INST.NO.INE-347A

CHINO

Ubiquitous Recorder

KR5000

General

INSTRUCTIONS

Thank you for purchasing a KR5000 Series Ubiquitous Recorder.

To ensure the safe and correct use of this instrument and in order to prevent troubles occurring, please read this manual thoroughly.

CHINO

- CONTENTS -

1. SAFETY PRECAUTIONS (⚠ WARNING)

The following “Safety Precautions” are given in order to ensure the correct use of the instrument and to help prevent human injury or damage to property from occurring. Please read and understand this chapter carefully and observe the warnings and cautions in them thoroughly.

1. Preconditions for Use

This instrument has been designed for indoor use.

2. Labels Attached to the Appliance

This instrument carries the following safety warning labels.

Label	Name	Description
	Alert symbol	Indicates a location that carries a risk of electric shock or injury.
	Protective conductor	Indicates that the power supply should be grounded in order to prevent electric shock.

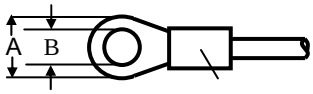
3. Warning and Caution Symbols Used in This Manual

The information for ensuring the safe use of the instrument and to help protect it against damage or unexpected events is classified according to its importance by using the symbols listed in the following table.

 **WARNING**	If the information given under this symbol is not observed, a risk of death or critical injury to the user may result.
 **CAUTION**	If the information given under this symbol is not observed, risks including user injury or property damage may result
	If the information given under this symbol is not observed, the instrument may be unable to manifest its full performance.
	The information given under this symbol supplements the description in the manual and is useful for the operation of the instrument.

⚠WARNING

The following warnings are critical for the prevention of risks of injuries and accidents.
Be sure to read them carefully, understand them well and observe them strictly.

<table>
<tr><td>1. Installation location</td><td>• This instrument is a component type. Before use, install it in an instrumentation panel or system to make sure that the user cannot touch the power terminals, etc. directly.
• This instrument is not designed to be waterproof or dustproof. Before use, install it on a DIN rail (35 mm) and on a panel that is located indoors.</td></tr>
<tr><td>2. Terminal cover</td><td>• To prevent electric shock, be sure to attach the terminals cover in order to make sure that the user cannot touch them directly.</td></tr>
<tr><td>3. Cable termination</td><td>• Always attach an insulation sleeve to the O-shaped solderless terminal before connecting the terminal to the cable.
<table><tr><th>Thread diameter</th><th>Securing torque</th><th>A</th><th>B</th></tr><tr><td>M4</td><td>1.2 N-m</td><td>8.4 or less</td><td>4.3 or more</td></tr></table> 
Use T=0.8 insulation sleeve.</td></tr>
<tr><td>4. Circuit breaker for the power supply</td><td>• This instrument does not incorporate a replaceable circuit breaker. Be sure to install a replaceable circuit breaker in the power supply circuit for this instrument, at a position within convenient reach or less than 3 meters from the instrument.
An attached power circuit breaker should comply with IEC947-1 and IEC947-3.</td></tr>
<tr><td>5. Confirmation of supply voltage and grounding</td><td>• Before supplying power to the instrument, make sure that the power supply is connected properly, the supply voltage and power source are as specified and that they are grounded properly.</td></tr>
<tr><td>6. Inhibition of use in a flammable atmosphere</td><td>• Do not use or store this instrument in a flammable or corrosive gas atmosphere.</td></tr>
<tr><td>7. Repair and modification</td><td>• When maintenance is required, please contact your nearest CHINO distributor, agent or dealer. Never have a person other than CHINO-qualifier personnel replace the parts, service or modify the instrument in any way.</td></tr>
<tr><td>8. Long-term storage</td><td>• When this instrument is to be stored for a long period, store it at ambient temperatures of between 0 and 50°C (32 and 122°F).</td></tr>
</table>

2. MAIN FEATURES AND FUNCTIONS

2-1 Features

This instrument is a network-compatible recorder, which can be connected to an Ethernet for collection and recording of a maximum of 128 items of field measurement data. The recorded data can be monitored in the web browser window of any PC connected to an intranet or to the Internet. The recorded data can also be transferred by means of FTP or by E-mail. A MODBUS (for the target equipment, see the communication input specifications in section 19 “Specifications”) and KE3000 input unit (KE3310) are provided for use in connecting to the measuring equipment. This instrument can be used in a wide range of applications from traditional applications for a paper-less recorder to a remote monitoring system.

2-2 General Recording Specifications

• Number of recording points: 128 points (16 points x 8 groups), 64 points (16 points x 4 groups), 32 points (16 points x 2 groups) or 16 points (16 points x 1 group).
Chart display, recording files, etc. are handled on a per-group basis.

• Recording interval: 1 sec. to 60 min. (The data updating interval is dependent on input instruments.)

• Recording method: Data is recorded in the RAM at every recording interval, and the RAM data is recorded on a Compact Flash card (128 MB) at every 8 recording intervals or at the time that recording is stopped. If this instrument is switched off during recording, the unwritten data in the previous measurement session is recorded the next time that the instrument is switched on. When recording is stopped or 7824 recording intervals have elapsed, the data recorded until then is delimited in a single file. The maximum number of files for each group is as follows.

128-point version: 31 files
64-point version: 63 files
32-point version: 127 files
16-point version: 255 files

• Recorder display method: A Java applet is executed on the browser. The communication between the PC and this instrument employs UDP/IP.
The screen can be split into a maximum of 8 fields and the recorded data of the desired group can be displayed in each of them. The size of each field can be varied as desired.

• Recorder display types: Real-time trend, historical trend, data display, bar graph display, alarm display, file lists (this instrument and PC), message summary.

3. TYPE/ACCESSORY CHECK

3-1 Checking the Type

This instrument carries a type code in its model number as shown below.

Check the type on the nameplate attached at the top of the case.

KR5□00-000

└──── Input instrument type

1: MODBUS instruments (SE, AL, AH, KE, BR or LT series)

3: KE3000 input unit (KE3310-000)

3-2 Checking the Accessories

The package of this instrument includes the following accessories. Please check them before use.

Item	Q'ty	Remark
① Installation/Connection Manual	1	
② CD-ROM	1	Instruction Manual pdf file (Japanese / English), Report application(Japanese / English), Java runtime installer

4. INSTALLATION

4-1 Precautions for Installation

⚠ CAUTION

1. Industrial environment

Select a place being separated from electric field and magnetic field generating sources and also free of mechanical vibrations and shocks.

- Overvoltage Category II
- Pollution Degree 2
- Altitude..... 2000m or lower
- Working place ……..……Indoors

2. Atmosphere

- Avoid places with flammable gases.
- Select a location free of dust, soot or steam.

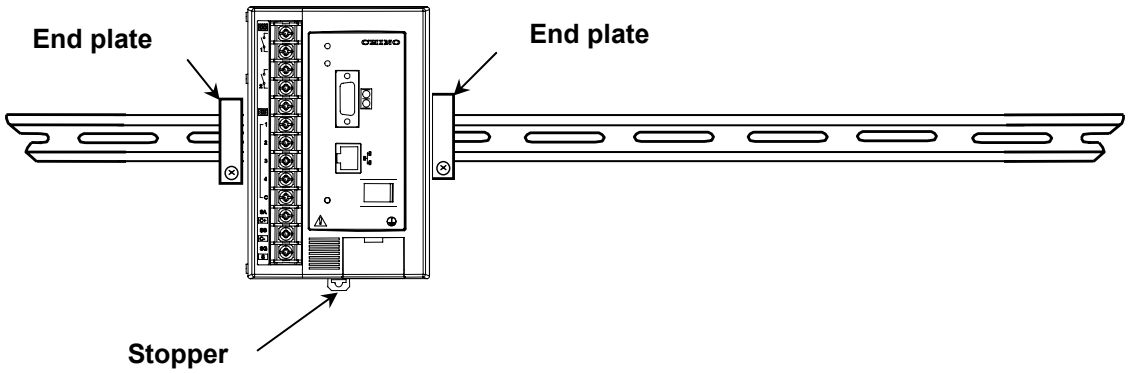
3. Ambient temperature

Make sure not to expose your recorder to direct sunlight and not to closely place other materials to it for preventing rise of its temperature.

- The recommended ambient temperature and humidity are about 23°C and about 50%RH.
- Make sure not to expose your recorder to hot air higher than 70°C.
- Make sure not place any heat source near to the terminal board of your recorder.（KR5300）
- Make sure not to plug up an air vent, in order to secure heat dissipation space.

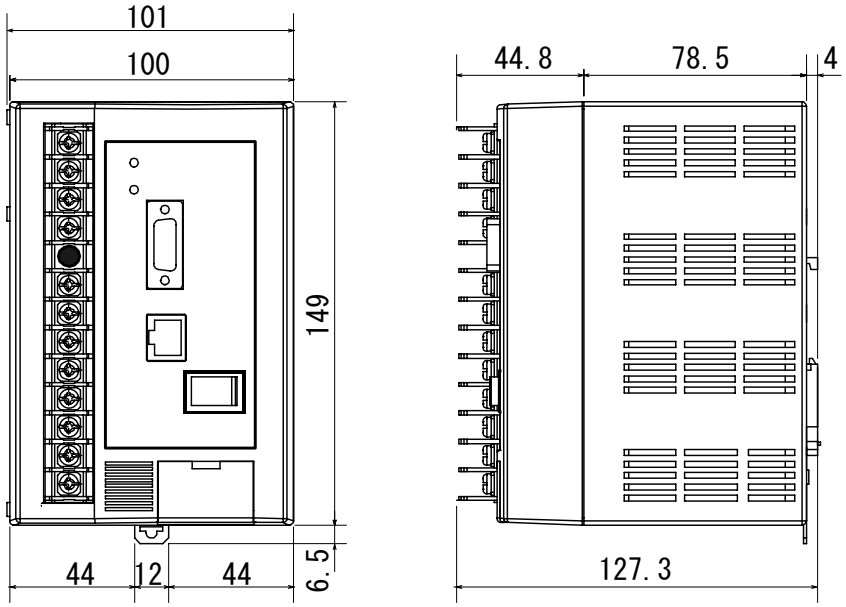
4-2 Installation Procedure

Mount this instrument on a DIN rail with a width of 35 mm, stop it using the provided stopper, and clamp it with end plates (commercially available) so that it will not move. Refer to "6-4 Connection of input unit" for the attachment method of input unit in the case of using KR5300.

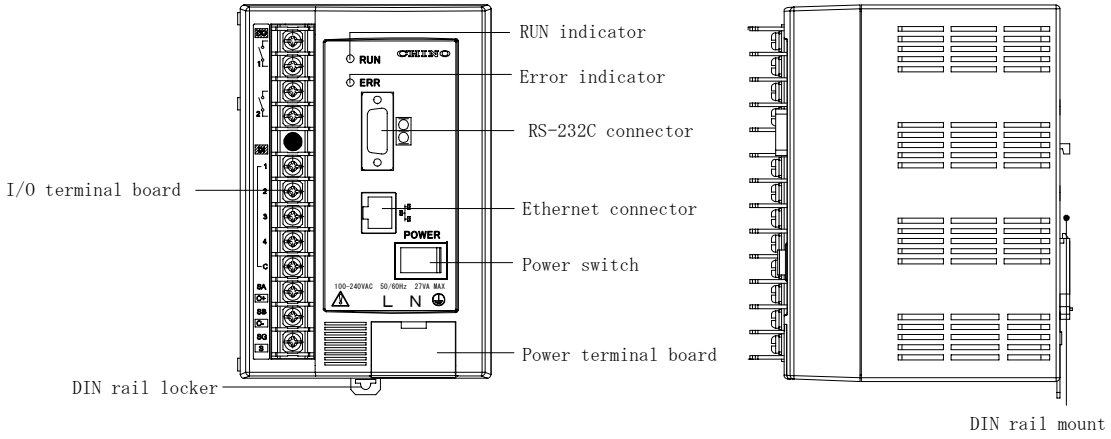


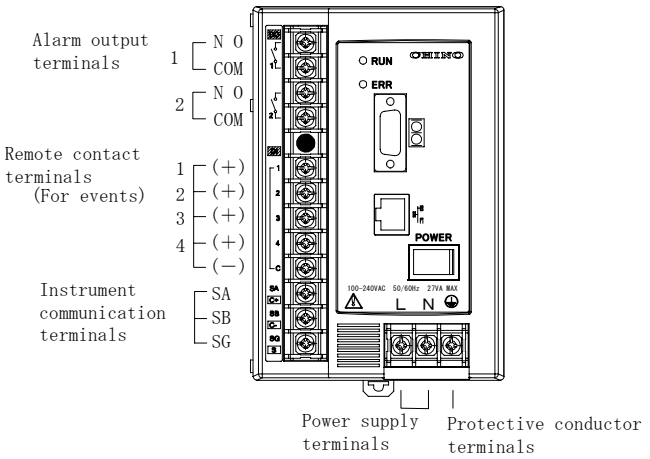
5.EXTERNAL DIMENSIONS AND NAMES OF PARTS

5-1 Dimensions(KR)



5-2 Names of parts(KR)





5-3 Indicator Lamps

This instrument uses two lamps to indicate the operation modes.

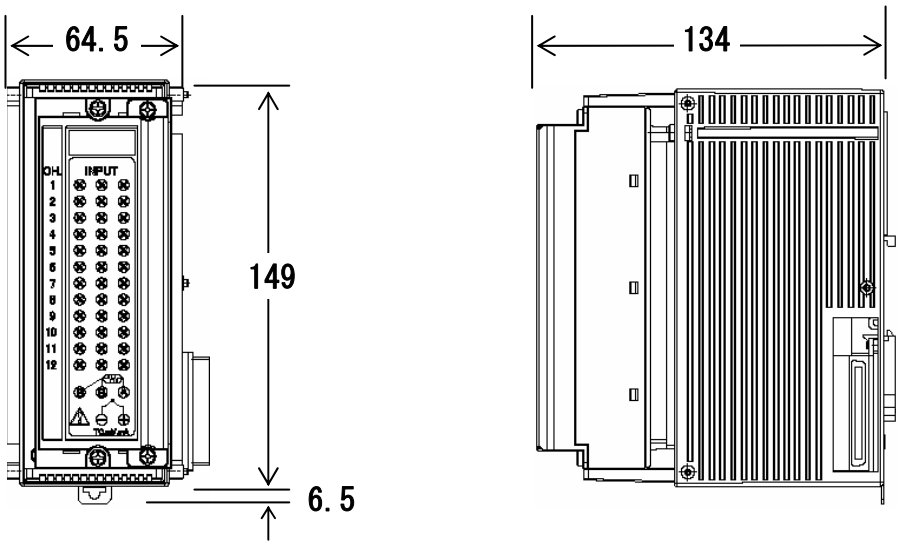
RUN indicator (Green lamp)

Lamp Status	Operation Mode
ON	Starting up
Blinking (approx. 1 sec. interval)	Normal operation
OFF	Power OFF

Error indicator (Red lamp)

Lamp Status	Operation Mode
ON	—
Fast blinking	Internal error
OFF	Normal operation

5-4 Dimensions of the input unit (For the KR5300)



6. CONNECTION

6-1 Precautions for Connection

⚠ CAUTION

1. Power Supply

• To prevent a malfunction, the power supply to this instrument should be single-phase, i.e. stable in voltage and free of waveform distortion.

2. Power Current Circuit

• Avoid distributing the input/output wiring in proximity of or in parallel with a power current or other high-voltage circuit. Maintain a distance of at least 50 cm between them.

3. Noise Source Caution

• To prevent unexpected troubles, install the instrument as far apart as possible from any source of noise. If it is impossible to keep a certain distance, the following countermeasures should be taken.

Potential sources of noise	● Electromagnetic switch ● Power line containing waveform distortion ● Inverter ● Thyristor regulator
Countermeasure	Insert a noise filter between the power supply and input/output terminals. A CR filter is used most often for this purpose.

4. Crimp Type Ring Lugs Connection

① To prevent the terminal connection from loosening, disconnection or short-circuiting between the terminals, attach crimp type ring lugs to the extremities of the connection cords.

② To prevent electric shock, attach an insulation sleeve to each crimp type ring lugs.

5. Non-used Terminals

• To prevent damage to the electrical circuitry, do not use any of the unused terminals for relay purposes. To prevent interference from extraneous noise, short-circuit the + and - terminals of unused terminals.

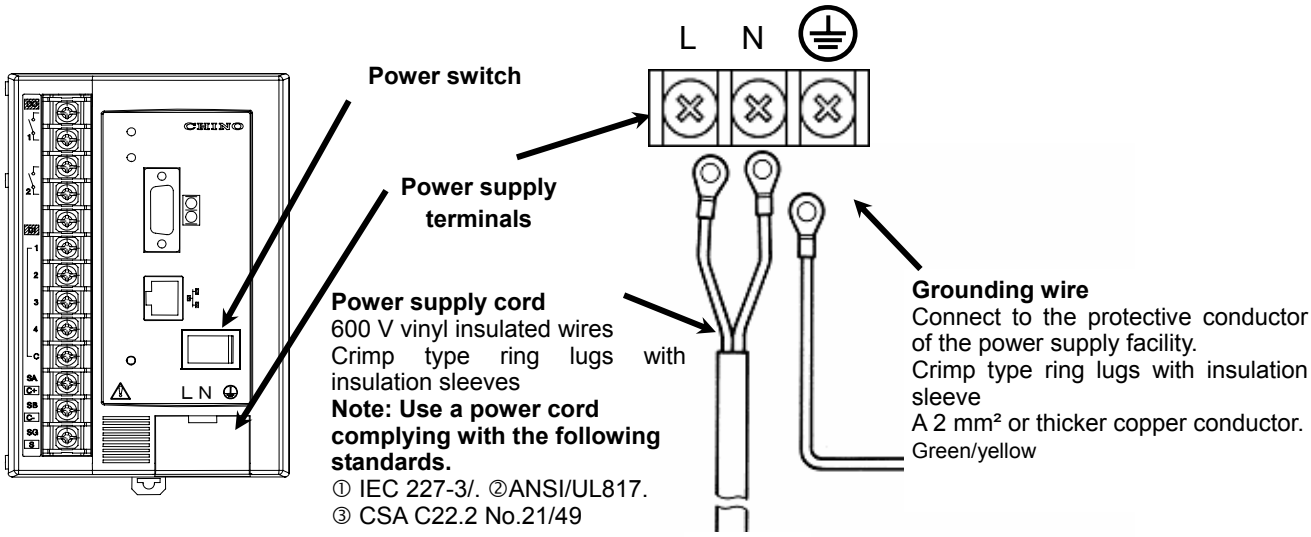
6. Connected Equipment

• Check that the type of connected equipment is compatible with this instrument.

7. Separate from a heat source

• For the thermocouple inputs, separate the input terminals from a heat source for the purpose of reducing a reference junction compensation error. Don't expose the input terminals to the radiation of direct sunlight, etc.

6-2 Power Supply Connection



CAUTION

1. In order to prevent electric shock, be sure to shut down the power supply circuitry before connecting it to the power supply or earth terminals.
2. The supply voltage rating of this instrument is indicated on the power supply terminals. Supplying a voltage other than that rated will result in an accident or malfunction. If noise interferes with the power supply, adopt countermeasures by installing a noise-elimination transformer, etc.
3. A 100-240 V/AC voltage is applied to the power supply terminals after connection. After completing the connection, be sure to attach the power terminal cover in order to prevent electric shock.
4. Prepare a switch and an overcurrent protective device (3 A) to the power supply for preventing an accidental electric shock during connection work. This instrument is not provided with any replaceable overcurrent protective device.

6-3 Connection of MODBUS Instruments (For the KR5100)

6-3-1 Communications

The KR5100 instrument communicates with MODBUS instruments using the RS-485 protocol.

Cable used: CHINO RS-485 communication cable (for parallel connection)

Model code: RZ-LEC□□□

Cable length

Communicating distance: The instruments can be connected at any intervals but the total length of the cables should not exceed 1.2 km.

6-3-2 Connection and setup of the SE3000

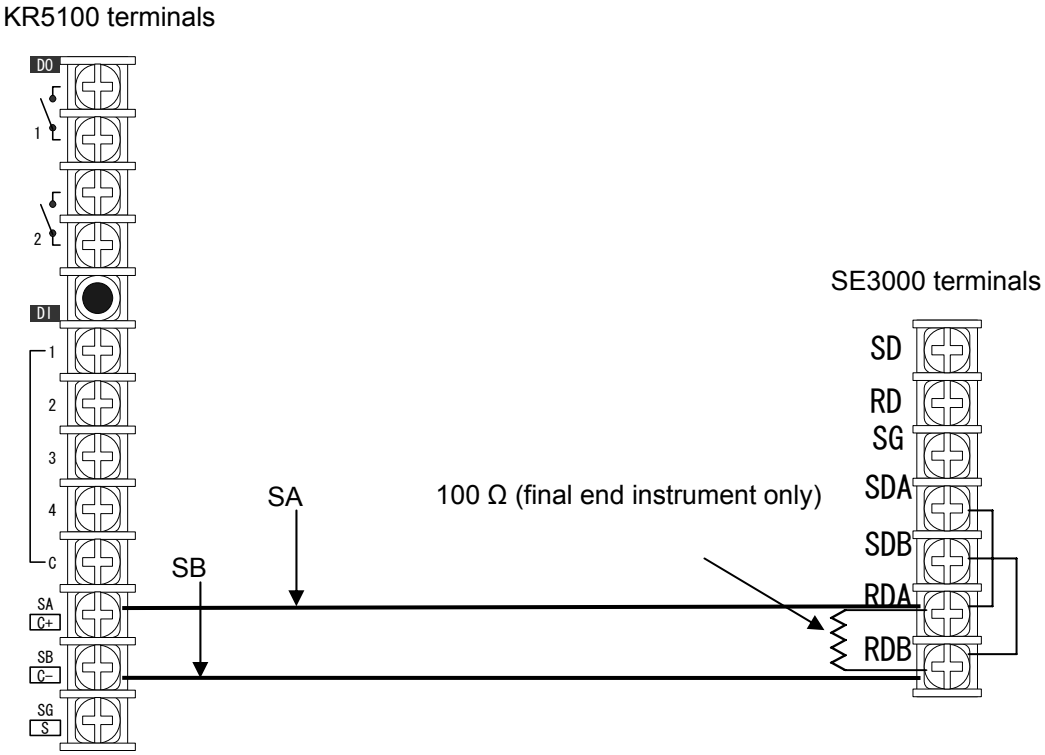
1) Connection

Ground the RDA-SDA terminals and RDB-SDB terminals of the SE3000 respectively.

Connect the RDA or SDA terminal of the SE3000 to the SA terminal of the KR5100.

Connect the RDB or SDB terminal of the SE3000 to the SB terminal of the KR5100.

With the final end SE3000, connect a termination resistor of 100 Ω across the RDA-RDB or SDA-SDB terminals. As the SE3000 does not have an SG terminal, the SG wire should be cut off.



2) Setup

Set the instrument ID No. of each SE3000 to a number in the range from 01 to 31 so that the number does not overlap with the ID No. of any other MODBUS instrument being connected. Set the communication port for the higher communication. Use the switch on the SE3000 front panel for setup.

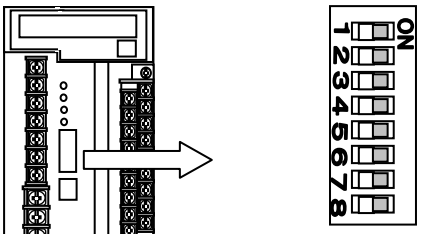
Set the switch on the top of the SE3000 for the “422A/485” communication type.

This switch can be set as described on the next page.

Setup of the SE3000

• Instrument No. Setup

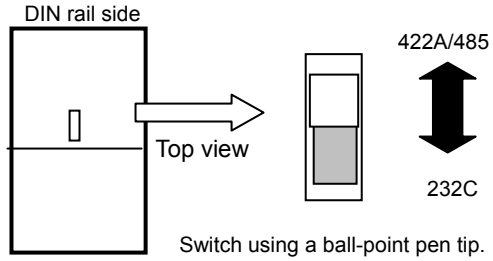
Location of SW.1



Use a small screwdriver blade.

• Communication type setup

Location of SW.2



Switch using a ball-point pen tip.

• Instrument No, setup for communication port setup

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	Number
OFF	OFF	OFF	OFF	OFF	1
ON	OFF	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	OFF	2
ON	ON	OFF	OFF	OFF	3
OFF	OFF	ON	OFF	OFF	4
ON	OFF	ON	OFF	OFF	5
OFF	ON	ON	OFF	OFF	6
ON	ON	ON	OFF	OFF	7
OFF	OFF	OFF	ON	OFF	8
ON	OFF	OFF	ON	OFF	9
OFF	ON	OFF	ON	OFF	10
ON	ON	OFF	ON	OFF	11
OFF	OFF	ON	ON	OFF	12
ON	OFF	ON	ON	OFF	13
OFF	ON	ON	ON	OFF	14
ON	ON	ON	ON	OFF	15
OFF	OFF	OFF	OFF	ON	16
ON	OFF	OFF	OFF	ON	17
OFF	ON	OFF	OFF	ON	18
ON	ON	OFF	OFF	ON	19
OFF	OFF	ON	OFF	ON	20
ON	OFF	ON	OFF	ON	21
OFF	ON	ON	OFF	ON	22
ON	ON	ON	OFF	ON	23
ON	OFF	OFF	ON	ON	25
OFF	ON	OFF	ON	ON	26
ON	ON	OFF	ON	ON	27
OFF	OFF	ON	ON	ON	28
ON	OFF	ON	ON	ON	29
OFF	ON	ON	ON	ON	30
ON	ON	ON	ON	ON	31

SW2	
Front (Terminal side)	Rear (DIN rail side)
RS232C	RS422A/485

Set to the rear position (DIN rail side).

Note

Ensure that the communication setup of the SE3000 is as follows (same setup as the factory setup).

Protocol:	MODBUS
Transfer mode:	RTU
Transfer rate:	9600 bps
Bit length:	8 bits
Stop bit:	1 bit
Parity:	None

SW 1-6	
OFF (Higher communication)	ON (Engineering port)

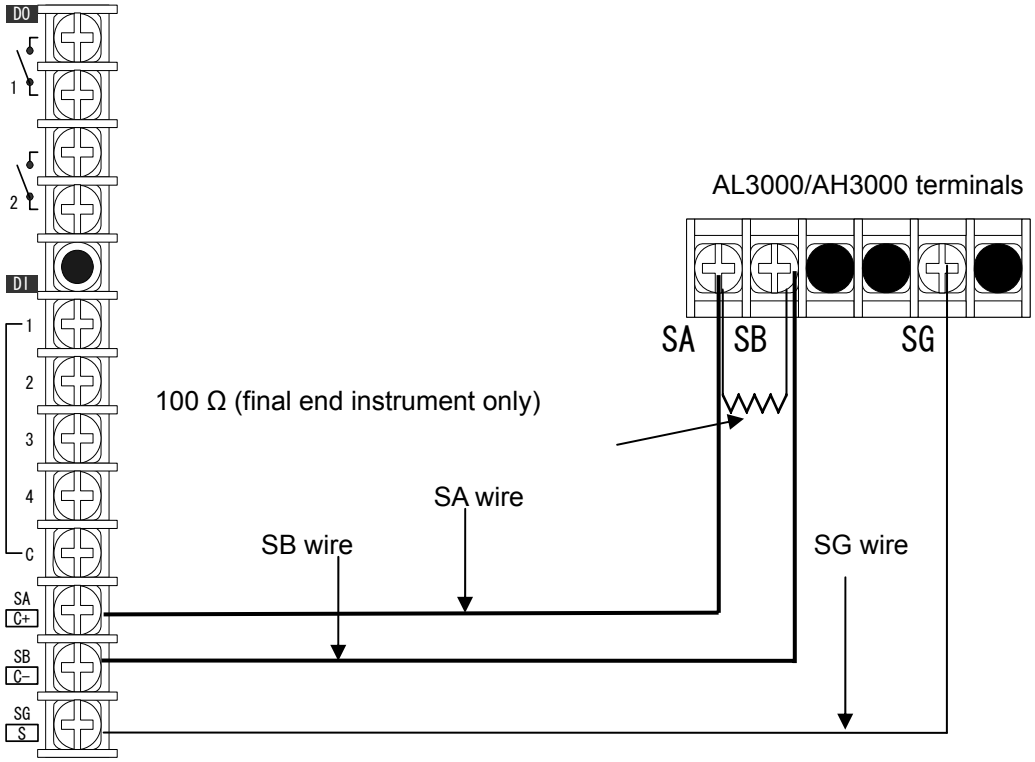
Set to OFF (higher communication).

6-3-3 Connection and setup of the AL3000/AH3000

1) Connection

Connect the SA terminals of the AL3000/AH3000 and KR5100, their SB terminals, and their SG terminals respectively. With the final end AL3000/AH3000, connect a termination resistor of 100 Ω across the SA and SB terminals.

KR5100 terminals



Note

If an “input instrument communication error (see section 12-7 “Error Message”) occurs during use, disconnect the SG wire.

(If an “input instrument communication error” occurs repeatedly, check the connection and

2) Setup

Set the instrument ID No. of the AL3000/AH3000 to a number in the range from 01 to 31 so that the number does not overlap with the ID No. of any other MODBUS instrument being connected.

Use the front panel keys of the AL3000/AH3000 for the setup.

The setup method is described on the following pages.

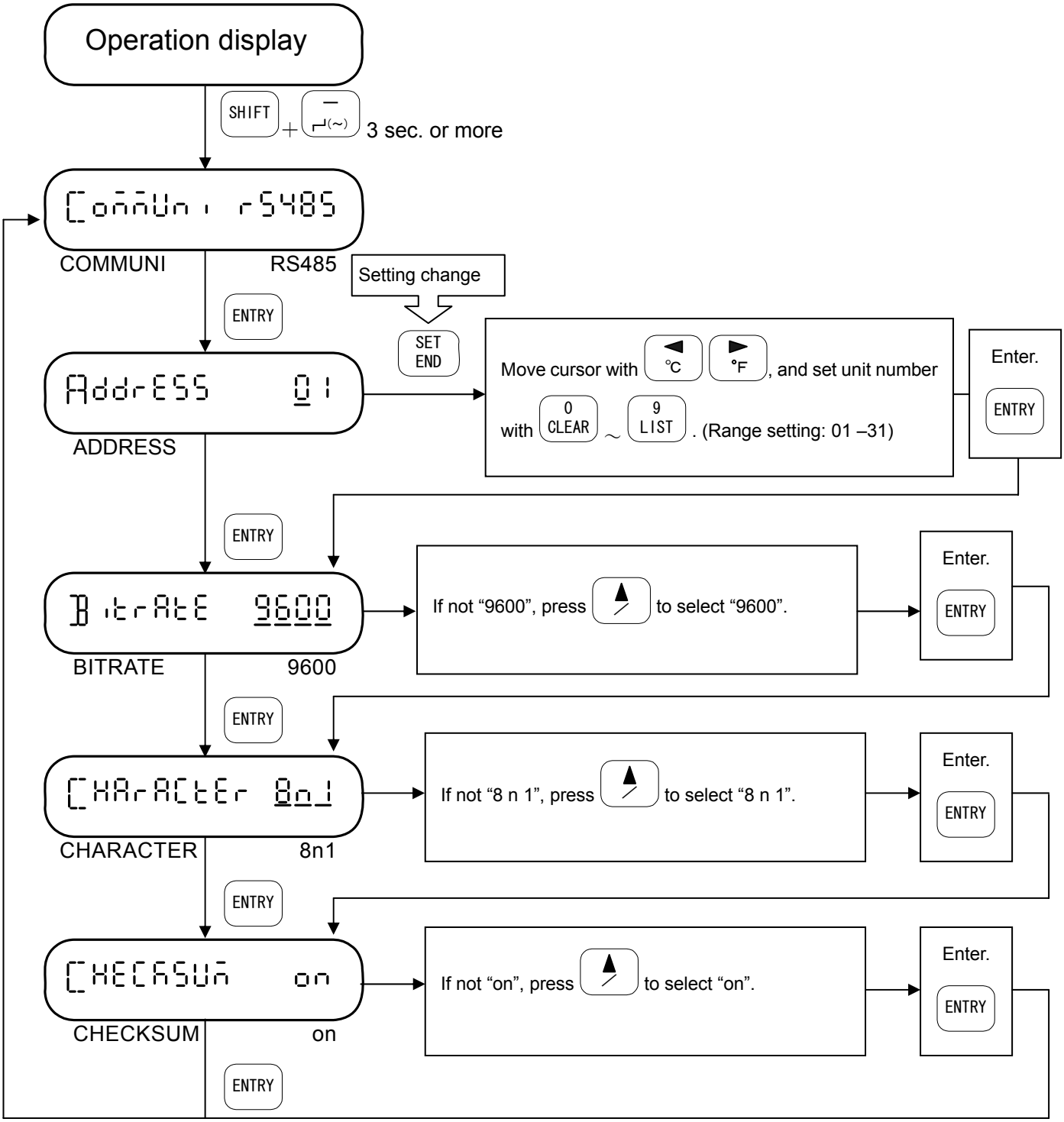
Note

Ensure that the communication setup of the AL3000/AH3000 is as follows (same setup as the factory setup).

Protocol:	MODBUS
Transfer mode:	RTU
Transfer rate:	9600 bps
Bit length:	8 bits
Stop bit:	1 bit
Parity:	None

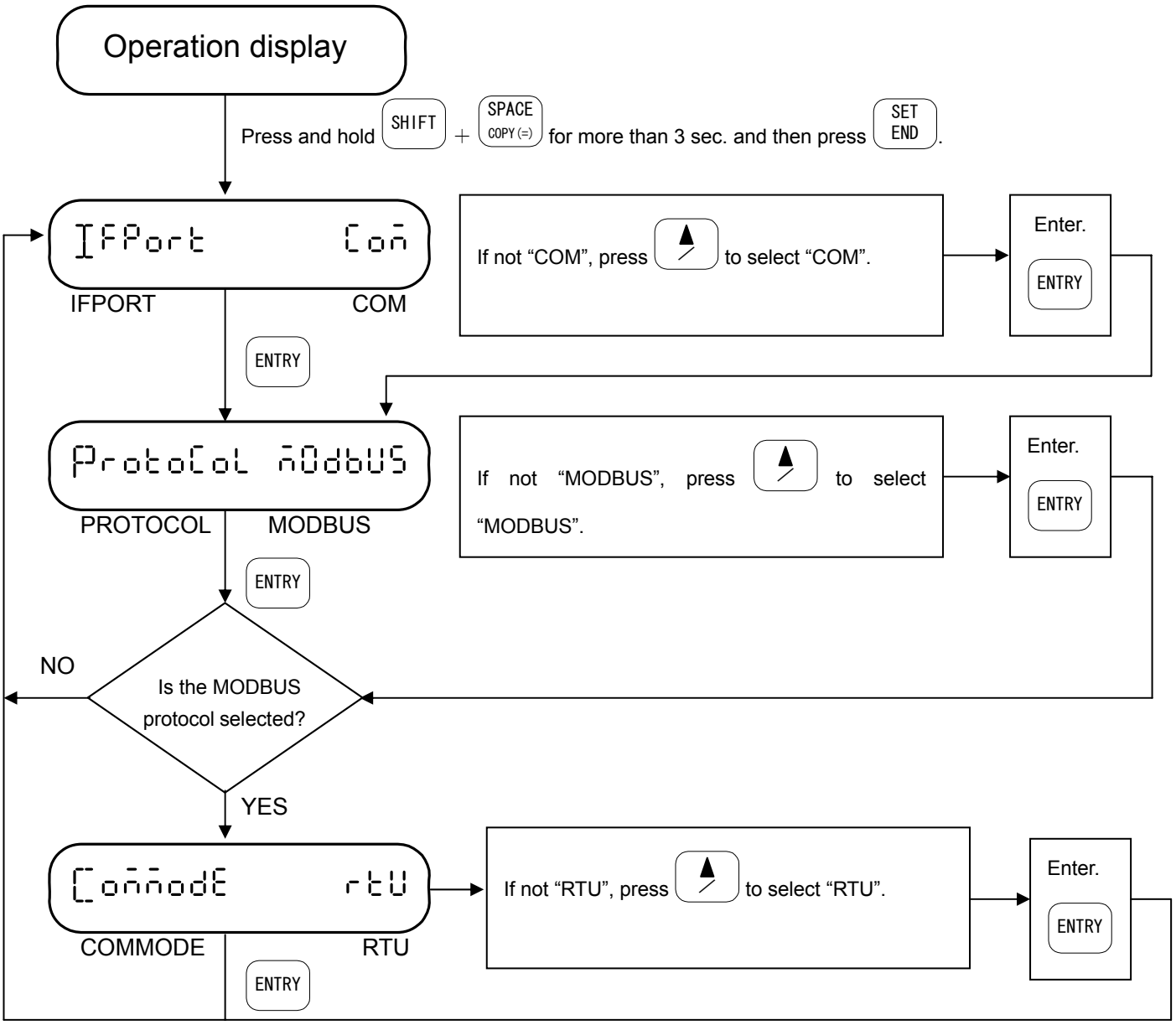
Setup of the AL3000/AH3000

• Communication specification setup



* Pressing DISPLAY RECORD FORMAT in any menu returns to the operation display.

