MODEL 23 AND 23-1
ELECTRONIC PERSONAL DOSIMETER
SOFTWARE MANUAL

April 2024

Version 1.06

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Table of Contents

Section	1.0 Introduction
1	

1.1 Overview

The Dosimeter Setting Device displays and updates the operation parameters in the Model 23 Electronic Personal Dosimeter via its infrared data communication interface with the dosimeter. The measurement trend data can be read out from the dosimeter by this Setting Device. The software of the Dosimeter Setting Device is based on the Microsoft® Windows® operating system.

1.2 Product Package

- PC software (supplied as CD)   1

- Infrared communication cable 1

- User's Manual   1

Section
2

2.0 Software License Agreement

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Section	# 3.0 Operation Environment
3	

3.1 General

Basic functions:

1. Reading out operation parameters and measurement data from dosimeters
2. Displaying trend data as data table or graph on the screen and downloading as EXCEL sheet
3. Writing operation parameters to dosimeters

Peer: Electronic Personal Dosimeter Dose-i
Temperature: 0 to 40℃
Humidity: 30 to 85%
Power supply: DC4.5 to 6.0 V (supplied from a computer)

3.2 Required Environment

The following requirements are applied to hardware and software respectively.

Hardware

⚛ CPU: Pentium 2 GHz or greater

⚛ Memory: 1 GB or greater

⚛ Hard Drive: free disc space of 20 MB or greater

⚛ Display: resolution 800 x 600 or greater

⚛ Communications Interface: USB x 1 ch

⚛ Others: mouse and keyboard

Software

The PC mentioned above should have the following software installed:

⚙ Operating System: Windows®8/8.1/10 operating system

⚙ Others: Microsoft® Office (Excel)

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3.3 Device Structure

USB connector

IR head

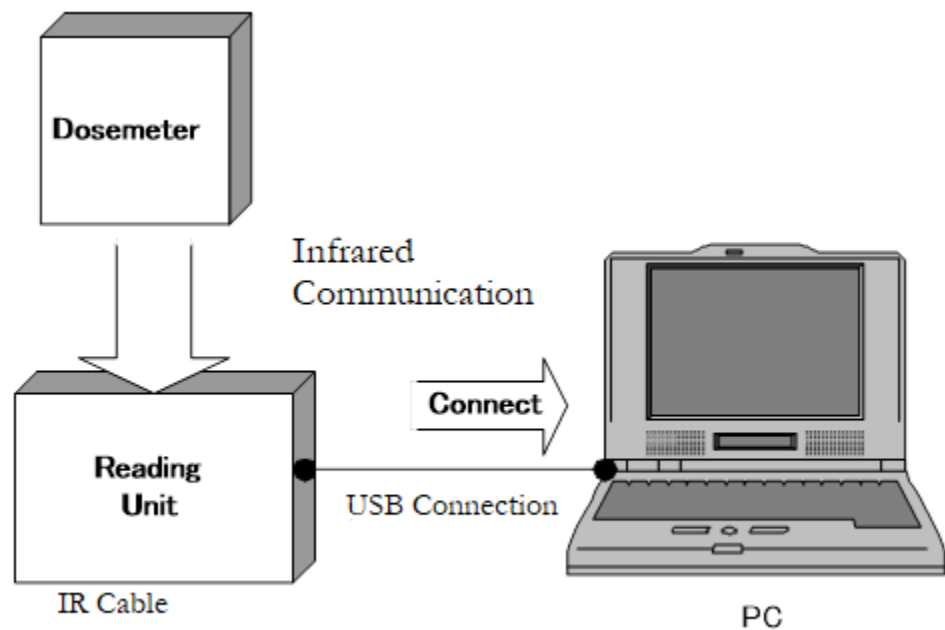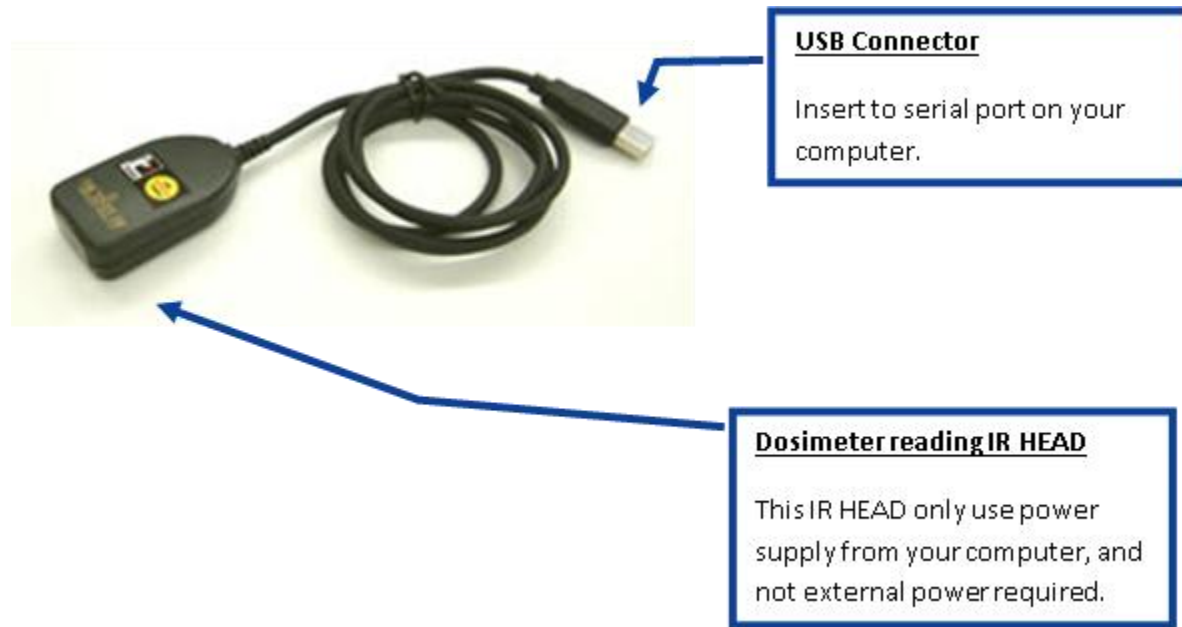| Section	# 4.0 System Configuration and Installation
4	

4.1 System Configuration

Dosimeter setting device consist of infrared communication cable (IR cable) and PC, which installed the dosimeter setting device software.

4.2 Product Configuration

The configuration of the IR cable

USB Connector

Insert to serial port on your computer.

Dosimeter reading IR HEAD

This IR HEAD only use power supply from your computer, and not external power required.

4.3 Installation and Setup

Driver for IR cable and dosimeter setting device software are needed for using this software.

Installation procedure for IR cable driver:
1. Insert the driver CD attached to IR cable into the CD-ROM drive of the PC.
2. Install according to installation manual.

Installation procedure for dosimeter setting device software:
1. Insert the installation CD into the CD-ROM drive of the PC.
2. Click "Dose-i_Tool" folder.
3. Execute "Setup.exe" file.

