Handheld LPC Measurement Software

For Windows

Operating Manual

KANOMAX Japan

2000.10

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NOTICE

1. Kanomax Jpan Co., Ltd. reserves all rights of this software.
2. No part of this software or manual may be used or reproduced in any form without permission.
3. The user should purchase a set of software for each computer.
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5. The specifications of this software or the descriptions of the manual are subject to change without notice.
6. This software may sometimes malfunction if it is installed in some types of PCs (such as IBM ThinkPad notebook PCs).
7. Install this software, reset the computer, and start the program at that time.
8. This software is not suitable to long-term monitoring. Note that collected data will be lost if a power failure occurs or the PC system goes down during remote measurement.

DESCRIPTIONS IN THIS MANUAL

This manual uses the following descriptions.

Descriptions	Meanings
XX.XX	Indicates a numeric value such as 21.56. Each "X" represents a numeral (0 to 9).
Key entry: Integer between 1 and 800	Indicates inputting an integer between 1 and 800 from the keyboard.
Key entry: 0.001 to 9.999, integer multiple of 0.001	Indicates inputting an integer multiple of 0.001 in the range from 0.001 to 9.999 from the keyboard.
Selection: 1, 6, 10 and 20	Indicates selecting one of the following: 1, 6, 10 and 20.

1. INTRODUCTION

1.1 System Configuration

This application software for Windows is applicable to the Handheld LPC made by Kanomax Japan Co., Ltd. It is designed to collect particle, air velocity, temperature and humidity data.

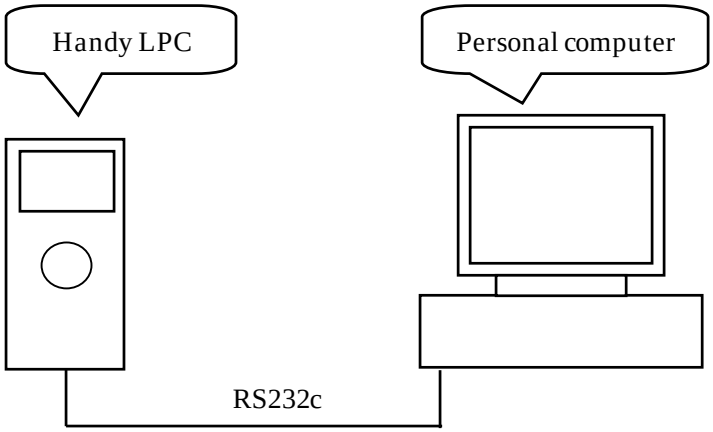


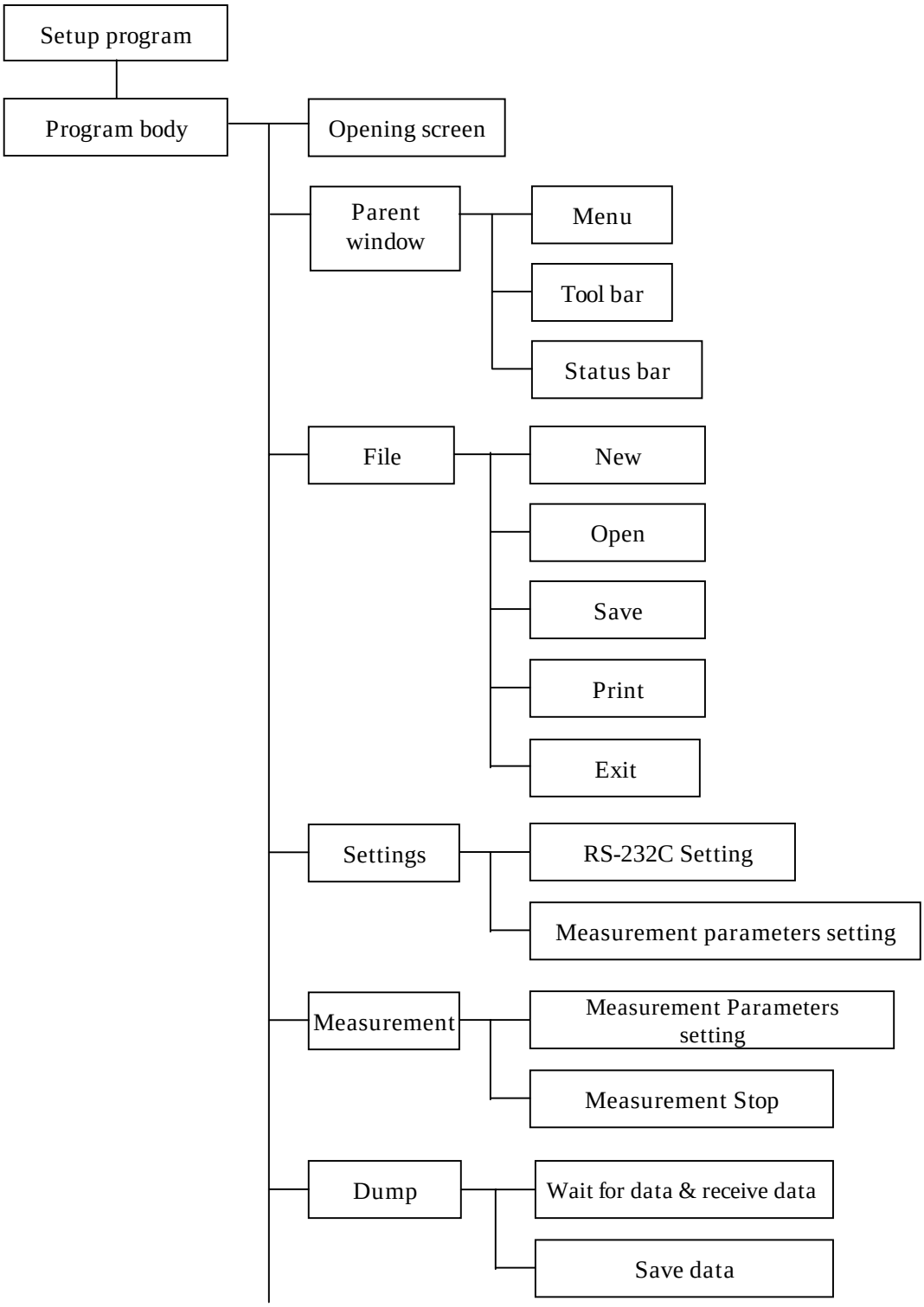
Fig. 1 System Configuration

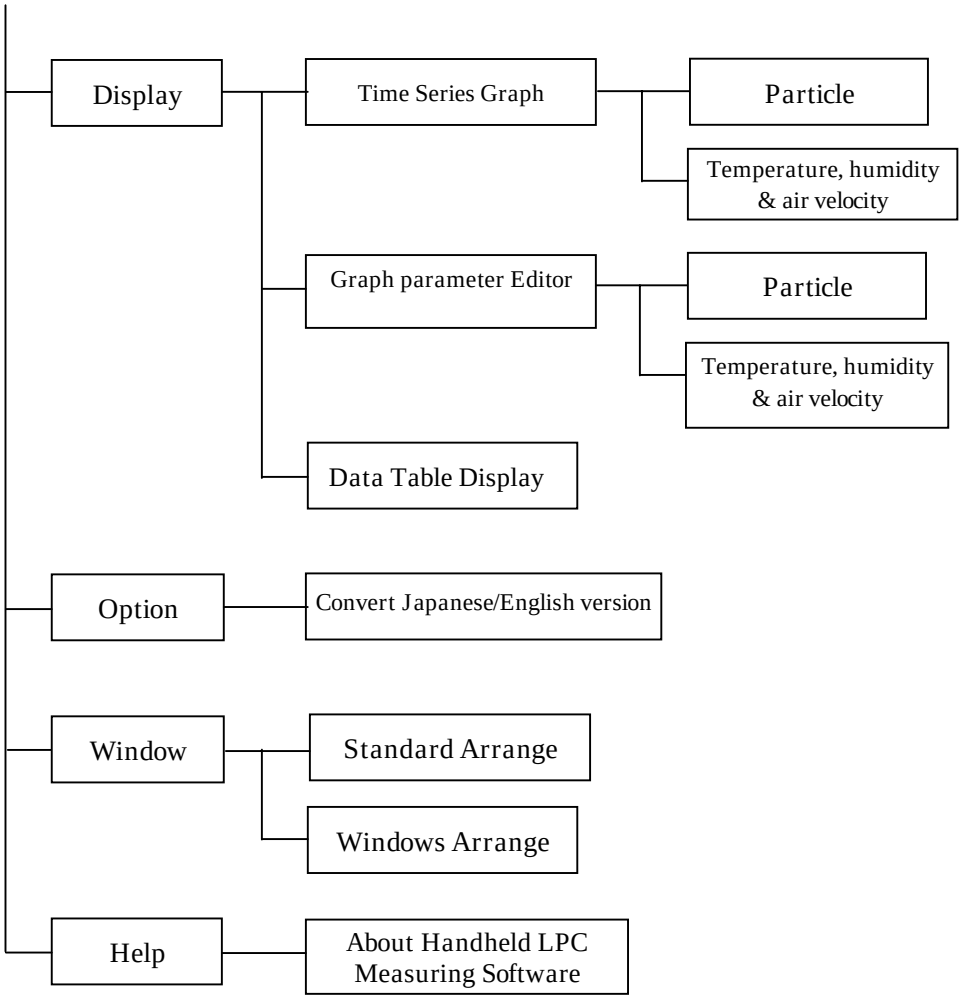
1.2 Operation Environments

This software runs in the following environments.

