3909

INTERFACE

PACK

INSTRUCTION MANUAL

Contents

Introduction

Thank you for purchasing this HIOKI "3909
INTERFACE PACK." To get the maximum
performance from the unit, please read this manual
first, and keep this at hand.

Safety Notes

⚠ WARNING

**Incorrect measurement procedures could result in
injury or death, as well as damage to the
equipment. Please read this manual carefully and
be sure that you understand its contents before
using the equipment. The manufacturer disclaims
all responsibility for any accident or injury except
that resulting due to defect in its product.**

This Instruction Manual provides information and
warnings essential for operating this equipment in a
safe manner and for maintaining it in safe operating
condition. Before using this equipment, be sure to
carefully read the following safety notes.

Safety symbols

	In the manual, this mark indicates explanations which it is particularly important that the user read before using the unit.

The following symbols are used in this Instruction Manual to indicate the relative importance of cautions and warnings.

⚠WARNING	Indicates that incorrect operation presents significant danger of accident resulting in death or serious injury to the user.
⚠CAUTION	Indicates that incorrect operation presents possibility of injury to the user or damage to the equipment.
NOTE	Denotes items of advice related to performance of the equipment or to its correct operation.

・Check before use

Before using the unit, inspect it and check the operation to make sure that the unit was not damaged due to poor storage or transport conditions. If damage is found, contact your dealer or HIOKI representative.

Inspection

When you receive this product, before use, please check that no abnormality or damage has occurred during delivery. In particular, be sure to check the accessories and connectors.

In the unlikely event of damage, or if the unit does not function according to specification, you should immediately contact the dealer from whom you bought the unit, or the nearest HIOKI service facility.

Notes on Use

In order to ensure safe operation and to obtain maximum performance from the unit, observe the cautions listed below.

・ "TEMP Utility" is a product of HIOKI E.E. CORPORATION.

・ The reproduction, copying, or alteration of part or all of the "TEMP Utility" for any purpose other than controlling the infrared thermometer or processing the data is prohibited by law.

・ The "TEMP Utility" may be changed or upgraded by HIOKI E.E. CORPORATION without notice.

・ When the "TEMP Utility" is to be quoted in a published work, prior permission from HIOKI E.E. CORPORATION is required. Further, use of the trademark "HIOKI" is not permitted.

・ HIOKI E.E. CORPORATION will assume no responsibility for the resulting operation of the "TEMP Utility" by the user.

⚠ CAUTION

Floppy disks
・ Do not drop, bend by hand, or give strong shock to the floppy disks.
・ Do not put the floppy disks in a place where they will be exposed to direct sunlight, near a strong magnetic field, or close to a heating device.
・ Do not get the floppy disks wet.

Registered trademark
・ Windows, Excel and Internet Explorer are the trademarks of Microsoft Corporation, USA
・ i486DX4 and Pentium are trademarks of Intel Corporation, USA
・ Other product names are the trademarks or registered trademarks of following companies:
Copyright (c) 1967-1997 Microsoft Corporation, all rights reserved.
Copyright (c) 1998 HIOKI E.E. Corporation

Chapter 1
Summary

1.1 Product Summary of TEMP Utility

The TEMP utility is software that makes it easy to process or manage 3443(-01) or 3444(-01) measurement data on a personal computer.

In the explanations that follow, words enclosed in quotation marks (" ") are the names of screens or buttons. Menu items are indicated as words enclosed in square brackets ([ ]).

1.2 General Specifications of TEMP Utility

Media: Four 3.5-inch 2HD (1.44 MB) floppy disks (two disks for Japanese version, two disks for English version)

● Operating environment

Main unit	Personal computer with CPU of i486DX4 or more that operates with Windows95, Window98, or WindowsNT4.0 You need Microsoft Internet Explorer 4.01 service pack 1.
Memory	16MB or more
Display	Resolution 800x600 dots, 16 colors or more
Hard disk	At least 4MB free space

● Recommended operating environment

Main unit	Personal computer with a Pentium 120MHz CPU or greater that operates with Windows95, Window98, or WindowsNT4.0 You need Microsoft Internet Explorer 4.01 service pack 1.
Memory	16MB or more
Display	Resolution 800x600 dots, 16 colors or more
Hard disk	Hard disk:At least 4MB free space

1.3 TEMP Utility Specifications

●3443(-01) (Field Type)

No. of maximum data	Data No. 64. 130 total
File operation	File reading, file writing (CVS format)
Printing	Data printing. Vertical and horizontal printing of A3, A4, B4, and B5 paper
Screen	Data No. table, data table, graph screen, and other various setting screens
Statistics	Maximum, minimum, average values
Measured value judgment	Comparison judgment of upper limit and lower limit
Communication	Memory data reading and setting of infrared thermometer measurement through RS-232C cable are possible.

●3444(-01) (Laboratory Type)

| No. of maximum data	32,000 data × 8CH
File operation	File reading, file writing (CVS format)
Printing	Data and graph printing. Vertical and horizontal printing of A3, A4, B4, and B5 paper
Screen	Data CH table, data table, graph screen, real-time measurement screen, other various setting screens
Graph display function	8CH simultaneous display, time axis, temperature axis scale change and zooming Two-cursor display, cursor data display, calculation of data between cursors
Edit	Copying graph screen to clipboard
Statistics	Maximum, minimum, average values
Communication	Setting of real-time measurement and infrared thermometer measurement through RS-232C cable are possible.

Chapter 2
Prior to use

●Attaching the ferrite core

It is recommended to attach a ferrite core to each cable to prevent any influence from electromagnetic waves.

NOTE

· CE marking is obtained in the state where the ferrite core is attached to the cable.

· Modular cable

Ferrite core
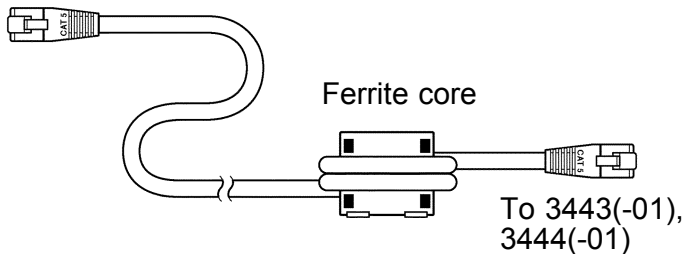
To 3443(-01), 3444(-01)

Wind the cable double, and attach the ferrite core as close to the 3443(-01), 3444(-01) side connector as possible.

· Other cable

Like the modular cable, wind the analog output cable or personal computer cable double around the ferrite core (large), and attach it as close to the expansion box side as possible.

●Switching between Fahrenheit and Celsius
　The 3443-01 and 3444-01 can switch between
　Fahrenheit and Celsius displays.
　(Refer to Instruction Manual of the 3443-01 or
　3444-01.)

Chapter 3
Connecting Method
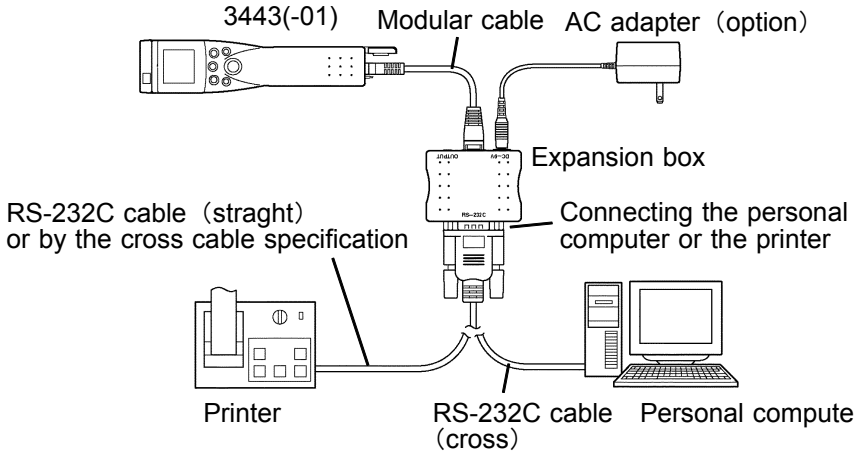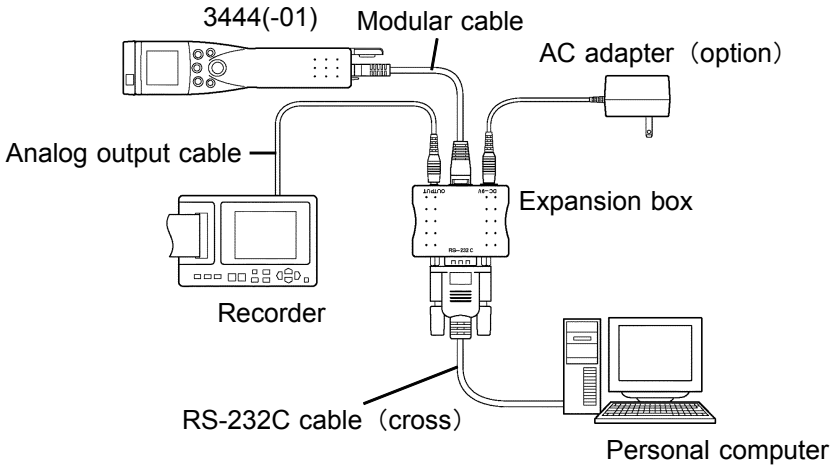
●3443(-01) (Field Type)

