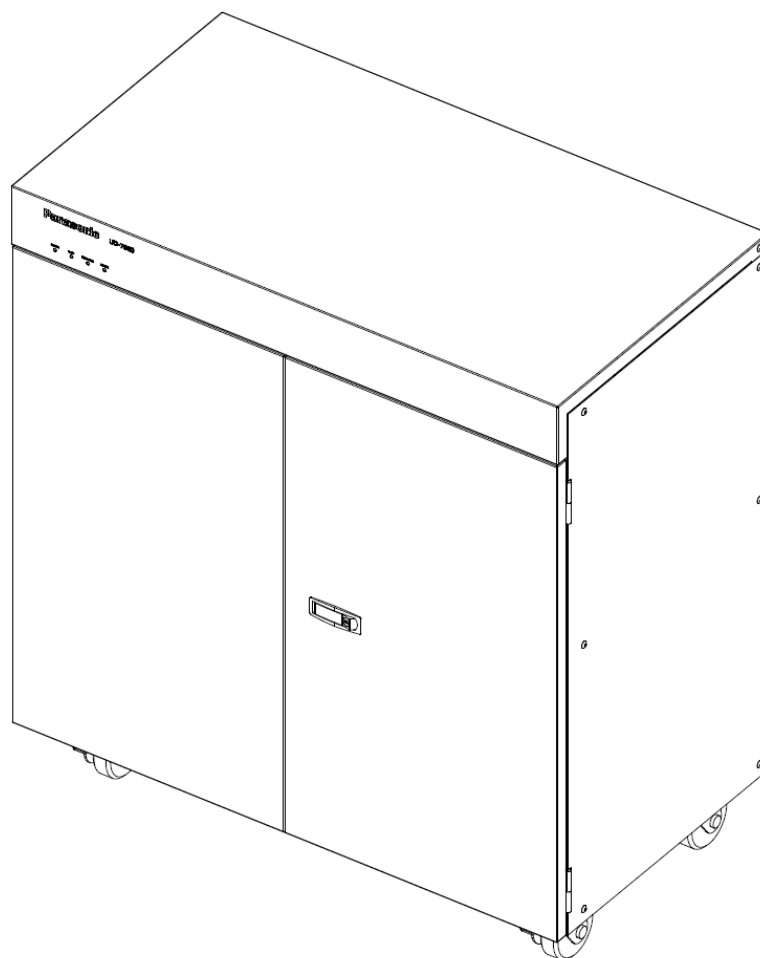# Panasonic®

Operating Instructions Software Guide

TLD READER

Model No. UD-7900N14EU

Before attempting to connect or operate this product, please read these instructions carefully and save this manual for future use.
The model number is abbreviated in some descriptions in this manual.

Refer to the manuals provided with the devices in use or descriptions of how to perform the basic operations relating to the Windows® operating systems and how to handle the PC and peripheral devices.

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Precautions

Be sure to refer to the precautions described in the manuals of the PC to install this software.

Safety Instructions

Be sure to refer to the safety instructions described in the manuals of the PC to install this software.

Contents

1. Operation

The TLD reader UD-7900P automatically measures a total of 500 badges (10 magazines, 50 badges per magazine) inserted in magazines.
Measurement data will be stored in a file and can easily be checked, analyzed and used to create reports.

■ Launching of application software

After checking the setup of the system component devices (connection of signal cables and turning on the power), launch the application software.

When the application software is launched, the main screen (Fig. 1-1) will be displayed. Processing will be executed continuously from the previous badge. The current badge position will be displayed in the current badge information (Fig. 1-2).

