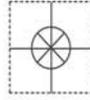


M-4450/0307



# User's Guide

# Graphic Recorder RD9900

General  
Instruction Manual

**INSTRUCTION  
MANUAL**

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# PREFACE

Thank you for purchasing the RD9900 series graphic recorder. Before using your new recorder, please be sure to read this instruction manual which will advise you on how to use the instrument correctly and safely and how to prevent problems.

## 1 . Separate instruction manuals

The present instruction manual describes the optional specifications of alarm output and report application of appendix as well as the operation of standard specifications. When the instrument is provided with the higher order or low order serial communications interface (option), the instruction manual for communications interface is attached as a separate manual. For other options for which you need to have instructions, their instruction manuals are attached respectively. Please read these instruction manuals together with this manual.

## 2 . Request

- Request to instrumentation engineers, constructors, and sale agents  
Make sure to deliver this instruction to the operator of this instrument.
- Request to the operator of this instrument  
This instruction manual is necessary for maintenance, too. Keep this manual with care until the instrument is discarded.

# 1 For safe use

This section "FOR SAFE USE" has been compiled to promote the correct use of the instrument in order to prevent human injury or damage to property before they occur. Please read the following information carefully and be sure to observe the warnings and cautions in it.

## 1. Preconditions for use

This instrument is designed for indoor use by mounting it on an indoor instrumentation panel.

## 2. Labels on this instrument

The following labels are used for safe use.

Label	Name	Meaning
	Alert symbol mark	Indicates the location which should refer to the manual in order to prevent an electric shock and injury.
	Protective conductor terminal	A terminal is provided for connection to the protective conductor of the power supply facility for the prevention of an electric shock.

## 3. Symbols in this manual

The cautions to be observed for preventing the damage of this instrument and unexpected accidents are sorted by the following symbols according to their importance degrees for enabling operators to use this instrument safely.

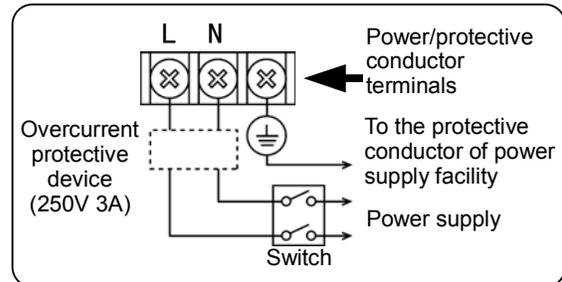
 <b>Warning</b>	The nonobservance of information under this symbol may result in hazardous, critical or serious injury to the user.
 <b>Caution</b>	The nonobservance of information under this symbol may result in a hazardous situation or a light injury to the user or in physical damage to the property.
 <b>Remarks</b>	This symbol shows a caution when the instrument does not function as specified or when such a possibility exists.
 <b>Reference</b>	This reference serves as a supplement for handling and operation, and it may be convenient for the user.

## WARNINGS

This paragraph covers important warning for safety to be observed before reading the instructions. Fully understand the following warning before reading this manual. These warnings are important for preventing the damage to human bodies as well as accidents.

### 1. Switch and overcurrent protective device

The RD9900 series graphic recorder is not provided with a replaceable overcurrent protective device. Prepare the switch and the overcurrent protective device for the power supply (circuit breakers, circuit protectors or the like) within 3m of this instrument in a location where the operator can reach instrument in a location where the operator can reach them handily. Use a switch and an overcurrent protective device conforming to IEC947-1 and IEC947-3.



### 2. Be sure to ground the RD9900 series graphic recorder

Before turning the power on, connect the protective conductor terminal of the RD9900 series graphic recorder to the protective conductor of the power supply facility. In order to prevent an accident by electric shock, do not disconnect an instrument in use.

#### Reference Fuse in the power supply

The following fuse is mounted in the power supply unit of RD9900 series graphic recorder for safety use. However, this fuse is not replaceable.

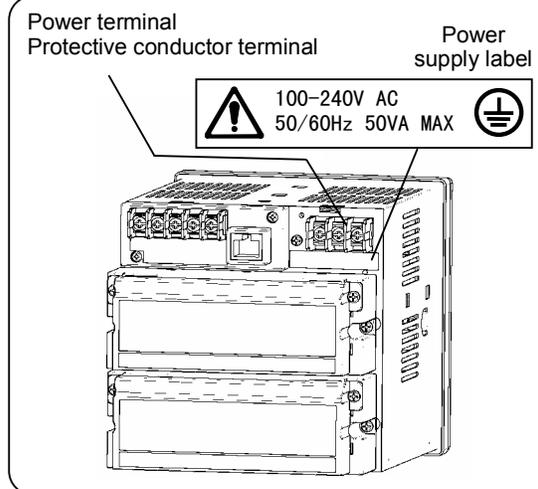
Manufacturer : Nippon Seisen Cable., Ltd.  
Model : FCT 250V 3A 8H02

### 3. Before turning on the power supply

In order to ensure safety, before turning on the external power switch make sure that the power voltage is within the range indicated on the power supply label.

### 4. Don't repair or modify this instrument

Make sure that any persons other than service engineers approved by OMEGA ENGINEERING INC. do not repair or modify this instrument by replacing parts. Otherwise it may be damaged or will not function normally or an accident such as electric shock may occur. For ordinary operation, it is not necessary to open the internal unit.



### 5. Use this instrument in accordance with this instruction manual

Use the RD9900 series graphic recorder correctly and safely by following this instruction manual. OMEGA ENGINEERING INC. will not be responsible for any injury, damage, lost profit or any other claim, which may result from its wrong use.

### 6. Turn off the power supply if an abnormal symptom occurs

Turn off the power supply immediately and contact your local OMEGA sales agent if any abnormal odor noise or any smoke occurs, or if the RD9900 series graphic recorder generates heat that is too hot to be touched.

## 2 Main features and functions

Besides displaying in various formats like real time trend graph/bar graph/numeric value etc. in 5.6 inch TFT color LCD and measuring various industrial quantities and temperature of multi channels, this instrument can as per the requirement, record the data of internal memory and memory card (CF card) and replay it. Stored data can be used using commercial software like excel etc. Exclusive analysis software is also available.

Management of measurement result is easy	Measurement result is displayed in various screen formats and monitoring is easy. The old data stored in CF card can also be read. The stored data can also be managed using commercial software like EXCEL (Registered trademark of Microsoft Ltd.) etc.
Compliance with international standards	(Planning to get CE marking compliance)
Various screen displays	Real time trend, bar graph, data display (table format) and composite displays like real time trend and bar graph, real time trend and numeric value display, real time trend and historical trend can be arbitrarily selected and maximum screens can be monitored as per requirement. Alarm display screen and marker list screen to display past alarm activation status collectively, are also available. Other than maximum 5 groups can be displayed switching over of that screen can be done by simple operation.
Various memory functions	Start/stop of data storage can be done by arbitrary condition settings like key operation, alarm, time setting etc. and up to 5 files can be stored at a time. During normal operations, data is stored in internal memory and can be saved on CF memory card.
Analog recorder sensation	As trend screen displays the data on the chart by using scale plate and pointer, monitoring can be done by analog recorder sensation.
Marker function	Marker and marker text (alphanumeric characters, maximum 31 characters) can be written on the trend screen. Marker text is written arbitrarily and also there are 50 types of marker texts that are already registered. This marker text can also be written in historical trend screen (replay). 'No marker text' marking only, is also possible.
MODBUS communication	Parameter settings, data acquisition and operation can be done using high order communication of option. As communication protocol uses MODBUS it is possible to communicate with program indicator equipped with MODBUS protocol, even without creating communication software and building a system is easy. (MODBUS: Registered trademark of SCHNEIDER Ltd.)
Consumables are not required	Consumables like chart, pen and ink as used in strip chart recorders are not necessary, thereby making the system cleaner and less time consuming.
Set up is easy	Each parameter setting is done by selecting the setting item from menu screen, using key operation. A window is opened and the method of setting is interactive. Hence set up is easy. Also operation can be done easily using the required parameter settings operation, in 'Simple settings (HOME)' screen
Software package is available	Data analysis can be done easily on the PC as software package for exclusive analysis is available. <ul style="list-style-type: none"> <li>• Software for analysis : (Windows98,Me,2000,XP version)</li> </ul>

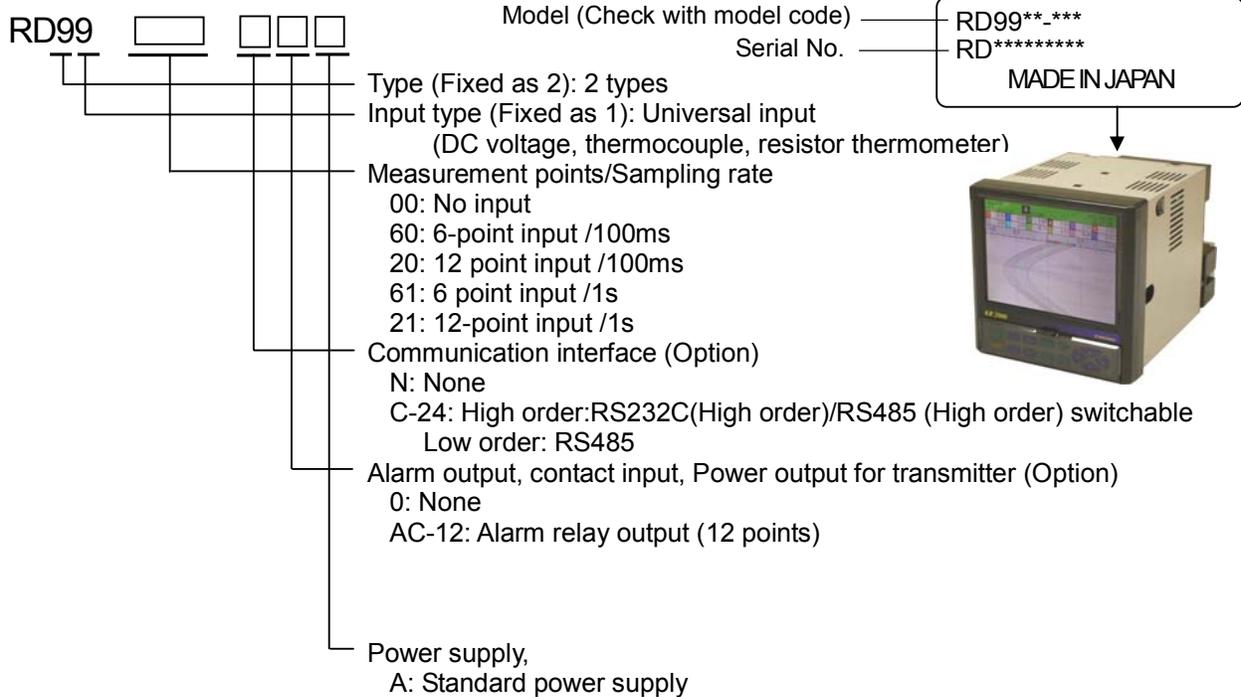
# 3 Checking model and attachments

## 3.1 Model check

The model No. and serial No. of the RD9900 series graphic recorder can be confirmed by the label on the upper face of the case.

Please check the model of your instrument from the model code, before use.

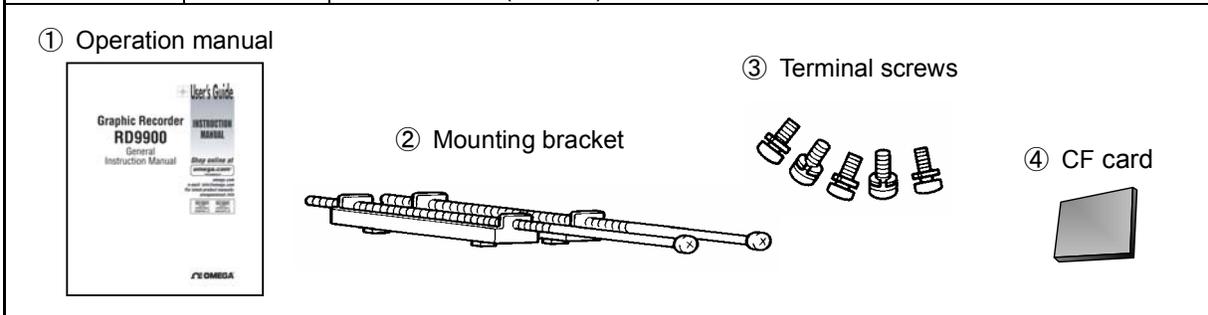
### ■Model code



## 3.2 Checking attachments

Package contains the following attachments. Please confirm.

Parts name	Quantity	Remarks
① Operation manual	1	INE-365□ (For RD9900 series graphic recorder) CD-ROM
	(1 copy)	INE-366□ (Connection/mounting edition) A4 18 pages
	1	RZMC-01-□ (CF card)
② Mounting bracket	2	For use in panel mounting
③ Terminal screw	5	For M3.5, input terminal and alarm (digital input) terminal (Spare in case of loss)
④ CF card	1	RZ-CMC128 (128MB)



# 4 Installation

## 4.1 Mounting location

In order to avoid unfavorable effects on measurement accuracy and recording operation, mount the RD 9900 series graphic recorder at the following locations.

### 1) Industrial environment

Select a place away from electric field and magnetic field and away from mechanical vibrations/shock.

- Over voltage category..... II
- Altitude.....2000m or less
- Pollution degree.....2
- Place of use.....Indoor

### 2) Ambient temperature/humidity

Keep away from direct sunlight and to avoid increase in temperature do not keep the RD9900 series graphic recorder in a very closed place.

- Place with stable ambient temperature of around 23°C and humidity 50%RH
- Place not exposed to hot drafts (50°C or more), in order to avoid deformation of front panel
- Place where there is no source of heat near the terminal. This is to avoid, measurement errors.

### 3) Atmosphere

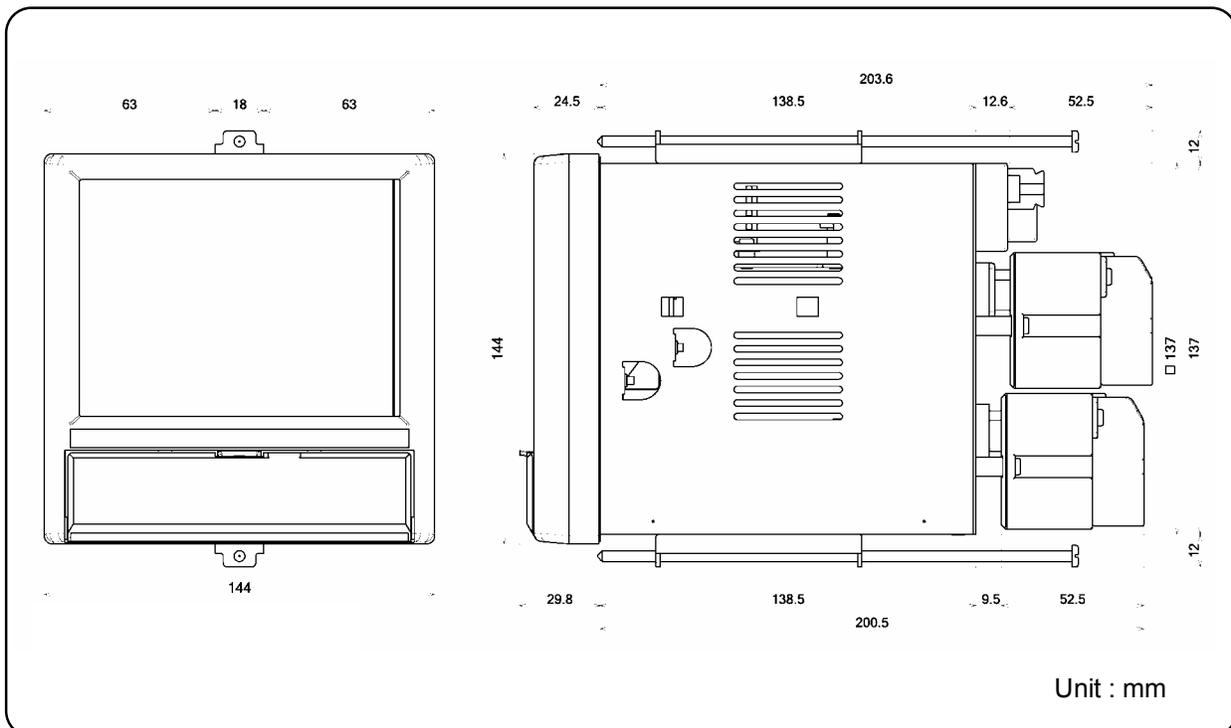
- For safety reasons avoid place where there is inflammable gas.
- Avoid places with dust, smoke, vapors etc.

### 4) Mounting angle

- Lateral tilting...0°
- Longitudinal tilting...Forward tilting: 0°, Backward tilting: 0-20°

## 4.2 External dimensions

Following figure shows the dimensions of RD9900 series graphic recorder together with its mounting brackets.



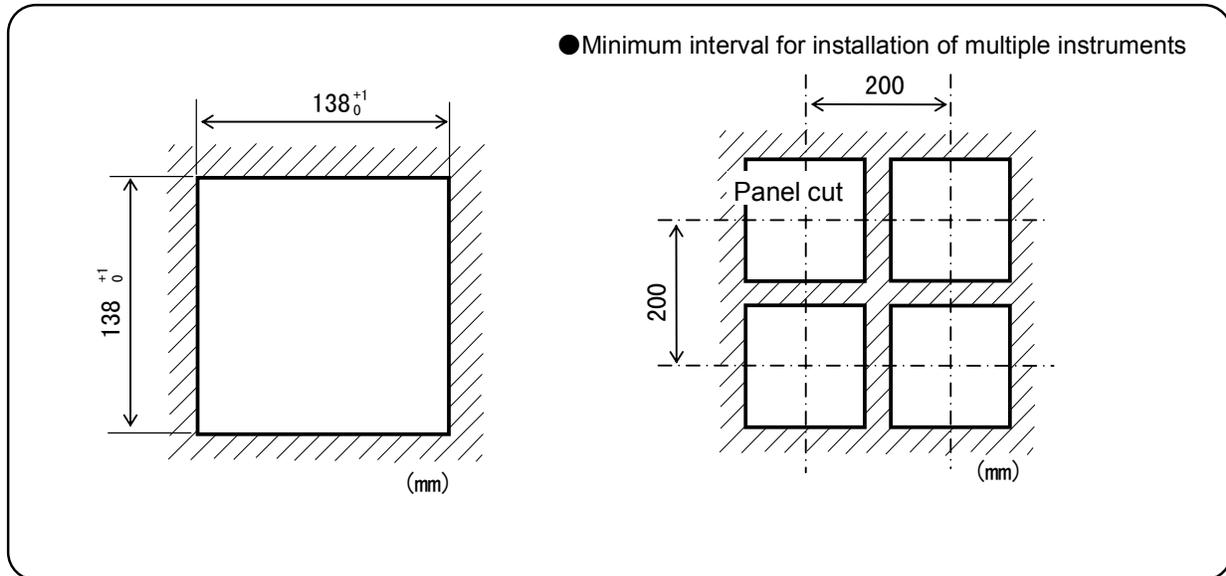
## 4.3 Method of mounting the panel

### Warning

#### ■ Mount on the panel and use

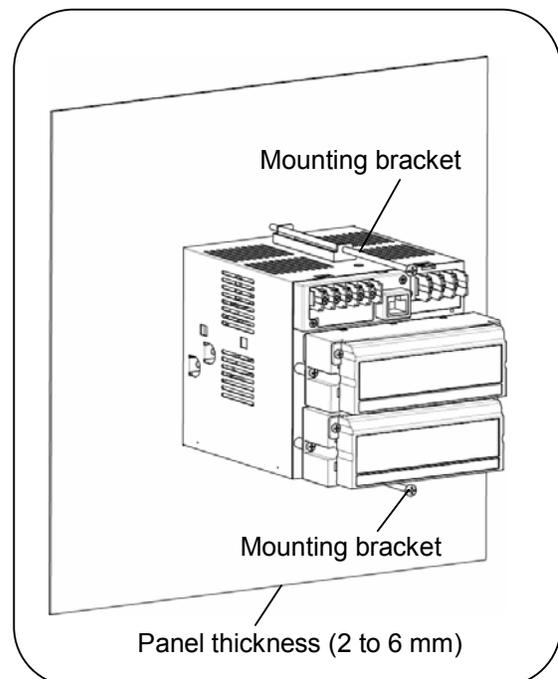
- ① The RD9900 series graphic recorder has been designed to be mounted on an indoor instrumentation panel.
- ② Use a panel made of a steel plate of 2mm to 6mm in thickness.

### 1) Panel cut size



### 2) Mounting method

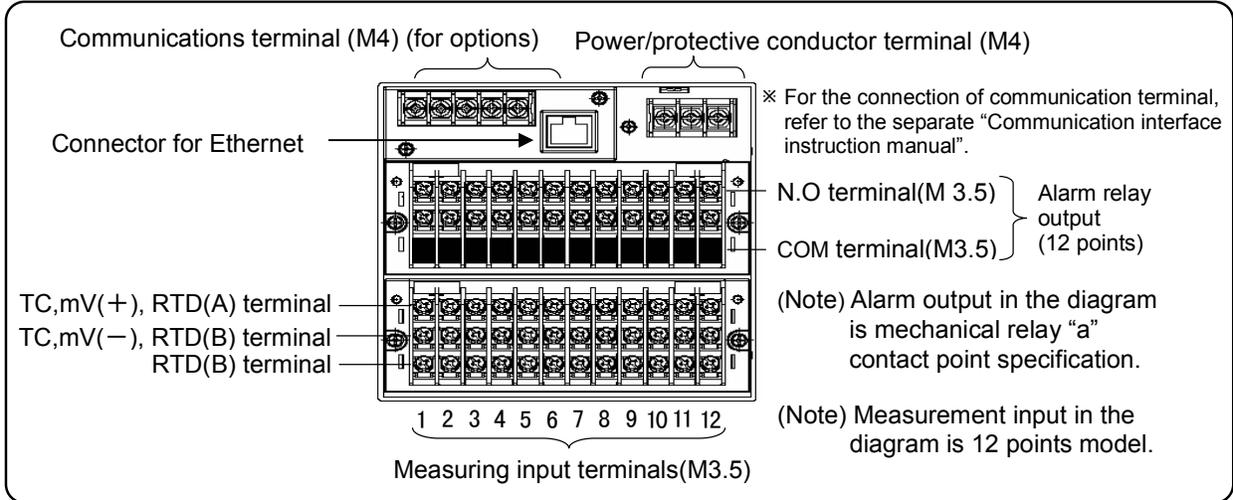
- ① Insert the RD9900 series graphic recorder in the panel cutout from the front of the panel.
- ② Fixed the RD9900 series graphic recorder using mounting brackets (Screw tightening torque: 1.0 N·m). Mounting brackets are fixed on the top and bottom.



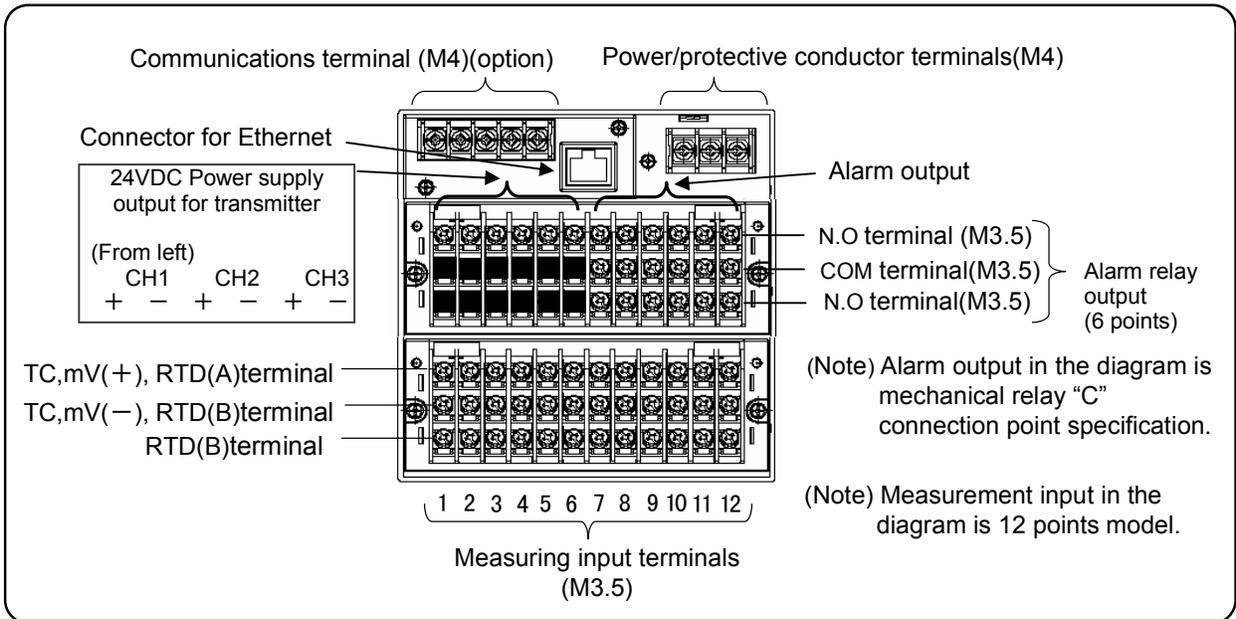
# 5 Connections

## 5.1 Terminal board arrangement

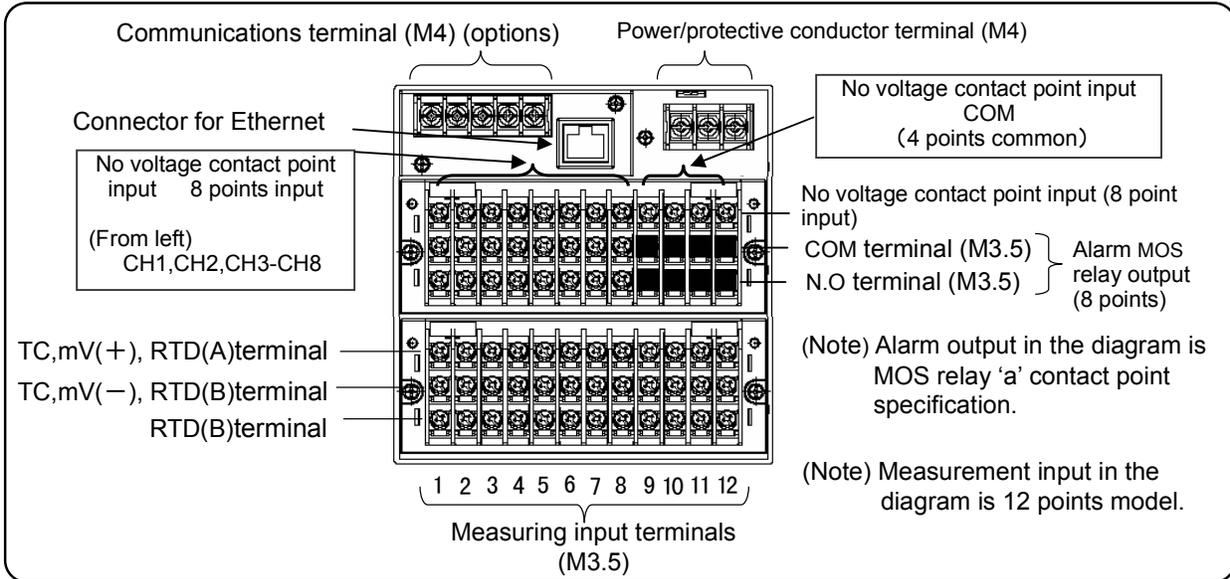
The following diagram shows the terminal board arrangement in which option (Alarm relay output [12 points], communication interface) are mounted. Connector for Ethernet is a standard mounting.



Following figure is terminal board diagram for option (24VDC transmitter power supply, alarm relay output [6 points] in RD9900, equipped with communication interface. Connector for Ethernet is a standard mounting.



Following figure is terminal board diagram for option (digital input [8 points] + alarm MOS relay output [8 points]) in RD9900, equipped with communication interface. Connector for Ethernet is a standard mounting.



## ⚠ Warning

### ■ Alert symbol marks (⚠) and places

Alert mark ⚠ is pasted at places where there is a possibility of getting an electric shock on touching (See the following table).

Terminal name	Power supply terminal	Measurement input terminal	Mechanical relay 'c' contact alarm terminal	MOS relay, mechanical relay 'a' contact alarm terminal
Place where the alert mark is put	On the lower left of power supply terminal	On the upper left of terminal cover	On the upper left of terminal cover	Adjacent to alarm terminal

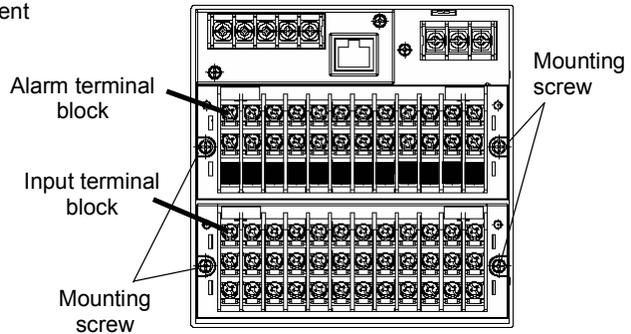
### Remarks ➤ Input terminal and alarm terminal blocks are removable

In order to facilitate connection, the input terminal block and alarm terminal block (including the digital input terminal block) are removable.

- It can be removed by removing to mounting screws along with each terminal block
- Each terminal block is connected to the instrument

### ⚠ Caution

- Turn off the power supply in advance  
For mounting or dismantling the terminal block, turn off the external power switch to prevent the electric circuits from being damaged.



### Notes ➤ Replacement of thermocouple input terminal block

Thermocouple input terminal block cannot be replaced by terminal block of any other instrument. If replaced measurement error occurs.

## 5.2 Precautions while connecting

Points to be taken care of before connecting are given below. Please abide by them for safety and reliability.

### 1) Source of power supply

In order to avoid mistake in operations, the power supplied to RD9900 series graphic recorder should be single-phase power supply with stable voltage and without waveform distortion.

#### Warning

- ① Switch and over current protective device  
Add a switch and an over current protective device (3A) to the power supply in order to avoid an electric shock. This instrument is not provided with replaceable fuse.
- ② Turn off the power supply before connection  
Be sure to turn OFF the power supply during input/output connection and power supply, in order to prevent electric shock.

### 2) Away from strong electrical circuits

Avoid placing the input/output cables near or besides strong electrical circuits like power line etc. In case of placing it near or besides strong electrical circuits, they should be separated by at least 50cm.

### 3) Thermocouple input should be away from source of heat

In order to reduce reference junction compensation error, place thermocouple input, especially the terminal part away from source of heat (objects generating heat). Also avoid the radiations due to direct sunlight.

### 4) Keep away from noises

Keep it away from the sources generating noise. Otherwise unexpected malfunctioning may occur. In case it is not possible to keep it away from noise source, take the following countermeasures.

Major noise sources	<ul style="list-style-type: none"> <li>● Electromagnetic switch, etc.</li> <li>● Power line having waveform distortion</li> <li>● Inverter</li> <li>● Thyristor regulator</li> </ul>
Counter measures	Insert noise filters between power supply and input/output terminals. A CR filter is often used.

### 5) Use crimp style terminals

- ① Use crimp style terminal as connection code terminal to avoid loose or disconnected terminals and to prevent short circuit between the terminals.
- ② Use crimp style terminals with insulating sleeve to prevent electric shock.

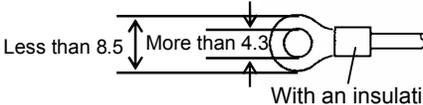
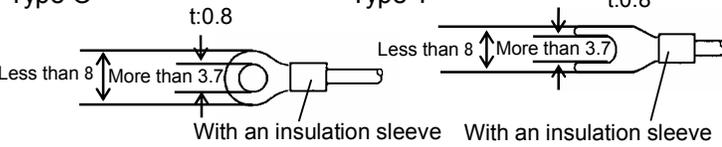
### 6) Unused terminals

Do not use any unused terminals for relaying, otherwise electric circuits may get damaged.

#### Warning

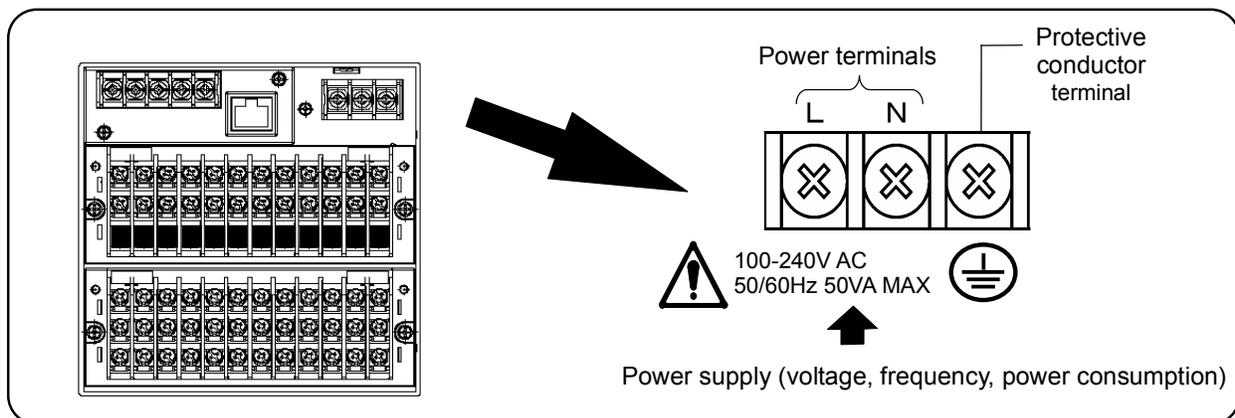
- Secure the connected cables properly  
Secure the connected cables so that they are not hooked by a person or a substance, otherwise the connections may be cut and that may cause an electric shock.

#### Kinds of terminals and terminal process

Terminal block	Screw diameter	Tightening torque	Terminal process (Unit: mm)
Power and protective conductor and communication terminal	M4	1.2N.m	<p>Type O <span style="float: right;">t:0.8</span></p>  <p>Less than 8.5    More than 4.3</p> <p>With an insulation sleeve</p>
Terminal other than the above	M3.5	0.8N.m	<p>Type O <span style="float: right;">t:0.8</span>      Type Y <span style="float: right;">t:0.8</span></p>  <p>Less than 8    More than 3.7      Less than 8    More than 3.7</p> <p>With an insulation sleeve      With an insulation sleeve</p> <p>※As far as possible use Type O.</p>

## 5.3 Connection of power and protective conductor terminals

### 1) Power and protective conductor terminals



### Warning

#### ■ Turn off the power supply

Be sure to turn off the power supply before connecting the power supply and protective conductor terminals to prevent an electric shock.

### 2) Connection of power terminals

Power cable used is 600V vinyl insulated cable and terminal is connected by processing crimp style terminal with insulated sleeve.

