SR Mini SYSTEM

Operation panel

OPM

Instruction Manual

INTRODUCTION

Thank you for purchasing the "**SR Mini SYSTEM Operation Panel**".

This manual explains the operation panel instruction and installation used when operating the "**SR Mini SYSTEM Operation Panel**".

Prior to the "**SR Mini SYSTEM Operation Panel**", please carefully read this manual and fully understand the contents. Keep this manual safely for future reference as required.

USERS OF THIS MANUAL

This manual is written for all personnel who operate the "**SR Mini SYSTEM Operation Panel**", and have a fundamental knowledge of electrical, communication and control engineering.

CAUTIONS

● This manual is subject to change without prior notice.

● Examples of figures, diagrams and numeric values used in this manual are only for a better understanding of the text, but not for assuring the resultant of operation.

● This manual may not be reproduced or copied in whole or in part without RKC's prior consent.

● This instrument and manual are manufactured, prepared, then shipped under strict quality control.
However, if any defect is found, please contact your nearest RKC sales office or agent from which you bought the system.

● RKC assumes no responsibility for any of the following damages which the user or third party may suffer.

(1) Damage incurred as a result of using this instrument.

(2) Damage caused by the failure of the instrument which cannot be predicted by RKC.

(3) Other indirect damage.

● If there is any conflict between the screens described in this manual and those on the product, the screens on the product take priority over the screens in this manual.

⚠ WARNING

● WIRING PRECAUTIONS

· If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.

· In order to prevent instrument damage or failure, protect the power line and the input/output lines from high currents by using fuses with appropriate ratings.

● POWER SUPPLY

· In order to prevent instrument damage or failure, supply power of the specified rating.

· In order to prevent electric shock or instrument failure, do not turn on the power supply until all of the wiring is completed.

● INSTALLATION ENVIRONMENT

In order to prevent fire, explosion or instrument damage, never use this instrument at a location where flammable or explosive gases or vapour exist.

● NEVER TOUCH THE INSIDE OF THE INSTRUMENT.

In order to prevent electric shock or burns, never touch the inside of the instrument. Only RKC service engineers can touch the inside of the instrument to check the circuit or to replace parts. High voltage and high temperature sections inside the instrument are extremely dangerous.

● NEVER MODIFY THE INSTRUMENT.

In order to prevent accident or instrument failure, never modify the instrument.

● MAINTENANCE

· In order to prevent electric shock, burns or instrument failure, only RKC service engineers may replace parts.

· In order to use this instrument continuously and safely, conduct periodic maintenance. Some parts used in this instrument have a limited service life and may deteriorate over time.

INSTRUMENT SAFETY CAUTIONS

● This instrument is designed to be mounted on instrumentation panels. It is therefore manufac-
tured as part of the final product to facilitate wiring. This means that unauthorized personnel
can easily access the high–voltage sections in this instrument such as power terminals, etc.
Therefore, when this instrument is installed on the final product, the user should take the
necessary measures for the final product to ensure that unauthorized personnel cannot access
the high–voltage sections, etc.

● In order to use this instrument correctly and safely, always observe the cautions described in
this manual when performing operations and maintenance.
RKC assumes no responsibility for any injury or accident resulting from not following these
cautions.

NOTES ON INDICATIONS

The following indications are used in this manual to ensure the safe, correct use of the SR Mini SYSTEM
Operation Panel.

<Signal Words>

WARNING : Where there are possible dangers such as electric shock, fire (burns), etc. which
could cause loss of life or injury, precautions to avoid such dangers are described.

CAUTION : These describe precautions to be taken if unit damage may result if operating
procedures are not strictly followed.

NOTE : Extra notes or precautions are added to operating procedures and explanations.

<Symbol Mark>

⚠ : This mark is used when great care is needed especially for safety.

✳ : This mark is used to add extra notes, precautions or supplementary explanations
to table and figures.

OPERATING CAUTIONS

■ This instrument is intended to be used under the following environmental conditions.(IEC1010)
[OVERVOLTAGE CATEGORY II, POLLUTION DENGREE 2]

■ In order to prevent electric shock or instrument failure, do not switch on the power until all wiring is completed.

■ In order to prevent breakdown, electric shock and fire when installing this device, read the precautions and installation method carefully and install with the correct method in a proper location.

■ In order to prevent instrument damage or failure, do not drop the instrument or do not give a strong shock to the instrument.

■ Have all wiring performed by personnel who have been educated in the necessary basics of electricity and who are experienced in the field work.

■ To the instrument with power supply of 24V, please be sure to supply the power from SELV circuit.

■ Before cleaning the instrument, check that the power is turned off.

■ Remove stains on the display unit using a soft cloth or tissue paper.

■ As the display unit is easily scratched, do not scrub or touch it with a hard object.

■ Press the touch switches lightly to avoid damaging them.

■ In order to prevent scratches and damage, do not press the touch switches with anything other than fingers.

■ The stains on the housing shall be wiped off by the cloth which is dipped into the neutral cleanser diluted by water and wrung tightly, and finish it by a dried cloth.

■ Do not spray insecticide or clean the operation panel with a volatile organic solvent (thinner or benzene), chemicals or chemical dustcloth to avoid damaging or discoloring the panel.

■ Avoid the following when selecting the mounting location:

  ● Ambient temperature of less than 0 ℃ or more than 50 ℃ .

  ● Ambient humidity of less than 45 % or more than 85 % RH.

  ● Rapid changes in ambient temperature which may cause condensation.

  ● Corrosive or flammable geses.

  ● Direct vibration or shock to the mainframe.

  ● Water, oil, chemicals, vapor or steam splashes. *

  ● Excessive dust, salt or iron particles. *

  ● Excessive induction noise, static electricity, magnetic fields or noise.

  ● Direct air flow froman air conditioner.

  ● Outdoors where the system is exposed to direct sunlight.

  ● Heat to be accumulated due to radiation heat.

  * The front operation panel has a dustproof, splashproof construction equivalent to IP55 when the instrument is mounted on the panel, allowing it to be used safety even in harsh environments.

■ Separate the grounding of this instrument from that of high–voltage eqipment. Ground this instrument separately from other equipment so that its grounding resistance is 100 Ω or less.

■ Take adequate measures to prevent noise affecting this instrument.

● As input signal wires may be easily affected by external noise, keep them as far from high–voltage wires for equipment and load wires as possible.

● If this instrument is considered to be affected by noise, use a noise filter if necessary.

Name and number of this instruction manual:

Name : **Operation Panel Instruction Manual**

Manual number : **IMSRM03–E5**

■ Revisions

Date of revision	Manual number	Reason for revision
September 29, 1994	**IMSRM03–E1**	The First edition issue
February 14, 1995	**IMSRM03–E2**	Addition of the "Supplementary Manual" Modification of figures on the screen
April 28, 1995	**IMSRM03–E3**	Operation monitoring screen : Additional description of the operation monitoring menu screen Setting screen : Additional description of the LBA setting screen and simultaneous setting function Additional description and change of screens in the "Supplementary Manual"
July 14, 1995	**IMSRM03–E4**	Clerical error correction
May **, 1999	**IMSRM03–E5**	· Change of the content of previous text. · Revision of clerical errors.

CONTENTS

MEMO

Chapter 1

OUTLINE

1. OUTLINE

1.1 Features

This equipment is the operation panel of the FAREX SR Mini SYSTEM. Through connection with the control unit, various data monitoring and setting, operation and alarm monitoring, etc. can be carried out.

Easy operation using the transparent touch panel

By touching the transparent touch panel on the display of this operation panel equipment, operations such as changing the settings and switching the displays can be performed. Operations can be easily carried out using the sensation of conducting a dialog with the display.

In addition, a feeling that an operation has surely been carried out is obtained due to the "Peep" sound that is given out each time a key is touched.
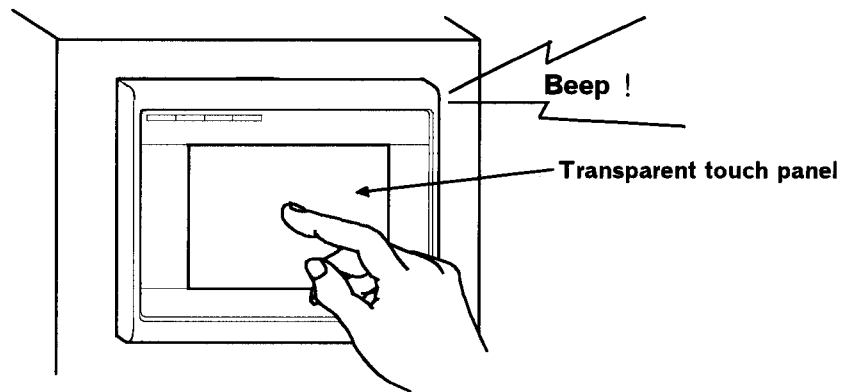
Full range of interfaces (Option)

It is possible to select the interface with a host computer from one of the RS–232C, RS–485 or RS–422A interface types.

For the communication speed, the 4 types of 2400bps, 4800bps, 9600bps or 19200bps are available.

Availability of exclusive screen protection sheets (Option)

This product has a dustproof, splashproof construction equivalent to IP55, and so it can be used even in environments exposed to much water or oil.

However, in order to prevent the instrument from scratches or contamination, cover it with a special replaceable protective sheet.
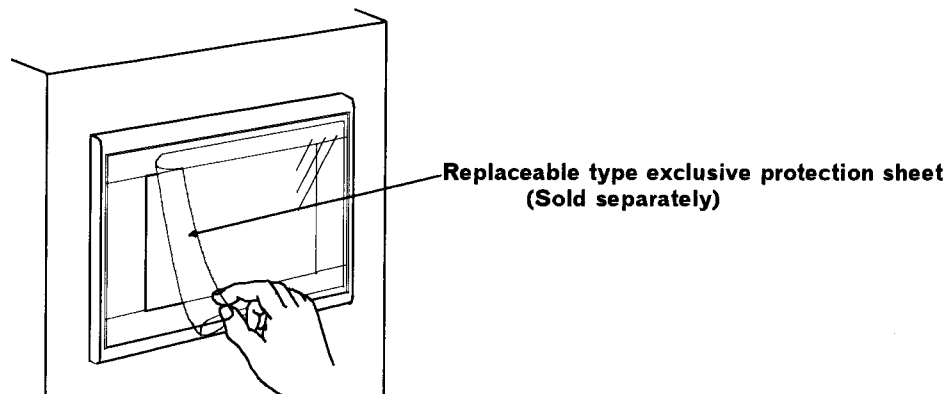
1.2 Handling procedure

Proceed with the work according to the following procedures .

① **Confirmation of the accessories**
　　　　See Chapter 1: "1.3 Confirmation of the products" (Page 1−4).

② **Confirmation of the model code**
　　　　See Chapter 1: "1.5 Model code" (Page 1−6).

③ **Mounting and wiring**
　　　　See Chapter 2: "MOUNTING AND WIRING" (Page 2−1).

④ **Preparations before operation**
　　　　See Chapter 3: "OPERATIONS" (Page 3−1).

⑤ **Switch ON the power**
　　　　See Chapter 3: "OPERATIONS" (Page 3−1).

⑥ **Settings concerning the communications**
　　　　See Chapter 3: "OPERATIONS" (Page 3−1).

⑦ **Operations**
　　　　See Chapter 3:"OPERATIONS" (Page 3−1), and
　　　　　　Chapter 4:"METHOD OF OPERATION" (Page 4−1).

* When carrying out the above procedure, be sure to follow each of the caution items.

1.3 Confirmation of the products

When first opening the packing box, confirm that the following products are all included. In the worst case, if any of the packaged products are missing or damaged, or if there are missing pages or erratic pagination in the manual, etc., please contact your nearest RKC sales office or agent from which you bought the instrument.

● **SR Mini SYSTEM   Operation panel main unit**   ....   The number of units ordered
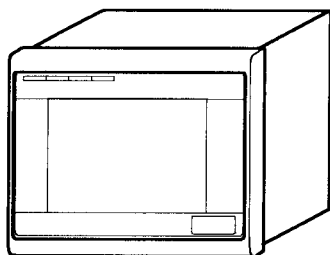
● **Operation panel mounting brackets**   ....   4 brackets for each 1 operation panel
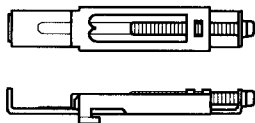
● **Operation Panel Instruction Manual (This   Manual : IMSRM03‐E5)**   ....   1 copy
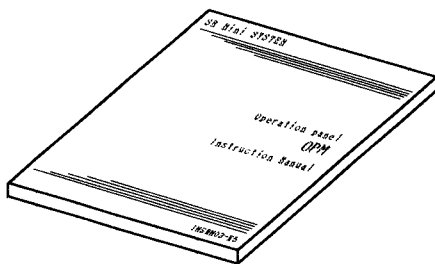
● **Modular connector cable (Sold separately)**   ....   1 cable for each 1 operation panel
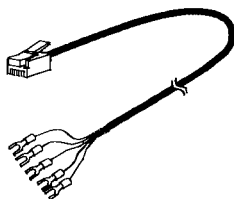
1.4 Manual configuration (Instruction manuals)

The composition of the SR Mini SYSTEM instruction manuals are as shown below.
Refer to each of the manuals when necessary. Additionally, if a required manual is not included,
it can be requested from your nearest RKC sales office or agent from which you bought the
instrument.

● Concerning the mounting and operation of SR Mini SYSTEM control unit
   .... Hardware Instruction Manual (IMSRM02-J □) and Installation
     Manual (IMSRM01-J □)

● Concerning the operation of the SR Mini SYSTEM communications
   .... Communications Instruction Manual (IMSRM04-J □)

● Concerning the operation of the operation panel of the SR Mini SYSTEM
   .... Operation Panel Instruction Manual (This manual)

1.5 Model code

Confirm whether the delivered product is the model that was ordered by referring to the following model code list.

In the worst situation, if the delivered product differs from the required specification, please contact your nearest RKC sales office or agent from which you bought the instrument.

OPM– ☐ ☐ ☐ *☐ / **E**
         ①   ②   ③

① **CL1: Monochrome LCD display**
   CL3: Blue LCD display

② **Communication protocol for a host computer**
   N: No function
   1: RS–232C
   4: RS–422A
   5: RS–485

③ **Screen display type**
   E : English characters

*The OPM is provided with two alarm relay contact outputs as standard.
 The details of the alarm output are those set by the control unit.

*The communication protocol for the control unit should conform to RS–422A.

1.6 System configuration

■Operation panel & Control unit

Operation panel(OPM)   Control unit *

16 units max.

Function modules: 10 modules max.

■Host computer & Operation panel & Control unit

Host computer   Operation panel(OPM)   Control unit *

16 units max.

Function modules: 10 modules max.
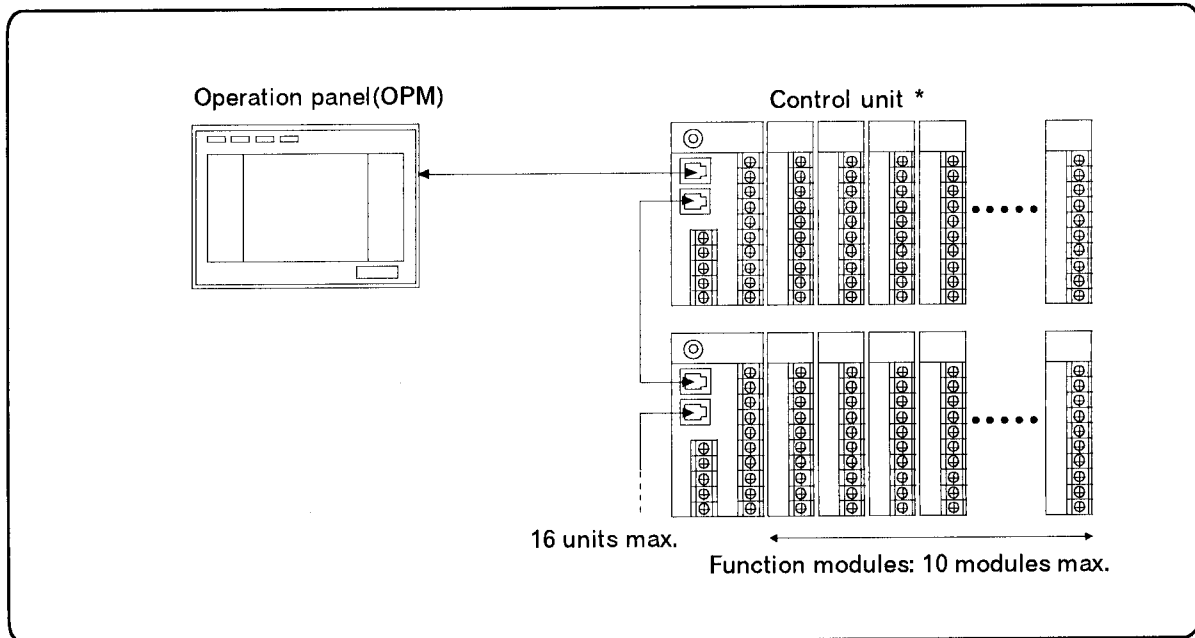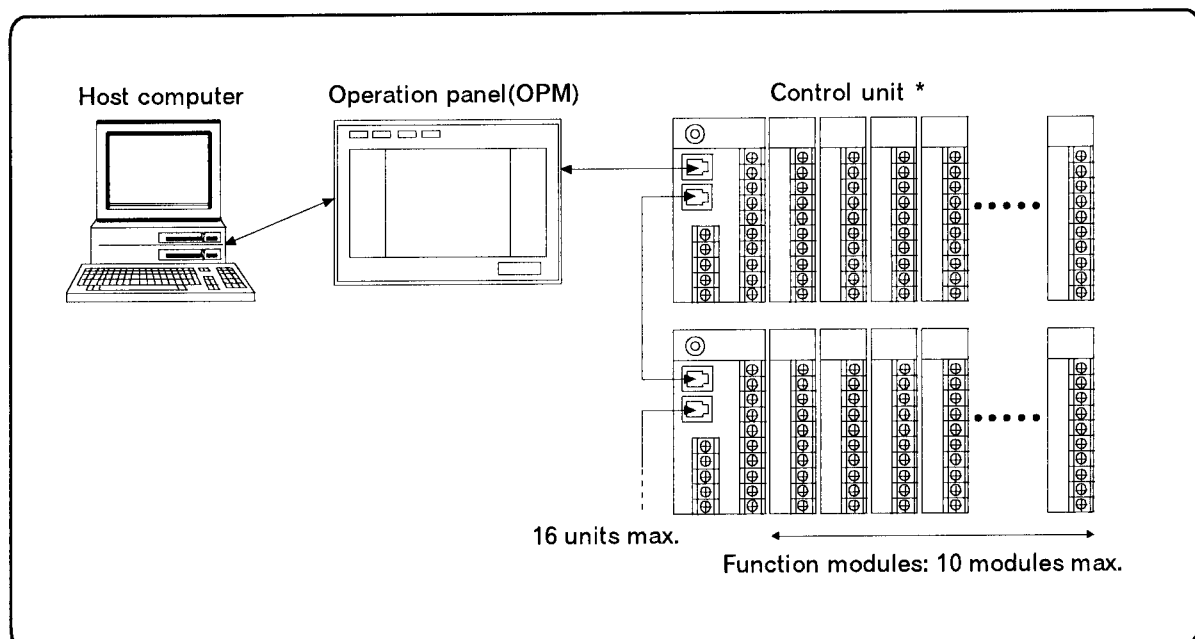
* Note that this operation panel cannot connect any control units other than TIO(A, B, C or D type), CT, DI and DO.

1.7 Name of parts
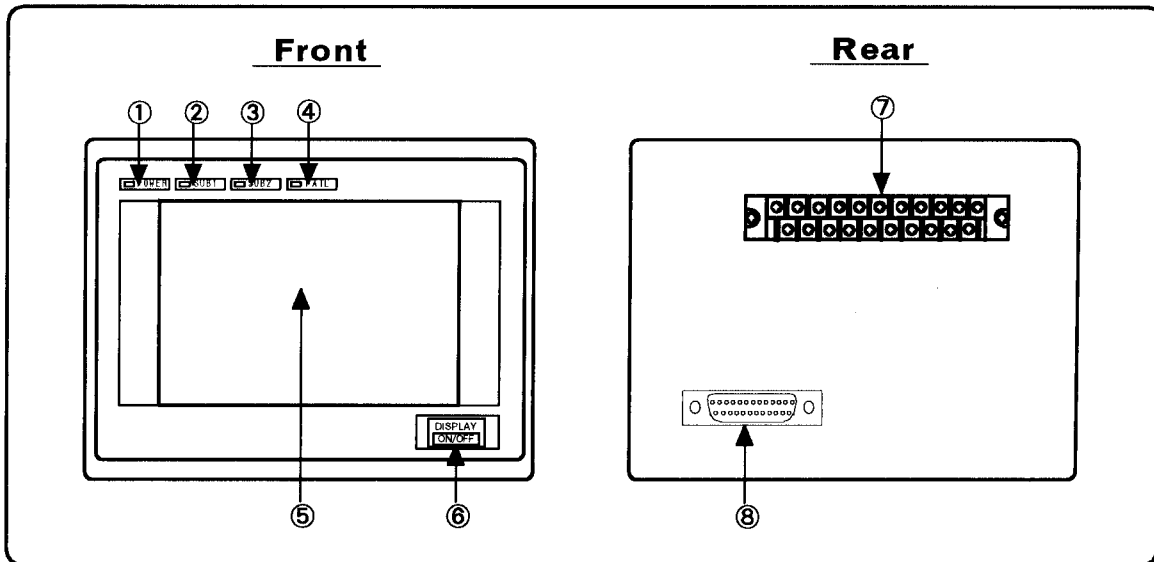
No.	Name	Description
①	Power indicator lamp	Lights when the operation panel is turned on. (Green)
② ③	SUB 1 indicator lamp SUB 2 indicator lamp	Lights during alarm output. (Red)
④	Failure output indicator lamp	Lights when there is an abnormality in the operation panel. (Red)
⑤	Display/touch panel	Displaying and setting unit for all data.
⑥	DISPLAY screen ON/OFF switch	Switch that changes between displaying or not displaying the display screen.
⑦	Terminal board	Terminals to connect grounding, power, SUB1 output, SUB2 output, FAIL output wires and communication connections with the control unit.
⑧	Host computer communication connector	Connector to connect the host computer. One of the RS-232C, RS-422A, and RS-485 connectors can be specified.

CHAPTER 2

MOUNTING AND WIRING

2. MOUNTING AND WIRING

⚠ **WARNING**

In order to prevent electric shock or instrument failure, always turn off the power before mounting or removing the operation panel.

2.1 Cautions for mounting

(1) Mounting environment

Avoid the following when selecting the mounting location.

● Ambient temperature of less than 0 °C or more than 50 °C .

● Ambient humidity of less than 45% or more than 85% RH.

● Rapid changes in ambient temperature which may cause condensation.

● Corrosive or inflammable gases.

● Direct vibration or shock to the mainframe.

● Water, oil, chemicals, vapor or steam splashes. *

● Excessive dust, salt or iron particles. *

● Excessive induction noise, static electricity, magnetic fields or noise.

● Direct air flow from an air conditioner.

● Should be used indoors where the system is not exposed to direct sunlight.

● Heat to be accumulated due to radiation heat.

* The front operation panel has a dustproof, splashproof construction equivalent to IP55 when the instrument is mounted on the panel, allowing it to be used safely even in harsh environments.

(2) Mounting cautions

When mounting the instrument within the panel, take into account the following.

● Allow enough ventilation space to radiate heat from around the instrument. Allow a minimum of 50 mm on the left and right and 80 mm on the top and bottom.

More than 80 mm

More than 50 mm

This product

More than 50 mm

More than 80 mm

▨ : Top of panel, wiring ducts, other equipment, etc.
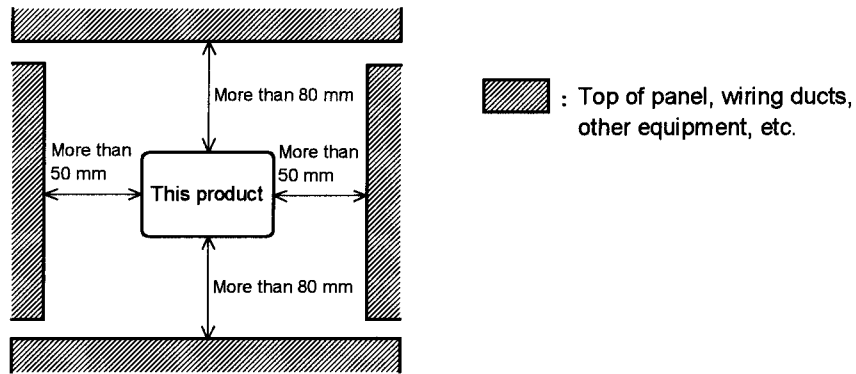
● Do not mount the instrument directly above equipment which generates much heat (heaters, transformers, semiconductor drive units, large resistors etc.).

● If the ambient temperature exceeds 50 ℃ , cool the panel inside using forced fans or coolers. However, do not directly expose the instrument to cooled air.

● In order to improve the noise rejection characteristics and safety, mount the instrument as far away from high−voltage equipment, power lines or rotating machinery as possible.

High−voltage equipment:	Do not install it in the same panel as the instrument.
Power line:	Mount the instrument more than 200 mm away from power lines.
Rotating machinery:	Mount the instrument as far away from rotating machinery as possible.

(3) Mounting angle

Mount the operation panel within 30° in the forward direction, 90° in the backward direction, or 45° in the right or left direction to prevent malfunction.

Front

Within 45°   Within 45°

Side

Within 30°   Within 90°
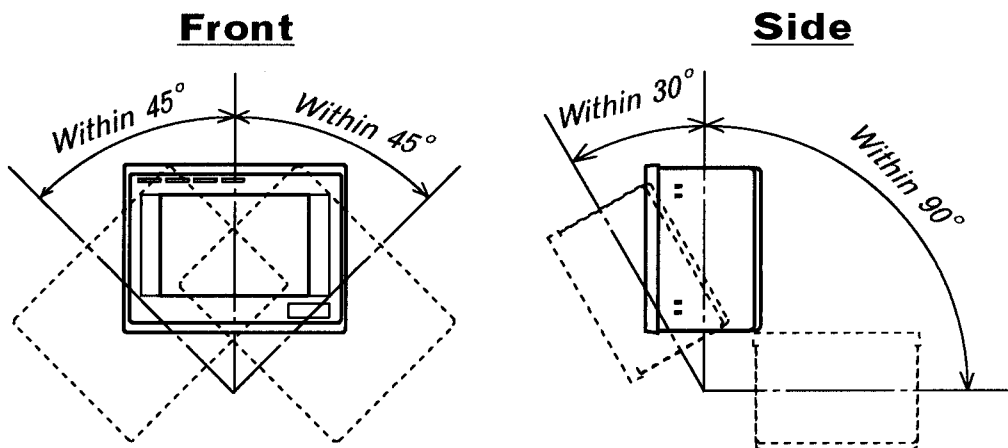
2.2 Mounting

(1) Dimensions

185.3

(Unit : mm)

*Take as much mounting space as possible in
 consideration of cable lengh, operability on safety.

192

144

114

12 85

137.3 151

*

External dimensions

More than 50

186$^{+1.1}_{0}$

(Unit : mm)

138$^{+1.0}_{0}$

More than 80

Thickness of panel board : 10mm (max.)
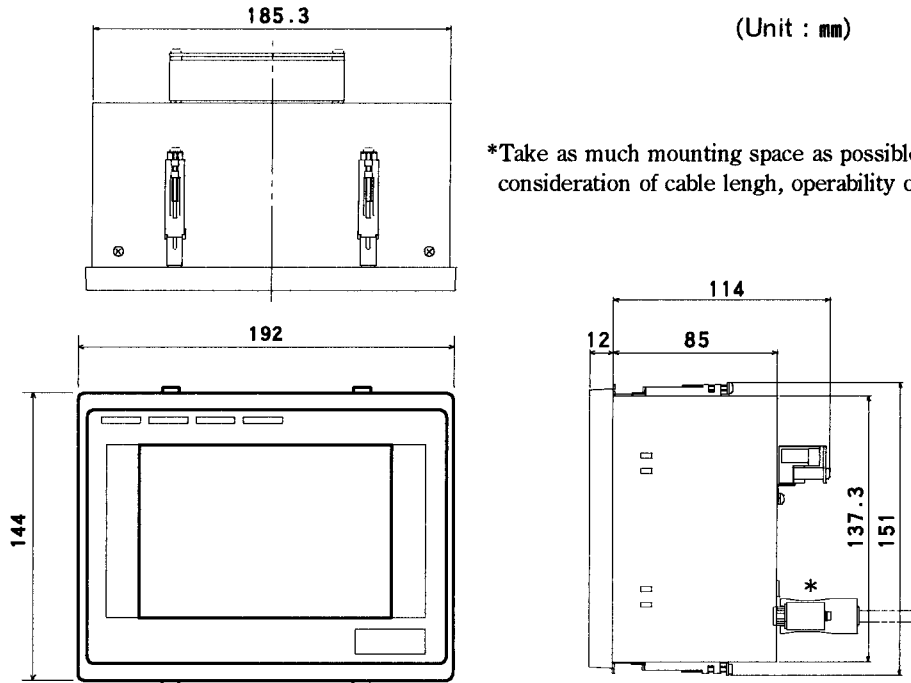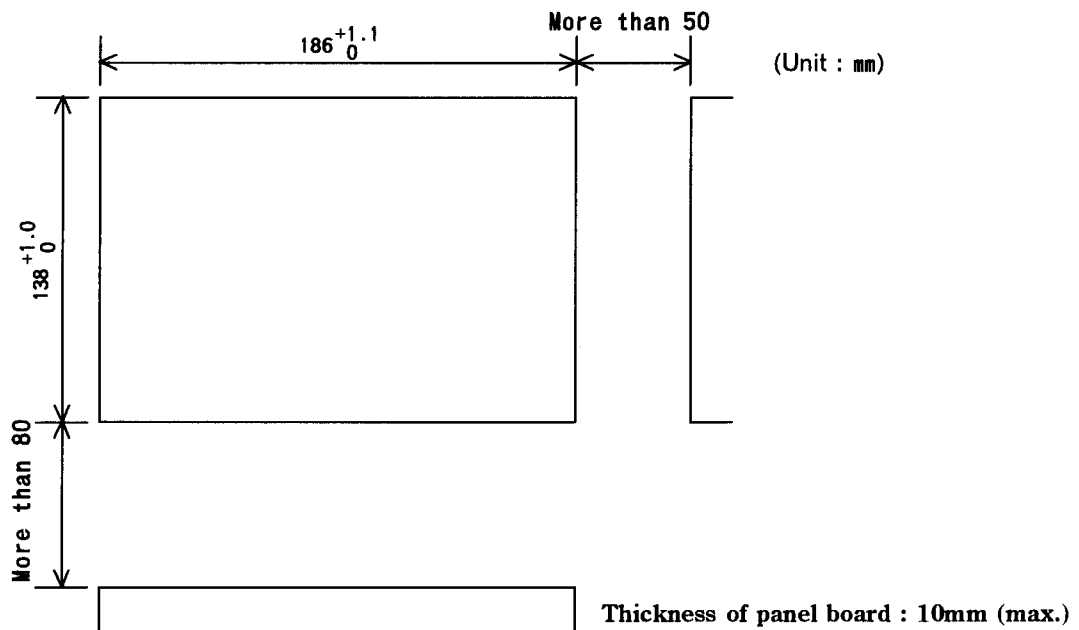
Panel cutout dimensions

(2) Mounting method

⎡ **CAUTION** ⎤

The maximum thickness of panel (applicable range of mounting brackets) to be mounted with the instrument is 1 to 10 mm. In order to improve safety, splashproof and dustproof effects, mount the instrument is as thick a panel as possible.

① Prepare 4 mounting brackets supplied with the operation panel.

Tightening screw
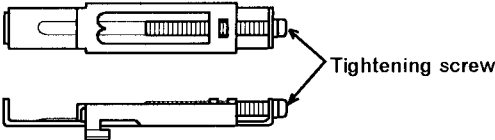
Mounting brackets .... 4 brackets
(Attached to the operation panel)

② Make a panel cutout through the panel by referring to the panel cutout dimensions.

③ Insert the operation panel main unit into the front face of the mounting panel.

Mounting panel
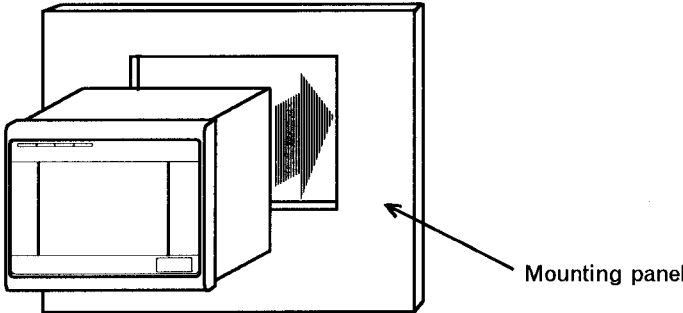
④ The mounting brackets should be attached in 2 places on each of the top and bottom surfaces, and also in 2 places on both side surfaces. (Total of 4 locations)

Front

Mounting brackets

Mounting panel — Slot
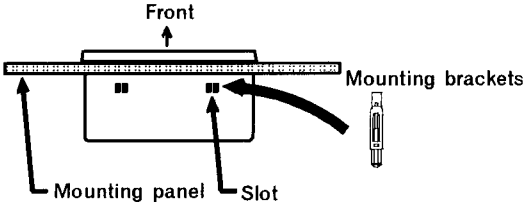
⎡ **NOTE** ⎤

There are eight holes (A to H) to insert mounting brackets.
Select two holes each for the top and bottom (4 holes in total) or two holes each for the left and right sides (4 holes in total) depending on the mounting surface condition and mounting location.

Positions of the
mounting brackets
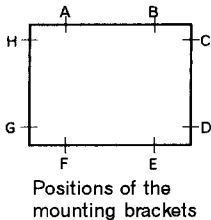
③ Tighten each bracket setscrew using a Phillips screwdriver to secure the operation panel.

║CAUTION║

Tighten the bracket setscrew so that the thickness of the dustproof packing is uniform, otherwise the operation panel may not be fully dustproof and splashproof.
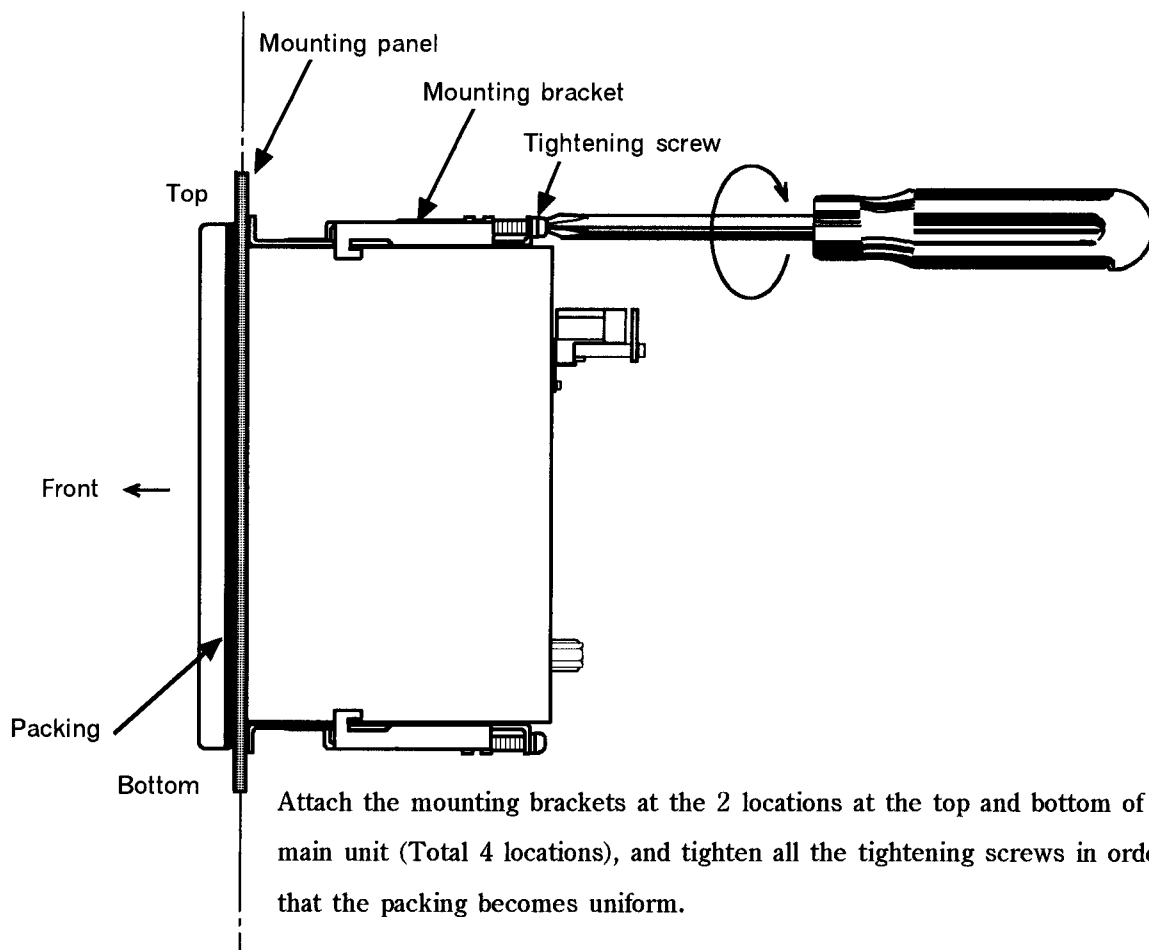
Attach the mounting brackets at the 2 locations at the top and bottom of the main unit (Total 4 locations), and tighten all the tightening screws in order that the packing becomes uniform.

│ Tightening torque (Recommended value) : 0.3N · m (3kgf · cm) │

2.3 Cautions for wiring

⚠ **WARNING**

In order to prevent electric shock or instrument failure, do not turn on the power before all the wiring is finished.

(1) Measures for noise

Noise may adversely affect electronic equipment, causing equipment malfunction and many problems such as lost profit due to decrease in productivity, time loss, etc.

Therefore the source of noise must be eliminated wherever possible.

<Measures for suppressing power supply noise>

If a noise source is near the instrument and could affect the instrument, use a noise filter.

(Select the noise filter after checking the power supply voltage of the instrument*)

Noise suppression is more effective if an insulating transformer is also used.

*Sufficient effect may not be obtained depending on the filter used. Therefore, select the suitable filter by referring to the filter frequency characteristics.

