| 4:DTR | 9: — |
| 5:SG | |
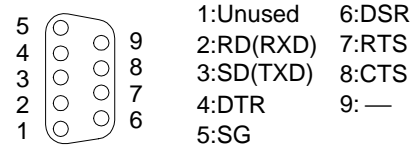
\* A bar code reader is connected to the RS-232C connector. Accordingly, the printout function or the two-port interface function cannot be used together with a bar code reader.
If the F930GOT is connected to the PLC via RS-232C, the bar code reader connection function is not available.

### 13.2.2    Communication specifications

The F930GOT can be connected to a bar code reader which satisfies the communication specifications and the communication format shown below.

- Communication specifications

| Communication port | RS232C |
|---|---|
| Baud rate | 9600 bps |
| Data length | 8 bits |
| Stop bit length | 1 bit |
| Parity | Even |

- Communication format

| Data | CR (0DH) |
|---|---|

Data      : ASCII code
Header    : None
End code : CR (0DH)

### 13.2.3 Setting of system information (control devices)

When a bar code reader is connected, the system information (control devices) are required to be set.
Set the system information in "Common Setting" in the screen creation software.

| | System information<br>SW☐D5C-GOTR-PACK | Control device<br>FX-PCS-DU/WIN-E |
|---|---|---|
| Bar code input | b5 of "head write device +4" | MO + 8 |
| Bar code input invalid | b5 of "head read device" | MO + 9 |
| Bar code input read completed | b6 of "head read device" | MO + 10 |
| | Refer to Paragraph 8.6.2. | Refer to Paragraph 8.6.1. |

- Bar code input (GOT → PLC)
  Because this signal becomes ON when the data read by the bar code reader is stored in the PLC, the write timing can be confirmed using this signal.
  To set to OFF this bar code input signal, set to ON the bar code input read completed signal.

- Bar code input read completed (PLC → GOT)
  This signal sets the bar code input signal from ON to OFF.

- Bar code input invalid (PLC → GOT)
  When this bit is set to ON when a bar code is connected, the bar code input becomes invalid.
  The data read by the GOT is cleared.
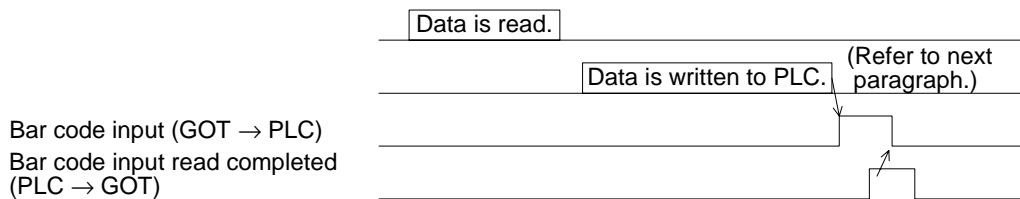


- In the following condition, the data read by the bar code reader is not written to the PLC.
  When the bar code input invalid signal is ON
  When the bar code input read completed signal remains ON
  When the bar code input signal is ON

### 13.2.4 Write to PLC

Set word devices in the PLC to which ASCII codes of the bar code reader are written from the GOT.
Set the word devices using the screen creation software.

- SW□D5C-GOTRE-PACK
  Set word devices in "Bar Code Reader" in "Common Setting".

- FX-PCS-DU/WIN-E
  Set word devices in "Bar Code Setting" in "System Setting" in "View".

- Specification of word devices

  D, T, C, GD                : FX Series  ⎫ When connecting a PLC manufactured by
  D, W, TN, CN, R, Z, V, GD  : A Series   ⎬ another company, specify word devices suit-
                                          ⎭ able to the connected PLC.

  \* When the FX Series PLC is connected, C200 to C255 are not available.

- Number of devices (number of specified words)
  One word stores two characters of the ASCC code data sent from the bar code reader.
  Two to 32 word devices can be specified.

- Example of storage
  The ASCII code data from the bar code reader is stored in the word devices specified above.
  If the read data is smaller than the specified number of devices, space (20H) is stored in unused word devices.

  Example: Data read from bar code reader: 1234567
  Head device of write destination : D100
  Number of devices: 6

| Write destination device | Stored data | ASCII code |
|---|---|---|
| D100 | 7 | |
| D101 | H3231 | 21 |
| D102 | H3433 | 43 |
| D103 | H3635 | 65 |
| D104 | H2037 | 7 |
| D105 | H2020 | |

Space (20H) is stored after "7".

On the contrary, if the read data is larger than the specified number of devices, the excessive data is not stored.

Example:  Data read from bar code reader: 1234567
            Head device of write destination : D100
            Number of devices: 2

| Write destination device | Stored data | ASCII code |
|---|---|---|
| D100 | 7 | |
| D101 | H3231 | 21 |

← The number of all ASCII codes including excessive ASCII codes is stored.
Check this value, and judge whether the data is correctly written.

↑
"3" to "7" are not stored.

To the specified head word device, the number of all read ASCII codes is stored without regard to the specified number of devices.

## 13.2.5 Example of sequence program

This paragraph describes a program when the SW□D5C-GOTRE-PACK is used.



```
1 2 3 4 5 6 7   ⬚
          ↑
          *
```

F930GOT

Bar code reader
Connected to RS-232C connector

PLC
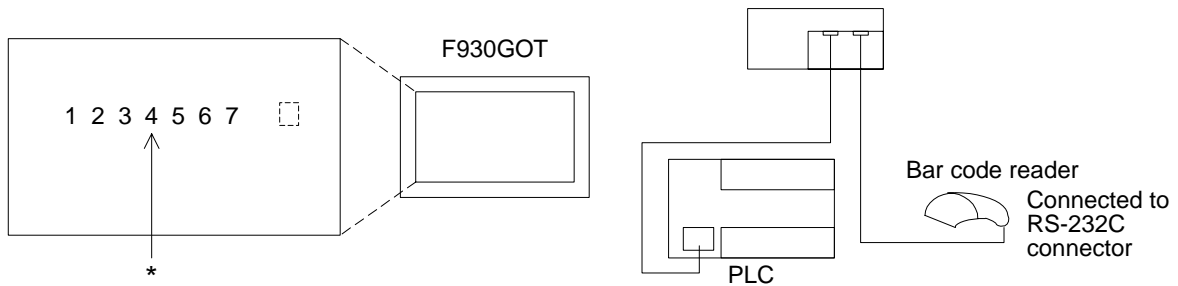
\* The ASCII codes can be displayed on the screen using "ASCII Code Display" or "ASCII Code Input". ⬚ indicates space.

- Setting of system information
  Read device: D10 (b5 and b6 are occupied.)
  Write device: D20 (D24 b5 is occupied.)

- Write destination device and number of devices for bar code setting
  Write destination device: D50
  Number of devices: 5 (D50 to D54 are occupied.)



M8000 (Always ON)
┤├ ——————— [MOV K2M10 D10]
           [MOV D24 K2M20]

Input for bar code input invalid        Bar code input invalid
┤├ ——————————————————— ( M15 )

M25: Bar code input
┤├ ——————————— | Program for bar code data processing (arbitrary) |

Input of input completed    T0        Bar code input read completed
┤├ ————————————— ┤/├ ——————— ( M16 )
                            —— ( T0 ) K10
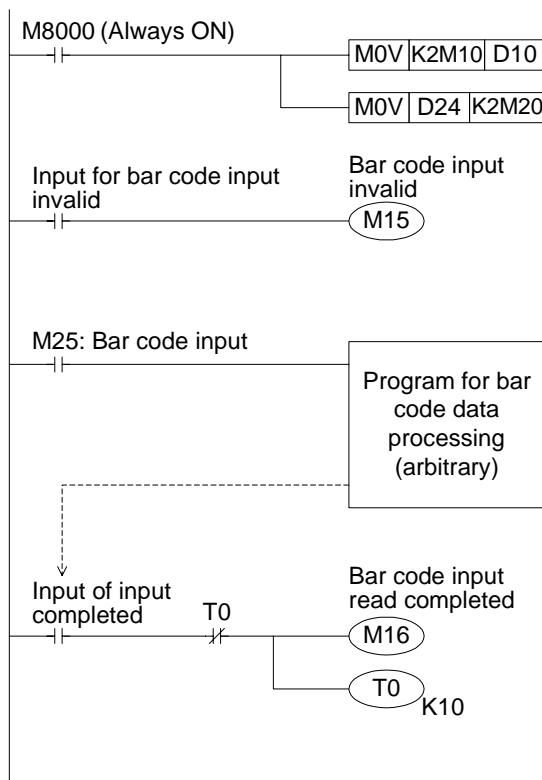
- The ON/OFF status of M10 to M17 is transferred to D10 (b7 to b0).
  (M15: Bar code input invalid, M16: Bar code input read completed)

- The ON/OFF status of D24 (b7 to b0) is transferred to M27 to M20.
  (M25: Bar code input)

- Make this program when the bar code input should be set invalid.
  (Make this program upon necessity.)

- When data is input from the bar code reader, M25 becomes ON.
  ASCII codes are written from the GOT to the write destination devices (D50 to D54).
  (The GOT automatically writes the ASCII codes. Any program for write is not required.)

- When data input (M25) from the bar code reader is finished, M16 becomes ON to indicate that read is completed.
  Then, the GOT sets M25 to ON, and the next data can be input.

- In this example, M16 remains ON for 1 second.
  (While M16 remains ON, next bar code input data cannot be read.)

### 13.2.6   Troubleshooting

If data is not written normally, confirm the following points.