If there is no batch at the application software launch, "DefaultBatch" will automatically be created.
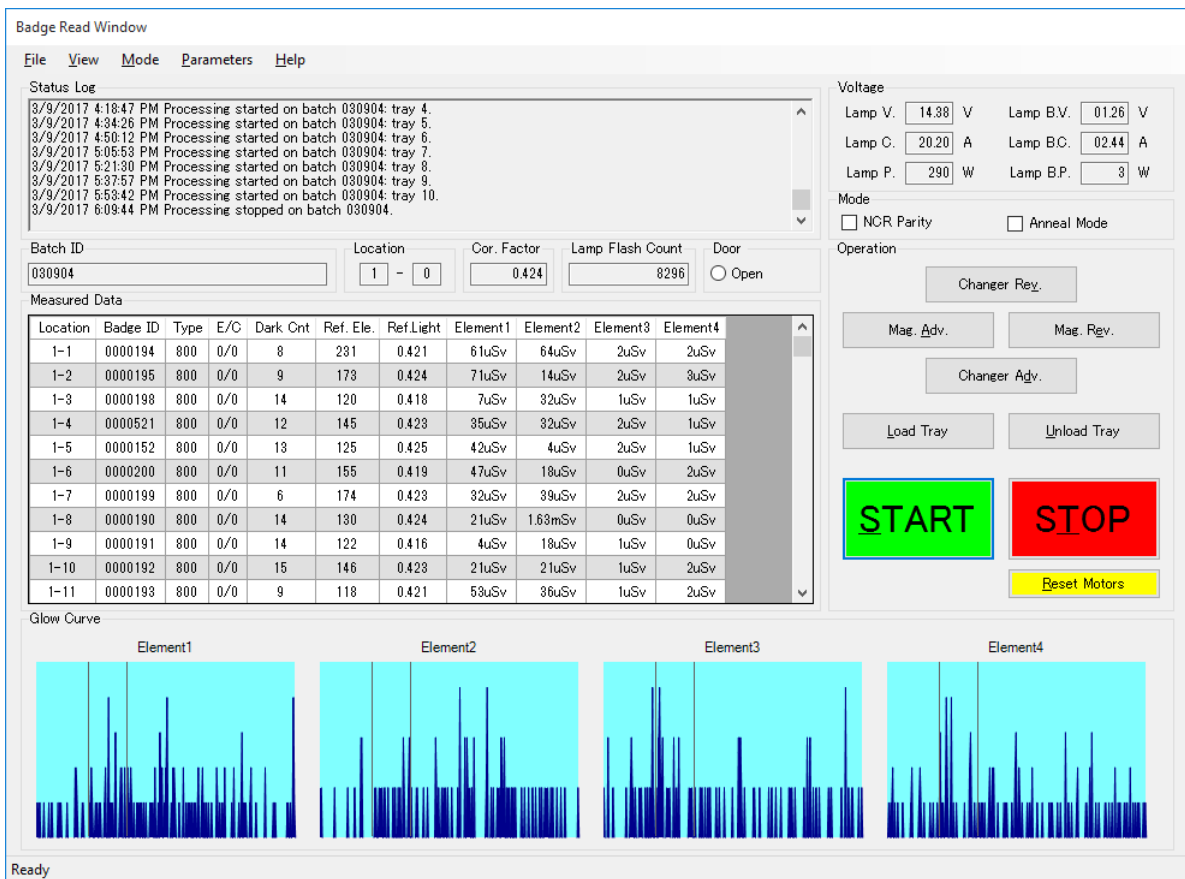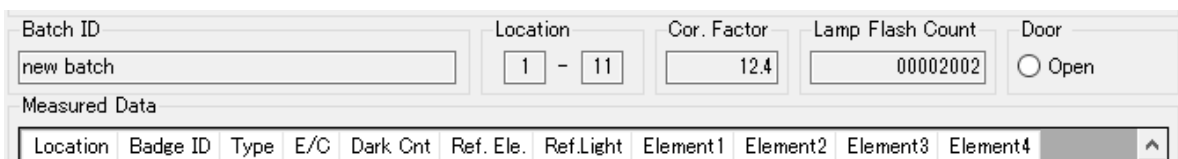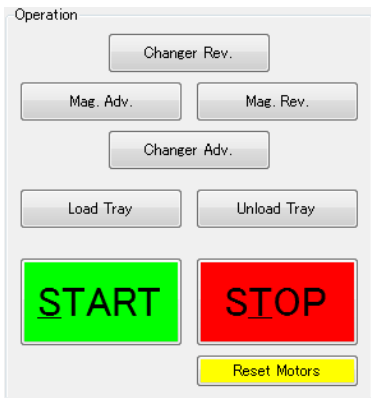

Fig. 1-1 Main screen

Fig. 1-2 Current badge information

In the "Location" field, the magazine number and the badge number will be displayed.
(Example): Values 01-00 in the "Location" field indicate that magazine number "1" (shelf position 1) is waiting for being loaded.

■ How to start measurement

Measurement of all badges will start by clicking the [START] button on the main screen. Measurement will stop when the [STOP] button is clicked.
Measurement will also automatically stop when an error occurred. In this case, removing of the error cause and restarting of the measurement will make possible to write the corresponding data.

By clicking the [Reset Motors] button, the mechanical initialization operation will start.

Magazines located in the shelf of the magazine changer will automatically be loaded in order during the badge measurement.
This product will skip shelves without magazines and shift to the next shelf. When processing of the last shelf is completed, measurement will be ended and the changer shelf will be moved to the initial position.

When the magazine with badges is taken in, the badge of the top slot will be sent to the number read position and ID code, badge code and rank code will be read. Then, the dark count and other data will be read and measurement of each element will be executed.
When the measurement is completed, the badge will be returned to the magazine from which the badge originally came and the magazine will be advanced by 1 slot.
When measurement of 1 slot is completed, the magazine will be returned to the shelf and the shelf will be advanced by 1 step. After this, these processes will be repeated.
If a mechanical error has occurred, the measurement cannot be started. Therefore, press the [Reset Motors] button to initialize.

■ Create a batch file

First, create a batch file to manage all measurement data at once (It is unnecessary to create it if continuously use the old batch file or only check the file or data.). It is crucial to newly create a batch file to prevent the old batch file data from being lost.