Note: Use the cords with the following standards.

- ① IEC 227-3
- ② ANSI/UL817,
- ③ CSA C22.2 No. 21/49

### 3) Connection of protective conductor terminal

Be sure to connect to the protective conductor of the power supply facility. Connection is done after processing insulating sleeve crimp style terminal.

- Grounding wire: Copper wire 2mm<sup>2</sup> or more (Green/yellow)

### Caution

#### ■ Be careful with the power voltage and noise

The power voltage of this instrument is indicated on the power terminal part. Don't apply any voltage other than indicated, otherwise a malfunction or an accident may result. If there is noise in the power supply, take countermeasures like installing noise reduction transformer.

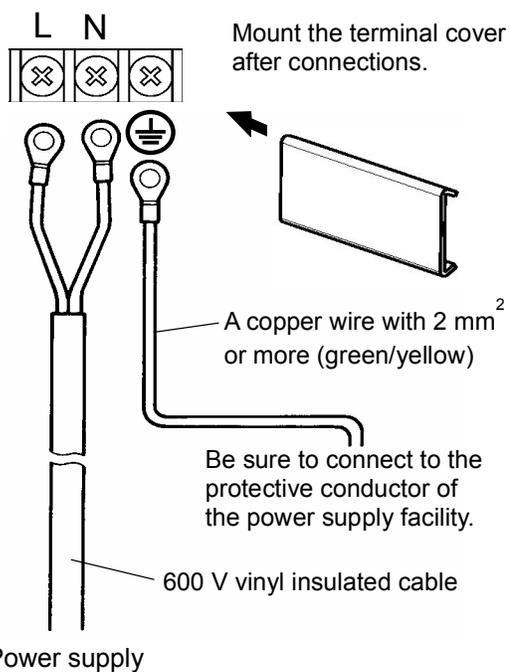
### Warning

#### ■ Mark at power terminal block

A voltage of 100 to 240 V AC is applied to the power terminals, after connection. Be sure to mount the power terminal cover after connection, to prevent an electric shock.

#### Notes L/N indication of power terminal

It is an indication that conforms to CSA standards CANADA. Live side of single-phase alternating current power is L indication and neutral side is N indication. To get satisfactory performance maintain the connection of L and N.



## 5.4 Connection of measuring input terminal

### 1) Measuring input terminal

Connect after switching off the power supply to prevent electric shock.

- In input terminal, do the connections using crimp style connection with insulated sleeve.

**⚠ Caution**

■ **Allowable input voltage**

Input type	Allowable input voltage
Voltage, thermocouple input	$\pm 10\text{VDC}^*$
Resistance thermometer input	$\pm 6\text{VDC}$

※ Channel in which setting are done in a range of  $\pm 5\text{V}$  or higher is  $\pm 60\text{VDC}$

### 2) Connection of DC voltage (current) input

In order to suppress noise, use twisted cable as input cable for instrumentation. Connect the current input after connecting current input shunt resistor to the channel to be measured.

● **DC voltage (DC) input** ⚠

**⚠ Warning**

■ **Mark on measuring input terminal block** ⚠

High voltage can be applied to measuring input terminal, using common mode. The allowable noise value is lower than 30 V AC or lower than 60 V DC. Make sure that the noises are lower than the allowable values. Mount the terminal cover after connection to prevent electric shock and to protect the input wires. In the case of thermocouple input, the mounting of the terminal cover reduces the reference junction compensation error.

### 3) Connection of thermocouple (TC) input

Always connect by thermocouple wire (or extension wire) up to the input terminal of KR 2000 series recorder. If copper wire is used for connection in between, noticeable error occurs in measurement. Avoid using pair of thermocouple wires for connection in parallel with other instrument (controller etc) as malfunctioning may occur.

● **Thermocouple (TC) input** ⚠

### 4) Connection of resistance thermometer (RTD) input

In order to avoid measurement errors, use 3-core input cable, where the resistance value of each cable is equal. One resistance thermometer cannot be connected in parallel with other instrument (controller etc.)

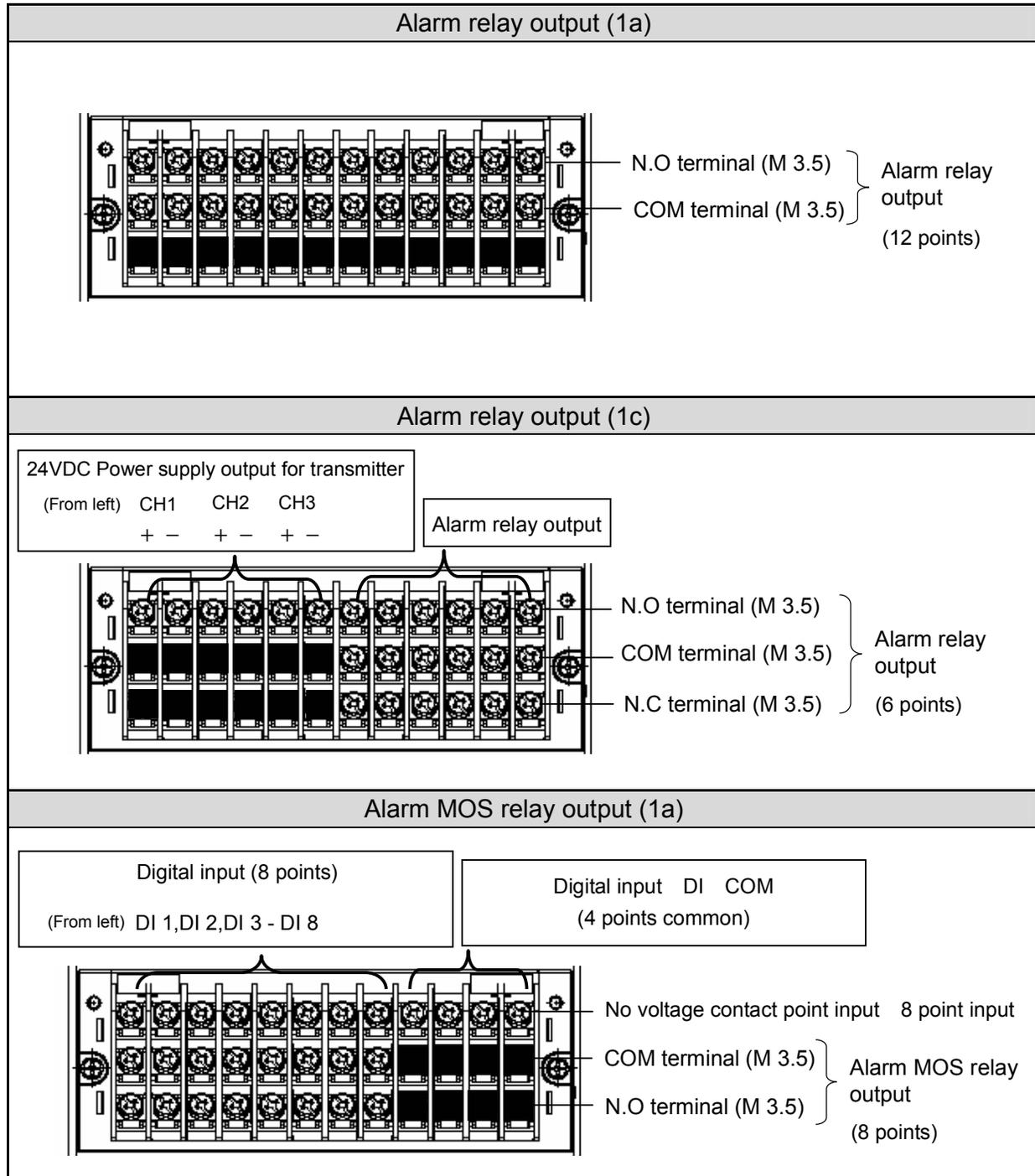
● **Resistance thermometer input** ⚠

## 5.5 Connection of alarm output terminal (Option)

Following connections apply only to RD9900 series graphic recorder with alarm output (option).

### 1) Alarm output terminal

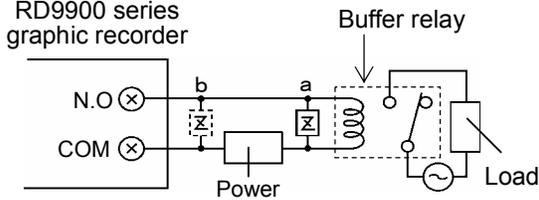
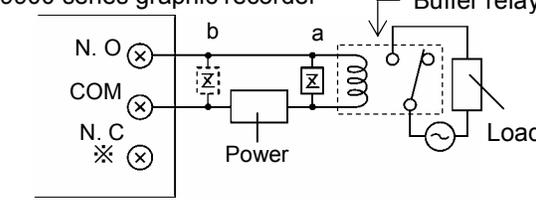
Terminal configuration varies depending on the output specifications.



## 2) Connection

In order to prevent an electric shock, turn off the power supply and buffer relay power supply before doing the connections.

- ① Connect to load via buffer relay.
- ② Connect to alarm output terminal using crimp style terminal with insulated sleeve.

Example of MOS relay and mechanical relay 'a' contact output	Example of mechanical relay 'c' contact output
 <p>RD9900 series graphic recorder</p> <p>Buffer relay</p> <p>N.O. (x)</p> <p>COM (x)</p> <p>Power</p> <p>Load</p> <p>⊗ : Contact point protective element (It is recommended to mount this element on the a side)</p>	 <p>RD9900 series graphic recorder</p> <p>Buffer relay</p> <p>N. O. (x)</p> <p>COM (x)</p> <p>N. C. (x)</p> <p>Power</p> <p>Load</p> <p>⊗ : Contact protective element (It is recommended to mount this element on the a side)</p> <p>⊗ N.C terminal as against N.O terminal is released at the time of alarm activation.</p>

### Warning

- 
**mark on alarm output part**  
 Connect a load which does not exceed the specified contact capacity, to the alarm output terminal. A buffer relay power supply is applied to the alarm output terminal after connecting. Hence do not touch this terminal one may get a shock. Be sure to mount the terminal cover after connections.

### Caution

- 
**Take safety measures**  
 Output malfunction may occur in this instrument due to erroneous operation/failure, abnormal input etc. Take safety measures against this as per the requirement, before using.

## 3) Precautions for connection

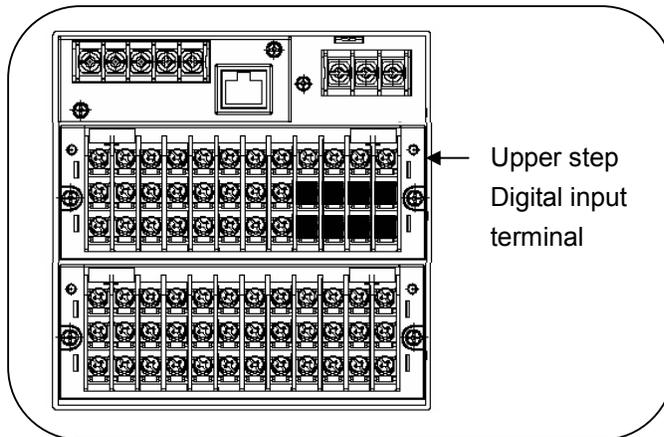
Following are the precautions to be taken during connection.

Item	Contents												
Contact capacity of MOS relay output specifications	<ul style="list-style-type: none"> <li>●Maximum voltage...240V (AC,DC)</li> <li>●Maximum current...50mA (AC,DC) * Irrespective of load types</li> </ul>												
Contact capacity of mechanical relay output specifications (a contact, c contact common)	<table border="1" data-bbox="592 1234 1372 1369"> <thead> <tr> <th>Power supply</th> <th>Resistance load</th> <th>Induction load</th> </tr> </thead> <tbody> <tr> <td>100 V AC</td> <td>0.5 A</td> <td>0.2 A</td> </tr> <tr> <td>240 V AC</td> <td>0.2 A</td> <td>0.1 A</td> </tr> <tr> <td>30 V DC</td> <td>0.3 A</td> <td>0.1 A</td> </tr> </tbody> </table>	Power supply	Resistance load	Induction load	100 V AC	0.5 A	0.2 A	240 V AC	0.2 A	0.1 A	30 V DC	0.3 A	0.1 A
Power supply	Resistance load	Induction load											
100 V AC	0.5 A	0.2 A											
240 V AC	0.2 A	0.1 A											
30 V DC	0.3 A	0.1 A											
Mounting of contact protective element Z	<ul style="list-style-type: none"> <li>●Mount the contact protective element that conforms to buffer relay. MOS relay is broken, if a signal exceeding the contact capacity is applied even momentarily.</li> <li>●The mounting position is on coil side (diagram 'a' of clause 2 'Connection' of section 5.5) of the buffer relay that effectively lightens the load and thus prevents malfunctioning.</li> </ul>												
Selection of buffer relay	<p>(1) Coil rating ... Within the contact capacity of output terminals</p> <p>(2) Contact rating ... Two times or more than the load current</p> <p>A coil surge absorption element built-in type relay is recommended. Mount an additional buffer relay if a buffer relay satisfying the load rating is not available.</p>												
Selection of contact protective element	<p>Mount this element when buffer relay of surge absorption element built-in type is not available.</p> <p>This element is generally composed of C·R (condenser + resistor).</p> <p>Reference value of C·R            C:0.01μF (Rating around 1KV)            R:100 to 150Ω (Rating around 1W)</p>												

## 5.6 Connection of digital input and operation selection (Option)

Following connections apply only to RD9900 series graphic recorder with digital input (option).

### 1) Digital input terminal



#### Notes Features of digital input terminal

- Voltage when the contact point is open : Approximately 5 V
- Current in case of contact point short circuit : Approximately 2 mA

### 2) Connection

In order to prevent electric shock, turn off the power supply before connection.

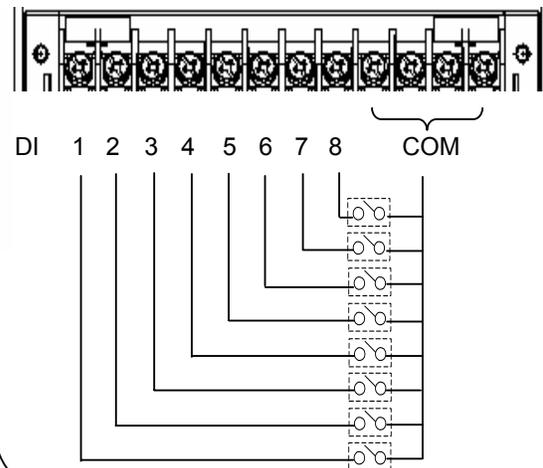
- ① Apply a no-voltage contact signal to digital input terminals.
- ② Connect to digital input terminal using crimp style terminal with insulated sleeve.

#### Warning

##### ■ No voltage contact input

For the contact to be connected to the digital input terminal, use a switch or relay driven at lower than 30 V AC or lower than 60 V DC, or use manual contact supporting very light loads.

#### ■ Connection example



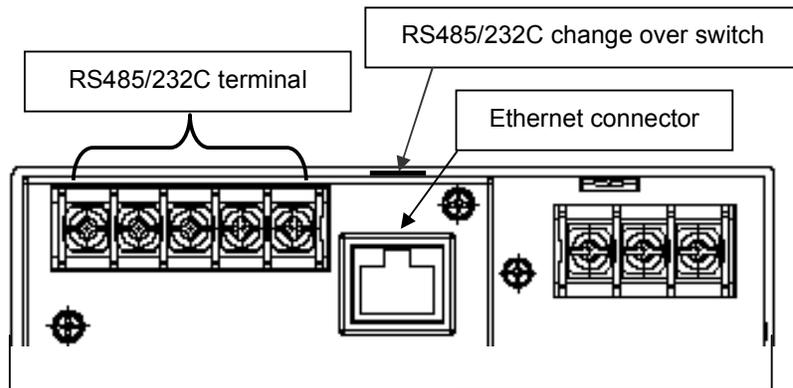
#### ■ Function of the terminal

Terminal name	Function	
DI 1	① Digital Input To be used as contact input	④ Marker Displays marker
DI 2		
DI 3	② Pulse Input To be used as pulse input	⑤ File Drive Executes recording start/stop of data file of internal memory
DI 4		
DI 5	③ Integration Reset Resets integration operation	
DI 6		
DI 7		
DI 8		

- Each function requires a short circuit of 0.1 seconds or more between COM terminal and each terminal.

## 5.7 Connection of communication I/F terminal

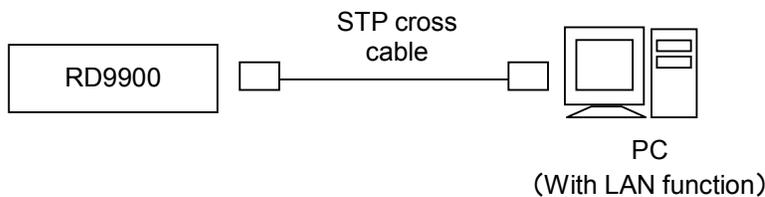
The RD9900 communicates with high order instruments via Ethernet and RS232C/RS485, and with low order instrument via RS485.



### 1) When carrying out high order communication using Ethernet

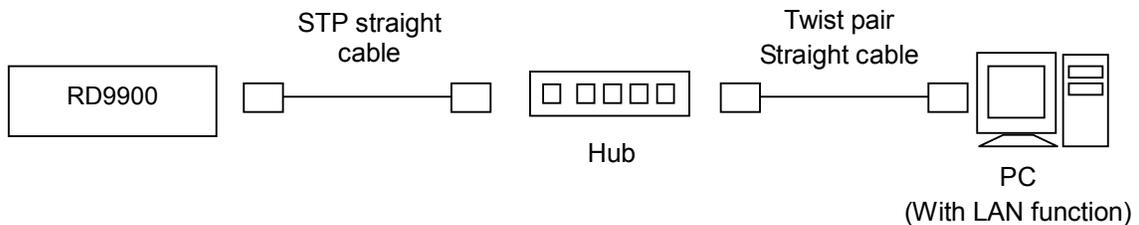
#### [In case of 1 is to 1 connection with PC]

In case of connecting PC and Ethernet IF as 1 is to 1, use cross type STP cable.

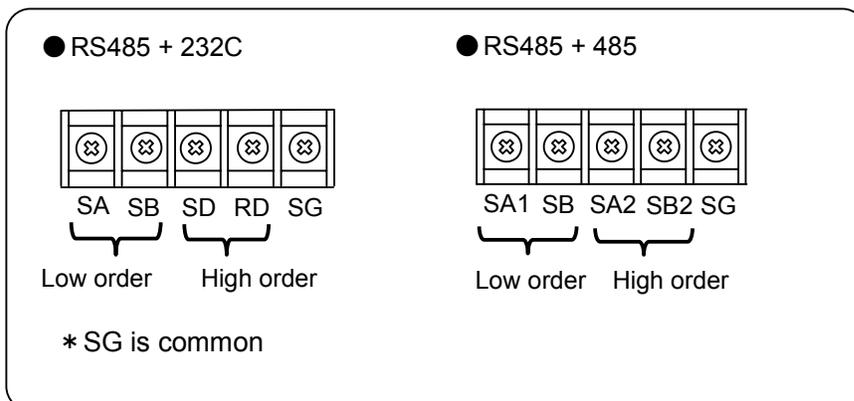


#### [In case of N is to N connection with PC]

In case of connecting to existing LAN or a number of PCs, use straight type STP between hub and Ethernet unit, using switching hub.



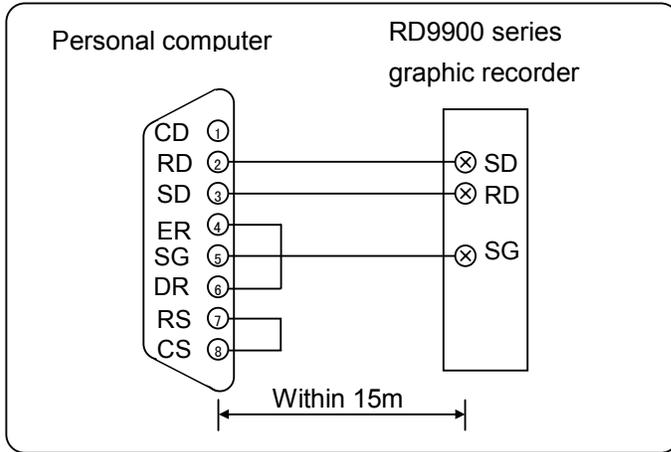
### 2) Kind of communication terminal



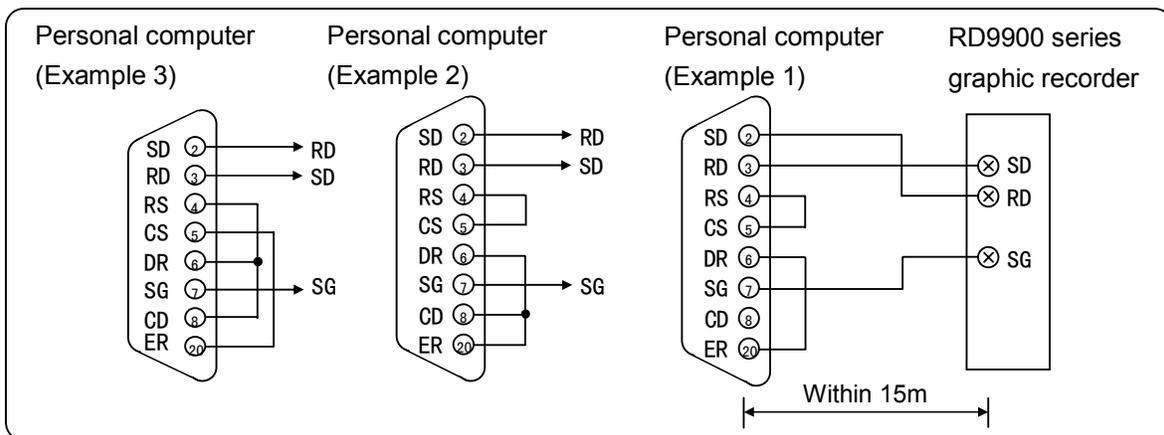
### 3) High order communication for RS232

There are only 3 communication terminals of this instrument viz. SD, RD and SG and control signal is not used. General PC uses control signal. The wiring of the control signal in the connector differs depending on how the PC uses control signal, hence read the operation manual of the PC to be used.

#### ① Example of 9 pin connector



#### ② Example of 25 pin connector



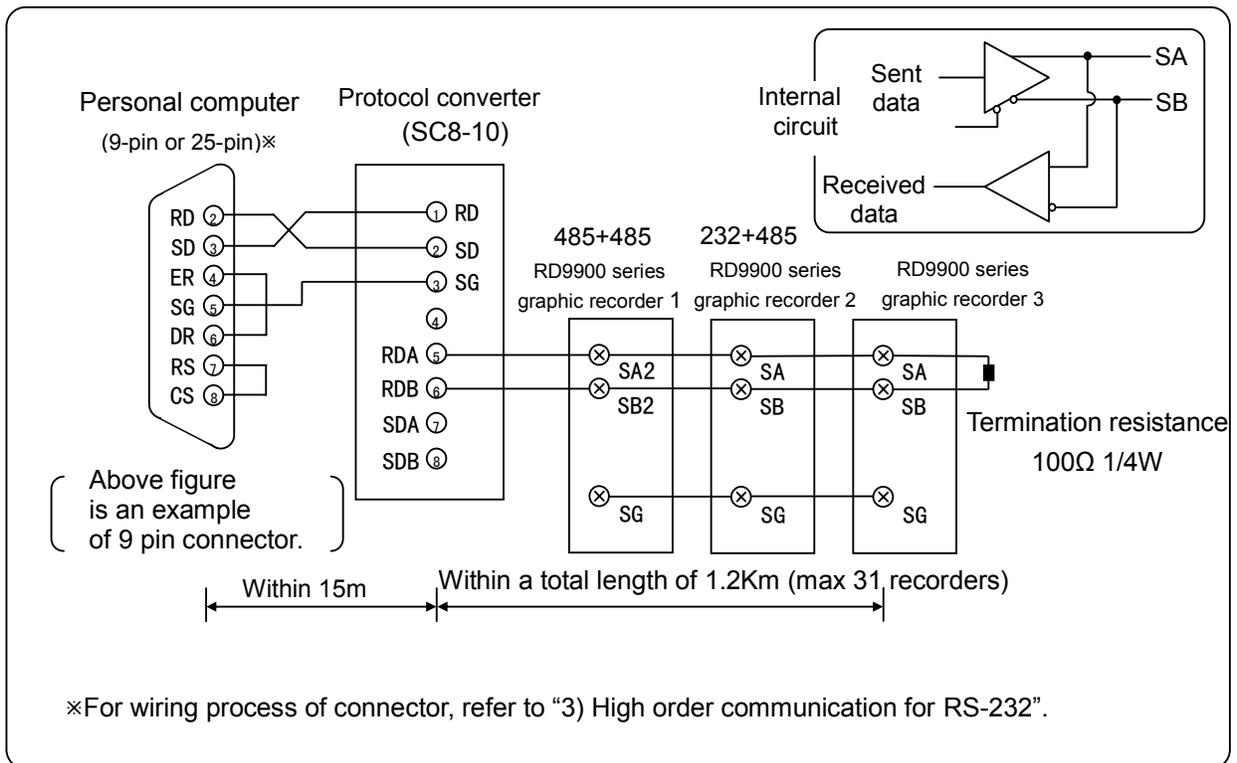
#### 4) Connection of RS232C/485

Connect to the PC using protocol converter (our model:SC8-10).There are only 3 signals viz. SD, RD and SG between protocol converter and PC and control signal is not used. Wiring process of connector similar to “(3) High order communication for RS-232” on the previous page, is necessary.

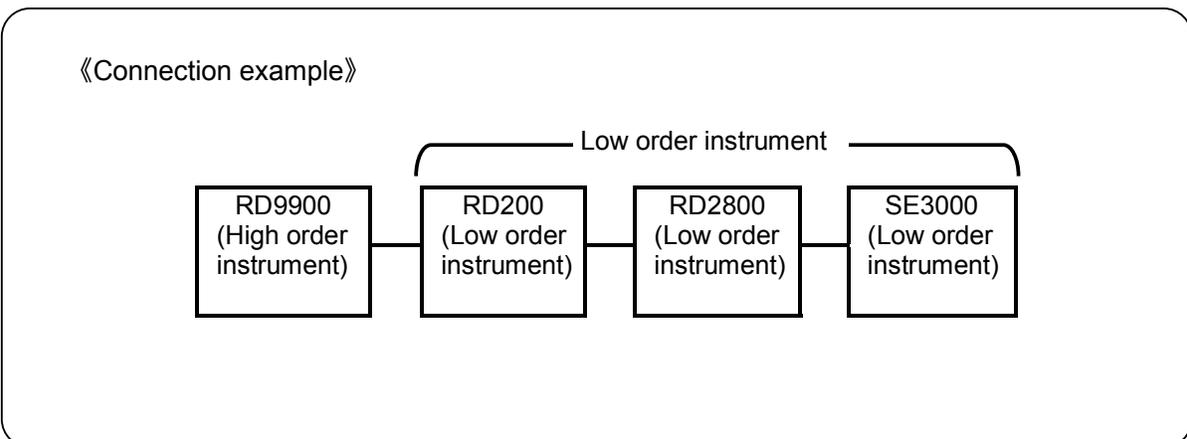
#### Notes Installing termination resistance

To ensure the transmission of communication data of RS232C or RS485, termination resistance is installed in both the terminals of transmission route. When protocol converter (SC8-10) takes both the terminals of transmission circuit, short ④ and ⑤. By doing this termination resistance is inserted.

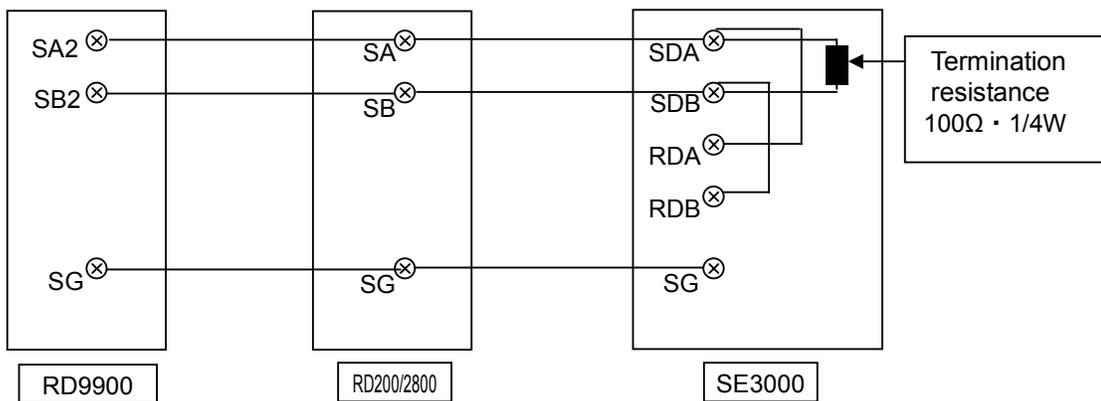
#### ① High order communication for RS485



#### ② Low order communication for RS-485



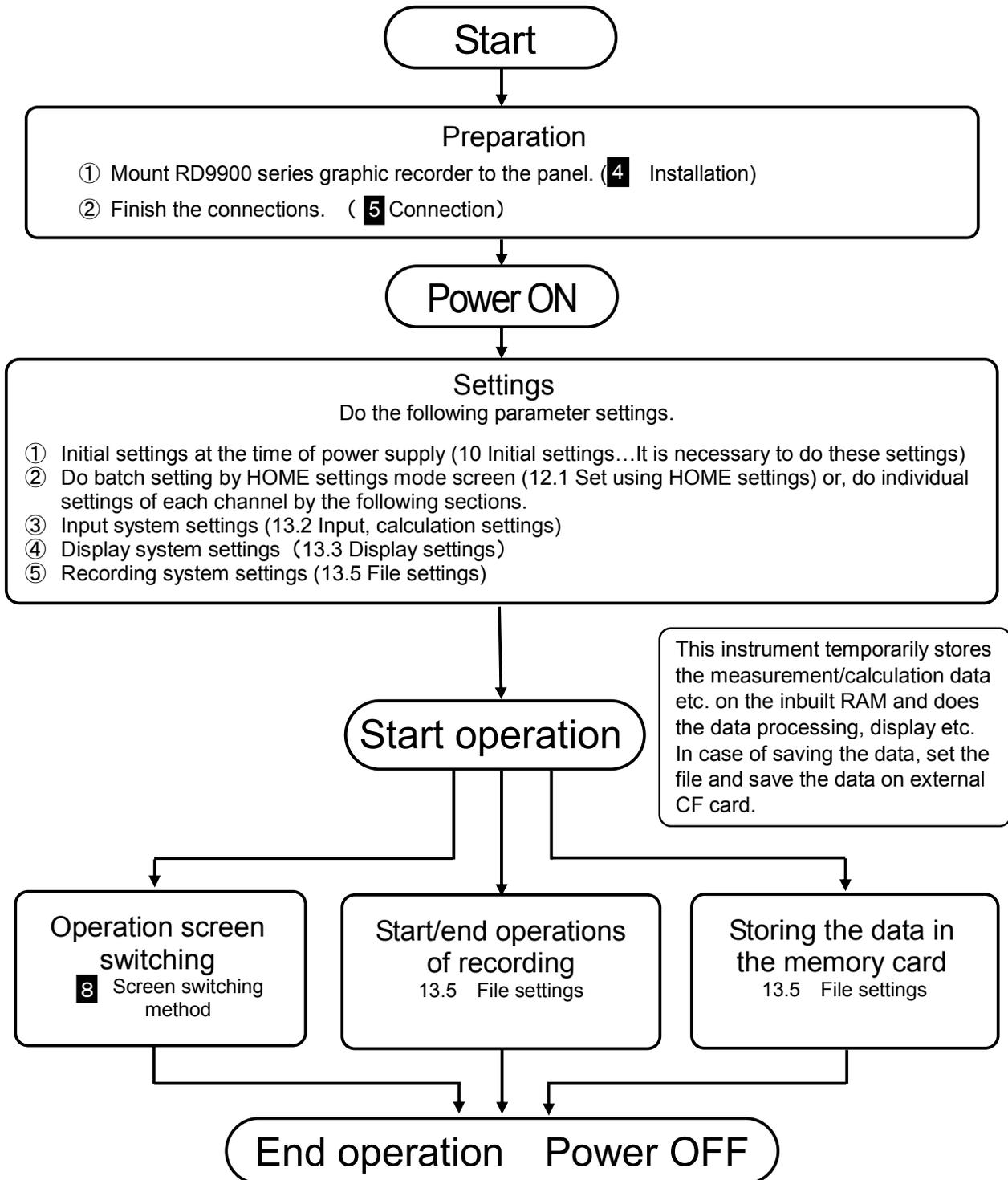
Connection example



For details of low order connection instrument, input points and connections of various instruments, refer to "Communication interface edition".

# 6 Operation (Be sure to read section 1 to ensure safety.)

Initial setting values are set in RD9900 series graphic recorder at the time of shipping them from the factory. Always do the following settings during actual operation.



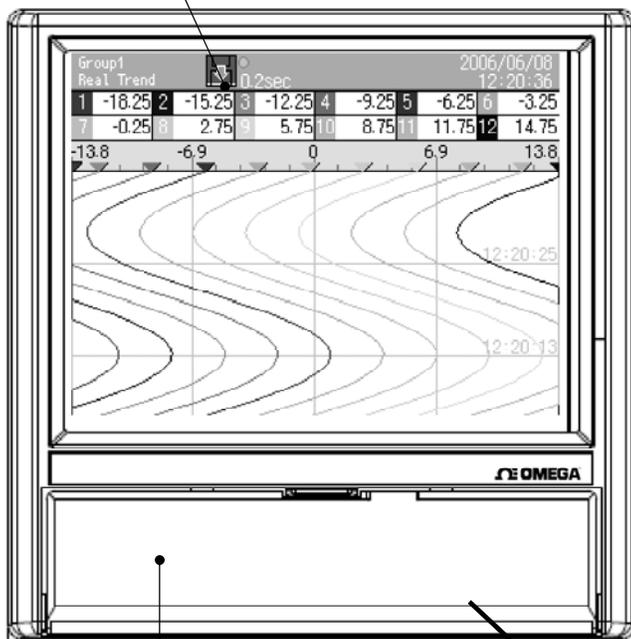
● On a part of LCD some of the images may always be lit and some may not be lit. However as a characteristic of LCD there is an uneven brightness and it is not a malfunction.