- When data is not written to the PLC

    Action 1:   Confirm the version of the GOT and the screen creation software.
    F930GOT: V.2.00 or later
    Screen creation software: SW☐D5C-GOTRE-PACK: V.G or later
    FX-PCS-DU/WIN-E: V.2.30

    Action 2:   Confirm the bar code reader specifications.
    Make sure that the contents in "13.2.2 Communication specifications" are satisfied.

    Action 3:   Confirm the wiring.

    Action 4:   Make sure that all of the bar code input signal, the bar code input invalid signal and the bar code input read completed signal assigned to the system information (control devices) are OFF.
    If any signal is ON, data cannot be written.
    * When the bar code input read completed signal becomes ON in the PLC, the GOT sets to OFF the bar code input signal.  (Refer to Paragraph 13.2.3.)

- When data is partially written to the PLC

    * After receiving the end code (CR: 0DH) from the bar code reader, the GOT writes data to the PLC.
    Accordingly, it does not usually occur that data is partially written.

    Action 1:   Confirm the setting of the bar code in the screen creation software.
    Especially, the number of devices may be small.

    Action 2:   Confirm the bar code reader specifications.

    Action 3:   The data may be interrupted while being transferred.
    Check whether there is imperfect contact.

## 13.3    Connection of PLC manufactured by Allen-Bradley

When connecting the SLC500 Series PLC manufactured by Allen-Bradley, set the communication parameters and the RS-232C port as follows using an SLC500 Series peripheral tool.

### 13.3.1    Connection

Connect the SLC500 Series PLC manufactured by Allen-Bradley to the programming connector in the PLC.

- Applicable PLC

  < SLC500 Series >              < Connection status >
    SLC5/03, SLC5/04               CPU PORT (RS-232C)

- System configuration



To CPU (programming connector)
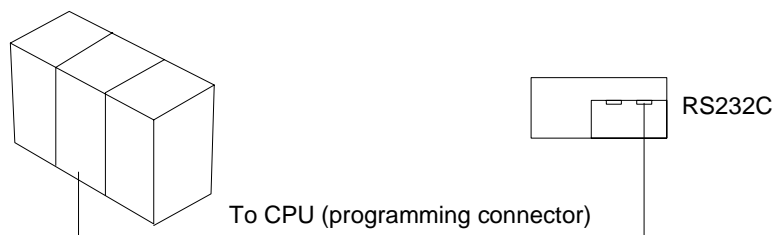
- Connect the SLC Series PLC to the GOT as shown below.

  For the cable length and the detailed specifications of the SLC Series, refer to the instruction manual of the SLC500 Series.

  < CPU PORT (RS-232C) > SLC 5103/5104
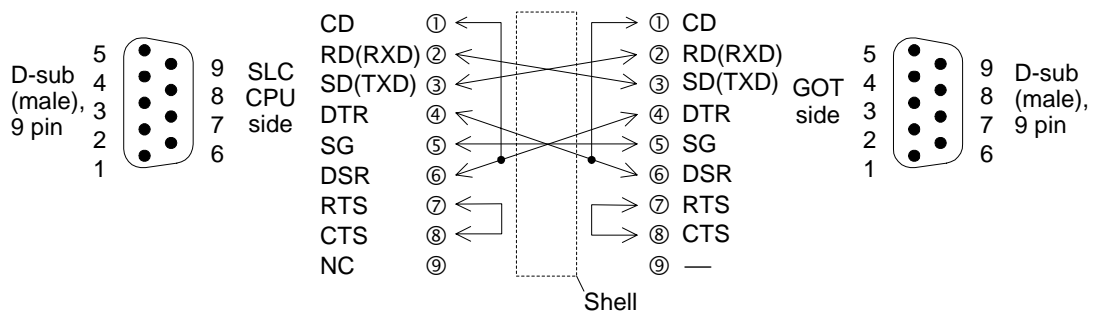
### 13.3.2　Setting of communication

- Setting of RS-232C (channel 0) parameters
  Set the system mode driver (DF1) to "half-duplex slave (DF1)".
  Set other parameters to the default values (initial values).

- Channel configuration of DF1 (half-duplex slave)
  Set the parameters as shown in the table below.
  Set all parameters except shaded ones to the default values.

| Parameter | Set value |
|---|---|
| Diagnostic File | — |
| Baud Rale | 19200 |
| Parity | Even |
| Duplicate Packet Delection | Disabled |
| Station Address | 0 |
| Error Delection | BCC |
| Poll Timeout | 50 |
| RTS Off Delay | 0 |
| RTS Send Delay | 0 |
| Message Retries | 3 |
| Control Line | No Handshaking |
| EOT Suppression | No |

- Setting on the GOT side
  When the connected PLC is set to "SLC500 Series" in the screen creation software or "SET-UP MODE" in the GOT, the following setting is selected.
  (The following setting is automatically selected when the PLC model is set to "SLC500 Series".  You do not have to set them manually.)

| | |
|---|---|
| Baud rate | 19200 |
| Data length | 8 bits |
| Stop bit | 1 bit |
| Parity bit | even |
| Control method | None |

### 13.3.3  Device list

The table below shows the list of devices in the SLC500 Series compatible with the GOT. And have in mind the restriction described below.

- Device specification method
  Use the following format to specify bit/word devices.

  1) Bit device

     <u>    </u>○○○□□

     - <u>    </u> : Specify the device symbol (shown in the table below) in one or two alphabets.
     - ○○○ : Specify the file No. (shown in the table below) corresponding to each device in decimal(*1).
     - □□□ : Specify the element (device No.) in decimal.

     Example:  To specify "B003064E"
     Device symbol: B      Element (device No.): 64
     File No.: 3         Bit position: E

  2) Word device
     The specification method is equivalent to that for bit devices.

     Example:  To specify "N057129"
     Device symbol: N      Element (device No.): 129
     File No.: 57

     *1 The file Nos. 10 to 255 are required to be set in advance using the package software manufactured by Allen-Bradley.

- Support device table

| Device name (symbol) | File No. ○○○ | Available element (device No.) specification range □□□ |
|---|---|---|
| Bit (B) | 3, 10 to 255 | 0 to 255 |
| Timer coil (TT) | 4, 10 to 255 | 0 to 255 |
| Timer contact (TN) | 4, 10 to 255 | 0 to 255 |
| Timer set value (TP) | 4, 10 to 255 | 0 to 255 |
| Timer current value (TA) | 4, 10 to 255 | 0 to 255 |
| UP counter coil (CU) | 5, 10 to 255 | 0 to 255 |
| DOWN counter coil (CD) | 5, 10 to 255 | 0 to 255 |
| Counter contact (CN) | 5, 10 to 255 | 0 to 255 |
| Counter set value (CP) | 5, 10 to 255 | 0 to 255 |
| Counter current value (CA) | 5, 10 to 255 | 0 to 255 |
| Integer (N) | 7, 10 to 255 | 0 to 255 |

Note: Shaded columns indicate word devices.  Other columns indicate bit devices.

• Restriction in device specification

   1. Word specification for bit devices and bit specification for word devices are not supported in the GOT in the same way as a case where another PLC is connected.

   2. The GOT supports only the devices shown above, and does not support other devices (that is, devices related to input image, output image, status, control, floating point and network).

• **Cautions**

   As described in the previous page, the user is required to set devices to be used for the SLC500 Series. Accordingly, if devices to be monitored or set are not specified in the PLC, a communication error may occur.
   Especially, the GOT is always monitoring sampling devices in the sampling mode even if the sampling condition is not set. As a result, a communication error occurs if sampling devices are not present. In such a case, change sampling devices or set devices in the PLC.

## 13.4    Connection to MELSEC-QnA Series

The MELSEC-QnA Series PLC can be connected as described below.

### 13.4.1    CPU direct connection (CPU PORT)

- Applicable PLC
  QnA, Q2AS: CPU direct connection (RS-422)

- Connection method
  CPU direct connection (RS-422)

  - For connection, refer to "Connection to A Series" in "1.8 Connection of MELSEC FX/A Series (CPU PORT)".

- Caution
  A personal computer can be connected using the built-in two-port interface function during CPU direct connection.  In this case, only the SW☐D5C(F)-GPPW is available as the ladder creation software.

### 13.4.2    Computer link connection (LINK PORT)

- Applicable serial communication unit
  AJ71QC24, AJ71QC24-R2, AJ71QC24-R4, A1SJ71QC24, A1SJ71QC24-R2

- Connection method
  CPU direct connection (RS-232C or RS-422)

  - Though this is computer link connection, make sure to select "CPU PORT" as the connection method.

  * Connection for computer link connection is equivalent to that for the MELSEC A Series except when the RS-422 interface connector is D-sub, 25-pin type.
    Refer to the connection diagram for the A Series shown in Paragraph 1.6.3.