To create a batch file, select [File] - [New] - [Batch] from the menu bar. On the "New Badge" screen that is displayed at this time, register the badge ID, operator and comment (Fig. 1-3 and Fig. 1-4). By clicking the [Make Batch] button, a new file will be created and the screen will return to the main screen. The information registered at this time will be displayed on the "Status Log" window (Fig. 1-5).
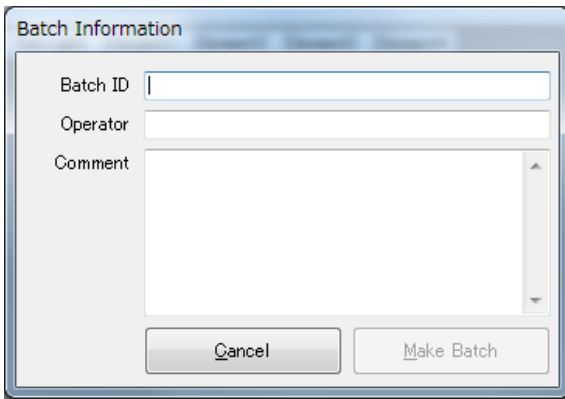
Fig. 1-3 New batch   Fig. 1-4 New batch (example)

```
2016/11/27 16:25:00 UD-7900 Program Started with 716 Read Mode.
2016/11/27 16:59:38 Batch 11272016 created.
```
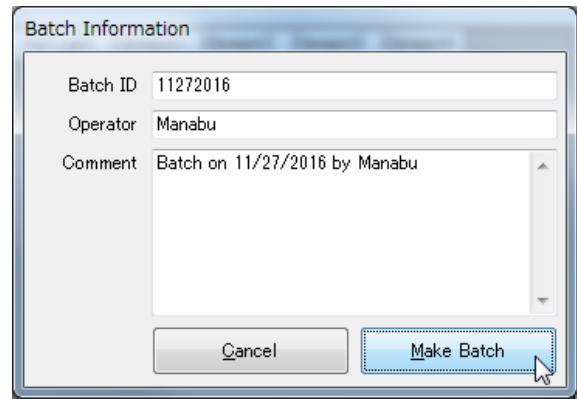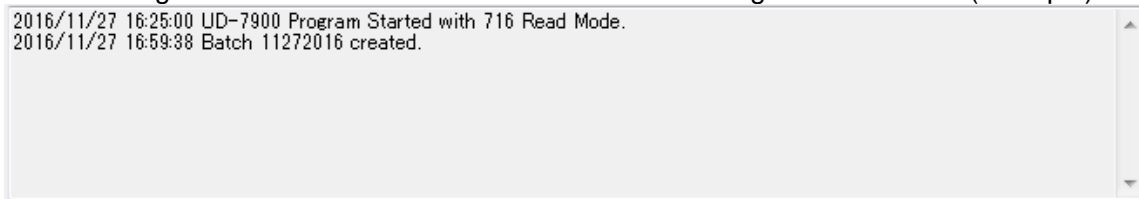
Fig. 1-5 Program status

▋ Set the magazine

When executing a measurement, firstly set the magazine to the automatic changer.
Refer to the operating instructions of UD-7900 for how to set the magazine.

If there is an unnecessary magazine in the measurement section, remove it by clicking [Unload Tray].
If the shelf position is not "1", return the automatic changer to shelf position 1 by clicking [Changer Rev.].
  The current badge information will display the shelf position in the form of "[Shelf number] - [Slot number]".
If the shelf number is "1" and there is no magazine in the reader, "Batch Status" will display 01-00.
If the magazine is not in the measurement section, "00" will be displayed for the slot position.
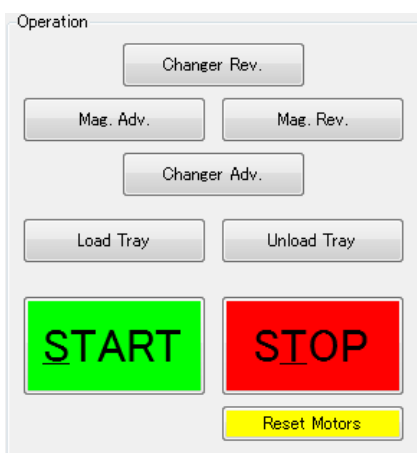
Changer Rev	Reversely advances the shelf by 1 step.
Changer Adv	Advances the shelf by 1 step.
Mag Adv	Advances the magazine by 1 slot.
Mag Rev	Reversely advances the magazine by 1 slot.
Unload Tray	Returns the magazine from the reader to the automatic changer.
Load Tray	Takes the magazine out of the automatic changer and send it to the reader.
START	Starts the measurement of a badge.
STOP	Stops the measurement of a badge.
Reset Motors	Executes the mechanical initialization operation.

Magazines at the bottom shelf will be set first. The bottom stage of the shelf is shelf position 1 and the top stage of the shelf is shelf position 10.

�though Status and display

Statuses and data during measurement will be displayed. The above includes each status of device, program, power source, badge and operation, analog input data (option) and glow data.

Measured Data

Each reading value and calculation result during the badge measurement will be displayed. The "Batch" display and the "Location" display are useful to check the magazine position when manually controlling the automatic changer.

Status Log

Log information including start of measurement, end of measurement, unmatched status, etc. will be displayed. It is possible to browse all log information even after completing the measurement. In this case, use the scroll bar on the right side of the window. The log information will be stored in the "batch" directory for reference in future.
The latest error message will be displayed in red.