Click "Next."
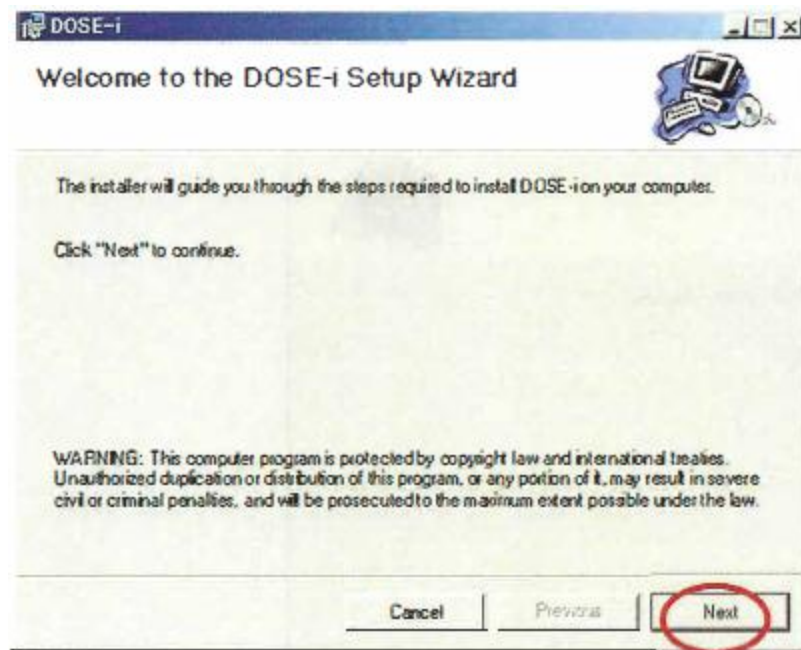
Choose an installation directory, and then click "Next."
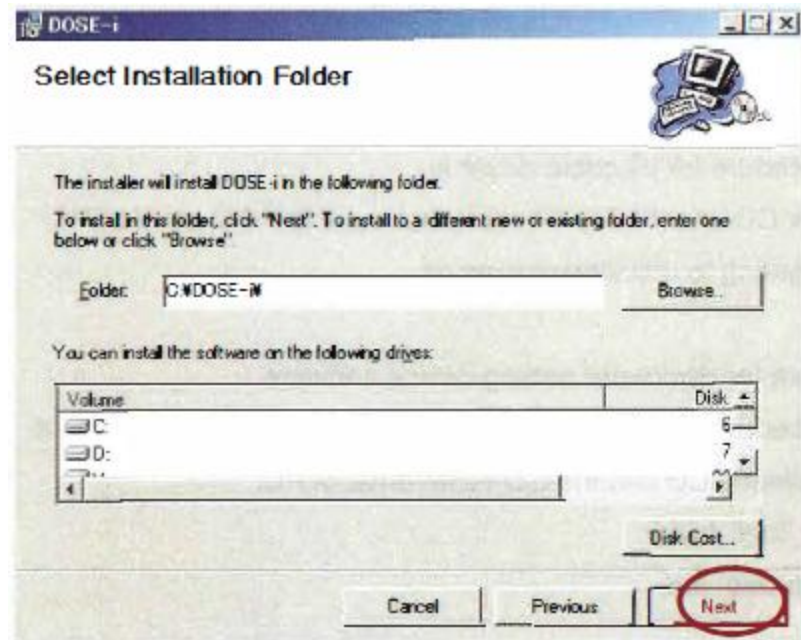
Click "Next."

Click "Close."

Hardware setup procedure:
1. Insert the USB connector of the IR cable into the USB port of the PC.
2. Wait for a few seconds until the cable is recognized by the PC.

Section	# 5.0 Operational Instructions

5

5.1 Functional Outline of Software
The functional outline of the dosimeter setting device software is shown below:

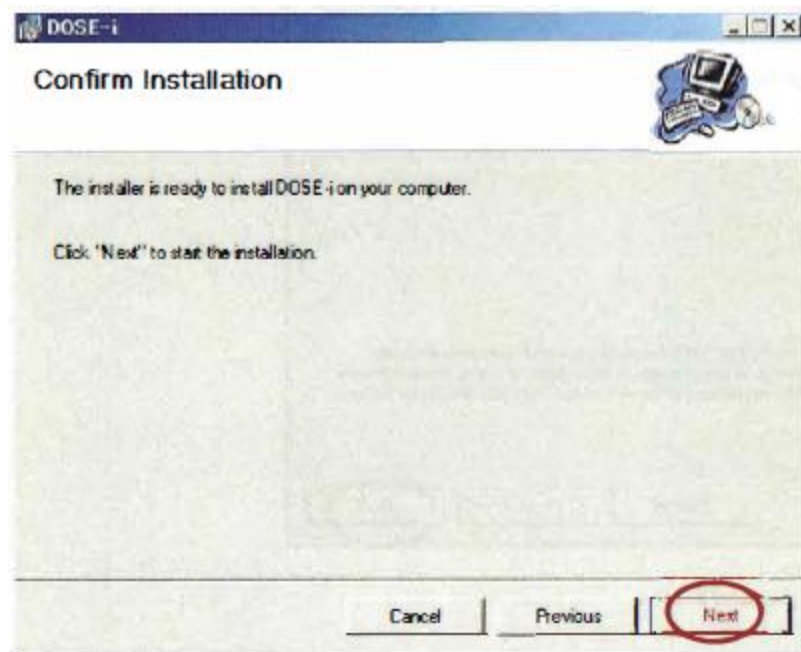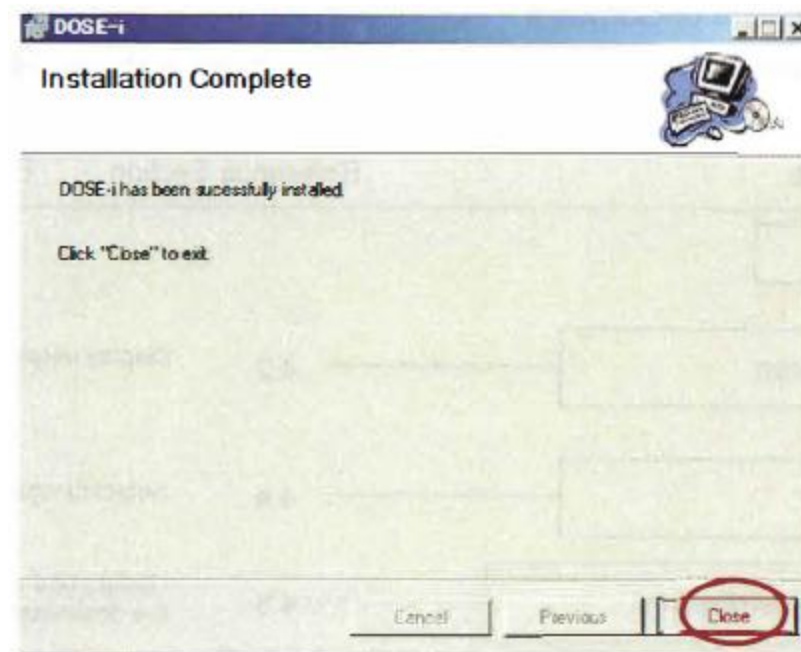| Screen Name	Reference Section	Function
Start UP		
Version Screen	4.2	Display version of the software
Main Menu	4.4	Select function
Dosimeter Settings	4.5	Update operational parameters of the dosimeter
Indication Display	4.6	Display measurement information
Data Trending Mode	4.7	Display some parameters related with trend data acquisition
Table Display	4.7.1	Display trend data in a table format
Graph Display	4.7.2	Display trend data in a graph format
Manual Calibration	4.8	Update calibration factor with direct input
Maintenance Mode	4.9	Perform dosimeter operation checks
System Settings	4.10	Update operating parameter
Client Control No.	4.11	Update client control number
Alarm Settings	4.12	Update alarm threshold (dose/ dose rate)
Counts Readout	4.13	Display internal counts value
Maintenance Settings	4.14	Update the parameter for indicator and buzzer