# 7 Name of component part

## 7.1 Name of the front panel and its major functions

Display

5.6 inch TFT color LCD  
 Operation screen: Refer to 9

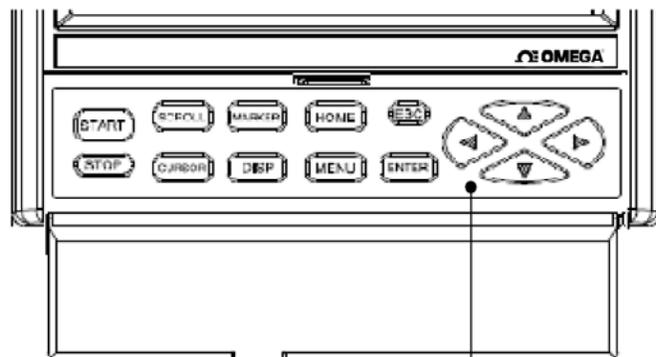


Key cover raised

Key cover

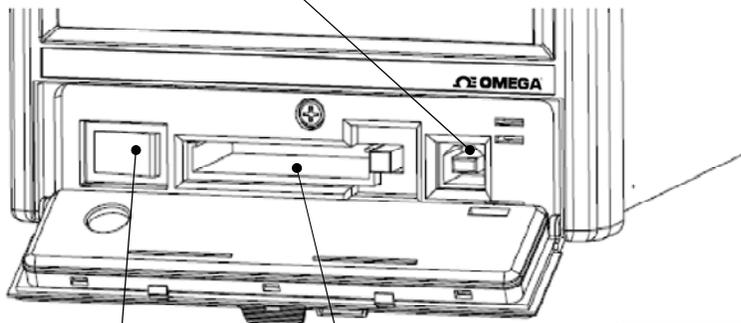
USB port

File on the CF card can be accessed by connecting to the PC.



Keyboard

Key case raised



Power switch

CF card drive

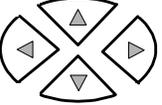
**Caution**

■ Front glass

The front of display part is made by glass. To avoid injuries due to broken glass, do not blow the glass hard.

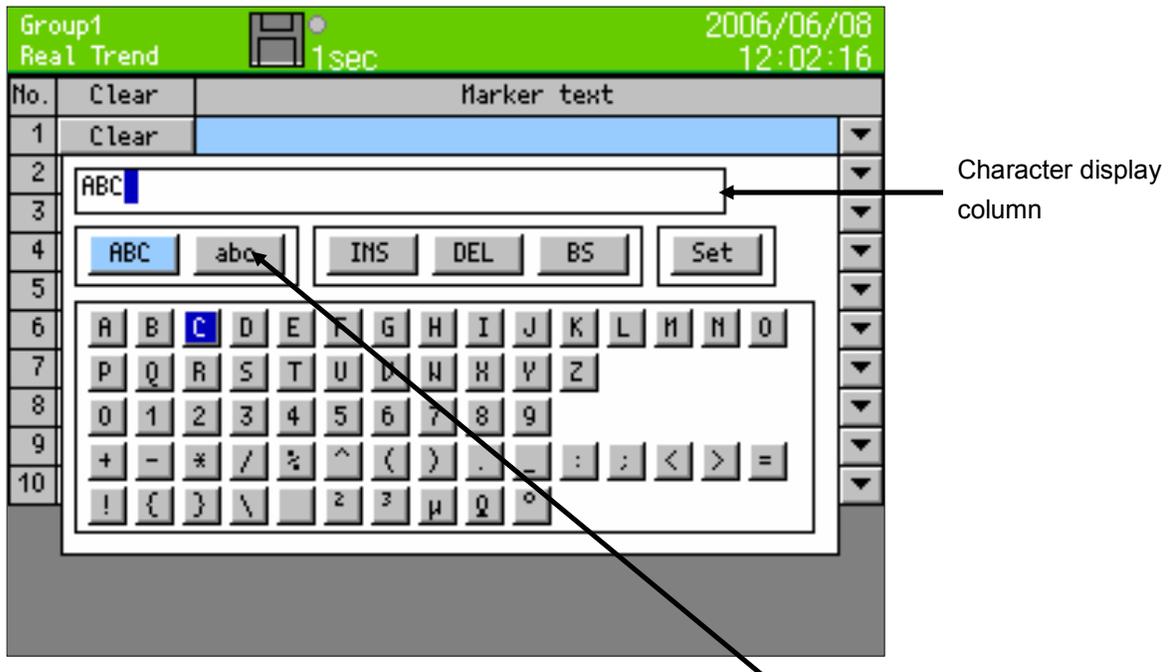
## 7.2 Name of the key and its functions

Functions and methods of using the key differs depending on operation screen and setting screen.

Key	Key of each screen and their major functions and methods of using	
	Operation screen	Setting screen
	Recording starts	Not used
	Recording stops	Not used
	Used for switching of scroll mode and for moving to historical trend	Not used
	Used for switching the cursor mode in historical trend	Not used
	Performs marker writing to trend	Not used
	Displays DISP menu	Snapshot is taken by pressing for a long time
	Displays HOME setting screen	Exits HOME screen
	Displays MENU setting screen	Returns to the previous screen
	Used for canceling the menu or for returning to the previous screen	Clicked for returning from setting screen to operation screen and for returning to the previous screen.
	Decides the menu item and also displays the ENTER menu	Used for opening the menu that is selected by the cursor and for deciding the numeric value or character selected by the cursor. Used for returning from setting screen to operation screen and for storing parameters.
 Direction key	Selects menu item and also changes the display group and channel	Used for moving the cursor to the left, right, up and down

### 7.3 Method of inputting the characters

Used for inputting/setting the password, setting marker text string, setting tag name etc.



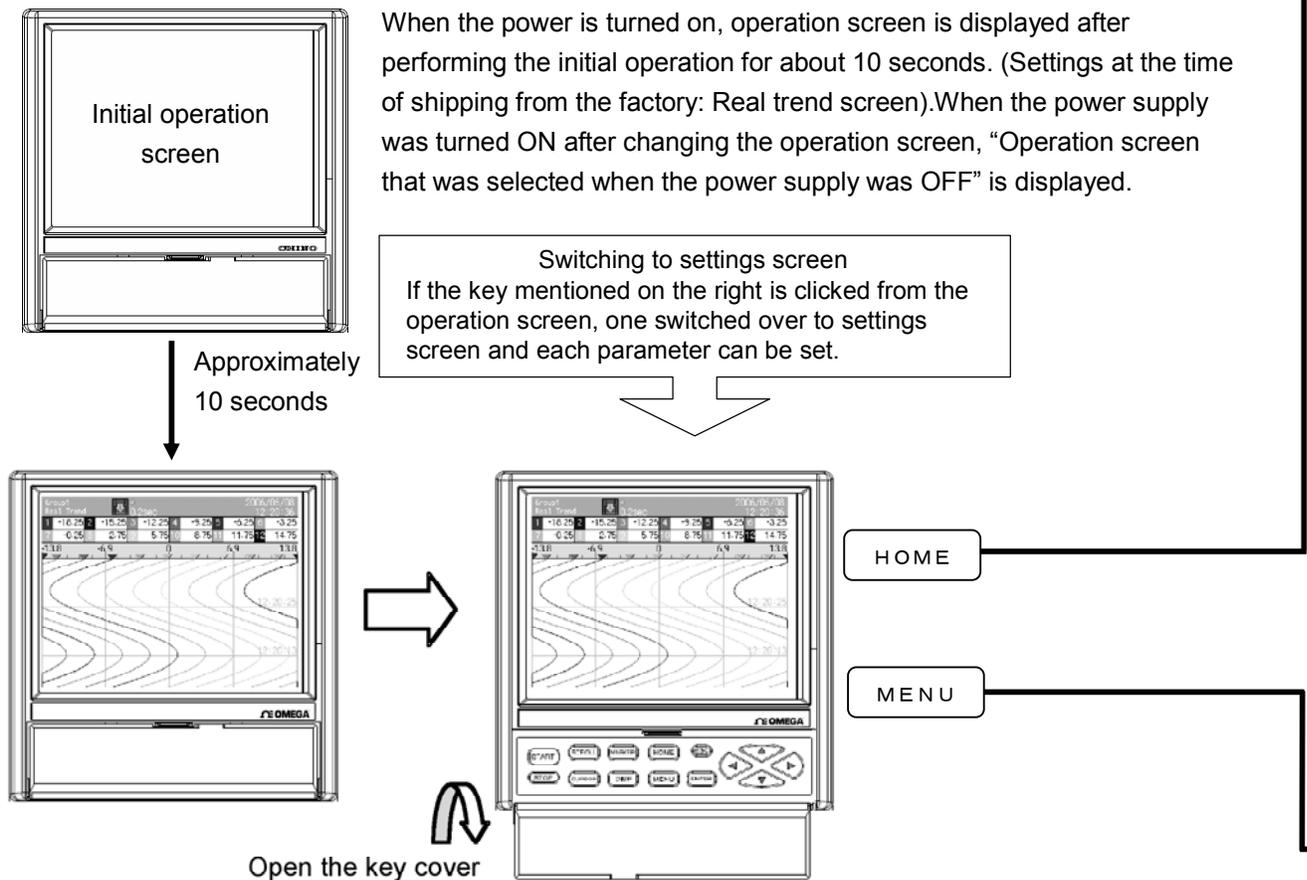
By taking the focus (blue) to upper case English characters, lower case English characters and Kana, the input character list underneath, changes.

When character input screen is displayed, if down key of the direction key is clicked, after taking the focus (blue) to upper case English characters and kana etc. the focus moves to the below column. When the focus (blue) moves to the below column, move the focus using the arrow key up to the character to be entered and the click the ENTER key. Selected character is displayed in the character display column.

- ABC** Upper case alphabets, symbols and numbers can be entered.
- abc** Lower case alphabets, symbols and numbers can be entered.
- INS** Insert/overwrite is selected.  
(Insert/overwrite toggles at the time of selecting.)
- DEL** Characters selected in the character input column are deleted.
- BS** The character that is one position before the selected character, in the character input column, is deleted.
- Set** Entered character is decided. Similar is the case when ENTER key is clicked after moving the focus to character input column.

MEMO

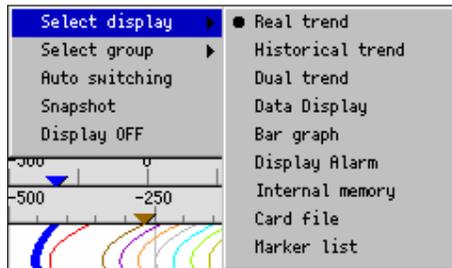
## 8 Screen switching method



### Method of switching of operation screen

Switching of operation screen is done by selecting the DISP menu. Switch over to the desired screen by doing the following operations.

- ① DISP menu is displayed by clicking the DISP key.



- ② Select the menu by using the direction key and on clicking the ENTER key, selected screen is displayed.

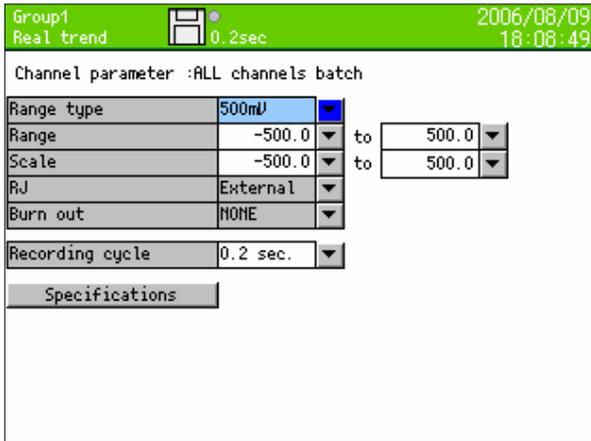
- Display selection: Display type (Real time trend, data value display etc.) of the screen can be changed.
- Group selection: Group to be displayed can be changed.

※ If "auto switching" is selected (status is checked) display group is automatically switched at a fixed interval.



### <HOME settings>

Used in order to facilitate identical settings of all channels. Only some items can be set. Items being recorded cannot be used.



### <MENU settings>

Used for normal settings. All the items can be set. Even while recording, all the settings can be seen however there are items for which partial setting cannot be done. Items that cannot be set are displayed in gray.



# 9 Name and functions of operation screen

## 9.1 Common operations of operation screen

(Method of using each key)

START

Start the recording. Record in the internal memory the data of the group for which recording conditions are formed. Group for which recording conditions are not formed is in waiting status, and recording starts at the time of forming. If recording conditions are not formed, the status is waiting status.  
Storing into CF card is automatically done during save interval and at the time of file completion.

STOP

Stop the recording. Change the recording status of all the groups to stop status. File that is being recorded is completed and stored into CF card.

DISP

Display DISP menu.

Menu item	Operation contents
Display selection	Changes the kind of operation screen.
Select group	Changes the display group
Auto switching	Automatic switching of group and channels to ON/OFF. When the checkbox is checked the status is ON. Invalid when auto switching time is set as 0.
Snapshot	Saves the hardcopy of the screen to CF card (SNAPSHOT folder).
Display OFF	Turns OFF the LCD display. It is redisplayed if some other key is clicked.

HOME

MENU

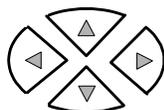
Each setting screen is displayed.(Refer to chapter 7.2)

ENTER

Displays ENTER menu. Contents of menu differ depending on the screens.

ESC

Return to the previous screen. Returns only for real time trend, bar graph and numeric display.



For vertical trend,

Change the display group using the up and down keys and change the display channel using left and right keys.

For horizontal trend,

Change the display group using the left and right keys and change the display channel using up and down keys.

(Display data)

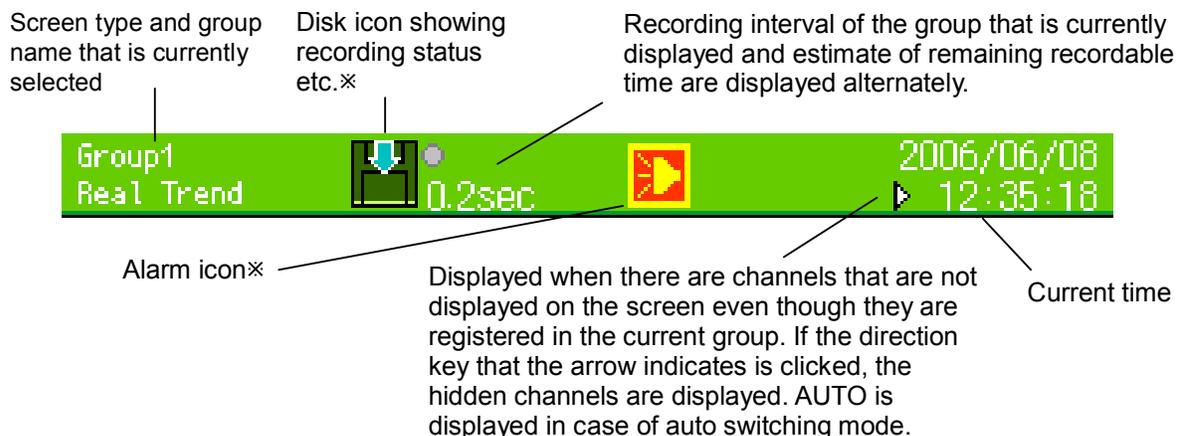
Measurement data displayed in each screen

Measurement data	Contents
(Numeric value)	Displayed based on display scale settings of each channel The upper and lower limits of display scale are displayed as decimal digits. When kind is "Exponent", it is displayed in exponential format like "1.2E+3". In this case, the significant part after the decimal can be set up to 2 digits however due to the screen only 1 digit is displayed.
BURN	Open circuit the terminal
OVER	Value exceeding the upper limit value that can be measured, is measured
UNDER	Value less than the lower limit value that can be measured, is measured
CAL ER	Calculation error
RJ ERR	Instrument is abnormal

Data display is updated every 0.1sec irrespective of the recording interval and excluding historical data display part of historical trend and dual trend. In order to slow down the updating speed, change "Date display update interval" (Refer to chapter 13.3.3)

## 9.2 Status bar

Status bar is always displayed on the top part of the screen. Displays the status etc. of the instrument. Normally the back color is green but when the schedule (refer to 13.7) is set, it becomes gray for period other than the schedule period.



### Disk icon

Back color displays recording status of the group that is currently displayed.

Back color	Status
Green	Recording. The arrow moves.
Green blinking	START key is clicked however, the recording is in wait status as the recording condition is not formed
Gray	START key is not clicked. (Stopped using the STOP key)
Yellow	Remaining capacity of the CF card is less than 10%.
Red	CF card capacity is nil.

When X is displayed on the disk mark, it indicates that CF card is not inserted.



Circular stamp on the upper right of the icon shows the access status of CF card. If CF card is removed when the color is red, one may lose the data. Remove the CF card when the circular stamp is gray.

Color	Status
Gray	Not accessing the CF card.
Yellow	Writing in the CF card within approximately 5 seconds.
Red	Accessing the CF card

### Alarm icon

Shows the activation status and confirmation status of the icon. Confirmation (ACK) of alarm is done using the ENTER menu in the operation screen.

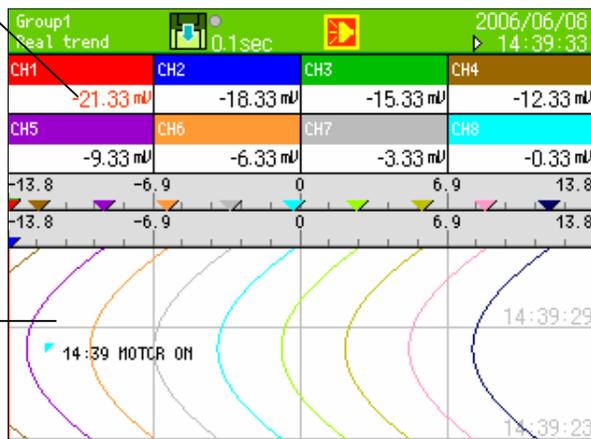
Icon status	Alarm status	Confirmation (ACK) status
Lit	ON	Completed
Icon internal blinking	ON	Incomplete
Icon blinking	OFF	Incomplete
Hide	OFF	—

### 9.3 Real time trend screen

Trend of measurement values can be seen by analog recorder sensation. Pen is displayed in the position of scale plate that corresponds to “Display position” parameter value of each channel. When multiple channels set the same “display position”, display pen, trend and scale plate in the contents of display scale of the smallest channel number in the group.

Measurement data of alarm activation channel is displayed in red

Marker display



Can be selected from data display (With/without tag), bar graph and none

ENTER menu function

Magnify/reduce	Reduce and display the trend time axis.(Same magnification-1/64)
----------------	--

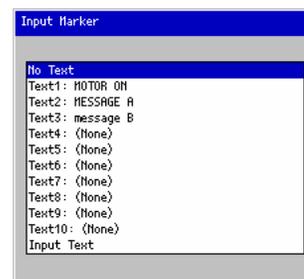
Key operations other than the common operations (9.1)

SCROLL

Displays historical trend (or dual trend) screen. Operation is the same as the operation of selecting the historical trend (or dual trend) from DISP menu. If historical trend is selected from DISP menu then historical trend is displayed after that and when dual trend is selected dual trend is displayed.

MARKER

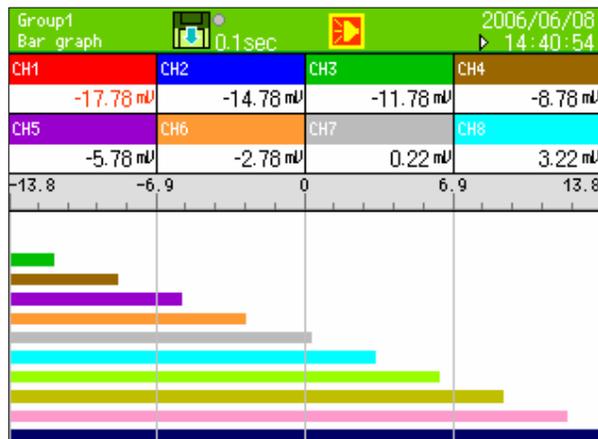
Marker write dialog box is displayed. Recording cannot be stopped. Marker text registered before hand in MENU settings is selected and marker is inserted on the trend by clicking the enter key. When “Input text” is selected, keyboard screen is displayed and arbitrary text can be inserted.



## 9.4 Bar graph screen

Measurement value is displayed in real time as bar graph and measurement value of each channel can be seen visually.

The length of the bars and scale plate is displayed in the contents of display scale with smallest channel number in the group.



Can be selected from data display (With/without tag) and none

ENTER menu function

None

Key operations other than the common operations (9.1)

None

## 9.5 Numeric display

“Measurement data of each channel” and “Alarm activation status” is displayed.

Depending on the “Data display frame count” or number of registration points of the group, data of channel 1/4/6/12/21/44 is displayed.

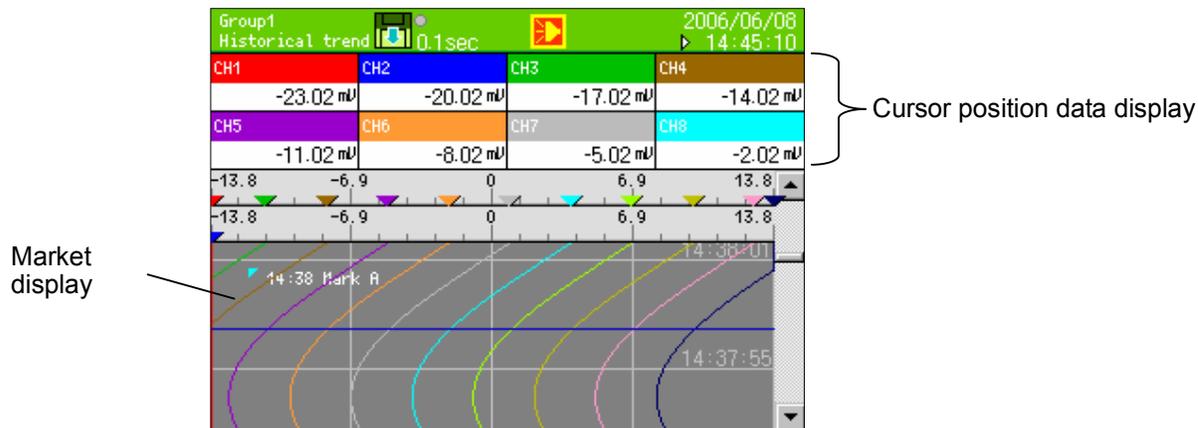
Measurement data of alarm activation channel is displayed in red



## 9.6 Historical trend screen

Replays the recorded data and displays it as trend. When “Historical trend” in DISP menu is selected (or when “SCROLL” key from real trend is clicked), data in the internal memory is displayed. When file is selected from “internal memory” screen and “card file” screen, data of the target file is displayed. Historical trend operation method for all the files is the same.

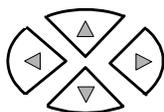
Display method of position of scale plate, trend and pen is same as real time trend.



### ENTER menu function

Magnify/reduce	Reduces and displays the trend time axis.(Same magnification-1/64)
----------------	--

### Key operations other than the common operations (9.1)



For vertical trend

Left and right key: Changing the display channel

Up and down key: Moving the cursor when cursor mode is ON and at the time of scrolling the trend

For horizontal trend

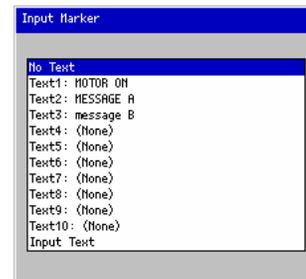
Up and down key: Changing the display channel

Left and right key: Moving the cursor when cursor mode is ON and at the time of scrolling the trend

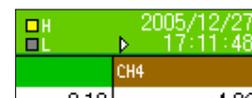
**SCROLL** Scroll mode is switched. When clicked once, scroll bar is enclosed in a yellow frame and scroll mode becomes ON. In this status if direction key is clicked, screens are scrolled one by one. When clicked again, scroll mode becomes OFF, and dots are scrolled one by one using the direction key.

**CURSOR** Cursor mode is switched. When clicked once, cursor line is displayed in yellow color and the cursor mode becomes OFF. In this status if direction key is clicked, scrolling is not done but cursor line moves. And the data where the cursor is placed is reflected in data display (or bar).

**MARKER** Marker write dialog box is displayed. Marker text registered before hand in MENU settings is selected and by clicking the enter key, marker is written in the position where the cursor is placed. When “Input text” is selected, keyboard screen is displayed and arbitrary text can be written.



**HOME** When the “data format” of the file to be displayed is “Maximum/Minimum”, the value to be displayed in data display (or bar) switches between Maximum/minimum. Other operations are same as that of HOME key. Either of the current display is shown in H, L display in the status bar.

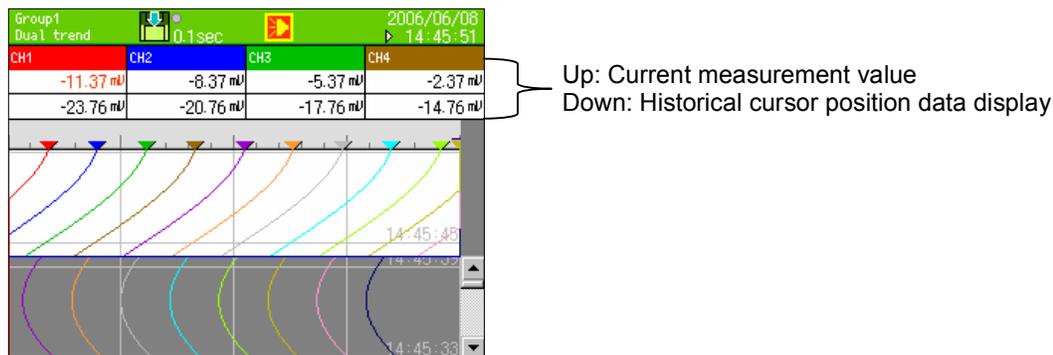


## 9.7 Dual trend screen

“Real time trend” and “Historical trend” can be split and displayed above and below. Thus the current and the past data can be compared. Also the data display displays the current value/value of the cursor position of historical trend by splitting it into above (up) and below (down).

Method of displaying the position of trend and pen is same as that of real time trend however, in case of settings such as ‘displaying multiple scale plate’, 1 scale plate is displayed, and the numeric value on the scale plate is not displayed.

Operation method is the same as that of historical trend.



ENTER menu function

Magnify/reduce	Reduces and displays the trend time axis.(Same magnification-1/64)
----------------	--

Key operations other than the common operations (9.1)

Same as historical trend. (Refer to 9.6)

## 9.8 Alarm display screen

List of alarms that are activated is displayed. Activation date and time, cancel date and time (cancelled alarms only), channel (tag name) and kind of alarm are displayed in new order (latest on the top).

Irrespective of the groups all the alarms activated in this instrument are displayed.

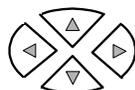
Maximum storage count is 1000.If that number is exceeded the oldest ones are deleted.

Activation time	Cancel time	CH	Type
05/30 18:58:23		CH1	AL1 D. upp
05/30 18:57:43	06/08 13:41:47	CH2	AL4 Upper
05/30 18:57:43	06/08 13:41:47	CH2	AL3 Upper
05/30 18:57:43	06/08 13:41:47	CH2	AL2 Upper
05/30 18:57:43	06/08 13:41:47	CH2	AL1 Upper
05/30 18:57:43	05/30 18:58:17	CH1	AL4 Upper
05/30 18:57:43	05/30 18:58:17	CH1	AL3 Upper
05/30 18:57:43	05/30 18:58:17	CH1	AL2 Upper
05/30 18:57:43	05/30 18:58:17	CH1	AL1 Upper
05/30 18:57:13	05/30 18:57:24	CH1	AL4 Upper
05/30 18:57:13	05/30 18:57:24	CH1	AL3 Upper
05/30 18:57:13	05/30 18:57:24	CH1	AL2 Upper
05/30 18:57:13	05/30 18:57:24	CH1	AL1 Upper
05/30 18:56:56	05/30 18:57:03	CH1	AL1 Upper
05/30 18:56:21	05/30 18:56:50	CH1	AL1 Upper
05/30 18:56:07	05/30 18:56:14	CH1	AL1 Upper

ENTER menu function

Trend display	Jumps to the trend of activated date and time of the selected row. Cannot jump when file not found or when not recorded in activation time. In this case, the file search is carried out in the order internal memory → CF card.
---------------	--

Key operations other than the common operations (9.1)



Up and down key: Moving the selected row  
Left and right key: Not used



Scroll mode is switched. When clicked once, scroll bar is enclosed in a yellow frame and scroll mode becomes ON. In this status if direction key is clicked, screens are scrolled one by one. When clicked again, scroll mode becomes OFF, and rows are scrolled one by one using the direction key.

## 9.9 Internal memory screen

Files recorded in internal memory are displayed as list. Start date and time, end date (item being recorded is the latest data time) and time and data count are displayed. Files are displayed in new order (Latest on the top). All the files only of the selected group are selected.

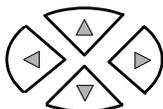
Selected row is displayed in yellow color

Start date and time	End date and time	Data count
2006/06/08 16:40:30	2006/06/08 16:49:35	5455
2006/06/08 16:31:30	2006/06/08 16:32:26	569
2006/06/08 16:24:35	2006/06/08 16:24:42	74
2006/06/08 16:19:11	2006/06/08 16:19:27	161
2006/06/08 16:15:59	2006/06/08 16:16:36	373
2006/06/08 14:44:27	2006/06/08 14:49:18	2916
2006/06/08 14:35:41	2006/06/08 14:43:13	4522
2006/06/08 13:42:17	2006/06/08 13:42:48	315
2006/06/08 13:41:49	2006/06/08 13:42:03	141
2006/06/08 13:41:24	2006/06/08 13:41:32	84
2006/06/08 13:41:15	2006/06/08 13:41:15	2
2006/06/08 13:41:13	2006/06/08 13:41:13	10
2006/06/08 13:41:11	2006/06/08 13:41:11	10
2006/06/08 13:41:09	2006/06/08 13:41:09	10
2006/06/08 13:41:07	2006/06/08 13:41:07	10
2006/06/08 13:41:05	2006/06/08 13:41:05	10
2006/06/08 13:41:02	2006/06/08 13:41:02	10

ENTER menu function

Trend display	Files of the selected row are displayed as trend.
---------------	---

Key operations other than the common operations (9.1)



Up and down key: Moving the selected row  
Left and right key: Not used

SCROLL

Scroll mode is switched. When clicked once, scroll bar is enclosed in a yellow frame and scroll mode becomes ON. In this status if direction key is clicked, screens are scrolled one by one. When clicked again, scroll mode becomes OFF, and rows are scrolled one by one using the direction key.

### Internal memory

This instrument records all the data in the internal memory as a file. This file is copied to the CF card at the time of file completion and at every 'save interval' that is set.

<Limitations of internal memory>

(File capacity)

Approximately 256KB (Excluding header and marker) is taken as one file. File size can be calculated as follows.

Data volume x Number of channels x recording count

(Usually data volume is 4 bytes, when data format is "Maximum/minimum" it is 6 bytes)

Before reaching 256KB if recording is stopped due to non formation of recording condition, due to STOP key or due to power off etc, the file is completed at that point of time.

(Number of files)

Maximum number of files that can be saved in internal memory are 250 (In group unit, "250 ÷ Number of groups used" [Fraction is rounded down]).

(Volume of all files)

Total volume of files that can be saved in internal memory is 64KB X (63÷(Number of groups used) - 2). If it is exceeded files starting from the oldest file are deleted.

## 9.10 Card file screen

Files recorded in CF card are displayed as list. Start date and time, end date (item being recorded is the latest data time) and time and data count are displayed. Files are displayed in new order (Latest on the top). All the files only of the selected group are selected.

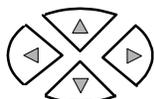
Start date and time	End date and time	Data count
2006/06/08 16:49:36	2006/06/08 16:50:30	542
2006/06/08 16:40:30	2006/06/08 16:49:35	5460
2006/06/08 16:31:30	2006/06/08 16:32:26	569
2006/06/08 16:24:35	2006/06/08 16:24:42	74
2006/06/08 16:19:11	2006/06/08 16:19:27	161
2006/06/08 16:15:59	2006/06/08 16:16:36	373
2006/06/08 15:59:10	2006/06/08 16:00:10	601
2006/06/08 15:58:25	2006/06/08 15:58:25	1
2006/06/08 15:55:26	2006/06/08 15:55:26	1
2006/06/08 15:53:51	2006/06/08 15:54:51	601
2006/06/08 15:53:07	2006/06/08 15:53:07	1
2006/06/08 15:49:22	2006/06/08 15:49:22	1
2006/06/08 15:43:38	2006/06/08 15:43:38	1
2006/06/08 15:42:05	2006/06/08 15:42:05	1
2006/06/08 15:41:28	2006/06/08 15:41:28	1
2006/06/08 15:40:01	2006/06/08 15:40:01	1
2006/06/08 15:39:24	2006/06/08 15:39:24	1

Selected row is displayed in yellow

ENTER menu function

Trend display	Files of the selected row are displayed as trend.
---------------	---

Key operations other than the common operations (9.1)



Up and down key: Moving the selected row  
Left and right key: Not used



Scroll mode is switched. When clicked once, scroll bar is enclosed in a yellow frame and scroll mode becomes ON. In this status if direction key is clicked, screens are scrolled one by one. When clicked again, scroll mode becomes OFF, and rows are scrolled one by one using the direction key.

## 9.11 Marker list screen

Marker recorded on the trend is displayed as list. Recording date and time and text is displayed in new order (Latest on the top). Marker, recorded in the group that is selected, is displayed. Maximum storage count is 200. If that number is exceeded the oldest ones are deleted.

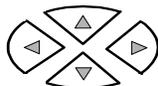
Date and time	Marker text
06/08 14:39:28	MOTOR ON
06/08 14:38:00	Mark A
06/02 11:31:03	
06/02 11:19:32	BBBB
06/02 11:19:28	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
05/19 14:23:09	BBBB
05/19 14:22:56	AAAA
05/19 14:22:32	AAAA
05/19 14:22:15	BBBB
05/19 14:22:11	AAAA
05/18 17:14:43	

Selected row is displayed in yellow color

ENTER menu function

Trend display	Jumps to the trend position of marker of the selected row. Cannot jump when file is not found.
---------------	---

Key operations other than the common operations (9.1)



Up and down key: Moving the selected row  
Left and right key: Not used



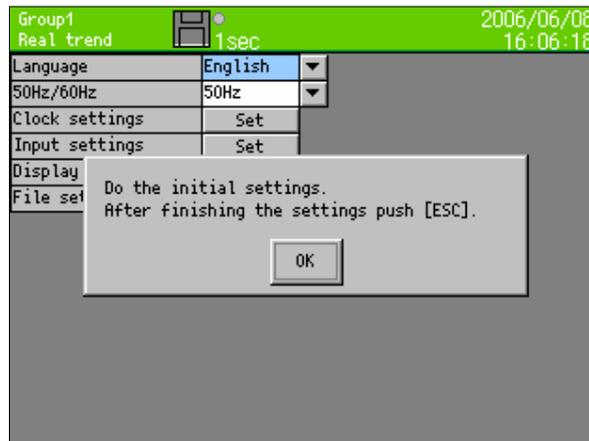
Scroll mode is switched. When clicked once, scroll bar is enclosed in a yellow frame and scroll mode becomes ON. In this status if direction key is clicked, screens are scrolled one by one. When clicked again, scroll mode becomes OFF, and rows are scrolled one by one using the direction key.