Lamp Status

Voltage				
Lamp V.		V	Lamp B.V.		V
Lamp C.		A	Lamp B.C.		A
Lamp P.		W	Lamp B.P.		W

Lamp Flash Count

Each voltage value will be displayed.
The lamp voltage, current and power will be displayed when the measurement is being executed or when "Reader Check" or "Lamp F3/F4 Check" is being executed.

Glow Curve Display

Glow Curve — Element1, Element2, Element3, Element4
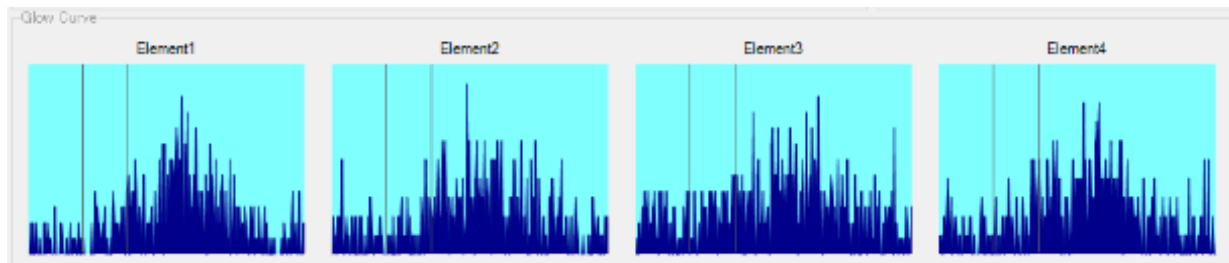
Glow data at measurement will be displayed in auto scale.

2. Reviewing Data

The following are descriptions of how to check data and of how to create each report. It is also possible to create a report from the latest batch file or a batch file used in the past. Select [View/Reports] on the main screen.
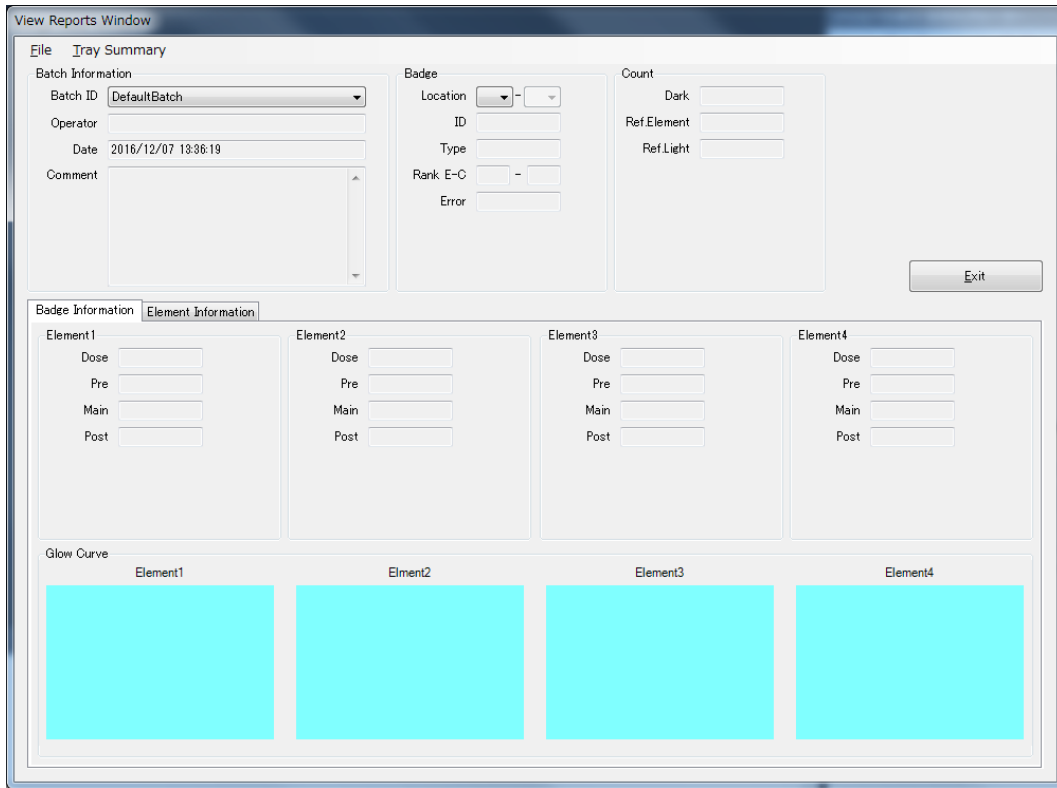
Exit button	**View/Reports – Exit Command**

Close the data review screen and return to the main screen.