< Communication via RS-422 >
When the RS-422 interface connector in computer link connection is D-sub, 25-pin type
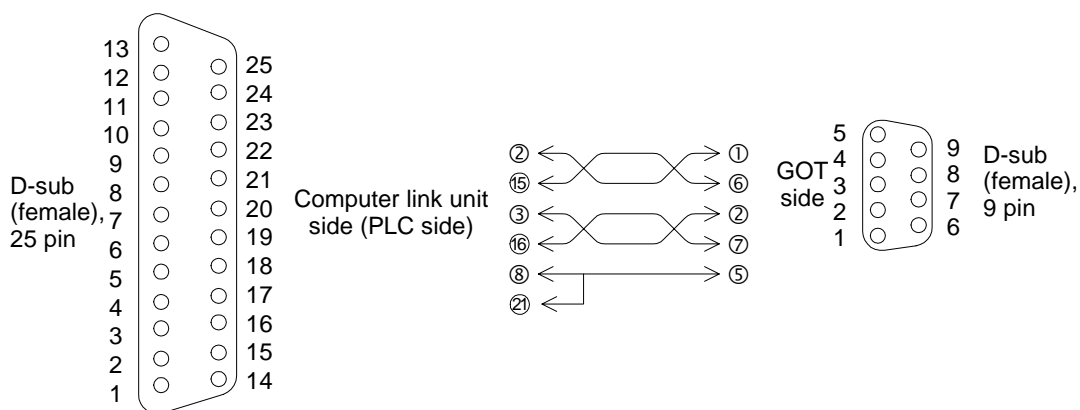


Caution:    In CPU communication, when a personal computer is connected using the two-port interface function built in the GOT, only the SW☐D5C(F)-GPPW is available as the personal computer software.

- Setting of computer link unit
  Set the communication format of the computer link unit as shown below.

| Used port | When RS-422 is use | When RS-232C is used |
|---|---|---|
| Mode setting switch No. | 5<br>RS-422: Format 5<br>RS-232C: No-procedure | 1<br>RS-422: No-procedure<br>RS-232C: Format 1 |
| Transmission speed | 19200 bps | |
| Data bit | 8 bits | |
| Stop bit | 1 bit | |
| Parity bit | Provided: Odd | |
| Sum check | Provided | |
| Write during run | Possible | |
| Station No. | 00 to 0F (in accordance with setting in GOT) | |

← The GOT station
  No. can be set in
  "SET-UP MODE".

- Caution: When RS-232C is connected

  The GOT does not control CD signals.  Accordingly, when the RS-232C is connected, the buffer memory in the computer link unit should be set so that CD signals are not checked.

  Example: When I/O signals in the computer link unit are 80 (H) to 9F (H)
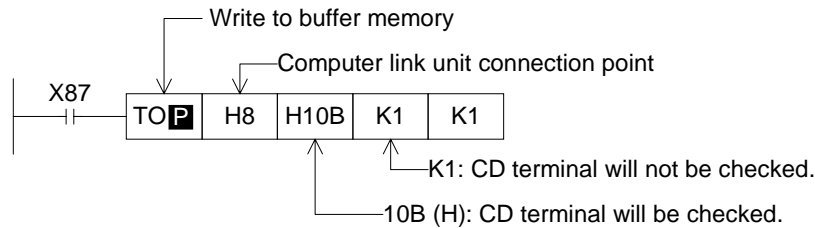


- Restriction in functions
  In connection via a computer link unit, the following functions of the GOT are disabled.

  - Index registers (V and Z) cannot be monitored, and their current values cannot be changed.

  - When the RS-232C is connected for communication, the printer output function of the GOT is disabled.

  - The two-port interface function is disabled.

## 13.5    Additional key codes

When touch keys to which the following key codes are assigned are pressed on the screen on which the alarm history display function (Refer to Paragraph 11.3.5.) is displayed, the history can be deleted from the screen display.

| Key code | Description of function |
|---|---|
| FFB6 (H) | Deletes an alarm selected by the cursor from the screen display if the alarm is recovered. |
| FFB7 (H) | Deletes all recovered alarms from the screen display without regard to the cursor position. |

Display example
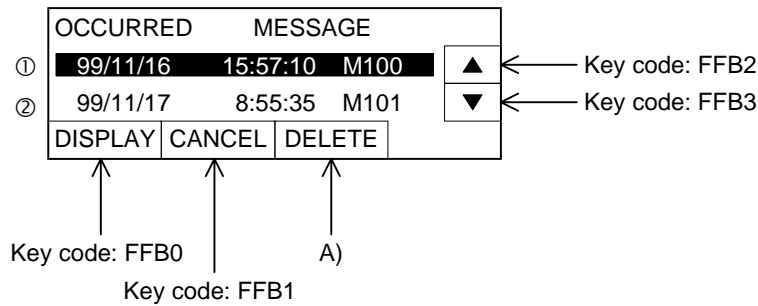


When the key code FFB6 is assigned to A) :

A) deletes the alarm ① where the cursor is located from the screen display if it has already recovered.

A) does not delete the alarm ① from the screen display if it has not recovered yet.

When the key code FFB7 is assigned to A) :

A) deletes all alarms which occurred in the past and have already recovered from the screen display.

## 13.6    Observe status function

The observe status function monitors the ON/OFF status of specified bit devices, then turns ON/OFF a bit device in the PLC or writes a numeric value to word devices in the PLC from the F930GOT in accordance with changes in the monitored ON/OFF status.

### 13.6.1    Outline of observe status function
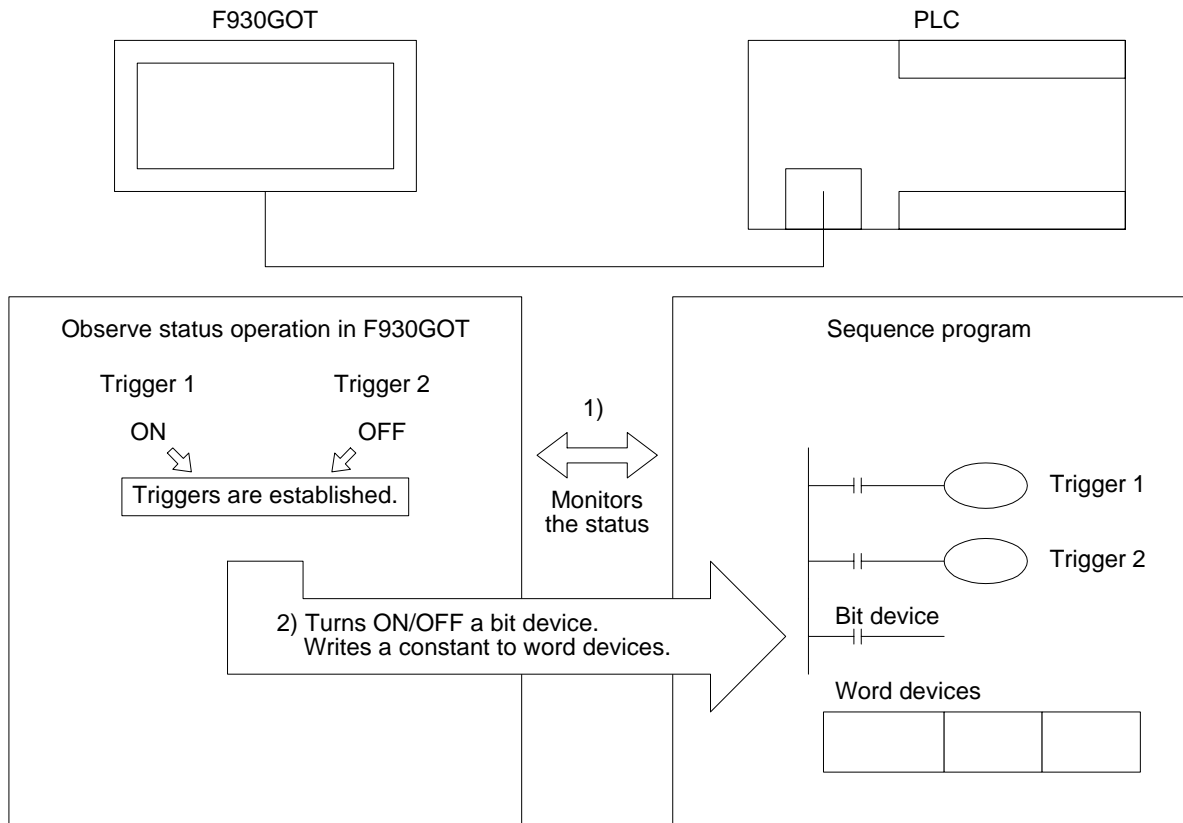


1) The 930GOT monitors always or at a constant cycle whether the bit devices specified as triggers are ON or OFF. (The ON/OFF status for triggers can be specified using the screen creation software. Refer to the next page.)

2) When the specified triggers are established, the F930GOT turns ON/OFF a specified bit device or writes a constant to specified word devices.

### 13.6.2  Observe status cycle

Set the cycle at which the F930GOT monitors whether the specified triggers are established. Select "always" or "constant cycle".

- Always:
  Every time communication is performed between the F930GOT and the PLC, the F930GOT monitors whether the specified triggers are established at every 200 to 300 ms.

- Constant cycle: The cycle can be set to 1 to 60 seconds with the increment of 1 second. At the set cycle, the F930GOT monitors whether the specified triggers are established.

### 13.6.3  Setting the triggers

Set the triggers to be monitored.
Up to two bit devices can be set.

- Trigger 1: Set ON or OFF of a bit device.

- Trigger 2: Set ON or OFF of a bit device.

• When the trigger 1 and the trigger 2 are set, the F930GOT performs the operation described in the next paragraph only when the both triggers are established.

Example:  Trigger 1: "ON" is set.

Trigger 2: "OFF" is set.

Both triggers are established.
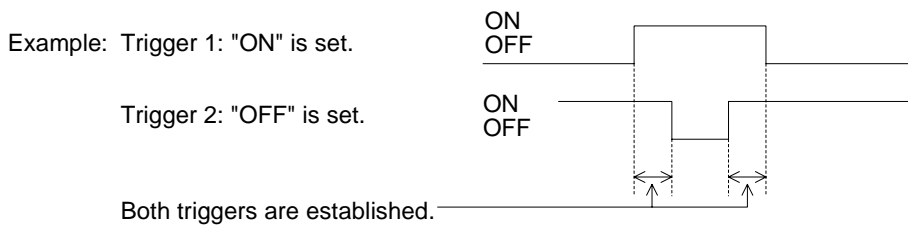
• Make sure to set the trigger 1.  And set the trigger 2 if necessary.