3443(-01)　　Modular cable　AC adapter（option）

Expansion box

RS-232C cable（straght）
or by the cross cable specification

Connecting the personal
computer or the printer

Printer

RS-232C cable
（cross）

Personal compute

●3444(-01) (Laboratory Type)

NOTE
・Purchase the RS-232C cable and printer cable from a computer shop.
Refer to 3.1 "Connecting the personal computer" and 4.1 "Connecting the printer."
・Use of the wrong connection (cross connection vs. straight connection) with the RS-232C cable will cause a breakdown.
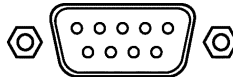Carefully confirm prior to connecting the expansion box.

Chapter 4
Use of Personal
Computer

4.1 Connecting the Personal Computer

Connect the RS-232C cable to the connector
indicated as RS-232C on the expansion box and to
the COM port of the personal computer.

9-pin connector (male)

The RS-232C cable has two types of connectors:
straight and cross.
A cross connection RS-232C cable is used to
connect the expansion box to the personal computer.
An RS-232C cable can be obtained at a personal
computer shop. Please purchase the type conforming
to your computer.

4.2 Installation

> ⚠ **CAUTION**
>
> · If a power failure occurs or power to the computer
>   is turned OFF during execution of Setup.exe, data
>   stored on the hard disk may be damaged.

1. Insert Disk 1 of TEMP Utility into the floppy disk
   drive.

2. Double-click My Computer on the desk top, and
   then double-click the icon 3-1/2 Floppy (A:).

3. Double-click Setup.exe on the disk.

4. Install TEMP Utility in accordance with the
   instruction on the screen.
   In some cases, you may be requested to restart
   Windows during installation.
   Take out the floppy disk, and restart in accordance
   with the instructions on the screen.
   When Window restarts, perform installation from the
   beginning.

5. Confirm that installation has been completed
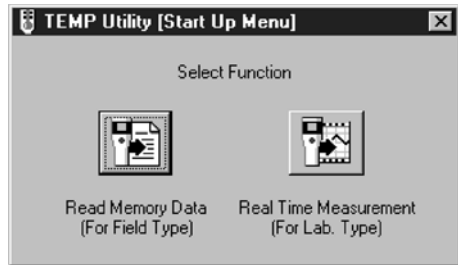   correctly.
   (The TEMP Utility icon is created in the sub-menu
   Programs of the Windows Start menu.)

4.3 Reading Memory Data (for 3443(-01) only)

4.3.1 Basic Usage

1. Start up Reading Memory.

① Select Start →
Programs →
TEMP Utility
from the menu
bar.
The TEMP

Utility [Start Up Menu] screen is displayed.

② Select the Read Memory Data button.
Reading of the memory data starts.
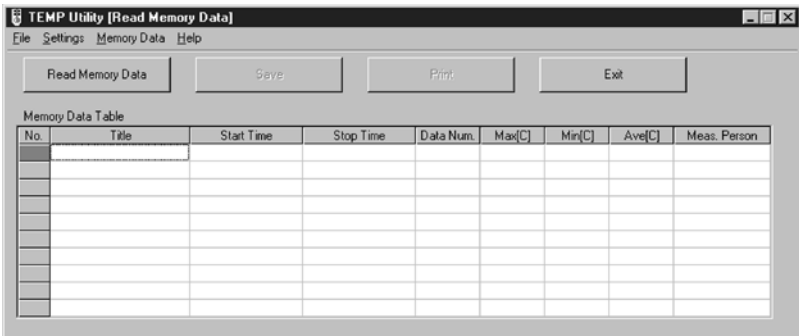
2. Set communication.

Select COM port to enable communication.
Select [Settings] - [COM Port] from the menu bar.
Select COM port connected to the infrared
thermometer from COM1 to COM4.
If you do not know which COM port the infrared
thermometer is connected to, select COM1 or
COM2 under normal operation.

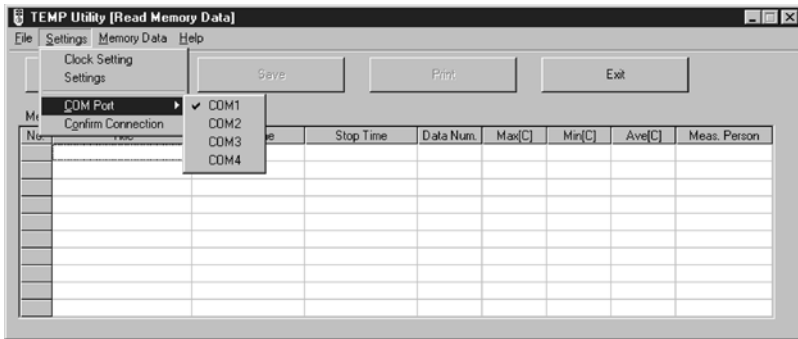### 3. Check communication.

When the infrared thermometer is connected to the personal computer and communication setup has been

completed, confirm communicability.

Select [Settings] - [Confirm Connection] from the menu bar. Operation in accordance with the instructions allows you to check the communicability.

If the connection is incorrect, change the COM port and check again.

4. Read thermometer memory data to the personal computer.

Select the Read Memory Data button to confirm that the memory data of the 3443(-01) has been transmitted to the memory data list.

No.	Title	Start Time	Stop Time	Data Num.	Max[C]	Min[C]	Ave[C]	Meas. Person
1		98/10/28 13:36	98/10/30 13:37	9	28.7	27.9	28.2	
2		98/10/28 15:05	98/10/30 15:07	7	24.6	24.3	24.5	
3		98/10/29 15:10	98/10/30 15:11	4	25.5	25.2	25.4	
4		98/10/29 15:12	98/10/30 15:13	4	25.8	24.5	25.4	
5		98/10/29 15:20	98/10/30 15:21	4	41.4	41.0	41.2	
6		98/10/29 15:23	98/10/30 15:23	4	38.6	38.3	38.5	
7		98/10/27 15:30	98/10/30 15:30	14	49.5	47.8	48.7	
8		98/10/28 15:38	98/10/30 15:38	6	25.2	25.0	25.1	
11		98/10/28 13:36	98/10/30 13:37	9	28.7	27.9	28.2	
12		98/10/28 15:05	98/10/30 15:07	7	24.6	24.3	24.5	

NOTE

· The memory data of thermometer can be completely cleared using the personal computer.

Select [Memory Data] - [Clear Memory Data].

5. Ending

Select the Exit button.

TEMP Utility is closed.

4.4 Data processing

● Memory Data Table

Memory data for the 3443(-01) is managed according to blocks named for data No. A maximum of 130 readings can be stored in the memory for any data No., and the available data Nos. are 1 to 64. However, the total number of data readings that can be stored for all the data Nos. combined is 130. In the Memory Data Table, the title, start time and stop time, the number of memory data, maximum value, minimum value, average value, and the person taking the measurements are displayed for each data No. of memory data.

No.