## 10 Initial settings

When power supply is switched ON at the time of receipt or when settings are initialized, initial settings screen is displayed. Please set the minimum required parameters from below.

One can exit without setting other items except power supply frequency. At that time operation is done with the settings at the time of shipping.

- Power supply frequency 50Hz/60Hz
- Clock settings
- Input settings
- Display settings
- File settings

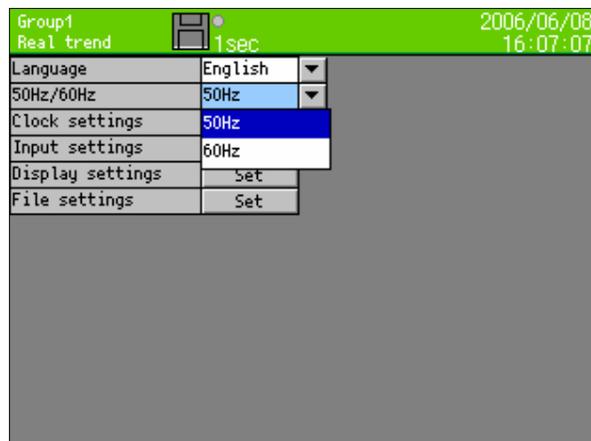


When ENTER key is clicked message is erased and the settings can be done.

### ① Setting power frequency

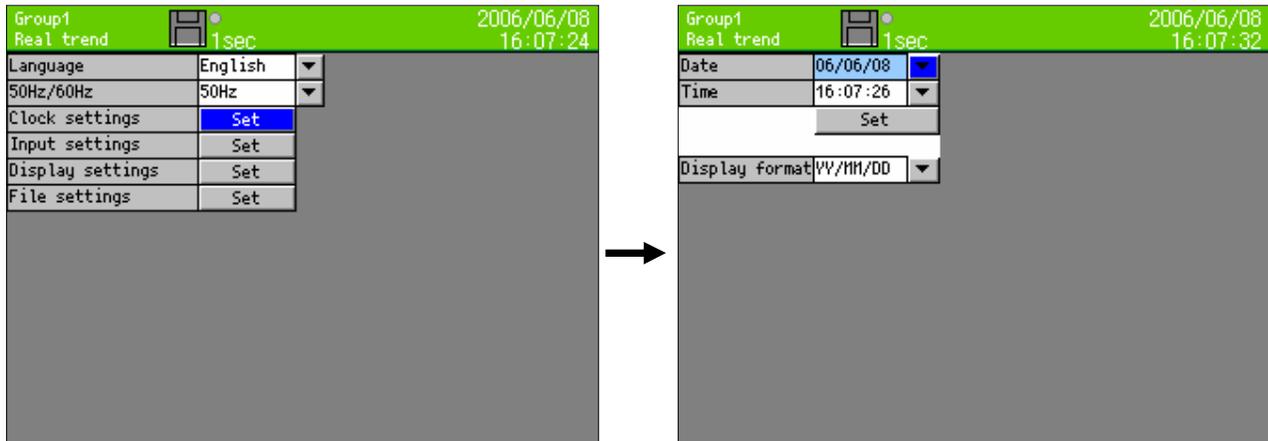
When cursor is brought to the item of 50Hz/60Hz using arrow key and ENTER key is clicked, pulldown menu is displayed.

Move the cursor to the selected frequency using the direction key and then clicking ENTER button. Confirm the power frequency to be used and set it.



## ② Setting the clock

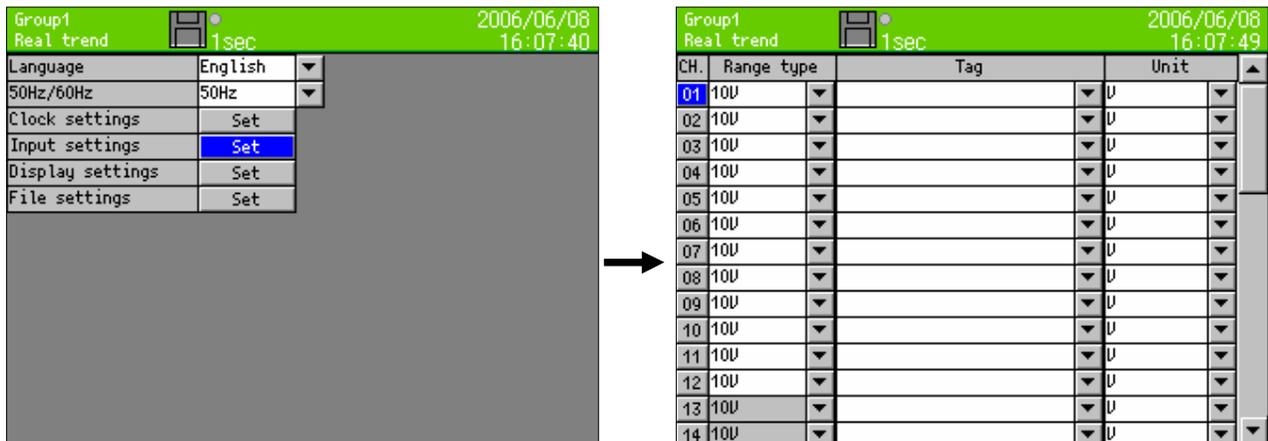
Move the cursor to the clock setting item using the direction key and click the ENTER key, the following clock settings screen is displayed.



※For detailed settings refer to “13.11.1 Clock settings”

## ③ Input settings

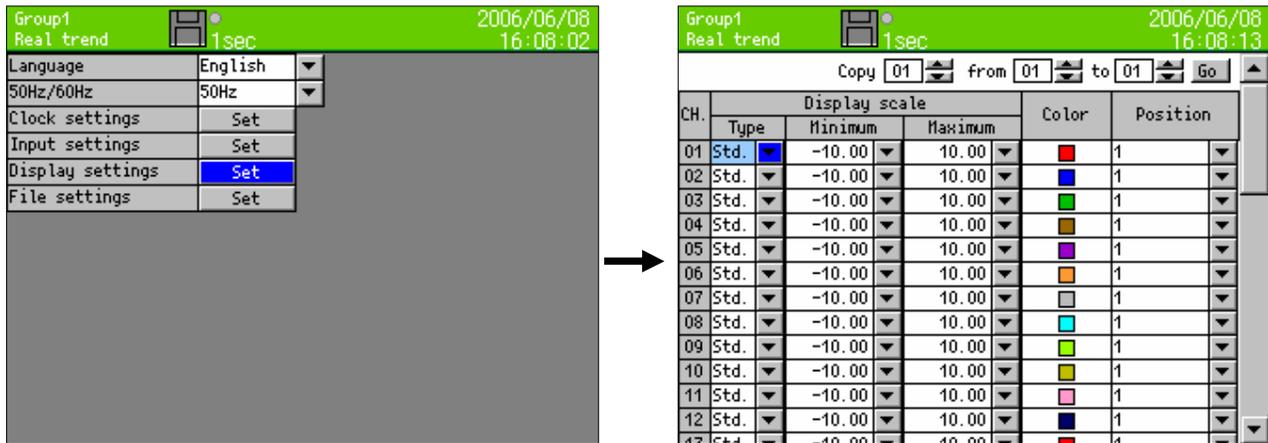
Move the cursor to the input setting item using the direction key and click the ENTER key, the following input settings screen is displayed.



※For detailed settings refer to “13.2 Input operation settings”

#### ④ Display settings

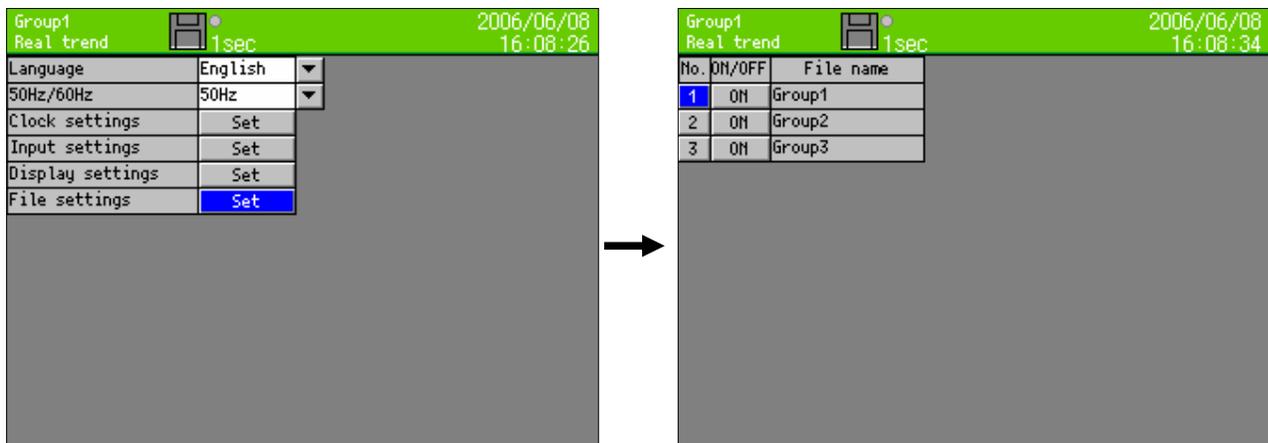
Move the cursor to the display setting item using the direction key and click the ENTER key, the following display settings screen is displayed.



※For detailed settings refer to “13.3.1 Channel parameters”.

#### ⑤ File settings

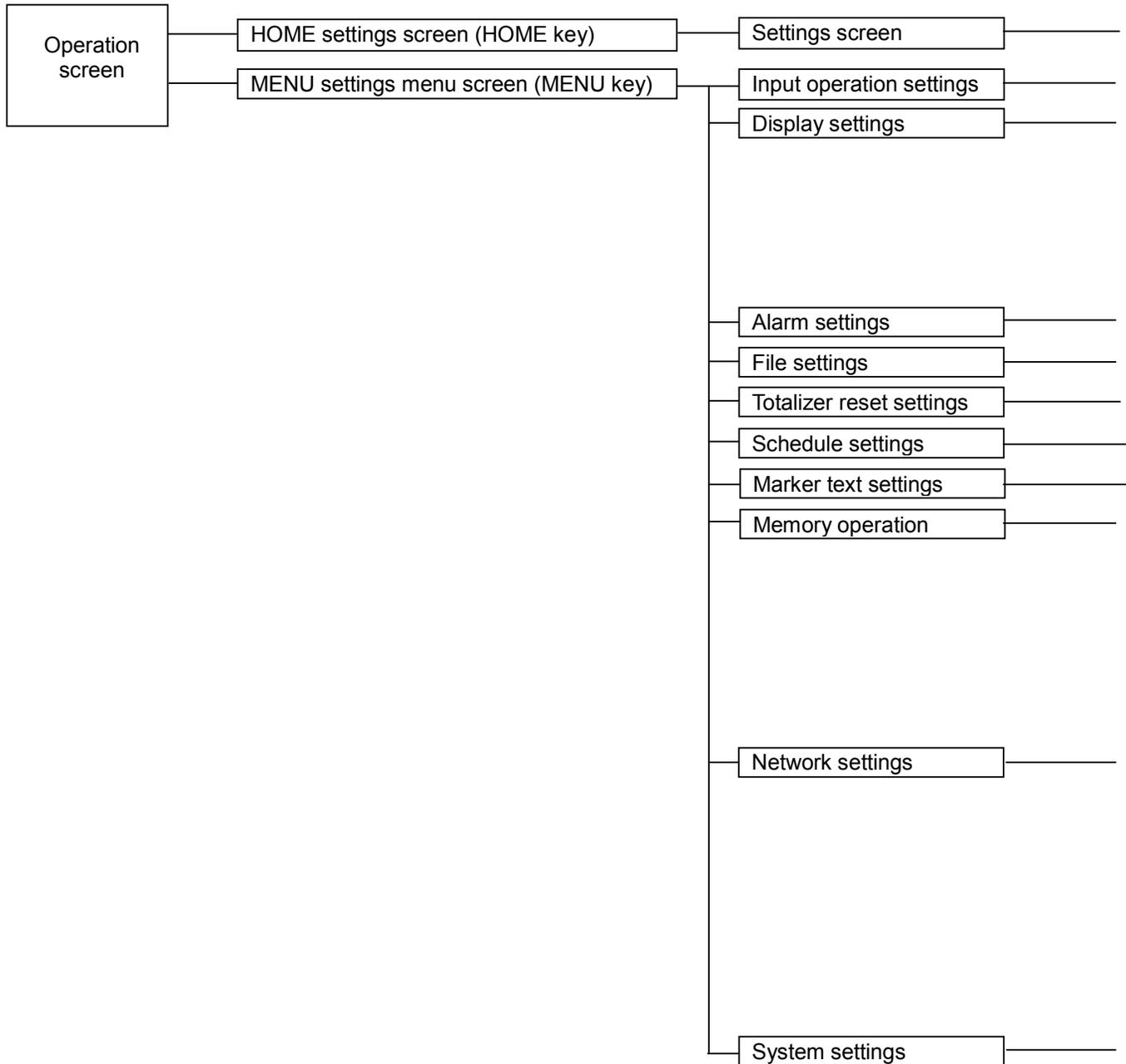
Move the cursor to the file setting item using the direction key and click the ENTER key, the following file settings screen is displayed.

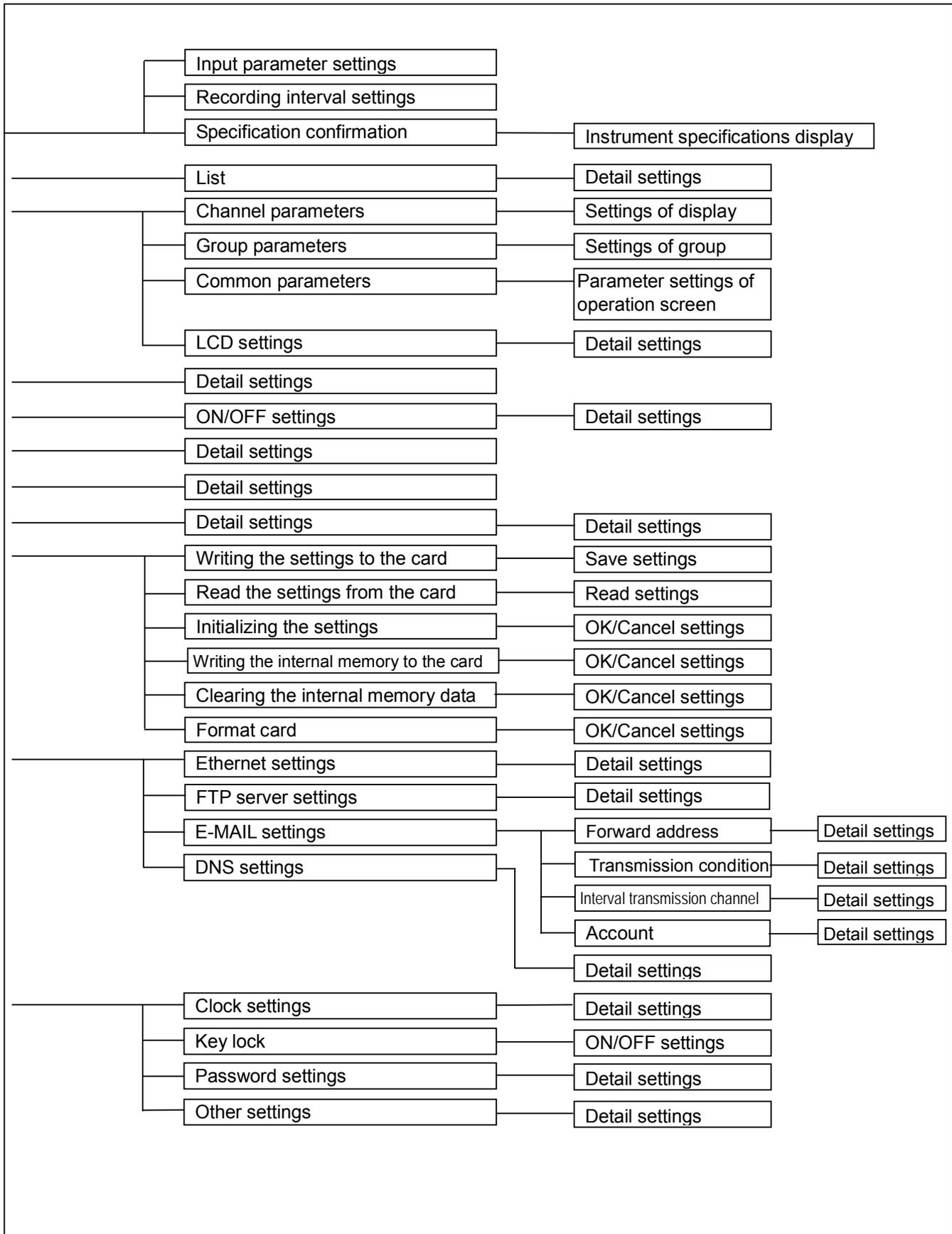


※For detailed settings refer to “13.5 File settings”.

MEMO

# 11 Flow chart of HOME settings & MENU settings



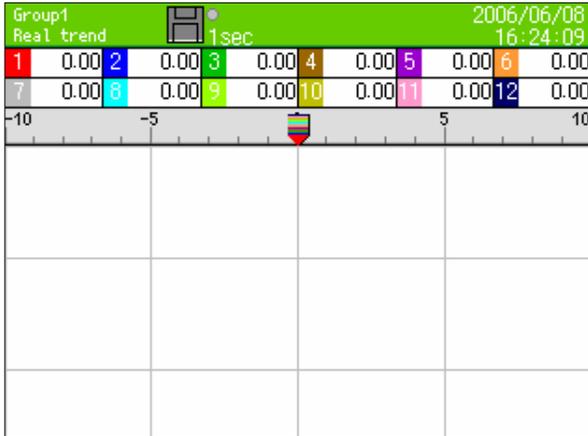


# 12 HOME settings

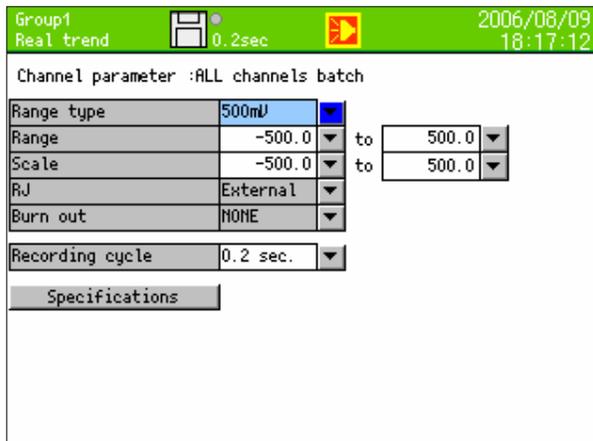
## 12.1 Set using HOME settings

When “HOME settings” is used, input setting of all channel batch and setting of recording interval can be done. This facilitates the input/recording confirmation.

### □ Operation screen



### □ Home settings screen



In case of settings for HOME settings, if HOME key in the operation screen is clicked, one moves to the screen for doing the settings. Each of the settings to be done by the direction key can be done by moving the cursor (blue) to the desired item and clicking the ENTER key due to which the selected screen gets displayed.

- Move the focus (blue) to the setting item using direction key.
- It is decided by clicking the “Enter” key for the item to be set.

### ■ Setting range type

DC voltage	13.8mV, 27.6mV, 69mV, 200mV, 500mV, 2V, 5V, 10V, 20V, 50V
Thermocouple	K, E, J, T, R, S, B, N, W-Wre26, PR40-20, NiM0-Ni, CR-AuFe,PlatineI2, U, L
Resistance thermometer	Pt100, JPt100, Pt50, Pt-Co

### ■ Setting the range

- Set the scope of range.(It is decided by range type.)

■ Setting the scale

- Set the scope of range. (It is decided by range type.)

Number	Point
10.00	2

↑

This numeric value decides the position of the decimal point.

■ RJ (Reference junction compensation) is set

- Whether RJ is internal or external, is set.

■ Setting burnout

None	Burnout function is not used.
UP	Set as upper limit burnout.
DOWN	Set as lower limit burnout.

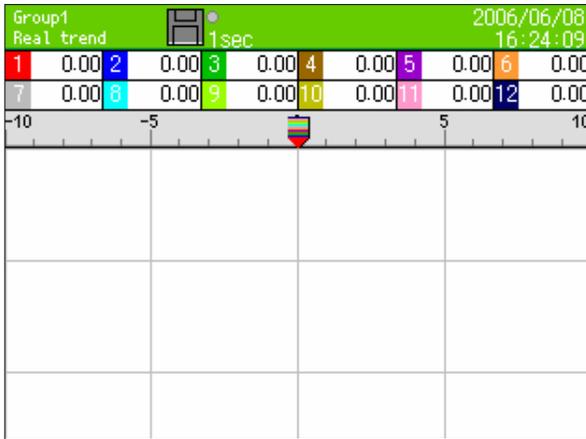
■ Set the recording interval

Seconds	0.1 second, 0.2 seconds, 0.5 seconds, 1 second, 2 seconds, 3 seconds, 5 seconds, 10 seconds, 15 seconds, 20 seconds, 30 seconds
Minutes	1 minute, 2 minutes, 3 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 60 minutes

## 12.2 Confirming the specifications using HOME settings screen

- Specification information of the instrument can be confirmed.
- For queries please contact after confirming this screen.

### □ Operation screen



↓  
HOME Click

### □ Home settings screen

↓  
Specification  
ENTER Click

Select: Move the focus to "Specifications confirmation using "↓".

### □ Specifications confirmation screen

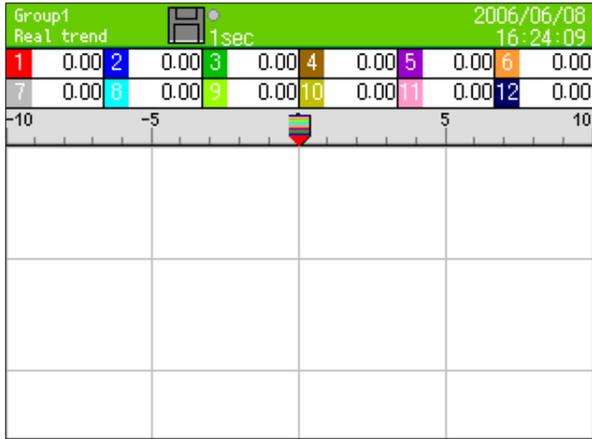
In specifications confirmation screen following can be confirmed,

- Model
- Serial number
- Software version
- MAC address.

# 13 MENU settings

## 13.1 Setting MENU screen

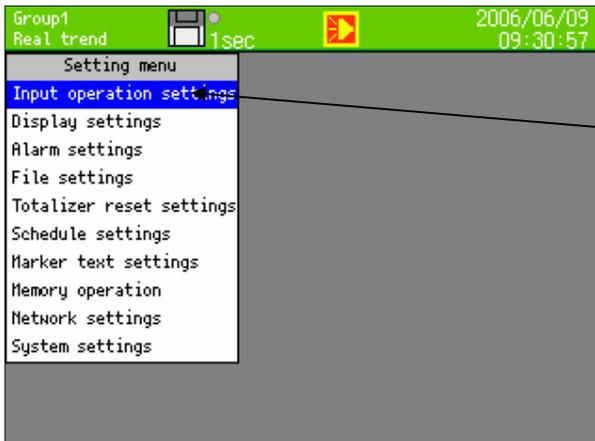
□ Operation screen



For setting parameter, if MENU key in the operation screen is clicked, parameter items that can be set are displayed. Items to be set are selected by the direction key and on clicking the ENTER key, one moves to the screen in which each parameter is set.



□ Settings menu screen



As list box of the parameters is displayed, select the parameter by moving the cursor to the parameter to be set using the up and down keys. The selected items are as shown on the left. (Example, at the time of selection of input operation settings)

□ "Input operation settings" screen

Select "Input operation settings"



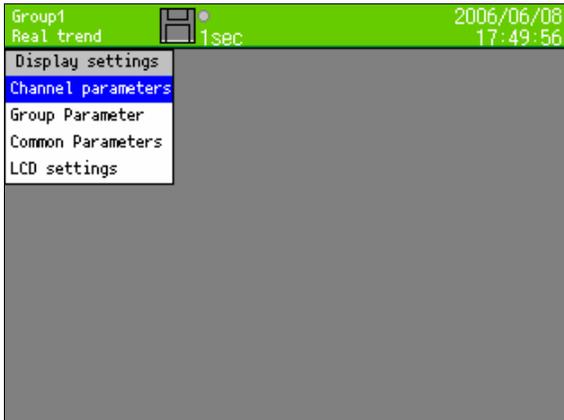
CH.	Range type	Tag	Unit
01	10V		V
02	10V		V
03	10V		V
04	10V		V
05	10V		V
06	10V		V
07	10V		V
08	10V		V
09	10V		V
10	10V		V
11	10V		V
12	10V		V
13	10V		V
14	10V		V

Input operation settings  
Refer to "13.2 Input operation settings".

□ Display settings screen

Selecting "Display settings"

ENTER Click

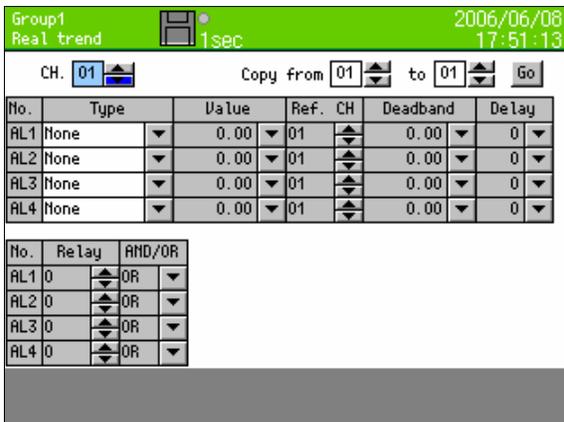


Display settings  
Refer to "13.3 Display settings".

□ Alarm settings screen

Select "Alarm settings"

ENTER Click

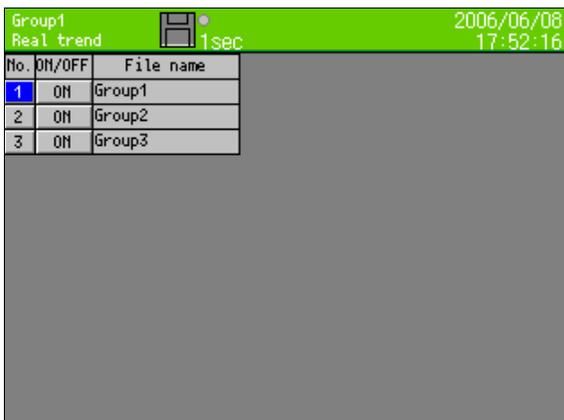


Alarm settings  
Refer to "13.4 Alarm settings".

□ File settings screen

Select "File settings"

ENTER Click



File settings  
Refer to "13.5 File settings".

□ Totalizer reset settings screen

Select “Totalizer reset ”

ENTER Click

Group1		2006/06/08
Real trend		17:54:38
Manual reset		Go
Auto Reset	OFF	
Standard time	00:00	▼
Interval	24:00	▼

Totalizer reset settings

Refer to “13.6 Totalizer reset settings”.

□ Schedule settings screen

Select “Schedule settings”

ENTER Click

Group1		2006/06/08
Real trend		17:55:39
Schedule setting		No settings
Date settings		Date Time
Start date and time	05/01/01	00:00
End Date and time	05/01/02	00:00
Day setting		Sun Mon Tue Wed Thu Fri Sat
Usage days	<input type="checkbox"/>	
Start time	00:00	▼
End time	00:00	▼

Schedule settings

Refer to “13.7 Schedule settings”.

□ Marker text settings screen

Select “Marker text settings”

ENTER Click

Group1		2006/06/09
Real trend		14:05:11
No.	Clear	Marker text
1	Clear	▼
2	Clear	▼
3	Clear	▼
4	Clear	▼
5	Clear	▼
6	Clear	▼
7	Clear	▼
8	Clear	▼
9	Clear	▼
10	Clear	▼

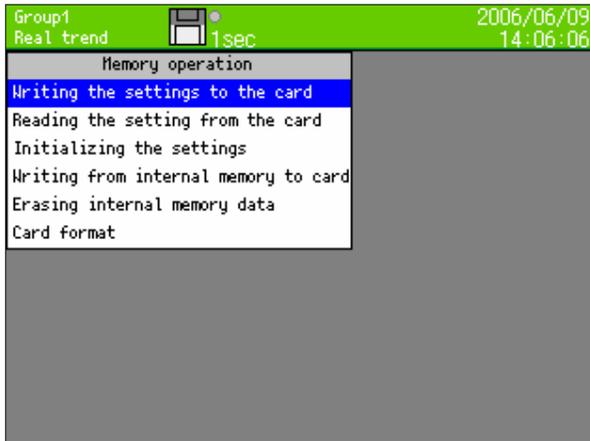
Marker text settings

Refer to “13.8 Marker text settings”.

☐ Memory operation

Select “Memory operation”

ENTER Click

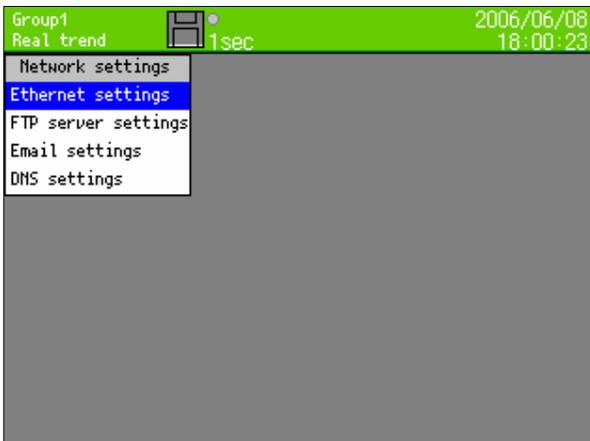


Memory operation  
Refer to “13.9. Memory operation”.

☐ Network settings

Select “Network settings”

ENTER Click

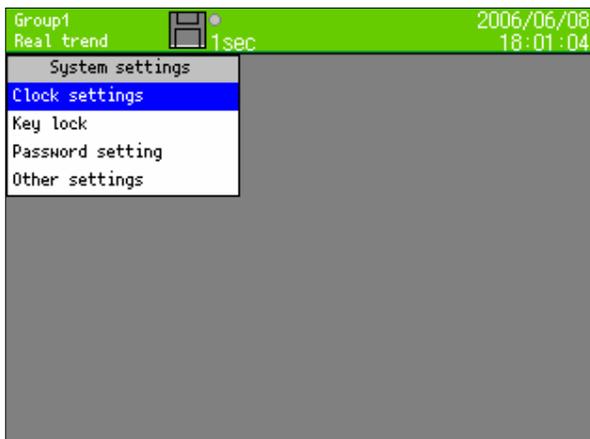


Network settings  
Refer to “13.10. Network settings”.

☐ System settings

Select “System settings”

ENTER Click



System settings  
Refer to “13.11. System settings”.

## 13.2 Input operation settings

### 13.2.1 Setting contents

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one move to the input screen.

Following screen is displayed on selecting “Input operation settings” of settings menu screen.

Group1		2006/06/08	
Real trend		17:48:58	
CH.	Range type	Tag	Unit
01	10V		V
02	10V		V
03	10V		V
04	10V		V
05	10V		V
06	10V		V
07	10V		V
08	10V		V
09	10V		V
10	10V		V
11	10V		V
12	10V		V
13	10V		V
14	10V		V

When focus is on Ch number and when “ENTER” is clicked, detail setting screen of that Ch is displayed.

Group1		2006/06/08	
Real trend		18:03:35	
CH.	01	Copy from	01 to 01 Go
Range type	10V		
Range	-10.00	to	10.00
Scale	-10.00	to	10.00
Correction	0.00		
RJ	External		
Burn out	NONE		
Tag			
Unit	V		
Calculate	OFF		
Formula			

■ Setting range type

(Analog input) KR2120: CH1-12, KR2160: CH1-6

DC voltage	13.8mV, 27.6mV, 69mV, 200mV, 500mV, 2V, 5V, 10V, 20V, 50V
Thermocouple	K, E, J, T, R, S, B, N, W-WRe26, WRe5-WRe26, PR40-20, NiMo-Ni, CR-AuFe,Platinel2, U, L
Resistance thermometer	Pt100, JPt100, Pt50, Pt-Co

(Digital input) \*At the time of digital input option selected CH37-44

Digital input	DI
Pulse input	Pulse(+), Pulse(-)

■ Setting the range scope

- Setting the scope of range. (It is decided by range type.)

■ Setting the scale

- Set the scope of range. (It is decided by range type.)

Number	Point
10.00	2

← This numeric value decides the position of the decimal point.

■ Setting sensor correction

- Setting the addition value to input value (shift value)

■ RJ (Reference junction compensation) is set

- Whether RJ is internal or external is set.

■ Setting burn out

None	Burnout is not used.
UP	Setting upper burnout.
DOWN	Setting lower burnout.

■ Setting the tag

- Setting the tag name (Setting for displaying the tag name instead of channel no.)

■ Setting the unit

- Unit of that Ch is set.

■ Set the usage of computation

None	Displays and records the input data as the measurement data of that channel.
Yes	Displays and records the process result of calculation that is set in arithmetic expression, as the measurement data of that channel.

■ Setting the arithmetic expression

- When computation usage is set to yes, the arithmetic expression of that Ch is set.

■ Copying the parameter using copy function

Ch. 01	Copy from 02	to 05	Go
--------	--------------	-------	----

In the above screen the setting is, copying Ch01 from Ch02 to Ch05. On selecting Go and clicking the ENTER key, the parameter of Ch01 is copied from Ch02 to Ch05.

## 13.2.2 Setting method of computation

### 1) Computation types

#### Mathematical calculation

Four arithmetic operations are performed.

	Symbol	Example	Remarks
Totalizer	+	$X+Y$	
Subtraction	-	$X-Y$	
Multiplication	*	$X*Y$	
Division	/	$X/Y$	
Reminder	%	$X\%Y$	
Exponential	^	$X^Y$	

※X, Y indicate the arithmetic expression or numeric value.

#### Comparison calculation

Perform the comparison operation and result is 1 (during formation) or 0 (during non formation)

	Symbol	Example	Remarks
Equal value	==	$X==Y$	
Unequal value	!=	$X!=Y$	
Greater than	>>	$X>>Y$	
Less than	<<	$X<<Y$	
Equal or greater than	>=	$X>=Y$	
Equal or less than	<=	$X<=Y$	

※X, Y indicate the arithmetic expression or numeric value.

#### Logical operation

Logical operations for 1 or 0 are performed and result is returned as 1 or 0.