### 13.6.4    Setting the operation

This paragraph describes the operation performed when the triggers set in the previous paragraph are established.
As the operation, a bit device can be turned ON/OFF or data can be written to word devices.
One type of operation can be selected for the triggers set in the previous paragraph.

1) Operation of bit device

- Momentary
  While specified triggers are established, a specified bit device remains ON.

  | Trigger | | Established | | Established | |
  |---|---|---|---|---|---|
  | Operation | OFF | ON | OFF | ON | OFF |
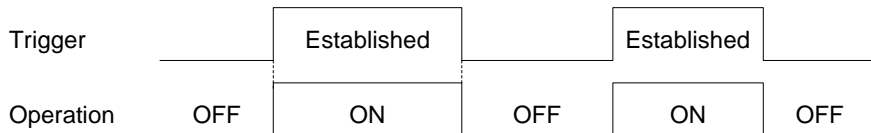
- Set
  When specified triggers become established, a specified bit device turns ON.
  Even if the specified triggers become released after the specified bit device turns ON, it remains ON.

  | Trigger | | Established | | Established | |
  |---|---|---|---|---|---|
  | Operation | OFF | ON | | | |

- Reset
  When specified triggers become established, a specified bit device turns OFF.
  Even if the specified triggers become released after the specified bit device turns OFF, it remains OFF.

  | Trigger | | Established | | Established | |
  |---|---|---|---|---|---|
  | Operation | ON | OFF | | | |

- Alternate
  When specified triggers become established, the current status of a specified bit device is inverted.
  (If the specified bit is ON, it turns OFF.  If it is OFF, it turns ON.)

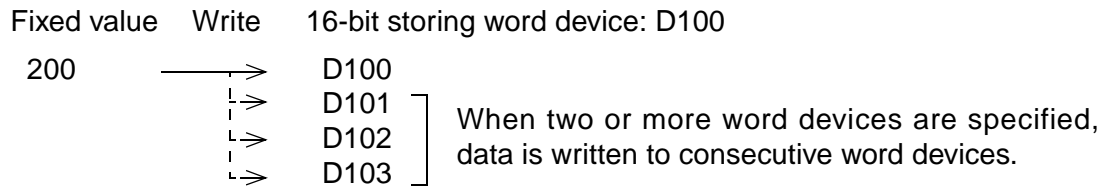  | Trigger | | Established | | Established | |
  |---|---|---|---|---|---|
  | Operation | OFF | ON | | OFF | |
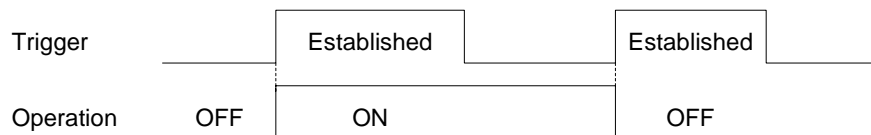
2) Operation of word devices

When specified triggers become established, a fixed value or a "fixed value + current value of indirectly specified word device" is written to specified word devices.

- Fixed
  When specified triggers become established, a 16-bit or 32-bit value is written to specified word devices.
  The fixed value should be decimal.

  Operation example: When specified triggers become established, a fixed value "200" is written to D100 to D103.

  Fixed value    Write    16-bit storing word device: D100

  200    ⟶    D100
              ⌐⟶  D101  ⎤
              ⌐⟶  D102  ⎬  When two or more word devices are specified,
              ⌐⟶  D103  ⎦  data is written to consecutive word devices.

  For the number of storing devices, refer to the next paragraph.

- Fixed + Indirect
  When specified triggers become established, a fixed value added by the current value of an indirectly specified word device is written to specified word devices.
  * The fixed value should be set. Setting of only an indirect device is disabled.

  Operation example 1: When specified triggers become established, a fixed value (300) added by the current value of D200 is written to D210.
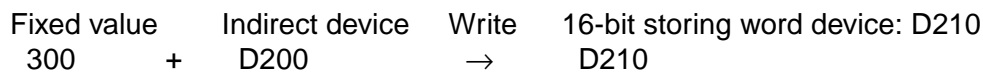
  Fixed value        Indirect device    Write    16-bit storing word device: D210
    300        +      D200        →        D210
  * When the current value of D200 is "100", "400 (= 300 + 100)" is written to D210.

• When 32-bit word devices are specified as storing devices, indirect devices should be also the 32-bit type (which occupies 2 points).

Operation example 2: When two or more storing devices are specified, the write operation FM0V or BM0V is available.

FM0V:   A fixed value added by the current value of an indirect device is written to two or more storing devices.

Storing devices: D10 to D12 (16-bit) (3 points)
Indirect device: D100
Fixed value: 20

Fixed value    Indirect device    Write       16-bit storing word devices: D10 to D12

  20      +      D100      ⎯⎯⎯⟹ D10
                                    ⊢⟹ D11
                                    ⊢⟹ D12

* When the current value of D100 is "30", "50 (= 20 + 30)" is written to D10 to D12.


BM0V:   A fixed value added by the current value of an indirect device is written to two or more storing devices.
Different from FM0V, the number of indirect devices is equivalent to that of storing devices.  Indirect devices correspond to storing devices on the one-to-one basis.

Storing devices: D10 to D12 (16-bit) (3 points)
Indirect devices: D100 to D102
Fixed value: 20

| Fixed value | | Indirect device | Write | 16-bit storing word devices: D10 to D12 |
|---|---|---|---|---|
| 20 | + | D100 | → | D10 |
| 20 | + | D101 | → | D11 |
| 20 | + | D102 | → | D12 |

* When the current value of D100 to D102 are "30", "40" and "50" respectively, the following values are written to D10 to D12.
  20 + 30 = 50 (D10)
  20 + 40 = 60 (D11)
  20 + 50 = 70 (D12)

### 13.6.5　Trigger and number of devices

The table below shows the number of registration points available in the observe status function.

- Triggers can be registered for each project or screen (No. 1 to 500).

| Maximum number of registered triggers | |
|---|---|
| For projects<br>40 points | 80 points in total |
| For screens<br>40 points | |

*　When screens are overlapped or a screen is called, triggers registered on the base screen are valid.

- The table below shows the number of storing devices for one trigger.

| Bit devices | | For "Momentary", "Set", "Reset" and "Alternate"<br>1 to 40 points in total |
|---|---|---|
| Word devices | 16-bit | For "Signed" and "Unsigned"<br>1 to 20 points in total |
| | 32-bit | For "Signed" and "Unsigned"<br>1 to 10 points in total |

- Many triggers and storing devices can be registered as shown above. However, the registered contents and the number of registered points give effect on the responsibility of the F930GOT. Confirm the cautions described in the next paragraph.

### 13.6.6 Cautions

When many registration points are registered or when many observe status operations are performed as described below, it takes considerable time until the operations are completed. As a result, the responsibility of the F930GOT may be affected.

* When "Momentary" is selected as the bit device operation and many storing devices are set
  And when many triggers are set for "Momentary"

* When many triggers are established and many write operations are often performed
  Especially when the observe status cycle is set to "always" or the cycle is set to a short period

### Effect on F930GOT

* Effect on functions and objects which are actuated at a constant cycle

  Functions which are cyclically actuated may not be actuated in accordance with the setting. For example, the observe status function (monitoring cycle), the sampling function, the alarm history/list function, the current time function and the trend graph function may be affected.

* Effect on transfer of the screen data

  When the display is automatically changed over to the PLC transfer screen and the screen data is transferred, the message "Main unit processing error" may be displayed on the screen creation software side.
  In such a case, change over the display to the PLC transfer screen by key operation.  Then, the screen data can be sent and received.

* Effect on the monitoring function, the screen changeover function and the key operation

  Specified operation may be delayed for screen changeover, monitoring and key operation in the same way as the description above.

* Effect on the built-in 2PIF function

  When circuit monitoring, device batch processing or monitor registration is executed in a peripheral unit, a communication error may occur in the peripheral unit.

### 13.6.7   Use example (utilization of clock data)

The clock data built in the F930GOT can be transferred to a data register in the PLC for later utilization while a specified bit device is ON. The clock data built in the F930GOT is stored in the following registers. However, only the GOTR-PACK can handle these registers.

GD0: Current time (second)            GD1: Current time (minute)
GD2: Current time (hour)              GD3: Current time (day)
GD4: Current time (month)             GD5: Current time (year)
GD6: Current time (day of week)


Example:  When the clock data (year, month, day, hour, minute and second) is transferred to the register D100 in the PLC at every 30 seconds while M10 is ON

Select "Observe Status" in the screen creation software.

1) Select "Project", and set the cycle to 30 seconds.

2) Set the trigger 1 to "M10, ON".

3) Select "Word Set (16-bit)" as the operation, and set the number of points to "7".

4) Set "Storing Device" to "D100", "Fixed" to "0" and "Indirect Device" to "GD0".

5) Set the transfer method to "BM0V".

When this data is transferred to the F930GOT, the current time is stored in D100 at every 30 seconds while M100 is ON.

## 13.7    Addition of images for "Touch Key" and "Indicator" objects

More images are available for the "Touch Key" and "Indicator" objects.
Confirm additional images in the screen creation software.