Title

Start time

Stop time

Number of data

Max. / Min. /
Ave. values

Person taking
measurements

No.	Title	Start Time	Stop Time	Data Num.	Max[C]	Min[C]	Ave[C]	Meas. Person
1	Fan motor1	98/10/28 13:36	98/10/30 13:37	9	28.7	27.9	28.2	T. Sato
2	Fan motor2	98/10/28 15:05	98/10/30 15:07	7	24.6	24.3	24.5	T. Sato
3	Fan motor3	98/10/29 15:10	98/10/30 15:11	4	25.5	25.2	25.4	T. Sato
4	Fan motor4	98/10/29 15:12	98/10/30 15:13	4	25.8	24.5	25.4	T. Sato
5	Braker1	98/10/29 15:20	98/10/30 15:21	4	41.4	41.0	41.2	T. Sato
6	Braker2	98/10/29 15:23	98/10/30 15:23	4	38.6	38.3	38.5	T. Sato
7	Braker3	98/10/27 15:30	98/10/30 15:30	14	49.5	47.8	48.7	T. Sato
8	Braker4	98/10/28 15:38	98/10/30 15:38	6	25.2	25.0	25.1	T. Sato
11	Braker5	98/10/28 13:36	98/10/30 13:37	9	28.7	27.9	28.2	T. Sato
12	Braker6	98/10/28 15:05	98/10/30 15:07	7	24.6	24.3	24.5	T. Sato

○ Enter the title and the person taking
measurements in the measurement data.

The title and the person taking the measurements
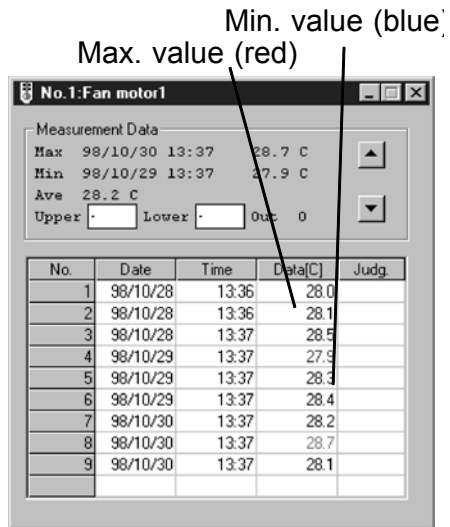can be entered in the Memory Data Table.
The reliability of the measured data increases when
the title and the measuring person as the responsible
person for the measured data are entered. It is
recommended to enter these items without fail.
Double-click on the Title cell of each data No. or
the Meas. Person cell in the Memory Data Table.
Enter the text, and hit the Return key.

● Data Table

The measured data
for each data No.
can be viewed by
displaying the Data
Table.

When [Memory
Data] - [Data
Table] is selected,
the Data Table
display can be
switched ON/OFF.

Min. value (blue)

Max. value (red)

No.	Date	Time	Data[C]	Judg.
1	98/10/28	13:36	28.0	
2	98/10/28	13:36	28.1	
3	98/10/28	13:37	28.5	
4	98/10/29	13:37	27.9	
5	98/10/29	13:37	28.3	
6	98/10/29	13:37	28.4	
7	98/10/30	13:37	28.2	
8	98/10/30	13:37	28.7	
9	98/10/30	13:37	28.1	

No.1:Fan motor1

Measurement Data
Max 98/10/30 13:37 28.7 C
Min 98/10/29 13:37 27.9 C
Ave 28.2 C
Upper -   Lower -   Out 0

○ Selection of the data No. displayed

Click on the cell of the data No. to be displayed in
the Memory Data Table.

When the number is selected, the color of the
number portion at the far left of the table changes.
The measured data of the selected data No. is shown
in the Data Table.

Clicking on the ▲ button in the Data Table displays
the Data Table of the previous data No. and clicking
on the ▼ button displays the Data Table of the next
data No.

○ Judgment function

The Data Table has a place to enter the upper limit value and lower limit value. By entering numerical values in this cell, the measured data can be judged. Judgment results are displayed in the Judg. column of the Data Table.

Limit value

Hi:Displayed when the measured value is above the upper limit value.

Lo:Displayed when the measured value is below the lower limit value.

When the measured value is within the range, nothing is displayed.

If "-" is entered in the input section of the upper limit value or lower limit value, the respective judgment function is ignored. If "-" is entered in both input cells, the judgment function is turned OFF.
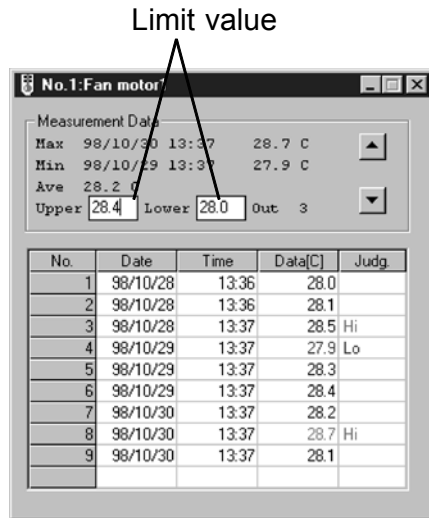
4.5 Saving or Reading the File and Printing

● Saving the measured data in a file

The measured data of all data Nos. are collectively saved in one file.

Select [File] - [Save As] from the menu bar. Enter the file name or select the file, and select the [Save] button. The data is saved.

To update the file after having changed the title or the measuring person with the data read from the file, select [File] - [Save] from the menu bar. The file is saved in CSV format (text file punctuated with commas).

Saving of data with many numbers may take a long time.

● Reading the measured data from the file

Select [File] - [Open] from the menu bar. Select the file name, and select the [Open] button to start reading.

● Printing

The measured data of all data No. is collectively printed.

Select [File] - [Page Setup] from the menu bar. Set selection of printer and paper size.

Select [File] - [Print] from the menu bar. The printing dialog box is displayed. Make the necessary settings, and print.

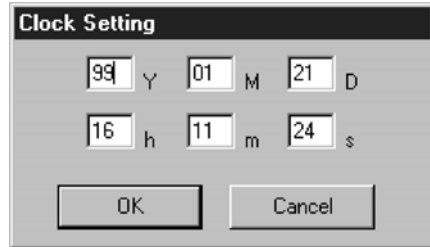Selecting the [Print] button also starts printing.

NOTE · It is not possible to print the data of the Table only or of each data No. individually.

● Setting the main unit clock

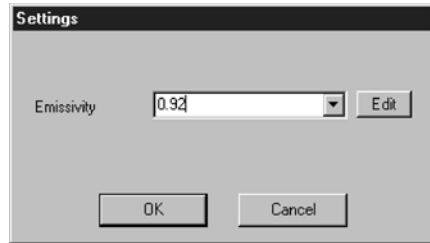Select [Settings] - [Clock Setting]. Set the time, and select the OK button. The data is transmitted to the

Clock Setting

| 99 | Y | 01 | M | 21 | D |
| 16 | h | 11 | m | 24 | s |

| OK | Cancel |

main unit, and the time is set.

● Main unit setup

Measurement setting for transmitting to the infrared thermometer Select [Settings] - [Settings].

Settings

Emissivity 0.92 ▼ Edit

| OK | Cancel |

The main unit Settings screen appears.

Emissivity setting
To set the emissivity, enter the numerical value directly or select from the list.
Setting range is 0.10 to 1.00 with a resolution of 0.01.
Selecting the Edit button allows you to edit the contents.

Editing the Emissivity lists
A total of ten emissivity lists can be registered.

Adding:

Click on the portion to be added in the list.

Type in the content to be added in the input cell for material and/or emissivity, and select the [Add] button.
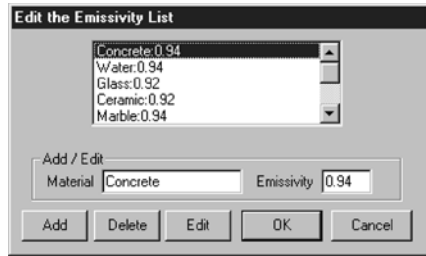
Deleting:

Click on the item to be deleted from the list.
When the [Delete] button is selected, the item is deleted.