5.2 Starting the Software Operation

1. Select the icon [Dose-i]

2. The software starts running, and then the Version screen will appear. Select the right COM port that the IR cable is connected with and click "Start."
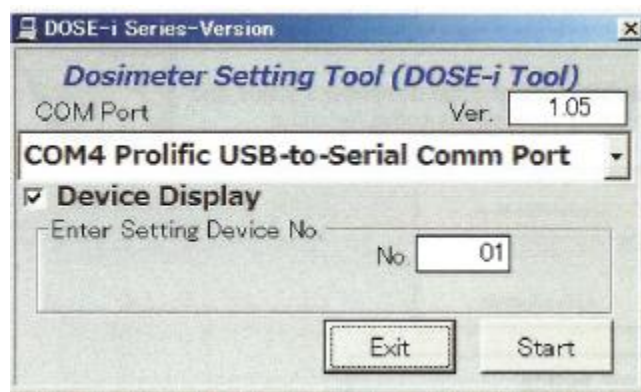
Caution!

For COM port number that the IR cable is connected with, please check for the correct COM port number by device manager function on the PC.

5.3 Screen Interface

The fields and buttons on the following screen are common to all screens. See the following sections for details of each screen.

Transmission status signal
Indicates communication status between computer & dosimeter.
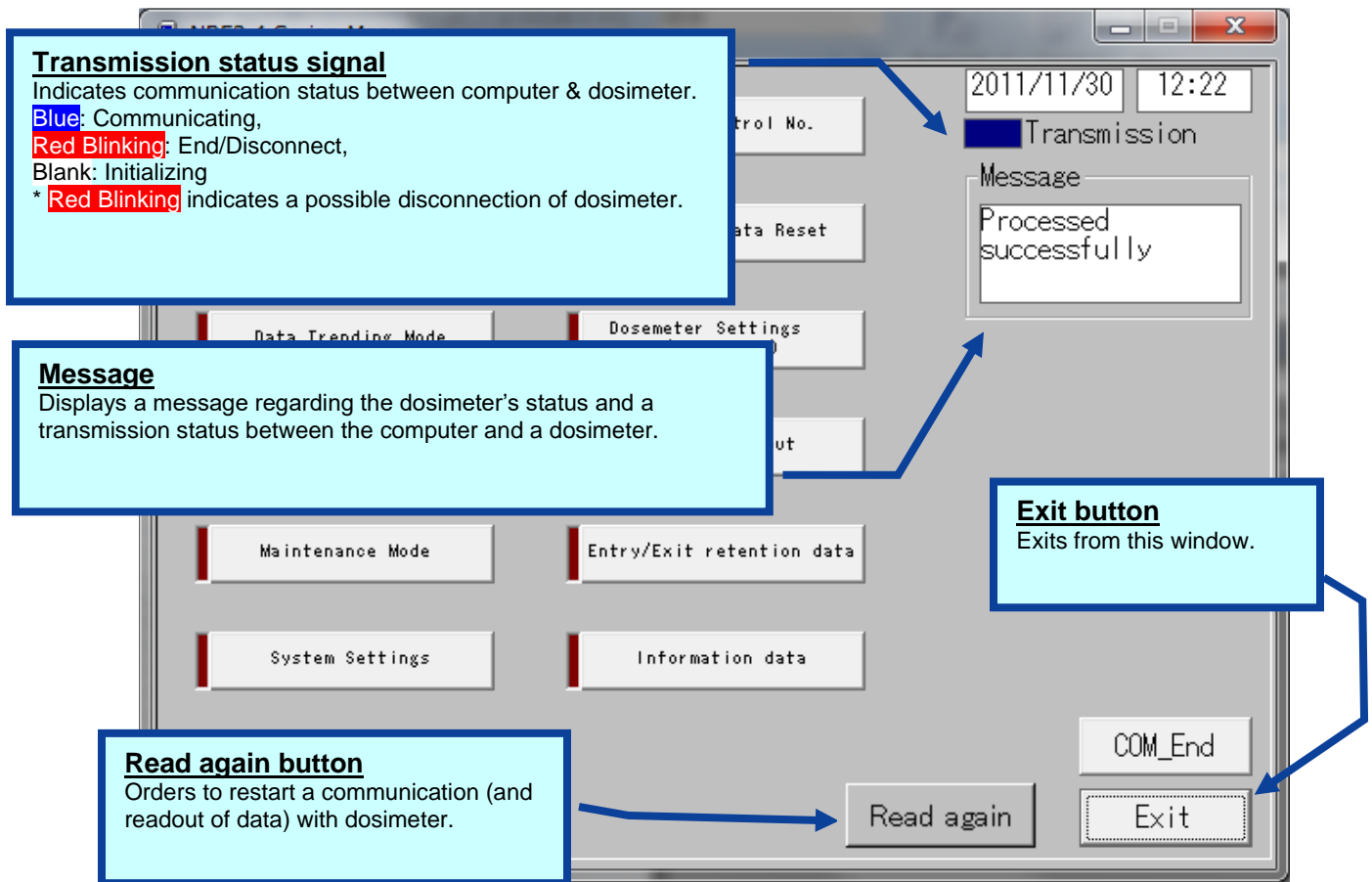Blue: Communicating,
Red Blinking: End/Disconnect,
Blank: Initializing
* Red Blinking indicates a possible disconnection of dosimeter.

Message
Displays a message regarding the dosimeter's status and a transmission status between the computer and a dosimeter.

Exit button
Exits from this window.

Read again button
Orders to restart a communication (and readout of data) with dosimeter.

Common features of the menu screen (functions and layout)

The following messages will be indicated in the Message box.

Severity	Messages	Descriptions
1	LOW battery	Dosimeter's battery power is critically low.
2	Please place dosimeter into reader	Communication with dosimeter has not been established yet.
3	Maintenance mode	Dosimeter is in Maintenance mode.
4	Processed Successfully	Communication between the setting device and dosimeter has been established.
5	Initializing...	In the process of establishing communication between the setting device and a dosimeter.