Power supply for this instrument — Use lead wires that have been twisted — Insulating transformer — IN — **Noise filter** — OUT — Power supply terminals on this instrument — Shorten the pitch — Shorten as much as possible
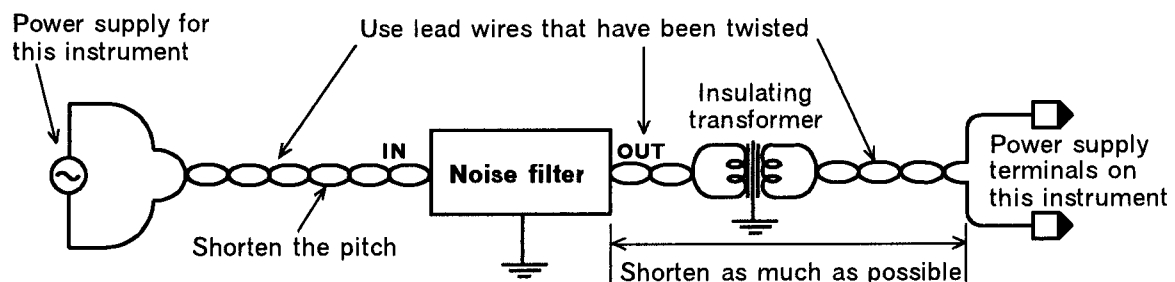
CAUTIONS

● If the instrument is likely to be affected by noise, twist the power supply leadwires used for connections to reduce the noise.
The shorter the twists, the more effective the noise suppression. In addition, always ground the noise filter and insulating transformer.

● Always install the noise filter on the grounded panel. Also minimize the wiring distance between the noise filter output side and instrument power supply terminals to ensure the effectiveness of the noise filter.

● Do not connect fuses or switches on the wiring of the noise filter output side, since these may reduce the effectiveness of the noise filter.

<**Measures for noise in input/output signal wires**>

● Use independent ducts for the input/output wires and power circuits inside and outside the panel.

● If input/output wires have to be placed in the same duct as the power circuits, use shielded wires.
Also ground the shield to reject any noise generated by the floating capacitance between the cores and shield or by a grounding potential.

[Example : When signal source is grounded] Connect the signal source to the grounding side.
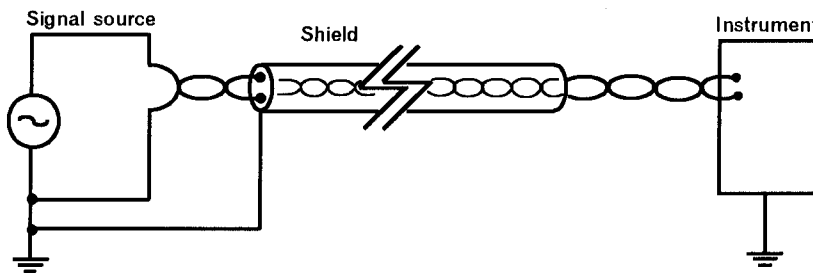
[Example : When signal source is not grounded] Ground the signal source on the instrument side.
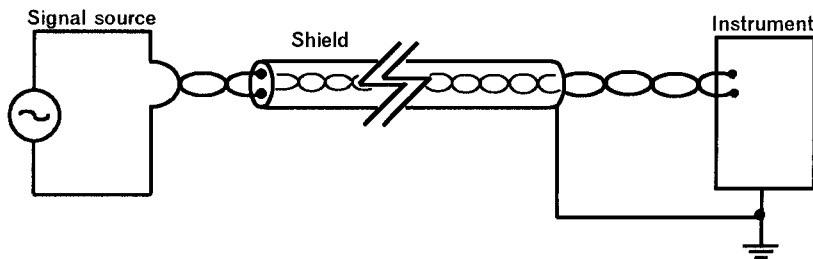
(2) Power supply line wiring

● Use a power supply is within the power supply voltage variation range.
90 to 264 V AC [Including power supply voltage variations], Common 50/60 Hz
(Rating : 100 to 240 V AC)

● For power supply wires, use twisted wires with low voltage drop.

● For eliminating noise contained in the power supply use an insulating transformer.
It is recommended to reject the noise before supplying the power to the unit.

● Separate each of the instrument power supply line, input/output circuit power supply line, equipment and motor power supply line, and operating circuit power supply line.

(3) Ground wiring

● Do not ground the instrument together with other equipment.
The full grounding effect may not be produced depending on the grounding method.

Dedicated grounding:
Suitable

Common grounding:
Not suitable
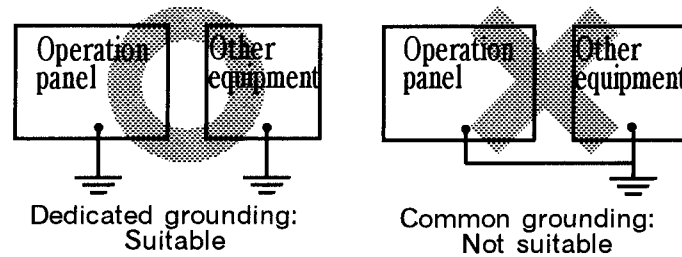
● Do not mix this grounding wire with other grounding wires. Ground this grounding wire to a grounding resistance 100 Ω or less.

● Do not use the same grounding wire as that for high-voltage equipment such as motors, etc.

● Do not ground grounding wires so that they form a grounding loop. Ground each wire at one point.

● The ground resistance is 100 Ω or less as shown in the following figure.

● Use grounding wires with a cross section of 2.0 ☒ or more.

(4) FAIL output wiring

Configure the FAIL output in the external relay circuit so that a failure or error in the instrument does not affect the entire system, and configure an emergency stop circuit.

2.4 Wiring

(1) Terminal configuration
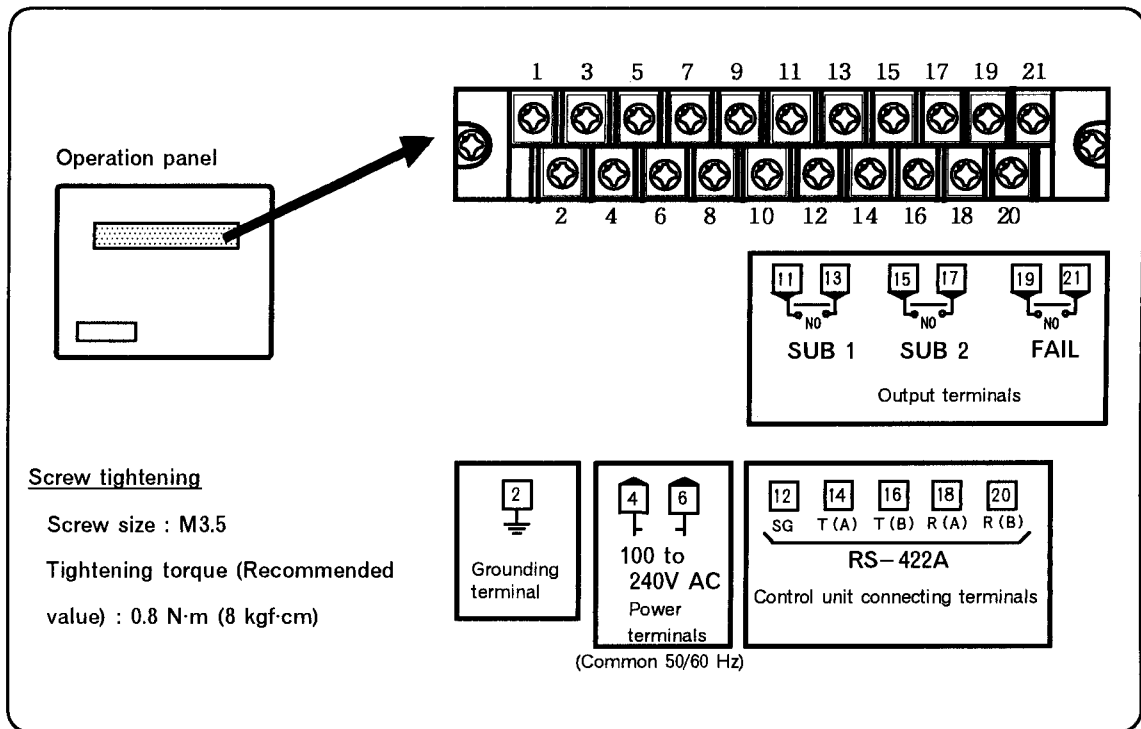
*1: The SUB output is provided so that an alarm occurring in the control unit or the temperature rise completion signal is contact output even to the operation panel.
For details on SUB output assignment, see OPM initialize "SUB output setting" in the supplementary manual.

$$\left[\begin{array}{l} \text{Relay contact output (Closed at error occurrence)} \\ \text{Relay contact capacity : 250 V AC, 0.1 A or less (Resistive load) , 1"a" contact} \end{array} \right]$$

*2: The FAIL output becomes open when the operation panel main unit is abnormal.
Use the FAIL output when an emergency stop circuit signal needs to be output.

$$\left[\begin{array}{l} \text{Relay contact output (Open at error occurrence)} \\ \text{Relay contact capacity : 250 V AC, 0.1 A or less (Resistive load) , 1"a" contact} \end{array} \right]$$

2.5 Connection

⚠️ **WARNING**

In order to prevent electric shock or instrument failure, turn off the power for instrument and peripheral equipment before connecting or disconnecting.

CAUTIONS

- Connect the connector in the correct position and direction. In the connector is inserted incorrectly and forcibly into the socket, its pins may be bent to cause instrument failure.

- Connect or disconnect the connector in the direction parallel to the socket surface as much as possible. Otherwise, its pins may be bent to cause instrument failure.

- Disconnect the connector by holding the connector. If the connector is disconnected by pulling the cable, the instrument may become faulty.

- For preventing the instrument from the malfunction, do not touch the contact surface of the connector with bare or oily hands.

- For preventing the instrument from the malfunction, firmly connect the connector, then firmly fix the connector with set screws.

- For preventing the cable from damage, do not forcibly bent it. Keep a bending radius of more than 40 mm.

- If the instrument is easily affected by noise, use the ferrite core in the both ends of the cable (nearest the connector).

(1) Connection with the control unit

Operation panel

RS—422A

Control unit

Connect to terminals on the
operation panel.

Connect to the modular jack on
the PCP module [COM.PORT1].

RKC special cable type : W—BF—01—3000 (Sold separately)

[Standard cable length : 3m]
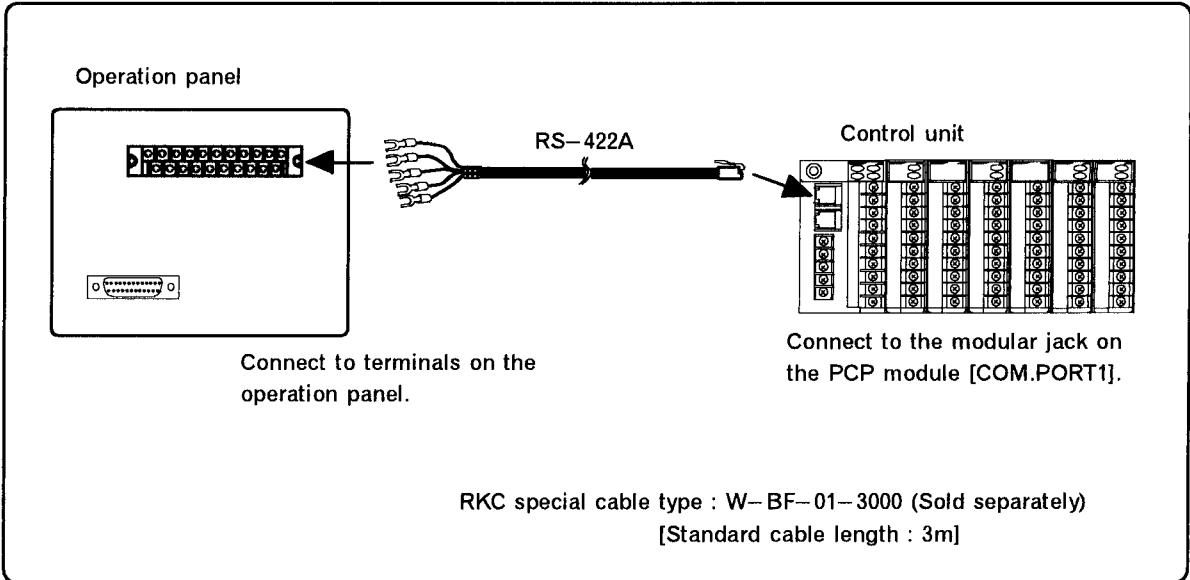
(2) Connector with a host computer (Option)

Operation panel

Hpst computer

RS—422A
RS—485   (Specify when ordering)
RS—232C

To host communication
connector [HOST]

To communication
connector

Connector pin numbers

13 ----------------- 1

25 ----------------- 14

Connector used : SDBB—25S

(Manufactured by HIROSE ELECTRIC CO., LTD)

*The customer must prepare the communication cables.

Recommended connector type : SDBB—25P
(Manufactured by HIROSE ELECTRIC CO. , LTD)

RS-422A

● **Description of modular signals**

Pin No.	Symbol	Name	Signal direction	
			Operation panel	Host computer
2	T(A)	Send data	→	
14	T(B)	Send data	→	
8	SG	Signal ground	—	
4	R(A)	Receive data	←	
16	R(B)	Receive data	←	

● **Communication cable core connection**

Operation panel   Paired wire   Host computer

T (A) 2   TXD
T (B) 14   TXD
SG 8   SG
R (A) 4 $\overline{RXD}$
R (B) 16   RXD

*Maximum number of connections: 16 sets

Twisted pair (with shield)

*$\overline{TXD}$ and $\overline{RXD}$: Negative logic
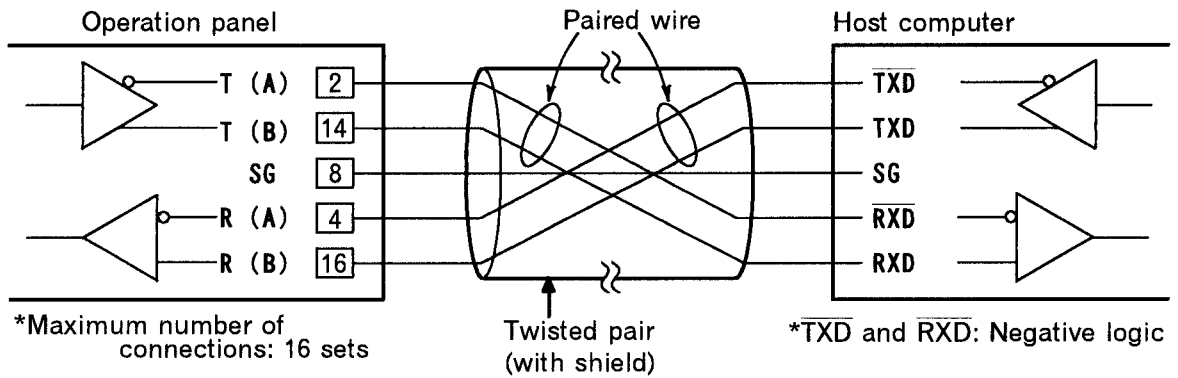
RS-485

● **Description of modular signals**

Pin No.	Symbol	Name	Signal direction	
			Operation panel	Host computer
2	T/R (A)	Send and receive data	← →	
14	T/R (B)	Send and receive data	← →	
8	SG	Signal ground	—	

● **Communication cable core connection**

Operation panel   Paired wire   Host computer

T/R(A) 2   TXD/RXD
T/R(B) 14   TXD/RXD
SG 8   SG

*Maximum number of connections: 16 sets

Twisted pair (with shield)

*$\overline{TXD}$ and $\overline{RXD}$: Negative logic
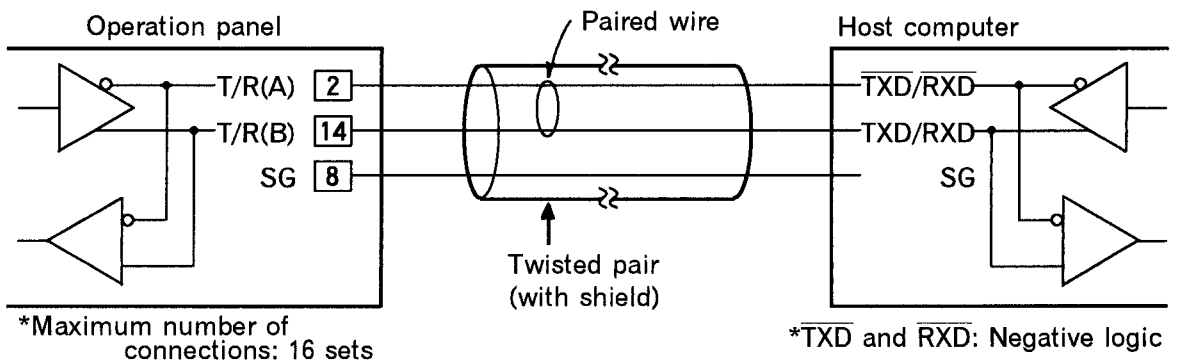
RS-232C

● **Description of modular signals**

Pin No.	Symbol	Name	Signal direction	
			Operation panel	Host computer
2	SD (TXD)	Send data	⟶	
3	RD (RXD)	Receive data	⟵	
7	SG (GND)	Signal ground	⟶	
4	RS (RTS)	Request to send		
5	CS (CTS)	Clear to send		

● **Communication cable core connection**
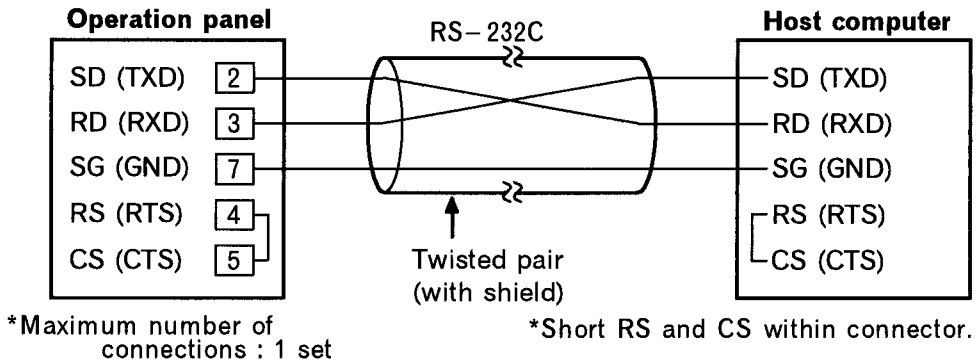
Operation panel				Host computer
SD (TXD)	2			SD (TXD)
RD (RXD)	3	RS-232C		RD (RXD)
SG (GND)	7			SG (GND)
RS (RTS)	4			RS (RTS)
CS (CTS)	5			CS (CTS)

Twisted pair (with shield)

*Maximum number of connections : 1 set

*Short RS and CS within connector.

CHAPTER 3

OPERATIONS

3. OPERATIONS

IMSRM03-E5

3.1 Preparations before operation

Before carrying out the operation, re-check each of the items that have been explained so far according to the procedure given below in order to allow the operation to be carried out in safety.

1. **Confirm that the settings are outside the environment of Chapter 2, Section 2.1.**

   See Chapter 2: "2.1 Cautions for mounting" (Page 2-2).

2. **Confirm that the power supply voltage is appropriate to the instrument specifications.**

   Use within a range of 100 to 240V AC.

3. **Confirm that there is no abnormality in the wiring components.**

   See Chapter 2: "MOUNTING AND WIRING" (Page 2-1).

4. **Confirm that the control unit initialize settings have been set properly.**

   See the separate Installation Manual, or else see Chapter 3:
   "3.2 Initialize settings prior to operation" (Page 3-3).

5. **Turn on the power and begin the operation.**

   See Chapter 3: "3.3 When power on for the first time", or else see
   Chapter 4: "OPERATING PROCEDURE" (Page 4-1).

When an error is suspected, see Chapter 5: "MEASURES TAKEN AT ERROR OCCURRENCE " in this manual.

3.2 Initialize settings prior to operation

Always make the settings on the controller and operation panel the same.
If the control unit and operation panel are purchased as a set, they are set to the same settings.

(1) Settings for communications with control unit

<Setting procedure>

① If the section marked with ▓ (removal lever) is lifted centering around the upper module engagement while pressing the above section, the module is separated from the mother block.
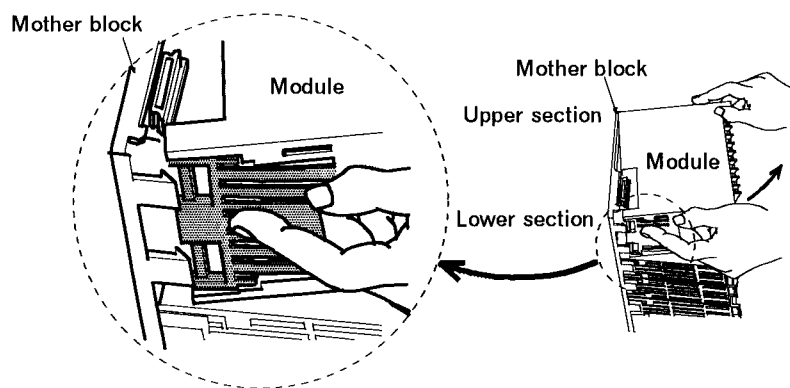
② Set the desired data configuration and communication speed by the dip switches located in the PCP module.
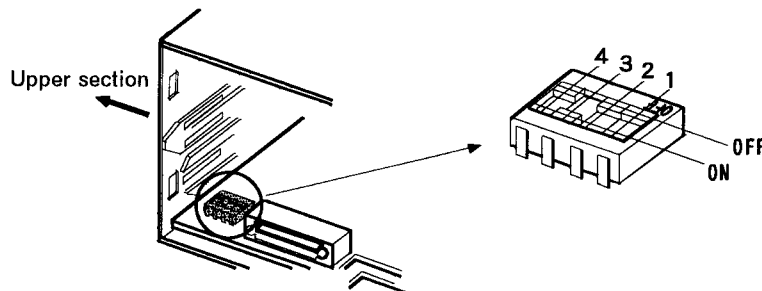
View from the rear with
the mother block removed.

1	2	Data configuration
OFF	OFF	8-bit non-parity
OFF	ON	7-bit even parity
ON	OFF	7-bit odd parity
ON	ON	(Don't set this one)

3	4	Communication speeds
OFF	OFF	2400 bps
OFF	ON	4800 bps
ON	OFF	9600 bps
ON	ON	19200 bps

***When connecting to the operation panel, check that the options are set
to the positions marked with the arrows.**

③ After the above settings are finished, firmly engage the PCP module with the engagement at the top of the mother block, then with the lower section of the mother block centering around the upper engagement until a click sound is produced by following the reverse order of disassembly.

(2) Unit address setting

⊫ CAUTION ⊫

Set the unit address such that it is different to the other addresses on the same line.
Otherwise, problems or malfunction may result.
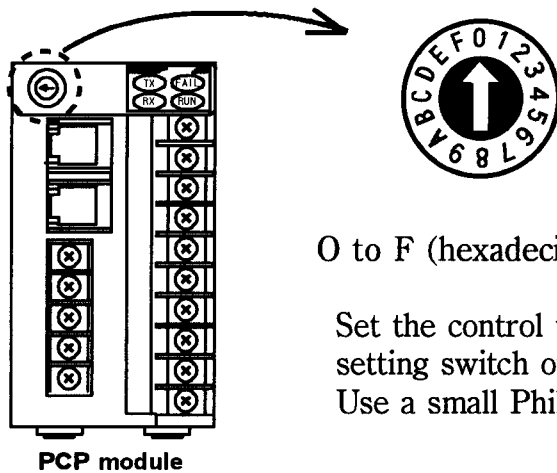
PCP module

O to F (hexadecimal) : Addresses 0 to 15

Set the control unit address number by the unit address
setting switch on the PCP module.
Use a small Phillips screwdriver to make the settings.

(3) Settings for communications with host computer

These settings are made on the screen of the operation panel.
For details on the settings, see the supplementary manual for **MMI initialize "1.7 Host communication**
initialize settings" (Page A− 12).

3.3 When power on for the first time

(1) Cheking before power on

Prior to turning on the power, check that:

● Ensure before power on that the operating location corresponds to the caution items outlined in Chapter 2: MOUNTING AND WIRING, and check that there are no abnormalities in the wiring or connections.

● There are no incorrect wiring and connections.

● When the power on for the first time after the control unit modules are reconfigured, system setting of the control unit has been initialized.
  (See the supplementary manual for "Controller initialize ".)

● When the control unit are used under multidrop connection, confirm that the control units existing after power on are set to "Unused".
  (See the supplementary manual for "MMI initialize ".)

(2) Contrast adjustment

In addition to the special characteristics of the LCD, the screen display may be difficult to see according to the position that the operation panel screen is viewed from and the surrounding brightness.
In this situation, an adjustment of the display contrast should be carried out to adjust the screen to the brightness that allows the easiest confirmation of the display.

<Adjustment procedure>
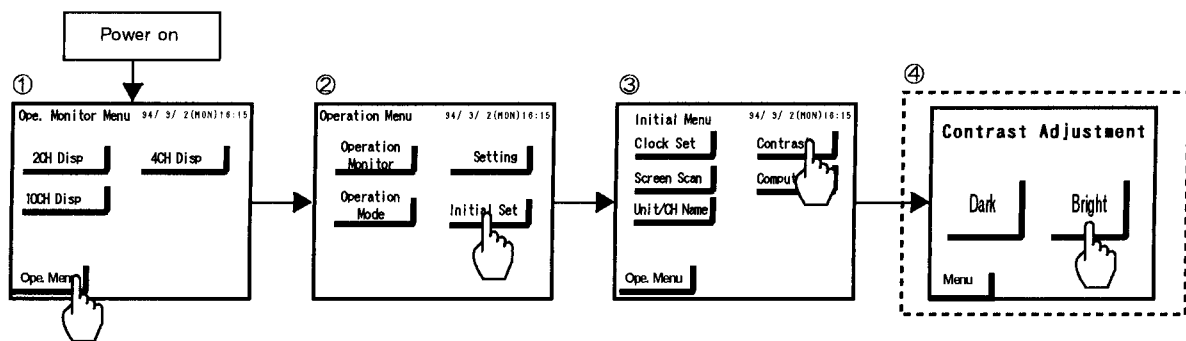
①Touch the Ope. Menu key on the operation monitoring menu screen to display the operation menu screen.

②Touch the Initial Set key on the operation menu screen to display the initialize menu screen.

③Touch the Contrast key on the initialize menu screen to display the contrast adjustment screen.

④Touching the Dark key darkens the screen, and touching the Bright key brightens the screen.

When returning to the operation monitoring menu screen after contrast adjustment is finished, touch the Menu , Ope. Menu , and Operation Monitor keys in this screen.

*The contrast adjustment settings will remain memorized even when the power is turned off.

MEMO

CHAPTER 4

OPERATING PROCEDURE

4. OPERATING PROCEDURE

4.1 Prior to starting screen operation

In this equipment, transparent touch panel keys are employed to improve the operation ability. Observe the following when operating the screen.

● Do not strike or scratch the surface of the touch panel (display unit) with a sharp object such as a ballpoint pen or screwdriver. Since this may scratch or damage the panel.

● Avoid indelibly staining the touch panel (display unit), or the display may become unclear or be damaged.

● In order to prevent scratches and damage, do not press the touch keys with anything other than fingers.

● Press the touch keys lightly to avoid damaging them.

● Do not spray insecticide or clean the operation panel with a volatile organic solvent (thinner or benzene), chemicals or chemical dustcloth to avoid damaging or discoloring the panel.

If the operation panel is dirty, clean it using a clean cloth dampened with neutral detergent and then completely wrung out.
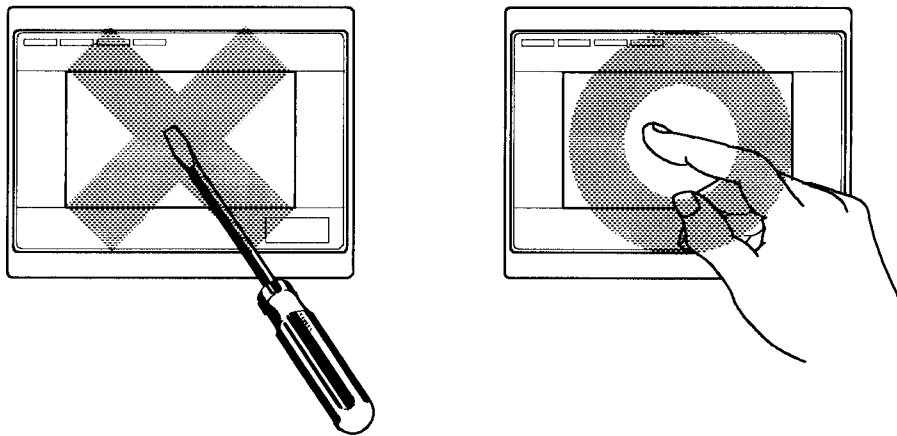
(Using a sharp–tipped object such as a screwdriver, etc. for the operation will become a cause of switch breakage.)

(Cleaning with a volatile organic solvent will become a cause of switch breakdowns and screen clouding, etc.)

4.2 Screen configuration

Screen configuration

① **Operation monitoring screen**

Displays the various measured values (PV, operation output values,
alarm conditions, etc.)
→ See "4.4.2 Operation monitoring screen" (Page 4–6).

② **Setting screen**

Carries out setting of the various set values of the control unit (SV,
alarm set values, PID constants, etc.)
→ See "4.4.3 Setting screen" (Page 4–11).

③ **Operation mode screen**

Carries out switching of the operation conditions such as executing the
autotuning or control Run / Stop, etc.
→ See "4.4.4 Operation mode screen" (Page 4–24).

④ **Initialize setting screen**

Carries out changing of the initial set values of the control unit and
operation panel (Communication settings, time setting, screen scanning
setting, Unit/CH name setting, screen contrast adjustment, etc.)
→ See "4.4.5 Initialize setting screen" (Page 4–38).

⑤ **Error message screen**

On the occurrence of an error, the message with the contents of
the error is automatically displayed.
→ See "4.4.6 Error message screen" (Page 4–49).

* For more details, see the explanations for each screen.

4.3 Screen flow diagram

Power ON

Automatic

| Initialize diagnosis Error display | Error occurrence | Start up screen |

See
"4.4.6 Error message
screen" (Page 4–49).

Automatic

Operation monitoring menu ..... See "4.4.2 Operation monitoring
screen" (Page 4–6).

Operation menu

See
"4.4.1 Operation menu
screen"(Page 4–2).

Setting screen menu ..... See "4.4.3 Setting screen" (Page 4–11).

Operation mode menu ..... See "4.4.4 Operation mode
screen" (Page 4–24).

Initialize setting menu ..... See "4.4.5 Initialize settings
screen" (Page 4–38).

Error occurrence

Error display ..... See "4.4.6 Error message
screen" (Page 4–49).

* Start up screen

When the power is turned on, the operation panel confirms
the control unit cofiguration and checks whether there is
any abnormality in the hardware.
During this time the start up screen is displayed .

Please wait.

SR Mini
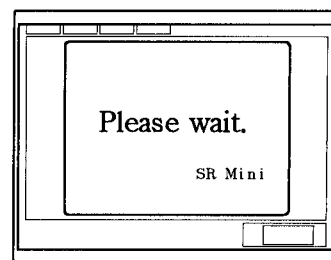
Start up screen

4.4 Explanation of each screen

4.4.1 Operation menu screen

The operation menu screen allows the selection of each of the "Operation Monitor", "Setting", "Operation Mode" and "Initial Set" screens.

■ **Calling procedure**
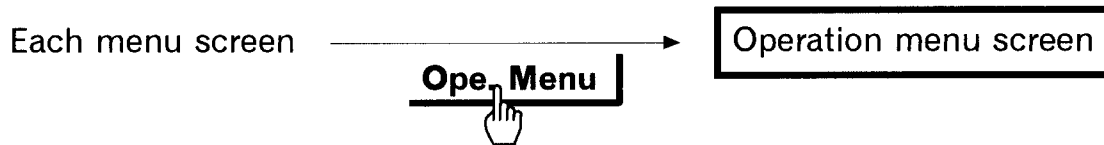
Each menu screen ⟶ Ope. Menu ⟶ Operation menu screen

■ **Display details**

Clock display

Changes to the Operation monitoring screen.	Operation Menu 94/ 3/ 2(MON)16:15	
	Operation Monitor Setting	**Changes to the Setting screen.**
Changes to the Operation mode screen.	Operation Mode Initial Set	**Changes to the Initialize setting screen.**

● Select the necessary screen by touching the menu key on the operation menu screen.

● After changing to each of the relevant screens, touching the **Ope. Menu** key at the bottom of the screen returns the screen again to the operation menu screen.

● For the contents and operation methods of the each screen, see description of 4.4.2 and afterwards.

4.4.2 Operation monitoring screen

The Operation monitoring screen monitors (Confirms by displaying) the set values, measured values, control output values, alarm output conditions, etc. in units of 2, 4 or 10 channels.
After switching on the power, the temperature set value items and temperature measured value items will be automatically displayed.

■ Calling procedure
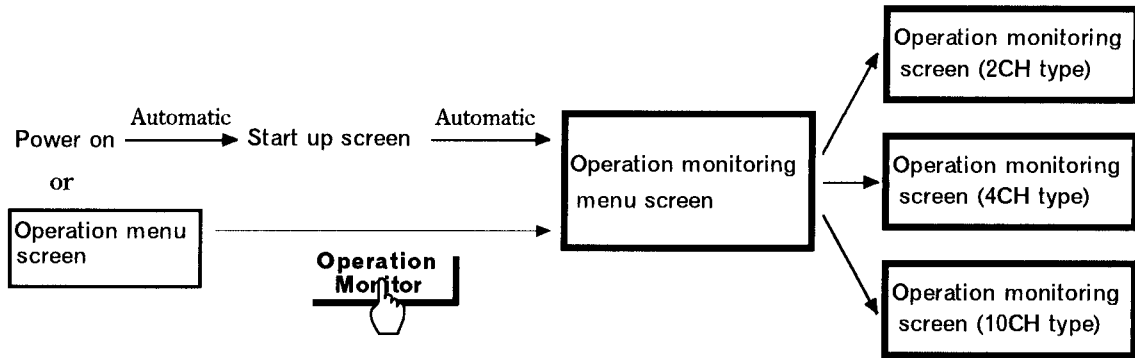
■ Display details

Operation monitoring menu screen
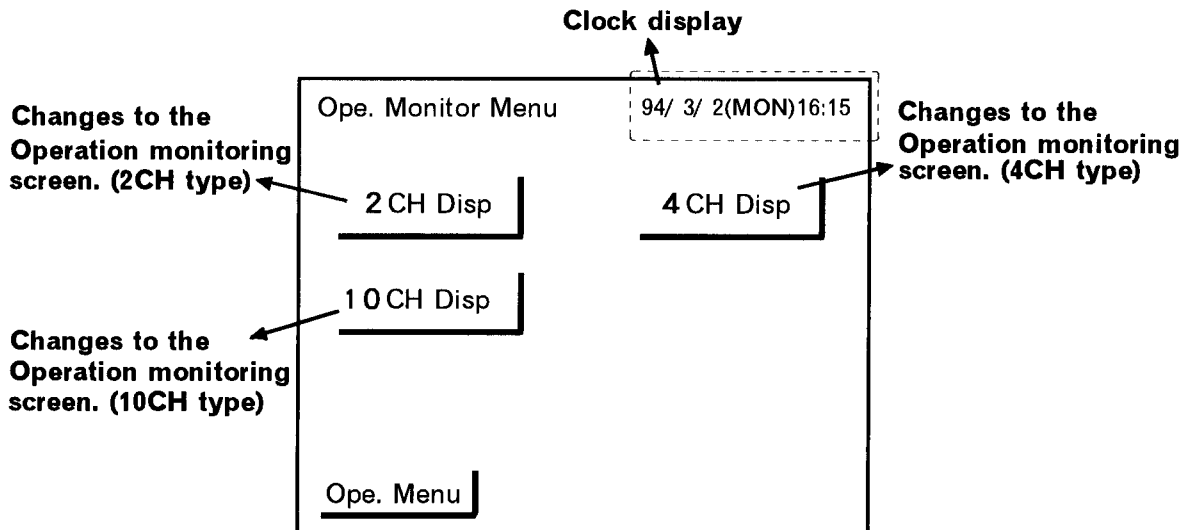
● Select the necessary screen by touching the menu key on the operation monitoring menu screen.

● After changing to each of the relevant screens, touching the **Menu** key at the bottom of the screen returns the screen again to the operation monitoring menu screen.

Operation monitoring screen

2-channel display type

Control unit name display

Control unit No. display

Channel No. or name display

Item display
(PV: Measured value)

| Operation Monitor | 94/ 8/ 2(MON)16:15 |
| Unit 1 : | Area : 1   Run |

CH	PV(°C)	SV(°C)
TMP01	100	100
TMP02	150	150

Message:

Menu | Unit | CH | Para.

① ② ③ ④

Clock display

Current memory area number and control mode display area

Item display
(SV: Set value)

Message display area
(A message is displayed after temperature rise is completed or when an alarm occurs.)

4-channel display type

Control unit name display

Control unit No. display

Channel No. or name display

Item display
(PV: Measured value)

| Operation Monitor | 94/ 8/ 2(MON)16:15 |
| Unit 1 : | Area : 1   Run |

CH	PV(°C)	SV(°C)
TMP01	100	100
TMP02	150	150
TMP03	150	150
TMP04	200	200

Message:

Menu | Unit | CH | Para.

① ② ③ ④

Clock display

Current memory area number and control mode display area

Item display
(SV: Set value)

Message display area
(A message is displayed after temperature rise is completed or when an alarm occurs.)

10-channel display type

Control unit name display

Control unit No. display

Channel No. or name display

Item display
(PV: Measured value)

Item display
(SV: Set value)

| Operation Monitor | 94/ 8/ 2(MON)16:15 |
| Unit 1 : | Area : 1   Run |

CH	PV(°C)	SV(°C)	CH	PV(°C)	SV(°C)
TMP01	100	100	TMP06	100	100
TMP02	150	150	TMP07	150	150
TMP03	150	150	TMP08	150	150
TMP04	200	200	TMP09	200	200
TMP05	250	250	TMP10	250	250

Message:

Menu | Unit | CH | Para.

① ② ③ ④

Clock display

Current memory area number and control mode display area

Message display area
(A message is displayed after temperature rise is completed or when an alarm occurs.)

① **Operation monitoring menu screen select key**

Touching this key changes to the operation monitoring menu screen.

② **Control unit No. select key**

Every time this key is touched, the control unit display is selected.