Changing:

Click on the item to be changed in the list.
Type in the content to be added in the input cell for material and/or emissivity, and select the [Edit] button.

4.6 Real-time Measurement (for 3444(-01) only)

Real-time measurement has the following functions:

· Real-time measurement

Connected to the infrared thermometer through RS-232C, it reads the measured data to the personal computer in real time and stores the data in the memory.

・ Displaying 8-channel data table (see p. 20)
  It is possible to display a maximum of 8 channels of
  the real-time measured value data and the measured
  data read from the file as data tables.

・ Graph display (see p. 26)
  It is possible to display the read data for a
  maximum of 8 channels.
  Scale for time axis and temperature axis, and
  optional zooming are possible.
  Reading of the value by cursor and statistic
 calculation for cursors are possible.

4.6.1 Real-time Measurement

It is possible to connect the infrared thermometer to
the personal computer using an RS-232C cable, read
the measured data at real time, and store it in your
personal computer.

1. Start [Real Time Measurement].

① Select [Start] -
   [Program] - [TEMP
   Utility] from the
   menu bar.
   The [TEMP Utility
   (Start Up Menu)]
   screen is displayed.
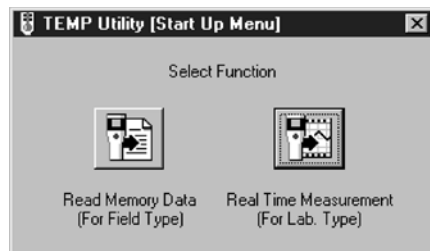
② Select the Real Time Measurement button.
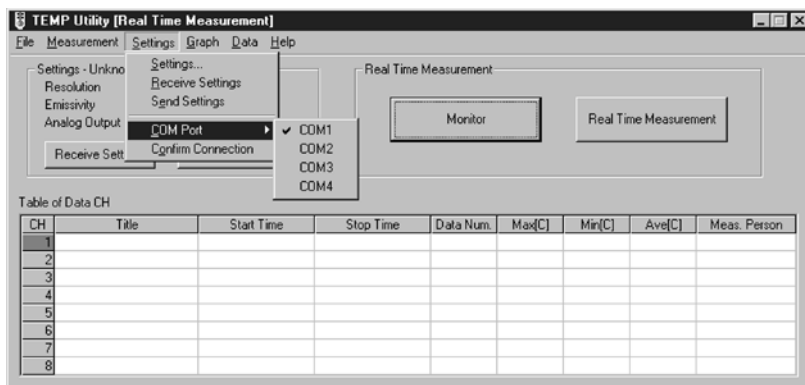   Real-time measurement starts.
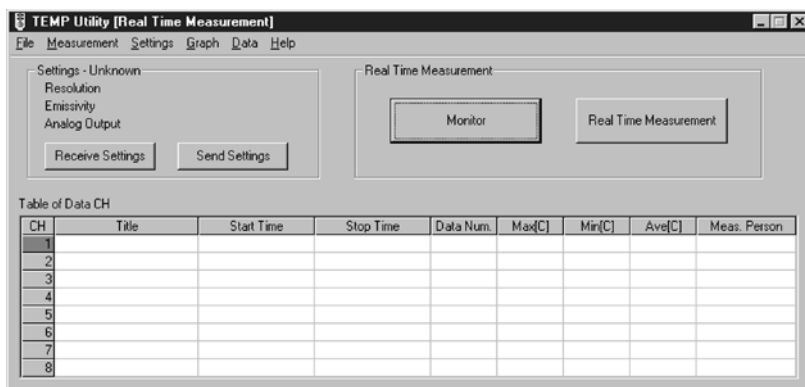
2. Set the communication.

Select COM port to enable communication.

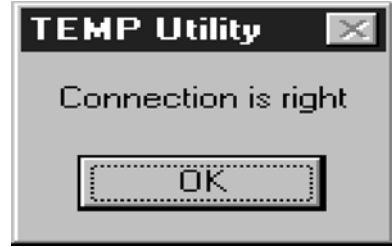Select [Settings] - [COM Port] from the menu bar.

Select the COM port connected to the infrared thermometer from COM1 to COM4.

If you do not know which COM port the infrared thermometer is connected to, select COM1 or COM2 under normal operation.

3. Check the communication.

When the infrared thermometer is connected to the personal computer and communication setup has been completed, confirm communicability.

TEMP Utility ✕

Connection is right

OK

Select [Settings] - [Confirm Connection] from the menu bar. Operation in accordance with the instructions allows you to check the communicability.

If the connection is incorrect, change the COM port and check again.

4. Read the measured data of the thermometer into the personal computer.

① Select the memory storage CH

Press the Real Time Measurement button or select [Measurement] - [Real Time Measurement]. The Real Time Measurement Select CH screen is displayed.

Select the CH No. to which the measured data is read, and select the OK button.

The color of the selected CH number at the far left of the list changes.

Real Time Measurement Select CH

Logging CH

CH 1 ▼

OK
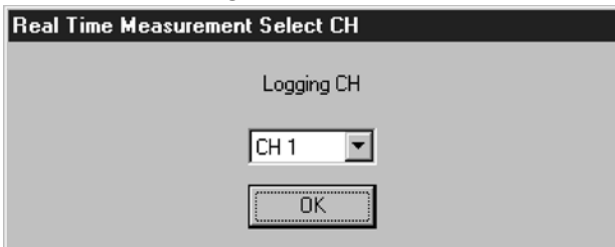
② Set the conditions for real-time measurement.

When the [Measurement Time Settings] screen is displayed, set up as follows:

Logging Time   Timer Measurement

    Interval Time   Load To Excel
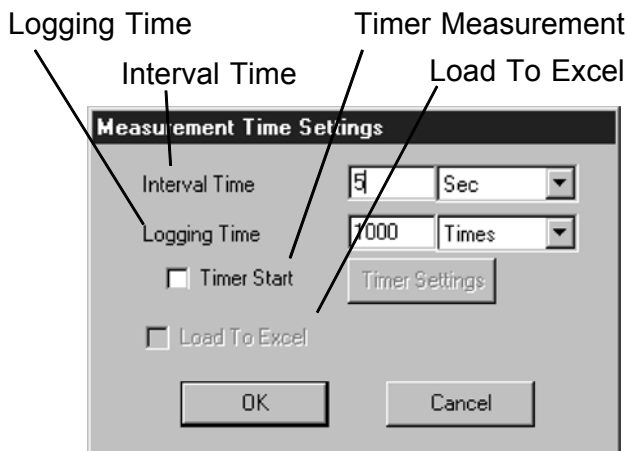
· Interval setting

Decide the interval (measurement interval) by selecting the figure and unit.

· Logging time setting

Similarly, decide the logging time (measurement time) by selecting the figure and unit. When "Continuous" is selected, measurement continues until it is stopped manually. When "Continuous" is selected, the figures cannot be input.

Further, if "Times" is selected, measurement is performed only for the count that was set.

Measurement count includes the measurement start time as one time. The measurement time interval is the time set in Interval Time.

・ Timer measurement

When performing timer measurement, check the "Timer Start" check box in the Measurement Time Settings dialog box. When the check box is checked, the Timer Settings screen appears automatically. To change or confirm the timer time later, select the "Timer Settings" button next to the "Timer Start" check box. The Timer Settings screen is displayed.

Timer setting

Measurement start time and stop time or measurement time can be set with the Timer Settings screen. For the measurement
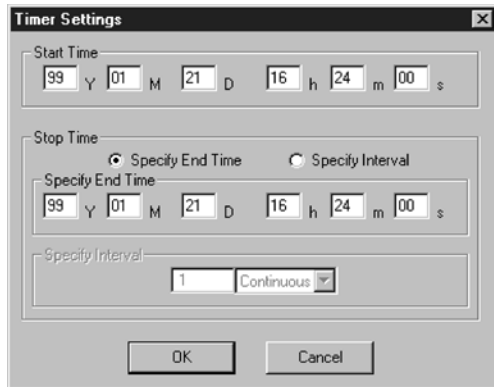
stop time, specify the end time directly or set with the measurement time. If "Continuous" is selected for the measurement time, measurement can be stopped manually when it was started with the timer.
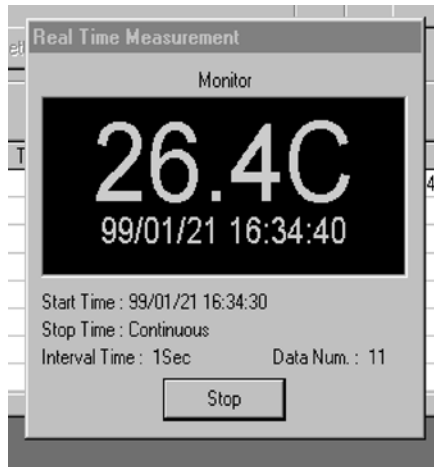
・ Option of loading to Excel

This option is valid if Microsoft Excel software has been installed.