■ Batch file to be applied

At the default, the latest batch file is selected to be applied (Fig. 2-1). To change to a batch file used in the past, select a batch ID from the list (Fig. 2-2). After selecting the batch file, update the display to the content of the corresponding batch file.
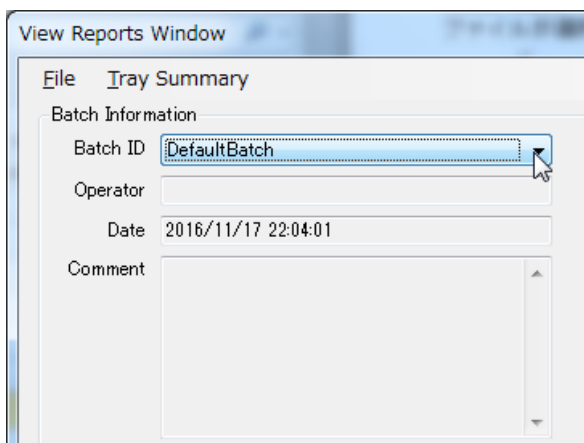
Fig. 2-1 Select the latest batch ID file
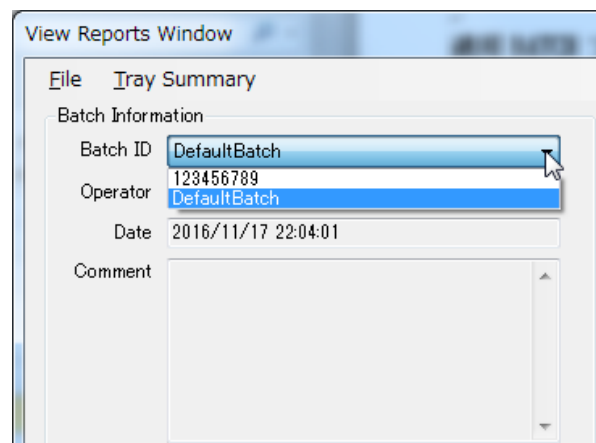
Fig. 2-2 Select from the Batch ID list

▊ Review data

After the measurement, it is possible to review data in text format or in graph format .

<table>
<tr><td align="center">Text format</td><td align="center">Graph format</td></tr>
</table>

Export Data
(Refer to pages 12 and 40.)

"Export Data" creates detailed reports of each element.

Badge Information
(Refer to page 16.)

"Badge Information" displays glow curves of the selected badge.

Badge Results
(Refer to pages 13 and 40.)

"Badge Results" displays all measurement results in the batch.

Tray Summary
(Refer to pages 14 and 41.)

"Tray Summary" displays the average value and calculation result of "σ" other than measurement values.

Element Information
(Refer to page 17.)

"Element Information" displays related parameters other than the P counter information of the specified element.

Status Log
(Refer to pages 15)

"Status Log" displays errors occurred in the selected batch.

▌ Export Data

"Export Data" creates a detailed report of 4 elements on all measurements. This report can be imported for spread sheet software and also be cut & paste on word processing software. To create this report, select [File¥Export Data] from the menu of the "Review Data" screen.

Format of "Export data"

DateTime				Badge measurement time
Try				Magazine number
Slt				Slot number
BdgNo				Badge number
Typ				Badge type
Err				Badge error code
E1Dose	E2Dose	E3Dose	E4Dose	Element # Dose value
E1Cnts	E2Cnts	E3Cnts	E4Cnts	Element # Count
E1Pre	E2Pre	E3Pre	E4Pre	Element # Pre
E1Main	E2Main	E3Main	E4Main	Element # Main
E1Post	E2Post	E3Post	E4Post	Element # Post
E1PreCnts	E2PreCnts	E3PreCnts	E4PreCnts	Element # Pre-count
E1MainCnts	E2MainCnts	E3MainCnts	E4MainCnts	Element # Main count
E1PostCnts	E2PostCnts	E3PostCnts	E4PostCnts	Element # Post-count
E1Err	E2Err	E3Err	E4Err	Element # Error code
			Drk	Dark count
			Ref.Element	Reference element
			Ref.Light	Reference light
			C	Rank C
			E	Rank E
			Unit	Unit of dose

Badge Results

"Badge Results" provides the following information about the selected badge. To create this report, select [View¥Badge Results] from the menu of the "Review Data" screen.

Item	Description
Batch:	Batch ID
Operational Time:	Date and time when measurement started
Operator:	Batch operator
Comment:	Comment
Time	Badge measurement time
Try	Magazine number
Slt	Slot number
BdgNo	Badge number
Typ	Badge type
Err	Badge error code
E1	Element 1 dose value
E2	Element 2 dose value
E3	Element 3 dose value
E4	Element 4 dose value
Drk	Dark count
Ref	Reference element
Corr	Reader sensitivity correction factor
C	Rank C
E	Rank E