- Computer: Personal computer with a Pentium CPU or better and one or more COM ports.
- Operating system: Japanese or English-version Windows 95 or 98
- Memory size: 16MB or more
- Hard disk size: At least 5MB for software installation
- Display Display of 640 x 480 or higher resolution compatible with Windows 95 or 98
  (Recommended resolution: 800 x 600 or higher)
- Handheld LPC made by Kanomax Japan Co., Ltd.

1.3 Program Block Diagram




Display
Time Series Graph
Particle
Temperature, humidity & air velocity
Graph parameter Editor
Particle
Temperature, humidity & air velocity
Data Table Display
Option
Convert Japanese/English version
Window
Standard Arrange
Windows Arrange
Help
About Handheld LPC Measuring Software

2. FUNCTIONAL SPECIFICATIONS

<table>
<tr><td colspan="2">Items</td><td colspan="4">Descriptions</td></tr>
<tr><td colspan="2" rowspan="2">Measurement range</td><td>Particle</td><td>Air velocity</td><td>Temperature</td><td>Humidity</td></tr>
<tr><td>0 to 6.00E + 6 particles/cf
0 to 2.12E + 8 particles/m*
0 to 4.00E + 9 CNT</td><td>0 to 1.00 m/s
0 to 197FPM</td><td>0 to 50.0 ℃
32 to 122 F</td><td>3 to 98%</td></tr>
<tr><td colspan="2" rowspan="2">Communication type: RS-232C</td><td colspan="4">Communication ports: COM1, COM2, COM3 & COM4 selectable</td></tr>
<tr><td colspan="4">Baud rate: 9600, data length: 8 bits, parity: none, stop bit: 1</td></tr>
<tr><td colspan="2">Connectable LPC's</td><td colspan="4">One unit</td></tr>
<tr><td colspan="2">Multi-lingual function</td><td colspan="4">- Japanese and English
- Languages are selectable on the menu.
- Storing the language selection parameter in the registry.</td></tr>
<tr><td rowspan="3">Dump</td><td>Dump</td><td colspan="4">Dump setting is done on the LPC.
- PC side: Selects or cancels the program dump mode (through operation).
- Dump mode: State ready to receive data sent by the LPC</td></tr>
<tr><td>Display</td><td colspan="4">- Displays dumped data in the text box as is.
- Displays dumped data on the table.
- Re-displays data from a data file.</td></tr>
<tr><td>Saving</td><td colspan="4">Dumps data, and then saves it in a specified file. (You may leave data unsaved.
- In such a case, a confirmation message appears before proceeding to the next process.)
- All dumped LPC data and parameters are saved in a file.
- Data saving format: .TXT and .CSV formats are selectable.
(You may process data using Excel.)</td></tr>
<tr><td></td><td>Printout</td><td colspan="4">- Prints all dumped data from the data re-display table window.</td></tr>
<tr><td rowspan="3">Remote measure-ment</td><td>Reading meas. information</td><td colspan="4">- Sensor connection: Whether or not temperature and humidity sensors are connected or an air velocity sensor is connected
- Unit: In units of particles, temperature and air velocity
- Measurement, display and saving processes are controlled automatically in accordance with the above setting.</td></tr>
<tr><td>Setting meas. parameters</td><td colspan="4">- LPC address: Fixed to 0.
- Number of samplings (N): 1 to 3000 times
- Time interval (Ti): 1 to 1440 minutes (May be set to a maximum of 24 hours, 1440 minutes, in units of minutes.)
- Sampling time (Ts): 1 to 3600 seconds (Must not exceed the time interval. An error message shall be displayed if Ts exceeds Ti.)</td></tr>
<tr><td></td><td>Measurement</td><td colspan="4">Controls ON/OFF of the pump and reads data.</td></tr>
</table>

	Display	- Real-time data display and re-display of data from a remote measurement data file - Time series graph - Displays air velocity, temperature and humidity graphs in a frame. - Displays a maximum of five types of particle data in a frame when 0.3, 0.5, 1, 3 and 5 μm are selected. - Displays "air velocity, temperature and humidity" and "particle" graphs in different graph windows. - Graph style: Broken line graph - Linear or logarithmic vertical axis is selectable for the particle graphs. -Only linear vertical axis is available for the air velocity, temperature and humidity graphs. - Horizontal axis time width may be set in the ranges from 10 to 60 minutes, from 1 to 24 hours, or from 1 to 30 days. - Selectable vertical axis display range - Possible to scroll the graph and change the page using the scroll bars when re-displaying a graph. - Displays a time series data table. - Displays measurement parameters from the status bar.
	Saving	- Saves data and parameters in a specified file after completion of measurement. (You may leave data not to be saved. In such a case, a confirmatory message appears before proceeding to the next process.) - Data saving format: .TXT and .CSV formats are selectable. (You may process data using Excel.)
	Printout	- Outputs a graph displayed in an active window to the printer. - Outputs all time series data lists to the printer.

3. SETUP AND DELETION OF SOFTWARE

Software distribution files are provided to allow you to set up or delete the LPC software easily.

3.1 Setup

When you execute "Setup.exe," the setup program checks the environments of the PC where the software is to be installed and installs the necessary files automatically. The software is installed in the "C:¥Program File¥LPC" directory. You may change the directory by clicking the "Change Directory" button before starting installation.

(1) When you begin to install the software, the English screen appears first.

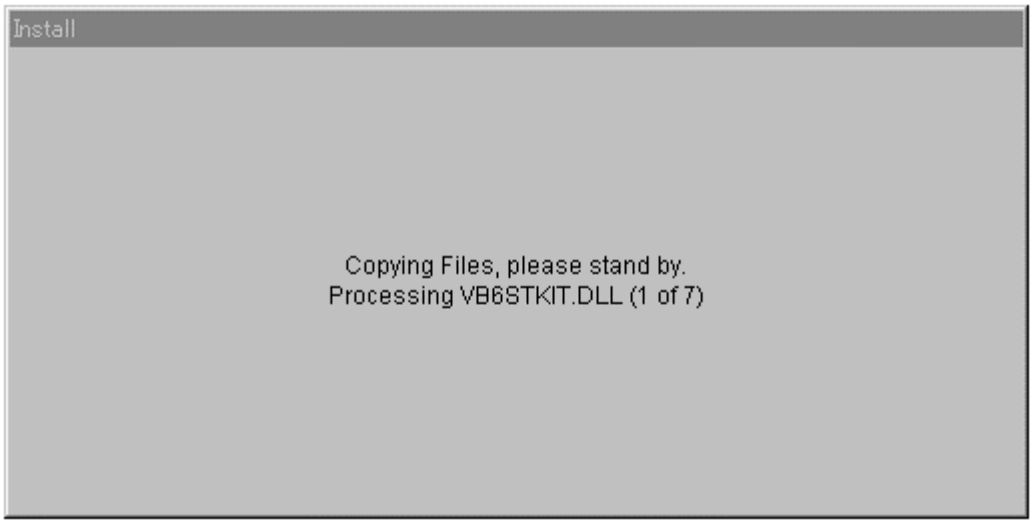
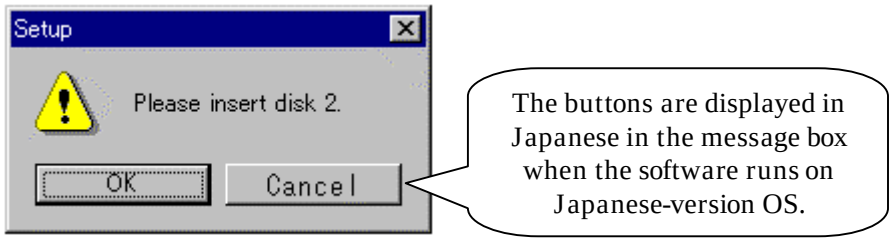


Fig. 2 Installation Opening Screen



(2) When all necessary files have been installed, the following menu appears. You may select setup in Japanese or English.