When the "Loading to Excel" check box is checked, the measured value can be read to an Excel table in addition to normal real-time measurement.

③ Starting real-time measurement

After setting the interval and logging time, select the OK button in the Measurement Time Settings screen, and proceed in accordance with the instructions to start measurement.

Real Time Measurement

Monitor

26.4C
99/01/21 16:34:40

Start Time : 99/01/21 16:34:30
Stop Time : Continuous
Interval Time : 1Sec   Data Num. : 11

Stop

The screen displays the Real Time Measurement window for the measured values and the data table to which the measured values are stored.
When the option of reading to Excel is specified, Excel starts automatically and the data is read to a new BOOK sheet.

④ Stopping real time-measurement

Selecting the Stop
button stops the real-
time measurement.
Measurement results
up to this time are
displayed in the
measurement data
CH list and the data
table.

No.	Date	Time	Data[C]
4	99/01/21	16:36:00	26.3
5	99/01/21	16:36:01	26.1
6	99/01/21	16:36:02	26.4
7	99/01/21	16:36:03	26.2
8	99/01/21	16:36:04	26.4
9	99/01/21	16:36:05	26.3
10	99/01/21	16:36:06	26.3
11	99/01/21	16:36:07	26.4
12	99/01/21	16:36:08	26.2
13	99/01/21	16:36:09	26.2
14	99/01/21	16:36:10	26.4
15	99/01/21	16:36:11	26.3
16	99/01/21	16:36:12	26.2
17	99/01/21	16:36:13	26.2
18	99/01/21	16:36:14	26.3
19	99/01/21	16:36:15	26.3
20	99/01/21	16:36:16	26.2
21	99/01/21	16:36:17	26.3
22	99/01/21	16:36:18	26.4

CH 1: — Measurement Data
Max 99/01/21 16:36:02 26.4 C
Min 99/01/21 16:36:01 26.1 C
Ave 26.3 C

4.6.2 Monitor Measurement

With Monitor measurement, the measured data is
read in real time from the infrared thermometer at
an interval of one second, and displayed on the
screen. As the measured data is not stored, this
measurement can be performed easily if operation
check or recording is not required.
To start Monitor measurement, select the Monitor
Measurement button or select [Measurement] -
[Monitor Measurement] from the menu bar.

4.6.3 Data Processing

Making use of the data with your personal computer
The real-time measurement measured value data or data read from the file are displayed in the Table of Data CH. It can be displayed also as each data table up to a maximum of 8 channels.

Also, the maximum value, minimum value, and average value of the data are calculated and displayed.

● Table of Data CH

Enter the title and person taking measurements in the measurement data.
The title and the person taking measurements

can be entered in the Table of Data CH.
The reliability of the measured data increases when the title and the measuring person as the responsible person for the measured data are entered. It is recommended to enter these items without fail.
Double-click on the Title cell of each data No. or the Meas. Person cell in the Table of Data CH. Enter the text, and hit the Return key. Entry is not possible in a CH that has no measured data.

No.   Start time   Number of data   Person taking measurements

Title   Stop time   Max. / Min. / Ave. values
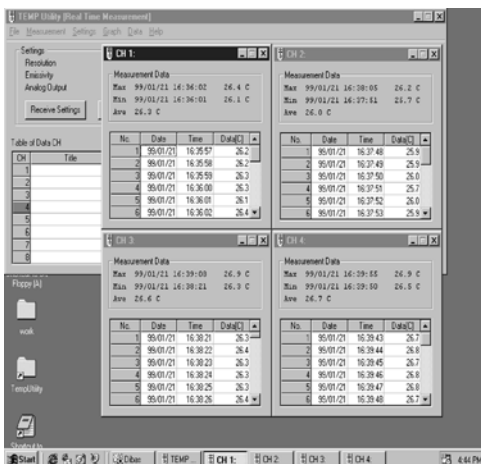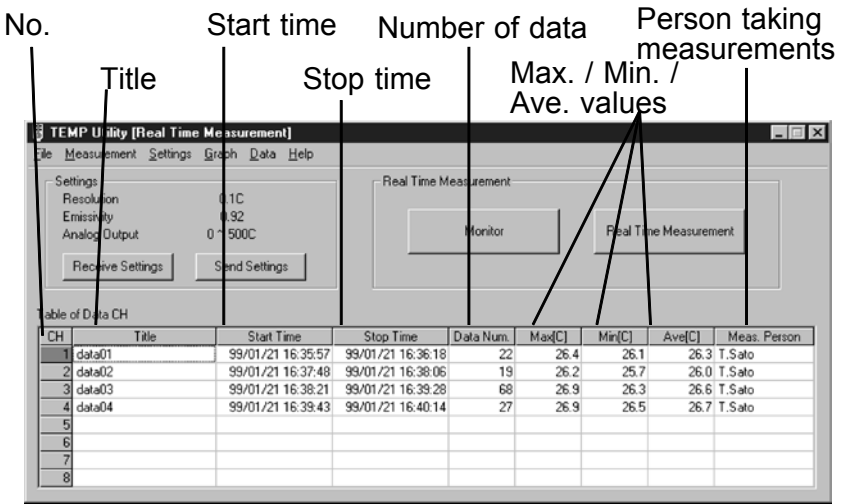
● Data table

The measured data of each CH by real-time measurement can be viewed when the data table is displayed. Selecting [Data table] - [CH 1] allows you to switch the data display ON/OFF. A maximum of 8 channels can be displayed at one time.
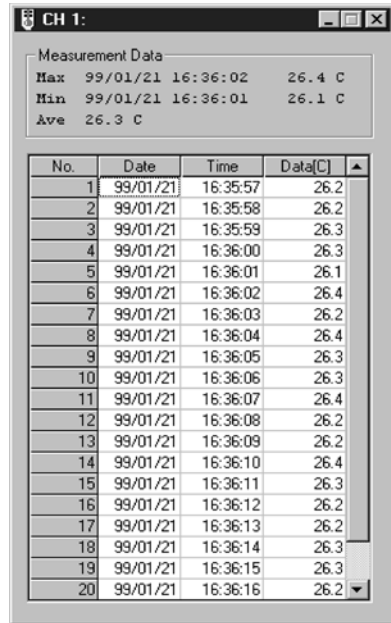
4.6.4 Saving or Reading of the File and Printing

● Saving the measured data in the file

① Select the CH to be saved.

Select [File] - [Save As] from the menu bar. Select the CH to be saved in the [Save File, Select CH] screen, and select the OK button.

```
Save file, select CH

            Save the selected CH.

                 CH 1   ▼

                   OK
```

NOTE · If you try to select a CH that contains no data, an error message is displayed.

② Store the measured data.

Enter the file name in the [Save As] screen or select the file and select the [Save] button. The data is saved.

To update the file after having changed the title or the measuring person with the data read from the file, select [File] - [Save] from the menu bar. The file is saved in CSV format (text file punctuated with commas). Saving of data with many numbers may take a long time.

● Reading from the file of the measured data

① Select [File] - [Open] from the menu bar. Select
   CH to be read on [Open File, Select CH] and
   select the [OK] button.

Open file, select CH

Load to the selected CH.