• Communication protocol and mode setup



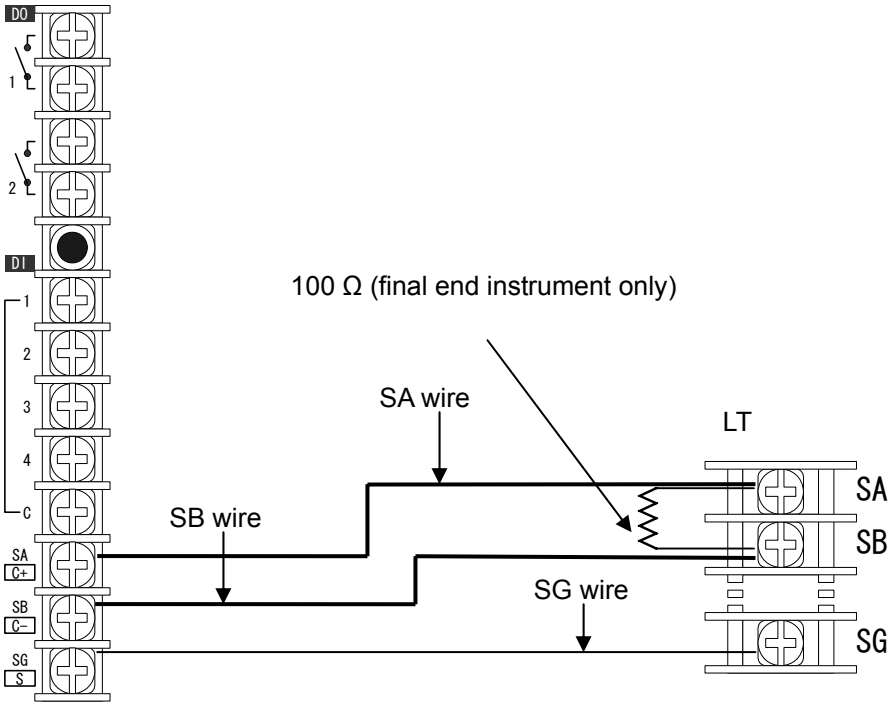
* Pressing DISPLAY RECORD FORMAT in any menu returns to the operation display.

6-3-4 Connection and setup of the LT

1) Connection

Connect the SA terminals of the LT and KR5100, their SB terminals., and their SG terminals respectively. With the final end LT, connect a termination resistor of 100 Ω across the SA and SB terminals.

KR5100 terminals



Note

If an “input instrument communication error (see section 12-7 “Error Message”) occurs during use, disconnect the SG wire.
(If an “input instrument communication error” occurs repeatedly, check the connection and setup.)

2) Setup

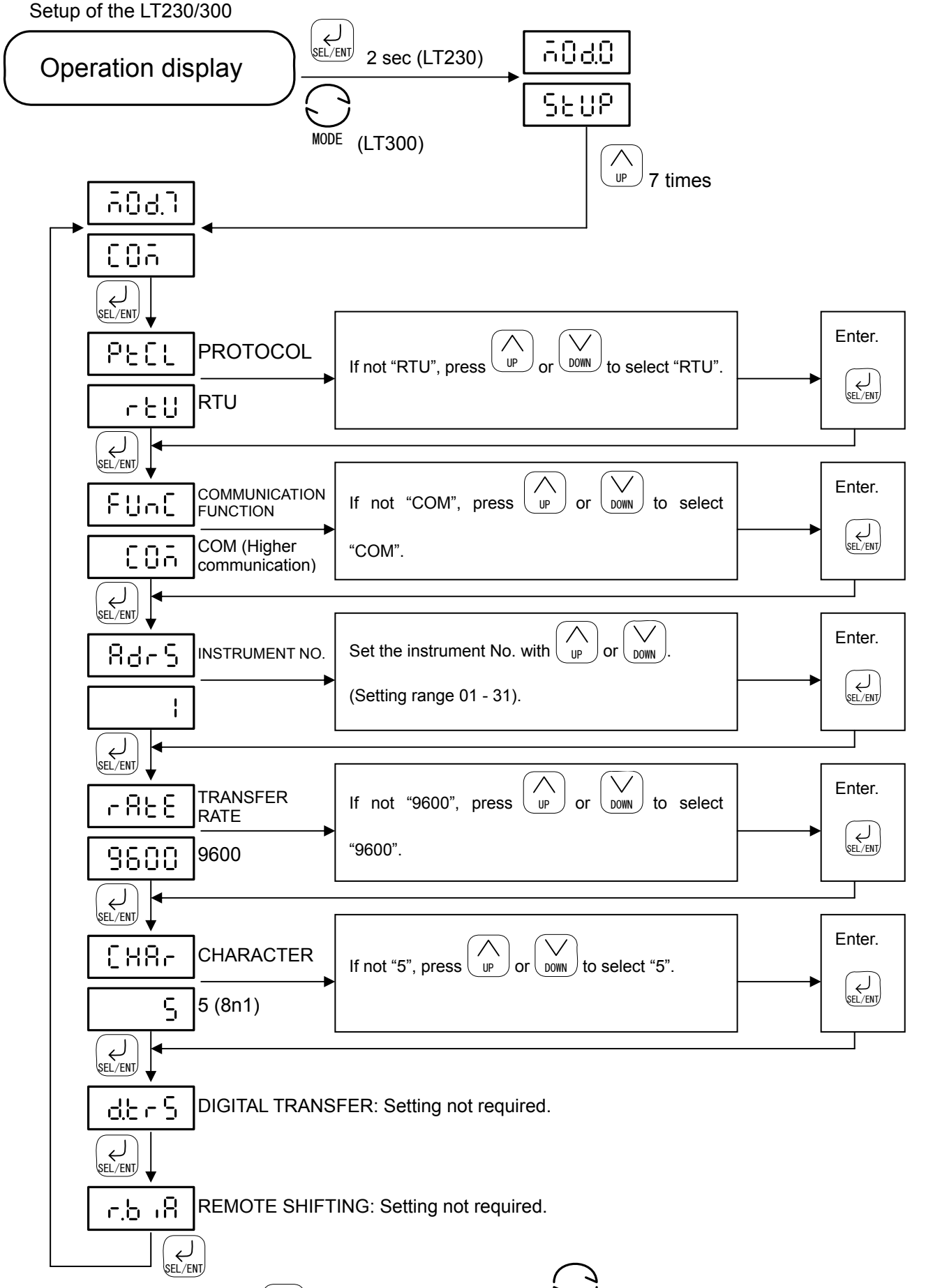
Set the instrument ID No. of each LT to a number in the range from 01 to 31 so that the number does not overlap with the ID No. of any other MODBUS instrument being connected. Use the front panel keys of the LT for the setup.
The setup method is described on the following pages.

Note

Ensure that the communication setup of the LT is as follows (same setup as the factory setup).

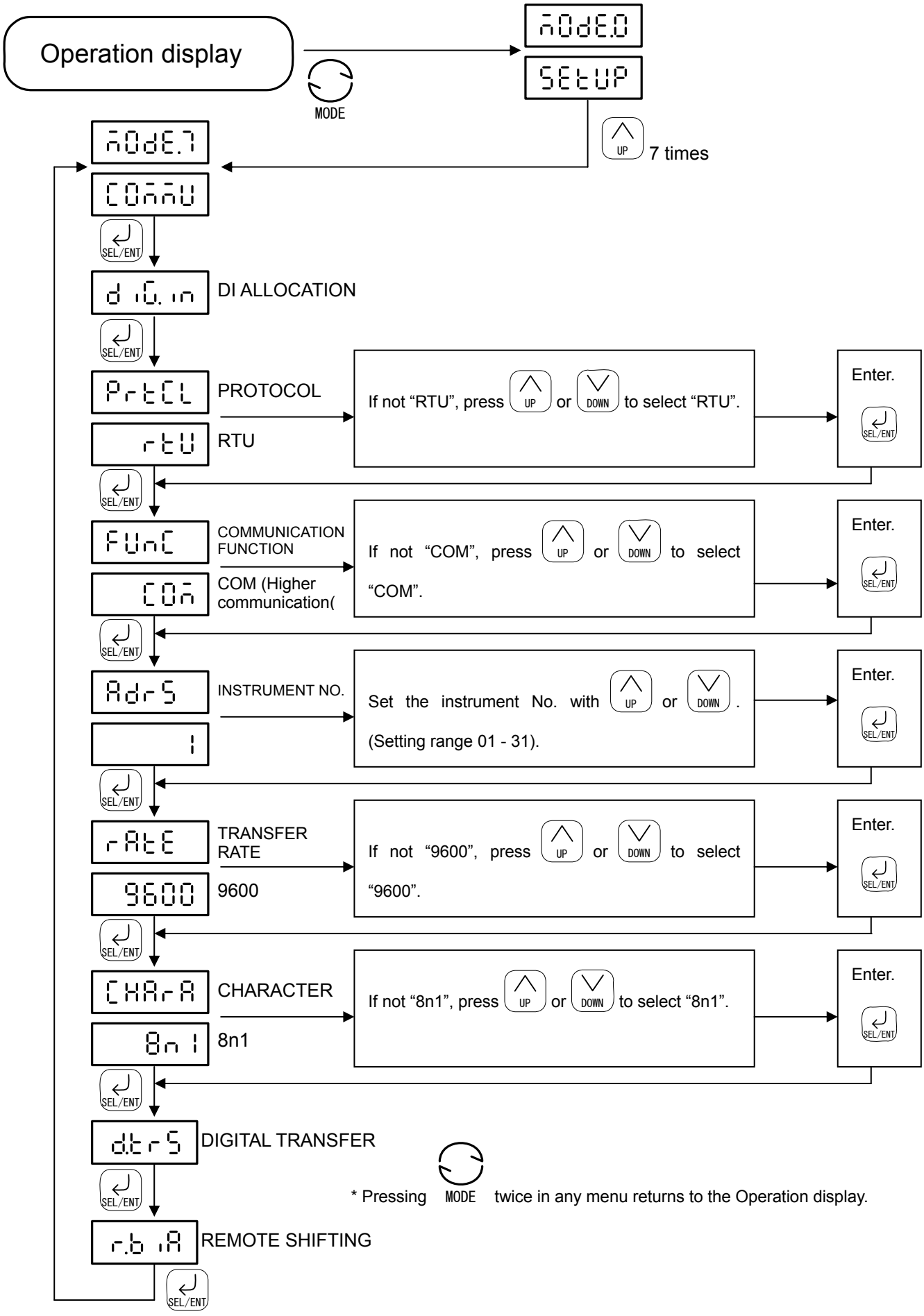
Protocol:	MODBUS
Transfer mode:	RTU
Transfer rate:	9600 bps
Bit length:	8 bits
Stop bit:	1 bit
Parity:	None

Setup of the LT230/300



* Holding SEL/ENT for 2 sec. (LT230) or pressing MODE (LT300) twice returns to Operation display.

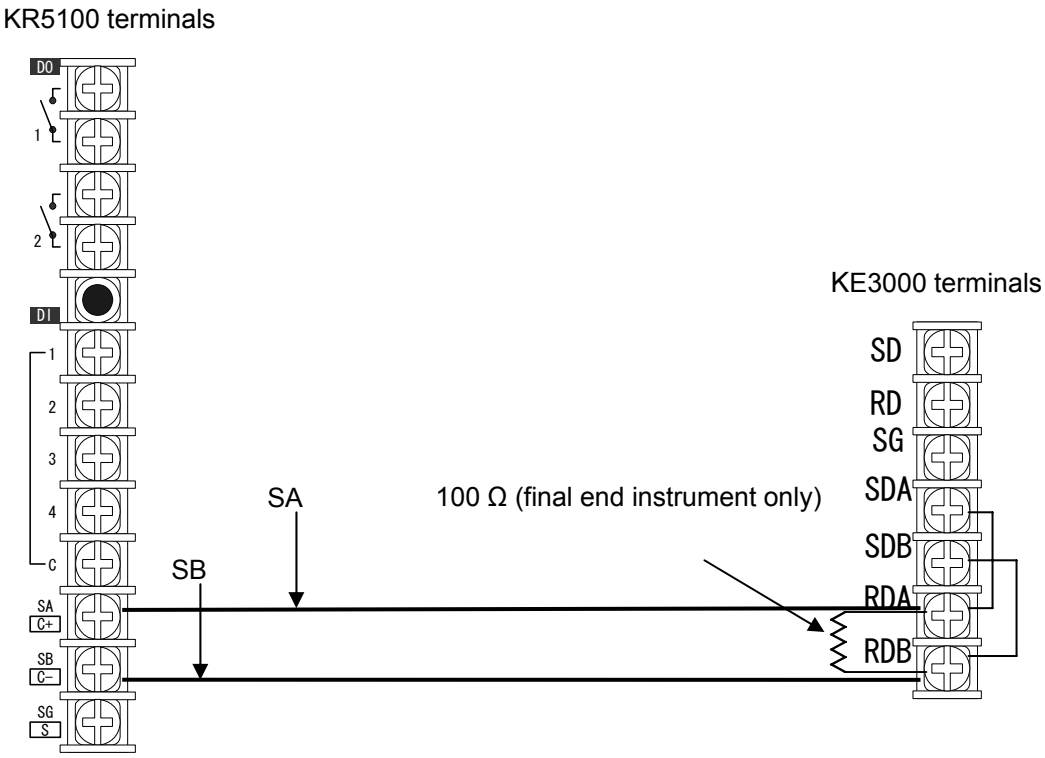
Setup of the LT400



6-3-5 Connection and setup of the KE3000

1) Connection

Ground the RDA-SDA terminals and RDB-SDB terminals of the KE3000 respectively.
Connect the RDA or SDA terminal of the KE3000 to the SA terminal of the KR5100.
Connect the RDB or SDB terminal of the KE3000 to the SB terminal of the KR5100.
With the final end KE3000, connect a termination resistor of 100 Ω across the RDA-RDB or SDA-SDB terminals. As the KE3000 does not have an SG terminal, the SG wire should be cut off.



Note

If an “input instrument communication error (see section 12-7 “Error Message”) occurs during use, disconnect the SG wire.
(If an “input instrument communication error” occurs repeatedly, check the connection and setup.)

2) Setup

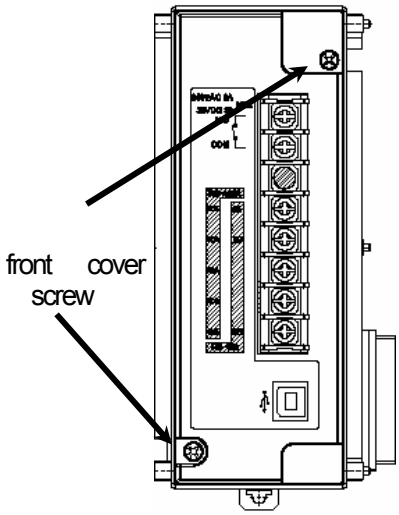
Set the instrument ID No. of each KE3000 to a number in the range from 01 to 31 so that the number does not overlap with the ID No. of any other MODBUS instrument being connected.
The setup method is described on the following pages.

Note

Ensure that the communication setup of the KE3000 is as follows (same setup as the factory setup).

Protocol:	MODBUS
Transfer mode:	RTU
Transfer rate:	9600 bps
Bit length:	8 bits
Stop bit:	1 bit
Parity:	None

Setup of the KE3000

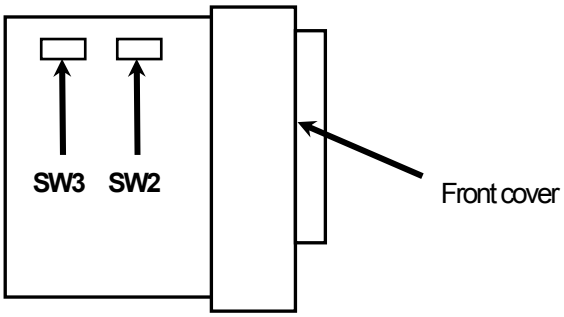


1. Turn the power to this unit off, remove 2 pieces of the front cover screw (shown in the right figure) of the communication unit (USB), and then remove the front cover together with the internal printed circuit board. As this printed circuit board is connected, via a connector, with the printed circuit board fixed to the inside of case, it takes a bit of muscle to remove the front cover.

2. 2 pieces of small dip switches are mounted on this printed circuit board (shown in the following figure). The Bit 2 of the SW2 is for the transmission code and the Bit 3 is for the baud rate, and the Bit 4 & 5 are for the transmission character configuration. The Bit 4 to 7 of the SW3 are for programming instrument ID No. Following the table shown below, program them to be adequate values with a tip of mechanical pencil or a sharp needle.

Transmission codes	SW2 Bit2
RTU (Defaults)	OFF
ASCII	ON

Transmission speeds	SW2 Bit3
9600bps (Defaults)	OFF
19200bps	ON



Transmitted Character Configuration	SW2		Remarks
	Bit4	Bit5	
8N1 (Default)	OFF	OFF	
8N1	OFF	ON	
7E1	ON	OFF	Operation with 8N1 at RTU
7O1	ON	ON	Operation with 8N1 at RTU

Instrument ID No.	SW3					Instrument ID No.	SW3				
	Bit4	Bit5	Bit6	Bit7	Bit8		Bit4	Bit5	Bit6	Bit7	Bit8
1 (Default)	OFF	OFF	OFF	OFF	OFF	16	ON	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	ON	17	ON	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	ON	OFF	18	ON	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	ON	ON	19	ON	OFF	OFF	ON	ON
4	OFF	OFF	ON	OFF	OFF	20	ON	OFF	ON	OFF	OFF
5	OFF	OFF	ON	OFF	ON	21	ON	OFF	ON	OFF	ON
6	OFF	OFF	ON	ON	OFF	22	ON	OFF	ON	ON	OFF
7	OFF	OFF	ON	ON	ON	23	ON	OFF	ON	ON	ON
8	OFF	ON	OFF	OFF	OFF	24	ON	ON	OFF	OFF	OFF
9	OFF	ON	OFF	OFF	ON	25	ON	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON	OFF	26	ON	ON	OFF	ON	OFF
11	OFF	ON	OFF	ON	ON	27	ON	ON	OFF	ON	ON
12	OFF	ON	ON	OFF	OFF	28	ON	ON	ON	OFF	OFF
13	OFF	ON	ON	OFF	ON	29	ON	ON	ON	OFF	ON
14	OFF	ON	ON	ON	OFF	30	ON	ON	ON	ON	OFF
15	OFF	ON	ON	ON	ON	31	ON	ON	ON	ON	ON

* Do not operate other switches. If not, it may adversely affect other performance.

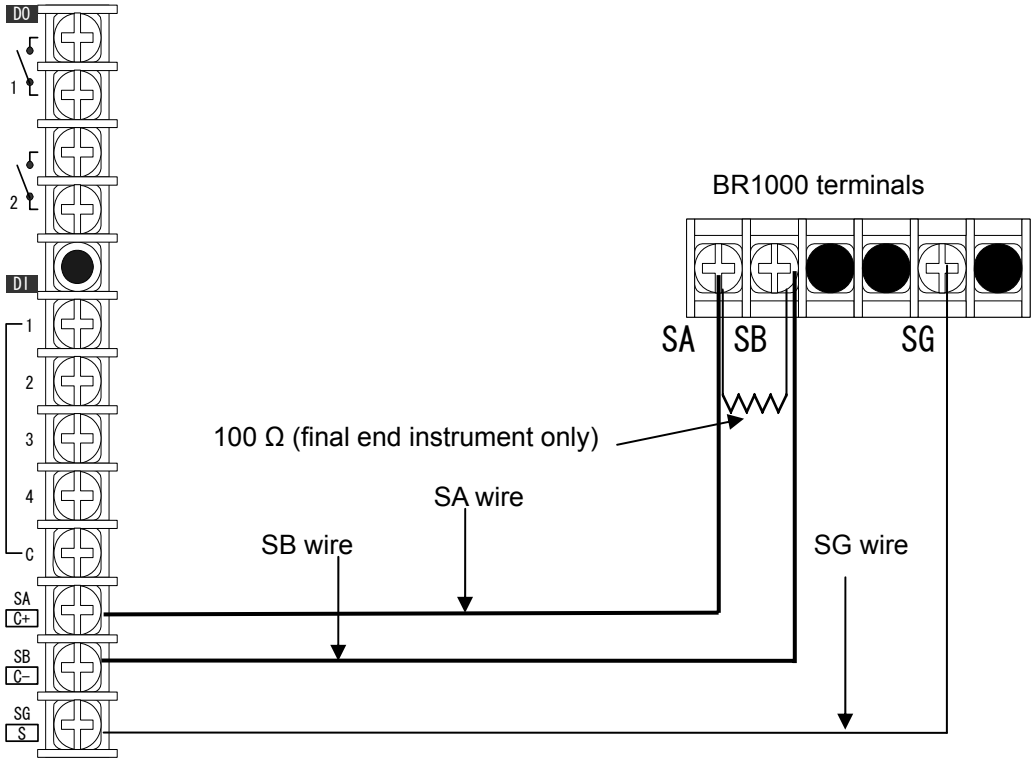
3. After programming, fit the printed circuit board to the guides of the case, mount the front cover to the original position, and then fix it with 2 pieces of the front cover screw. When the printed circuit board is correctly connected inside, you will hear a tick.

6-3-6 Connection and setup of the BR1000

1) Connection

Connect the SA terminals of the BR1000 and KR5100, their SB terminals, and their SG terminals respectively. With the final end BR1000, connect a termination resistor of 100 Ω across the SA and SB terminals.

KR5100 terminals



Note

- If an “input instrument communication error (see section 12-7 “Error Message”) occurs during use, disconnect the SG wire.(If an “input instrument communication error” occurs repeatedly, check the connection and setup.)
- This instrument can not set up the range and scale of the BR recorder.
- Monitoring on this instrument is only limited to the input channels of BR recorder, except for computation channel and low-order communication instrument.

2) Setup

Set the instrument ID No. of the BR1000 to a number in the range from 01 to 31 so that the number does not overlap with the ID No. of any other MODBUS instrument being connected.

Use the front panel keys of theBR1000 for the setup.

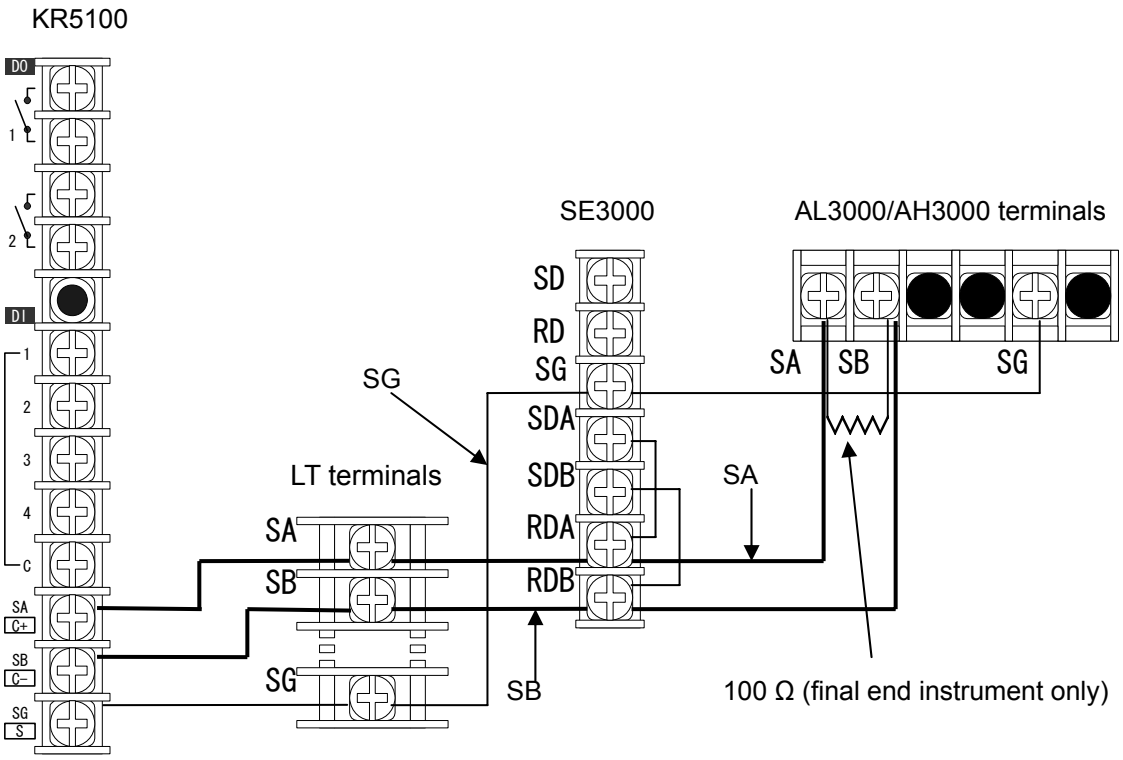
Note

Ensure that the “communication 1” setup of the BR1000 is as follows (same setup as the factory setup).

Mode:	RTU
Bit Rate:	9600bps
Charcter:	8N1
Port:	COM

6-3-7 Presence of mixed MODBUS instruments

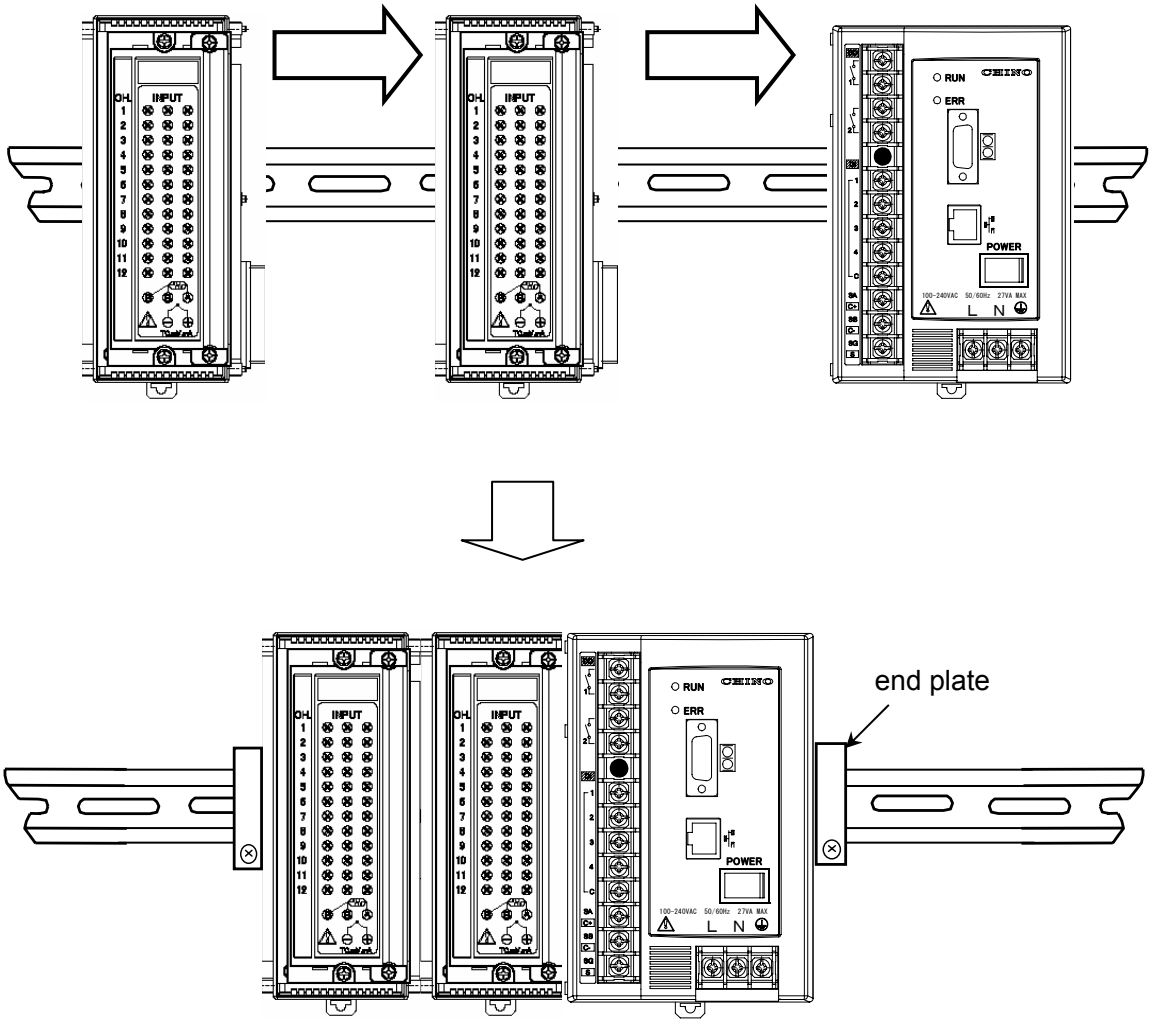
When connecting different MODBUS instruments simultaneously, connect their SA terminals, RDA (SDA) terminals, SB terminals, RDS (SDB terminals) and SG terminals respectively and connect a termination resistor to a final end instrument.



6-4 Connection of the input unit(For the KR5300)

6-4-1 Connection of the KR to input unit

Connect the connector of input unit（KE3310-000）to the connector of KR5300 on the DIN rail. When using two input units, connect to the left-hand side of the KR. After connection , clamp it with end plates (commercially available) so that it will not move.

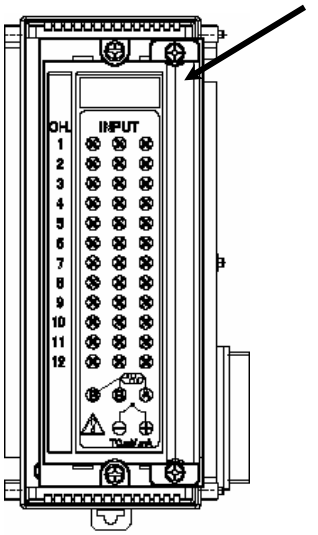


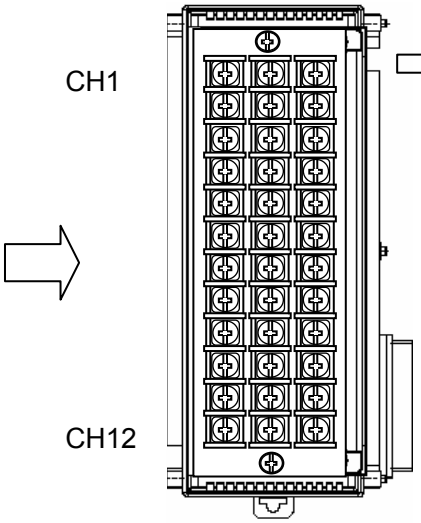
⚠ CAUTION

Mount the instrument with its bottom down to the vertical side of the rail. If not, it may cause an indication accuracy error.

6-4-2 Connection of the input unit

Remove the terminal cover by loosing 2 pieces (at upper/lower positions) of the fixing screw.





Voltage		–	+
Thermocouple		–	+
Resistance thermometer	B	B	A

⚠ Cautions

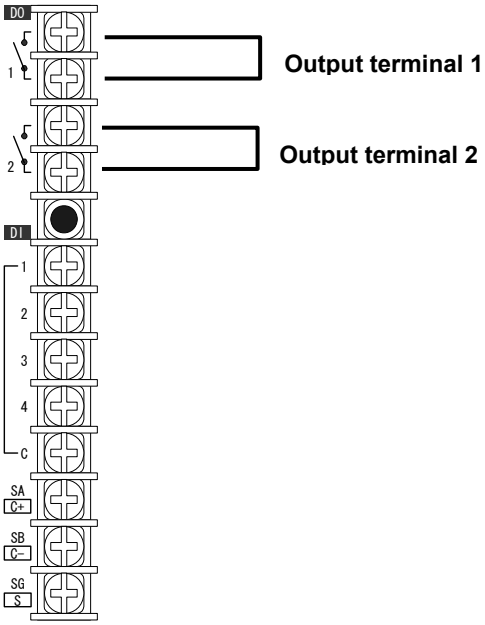
1. For the input terminals, apply a voltage lower than the allowable input voltage.
   * Voltage/thermocouple input … ± 10VDC
   * Resistance thermometer … ±6VDC
2. Before carrying out wiring, make sure to turn off the power of the power source because there is a possibility of electric shock.
3. Wire to the input terminals with crimp type lugs with insulation sleeve.
4. For wiring of DC voltage (current) inputs, use twisted wires for instrumentation as counter measures for noise. For current inputs, connect a shunt resistor to a channel for current input and then carry out wiring.
5. For wiring of thermocouple inputs, make sure to wire to this unit with thermocouple wires (or extension wires). The termination in copper wire causes large measurement errors. In addition, do not connect a pair of thermocouple wires to other instrument (a controller, etc.) in parallel. It becomes the source of troubles.
6. For wiring of resistance thermometer inputs, use 3-core cords for input wires, of which each wire has same resistance value. The parallel connection of 1 piece of the resistance thermometer to other instrument (a controller, etc.) is disabled.
7. A high voltage may apply to the measuring input terminals due to the common mode noise. The allowable noise value is less than 30VAC or 60CVDC. Check the noise is lower than the allowable value. After wiring, attach the terminal cover to avoid an electrical shock or to protect input wires. In case of thermocouple inputs, the reference junction compensation error will become small by attaching the terminal cover.

6-5 Connection of the Alarm Output Terminals

For the alarm output, see section 12-6-2, “Alarm Setup”.
In addition, manual operation to ON and OFF the alarm output terminals can be operated. (See section 11-12 DO operation.)

6-5-1 Alarm output terminals

KR5000 terminals



6-5-2 Connection

To prevent electric shock, shut off the power supply and the buffer relay power before proceeding to the connection.

① Insert a buffer relay in any connection to a load.

② Use crimp type ring lugs with insulation sleeves for the connection to the alarm output terminals.

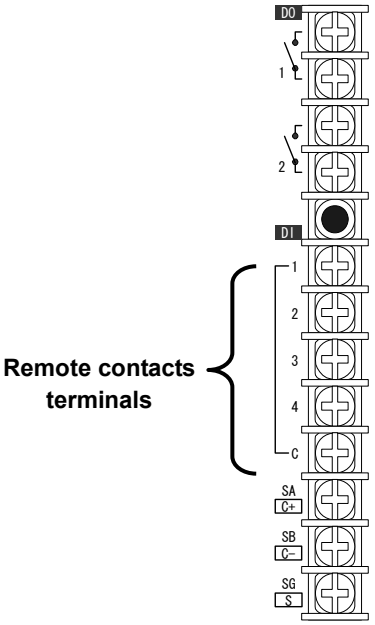
⚠CAUTION

Item	Description
MOS relay output contact capacity	● Max. voltage: 240 V (AC,/DC) ● Max. current: 50 mA (AC/DC)* * Regardless of the load type.
Contact protection device	● Attach a contact protection device matching the buffer relay. The MOS relay will be damaged, when a signal exceeding the contact capacity is applied even for an instant.
Selection of buffer relay	(1) Coil rating: Below the contact capacity of the output terminal. (2) Contact rating: Twice of greater than the load current. It is recommended to use a relay incorporating a coil surge absorption device. If a relay that can meet the load rating is not available, install another grade of buffer relay.
Selection of contact protection device	Use this device if a buffer relay incorporating a surge absorption device is not available. The C-R (Capacitor + Resistor) device is the most generally used device. (C and R reference values) C: 0.01 μF (Rated around 1 kV) R: 100 to 150 Ω (Rated around 1 W)

6-6 Connection of the External Remote Contacts Terminals

For the remote contacts, see section 12-6-4, “Recording Setup”.

6-6-1 Remote contacts terminals



KR5000 terminals

6-6-2 Connection

To prevent electric shock, be sure to switch off the power supply before proceeding to the connection.

① Apply only non-voltage contact signals to the remote contacts terminals.

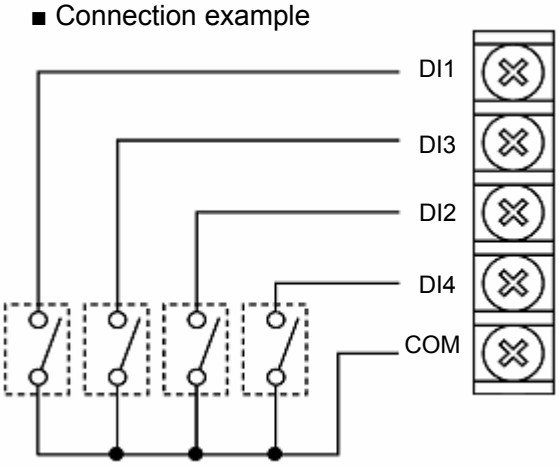
② Attach crimp type ring lugs with insulation sleeves to the wires connected to the remote contact terminals.

⚠ CAUTION

■ Non-voltage contact

The contacts connected to the external drive terminals should be switches or relays driven by voltage levels of 30 V AC or 60 V DC or less or contacts that can manually be set compatible with very low loads.

■ Connection example



- Grounding of 1 second or more is required between the COM terminal and a terminal to let this instrument recognize grounding.