* Note: Features on the menu will function only when the dosimeter is in communication. If "Transmission" is Red Blinking, place/replace the dosimeter. and then click "Read again" button. Data communication will be started/resumed, and "Transmission" will be Blue.
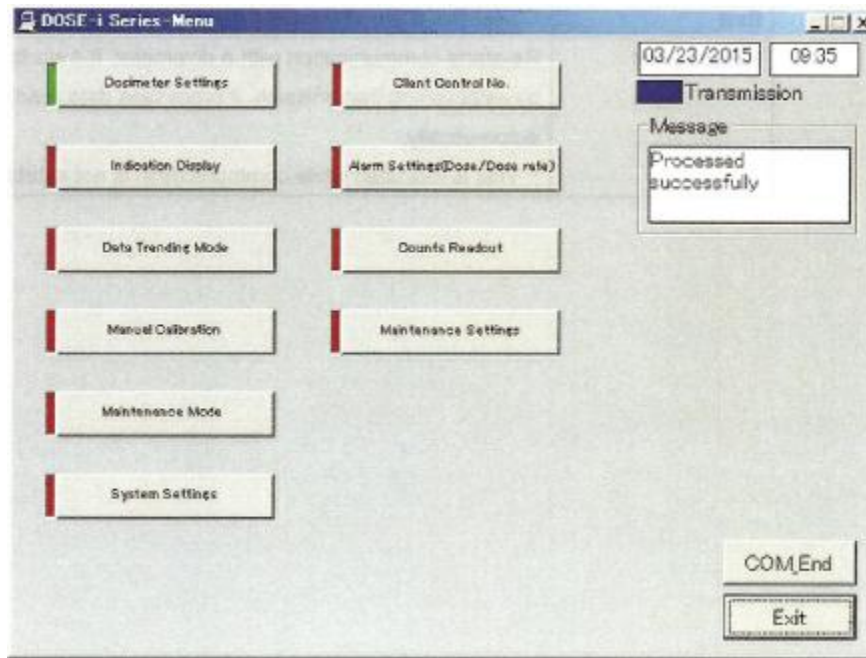
5.4 Main Menu

Figure 5-1 Menu screen

All functions that are performed via data communication with dosimeters are listed in the following table. It turns green by first click, and then go to the screen of the selected function by second click.

<Menu Button>

Dosimeter Settings	Goes to the next screen: Fig. 5-2
Indication Display	Goes to the next screen: Fig. 5-3
Data Trending Mode	Goes to the next screen: Fig. 5-4-1
Manual Calibration	Goes to the next screen: Fig. 5-5
Maintenance Mode	Goes to the next screen: Fig. 5-6
System Settings	Goes to the next screen: Fig. 5-7
Client Control No.	Goes to the next screen: Fig. 5-8
Alarm Settings	Goes to the next screen: Fig. 5-9
Counts Readout	Goes to the next screen: Fig. 5-10
Maintenance Settings	Goes to the next screen: Fig. 5-11

<Command Button>

COM_End	Finishes the communication with a dosimeter.
Exit	Closes the dosimeter setting device software.
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data read out automatically. *: This is indicated while communication is not established.

5.5 Dosimeter Settings
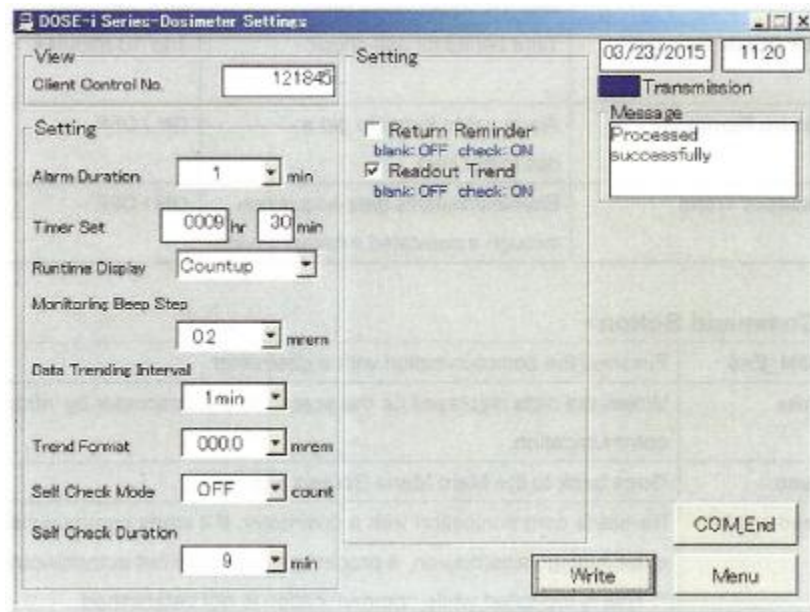
Fig. 5-2 Dosimeter Settings Screen

Display the operational parameters, which are read out from the dosimeter.
Write the edited settings data to the dosimeter by clicking the "Write" button.

<View>

Name	Definition, range, and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999

<Setting>

Name	Definition, range, and unit of the functions	
Alarm Duration	Alarm duration length	1 to 9 min.
Timer Set	Alarm threshold for operation time	0000h:01 min to 9999h:59min
Runtime Display	Mode selection for indicating operation time	Count down/Count up
Monitoring Beep Step	Beep activation intervals according to the dose increment	OFF/0.1/0.2/1/10 mrem
Data Trending Interval	Data trending intervals	15 sec/30 sec/1 min/ 5 min/ 10 min/30 min/60 min/90 min
Trend Format	Shifts the decimal point for data trending	000.0/0000 mrem
Self-Check Mode	Enables/disables shelf-check and sets the check count value	Off/1/3/5/10/20/40/80/100 count
Self-Check Duration	Time period for self-check	1 to 10 minutes
Return Reminder	Alarm no to forget to get a dosimeter back	ON/OFF
Readout Trend	Enables/Disables data acquisition through a dedicated external device	ON/OFF

Command Button>

COM_End	Finishes the communication with a dosimeter
Write	Writes the data displayed on the screen to the dosimeter by infrared communication.
Menu	Goes back to the Main Menu Scree: Fig. 5-1
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. * This is indicated while communication is not established.

5.6 Indication Display
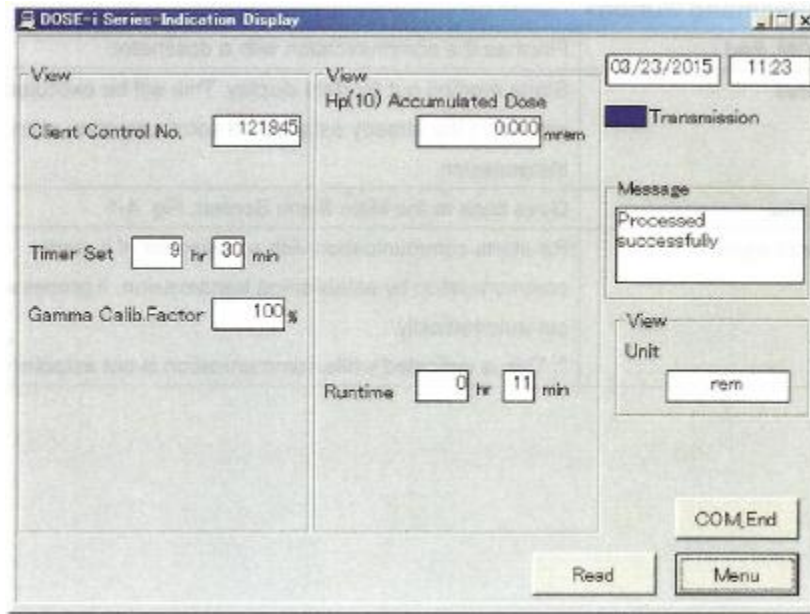
Fig. 5-3 Indication Display Screen

Display the measured values read out from the dosimeter.