CH 1 ▼

OK
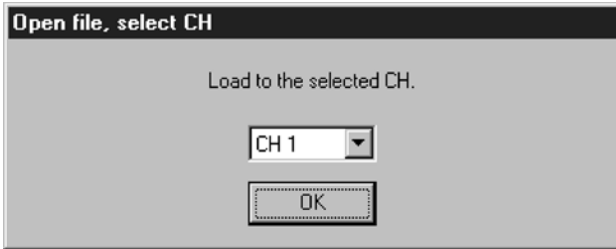
② Reading the measured data

Enter the file name in the [Open File] screen or
select the file and select the [Open] button. The data
is read.

If the number of data is large, it may take a long
time to load.

● Printing

① Select CH to be printed.

The measured data of each CH is printed.

Select [File] - [Page Setup]. Set selection of printer
and paper size.

Select [File] - [Print]. Select CH to be printed in the
[Print Date, Select CH] screen, and select the [OK]
button.

Print data, select CH

Print the selected CH.

CH 1 ▼

OK

② Print the measured data.

When the print screen is displayed, make the
required setting and start printing.

NOTE · It is not possible to print the data of all CH at one
time.

● Graph display

Select [Graph] - [Graph display]. The TEMP utility
- [Graph] screen is displayed.

For details, see section 4.6.6 Graph Display.

4.6.5 Main unit setup

Resolution, emissivity, and scaling of the analog
voltage output of the 3444(-01) main unit can be set
from the TEMP Utility.

● Main unit setup

Each set value to be transmitted to the infrared
thermometer is set.

Select [Settings] - [Settings].

Settings screen appears.

Resolution ——————
Emissivity ——————
Analog Output Scaling ——————
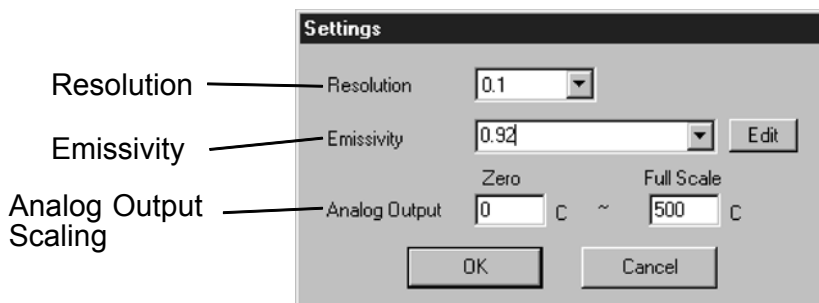
· Resolution

Select 0.1℃ or 1℃ (0.1ℓ or 1ℓ) for measurement
resolution.

· Emissivity

To set the emissivity, enter the numerical value directly or select from the list.

Setting range is 0.10 to 1.00 with a resolution of 0.01.

Selecting the Edit button allows you to edit the content of the list.

Editing the Emissivity list

A total of ten emissivity lists can be registered.
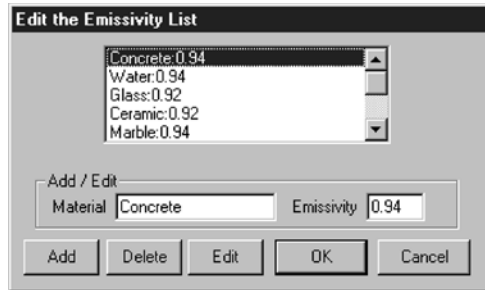
Adding:

Click on the portion to be added in the list.

Type in the content to be added in the input cell for material and/or emissivity, and select the [Add] button.

Deleting:

Click on the item to be deleted from the list.

When the [Delete] button is selected, the item is deleted.

Changing:

Click on the item to be changed in the list.

Type in the content to be added in the input cell for material and/or emissivity, and select the [Edit] button.

・ Analog output scaling

Set the temperature corresponding to zero output
and full-scale output of analog output.
Setting range is -50℃ to 500℃ (-67ℓ to 941ℓ)
with 1℃ (1ℓ) resolution.
However, the difference between the zero and full-
scale values should be set 10℃ (18ℓ) or more.

● Main unit setup transmission

Selecting the [Send Settings] button transmits the
set values to the main unit.

● Main unit setting reception

Selecting the [Receive Settings] button allows you
to read the main units present various set values.

4.6.6 **Graph display**

The data read from a maximum of 8 channels can be displayed in a graph simultaneously.

It is possible to change the scale of the time axis and the temperature axis, and free zooming.

It is also possible to perform readout of the values and statistical calculation between cursors.

Select [Graph] - [Graph] from the menu bar to display the TEMP Utility [Graph] screen.
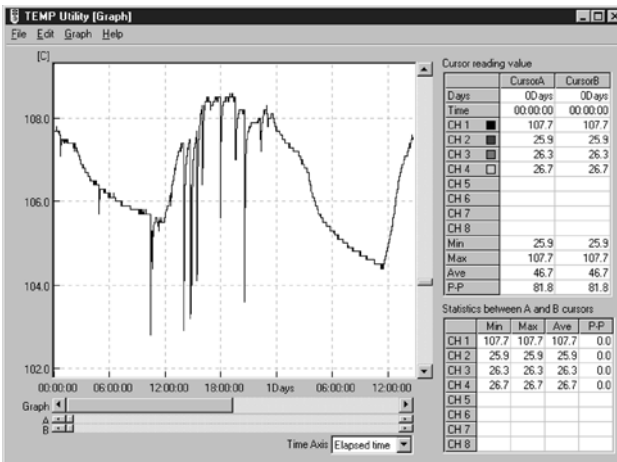
Before starting real-time measurement or during real-time measurement, select [Graph] - [Graph] from the menu bar, and execute real-time measurement. Measurement can be performed while plotting the present value on the graph.

But, as operation may become unstable, do not overlap other screens on the graph.

● Setting the time axis

Select [Graph] - [Time axis setting] from the menu bar.

When [Auto Ranging] is selected, the time axis is automatically set so that all measured data are contained in the display screen.

By selecting the [Display A-B Range], the sub-menu portion between cursors A and B is magnified and displayed.

When the time of [1Sec], [5Sec] ... is selected, one scale on the graph is used as the selected time.
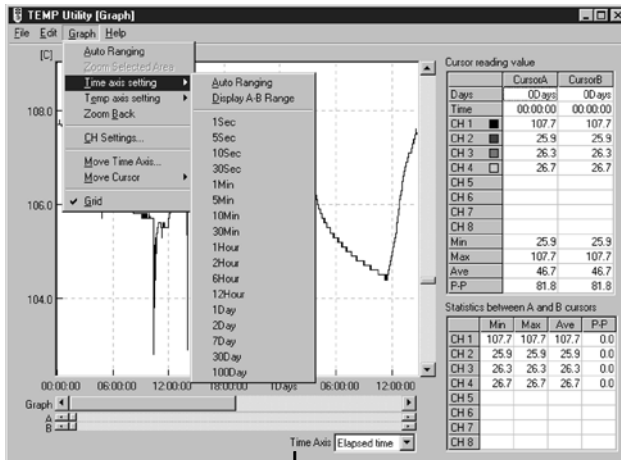
Time axis time display

When the time axis display time is set to [Passed Time], the time axis displayed shows the time passed from measurement start.

To show the measurement time of each channel, select the CH No.

● Temperature axis setting

Select
[Graph] -
[Temp
axis
setting]
from the
menu bar.
When
[Auto
Ranging]
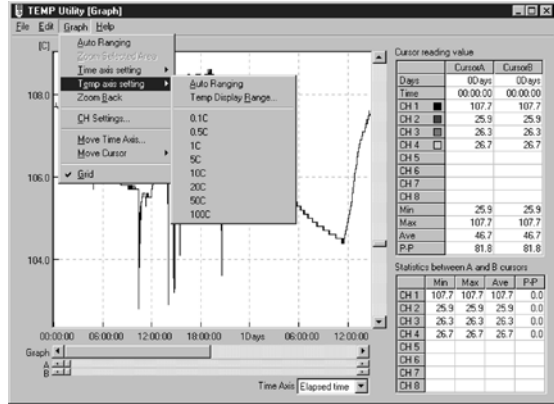
is selected, the temperature time axis is
automatically set so that all measured data are
contained in the display screen in the time axis
range displayed on the screen.

By selecting [Temp Display Range...], the display
range of time axis can be set.