	Symbol	Example	Remarks
Logical AND	AND	$X\text{AND}Y$	
Logical OR	OR	$X\text{OR}Y$	
Exclusive OR	XOR	$X\text{XOR}Y$	
Negation	NOT	$\text{NOT}(X)$	Put the object that is a negation in brackets

※X, Y indicate the arithmetic expression or numeric value. Express X and Y as 0 or 1.

#### General calculation function

Function calculation is performed.

	Symbol	Example	Remarks
Round up after the decimal	CEL	$\text{CEL}(X)$	
Round down after the decimal	FLR	$\text{FLR}(X)$	
Absolute value	ABS	$\text{ABS}(X)$	
Square root	SQR	$\text{SQR}(X)$	
Power of e	EXP	$\text{EXP}(X)$	
Natural logarithm (base is e)	LOG	$\text{LOG}(X)$	
Common logarithm (bottom is 10)	LOG10	$\text{LOG10}(X)$	

※X indicates the arithmetic expression or numeric value.

### Channel data calculation function

Function calculation is performed.  
When error data (OVER, UNDER etc.) is included in measurement data it becomes "CAL ER".

	Symbol	Example	Remarks
Measured data	CH	<b>CH(X)</b>	X is channel No.
Process result data	PCH	<b>PCH(X)</b>	
Previous process result data	OCH	<b>OCH(X)</b>	Data at the time of previous scanning (before 0.1 second)
Totalizer	ITG	<b>ITG(X)</b>	Refer to 2) Totalizer operation
F value	FV	<b>FV(X#T#Z#R)</b>	Refer to 3) F value
Relative humidity	RH	<b>RH(D#W)</b>	Refer to 4) Relative humidity
Dew-point temperature	DEW	<b>DEW(T#H)</b>	Refer to 5) Dew-point temperature

※ X indicates channel number.

- \* Channel data calculation uses calculation result of specification destination when calculation is carried out using settings of channel number specification destination. When channel no. doing the calculation is greater than channel no. to be specified, the calculation result obtained previously is used.

### System information acquisition function

	Symbol	Example	Remarks
CF card remaining amount	CF	<b>CF(A)</b>	A= Unit of remaining amount 0: MB 1: Minute 2: Hour 3: Day

## 2) Totalizer operation

For totalizer operation ITG function or ITG24 function is used.

Do not use totalizer function more than two times in one arithmetic expression. Result is not calculated correctly. It is possible to use multiple functions except totalizer.

Example : ~~ITG(1)+ITG(2)~~, ~~ITG24(1)-ITG(1)~~, ITG(1)/100

For resetting the totalizer, refer to chapter 13.6.

### 1. Standard totalizer operation

**Totalizer value is reset in totalizer reset standard time and every interval.**

Method of inputting arithmetic expression

**ITG(d)**

d: Channel No. to be totalized

Calculation contents

$$D_n = D_{n-1} + \{(PV_n + PV_{n-1}) \times (T_n - T_{n-1})\} \div 2$$

$D_n$  : Totalizing result

$D_{n-1}$  : Previous totalizing result

$PV_n$  : Data to be totalized

$PV_{n-1}$  : Data of the previous calculation to be totalized.

$T_n$  : Time of calculation

$T_{n-1}$  : Time of previous calculation (0.1 seconds before)

When error data (OVER, UNDER etc.) is included, calculation is not performed and previous result is considered.

### 2. 24hours totalizer operation

**Totalizer value is reset only in totalizer rest standard time.**

Method of inputting arithmetic expression

**ITG24(d)**

d: Channel No. to be totalized

Calculation contents are same as standard totalizer.

### 3) F value

Method of inputting arithmetic expression

**FV(X#To#Z#R)**

X: Channel to be calculated, To: F value calculation standard temperature, Z: Z value,

R: F value calculation starting temperature

Calculation of F value is below

$$\int 10^A dt \text{ however, } A = (To - T) \div Z \quad T: \text{ channel data to be calculated}$$

When T exceeds R, F value is reset to 0.

### 4) Relative humidity

Method of inputting arithmetic expression

**RH (D#W)**

D: Dry bulb temperature, W: Wet bulb temperature

Calculation of relative humidity is below

$$((A - 0.000662 \times 1013.0 \times (D - W)) \div B) \times 100$$

However, A: Dry bulb saturated water vapor pressure, B: Wet bulb saturated water vapor pressure

Calculation of saturated water vapor pressure is below

$$6.1121 \times E \times P((17.502 \times T) \div (240.9 + T)) \quad T: \text{ Humidity}$$

## 5) Dew-point temperature

Method of inputting arithmetic expression

DEW (T#H)

T: temperature data channel, H: Relative humidity channel

Calculation of dew-point temperature is below

t: Temperature data

h: Relative humidity data

D: Dew-point temperature

$$\textcircled{1} K = t + 273.15$$

$$\textcircled{2} \text{In case of } t \geq 0$$

$$W = \text{EXP} \left( -5800.2206 / K + 1.3914993 + K \times (-0.048640239 + K \times (0.41764768E-4 - 0.14452093E-7 \times K)) \right) + 6.5459673 \times \text{LOG} (K) / 1000$$

In case of  $t < 0$

$$W = \text{EXP} \left( -5674.5359 / K + 6.3925247 + K \times (-9.677843E-3 + K \times (0.62215701E-6 + K \times (0.20747825E-8 - 9.484024E-13 \times K))) \right) + 4.1635019 \times \text{LOG} (K) / 1000$$

$$\textcircled{3} S = W \times h / 100$$

$$\textcircled{4} P = S \times 1000$$

$$\textcircled{5} Y = \text{LOG} (P)$$

$$\textcircled{6} \text{In case of } P \geq 611.2$$

$$D = -77.199 + Y \times (13.198 + Y \times (-0.63772 + 0.071098 \times Y))$$

In case of  $P < 611.2$

$$D = -60.662 + Y \times (7.4624 + Y \times (0.20594 + 0.016321 \times Y))$$

## 6) Example of arithmetic expression where calculations are combined

$$\bullet (CH(1)*3-20)/6$$

("Raw data of channel 1" X 3 - 20) ÷ 6

$$\bullet (CH(1)+CH(2))<300$$

It is 1 when the total of raw data of channel 1 and channel 2 is less than 300.

$$\bullet \text{ABS}(CH(1)) \geq 50$$

It is 1 when absolute value of channel 1 is 50 or more.

$$\bullet (PCH(1) \geq 100) \text{AND} (PCH(2) \leq 50)$$

It is 1 when data of channel 1 is 100 or more and data of channel 2 is less than 50.

## 13.3 Display settings

### 13.3.1 Channel parameter

- Operation is done in MENU mode.
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one move to the input screen.

Following screen is displayed when channel parameters of display settings screen is selected from setting menu screen.

Kind of wave pattern and maximum and minimum of display scale and color and display position of each channel are set.

CH.	Display scale		Color	Position
	Type	Minimum		
01	Std.	-10.00	10.00	1
02	Std.	-10.00	10.00	1
03	Std.	-10.00	10.00	1
04	Std.	-10.00	10.00	1
05	Std.	-10.00	10.00	1
06	Std.	-10.00	10.00	1
07	Std.	-10.00	10.00	1
08	Std.	-10.00	10.00	1
09	Std.	-10.00	10.00	1
10	Std.	-10.00	10.00	1
11	Std.	-10.00	10.00	1
12	Std.	-10.00	10.00	1
13	Std.	-10.00	10.00	1

#### ■ Setting the display scale

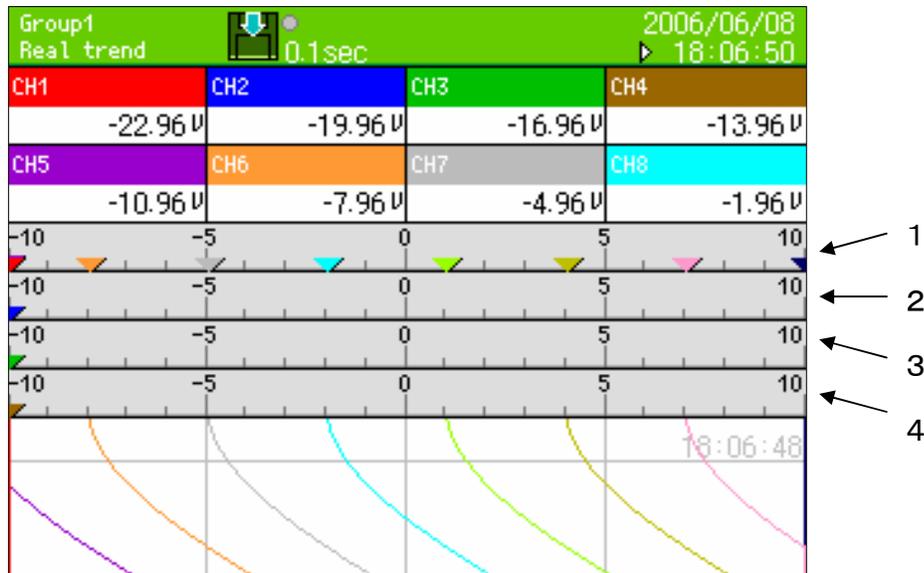
Data is displayed on the screen using setting contents of display scale.

Item	Contents
Type	<p>“Standard” :Min &amp; Max value can be set in a range of <math>\pm 30000</math>.Screen is displayed in standard format.</p> <p>“Exponent” :Is set in exponent format. Screen is also displayed in exponent format.</p> <p>Min, Max significand is 1-9.99, exponent part can be set in the range of <math>\pm 15</math>.</p>
Min, Max	<ul style="list-style-type: none"> <li>• In trend display, coordinate calculation is done such that Min value is on the extreme left (lower) and maximum value is on the extreme right (up). ( ) for horizontal direction</li> <li>When for the same display position there are multiple channels, the Min, Max of channel of smallest number are displayed on the scale plate and the pen coordinates use the Min, Max value of each channel.</li> <li>• Displays, in less than the number of decimal digits of the screen display</li> </ul>

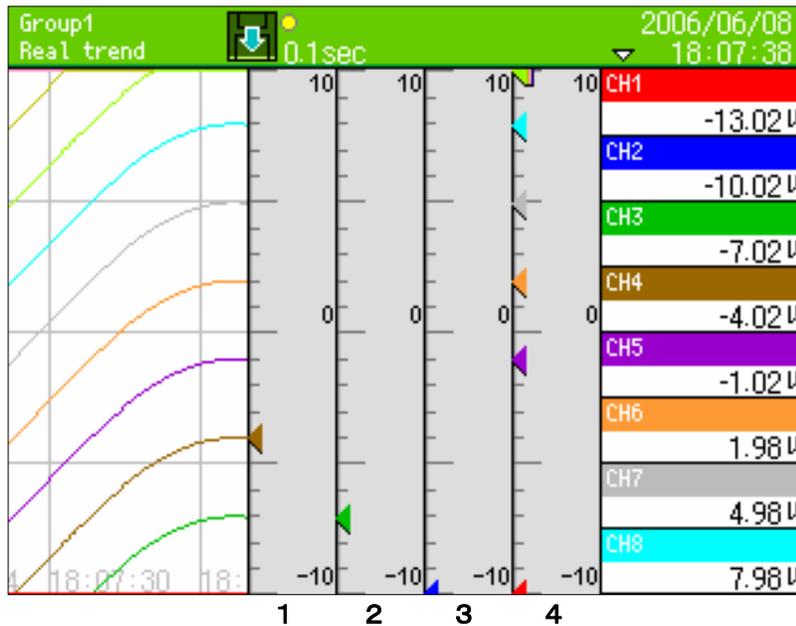
■ Setting the display position

- Display position (1, 2, 3, 4) indicates the position of scale plate.

For vertical trend graph



For horizontal trend graph



■ Copy the parameter using the copy function



In the above screen, Ch01 is copied from Ch02-Ch05. On selecting Go and clicking the “Enter” key the settings of Ch01 are copied from Ch02-Ch05. Color is not copied.

### 13.3.2 Group parameter

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one move to the input screen.

Following screen is displayed on selecting group parameter in display settings screen from settings menu screen.

The group, of the number specified in numeric value of upper left "Group", can be set.

Group	1	Group name					
Channel	01	02	03	04	05	06	
Trend display	Y	Y	Y	Y	Y	Y	
Size	1	1	1	1	1	1	
Channel	07	08	09	10	11	12	
Trend display	Y	Y	Y	Y	Y	Y	
Size	1	1	1	1	1	1	
Trip Line 1	Posi	0	%	Color	Red	Size	1
Trip Line 2	Posi	0	%	Color	Red	Size	1
Trip Line 3	Posi	0	%	Color	Red	Size	1
Trip Line 4	Posi	0	%	Color	Red	Size	1

#### ■ Setting the group name

- Group name is set. Other than being used for screen display, this group name is used in file name of recording data.

#### ■ Channel

- Channel to be registered in the group, is set. Registration is cancelled if blank (clicked down-arrow key at 1, and clicked up-arrow key at 44) is set.

#### ■ Trend display

- On clicking ENTER every time after selecting, toggling between "Y"/"N" is done. Items with N are not displayed even if channels are registered. Channel that selects N also records the data in the file.

#### ■ Trend line size

- It is the thickness of the trend line. It can be selected from 1, 3, 5.

#### ■ Setting trip line

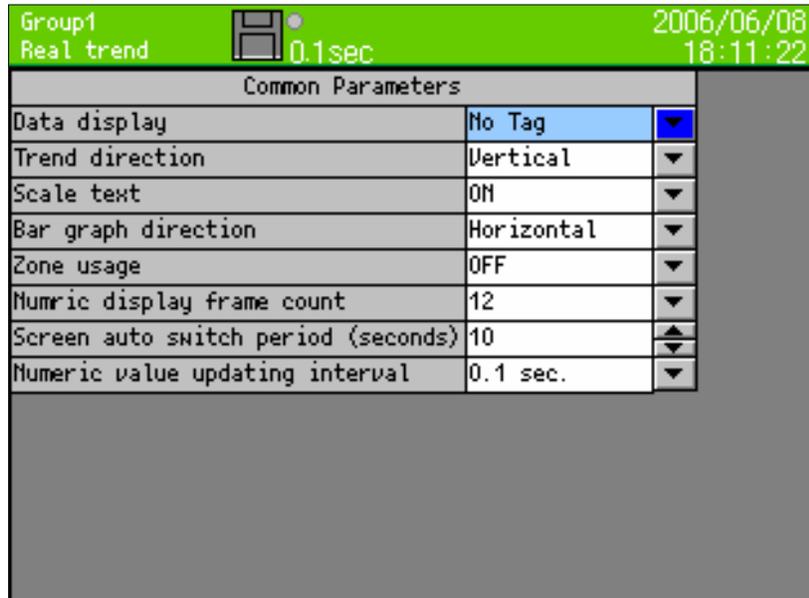
Setting of the trip line (dotted line) to be displayed on trend is done.

- Posi  
Display position of trip line is set in the range 0-99% of display width.
- Color  
Color of the trip line can be selected from 12 colors.
- Size  
Thickness of the trip line is selected from 1, 3, 5.

### 13.3.3 Common parameters

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one move to the input screen.

Following screen is displayed when common parameter of display settings screen is selected from settings menu screen.



#### ■ Setting combined display

- Whether to display tag name or to display bar graph or not to display anything on the upper part (or right side) of the trend screen, is set.

No tag	With tag	Bar graph	None
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#### ■ Setting the trend direction

- Whether the direction of wave format display should be vertical or horizontal, is set.

#### ■ Setting the scale text

- Whether to display numeric value on the pointer of the scale plate or no, is set.

#### ■ Setting the bar graph direction

- Whether the direction of bar graph, in bar graph screen should be vertical or horizontal, is set.

#### ■ Setting zone usage

- Display range of measurement/zone data is called zone. If zone is set to yes, it can be divided into zones. Detailed explanation is given on the next page.

#### ■ Setting numeric display frame count

- Split count of numeric display frame is set.

1	4	6	12	21	44
---	---	---	----	----	----

#### ■ Screen auto switching period

- When "Auto conversion" on DISP menu is turned ON, switching period is set.

#### ■ Numeric value update period

- Numeric value update period of measurement data to be displayed on the screen is selected.

0.1 seconds	0.5 seconds	1 second
-------------	-------------	----------

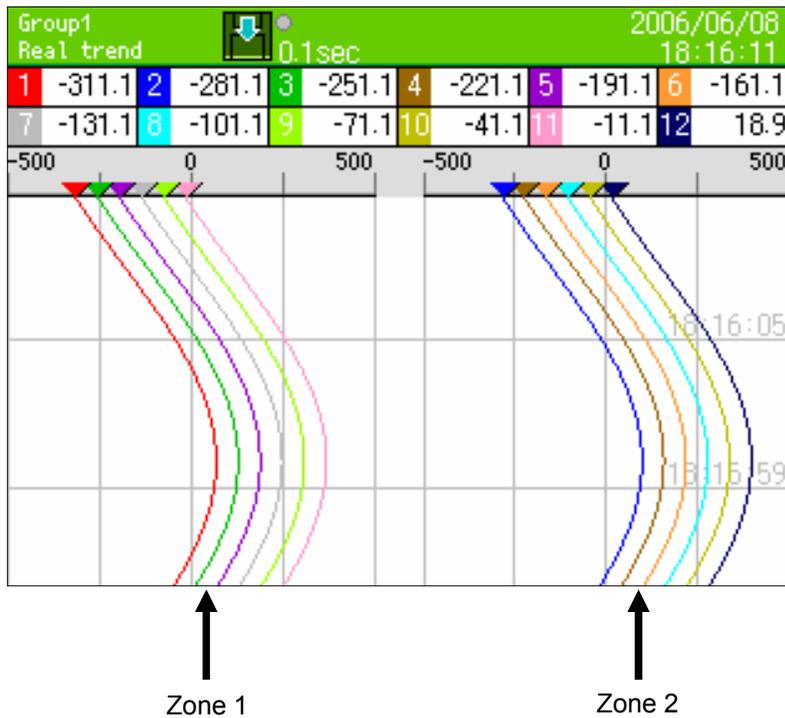
## Zone

Display range of measurement/zone data is called zone. It can be displayed by setting zone for each channel. By displaying in separate zone the wave type, it can be easily read.

Select 'yes' in zone usage. Item of zone gets added when channel parameter of display settings screen is selected from settings menu screen, and the following screen is displayed.

CH.		Display scale			Color	Zone	Posi
Type	Minimum	Maximum					
01	Std.	-10.00	10.00	Red	1	1	
02	Std.	-10.00	10.00	Blue	2	1	
03	Std.	-10.00	10.00	Green	1	1	
04	Std.	-10.00	10.00	Brown	2	1	
05	Std.	-10.00	10.00	Purple	1	1	
06	Std.	-10.00	10.00	Orange	2	1	
07	Std.	-10.00	10.00	Grey	1	1	
08	Std.	-10.00	10.00	Cyan	2	1	
09	Std.	-10.00	10.00	Light Green	1	1	
10	Std.	-10.00	10.00	Yellow	2	1	
11	Std.	-10.00	10.00	Pink	1	1	
12	Std.	-10.00	10.00	Dark Blue	2	1	
13	Std.	-10.00	10.00	Red	1	1	

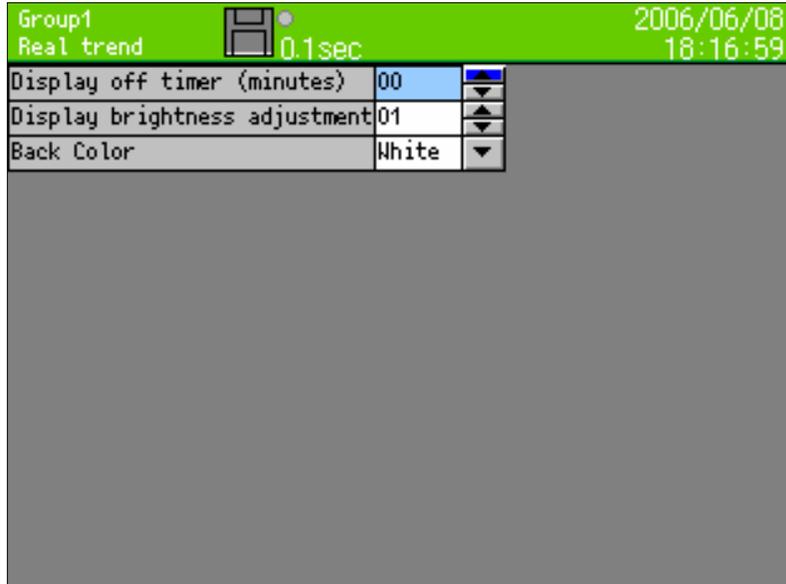
When zone is set to either 1 or 2, the display of wave format in trend screen is divided into 2, and No. set as 1 is displayed in zone 1 and No. set as 2 is displayed in zone 2.



### 13.3.4 LCD settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when LCD settings of display settings screen is selected from settings menu screen.



#### ■ Setting display off timer (minutes)

- The period of display off timer of LCD can be set from 1 minute to 60 minutes.
- For canceling the display off, click any key.

#### ■ Setting the 'display brightness adjustment'

- Brightness of LCD backlight can be selected from 4 steps. 1 is the brightest and 4 is the darkest.

#### ■ Setting back color

- Either white or black is selected as back color of the screen.

## 13.4 Alarm settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when, alarm settings is selected in settings menu screen.

No.	Type	Value	Ref. CH	Deadband	Delay
AL1	None	0.0	01	0.0	0
AL2	None	0.0	01	0.0	0
AL3	None	0.0	01	0.0	0
AL4	None	0.0	01	0.0	0

No.	Relay	AND/OR
AL1	0	OR
AL2	0	OR
AL3	0	OR
AL4	0	OR

### ■ Setting the type

- Type of alarm is set.

None	Alarm is not set	Diff. upper	Sets differential upper limit alarm
Upper	Sets upper limit alarm	Diff. lower	Sets differential lower limit alarm
Lower	Sets lower limit	Error	Sets error alarm

### ■ Setting the settings value

- Judgment value of alarm is set.

### ■ Setting reference CH

- During differential upper limit/differential lower limit, channel No. that becomes the reference, is set.

### ■ Setting dead band

- Alarm dead band, between alarm value and cancellation is set.

### ■ Setting delay

- Delay time of alarm is set.(0-3600 seconds)

### ■ Setting relay

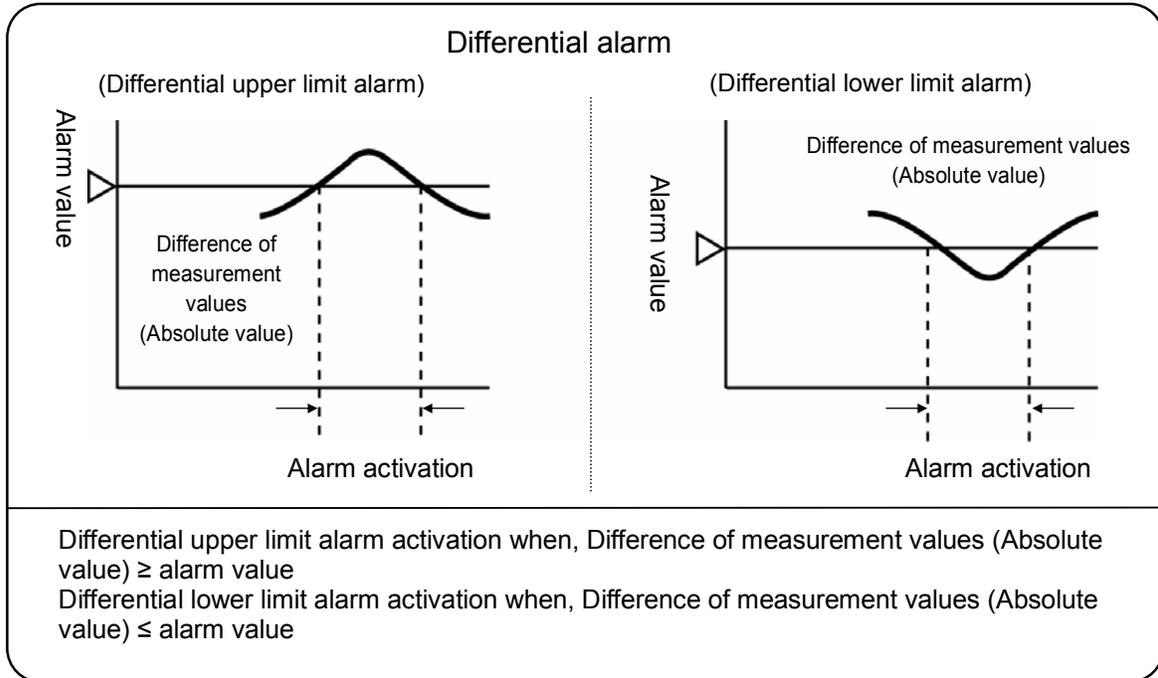
\*When alarm is outputted actually, alarm output terminal (option) is necessary

- Regardless of existence of alarm output terminals, setting can be done.
- Set the alarm output terminal No. 0-12. When alarm output is set to 0, alarm is not outputted.

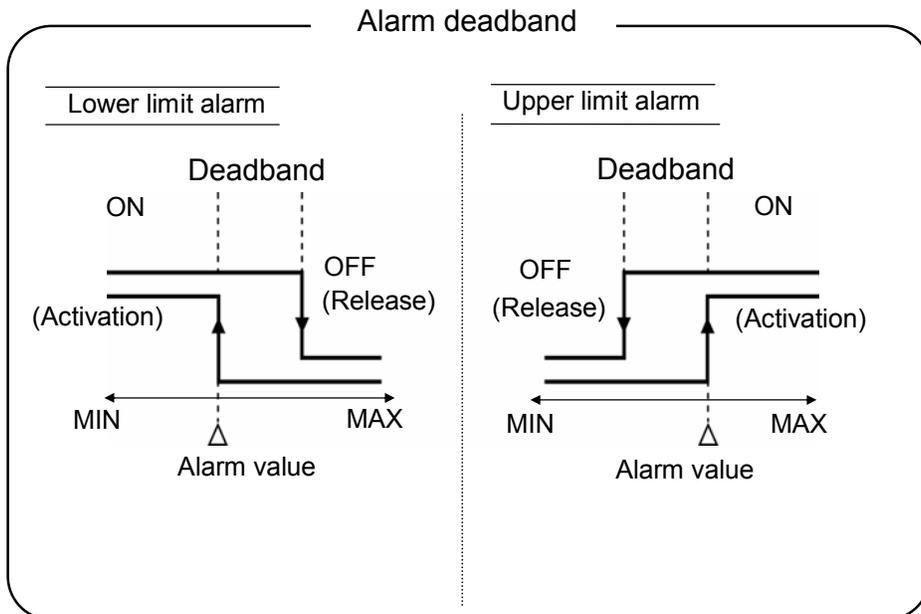
### ■ Setting alarm output mode

AND	Relay is ON when all the alarms set in one alarm output terminal are in alarm status.
OR	Relay is ON when a number of alarm relays are connected to one alarm output terminal and one among those is in alarm status.

## Differential alarm



## Alarm dead band



## 13.5 File settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when, file settings in settings menu screen is selected.

Group1			2006/06/08
Real trend			17:52:16
No.	ON/OFF	File name	
1	ON	Group1	
2	ON	Group2	
3	ON	Group3	

Following screen is displayed when ENTER key is clicked, when No. column is selected.

Group1		2006/08/09
Real trend		18:27:56
Recording cycle	0.2 sec.	
Data format	Sampling	
Start trigger	Key	
Pretrigger	0	
End trigger	Key	
Period (sec.)		
Save format	CSV	
Auto save period	1 min.	
Directory	GROUP1	

### ■ Setting the recording cycle \*\*

Seconds	0.1 sec, 0.2 sec, 0.5 sec, 1 sec, 2 sec, 3 sec, 5 sec, 10 sec, 15 sec, 20 sec, 30 sec
Minutes	1 min, 2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 60 min

\*\* If a recording cycle less than 0.5 seconds is set, recording is done in 3 groups and 12 points for each group.

### ■ Setting the data format

When recording cycle is 0.1 seconds, only sampling can be selected.

In case of recording the data in the file, average, maximum, minimum, maximum/minimum of the recording cycle can be recorded. When maximum/minimum is selected, data size becomes 1.5 times larger.

Sampling	Average	Maximum	Minimum	Maximum/minimum
----------	---------	---------	---------	-----------------

■ Setting start trigger

Recording is started using the following trigger.

Key	Alarm
-----	-------

Trigger type	Contents
Key	Starts the recording without conditions
Alarm	Starts the recording when alarm relay is ON If this item is selected, relay channel can be selected
Digital input (option)	Start the recording when digital input terminal is ON If this item is selected, input terminal No. can be selected

■ Setting pretrigger (0-1000)

At the time of starting the recording, the data of the count set here is recorded back.

Example: When recording is started at 13:00:00 with pre-trigger "10", recording cycle "2 seconds" the data from 12:59:40 to 12:59:58 is added at the beginning of the file.

Note: There are cases when data of the minutes specified here is not sufficient as, in case of power OFF or settings are changed, the data for pre-trigger is cleared. In that case the data of the saved minutes is added at the beginning of the file.

■ Setting end trigger

'End recording' condition is selected. First item displays the contents same as that of start trigger.

Key (Alarm)	Period (seconds)
-------------	------------------

Trigger type	Contents
Key (Alarm)	Stops the recording when start condition is not formed.
Period	Stops after recording the data of the specified period (seconds). At that time if the start condition is formed then it immediately (within 1 second) starts recording.

■ Setting save format

File format at the time of recording to CF card is selected.

Binary	CSV
--------	-----

Save format	Contents
Binary	Recording is done in binary file (extension "krf") For replay either this instrument or analysis software is necessary.
CSV	Recording is done in CSV format text file. It can be read using spreadsheet software like excel (made by Microsoft) etc. It can be used as report application of attachment. When decimal point is set as ",", it becomes a text file with tab delimiter. In this case the extension is "txt".

■ Setting the auto save period

It is the period for copying the internal memory file to CF card.

Other than this period, each file is copied to CF card at the time of completion.(Refer to 9.9)

Minutes	No settings, 1 min, 2 min, 3 min, 5 min, 10 min, 20 min, 30 min, 60 min
---------	---

■ Setting the directory (Maximum length 16 characters)

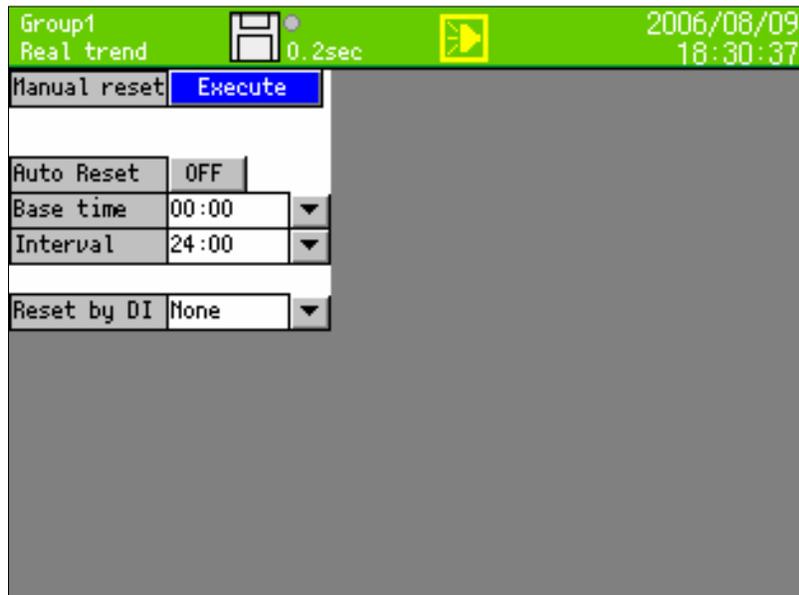
- In case of saving the data to an external storage media, directory name in which it is to be set can be specified.
- Hierarchy can also be specified. Delimiting symbol is "\" (backslash).  
For input method refer to "7.3 Method of entering the characters".

## 13.6 Totalizer reset settings

Totalizer is done by using the calculation settings of each channel. In this screen, a process for resetting the totalization data to 0, is set.

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when, totalizer reset settings of settings menu screen is selected.



### ■ Manual reset

- Consider totalization data to be 0.

### ■ Auto reset

- In case of using auto reset of totalizer, switch it ON.  
Switch it OFF when it is not in use.

### ■ Standard time, interval

- Totalizer reset is performed at the following time,  
Base time + (interval x n) n = 0, 1, 2, 3, ... .

Example: When “base time” is 0:00 and “interval” is 04:00, totalization value is reset at 0 o'clock, 4 o'clock, 8 o'clock, 12 o'clock, 16 o'clock and 20 o'clock.

### ■ Digital input reset (option)

- Totalizer is reset is performed when specified digital input terminal is ON.  
In case of not using, select “OFF”.

## 13.7 Schedule settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when scale settings from settings menu screen is selected.

Group1		2006/06/09						
Real trend	1sec	14:07:21						
Schedule settings	No settings							
Date settings		Date	Time					
Start date and time	05/01/01	00:00						
End date and time	05/01/02	00:00						
Day setting		Sun	Mon	Tue	Wed	Thu	Fri	Sat
Usage days		<input type="checkbox"/>						
Start time	00:00							
End time	00:00							

If schedule is set in this screen, only that period is recorded. Even though the condition specified in file settings are formed, only the cases of the schedule period are recorded. For period other than the schedule period, status bar is displayed in gray color.

- Setting the schedule
  - No settings, date and day is selected.
  - Due to these settings, the following settings become enabled.
- Parameter of date settings is set.
  - Start date and time, and end date and time is set.
- Parameter of day settings is set.
  - Usage days is checked.
  - Start time and end time is set.

## 13.8 Marker text setting

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when marker text settings of settings menu screen is selected.

Without digital input option		With digital input option	
Group1 Real trend Rem. 1.4year 2006/07/14 11:40:29		Group1 Real trend 0.2sec 2006/08/09 18:33:24	
No.	Marker text	Digital input type	Standard
1	Clear	No.	DI Group Marker text
2	Clear	1 None	1
3	Clear	2 None	1
4	Clear	3 None	1
5	Clear	4 None	1
6	Clear	5 None	1
7	Clear	6 None	1
8	Clear	7 None	1
9	Clear	8 None	1
10	Clear	9 None	1
11	Clear	10 None	1
12	Clear	11 None	1
13	Clear	12 None	1
14	Clear		

Up to 50 marker texts to be inserted on trend can be registered here, in advance. For marker text writing refer to chapter 9.3.

Even when it is not registered here, text can be created at the time of marker insertion.

- If clear is selected marker text is erased.
- If message column is selected, character input screen is displayed.

(The maker inserted with digital input (option))

The maker is inserted on trend with ON of the digital input terminal.

<Digital input --- standard>

When the channel that is specified for [digital input] is ON, the corresponded maker is inserted on trend of specified group.