Example of output

```
        Batch DefaultBatch Processing Report

Operational Time: 12/11/2016 3:46:06 PM  Operator:
Comment:

    Time Try Slt BadgeNo Typ Err     E1      E2      E3       E4   Drk Ref  Corr  C E
15:46:06  01  03 0702345  10         18uSv   18uSv   185uSv   8uSv 002 017 0.450 7 2
15:46:36  01  04 6101379  10         18uSv   22uSv   221uSv   9uSv 003 000 0.450 5 1
15:46:56  01  05 6101338  10         29uSv   17uSv   155uSv   7uSv 004 000 0.450 2 1
15:47:16  01  06 6101042  10         41uSv   30uSv   209uSv  11uSv 001 012 0.450 0 0
15:47:35  01  07 0702138  10         22uSv   14uSv   140uSv   7uSv 005 000 0.450 5 1
15:47:54  01  08 0702466  10         28uSv   28uSv   278uSv   9uSv 003 010 0.450 0 3
15:48:14  01  09 0702272  10         30uSv   62uSv   260uSv   9uSv 002 007 0.450 0 2
15:48:33  01  10 0702410  10         60uSv   35uSv   208uSv   2uSv 001 009 0.450 7 7
```

Tray Summary

In "Tray Summary", it is possible to check the element dose value, average value and "σ" (by magazine) of the selected batch. To display this report, select [Tray Summary/Tray #] (#: 1-10) on the "Review Data" screen.
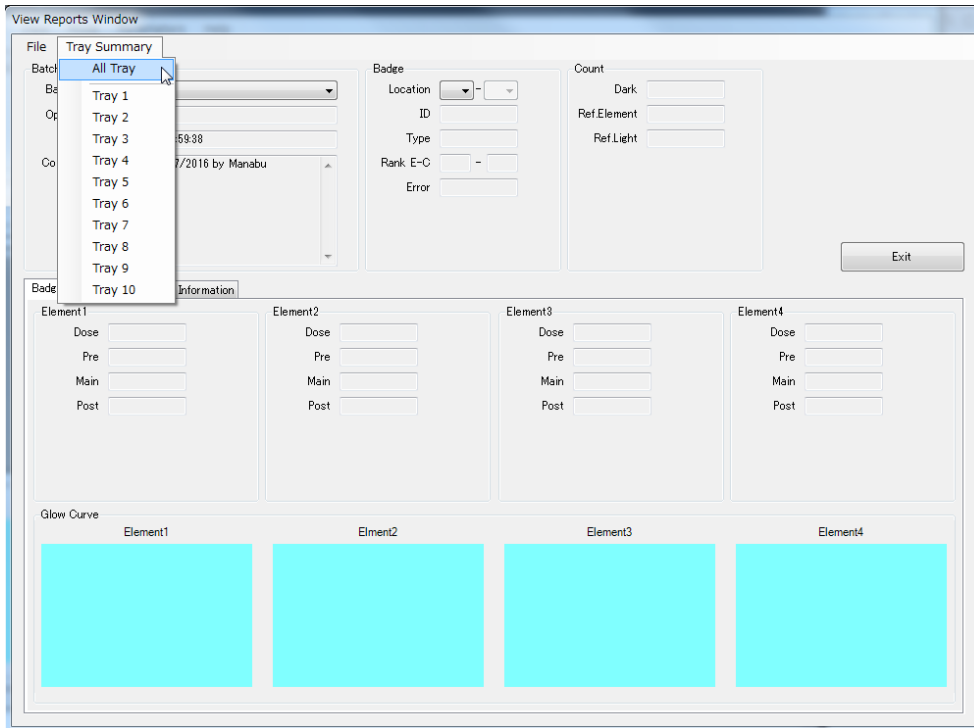
Example of output

```
              Batch DefaultBatch Tray   Report
Operational Time: 12/11/2016 4:02:59 PM  Operator:
Comment:

--------------------------------------------------------------
Slt BadgeNo   E1     E2      E3      E4    Average  Sigma
--------------------------------------------------------------
 01 6100003   34uSv  16uSv   125uSv   8uSv   45uSv   46.71
 02 6101248   13uSv  11uSv   165uSv   7uSv   49uSv   67.01
 03 0702345   18uSv  18uSv   185uSv   8uSv   57uSv   73.87
 04 6101379   18uSv  22uSv   221uSv   9uSv   67uSv   88.75
 05 6101338   29uSv  17uSv   155uSv   7uSv   52uSv   59.97
 06 6101042   41uSv  30uSv   209uSv  11uSv   72uSv   79.39
 07 0702138   22uSv  14uSv   140uSv   7uSv   45uSv   54.67
 08 0702466   28uSv  28uSv   278uSv   9uSv   85uSv  111.27
 09 0702272   30uSv  62uSv   260uSv   9uSv   90uSv   99.81
 10 0702410   60uSv  35uSv   208uSv   2uSv   76uSv   78.80
 . . .
 41 0702157   34uSv  47uSv   177uSv  17uSv   68uSv   63.40
 42 0702340   60uSv  22uSv   252uSv  15uSv   87uSv   96.65
 43 6100198   24uSv  13uSv   305uSv  18uSv   90uSv  124.19
 44 0702415   80uSv  28uSv   301uSv  20uSv  107uSv  114.21
 45 6101267   36uSv  55uSv   273uSv  20uSv   96uSv  102.94
 46 6100999   34uSv  34uSv   180uSv  15uSv   65uSv   66.42
 47 6101063   61uSv  15uSv   263uSv  16uSv   88uSv  102.30
 48 6301820   32uSv   8uSv   178uSv  15uSv   58uSv   69.69
 49 0702215   29uSv  35uSv   292uSv  14uSv   92uSv  115.44
 50 0203013    0uSv   0uSv     0uSv   0uSv    0uSv    0.00
--------------------------------------------------------------
No. of Data   050    050     050     050
Average       32uSv  30uSv   188uSv  10uSv
Sigma         16.65  24.01   67.08    4.60
```