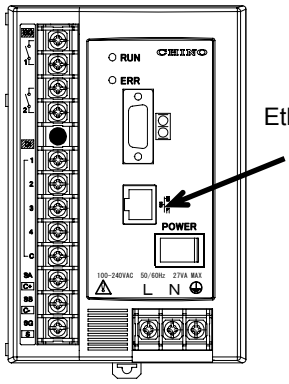
Note

Characteristics of remote contacts terminals

- Contact drive terminal voltage: Approx 5 V
- Contact grounding current: Approx. 5 mA

6-7 Ethernet Connection

Using an Ethernet cable, connect the Ethernet connector (RJ-45) of this instrument to the LAN card or Ethernet hub of the PC.



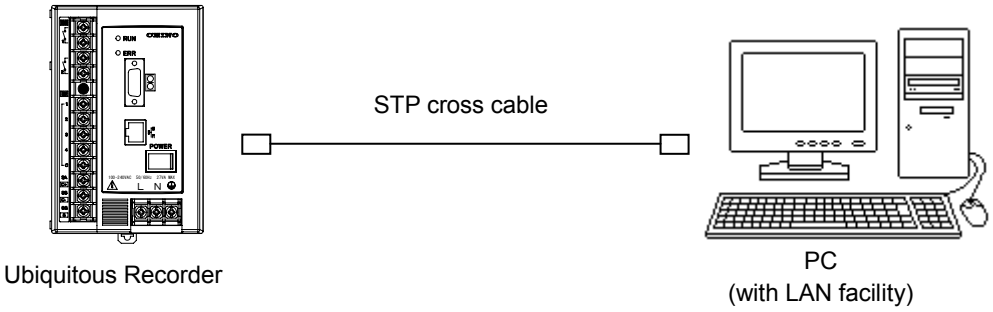
⚠ CAUTION

Before actual connection to the PC, check the setup of the PC's LAN card and this instrument to confirm that they are compatible.

For details, see Chapter 8, "Preparation of the PC Environment."

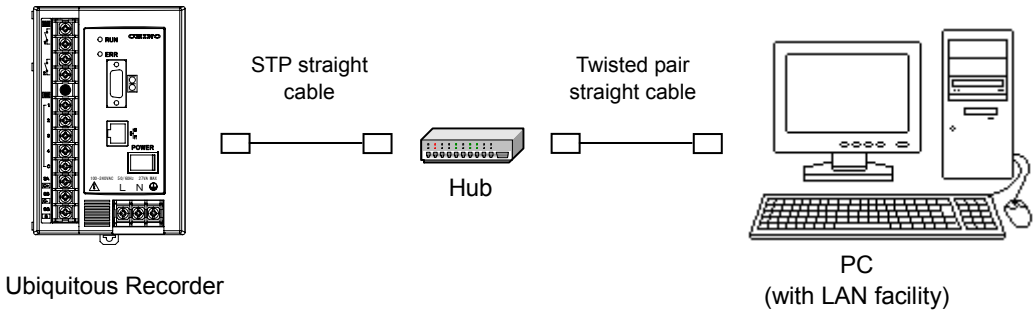
6-7-1. One to one connection with a PC

When connecting this instrument with a PC in a 1-to-1 connection, use a <u>cross type</u> STP cable.



6-7-2. N-to-N connection with PCs

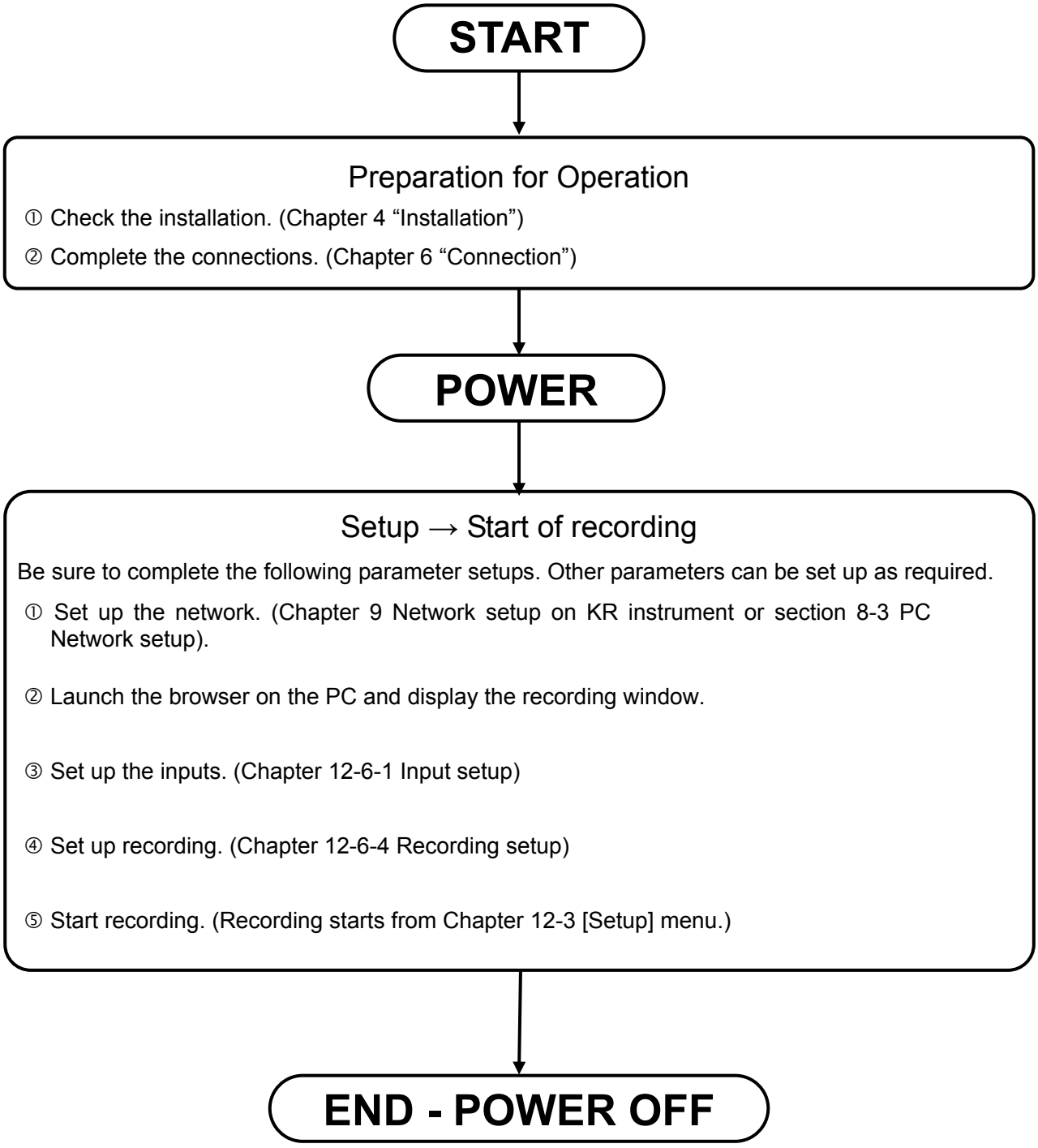
When connecting this instrument with more than one PC or with an existing LAN, use a commercially available Ethernet hub and connect the hub to this instrument using a <u>straight type</u> STP cable.



CAUTION ⚠

The cable connected to the Ubiquitous Recorder should be a shielded twisted-pair (STP) cable. Attach an ferrite clamp in the KR side of a cable.

7. OPERATION



The above setup procedures (including the start of recording condition) are saved in memory and applied the next time the instrument is turned on.

8.PREPARATION OF PC ENVIRONMENT

8-1 Compatible PC Environment

Hardware environment

CPU: Pentium 600 MHz or higher.

Memory: 128 MB or more

Hard disk: Max. 250 MB per connected Ubiquitous Recorder unit (Selectable)

Communication: LAN interface (Ethernet adapter)

A serial interface (RS232C port) is required when Chapter 9 “Network setup on KR instrument” is performed

Software environment

OS: Windows 98 SE, ME, Windows 2000 or XP

Browser: Internet Explorer 5.0 or later, Netscape 6.0 or later, or Opera 7 or later. The Java applet should be active (see section 8-4 JAVA).

8-2 PC LAN Function Check

Execute the following procedures to ensure that the LAN interface (Ethernet adapter) connected to the PC functions normally and the internet protocol is available.

8-2-1 Procedure for checking the LAN function

The procedure and setting items vary depending on the OS. The following procedure takes Windows XP Professional Edition as an example and assumes that there is an Ethernet adapter available.

① Log on with the Administrator’s authority.

② Select [Start] - [Control Panel] - [Performance and Maintenance], and click on the [System] icon.

③ When the [System Properties] dialog box opens, select the [Hardware] tab and click on [Device Manager].

④ Click on menu bar item [View] and select [Device (per type)]. When the device tree is displayed, expand item “Network Adapter” and ensure that the LAN card (Ethernet adapter) to be used is listed in it.

⑤ If the LAN card (Ethernet adapter) is not listed, install it properly as described in the manuals for the PC and LAN card.

Even if it is listed, the LAN does not function normally if an ✕ or **!** symbol is attached to the icon. In this case, set it up for normal by referring to the manuals for the PC and LAN card or calling for the manufacturer’s support.

8-2-2 Procedure for checking the internet protocol availability

① Log on with the Administrator's authority.
② Select [Start] - [Control Panel] - [Network and Internet Connection], and click on the [Network Connection] icon.
③ Select the [Local Area connection] icon, click on it with the mouse right button and select "Properties" from the displayed menu.
④ When the [Local Area Connection Properties] dialog box opens, select the [General] tab and ensure that the item "Internet Protocol (TCP/IP)" is listed in the scroll display area at the center and that it is checked.
If the item is not checked check it, and then set up the IP address and the subnet mask as described in the section 8-3 "PC Network Setup"
If the item is not listed, install the internet protocol by referring to the manuals for the PC and LAN card.

8-3 PC Network Setup

The IP address and subnet mask of this instrument are set as follows at the factory.

IP address: 192.168.254.254

Subnet mask: 255.255.255.0

When connecting this instrument to an existing network environment, set its IP address according to the network environment of the PC as described in Chapter 9 "NETWORK SETUP ON KR INSTRUMENT".

When the IP address of this instrument is used in the initial shipment condition, e.g. when it is connected to a PC in 1-to-1 connection or when building a dedicated LAN, set the IP address of the PC as follows.

IP address: An address in the range from 192.168.254.1 to 192.168.254.253

Subnet mask: 255.255.255.0

When this instrument and PC are connected in a network connection, the IP address of the instrument can be changed from the network (see section 11-5 Ethernet Setup).

The network environment of the PC can be set by using the following procedure.

① Log on with the Administrator's authority.
② Select [Start] - [Control Panel] - [Network and Internet Connection], and click on the [Network Connection] icon.
③ Select the [Local Area connection] icon, click on it with the mouse right button and select "Properties" from the displayed menu.
④ When the [Local Area Connection Properties] dialog box opens, select the [General] tab, select item "Internet Protocol (TCP/IP)" in the scroll display area at the center, and click on the [Properties] button.
⑤ When the [Internet Protocol (TCP/IP) Properties] dialog box opens, check the items "Use the following IP address" and the [General] tab and also ensure that the item "Internet Protocol (TCP/IP)" is checked, enter the desired values in the [IP Address] and [Subnet Mask] fields, and click on the <OK> button.
After performing the above, click on the <OK> button in the [Local Area Connection Properties] dialog box to complete the setup.

CAUTION ⚠

When the IP address of a PC connected to an existing LAN is changed, the communications with other PCs may be affected. In this case, isolate the PC temporarily from the existing LAN and set up the PC with an independent status. To prevent this operation from affecting the existing LAN, be sure to inform the real network administrator, if present, in advance.

8-4 Java

8-4-1 Java execution environment

This instrument uses Java in the recording display. It is therefore required that the PC running the browser has either of the software described below installed in it.

① Sun Microsystems JAVA Version 1.3 or later (1.4 or later recommended)

② Microsoft VM Version 5.0.0.3234 (incorporated as standard in Internet Explorer 5.0) or later

① can be installed from the provided CD-ROM. The latest version can be downloaded from http://java.com/ja/.

Netscape can be selected as an option during installation. If Opera is used, Opera with Java should be used.

② is incorporated as standard in Internet Explorer 5.0 or higher. If Windows XP, the VM may not be incorporated in earlier versions. In this case, install the Sun Microsystems Java Execution Environment from the provided CD-ROM.

8-4-2 Installation of Java Execution Environment

If the recording display does not function, the PC may not have the Java Execution Environment installed in it. In this case, install the Sun Microsystems Java Execution Environment from the provided CD-ROM.

(Installation Procedure)

Open the JRE folder in the provided CD-ROM, double-click on “j2re-1_4_2_06-windows-i586-p.exe” to run it.

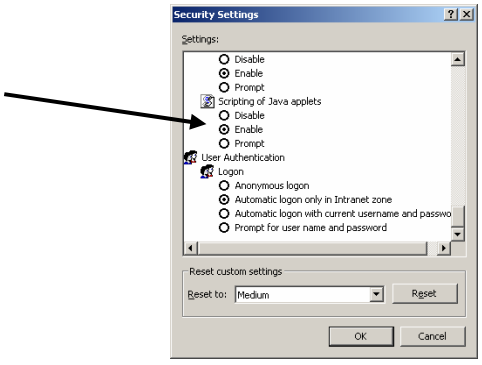
When the installer is launched, complete the installation by following the displayed instructions.

8-4-3 Browser setup

The recording display for this instrument is not displayed if Java is disabled by the browser. In this case, enable Java with the following procedure.

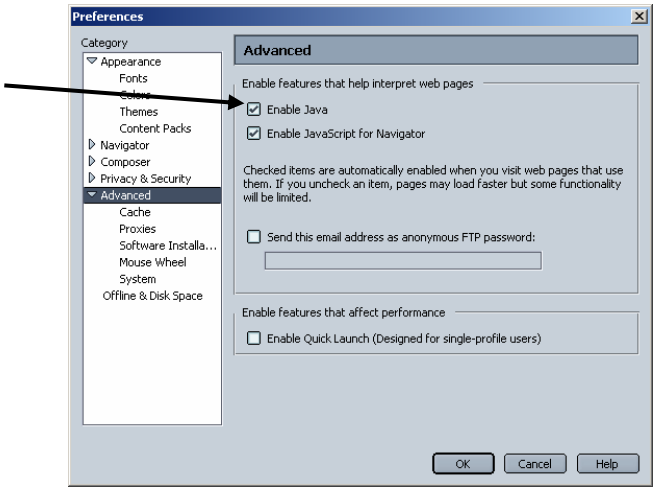
(Procedure for Internet Explorer)

Open the [Tool] menu, select [Options], select the [Security] tab, and then set the security level of the site zone to which the recording display belongs to “Medium” or lower or select [Customize the Level] and check [Scripting of Java applets] to enable it.



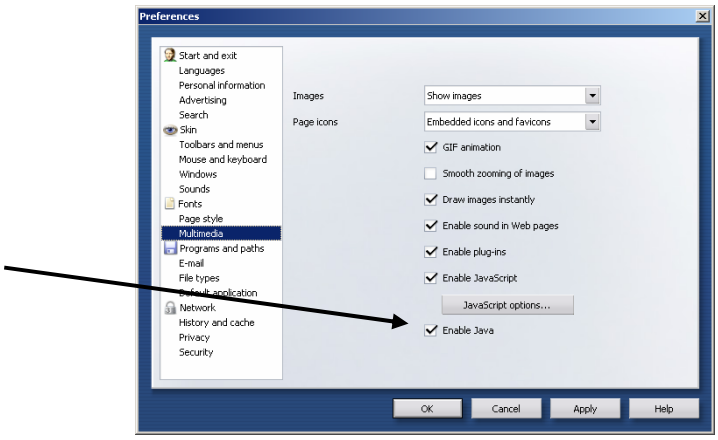
(Procedure for NetScape)

Open the [Edit] menu, select [Preferences], select [Advanced] from the left tree and check “Enable Java”.



(Procedure for Opera)

Open the [Tools] menu, select [Preferences], select [Multimedia] from the left tree and check “Enable Java”.



9. NETWORK SETUP ON KR INSTRUMENT

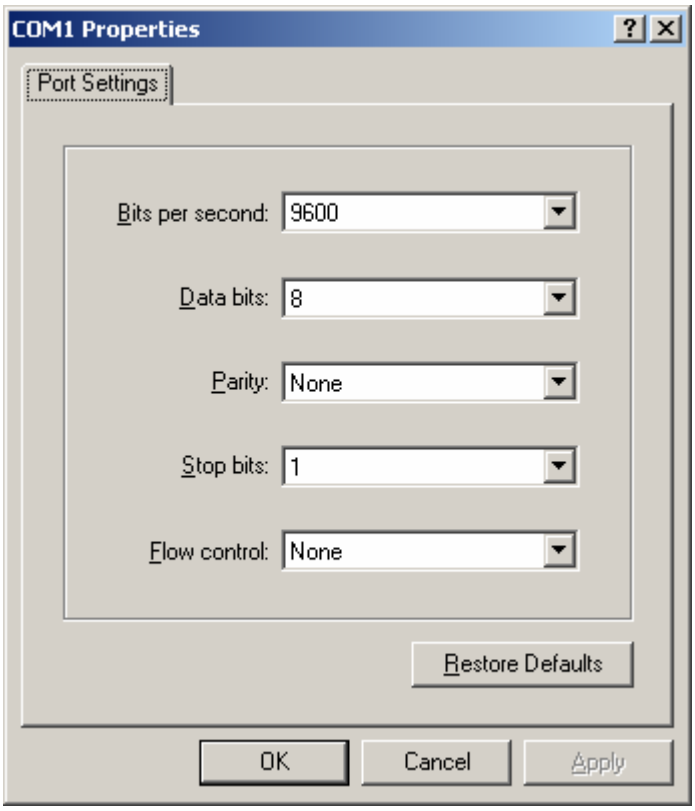
Use HyperTerminal to perform the network setup of this instrument.

9-1 Connecting This Instrument and the PC

Using a commercially available RS232C cross cable, connect the RS232C connector (9-pin) of this instrument to the RS232C connector of the PC.

9-2 Launching HyperTerminal

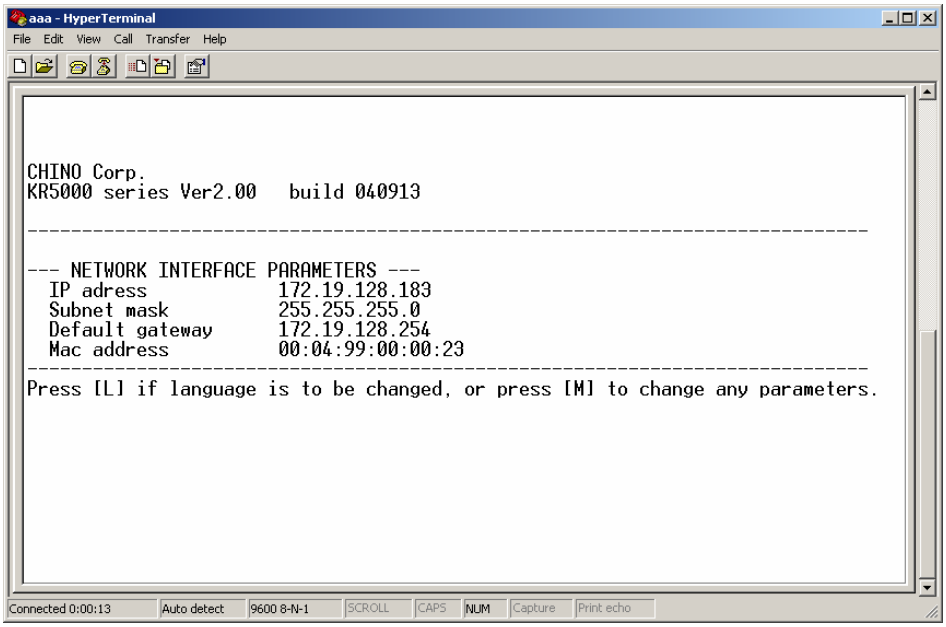
Open the Windows [Start] menu; select [Accessories] - [Communication] - [HyperTerminal] to launch it.
The setup window can be opened by opening the [Communication] menu and selecting [Disconnect], this selection is not required when [Disconnect] is grayed out. Then open the [File] menu and select [Properties].
In the [Connection Method] field select the port where the PC is connected.
Click on the [Modem Setup] button and set the communication setup window as shown below.
Click on the [OK] button to close all the setup windows, and then open the [Communication] menu and select [Connect].



Bits/sec.: 9600
Data bits: 8 bits
Parity: None
Stop bit: 1
Flow control: No

9-3 Turning The Instrument On

When this instrument is turned on, a window as shown below appears.



9-4 Setup

Follow the displayed instructions. To change a value, enter the desired value and press the “Enter” key.

If a value is not to be changed, simply press the “Enter” key.

The setup items are displayed in the following order. Set the required items.

① Press [L] if language is to be changed, or press [M] to change any parameters.

② Enter [A] if parameters are not to be changed, or enter [M] to change parameters.

③ Enter the IP address.

④ Enter the subnet mask.

⑤ Enter the default gateway.

10. INPUT AND RECORDING

10-1 Number of Measuring Channels

This number can be selected from 128, 64, 32 and 16 points as described in section “11-11”. **Note that changing this setup clears all of the existing recorded files.**

This instrument handles measuring channels per group, which consists of 16 channels. The operation on one group basis is applied to the trend display, file management, etc. Therefore, the number of groups for each number of measuring points is as shown in the following table.

Number of Points	Number of Groups
128	8
64	4
32	2
16	1

10-2 Measuring Interval

The data capturing interval is variable depending on the connected input instrument.

Model	Measuring Interval
KR5100	0.9 sec. per input instrument
KR5300	0.9 sec. for all channels

This instrument captures the measurement data at the interval shown above. However, please note that the data updating timing varies depending on the input instrument.

10-3 Data Display Function

10-3-1 Number of digits

The measurement data display method such as the number of display digits is determined according to the input instrument. Check the setup of the input instrument. (See sections 11-9 and 11-10.)

10-3-2 Error data

The following tables show the types of error data.

(Errors on input instrument)

Display	Description
DATA_HI	Data range over (Higher limit)
DATA_LO	Data range over (Lower limit)
BURNOUT	Burn-out

(Errors detected by this instrument)

Display	Description
NO_DATA	Data cannot be captured from the input instrument or the input details are not set.
CAL_ERR	Calculation error
NO_GOOD	Data read error

10-4 Data Processing Function

The input data can be subjected to the following processing operations. For the setup method, see section 12-6-1 Input setup.

10-4-1 Moving average

Calculation of the moving average of the input data is executed. This function treats the average of the latest *n* items of data of every second (moving average data count of 1 to 8) as the measured data. This function cannot be used in combination with the calculation function.

10-4-2 Data calculation

For channels to which the data calculation function is registered, this instrument treats the result of a calculation as the data. The calculation formula can be input in up to 32 characters. For details of the operation procedure, see Chapter 13 Computation specifications.

10-5 Data Recording Function

This instrument records the data in the internal memory according to the set recording interval (See section 12-6-4 Recording Setup.) and recording conditions. The data is recorded in a file at a specified timing, and the recorded data can be downloaded in the PC through the browser or transferred to an FTP server using the FTP transfer function.

10-5-1 Recording modes

This instrument employs the following three modes in data recording.

① Stop: Recording is not performed.

② Record-pause: Recording has been started but is not performed currently because the required conditions (time, external contact input, etc.) are not met.

③ Record: Recording is performed.

The above modes can be checked by an icon or character display. (See section 12-2 Status bar.)

10-5-2 File creation timing

The recorded data is written in a file in the internal CompactFlash memory card at one of the following timings.

① After every 8 times of recording (Example: Every 8 seconds if the recording interval is 1 sec.)

② At the recording is stopped

③ When this instrument is turned on (the data recorded when this instrument has been on the last time is recorded). **However, recording is continued if this instrument is turned on within 3 seconds after it has been previously turned off.**

The file is closed in cases ② and ③ above or **when the number of recorded data items reaches 7824**. After this, a new file is opened and the next recorded data is written in this file.

When the auto FTP transfer function (See section 11-6 FTP server setup.) is set, the file is transferred to the FTP server at the moment it is closed.

10-5-3 File capacity

The recording capacity per file is limited according to the number of files per group, and the number of recordable files is dependent on the number of data measuring points. For the setup of the number of data measuring points, see section 10-1.

Number of points	Max. number of files (per group)
128	31
64	63
32	127
16	255

When the number of files reaches the limit, the way the next file is written is variable depending on the "Overwrite mode" setting (See section 12-6-4 Recording setup.).

Overwrite mode	Operation
ON	At the start of recording of the next file, the oldest file in the group is cleared and the new file is recorded in place.
OFF	The next file cannot be recorded.

TIP

Examples of recordable time under continuous operation

	Recording interval	Recordable period
16 points x 1 group	1 sec.	Approx. 23 days
	1 min.	Approx. 3 year 10 months
16 points x 8 groups	1 sec.	Approx. 2 days 19 hours
	1 min.	Approx. 168 days
	10 min.	Approx. 4 years 7 months

10-5-4 File format

When the created file is downloaded to the PC (See section 12-5-7 KR file list window and section 11-6 FTP server setup.), the file is saved as a CSV type text file. The CSV files can be displayed and processed on various types of tabulation software, such as Microsoft Excel etc.
(Notice) When a comma is used as decimal point, file separation is [Tab] and file extension is ".txt".

The files are created in the format as shown in the following table.

	CH1 tag	CH2 tag	CH3 tag	CH4 tag	• • •
Time	CH1 data	CH2 data	CH3 data	CH4 data	• • •
Time	CH1 data	CH2 data	CH3 data	CH4 data	• • •
Time	CH1 data	CH2 data	CH3 data	CH4 data	• • •
Time	CH1 data	CH2 data	CH3 data	CH4 data	• • •
•	•	•	•	•	
•	•	•	•	•	

Tag: The entered tag name is recorded. If no tag has been registered, the channel number such as "1CH" for CH1 is recorded.

Time: Time is recorded by the format specified by "recorder setup." (See section 11-11 Recorder Setup). The uppermost data is the oldest data. The time may be displayed in another format depending on the setup of Microsoft Excel, etc.

Data: The recorded data is shown. The decimal point position is determined according to the setup of the input instrument. The number of digits after the decimal point may be variable depending on the setup of Microsoft Excel, etc.

11. WEB BROWSER OPERATION

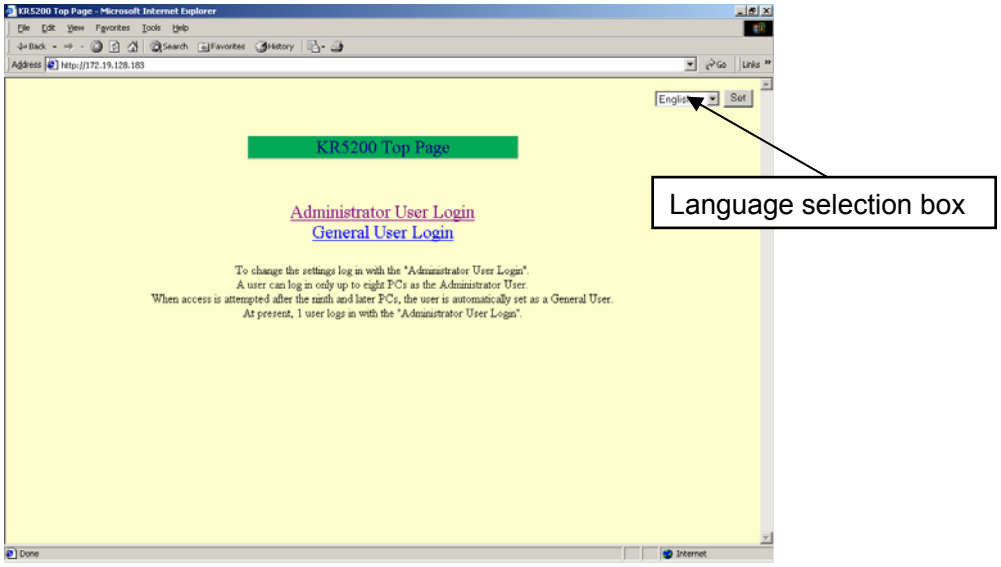
The display windows shown in this chapter are those of Internet Explorer. They are variable depending on the browser and image resolution setting.

11-1 Displaying the Main Menu

①Launch the browser.

②Enter the address of this instrument.

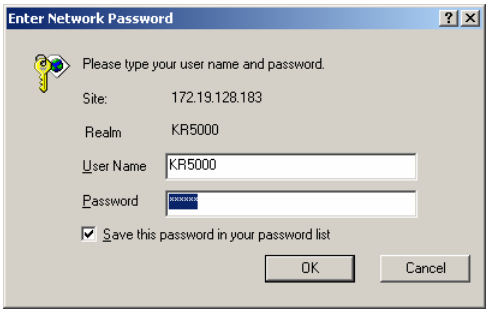
The screen of the following figure is displayed. Choose "English", when "English" is not chosen with a language selection box. When you use it in Japanese, please select "Japanese" with a language selection box.



③Click on either “Administrator User Login” or “General User Login”.

When the [Login] dialog box opens, enter the Username and Password.

With the factory setup, the Username is “KR5000” and Password is “KR5000”.



Administrator User: This user is permitted to perform a setup.

A user can log in only up to eight PCs as the Administrator User.

When access is attempted after the ninth and later PCs, the user is automatically set as a General User.

General User: This user is not permitted to perform a setup, and is allowed only to view data.

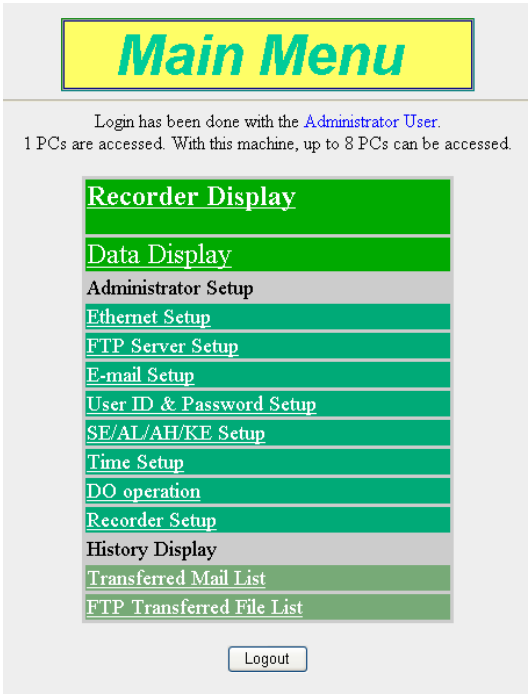
④The main menu opens (see next page).

11-2 Main Menu

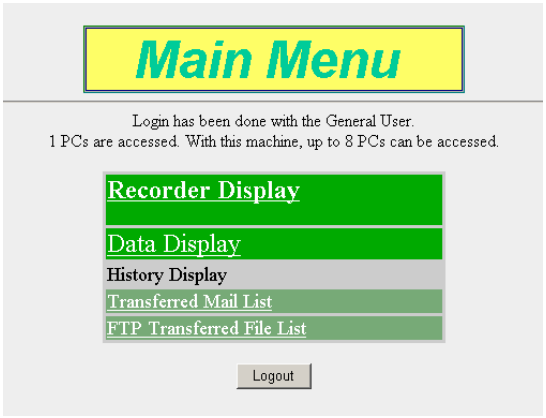
This display can be used as the point of departure for access to other menus.

To move to a menu, click on the title of the desired menu.

(Main Menu for Administrator User)



(Main Menu for General User)



- Recorder Display: Moves to the Recorder display.
  (See Chapter 12 Recorder display operation.)
- Data Display: Displays channel data in the text format.
- Ethernet Setup: Sets up the Ethernet communication.
- FTP Server Setup: Sets up the FTP transfer of recorded data.
- E-mail Setup: Specifies the E-mail address to be notified in case of alarm.
- User ID & Password Setup: Manages the users permitted to access this instrument.
- SE/AL/AH/KE Setup: Sets up the SE/AL/AH/KE instrument.
- Input unit Setup: Sets up the KE3000 input unit (KE3310).
- Time Setup: Sets the time of day of this instrument.
- DO operation (in manual output) Operate the alarm output terminals
- Recorder Setup: Checks the setup and version information of the instrument.
- Transferred Mail List: Views the transmission history of alarm notification mails.
- FTP Transferred File List: Views the history of file transfer using FTP.

Click on <Logout> to exit from the Main Menu.

Note

The number of accessed units is not counted correctly when the NAPT (Network Address and Port Translation) router or proxy server is used.

11-3 Recording Planning

11-3-1 Security warning

One of the following warning boxes should be displayed at the moment the Recording Planning menu is accessed. If neither one of the following boxes or the Recording Planning menu is displayed, check “section 8-4 Java.

Warning ① should be displayed when the browser in use is IE and the Java plug-in is not set, and warning ② should be displayed when the browser is IE and the Java plug-in is set or when the browser is Netscape.

Click on <Yes> to move to the Recording menu.

With warning ②. the message indicating expiration of the validity period of the certificate is displayed when the current date is after the validity date. However, the browser operation can be made possible in the same way as in the validity period by simply clicking on <Yes>. With warning ①. the message indicating expiration of the validity period is not displayed.

Warning ①

Warning □ (Validity period)

(After validity period)

The above display can be skipped from the next time and subsequently by checking “Always trust information from CHINO CORPORATION” (with warning ①) or clicking on <Always> (with warning ②).

*** Certificate validity period**

Even after the validity period of the certificate has expired, the browser can be used normally by simply clicking on <Yes> in the warning box. If it is required to update the certificate in order to ensure network security, please contact CHINO Corporation.

After the above, the recording display is opened.

For detailed operations with the recorder display, see Chapter 12 Recorder display operation.

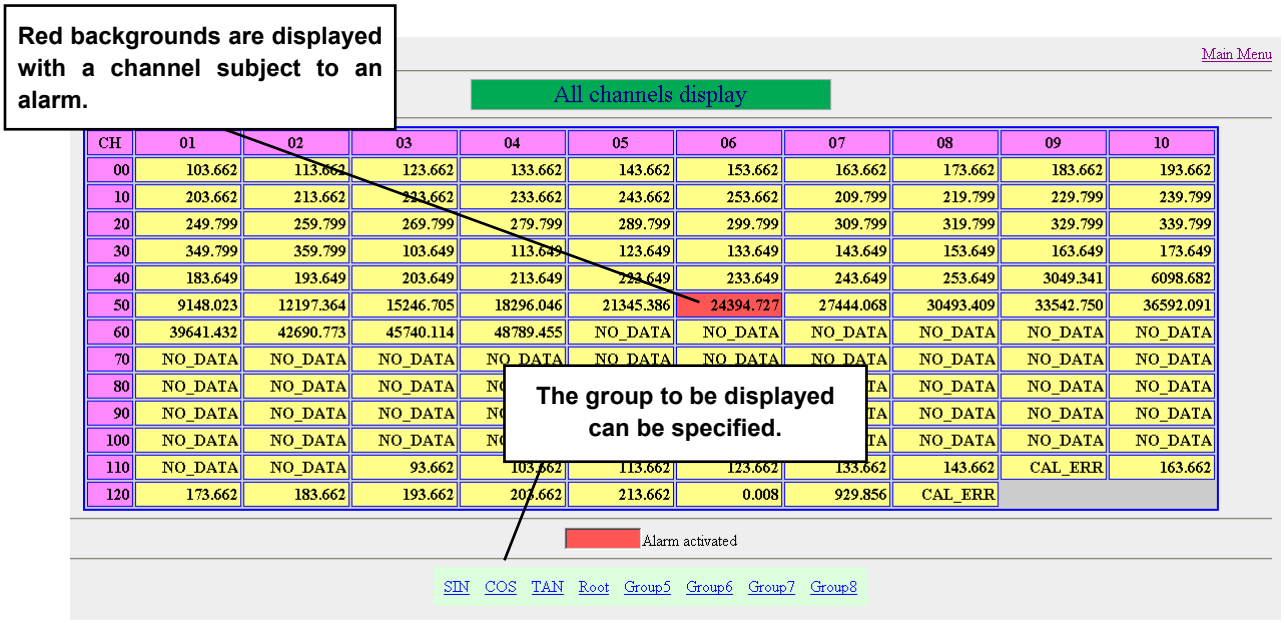
Tip Certificate

The certificate displayed in this box is intended to certify that the current Java applet has been compiled by CHINO Corporation and that it is not a counterfeit.

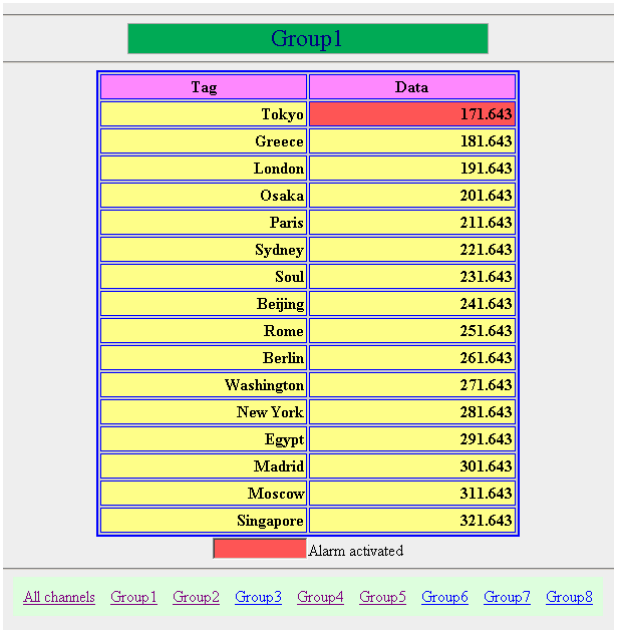
11-4 Data Display

This display shows the channel data in the text format so that it can be viewed even on a Java-incompatible browser. The display is refreshed every 10 seconds automatically.