<View>

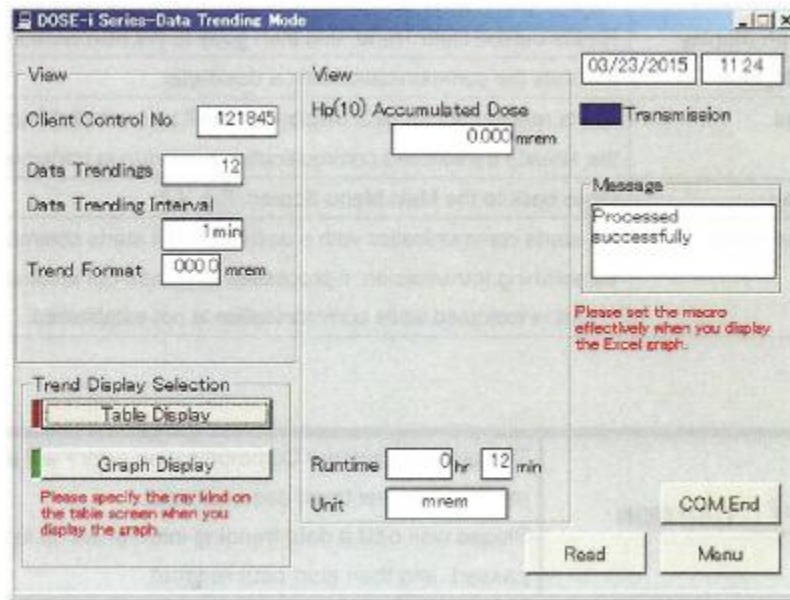| Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999
Timer Set	Alarm threshold for operation time	0000 h : 01 in to 9999 h : 59 min
Gamma Calib. Factor	Calibration factor for gamma ray	Gamma : 60 to 140%
Hp(10) Accumulated Dose	Accumulated dose of gamma ray	0.000 to 999999.999 mrem
Runtime	Operation time of the dosimeter	0000 h : 00 min to 9999 h : 59 min

<Command Button>

COM_End	Finishes the communication with a dosimeter
Read	Starts reading out for data display. This will be executed from initializing the already established communication, even during transmission
Menu	Goes back to the Main Menu Scree: Fig. 5-1

Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. * This is indicated while communication is not established.

5.7 Data Trending Mode

Fig. 5-4-1 Data Trending Mode Screen

Display the trend setting data readout from the dosimeter.
Select the display type of data trend.

<View>

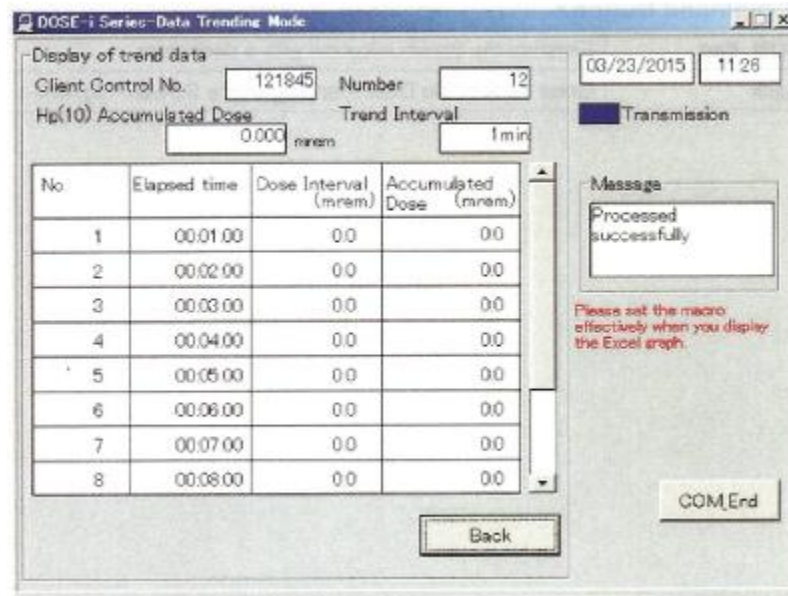| Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999
Data Trendings	Number of trend data stored	1 to 600
Data Trending Interval	Interval of data trending	15 sec/30 sec/1 min/5 min/10 min/30 min/60 min/90 min
Trend Format	Shifts the position of decimal point for data trending.	000.0 / 0000 mrem
Hp(10) Accumulated Dose	Accumulated dose of gamma ray	0.000 to 999999.999 mrem
Runtime	Operation time of the dosimeter	0000 h : 00 min to 9999 h : 59 min
Unit	Measurement unit	mSv, mrem

<Command Button>

Table Display	Reads out the Data Trend, and then goes to the next screen: Fig. 5-4-2
Graph Display	Reads out the Data Trend, and then goes to the next screen: Fig. 5-4-3
Com_End	Finishes the communication with a dosimeter.
Read	Starts reading out for data display. This will be executed from initializing the already established communication, even during transmission.
Menu	Goes back to the Menu screen: Fig. 5-1
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

Caution!

The prompt window <Communication error> will appear during data readout if a new trend does not exist. Please wait until a data trending interval setup in the dosimeter has passed, and then start data readout.

5.7.1 Table Display

Fig. 5-4-2 Table Display Screen

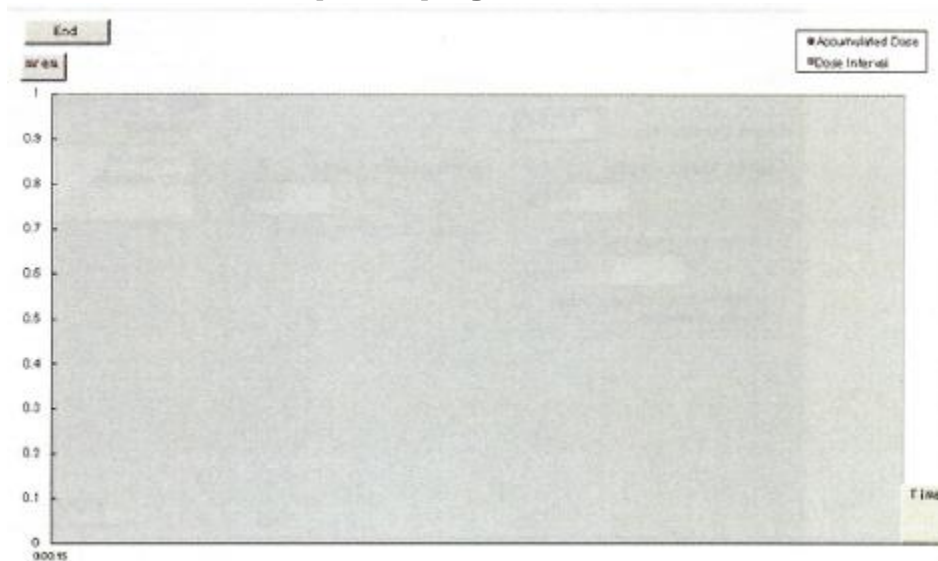Display the trend readout from a dosimeter in table.