When a temperature like [0.1℃], [0.5℃] ... ([0.1ℓ],
[0.5ℓ] ...) is selected, one scale on the graph is
used as the selected temperature.

● Zoom

Press the
right
button of
the mouse
while in
the graph
screen to
select the
zooming
rate from
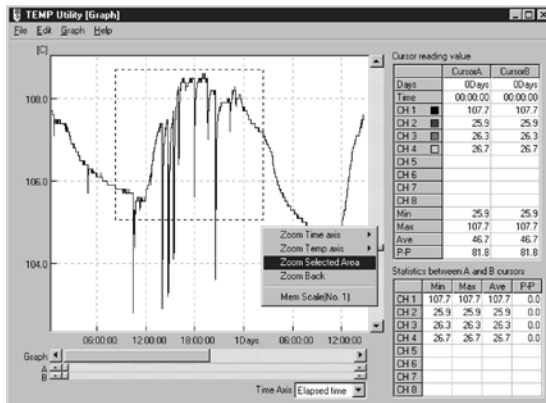
[Zoom Time Axis] and [Zoom Temp Axis].
By selecting [Mem Scale], the zooming rate of the
time axis and temperature and graph display
position can be memorized by No. (max. of 5)

● Arbitrary zooming range

While pressing the left mouse button, drag the
portion to be zoomed on the graph screen and select
the range.
When selected, press the right button of the mouse
at that spot and select [Zoom Selected Area]. To
return to the previous state, press the right button of
the mouse on the graph screen to select [Zoom
Back].
Selecting [Graph] - [Zoom Selected Area] or
[Graph] - [Zoom Back] performs the same
operation.

● Setting Waveform display position

For long-term
data collection,
the cursor
position from
the present
display position
in the specified

Move Time Axis

○ Specify End Time (Elapsed time)

◯ Days `1` Hour `0` Min `0` Sec

○ To CursorA

○ To CursorB

[OK]   [Cancel]

time can be displayed quickly.
Set the display position of the waveform in time
axis direction.
Selecting [Graph] - [Move Time Axis...] from the
menu bar displays the setup screen.
You can choose to set the time directly or by cursor
(A or B) position.
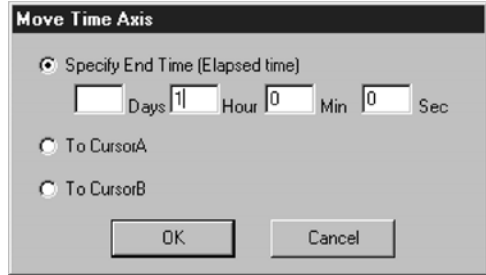
● Cursor

Two cursors (A and B) are used: the red cursor is
cursor A and the blue one is B. The cursors can be
moved only in the block that contains the data.
Information for the cursor is displayed in two tables
on the right side of the screen.
The upper table displays the cursor time, reading
value of each channel's measured value and
statistical calculation values between channels.
The lower table displays the statistical calculation
values for each channel between cursors A and B.
The cursor also has the functions listed below.
・Zooming the time axis of the graph between
cursors A and B
・Moving the waveform display position to the
cursor position

● Moving the cursor

To move the cursor, the following three ways are used:

・Operate the cursor scroll bar.

・Directly drag the cursor on the graph screen.

・Select [Graph] - [Move Cursor] from the menu bar to move the cursor to the specified time.
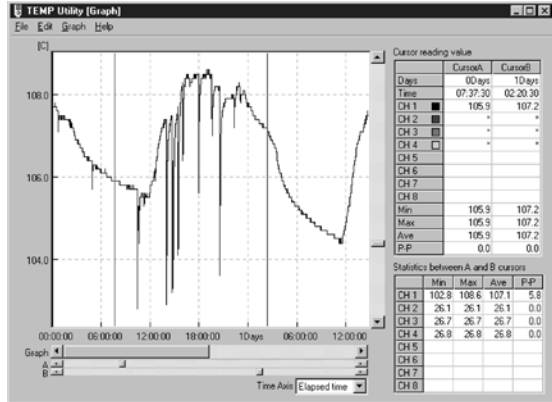
● CH settings

ON/OFF or the color of lines on the graph display of each channel can be specified.

Selecting [Graph] - [CH Settings] displays the CH Settings screen.

Color
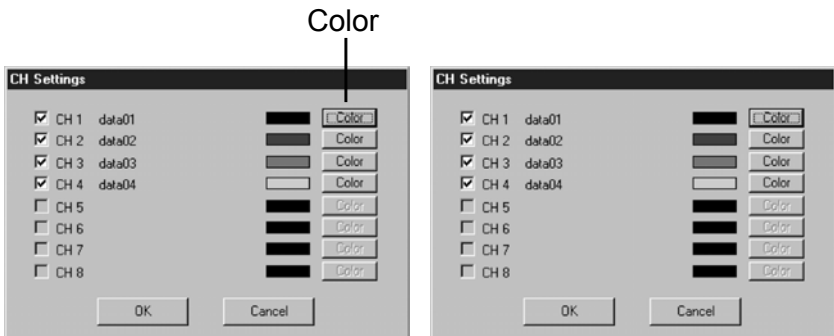
● Grid setting

Display of grid lines on the graph can be turned ON/OFF. Select [Graph] - [Grid] from the menu bar to turn ON/OFF.

● Graph copying

Copying the graph

By selecting [Edit] - [Copy] from the menu bar, the displayed graph is copied to the clipboard as bit map data.

The graph copied to the clipboard can be pasted to other applications, such as word processing software.

● Graph printing

Printing the graph

The displayed graph can be printed.

Select [File] - [Page Setup] from the menu bar to set selection of printer and paper size.

Select [File] - [Print] from the menu bar. Make necessary settings on the print screen displayed and start printing.

Chapter 5
Using the Printer
(for 3443(-01) only)

5.1 Connecting the Printer

The 3443(-01) (field type) is equipped with an RS-232C interface (with busy signal). It can be connected to a printer for which the following settings are possible:

・Baud rate: 2,400bps
・Data bit length: 8 bit, start, stop bit: each 1 bit
・No parity

When CR function can be set, set to "CR ignore" or "Return only".

(Field type outputs CR+LF for every line.)

To connect to the field type, use the cable specified in the table below.

Printer model (example)	Printer side connector type	Printer side connector signal	Cable specifications
9442 (HIOKI E.E. CORPORATION)	D-SUB 9-pin (female)	3: Data input (DATA) 5: Ground (GND) 8: Ready to Send (BUSY)	9444 D-SUB 9-pin (female) (male) Extension cable
DPU-201GS (Seiko Electronics)	D-SUB 9-pin (female)	3: Data input (DATA) 5: Ground (GND) 8: Ready to Send (BUSY)	D-SUB 9-pin (female) (male) Extension cable
BL-58RS (Sanei Electric Inc)	D-SUB 9-pin (male)	2: Data input (DATA) 5: Ground (GND) 7: Ready to Send (BUSY)	D-SUB 9-pin (female) (female) Cross cable

NOTE · Printers not equipped with an RS-232C interface cannot be used.

○ Connection

3443(-01)

Modular cable

Expansion box

Printer

RS-232C cable
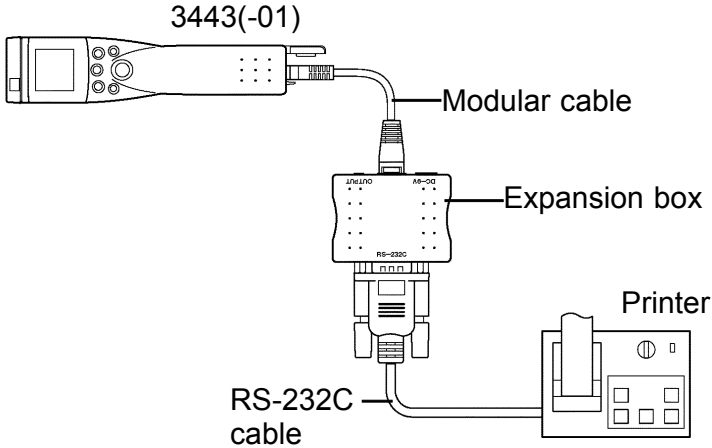
5.2 Printing Thermometer Memory Data

1. After checking that the printer is connected to the thermometer main unit as illustrated on the previous page, turn ON the printer and thermometer main unit.