The data can be displayed either for all channels or every group. The data in the group display is accompanied with the tag names.



(Example of group display)

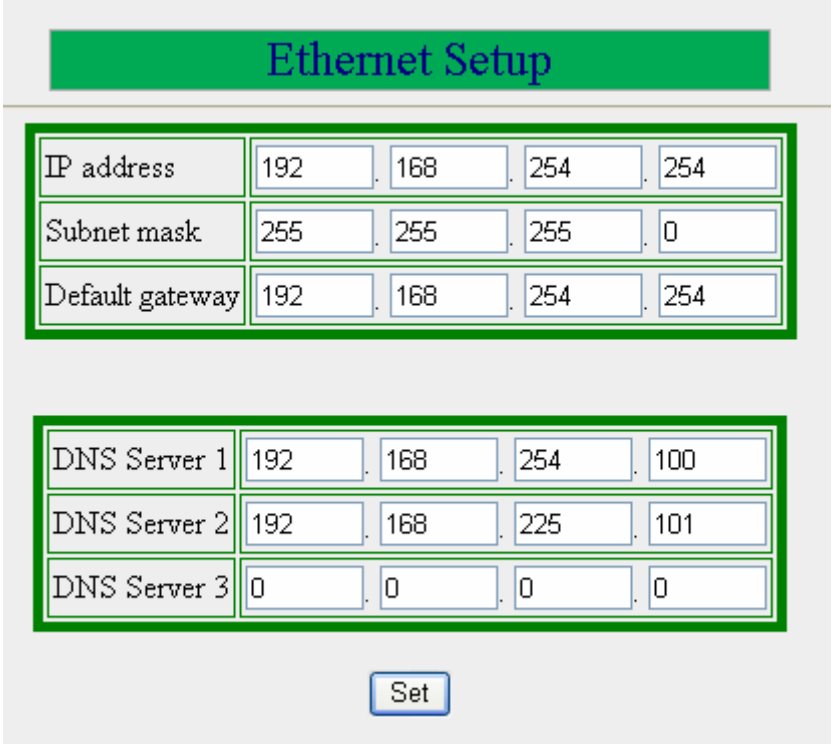


11-5 Ethernet Setup

This menu is used to set up the Ethernet communication. Enter the parameter values and click on the <Set> button.

Set the IP address, subnet mask and default gateway of this instrument and click on the <Set> button.

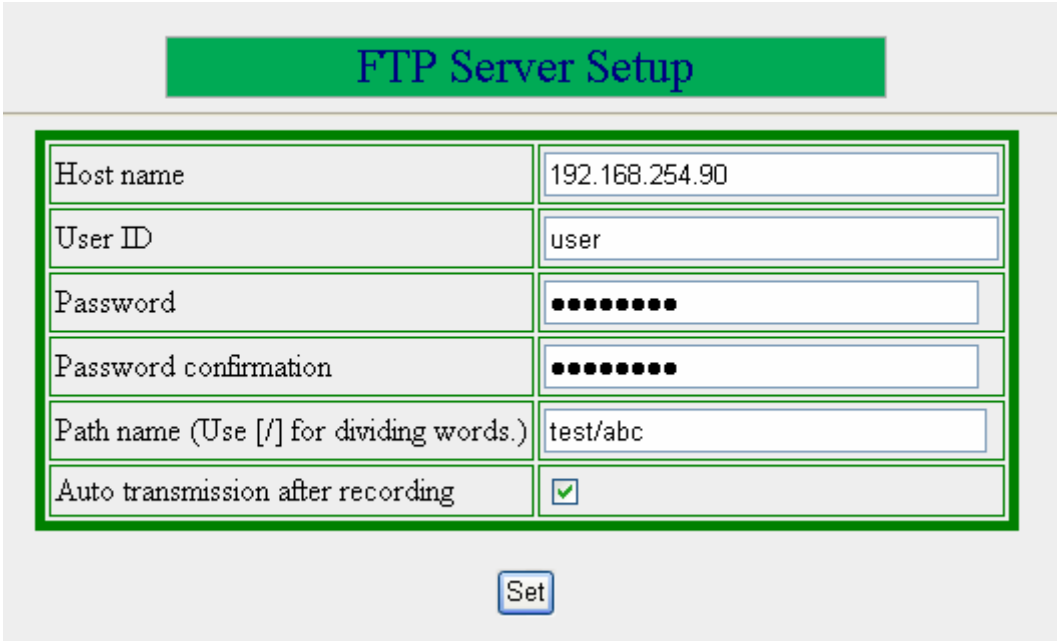
Set DNS servers up to three when it is possible to connect it with the DNS server.



11-6 FTP Server Setup

This menu is used to set up the FTP transfer of recorded data. For details on the FTP transfer, see Chapter 15 “FTP FILE TRANSFER”.
Enter the following items and click on the <Set> button.

Host name: Host name of the FTP server.
User ID: User name to be used in logging in to the FTP server.
Password: Password to be used in logging in to the FTP server.
Path name: Path name of the FTP server location where the data is written. If this field is left blank, the data will be written in the route directory of the FTP server.
Auto transmission after recording: The recorded data are transferred automatically when the recorded file is created.



Reference

It is the CSV files that can be subjected to FTP transfer. The data in the CSV files can be loaded by various types of tabulation software such as Microsoft Excel etc..
For the format of the file, see 10-5-4 File format.

When the PC running the browser holds FTP transferred files, the PC can view the trend display on the browser. See section 12-5-8 PC file list window.

11-7 E-mail Setup

In case of an alarm, an E-mail is sent to the address specified in this menu. The mailing method is also specified in this menu.

The E-mail can be sent at the timing of the alarm occurrence in a group, at the startup of this instrument or at the specified time of day.

Transmission of up to 20 kinds of E-mails can be set.

For details on the E-mailing, see Chapter 16 “E-mailing”.

Enter the following items and click on the <Set> button.

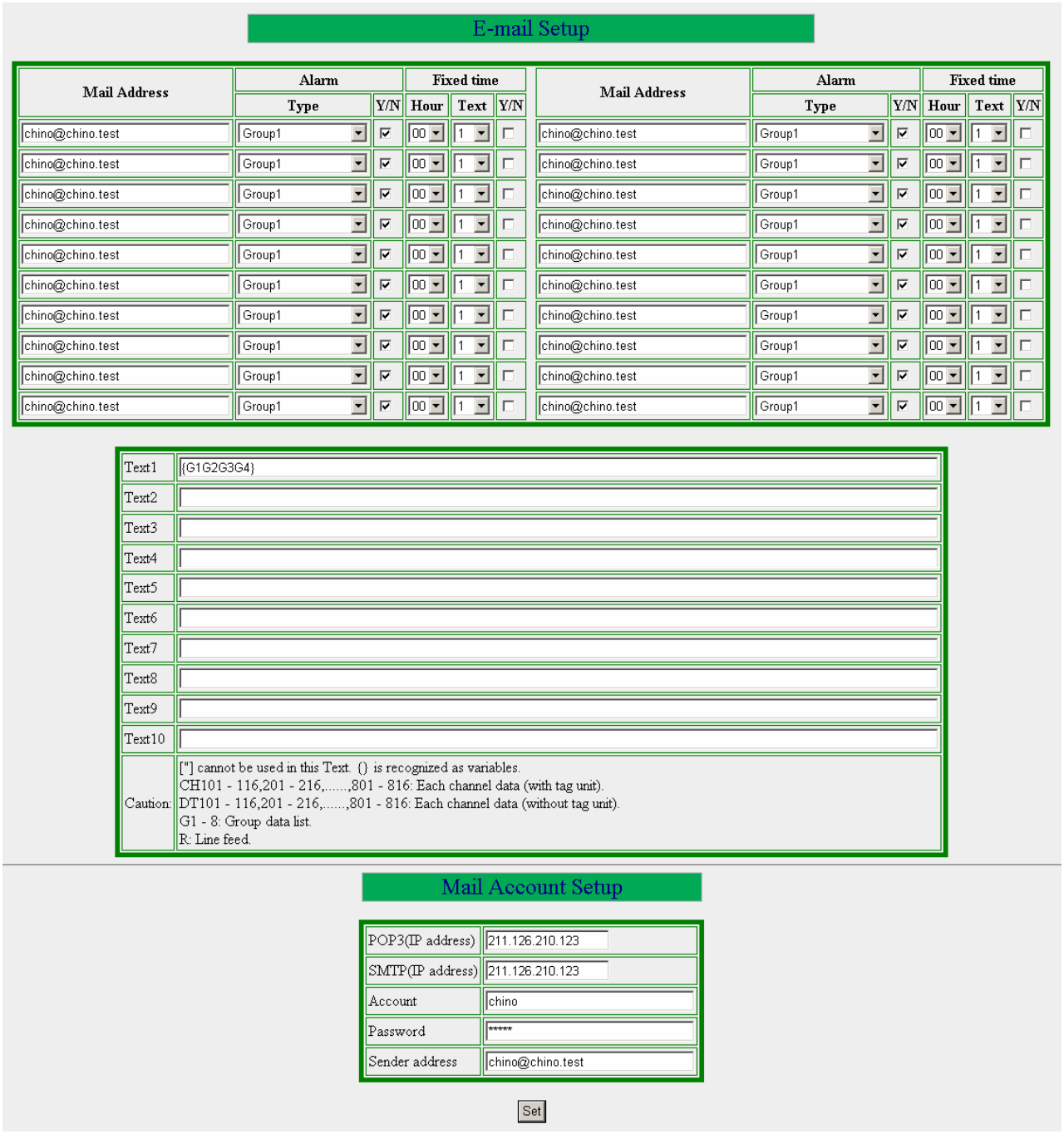
E-mail setup

Item	Description
Mail Address	Destination address.
Alarm	Select the type of event to be sent by E-mail. **Group 1-8**: E-mail is sent when an alarm occurs in the specified group. **All Group**: E-mail is sent when an alarm occurs in any of the measuring groups of this instrument. **Startup**: E-mail is sent when this instrument is turned on (or reset). **Device Error**: E-mail is sent when a device error (recording memory error, etc.) occurs. **Remaining Memory**: E-mail is sent when 90% or more of the recording capacity of one or more groups is consumed. When an item is checked, an E-mail is sent at the set timing. No E-mail is sent for an item that is unchecked. The message is mailed in the fixed format.
Fixed time	E-mail can be sent at a specified time of day. When this item is checked, an E-mail is sent at the set time of day. No E-mail is sent when this item is unchecked. The message to be mailed can be selected in “Text” below.
Text	The message text in the E-mail to be sent at the specified time of day can be selected. The message content can be registered in “Text 1-10” below.
Text 1-10	The message of the E-mail to be sent at the specified time of day can be defined here. Double quotation marks (“) cannot be used in the text, and the string inside { } is recognized as a variable. The channel numbers are consecutive numbers. Example: CH302 → Channel 2 in Group 3 (Usable variables) CH101-116,201-216,…,801-816:Each channel data (with tag unit) DT101-116,201-216,…,801-816:Each channel data (without tag unit) G1-8: Group data list R: Return

Mail account setup

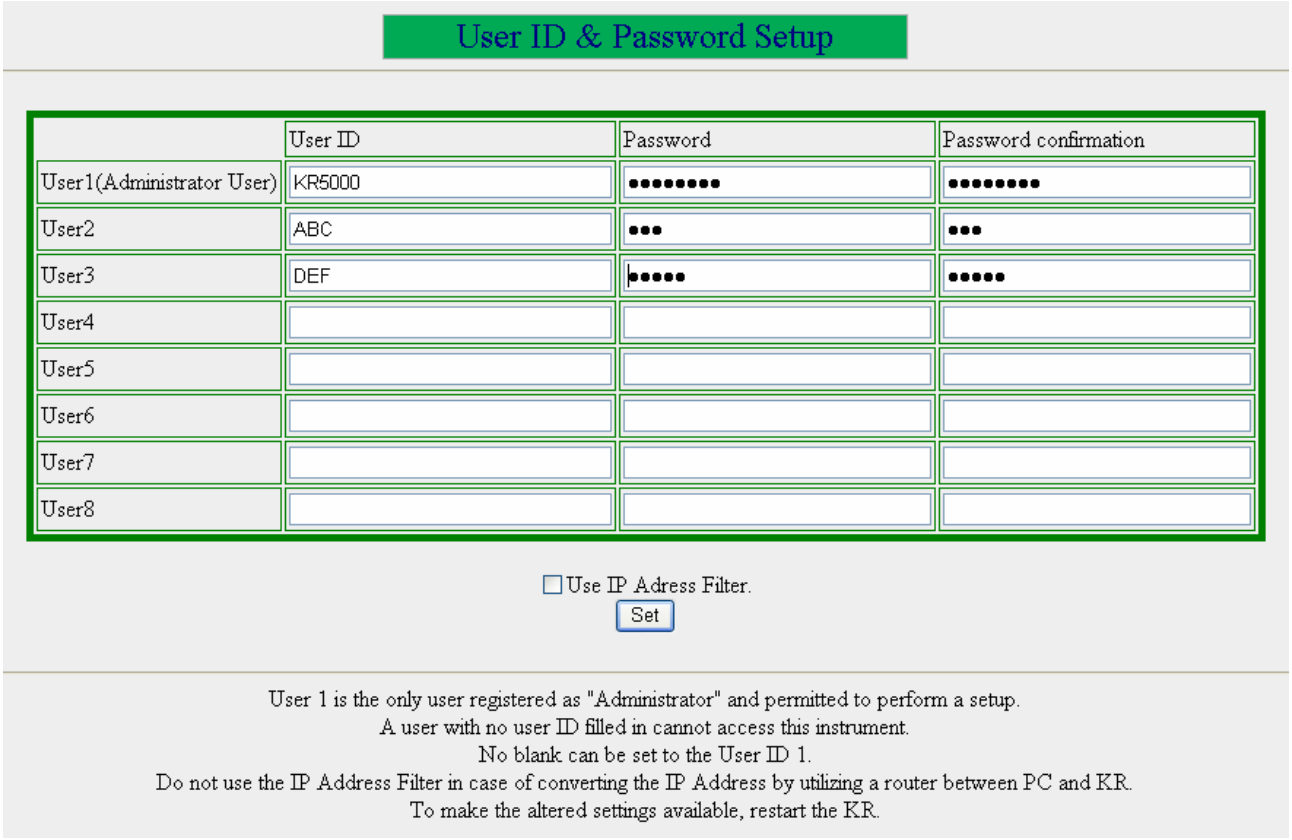
This sets up the mail account used by this instrument to send E-mails.

Item	Description
POP3	IP address or domail name of the POP3 server
SMTP	IP address or domail name of the SMTP server
Account	Mail account name
Password	Password for the mail account
Sender address	Mail address



11-8 User ID & Password Setup

This menu is used to register the user IDs that can access this instrument and their passwords. The users other than the one in the top row (Administrator User) are allowed to access only the “Recording Planning,” “Data Display,” “Transferred Mail List” and “FTP Transferred File List” menus. These users are not permitted to perform setups in the Recording Planning menu.
Enter the user ID in the center column and the password in the right column of each row, and click on the <Set> button.
When the check is put in "Use IP Adress Filter", the setting excluding same IP address as PC logged in is not accepted on the recorder display. However, when the address translation is done by the router etc. , it is not likely to be able to set it. Please remove the check here when the error of "It is a setting improper user." is displayed on the recorder display.

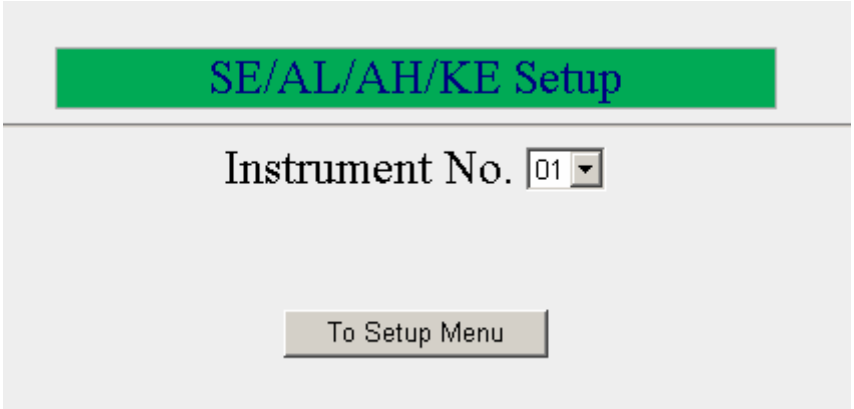


11-9 Input Instrument Setup - SE, AL, AH and KE (For the KR5100)

This menu is displayed only with the KR5100, and is used to set up the SE, AL, AH and KE instruments. It cannot be used to set up the LT, BR.

11-9-1 Setup top menu

The initial display is as shown below. Specify the instrument number here, and then click on the <To Setup Menu> button to open the display shown in section 11-9-2.

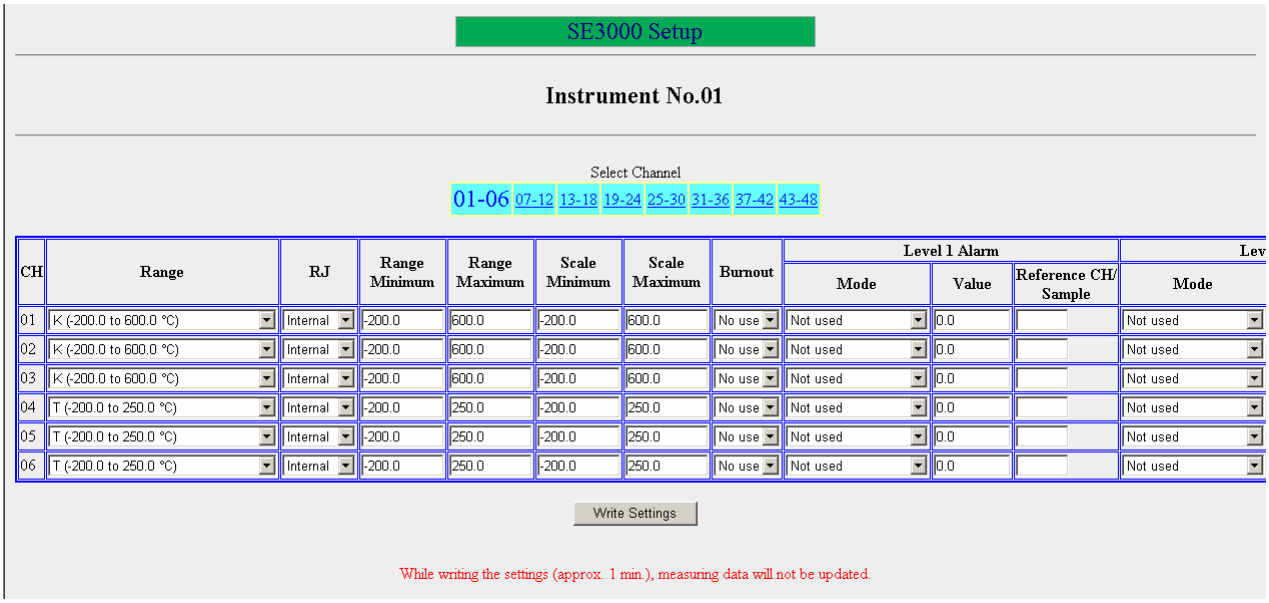


11-9-2 Settings operation

Write the settings for the specified device. Enter the desired settings to the items and click on the <Write Settings> button to save the settings in the device. The settings items are displayed for every 6 channels.

If the channel you want to set is not displayed in the current menu, use “Select Channel” (“01-06”, etc.) to select the desired channel.

For details on the setting items, refer to the instruction manual for each device.



Setting items

Item		Description
Range		Select the range. The available range is variable depending on the device.
RJ		Select the reference junction compensation from Internal / External.
Range Minimum / Maximum		Set the range minimum / maximum value.
Scale Minimum / Maximum		Set the scale minimum / maximum value.
Burn-out		Select the data processing to be executed when burnout occurs, from No use / Up / Down.
Level 1-4 Alarm	**Mode**	Set the alarm type for each of the four alarm settings.
	Setting	Set the alarm value for each of the four alarm settings.
	Relay No.	Set the alarm output relay No. for each of the four alarm settings. This item is displayed only when the target device is equipped with an alarm output.
	Reference CH / Sample	Set the reference channel (for difference alarm) or sampling count (variation rate alarm).
	Standby	Select the standby from Enable / Desable.
	Delay	Set the delay time (second).
Alarm Deadband		Set the alarm deadband.

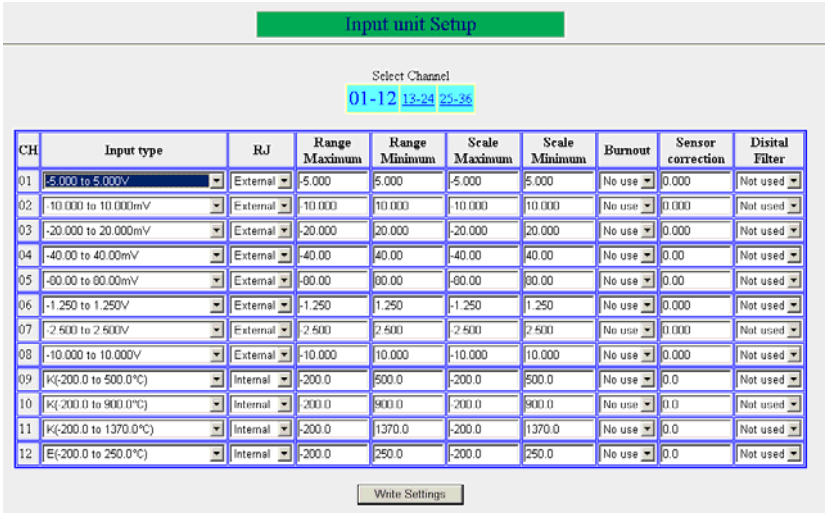
⚠CAUTION

The data displayed on the Recording Planning menu is not updated in the period in which the settings are written in the instrument (about 1 minute).

11-10 Input unit setup(For the KR5300)

This menu is displayed only with the KR5300, and is used to set up the input unit (KE3310-000).

Write the settings. Enter the desired settings to the items and click on the <Write Settings> button to save the settings in the instrument. The settings items are displayed for every 12 channels.
If the channel you want to set is not displayed in the current menu, use “Select Channel” (“01-12”, etc.) to select the desired channel.



Setting items

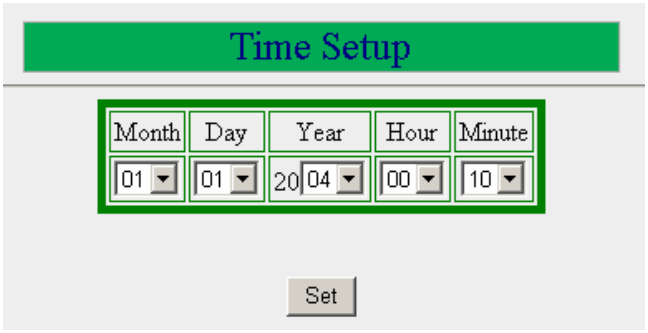
Item	Description
Input type	Select the input type.
RJ	Select the reference junction compensation from Internal / External.
Range Maximum / Miminum	Set the range maximum/minimum value. -30000 to 30000 ＊Thermocouple and RTD inputs should be within the measuring range.
Scale Maximum / Miminum	Set the scale maximum/minimum value. -30000 to 30000 ＊Thermocouple and RTD inputs should be within the measuring range.
Burnout	Select the data processing to be executed when burnout occurs, from No use / Up.
Sensor correction	Set the correction value. –30000 to 30000
Digital Filter	Select from Not used / Weak / Medium / Strong.

⚠ CAUTION

The data displayed on the Recording Planning menu is not updated in the period in which the settings are written in the instrument (about 90 seconds).

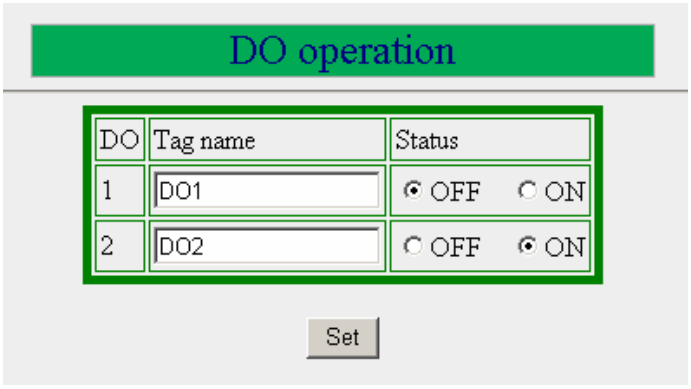
11-11 Time Setup

This menu is used to adjust the internal clock of the instrument. This setting is permitted only to the Administrator user. Set the date and time, and then click on the <Set Time> button. The figure for “second” is set to “0” at the moment the setting date is written.
A time setup is not possible while any group is being recorded.



11-12 DO operation

This item is used to operate ON/OFF status of the alarm output terminals.

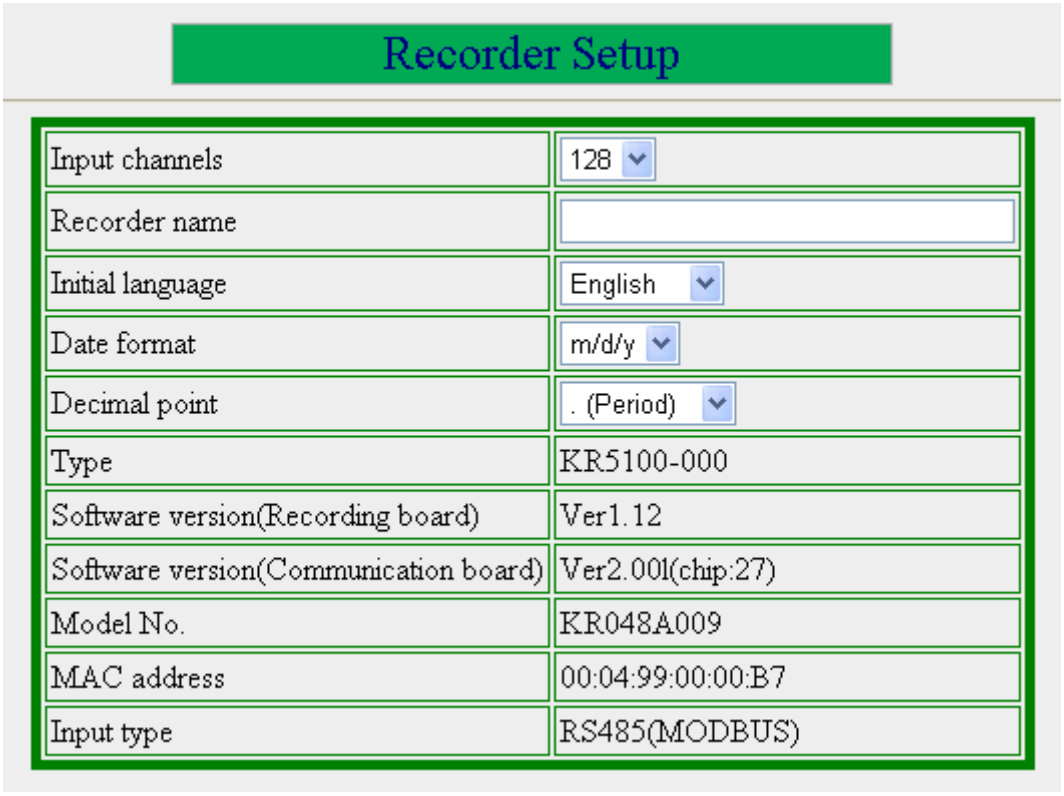


Tag name	Set up any name within 15 characters.
Status	Select ON or OFF.

When the user clicks on the [Set] button, the status is switched.
It enters the state of turning on when either is turning on when using it together with the output of alarm. (OR output)

11-13 Recorder Setup

This menu is used to set up the number of input channels and other items for this instrument.
It is also used to check the version information, etc.
The recorder setup is not possible while any group is being recorded.



Note: When the numbers on the input channel are changed, the settings on the recorder menu and the recording file are also cleared.

Item	Description
Input channels	Select the maximum number of input channels from 128, 64, 32 and 16. Selecting a small number of input points increases the number of recordable files (see section “10-5-3”.) The saved settings and recorded files are cleared when this setting is changed.
Recorder name	Set the recorder name to be written in the E-mail to be sent for alarm notification.
Language	The language used by the language first displayed on a browser screen, the page for cellular phones, E-mail, and setup (see section “9. NETWORK SETUP ON KR INSTRUMENT”) by the hyper-terminal is set up.
Date format	The expression method of the date is selected from "y/m/d", "m/d/y", and "d/m/y."
Decimal point	The character showing a decimal point is selected from ".(period)" and ",(comma)".

11-14 Transferred Mail List

This menu displays the logs of E-mails transferred upon alarm occurrence, etc. This list is cleared when the power is switched OFF.

11-15 FTP Transferred File List

This menu displays the history of the FTP file transfer that is initiated when a file completes recording or an operation is performed on the Recording Planning menu. It also displays the error details for a failed transfer. This list is cleared when the power is switched OFF.

11-16 Web Display on Cellular Phone

The web page displaying the information on this instrument can also be viewed on an I-mode compatible cellular phone screen.

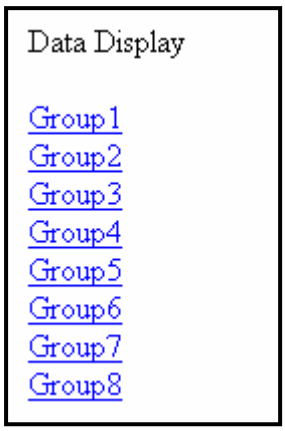
Only the Data Display menu can be viewed on a cellular phone screen.

To view the Data Display menu for cellular phone, append “/k” to the end of the normal address as shown below.

http:///(Address of this instrument)/k

When the user ID and password are requested, enter the user ID and password set in section 8 “User ID & Password Setup”.

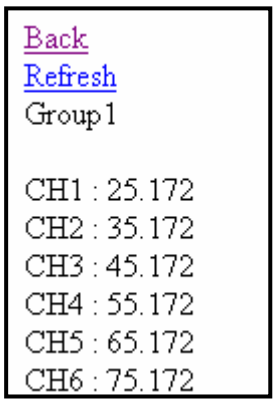
The following menu is displayed initially.



When a group name is selected, the data on each group can be viewed separately.

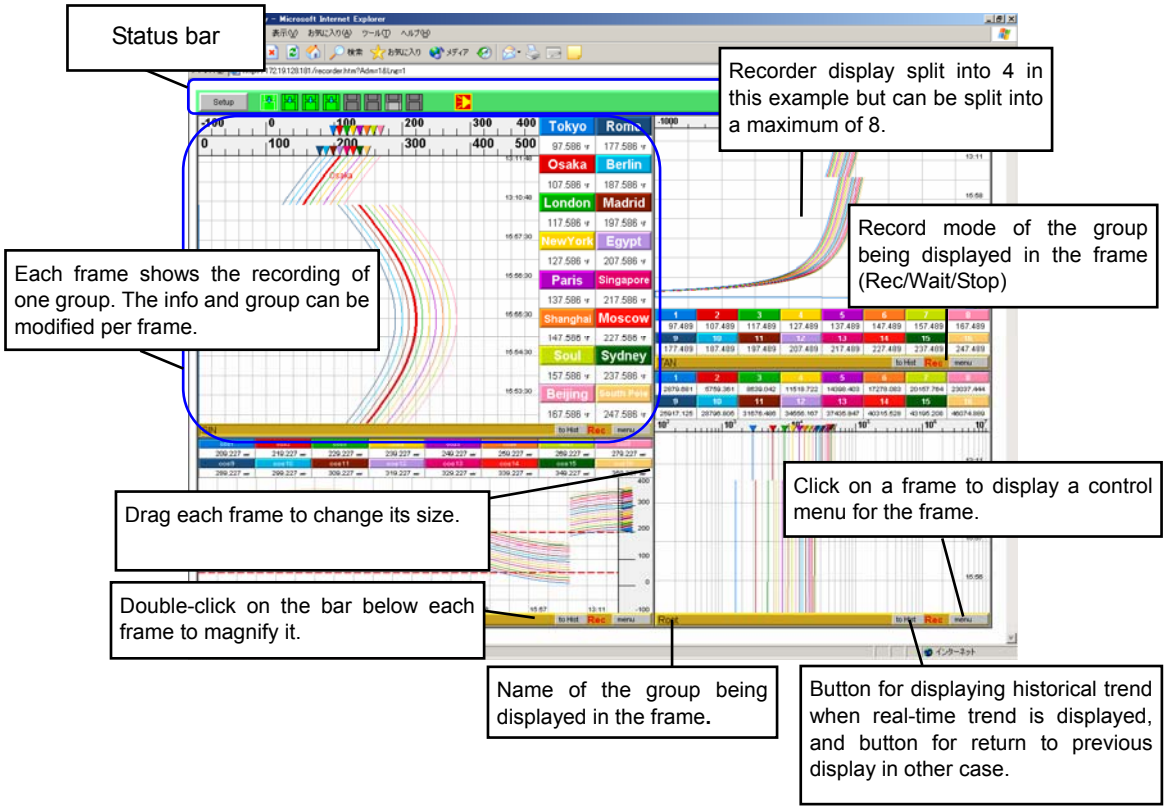
Select “Return” to return to the home page.

Select “Refresh” to update to the latest data.



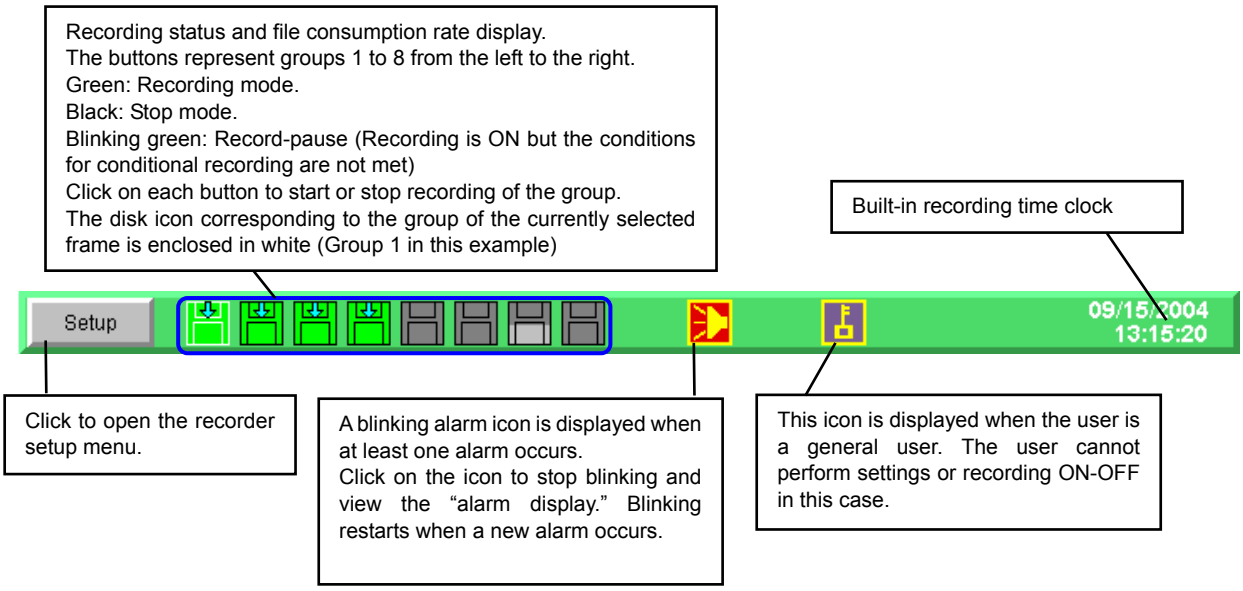
12. RECORDER DISPLAY OPERATION

12-1 Display Configuration



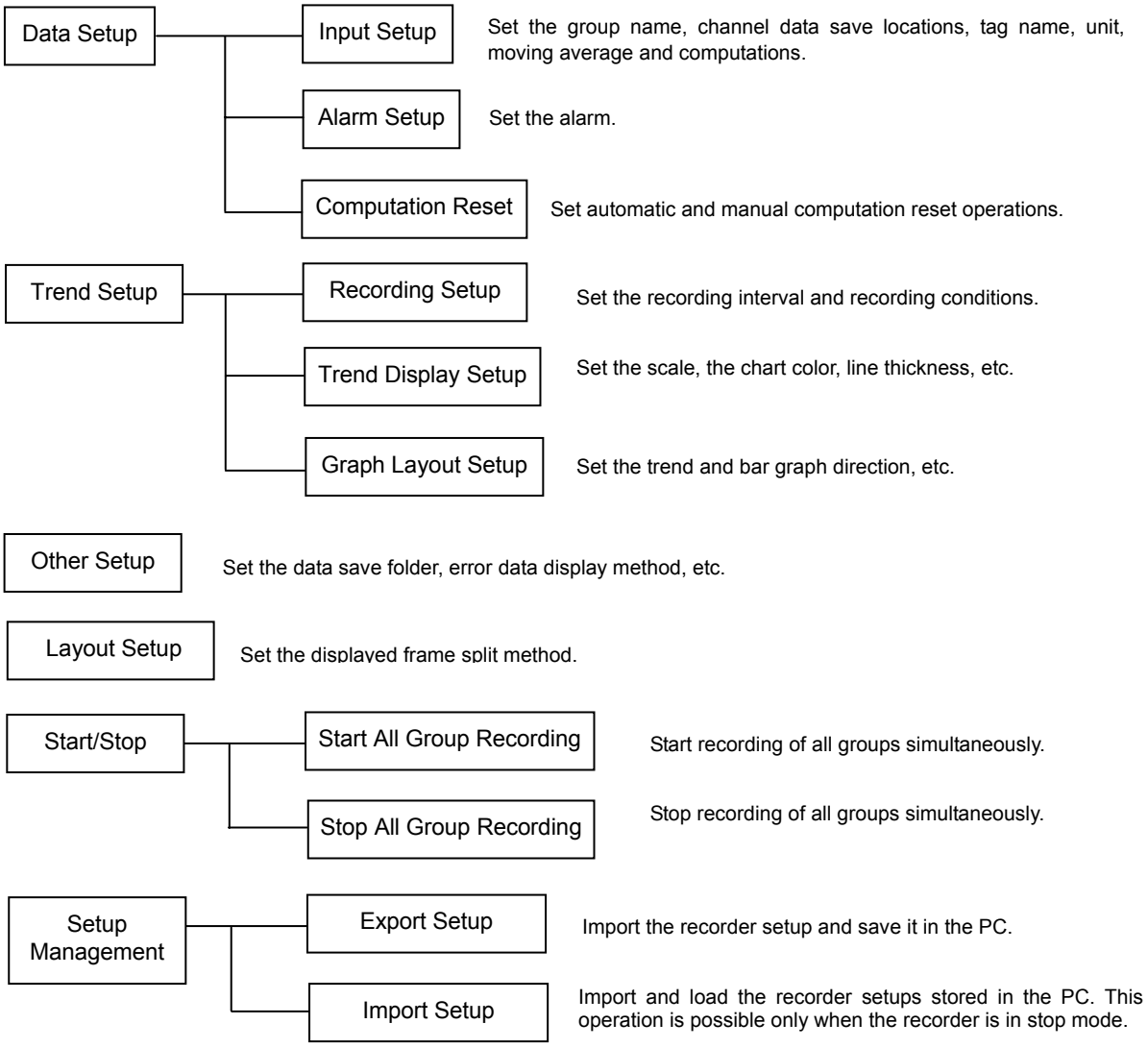
12-2 Status Bar

The status bar shows the operational status of this recorder.