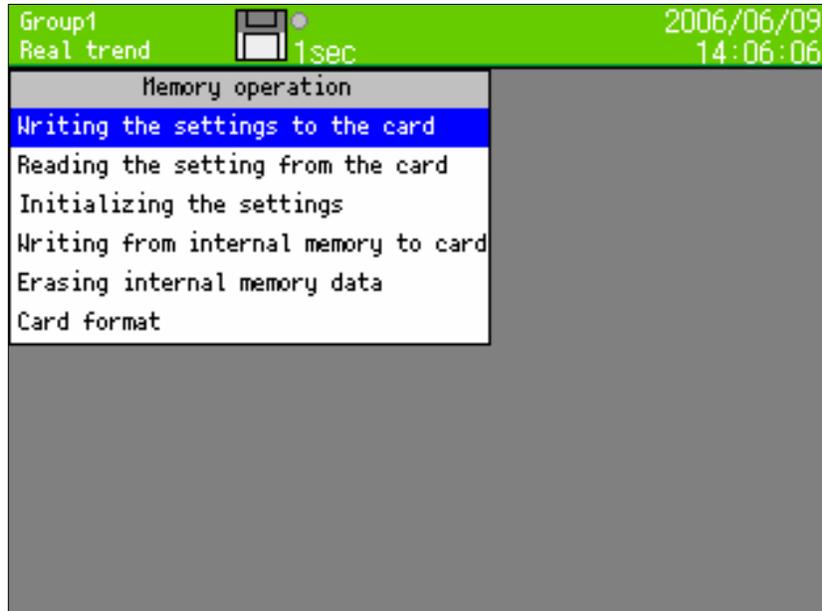
<Digital input --- binary>

When the contact point state is input in the state of 1-50 and turn ON CH8 with using CH1-7 of digital input terminal (CH1 side is low order bit and CH4 side is high order bit of binary expression), the marker which is corresponded with [No.] is inserted on trend of specified group.

## 13.9 Memory operation

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when, memory operation of settings menu screen is selected.



### ■ Writing the settings to the card

Up to 10 current setting contents can be written to CF card.

Numbers 1-10 and file name is displayed as list. Select the number to be written and click the ENTER key.

On clicking the “ENTER” key after entering the file name, setting contents are written.

File is saved with extension “.krs”, in “SETUP” folder in the CF card.

Settings file can be read and used in other RD9900 series also.

### ■ Reading the settings from card

Settings file is read from CF card and the current settings are overwritten.

Numbers 1-10 and file name is displayed as list. Select the number to be read and click the ENTER key.

### ■ Initializing the settings

As the current settings are the settings at the time of shipping from the factory they are overwritten.

### ■ Writing the internal memory to card

Entire data from the internal memory is written to the CF card.

### ■ Erasing internal memory data

Entire data of internal memory is erased.

### ■ Card format

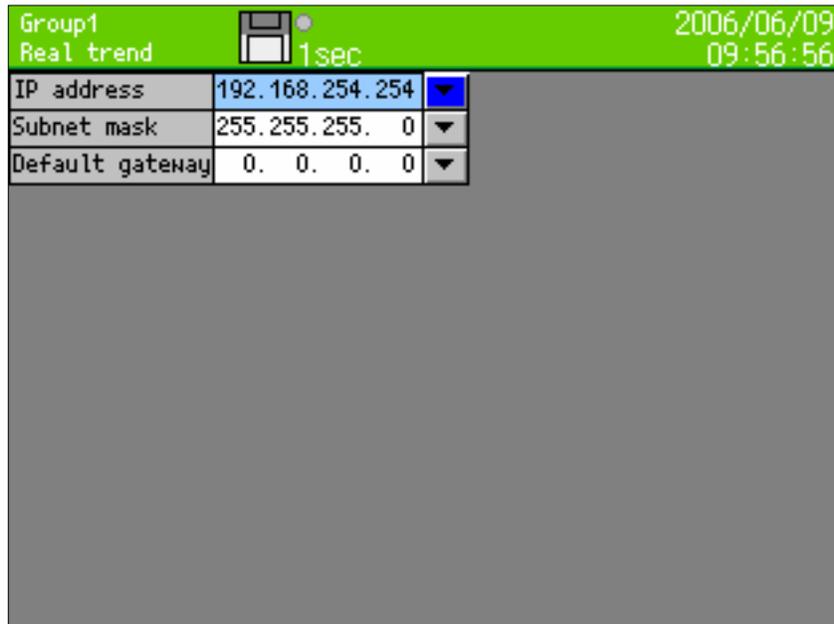
CF card is quick formatted.

## 13.10 Network settings

### 13.10.1 Ethernet settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when Ethernet settings of network settings screen is selected from settings menu screen.



This instrument performs address settings etc. for using on the Ethernet.

#### ■ IP address

Set IP address of this instrument. DHCP (IP address auto acquisition) cannot be used. Ask the IP address to the administrator of the network to be connected to.

#### ■ Subnet mask

Set the subnet mask of this instrument.

#### ■ Default gateway

If there is router gateway etc. on the network, set default gateway address.

### Example of usage in small scale network

In case of using in small scale network, set the IP address as follows, using a router, without connecting to internet and company LAN .

Instrument	IP address	Subnet mask
RD9900 A	192.168.254.254	255.255.255.0
RD9900 B	192.168.254.253	255.255.255.0
...	...	...
PC A	192.168.254.1	255.255.255.0
PC B	192.168.254.2	255.255.255.0
...	...	...

### 13.10.2 FTP server settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when FTP server settings of network settings screen is selected from settings menu screen.

Group1	Real trend	2006/06/09	09:58:14
FTP server ON/OFF		OFF	
Login user name	anonymous		▼
Login password			▼

Settings, for using the FTP server function of this instrument are done.

■ FTP server ON/OFF

When ON the FTP server function is executed. Switch it OFF when FTP server function is not in use.

■ Login user name

Set the user name for logging in to the FTP server.

■ Login password

Set the password for logging in to FTP server.

#### Method of using FTP server

By using the function of FTP server, file in the CF card of this instrument can be read from the network PC. Method of connection at the time of using Web browser (InternetExplorer、Netscape、Opera) is explained below.

Note: In case of connecting to FTP server using Web browser, if user name other than "anonymous" is set, normal connection may not be possible.

- Enter "[ftp://\(IP address of this instrument\)/](#) and click the ENTER key of the PC
- List of files and folders is displayed in the browser.
- And the later operations like moving, copying, opening file etc. are similar to those of windows explorer. However writing to this instrument is not permitted.

In case of connecting using FTP client software other than Web browser, connect by doing the settings in each of the software such that one can log in using the user name and password set in this instrument.

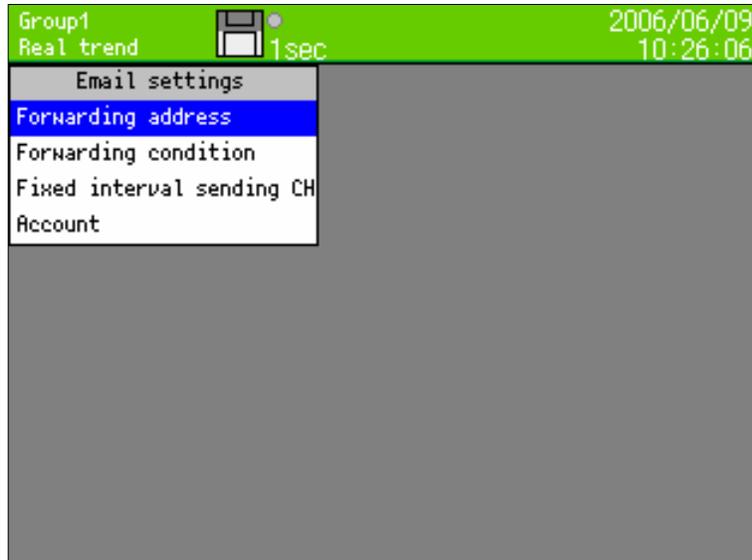
### 13.10.3 E-MAIL settings

In this instrument E-MAIL can be sent by alarm or time event.

Specify beforehand the addresses to whom the mail is to be sent and when the event (Maximum 8 conditions can be registered) is activated, the mail is sent to the address that is selected.

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when E-MAIL settings of network settings screen is selected from settings menu screen.



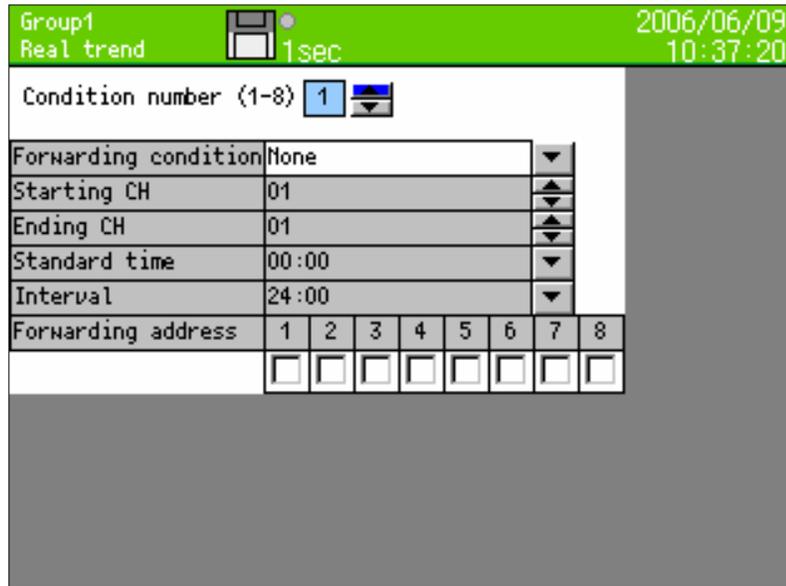
When forwarding address is selected, following screen is displayed. (For settings of forwarding address name, refer to “7.3 Method of entering the characters”.)



Forwarding address is set.

- Forwarding address up to 8 contacts can be set

Following screen is displayed when selecting 'forwarding condition' is selected.



■ Selecting the condition number

- Maximum 8 types of E-mail forwarding conditions can be registered. The condition number selected here, is set in the screen.

■ Selecting forwarding condition

- The condition at which E-MAIL is to be forwarded to forwarding address, is set.

Item	Contents
None	This condition is not used
Alarm activation time	Sends when alarm is activated in the specified channel.
Fixed interval	Considers the base time as standard and sends E-MAIL at every interval.

■ Setting the beginning CH, ending CH

- Beginning CH and ending CH to be forwarded during alarm activation is set.

■ Beginning CH, ending CH

- It is enabled when "Alarm activation time" is selected in forwarding condition.  
E-mail is sent when alarm is activated in the specified channels from beginning channel to ending channel.

■ Base time, interval

- E-mail is sent at the following time.  
Base time + (interval x n) n = 0, 1, 2, 3, ...

Example: When "Base time" is 0:00, "Interval" is 04:00, E-mail is sent at 0 o'clock, 4 o'clock, 8 o'clock, 12 o'clock, 16 o'clock and 20 o'clock.

■ Forwarding address

- Check the address to which E-mail is to be forwarded.

Following screen is displayed when 'Interval forwarding channel' is selected.  
 When "fixed interval" is specified in forwarding condition, the data of the channel registered in this screen is written in the body of the E-mail and it is sent.

- Condition number
  - Select the E-mail forwarding condition number that performs the settings.
- Setting fixed interval forwarding CH data
  - Channel number of the data to be attached is checked

Following screen is displayed when account is selected.

- POP3 address
  - SMTP server is used when POP3 authentication is required. Enter the address of POP3 server.  
Do not input anything when POP3 authentication is not required.
- SMTP address
  - Enter the address of SMTP server.
- Sender address
  - Enter the E-mail address obtained for this instrument. If the address is not correct, there also exist SMTP servers that do not receive the sent mail.
- Account
  - Enter the mail account to be used in mail server login.
- Password
  - Enter the password to be used in mail server login.

### 13.10.4 DNS settings

DNS server is the server for converting the address specified by name, to IP address.

If address of FTP server, POP3 server, SMTP server etc. are entered as names, it is necessary to set the DNS server.

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when DNS settings of network settings screen is selected from settings menu screen.

Group1		2006/06/09
Real trend		10:46:48
1sec		
DNS ON/OFF	OFF	
Primary server IP	0. 0. 0. 0	▼
Secondary server IP	0. 0. 0. 0	▼

■ DNS on/off

- DNS ON (enabled), OFF (disabled) is selected

■ Primary server IP, secondary server IP

- Enter the address of DNS server. When primary server is not found, secondary server address is used. When there is only 1 DNS server, it is okay even if secondary server column is blank.

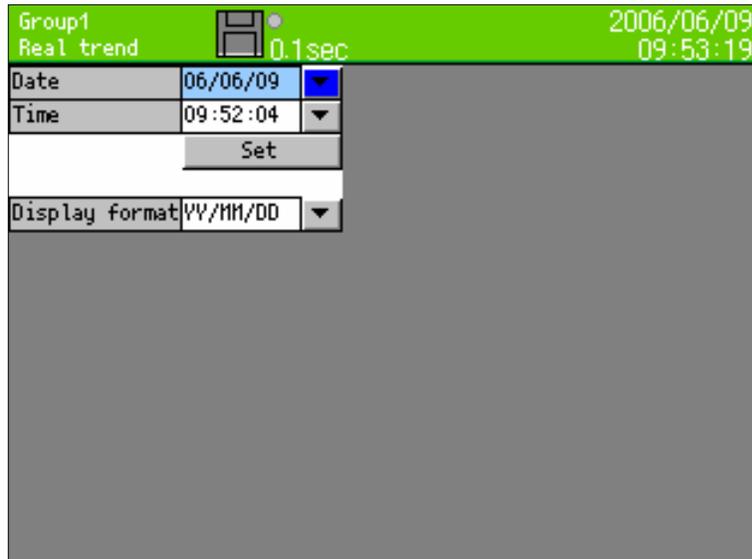
## 13.11 System settings

### 13.11.1 Clock settings

Set the date/clock of internal clock of this instrument.

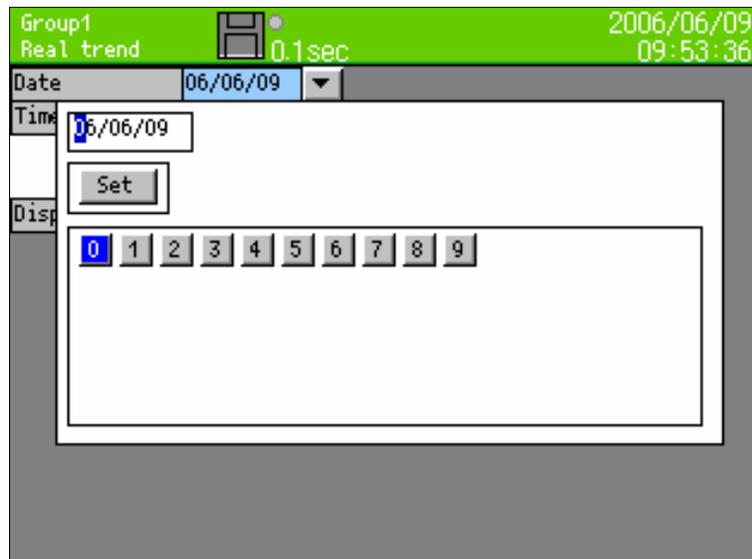
- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when, clock settings of system settings is selected from settings menu screen.



When year month date, time are selected the following screen is displayed, input in the same way as one does for character input.

Writing to internal clock is done by clicking "Set" button. Click "Set" button in accordance to the time signal etc.



For display format select, date display format.

YY/MM/DD: Year/month/date

MM/DD/YY: Month/date/year

DD/MM/YY: Date/month/year

### 13.11.2 Key lock

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when key lock of system settings is selected from settings menu screen.

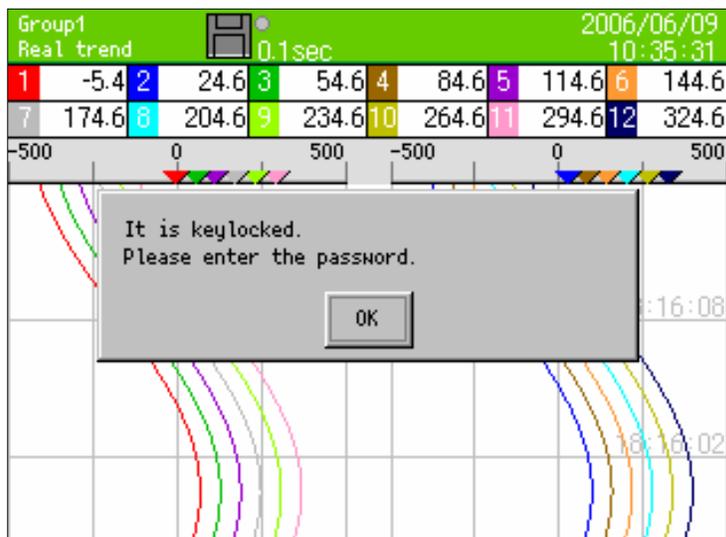


When key lock is ON, and when MENU key or HOME key is clicked, setting screen does not appear unless password is entered. Set the password using "Password settings" on the next page.

#### ■ Setting key lock

- Set ON/OFF of key lock.

(Message when key lock is ON)



### 13.11.3 Password settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when, password settings of system settings is selected from settings menu screen.

This password is used

- When key lock is to be released
- And in case of login password for displaying the web page

Group1			2006/06/09
Real trend		1sec	11:28:56
Old password			
New password			

- Setting password (For password name setting, refer to “7.3 Method of entering the characters”.)
  - Password of key lock is set.
- For changing the password
  - The password is changed by entering the currently used password in old password field, enter the changed password in the new password field.

### 13.11.4 Other settings

- Operation is done using MENU settings
- Move the focus to the setting item using direction key.
- When ENTER key is clicked for the item to be set one moves to the input screen.

Following screen is displayed when other settings of system screen is selected from settings menu screen.

Group2		2006/06/27
Real trend		17:47:00
Language	English	▼
Instrument name		▼
Usage group count	3	▼
Decimal point symbol	.	▼
50Hz/60Hz	50Hz	▼
Filter Level	00	▲▼
Overwrite mode	OFF	▼

#### ■ Language

- Language can be selected from English and Japanese. Default setting is English.

#### ■ Name of the instrument

- Used in subject at the time of sending E-mail." Message from (name of the instrument)" is used as subject.
- When blank, it becomes "Message from RD9900"

#### ■ Setting usage group count

- Usage group count can be set from 1-5.
- The smaller the usage group count the longer the period for recording it in internal memory (Refer to 9.9 Internal memory).When usage group count is 4 or more, recording within interval of less than 1 second is not possible.

#### ■ Setting the decimal point

- 2 types of decimal points can be set ". (period)", ",", comma".
- When decimal point is a comma and format for saving the file is CSV, file becomes a text file with tab delimiter (Refer to 13.5 File settings).

#### ■ Setting 50Hz/60Hz

- Power supply frequency can be selected from 50Hz, 60 Hz.

#### ■ Setting filter label

- Input filter can be set between 0-3. 0 means no filter and 3 means the strongest filter.

#### ■ Setting overwrite mode

- When overwrite mode is ON and the CF card remaining amount decrease, deleting old file and continuing to insert to CF card. When overwrite is Off and the CF card remaining amount is insufficient, the data is not inserted any more (recording is continued in internal memory).

# 14 Setting/Displaying in WEB screen

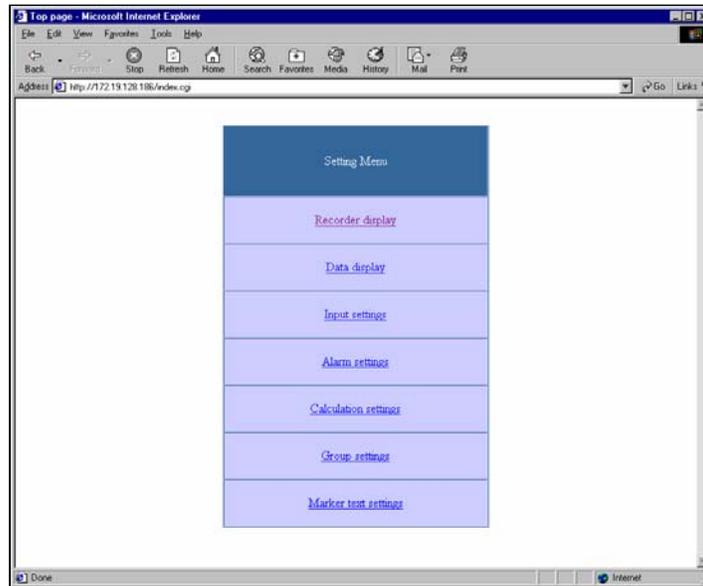
## 14.1 Display and settings of the Web screen

Inputting the recorder, displaying the data and settings for recording are done using web browser.

### 14.1.1 Top page

When IP address of recorder is accessed through web browser (Ex: Internet Explorer), the following screen is displayed after password authentication.

In password authentication the user name to be used is fixed as “user” and it cannot be changed however, the password can be set and changed for the machine, to an arbitrary string. When link is clicked, one moves to the following from above, “recorder display” that displays the same screen of the instrument (RD9900) in browser and can be operated the instrument on this screen, “data display” that displays the data of each recording channel, “input settings” that sets input parameter for each channel, “alarm settings” that sets alarm parameters, “calculation settings” that sets operators for each channel and “group settings” that sets items associated with recording.

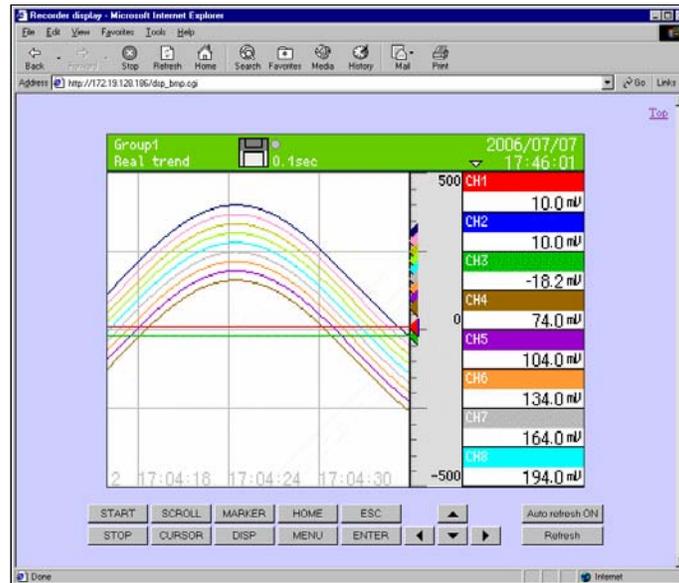


### 14.1.2 Recorder display

Display the same screen as the instrument (RD9900). Keys of the screen can be operated same as keys of the instrument. It will be taken more time for reading than other screen because of using image file. For preventing operational error, do not operate the screen of the instrument and this recorder display screen simultaneously.

Do not use 'refresh', 'back', 'forward' etc. in the browser. Use the keys bottom of the screen.

When click the 'refresh' key of the right bottom of the screen, performing reload of previous display. When click 'auto refresh ON' key, refresh the screen every 5 seconds. When stop the auto refresh, click 'auto refresh OFF'.



### 14.1.3 Data display

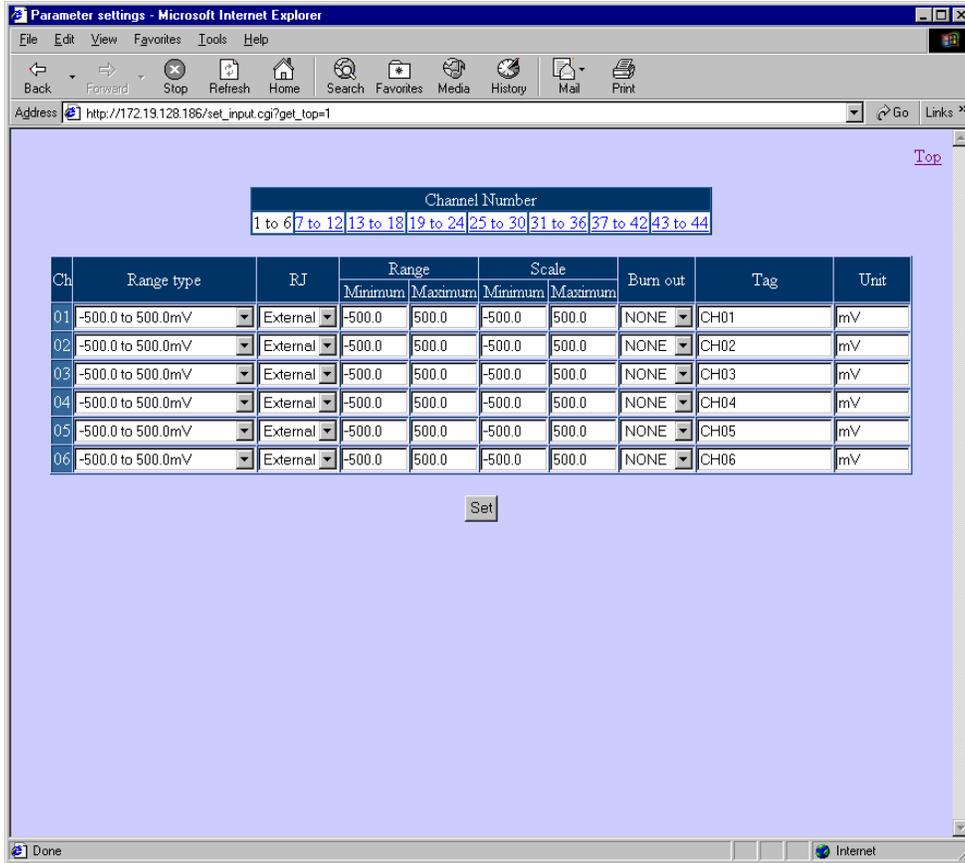
Recorder data displays 44 channels along with tag name and unit. At the time of display, screen can be selected from, 'screen that fixed displays the acquired data' and 'screen that automatically refreshes the data after every 5 seconds'. If link is clicked from the TOP page, one moves to the screen that fix displays the data acquired at the time of displaying. To go to the auto refresh screen, click "Start auto refresh" link on the lower part of the screen.

Channel number	Tag	Data	Unit	Channel number	Tag	Data	Unit
01	CH01	-403.3	mV	23	CH23	43.54	V
02	CH02	-373.3	mV	24	CH24	46.54	V
03	CH03	-343.3	mV	25	CH25	49.49	V
04	CH04	-313.3	mV	26	CH26	52.49	V
05	CH05	-283.3	mV	27	CH27	55.49	V
06	CH06	-253.3	mV	28	CH28	58.49	V
07	CH07	-223.3	mV	29	CH29	61.49	V
08	CH08	-193.3	mV	30	CH30	64.49	V
09	CH09	-163.3	mV	31	CH31	67.49	V
10	CH10	-133.3	mV	32	CH32	70.49	V
11	CH11	-103.3	mV	33	CH33	73.49	V
12	CH12	-73.3	mV	34	CH34	76.49	V
13	CH13	13.54	V	35	CH35	79.49	V
14	CH14	16.54	V	36	CH36	82.49	V
15	CH15	19.54	V	37	CH37	85.49	V
16	CH16	22.54	V	38	CH38	88.49	V
17	CH17	25.54	V	39	CH39	91.49	V
18	CH18	28.54	V	40	CH40	94.49	V
19	CH19	31.54	V	41	CH41	97.49	V
20	CH20	34.54	V	42	CH42	100.49	V
21	CH21	37.54	V	43	CH43	103.49	V
22	CH22	40.54	V	44	CH44	106.49	V

### 14.1.4 Input settings

Setting on input parameter of the recorder is changed. When 'Set' button is clicked after entering each item, the setting contents are written in the recorder. Settings of 6 channels is displayed on 1 screen, channel block to be displayed can be switched by selecting the link from "Display CH selection" table that is there on the upper part of the screen.

Settings cannot be changed during recording.

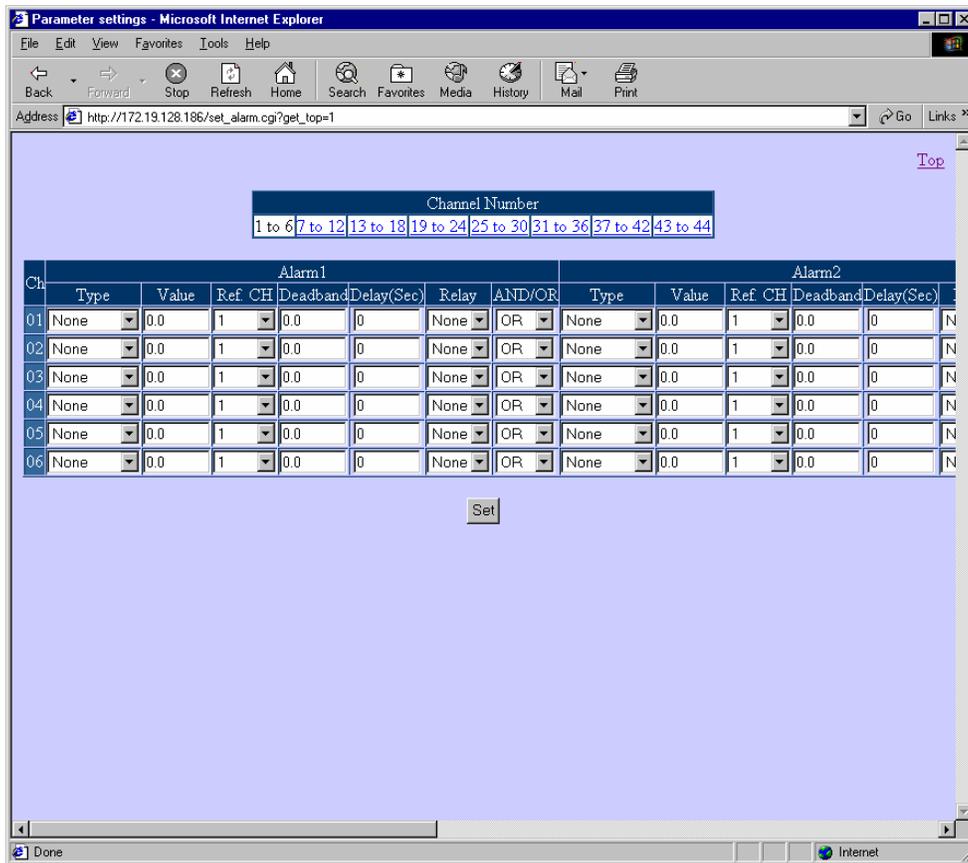


Contents of each item to be set

Setting items	Contents
Range type	Input range is selected.
RJ	Reference junction compensation is selected from internal/external
Range Min	Minimum value of the range is selected.
Range Max	Maximum value of the range is selected.
Scale Min	Minimum value of the scale is set.
Scale Max	Maximum value of the scale is set.
Burnout	Burnout is selected from upper limit, lower limit and none.
Tag	Maximum single byte 15 characters are set as tag name for the data.
Unit	Unit of data is set in maximum 7 single byte characters.

### 14.1.5 Alarm setting

Setting of alarm parameter of the recorder is changed. When 'Set' button is clicked after entering each item, the setting contents are written in the recorder. Settings of 6 channels is displayed on 1 screen, channel block to be displayed can be switched by selecting the link from "Display CH selection" table that is there on the upper part of the screen.

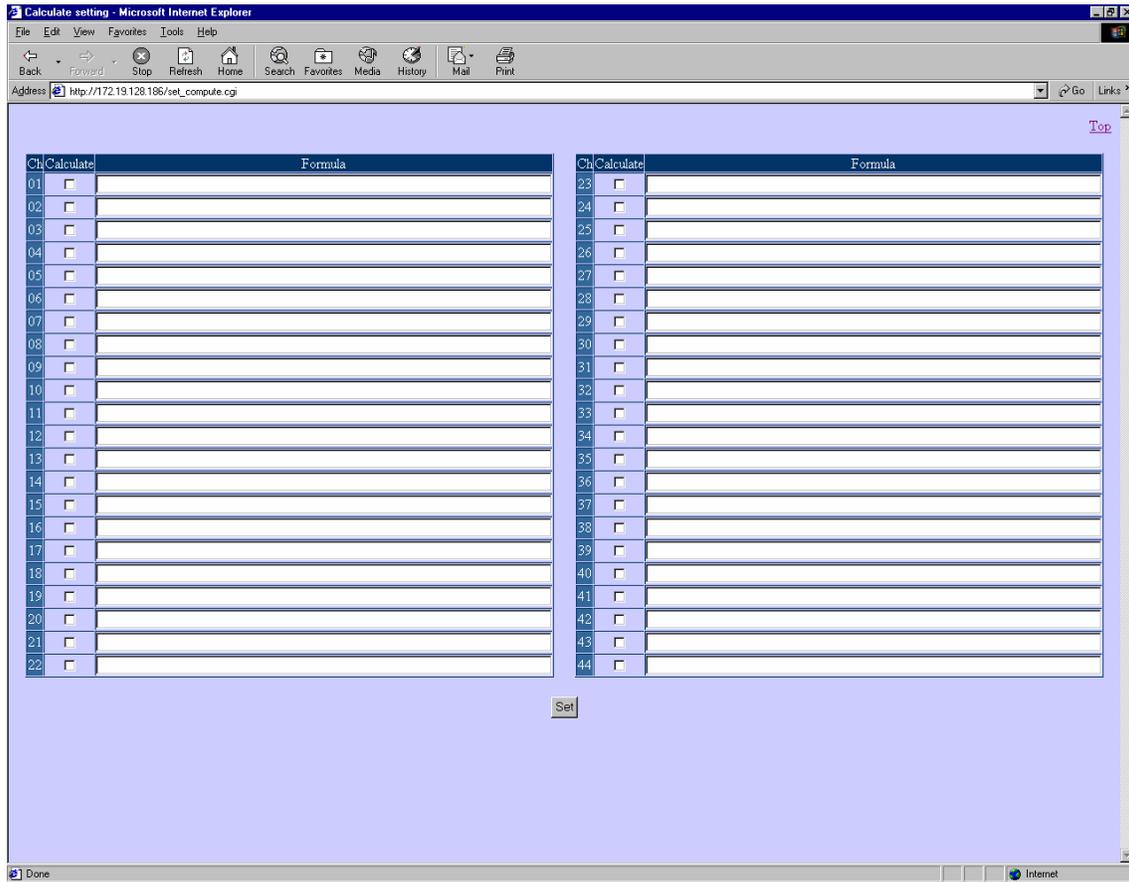


Contents of each setting item

Setting items	Contents
Alarm 1-4 Type	Type of each alarm can be selected.
Alarm 1-4 setting value	Alarm value of each alarm is set.
Alarm 1-4 reference CH	If differential alarm is set in alarm kind of each alarm, comparison channel is selected.
Alarm 1-4 dead band	Dead band of each alarm is set.
Alarm 1-4 delay	Delay of each alarm is set from 1-3600 seconds.
Alarm 1-4 relay number	Output destination relay number at the time of activating the alarm, is selected.
Alarm 1-4 AND/OR	Whether to output by getting AND or whether to output by getting OR of the specified channel, is set during each alarm activation.