## 13.8    Addition of shade patterns

When a rectangle or circle is created, it can be shaded.
Seven shade patterns Nos. 1 to 7 are added.

# MEMO

# 14.    Additional Function (Ver. 2.10 and Later)

This section describes the function added in the Ver. 2.10 and later.

## 14.1    Outline of additional function

• Applicable version

***Table 14.1:***

| Product model name | Version | Remarks |
|---|---|---|
| F930GOT-BWD-E | V2.10 | |

In order to use this additional function, the following version of the screen creation software is required.
SW4D5C-GOTRE-PACK Ver. A (manufactured in January, 2000)

• Contents of additional function

1) Availability of alphabetic fonts
   When "CHARACTER SET" in "LANGUAGE" in "SET-UP MODE" is set to "WEST EUROPE", the following nine languages can be displayed.
   The system language is fixed to English.

   - Italian, English, Dutch, Swedish, Spanish, Danish, German, Portuguese and French
     In order to display either of the above languages, create screens using the screen creation software started up on the OS (Windows) compatible with the corresponding language.

# MEMO

# 15.    Additional Functions (V 2.20/3.00 or later)

This section describes the functions added in V 2.20/3.00 or later.

## 15.1    Outline of additional functions

- Applicable versions and models

*Table 15.1:*

| Model name | Version V 2.20 | Version V 3.00 |
|---|---|---|
| F930GOT-BWD-E | Produced in April, 2000 or later (Serial No.: 04**** or later) | Produced in June, 2000 or later (Serial No.: 06**** or later) |

- Additional functions
  The table below shows the additional functions.
  Confirm also the version of the screen creation software compatible with each function.

*Table 15.2:*

O : Supported     — : Not supported

| Function | Applicable GOT version | | Screen creation software version[1] | |
|---|---|---|---|---|
| | **V2.20** | **V3.00** | **GOTRE-PACK** | **DU/WIN** |
| Connection to MELSEC Q Series PLC Direct connection to CPU (RS-232C) and connection to serial communication unit (RS-422, RS-232C) are available. | ✓ | ✓ | SW4 Version 50F[2] | V2.40 |
| Connection to PLC manufactured by Siemens Connection to S7-300/400 Series PLC is available. | — | ✓ | To be supported in near future | V2.40 |
| Connection to machine controller manufactured by YASUKAWA ELECTRIC CORP. | — | ✓ | SW4 Version 50F | To be supported in near future |
| Two or more GOT units can be connected when micro computer board is used. | — | ✓ | SW1 Version 00AF | V2.20 |

*1 "GOTRE-PACK" stands for SW☐D5C-GOTRE-PACK (V).
   "DU/WIN-E" stands for FX-PCS-DU/WIN-E.

*2 The product "SW2, Version A or later" can be connected to the Q Series PLC when "PLC TYPE" is set to "A, QnA".

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## 15.2    Connection to MELSEC Q Series PLC

### 15.2.1    Direct connection to CPU

- Applicable PLC: Q Series PLC

- Connection type: Direct connection to CPU (RS-232C)

<Direct connection to CPU> RS-232C



CPU        Connection cable shown on the right
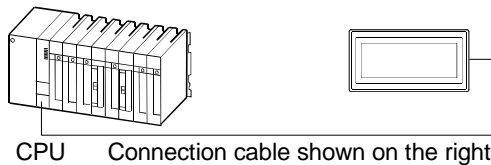
Connect the RS-232C connector of the GOT.
Cable: QC30R2 (3 m)

### 15.2.2    Connection to serial communication unit

- Applicable serial communication unit: QJ71C24, QJ71C24-R2

- Connection type: Direct connection to CPU (RS-232C or RS-422)

  Caution:
  When connecting the GOT to a serial communication unit, select "direct connection to CPU"
  as the connection type.
  Though each of the QJ71C24 and the QJ71C24-R2 is equipped with two interface ports,
  the GOT can be connected to only an either port.

- Setting of serial communication unit
  Set the communication format of the serial communication unit as shown below.

*Table 15.3:*

| Used port | When RS-422 is used | When RS-232C is used |
|---|---|---|
| **Communication protocol** | 5<br>RS-422   : Format 5<br>RS-232C : No-procedure | 5<br>RS-422   : No-procedure<br>RS-232C : Format 5 |
| **Transmission speed** | 38400bps | |
| **Data bit length** | 8 bits | |
| **Stop bit length** | 1 bit | |
| **Parity bit** | Provided (odd) | |
| **Sum check** | Provided | |
| **Write during run** | Possible | |
| **Station No.** | 00 to 0F (in accordance with setting in GOT) | |

← The GOT station No. can
   be set in "SET-UP MODE".

■**Important point**

- Setting of screen creation software

  SW□D5C-GOTRE-PACK
      From "□ = 2, Version 00A" to □= 4, Version 30C": Set "PLC TYPE" to "A, QnA".
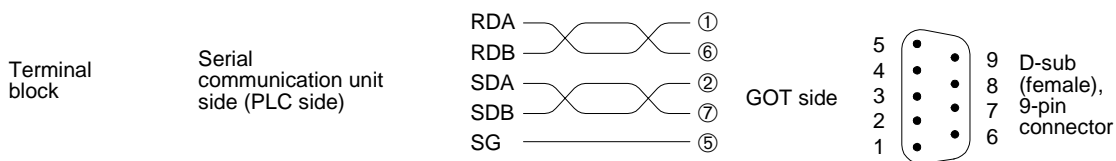      "□ = 4, Version 50F or later": Set "PLC TYPE" to "QnA, Q".

◆ **MITSUBISHI**

- Connection to serial communication unit

### RS-232C connection

D-sub (male), 9-pin connector

| 5 | 9 |
|---|---|
| 4 | 8 |
| 3 | 7 |
| 2 | 6 |
| 1 | |

Serial communication unit side (PLC side)

CD(DCD) ①
RD(RXD) ②
SD(TXD) ③
ER(DTR) ④
SG(GND) ⑤
DR(DSR) ⑥
RS(RTS) ⑦
CS(CTS) ⑧

GOT side

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

D-sub (female), 9-pin connector

| 1 | 6 |
|---|---|
| 2 | 7 |
| 3 | 8 |
| 4 | 9 |
| 5 | |

### RS-422 connection

Terminal block

Serial communication unit side (PLC side)

RDA
RDB
SDA
SDB
SG

GOT side

① ⑥ ② ⑦ ⑤

D-sub (female), 9-pin connector

| 5 | 9 |
|---|---|
| 4 | 8 |
| 3 | 7 |
| 2 | 6 |
| 1 | |
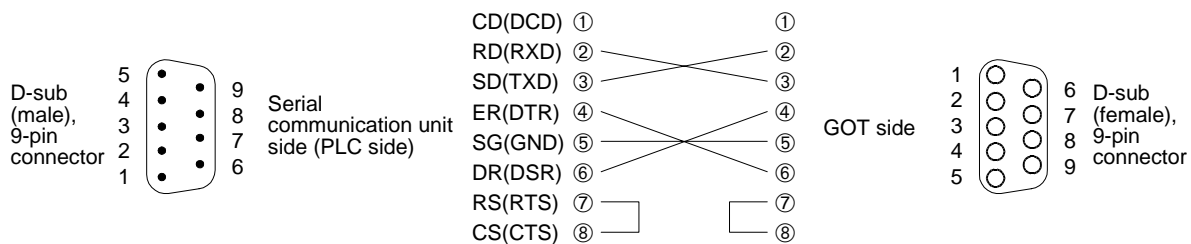
## 15.3    Connection to PLC manufactured by Siemens

### 15.3.1    Direct connection to CPU

- Connected PLC
  For direct connection to CPU (RS-232C), the HMI adapter is required.  (Refer to the connection example shown below.)

***Table 15.4:***

| | Applicable CPU |
|---|---|
| S7-300 Series | 312IFM, 313, 314, 314IFM, 315, 315-2DP, 316 |
| S7-400 Series | 412-1, 413-1, 413-20DP, 414-1, 414-2DP, 416-1, 416-20DP |

However, 416-1 and 416-2DP do not support some devices.  (Refer to the next page.)

- Setting of PLC
  Set the MPI address of the PLC connected to the GOT using the programming software (STEP7) for the S7-300/400 Series PLC.

***Table 15.5:***

| | MPI address |
|---|---|
| Personal computer (for programming) | 0 (fixed in MPI network) |
| HMI adapter | 1 (fixed) |
| PLC | 2 to 31 |

The MPI address of the HMI adapter is "1", and the maximum MPI address is "31".  Accordingly, make sure to set the MPI address of the PLC inside the range from 2 to 31.

- Setting of GOT
  Set the connected PLC, the connection type and the station No. as shown below.