③ **Channel No. select key**

Every time this key is touched, the channel Nos. currently displayed change in steps of 2, 4 or 10 channels.

④ **Item select key**

Every time this key is touched, the setting items change in the following order.

Para.	PV/SV	: Display of measured values/set values
	MVH/MVC	: Display of heat/cool control output values
	ALM1/ALM2	: Display of first and second alarm outputs
	BO/HBA/LBA	: Display of burnout/heater break alarm outputs/ loop break alarm outputs
	CT1/HA1	: Display of CT input values and HBA set values * (TIO module CT input)
	CT2/HA2	: Display of CT input values and HBA set values * (CT module CT input)
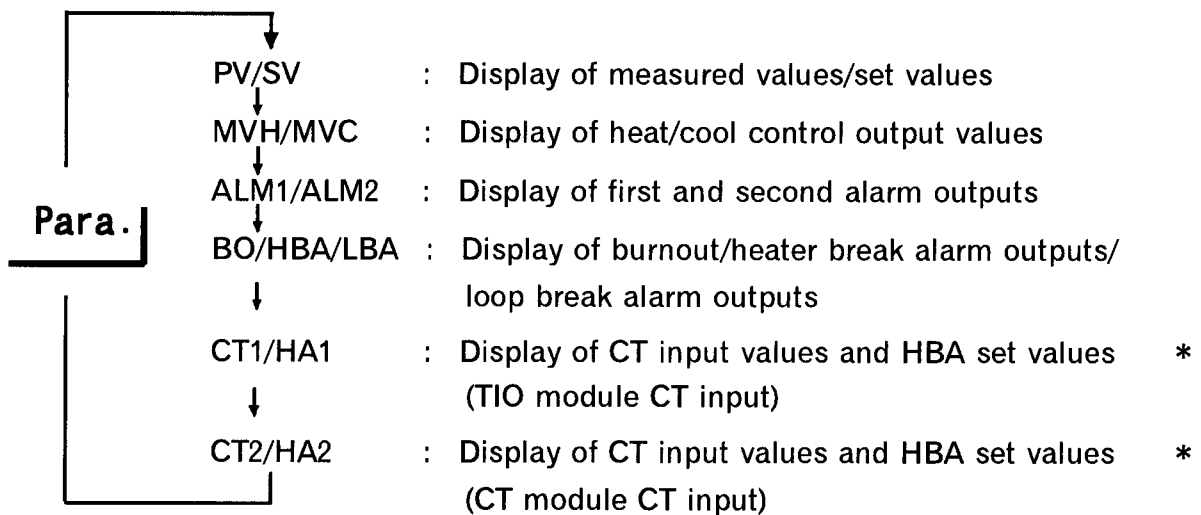
* CT1 and CT2, HA1 and HA2 screens

CT1 and HA1 will show the input values of each of the TIO module CT inputs, and the HBA set values.
CT2 and HA2 will show the input values of each of the CT module CT inputs, and the HBA set values.

(Example)
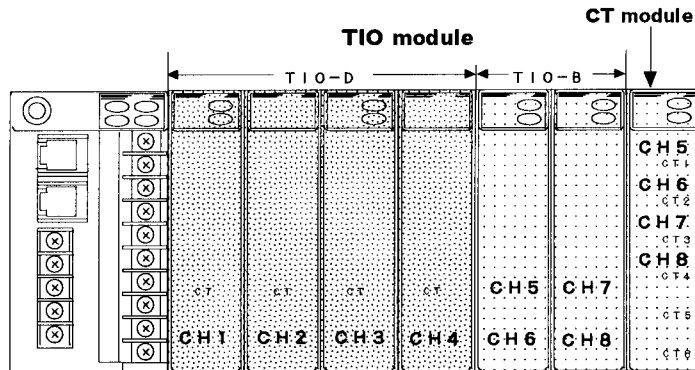
(CT1, HA1 display)

Operation Monitor		94/ 8/ 2(MON)16:15			
Unit 1 :			Area : 1	Run	
CH	CT1(A)	HA1(A)	CH	CT1(A)	HA1(A)
1	10.0	8.0	6	0.0	0.0
2	20.0	16.0	7	0.0	0.0
3	20.0	16.0	8	0.0	0.0
4	20.0	16.0	9	------	------
5	0.0	0.0	10	------	------

Message: [   ]

| Ope.Menu | Unit | CH | Para. |

* The displayed channel numbers will be the channel numbers of the TIO module.

(CT2, HA2 display)

Operation Monitor		94/ 8/ 2(MON)16:15			
Unit 1 :			Area : 1	Run	
CT_CH	CT2(A)	HA2(A)	CT_CH	CT2(A)	HA2(A)
1	15.0	12.0	6	0.0	0.0
2	30.0	24.0	7	------	------
3	20.0	16.0	8	------	------
4	20.0	16.0	9	------	------
5	0.0	0.0	10	------	------

Message: [   ]

| Ope.Menu | Unit | CH | Para. |

* The displayed channel numbers will be the channel numbers of the CT module.

● If there is no CT nor HBA in the connected module, the "CT1/HA1" or "CT2/HA2" screen is not displayed.

NOTES

● It is not possible to change any of the set values on the operation monitoring screen.
Change the settings only on the setting screen.

● If the number of control units used is 1 , the control unit No. select key is invalid.

● If there is no channel to be selected, the channel No. select key becomes invalid.

● Channels which are not in use are displayed as "— — — — — —". (Except the display of channel Nos.)

● The operation monitoring screen is scanned only on the CH display screen selected from the operation
monitoring menu screen. (A screen whose CH display differs is not scanned.)

● When the power is turned on again, the operation monitoring screen displayed just before power off
is displayed.

● Even if there are two or more display resolutions (1 ℃ / ℉ and 0.1 ℃ / ℉), the relevant data items
are displayed on the operation monitoring screen.
However, data items in temperature engineering units of ℃ / ℉ cannot be displayed on the above
screen. In the operation panel, the temperature engineering unit is determined by the first TIO module
in No.1 control unit.

● The message is displayed only on the operation monitoring screen. One of the following messages is
displayed after the temperature rise is completed or when an alarm occurs.

Touching the message display area when an alarm occurs changes to the alarm monitoring screen.
Alarm occurring unit and channel Nos. can be checked.

No.	Item	Message	
1	Burnout	Burnout alarm is "ON"!!	High
2	Heater break alarm	Heater break alarm is "ON"!!	↑
3	Alarm 1 (1st alarm)	Alarm 1 is "ON"!!	Displayed priorty order
4	Alarm 2 (2nd alarm)	Alarm 2 is "ON"!!	
5	Loop break alarm	Loop break alarm is "ON"!!	↓
6	Completion of temperature rise	Temperature rise completed!	Low

* The message of the burnout, heater break alarm, 1st alarm, 2nd alarm or loop break alarm is displayed
if the relevant alarm occurs in any of the using channels. If more than one type of alarm occurs
simultaneously, the message corresponding to the above item with higher priority is displayed.
For example, if the burnout and 1st alarms occur simultaneously, the burnout alarm message is
displayed.

* The temperature rise completion message is displayed after the temperature rise is completed in all
units.

4.4.3 Setting screen

The Setting screen is used to set the temperature set value, alarm set value and set values for controls.
To call each setting screen, touch the setting screen key on the operation menu screen to display the setting
menu screen. The setting screen can be called up by touching the relevant key on the setting menu screeen.
In addition, only items to be set can be assigned to any position only on the setting menu screen by
OPM initialize "Menu Make".   For details on this setting, see Supplementary Manual "OPM initialize".

■ Calling procedure
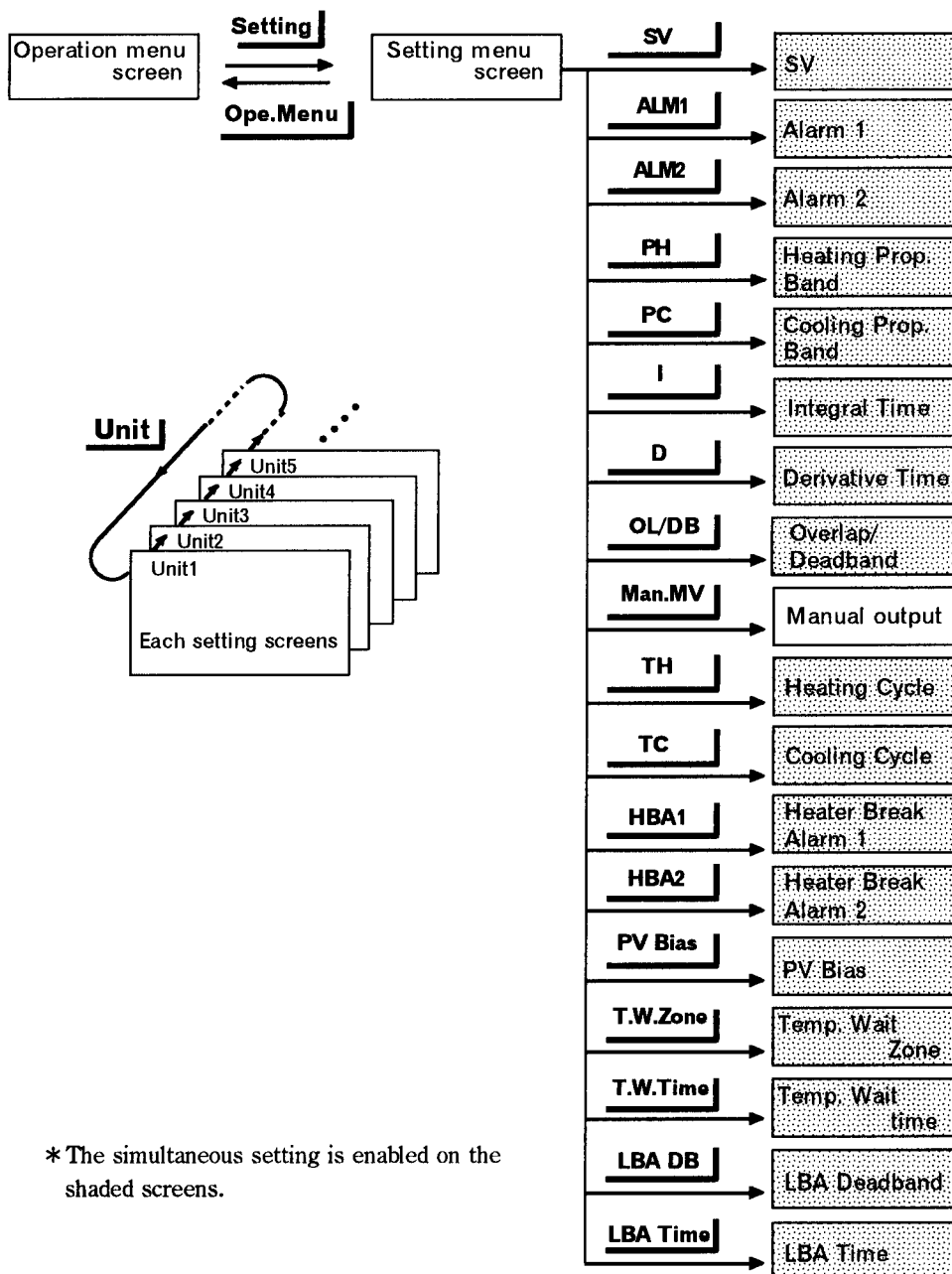
* The simultaneous setting is enabled on the
shaded screens.

■ Display details

Setting menu screen
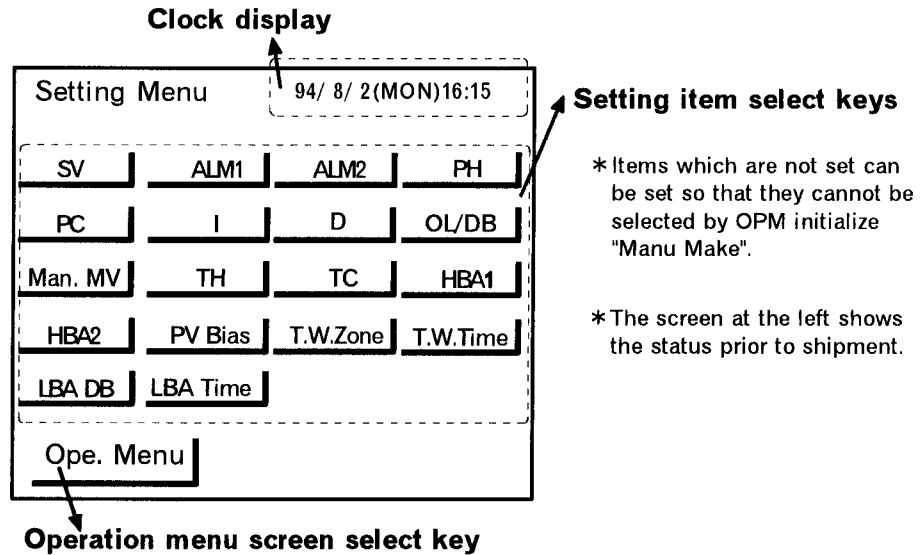
Clock display

```
Setting Menu      94/ 8/ 2(MON)16:15

  SV    | ALM1  | ALM2  |  PH
  PC    |   I   |   D   | OL/DB
 Man. MV|  TH   |  TC   | HBA1
 HBA2   | PV Bias| T.W.Zone| T.W.Time
 LBA DB | LBA Time

 Ope. Menu
```

Operation menu screen select key

Setting item select keys

*Items which are not set can
 be set so that they cannot be
 selected by OPM initialize
 "Manu Make".

*The screen at the left shows
 the status prior to shipment.

Operation menu screen select key
> Touching this key changes to the operation menu screen.

Setting item select keys
> Touching the key corresponding to the desired item changes to the setting screen
> for that item.
> The key corresponding to the item which does not exist in the connected module
> becomes invalid.

Each setting screens

Each setting screen is shown below.

< Basic screen >

Item display

Control unit name display
(At shipment : No display)

Control unit No. display

Channel No. or name display

Setting display

Display of current memory area number and computer/local mode

```
Setting  SV ( C )
Unit1:
 CH  | SV  | CH  | SV       7 8 9
TMP01| 100|TMP06| 100
TMP02| 150|TMP07| 150      4 5 6
TMP03| 150|TMP08| 150
TMP04| 200|TMP09| 200      1 2 3
TMP05| 250|TMP10| 250
                          0 . ±
《Local Mode》  Area:1

  Unit  |   CH     CL   ENT

  Menu  |  Para.       ALL
```

Numeric keys

Clear key

Entry key

①   ② ③ ④   ⑤

4 - 13

① **Setting menu screen select key**

   Touching this key changes to the setting menu screen.

② **Control unit No. select key**

   Every time this key is touched, the control unit display is selected.

③ **Channel No. select key**

   Every time this key is touched, the channel Nos. currently displayed change in steps of 10 channels.

④ **Item select key**

   Every time this key is touched, the setting items change in the following order.

	SV	: Temperature set value
	ALM1	: First alarm set value
	ALM2	: Second alarm set value
	PH	: Heat—side proportional band
	PC	: Cool—side proportional band
	I	: Integral time
Para.	D	: Derivative time
	OL/DB	: Overlap/Deadband
	Man.MV	: Manual output set value
	TH	: Heat—side proportioning cycle time
	TC	: Cool—side proportioning cycle time
	HBA1	: Heater break alarm set value
		(Setting relating to the TIO module CT input.)
	HBA2	: Heater break alarm set value
		(Setting relating to the CT module CT input.)
	PV Bias	: PV bias
	T.W.Zone	: Temperature rise completion range (Temp.wait zone)
	T.W.Time	: Temperature rise completion soak time (Temp.wait time)
	LBA DB	: Loop break alarm Deadband
	LBA Time	: Loop break alarm Time

⑤ **Simultaneous setting key**

   All the set values on one screen now displayed can be set to the same value.

   ＊However, no simultaneous setting is available for the "Man. MV" setting.

■ **Each setting screens**

Set value setting screen

```
Setting : SV ( C )
Unit1:
┌────┬────┬────┬────┐      ┌─┐┌─┐┌─┐
│ CH │ SV │ CH │ SV │      │7││8││9│
├────┼────┼────┼────┤      └─┘└─┘└─┘
│TMP01│  0│TMP06│  0│      ┌─┐┌─┐┌─┐
│TMP02│  0│TMP07│  0│      │4││5││6│
│TMP03│  0│TMP08│  0│      └─┘└─┘└─┘
│TMP04│  0│TMP09│  0│      ┌─┐┌─┐┌─┐
│TMP05│  0│TMP10│  0│      │1││2││3│
└────┴────┴────┴────┘      └─┘└─┘└─┘
                           ┌─┐┌─┐┌─┐
《Local Mode》   Area:1     │0││.││±│
                           └─┘└─┘└─┘
   Unit |   CH |      CL | ENT|

   Menu |  Para. |       ALL |
```

Setting range: Within input range

Factory set value: 0

ALM1 setting screen

```
Setting : Alarm 1 ( C )
Unit1:
┌────┬────┬────┬────┐      ┌─┐┌─┐┌─┐
│ CH │ALM1│ CH │ALM1│      │7││8││9│
├────┼────┼────┼────┤      └─┘└─┘└─┘
│TMP01│ 50│TMP06│ 50│      ┌─┐┌─┐┌─┐
│TMP02│ 50│TMP07│ 50│      │4││5││6│
│TMP03│ 50│TMP08│ 50│      └─┘└─┘└─┘
│TMP04│ 50│TMP09│ 50│      ┌─┐┌─┐┌─┐
│TMP05│ 50│TMP10│ 50│      │1││2││3│
└────┴────┴────┴────┘      └─┘└─┘└─┘
                           ┌─┐┌─┐┌─┐
《Local Mode》   Area:1     │0││.││±│
                           └─┘└─┘└─┘
   Unit |   CH |      CL | ENT|

   Menu |  Para. |       ALL |
```

Setting range: Within input range
                 or span range

Factory set value:
              Depends on specifications

ALM2 setting screen

```
Setting : Alarm 2 ( C )
Unit1:
┌────┬────┬────┬────┐      ┌─┐┌─┐┌─┐
│ CH │ALM2│ CH │ALM2│      │7││8││9│
├────┼────┼────┼────┤      └─┘└─┘└─┘
│TMP01│-50│TMP06│-50│      ┌─┐┌─┐┌─┐
│TMP02│-50│TMP07│-50│      │4││5││6│
│TMP03│-50│TMP08│-50│      └─┘└─┘└─┘
│TMP04│-50│TMP09│-50│      ┌─┐┌─┐┌─┐
│TMP05│-50│TMP10│-50│      │1││2││3│
└────┴────┴────┴────┘      └─┘└─┘└─┘
                           ┌─┐┌─┐┌─┐
《Local Mode》   Area:1     │0││.││±│
                           └─┘└─┘└─┘
   Unit |   CH |      CL | ENT|

   Menu |  Para. |       ALL |
```

Setting range: Within input range
                 or span range

Factory set value:
              Depends on specifications

Heating Prop.Band setting screen

Setting : Heating Prop. Band (%)

Unit1:

CH	PH	CH	PH
TMP01	3.0	TMP06	3.0
TMP02	3.0	TMP07	3.0
TMP03	3.0	TMP08	3.0
TMP04	3.0	TMP09	3.0
TMP05	3.0	TMP10	3.0

《Local Mode》   Area:1

7	8	9
4	5	6
1	2	3
0	.	±

Unit   CH   CL   ENT

Menu   Para.   ALL

Setting range: 0.1 to 1000.0% of span

Factory set value: 3.0

Cooling Prop.Band setting screen

Setting : Cooling Prop. Band (%)

Unit1:

CH	PC	CH	PC
TMP01	3.0	TMP06	3.0
TMP02	3.0	TMP07	3.0
TMP03	3.0	TMP08	3.0
TMP04	3.0	TMP09	3.0
TMP05	3.0	TMP10	3.0

《Local Mode》   Area:1

7	8	9
4	5	6
1	2	3
0	.	±

Unit   CH   CL   ENT

Menu   Para.   ALL

Setting range: 0.1 to 1000.0% of span

Factory set value: 3.0

Integral time setting screen

Setting : Integral Time (sec)

Unit1:

CH	I	CH	I
TMP01	240	TMP06	240
TMP02	240	TMP07	240
TMP03	240	TMP08	240
TMP04	240	TMP09	240
TMP05	240	TMP10	240

《Local Mode》   Area:1

7	8	9
4	5	6
1	2	3
0	.	±

Unit   CH   CL   ENT

Menu   Para.   ALL

Setting range: 1 to 3600 second

Factory set value: 240

Derivative time setting screen

Setting : Derivative Time (sec)						
Unit1:						
CH	D	CH	D	7	8	9
TMP01	60	TMP06	60	4	5	6
TMP02	60	TMP07	60			
TMP03	60	TMP08	60	1	2	3
TMP04	60	TMP09	60			
TMP05	60	TMP10	60	0	.	±

《Local Mode》 Area:1

Unit | CH | CL | ENT

Menu | Para. | ALL

Setting range: 0 to 3600 second

Factory set value: 60

Overlap/Deadband setting screen

Setting : Overlap/Deadband (%)						
Unit1:						
CH	OL/DB	CH	OL/DB	7	8	9
TMP01	0.0	TMP06	0.0	4	5	6
TMP02	0.0	TMP07	0.0			
TMP03	0.0	TMP08	0.0	1	2	3
TMP04	0.0	TMP09	0.0			
TMP05	0.0	TMP10	0.0	0	.	±

《Local Mode》 Area:1

Unit | CH | CL | ENT

Menu | Para. | ALL

Setting range: −10.0 to +10.0% of span

Factory set value: 0.0

Manual output setting screen

Setting : Manual Output (%)						
Unit1:						
CH	Man.MV	CH	Man.MV	7	8	9
TMP01	0. 0	TMP06	0. 0	4	5	6
TMP02	0. 0	TMP07	0. 0			
TMP03	0. 0	TMP08	0. 0	1	2	3
TMP04	0. 0	TMP09	0. 0			
TMP05	0. 0	TMP10	0. 0	0	.	±

《Local Mode》

Unit | CH | CL | ENT

Menu | Para.

Setting range: −5.0 to +105.0 %

Factory set value: 0.0

*No simultaneous setting is available.

Heating side prportioning cycle setting screen

Setting: Heating Cycle (sec)

Unit1:

CH	TH	CH	TH
TMP01	20	TMP06	20
TMP02	20	TMP07	20
TMP03	20	TMP08	20
TMP04	20	TMP09	20
TMP05	20	TMP10	20

《Local Mode》

7	8	9
4	5	6
1	2	3
0	.	±

Unit | CH | CL | ENT

Menu | Para. | ALL

Setting range: 1 to 100 second

Factory set value:
- Relay contact output 20
- Voltage pulse output 2
- Open collector output 2
- Triac output 2

*Setting will be invalid in ON/OFF action or continuous voltage/current output.

Cooling side prportioning cycle setting screen

Setting: Cooling Cycle (sec)

Unit1:

CH	TC	CH	TC
TMP01	20	TMP06	20
TMP02	20	TMP07	20
TMP03	20	TMP08	20
TMP04	20	TMP09	20
TMP05	20	TMP10	20

《Local Mode》

7	8	9
4	5	6
1	2	3
0	.	±

Unit | CH | CL | ENT

Menu | Para. | ALL

Setting range: 1 to 100 second

Factory set value:
- Relay contact output 20
- Voltage pulse output 2
- Open collector output 2
- Triac output 2
- Continuous voltage/current output 0

*Setting will be invalid in ON/OFF action, heat control action or continuous voltage/current output

Heater Break Alarm 1 setting screen

Setting: Heater Break Alarm 1 (A)

Unit1:

CH	HBA1	CH	HBA1
TMP01	0.0	TMP06	0.0
TMP02	0.0	TMP07	0.0
TMP03	0.0	TMP08	0.0
TMP04	0.0	TMP09	0.0
TMP05	0.0	TMP10	0.0

《Local Mode》

7	8	9
4	5	6
1	2	3
0	.	±

Unit | CH | CL | ENT

Menu | Para. | ALL

Setting range: 0.0 to 100.0 A or 0.0 to 30.0 A
(Settings relating to the TIO module CT input.)

Factory set value: 0.0

Heater Break Alarm 2 setting screen

Setting : Heater Break Alarm 2 (A)

Unit1:

CH	HBA2	CH	HBA2
TMP01	0.0	TMP06	0.0
TMP02	0.0	TMP07	0.0
TMP03	0.0	TMP08	0.0
TMP04	0.0	TMP09	0.0
TMP05	0.0	TMP10	0.0

《Local Mode》

Unit   CH   CL   ENT

Menu   Para.   ALL

7	8	9
4	5	6
1	2	3
0	.	±

Setting range: 0.0 to 100.0 A or 0.0 to 30.0 A
(Settings relating to the CT module CT input.)

Factory set value: 0.0

PV bias setting screen

Setting : PV Bias (%)

Unit1:

CH	PVB	CH	PVB
TMP01	0.00	TMP06	0.00
TMP02	0.00	TMP07	0.00
TMP03	0.00	TMP08	0.00
TMP04	0.00	TMP09	0.00
TMP05	0.00	TMP10	0.00

《Local Mode》

Unit   CH   CL   ENT

Menu   Para.   ALL

7	8	9
4	5	6
1	2	3
0	.	±

Setting range: −5.00 to +5.00% of span

Factory set value: 0.00

Temperature rise completion range setting screen

Setting : Temp. Wait Zone (°C)

Unit1:

CH	Zone	CH	Zone
TMP01	10	TMP06	10
TMP02	10	TMP07	10
TMP03	10	TMP08	10
TMP04	10	TMP09	10
TMP05	10	TMP10	10

《Local Mode》

Unit   CH   CL   ENT

Menu   Para.   ALL

7	8	9
4	5	6
1	2	3
0	.	±

Setting range: 1 to 10°C (1 to 20°F)

Factory set value: 10°C (20°F)

Temperature rise completion soak time setting screen

```
Setting : Temp.  Wait  Time  (min)

 Unit1:                        7    8    9

                               4    5    6
 Temp. Wait Time =    0
                               1    2    3

 《Local Mode》                  0    .    ±


                              CL    ENT

 Menu    Unit    Para.      ALL
```

Setting range: 0 to 360 minute

Factory set value: 0

LBA Deadband setting screen

```
Setting : LBA Deadband (℃ )
 Unit1:
  CH   LBA DB  CH   LBA DB    7    8    9
 TMP01    0   TMP06    0
 TMP02    0   TMP07    0      4    5    6
 TMP03    0   TMP08    0
 TMP04    0   TMP09    0      1    2    3
 TMP05    0   TMP10    0
                              0    .    ±
 《Local Mode》

    Unit       CH         CL    ENT

    Menu      Para.         ALL
```

Setting range: Input span

Factory set value: 0

LBA Time setting screen

```
Setting : LBA Time  (sec)
 Unit1:
  CH   Time   CH   Time       7    8    9
 TMP01   480  TMP06   480
 TMP02   480  TMP07   480     4    5    6
 TMP03   480  TMP08   480
 TMP04   480  TMP09   480     1    2    3
 TMP05   480  TMP10   480
                              0    .    ±
 《Local Mode》

    Unit       CH         CL    ENT

    Menu      Para.         ALL
```

Setting range: 1 to 7200 second

Factory set value: 480

■ **Setting procedure**

Prior to starting the setting, observe the following points.

- Use set values conforming to the control unit specification.

- For the control unit with ON/OFF control action, manual output set value is invalid.
  Auto/Manual operation mode transfer is also invalid.

- If the control unit is set to computer mode, only the "screen select key" on the setting
  screen is valid.

- If an unsettable numerical value is tried to be entered, it automatically returns to the
  value before this setting while the latter valule is inverselly displayed.
  (Example: When trying to input a set value of 800 ℃ in the control unit with a
  range of 0 to 400 ℃ .)

- If the number of control units used is 1, the control unit No. select key is invalid.

- If there is no channel to be selected, the channel No. select key becomes invalid.

Method of changing settings

```
Setting : SV (°C)
Unit1:
┌──────┬─────┬──────┬─────┐        7   8   9
│  CH  │ SV  │  CH  │ SV  │
├──────┼─────┼──────┼─────┤        4   5   6
│TMP01 │ 100 │TMP06 │ 100 │
│TMP02 │ 150 │TMP07 │ 150 │        1   2   3
│TMP03 │  50 │TMP08 │ 150 │
│TMP04 │ 200 │TMP09 │ 200 │        0   .   ±
│TMP05 │ 250 │TMP10 │ 250 │
└──────┴─────┴──────┴─────┘
《Local Mode》     Area:1

  Unit      CH        CL   ENT

  Menu    Para.          ALL
```

1. Touch the numeral section to be set to highlight (inversely display) the numeral.

```
Setting : SV (°C)
Unit1:
┌──────┬─────┬──────┬─────┐        7   8   9
│  CH  │ SV  │  CH  │ SV  │
├──────┼─────┼──────┼─────┤        4       6
│TMP01 │ 125 │TMP06 │ 100 │
│TMP02 │ 150 │TMP07 │ 150 │        1       3
│TMP03 │ 150 │TMP08 │ 150 │
│TMP04 │ 200 │TMP09 │ 200 │        0   .   ±
│TMP05 │ 250 │TMP10 │ 250 │
└──────┴─────┴──────┴─────┘
《Local Mode》     Area:1

  Unit      CH        CL   ENT

  Menu    Para.          ALL
```

2. Next, enter the desired numeral to be set by the numeric keys.
   (In the example figures at left, a set value of 100°C has been changed to 125°C.)

```
Setting : SV (°C)
Unit1:
┌──────┬─────┬──────┬─────┐        7   8   9
│  CH  │ SV  │  CH  │ SV  │
├──────┼─────┼──────┼─────┤        4   5   6
│TMP01 │ 125 │TMP06 │ 100 │
│TMP02 │ 150 │TMP07 │ 150 │        1   2   3
│TMP03 │ 150 │TMP08 │ 150 │
│TMP04 │ 200 │TMP09 │ 200 │        0   .   ±
│TMP05 │ 250 │TMP10 │ 250 │
└──────┴─────┴──────┴─────┘
《Local Mode》     Area:1

  Unit      CH        CL   ENT

  Menu    Para.          ALL
```

3. Touch the **ENT** key.
   The inversed display returns to normal and the set value is entered.

   * If there is a mistake in the above setting, the current value returns to the value before this setting while the latter value is highlighted.

   * The changed set value is registered by touching the **ENT** key. During a setting change, control is performed using the data before the above setting change.

NOTES

● If the input of the numeral set value is mistaken, touch the **CL** key. Then you can return to the previous value in the inversed display. And cary out the setting once again.

● The **±** key is used to affix the minus or plus sign to the numeral value displayed. Every time this key is touched, the plus sign (no display) changes to the minus sign and vice versa.
After the numeral value is entered, touch this key to affix the plus or minus sign to that value before touching the **ENT** key.

Simultaneous setting procedure

```
Setting : SV ( C )
Unit1:
┌────┬────┬────┬────┐   ┌─┐┌─┐┌─┐
│ CH │ SV │ CH │ SV │   │7││8││9│
├────┼────┼────┼────┤   └─┘└─┘└─┘
│TMP01│ 100│TMP06│  0 │  ┌─┐┌─┐┌─┐
│TMP02│   0│TMP07│  0 │  │4││5││6│
│TMP03│   0│TMP08│  0 │  └─┘└─┘└─┘
│TMP04│   0│TMP09│  0 │  ┌─┐┌─┐┌─┐
│TMP05│   0│TMP10│  0 │  │1││2││3│
└────┴────┴────┴────┘   └─┘└─┘└─┘
 《Local Mode》   Area:1   ┌─┐┌─┐┌─┐
                         │0││.││±│
   Unit │  CH │  CL │ ENT│
   Menu │ Para.│   ALL│
```
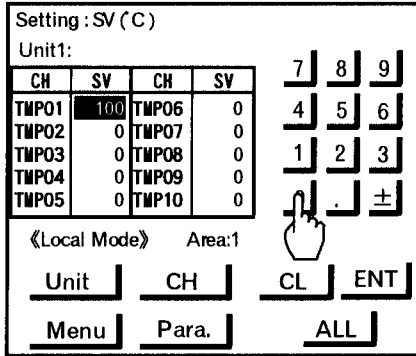
1. Touch the numeral section to be set to highlight (inversely display) the numeral.
   Next, enter the desired numeral to be simultaneously set by the numeric keys.

```
Setting : SV ( C )
Unit1:
┌────┬────┬────┬────┐   ┌─┐┌─┐┌─┐
│ CH │ SV │ CH │ SV │   │7││8││9│
├────┼────┼────┼────┤   └─┘└─┘└─┘
│TMP01│ 100│TMP06│  0 │  ┌─┐┌─┐┌─┐
│TMP02│   0│TMP07│  0 │  │4││5││6│
│TMP03│   0│TMP08│  0 │  └─┘└─┘└─┘
│TMP04│   0│TMP09│  0 │  ┌─┐┌─┐┌─┐
│TMP05│   0│TMP10│  0 │  │1││2││3│
└────┴────┴────┴────┘   └─┘└─┘└─┘
 《Local Mode》   Area:1   ┌─┐┌─┐┌─┐
                         │0││.││±│
   Unit │  CH │  CL │ ENT│
   Menu │ Para.│   ALL│
```

2. Touch the **ALL** key to highlight the **ALL** key.

```
Setting : SV ( C )
Unit1:
┌────┬────┬────┬────┐   ┌─┐┌─┐┌─┐
│ CH │ SV │ CH │ SV │   │7││8││9│
├────┼────┼────┼────┤   └─┘└─┘└─┘
│TMP01│ 100│TMP06│ 100│  ┌─┐┌─┐┌─┐
│TMP02│ 100│TMP07│ 100│  │4││5││6│
│TMP03│ 100│TMP08│ 100│  └─┘└─┘└─┘
│TMP04│ 100│TMP09│ 100│  ┌─┐┌─┐┌─┐
│TMP05│ 100│TMP10│ 100│  │1││2││3│
└────┴────┴────┴────┘   └─┘└─┘└─┘
 《Local Mode》   Area:1   ┌─┐┌─┐┌─┐
                         │0││.││±│
   Unit │  CH │  CL │ ENT│
   Menu │ Para.│   ALL│
```
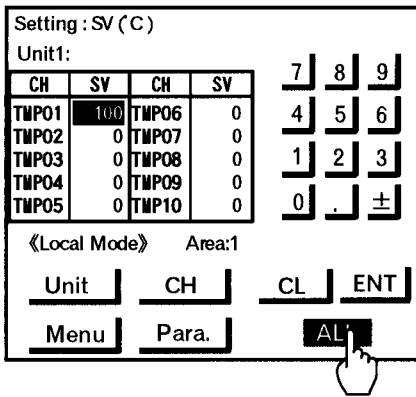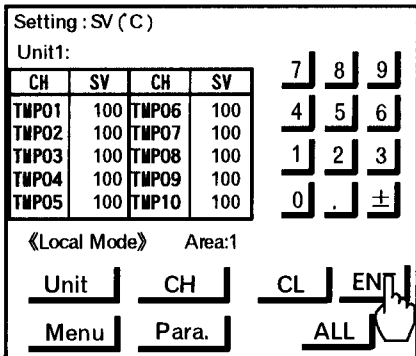
3. Touch the **ENT** key.
   All the set values displayed on the screen change to the value thus set.

* If there is a mistake in the above setting, the current value returns to the value before this setting while the latter value is highlighted.

* The changed set value is registered by touching the **ENT** key. During a setting change, control is performed using the data before the above setting change.

```
Setting : SV ( C )
Unit1:
┌────┬────┬────┬────┐   ┌─┐┌─┐┌─┐
│ CH │ SV │ CH │ SV │   │7││8││9│
├────┼────┼────┼────┤   └─┘└─┘└─┘
│TMP11│ 100│TMP16│  0 │  ┌─┐┌─┐┌─┐
│TMP12│   0│TMP17│  0 │  │4││5││6│
│TMP13│   0│TMP18│  0 │  └─┘└─┘└─┘
│TMP14│   0│TMP19│  0 │  ┌─┐┌─┐┌─┐
│TMP15│   0│TMP20│  0 │  │1││2││3│
└────┴────┴────┴────┘   └─┘└─┘└─┘
 《Local Mode》   Area:1   ┌─┐┌─┐┌─┐
                         │0││.││±│
   Unit │  CH │  CL │ ENT│
   Menu │ Para.│   ALL│
```
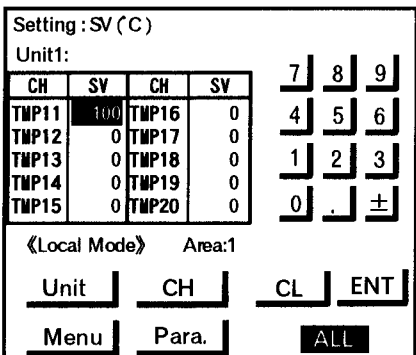
4. After the above simultaneous setting is registered, the current screen changes to the next channel or unit screen. (However, when there is the screen.)
   Touching the **ENT** key simultaneously sets the high-lighted numeral.

   *Returning to the screen on which the simultaneous setting was started ends the simultaneous setting.

//--//

| NOTES |

● No simultaneous setting function is available for manual output.

● The simultaneous setting function is activated for each screen displayed.

● In order to suspend the simultaneous setting function, touch the **ALL** key to release the inverse display.

● When the set value needs to be changed during simultaneous setting, touch the **CL** key, then re-enter the desired set value and finally touch the **ENT** key.

● The **±** key is used to affix the minus or plus sign to the numeral value displayed. Every time this key is touched, the plus sign (no display) chanes to the minus sign and vice versa.
After the numeral value is enterd, touch this key to affix the plus or minus sign to that value before touching the **ENT** key.

4.4.4 Operation mode screen

The operation mode screen is used to select or specify the operation mode (condition).
In addition, only items to be set can be assigned to any position only on the setting menu screen by
OPM initialize "Menu Make".　For details on this setting, see supplementary manual "OPM initialize".

■ **Calling procedure**


```
                    Operation
                      Mode                                PID/AT
  Operation menu   ───────►   Operation mode   ─────────────────────►  PID/AT
     screen        ◄───────    menu screen
                    Ope.Menu
```

Ope. Mode Change	→	Ope. Mode Change
Control Responce	→	Control Responce
Auto/Manual	→	Auto/Manual
Cont. Run/Stop	→	Control Run/Stop
Memory Area	→	Memory Area
Alarm Interlock	→	Alarm Interlock
Heat up Judge	→	Heat up Judge **

** Temperature rise completion trigger

| LBA Selection | → | LBA Selection |

＊The simultaneous setting is enabled on the
shaded screens.