Fig. 3 Language Selection Menu

(3) When you select Japanese, the Japanese setup screen appears. When you select English, the English setup screen appears. You may execute setup on either screen. The selected language is registered in the registry. When the installed application (LPC.EXE) is executed, display is given in the selected language on the application screen.

3.2 Deletion

You may delete the Handy LPC software using "Add/Delete Application" on the control panel. The deletion screen is displayed in English.

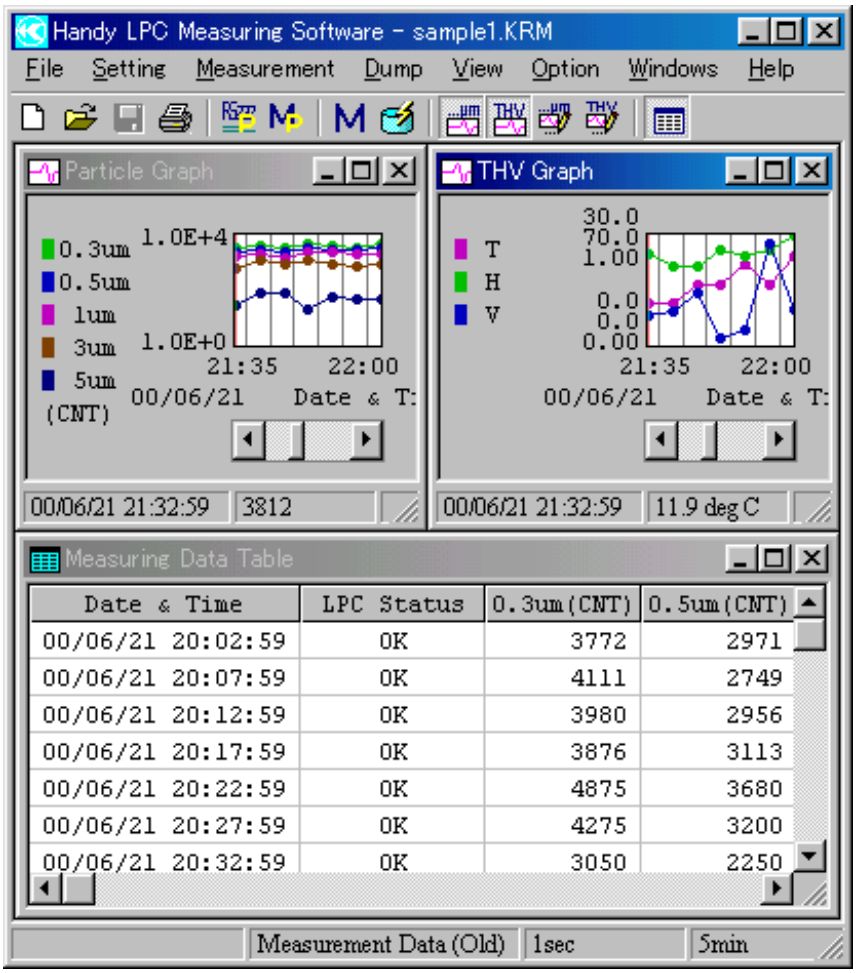
4. PROGRAM STARTUP AND OPERATION PROCEDURES

①Starting the program

Startup operation
(Execution file: LPC.EXE)

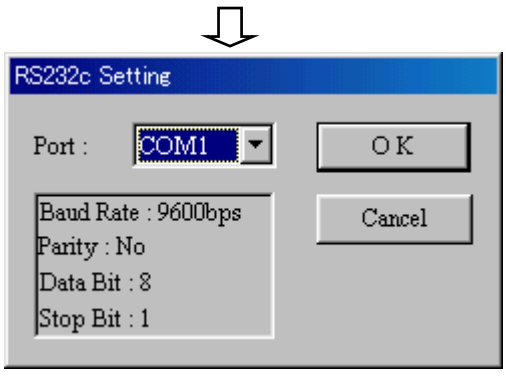
②Initial screen

A file having been opened before quitting the program previously is displayed.



③RS-232C Settings

Select a serial communication port.
(Selectable ports: COM1 to COM4)



④ Remote measurement

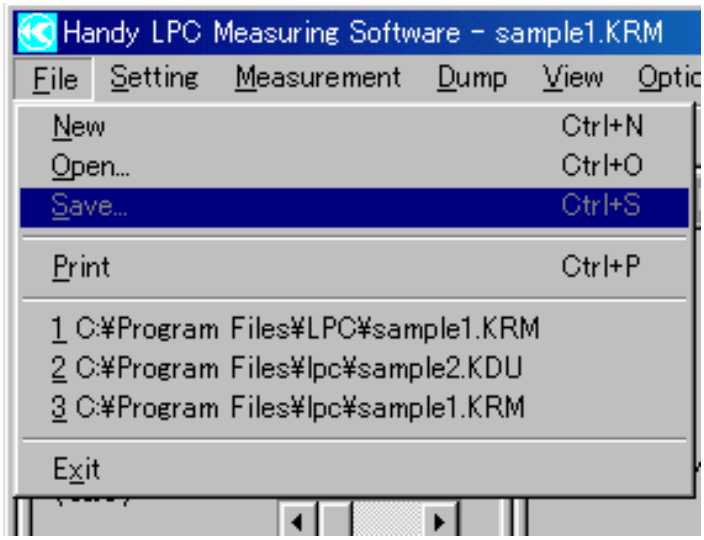
Remote measurement and dump
Select on the menu or click on the icon on the tool bar to execute measurement or dump.

⇩

⑤ Data saving

In dumping data, click on the Save button in the Dump dialog box.

In measurement, select "Save" on the "File" menu to save data as shown on the right.



⑥ Quitting program

Select "Exit" on the "File" menu to quit the program.

Fig. 4 Operation Procedures

5. SCREEN CONFIGURATION

Arrange the menus and tool bar in the parent window. The menus and tool bar in the parent window change according to the active child window.