### 14.1.6 Calculation settings

Whether to use/not the calculation for each channel of recorder is selected and arithmetic expression is set. When 'Set' button is clicked after entering each item, the setting contents are written in the recorder. Settings cannot be changed during recording.

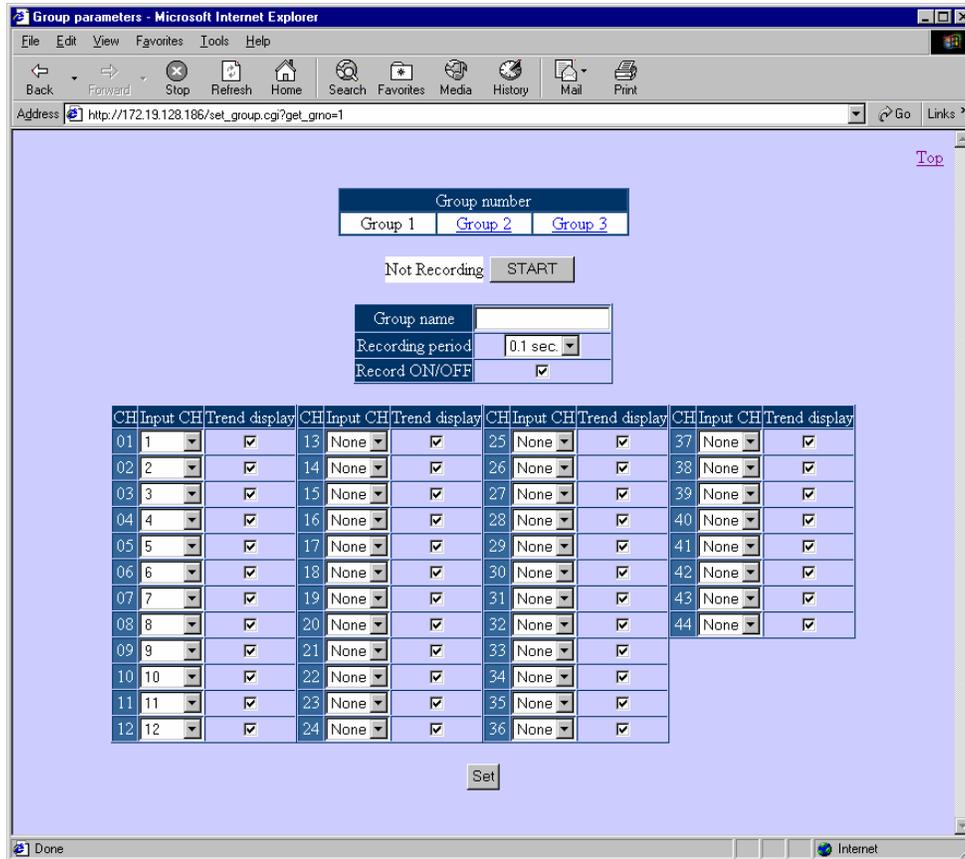


Contents of each setting item

Setting items	Contents
Calculate	Whether to use the calculation or not is selected.
Formula	Calculation contents are set in a string of maximum 48 characters.

### 14.1.7 Group settings

Settings of parameters associated with the recording of the recorder are changed. When 'Set' button is clicked after entering each item, the setting contents are written in the recorder. Settings of 1 group are displayed on 1 screen, group to be displayed can be switched by selecting the link from "Group number" table that is there on the upper part of the screen. The group that can be selected here is each group from group 1 to the usage group count that is set in "System settings" → "Other settings" of the recorder. During recording when recording ON is selected the group that is set cannot be changed.

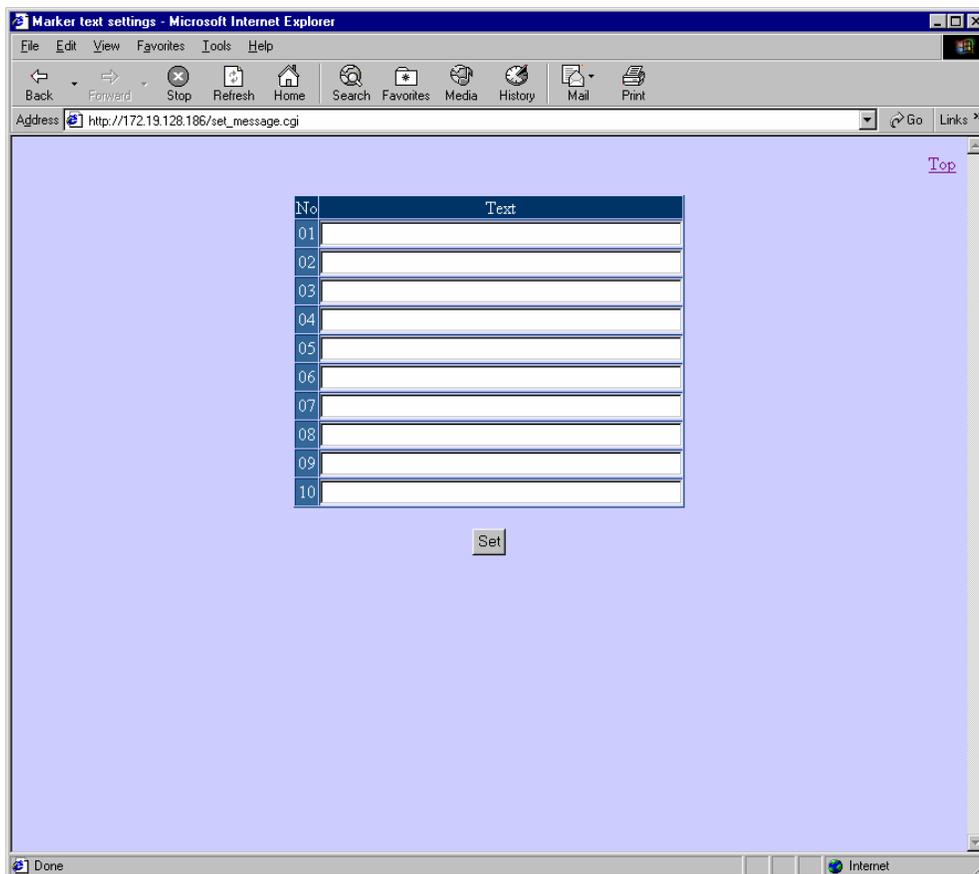


Contents of each setting item

Setting items	Contents
Group name	Group name can be set by a string of maximum 16 characters.
Recording cycle	Time interval to display and record the data is selected.
Recording ON/OFF	Whether to select a relevant group or not is selected.
Input channel	Input channel number to be recorded in the each recording channel is selected.
Trend display	Whether to display or not on the screen the trend of each recording channel is selected.

### 14.1.8 Maker text setting

Setting of maker text parameter of the recorder is changed. When 'Set' button is clicked after entering each item, the setting contents are written in the recorder. After setting text of the end (No.10 in below the figure), 10 more texts are displayed, and text can be set maximum 50. Refer to 9.3 and 9.6 about maker insertion in trend.



Contents of each setting item

Setting item	Contents
Text (No. 01 to 50)	Maker text can be set by a string of maximum 30 characters.

# 15 Read the recorded data using USB

## 15.1 Outline

The recorded data stored in the CF card can be read through USB port installed in RD9900. Therefore, the required file can be copied to the PC without removing the CF card from the instrument.

## 15.2 Operation Environment

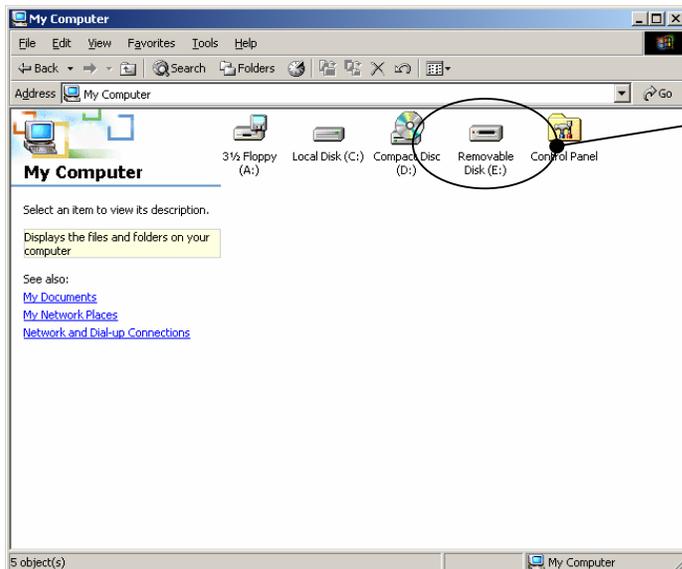
Compatible PC	Model loaded with USB1.1 or higher interface
Compatible OS	Windows2000 / XP
Compatible USB cable	A type plug-B type plug
Limitations	<ul style="list-style-type: none"><li>• Operations by connecting via USB hub are not guaranteed.</li><li>• Write operations to file or folder (Including Move, name change) are not possible.</li><li>• CF card is not recognized depend on the USB port of your personal computer. Please acknowledge not supporting it in that case.</li></ul>

## 15.3 Access to data file

Check that the CF card is inserted when RD9900 is in operating condition.

Open the front compartment and connect the USB port of the PC on which USB port of RD9900 and OS are being installed, with the compatible USB cable.

After connecting, CF card set in RD9900 is recognized as the removable disk on the OS. (Drive is automatically installed when connected with the PC initially. Restarting of OS is requested depending on the PC environment.)



Removable disk added by USB connection. CF card in RD9900 can be assessed.

Contents of the CF card set in RD9900 can be read by accessing the recognized removable disk. Since it is a read-only file, copy the required file to the hard disk in the PC and then use it.

## Warning

- Do not disconnect the power supply when the data is being accessed.  
Take care as the contents of the CF card may get destroyed and the data may get lost, when the power supply of RD9900 is disconnected, when the data file is being accessed.
  
- Do not remove the USB cable when the data is being accessed.  
Operations of RD9900 system may get unstable on removing the USB cable, when the data file is being accessed. Moreover, in case to remove the cable, click on “Safe Removal of Hardware” icon displayed on the task tray on the PC screen and then execute the operations stipulated by OS.
  
- Access to the data when it is being recorded  
RD9900 system executes the access to the CF card when the storing operation is in progress. Although it can operate exclusively by the access from the PC, however, as the total performance decreases, access the data when the storing operation is being stopped,
  
- Update card information  
After connecting the cable, the file on the updated CF card may not be displayed on the PC. When recording operation, write of setup file, snapshot is executed after connecting the cable, file information is updated by inserting and removing the CF card.

# 16 Scale calibration

## 16.1 Scale calibration

To maintain the measuring accuracy, it is recommended to calibrate this instrument every year.

Calibration Name	Description
Zero-span adjustment	Adjustment by entering the zero and span of measuring range for each.  * This instrument dose the input processes with 1 AD converter every 4 channels. Therefore, 6 point specification adjust 2 times and 12 point specification adjust 3 times with inputting the zero and span of each measuring range.

※ Setting sensor correction (shift of value) for each channel is available. (Refer to 13.2 Input operation settings)

## 16.2 Calibration Environment

Items	Reference conditions
Ambient temperature	23°C±2°C
Ambient humidity	50% ± 10%
Power voltage	100V AC ± 1%
Power frequency	50Hz or 60Hz ± 0.5%

## 16.3 Preparation

### 16.3.1 Preparation of tools

Tools	Input types			Remarks
	DC voltage	Thermocouple	Resistance	
DC voltage current generator	○			Accuracy: Shall be better than ±0.05%
Reference junction compensator		○		0°C±0.2°C
Thermocouple for test		○		Same type of thermocouple as input type
Standard variable resistor			○	Accuracy: Shall be better than ±0.05%
3-core copper wire			○	Three copper wires shall have the same resistance value

### 16.3.2 Before calibration

- ① Attach the terminal board cover and turn power on.
- ② Keep the RD9900 series graphic recorder's power on for more than 30 minutes until it is stabilize. (The ideal warm-up period is more than 1 hour.)

#### Remarks

Adjustment

Checking and adjustment of measured values require careful work with a standard tool and other tools. When checking an adjustment of measured values are required, please contact our sales agent.

## 16.4 Connection

Connections depend upon the input types.

Connect a standard tool and other tools to the measuring input terminals to be adjusted.

### Caution

■ Turn off the source power supply before starting connection

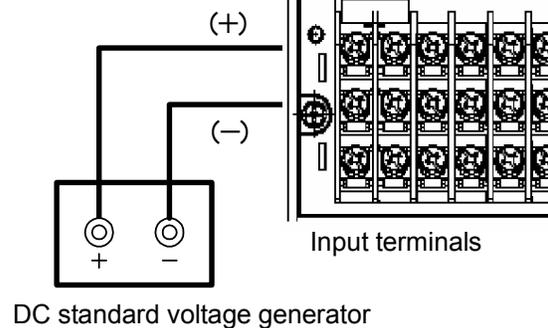
Turn off the source power supply before starting connections for the purpose of preventing an electric shock accident

① In case of DC voltage input

CH2, CH5, CH11 are for adjustment channels.  
When adjustment, connect the CH2, CH5, CH11 like right figure at same time.

CH1-CH4 are adjusted by adjustment of CH2  
CH5-CH8 are adjusted by adjustment of CH5  
CH9-CH12 are adjusted by adjustment of CH11

■ Using only CH2, CH5 for 6 channel specification

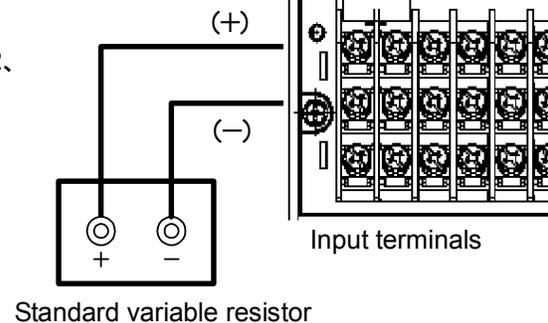


② In case of resistance thermometer input

CH2, CH5, CH11 are for adjustment channels.  
When adjustment, connect the each channel of CH2, CH5, CH11 like right figure.

CH1-CH4 are adjusted by adjustment of CH2  
CH5-CH8 are adjusted by adjustment of CH5  
CH9-CH12 are adjusted by adjustment of CH11

■ Using only CH2, CH5 for 6 channel specification

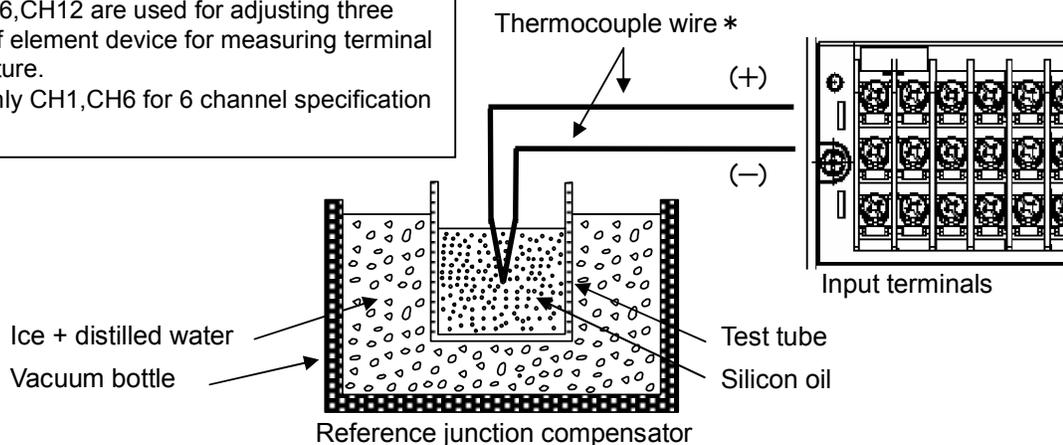


③ In case of thermocouple input

Ch2, CH5, CH11 are for adjustment channels.  
When adjustment, connect the each channel of CH2, CH5, CH11 like right figure.

■ CH1, CH6, CH12 are used for adjusting three places of element device for measuring terminal temperature.

■ Using only CH1, CH6 for 6 channel specification



The electromotive force of the thermocouple input becomes small by the electromotive force equivalent to the temperature at terminals. The instrument itself compensates for the electromotive force equivalent to the temperature at terminals. This is called reference junction compensation. Accordingly, the reference junction compensator is necessary for reducing the electromotive force compensated.

## 16.5 Zero and span adjustment

### 16.5.1 Calibration menu

- The zero and span adjustment are to be performed by entering the zero and span values of input range to each channel for adjustment.
- Move the focus to adjusting range by direction key.
- When click the enter key in adjusting range, display the calibration mode.

After clicking MENU key in operation screen, hold the HOME key for more than 5 seconds to display the calibration menu like below.

The below data show adjusted AD account value.

Group1			2006/06/09					
Real trend			1sec					
Range			Zero			Span		
6.9mV	Go	CLR	0000	0000	0000	0000	0000	0000
13.8mV	Go	CLR	0000	0000	0000	0000	0000	0000
27.6mV	Go	CLR	0000	0000	0000	0000	0000	0000
55.2mV	Go	CLR	0000	0000	0000	0000	0000	0000
69mV	Go	CLR	0000	0000	0000	0000	0000	0000
200mV	Go	CLR	0000	0000	0000	0000	0000	0000
500mV	Go	CLR	0000	0000	0000	0000	0000	0000
2V	Go	CLR	0000	0000	0000	0000	0000	0000
5V	Go	CLR	0000	0000	0000	0000	0000	0000
10V	Go	CLR	0000	0000	0000	0000	0000	0000
20V	Go	CLR	0000	0000	0000	0000	0000	0000
50V	Go	CLR	0000	0000	0000	0000	0000	0000
Pt150	Go	CLR	0000	0000	0000	0000	0000	0000
Pt300	Go	CLR	0000	0000	0000	0000	0000	0000

### 16.5.2 Adjustment of DC voltage input range

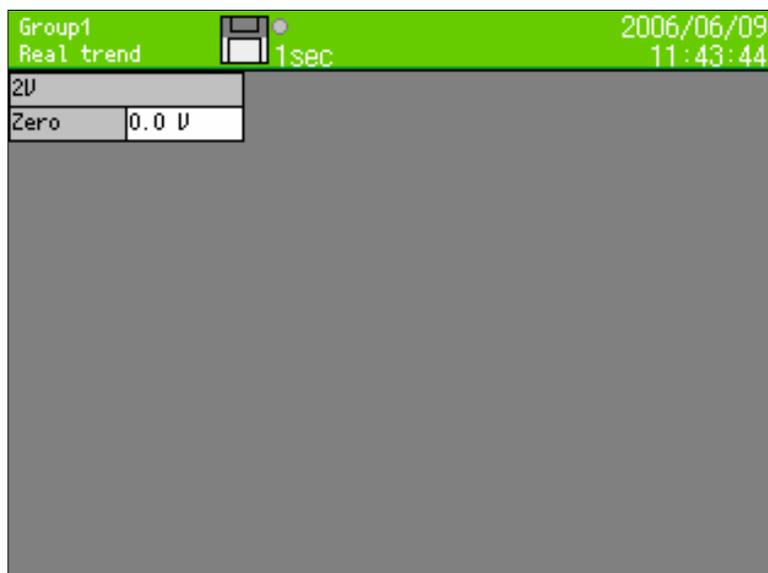
Connect like “16.4 Connection ① In case of DC voltage input”.

Connect CH2, CH5, CH11 at same time, and input the voltage of adjusting range for adjustment.

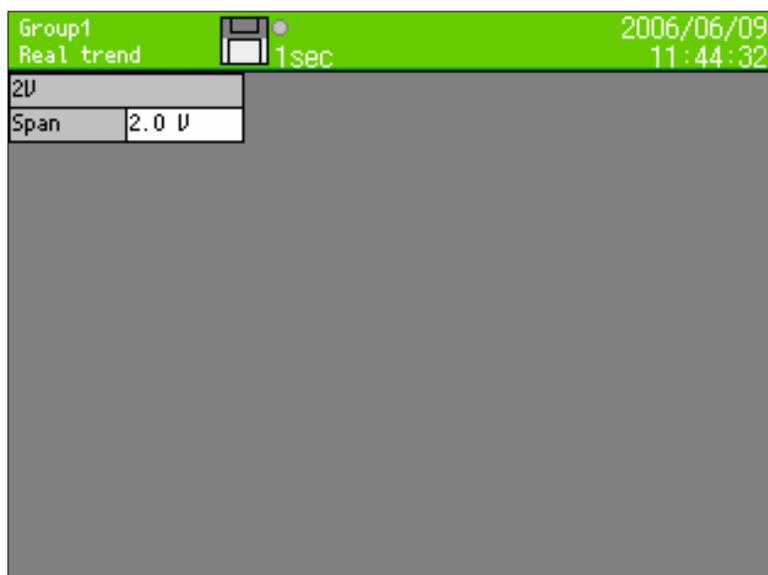
- ① Select Go of adjusting range and click the ENTER key.

Group1			2006/06/09					
Real trend			1sec					
Range			Zero			Span		
6.9mV	Go	CLR	FF87	FF78	FF67	5C20	5BCF	5BE0
13.8mV	Go	CLR	FFC7	FFC0	FFB6	69FF	69AC	69C9
27.6mV	Go	CLR	FFDE	FFDA	FFD6	67DA	678C	67B0
55.2mV	Go	CLR	FFF3	FFF0	FFF1	5913	58D6	58F2
69mV	Go	CLR	FFF5	FFF2	FFF3	6474	642F	644F
200mV	Go	CLR	FFFF	FFFD	FFFF	649D	6458	6472
500mV	Go	CLR	0002	0000	0002	68B4	6871	6898
2V	Go	CLR	0003	0001	0004	6683	6651	667D
5V	Go	CLR	FFF9	FFF2	FFF2	6648	65F0	6615
10V	Go	CLR	FFFF	FFFC	FFFE	417A	4144	415A
20V	Go	CLR	0001	FFFE	0000	63A3	6353	6372
50V	Go	CLR	0003	0000	0003	67AE	6760	678B
Pt150	Go	CLR	FFA6	FF80	FF9B	5C39	5BBB	5C29
Pt300	Go	CLR	FFDF	FFC9	FFDA	49FA	49A3	49EA

- ② The window which is indicate input voltage value is shown, then input the voltage value to the instrument.



- ③ Adjust zero  
Example) In case of adjust  $\pm 2V$  range  
• Input 0V by DC standard voltage generator
- ④ After inputting Zero for more than 5 seconds, click the ENTER key.
- ⑤ Adjust span  
Example) In case of adjust  $\pm 2V$  range  
• Input +2V by DC standard voltage generator



- ⑥ After inputting Span for more than 5 seconds, click the ENTER key.
- ⑦ After adjusting span, return to calibration menu for all rages.
- ⑧ In case of adjusting other range, repeat ① to ⑥.
- ⑨ After adjustment, click the ESC key for retuning MENU settings menu screen.

### 16.5.3 Adjustment of resistance thermometer input range

Connect like “16.4 Connection ② In case of resistance thermometer input”. Input resistance of adjusting range to each channel of CH2, CH5, CH11 for adjustment.

- ① Select Go of adjusting range, and click the ENTER key.
- ② The window which is indicate input resistance value is shown, then input the resistance value to the instrument.
- ③ Adjust zero  
 Example) In case of adjusting Pt150 range  
 · Input 100Ω by standard variable resistor
- ④ After inputting Zero for more than 5 seconds, click the ENTER key.
- ⑤ Adjust span  
 Example) In case of adjusting Pt150 range  
 · Input 157.33Ω by standard variable resistor
- ⑥ After inputting Span for more than 5 seconds, click the ENTER key.
- ⑦ After adjusting span, return to calibration menu for all rages.
- ⑧ In case of adjusting other range, repeat ① to ⑥.
- ⑨ After adjustment, each channel of CH2, CH5, CH11, click the ESC key for retuning settings menu screen. When adjust channel is opening, not adjusted that channel.

### 16.5.4 Adjustment of thermocouple input range...Adjustment of reference junction (RJ0·C)

#### Remarks

After adjusting DC voltage input range, adjusting thermocouple input range. If adjusting DC voltage input range after adjusting thermocouple input range, result of adjustment is influenced.

Connect like “16.4 connection ③ In case of thermocouple input”.  
 Connect thermocouple to each CH1, CH6, CH12 for adjustment.

- ① Before moving calibration screen, set input setting of CH1, CH6, CH12 like below.  
 (Refer to “13.2.1 Setting contents”)

Range type	Connecting thermocouple
Range	Set 1 for decimal point position of range setting value. Recommend : Reference range $\pm 13.8\text{mV}$ 、 Display resolution $0.1^\circ\text{C}$ for Measuring range (Refer to “13 Specifications ○ Measuring Range, Accuracy Rating and Display Resolution”)
R J	Internal
Burnout	None

- ② Select Go of range RJ0·C in calibration screen, and click ENTER key.

Group1			2006/06/09					
Real trend			11:41:55					
Range			Zero			Span		
27.6mV	Go	CLR	FFF9	001C	FFF0	67CE	67D2	67D6
55.2mV	Go	CLR	0001	000F	FFFC	58EE	58F1	5901
69mV	Go	CLR	0002	0000	FFFD	6446	644A	645B
200mV	Go	CLR	0005	0008	0004	6469	645E	6478
500mV	Go	CLR	0007	0006	0005	6882	6885	6893
2V	Go	CLR	0007	0005	0006	6671	666D	667C
5V	Go	CLR	FFFE	0013	FFF9	6602	6609	661D
10V	Go	CLR	0004	0009	0002	414A	414A	4159
20V	Go	CLR	0006	0009	0005	6359	635F	6372
50V	Go	CLR	0007	0007	0007	676A	6777	6785
Pt150	Go	CLR	FFA2	FFD6	FFE0	5C23	5C35	5C46
Pt300	Go	CLR	FFDB	FFEF	FDE7	8025	49D0	FFFE
Pt850	Go	CLR	FFA2	FFFF	FF6E	FFFD	3CA1	FFFD
RJ0°C	Go	CLR	0000	FFFF	0000	---	---	---

- ③ After 30 seconds elapsing, click the ENTER key.

Group1			2006/06/09					
Real trend			11:47:04					
RJ0°C								
Zero			0.0°C					

- ④ After adjusting span, return to calibration menu for all ranges.  
 ⑤ After adjustment, click the ESC key for retuning MENU settings menu screen.

#### Remarks

- When mistake inputting the value and some inconvenience occurs, try to adjust again.
- When select CLR and click ENTER key in the adjustment screen, adjustment data is cleared and is returned to the original data at the time of shipping from factory.

# 17 Recommended parts replacement interval

It is recommended to replace parts periodically as preventive maintenance for using this instrument under good conditions for a long time

## Warning

For replacement of parts, always have OMEGA-approved service personnel perform the operation. Otherwise, this instrument may not recover properly and also accident may occur. Ask OMEGA sales agent to perform parts replacement.

### 17.1 Operating Conditions

The reference parts exchange intervals are under the following standard conditions. The intervals become shorter if the surrounding conditions are worse than the standard conditions.

Items	Conditions
Temperature	20 to 25°C
Humidity	20 to 80%RH
Operation time	8 hours/day
Corrosive gas	Shall be free of corrosive gases

Items	Conditions
Others	1) A place free of dust, moisture, and soot
	2) A place free of vibrations and shocks
	3) A place where operation is not affected unfavorably

### 17.2 Reference of Parts Replacement Intervals

Part name	Exchange reference	Remarks
Power supply unit	5 years	Surrounding temperature 25°C
LCD	3 years	※
Keypad	5 years	
Relay (For mechanical alarm output)	70,000 times	Resistance load (Less than rated contact rating)
	20,000 times	Inductive load (Less than rated contact rating)
Lithium battery	5 years	

\*\* The exchange interval of the LCD is, the interval when the brightness reduces to half. The brightness reduction differs depending on the usage status.  
The replacement interval extends by using the screen saver function and by reducing the brightness.

# 18 Specifications

## ■ General Specifications

Rated power voltage: 100-240 VAC, 50/60 Hz  
(Universal power supply)

Power consumption: 50VA MAX

Operating conditions:

- Reference operating condition
  - ... Ambient temperature/humidity range  
21 to 25°C 45 to 65%RH
  - Power voltage 100 VAC  $\pm 1\%$
  - Power frequency 50/60 Hz  $\pm 0.5\%$
  - Attitude left/right 0° forward tilting 0° backward tilting 0°
  - Warm-up time: 30 minutes or more
- Normal operating condition
  - ... Ambient temperature/humidity range  
0 to 50°C, 20 to 80%RH
  - Power voltage 90 to 264 VAC
  - Power frequency 50/60 Hz  $\pm 2\%$
  - Attitude left/right 0° forward tilting 0° backward tilting 0° to 20°
- Transportation condition,
  - ... In the packed condition on shipment from the factory
  - Ambient temperature/humidity range  
-20 to +60°C, 5 to 90%RH (no dew condensation)
  - Vibrations 10 to 60 Hz, less than 0.5 G
  - Impact Less than 40 G
- Storage condition,
  - ... Ambient temperature/humidity range  
-20 to 60°C, 5 to 90% RH (no dew condensation)

Power failure protection:

FLASH memory and SRAM stores the setting.  
A FLASH memory stores the data.  
A lithium battery backs ups the clock and parameter RAM for more than 5 years (provided that the daily operating hours is longer than 8 hours).

Insulation resistance:

Between secondary and protective conductor terminals  
..... More than 20 M $\Omega$  at 500 VDC

Between primary and protective conductor terminals  
..... More than 20 M $\Omega$  at 500 V DC

Between primary and secondary terminals  
..... More than 20 M $\Omega$  at 500 VDC

Between alarm output (mechanical relay) and other secondary terminal  
..... More than 20 M $\Omega$  at 500 VDC

Primary terminals: Power terminals (L, N),  
Secondary terminals: Input terminals,

Dielectric strength:

Between secondary and protective conductor terminals  
..... 1 minute at 500 V AC

Between primary and protective conductor terminals  
..... 1 minute at 1500 V AC

Between primary and secondary terminals  
..... 1 minute at 2300 V AC

Primary terminals: Power terminals (L, N),  
Secondary terminals: Input terminals,

Case assembly material: Door flame.....ABS resin

Case and power supply material..... Steel

Color: Door frame..... Black (Equivalent to Munsell N3.0),  
Case.....Gray (Equivalent to Munsell N7.0)

Weight: Approx. 2.2 kg

Mounting: Panel mounting

Clock accuracy:  $\pm 2$  minutes per 30 days (excluding errors due to power ON/OFF under the reference operating conditions.)

Terminal screws: Power terminal.....M4.0  
Protective conductor terminal.....M4.0  
Input terminals.....M3.5  
Alarm output terminals.....M3.5  
Digital input terminal.....M3.5  
Communication terminals.....M4.0

## ■ Standards

CE marking: EN61326+A1 Class A

EN61000-3-2+A14,

EN61000-3-3,

En61010-1+A2

(Approval pending)

IP: IEC529 IP54 (front part) compliance (Approval pending)

## ■ Input Specifications

Measuring points: KR2160... 6 points,  
KR2120... 12 points

Input types: Universal

DC voltage...  $\pm 13.8$  mV,  $\pm 27.6$  mV,  
 $\pm 69.0$  mV,  $\pm 200$  mV,  
 $\pm 500$  mV,  $\pm 2$ V,  $\pm 5$ V\*,  
 $\pm 10$ V\*,  $\pm 20$ V\*,  $\pm 50$ V\*  
(\* With built-in shunt resistors)

DC current... Available by adding external shunt resistor

T/C... B, R, S, K, E, J, T, N,  
NiMo-Ni, CR-AuFe,  
PtRh40-PtRh20,  
WRe5-WRe26, W-WRe26,  
Platinel II, U, L

RTD... Pt100,  
JPt100, Pt50, Pt-Co

Range setup: Setting of input types and ranges by key operation.

The measuring range is selected automatically according to the set range.

Scale setup: Setting of minimum values, maximum values and engineering units by key operation.

Accuracy rating: See table of inputs.

Temperature drift:  $\pm 0.01\%$  of full scale/ $^{\circ}$ C [Other input types than the resistance thermometer inputs are converted into the reference range (see the Accuracy Rating table)]

Sampling rate: KR2160... 0.1 second / 6 points  
KR2120... 0.1 seconds / 12 points

Reference junction (RJ) compensation accuracy:

K, E, J, T, N, Platinel II ... Maximum  $\pm 0.5^{\circ}$ C  
R, S, NiMo-Ni  
CR-AuFe  
WRe5-WRe26,  
W-WRe26, U, L ..... Maximum  $\pm 1.0^{\circ}$ C

(The above errors are added to the accuracy ratings for the internal reference junction compensation)

Input resolution: Approx. 1/32,000 (converted into reference range)

Burnout: Signal disconnection detection for thermocouple and resistance thermometer inputs.

Up-scale burnout, down-scale burnout or burnout disabled can be selected for each input.

Allowable signal source resistance:

Thermocouple inputs (burnout disabled), DC voltage inputs (max.  $\pm 2$  V) ..... Less than 1 K $\Omega$

DC voltage inputs ( $\pm 5$  to 50 V) ... Less than 100  $\Omega$

Resistance thermometer inputs (Pt100, JPt100)

... Less than 10  $\Omega$  per wire -- common for 3 wires

Input resistance: Thermocouple input  
 ... Approx. 1 MΩ  
 DC voltage input  
 ... Approx. 1 MΩ at less than ±2 V,

Maximum input voltage:  
 Thermocouple inputs (burnout disabled),  
 DC voltage inputs (max. ±2V) Maximum ±10V DC  
 DC voltage inputs (±5 to 50 V) Maximum ±60V DC  
 Thermocouple inputs (burnout enabled),  
 resistance thermometer inputs Maximum ±60V DC

Maximum common mode voltage: 30V AC

Common mode rejection ratio: Minimum 120dB (50 or 60Hz)

Series mode rejection ratio: Minimum 50dB (50 or 60Hz)  
 However, when it contains a thing for the signal and the peak value of the noise is equal to or less than 1.5 times the standard range.

## ■Recording Specifications

Internal memory: 4MB

Recording cycle:

Second	0.1, 0.2, 0.5, 1, 2, 3, 5, 10, 15, 20, 30 sec
Minute	1, 2, 3, 5, 10, 15, 20, 30, 60 min

Recording data:

- Measured data (simultaneous storage of max. 5 files)
  - Measured data
  - Group name, recording start date/time, recording cycle, measured data, alarm data, maker text
  - Programmed parameters All parameters

Recording measured data: 4-byte binary/1 data  
 (Recording maximum and minimum value 6 byte/1 data)

Recording into internal memory:

.\*The following conditions can be selected.