■ Display details

Operation mode menu screen

Clock display

Operarion Mode Menu 94/ 8/ 2(MON)16:15

PID/AT	Ope. Mode Change
Control Responce	Auto/Manual
Cont. Run/Stop	Memory Area
Alarm Interlock	Heat up Judge
LBA Selection	

Ope. Menu

Mode item select keys

*Items which are not set can be set so that they cannot be selected by OPM initialize "Manu Make".

*The screen at the left shows the status prior to shipment.
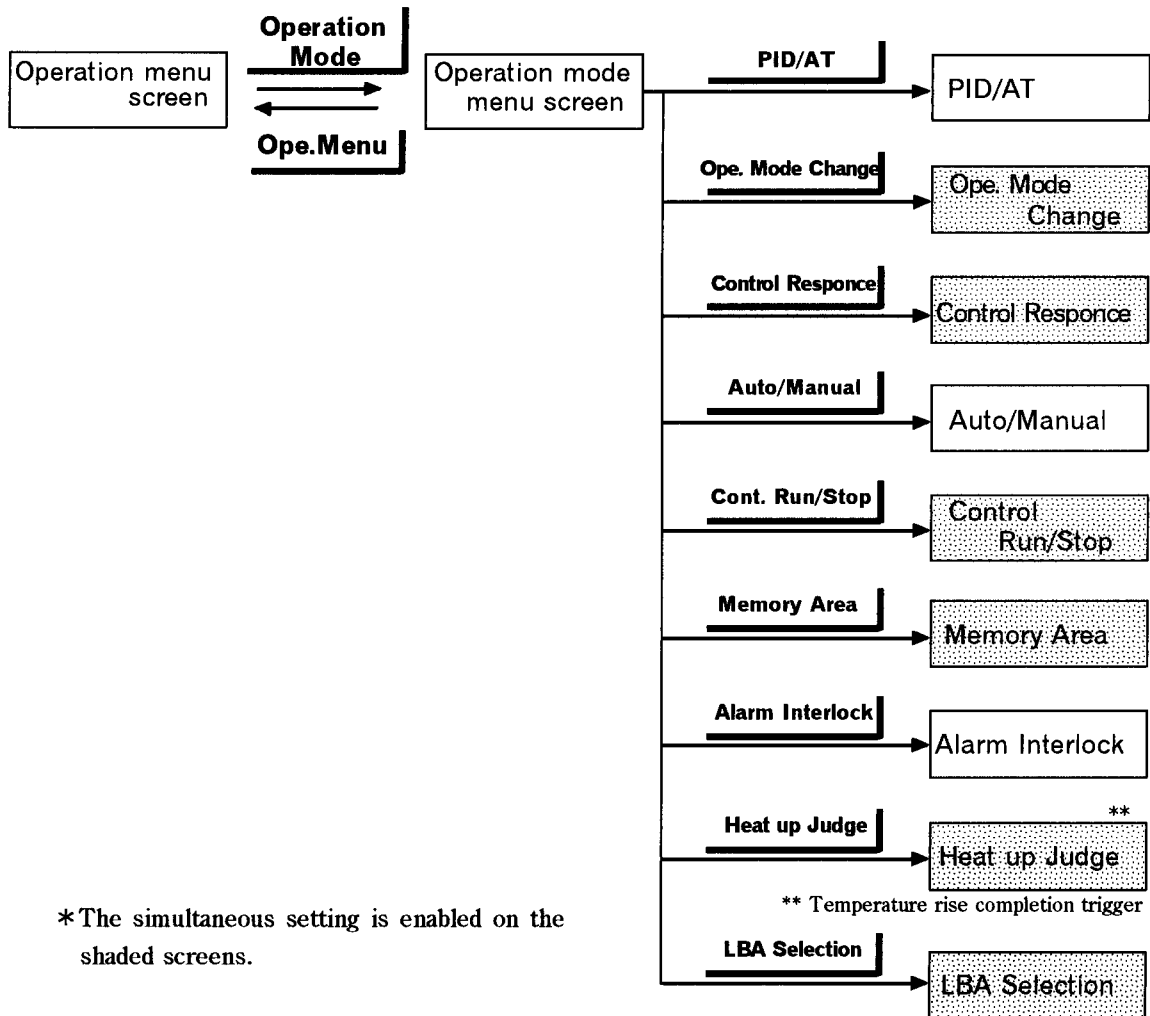
Operation menu screen select key
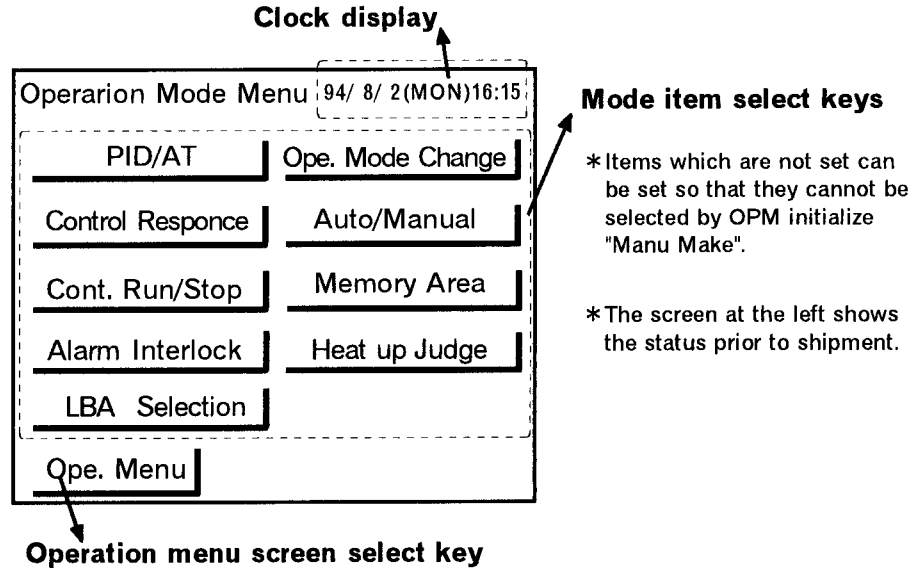
Operation menu screen select key
Touching this key changes to the operation menu screen.

Mode item select keys
Touching the key corresponding to the desired item changes to the operation mode screen for that item.

The key corresponding to the item which does not exist in the connected module becomes invalid.

Each operation mode screens

Each operation mode screen is shown below.

< Basic screen >

Item display **Control unit name display**
(At shipment : No display)

Control unit No. display

Operation Mode: Ope. Mode Change
Unit1:

CH	Mode	CH	Mode
1	Normal	6	Normal
2	Normal	7	Normal
3	Normal	8	Normal
4	Normal	9	Normal
5	Normal	10	Normal

Channel No. or name display

Mode display

Unused / Moni. / Alarm / Normal — **Mode select keys**

Display of current memory area number and computer/local mode

《Local Mode》

(Only the screen select key is valid in computer mode.)

| Unit | CH | CL | ENT |
| Menu | Para. | ALL | |

Clear key

Entry key

① ② ③ ④ ⑤

① **Operation mode menu screen select key**

Touching this key changes to the operation mode menu screen.

② **Control unit № select key**

Every time this key is touched, the control unit display is selected.

③ **Channel № select key**

Every time this key is touched, the channel Nos. currently displayed change in steps of 10 channels.

④ **Item select key**

Every time this key is touched, the operation mode items change in the following order.

```
            ┌──► PID/AT
            │       ↓
            │    Operation Mode Change
            │       ↓
            │    Control Response
            │       ↓
   Para.    │    Auto/Manual
            │       ↓
            │    Control Run/Stop
            │       ↓
            │    Memory Area
            │       ↓
            │    Alarm Interlock release
            │       ↓
            │    Temperature rise completion trigger ( Heat up Judge )
            │       ↓
            └──── LBA Selection
```
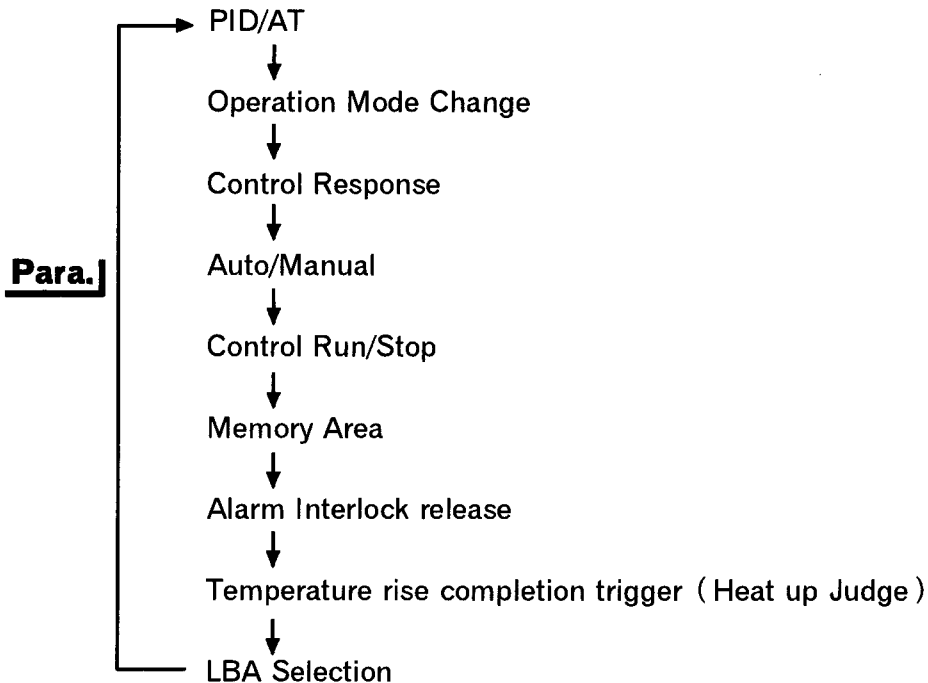
⑤ **Simultaneous setting key**

Any mode items can be simultaneously set for each screen displayed.

＊ However, the following operation mode items cannot be simultaneously set.

● PID/AT

● Auto/Manual

● Alarm Interlock release

■ **Each operation mode screen**

PID/AT screen

This screen is used in executing AT (Autotuning) from PID (PID control) or in stopping AT and changing to PID.

```
Operation Mode : PID/AT
Unit1:
 CH | PID/AT| CH |PID/AT
  1 |  PID  |  6 |  PID      PID
  2 |  PID  |  7 |  PID
  3 |  PID  |  8 |  PID
  4 |  PID  |  9 |  PID      AT
  5 |  PID  | 10 |  PID
  《Local Mode》
    Unit |   CH |   CL | ENT
    Menu | Para. |
```

Setting :   PID control
　　　　　　 Autotuning (AT)

Factory set value :   PID control

*By executing AT, the number or name of the channel that is currently executed is shown in the inversed display on the operation monitor - ing screen.

<The conditions of autotuning >

Autotuning (AT) is the function which automatically measures, calculates and sets the optimum PID constants according to the set temperature. Following is the conditions necessary to carry out autotuning and the conditions which will cause the autotuning to stop.

Conditions necessary for autotuning:

The autotuning should be executed after satisfying all of the following conditions:

(1) Operation mode conditions:
　　　● Auto/Manual :　　　Auto mode
　　　● PID/AT :　　　　　　PID mode
　　　● Control Run/Stop :　Control Run mode

(2) The input value should not be underscale or over–scale displayed.

(3) The output limiter (high limit) should be more than 0.1% and the output limiter (low limit) should be less than 99.9%. (By controller initialize setting)

(4) When operation mode is set to "Normal".

When the autotuning is finished, the mode display of each channel will automatically return to show "PID".

Conditions which will cause the autotuning to stop:

● When the set value (SV) is changed.
● When the memory area is changed.
● When the PV bias value is changed.
● When the AT bias value is changed.
● When transfer to Manual mode using the Auto/Manual transfer.
● When the input value becomes underscale or over-scale display.
● When the power is cut off.
● When "FAIL" occurs in the module whose channel is under the autotuning.
  Otherwise, when "FAIL" occurs in the PCP module.
● When transfer to the PID mode by the PID/AT transfer.
● When operation mode is set to "Normal".
● When the Control Run/Stop function is changed to the "Control Stop" function.
● When the digital filter is changed. (By controller initialize setting)
● When the output limiter high limit or low limit is changed. (By controller initialize setting)

| CAUTION |

When the above-mentioned conditions to stop the autotuning occurs, the auto tuning
is immediately stopped and switch over to the PID (PID control) mode.
The PID constants return to the values at the start of the autotuning.

Operation mode change screen

This screen is used to select the operation conditions for each channel.

```
Operation Mode : Ope. Mode Change
Unit1:
┌────┬───────┬────┬───────┐          Unused  ◄── ①
│ CH │ Mode  │ CH │ Mode  │
├────┼───────┼────┼───────┤          Moni.   ◄── ②
│  1 │Normal │  6 │Normal │
│  2 │Normal │  7 │Normal │          Alarm   ◄── ③
│  3 │Normal │  8 │Normal │
│  4 │Normal │  9 │Normal │          Normal  ◄── ④
│  5 │Normal │ 10 │Normal │
└────┴───────┴────┴───────┘
  《Local Mode》

   Unit      CH        CL    ENT

   Menu     Para.        ALL
```

Setting: Unused
         Moni. (Monitoring)
         Alarm
         Normal

Factory set value: Normal

① **Unused mode select key**

If set to "Unused", no control, monitoring or alarm monitoring is performed.
Use this mode when conducting module replacement, or device maintenance and inspection.

② **Monitor mode select key**

If set to "Monitoring", only the monitoring action is performed (measured value capture) .
No control or alarm monitoring is performed. Use this mode when stopping equipment operation temporarily.

③ **Alarm mode select key**

If set to "Alarm", monitoring or alarm monitiring is performed. No control is performed.
Use this mode when stopping equipment operation temporarily.

④ **Normal mode select key**

Control, monitoring and alarm monitoring are performed.

║ CAUTION ║

**Even if the temperature rise completion function (Heat up judge) is set to the unused mode,
it continues to be effective.   If the temperature rise completion function is also to be set
invalid, change the setting of the temperature rise completion trigger function to "No".**

Control response designation parameter screen

This screen is used to change the characteristics of the control response (Slow, fast or medium).

```
Operation Mode : Control Response
Unit1:
┌────┬──────┬────┬──────┐
│ CH │ Resp.│ CH │ Resp.│    Slow
├────┼──────┼────┼──────┤
│ 1  │ Slow │ 6  │ Slow │   Medium
│ 2  │ Slow │ 7  │ Slow │
│ 3  │ Slow │ 8  │ Slow │    Fast
│ 4  │ Slow │ 9  │ Slow │
│ 5  │ Slow │ 10 │ Slow │
└────┴──────┴────┴──────┘
 《Local Mode》    Area:1

   Unit    CH      CL   ENT

   Menu    Para.     ALL
```

Setting: Slow, Medium, Fast

Factory set value: Slow

<Control response designation parameter>

This is the function of enabling the setting of response to set value (SV) change in select any one of 3 steps (Slow, Medium, Fast) in PID control.   In order to achieve faster controlled object response to set value (SV) change, select Fast.

However, slight overshoot is unavoidable when selecting Fast.   Depending on the controlled object, specify Slow if overshoot should be avoided.
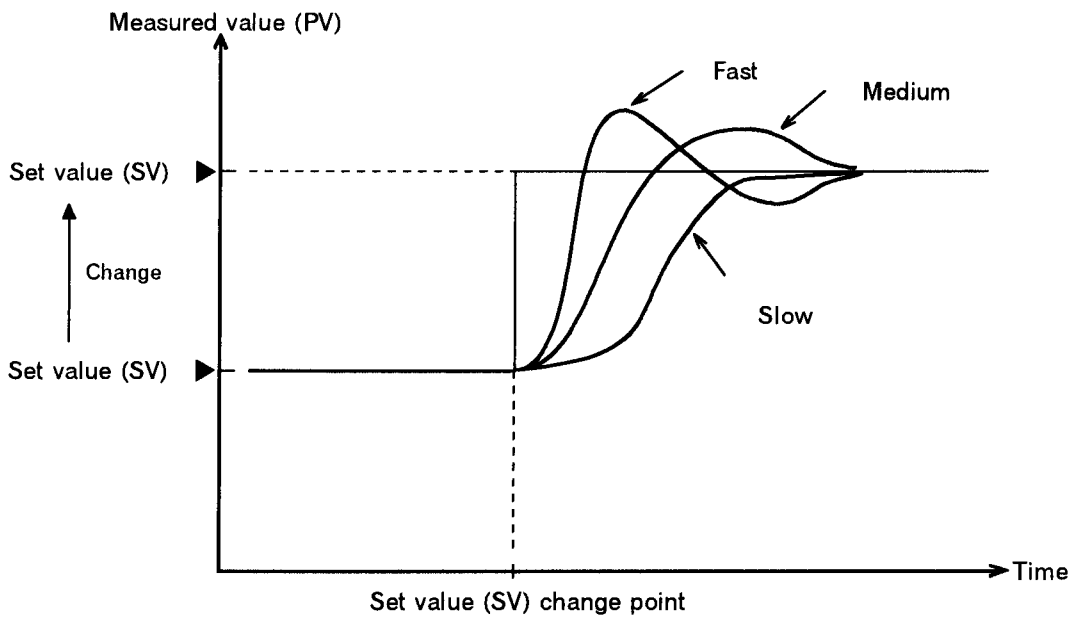
Fig. Example of control response designation parameter at set value (SV) change

Auto/Manual screen

This screen is used to change the control to Auto mode (Automatic operation) or to Manual mode (Manual operation).

```
Operation Mode : Auto/Manual
Unit1:
┌────┬──────┬────┬──────┐
│ CH │ A/M  │ CH │ A/M  │       ┌───────┐
├────┼──────┼────┼──────┤       │ Auto  │
│  1 │ Auto │  6 │ Auto │       └───────┘
│  2 │ Auto │  7 │ Auto │
│  3 │ Auto │  8 │ Auto │       ┌───────┐
│  4 │ Auto │  9 │ Auto │       │Manual │
│  5 │ Auto │ 10 │ Auto │       └───────┘
└────┴──────┴────┴──────┘

 《Local Mode》

  ┌──────┐  ┌──────┐   ┌─────┐ ┌─────┐
  │ Unit │  │  CH  │   │ CL  │ │ ENT │
  └──────┘  └──────┘   └─────┘ └─────┘
  ┌──────┐  ┌──────┐
  │ Menu │  │ Para.│
  └──────┘  └──────┘
```

Setting: Auto mode, Manual mode

Factory set value: Auto mode

*The output settings during manual control should be set using the manual output items in the setting screen.

CAUTION

When the specification of control unit is ON/OFF control , the manual mode is invalid.
The setting of the manual output in the setting screen is also invalid.

Control Run/Stop screen

This screen is used to change the Control Run/Stop for each of the units.

```
Operation Mode : Control Run/Stop


Unit 1:                          ┌───────┐
                                 │  Run  │
                                 └───────┘
Control Run/Stop =  Run
                                 ┌───────┐
                                 │ Stop  │
 《Local Mode》                  └───────┘


                          ┌─────┐ ┌─────┐
                          │ CL  │ │ ENT │
                          └─────┘ └─────┘
 ┌──────┐┌──────┐┌──────┐  ┌─────┐
 │ Menu ││ Unit ││ Para.│  │ ALL │
 └──────┘└──────┘└──────┘  └─────┘
```

Setting: Run, Stop

Factory set value: Run

*The item on this screen is unit of the control unit.

<Control Run/Stop>

Keys between running or stopping the control. When changed to control stop, both the control and alarm output change to the OFF condition.

Memory area screen

This screen is used to change the memory area for each of the units.

```
Operation Mode : Memory Area


Unit 1:
                        ▲

Memory Area =  1
                        ▼

《Local Mode》

                     CL   ENT

Menu  Unit   Para.   ALL
```
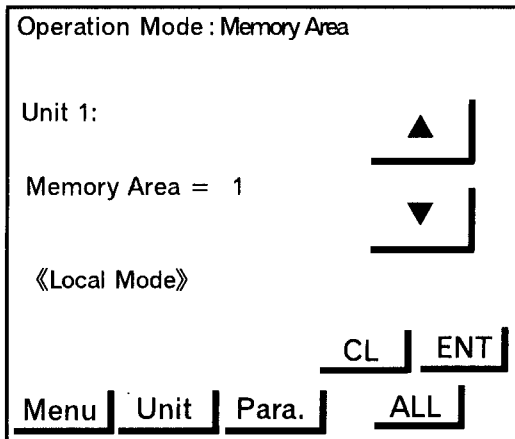
Setting: 1 to 8

Factory set value: 1

*The item on this screen is unit of the control
 unit.

*During a memory area change, the operation
 panel reads all of the data stored in the changed
 area from the control unit.
 During this period, all key operations are invalid
 and the message **"Please wait."** appears on
 the screen..

<Memory area>

In this item, the memory area number is set for each control unit.
The memory area function is the function which stores the parameter values such as the set value
(SV) etc. in up to 8 memories. When required, read in the appropriate 1 memory out of 8 memories
and to use its parameters for the control.

Alarm interlock screen

This screen is used to the alarm interlock release specifying.

```
Operation Mode : Alarm Interlock


Unit 1:
                        OFF
Alarm Interlock =  ON
※OFF : Alarm interlock off
        and alarm reset.

    《Local Mode》

                     CL   ENT

Menu  Unit   Para.
```
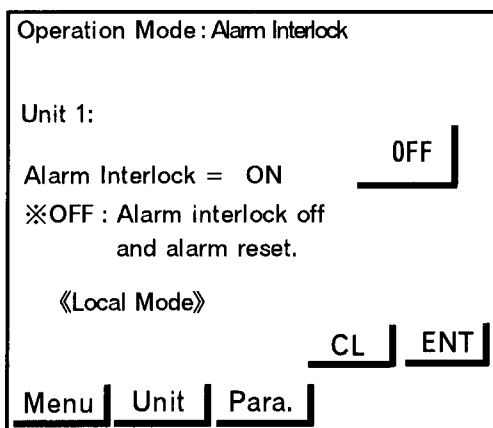
Setting :   OFF(Alarm inerlock release)

*The item on this screen is unit of the control
 unit.

*When the alarm specification has an interlock
 function, this designation allows the interlock
 condition to be released.
 By executing "OFF",the interlock is released
 and the display also changes automatically to
 "ON".

<Alarm interlock >

● By executing "OFF", the interlock is released and the display also changes automatically to "ON".

● The alarm interlock function is used to hold the alarm state even if the measured value (PV) is
   out of the alarm zone after its entry into the zone once.

Temperature rise completion trigger screen

This screen is used to select whether the temperature rise completion trigger function (Heat up judge) is used.   This function is set for each channel.

```
Operation Mode : Heat up Judge
Unit 1:
┌────┬───────┬────┬───────┐
│ CH │ Judge │ CH │ Judge │    Yes │
├────┼───────┼────┼───────┤
│ 1  │ No    │ 6  │ No    │
│ 2  │ No    │ 7  │ No    │    ────┘
│ 3  │ No    │ 8  │ No    │
│ 4  │ No    │ 9  │ No    │    No  │
│ 5  │ No    │ 10 │ No    │    ────┘
└────┴───────┴────┴───────┘
《Local Mode》

  Unit │    CH │    CL │ ENT│

  Menu │  Para. │    ALL │
```

Setting: Yes, No

Factory set value: No

NOTE

The temperature rise completion function becomes valid even when "Unused" is selected in each channel on the operation mode change screen.   If it is necessary to disable the operation mode and also to disable the temperature rise completion trigger function, change the above temperature rise completion trigger selection to "No".

Loop break alarm selection screen

This screen is used to select whether the loop break alarm function is used. This function is set for each channel.

```
Operation Mode : LBA Selection
Unit1:
┌────┬────────┬────┬────────┐
│ CH │ Select │ CH │ Select │   Yes │
├────┼────────┼────┼────────┤
│ 1  │ No     │ 6  │ No     │   ────┘
│ 2  │ No     │ 7  │ No     │
│ 3  │ No     │ 8  │ No     │   No  │
│ 4  │ No     │ 9  │ No     │   ────┘
│ 5  │ No     │ 10 │ No     │
└────┴────────┴────┴────────┘
《Local Mode》

  Unit │    CH │    CL │ ENT│

  Menu │  Para. │    ALL │
```

Setting: Yes, No

Factory set value: No

CAUTION

The loop break alarm function is activated only when the operation mode select switch is turned to "Normal mode". This function is not activated during autotuning.

■ **Setting procedure**

Method of changing mode (Example: PID/AT screen)
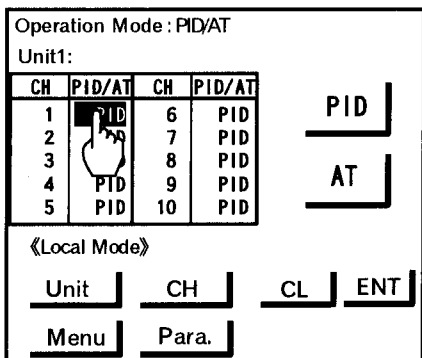
```
Operation Mode : PID/AT
Unit1:
CH  PID/AT  CH  PID/AT
1   PID     6   PID        PID
2   PID     7   PID
3           8   PID
4   PID     9   PID        AT
5   PID    10   PID
《Local Mode》
Unit      CH       CL   ENT
Menu      Para.
```

1. Touch the mode section to be set to highlight (inversely display) the mode.

```
Operation Mode : PID/AT
Unit1:
CH  PID/AT  CH  PID/AT
1   AT      6   PID        PID
2   PID     7   PID
3   PID     8   PID
4   PID     9   PID        AT
5   PID    10   PID
《Local Mode》
Unit      CH       CL   ENT
Menu      Para.
```
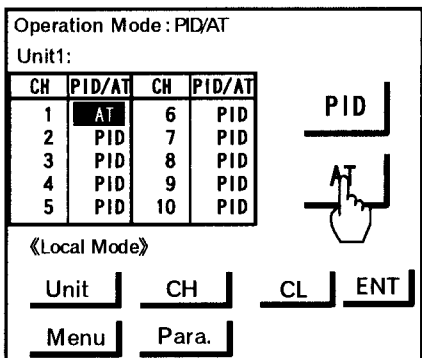
2. Select the required mode by the mode select key to change the mode.

```
Operation Mode : PID/AT
Unit1:
CH  PID/AT  CH  PID/AT
1   AT      6   PID        PID
2   PID     7   PID
3   PID     8   PID
4   PID     9   PID        AT
5   PID    10   PID
《Local Mode》
Unit      CH       CL   ENT
Menu      Para.
```
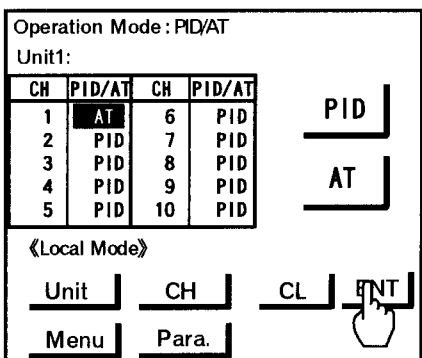
3. Touch the **ENT** key.
   Then the inversed mode returns to normal and the mode is entered.

   * If there is a mistake in the above setting, the current mode returns to the mode before this setting while the latter mode is highlighted.

   * The changed mode is registered by touching the **ENT** key.

Simultaneous setting procedures

Setting procedures in operation modes other than "Control Run/Stop" and "Memory Area" are the same as those on the setting screen.   In "Control Run/Stop" and "Memory Area" modes, the setting is enabled for each control unit.   The setting procedures are described in the following.

● **In Control Run/Stop mode**
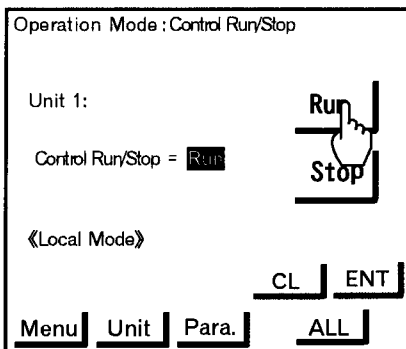
1. Touch the mode section to be set to highlight (inversely display) the mode.
   Next, touch the mode select key to enter the mode to be simultaneously set.
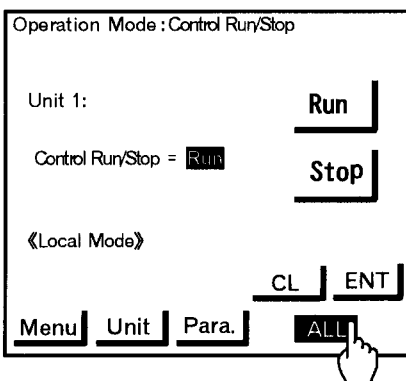
2. Touch the **ALL** key to highlight the **ALL** key.
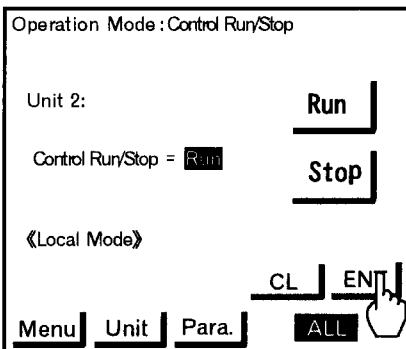
3. Touch the **ENT** key.
   After the simultaneous setting is registered, the next unit screen is displayed. Touching the **ENT** key in succession enables the simultaneous setting for each unit screen.

   * If there is a mistake in the above setting, the current mode returns to the mode before this setting while the latter mode is highlighted.

   * The changed mode is registered by touching the **ENT** key.

● **In Memory Area**
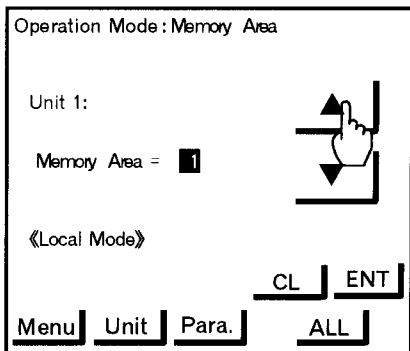
```
Operation Mode : Memory Area

Unit 1:

Memory Area =  ■1

《Local Mode》
                      CL    ENT
Menu  Unit  Para.        ALL
```

1. Touch the mode section to be set to highlight (inversely display) the mode.
   Next, touch the mode select key to enter the memory area No.
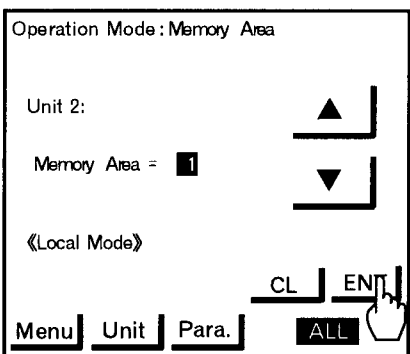
```
Operation Mode : Memory Area

Unit 1:

Memory Area =  ■1

《Local Mode》
                      CL    ENT
Menu  Unit  Para.       ALL
```

2. Touch the **ALL** key to highlight the **ALL** key.

```
Operation Mode : Memory Area

Unit 2:

Memory Area =  ■1

《Local Mode》
                      CL    ENT
Menu  Unit  Para.       ALL
```

3. Touch the **ENT** key.
   After the simultaneous setting is registered, the next unit screen is displayed. Touching the **ENT** key in succession enables the simultaneous setting for each unit screen.

   *During a memory area change, the operation panel reads all of the data stored in the changed area from the control unit. During this period, all key operations are invalid and the message "Please wait." appears on the screen.

   *If there is a mistake in the above setting, the current mode returns to the mode before this setting while the latter mode is highlighted.

   *The changed mode is registered by touching the **ENT** key.

NOTES

●No simultaneous setting function is available for "PID/AT", "Auto/Manual" and "Alarm interlock release".

●In order to suspend the simultaneous setting function, touch the **ALL** key to release the inverse display.

●When the set value needs to be changed during simultaneous setting, touch the **CL** key, then make a re-entry by touching the select mode key and finally touch the **ENT** key.

4.4.5 Initialize setting screen

The initialize setting screen is used to set the time, scan the operation monitoring screens, and also display or set both data which is not frequently set such as data on the operation panel and commands.

■ Calling procedure

```
┌──────────────┐   Initial Set    ┌──────────────┐   Clock Set      ┌──────────────┐
│Operation menu│ ═══════════════▶ │Initialize menu│ ──────────────▶ │  Clock Set   │
│    screen    │ ◀═══════════════ │    screen     │                  └──────────────┘
└──────────────┘   Ope.Menu       └──────────────┘   Contrast       ┌──────────────┐
                                            │       ──────────────▶ │   Contrast   │
                                            │                        │  Adjustment  │
                                            │              Screen Scan └──────────────┘
                                            │       ──────────────▶ ┌──────────────┐
                                            │                        │Screen Scan Set│
                                            │          Computer/Local└──────────────┘
                                            │       ──────────────▶ ┌──────────────┐
                                            │                        │Computer/Local│
                                            │                        │   Selection  │
                                            │           Unit/CH Name └──────────────┘
                                            └─────────────────────▶ ┌──────────────┐
                                                                     │Unit/CH Name  │
                                                                     │          Set │
                                                                     └──────────────┘
```
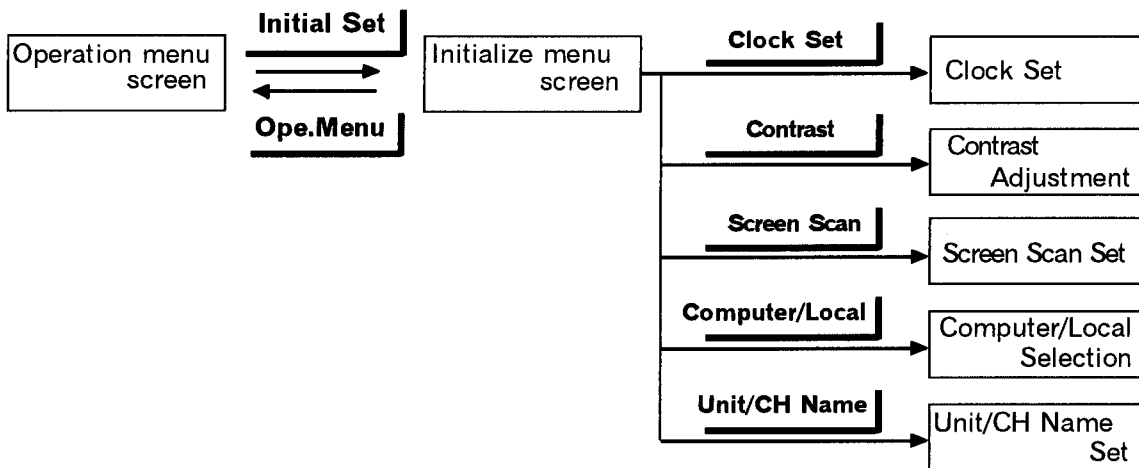
■ Initialize menu screen

This screen allows changing to each of the initialize setting screens.

```
              Clock display
        ┌────────────────────────────────────┐
        │ Initial Menu     ┌94/ 8/ 2(MON)16:15┐ │   Item select keys
        │                  └ ─ ─ ─ ─ ─ ─ ─ ─ ─┘ │
        │  ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─┐ │        ↗
        │  │  Clock set  │    Contrast    │   │ │
        │  │                                  │ │
        │  │  Screen Scan │ Computer/Local │   │ │   *In order to perform "OPM initialize"
        │  │                                  │ │   or "Controller initialize", it is
        │  │  Unit/CH Name │                  │ │   necessary  to release the protect
        │  │                                  │ │   processing, then to display each
        │  └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─┘ │   menu key on the initialize menu
        │                                      │   screen.
        │  ┌────────────┐                      │   For details, see supplementary
        │  │ Ope. Menu  │                      │   manual.
        │  └────────────┘                      │
        └────────────────────────────────────┘
          Operation menu screen select key
```
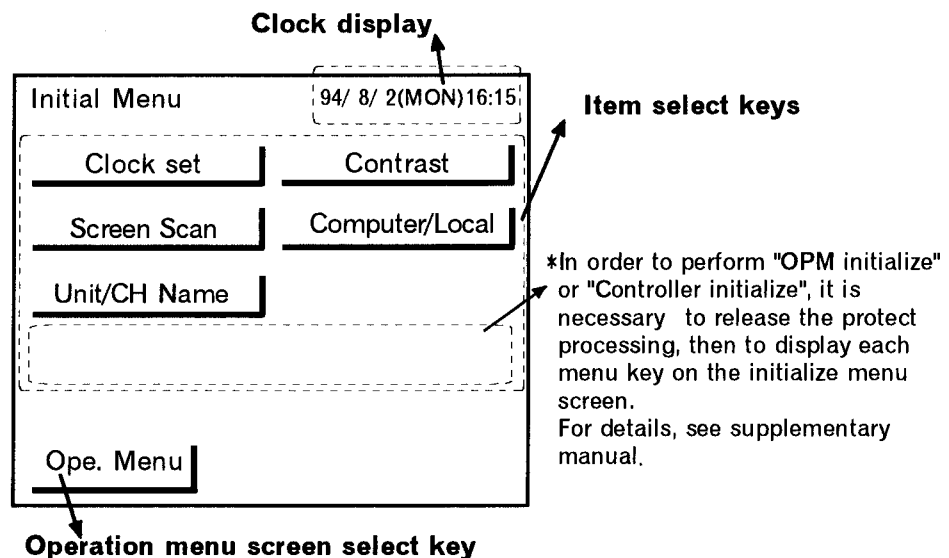
Operation menu screen select key

Touching this key changes to the operation menu screen.

Item select keys

Touching the key corresponding to the desired item changes to the initialize setting screen for that item.