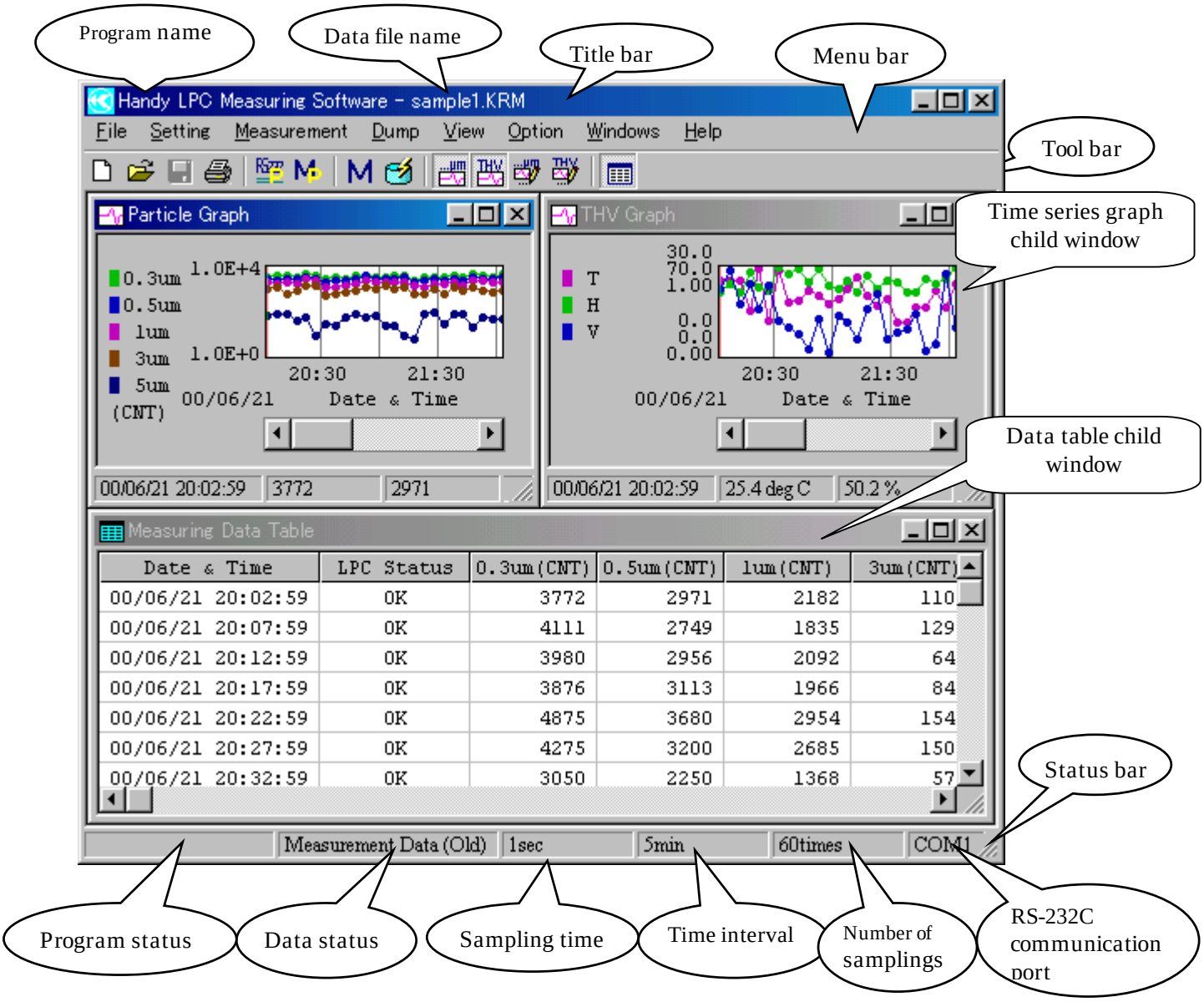


Fig. 5 Basic Screen Configuration

(1)Tool bar

The frequently used menu options are arranged as buttons on the tool bar. Clicking a button executes the corresponding menu option immediately.

(2)Status bar

The program status, data status and measurement parameters are displayed on the status bar.

6. DATA FILE

6.1 File Menu

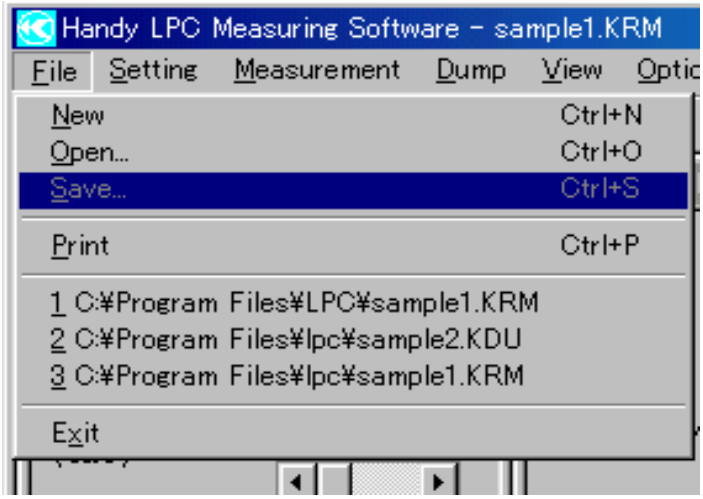


Fig. 6 File Menu

(1) New

Select "New," and the program executes the following processing.

1) If unsaved data exists in the memory, the "Save File Confirmation" dialog box appears. You may save the unsaved data in this dialog box.

2) The file name is "NEWFILE.KRM." Data is cleared and the parameters remain unchanged.

(2) Open

Select "Open," and the program executes the following processing.

1) If unsaved data exists in the memory, the "Save File Confirmation" dialog box appears. You may save the unsaved data in this dialog box.

2) The "Open" dialog box appears. Open an existing file in this dialog box.

(3) Save

Select "Save," and the "Name and Save File" dialog box appears. You may specify any file name and save data in that file.

(4) Print

Select "Print" to output a graph or data list in the active child window to the printer.

(5) 1 E:¥Win LPC¥…, 2 E:¥Win LPC¥…, etc.

Open a file used recently using the same procedures as described in (2) Open.

(6) Exit

Select "Exit," and the program executes the following processing.

1) If unsaved data exists in the memory, the "Save File Confirmation" dialog box appears. You may save the unsaved data in this dialog box.

2) The program quits.

6.2 Data File List

Measurement data file	- File name: ###.KRM - File type: Binary - Contents: File information, measurement parameters and remote measurement data * This file format is exclusive for the internal processing of this program and is not disclosed. This program accesses the data file and re-displays remote measurement data.
Dump data file	- File name: ###.KDU - File type: Binary - Contents: File information, measurement parameters and dumped data * This file format is exclusive for the internal processing of this program and is not disclosed. This program accesses the dump data file and re-displays dumped data.
Data file * In the CSV format compatible with Excel or the text format	- File name: ###.CSV or ###.TXT - File type: Microsoft Excel character file with comma delimiters - Contents Remote measurement: Measurement parameters & measured data Dump: Dumped data *A .CSV or .TXT file is created according to your selection together with a measurement data file (or dump data file). * For details, see Appendices 1 and 2.
Registration in registry	The following are saved in "HKEY_CURRENT USER¥Software¥VB and VBA Program Settings¥Handy LPC Measuring Software" in the registry: Default remote measurement parameters, RS-232C communication port, language selection parameter, recently used data file list, and size and position of the parent window

7. SETTINGS

7.1 Setting RS-232C Communication Port

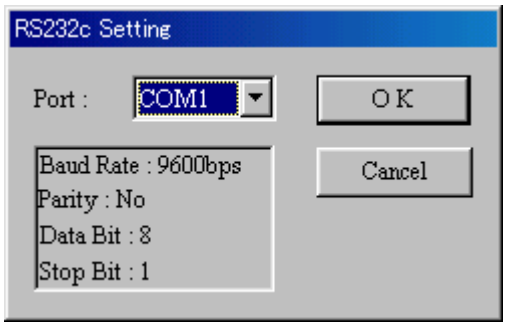


Fig. 7 RS-232C Settings Dialog Box

Select an RS-232C communication port from among COM1, COM2, COM3 and COM4 from the combo box. Other RS-232C port parameters are fixed as shown below.

RS-232C address of Handy LPC: 0

Baud rate: 9600, data length: 8 bits, parity: none, stop bit: 1

7.2 Setting Measurement Parameters

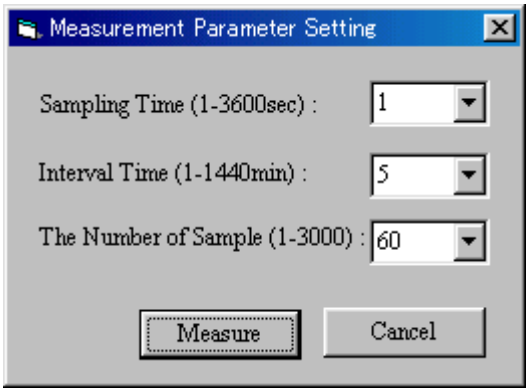


Fig. 8 Measurement Parameter Settings Dialog Box

Set the remote measurement parameters as shown below in the measurement parameter settings dialog box shown in Fig. 8.

Items	Set values
Sampling time	Set the sampling time in units of seconds. Key entry: Integer between 1 and 3600 Selection: 1, 5, 10, 30, 60, 300, 600 and 1200
Time interval	Set the time interval in units of minutes. Key entry: Integer between 1 and 1440 Selection: 1, 5, 10, 20, 30, 60, 120 and 180
Number of samplings	Key entry: Integer between 1 and 30000 Selection: 1, 10, 60, 120, 300, 600, 1200 and 3000

8. REMOTE MEASUREMENT

Carry out remote measurement in the Handy LPC remote mode as shown below.

8.1 Starting and Stopping Measurement

(1) Starting measurement

Execute "Measurement" on the "Measurement" menu, and the "Measurement Parameter Settings Dialog Box 2" appears.
The "Measurement Parameter Settings Dialog Box 2" has quite the same details including the parameter buffer as the "Measurement Parameter Settings Dialog Box" (shown in Fig. 8), with the only exception of the following:
The Measure (Start Measurement) button is provided, instead of the OK button.

Click the Measure (Start Measurement) button to start measurement.

(2) Stopping measurement

Execute "Measurement Stop" on the "Measurement" menu during measurement, and a dialog box for confirming stoppage of measurement appears. Use this dialog box to stop measurement. If measurement is stopped halfway, data collected before stopping measurement may be saved. The number of read data is the number of data read actually.