Item	Description
Batch:	Batch ID
Tray:	Magazine number
Operational Time:	Date and time when measurement started
Operator:	Batch operator
Slt	Slot number
Badge No	Badge number
Element (1-4)	Element measurement value
(in line) Average	Measurement average value (by batch)
(in line) Sigma	σ (by batch)
No. of Data	Number of element
(bottom) Average	Measurement average value (by element)
(bottom) Sigma	σ (by element)

Status Log

In "Status Log", it is possible to check errors occurred in the selected batch. To display this report, select [View/Status Log] on the "Review data" screen.

Example of output

```
TLDErrorLog.txt
2016/12/11 15:30:47 UD-7900 Program Started with 710 Read Mode.
2016/12/11 15:30:49 Batch DefaultBatch created.
2016/12/11 15:32:18 START button pressed.
2016/12/11 15:32:20 Processing started on batch DefaultBatch: tray 1.
2016/12/11 15:32:58 STOP button pressed.
2016/12/11 15:37:33 UD-7900 Program Shutdown.
```

▉ Graph output

In "Graph Output", mainly glow curves and the related parameters will be displayed.

Badge Information

Badge Information: Displays glow curves and the related parameters.
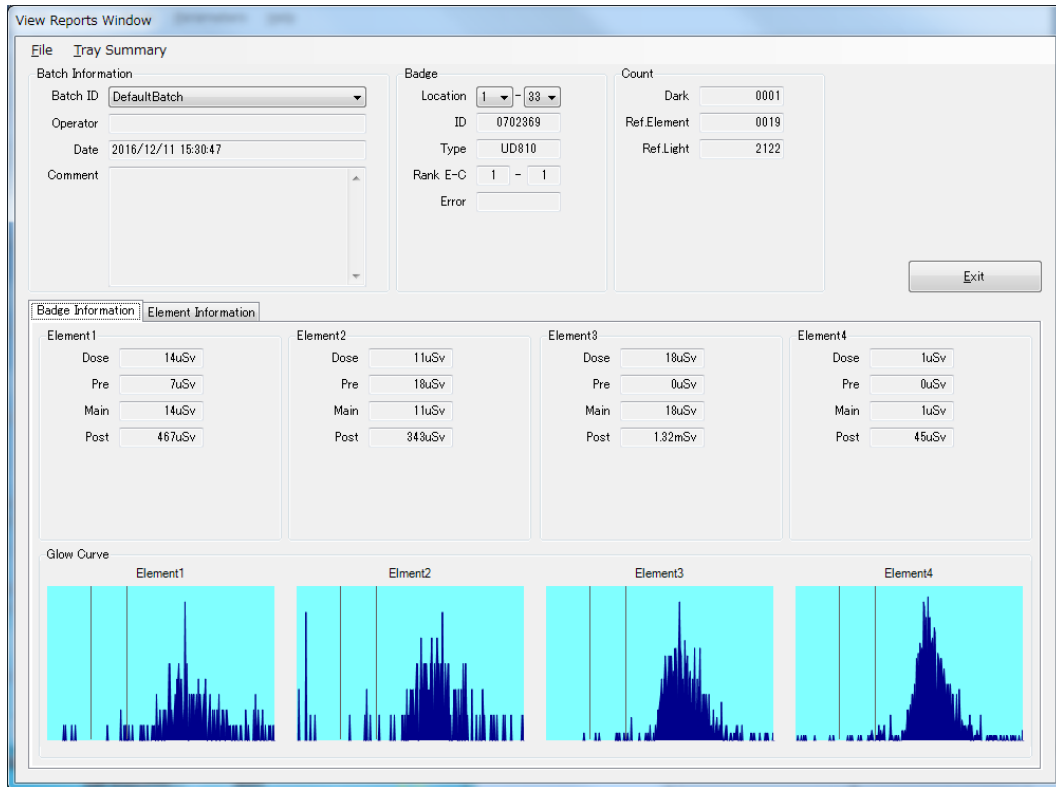
In "Badge Information", glow curve data can be displayed. Select TRAY of badge to be displayed and BADGE.

Element Information

Element Information: Displays glow curves and the related parameters.
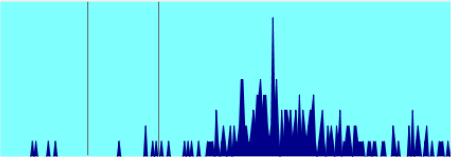
In "Element Information", glow curve data can be displayed. Select Element No. of badge to be displayed and BADGE.

Description of Menus

Descriptions about details of screens and operations are provided here. First, descriptions about content to be displayed on the main screen, and then about each menu are provided. These contain the status displays and the controls to operate through these displays.