■ Clock set screen (Time setting)

This screen is used when setting the time of the clock function that is built into the operation panel.
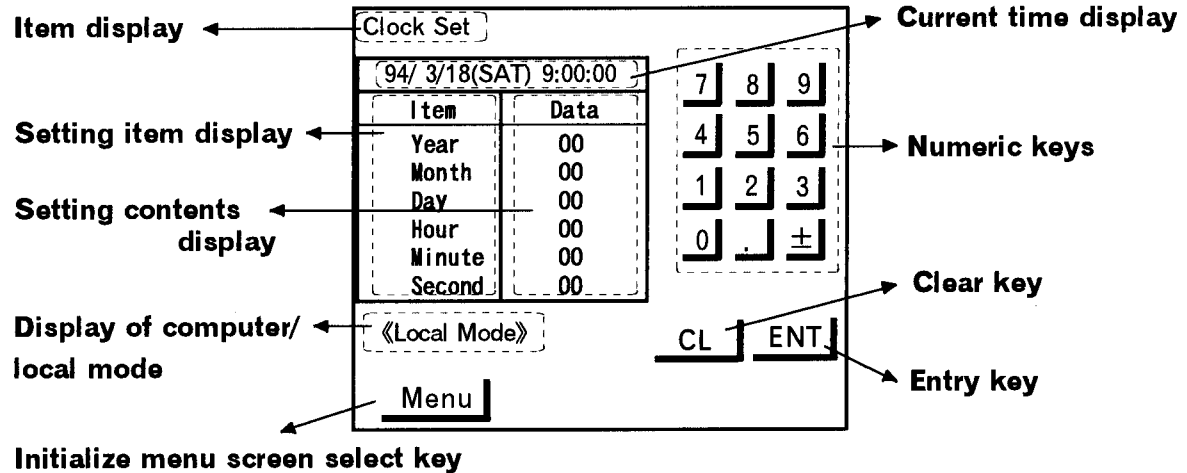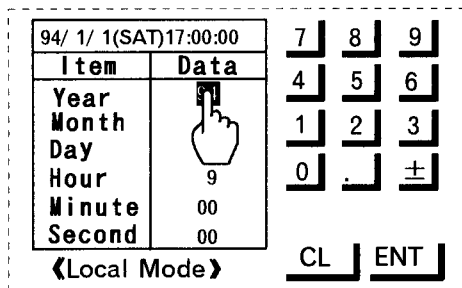
<Display details>

Item display ← **Clock Set**

Current time display

Setting item display ←

Setting contents display ←

Item	Data
Year	00
Month	00
Day	00
Hour	00
Minute	00
Second	00

`94/ 3/18(SAT) 9:00:00`

Numeric keys

Display of computer/ ← 《Local Mode》
local mode

Clear key

Entry key

Menu

Initialize menu screen select key

<Setting procedure>

Item	Data
Year	00
Month	
Day	
Hour	9
Minute	00
Second	00

《Local Mode》

1. Touch the numeral section to be set to highlight (inversely display) the numeral.

Item	Data
Year	94
Month	3
Day	18
Hour	9
Minute	00
Second	00

《Local Mode》
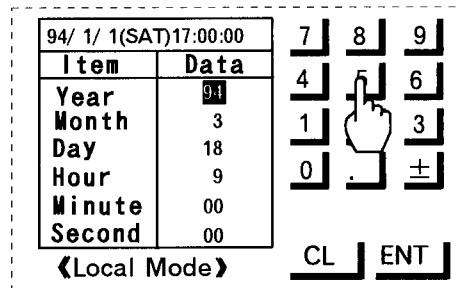
2. Change the required numeral to be set by the numeric keys.

Item	Data
Year	94
Month	3
Day	18
Hour	9
Minute	00
Second	00

《Local Mode》
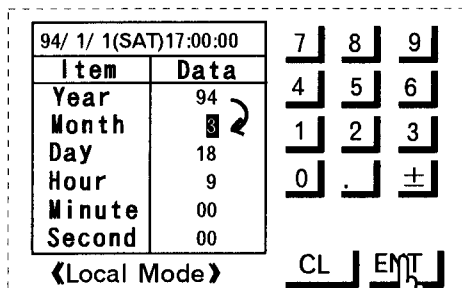
3. By touching the **ENT** key, the set value is entered and the inversed display moves to the next setting item. If this item is not necessary for the setting, touch the **ENT** key to move to the next item.

Item	Data
Year	94
Month	3
Day	18
Hour	9
Minute	00
Second	00

《Local Mode》
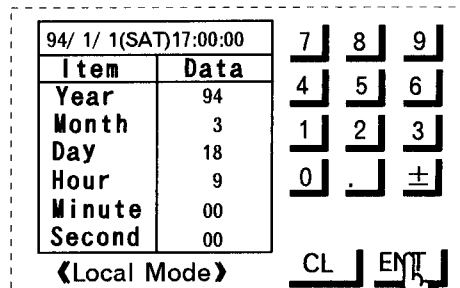
4. When the setting of the second is completed (When the **ENT** key is touched at the second item), the clock starts operation as the numerals.

* For the setting of the year, set the lower two digits of the year figures.

* Week : The day of the week is automatically set and displayed in English. (Supported between 1994 and 2093)

■ **Contrast Adujustment screen**

This screen is used to adjust the contrast of the operation panel display.

<Display details>

Item display ◄——

Each time this key is touched, the screen becomes darker.

Contrast Adjustment

Dark   Bright

Each time this key is touched, the screen becomes brighter.

Menu

Initialize menu screen select key
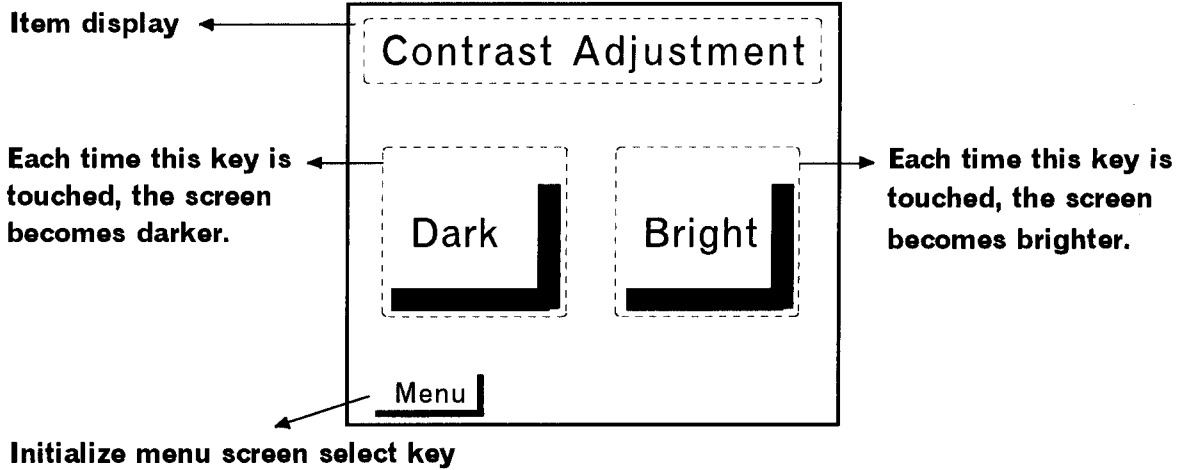
* The LCD (Liquid Crystal Display) may be difficult to see depending on the position from which the screen is viewed.
In this case, adjust contrast of the screen to improve display clarity.

■ **Screen scan setting screen**

This screen is used to for the setting of the items concerning the scanning of each screen during operation monitoring is carried out.

<Display details>

Item display ◄—— Screen Scan Set

Setting item display ◄——
1. Screen Scan ? = Yes
2. Scan Type= Item Transfer
3. Scan Time=   10(sec)

▲ ▼

Setting (Changing) keys

Display of computer/ ◄—— 《Local Mode》
local mode

CL   ENT

Clear key

Entry key

Menu

Initialize menu screen select key

<Setting procedure>
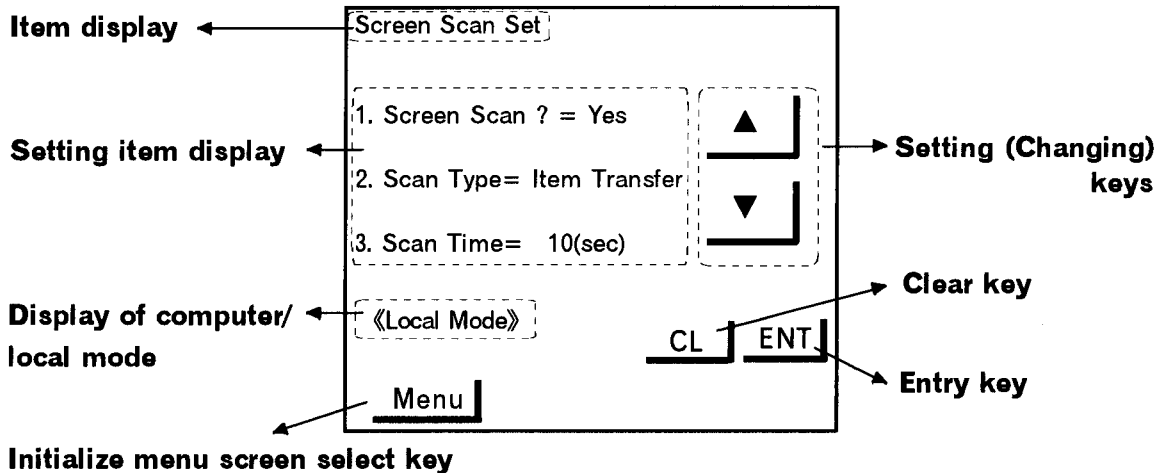
1. Setting the ON/OFF of the display screen scanning
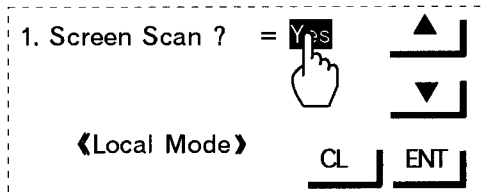
```
 _____          _____
| 1. Screen Scan ? = Yes  ▲|        | 1. Screen Scan ? = No   ↑|
|                         ▼|   →    |                          |
|   《Local Mode》           |        |   《Local Mode》           |
|                   CL  ENT|        |                    CL  ENT|
 ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾          ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾
```

1. Touch the setting section to be set to highlight (inversely display) the setting.
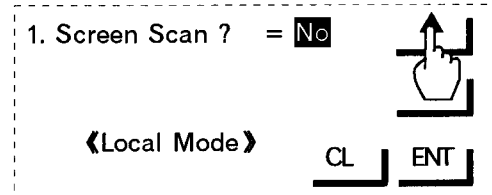
2. Select the ON/OFF of the scanning by the ▲ or ▼ key, and touch the ENT key to enter this mode.

2. Setting the type of screen scanning
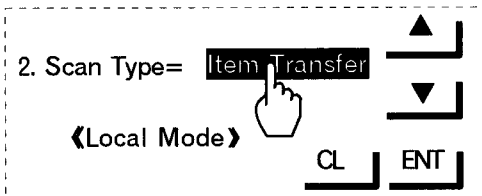
```
 _____          _____
| 2. Scan Type= Item Transfer ▲|    | 2. Scan Type= Unit Transfer ↑|
|                           ▼|  →   |                            |
|   《Local Mode》             |      |   《Local Mode》             |
|                     CL  ENT|      |                      CL  ENT|
 ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾        ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾
```

1. Touch the setting section to be set to highlight (inversely display) the setting.
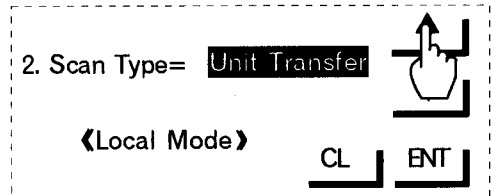
2. Select the type by the ▲ or ▼ key, and touch the ENT key to enter this type.

● Scanning type

Item Transfer : Scans the items in the operation monitoring screen

Unit Transfer : In using several control units joined together, the displayed item can be scanned for each unit separately.

3. Screen scanning time

```
 _____          _____
|                         ▲|        |                          ↑|
| 3. Scan Time= 10 (sec)  ▼|   →    | 3. Scan Time= 20 (sec)   |
|   《Local Mode》           |        |   《Local Mode》           |
|                   CL  ENT|        |                    CL  ENT|
 ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾          ‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾
```
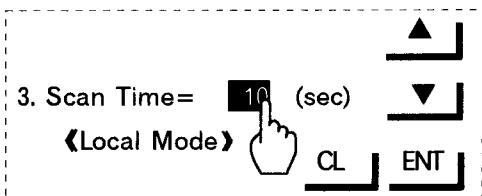
1. Touch the setting section to be set to highlight (inversely display) the setting.

2. Set the required time by the ▲ or ▼ key. Each time the ▲ or ▼ key is touched, the time changes up or down accordingly.
Finally, touch the ENT key to enter the time and to finish.
   (Setting range : 1 to 9999 second)

<Scanning screen flow diagram>

● **When item changing is selected**

------------------------------ **For the displayed control unit** --------------------------

(Example : 10 channel display type)

| PV/SV 1 to 10CH | MVH/MVC 1 to 10CH | ·············· | CT2/HA2 1 to 10CH |

| PV/SV 11 to 20CH | MVH/MVC 11 to 20CH | | CT2/HA2 11 to 20CH |
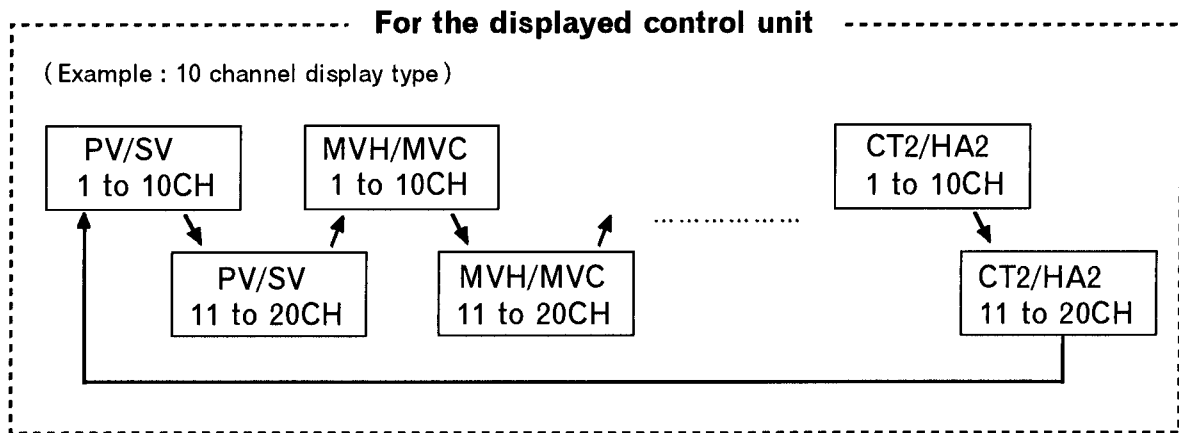
* If more than one control unit is connected, when the **Unit** key is touched during screen scanning, each item corresponding to the selected control unit is scanned.

* If there is no relevant module, that screen item skipped.

* If there is no CT nor HBA in the connected module, the "CT1/HA1" or "CT2/HA2" screen is not displayed.

● **When unit changing is selected**

--------------------------- **For the displayed items** --------------------------

(Example : 10 channel display type)

| Control unit 1 displayed items 1 to 10CH | Control unit 2 displayed items 1 to 10CH | ············ | Last connected control unit |

| Control unit 1 displayed items 11 to 20CH | Control unit 2 displayed items 11 to 20CH |
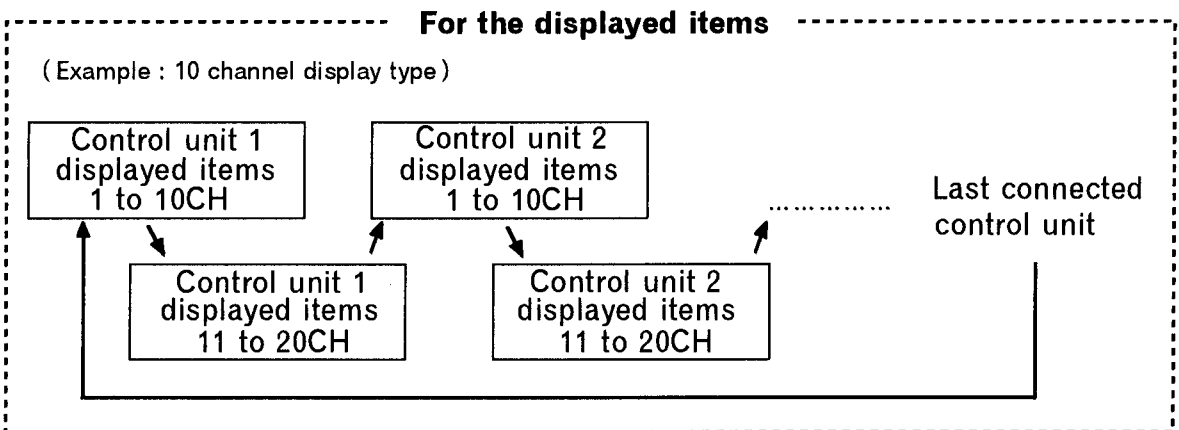
* If the **Para.** key is touched during screen scanning, when the select item that is scanned in each control unit.

* If there is no relevant module, that screen item skipped.

■ Computer/Local screen

This screen is used to select whether the settings shall be carried out by a host computer (Computer mode) or by the operation panel (Local mode).
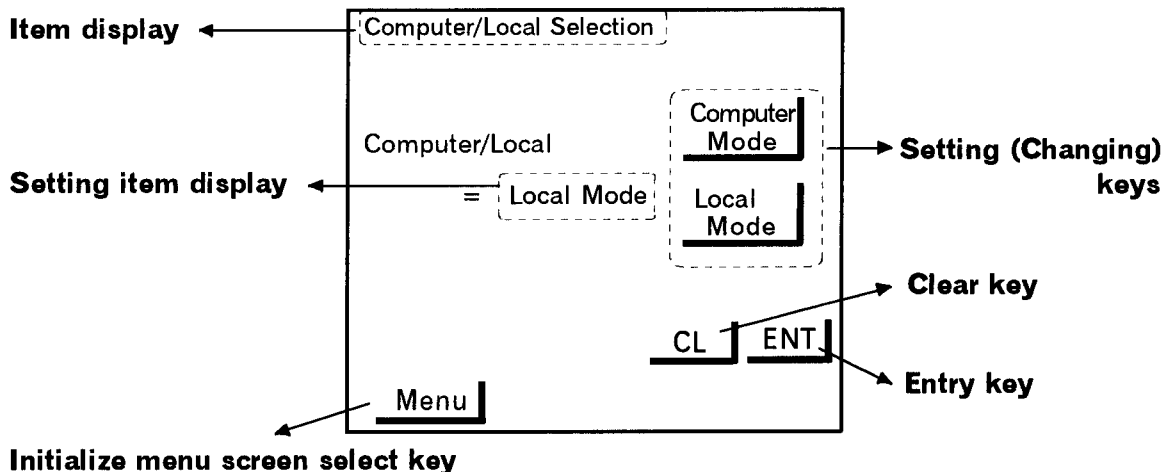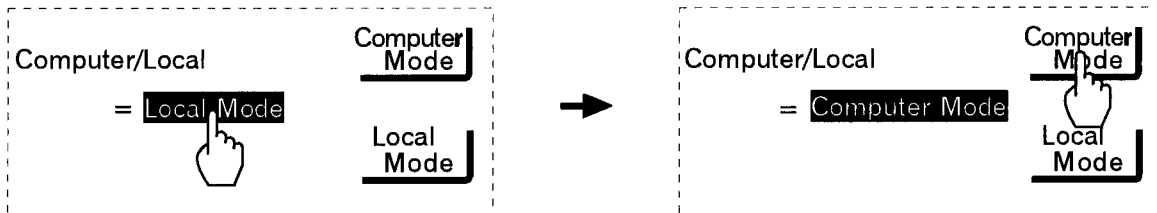
<Display details>

Item display ◄───────────

Setting item display ◄───────

Computer/Local Selection

Computer/Local

Computer
Mode

= Local Mode

Local
Mode

Setting (Changing) keys

Clear key

CL ENT

Entry key

Menu

Initialize menu screen select key

<Setting procedure>

Computer/Local

Computer
Mode

= Local Mode

Local
Mode

➡

Computer/Local

Computer
Mode

= Computer Mode

Local
Mode

1. Touch the setting section to be set to highlight (inversely display) the setting.

2. Select the required mode by the "Computer mode" or "Local mode" changing key, and touch the **ENT** key to enter this mode.

* In the Computer mode, the host computer has priority and none of the operation panel keys concerning the settings are effective. (Except for the setting of Computer/Local .)

■ **Unit/CH (Channel) name setting screen**

This screen is used to set the names of control unit and channel shown on the operation monitoring screen, setting screen and operation mode screen.

CAUTION

The number of characters that can be set as the channel name is 2 full–size characters +1 half–size characters or 5 half–size characters.
The unit name can be up to 6 full–size characters or 12 half–size characters.

<Flow diagram of the unit/channel name setting screen>

<Display details>
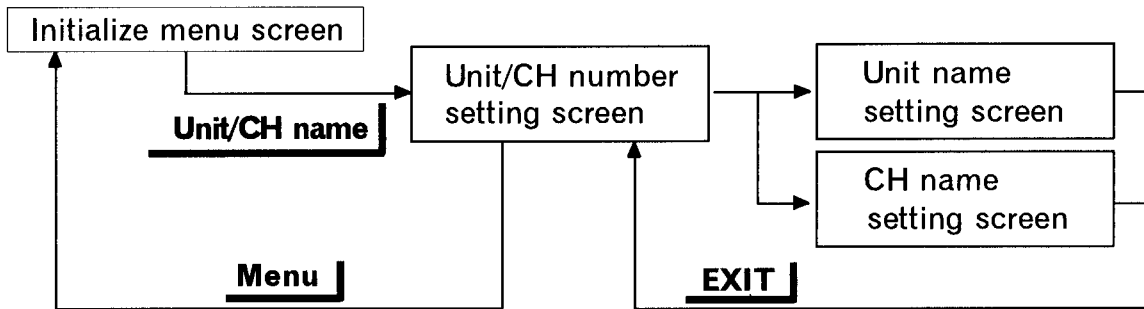
Unit/CH number setting screen

This screen is used to specify the control unit and the channel to be set or changed the name.
It is also used to check what names are set.
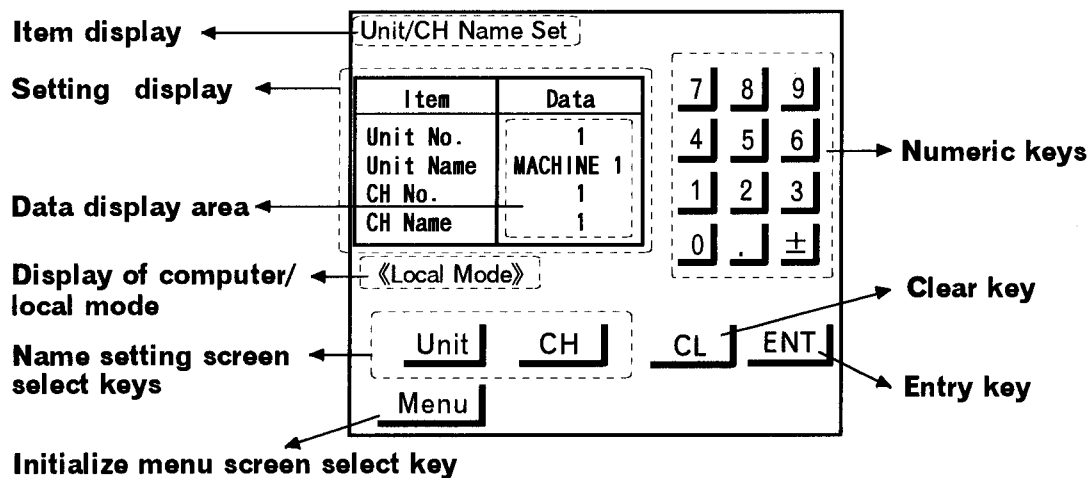
* When the operation panel is shipped from the factory, the unit names are set to blank and the CH names are set to 1, 2 .... .

Unit/CH name setting screen

This screen is used to set or change the names of the control unit and the channel. The unit and channel settings are carried out separately.

Screen item display

Display of the unit currently set

Character selecting item screen

```
(Display : Character1)          (Unit 1)
! " # $ % & ' ( ) * + , - . / 0
1 2 3 4 5 6 7 8 9 : ; < = > ? @
A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z [ ¥ ] ^ _
```

Space key

Setting item and setting name display

Name previous key

Unit Name = ■_____

Entry key

Screen item selection keys

```
Char  Sym.  Kana  Kanj  SP  ENT
```

Back space key

Setting editing end key

```
EXIT  △  ▽  Jump  PRIV  BS
```

:Unused

(△) next screen & (▽) previous screen select keys

Screen item display

Display of the unit/CH currently set

Character selecting item screen

```
(Display : Character1)          (Unit 1  CH1)
! " # $ % & ' ( ) * + , - . / 0
1 2 3 4 5 6 7 8 9 : ; < = > ? @
A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z [ ¥ ] ^ _
```

Space key

Setting item and setting name display

Name previous key

CH Name = ■_____

Entry key

Screen item selection keys

```
Char  Sym.  Kana  Kanj  SP  ENT
```

Back space key

Setting editing end key

```
EXIT  △  ▽  Jump  PRIV  BS
```

:Unused

(△) next screen & (▽) previous screen select keys

<Setting procedure>

To the set "M" character in setting the name of unit 2 as "MACHINE 2".

<Unit/CH number setting screen>

Unit/CH Name Set

Item	Data
Unit No.	1
Unit Name	
CH No.	
CH Name	

《Local Mode》

7 8 9
4 5 6
1 2 3
0 . ±

Unit | CH | CL | ENT

Menu

1. Touch the unit number to be set to highlight (inversely display) the unit number.

Unit/CH Name Set

Item	Data
Unit No.	2
Unit Name	
CH No.	1
CH Name	1

《Local Mode》

7 8 9
4 5 6
1 2 3
0 . ±

Unit | CH | CL | ENT

Menu

2. Touch the numeric key to change the value to the number of the unit which is to be changed, and touch the **ENT** key to enter this value.

<Unit name setting screen>

Unit/CH Name Set

Item	Data
Unit No.	2
Unit Name	
CH No.	1
CH Name	1

《Local Mode》

7 8 9
4 5 6
1 2 3
0 . ±

Unit | CH | CL | ENT

Display : Character1   Unit 2

```
! " # $ % & ' ( ) * + , - . / 0
1 2 3 4 5 6 7 8 9 : ; < = > ? @
A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z [ ¥ ] ^ _
```

Unit Name = ■

Char | Sym. | Kana | Kanj | SP | ENT

EXIT | △ | ▽ | Jump | PRIV | BS

3. Next, by touching the **Unit** key, the screen changes to the unit name setting screen.

* By touching the **CH** key, the screen changes to the CH name setting screen.

```
Display : Character1          Unit 2
 ! ” # $ % & ’ ( ) * + , - . / 0
 1 2 3 4 5 6 7 8 9 : ; < = > ? @
 A B C D E F G H I J K L █ N O P
 Q R S T U V W X Y Z [ ¥ ] ^ _

        Unit Name = ■

  Char Sym. Kana Kanj  SP  ENT
  EXIT  △   ▽   Jump PRIV  BS
```
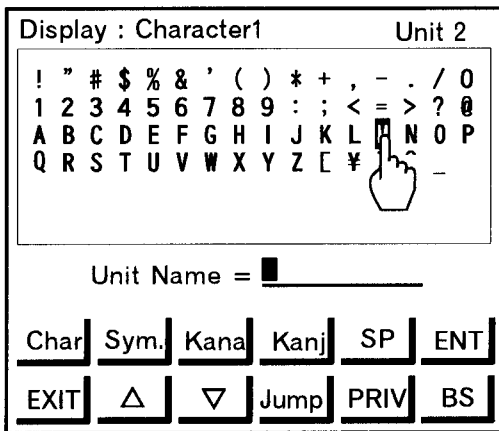
4. Select the character "M" from the screen
   by touching the character area to turn
   the character into the inversed display.

```
Display : Character1          Unit 2
 ! ” # $ % & ’ ( ) * + , - . / 0
 1 2 3 4 5 6 7 8 9 : ; < = > ? @
 A B C D E F G H I J K L M N O P
 Q R S T U V W X Y Z [ ¥ ] ^ _

        Unit Name = M■

  Char Sym. Kana Kanj  SP  ENT
  EXIT  △   ▽   Jump PRIV
```

5. Finally, touch the **ENT** key to enter and
   display the "M" character in the unit name
   display area.
   Then continue to select and enter the
   necessary characters to make up the name.

```
Display : Character1          Unit 2
 ! ” # $ % & ’ ( ) * + , - . / 0
 1 2 3 4 5 6 7 8 9 : ; < = > ? @
 A B C D E F G H I J K L M N O P
 Q R S T U V W X Y Z [ ¥ ] ^ _

     Unit Name = MACHINE 2■

  Char Sym. Kana Kanj  SP  ENT
  EXIT  △   ▽   Jump PRIV  BS
```

```
Unit/CH Name Set
  Item      Data        7  8  9
 Unit No.     2         4  5  6
 Unit Name  MACHINE 2   1  2  3
 CH No.       1         0  .  ±
 CH Name      1
 《Local Mode》
    Unit   CH     CL   ENT
    Menu
```

6. After completing setting and registration, touch the **EXIT** key to end the unit name editing
   and to change to the Unit/CH number setting screen. Check if the registered unit name
   "MACHINE 2" is set.

* Carry out the setting of the channel names by the same method.
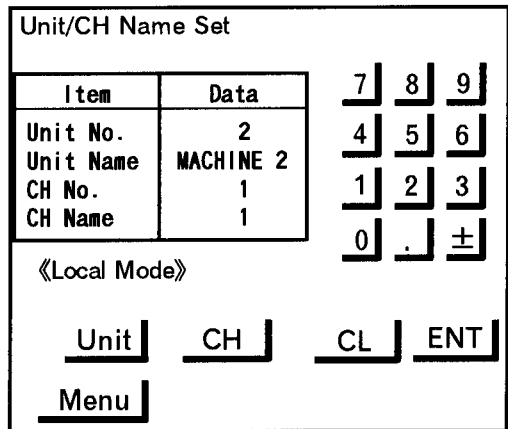
◆ __PRIV__| key

When the settings of similar names continue, this key is used to input the previously input name directly and used for the setting.

(Unit 2 name setting screen)

```
Display : Character1          Unit 2

  ! " # $ % & ' ( ) * + , - . / 0
  1 2 3 4 5 6 7 8 9 : ; < = > ? @
  A B C D E F G H I J K L M N O P
  Q R S T U V W X Y Z [ ¥ ] ^ _



      Unit Name = MACHINE 1█

  Char  Sym.  Kana  Kanj  SP   ENT
  EXIT   △    ▽    Jump  PRIV  BS
```

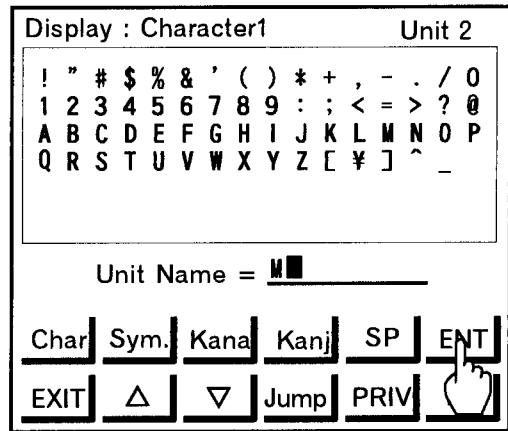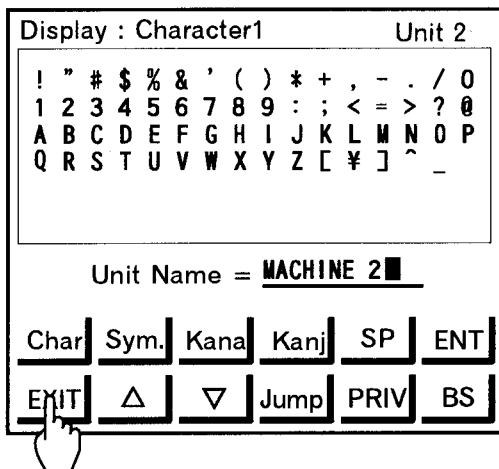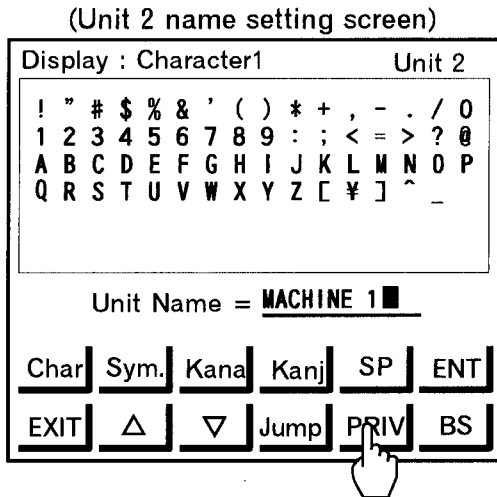After setting unit 1 as **"MACHINE 1"**, if unit 2 is to be set as **"MACHINE 2"**, touch the __PREV__| key on the unit 2 name setting screen.
The previously set **"MACHINE 1"** characters can be directly input into the name area.
Then touch the __BS__| key to delete just the character **"1"**, and input and set the character **"2"**.

◆ **When the settings are entered wrongly or when the entered values are to be changed:**

__BS__| key: Each time this key is touched, the last character of the name will be deleted one by one.

<Underline and cursor on the name display unit during name editing>

● The underline shows the margin in which the characters for the name can be input.

● The cursor (inversed display) shows the position where the characters are to be entered.
  It also shows the position from which characters are to be entered when a space is set by the __SP__| key. However, no characters can be entered or set in any position not underlined.

| NOTE |

When entering names, the use of "− − − −" etc. for unused CH names is convenient to make the screen display clearer.

4.4.6 Error message screen

This screen is automatically displayed on the occurrence of an abnormality in the control unit, operation panel main unit or communications.

<Display details>
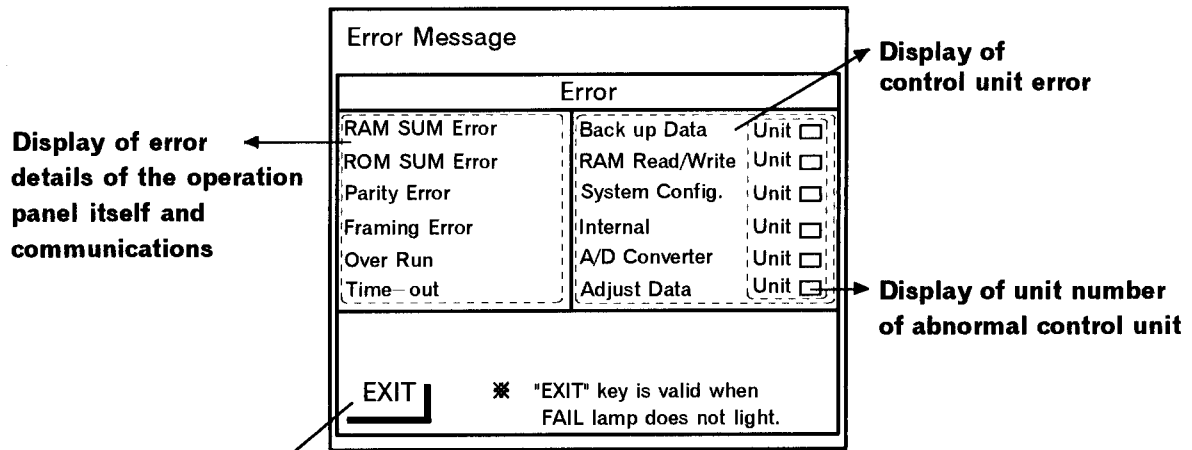
By touching this key, the error screen returns to the previous screen just before the error.

* When an error occurs, the error contents is shown in inversed display.

Furthermore, for the errors of control unit, the number of the abnormal unit is also displayed.

* Using the **EXIT** key, the previous screen just before the error can be displayed.

(If the error will occur when the power was turned on, the screen will return to the operation monitoring screen.)

However, when the FAIL lamp on the operation panel is lit, the resetting can not be called out.

MEMO

CHAPTER 5

IN CASE OF TROUBLE

5. IN CASE OF TROUBLE

5.1 Error message

If a system error occurs during operation or when the power is turned on, the error message screen will be displayed, and at the same time it will be possible to have confirmation of the contents of the error (Inversed display part).

```
┌─────────────────────────────────────────┐
│ Error Message                            │
│ ┌─────────────────────────────────────┐ │
│ │                Error                │ │
│ ├──────────────────┬──────────────────┤ │
│ │ RAM SUM Error    │ Back up Data  Unit ☐ │
│ │ ROM SUM Error    │ RAM Read/Write Unit ☐ │
│ │ Parity Error     │ System Config. Unit ☐ │
│ │ Framing Error    │ Internal      Unit ☐ │
│ │ Over Run         │ A/D Converter Unit ☐ │
│ │ Time-out         │ Adjust Data   Unit ☐ │
│ └──────────────────┴──────────────────┘ │
│                                          │
│  EXIT ┐    ✳  "EXIT" key is valid when   │
│       ┘       FAIL lamp does not light.  │
└─────────────────────────────────────────┘
```

(Error message screen)

(1) Concerning the operation panel

① RAM SUM check error .... Problem with the memory back-up battery
② ROM SUM check error .... Problem with the ROM on the CPU board
③ Parity error .... During communication, the data has been wrongly written
④ Framing error .... During communication, the data has been wrongly written
⑤ Over Run .... Problem with the taking-in of the received data
⑥ Time-out .... No response from the controller

● If errors ① or ② have occurred, request for the replacement or the repair of the operation panel.
(See "5.4 Replacement procedure" on page 5-11.)

● If errors ③ to ⑤ have occurred, there will be a possibility that too much noise or surge might be applied to the connecting cable with control unit. Investigate the wiring condition of the connecting cable and whether there is a noise generating source nearby, then switch on the power again.
(See "5.3 Precautions for power on again" on page 5-10.)

● If error ⑥ has occurred, there will be a possibility of the problem with the power supply, there may be the breakage of the connecting cable with control unit, or the detachment of the connector. Confirm the power supply to the control unit and the condition of the connecting cable.

* If the above-mentioned processing does not improve the problem, please contact RKC's sales representative, our closest sales office, or the agent who has supplied the equipment.

(2) Concerning the control unit

① Back–up data error ···· The control data has been destroyed or written wrongly
② RAM read/write error ···· Problem with the system RAM
③ System composition error ···· The system composition has been changed
④ Internal communications error ···· Abnormality in the internal communications
⑤ A/D converter error ···· Problem with the A/D converter
⑥ Adjustment data error ···· The adjustment data has been written wrongly

● If error ① , ② or ⑤ occurs:
   Cause : The RAM, ROM or A/D converter is faulty.
   Action : Request us to repair it or replace the defective control unit.
          (The module whose FAIL lamp is lit).

● If error ③ occurs:
   Cause : The present module configuration differs from the initial module configuration, for example,
          when replacing a module having a different module No.
   Action : Perform the system settings again, or return the present module configuration to the original
          module configuration.

● If error ④ occurs:
   Cause : The module was removed while the power was on. The module is faulty.
   Action : Install the removed module as before. Request us to repair it or replace the defective
          control unit (The module whose FAIL lamp is lit).