12-3 [Setup] Menu

Click on [Setup] to open the following menus.
For details on each menu, see section 12-6 [Setup Menu] Details.



12-4 Menu on Each Frame

Each frame has a menu button at bottom right. This button is used for setups related to the display in the frame.
The displayed menu provides the following items.

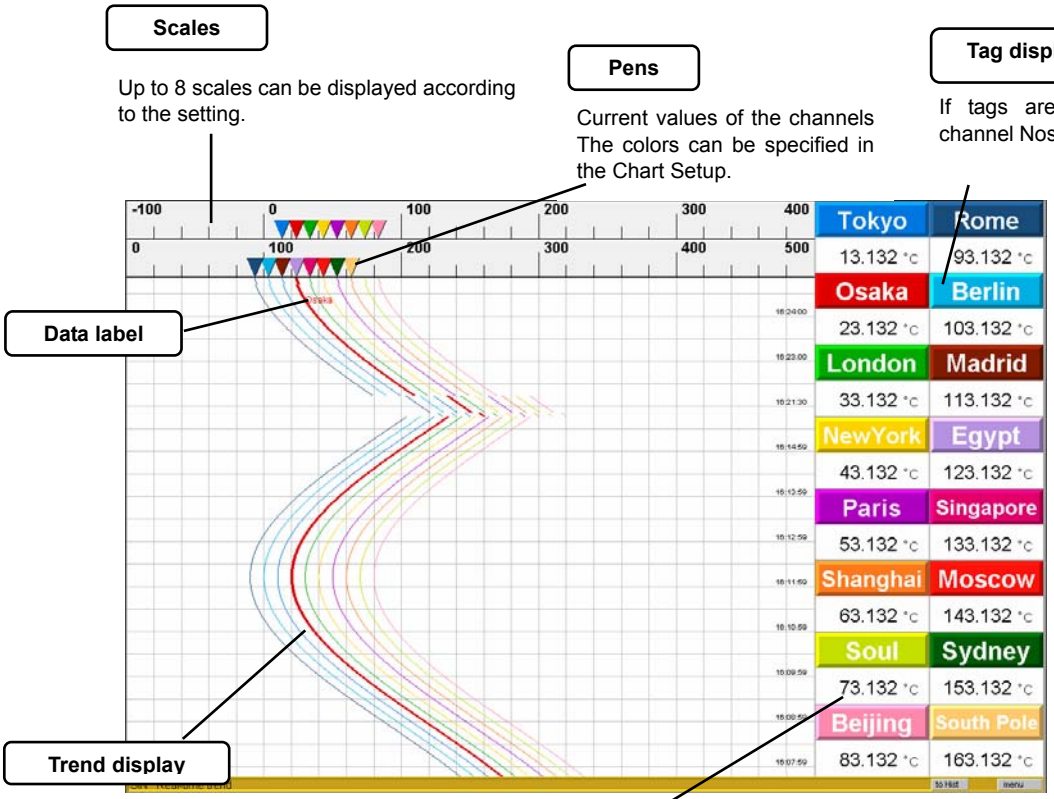
Maximize - - - - - - Magnifies the frame shown in a split display. This is the same effect as double-clicking on the bar of the frame.
Select Group - - - Selects the group to be displayed in the frame.
Select Display - - Selects the display type to be displayed in the frame.
Start/Stop - - - - -- Starts or stops the recording of the group being displayed in the frame.

Menu items proper to each frame may also be displayed. For details, refer to the description of each window.

12-5 Names & functions of Recorder Operation Display

12-5-1 Real-time trend display window

This window shows the trends of measurement values like a chart recorder. The display is updated every second.
The data display positions and chart scrolling method can be modified by opening the [Setup] menu and selecting “Graph Layout Setup” (see section 12-6-6 ”).
A message can be input by double-clicking on the chart. The input messages are managed using “Message Summary” (see section 12-5-6). As the input messages are stored in the hard disk of the PC in use, they cannot be displayed when the recorder data is displayed on another PC.
Click on a pen or tag display to view the trend display of the data of the corresponding channel. The trends of multiple channels can also be displayed by repeating the clicking operations. The trend display can be hidden by clicking on the pen or tag display again.



The recorded chart is scrolled.
Any comment can be input by double-clicking on the display.

Only the data selected to be displayed in charts in Chart Setup is displayed using characters. The unit is also displayed if it is set.
Data under alarm blinks in the color selected in Alarm Setup.

12-5-2 Numerical data display window

This window shows data as numerical values as well as the alarm occurrence situations.

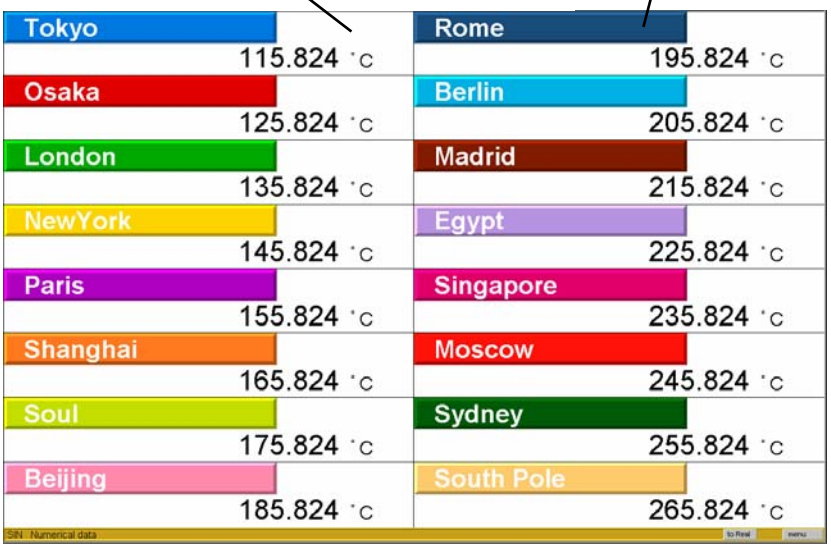
Data of all 16 points is displayed including that which is not shown in the trend display.

Measured Data display

Data is displayed using characters. The unit is also displayed if it is set. Data under alarm blinks in the color selected in the Alarm Setup.

Tag display

If tags are not set, the CH Nos. are displayed.



12-5-3 Bar Graph display window

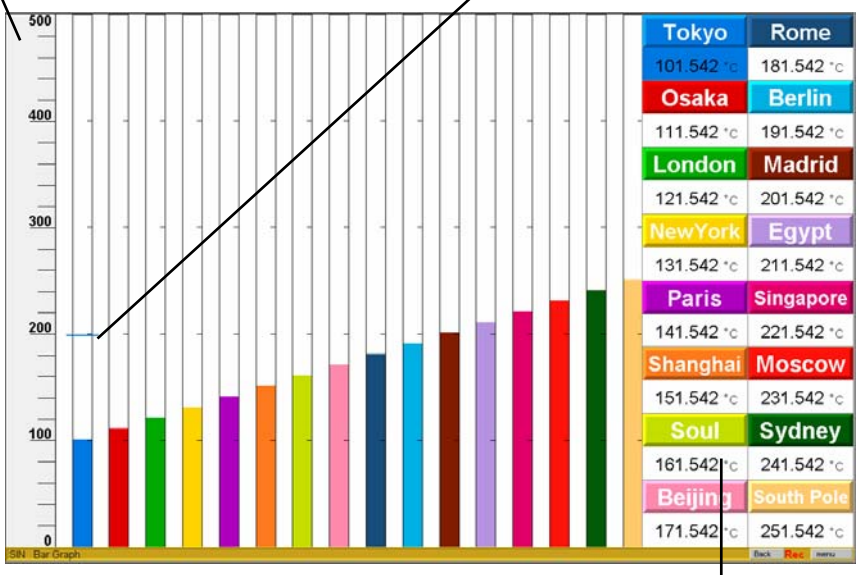
This window shows the bar graphs for the data. This is a visual representation of the measurements.

Scales

Displayed as setup in the Trend Display Setup like the real-time trend display. The setup for scale No. 8 is used.

Alarm bar

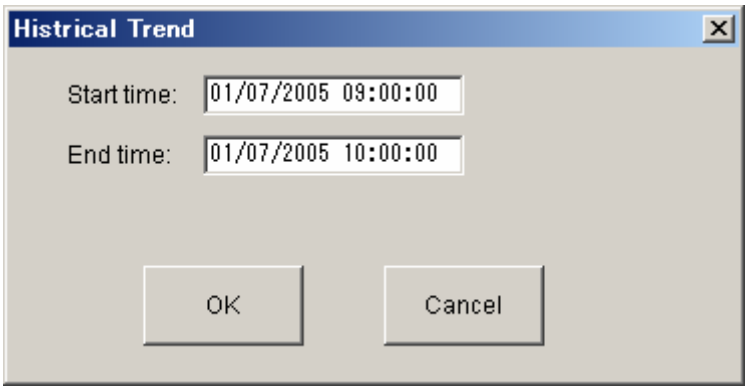
The lines indicating the alarm values (upper and lower limits only) are displayed in the color set in the Alarm Setup.



Data is displayed in the same way as the real-time trend display.

12-5-4 Historical Trend display window

This window shows the trend from the present toward the past. The basic operations such as channel selection and message input are identical to the real-time trend display (See section 12-5-1 Real-time trend display window). The scales are also displayed according to the real-time trend display setup. When “Historical Trend” is selected in the menu, the time period can be selected as shown below. When the user clicks on the [OK] button without modifying the defaults, the trends over the specified number of data items are displayed starting from the present time (See section 12-6-7.). Clicking on the [Cancel] button during the data loading displays the trend of data loaded until then.



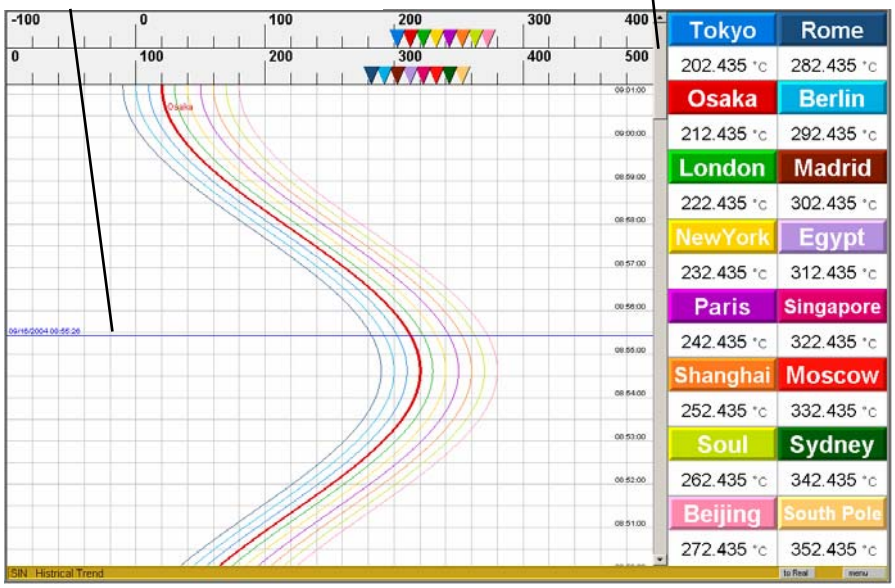
To view the trend of a specified file, open a chart as described in section 12-5-7 KR file list window or 12-5-8 PC file list window.

Cursor line

The cursor is displayed in the position where the mouse is clicked. The data of the selected position is shown in the data display area.

Scroll bar

Movement of the display position is possible using the scroll bar.



(Proper menu items)

- Reduce Time Axis - Reduces the time axis to the 1/2 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512 and 1/1024 sizes.
- Search - - - - - - - - - Opens the Search window for jumping to the specified time, maximum or minimum value.

12-5-5 Alarm display window

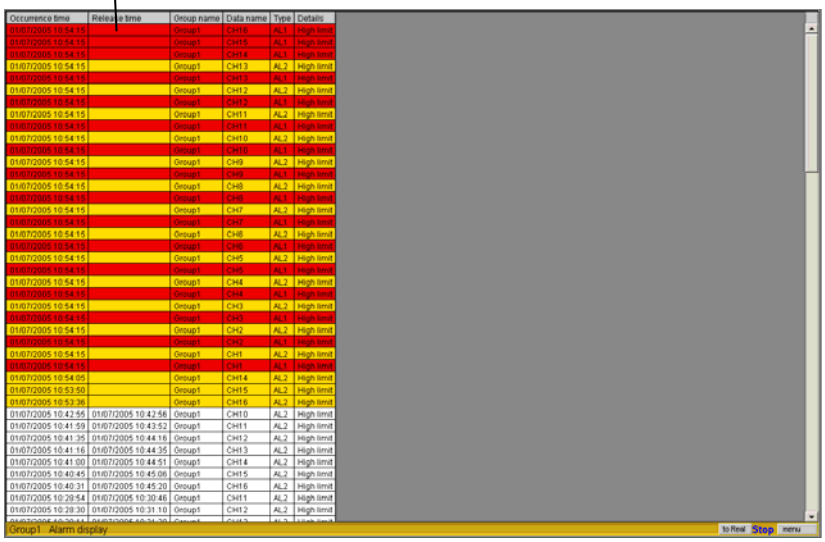
This window shows the alarm history of all groups in the form of a list.

This recorder stores up to 200 alarm histories (including those occurring and those canceled). When the 201st alarm history is activated, the oldest data is deleted.

Double-click on the list or select the proper menu item “Open with Trend” to view the historical trend of the alarm occurrence position. The real-time trend is displayed when an alarm that is occurring currently is selected.

Alarm display

Shows the occurrence time, release time, group name, data tag name (CH No.), alarm type (AL1-4) and alarm details from the left to the right.
The order and line height can be set by clicking on the [Set] button and selecting “Other Setup.”
The alarm that is occurring currently blinks in the set alarm color.



(Proper menu items)

- Open with Trend - - Shows the historical trend at the occurrence time of the selected line. The trend display is not available when the history file for the occurrence time does not exist.
- Clear All Alarms Display - - -All alarms display can be cleared. Individual alarm display cannot be cleared.
- Save in CSV - - - - - Saves the list contents as a CSV file in the PC.

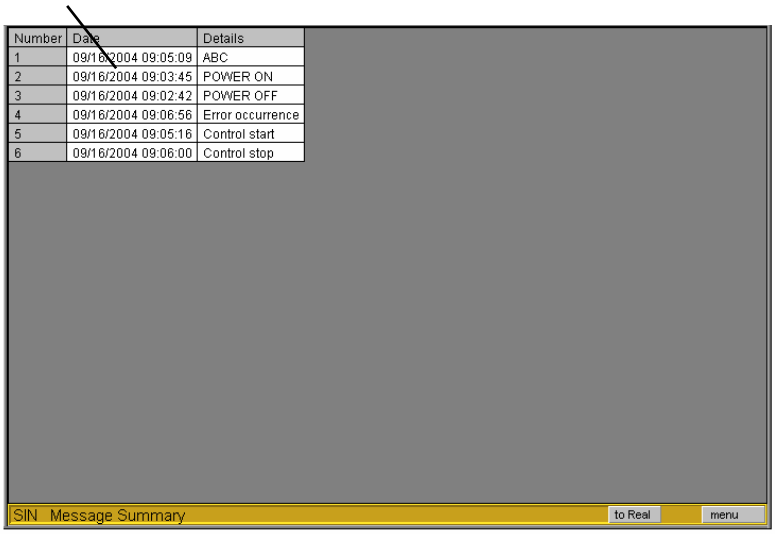
12-5-6 Message summary window

This window shows the list of messages input in the [Real-time Trend] and [Historical Trend] windows. The input messages are not saved in this recorder but stored in the hard disk of the PC in use. As a result, they cannot be displayed when this recorder is accessed from a different PC.

Double-click on the list or select the proper menu item “Open with Trend” to view the historical trend of the alarm occurrence position.

Message summary

List of messages input on the trend display.



(Proper menu items)

- Open with Trend - - Shows the historical trend at the occurrence time of the selected line. The trend display is not available when the history file for the occurrence time does not exist.
- Delete Message - - Deletes either all messages or individual message(s).

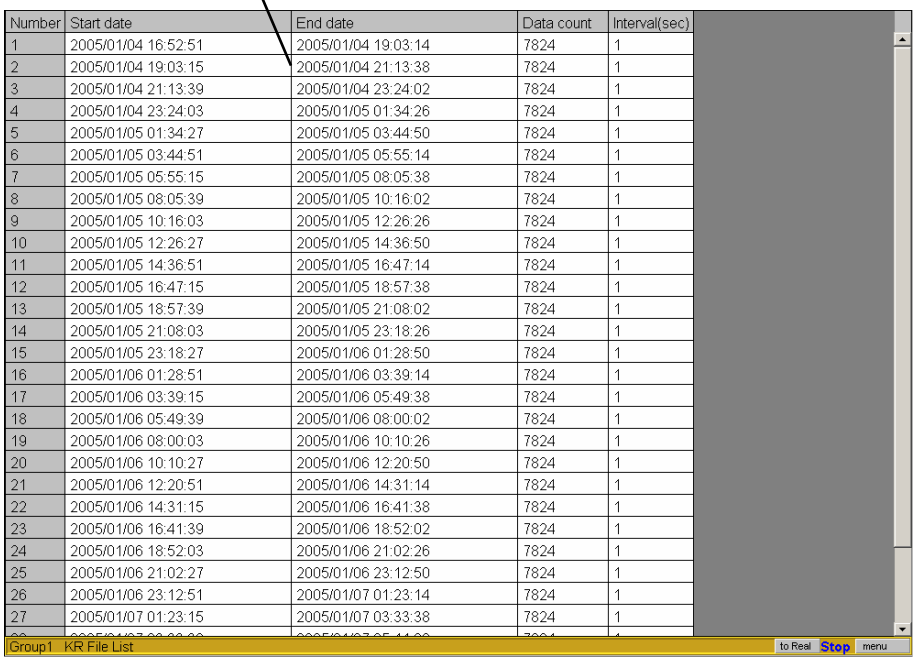
12-5-7 KR file list window

This window shows the list of files saved in the instrument. These files can also be downloaded in the PC. The administrator user is permitted to delete the files through this window (only when recording is in the stop mode). To delete files, select proper menu item “Delete Files” or press the DELETE key on the keyboard to open the [Delete] window.

Double-click on the list or select proper menu item “Open with Trend” to view the historical trend of the selected file.

File list

Shows the file start time, file end time, data count and recording interval of each file from the left to the right.



Number	Start date	End date	Data count	Interval(sec)
1	2005/01/04 16:52:51	2005/01/04 19:03:14	7824	1
2	2005/01/04 19:03:15	2005/01/04 21:13:38	7824	1
3	2005/01/04 21:13:39	2005/01/04 23:24:02	7824	1
4	2005/01/04 23:24:03	2005/01/05 01:34:26	7824	1
5	2005/01/05 01:34:27	2005/01/05 03:44:50	7824	1
6	2005/01/05 03:44:51	2005/01/05 05:55:14	7824	1
7	2005/01/05 05:55:15	2005/01/05 08:05:38	7824	1
8	2005/01/05 08:05:39	2005/01/05 10:16:02	7824	1
9	2005/01/05 10:16:03	2005/01/05 12:26:26	7824	1
10	2005/01/05 12:26:27	2005/01/05 14:36:50	7824	1
11	2005/01/05 14:36:51	2005/01/05 16:47:14	7824	1
12	2005/01/05 16:47:15	2005/01/05 18:57:38	7824	1
13	2005/01/05 18:57:39	2005/01/05 21:08:02	7824	1
14	2005/01/05 21:08:03	2005/01/05 23:18:26	7824	1
15	2005/01/05 23:18:27	2005/01/06 01:28:50	7824	1
16	2005/01/06 01:28:51	2005/01/06 03:39:14	7824	1
17	2005/01/06 03:39:15	2005/01/06 05:49:38	7824	1
18	2005/01/06 05:49:39	2005/01/06 08:00:02	7824	1
19	2005/01/06 08:00:03	2005/01/06 10:10:26	7824	1
20	2005/01/06 10:10:27	2005/01/06 12:20:50	7824	1
21	2005/01/06 12:20:51	2005/01/06 14:31:14	7824	1
22	2005/01/06 14:31:15	2005/01/06 16:41:38	7824	1
23	2005/01/06 16:41:39	2005/01/06 18:52:02	7824	1
24	2005/01/06 18:52:03	2005/01/06 21:02:26	7824	1
25	2005/01/06 21:02:27	2005/01/06 23:12:50	7824	1
26	2005/01/06 23:12:51	2005/01/07 01:23:14	7824	1
27	2005/01/07 01:23:15	2005/01/07 03:33:38	7824	1

(Proper menu items)

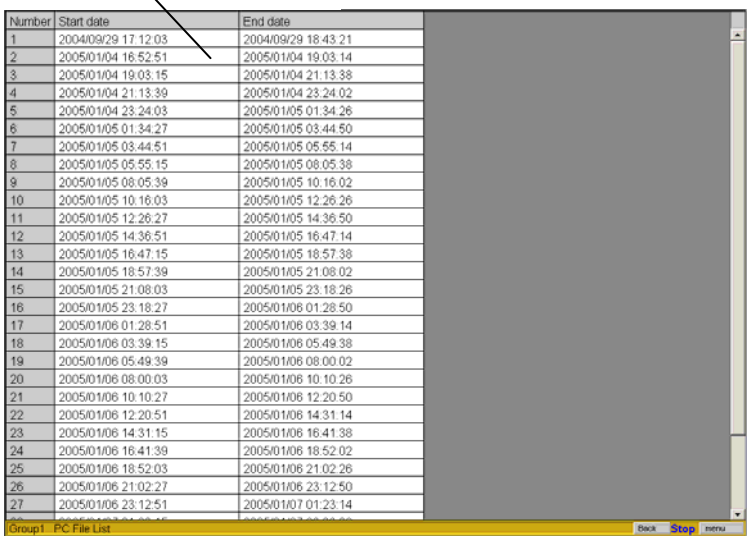
- Open with Trend - - - - - - Shows the historical trend of the selected line.
- Download - - - - - - - - - - - Downloads the selected file(s) in the PC. The download destination folder can be specified by opening the [Setup] menu and selecting “Other Setup.” Individual file(s), all files or all files in a group can be downloaded at the same time.
- Delete File - - - - - - - - - - -Deletes file(s). Individual file(s), all files or all files in a group can be deleted at the same time.
- FTP Transfer - - - - - - - - Transfers file(s) to the specified FTP server (see section “11-6”). Individual file(s), all files or all files in a group can be transferred at the same time.
- Cancel FTP Transfer - - - Cancels the file transfer (see section “15-3”).

12-5-8 PC file list window

This window shows the list of files downloaded from the recorder to the specified folder in the PC. The list also shows the FTP transferred files, if they are present in the folder. The files in the currently selected group are displayed. The files can also be deleted through this window.
To delete files, select proper menu item “Delete Files” or press the DELETE key on the keyboard to open the [Delete] window.
Double-click on the list or select proper menu item “Open with Trend” to view the historical trend of the selected file.

File list

Shows the start time and end time of each file from the left to the right.



Number	Start date	End date
1	2004/09/29 17:12:03	2004/09/29 18:43:21
2	2005/01/04 16:52:51	2005/01/04 19:03:14
3	2005/01/04 19:03:15	2005/01/04 21:13:38
4	2005/01/04 21:13:39	2005/01/04 23:24:02
5	2005/01/04 23:24:03	2005/01/05 01:34:26
6	2005/01/05 01:34:27	2005/01/05 03:44:50
7	2005/01/05 03:44:51	2005/01/05 05:55:14
8	2005/01/05 05:55:15	2005/01/05 08:05:38
9	2005/01/05 08:05:39	2005/01/05 10:16:02
10	2005/01/05 10:16:03	2005/01/05 12:26:26
11	2005/01/05 12:26:27	2005/01/05 14:36:50
12	2005/01/05 14:36:51	2005/01/05 16:47:14
13	2005/01/05 16:47:15	2005/01/05 18:57:38
14	2005/01/05 18:57:39	2005/01/05 21:08:02
15	2005/01/05 21:08:03	2005/01/05 23:18:26
16	2005/01/05 23:18:27	2005/01/06 01:28:50
17	2005/01/06 01:28:51	2005/01/06 03:39:14
18	2005/01/06 03:39:15	2005/01/06 05:49:38
19	2005/01/06 05:49:39	2005/01/06 08:00:02
20	2005/01/06 08:00:03	2005/01/06 10:10:26
21	2005/01/06 10:10:27	2005/01/06 12:20:50
22	2005/01/06 12:20:51	2005/01/06 14:31:14
23	2005/01/06 14:31:15	2005/01/06 16:41:38
24	2005/01/06 16:41:39	2005/01/06 18:52:02
25	2005/01/06 18:52:03	2005/01/06 21:02:26
26	2005/01/06 21:02:27	2005/01/06 23:12:50
27	2005/01/06 23:12:51	2005/01/07 01:23:14

Group1 PC File List Back Stop menu

(Proper menu items)
• Open with Trend - - Shows the historical trend of the selected line.
• Delete File - - - - - - -Deletes file(s). Individual file(s), all files or all files in a group can be deleted at once.

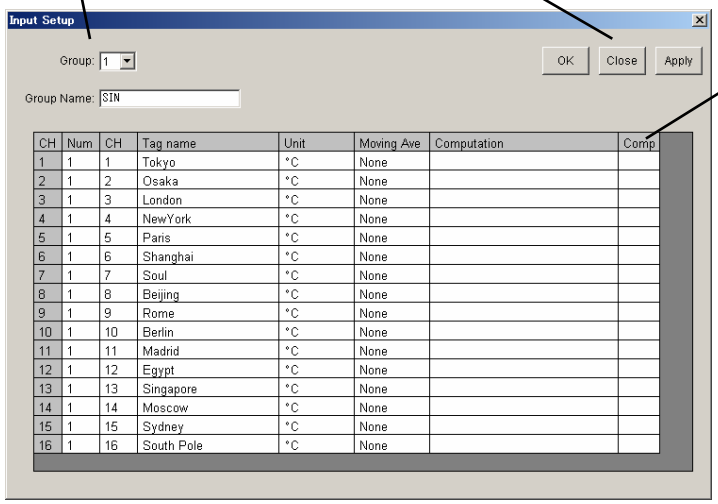
12-6 [Setup Menu] Details

12-6-1 Input setup

This menu option is used for setups related to the input data.

Select the group number to be set up.

OK: Closes the window after sending the setup.
Close: Closes the window without sending the setup.
Apply: Sends the setup.



CH	Num	CH	Tag name	Unit	Moving Ave	Computation	Comp
1	1	1	Tokyo	°C	None		
2	1	2	Osaka	°C	None		
3	1	3	London	°C	None		
4	1	4	NewYork	°C	None		
5	1	5	Paris	°C	None		
6	1	6	Shanghai	°C	None		
7	1	7	Soul	°C	None		
8	1	8	Beijing	°C	None		
9	1	9	Rome	°C	None		
10	1	10	Berlin	°C	None		
11	1	11	Madrid	°C	None		
12	1	12	Egypt	°C	None		
13	1	13	Singapore	°C	None		
14	1	14	Moscow	°C	None		
15	1	15	Sydney	°C	None		
16	1	16	South Pole	°C	None		

Double-click on a list title to enter the same setting in all of the entry areas in the selected column. Double-clicking on title “CH” enters sequential numbers below it.

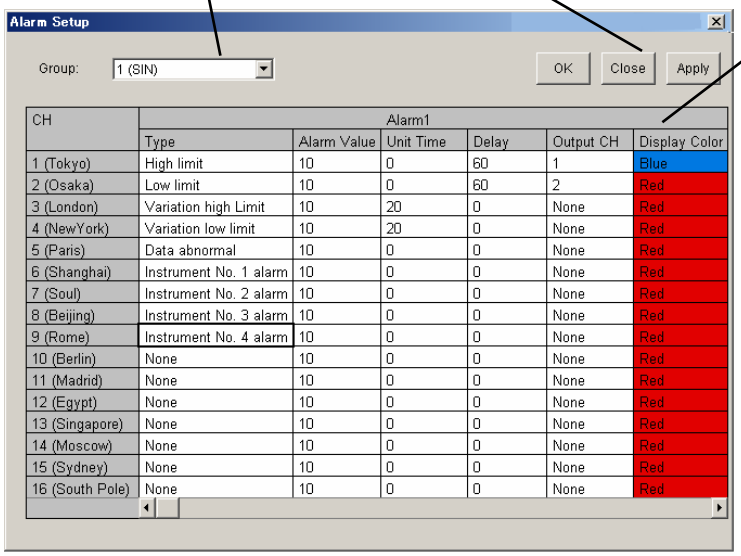
- Group Name: Group name in max. 16 characters.
- Num: Instrument No. of the instrument in which the data is loaded. (For the KR5100)
- CH: Channel No. of the instrument in which the data is loaded.
- Tag Name: Data tag name in max. 16 characters.
- Unit: Unit of data, in max. 8 characters
- Moving Ave.: Moving average time.
  This item cannot be used simultaneously with “Computation.”
  Select from “None,” “2 sec.,” “4 sec.” and “8 sec.”
- Computation Expression: When the computation expression is set here and the entry in the “Computation” column is “＊”. The data for the channel shows the computation result. The expression should be set using max. 32 characters.
  For the specifications of the computation expression, see section 13 COMPUTATION SPECIFICATIONS.
  In case of computation error, ”CAL_ERR” is displayed as the data.
- Comp.: “＊” is displayed when computation is enabled. **This item cannot be used simultaneously with “Moving Average.”** Clicking on the column displays ”＊” and clicking on it again hides it. See section “Computation Expression” above.

12-6-2 Alarm setup

This item is used to set the alarm.
Up to four alarm conditions can be set per channel.
For the alarm specifications, see Chapter “14. ALARM SPECIFICATIONS”.

Select the group number to be set up.

OK: Closes the window after sending the setup.
Close: Closes the window without sending the setup.
Apply: Sends the setup.



CH	Alarm1					
	Type	Alarm Value	Unit Time	Delay	Output CH	Display Color
1 (Tokyo)	High limit	10	0	60	1	Blue
2 (Osaka)	Low limit	10	0	60	2	Red
3 (London)	Variation high Limit	10	20	0	None	Red
4 (NewYork)	Variation low limit	10	20	0	None	Red
5 (Paris)	Data abnormal	10	0	0	None	Red
6 (Shanghai)	Instrument No. 1 alarm	10	0	0	None	Red
7 (Soul)	Instrument No. 2 alarm	10	0	0	None	Red
8 (Beijing)	Instrument No. 3 alarm	10	0	0	None	Red
9 (Rome)	Instrument No. 4 alarm	10	0	0	None	Red
10 (Berlin)	None	10	0	0	None	Red
11 (Madrid)	None	10	0	0	None	Red
12 (Egypt)	None	10	0	0	None	Red
13 (Singapore)	None	10	0	0	None	Red
14 (Moscow)	None	10	0	0	None	Red
15 (Sydney)	None	10	0	0	None	Red
16 (South Pole)	None	10	0	0	None	Red

Double-click on a list title to enter the same setting in all of the entry areas in the selected column.

- Type: Select the alarm type from “High limit”, “Low limit”, “Variation high Limit”, “Variation low limit”, “Data abnormal”, “Instrument No. 1 alarm”, “Instrument No. 2 alarm”, “Instrument No. 3 alarm” and “Instrument No. 4 alarm”. “Instrument alarm” is not in use for the KR5300.
- Alarm Value: Alarm determination value.
- Unit Time: Used only with the “Variation high limit” and “Variation low limit” alarms. Specify the unit time (sec.) for the alarm value.
- Delay: Alarm delay (sec.). Specify a value from 0 to 3600.
- Output CH: Channel No. to be used when the recorder should output a contact signal in case of an alarm.
- Display Color: Color indicating alarm occurrence.

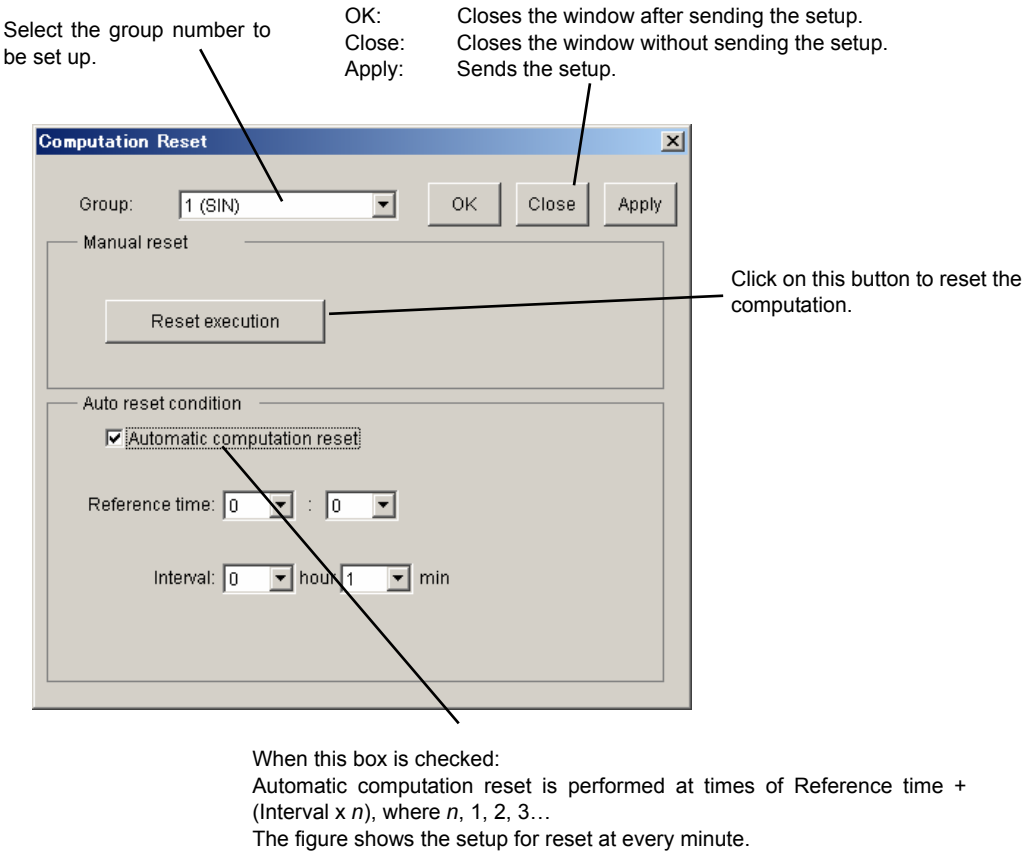
(Alarm Determination Method)

- High (low) limit: Alarm is determined when the data exceeds the set high (or low) limit value.
- Variation high (low) limit: Alarm is determined when the difference between the latest data and the data of the time identical to the unit time is larger (or smaller) than the set value.
- Data abnormal: Alarm is determined when the data is character data other than “DATA_HI/LO,” such as “BURN_OUT” or “NO_DATA.”
- Instrument 1-4 alarm: Alarm is determined when an instrument (SE,AL etc.) identifies an alarm.