8.2 Measurement

(1) Measurement control
During measurement, the program controls the measurement timing and ON/OFF of the Handy LPC pump as well as reads measured data.

(2) Data display
During measurement, the program provides real-time display of a time series graph of data and numeric values. For details, see Fig. 5 "Basic Screen Configuration" and section 10 "DISPLAYING REMOTE MEASUREMENT DATA."

8.3 Storing Measured Data

After completion of measurement, select "Save" on the "File" menu to save measured data in any selected file. You may select either file format: .TXT (text file), or .CSV (Microsoft Excel character file with comma delimiters).
For example, when you specify a data file name "Test" and select the ".TXT" format, data is saved in the Test.KRM and Test.TXT files. When you select the ".CSV" format, data is saved in the Test.KRM and Test.CSV files.

* For details of the data file formats, see Appendix 1 "Sample of Remote Measurement Data File.

9. DUMP

Use the Handy LPC Dump mode to dump data.

Execute "Dump" on the "Dump" menu. The program enters the dump mode and the "Dump Dialog Box" (shown in Fig. 9) appears.

In the dump mode, the PC is ready to receive data sent by the Handy LPC. Carry out the dump-related settings on the LPC and press the START button. The Handy LPC dumps specified data to the PC.

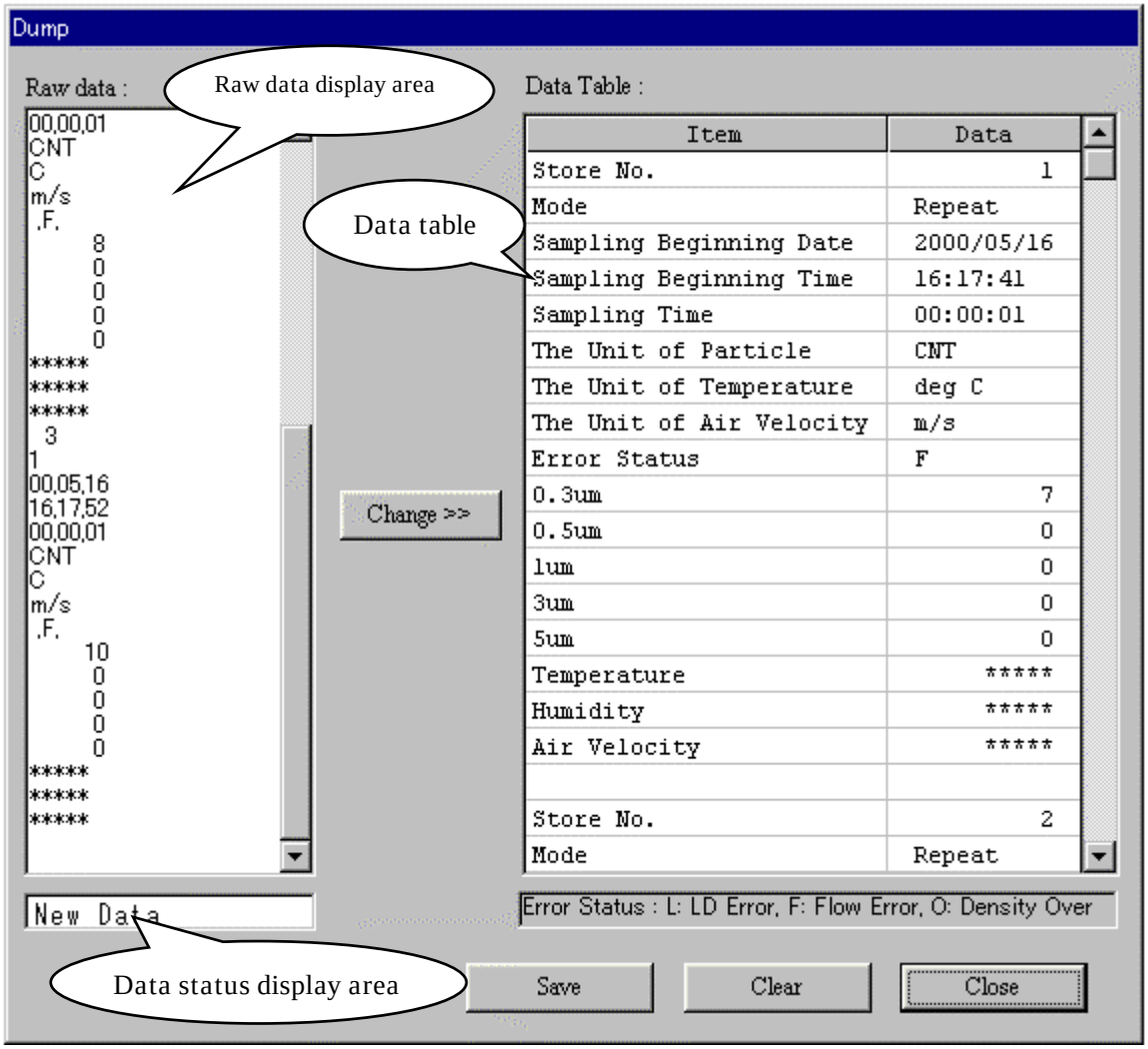


Fig.9 Dump Dialog Box

(1) Displaying read data

Read raw data is displayed in the "Raw Data Display Area" on the left of the "Dump Dialog Box" and the data storage status is displayed in the "Data Status Display Area" in the lower part. Clicking the 変換 >> (Convert) or Save button converts unprocessed data. Processed data is displayed in the data table.

(2) Saving data

When you click the Save button, the "Name and Save File" dialog box appears and you may save data in a file with an optional file name. You may select either file format: .TXT (text file), or .CSV (Microsoft Excel character file with comma delimiters).For example, when you specify a data file name "Test" and select the ".TXT" format, data is saved in the Test.KDU and Test.TXT files. When you select the ".CSV" format, data is saved in the Test.KDU and Test.CSV files.

* For details of the data file formats, see Appendix 2 "Sample of Dump Data File."

(3) Clearing data
Clicking the Clear button clears dumped data.

Unless you clear previously dumped data before dumping the next data, newly dumped data is added to the previous data.

(4) Exiting the dump mode
When you click the Close button, the program executes the following processing:
1) The program displays the "Save File Confirmation" dialog box if dumped data hasn't been saved. You may save the dumped data.
2) The program closes the "Dump" dialog box and exits the dump mode.

10. DISPLAYING REMOTE MEASUREMENT DATA

10.1 Data Display Format

	Unit	Display format	Example
Particle	CNT、/cf、/m3	＜１００００ ： XXXX ≧１００００ ： X. XXXE+X	２５６８ １．２５６E+５
Temperature	deg C、deg F	XXX. X	２６．５
Humidity	%	XXX. X	７５．３
Air velocity	m/s	X. XXX	０．６５２
	FPM	XXX. X	１２５．３

10.2 Particle Time Series Graph

(1) Time series graph display window

Two types of particle time series graphs are available as shown in Figs. 10 and 11. One graph has a linear vertical axis, and the other has a logarithmic vertical axis.