● If error ⑤ or ⑥ occurs:
   Cause : The excessive noise, surge or strong impact might be added to the control unit.
   Action : Request us to repair it or replace the defective control unit.
          (The module whose FAIL lamp is lit).

*When replacing the instrument, see "5.4 Replacement method" (Page 5– 11).

5.2 Troubleshooting

This section describes probable causes and measures to be taken when any problem would arise in
this instrument.
If you have any queries about matters not described in this section, contact your nearest RKC sales agent or
RKC sales office directly giving as much information on the Model No., specifications, etc. as possible.
If the instrument is necessary to be replaced, observe the following warning.

⚠ **WARNING**

● In order to prevent electric shock or instrument failure, always turn
off the system power before replacing the instrument.

● In order to prevent electric shock or instrument failure, always turn
off the power before mounting or removing the operation panel.

● In order to prevent electric shock or instrument failure, do not
turn on the power until all the wiring is finished.

● In order to prevent electric shock or instrument failure, do not
touch the insides of operation panel or connectorpins.

● Have all wiring performed by personnel who have been educated
in the necessary basic of electricity and who are experienced in
such field work.

CAUTION

When replacing the module with a new one, always use the module with the same Model
No. In addition, when replacing the module with a new one of the different module type,
contact your nearest RKC sales agent or RKC sales office directly as it becomes necessary
to initialize the module, etc.

NOTE

When replacing the operation panel or module, see "5.4 Replacement procedure" or "SR Mini
Hardware Instruction Manual" (IMSRM02‒E ▢).

(1) Relating to the operation panel

Description of error		Presumed cause	Measures
The power supply lamp does not light		The power is not being supplied.	Check the external breaker, etc.
		The proper power supply voltage is not being supplied.	Check the power supply.
		Poor contacts at the power supply terminals.	Tighten the terminals.
		Problem in the power supply unit.	Replace the operation panel .
The screen display is abnormal		A noise generating source is close by.	Move the equipment away from the noise generating source.
		The proper power supply voltage is not being supplied.	Check the power supply specification.
The screens are not displayed		The display ON/OFF switch is set to OFF .	Press the display ON/OFF switch is turned ON.
		Problem with the LCD back light.	Replace the operation panel.
None of the controllers operate		Module not initialized.	Execute "Module initialize."
·The specified channel does not operate ·The specified control output does not operate ·The specified alarm does not operate ·The specified measured value is not displayed		The operation mode changing specifying has not been correctly set.	Change each item to the operation mode.
		Problem with the controller module.	Replace the module.
		Module not initialized.	Execute "Module initialize."
The touch keys on the screen do not operate	OPM Initialize or Cont. Initialize keys	Protection is being applied to the OPM Initialize or Cont. Initialize keys.	Release the Protection.
	Other keys	The screen is set to Computer mode.	Set to Local mode.
		Problem with the touch keys.	Replace the operation panel.
Error messages are displayed		See section 5.1 "Error messages."	

(2) Relating to the control unit

① Relating to the PCP module

Description of error	Presumed cause	Measures
The operation (RUN) lamp does not light	The power is not being supplied.	Check the external breaker, etc.
	The proper power supply voltage is not being supplied.	Check the power supply specifications.
	Poor contacts at the power supply terminals.	Tighten the terminals.
	Problem in the power supply unit.	Replace the PCP module.
The operation (RUN) lamp remains lit continuously	The module has become detached.	Restore to the proper mounting condition.
	The module was not initialized after the module configuration was changed.	Execute "Module initialize."
		Return the configuration to the original specification.
The data sending and receiving (TX, RX) lamps do not light	The power supply of the operation panel or host computer is not ON.	Check the power supplies.
	The OPM connecting cable is detached.	Inspect and replace the cable.
	Problem with the CPU.	Replace the PCP module.
The DO is not output	Problem with the output allocations.	Check the allocation settings.
	Problem with the output circuit.	Replace the PCP module.
The failure (FAIL) is output	Problem with CPU of the PCP module or power supply unit.	Replace the PCP module.
The failure (FAIL) is output (The FAIL lamp does not light) The operation (RUN) lamp remains lit	The module was not initialized after the module configuration was changed.	Execute "Module initialize."
		Return the configuration to the original specification.
	The module has become detached.	Restore to the proper mounting condition.

② **Relating to the DI module**

Description of error	Presumed cause	Measures
The operation (RUN) lamp does not flash	Problem with the power supply line.	Replace the mother block.
	Problem with the power supply.	Replace the PCP module.
	Breakdown in the CPU.	Replace the module.
The operation (RUN) lamp remains lit continuously	A module with a different system specification has been inserted.	Replace with the module that matches the specifications.
	The maximum number of modules that can be connected has been exceeded.	Remove the number of modules in excess.
The failure (FAIL) lamp lights	Breakdown of the CPU.	Replace the module.
None of the input values change	The module is in the "Unused" mode.	Set to the "Used" mode.
	Breakdown in the CPU.	Replace the PCP module.
	Problem with the bus line.	Replace the mother block.
The specified input value does not change	Wire breakage in the sensor.	Replace the sensor.
	Problem with the tightening of the terminals.	Tighten the terminals.
	The module is in the not used mode.	Set to the used mode.
	Breakdown in the input circuit or CPU.	Replace the module.
There is an error on and after the specified module	Problem with the mother block at the head of the abnormal modules.	Replace the mother block.
	The module connection has been detached.	Check the connections.

③ Relating to the TIO module

Description of error	Presumed cause	Measures
The operation (RUN) lamp does not flash	Problem with the power supply line.	Replace the mother block.
	Problem with the power supply unit.	Replace the PCP module.
	Breakdown in the CPU.	Replace the module.
The operation (RUN) lamp remains lit continuously	A module with a different system specification has been inserted.	Replace with a module that matches the specifications.
	The maximum number of modules that can be connected has been exceeded.	Remove the number of modules in excess.
The failure (FAIL) lamp lights	Breakdown of the CPU.	Replace the module.
The specified outputs are not output	Input wire breakage.	Replace the sensor.
	Problem with the external operation equipment.	Inspect the external operation equipment.
	Mistake in wiring or wiring breakage in the output.	Inspect and replace the wiring.
	Terminal screw looseness.	Tighten the terminal screws.
	Breakdown in the output circuit or CPU.	Replace the module.
	Problem with the bus line.	Replace the mother block.
None of the outputs operate	The unit is in the operation stop mode.	Set to the operation start mode.
	The unit is in the "Unused" mode.	Set to the "Used" mode.
	The load power supply is not being supplied.	Supply the power supply.
	The load power supply voltage is outside the rated values.	Change the voltage so that it is within the rated values.
	Breakdown in the main CPU.	Replace the PCP module.
	Problem in the bus line.	Replace the mother block.
The specified output relay does not become OFF	Welding of the output relay contact.	Replace the module.
	Problem with the resetting of the external operation equipment caused by the leak current from the surge killer, etc.	Review the surge killer and review the external operation equipment.
	Breakdown in the output circuit or CPU.	Replace the TIO module.

Continued from the previous page.

Description of error	Presumed cause	Measures
None of the output relays become OFF	Breakdown in the main CPU.	Replace the PCP module.
·The outputs cause chattering ·ON/OFF switching occurs in an extremely short time period	Problem with the tightening of the terminals.	Tighten the terminals.
	The control time period is too short.	Change the setting of the time period.
	Miss–operation caused by too much noise.	Investigate the installation of a noise filter.
None of the input values change	The module is in the "Unused" mode.	Set to the "Used" mode.
	Breakdown in the main CPU.	Replace the PCP module.
	Problem with the bus line.	Replace the mother block.
The specified input value does not change	Wire breakage in the sensor.	Replace the sensor.
	Problem with the tightening of the terminals.	Tighten the terminals.
	The unit is in the "Unused" mode.	Set to the "Used" mode.
	Breakdown in the input circuit or CPU.	Replace the module.
There is an error in a module following after the specified module	Problem with the mother block at the head of the abnormal modules.	Replace the mother block.
	The module connection has been detached.	Check the connections.
The control is unstable	The PID constant values are inappropriate.	Execute autotuning or change the settings of the PID constants.
	Problem with the tightening of the terminals.	Tighten the terminals.
	Problem with the operation of the external operation equipment.	Replace the external operation equipment.
	Breakdown in the output circuit or CPU.	Replace the TIO module.
There is an error on and after the specified module	Problem with the mother block at the head of the abnormal modules.	Replace the mother block.
	The module connection has been detached.	Check the connections.

④ Relating to the DO module

Description of error	Presumed cause	Measures
The operation (RUN) lamp does not flash	Problem with the power supply line.	Replace the mother block.
	Problem with the power supply.	Replace the module.
	Breakdown in the CPU.	Replace the module.
The failure (FAIL) lamp lights	The maximum number of modules that can be connected has been exceeded.	Remove the number of modules in excess.
	Breakdown of the CPU.	Replace the module.
The specified outputs do not operate (The RUN lamp flashes)	Problem with the external operation equipment.	Inspect the external operation equipment.
	Mistake in wiring or wiring breakage in the output unit.	Inspect and replace the wiring.
	Terminal screw looseness	Tighten the terminal screws.
	Breakdown in the output circuit or CPU.	Replace the module.
	Problem with the bus line.	Replace the mother block.
None of the outputs operate	The load power supply is not supplied.	Supply the power supply.
	The load power supply voltage is outside the rated values.	Change the voltage so that it is within the rated values.
	Breakdown in the main CPU.	Replace the PCP module.
	Problem in the bus line	Replace the mother block.
The specified output relay does not become OFF	Welding of the output relay contact.	Replace the module.
	Problem with the resetting of the external operation equipment caused by the leak current from the surge killer, etc.	Review the surge killer and review the external operation equipment.
	Breakdown in the output circuit or CPU.	Replace the module.
None of the output relays become OFF	Breakdown in the main CPU.	Replace the PCP module.
The outputs cause chattering	Problem with the tightening of the terminals.	Tighten the terminals.

Continued from the previous page.

Description of error	Presumed cause	Measures
ON/OFF switching occurs in an extremely short time period	The control time period is too short.	Change the setting of the time period.
	Miss–operation caused by too much noise.	Investigate the installation of a noise filter.
There is an error on and after the specified module	Problem with the mother block at the head of the abnormal modules.	Replace the mother block.
	The module connection has been detached.	Check the connections.

⑤ Relating to the CT module

Description of error	Presumed cause	Measures
The operation (RUN) lamp does not flash	Problem with the power supply line.	Replace the mother block.
	Problem with the power supply.	Replace the module.
	Breakdown in the CPU.	Replace the module.
The failure (FAIL) lamp lights	A module with a different system specification has been inserted.	Replace with a module that matches the specifications.
	The maximum number of modules that can be connected has been exceeded.	Remove the number of modules in excess.
	Breakdown of the CPU.	Replace the module.
Abnormality in the current taking–in values	A CT sensor with a different specification from the module specification has been used.	Replace the CT sensor.
	Heater break.	Inspect the heater.
	Looseness of terminals, or mistaken wiring between channels.	Tighten the terminals, or confirm the wiring.
	Breakdown of the input circuit or CPU.	Replace the module.
There is an error on and after the specified module	Problem with the mother block at the head of the abnormal modules	Replace the mother block.
	The module connection has been detached.	Check the connections.

5.3 Precautions for power on again

The "Data Protection" is one of the operation panel (OPM hereafter) functions.
(See supplementary manual for "OPM initialize".)
Note the following when using this function.

If the power is turned off once then turned on again to release an OPM alarm or error, and if "Data protection" is set to "OPM → Cont.", OPM data is transferred to the control unit when the power is turned on again.
If the OPM data would be destroyed, the destroyed data is transferred to the control unit.
Therefore, carefully turn on the power again.

■ When the power is turned on again with the data destoryed

If "Data Protection" is set to "OPM →Cont.", the destoryed OPM data is transferred to the control unit when the power is turned on again.

The destoryed data is transferred from the OPM to the control unit.

The data just before destruction is lost.
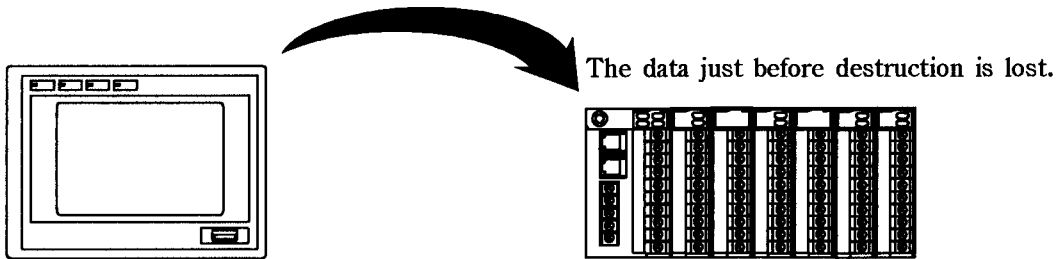
If "Data Protection" is set to "Cont. →OPM", the data is transferred before being destoryed to the OPM when the power is turned on again.

The data just before destruction is transferred to the OPM.
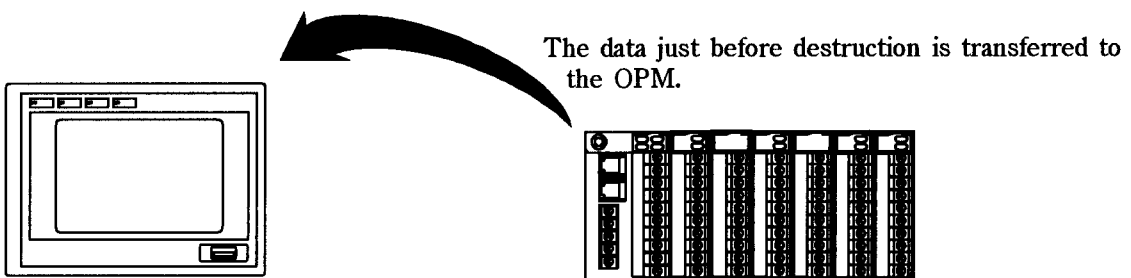
* "Data Protection" is set to "Cont. → OPM" prior to factory shipment.

5.4 Replacement method

> ⚠ **WARNING**
>
> In order to prevent electric shock or instrument failure, always turn off the power before mounting or removing the operation panel.

■ Replacement procedures

① Detaching the cable from the rear panel terminal.
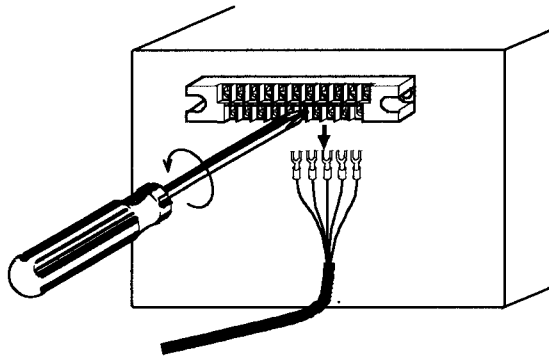
② Removing the mounting brackets.

Mountinig panel

Mounting brackets

Tightening screw

Top

Front ←

Packing
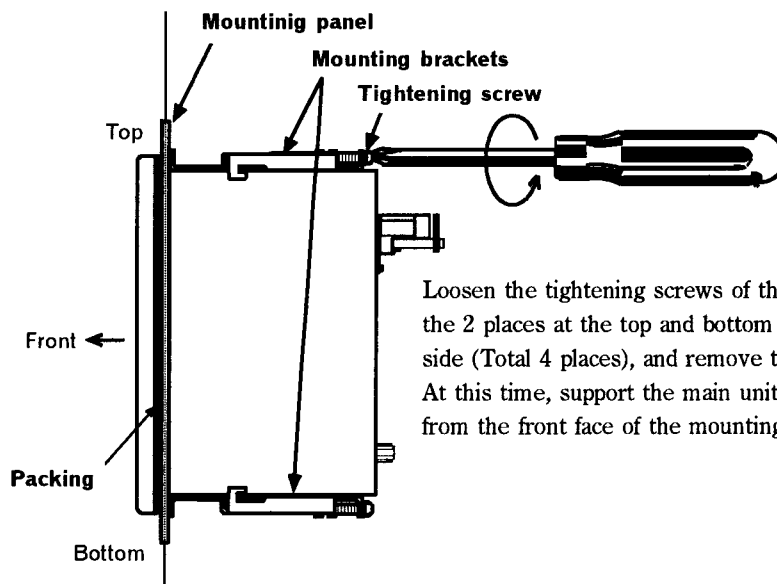
Bottom

Loosen the tightening screws of the mounting brackets in the 2 places at the top and bottom of the main unit rear side (Total 4 places), and remove the mounting brackets. At this time, support the main unit to stop it falling out from the front face of the mounting panel.

③ Remove the main unit from the front face.
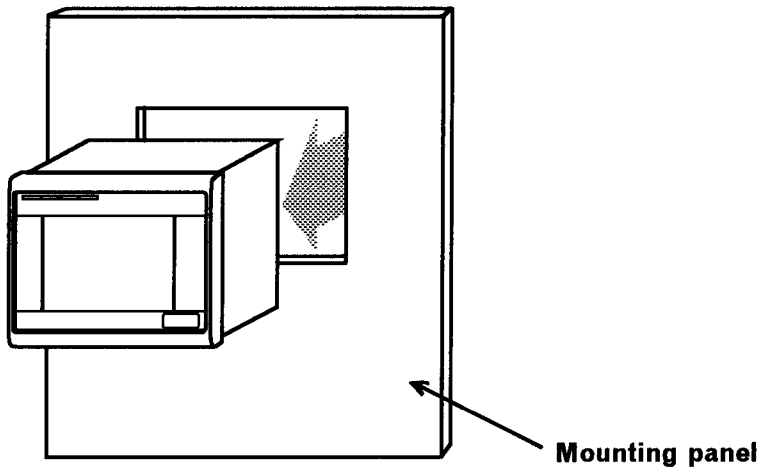
Mounting panel

④ Mount a normal operation panel.

Carry out the mounting by reversing the detaching procedures.

CAUTION

Tighten the bracket setscrew so that the thickness of the dustproof packing is uniform, otherwise the operation panel may not be fully dustproof and splashproof.

Mounting panel
Mounting brackets
Tightening screws
Top
Front
Packing
Bottom

Tightening torque (Recommended value)
: 0.3N · m (3kgf · cm)
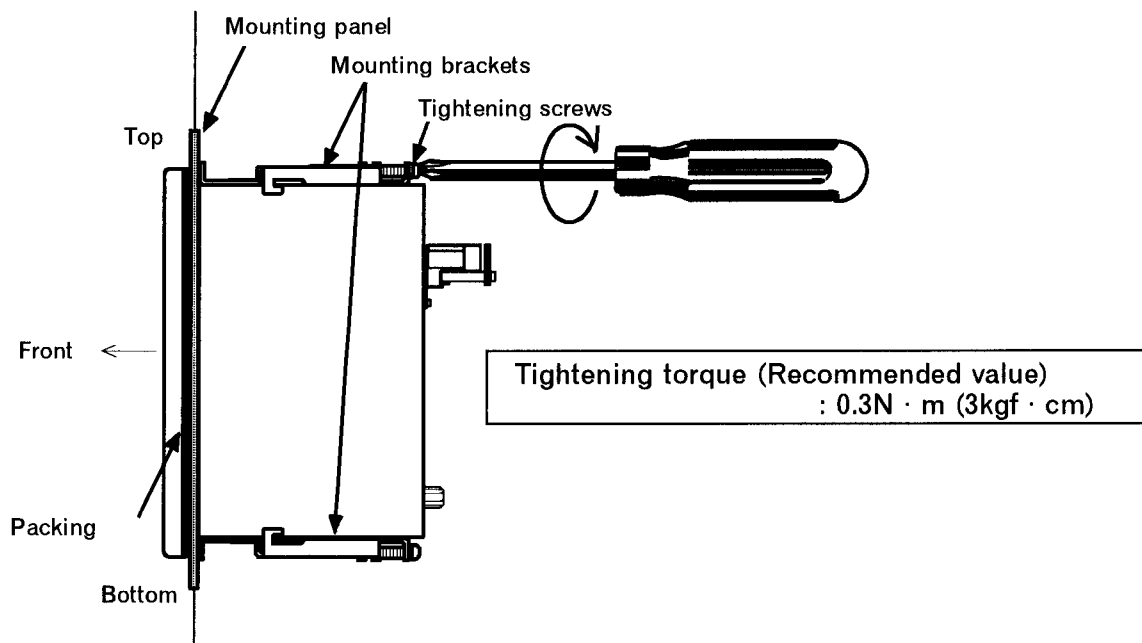
CHAPTER 6

SPECIFICATIONS

6. SPECIFICATIONS

■ DISPLAY SPECIFICATIONS

Item	Details
Display	Screen type: STN dot–matrix LCD (transmissivity type)
	Number of dots: 320(W) × 240(H) dots
	Screen area: 122(W) × 92(H)mm
	Colors: Black and white (Monochrome) or Blue
	Backlight: Cool fluorescent tube (CFL)
	Contrast: Adjustment with keys on front panel
	Number of screened characters : 16 characters × 12 lines (Full–size characters)
	Character types: Alphanumeric, symbols
	Character size: Half–size characters (8 × 16 dots) 　　　　　　Full–size characters (16 × 16 dots) 　　　　　　Blow up characters × 4, × 9 and × 16 with changeable 　　　　　　vertical–to–horizontal ratios.
	Graphic screen: Bar–graph, touchkey frame, screen frame
	Display details: Displays the measured value and set value of control unit, 　　　　　　and various keys.
LED indicators	POWER: Green LED (Lights when power goes on.)
	SUB1, SUB2: Red LED (Indicates sub output)
	FAIL: Red LED (Lights when the operation panel malfunctions.)
Setting	Setting method: Conversational style setting by touchkey
	Setting details: Each set values for control unit 　　　　　　Mode transfer settings 　　　　　　Initial settings 　　　　　　Other function settings
	Number of keys: Inside display area (transparent): Numbers differ according to display contents. Outside display area (non–transparent) : 1 　　　　　　　(However, the protect release switch is excuded.)
	Key types: In screen area (transparent): Screen change, data settings,mode tansfer keys etc. Outside screen area (non–transparent): Display ON/OFF

■ FUNCTION SPECIFICATIONS

Item	Details
Set value control selection function	Selection item: ① Control selection at power on ② Control selection at error occurrence (Setting backup error)
Calendar function	Setting method: Set on initialize screen
	Display: Year, month, day, day of the week, hour and minute.
	Accuracy: Maximum time difference per day; ± 4 second (0 to 50 ℃)
Screen scanning function	Applicable screens: Automatically scans the operating monitoring screens
	Setting method: Set on initialize screen
	Setting item: ① Scan time: 1 to 9999 second ② Selection of presence or absence of scan function ③ Scan type: Unit/item transfer select
Data storage function	Data protection: Buckup by lithium battery
	Battery life: Approx. 10 years (Time integrated during power off) *However, the above life differs depending on the product storage period, and storage and operating environments.
Control unit error monitoring function	Check item: Communication stop is monitored.
	Error display: An error message is displayed on LCD display unit.
Digital output function	① Number of output points: 2 ② Output method: Relay contact output (Closed at error occurrence) ③ Rating: 250V AC, 0.1A or less (Resistive load) * Electrical life : 300,000 time or more (Rated load) ④ Contact type: 1"a" contact ⑤ Output details: Selectable from among Alarm1, Alarm2, Burnout, HBA, Temp.Rise Comp., LBA and Unused.
Name setting function	① Unit name setting Number of setting characters : 12 characters ② Channel name setting Number of setting characters : 5 characters

Item	Details
Self‒diagnostic function	Check item: ① ROM and RAM check ② MCU power supply monitoring ③ Watchdog timer
	Error display: FAIL lamp lights, all other indicators go off except power lamp.
	FAIL output: ① Number of output points: 1 ② Output method: Relay contact output (Open at error occurrence) ③ Rating: 250V AC, 0.1A or less (Resistive load) * Electrical life : 300,000 time or more (Rated load) ④ Contact type: 1"a" contact

■ CONTROL UNIT COMMUNICATION SPECIFICATIONS

Item	Details
Communication interface	Based on RS‒422A, EIA standard
Communication protocol	Based on ANSI X3.28 subcategory 2.5, B1 Polling/selection type
Communication method	4‒wire system, multidrop connection (RS‒422A)
Synchronous method	Start/stop synchronous type
Communication speed	2400bps, 4800bps, 9600bps, 19200bps
Data format	Start bit: 1 Data bit: 7 or 8 Parity bit: Unused or Used (Odd number or Even number) *For 8 data bits : None Stop bit: 1
Data type	ASCII code
Maximum number of connection	16 units (When multidrop connection) *Maximum No. of modules per control unit : 10 modules

■ HOST COMPUTER COMMUNICATION SPECIFICATIONS

Item	Details
Communication interface	Based on RS−232C, EIA standard Based on RS−422A, EIA standard Based on RS−485, EIA standard *Can be specified when ordering.
Communication protocol	Based on ANSI X3.28 subcategory 2.5, B1 Polling/selection type
Communication method	Point−to−point connection (RS−232C) 4−wire system, multidrop connection (RS−422A) 2−wire system, multidrop connection (RS−485)
Synchronous method	Start/stop synchronous type
Communication speed	2400bps, 4800bps, 9600bps, 19200bps
Data format	Start bit: 1 Data bit: 7 or 8 Parity bit: Unused or Used (Odd number or Even number) Stop bit: 1 or 2
Data type	ASCII code
Maximum number of connection	RS−232C: 1 set RS−422A:16 sets RS−485: 16 sets

■ POWER SUPPLY SPECIFICATIONS

Item	Details
Power supply voltage	90 to 264 V AC (Common 50/60Hz) Including power supply voltage variation. (Rated:100 to 240 V AC)
Power consumption	Maximum 11.4 VA

■ OTHERS

Item	Details
Performance	Insulation resistance Between power and grounding terminals : 20 M Ω or more at 500 V DC
	Dielectric resistance Between power and grounding terminals : 1500 V AC for 1 minute
	Dustproof and waterproof: IP55
Working environment conditions	Allowable ambient temperature: 0 to 50 ℃
	Allowable ambient humidity: 45 to 85 %RH (No condensation)
Construction	Method of attachment: Panel attachment
	Weight: 1600 g
	External dimension: 144(H) ✕ 192(W) ✕ 100(D) mm

Supplementary Manual

MMI initialize
Controller initialize

This manual describes initialize settings (controller and MMI initialize) in the
dedicated operation panel for the SR Mini SYSTEM.
Usually, these settings do not need to be changed during normal operation;
unnecessary changes could cause malfunction and trouble.
Therefore, do not change the settings unless required.

『CAUTION』

**If the MMI initialize or controller initialize setting is changed, turn
the power off once, then turn the power on again.
The setting thus changed becomes valid at power on.**

(Releasing MMI/controller initialize calling-up key protect)

Initial Menu   94/ 10/ 3(MON)16:15

- Clock set
- Contrast
- Screen Scan
- Computer/Local
- Unit/CH Name
- **MMI Initial**
- **Cont. Initial**
- Ope. Menu

Pressing this section more than 8 times in succession highlights the "MMI initial key" to make the key valid.

Pressing this section more than 8 times in succession highlights the "Cont. initial key" to make the key valid.
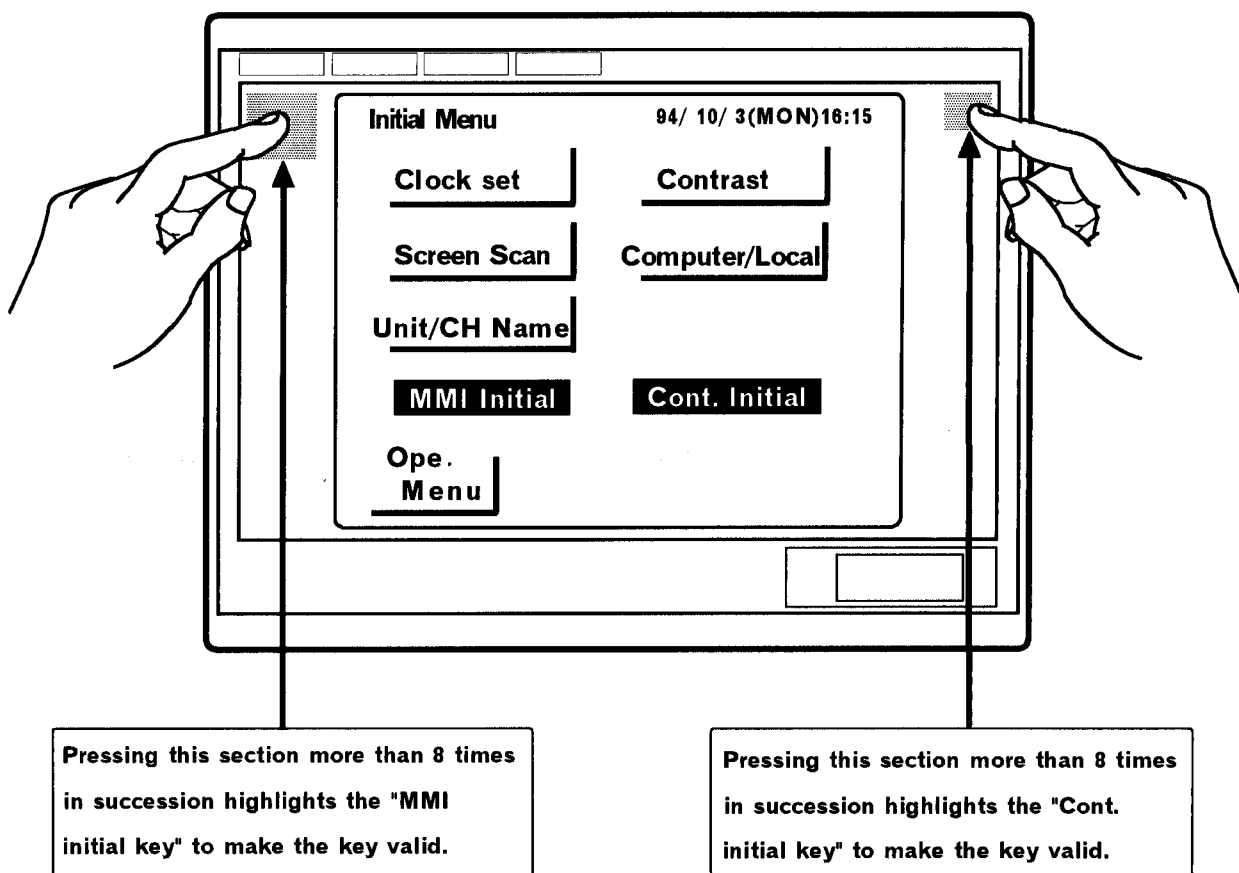
● Release the key protection for MMI/controller initialize setting screen change on the initialize menu screen.

● Protect is released when each initialize switch is displayed, and the switch becomes invalid.

● After the MMI/controller initialize switch is displayed, if any switch other than the above switch is touched, protect release is cancelled.
In this case, call up the initialize menu screen again to perform the protect release operation.

1. MMI initialize screen

This is used for various settings related to the OPM (operation panel) itself.

1.1 Calling procedure

```
                  MMI Initial                           Unit                          *
  ┌──────────────┐ ──────────►  ┌──────────────┐  ───────────────────────►  ┌──────────────┐
  │ Initialize Menu│            │ MMI Initialize│                            │ Unit Used/    │
  │        screen │ ◄──────────  │  Menu screen │                            │  Unused screen│
  └──────────────┘  Initial Menu└──────────────┘                            └──────────────┘

                                                Communication
                                                             ──────────────► ┌──────────────┐
                                                                             │ Communication │
                                                                             │ Initialize screen│
                                                                             └──────────────┘

                                                Data Protect
                                                             ──────────────► ┌──────────────┐
                                                                             │ Data Protection│
                                                                             │        screen │
                                                                             └──────────────┘

                                                Polling Order
                                                             ──────────────► ┌──────────────┐
                                                                             │ Polling Order │
                                                                             │  Select screen│
                                                                             └──────────────┘

                                                Host Computer
                                                             ──────────────► ┌──────────────┐
                                                                             │ Host          │
                                                                             │ Communication │
                                                                             │ Initialize screen│
                                                                             └──────────────┘

                                                SUB Output
                                                             ──────────────► ┌──────────────┐
                                                                             │ SUB Output    │
                                                                             │ Initialize screen│
                                                                             └──────────────┘

                                                Menu Make                          **
                                                             ──────────────► ┌──────────────┐
                                                                             │ Menu Make     │
                                                                             │        screen │
                                                                             └──────────────┘
```
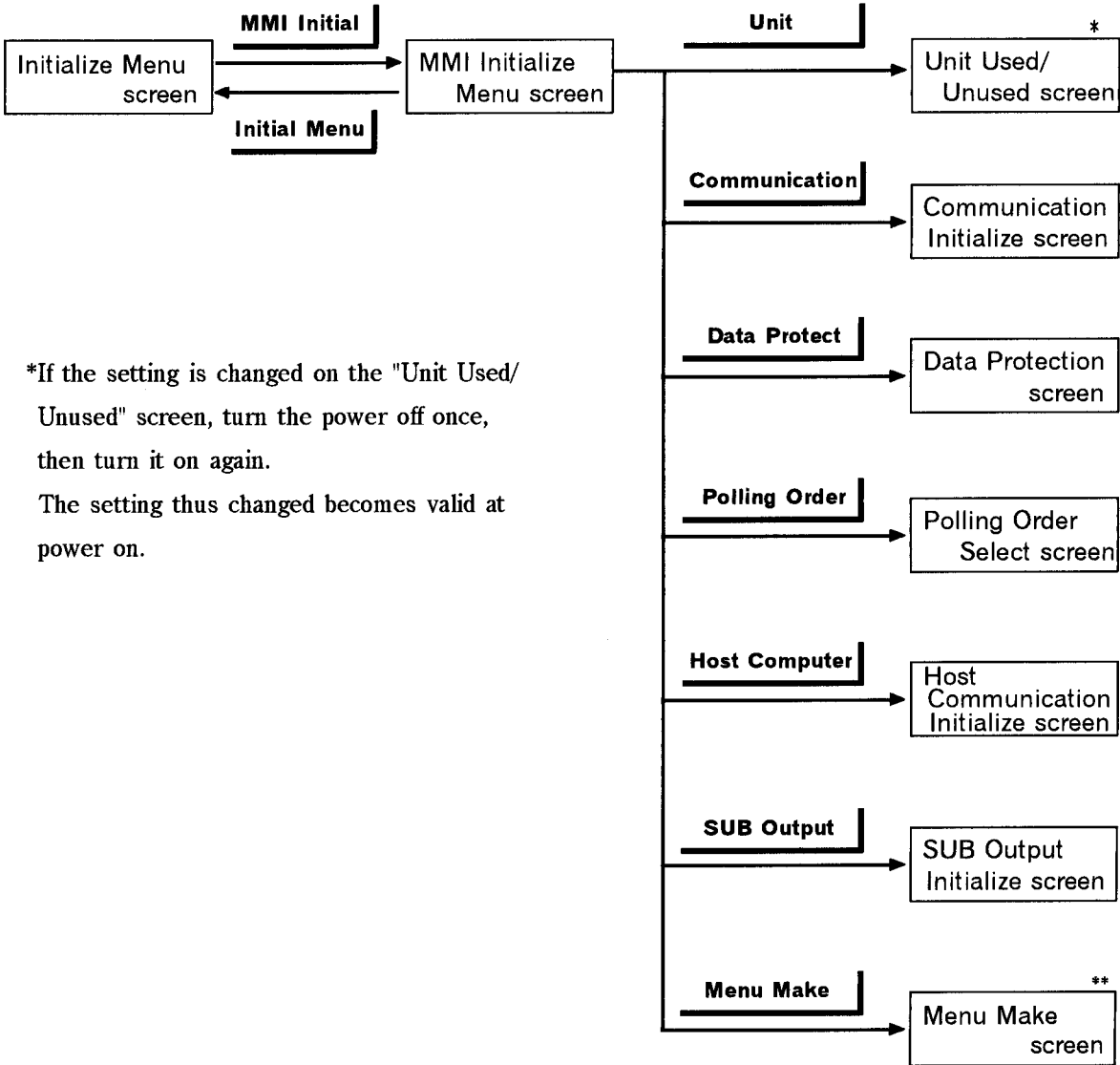
*If the setting is changed on the "Unit Used/
Unused" screen, turn the power off once,
then turn it on again.
The setting thus changed becomes valid at
power on.

**Menu generation

1.2 MMI initialize menu screen

Touching the highlighted MMI initialize key displays the MMI initialize menu screen.

Clock display

```
MMI Initial Menu      94/ 3/ 2(MAN)16:15

        Unit          Communication

     Data Protect     Polling Order          → Item select keys

     Host Computer    SUB Output

        Menu Make

Initialize menu screen
select key         ←   Initial Menu
```

Initialize menu screen select key

    Touching this key changes to the initialize menu screen.

Item select keys

    Touching the key corresponding to the desired item changes to the OPM initialize settings screen for that item.

● The details on each item screen are described on and after page 5.

1.3 Unit used/unused

This screen is used to select whether to enable each control unit when control units are multi-drop-connected. Unused control units are not displayed on the operation panel.

CAUTION

If "Unused" is selected and set for the existing controller, no controller is displayed on the operation panel.

Item display ← Unit Used/Unused

Unit	Set	Unit	Set
1	Used	9	Unused
2	Used	10	Unused
3	Unused	11	Unused
4	Unused	12	Unused
5	Unused	13	Unused
6	Unused	14	Unused
7	Unused	15	Unused
8	Unused	16	Unused

《Local Mode》

Used / Unused → Select key

Menu   Para.

CL   ENT → Entry key

Control unit No. display
Setting display
MMI initialize menu screen select key
Item select key   Clear key

MMI initialize menu screen select key
Touching this key changes to the MMI initialize menu screen.

Item select key
Touching this key changes to the next setting screen "Communication initialize settings".

Select key
If this key is touched after the setting column of the control unit No. to be changed is directly touched, used/unused can be selected.
The values selected by the select key are entered if the entry key is touched.

1.4 Communication initialize settings

This screen is used to perform settings related to communications between the operation panel and the control unit. The bit format and communication speed are set.

‖ CAUTION ‖

As the values on this screen are fixed, do not change them.

MMI initialize menu screen select key

Touching this key changes to the MMI initialize menu screen.

Item select key

Touching this key changes to the next setting screen "Data Protection".

Select key

Touching this key after the setting display section to be changed is directly touched allows the values to be changed.

The values selected by the select key are entered if the entry key is touched.