***Table 15.6:***

| PLC TYPE | "SIMENS S7-300" |
|---|---|
| CONNECTION | CPU PORT (RS232C) |
| STATION # | MPI address (2 to 31) set in PLC<br>Have in mind that station Nos. "0" and "1" are treated as "2". |

<Direct connection to CPU>

RS-232C connection

S7-300/400 Series manufactured by Siemens
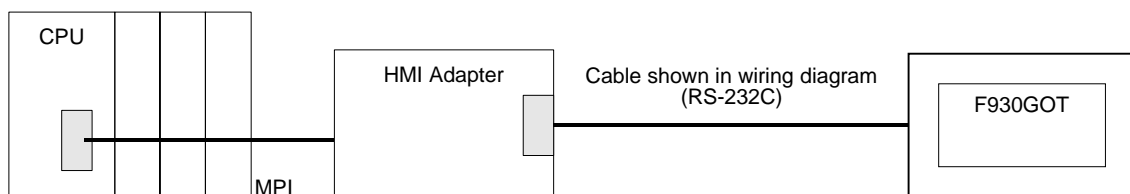


HMI adapter model name: 6ES7 972-0CA11-0XA0 (manufactured by Siemens)

Cable 6ES7901-1BF00-0XA0 manufactured by Siemens is available also.
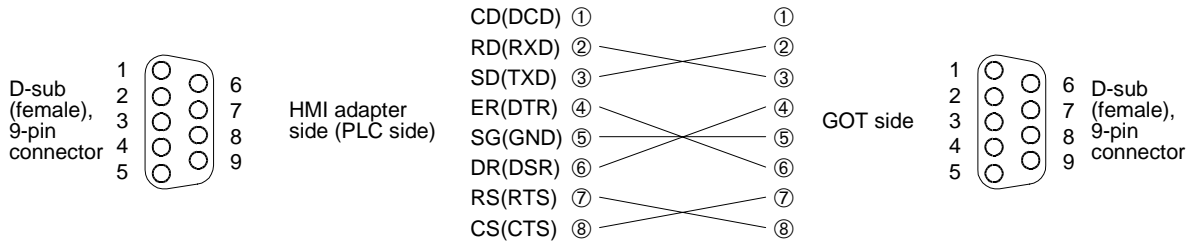


### 15.3.2  Support device range list

*Table 15.7: Support device range list*

| Device name (symbol) | Available setting range | |
|---|---|---|
| | **Notation in PLC** | **Notation in GOT** [*1] |
| Input relay (I) | I0.0 to I511.7 | ← |
| Output relay (Q) | Q0.0 to Q511.7 | ← |
| Bit memory (M) | M0.0 to M2047.7 | ← |
| Timer current value (T) | T0 to T511 | ← |
| Counter current value (C) | C0 to C511 | ← |
| Data register (D) | DB1.DBW0 to DB1.DBW65534<br>DB2.DBW0 to DB2.DBW65534<br>•<br>DB1023.DBW0 to DB1023.DBW65534 | D000100000 to D000165534<br>D000200000 to D000265534<br>•<br>D102300000 to D102365534 |

☆ Word devices are shaded, and bit devices are not shaded.
*1 Notation used in the GOT
   The device specification method is partially different.  Refer to the next paragraph.

### 15.3.3  Device specification method and restraint in GOT

- Device specification method
  Specify devices in the following formats.

1) Bit device

   ___☐☐☐☐☆

   - In "___", specify the device symbol (shown in Table 1) in one alphabet.

   - In "☐☐☐☐", specify the device No. (shown in Table 1) of the specified device in a decimal value in three or four digits.

   - In "☆", specify the bit position.  The available range is from 0 to 7.

   Example: When specifying "M01205"
            Device symbol = M
            Device (byte) No. = 120
            Bit position = 5

2) Timer (T) and counter (C)
   The specification method is equivalent to that for bit devices except that the bit position (☆) is omitted.

   Example: When specifying "T250"
            Device symbol = T
            Device No. = 250

3) Data register (D)
   A data register consists of the block No. and the device No. as shown below.

   D○○○○□□□□□

   • In "○○○○", specify the block No. (shown in Table 1 in the previous page) of the data register in a decimal number in four digits.

   • In "□□□□□", specify the device No. (shown in Table 1 in the previous page) of the data register in a decimal even number in five digits.

   Example: When specifying "D102031004"
            Device symbol = D
            Block No. = 1020
            Device No. = 31004

• Supplement

   - As to data registers, define the data block using the STEP7 in advance for the CPU, and download it to the CPU.

   - As to input and output relays, the English (IEC) notation is used in the GOT.  However, when the German (SIMATIC) notation is selected in the STEP7, devices E, A and Z are equivalent to I, Q and C respectively.

   - Because the F900 Series GOT does not distinguish the CPU type in the S7-300/400 Series PLC, the device range is checked inside the range shown in Table 1 in the previous page.
     ("STEP7" is the name of the programming software for the S7-300/400 Series PLC.)

• Restraint on device specification

   - Word specification for bit devices and bit specification for word devices are not supported in the F930GOT-E in the same way as connection to another PLC.

## 15.4 Connection to machine controller manufactured by YASUKAWA ELECTRIC CORP.

### 15.4.1 Direct connection to CPU

- Connected PLC
  Direct connection to CPU (RS-232C or RS-422)

  - Applicable machine controller

*Table 15.8:*

| Model | Condition |
|---|---|
| CP9200SH | • CN1, CN2, CN3 of MEMOBUS unit 217F |
| MP920 | • MEMOBUS port PORT1, PORT2 of CPU unit<br>• CN1, CN2, CN3 of MEMOBUS unit 217F |
| MP930 | • MEMOBUS port PORT1, PORT2 of CPU unit |

- Setting of machine controller
  Set the machine controller as shown below.

*Table 15.9:*

| Item | Set value |
|---|---|
| Protocol | MEMOBUS |
| Mode | RTU |
| Communication speed | 19,200bps |
| Data length | 8 bits |
| Stop bit length | 1 bit |
| Parity bit | Even |
| Slave address | 1 to 31 (in accordance with station No. setting in GOT) |

- Setting of GOT
  Set the connected PLC, the connection type and the station No. as shown below.

*Table 15.10:*

| | |
|---|---|
| PLC TYPE | CP9200SH manufactured by YASUKAWA |
| CONNECTION | CPU PORT (RS-232C) or CPU PORT (RS-422) |
| STATION # | In accordance with slave address of machine controller.<br>Make sure to set station No. inside range from 1 to 31.<br>Have in mind that station No. "0" is treated as "1". |

- System configuration



In case of CPU unit (MP920, MP930) Machine controller — RS-232C(MEMOBUS)

In case of MEMOBUS unit (CP9200SH, MP920) MEMOBUS unit 217F — RS-232C or RS-422 (MEMOBUS)

GOT
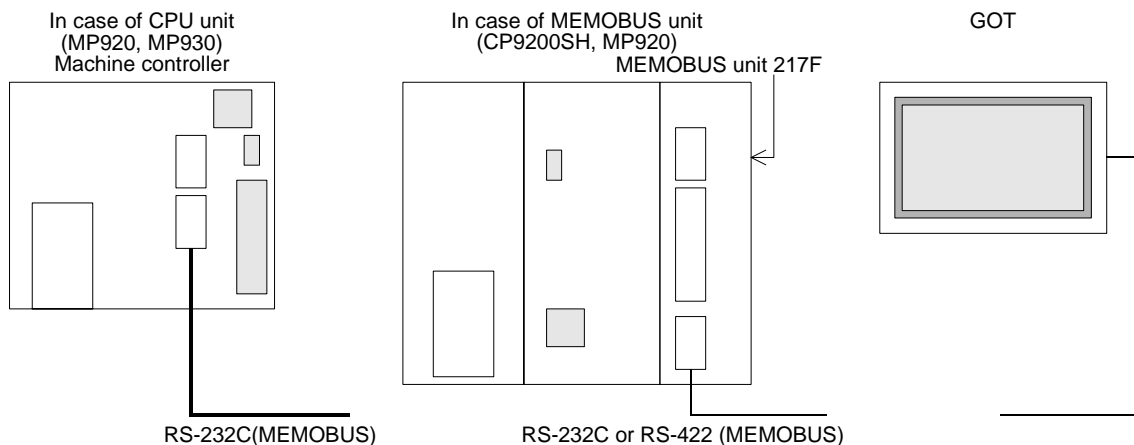
For connection to the GOT, refer to the connection diagram shown below in accordance with the connection port.

**Table 15.11:**

| Model | Unit | Connection port of machine controller | | F930GOT |
|---|---|---|---|---|
| CP9200SH | 217IF | CN1 | RS-232C | Connection diagram 1 |
| | | CN2 | RS-232C | Connection diagram 2 |
| | | CN3 | RS-422 | Connection diagram 3 |
| MP920 | CPU | PORT1 | RS-232C | Connection diagram 1 |
| | | PORT2 | RS-232C | Connection diagram 1 |
| | 217IF | CN1 | RS-232C | Connection diagram 1 |
| | | CN2 | RS-232C | Connection diagram 1 |
| | | CN3 | RS-422 | Connection diagram 3 |
| MP930 | CPU | PORT1 | RS-232C | Connection diagram 1 |
| | | PORT2 | RS-232C | Connection diagram 1 |