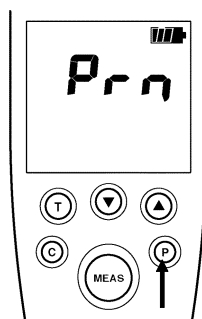Pressing the **MEAS** button momentarily will turn ON the main unit.

The power is turned OFF automatically when no operation is performed for 15 seconds (except when printing).
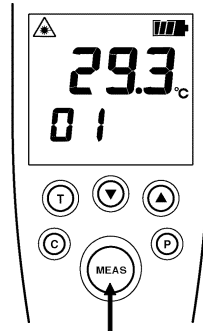
2. Pressing $\boxed{\text{P}}$ button one time starts printing of the data.

   "**Prn**" blinks on the thermometer display.

   a.Printing example

3. Memory data is sent to and printed on the printer. Since the data is stored in the memory of the main unit, all memory data will be printed.

```
PRINT 99/ 1/18 10:01:45
No. Date Time   Temp.
01  1/18 10:00   23.8 C
01  1/18 10:00   23.8 C
01  1/18 10:00   23.5 C
01  1/18 10:00   23.6 C
02  1/18 10:00   23.6 C
02  1/18 10:00   23.5 C
02  1/18 10:00   23.5 C
02  1/18 10:01   24.3 C
03  1/18 10:01   24.4 C
03  1/18 10:01   24.3 C
03  1/18 10:01   24.4 C
04  1/18 10:01   24.4 C
04  1/18 10:01   25.0 C
04  1/18 10:01   29.9 C
05  1/18 10:01   28.4 C
05  1/18 10:01   29.5 C
05  1/18 10:01   29.2 C
```

Chapter 6
Connecting to a
Recorder
(for 3444(-01) only)

The 3444(-01) type uses an expansion box, modular cable, and analog output cable. By connecting to the recorder, it can record changes in the measured values. Analog output is 0 to 1V. Further, by setting the analog output scale of the 3444(-01), the temperature output range to be recorded can be set.

○ Connection
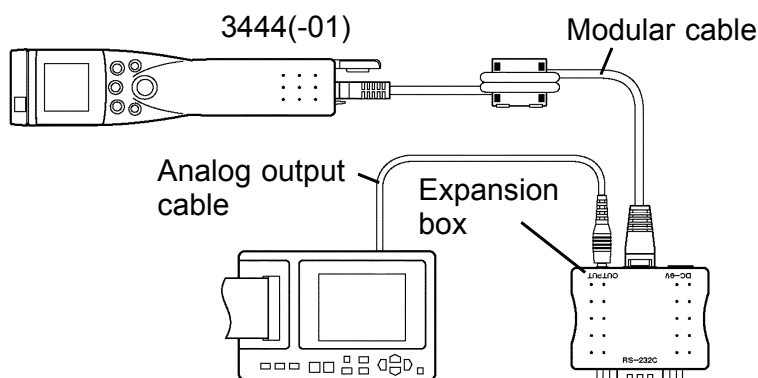
6.1 Setting Analog Voltage Output Scale

Set the analog voltage output zero (lower limit) and full-scale (upper limit) temperature.

If the ZERO set value is larger than or equal to the full-scale value, an error output (approx. 1.5V) will be output.

1. Displaying ZERO.

   Press the **M** button several times in the **HOLD** state to display **ZERO**. "**SET**" blinks.
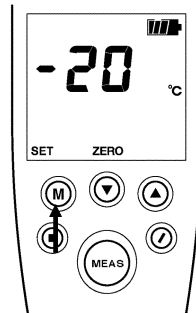
2. Changing **ZERO**.
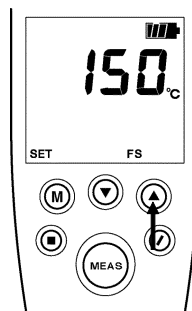
   Figures can be changed with the **▼** or **▲** buttons.
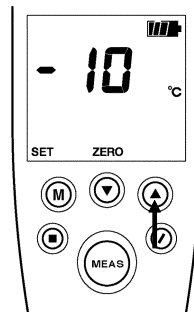
3. Displaying FULL-SCALE.

Press the **M** button one time in **ZERO** state and display full-scale value. "**SET**" blinks.
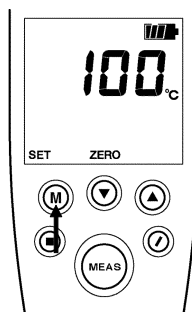
4. Changing FULL-SCALE value.

Figures can be changed with the **▼** or **▲** buttons.

5. End setup.

Pressing the **MEAS** button ends setup.
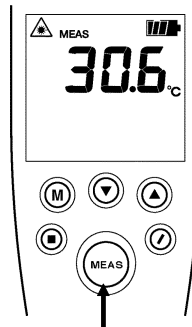
Chapter 7
Maintenance and
Service

⚠ CAUTION

· Gently wipe dirt from the surface of the unit with a
  soft cloth moistened with a small amount of water
  or mild detergent. Do not try to clean the unit using
  cleaners containing organic solvents such as
  benzine, alcohol, acetone, ether, ketones, thinners,
  or gasoline. They may cause discoloration or
  damage.

7.1 Troubleshooting

Problem	Causes	Solution
Data is not transmitted to personal computer.	· Battery of main unit is dead or not loaded.	· Load new battery.
	· Cable is connected incorrectly.	· Connect the connector firmly.
		· Check that the RS-232C cable connected to personal computer is cross connection.
	· COM port is incorrect.	· Change COM port setting to another port setting. · Set to COM1 or COM2 with [Settings] - [COMPort].
	· 3444(-01) memory data reading was selected.	· Memory data cannot be read as 3444(-01) has no data memory function.
Printer does not print.	· Printer is not turned ON.	· Turn ON the printer.
	· Cable is wrong.	· Use the correct cable.
	· Cable is not correctly connected.	· Connect firmly.

Analog output is not performed.	· 3443(-01) is connected.	· 3443(-01) is not equipped with voltage output.
	· Setting of ZERO and FULL-SCALE is wrong.	· Make correct setting.
	· Range of recorder has a different setting.	· Set the recorder range to 0 to 1V.

· **Service**

If the above shown solutions fail to solve the problem, it is possible that your unit is malfunctioning. Please contact your sales agent or the manufacturer to arrange for repair.

7.2 Questions and Answers about Measurement

Q: Why can't I measure the temperature on the other side of a glass pane?

A: Normal glass absorbs infrared radiation of the wavelength (8 to 16 μ m) which this device uses for temperature measurement. Therefore this device cannot measure the temperature of an object on the other side of a glass sheet, but instead measures the temperature of the glass sheet itself.

Q: Light is shining on an object. Why can't I measure its temperature accurately?

A: Since fluorescent light includes almost no infrared radiation, it has almost no effect upon normal temperature measurement. However sunlight and incandescent lights emit radiation which includes substantial amounts of the infrared radiation used by this device for temperature measurement, and accordingly may produce significant measurement discrepancies.

Q: Why can't I measure the temperature of a gas, vapor, or flame?

A: Since gases, vapors, and flames are transparent to infrared radiation, their temperatures cannot be measured in this way.

Q: Why can't I measure temperature through rain or fog?

A: Since rain and fog reflect and absorb infrared radiation, accurate measurement through them is impossible.

Q: Doesn't the measurement distance affect the resulting measured value for temperature?

A: Air hardly absorbs at all infrared radiation of the wavelengths (8 to 16 μ m) used by this device for temperature measurement. Therefore accurate temperature measurement is possible, irrespective of the measurement distance.

HIOKI

HIOKI E. E. CORPORATION

HEAD OFFICE

81 Koizumi, Ueda, Nagano 386-1192, Japan
TEL +81-268-28-0562 / FAX +81-268-28-0568
E-mail: os-com@hioki.co.jp

HIOKI USA CORPORATION

6 Corporate Drive, Cranbury, NJ 08512, USA
TEL +1-609-409-9109 / FAX +1-609-409-9108

3909A980-01 99-02-0002H
Printed on recycled paper