- Key operations
- Trigger signals (alarm activation)
- Start/end by day and time
- \*Pre-triggering recording available with the key operations and trigger signals
  - Pre-triggering measuring count =950 data
- \*Recording cycle can be programmed for each file

Memory usage display:

The amount of memory used in each file is displayed on the operation screens by icon.

External memory: • CF card  
 (FAT16, FAT32 formatted)

## ■Display Specifications

Display: 5.6-inch TFT color LCD  
 (316x234 dots: 111.36mmX83.52mm)

Trend display colors: 12 colors (selectable)

Operation screens:

Screens are switched with the DISP. Key, scroll key and ENTER key.  
 Screens of 5 groups can be switched except for the Alarm Summary screen (max. 44 channels/1 group).

- Trend screens:
  - One of the Real-time Trend, Historical Trend or Dual Trend displays can be selected.
  - (scale plate and pointer displays) Vertical or horizontal orientation selectable. Data display enabled or disabled selectable. Scrolling available.
- Bar graph screen...Data display enabled or disabled selectable.
- Data screen... (Data + Tag + Engineering unit + Alarm activated status)

Alarm summary screen: Current alarm output status + alarm log (Channel, level, alarm event time)

Skipping: On the Trend and Data screens, the channels to be skipped in display can be set for each group.

Scrolling: On the Historical Trend screens, previous data can be referred with the cursor operation.

- Historical Trend...Entire Memory file area
- Dual Trend...Enables on the historical trend screen only.

Display (Historical Trend): Historical data is displayed by specifying a file.  
 Data logging is continued.

- \* Display by scrolling or by time specified.
- \* Enables to display from a CF memory card.

Data search (Historical Trend):  
 Historical trend display by selecting from alarm display, marker list

Marker display: Marker can be displayed on the real-trend screen by the key operation or by digital input and stored in a message data file.

- ※ Pre-registration of marker text  
 (Maximum 50 texts, Maximum 30 characters / Text).

Display updating interval: Same as storing interval  
 LCD saver: When no key is operated for the specified period of time, the back-light is OFF. The period can be set from 1-60 minutes..

## ■Programming/Operation Specifications

Key types: 14

START, STOP, SCROLL, CURSOR, MARKER, DISP, HOME, MENU, ESC, ENTER,

Direction key: right, left, up, down

HOME setting:

- Input parameter setting
- Storage interval setting
- Specifications confirmation

MENU setting:

- Input and arithmetic setting
- Display setting
- Alarm setting
- File setting
- Totalizer reset setting
- Schedule setting
- Marker text setting
- Memory operation
- Network setting
- System setting

## ■ Alarm Specifications

Number of alarms that can be set: Up to 4 alarms/channel

Alarm types: Upper limit, lower limit, differential higher limit, differential lower limit

Alarm memory: Stores alarm event/cancellation time, alarm types  
 \* Storage of latest 200 common channels

Alarm output (Option): 12 points

○ Measuring Range, Accuracy Rating and Display Resolution

Note) For the accuracy under the reference operation condition and for thermocouple inputs (internal RJ), the reference junction compensation accuracy is not included.

Input type	Measuring range	Reference range	Accuracy rating	Display resolution	Input range	Measuring range	Reference range	Accuracy rating	Display Resolution				
THERMOCOUPLE	K	-200.0 to 300.0 °C	±13.8 mV	0.1 °C	DC Voltage	-13.80 to 13.80 mV	±13.8 mV	±0.1% ±1digit	10µV				
		-200.0 to 600.0 °C	±27.6 mV	0.1 °C		-27.60 to 27.60 mV	±27.6 mV		10µV				
		-200 to 1370 °C	±69.0 mV	1 °C		-69.00 to 69.00 mV	±69.0 mV		10µV				
	E	-200.0 to 200.0 °C	±13.8 mV	0.1 °C		-200.0 to 200.0 mV	±200.0 mV		100µV				
		-200.0 to 350.0 °C	±27.6 mV	0.1 °C		-500.0 to 500.0 mV	±500.0 mV		100µV				
		-200 to 900 °C	±69.0 mV	1 °C		-2.000 to 2.000 V	±2 V		1 mV				
	J	-200.0 to 250.0 °C	±13.8 mV	0.1 °C		-5.000 to 5.000 V	±5 V		1 mV				
		-200.0 to 500.0 °C	±27.6 mV	0.1 °C		-10.00 to 10.00 V	±10 V		10 mV				
		-200 to 1200 °C	±69.0 mV	0.1 °C		-20.00 to 20.00 V	±20 V		10 mV				
	T	-200.0 to 250.0 °C	±13.8 mV	0.1 °C		-50.00 to 50.00 V	±50 V		10 mV				
		-200.0 to 400.0 °C	±27.6 mV	0.1 °C	Resistance thermometer	Pt100 (JIS'97)	-140.0 to 150.0 °C	160 Ω	±0.15% ±1digit	0.1 °C			
	R	0 to 1200 °C	±13.8 mV	1 °C		-200.0 to 300.0 °C	220 Ω	±0.1% ±1digit	0.1 °C				
		0 to 1760 °C	±27.6 mV	1 °C		-200.0 to 850.0 °C	400 Ω	±0.1% ±1digit	0.1 °C				
	S	0 to 1300 °C	±13.8 mV	1 °C		JPt 100	-140.0 to 150.0°C	160 Ω	±0.15% ±1digit	0.1°C			
		0 to 1760 °C	±27.6 mV	1 °C			-200.0 to 300.0°C	220 Ω					
	B	0 to 1820 °C	±13.8 mV	1 °C		-200.0 to 649.0°C	400 Ω	±0.1% ±1digit	0.1 °C				
		N	-200.0 to 400.0 °C	±13.8 mV		0.1 °C	Pt50	-200.0 to 649.0 °C	220 Ω	±0.1% ±1digit	0.1 °C		
	W-WRe26		0 to 2315 °C	±69.0 mV		1 °C	Pt-Co	4.0 to 374.0 K	220 Ω	±0.15% ±1digit	0.1 K		
	WRe5-WRe26	0 to 2315 °C	±69.0 mV	1 °C		Resistance thermometer	JPt 100	-140.0 to 150.0°C	160 Ω	±0.15% ±1digit	0.1°C		
	PtRh40-PtRh20	0 to 1888 °C	±13.8 mV	1 °C				-200.0 to 300.0°C	220 Ω				
	NiMo-Ni	-50.0 to 290.0 °C	±13.8 mV	0.1 °C	-200.0 to 649.0°C			400 Ω					
		-50.0 to 600.0 °C	±27.6 mV	0.1 °C	Pt50			-200.0 to 649.0 °C	220 Ω			±0.1% ±1digit	0.1 °C
		-50 to 1310 °C	±69.0 mV	1 °C				Pt-Co	4.0 to 374.0 K			220 Ω	±0.15% ±1digit
	CR-AuFe	0.0 to 280.0 K	±13.8 mV	0.1 K	Exception of accuracy rating				Input range			Measuring range	Accuracy rating
		Platinel II	0.0 to 350.0 °C	±13.8 mV				0.1 °C	K, E, J, T, L			-200 to 0 °C	±0.2%±1digit
	0.0 to 650.0 °C		±27.6 mV	0.1 °C				R, S	0 to 400 °C			±0.2%±1digit	
	0 to 1395 °C		±69.0 mV	1 °C				B	0 to 400 °C			Not specified	
	U	200.0 to 250.0 °C	±13.8 mV	0.1 °C				400 to 800 °C	±0.15%±1digit				
-200.0 to 500.0 °C		±27.6 mV	0.1 °C	N, U		-200 to 0 °C	±0.3%±1digit						
L	-200.0 to 600.0 °C	±69.0 mV	0.1 °C	W-WRe26		0 to 100 °C	±4%±1digit						
	-200.0 to 250.0 °C	±13.8 mV	0.1 °C	100 to 400 °C		±0.5%±1digit							
	-200.0 to 500.0 °C	±27.6 mV	0.1 °C	PtRh20-PtRh5		0 to 100 °C	±4%±1digit						
-200 to 900 °C	±69.0 mV	1 °C	100 to 400 °C	±0.5%±1digit									
RESISTANCE THERMOMETER	Resistance thermometer	JPt 100	±0.15% ±1digit	0.1°C	PtRh40-PtRh20	0 to 300 °C	±1.5%±1digit						
					300 to 800 °C	±0.8%±1digit							
					CR-AuFe	0 to 20 K	±0.5%±1digit						
						20 to 50 K	±0.3%±1digit						
					Pt100('97)	700 to 850 °C	±0.15%±1digit						
					Pt-Co	4 to 50 K	±0.3%±1digit						

P t 1 0 0 : IEC751 (1995),  
JIS C1604-1997  
JPt100: JIS C1604-1981,  
JIS C1606-1989  
P t 5 0 : JIS C1604-1981

K, E, J, T, R, S, B, N: IEC584, JIS C1602-1995,  
U (Cu-CuNi), (Fe-CuNi): DIN43710  
W-WRe26, WRe5-WRe26, PtRh40,  
PtRh20, NiMo-Ni, CR-AuFe, PlatinelII: ASTM

# Appendix A. Report Application (Sample)

## Note

This Application is the Sample Application. Queries related to usage method and defects cannot be answered. Please understand it before using.

Daily / Monthly reports can be created by using the report application included in the auxiliary CD. Installation operations on the PC are required for using this application. Moreover, Excel (97 or higher) should be installed.

In this software, data is acquired in this instrument and edit is executed on the basis of the data imported on the PC. CSV format file can be used for the data.

## A-1 Operation environment

OS	Windows98, Me, Windows2000, XP
CPU	CPU higher or equivalent to Pentium300MHz
Memory	64MB or above
Others	Excel (Microsoft Corp.) 97 or higher is necessary

## A-2 Installation method

Insert the CDROM in the CD drive of the PC in which the report application is to be used, and run the "setup.exe" in the "report(English)" folder. Install according to the screen instructions when the installation starts.

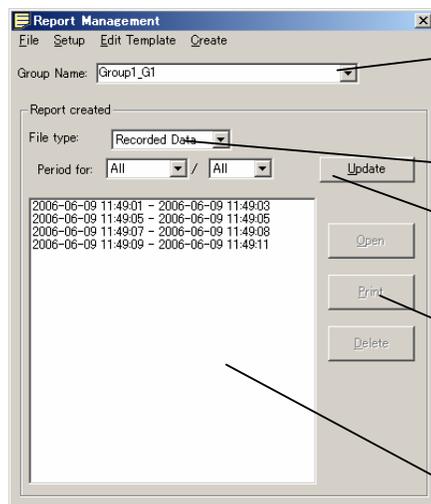
## A-3 Uninstallation method

Open "Add and Delete program (addition and deletion of the program depending on the OS)" from the control panel and delete the report application.

## A-4 Operation method

### A-4-1 Main screen

On activating main screen is displayed. Various operations are carried out considering this screen as base point.



Select the group to be operated. Group name based on the data of the specified acquired data folder by settings is registered in list. Enter the group by using keyboard when there is no group to be selected.

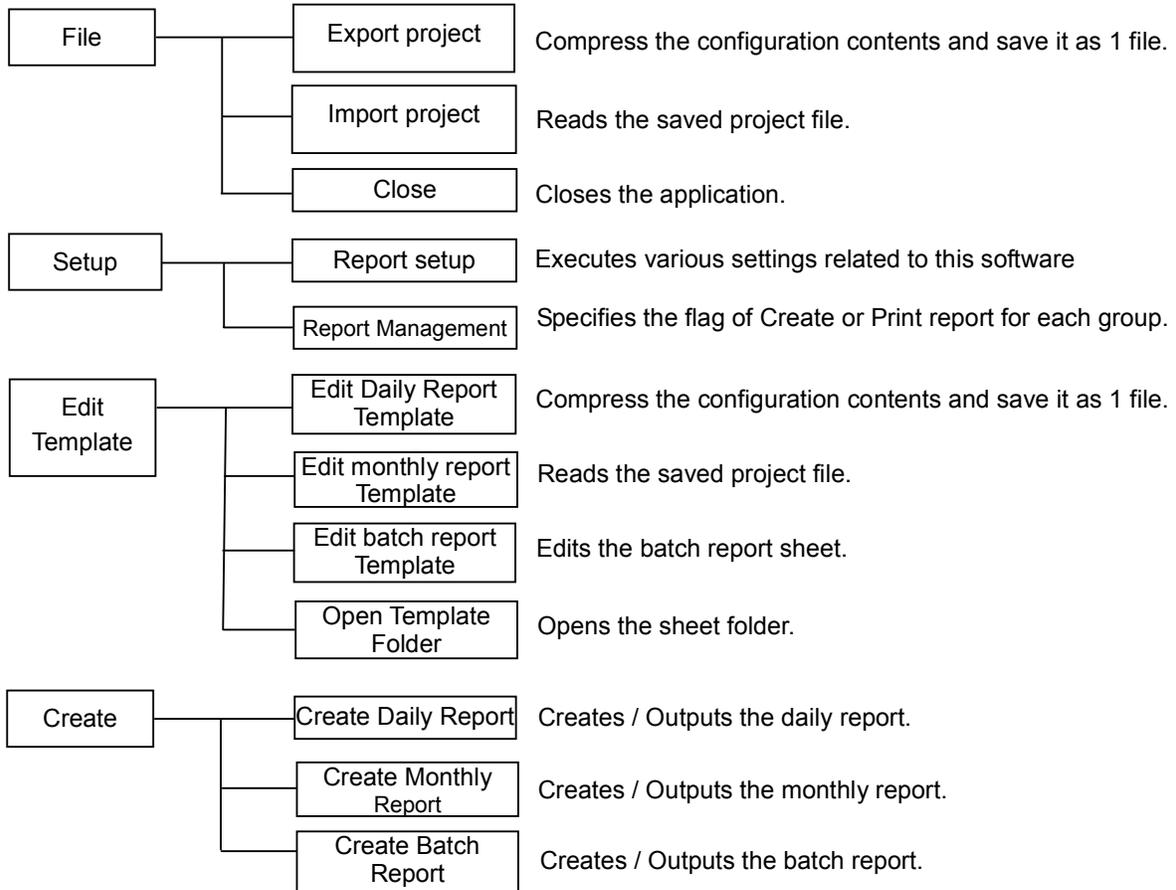
The created report file with the specified conditions, is displayed in the list box given below.

Update the contents from the following list box to the latest status.

Operations such as "Open" "Print" "Delete" can be executed for the file selected in the list box on the left.

In the specified folder, the date and time of the daily report file that matches with the conditions specified in the above combo box is displayed in list.

## A-4-2 Menu structure

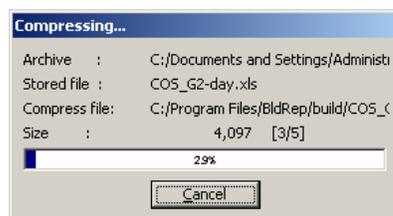


## A-4-3 Exporting Project

Specify the save destination and the file.

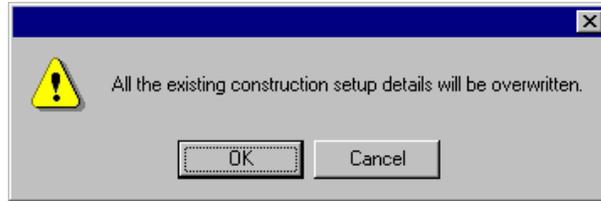


File is created by saving the compressed file.



#### A-4-4 Importing project

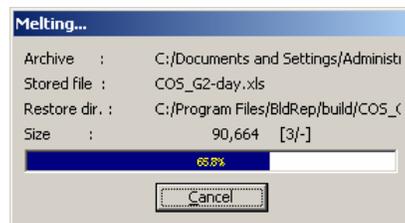
- ① Confirmation dialog box for overwriting the configuration is displayed. Click “OK”.



- ② Select the file to be read.



- ③ Read the file.



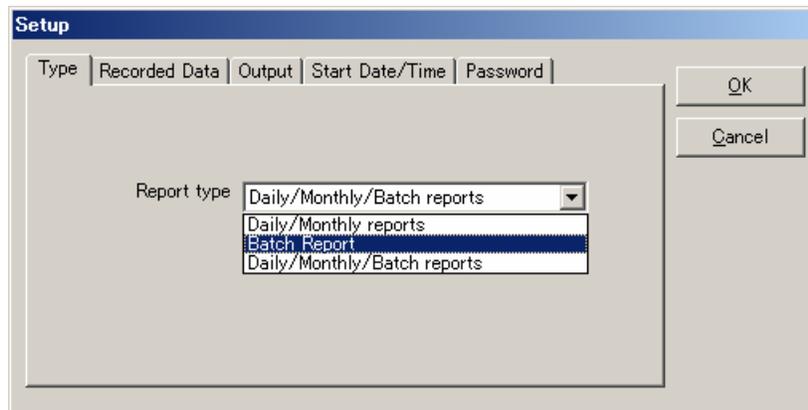
#### A-4-5 Report settings

Setting tab for type, acquired data, output, print, date origin and password is displayed. Respective tab contents are described below.

(Type)

Select the report type to be used from the following 3 patterns.

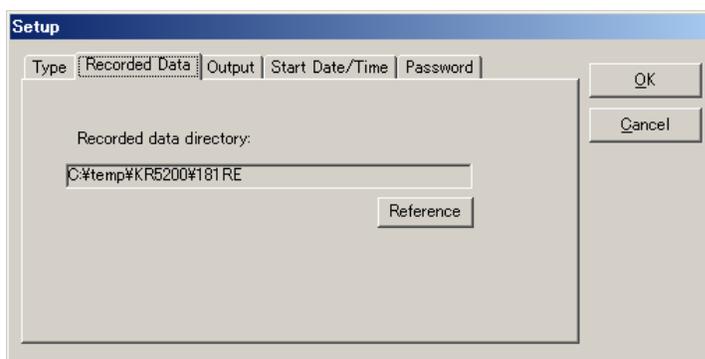
- Daily report and Monthly report
- Batch report
- Daily report, Monthly report and Batch report



Daily report...Create by collecting the acquired data of 1 day  
Monthly report...Create by collecting the daily report of 1 month  
Batch report...Create the batch report corresponding to the acquired data file

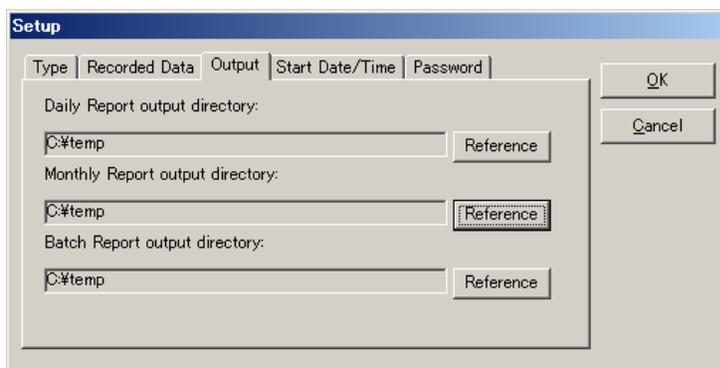
(Acquired data)

Specify the folder in which the acquired data is saved. Use the folder selection screen by clicking “Browse” for setting. Copy the file of this instrument in this directory or specify the data saving directory of CF card so that CF card can be inserted while creating the report.  
Only the CSV format file can be used for the acquired data. Set the “Save format” to “CSV” by setting the file of this instrument.



(Output)

Specify the output destination (save destination) of the report file. Use the folder selection by clicking the “Browse” for setting. Required setting items are displayed by selecting the “Type” tab. Following figure is the case of Daily report / Monthly report.

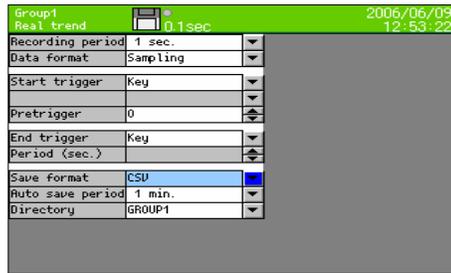


## RD9900 Settings

Set RD9900 as shown below for using the Report application.

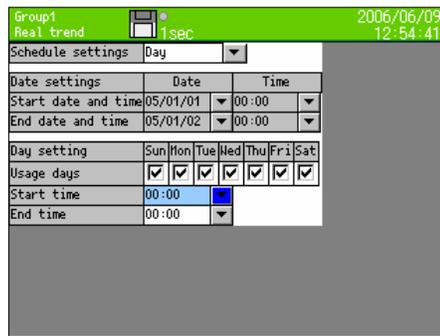
File save format

Select "CSV" for the file save format. This Application cannot be used in case of Binary.



Schedule settings

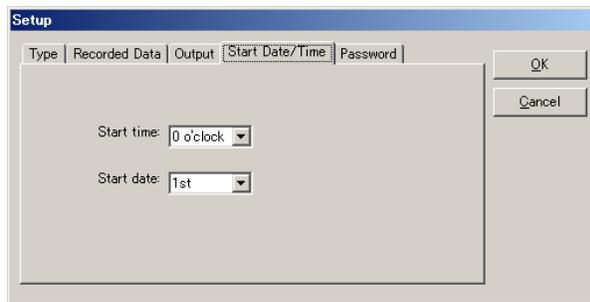
In case to use the daily report, select "Day" by RD9900 schedule settings and put a checkmark for the required day. It is convenient as the file is split on setting the start time and the end time to the date and time of the daily report.



(Start Date/Time)

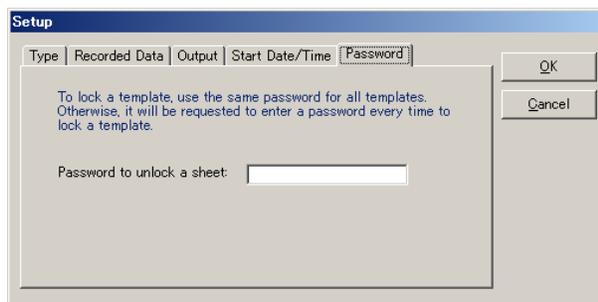
Set the time of the 1<sup>st</sup> day in case to create the daily report and the date of the starting of the month in case to create monthly report.

Decide whether to use which time range by using these settings while creating daily or monthly report.



(Password)

Register the password when the report sheet is locked with password. Use the same password for all the sheets. When the sheet is locked, password is not set or in case of error settings, it cannot be created.

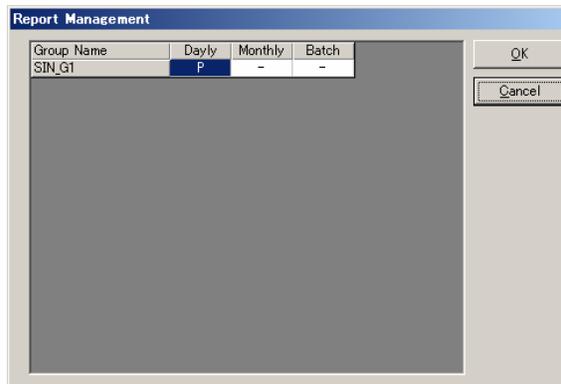


### A-4-6 Report Management

Specify whether to create report for each group.

Changes from \*→(Blank)→P on clicking each frame. “-” indicates that the sheet is not created. Report is not created for the group for which the sheet is not created.

Report is created for the group having \* mark and not created for the group having (Blank) mark. For the group with P mark, report is created and then printed.



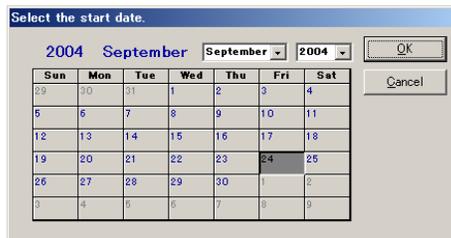
### A-4-7 Edit sheet

Edit sheet is explained in A-5 Edit Report Sheet.

### A-4-8 Create daily report

Daily report of the groups marked with \* mark in the daily report column of report management is created on the basis of the contents in daily report sheet.

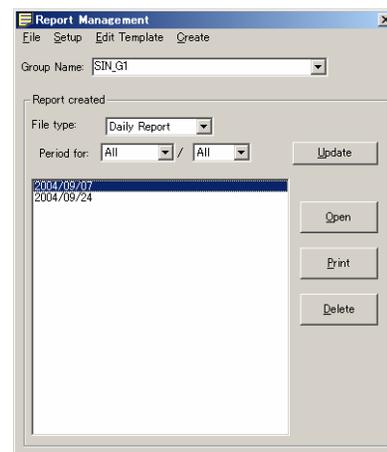
1. Specify the period for creating the daily report. Select the start date and the end date.



2. Daily report is created after reading the acquired data.



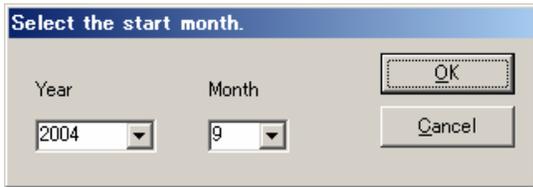
3. On creating the daily report, it is added in the “Created Reports” list.



### A-4-9 Create monthly report

The monthly report of the groups marked with \* mark in the monthly report column of the report management are created on the basis of contents on monthly report sheet.

- ① Specify the period for creating the monthly report. Select the start month and the end month.



A dialog box titled "Select the start month." with a blue header bar. It contains two dropdown menus: "Year" with "2004" selected and "Month" with "9" selected. There are "OK" and "Cancel" buttons.



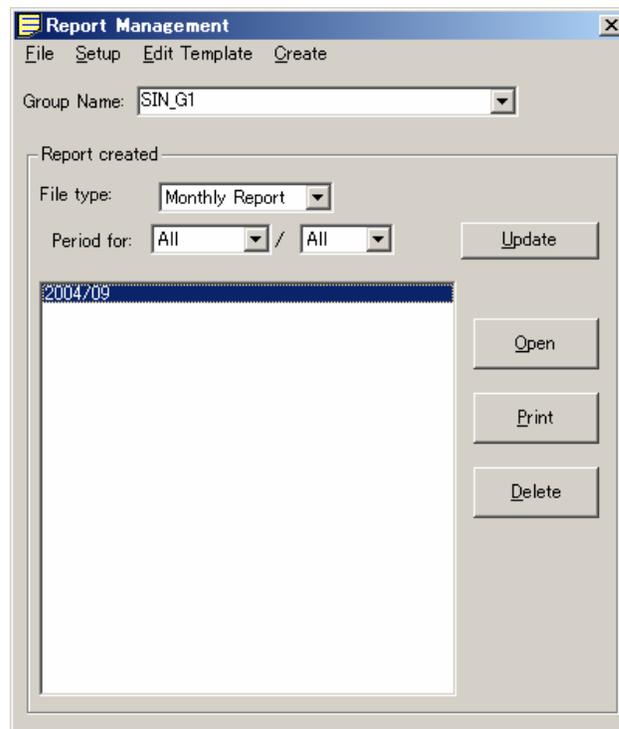
A dialog box titled "Select the end month." with a blue header bar. It contains two dropdown menus: "Year" with "2004" selected and "Month" with "9" selected. There are "OK" and "Cancel" buttons.

- ② Create a monthly report after reading the daily report.



A dialog box titled "2004/09 Createing monthly report..." with a blue header bar. It contains a large empty rectangular area and a "Cancel" button at the bottom.

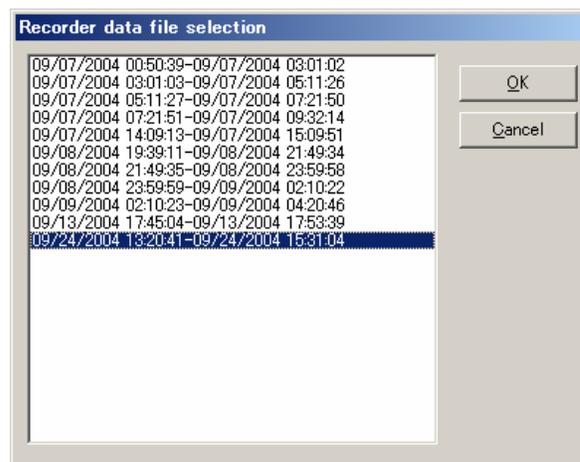
- ③ On creating the monthly report, it is added in the "Created Reports" list.



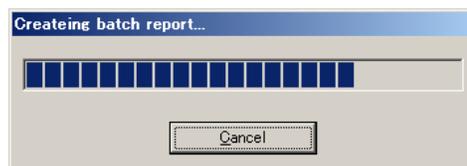
The "Report Management" window has a menu bar with "File", "Setup", "Edit Template", and "Create". The "Group Name" dropdown is set to "SIN\_G1". Under "Report created", the "File type" is "Monthly Report" and "Period for" is "All / All". There are "Update", "Open", "Print", and "Delete" buttons. A list box shows "2004/09" selected.

## A-4-10 Create batch report

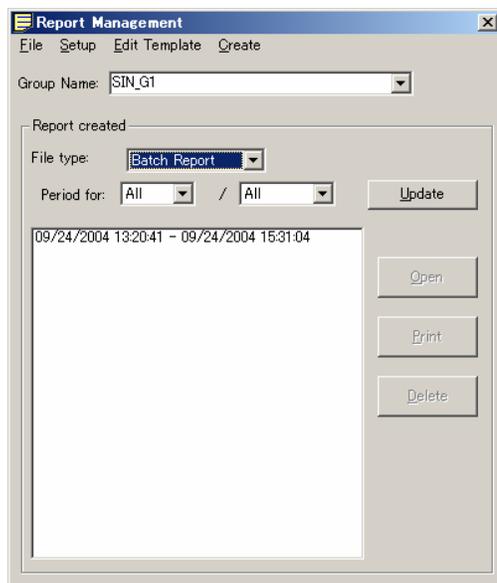
- ① Select the acquired data file to be considered as report.



- ② Read the acquired data and create the batch report.



- ③ On creating the batch report, it is added in the "Created Reports" list.



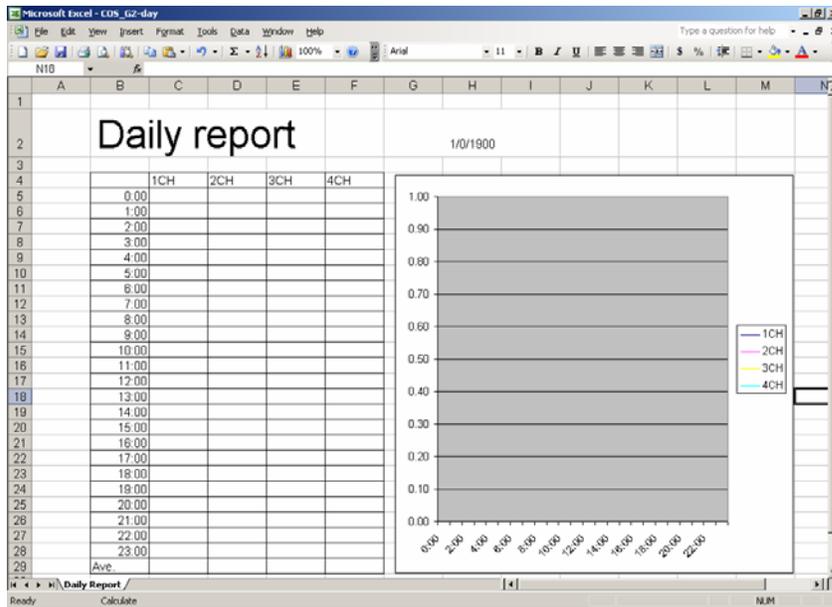
## A-5 Edit Report Sheet

Each report is created on the respective sheets. Frame of the table, formula, fixed character indicating the cell contents and settings related to printing should be created for the sheet beforehand.

### A-5-1 Edit Daily Report

In daily report sheet, the contents created on “daily report” sheet are output as daily report.

- Create frame, fixed character string etc. for the daily report.



- ② Open the input screen by double-clicking on the cell where the data is to be pasted.

Select the function applied to inserted data.

Select the data channel. If “Recording time” is selected, the time is computed in place of data. Use this for displaying time in the report.

Use this area when the input setup is to be input consecutively in the time or channel direction.

Select whether the computations such as averaging or maximum are applied to the entire day or to the data of specified time range.

Becomes blank when a result is an error.

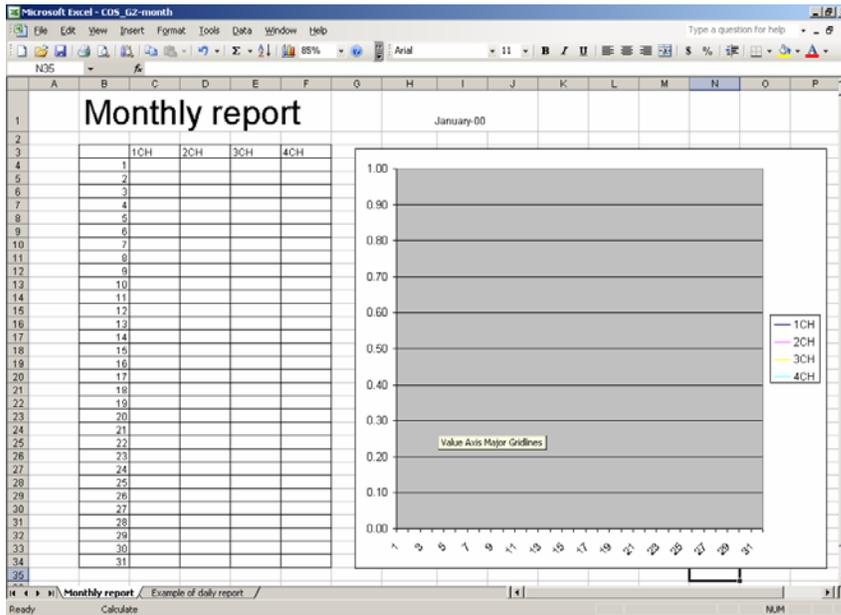
When this is checked and the computation result is an error, the result is displayed as a blank instead of an error indication.

- ③ After setting each item, Formula is written in the cell on clicking “OK”.
- ④ After the creation is complete, ‘Save as’ the file and then close it.

## A-5-2 Edit monthly report sheet

In monthly report sheet, the contents created on “monthly report” sheet are output as monthly report.

- ① Create frame, fixed character string etc. for the monthly report.



- ② Open the input screen by double-clicking on the cell where the data is to be pasted.

Specify the position of daily report data to be used. When the cursor is placed here, the daily report contents are displayed; click on the desired cell.

Use this area when the input setup is to be input consecutively in the time or channel direction.

Select whether a computation such as averaging or maximum is applied to the entire month or to the data of the specified days. When [Specified days] is selected, it is not permitted to select the function type but the data in the specified position of the specified day. is loaded simply.

Select the computation to be applied to the data.

When this is checked and the computation result is an error, the result is displayed as a blank instead of an error indication

- ③ After setting each item, Formula is written in the cell on clicking “OK”.
- ④ After the creation is complete, ‘Save as’ the file and then close it.