<View>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999
Hp(10) Accumulated Dose	Accumulated dose of gamma ray	0.000 to 999999.999 mrem
Number	Number of trend data stored	1 to 600
Trending Interval	Interval of data trending	15 sec/30 sec/1 min/5 min/10 min/30 min/60 min/90 min
Elapsed Time	Elapsed time	00:00:00 to 99:99:99
Dose Interval	Dose per trend interval duration	0.0 to 9999 mrem or 0.0 to 999.9 mrem
Accumulated Dose	Accumulated value of dose	0.0 to 999999.999 mrem

<Command Button>

COM_End	Finishes the communication with a dosimeter.
Back	Goes back to the Data Trending Mode Screen: Fig. 5-4-1

5.7.2 Graph Display

Fig. 5-4-3 Graph Display Screen

Display the trend data readout from a dosimeter can be displayed in EXCEL window.

<Command Button>

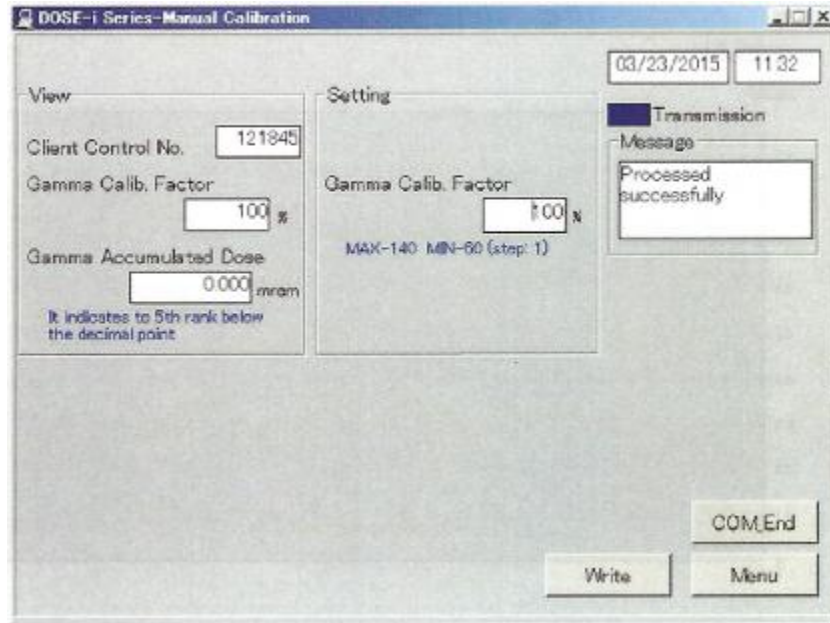| **End**	Close this Graph Display window.

5.8 Manual Calibration

Fig. 5-5 Manual Calibration Screen

Display accumulated dose and calibration factor readout from the dosimeter.
Write the edited calibration factor to the dosimeter by clicking "Write" button.

<View>

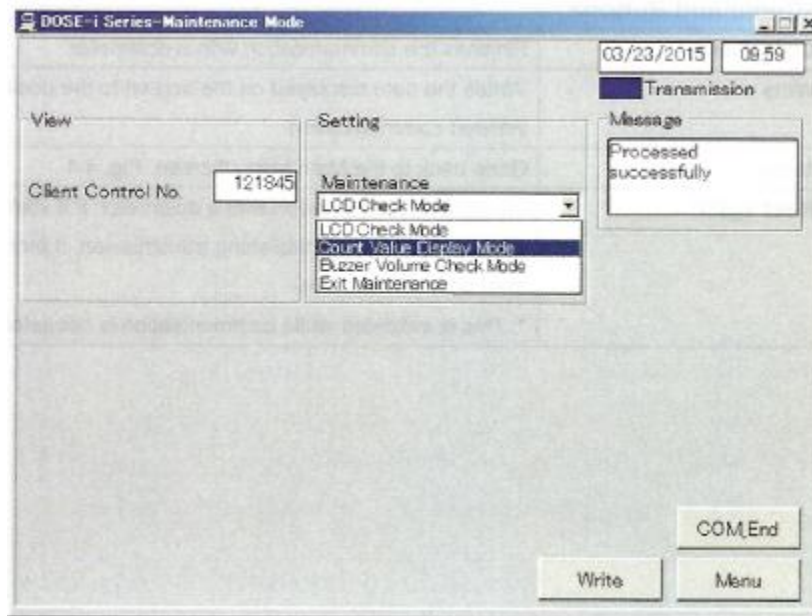| Name	Definition, range, and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999
Gamma Calib. Const.	Calibration factor readout from a dosimeter	60 to 140% (1 Pitch)
Gamma Accumulated Dose	Accumulated dose	0.000 to 999999.999 mrem

<Setting>

Name	Definition, range, and unit of the functions	
Gamma Calib. Factor	Calibration factor for gamma ray	60 to 140% (1 Pitch)

<Command Button>

Com_End	Finishes the communication with a dosimeter.
Write	Updates the date displayed on the screen to the dosimeter by infrared communication
Menu	Goes back to the Menu screen: Fig. 5-1
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

5.9 Maintenance Mode

Fig. 5-6 Maintenance Mode Screen

To perform dosimeter maintenance and checking, select the preferred mode and write to a dosimeter.

<View>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999

\<Setting\>

Name	Definition, range and unit of the functions	
Maintenance	LCD Check Mode	Indication of all items on LCD
	Count Value Display Mode	Indication of internal counter
	Buzzer Volume Check Mode	Activation of buzzer sound
	Exit Maintenance	Exit from maintenance mode

\<Command Button\>

Com_End	Finishes the communication with a dosimeter.
Write	Writes the data displayed on the screen to the dosimeter by infrared communication.
Menu	Goes back to the Menu screen: Fig. 5-1
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

5.10 System Setting
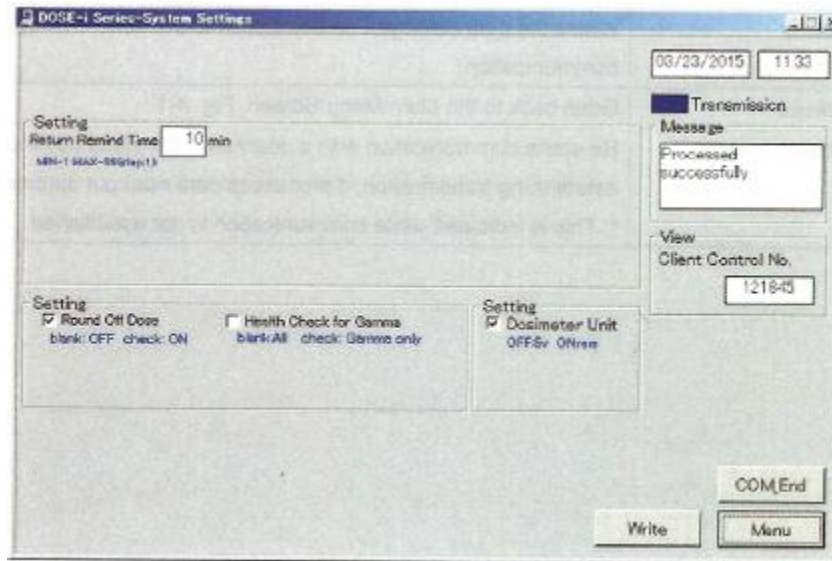
Fig. 5-7 System Setting Screen

Display the operating parameters, which are read out from the dosimeter.
Write the edited operating parameter to the dosimeter by clicking "Write" button.