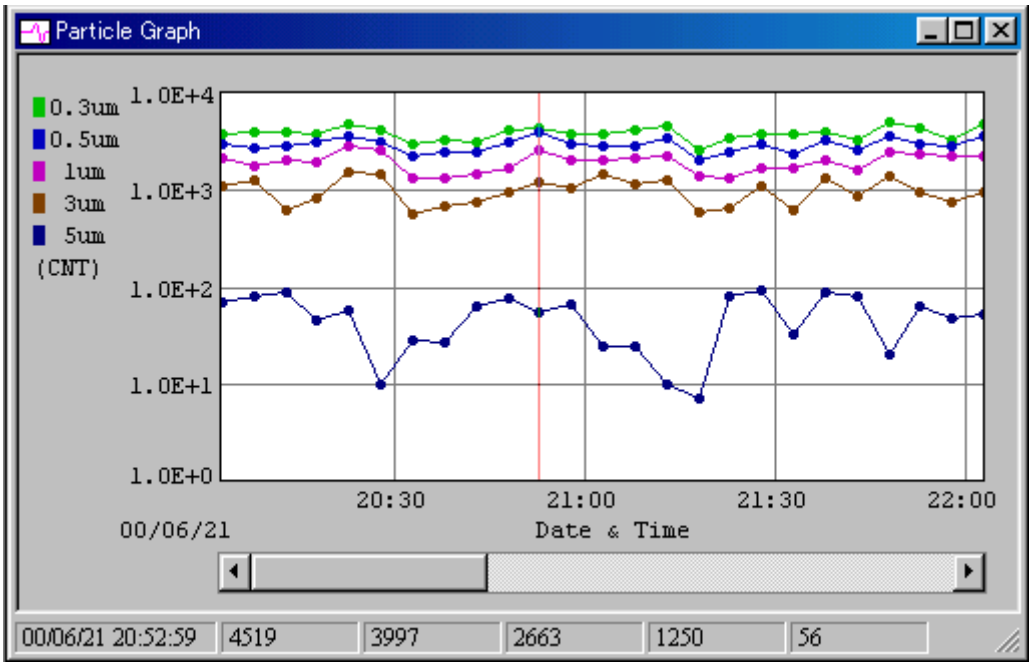


Fig. 10 Particle Time Series Graph (Linear) Display Window

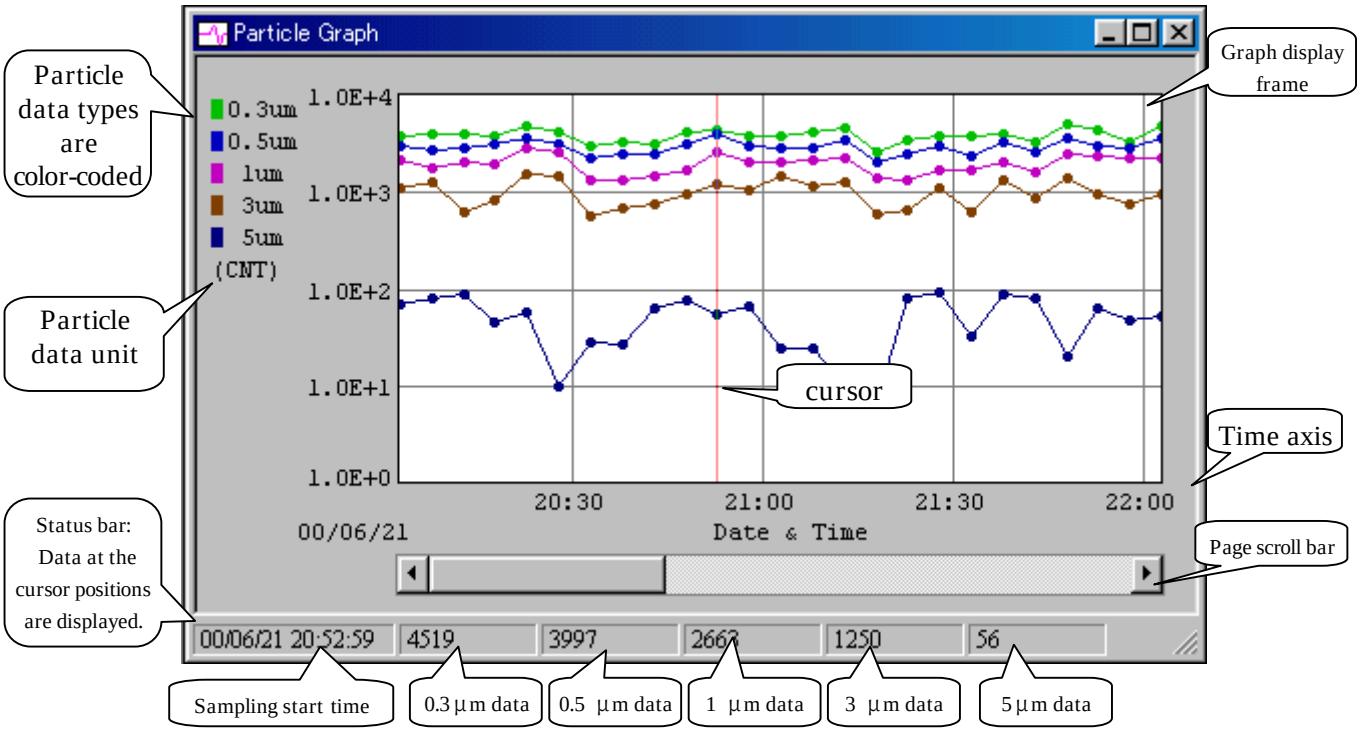


Fig. 11 Particle Time Series Graph (Logarithmic) Display Window

You may scroll the graph, move the cursors and display data at the cursor positions in the window shown above. The graph cursors disappear and the scroll bar is not functional during measurement.

(2) Setting the time series graph display parameters

Set the time series graph display parameters in the following dialog box.

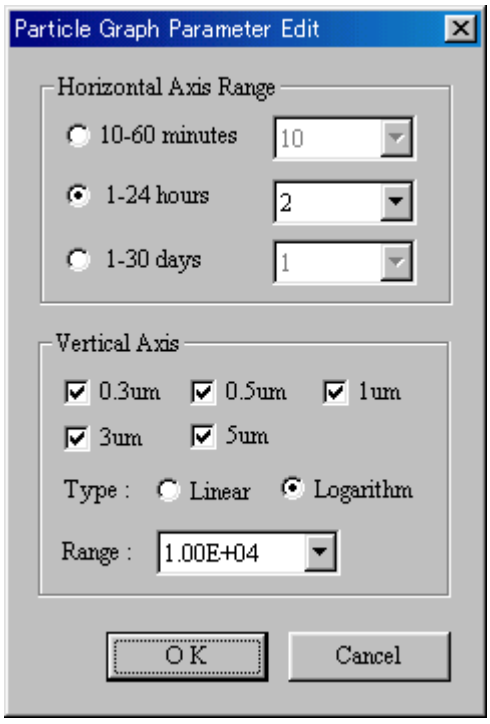


Fig. 12 Particle Time Series Graph Display Parameter Settings Dialog Box Set items

Set items：

Set items	Settings
Horizontal (time) axis range	The following ranges are selectable: 10, 20, 30, 40, 50 and 60 minutes 1 to 24 hours in units of hours 1 to 30 days in units of days
Vertical axis display item	A maximum of five types of particle data may be displayed in a frame when 0.3, 0.5, 1, 3 and 5 μm are selected.
Vertical axis type	Linear or logarithmic axis is selectable.
Vertical axis range	The following ranges are selectable: Linear: 10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 1.00E + 0.4, 1.00E + 0.4, 1.00E + 05, 1.00E + 06, 1.00E + 07, 1.00E + 08, & 1.00E + 09 Logarithmic: 10, 100, 1000, 1.00E + 04, 1.00E + 04, 1.00E + 05, 1.00E + 06, 1.00E + 07, 1.00E + 08, & 1.00E + 09

10.3 Temperature, Humidity and Air Velocity Time Series Graph

(1) Time series graph display window

The vertical axis of the temperature, humidity and air velocity time series graph is fixed to the linear axis.

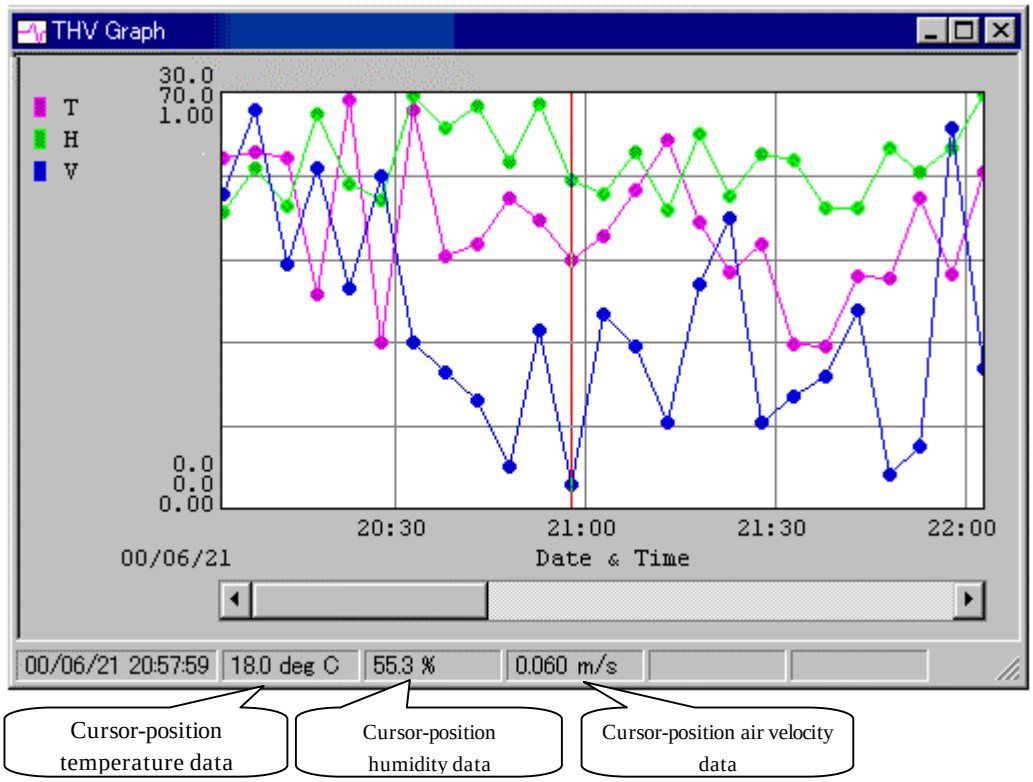


Fig. 13 Temperature, Humidity and Air Velocity Time Series Graph Display Window

You may scroll the graph, move the cursor and display data at the cursor position in the window shown above.