12-6-3 Computation reset

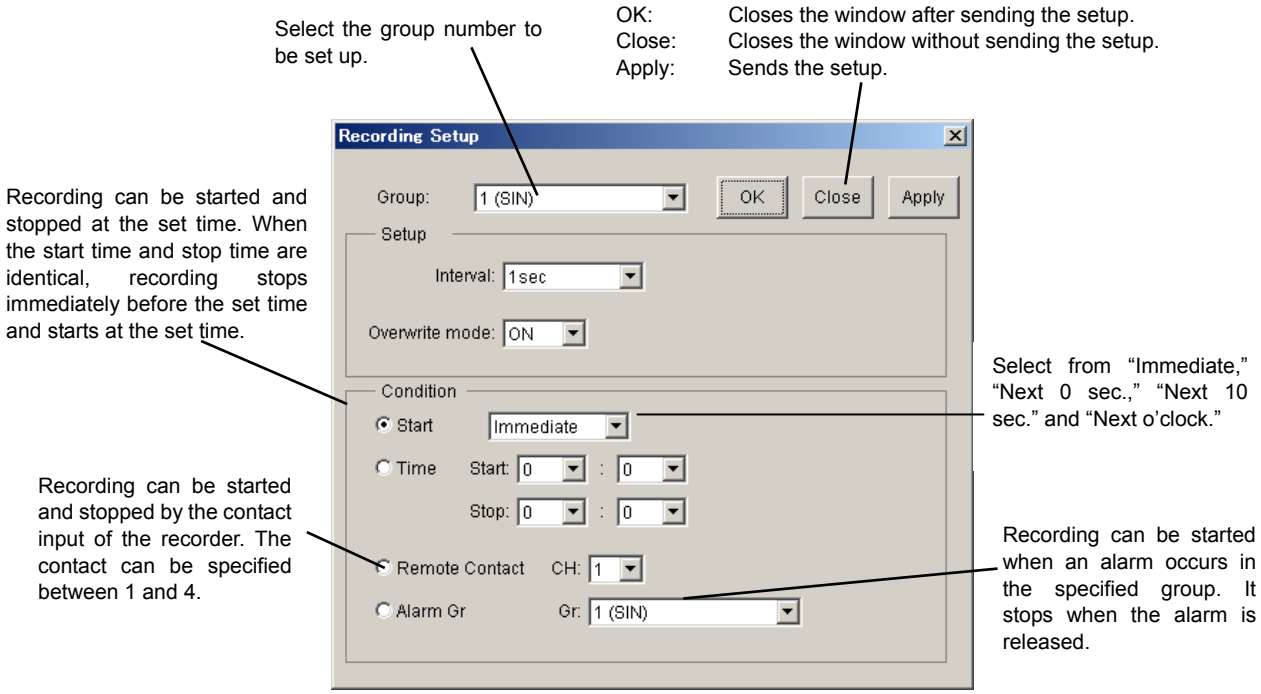
This item is used to set the automatic and manual computation reset operations.

When computation of a group is reset, the results of computations entered for the channels in the group are reset to “0.” When a totalizer (ITG or PITG) is used, this makes it possible to reset the accumulated value.



12-6-4 Recording setup

This item is used to set the recording method such as the recording interval.



Recording Setup

• Interval: Interval for recording data. The trend display advances by 1 dot at every interval period.

• Overwrite mode: Specification of the operation to be performed when the number of files attains the higher limit.

Overwrite Mode	Operation
ON	When recording starts, the oldest file in the group is deleted and recording of the new file continues.
OFF	No more recording is available.

Recording Condition: Select one of the four conditions. When recording is started, the recorder stays in record-pause mode until the condition is not met.

① Start: Set the start timing.

Immediate: Recording starts unconditionally.

Next 0 sec.: Recording starts when the figures for seconds in the time of day become ”00”.

Next 10 sec.: Recording starts when the latter digit in the figures for seconds in the time of day becomes “0”.

Next o’clock: Recording starts when the figures for minutes in the time of day become “00”.

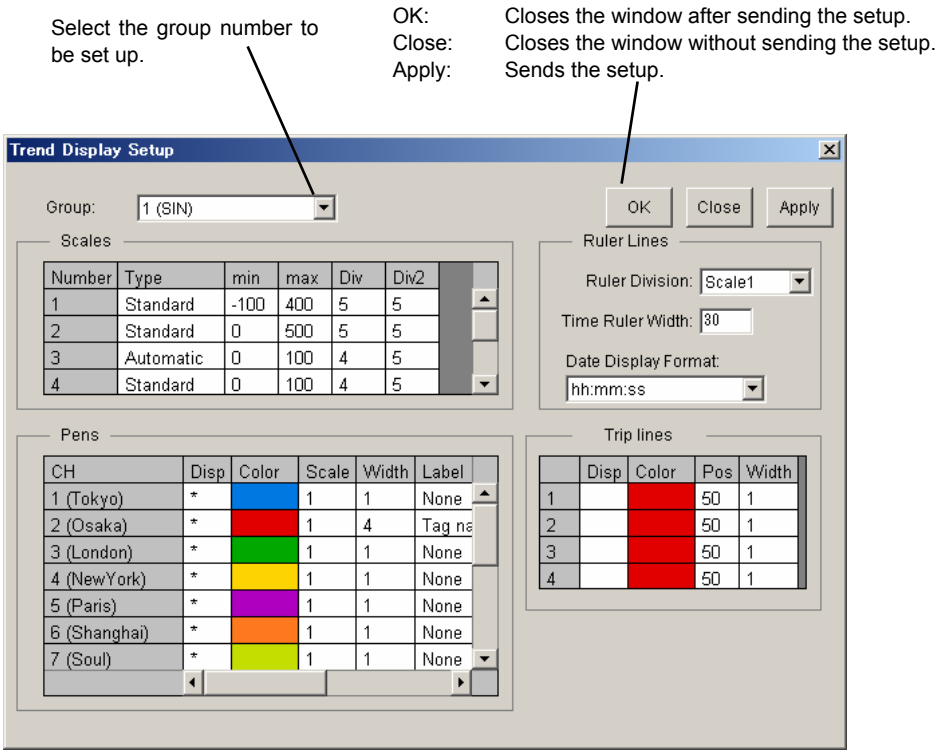
② Time: Recording continues for the specified period of time. If the start time and the stop time are identical, the recording file is changed at that time of every day.

③ Remote Contact: Recording continues while the signal from the specified contact input channel is ON. Recording stops when the signal goes OFF.

④ Alarm Gr: Recording starts when an alarm occurs in the specified group. Recording stops when the alarm is released.

12-6-5 Trend display setup

This item is used to set the trend display method.



(Scales)

Up to 8 scales can be set.

- Type: Select from “Standard,” “Automatic,” “Logarithm 1,” “Logarithm 2” and “Logarithm 3.” The “Standard” scale can be set by specifying the “Lower Limit” and the “Higher Limit.” The “Automatic” scale is adjusted automatically according to the data. With the “Logarithm” scales, the exponent of 10 can be set (between -8 and +8), the “Division” is set automatically and the “Auxiliary” division can be set to 1 or 9. “Logarithm 1” uses the notation such as 1, 10, 100,…, “Logarithm 2” uses the notation such as 10^0, 10^1, 10^2,…, and “Logarithm 3” uses the notation such as 1E+0, 1E+2, 1E+3,…
- Low Limit/High Limit: Low and high limits of scales.
- Division: Specify the number of divisions of scale. Figures are displayed on the scale.
- Auxiliary: Each division of scale can be divided further. The figures are not displayed with the auxiliary graduations.

(Pens)

The pens for use in drawing the trend display can be set.

- Disp.: Click on each area to display or hide “＊”. The channels marked “＊” are included in the chart. Even when a channel is not marked “＊”, its data is recorded in the file so it can be included any time when it is marked “＊”.
- Color: Select the pen color from 32 colors.
- Scale: Specify the number of the scale used by the pen.
- Width: Specify the pen line thickness.
- Label: Select the data label, which is displayed on the right of the trend display line, from “None,” “Tag name” and “Channel No.”

(Trend Chart)

The ruler lines in the trend display can be set here.

- Ruler Division: Specify the number of divisions of data in the magnitude direction. Either a scale between 1 and 100 or between 1 and 8 can be selected. Selecting a scale causes the number of scale divisions for that scale to be selected.
- Time Ruler Width: Specify the width of the ruler in the time direction in terms of the number dots.
- Date Display Format: Select the format of the date shown in the trend display. When ”Automatic” is selected, the date format is determined automatically according to the interval and frame size.

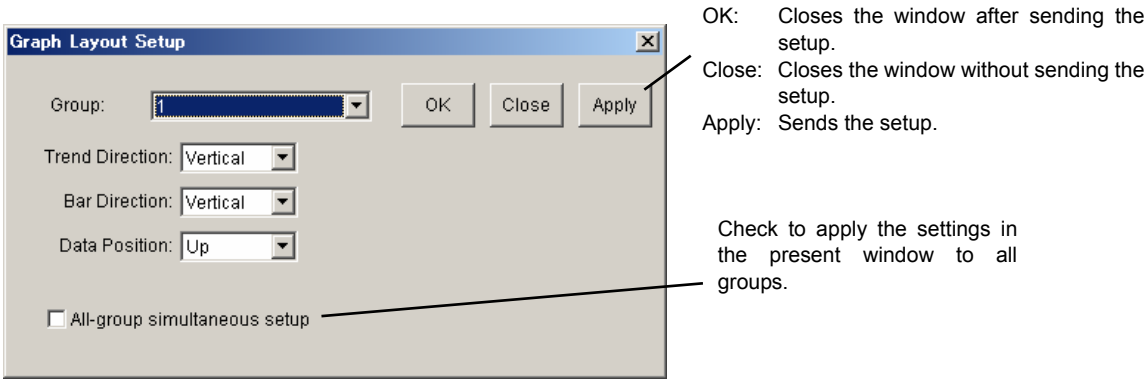
(Trip Lines)

Up to 4 trip lines can be set on the chart.

- Disp.: Click on each area to display or hide “＊”. Only the trip lines marked “＊” are displayed on the chart.
- Color: Select the trip line color from 32 colors.
- Pos.: Specify an integer between 1 and 99(%).
- Width: Select the trip line width in terms of the number of dots between 1 and 9.

12-6-6 Graph layout setup

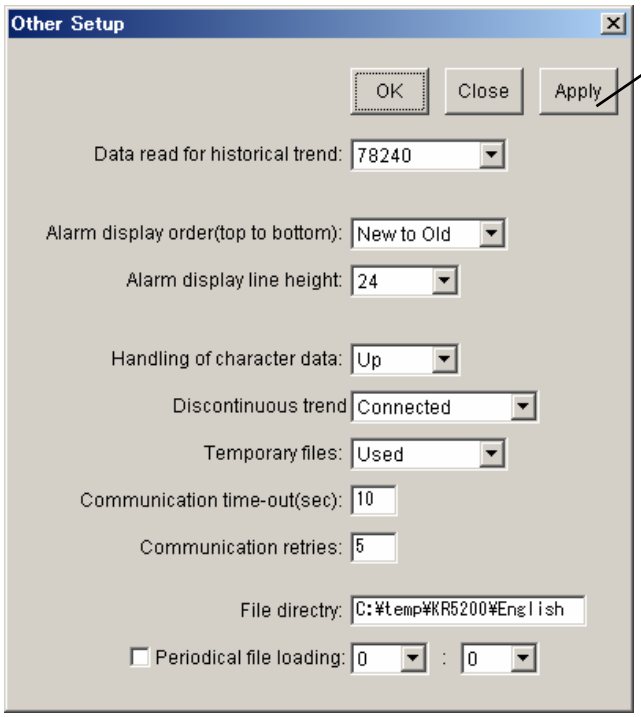
This item is used to set the graph display method, etc.



- Trend Direction: Select the trend scroll direction “Vertical” or “Horizontal.”
- Bar Direction: Select the orientation of the bar display “Vertical” or “Horizontal.”
- Data Position: Select the data display position in the trend and bar graph display from “Up,” “Down,” “Left,” “Right” and “None.”

12-6-7 Other setups

This item is used to set the data save folder, error data display method, etc.



OK: Closes the window after sending the setup.
Close: Closes the window without sending the setup.
Apply: Sends the setup.

- Data read for historical trend: Specify the maximum number of data items to be read when opening the historical trend. Reading takes a long time if a large number is specified. The data read can be canceled in the middle and, in this case, data until the file being read at the time of cancellation is displayed in the chart. Specify a value between 7824 and 78240 here.
- Alarm display order:
  - "New → Old": The latest alarm information comes at the top of alarm display.
  - "Old → New": The oldest alarm information comes at the top of alarm display.
- Alarm display line height: Specify the line height for the alarm display, file list and message summary display.
- Handling of character data: Set how character data (except for DATA_HI and DATA_LO) are displayed on the chart.
  - "Up": Swung out at the top limit
  - "Down": Swung out at the bottom limit.
- Discontinuous trend:
  - "Connected": Data with discontinuous time is shown in the trend display.
  - "Not connected": Data with discontinuous time is not shown in the trend display.
- Temporary files:
  - "Used": Read data is saved in the PC for quick display the next time.
    This consumes hard disk space of about 300 MB.
  - "Not used": Read data is not saved in the PC.
    Select this option when the remaining HDD capacity is low.
- Communication time-out: Set the communication time-out at 10 seconds or more.
- Communication retries: Set the number of retries in case of a communication error.
- File directory: Specify the directory for storing the files read from the recorder (see section 12-5-7 KR file list window).
- Periodical file loading: Loading of files in all groups (see section 12-5-7 KR file list window) at the specified time of every day. As this takes a long time, it is recommended to execute it at an off peak time.

CAUTION ⚠

Periodical file loading at the specified time is not executed when the network is unable to use due to selecting power options.

Example：

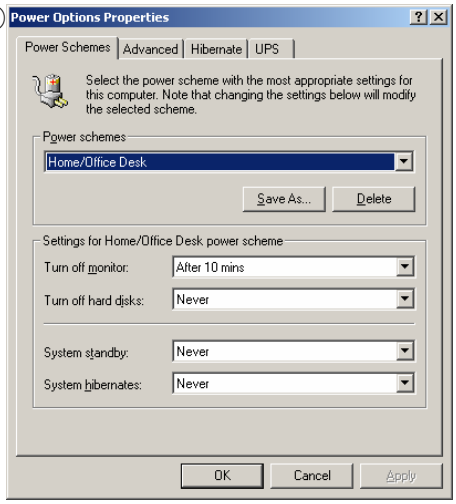
- System Standby
- Turn off hard disk
- Turn off network adapter　etc.

WindowsXP must be set as follows.

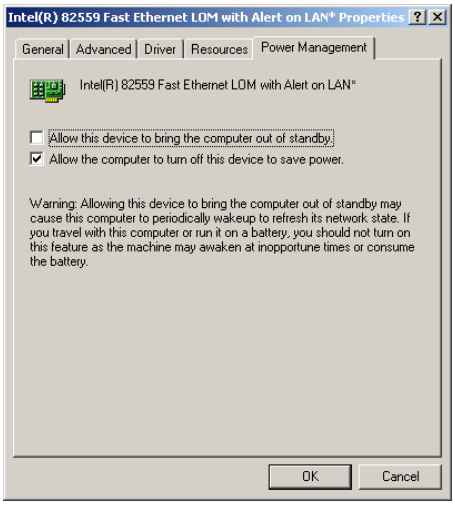
① Click the [Start]button, click the [Control Panel], and then double click the [Power Option] (on [Performance and maintenance] category). Select [Never] for all [Turn off hard disk], [System Standby] and [System hibernates].

② Click the [Start] button, click the [Control Panel], and then double click the [System] button (on [Performance and maintenance] category). On [Hardware] tab, click the [Device Manager], open the [Network Adapter], and then double click the device connecting this instruments.
On [Power Management] tab, uncheck the box [Allow the computer to turn off this device to save power.] (Need not this procedure if [Power Management] is not appeared).

①

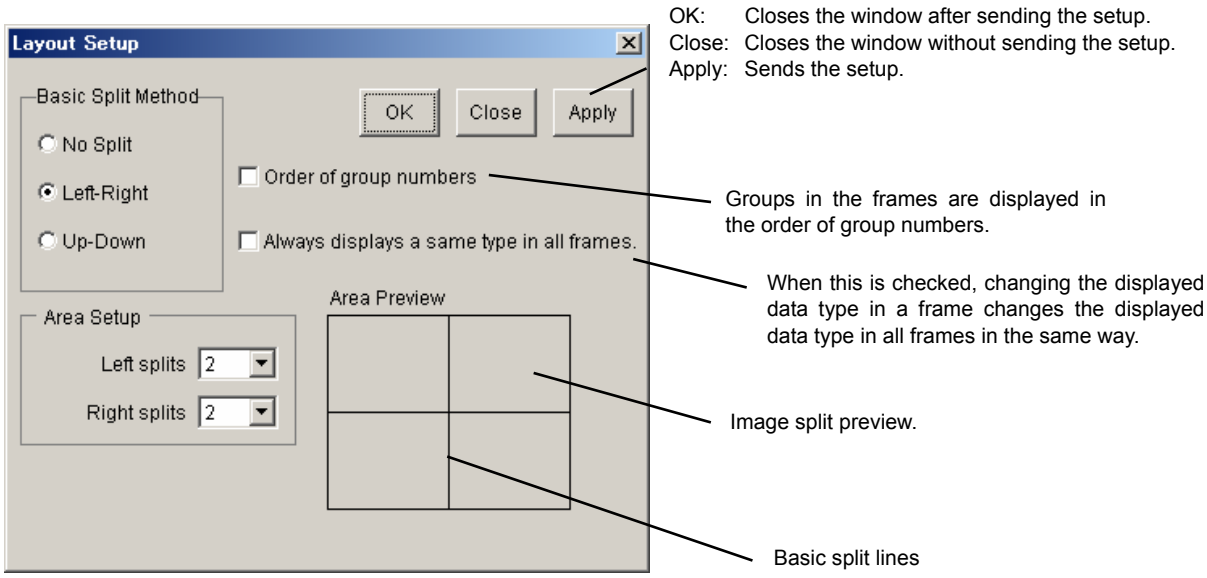


②



12-6-8 Layout setup

This item is used to modify the display splitting method.



(Basic Split Method)

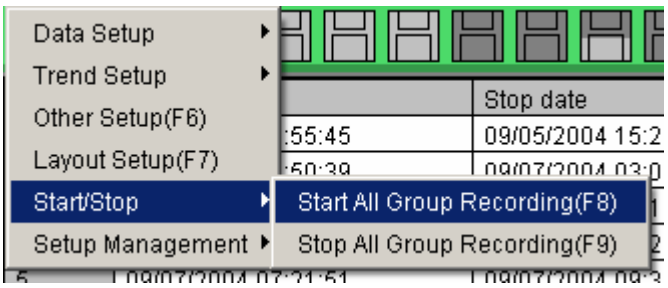
- No Split: The display is not split. Only one frame is displayed.
- Left-Right: The display is split into the left and right by drawing a vertical basic split line.
- Up-Down: The display is split into up and down by drawing a horizontal basic split line.

(Area Setup)

The two areas obtained by basic splitting can be split further.
For the actual mode of splitting, refer to the “Area Preview” at the bottom right.

12-6-9 Start/stop all-group recording

These items are used to start and stop the recording of all groups simultaneously. These operations can be executed only by the administrator user.
Recording of some groups may not start or stop depending on other setups.

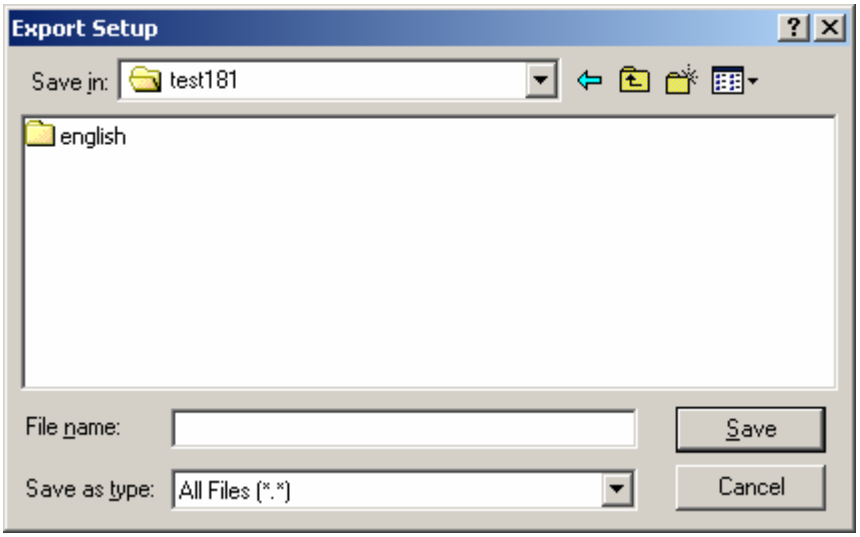


12-6-10 Export setup

This item can be executed even in between recording. This operation is available only for the administrator user.

Export refers to saving the settings of the recorder as a file in the PC.

① When the following box is displayed, specify the export destination folder and filename. The file is stored without the file extension.



② Click on [Save] to export and save all of the settings.

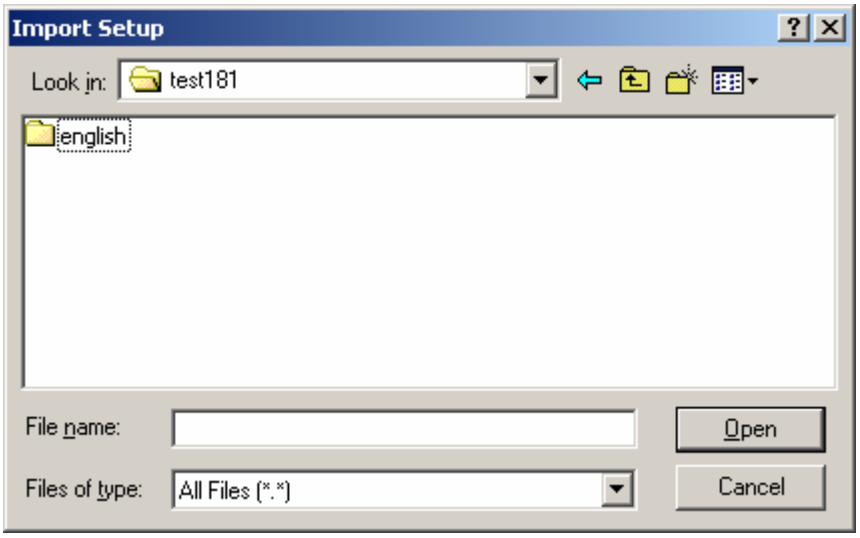
12-6-11 Import setup

CAUTION

Note that all of the settings (of all groups) in the recorder are overwritten when Import Setup is executed,

This item cannot be executed in between recording. This operation is available only for the administrator user.

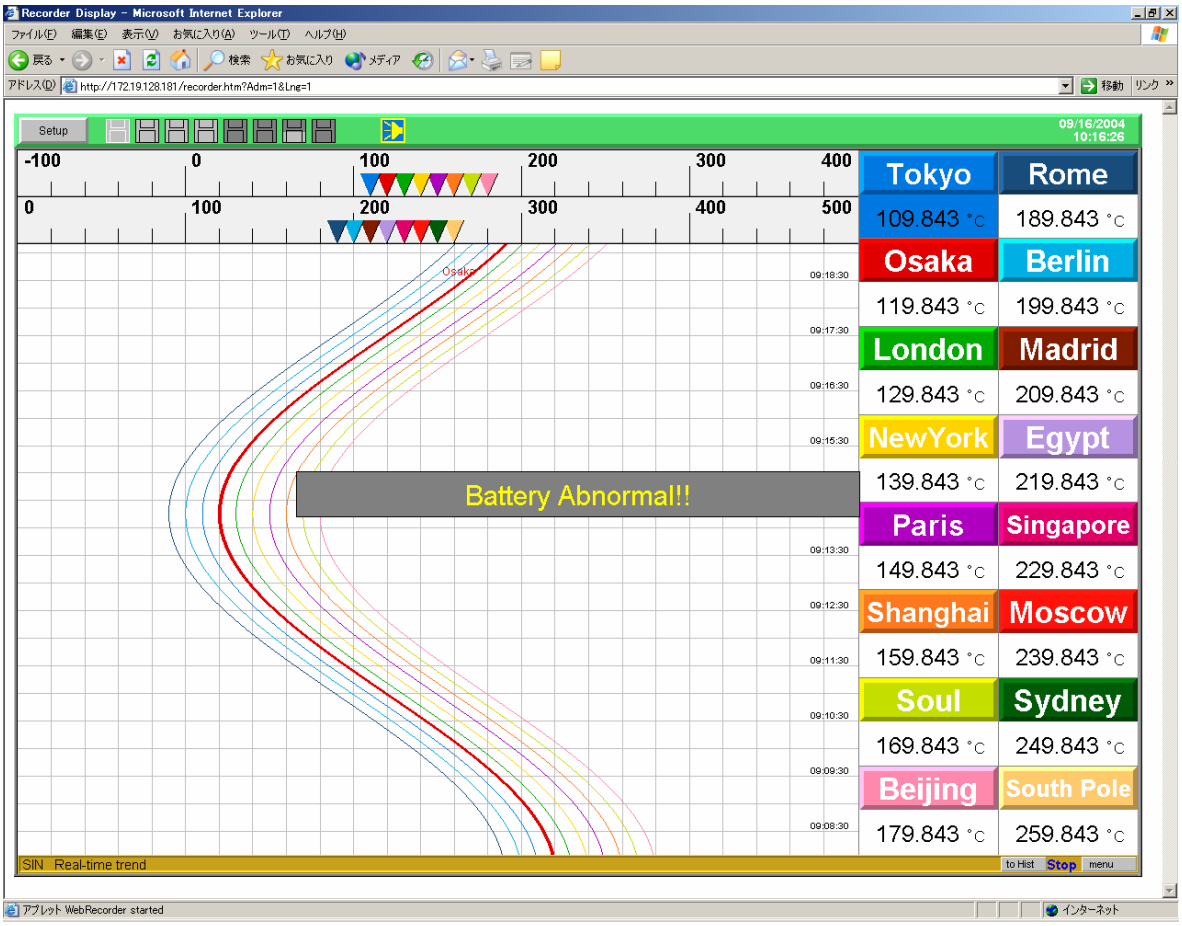
① When the following box is displayed, specify the filename created in section 12-6-10 “Export setup”.



② Click on [Open] to write all of the settings on the file.

12-7 Error Messages

When an error occurs with the recorder, the display shows an error message as shown below.
The following table shows the error messages that may be displayed and their countermeasures.



Message	Description	Countermeasure
No Response	The communication between the recorder and PC is disconnected.	Check the network environment. Check that the RUN indicator on the recorder is blinking.
Response Abnormal	The response from the recorder is abnormal.	Contact CHINO.
Recording Memory Abnormal	Read or write from or in the built-in CF card fails.	The CF card may sometimes need replacement. Contact CHINO.
Battery Abnormal	The lithium battery for backing up the internal memory may be exhausted.	The battery may need replacement, Contact CHINO.
Input Instrument Communication Error	Data cannot be input from an instrument such as SE, AL, AH or LT.	Check the input devices. Check the Input setup (12-6-1) to see if the instrument number settings, etc. are correct.

13. COMPUTATION SPECIFICATIONS

13-1 Computation Types

13-1-1 Arithmetic operations

The following arithmetic operations are available.

	Symbol	Example	Remark
Addition	+	*X***+***Y*	
Subtraction	-	*X***–***Y*	
Multiplication	*	*X******Y*	
Division	/	*X***/***Y*	
Surplus	%	*X***%***Y*	
Power	^	*X***^***Y*	

※ *X* and *Y* show an operation formula or a numerical value.

13-1-2 Comparison operations

The results of comparison operations include 1 (valid) and 0 (invalid).

	Symbol	Example	Remark
Equality	==	*X***==***Y*	
Inequality	!=	*X***!=***Y*	
More than	>>	*X***>>***Y*	
Less than	<<	*X***<<***Y*	
Equal to or more than	>=	*X***>=***Y*	
Equal to or less than	<=	*X***<=***Y*	

※ *X* and *Y* show an operation formula or a numerical value.

13-1-3 Logic operations

Logic operations of 1 and 0 are performed and the results are returned as 1 or 0.

	Symbol	Example	Remark
Logical product	AND	*X***AND***Y*	
Logical addition	OR	*X***OR***Y*	
Exclusive logical addition	XOR	*X***XOR***Y*	
NOT operation	NOT	**NOT(***X***)**	The target of the operation is enclosed inside ( ).

※ *X* and *Y* show an operation formula or a numerical value. *X* and *Y* should express 0 or 1.

13-1-4 General operational functions

The following functional operations are available.

	Symbol	Example	Remark
Rounding up fractions	CEL	**CEL(***X***)**	
Rounding down fractions	FLR	**FLR(***X***)**	
Absolute value	ABS	**ABS(***X***)**	
Square root	SQR	**SQR(***X***)**	
Exponent of e	EXP	**EXP(***X***)**	
Natural logarithms (Base = e)	LOG	**LOG(***X***)**	
Common logarithms (Base = 10)	LOG10	**LOG10(***X***)**	

※ *X* and *Y* show an operation formula or a numerical value.

13-1-5 Channel data operation functions

The following functional operations are available.

"CAL_ERR" is returned when the measured data contains error data (no data, overflow, underflow, burnout or a computation error).

	Symbol	Example	Remark
Measurement data	CH	**CH (***X***)**	X consists of Group No. + CH No. Example: 101 (Gr 1 - CH 1)
Processing result data	PCH	**PCH (***X***)**	
Last Measurement data	OCH	**OCH(***X***)**	Data in last scanning (500 msec. before)
Last processing result data	OPCH	**OPCH(***X***)**	
Sum of Measurement data	SUM	**SUM (***X***:***Y***)** or **SUM (***X***;***Y***;***Z***)**	To specify consecutive channels, specify the start CH No. and end CH No. and delimit them with a colon. To specify non-consecutive channels, specify all the CH Nos. and delimited them with semicolons. It is not permitted to specify only one channel (a computation error occurs in this case.)
Average of Measurement data	AVG	**AVG (***X***:***Y***)** or **AVG (***X***;***Y***;***Z***)**	
Sum of processing result data	PSUM	**PSUM (***X***:***Y***)** or **PSUM (***X***;***Y***;***Z***)**	
Average of processing result data	PAVG	**PAVG (***X***:***Y***)** or **PAVG (***X***;***Y***;***Z***)**	

※ *X,Y* and *Z* show an operation formula or a numerical value.

* Specify each channel number using the group No. (1 digit) and the channel No. (2 digits). Examples: 101 (Gr. 1 - CH 01). 513 (Gr. 5 - CH 13).

* The channel data used in computations are the computation results data when computations are set in the specified channel number. If the specified channel number is greater than the channel number set for computations, the computation results of the last acquired data are used in the computations.

13-2 Totalizer

The ITG function should be used for the totalizer

Do not combine more than one function in the totalizer, as this renders the result incorrect. The number of digits after the decimal point can be set (see section 13-3 Setting the Number of Digits after the Decimal Point). If it is required to combine more than one function, use PCH to recall the computation result from another channel.

Bad examples: ITG(101)+ITG(102), ITG(101)*60, ITG(CH(101)+CH(102))

Computation expression input method

ITG (d)

d: Integration target channel

Computation details

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

D_n: Integration results D_{n-1}: Last integration results.

PV_n: Integration target data. PV_{n-1}: Integration target data in last computation.

T_n: Computation time. T_{n-1}: Last computation time (1 sec. before)

If error data (DATA_HI, etc.) is included, the computation is not performed and the last result is applied.

13-3 Setting the Number of Digits after the Decimal Point

The number of digits after the decimal point to be used in computation results can be specified in the range from 1 to 7.

If this is not specified, the computation results become integers by rounding off the digits after the decimal point.

Append an underscore and the number of digits at the end of the expression.

For example, the expression for recording the computation result of the average of measured data in CH Nos. 1 to 16 in Group 1 using 3 digits after the decimal point is as follows.

AVG(101:116)_3

13-4 Notes

When a computation result exceeds the range of ±134217728, it becomes DATA_HI with a positive value or DATA_LO with a negative value.
When the number of digits after the decimal point is specified as described in section 13-3 and the value of the significant digits exceeds ±134217728, the number of digits after the decimal point is reduced in order to accommodate the significant digits within it.

Example) When the computation result is 1342177.2815 and the number of digits after the decimal point is specified to be “3”, the result becomes 1342177,2 because the value of the significant digits 13421772815 is more than 134217728.

13-5 Examples of Expressions Combining Computations

- **(CH(201)*3-20)/6_4**
  (“Raw data of Gr. 2 - CH 1” x 3 - 20)/6 is computed until the 4th digit after the decimal point.

- **AVG(201:316)<300**
  The computation result is “1” when the average of the raw data from Gr. 2 - CH1 to Gr. 3 - CH 16 is less than 300.

- **ABS (PSUM(111;205;215))>=50**
  The computation result is “1” when the absolute value of the sum of the data in Gr. 1 - CH 11, Gr. 2 - CH5 and Gr. 2 - CH 15 is equal to or more than 50.

- **(PCH (501)>=100)AND(PCH(801)<=50)**
  The computation result is “1” when the data of Gr. 5 - CH 1 is equal to or more than 100 and the data in Gr. 8 - CH 1 is equal to or less than 50.

14. ALARM SPECIFICATIONS

14-1 Alarm Types

There are 9 alarm types as listed below.

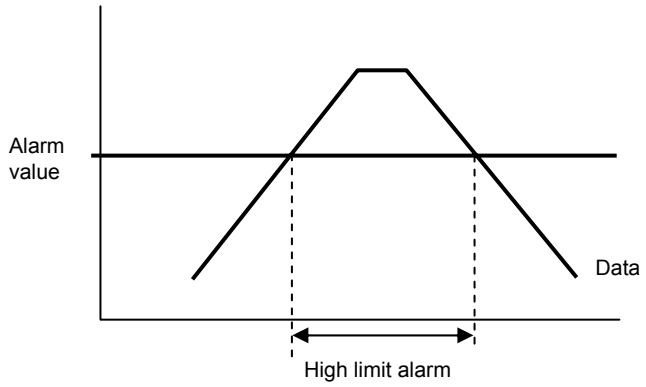
① High limit alarm
② Low limit alarm
③ Variation high limit alarm
④ Variation low limit alarm
⑤ Data abnormal
⑥ Instrument No. 1 alarm
⑦ Instrument No. 2 alarm
⑧ Instrument No. 3 alarm
⑨ Instrument No. 4 alarm

14-1-1 High limit alarm and low limit alarm

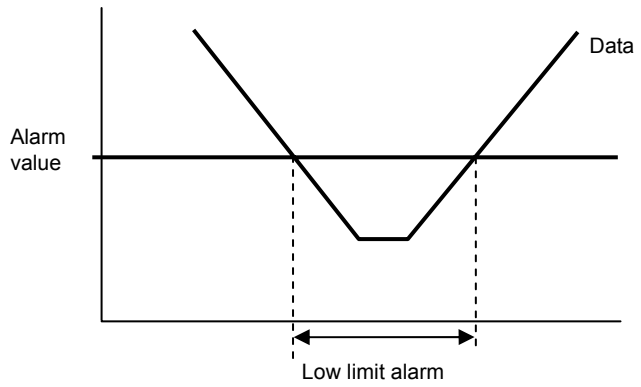
These alarms are output when the channel data exceeds the set alarm value.
The alarm output conditions are as follows:

Channel data > Alarm value (High limit alarm)
Channel data < Alarm value (Low limit alarm)

High Limit Alarm



Low Limit Alarm



14-1-2 Variation high limit alarm and variation low limit alarm

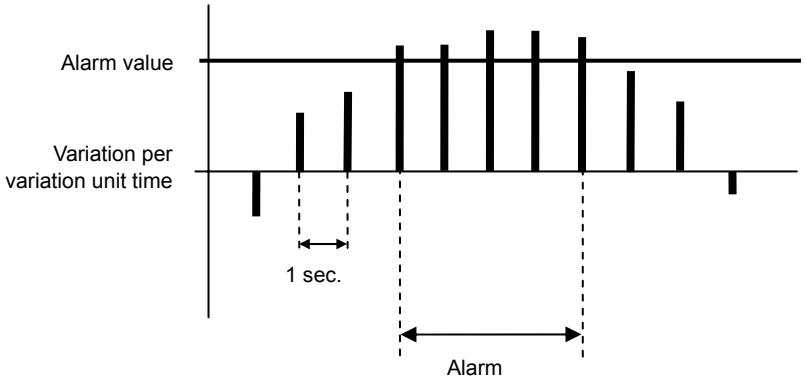
These alarms are output when the variation in unit time between the data before the present and the present data exceeds the alarm value.
It is required to set the alarm value and variation unit time (1 to 20 sec.).