<View>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999

<Setting>

Name	Definition, range and unit of the functions	
Return Remind Time	Reminder time not to forget to get the dosimeter back	1 to 99 min (1 Pitch)
Round Off Dose	ON/OFF of rounding off for integrated dose.	OFF / ON
Health Check for Gamma	Enable/disable failure check for gamma detector	OFF / ON
Dosimeter Unit	Switches display unit of the display between Sv and rem	OFF (Sv) / ON (rem)

<Command Button>

|	
Com_End	Finishes the communication with a dosimeter.
Write	Writes the data displayed on the screen to the dosimeter by infrared communication.
Menu	Goes back to the Menu screen: Fig. 5-1.
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

5.11 Client Control Number
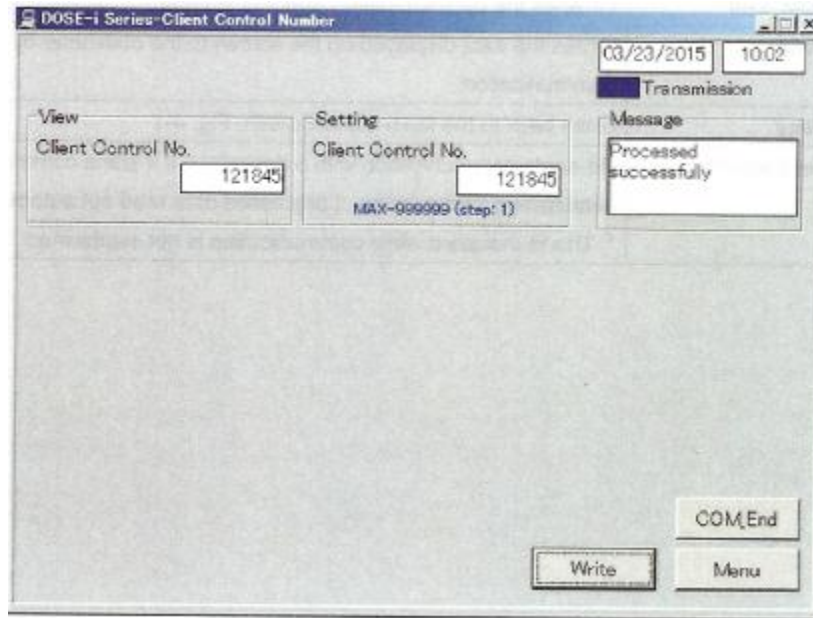
Fig. 5-8 Client Control Number Screen

Display the client control number, which is read out from the dosimeter.
Write the edited client control number to the dosimeter by clicking the "Write" button.

\<View\>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID	000001 to 999999

\<Setting\>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID	000001 to 999999

\<Command Button\>

|	
Com_End	Finishes the communication with a dosimeter.
Write	Writes the data displayed on the screen to the dosimeter by infrared communication.
Menu	Goes back to the Menu screen: Fig. 5-1.
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

5.12 Alarm Settings (Dose/ Dose Rate)
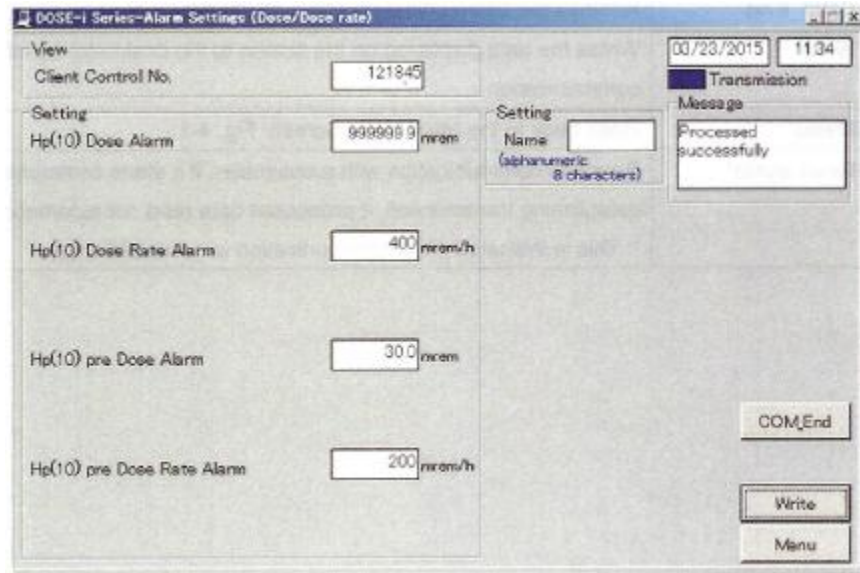
Fig. 5-9 Alarm Settings (Dose/Dose Rate) Screen

<View>

Name	Definition, range, and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999

<Setting>

Name	Definition, range, and unit of the functions	
Hp (10) Dose Alarm	Hp (10) integrated dose alarm threshold	0.1 to 999999.9 mrem
Hp (10) Dose Rate Alarm	Hp (10) dose rate alarm threshold	1 to 9999999 mrem/ h
Hp(10) Pre Dose Alarm	Hp (10) accumulated dose pre alarm threshold	0.1 to 999999.9 mrem
Hp(10) Pre Dose Rate Alarm	Hp (10) dose rate pre alarm threshold	1 to 9999999 mrem/ h
Name	User name	8 alphanumeric characters (capital) Note: Indicates up to 8 characters on dosimeter's display.

<Command Button>

Com_End	Finishes the communication with a dosimeter.
Write	Writes the data displayed on the screen to the dosimeter by infrared communication.
Menu	Goes back to the Menu screen: Fig. 5-1.
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

5.13 Counts Readout
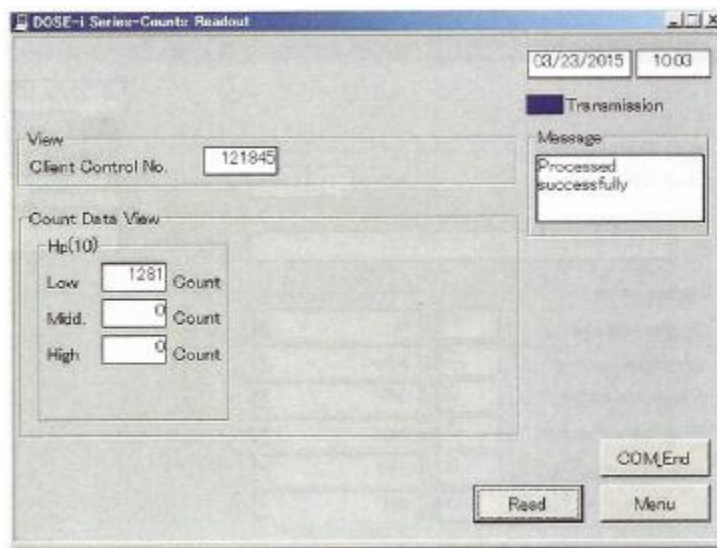
Fig. 5-10 Counts Readout Screen

Display the count values, which are read out from the dosimeter.