(2) Setting the time series graph display parameters

Set the time series graph display parameters in the following dialog box.

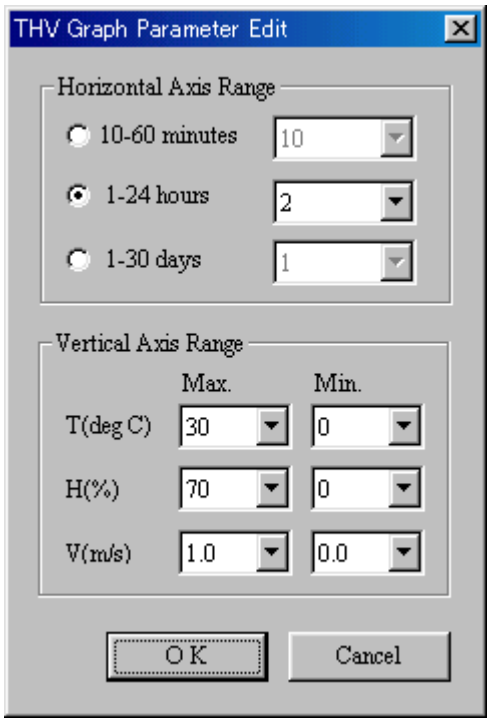


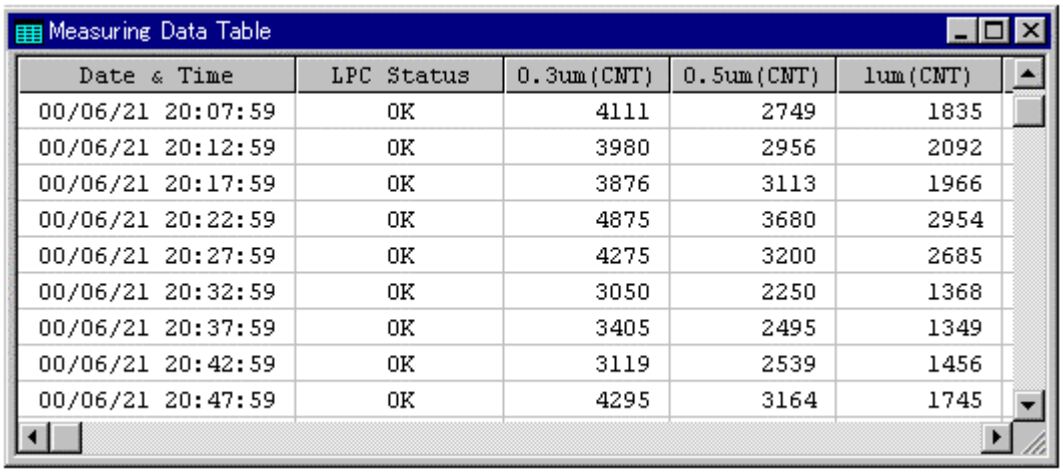
Fig. 14 Temperature, Humidity and Air Velocity Time Series Graph Display Parameter Settings Dialog Box

Set items：

Set items			Settings
Horizontal (time) axis range			The following ranges are selectable: 10, 20, 30, 40, 50 and 60 minutes 1 to 24 hours in units of hours 1 to 30 days in units of days
Vertical axis display range	Temperature (deg. C)	Max.	Selection： 5、10、15、20、25、30、35、40、45、50
		Min.	Selection： 0、 5、10、15、20、25、30、35、40、45
	Temperature (deg F)	Max.	Selection：40、50、60、70、80、90、100、110、120、130
		Min.	Selection：30、40、50、60、70、80、 90、100、110、120
	Humidity (%)	Max.	Selection：10、20、30、40、50、60、70、80、90、100
		Min.	Selection： 0、10、20、30、40、50、60、70、80、 90
	Air velocity (m/s)	Max.	Selection：0.1、0.2、0.3、0.4、0.5、0.6、0.7、0.8、0.9、1.0
		Min.	Selection：0.0、0.1、0.2、0.3、0.4、0.5、0.6、0.7、0.8、0.9
	Air velocity (FPM)	Max.	Selection：20、40、60、80、100、120、140、160、180、200
		Min.	Selection： 0、20、40、60、80、100、120、140、160、180

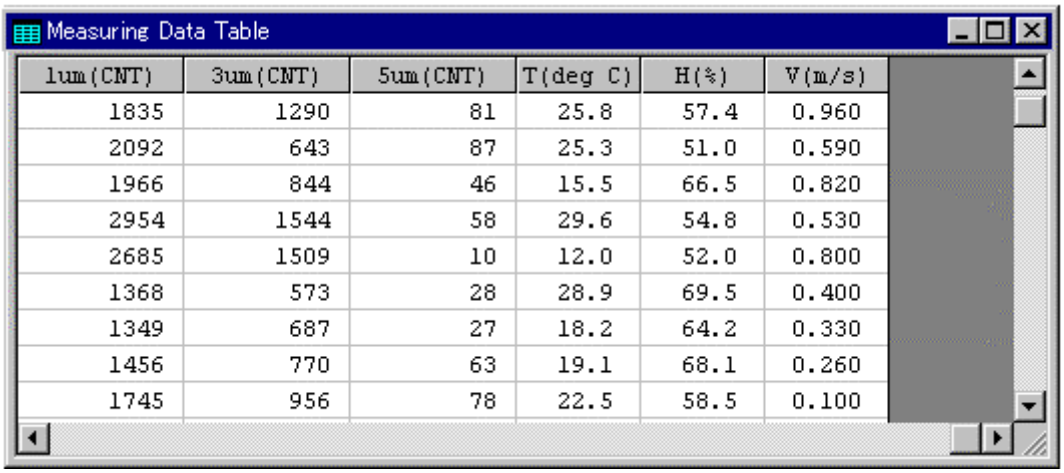
10.4 Data Table

Time series data values are displayed in the data table display window. The window size is adjustable.



Date & Time	LPC Status	0.3um(CNT)	0.5um(CNT)	1um(CNT)
00/06/21 20:07:59	OK	4111	2749	1835
00/06/21 20:12:59	OK	3980	2956	2092
00/06/21 20:17:59	OK	3876	3113	1966
00/06/21 20:22:59	OK	4875	3680	2954
00/06/21 20:27:59	OK	4275	3200	2685
00/06/21 20:32:59	OK	3050	2250	1368
00/06/21 20:37:59	OK	3405	2495	1349
00/06/21 20:42:59	OK	3119	2539	1456
00/06/21 20:47:59	OK	4295	3164	1745

Fig. 15 Data Table Display Window



1um(CNT)	3um(CNT)	5um(CNT)	T(deg C)	H(%)	V(m/s)
1835	1290	81	25.8	57.4	0.960
2092	643	87	25.3	51.0	0.590
1966	844	46	15.5	66.5	0.820
2954	1544	58	29.6	54.8	0.530
2685	1509	10	12.0	52.0	0.800
1368	573	28	28.9	69.5	0.400
1349	687	27	18.2	64.2	0.330
1456	770	63	19.1	68.1	0.260
1745	956	78	22.5	58.5	0.100

Fig. 16 Data Table Display Window (Scrolled to Right of Table)

11. DISPLAYING DUMP DATA

The dump data display format is the same as the dump data format of the Handy LPC.
Dump data is displayed on a table only. The dump data table display window is as shown below. The vertical size of the window is adjustable. The horizontal size is fixed.