< 1. Bit Format >

Parity bit selection	:	None / Even / Odd
Data bit selection	:	8 / 7 (When "8" is selected: No parity bit)
Stop bit	:	1 / 2

* Factory set value :

Parity bit selection	:	None
Data bit selection	:	8
Stop bit	:	1

< 2. Speed >

A - 7

Communication   :   1200 / 2400 / 4800 / 9600 / 19200 (bps)
        speed selection

* Factory set value :   9600 bps

* When the communication speed needs to be changed, always change it to the same value with the
  control unit.
  Both the operation panel and control unit are set to "9600bps" at the factory shipment .

* This setting is the communication setting with the control unit to be used.
  The communication setting with a host computer is set on the "1.7 Host communication initialize
  settings" screen.

1.5 Data protection

The operation panel can also store the data set to the control unit.   However, it uses only the memory area corresponding to the area number currently being used.
This screen is used to set the mode for data exchange between the operation panel (hereafter OPM) and the control unit at power on or if the data would be destroyed.

Item display ◄──── Data Protection

Setting display ◄──── 1. When Power Supplied
= MMI→Controller

Setting display ◄──── 2. When FAIL Detected
= No Fail Handling

▲
▼ ────► Select key

《Local Mode》

Menu   Para

CL   ENT ────► Entry key

MMI initialize menu screen select key ◄────

Item select key   Clear key

MMI initialize menu screen select key
Touching this key changes to the MMI initialize menu screen.

Item select key
Touching this key changes to the next setting screen "Polling Order Select".

Select key
Touching this key after the setting display section to be changed is directly touched allows the values to be changed.
The values selected by the select key are entered if the entry key is touched.

< 1. When power supplied >

Selection: Not Protected / MMI → Controller / Controller → MMI

* Factory set value : Controller → MMI

(Not protected)

No data is transferred between the control unit and OPM when power supplied.

(MMI → Controller)

Data stored in the OPM when power supplied is transferred to the control unit.

(Controller → MMI)

Data stored in the control unit when power supplied is transferred to the OPM.

< 2. When FAIL Detected >

Selection: With Fail Handling / No Fail Handling

* Factory set value : No Fail Handling

(With Fail Handling)

If control data on the control unit side is overwritten (destroyed), the data is automatically transferred to the control unit from the OPM.

(No Fail Handling)

The above transfer processing is not performed.

1.6 Polling Order select

This screen is used to set the order of data calling–up(polling) from the control unit in monitoring mode for each data type, in steps of one unit.
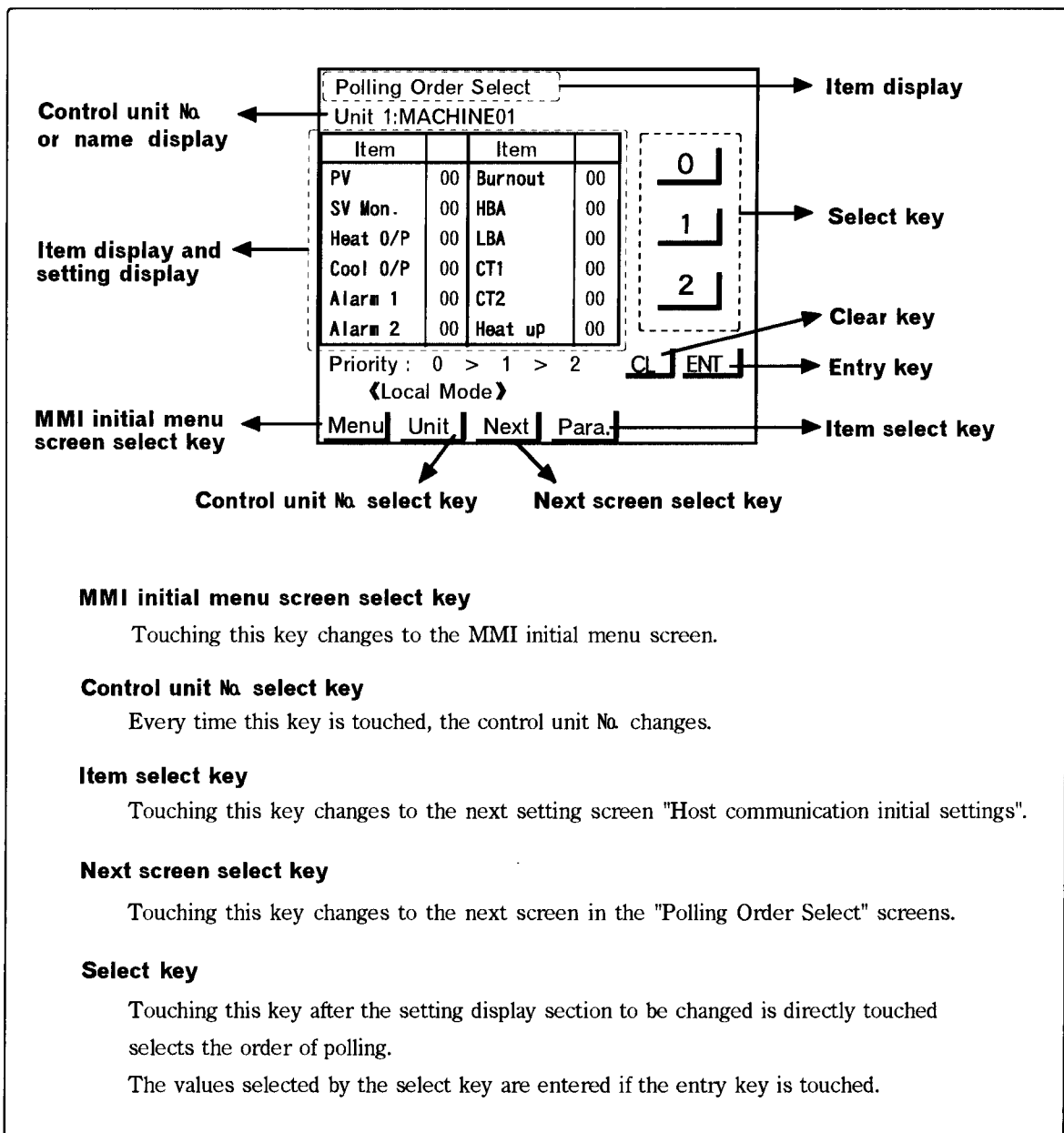
MMI initial menu screen select key

Touching this key changes to the MMI initial menu screen.

Control unit No. select key

Every time this key is touched, the control unit No. changes.

Item select key

Touching this key changes to the next setting screen "Host communication initial settings".

Next screen select key

Touching this key changes to the next screen in the "Polling Order Select" screens.

Select key

Touching this key after the setting display section to be changed is directly touched selects the order of polling.
The values selected by the select key are entered if the entry key is touched.

* This setting does not affect the order of control sampling.

Setting items : 0... Preferential display ╱ 1... Usual display ╱ 2... No polling made

     * Factory set value : 0... Preferential display

Setting example:

```
PV            = 0
Heat O/P      = 0
Cool O/P      = 1
ALM1          = 1
ALM2          = 1
    .
    .
    .
All parameters hereafter = 1
```

* O/P: Output

For example if the setting is as shown above, the order of data capture by the operation panel becomes as follows.

```
       0                  1              0                  1
|PV — Heat O/P|  —  |Cool O/P|  —  |PV — Heat O/P|  —  |ALM1|  —

       0                  1              0
|PV — Heat O/P|  —  |ALM2|     —  |PV — Heat O/P|  — · · · · · · · ·
```
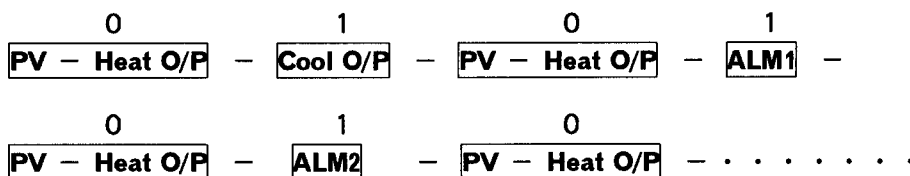
This means that the data on PV (measured value) and heating output which are set to zero is captured first and are updated on the display earlier than the other data.
In this manner,use this setting when the monitoring of the samll changes on the specific data is necessary.
(All values are set to "0" when shipped from factory.)

NOTE

If the function which does not exist in the system is set to "2"(No–polling), the updating period of the display can be done faster. The display shows "– – – –" for the item set to "2".

1.7 Host communication initialize settings

This screen is used to perform communication settings when the operation panel is controlled by a host computer.

The device address of the operation panel itself, bit format and communication speed are set.

Item display ◄──── ⌐Host Communication Initial¬

```
1. Address   = 0
2. Bit Format
      Parity  = None
      Data    = 8              ▲        ──► Select key
      Stop    = 1
```
Setting display ◄──── 3. Speed   = 9600(BPS)   ▼
```
4. SCI Protocol = RS-232C
```
《Local Mode》   CL ENT ──► **Entry key**

MMI initialize menu ◄──── Menu   Para.
screen select key

          ↓   ↓
Item select key   Clear key

MMI initialize menu screen select key

Touching this key changes to the MMI initialize menu screen.

Item select key

Touching this key changes to the next setting screen "SUB output initialize".

Select key

Touching this key after the setting display section to be changed is directly touched allows the values to be changed.

The values selected by the select key are entered if the entry key is touched.

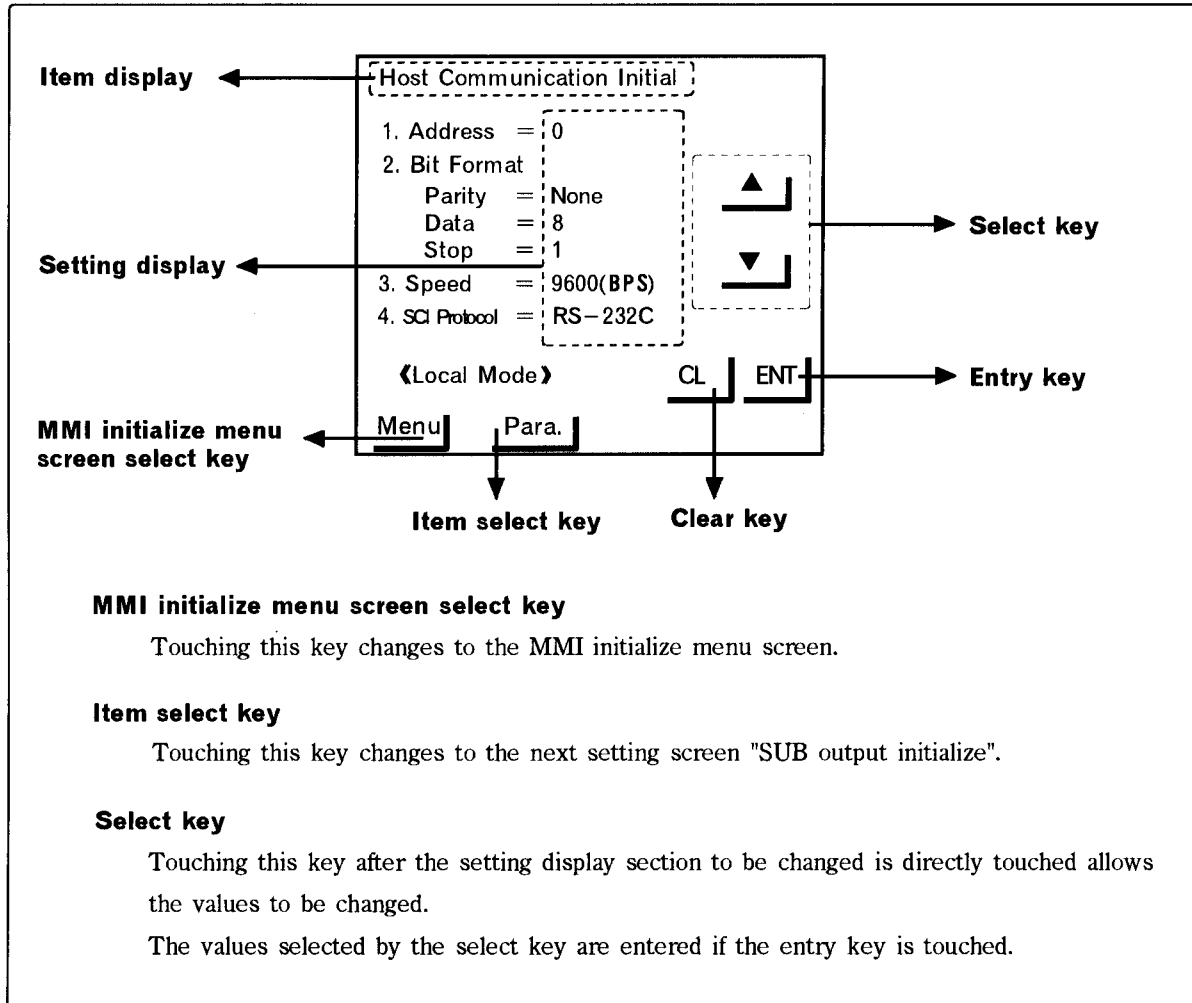### < 1. Address >

The device address of the operation panel is selected and set.

Address : 0 to 15 (Address No. : 0 to 15)

   * Factory set value : 0

< 2. Bit Format >

The communication bit format of the operation panel is selected and set.

Parity bit : None / Even / Odd
Data bit   : 8 / 7   (When "8" is selected: No parity bit)
Stop bit   : 1 / 2

   * Factory set value : ⌈ Parity bit : None ⌉
                          | Data bit   : 8 |
                          ⌊ Stop bit   : 1   ⌋

< 3. Speed >

Communication speed with the host computer is selected and set.

Communication speed ： 2400 / 4800 / 9600 / 19200 (bps)

* **Factory set value ： 9600 bps**

< 4. SCI Protocol >

The communication method of the operation panel is selected and set.

SCI Protocol ： RS–232C / RS–422A / RS–485

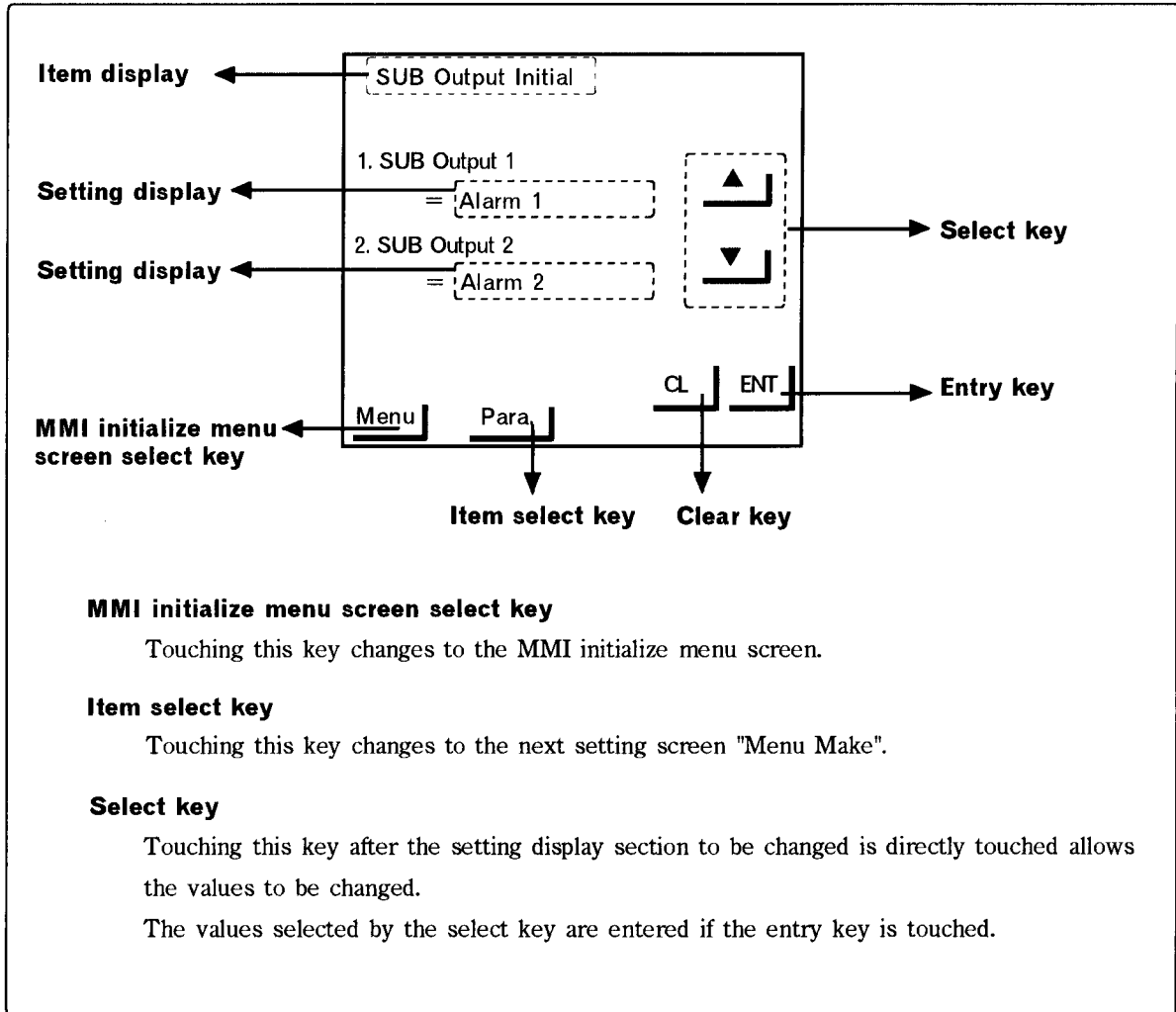* **Factory set value ： RS–232C**

* Set host communications in the same way as external host computer settings.

* This setting is the communication setting with the host computer to be used.

   The communication setting with the control unit is done on the screen "1.4 Communication initialize settings".

1.8 SUB output setting

This screen is used to assign output types so that even the SUB output signal on the operation panel side can be output when the control unit outputs an alarm or after a temperature rise is completed.

Item display ◄— ┌─────────────────┐
                 SUB Output Initial

1. SUB Output 1

Setting display ◄— = Alarm 1   ▲ —► Select key

2. SUB Output 2

Setting display ◄— = Alarm 2   ▼

                                       CL ENT —► Entry key

MMI initialize menu ◄— Menu   Para
screen select key

                     Item select key   Clear key

MMI initialize menu screen select key

Touching this key changes to the MMI initialize menu screen.

Item select key

Touching this key changes to the next setting screen "Menu Make".

Select key

Touching this key after the setting display section to be changed is directly touched allows the values to be changed.

The values selected by the select key are entered if the entry key is touched.

<1.SUB Output 1>

Selection: Alarm1 / Alarm2 / Burnout / HBA / Temp.Rise Comp. / LBA / Unused

                 * Factory set value : Alarm1

<2.SUB Output 2>

Selection: Alarm1 / Alarm2 / Burnout / HBA / Temp.Rise Comp. / LBA / Unused

                 * Factory set value : Alarm2

| NOTE |

For Alarm1, Alarm2, HBA, Burnout or LBA, the SUB output turns on when an alarm occurs in any of channels now used. For temperature rise completion, the SUB output turns off after all of the control units have completed then temperature rises.

1.9 Menu Make

This screen is used to generate each menu screen for setting and operation mode screens.
Items (parameters) to be displayed can be freely assigned to any positions on each menu screen.

■ **Calling procedure**
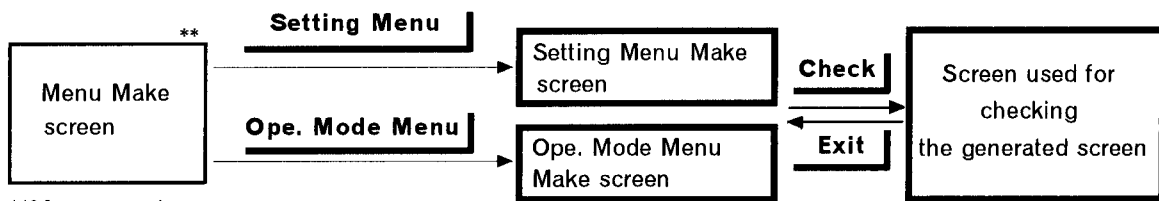
**Menu generation screen

■ **Display details**

Menu Make screen (Menu generation screen)

Setting Menu Make screen (Setting Menu generation screen)

Item display

Item display and setting display

Next screen select key

MMI initialize menu screen select key

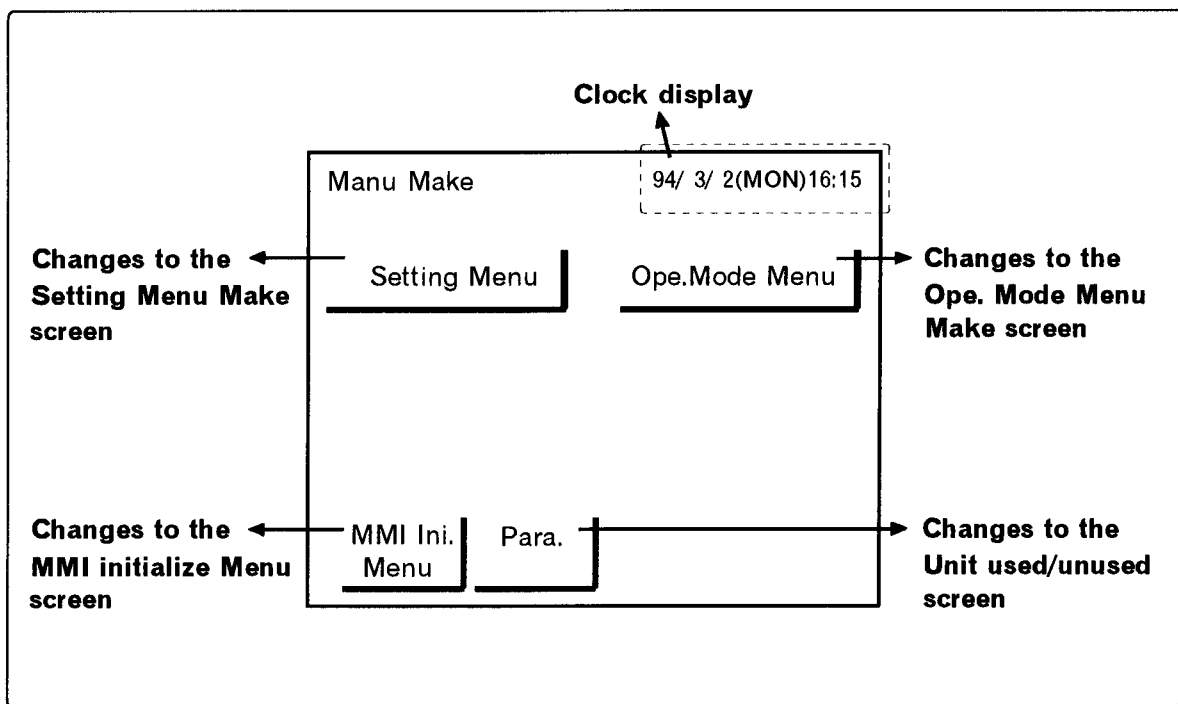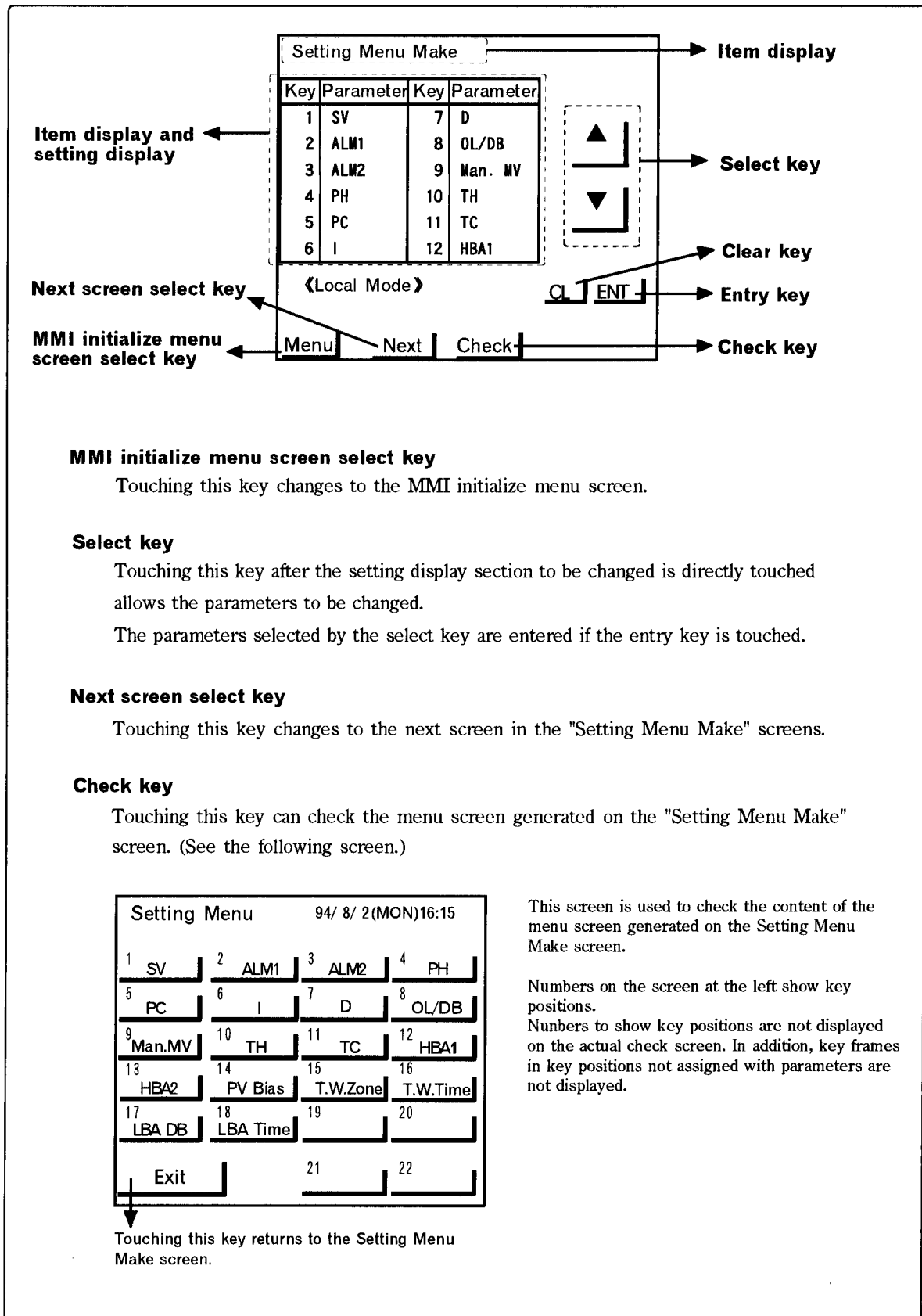Select key

Clear key

Entry key

Check key

Setting Menu Make			
Key	Parameter	Key	Parameter
1	SV	7	D
2	ALM1	8	OL/DB
3	ALM2	9	Man. MV
4	PH	10	TH
5	PC	11	TC
6	I	12	HBA1

《Local Mode》

CL ENT

Menu   Next   Check

MMI initialize menu screen select key

Touching this key changes to the MMI initialize menu screen.

Select key

Touching this key after the setting display section to be changed is directly touched allows the parameters to be changed.

The parameters selected by the select key are entered if the entry key is touched.

Next screen select key

Touching this key changes to the next screen in the "Setting Menu Make" screens.

Check key

Touching this key can check the menu screen generated on the "Setting Menu Make" screen. (See the following screen.)

Setting Menu		94/ 8/ 2(MON)16:15	
1 SV	2 ALM1	3 ALM2	4 PH
5 PC	6 I	7 D	8 OL/DB
9 Man.MV	10 TH	11 TC	12 HBA1
13 HBA2	14 PV Bias	15 T.W.Zone	16 T.W.Time
17 LBA DB	18 LBA Time	19	20
Exit		21	22

Touching this key returns to the Setting Menu Make screen.

This screen is used to check the content of the menu screen generated on the Setting Menu Make screen.

Numbers on the screen at the left show key positions.
Nunbers to show key positions are not displayed on the actual check screen. In addition, key frames in key positions not assigned with parameters are not displayed.

Ope. Mode Menu Make screen (Ope. Mode Menu generation screen)

```
                    Ope. Mode Menu Make ──────────────────►  Item display

          ┌─────┬──────────────────┐
          │ Key │    Parameter     │
          │  1  │ PID/AT           │
Item display and  ◄──│  2  │ Ope. Mode Change │         ┌─────┐
setting display   │  3  │ Control Response │         │  ▲  │ ───────►  Select key
          │  4  │ Auto/Manual      │         │     │
          │  5  │ Cont. Run/Stop   │         │  ▼  │
          │  6  │ Memory Area      │         └─────┘
          └─────┴──────────────────┘                        ──────►  Clear key
Next screen select key   《Local Mode》          CL┐ ENT┘  ──────►  Entry key

MMI initialize menu  ◄── │Menu│  Next │ Check├────────────►  Check key
screen select key
```

MMI initialize menu screen select key

Touching this key changes to the MMI initialize menu screen.

Select key

Touching this key after the setting display section to be changed is directly touched allows the parameters to be changed.

The parameters selected by the select key are entered if the entry key is touched.

Next screen select key

Touching this key changes to the next screen in the "Ope. Mode Menu Make" screens.

Check key

Touching this key can check the menu screen generated on the "Ope. Mode Menu Make" screen. (See the following screen.)
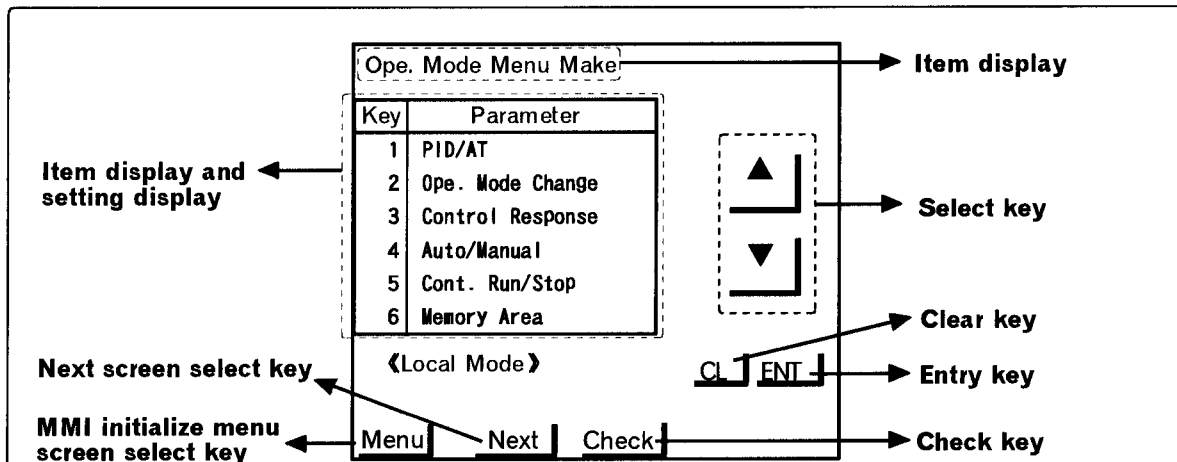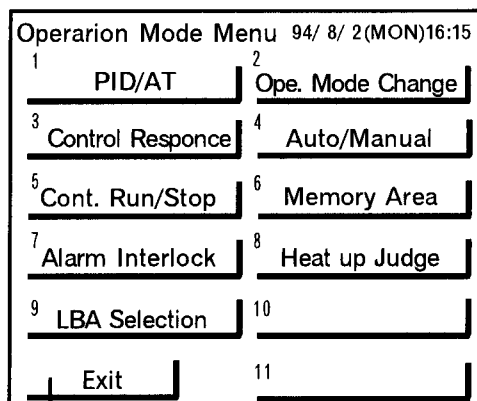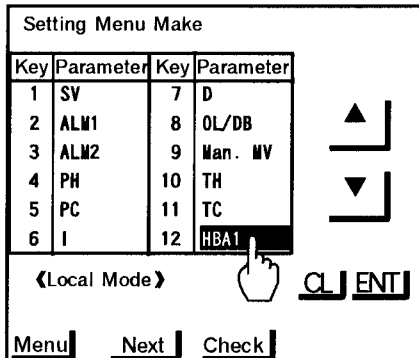
```
┌────────────────────────────────────────┐
│ Operarion Mode Menu  94/ 8/ 2(MON)16:15 │
│ 1                    2                   │
│     PID/AT       │ Ope. Mode Change │    │
│ 3                4                       │
│  Control Responce│    Auto/Manual   │    │
│ 5                6                       │
│ Cont. Run/Stop   │   Memory Area    │    │
│ 7                8                       │
│ Alarm Interlock  │  Heat up Judge   │    │
│ 9               10                       │
│  LBA Selection   │                  │    │
│                 11                       │
│     Exit         │                  │    │
└────────────────────────────────────────┘
```

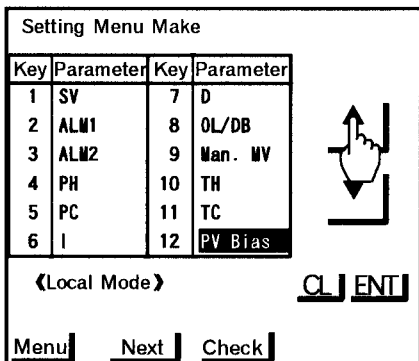This screen is used to check the content of the menu screen generated on the Ope. Mode Menu Make screen.

Numbers on the screen at the left show key positions.
Nunbers to show key positions are not displayed on the actual check screen. In addition, key frames in key positions not assigned with parameters are not displayed.

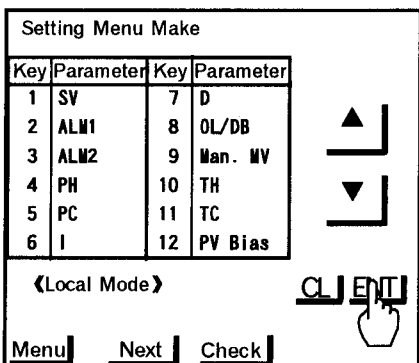Touching this key returns to the Ope. Mode Menu Make screen.

■ Setting procedure

Method of changing the menu   (Example: Setting Menu Make screen)

```
Setting Menu Make

Key|Parameter|Key|Parameter
 1 | SV      | 7 | D
 2 | ALM1    | 8 | OL/DB
 3 | ALM2    | 9 | Man. MV
 4 | PH      |10 | TH
 5 | PC      |11 | TC
 6 | I       |12 | HBA1

《Local Mode》              CL  ENT

Menu    Next   Check
```

1. Touch the parameter section to be set to highlight (inversely display) the parameter.

```
Setting Menu Make

Key|Parameter|Key|Parameter
 1 | SV      | 7 | D
 2 | ALM1    | 8 | OL/DB
 3 | ALM2    | 9 | Man. MV
 4 | PH      |10 | TH
 5 | PC      |11 | TC
 6 | I       |12 | PV Bias

《Local Mode》              CL  ENT

Menu    Next   Check
```

2. Select the required parameter by the select key to change the parameter.

```
Setting Menu Make

Key|Parameter|Key|Parameter
 1 | SV      | 7 | D
 2 | ALM1    | 8 | OL/DB
 3 | ALM2    | 9 | Man. MV
 4 | PH      |10 | TH
 5 | PC      |11 | TC
 6 | I       |12 | PV Bias

《Local Mode》              CL  ENT

Menu    Next   Check
```

3. Touch the **ENT** key.
   Then the inversed parameter returns to normal and the parameter is entered.

   * The changed parameter is registered by touching the **ENT** key.

```
Setting Menu    95/ 3/ 27(MON)16:15

  SV  |  ALM1  |  ALM2  |  PH

  PC  |   I    |   D    |  OL/DB

Man.MV|  TH    |  TC    |  PV Bias




  Exit
```
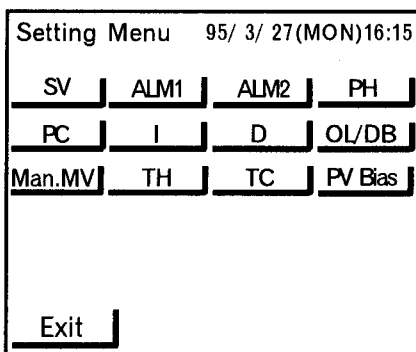
4. The generated menu screen can be checked on the check menu screen displayed by touching the **Check** key.
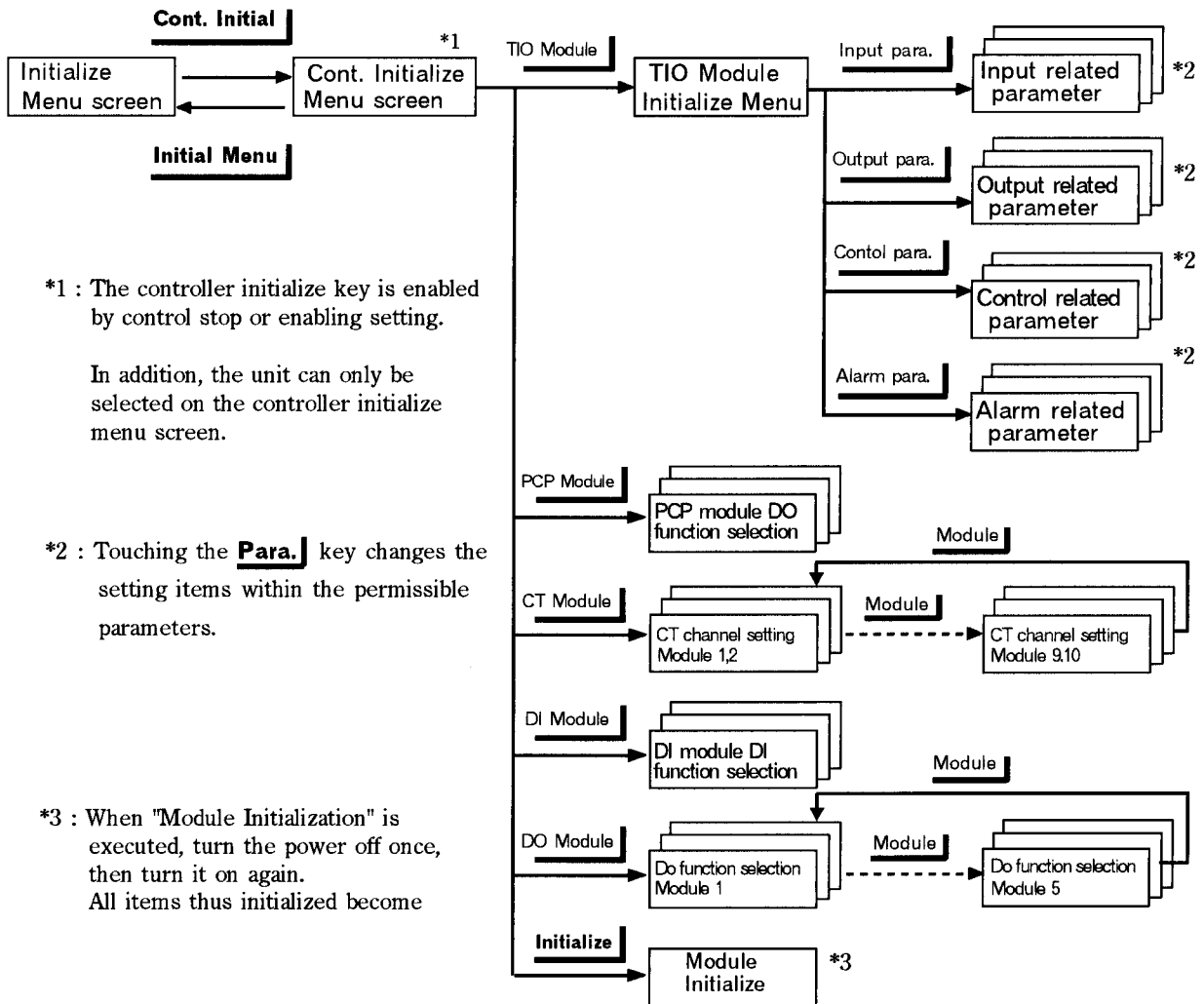   Touch the **Exit** key to return to the Setting Menu Make screen.