The alarm output conditions are as follows:

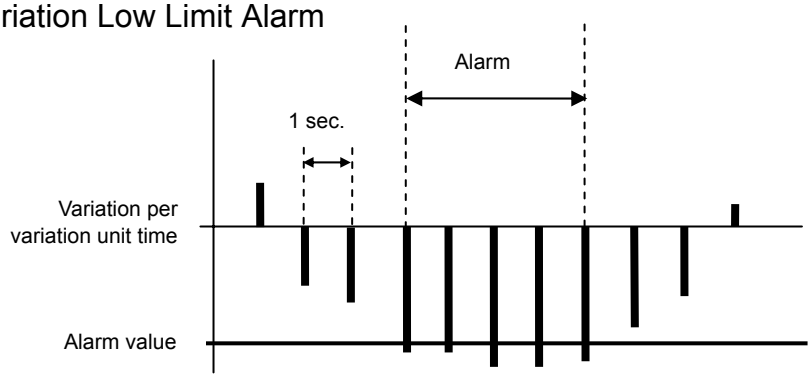
Present data > Data of variation unit time before present + Alarm value
(Variation high limit alarm)

Present data < Data of variation unit time before present - Alarm value
(Variation low limit alarm)

Variation High Limit Alarm



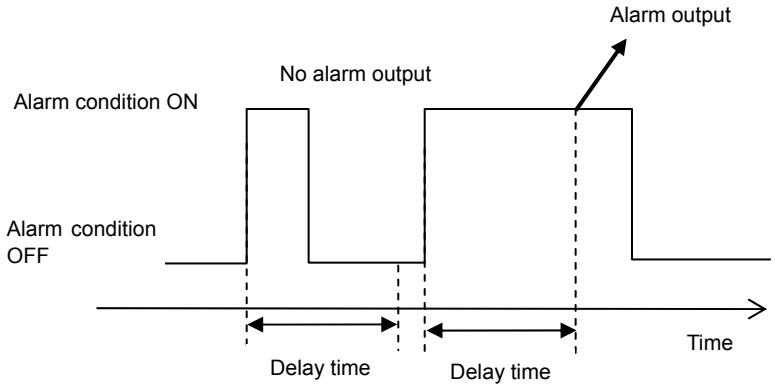
Variation Low Limit Alarm



14-2 Alarm Output Delay Function

14-2-1 Operation details

When the delay time (sec.) is set, the alarm is not output until the delay time has elapsed after the data exceeds the alarm value.



15. FTP FILE TRANSFER

The recorder is capable of transferring files to an FTP server.

15-1 Transfer Conditions

① Closing a file
A file is transferred automatically when it is closed because the recording is stopped or the data count has reached 7824. The transfer destination can be set and this transfer can be enabled or disabled in the FTP server setup (See section 11-6 FTP server setup.).
② User instructions (See section 12-5-7 KR file list window.)
The FTP transfer can also be initiated from a menu operation by the user. The transfer of only the specified files as well as of all files is possible. **Note that this operation is not available when a group is already being recorded.**

15-2 Restrictions of Operations During Transfer

The following operations are not available with a group being subjected to an FTP transfer.
• Start of recording (Possible in case of ① in section 15-1)
• Deletion of file(s)

Even if a group recording is started, the actual recording cannot begin if there is already a group under transfer. In this case, wait until the transfer is completed or start the recording of the individual group(s).

15-3 Canceling the Transfer

The user can cancel the FTP transfer with a menu operation (See section 12-5-7 KR file list window.). When a transfer of multiple files is canceled, the transfer stops when the file being transferred at the moment of cancellation has been transferred. **This operation is applied to all groups.**

15-4 Checking the Transfer Results

The results of a transfer can be checked as described in section 11-14 FTP transferred file list.

16 E-MAILING

The recorder is capable of sending E-mails. For the setup method, see section11-7 E-mail setup. E-mails are sent according to the settings made in the E-mail setup.

16-1 Timing of E-Mailing

Alarm (Group 1 - 8)	The recorder sends an e-mail when an alarm occurs in any of the set groups. If an alarm occurs in a group where an alarm has already occurred, the e-mail on the latter alarm is not sent.
Alarm (All groups)	The recorder sends an e-mail when an alarm occurs in any group. If an alarm occurs when an alarm has already occurred, the e-mail on the latter alarm is not sent.
Alarm (Start)	The recorder sends an e-mail when the instrment power turns on.
Alarm (Instrument error)	The recorder sends an e-mail in case of abnormality with the backup battery, internal recording memory or input instrument communication.
Alarm (Remaining memory)	The recorder sends an e-mail when 90% of the recording memory has been consumed in any group.
Specified time	The recorder sends an e-mail at a specified time of the day.

Any of the above Emails is sent immediately when an alarm condition is preset at the moment the recorder is turned on or when the actual time is less than 1 minute from the specified time.

16-2 E-Mailed Text

The alarm e-mails use fixed messages and the specified-time e-mail uses one of the messages specified as text 1 to text 10. The details of the actually sent e-mails are as follows.

① Alarm (Group 1 - 8) e-mail

Subject: Message from (Recorder name)

The recorder name is set in the Recorder Setup (see section 11-12).

Main text:

Name: Recorder name

Alarm occurs in the Group name (Group 0).

Tag 1:Data + Unit AL1 AL2
Tag 2:Data + Unit AL2 AL3 … AL1 to AL4 refers to an alarm situation.
:
Tag 16:Data + Unit

YYYY/MM/DD hh:mm:ss … Mail sending time

② Alarm (All groups) e-mail

Subject: Message from (Recorder name)
The recorder name is set in the Recorder Setup (see section 11-12).

Main text:

Name: Recorder name

Alarm occurs.

Group name (Group 1)
Tag 1:Data + Unit AL1 AL2
Tag 2:Data + Unit AL2 AL3 … AL1 to AL5 refer to alarm situations.
:
:
Tag 16:Data + Unit

Group name (Group 2)
Tag 1:Data + Unit AL1 AL2
(Hereafter continued until Group 8)

YYYY/MM/DD hh:mm:ss … Mail sending time

③ Alarm (Instrument error or remaining memory) e-mail

Subject: Message from (Recorder name)
The recorder name is set in the Recorder Setup (see section 11-12).

Main text:

Name: Recorder name

Battery error occurs, Recording memory error or Input instrument communication error has occurred or the remaining recording memory is low.

YYYY/MM/DD hh:mm:ss … Mail sending time

④ Specified time e-mail

Subject: Message from (Recorder name)

The recorder name is set in the Recorder Setup (see section 11-12).

Main text:

The text specified in the E-mail setup (see section 11-7) is sent. If the usage of a variable is erroneous, “Text error” is written as the body text.

Variables

Name	Description
CH	Tag 1: Data + Unit
DT	Data
R	Return (line feed)
G	Group name (Group 1)
	Tag 1: Data + Unit
	Tag 2: Data + Unit
	⋮
	Tag 16: Data + Unit

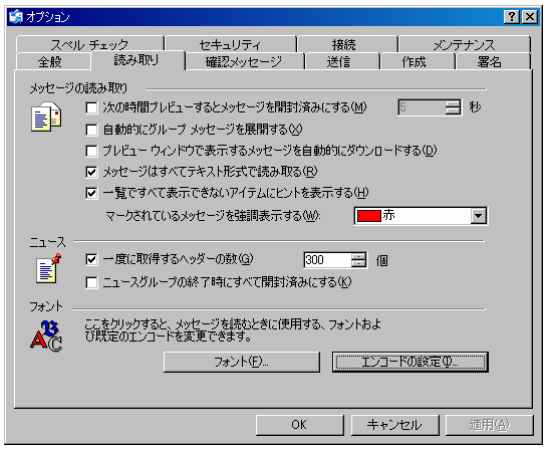
At the end of text: YYYY/MM/DD hh:mm:ss … Mail sending time

16-3 Setup of Mail Client Software(Use in Japanese)

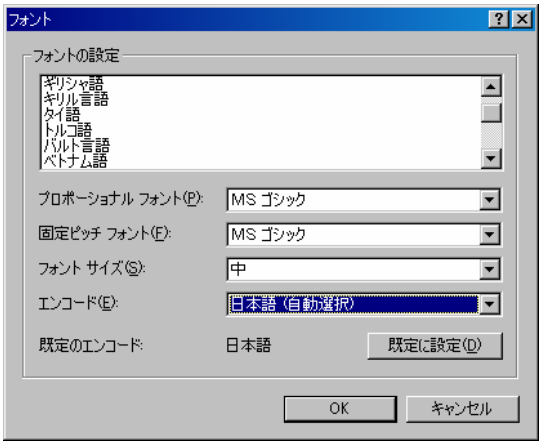
The e-mails are sent in Japanese (Shift JIS) characters, which may be displayed inaccurately if the encoding is set incorrectly in the mail client software. Be sure to set the encoding method in the mail client software to “Japanese Shift JIS” or “Japanese (Automatic selection)”. If your mail client software is Outlook Express, use the following procedure for the setup.

(Setup of Outlook Express(in japanese Windows))

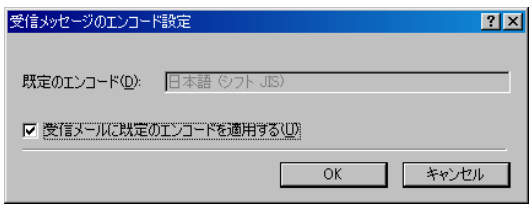
① Open the [ツール(Tool)] menu and select “オプション(Options)”.
② Click on the [読み取り(Read)] tab and then on the [フォント(Font)] button.



③ Set [エンコード(Encoding)] to “日本語（自動選択）(Japanese (Automatic selection))” and click on the [OK] button.



④ When the window shown in ② is displayed again, click on the [エンコードの設定(Encoding Setup)] button.
Check the box for “受信メールに規定のエンコードを適用する(Apply specified encoding to the received mails.)”



17. NETWORK OPERATION

The network functions of this recorder include the web, FTP client (file transfer) and SMTP/POP3 client (E-mail transmission) functions.

This chapter describes restrictions on these functions and methods for their effective utilization.

17-1 Restrictions on Network Operation

The following table shows the outline of the network protocols of the recorder.

Summary of the Network Protocols of This Recorder

Level	Network Functions			
Application	Data record/setup	Web Server	FTP Client	Mail transfer
Application layer	Exclusive protocol	HTTP	FTP	SMTP/POP3
Transport layer	UDP	TCP		
Network layer	IP			
Data link layer	Ethernet (10BASE-T/100BASE-TX)			

To record important data using this recorder, fully understand the functions of the recorder and the restrictions on the communications using it, and use a network configuration that can effectively acquire the necessary data.

The restrictions that should be taken into consideration when planning the network operation of the recorder are described in the following.

- If a router (local router or broadband router) is present between the monitoring/setting PC and the recorder, set the network configuration so that it can allow the passage of the protocols listed in the above table.
- The port numbers used by the application are the standard values that are “well-known” ports. Therefore, the port numbers of the recorder cannot be altered.
- The exclusive protocol of the recorder employs UDP, and it acts as a server that waits for communication commands at port No. 10002.
- UDP fragments may be produced depending on the sizes of the send/receive data on the exclusive protocol.
  If the router inserted in the path is not set to allow the passage of UDP fragments, the recorder display may not be viewed properly on the PC.
- When the recorder is accessed through a router, some displays may be unavailable depending on the communication environment.

  For the setup of the port Nos. for which communications are permitted by the router and fragments, contact the network administrator, manufacturer’s support division, ISP (Internet Service Provider), etc.

- E-mail sending and FTP file transfer operations may not complete under certain network status conditions. Take such cases into consideration when using a server beyond the Internet or intranet.

- The recorder is not compatible with DHCP (Dynamic Host Configuration Protocol for dynamic IP address allocation).
  When the recorder is installed in a network that is run using DHCP, concurrence in IP addresses may occur, making the PCs in the existing network incapable of communication.

  If this recorder should be installed in a network environment using a DHCP server (an environment making use of the router's DHCP function or utilizing a local DHCP server, etc.), be sure to confirm the range of IP addresses that would not be subjected to the DHCP allocation and set the address of the recorder properly before connecting it to the existing LAN.

- Communication with this recorder may be unavailable depending on the firewall setting (provided as standard for the OS or installed as a personal firewall application) of the PC.
  Be sure to check that the IP address of the recorder and the protocols and port numbers used in communications are not the targets of communication denial by the firewall.

- This recorder does not support encrypted communications such as SSL and IPSec.
  When encryption of data flowing through the network is required, the user should prepare a commercially available VPN router and build a security network.
  When using a VPN router with IPSec, confirm that the UDP fragment packets are processed properly.

  CHINO have developed a VPN using the FITELnet-F40, manufactured by Furukawa Electric Co., Ltd., and IPSec, and confirm that it is effective for all of the functions of the recorder.
  For construction of a VPN, consult a VPN router manufacturer or network administrator.

17-2 Monitoring via the Internet

A permanent connection to the Internet is an indispensable condition for the LAN environment in which the recorder is connected. Additionally, a mechanism for allowing the access of this recorder from the Internet is also required.

17-2-1 Preparation

Network configuration

The following example employs an ADSL circuit and broadband router in the permanent connection environment from the LAN accommodating this recorder and the Internet.

When it is required to monitor the recorder from the Internet using another connection environment than the following example, consult your network administrator and install and set up the environment according to the instructions by the network administrator as well as observing the advice in this manual.

This example assumes a network configuration as shown below.

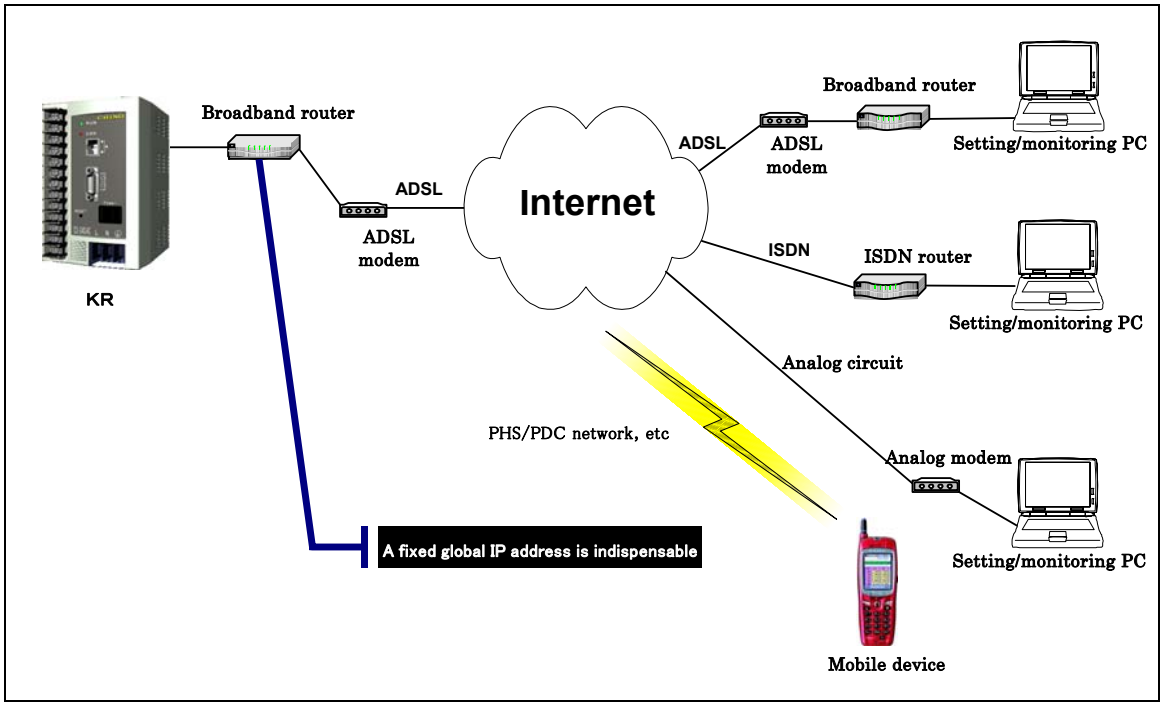


Fig. Example of Network Configuration for Setup/Monitoring via the Internet

The recorder side configuration

In addition to the Internet connection through ADSL, the LAN accommodating the recorder requires the service contracts and environment as described below.

(1) A service that allocates a permanently fixed global IP address.
(A fixed global IP address service, global fixed IP allocation service, etc.)
(2) A broadband router (hereinafter referred to as the router) with the function of transferring packets to the specific IP addresses or port numbers in the LAN when there is access to a fixed global IP address or specific port number.
(This can be implemented by a function called server publication, DMZ, port forwarding or static NAT.)

Setup and monitoring party

The setting/monitoring party is also required to have an Internet connection environment. It should be able to access the recorder with a dial-up connection using ISDN, analog modem, cellular phone or PHS network as well as broadband connection. To view a recorder display that uses the Java applet, it is recommended to prepare a connection speed that is equal to or higher than the ISDN speed (64 kbps).

17-2-2 Monitoring from a PC

A PC can access the recorder through the web browser using the same procedure as that for accessing the recorder in the LAN.
The PC should specify the fixed global IP address, which is allocated by the router, in the URL field of the web browser.
(Example: http://<*fixed ip address*>/)
The address conversion function of the router is activated, the recorder returns the response and the initial display can be displayed. Perform the required operations by referring to section 11 WEB BROWSER OPERATION.

17-2-3 Monitoring from a mobile device

Some of the Internet-connectable PDA devices have web browsers installed in them. Such a device is capable of accessing the recorder. However, since the web display of the recorder has been designed for viewing and controlling on a PC, the display may be unsuitable for a mobile device.

Web browsers installed in mobile devices are greatly variable in their specifications; some devices may be incapable of logging onto or setting the recorder (by button operations and character input). In addition, a recording display may not be viewable because It has been implemented using the Java applet for PC.

To display data on cellular phones, see section 11-15 Web Display on Cellular Phone.

17-3 Notes on the Use of the E-mailing Function

This recorder incorporates an E-mail transmission function for use in the notification of alarms, etc.
The E-mail transmission function employs the SMTP and POP3 protocols.
The POP3 protocol is not necessary for the mail transmission procedure itself, but it is used to support the mail transmission server that uses the authentication function of POP3.

17-3-1 Environment in which the E-mailing function has been confirmed

The following table shows the environment of the SMTP/POP3 server with which connection has been confirmed.
Use this table as a reference when installing a mail server yourself.

Server's OS	Server's Application
Windows Server 2003	Internet Information Server6.0

The server application should be set up so that the recorder can be identified as a client. For setup details, refer to the documents for the applications.

17-3-2 Notes on the use of mail servers provided by ISP (Internet Service Provider)

Some of the mail servers provided by ISPs do not allow E-mail transmission unless the login procedure by dial-up connection, etc. has completed. Note that normal E-mail transmission is not available if such a mail server is specified as the SMTP/POP3 server.
This trouble occurs for example when you have both a dial-up connection contract and broadband connection contract and attempt to access the mail server of the dial-up connection contract from the broadband connection environment.
To avoid this problem, it is required to set the mail server specified for a broadband connection as the POP3/SMTP address in the E-mail Setup of this recorder.

17-3-3 Character code format of transmitted e-mails and compatible authentication method

Character code format

The e-mails transmitted from the recorder takes the “ISO-8859-1” character code (Western European language format). As a result, when an e-mail message set for the Japanese language by the recorder is read with the mail software of the PC, the characters may not be readable.

If this happens, the message can be read by setting the character code format of the PC’s mail client software to Japanese.

Authentication method

This recorder is not compatible with an SMTP server that requires authentication for connection to it (SMTP over SSL, SMTP Auth, etc.). For POP3 authentication, the recorder supports only the authentication using clear text (it is not compatible with the APOP authentication, etc.).

In ordinary e-mail transmission, the SMTP server is accessed using the SMTP protocol. However, to prevent illegal mail transmission, many ISPs adopt the “POP before SMTP” method, which permits access to the SMTP access for the specified period of time only for the accounts that have been authenticated by accessing the POP3 server. This recorder is also compatible with this authentication method.

17-4 Using the File Transfer (FTP Client) Function

This recorder stores the collected recording data in files and can transfer them to the FTP server at the timings set by the user. This allows the FTP server to be used as the backup location of the internal memory.

FTP server installation conditions

There is a point to be noted in the installation of the FTP server for use in file transfer.

FTP transfer increases the load on the line and the CPU in the recorder. Therefore, in a network configuration in which the file transfer destination server is located outside the Internet, the transfer efficiency drops compared to transfer to a locally installed FTP server and the probability of a normal completion of file transfer drops.

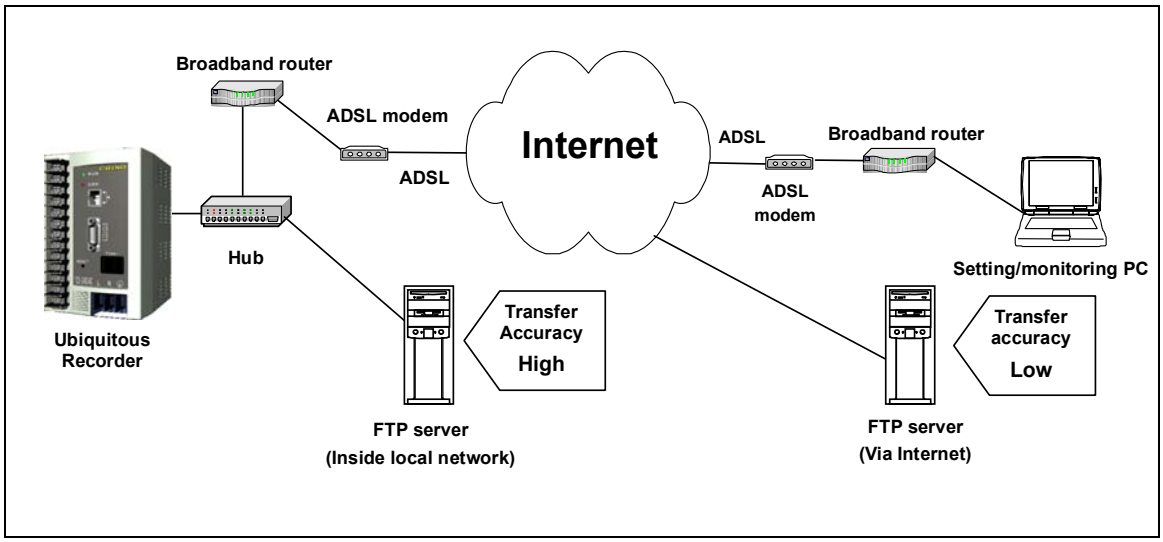


Fig. Transfer Reliability According to FTP Server Installation Locations

When using FTP transfer of files, implement a network configuration that can reduce the processing loads of the recorder, by installing the destination FTP server within the local network, etc.

When handling important data that should never be lost, it is recommended to connect the recorder and setting/monitoring PC in a 1-to-1 connection through a network hub.

17-4-1 FTP server applications with which operation has been confirmed

The following table shows the environments of the FTP server with which connection has been confirmed.

Server's OS	Server's Application
Windows 2000 Professional	Internet Information Server 5.0
Windows XP Professional	Internet Information Server 5.1
Windows Server 2003	Internet Information Server 6.0

However, it is always required to confirm the possibility of connection before actual operations. Also note that the server applications should be set up so that the recorder is identified as a client. For setup details, refer to the documents for the applications.

17-4-2 Notes on use of the file transfer function

- The FTP client function of the recorder does not support transfers in passive mode. File transfer may not work properly if a firewall is installed between the recorder and the transfer destination server. When transferring files to an FTP server beyond a firewall, the firewall should be set properly by the user.
- For the port number for accessing the FTP server, the control connection is fixed at No. 21.
- For the authentication of a user logging in to the FTP server, only basic authentication using clear text is supported.

18.MAINTENANCE

WARNING

Always have CHINO-authorized personnel replace the parts of this instrument. Otherwise, incorrect servicing as well as other dangers may result. Contact CHINO for the replacement of any part of this instrument.

18-1 Standard Part Replacement Intervals

Part	Replacement Timing	Remark
Power supply unit	5 years	Under 25°C ambient temperature
Lithium battery	3 years	
CompactFlash card	After creation of 70,000 files	Per recording group

The standard part replacement interval assumes the standard operating conditions shown in the following table. The intervals reduce when the actual operating conditions are below standard.

Item	Conditions, etc.
Temperature	20-25°C
Humidity	45-65% RH
Running hours	8 hours/day
Corrosive gas	Absent

Item	Conditions, etc.
Other	① Location free of dust, humidity and soot ② Location free of vibrations and impact ③ Location without other adverse effects on operation

18-2 Cleaning

The casing is made of plastic. Clean it with a dry soft cloth or with a soft cloth moistened with lukewarm water or a neutral detergent.

⚠ CAUTION

Do not use thinner, benzene or other chemicals that may damage the plastic components. These may cause deformation or breakage to the case.

19. SPECIFICATIONS

■General Specifications

Rated supply voltage: 100-240 V AC,
50/60 Hz (free power supply)

Power consumption: 27 VA max.

Operating conditions
• Standard operating conditions
Ambient temperature/humidity range:
21-25°C, 45-65%RH
Supply voltage: 100 V AC ±1%
Supply frequency: 50/60 Hz ±0.5%
• Normal operating conditions
Ambient temperature/humidity range:
0-50°C, 20-80%RH
Supply voltage: 90-264 V AC
Supply frequency: 50/60 Hz ±2%
• Transport conditions In the factory shipping package condition.
Ambient temperature/humidity range:
-20-+60°C, 5-90%RH
(without condensation)
• Storage condition
Ambient temperature/humidity range:
-20-+50°C,5-90%RH
(without condensation)

Power failure countermeasures:
Setups are backed up by an EEPROM.
Data backup by flash memory.
A lithium battery backs up the clock and data RAM for 3 years or more (assuming 8 hours of operation per day).

Insulation resistance:
Across secondary terminal and protective conductor terminal:
500 V DC 20 MΩ or more
Across primary terminal and protective conductor terminal:
500 V DC, 20 MΩ or more
Across primary terminal and secondary terminal:
500 V DC,20 MΩ or more

Primary terminals:	Power supply terminals (L, N), alarm output terminals (MOS relay)
Secondary terminals:	External drive terminals, communication terminals

Withstanding voltage:
Across secondary terminal and protective conductor terminal:
500 V AC, 1 min.
Across primary terminal and protective conductor terminal:
1500 V AC, 1 min.
Across primary terminal and secondary terminal:
2300 V AC, 1 min.

Primary terminals:	Power supply terminals (L, N), alarm output terminals (MOS relay)
Secondary terminals:	External drive terminals, communication terminals

Case and front frame:ABS resin

Color:
Front frame: DIC5Y8.5/1 equivalent
Case: Munsell N7.0 equivalent

Weight: About 850 g

Installation: DIN rail installation

Clock accuracy: ±5 min. per 30 days (under the standard operating conditions, excluding errors due to power ON/OFF)

Terminal screws:	Power supply terminals	M4.0
	Protective conductor terminals	M4.0
	Alarm output terminals	M4.0
	External drive terminals	M4.0
	Communication terminals	M4.0

■ Communication Input Specifications

Input system: MODBUS communication (KR5100)
Input points: 16, 32, 64 or 128 points
16 points x (1, 2, 4 or 8 groups)
Input interval: 1 sec./All points
Moving average: Moving averaging of 1, 2, 4 or 8 seconds

MODBUS specifications (KR5100):

Communication type:	RS-485
Connected instruments:	SE3000, AL/AH3000 series, BR1000 series, LT230, 350, 370, 450, 470, 830, KE3000 series
Transfer rate:	9600 bps
Bit length:	8 bits
Stop bit:	1 bit
Parity:	None
Check sum:	CRC16
Transfer mode:	Binary

■ Recording Function

Internal memory: CompactFlash memory card, 128 MB + Built-in RAM (for temporary storage)
Recording intervals: 1, 2, 5, 10, 20, 30 seconds, 1, 2, 5, 10, 20, 30, 60 minutes.
Recording method: The interval and conditions can be set individually for each group.Data is stored in the CompactFlash after every 8 intervals or when recording stops.
Recording conditions: External contact inputs (4 points), a larm output (per group), specified time of day
Memory area usage display:
Usage (%) of the memory area of each file is displayed in a recording display icon.

■ Operating Environment (PC)

Personal Computer:
Windows98/ME,Windows2000/XP
Running browser:
Internet Explorer 5.0 or later, Netscape 6.0 or later or Opera 7.0 or later,capable of running Java. (Java environment is provided in the CD-ROM)

■ Web Display Specifications (Setup Windows)

Data display:
Data display and alarm display using text
Setup windows:
Ethernet setting, FTP setting, E-mail setting, user ID/password setting, input device setting, time setting, etc.
History display:
FTP transfer history, E-mail transmission history

■ Web Display Specifications (Recorder Display)

Split frame display:
Splitting into a maximum of 8 frames. Each frame can display the desired display and group.
Trend display:
Real-time/historical trend display
One-touch display of a specified channel
Vertical/horizontal scroll switching
Manual/auto scale and logarithmic scale (up to 8 scales can be used simultaneously.)
Input of desired comments message
Trip line
Data reproduction (PC/recorder file)
Specified time section display (Historical trend display only)
Bar graph display:
Vertical/horizontal orientation selection
Alarm values (higher and lower limits) display using lines
Data display:
Data value display and alarm status check
Information display:
File list, alarm display, message display
A Jump from a piece of information to a related position is possible.

■ Alarm Function

Setups: A maximum of 4 alarms can be set per channel.
Alarm types:
Higher limit, lower limit, variation higher limit, variation lower limit, abnormal data, device-identified alarm.
Alarm memory:
Memory for alarm occurrence/release time and alarm type
Memory for information on the latest 200 events including occurrence and release
Alarm outputs:
2 points
Delay function:
Setup of alarm delay of 1 to 3600 sec.

■ Computation Function

The data of each channel can be substituted with a computation result.
Computation types:
Arithmetic operations :
Addition, subtraction, multiplication, division, remainder, power
Comparison operations :
Equality, inequality, more, l ess
Logic operations :
AND, OR, XOR, NOT
General functions :
Raise fractions, omit fractions, absolute value, square root, exponent of e, natural logarithms, common logarithms
Data computation :
Sum, average
Totalizer :
Analog integration and pulse integration with auto reset function

■ Communication Functions

Medium:
Ethernet (10BASE-T/100BASE-TX, semi-duplex)
E-mail:
Sent at alarm output, startup and specified time of day.
Notified addresses: Max. 20 addresses
Mail text - 10 templates (max. 182 characters)
FTP client:
Auto transfer of recording data files to FTP server.
Manual transfer of specified files to an FTP server.
Data server:
Acquisition of recording data files from PC.
Auto acquisition at specified time of day is possible every day.

■ User Authorization

Input of user ID and password is required for access.
Setup can be modified only by a user logging in using the user ID with the administrator's authority.
When the recorder is turned ON, modification of the recording setup by any user is denied.
Switching for enabling settings by the administrator user is required.

■ Serial Communication Function

Used by connecting to a HyperTerminal, etc. for initial setup of IP address, etc.
Medium: RS-232C
Transfer rate: 9600 bps
Bit length: 8 bits
Stop bit: 1 bit
Parity: None

■ Report Application

When installed from the provided CD-ROM, compilation, printing and management of daily and monthly reports are possible on Microsoft Excel. Automatic report output is possible by using the Windows Task Scheduler.
Operating environment:
CPU - Pentium 300 MHz equivalent or higher
RAM - 64 MB or more
OS - Windows 98/ME or Windows 2000/XP
Output method:
Microsoft Excel file (extension .xls)
Available functions:
Average, maximum, minimum and integrated values of every hour.

APPENDIX A. REPORT APPLICATION (SAMPLE)

NOTE

This application is a sample application. Therefore, we do not answer to the users' inquiries on its operations and troubles.

The report application in the provided CD-ROM can be used to compile daily and monthly reports. The application needs to be installed in the PC before use. It also requires that Microsoft Excel 2003 is installed in the PC when it is run.
This software edits reports based on the data recorded with the recorder and stored in the PC. The data can be downloaded in the PC by operating the [Recording Planning] window on the PC or it can be transferred to the PC using the FTP transfer function of the recorder.

A-1 Operating Environment

OS	Windows98, Me, Windows 2000 or XP
CPU	Pentium 300 MHz equivalent or faster
Memory	64 MB or more
Other	Microsoft Excel 2003.

A-2 Installation Procedure

Place the provided CD-ROM in the CD drive of the PC for which it is required to use the report application, and run "setup.exe" for the "report(English)" folder in the CD-ROM. When the installer is launched, perform the installation by following the displayed instructions.

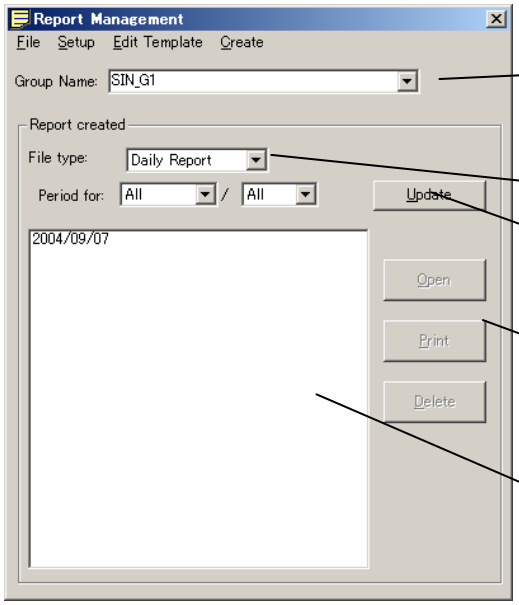
A-3 Uninstallation Procedure

Open the [Control Panel], select "Add or Delete Programs" (called "Add or Delete Applications" in some OSs), and delete the report application.

A-4 Operating Instructions

A-4-1 Basic window

The [Report Management] basic window opens when the application is launched. This window is the starting point of any operation.



Select the work target group. This list shows the names of groups based on the recorded data folder specified in the setup. If the desired group is not listed, input its name from the keyboard.

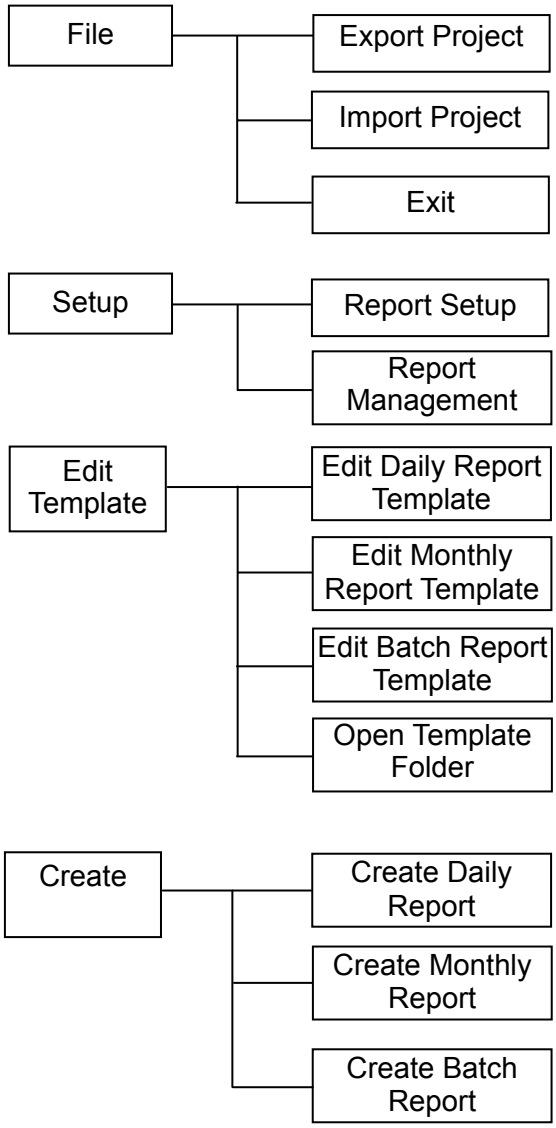
The report files matching the condition set here are displayed in the list box below.

Click to update the list box to the latest information.

The "Open," "Print" and "Delete" operations can be applied to the file selected in the list box on the left.

Report files matching the condition selected in the above combo boxes are searched in the specified folder and their dates are listed here.

A-4-2 Menu configuration



Compresses constructions and saves the result in a single file.

Loads a previously saved project file.

Exits from the application.

Sets up this application.

Specifies the necessity of compilation and printing of reports for each group.

Compresses constructions and saves the result in a single file.

Loads a previously saved project file.

Edits the batch report template.

Opens the report template folder.