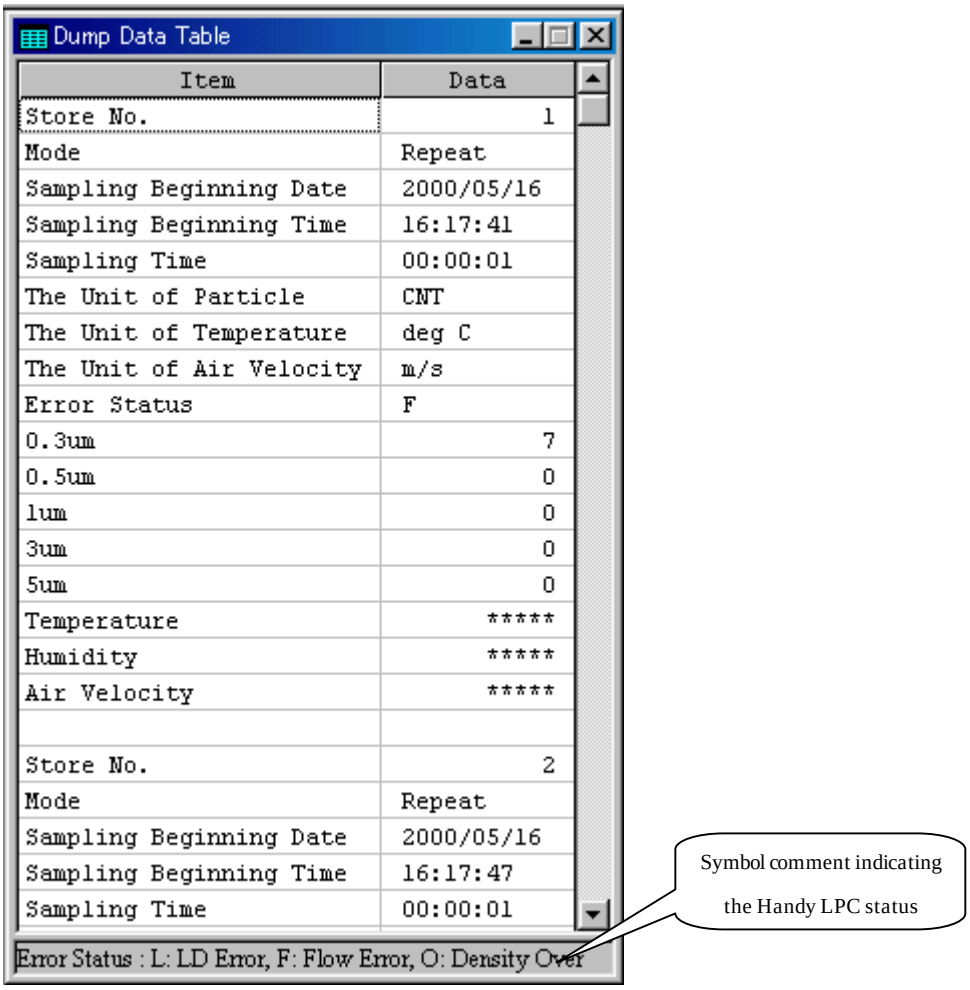


Fig. 17 Dump Data Table Display Window

12. OTHER FUNCTIONS

12.1 Converting Japanese-Version and English-Version Software

You may select the Japanese-version or English-version software on the "Option" menu.

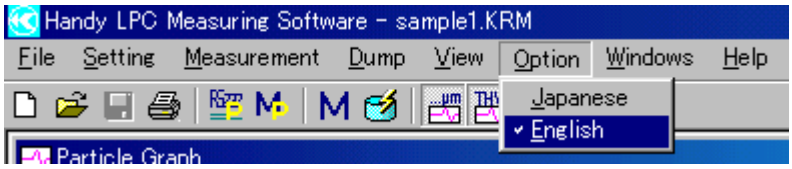


Fig. 18 Converting Japanese-Version and English-Version Software

12.2 Aligning Windows

Execute "Align Windows" on the "Window" menu to arrange the time series graph window and data table window as displayed on the Basic screen (shown in Fig. 5).

If a check mark is put on "Standard Layout," the child windows are automatically re-arranged when the parent windows are re-sized.

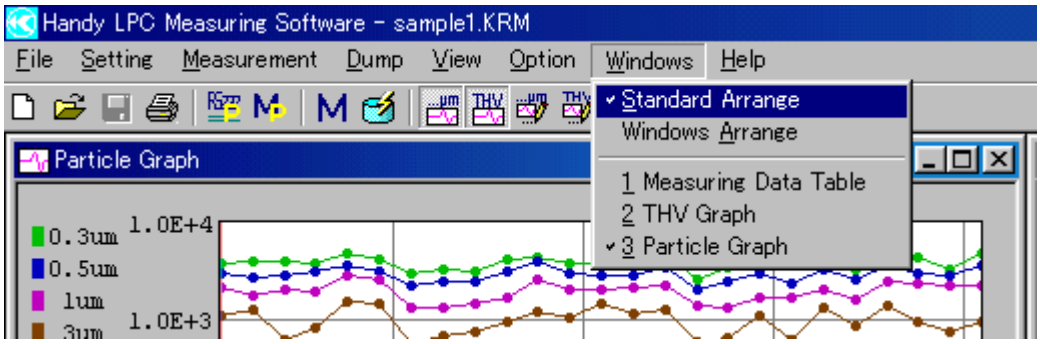


Fig. 19 Windows Alignment

12.3 Displaying Version Information

Executing "Version Information" on the "Help" menu displays the software version information display dialog box (shown in Fig. 20).

Fig. 20 Software Version Information Display Dialog Box

12.4 Printing Function

This program is capable of outputting time series graphs and time series data lists to the printer.

See Appendix 3 "Printout Samples of Time Series Graph and Time Series Data List."

(1) Printing time series graphs

Display a graph to be printed in the time series graph window. Execute "Print" on the "File" menu when the time series graph window is active, and the graph is output to the printer.

(2) Printing time series data lists

Activate the data table and execute "Print" on the "File" menu. All data are output to the printer.

Appendix 1: Sample of Remote Measurement Data File

[Remote Measurement Data]									
Sampling Time	1								
Interval Time	22								
The Number of Sample	8								
Date & Time	LPC Status	0.3um(CNT)	0.5um(CNT)	1um(CNT)	3um(CNT)	5um(CNT)	T(deg C)	H(%)	V(m/s)
2000/6/24 9:01	OK	3876	3113	1966	844	46	15.5	66.5	0.82
2000/6/24 9:23	OK	4875	3680	2954	1544	58	29.6	54.8	0.53
2000/6/24 9:45	OK	4275	3200	2685	1509	10	12	52	0.8
2000/6/24 10:07	OK	3050	2250	1368	573	28	28.9	69.5	0.4
2000/6/24 10:29	OK	3405	2495	1349	687	27	18.2	64.2	0.33
2000/6/24 10:51	OK	3119	2539	1456	770	63	19.1	68.1	0.26
2000/6/24 11:13	OK	4295	3164	1745	956	78	22.5	58.5	0.1
2000/6/24 11:35	OK	4519	3997	2663	1250	56	20.8	68.3	0.43

Appendix 2: Sample of Dump Data File

[Dump Data]																
1	Repeat	2000/5/16	16:17:41	00:00:01	CNT	deg C	m/s	F	7	0	0	0	0	*****	*****	*****
2	Repeat	2000/5/16	16:17:47	00:00:01	CNT	deg C	m/s	F	8	0	0	0	0	*****	*****	*****
3	Repeat	2000/5/16	16:17:52	00:00:01	CNT	deg C	m/s	F	10	0	0	0	0	*****	*****	*****
4	Repeat	2000/5/16	16:17:57	00:00:01	CNT	deg C	m/s	F	6	0	0	0	0	*****	*****	*****
5	Repeat	2000/5/16	16:18:02	00:00:01	CNT	deg C	m/s	F	12	0	0	0	0	*****	*****	*****
6	Repeat	2000/5/16	16:21:56	00:00:01	CNT	deg C	m/s	F	9	0	0	0	0	*****	*****	*****
7	Repeat	2000/5/16	16:22:02	00:00:01	CNT	deg C	m/s	F	5	0	0	0	0	*****	*****	*****
8	Repeat	2000/5/16	16:22:07	00:00:01	CNT	deg C	m/s	F	7	0	0	0	0	*****	*****	*****
9	Repeat	2000/5/16	16:22:12	00:00:01	CNT	deg C	m/s	F	4	0	0	0	0	*****	*****	*****
10	Repeat	2000/5/16	16:22:17	00:00:01	CNT	deg C	m/s	F	8	0	0	0	0	*****	*****	*****

Appendix 3: Printout Samples of Time Series Graph and Time Series Data List

The printout samples are shown on the following pages.