NOTES

● Key operation cannot be performed even if function module function items (parameters) not existing on the control unit side are assigned to the menu screen.
However,these function items are displayed on the menu screen.

● The relevant key becomes inoperable during menu generation by making the key parameter display section blank. Neither key names nor key frames are displayed on the menu screen.

● Key frame, shape, size or name, or character size cannot be changed.

2. Controller initialize screen

This screen is used to perform various settings to the control unit itself.

2.1 Calling procedure

*1 : The controller initialize key is enabled by control stop or enabling setting.

In addition, the unit can only be selected on the controller initialize menu screen.

*2 : Touching the **Para.** key changes the setting items within the permissible parameters.

*3 : When "Module Initialization" is executed, turn the power off once, then turn it on again.
All items thus initialized become

2.2 Controller initialize menu screen

Touching the highlighted controller initialize key, displays the following controller initialize menu screen.

Initialize menu screen select key
    Touching this key changes to the initialize menu screen.

Item select keys
    Touching the key corresponding to the desired item changes to the controller initialize
    settings screen for that item.
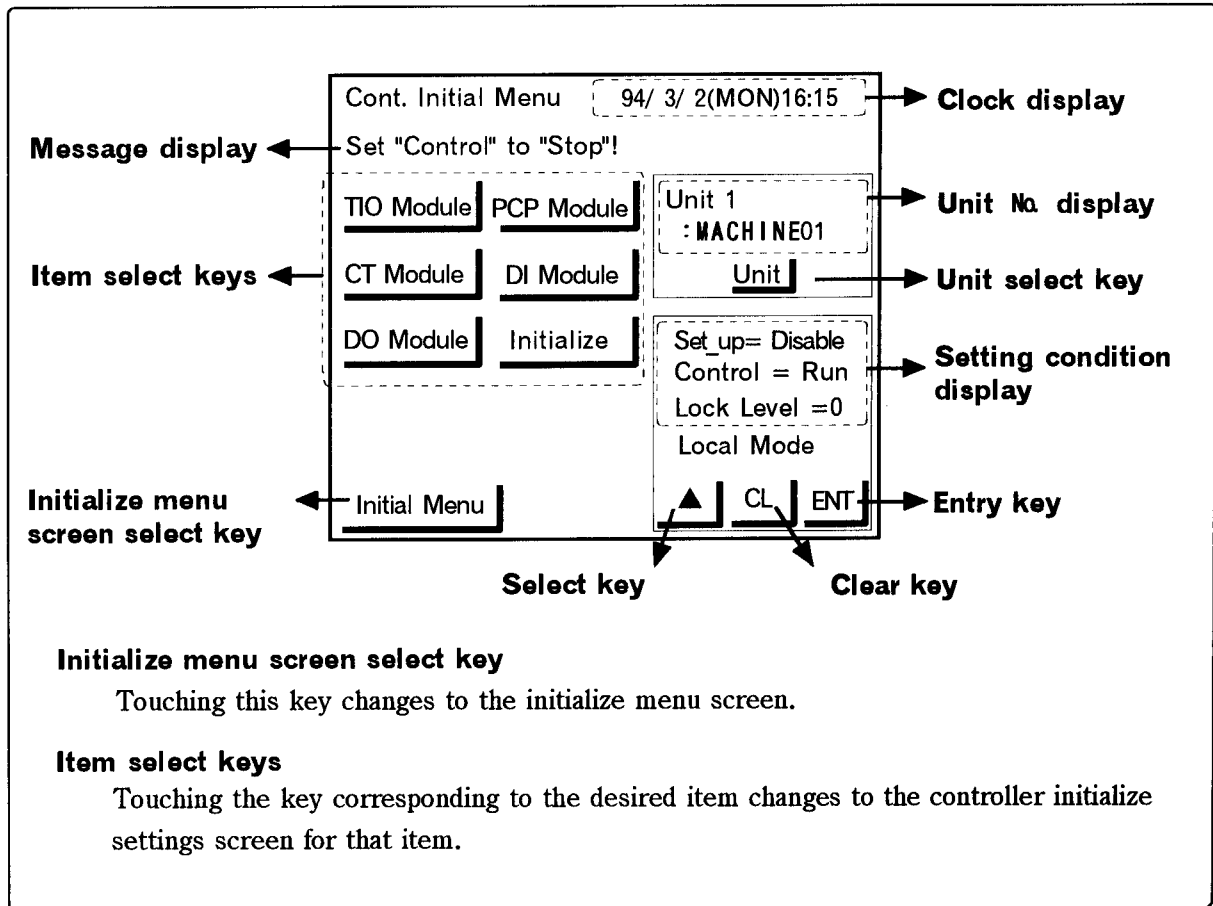
● **Unit No. display**
    Touching the unit select key allows the unit and name to be initialized to be set.

    * Unit No. can be selected only on the controller initialize menu screen.

● **Setting condition display**
    The conditions to enter the initialize settings are set.
    The key used to enter the initialize settings becomes valid when **Set_up=Enable** and **Control=Stop**.
    Select the setting using the setting select key after touching the setting display section to be changed,
    then enter it by touching the **ENT** key.

    Set_up selection   :   Disable / Enable
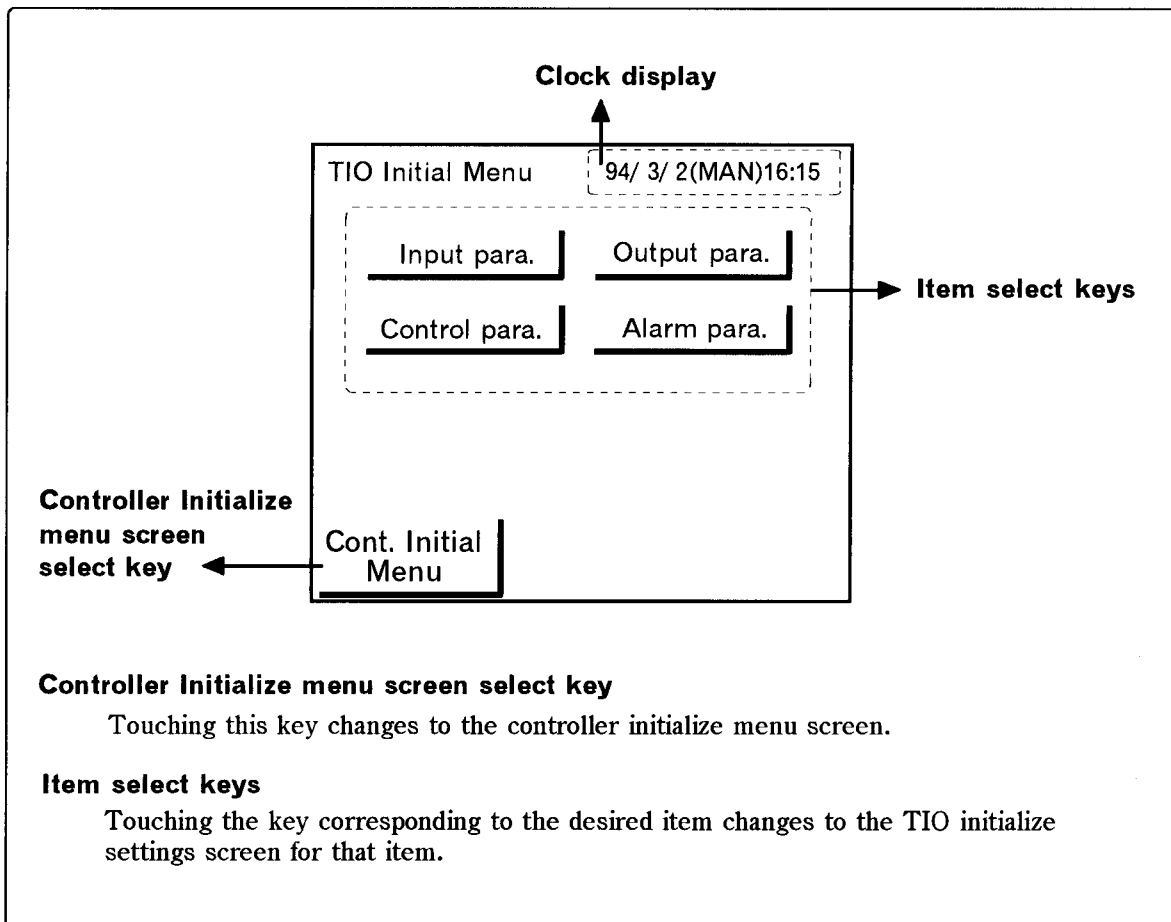   Control selection   :   Run / Stop
    Lock level   :   0

    * Factory set value : ⌈ Set_up selection : Disable ⌉
                             | Control selection : Run |
                             ⌊ Lock level   : 0   ⌋

    * The **Initial Menu** key becomes valid when "**Set_up=Disable**".

2.3 TIO module initialize settings

TIO module initialize menu screen

Touching the TIO module key displays the following TIO module initialize menu screen.

Clock display

```
TIO Initial Menu        94/ 3/ 2(MAN)16:15

     Input para.     Output para.                    Item select keys

     Control para.   Alarm para.
```

Controller Initialize menu screen select key ← Cont. Initial Menu

Controller Initialize menu screen select key

    Touching this key changes to the controller initialize menu screen.

Item select keys

    Touching the key corresponding to the desired item changes to the TIO initialize settings screen for that item.
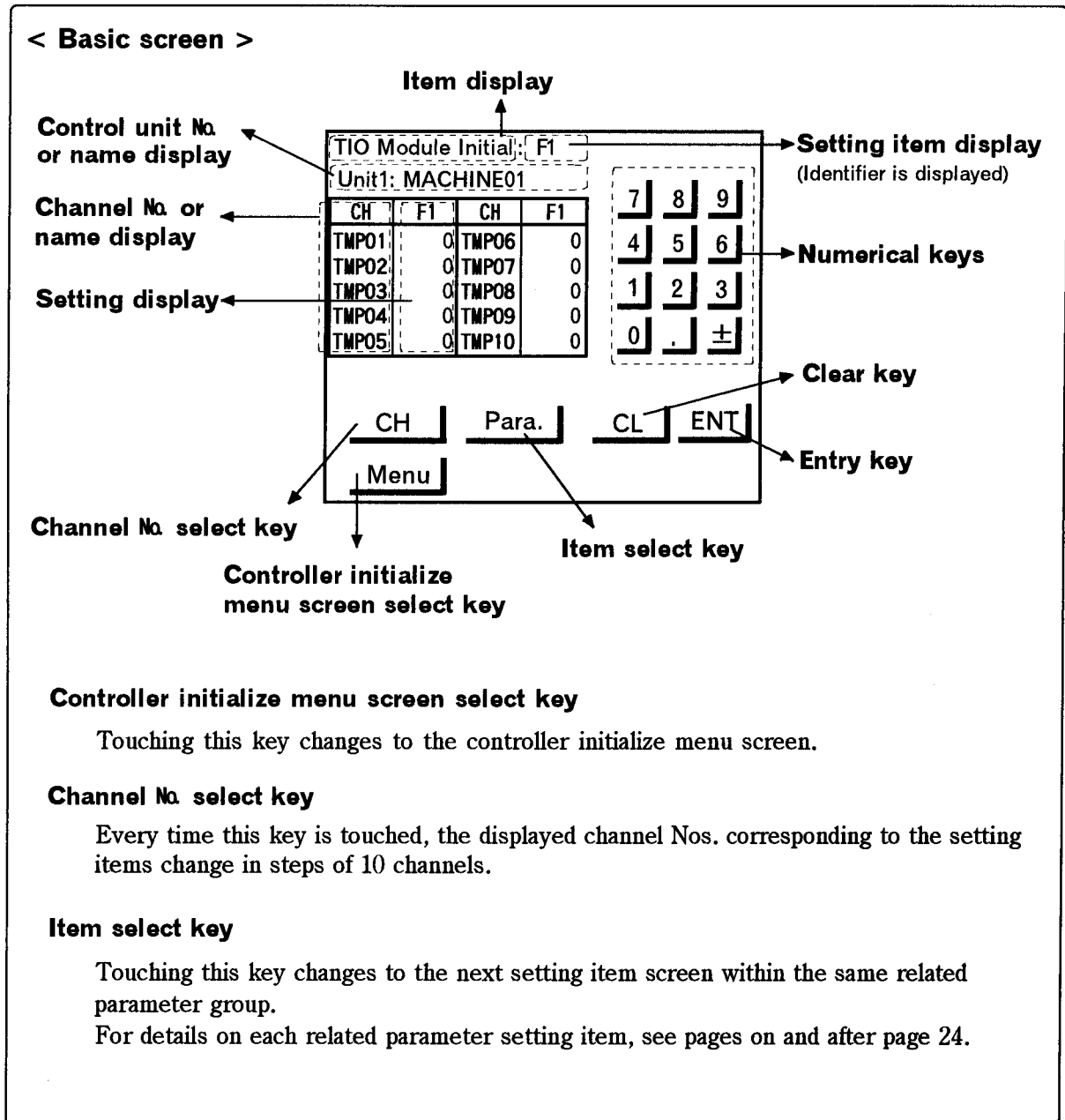
● TIO module initialize settings are divided into 4 groups of input, output, control and alarm.
Touching the related parameter key to be initialized changes to the related parameter setting screen.

    * For details on each related parameter setting screen, see pages on and after page 23.

Related parameter setting screen

The related parameter setting screen is shown below.

< Basic screen >

Item display

**Control unit No.
or name display**

**Channel No. or
name display**

Setting display

CH	F1	CH	F1
TMP01	0	TMP06	0
TMP02	0	TMP07	0
TMP03	0	TMP08	0
TMP04	0	TMP09	0
TMP05	0	TMP10	0

TIO Module Initial : F1
Unit1: MACHINE01

Setting item display
(Identifier is displayed)

Numerical keys

7 8 9
4 5 6
1 2 3
0 . ±

Clear key

CH   Para.   CL   ENT

Menu

Entry key

Channel No. select key

Item select key

**Controller initialize
menu screen select key**

Controller initialize menu screen select key

Touching this key changes to the controller initialize menu screen.

Channel No. select key

Every time this key is touched, the displayed channel Nos. corresponding to the setting items change in steps of 10 channels.

Item select key

Touching this key changes to the next setting item screen within the same related parameter group.
For details on each related parameter setting item, see pages on and after page 24.

For each parameter setting, follow the procedure in Chapter 4, "4.4.3 Setting screen".

* Unit No. cannot be selected on the above setting screen. Select it on the controller initialize menu screen.

Each related parameter setting item

■ Input related parameter (Lock Level=0)
*ID:Identifier

No.	Name	ID *	Range or Item description	Factory set value
1	Digital filter	F1	0 to 100 sec	0

■ Output related parameter (Lock Level=0)
*ID:Identifier

No.	Name	ID *	Range or Item description	Factory set value
1	Output change rate limit (High−limit)	PH	0.0 to 100.0% / second	0.0
2	Output change rate limit (Low−limit)	PL	0.0 to 100.0% / second	0.0
3	Output limit (High−limit)	OH	−5.0 to +105.0%	100.0
4	Output limit (Low−limit)	OL	−5.0 to +105.0%	*1
5	Operation output value during input error	OE	−5.0 to +105.0%	0.0

*1 Heating type : 0.0, Heating /cooling type : 100.0

■ Control related parameter (Lock Level=0)
*ID:Identifier

No.	Name	ID *	Range or Item description	Factory set value
1	AT bias	GB	Within ± the input span range	0
2	Setting change rate limit	HH	0.0 to 100.0% of span / minute	0.0
3	ON/OFF action differential gap (Upper)	IV	0.00 to 10.00% of span	0.02
4	ON/OFF action differential gap (Lower)	IW	0.00 to 10.00% of span	0.02

■ Alarm related parameter (Lock Level=0)
*ID:Identifier

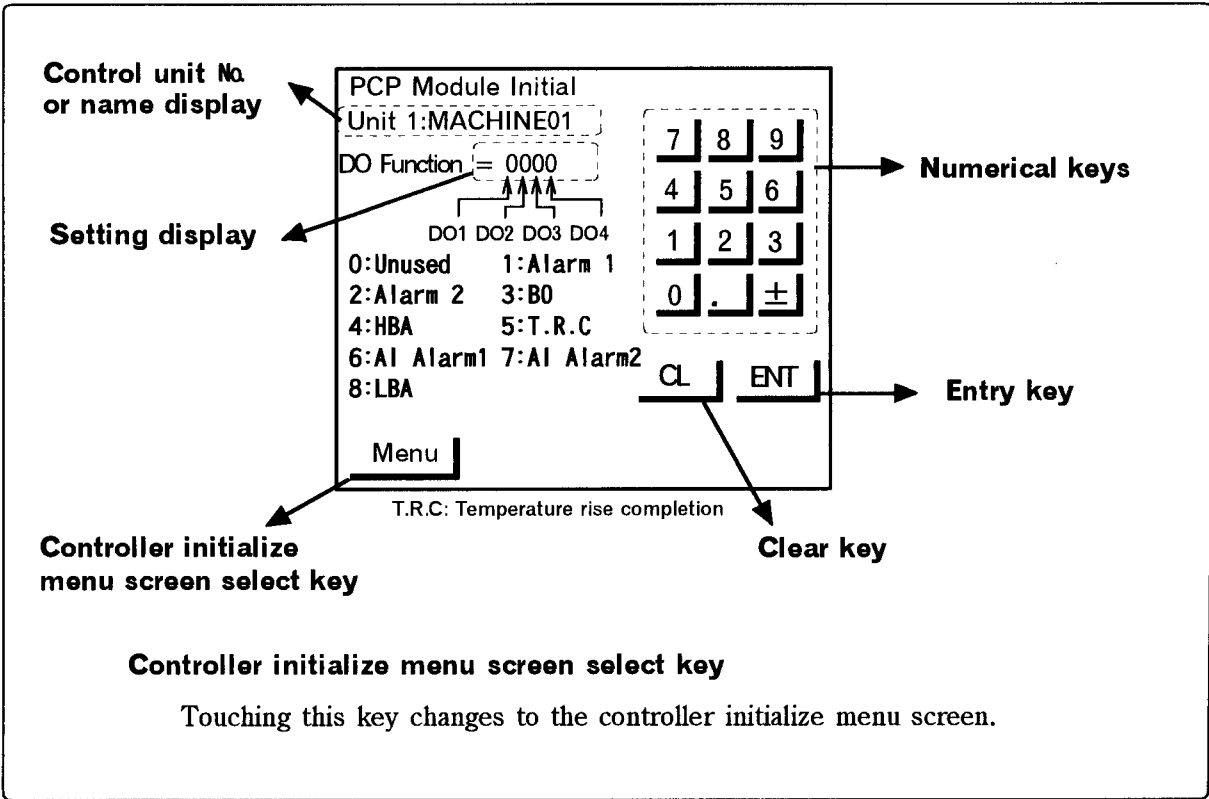| No.	Name	ID *	Range or Item description	Factory set value
1	Number of alarm delay times	DF	0 to 255 times	0
2	First alarm differential gap	HA	0.00 to 10.00% of span	0.1
3	Second alarm differential gap	HB	0.00 to 10.00% of span	0.1

2.4 PCP module DO function selection

This screen is used to assign functions to PCP module DOs (OUT 1 to 4) .

CAUTION

If the module configuration is changed (module location is changed or module is added or removed), always initialize the module first, then re-set the assignment .

→ See 2.8 Module initialize setting.

Control unit No. or name display

Setting display

Controller initialize menu screen select key

```
PCP Module Initial
Unit 1:MACHINE01
DO Function = 0000
          ↑↑↑↑
        DO1 DO2 DO3 DO4
0:Unused    1:Alarm 1
2:Alarm 2   3:BO
4:HBA       5:T.R.C
6:AI Alarm1 7:AI Alarm2
8:LBA
     Menu
```

Numerical keys

7	8	9
4	5	6
1	2	3
0	.	±

CL   ENT

Entry key

T.R.C: Temperature rise completion

Clear key

Controller initialize menu screen select key

Touching this key changes to the controller initialize menu screen.

(Factory set value: Depending on the model No.)

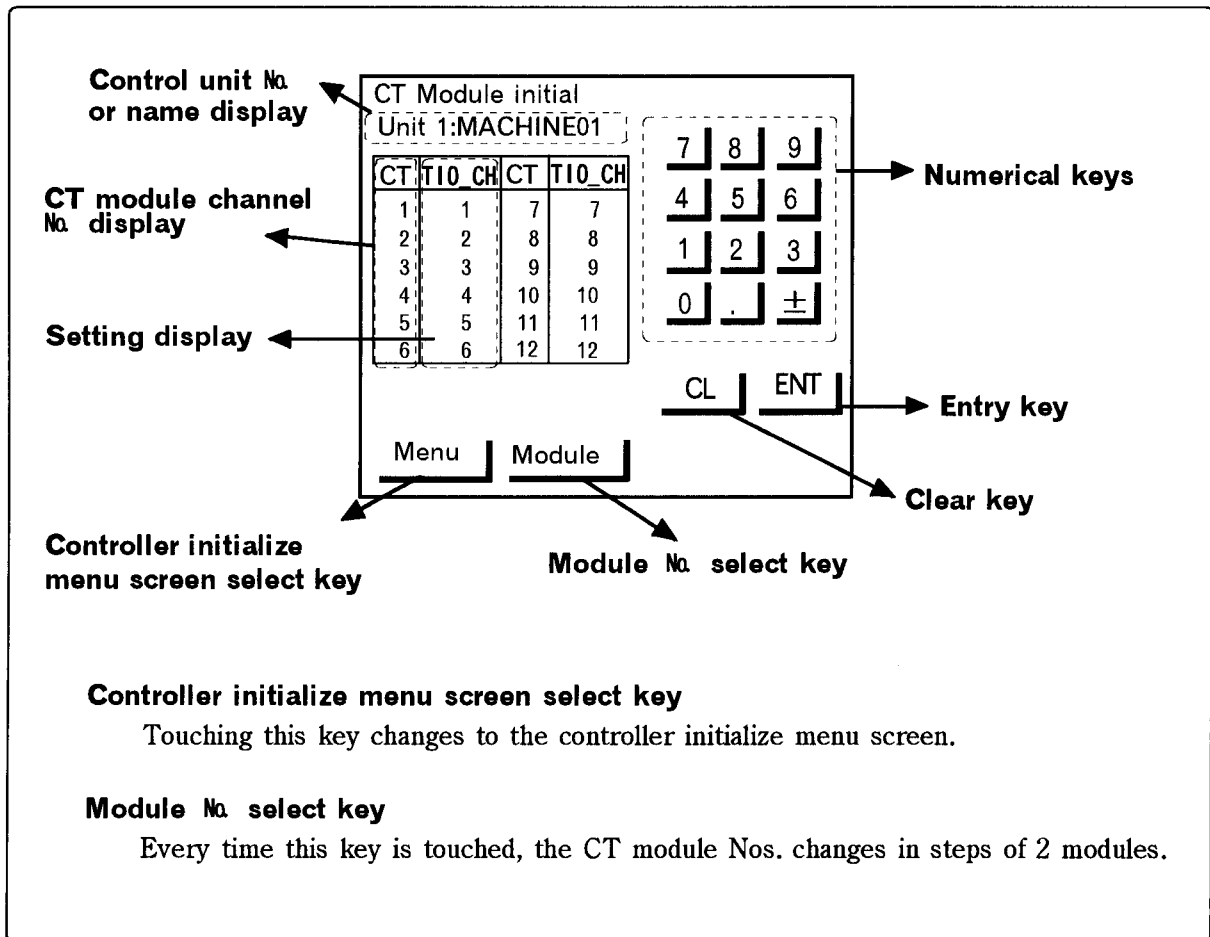For each parameter setting, follow the procedure in Chapter 4, "4.4.3 Setting screen."

* Unit No. cannot be selected on the above setting screen. Select it on the controller initial menu screen.

* For details on the PCP module DO terminal output status, see the relevant Hardware Instruction Manual.

2.5 CT channel setting

This screen is used to assign the TIO module channel used for the CT module input channel.

┃ CAUTIONS ┃

● **If the module configuration is changed (module location is changed or module is added or removed), always initialize the module first, then re-set the assignment.**
→ **See 2.8 Module initialize setting.**

● **When modules need to be added, do not exceed the maximum number of modules that can be connected.**
→ **See the Hardware Instruction Manual or the Installation Manual.**

Control unit No. or name display →

CT module channel No. display →

Setting display →

CT Module initial
Unit 1:MACHINE01

CT	TIO_CH	CT	TIO_CH
1	1	7	7
2	2	8	8
3	3	9	9
4	4	10	10
5	5	11	11
6	6	12	12

7 8 9
4 5 6
1 2 3
0 . ±

CL ENT

Menu Module

→ **Numerical keys**

→ **Entry key**

→ **Clear key**

Controller initialize menu screen select key

Module No. select key

Controller initialize menu screen select key
Touching this key changes to the controller initialize menu screen.

Module No. select key
Every time this key is touched, the CT module Nos. changes in steps of 2 modules.

<Channel No. range for each module>

TIO module channel : 1 to 20
CT module channel : 1 to 60   * TIO module channel setting can be duplicated.

For each parameter setting, follow the procedure in Chapter 4, "4.4.3 Setting screen."

* Unit No. cannot be selected on the above setting screen.   Select it on the controller initialize menu screen.

* For details on the CT module terminal output status , see the relevant Hardware Instruction Manual.
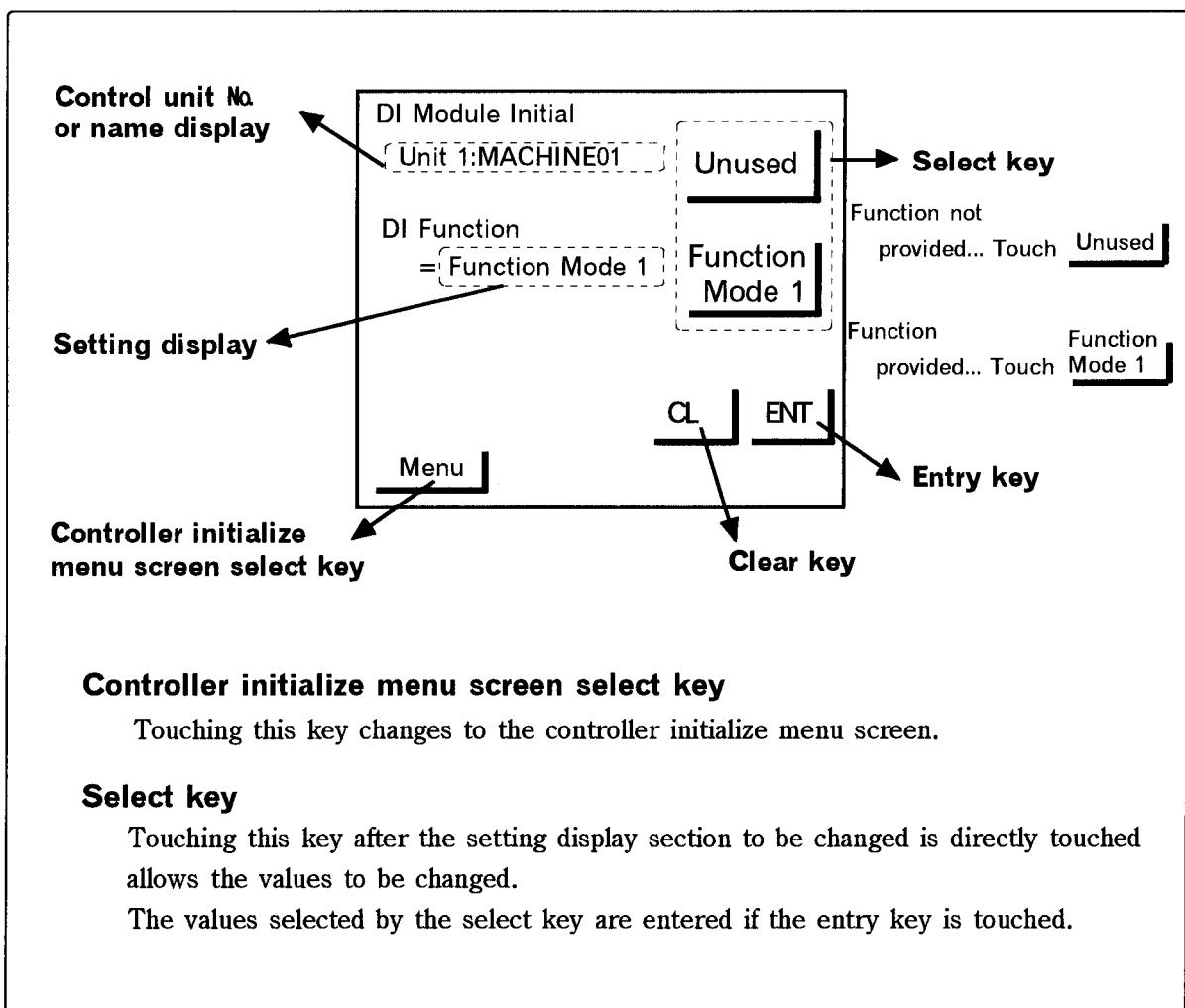
2.6 DI function selection of DI module

This screen is used to select whether to use the DI function of the DI module.

║ CAUTION ║

If the module configuration is changed (module location is changed or module is added or removed), always initialize the module first, then re- set the assignment.
→ **See 2.8 Module initialize setting.**

Controller initialize menu screen select key

    Touching this key changes to the controller initialize menu screen.

Select key

    Touching this key after the setting display section to be changed is directly touched allows the values to be changed.

    The values selected by the select key are entered if the entry key is touched.

For each parameter setting, follow the procedure in Chapter 4, "4.4.3 Setting screen."

* This function is selected and set for one DI module per unit.

* Unit No. cannot be selected on the above setting screen. Select it on the controller initialize menu screen.

* For details on the DI module terminal status , see the relevant Hardware Instruction Manual.

2.7 DO function selection of DO module

This screen is used to assign the alarm type to be output to the DO module output terminals (for each block).

CAUTIONS

● If the module configuration is changed (module location is changed or module is added or removed), always initialize the module first, then re-set the assignment.
→ See 2.8 Module initialize setting.

● When modules need to be added, do not exceed the maximum number of modules that can be connected.
→ See the Hardware Instruction Manual or the Installation Manual.

```
Control unit No.
or name display          DO Module Initial
                         Unit 1:MACHINE01
                                              7  8  9
DO module No.            <DO Module 1>
display                  DO Function = 00     4  5  6        Numerical keys

                            DO(1~4)  DO(5~8)  1  2  3
Setting display          0:Unused    1:Alarm 1
                         2:Alarm 2   3:BO     0  .  ±
                         4:HBA       5:AI Alarm1
                         6:AI Alarm2 7:LBA    CL  ENT        Entry key

                           Menu   Module                     Clear key

Controller initialize
menu screen select key        Module No. select key
```

Controller initialize menu screen select key

Touching this key changes to the controller initialize menu screen.

Module No. select key

Every time this key is touched, the DO module No. in one unit changes in steps of one module.

For each parameter setting, follow the procedure in Chapter 4, "4.4.3 Setting screen."

* One DO–A or DO–B module is divided into
each block (4 channels/block) for the respective
alarm type. Thus, four channels per block are
output.
The function is selected for each control unit
and is set for each block.
In addition, up to 5 DO modules per control
unit can be set.
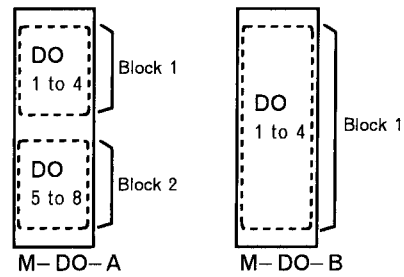
* Control unit number cannot be selected on the above setting screen. Select the control unit number on
the controller initialize lock release screen.

* For details on the DO module terminal output status, see the relevant Hardware Instruction Manual.

2.8 Module initialize setting

This screen is used to store the new system in the PCP module when the module configuration of the control unit is changed.
It can be selected that only the new module is initialized (system set) or all the modules are initialized.

║ CAUTION ║

If "all–module initialize" is executed, data within all modules (units) are set to the default values.
Therefore, perform this operation only after checking all the data.

Details of default: The set values or items expect the contents determinated by the modeling and the contents of the DO allocation of PCP module, the DO allocation of DO module and the channel allocation of CT module.

<Setting during module configuration change>
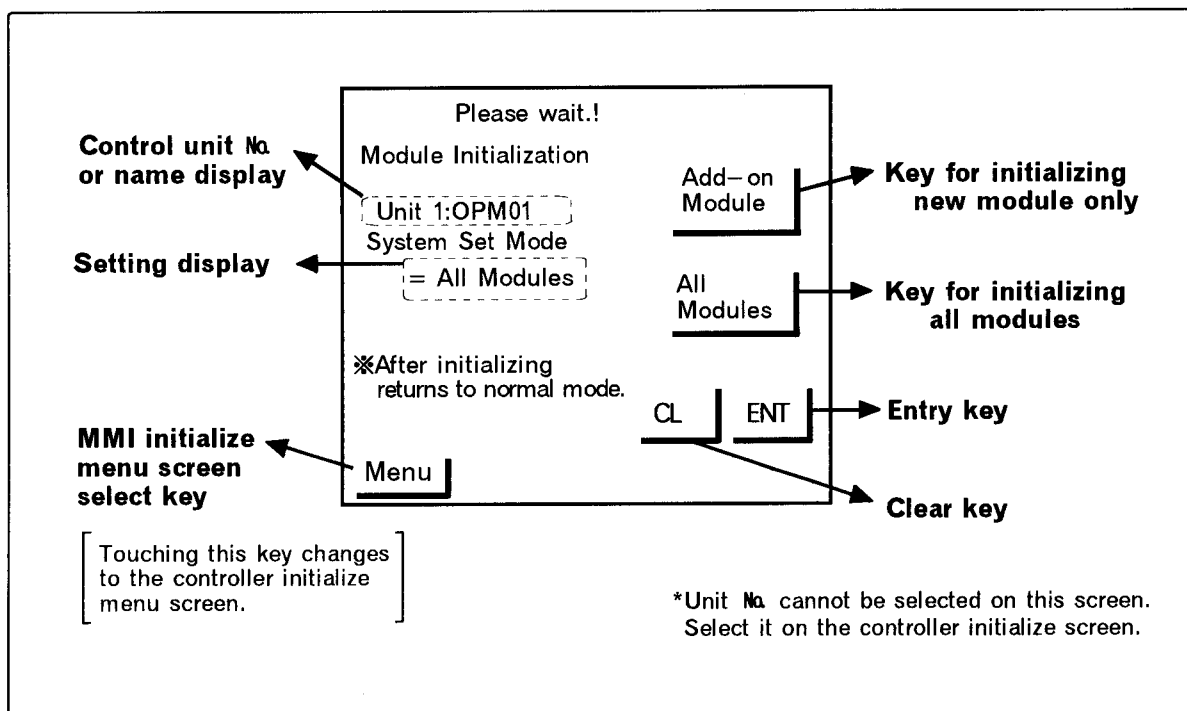
For this setting, follow the procedure in Chapter 4, "4.4.3 Setting screen".
Conduct this setting for each unit.

Details of setting

• When a module is added to control unit: Initialize new module only.

• When a module is removed from control unit: Initialize new module only.

• When a module is inserted (added) between existing modules: Initialize all modules.

• When the configuration of modules is changed in control unit: Initialize all modules.
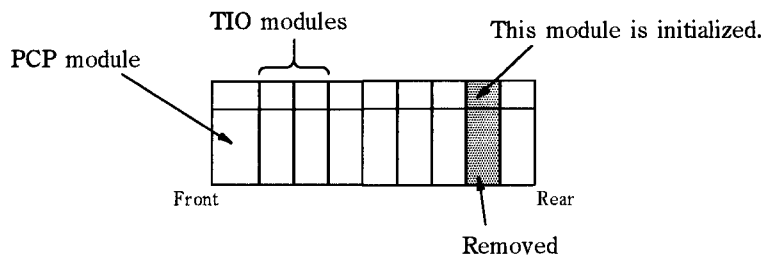
Module initialize example

The contents of module initialize vary depending on arrangement change, or place to or from which the module is added or removed.

● **When a module is added to the rear of the control unit : Added module initialize**

TIO modules
PCP module
This module is initialized.
Front   Rear
Added
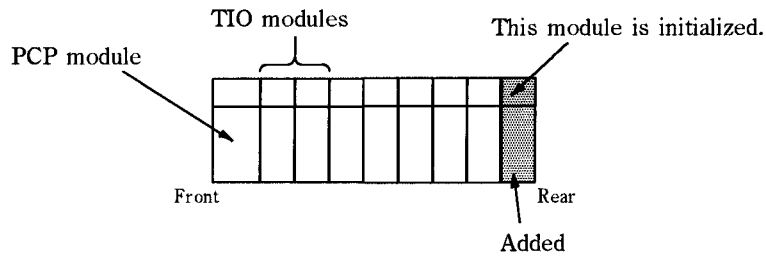
● **When a module is removed from the control unit: Added module initialize**

TIO modules
PCP module
This module is initialized.
Front   Rear
Removed

*If this operation is performed, the PCP module recognizes that the module was removed.

● **When a module is added to the control unit : All-module initialize**

● **When the module arrangement is changed in the control unit: All-module initialize**

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