<Connection diagram 1> When the MEMOBUS port is the RS-232C (D-sub, 9-pin) type
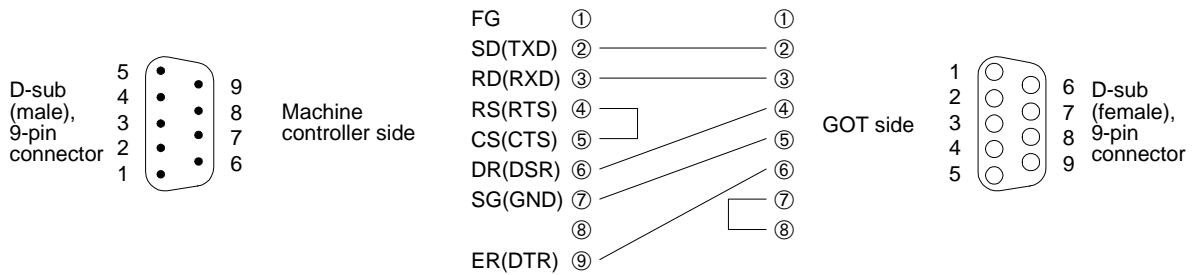
<Connection diagram 2> When the MEMOBUS port is the RS-232C (D-sub, 25-pin) type
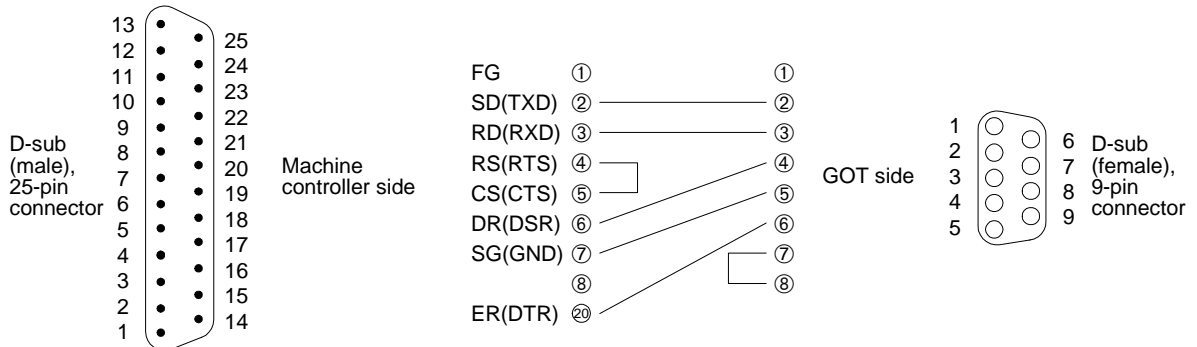
<Connection diagram 3> When the MEMOBUS port is the RS-422 (8-pin) type
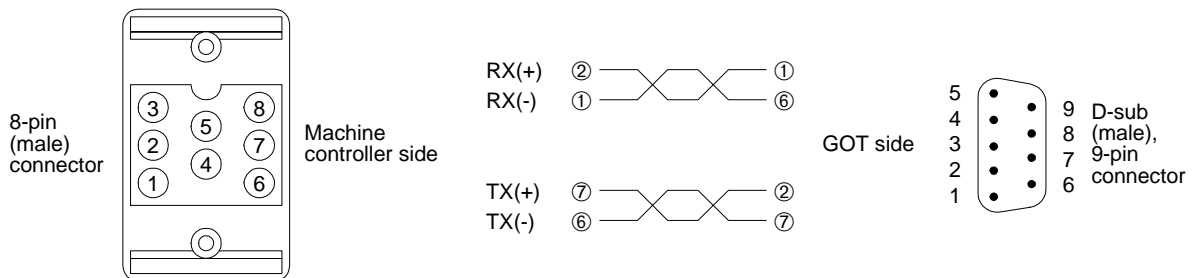
**15.4.2   Support device list**

*Table 15.12:*

| Device | Device No. | Number of points | Range | Radix | Bit | Word | Remarks |
|--------|-----------|------------------|-------|-------|-----|------|---------|
| Input relay | IB | 65535 | 00000 to 0FFFF | HEX | ○ | — | Read only |
| Coil | MB | 65535 | 00000 to 4095F | *1 | ○ | — | |
| Input register | IW | 32767 | 00000 to 07FFF | HEX | — | ○ | Read only |
| Holding register | MW | 32767 | 00000 to 32767 | DEC | — | ○ | |

*1 Word address (DEC) + Bit position (HEX)

*2 Input relays (IB) and input registers (IW) can be monitored only.  They cannot be changed.

## 15.5 Additional function to connect two or more GOT units when micro computer boards are used

In the GOT unit V 3.00 or later, up to four GOT units can be connected at a time when micro computer boards (for general-purpose communication) are used.
(For connection on the one-to-one basis, refer to Paragraph 1.6.6.)

### 15.5.1 Setting when two or more GOT units are connected

When GOT units and micro computer boards are connected on the one-to-one basis

- Connection type

  Perform either one among the followings.

  - When using the screen creation software (DU/WIN-E), set "PLC System" to "Universal".
  - When using the screen creation software (GOTRE-PACK), set the PLC type to "My Computer".
  - When using the GOT unit main body, select "SET-UP MODE" -> "PLC TYPE", and select "UNIVERSAL".

- Setting of communication port

  Perform either one between the followings.

  - When using the screen creation software (DU/WIN-E), select "View" → "System Settings" → "Setup Data", then set the port to "RS232C" or "RS422".
  - When using the GOT unit main body, select "SET-UP MODE" → "PLC TYPE", and set "CONNECTION" to "CPU PORT (RS232C)" or "CPU PORT (RS422)".

  When using the screen creation software (GOTRE-PACK), you cannot set the communication port.

- Setting of communication speed, data length, stop bit length and parity bit

  - When using the screen creation software (DU/WIN-E), select "View" → "System Settings" → "DU Printer".
  - When using the GOT unit main body, select "SET-UP MODE" → "SERIAL PORT".

  When using the screen creation software (GOTRE-PACK), you cannot set the communication condition.
  For each set item, select an either value among those shown below.

*Table 15.13:*

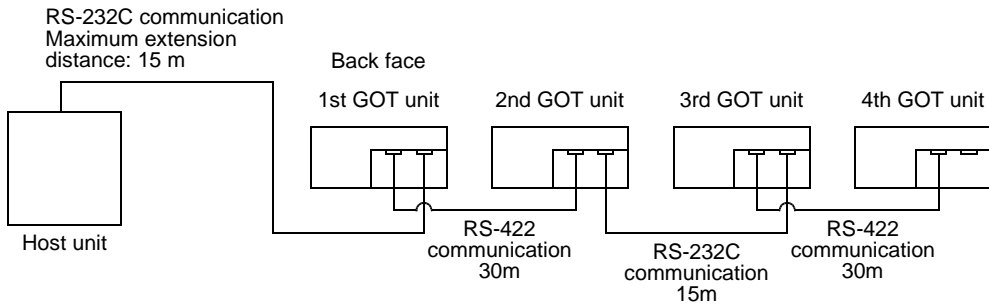| | |
|---|---|
| Transmission speed | 19200, 9600, 4800, 2400, 1200, 600, 300 (bps) |
| Data length | 8 or 7 bits |
| Stop bit length | 1 or 2 bits |
| Parity bit | Even, odd or none |

### Setting when two or more GOT units are connected

- When two or more GOT units are connected, you should set the station No. for each GOT unit.

  Perform either one between the followings.

  - When using the screen creation software (DU/WIN-E), select "View" → "System Settings" → "Setup Data", then set the station No.
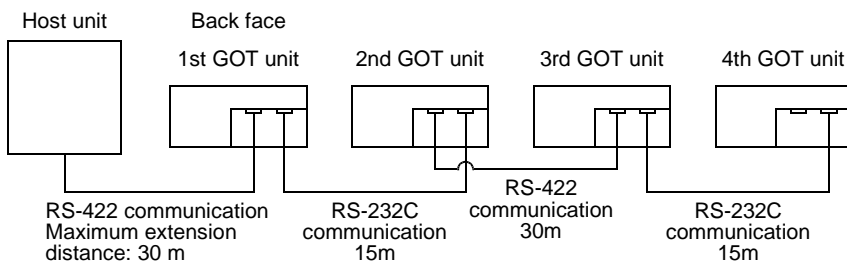  - When using the GOT unit main body, select "SET-UP MODE" → "PLC TYPE", then set "STATION #".

  When using the screen creation software (GOTRE-PACK), set the station No. using the GOT unit main body.

- System configuration

  <When RS-232C communication is adopted between the host unit and the first GOT unit>
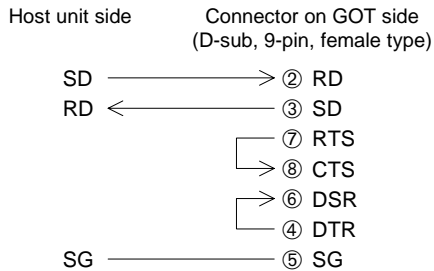
  

  <When RS-422 communication is adopted between the host unit and the first GOT unit>

  

  <Connection diagramV>
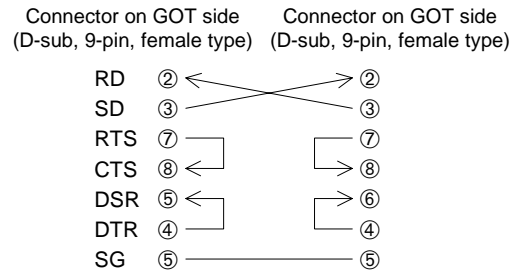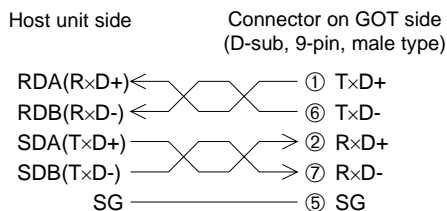
  - Cable between host unit and GOT unit (RS-232C)
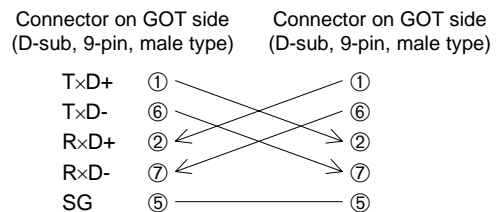    Control lines RTS, CTS, DTR and DSR are not used.

    

  - Cable between GOT unit and GOT unit (RS-232C)

    

  - Cable between host unit and GOT unit (RS-422)

    

  - Cable between GOT unit and GOT unit (RS-422)

### 15.5.2   Communication procedure

• When two or more GOT units are connected (with station No.)