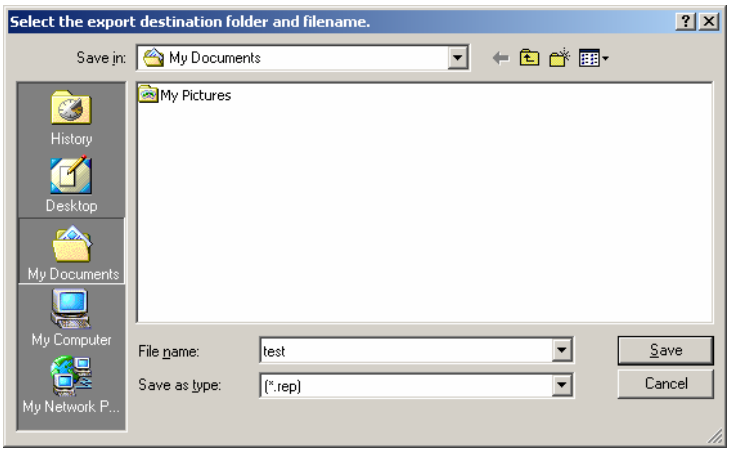
Compiles and outputs a daily report.

Compiles and outputs a monthly report.

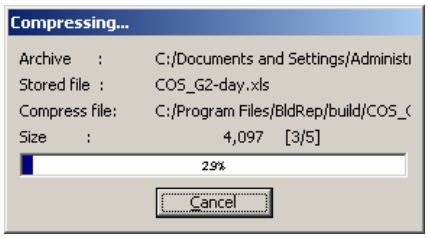
Compiles and outputs a batch report.

A-4-3 Export Project

Select the export destination folder and filename.

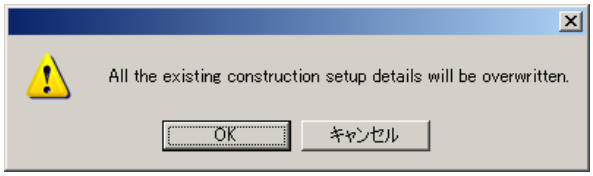


The constructions are compressed and the result is saved in a file.

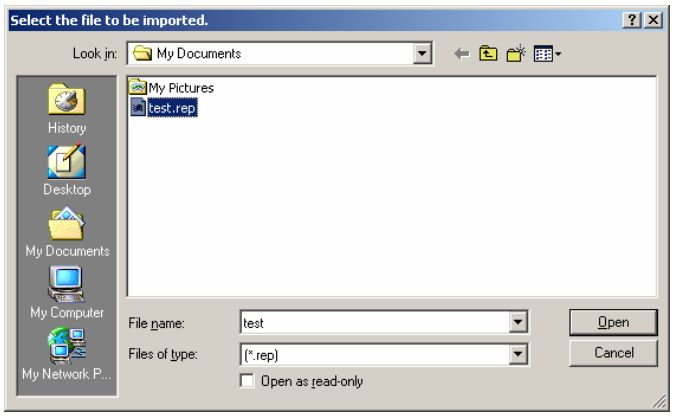


A-4-4 Import Project

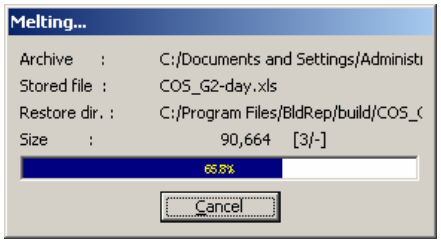
① The [Confirmation] dialog box is displayed to confirm overwriting of the existing setup. Click on the [OK] button.



② Select the file to be imported.



③ Import the file.



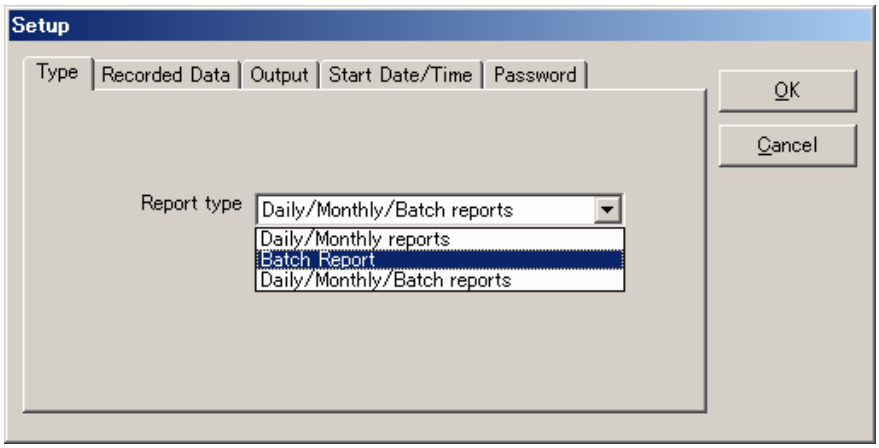
A-4-5 Setup

This window has the [Type], [Recorded Data], [Output], [Start Date/Time] and [Password] setup tabs. These tabs are described separately in the following.

(Type)

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

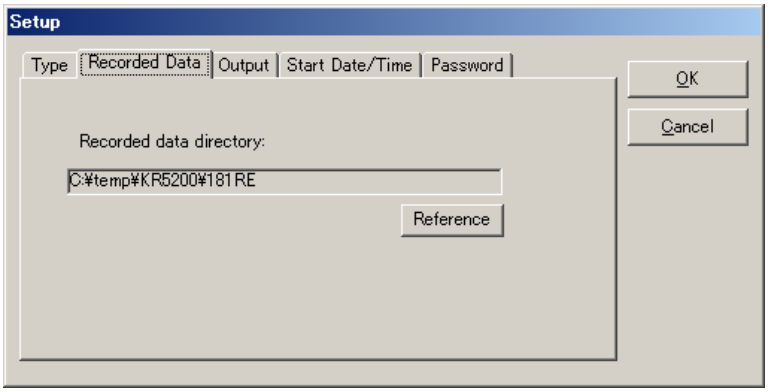
- Daily/Monthly reports
- Batch report
- Daily/Monthly/Batch reports



Daily report:	Report based on the data recorded every day.
Monthly report:	Report based on the data recorded every month.
Batch report:	Report on the recorded data files.

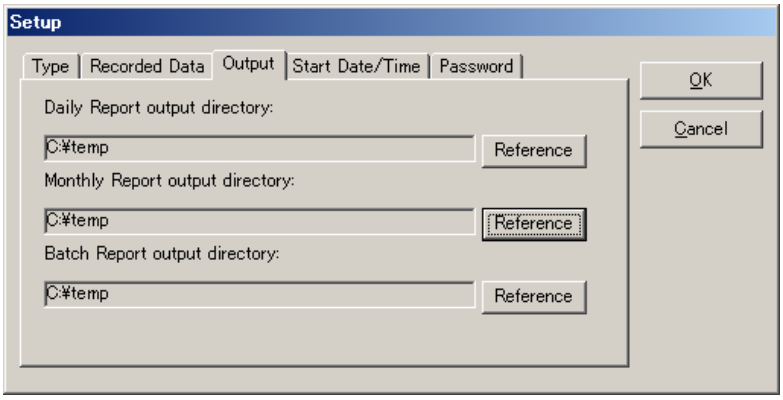
(Recorded Data)

Specify the folder storing the recorded data. This setup should be identical to that in [File Directory] in the [Other Setup] window for the recorder. To select the folder, click on the [Browse] button to open the folder selection window.



(Output)

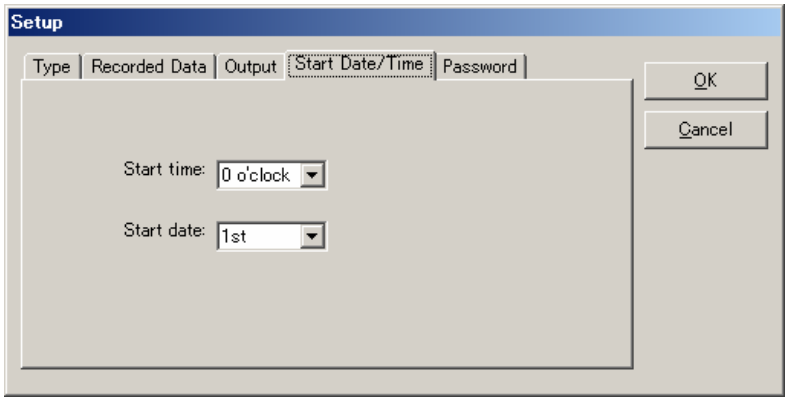
Specify the output (save) destination folder of the report files. To select the folder, click on the [Browse] button to open the folder selection window. This tab shows the necessary setup items according to the selection under the [Type] tab. The figure shown below is an example in which the daily and monthly reports are selected as the report types.



(Start Date/Time)

Specify the time at which every day starts for the creation of daily reports, and the date on which every month starts for the creation of monthly reports.

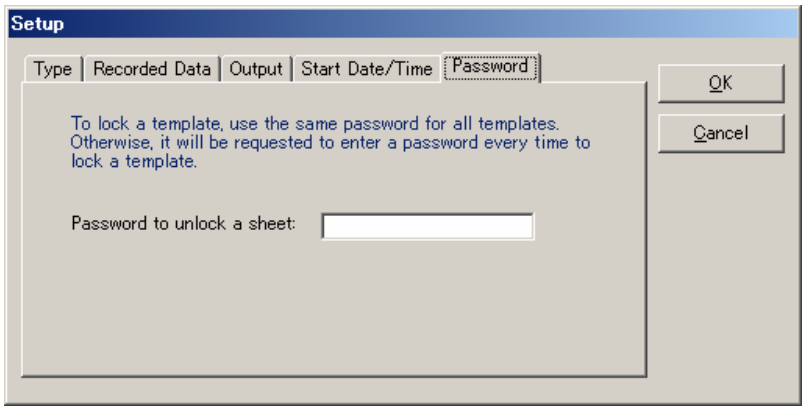
When every daily or monthly report is compiled, the time or day range of data included in the report is determined according to this setup.



(Password)

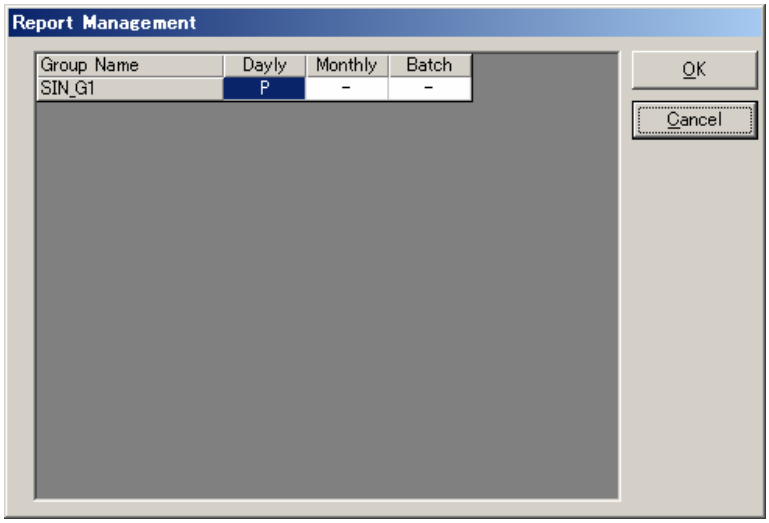
If the report templates are locked with passwords, enter the password used for unlocking. A single password is applied to all of the templates.

When a template is locked, no report can be created unless the password is input or if the input password is incorrect.



A-4-6 Report Management

Specify whether or not the reports are to be compiled for each group.
Click on each cell to switch the display in the cycle of "＊"→ "(Blank)" → **"P"**.
"**-**" indicates that the applicable template is not created. No report can be compiled without the template.
Reports marked "＊" are compiled and those marked "(Blank)" are not. Those marked **"P**" are printed after compilation.



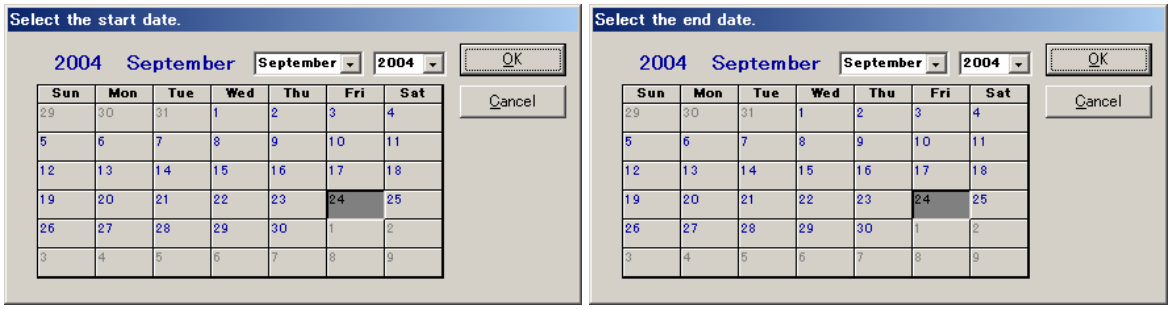
A-4-7 Edit Report Templates

For editing of the templates, see A-5 Edit Report Templates.

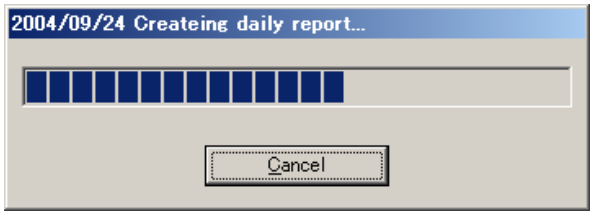
A-4-8 Daily Report

The daily reports for the groups marked "＊" in the [Report Management] window are created based on the daily report template.

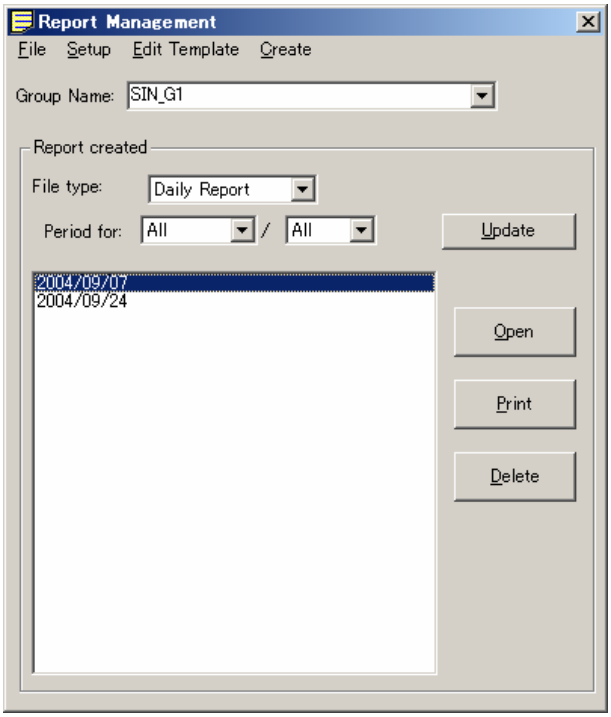
① Specify the period in which daily reports are compiled. Select the start date and end date.



② A daily report is created by loading recorded data.



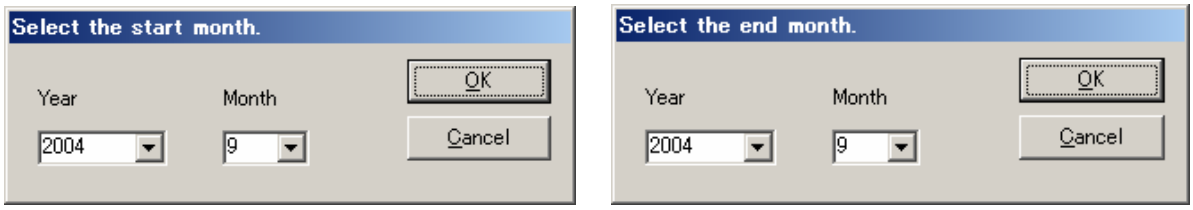
③ When the daily report has been created, it is added to the list of compiled reports.



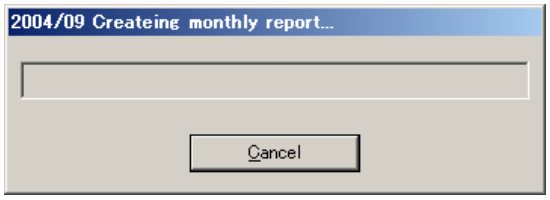
A-4-9 Monthly Report

The monthly reports for the groups marked "＊" in the [Report Management] window are created based on the monthly report template.

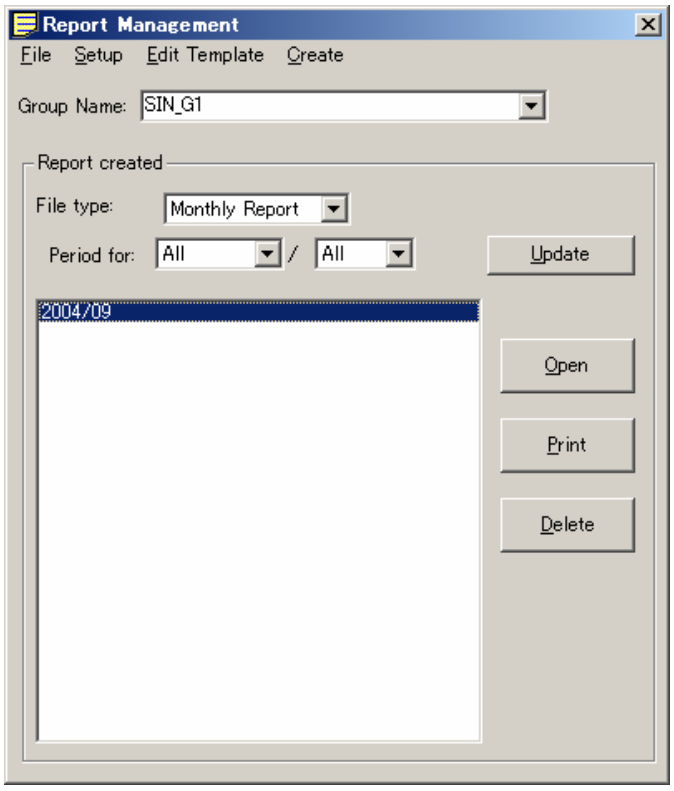
① Specify the period in which monthly reports are compiled. Select the start month and end month.



② A monthly report is created by loading daily reports.

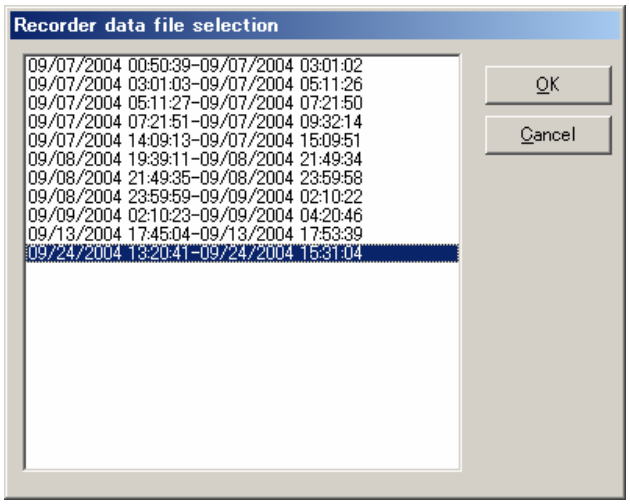


③ When the monthly report has been created, it is added to the list of compiled reports.

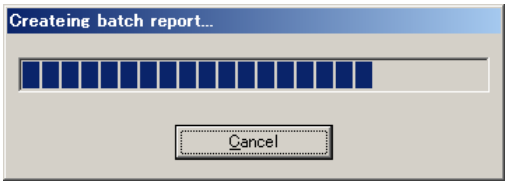


A-4-10 Batch Report

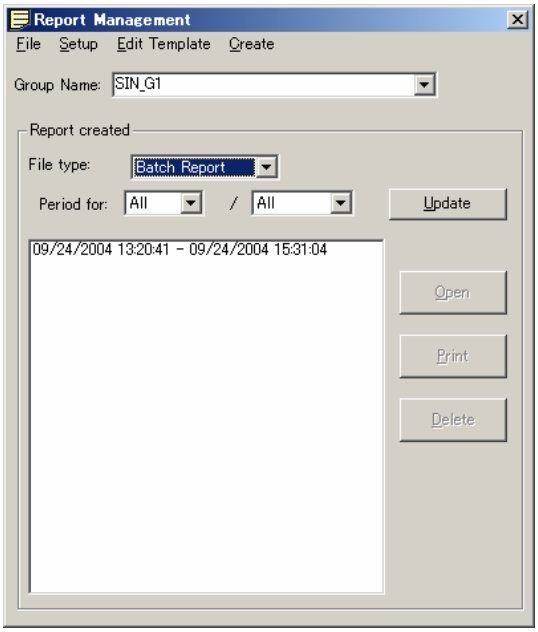
① Select the recorder data files to be compiled into a report.



② A batch report is created by loading recorded data files



③ When the batch report has been created, it is added to the list of compiled reports.



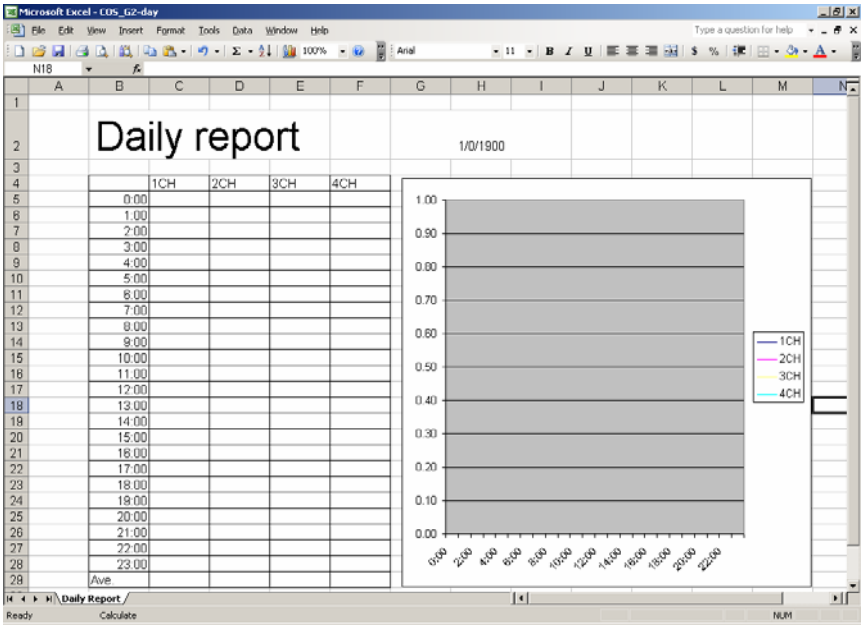
A-5 Edit Report Templates

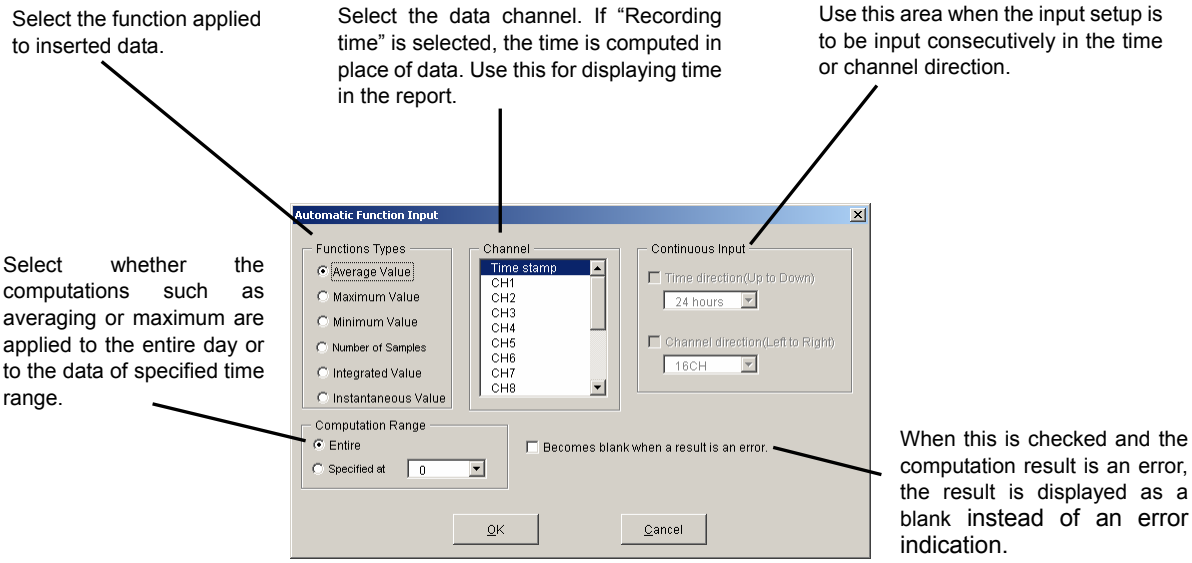
Reports are compiled based on the respective templates. Each template should be created in advance by setting the table frames, fonts, computation expressions for the contents of cells, fixed characters, printing setups, etc.

A-5-1 Edit Daily Report Template

The setups made on the “Daily Report” sheet can be used as the template for daily reports.

① Create the frames, fixed character strings, etc. for use in daily reports.



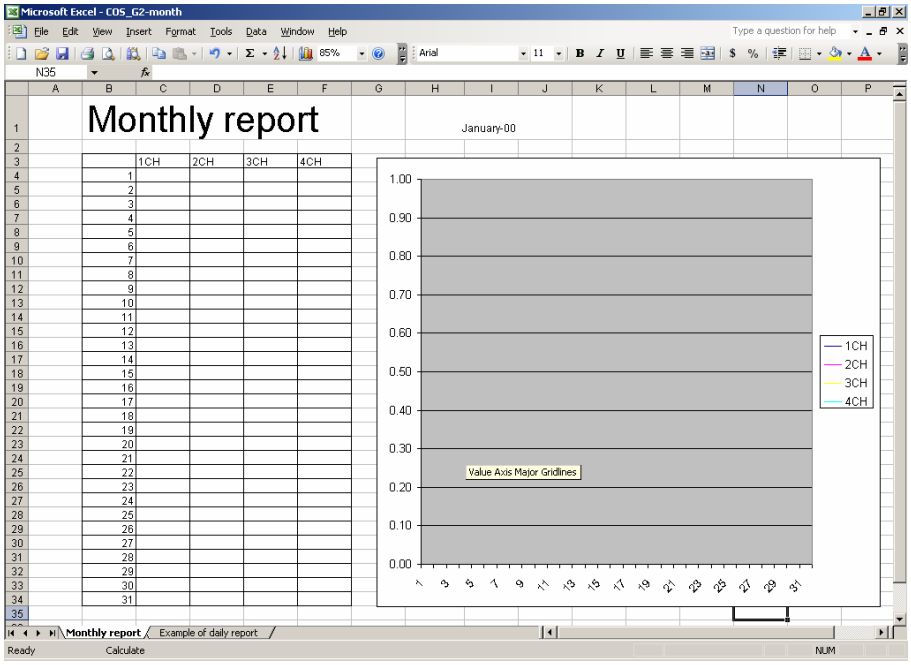


② Double-click on each cell in which you want to insert data to open the input window.
③ After completing the setup of items, click on the [OK] button to enter the computation result in the cell.
④ After completing the template setup, save the template file by overwriting.

A-5-2 Edit Monthly Report Template

The setups made on the “Monthly Report” sheet can be used as the template for monthly reports.

① Create the frames, fixed character strings, etc. for use in daily reports.

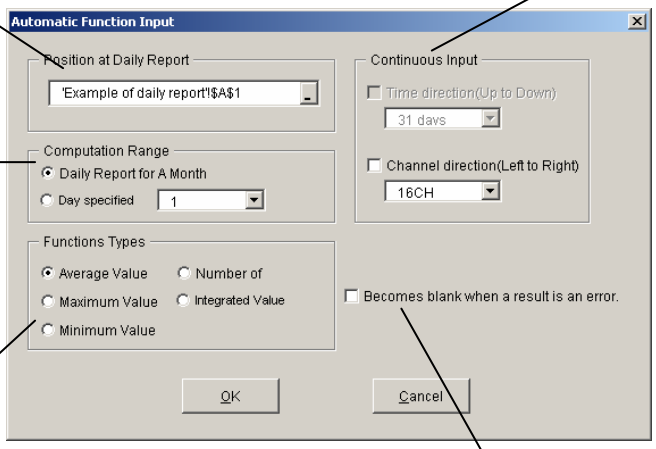


② Double-click on each cell in which you want to insert data to open the input window.

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.

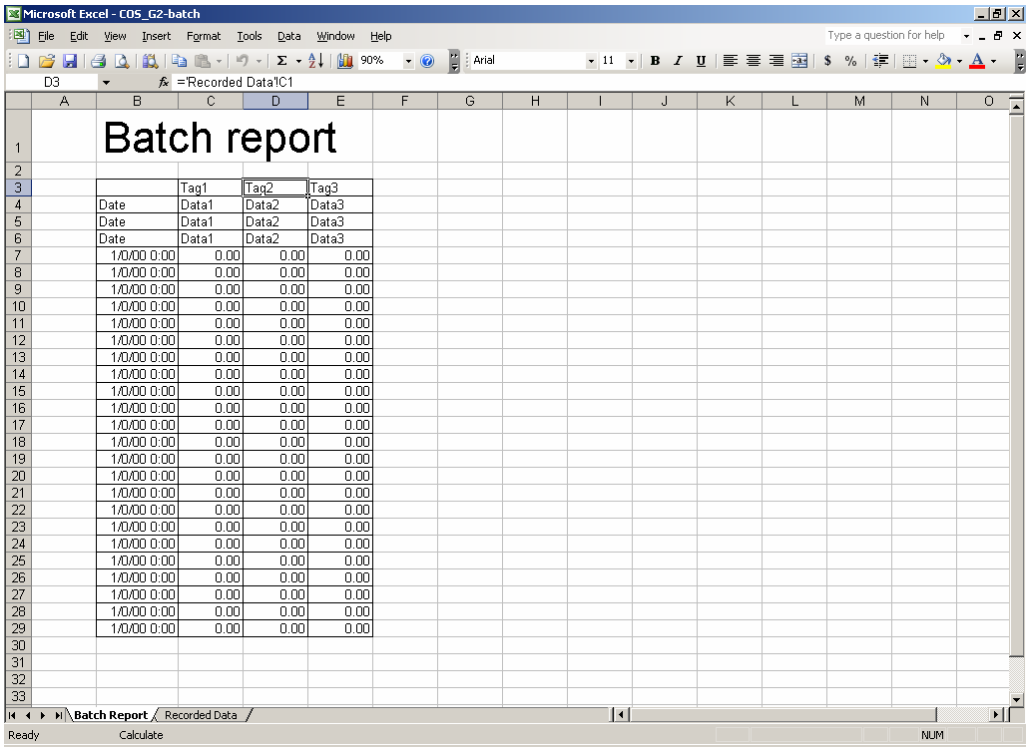
③ After completing the setup of items, click on the [OK] button to enter the computation result in the cell.

④ After completing the setup of template, save the template file by overwriting.

A-5-3 Edit Batch Report Template

The setups made on the Batch Report sheet can be used as the template for monthly reports. As the data in the recorded data file is entered in the Recorded Data sheet the report template can be created freely in the Batch Report sheet based on the data in the ”Recorded Data” sheet. Automatic input of functions is not available for these sheets.

① When the editing window is displayed, create the desired report format on the Batch Report sheet.



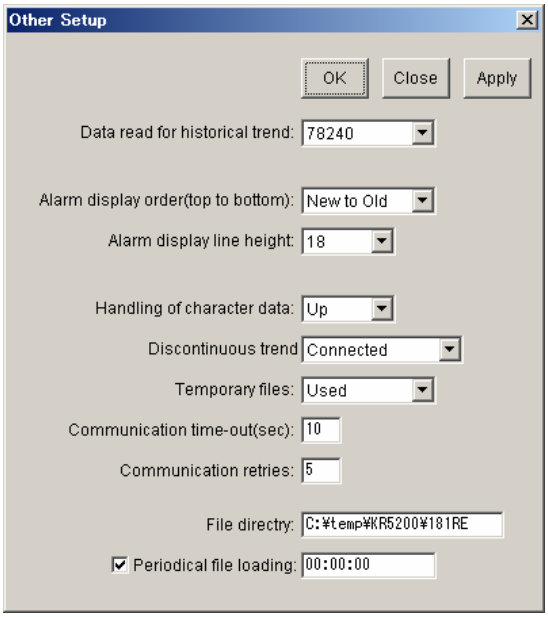
② After completing the setup of a template, save the template file by overwriting.

A-6 Automatic Processing According to Schedule

The daily and monthly reports can be compiled exclusively based on automatic processing, without any user operation.
This is possible with the following procedure.

A-6-1 Setting the Ubiquitous Recorder

Set the Ubiquitous Recorder for periodical data loading.

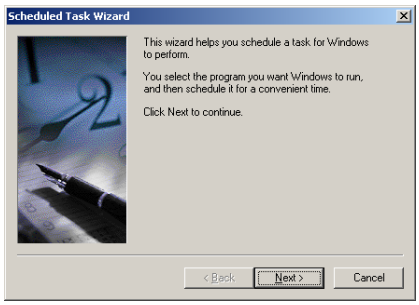


Set the directory for saving the file in [File Directory], check “Download file periodically”, and set the time of day. The time of day should be the time immediately after the time the data loading for the daily reports ends.
The periodical file downloading is performed only when the recorder display is active. It is therefore required to be set so that the recorder display window is permanently active.
By setting the shortcut for the recorder display in the Windows startup menu and setting the signature confirmation function to accept any signature, the recorder display window can be opened every time the PC is booted.
The periodical file downloading downloads the recorder files that are not present in the PC’s file directory that is updated.

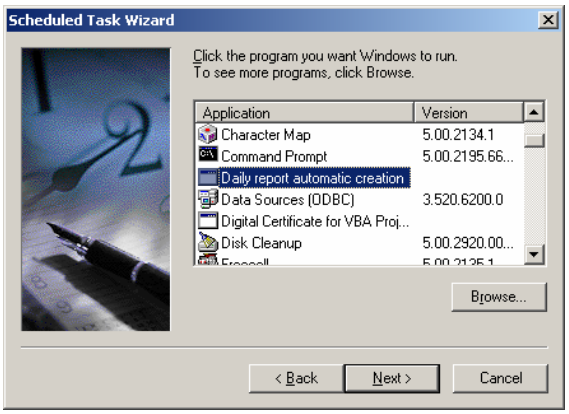
A-6-2 Entering the automatic daily report compilation schedule

(The following steps are those for Windows XP. The displayed windows are slightly different with other OSs.)

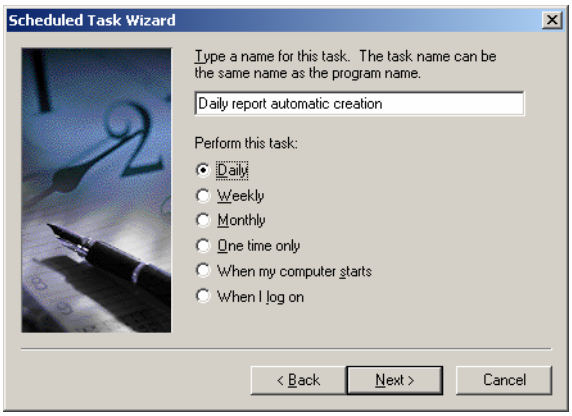
① Open [Control Panel] - [Task] and select “Add scheduled task”.
② Click on the [Next] button.



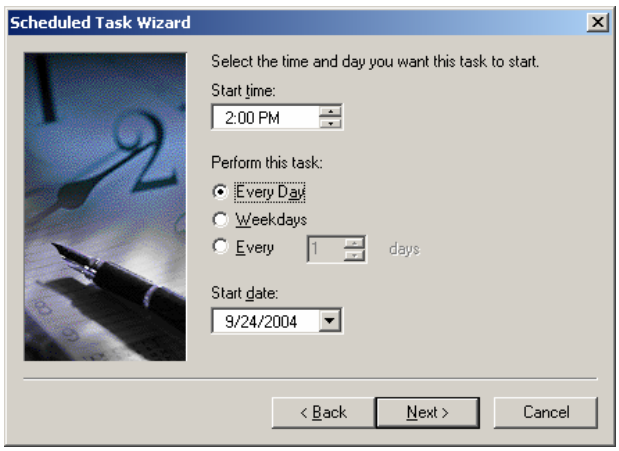
③ Select “Daily report automatic creation”.



⑤ Select “Daily”.



⑥ Set a time that is one hour or more after the file downloading time in [Start Time]. Select “All days”.



⑦ Input the user name and password that are used to log in the PC.

⑧ Click on the [Finish] button to close the window.

A-6-3 Entering the automatic monthly report compilation schedule

Set up the automatic monthly report compilation in the same way as for section A-6-2. In this operation, “AutoMont.exe” should be selected in place of “AutoDay.exe”, select “Monthly” in place of “Daily” and set the compilation date at the same day as the start date of every month.
(Example: When the start date of every month has been set to day 1, set the 1st day.)

When the above setups are completed, the daily and monthly reports will be compiled automatically.
If a report fails to be compiled because the recorder display is not active or the PC is not turned on, the missing report can be compiled by downloading the files in all the groups from the KR file display of the recorder and then creating the report manually using the report application.

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