<View>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999
Hp (10) Low	Count of Hp (10) Low	000000 to 999999 count
Hp (10) Mid	Count of Hp (10) Mid	000000 to 999999 count
Hp (10) High	Count of Hp (10) High	000000 to 999999 count

<Command Button>

Com_End	Finishes the communication with a dosimeter.
Read	Starts reading out for data display. This will be executed from initializing the already established communication even during transmission.
Menu	Goes back to the Menu screen: Fig. 5-1.
Read again*	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically. *This is indicated while communication is not established.

5.14 Maintenance Settings
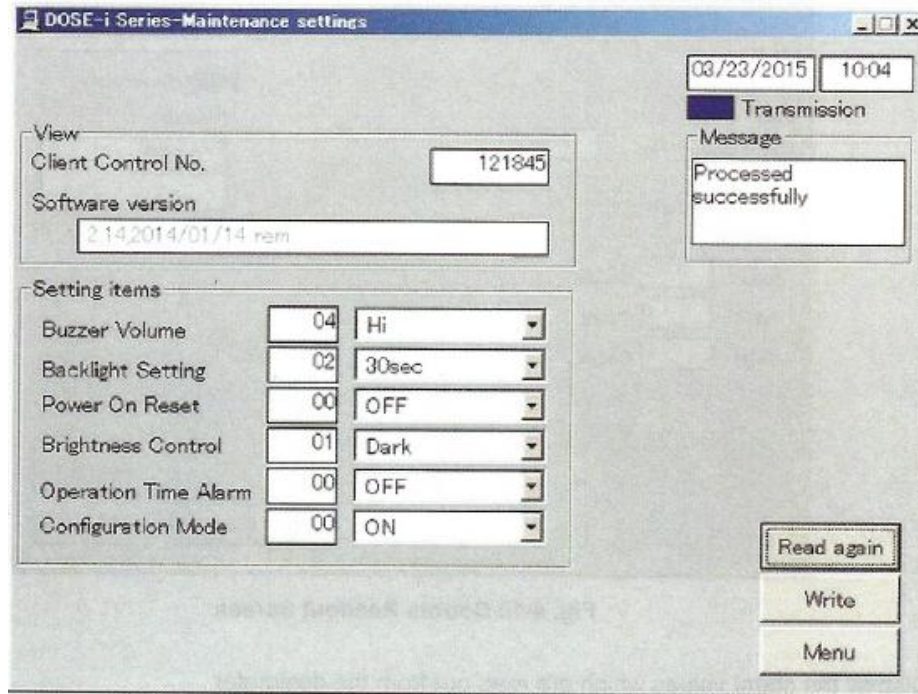
Fig. 5-11 Maintenance Settings Screen

Displays the maintenance settings parameters, which are read out from the dosimeter. Write the enabled setting data to the dosimeter by clicking the "Write" button.

<View>

Name	Definition, range and unit of the functions	
Client Control No.	Dosimeter ID number	000001 to 999999
Software version	Software version of docimeter	N/A

<Setting>

Name	Definition, range and unit of the functions	
Buzzer Volume	Volume of dosimeter buzzer	Hi / Mid / Low / OFF
Backlight Setting	Backlight duratopm	Continuity/10 sec/30 sec/60 sec
Power On Reset	If this is ON, accumulated dose value is reset when the power is turned off.	ON / OFF (Reset / Not reset)
Brightness Control	Brightness of display	EL display: Dark / Middle / Bright LCD: Middle
Operation Time Alarm	Enables/disables opeartion time alarm	ON/OFF
Configuration Mode	Enables/disables parameter configuration on dosimeter display	ON/OFF

<Command Button>

Read again	Re-starts communication with a dosimeter. If it starts communication by establishing transmission, it processes data readout automatically.
Write	Writes the data displayed on the screen to the dosimeter by infrared communication.
Menu	Goes back to the Menu screen: Fig. 5-1.

Section	6.0 Troubleshooting
6	

6.1 Errors and Solutions

1. **Communication Error** – communication error between a computer and a dosimeter setting device.

During computer startup, processing, or data communication:

Error timing and error message	Suggested Solution
<During establishing communication> "Reading unit, or cable abnormal"	Check the cable connection.
<During Status Process> "No response"	Check the cable connection.

During data readout from a dosimeter.

Error timing and error message	Suggested Solution
<During reading process or trend data acquisition> "Dosimeter not communicating"	Retry reading out.
<During reading process or trend data acquisition> "Dosimeter communication error"	Retry reading out.
<During reading process or trend acquisition data acquisition> "No response"	Check the IR communication cable. Check the connection with IR communication cable.
<During trend data rending process> "Trend data does not exist"	There is o trend data. Create some trend data first, and then read out.

During writing of operational parameters to the dosimeter

Error timing and error message	Suggested Solution
<During writing process> "Dosimeter not communicating"	Process reading out, first.
<During writing process> "Dosimeter communication error"	Process reading out, first.

\<During writing process\> No response	Process reading out, first. Check the cable connection.

Note: Please restart PC if the errors not listed in this section occurred.

2. **Internal Error** - Errors detected by an internal check.

When a writing procedures starts, the input value error may appear.

Error message	Suggested Solution
"Input Error of xxxx"	Re-enter the value within the valid range.

3. **Error during communication start** – Errors detected by PC when procedures to write parameters or to read out tread data started.

During attempting the writing process.

Error message	Suggested Solution
"Dosimeter Not Communicating" "Cannot write"	Start reading process, first.

During attempting to read out trend data:

Error message	Suggested Solution
"Dosimeter Not Communicating"	Cancel the trend data readout, and then start regular reading process.

Note: Please restart PC if the errors not listed in this section occurred.

Section

7

7.0 Abnormalities

Problem	Solution
Cannot establish communication.	IR communication cable may not be connected properly. Check the cable connection. Please contact Ludlum Measurements if communication errors happen frequently.

Section

8

8.0 Maintenance

Check the Dosimeter Setting Device as specified below to ensure its performance.

To be checked:	Procedure
External appearance	Visual check for any foreign objects such as dirt or dust balls in USB port. Check every six months, or every time a transmission error occurs.
Cable connection	Check any looseness on connection of cables. Check every six months, or every time a transmission error occurs.
Infrared communication	Put close dosimeter to the IR window of the cable and check the communication Check every six months, or every time a transmission error occurs.