Communication between the GOT units and the host unit is performed in the procedure in which the host unit sends a command with the station No., and the GOT having the specified station No. sends back a response to it.
At first, the 1st GOT unit directly connected to the host unit performs the following to a command sent from the host unit.

- When receiving a command to itself, the 1st GOT unit sends back a response to it.
  Until sending back is completed, the 1st GOT unit does not receive any command from the host unit.

- When receiving a command to another GOT unit, the 1st GOT unit sends the command from the host unit as it is to the 2nd GOT unit connected to another port, and waits for a response to it.

  - When receiving a response, the 1st GOT unit immediately sends the response as it is to the host unit.
    Until sending of the response to the host unit is completed, the 1st GOT unit does not receive any command from the host unit.

  - The timeout time for response is 5 seconds.
    If a response is not given within 5 seconds after sending a command to the 2nd GOT unit, the 1st GOT unit is ready for receiving a command from the host unit.

The 2nd GOT unit and later GOT units perform the same processing as the 1st GOT unit.
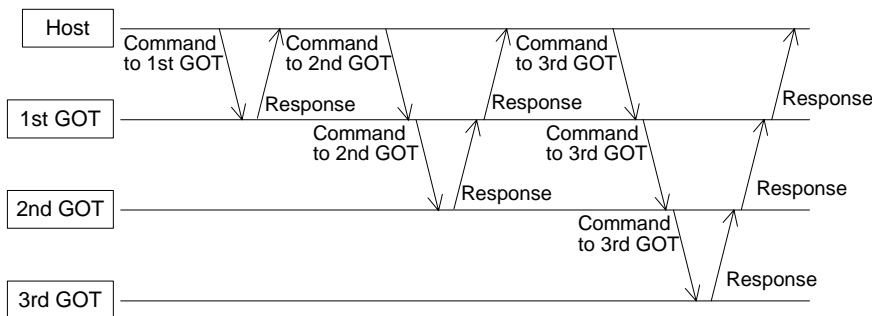


As to notification of interrupt, when a certain event occurs in itself or receiving an interrupt code from another GOT unit, the GOT unit immediately sends the interrupt code to the host unit.
However, while sending a response to the host unit, the GOT unit waits until sending is finished, then sends the interrupt code after sending is finished.
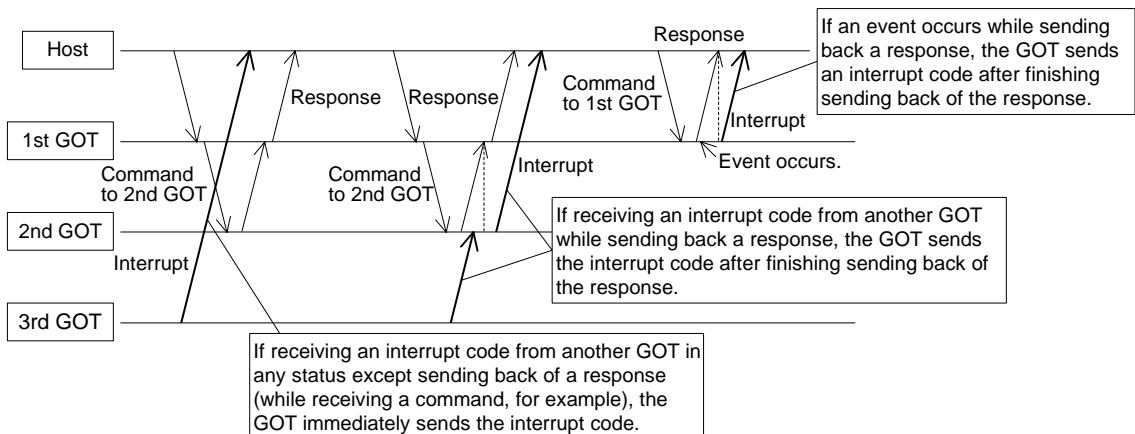


The interrupt code and the event type correspond each other in the same way as connection on the one-to-one basis. If two or more GOT units share the interrupt codes, you should set them properly so that they do not overlap.

### 15.5.3   Communication command

When two or more GOT units are connected, use the following commands.
(Refer to Paragraph 1.12.)

• Read with station No. ····Read the data stored in the GOT having the specified station No.

Command

| STX | 'A' | Station No. | | Read address | | Size | CR |
|-----|-----|-----|-----|-----|-----|-----|-----|

Type 2 may be used.

'A' at the head indicates a read command with station No.

Station No.     Using ASCII codes, specify the GOT station No. (decimal).
For example, if the station No. is 01, input '0 + 1'.  If the station No. is 15, input '1 + 5'.

Read address     Using ASCII codes, specify the head address of the data (hexadecimal) stored in the GOT.
The read address should be specified in turn from the upper digit.

Size     In the unit of byte, specify the size of the read data (01H to FFH).  The maximum allowable size is 255 bytes.
The size should be specified in the order of upper digit and lower digit in ASCII codes.
For example, if the size is 8AH (= 138) bytes, input '8 + A'.

Response

| STX | Data 1 | Data 2 | ·························· | CR |
|-----|--------|--------|------|-----|

Data     The data stored in the specified address is stored in turn.
1-byte data is converted into ASCII codes, and stored in the order of upper digit and lower digit.

Example:  When 2-byte data is read from the address 12EH in the GOT unit having the station No. 01 (format = Type 2)

Command

| STX | 'A' | '0' | '1' | '0' | '1' | '2' | 'E' | '0' | '2' | ETX | 'D' | 'F' |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 02H | 41H | 30H | 31H | 30H | 31H | 32H | 45H | 30H | 32H | 03H | 44H | 46H |

Sum = DFH

Memory inside GOT

| 12E | 5A |
|-----|----|
| 12F | 38 |

Response

| STX | '5' | 'A' | '3' | '8' | ETX | 'E' | '4' |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 02H | 35H | 41H | 33H | 38H | 03H | 45H | 34H |

Sum = F4H

Each data is expressed in hexadecimal.

12EH stores the upper side of the word data D151.  12FH stores the lower side of the word data D151.
The value of D151 is 5A38H (= 23096).

• Write with station No. ···· Overwrite the data stored in the GOT having the specified station No.

Command

| STX | 'B' | Station No. | Write address | Size | Data 1 | --------- | CR |
|-----|-----|-------------|---------------|------|--------|-----------|-----|

Type 2 may be used.

"B" at the head indicates a write command.

Station No.     Using ASCII codes, specify the GOT station No. (decimal).
                For example, if the station No. is 01, input "0 + 1".  If the station No. is 15, input "1 + 5".

Write address   Using ASCII codes, specify the head address of the data (hexadecimal) stored in the GOT.
                The write address should be specified in turn from the upper digit.

Size            In the unit of byte, specify the size of the write data (01 to FFH).  The maximum allowable size is 255 bytes.

Data            Sort the write data in the ascending order of address.
                Convert 1-byte data into ASCII codes, and sort it in the order of upper digit and lower digit.
                The maximum allowable number of data is 256 (512 after converted into ASCII codes).

Response

| ACK |
|-----|

---

Example:  When 2-byte data is written to the address 120H in the GOT unit having the station No. 01 (format = Type 2)

Command

| STX | 'B' | '0' | '1' | '0' | '1' | '2' | '0' | '0' | '2' | '3' | 'E' | '7' | '5' | ETX | 'A' | 'F' |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 02H | 42H | 30H | 31H | 30H | 31H | 32H | 30H | 30H | 32H | 33H | 45H | 37H | 35H | 03H | 41H | 46H |

Response

| ACK |
|-----|
| 06H |

Memory inside GOT

| 120 | 3E |
|-----|-----|
| 121 | 75 |

Each data is expressed in hexadecimal.

120H stores the upper side of the word data D144.  121H stores the lower side of the word data D144.
The value of D144 after write is 3E75H (= 15989).

---

### 15.5.4  Memory map

In addition to the memory map described in Paragraph 1.12, the following addresses are added.

- Clock data
  Version of GOT unit main body: V 1.00 or later

***Table 15.14:***

| 3000 | Clock (second) | 0 to 59 |
|------|----------------|---------|
| 3002 | Clock (minute) | 0 to 59 |
| 3004 | Clock (hour) | 0 to 23 |
| 3006 | Clock (day) | 0 to 31 |
| 3008 | Clock (month) | 0 to 12 |
| 300A | Clock (year) | 1980 to 2079 |
| 300C | Clock (day of week) | 0 (Sunday) to 6 (Saturday) |

- Special memory
  Version of GOT unit main body: V 3.00 or later

***Table 15.15:***

| M8052 | Interrupt code output prohibition flag<br>While this bit is ON, GOT unit does not send interrupt codes to host unit. |
|-------|---------------------------------------------------------------------------------------------------------------|
| M8002 | Contents of communication error<br><br>100 or larger  : Contents of communication error occurred in connected GOT unit<br>                                (when two or more GOT units are connected)<br>101  : Parity error<br>102  : Framing error<br>103  : Overrun error<br>104  : Transmission sentence format is incorrect.<br>105  : Timeout error (Command does not specify station No.)<br>106  : Commands for connection of two or more GOT units are not available.<br>          (Port is occupied by bar code reader, printer, etc.) |

# MEMO

# USER'S MANUAL

F930GOT-BWD-E

**MITSUBISHI ELECTRIC CORPORATION**

Effective Nov. 2000
Specification are subject
to change without notice.