▉ Main screen

The main screen is the initial screen when operating UD-7900. With the main screen as the starting-point, continuous work with the current batch, creation of new batch, data review of old batch, data analysis, creation of report, etc. can be executed.

"Status Log" displays start of measurement, end of measurement and error/abnormal data occurrence and their occurrence time and date. It is possible to display the past content (However, this is available only after launching the application software. When the application software is stopped once and restarted, content will be initialized.) using the scroll bar on the right side of the screen.

Lamp Status

Lamp Voltage¥B.V.	Lamp voltage/Bleeder voltage (average)
Lamp Current¥B.C.	Lamp current/Bleeder current (average)
Lamp Power¥B.P.	Lamp power/Bleeder power (average)
Lamp Flash Count	Cumulative lamp flash count

"Lamp Status" displays the lamp voltage, lamp current, lamp power and lamp flash count.

Batch ID

Header	Description
Batch ID	Batch ID
Location	Current magazine number and slot number
Cor.Factor	(10 times CAL) count

The current badge ID information will be displayed for "Badge ID". Displaying of measurement result by each item will go on even when the badge measurement processing is in progress. "Location" displays the magazine position even when the magazine is being sent manually.

Measured Data

Location	Badge ID	Type	E/C	Dark Cnt	Ref. Ele.	Ref.Light	Element1	Element2	Element3	Element4
1-1	0000000	802	7/1	3	26	0.441	0uSv	0uSv	0uSv	0uSv
1-2	0320009	802	0/0	1	22	0.441	5uSv	5uSv	0uSv	0uSv
1-3	0000000	802	6/0	2	5	0.441	3uSv	14uSv	0uSv	0uSv
1-1	0000000	800	0/0	1	16	0.444	8uSv	8uSv	1uSv	0uSv
1-2	0000000	800	0/0	2	6	0.444	0uSv	1uSv	0uSv	0uSv
1-3	0000000	800	0/0	4	9	0.441	33uSv	29uSv	43uSv	44uSv
1-4	0000000	800	0/0	0	19	0.441	6uSv	12uSv	1uSv	1uSv
1-5	0000000	800	0/0	2	5	0.440	8uSv	8uSv	0uSv	0uSv
1-6	0000000	800	0/0	3	4	0.440	0uSv	0uSv	0uSv	1uSv
1-7	0000000	800	0/0	0	31	0.435	6uSv	6uSv	0uSv	1uSv
1-8	0000000	800	0/0	1	21	0.435	20uSv	20uSv	43uSv	41uSv

Header	Description
Location	Current magazine number and slot number
Badge ID	TLD Badge number
Type	TLD Badge type
E/C	Rank E value/Rank C value
Dark Cnt	Dark count
Ref.Ele	Reference element
Ref.Light	Reference light
Element 1	Element 1 measurement result
Element 2	Element 2 measurement result
Element 3	Element 3 measurement result
Element 4	Element 4 measurement result

In "Measured Data", displaying of measurement result by each item will go on even when the badge measurement processing is in progress.

Glow Curve Display
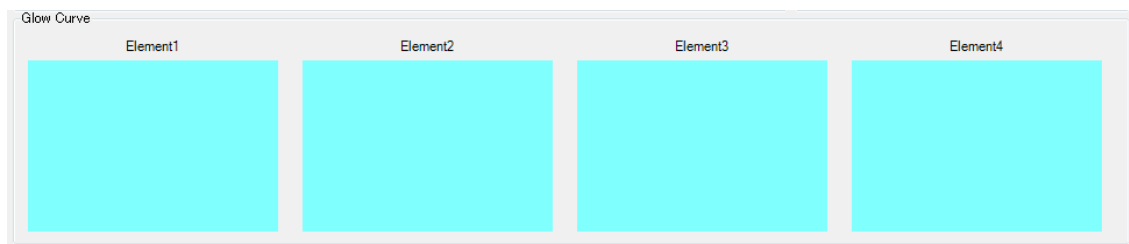
"Glow Curve Display" displays preview of glow data.

Autochanger Control
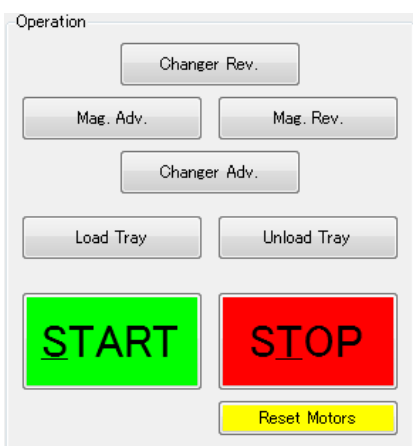
Changer Rev	Reversely advances the shelf of the automatic changer by 1 step.
Changer Adv	Advances the shelf of the automatic changer by 1 step.
Mag Adv	Advances the magazine by 1 slot.
Mag Rev	Reversely advances the magazine by 1 slot.
Unload Tray	Returns the magazine from the reader to the automatic changer (PULL).
Load Tray	Takes the magazine out of the automatic changer and send it to the reader (PUSH).
START	Starts the measurement.
STOP	Stops the measurement.
Reset Motors	Executes the mechanical initialization operation.

■ Menu Bar

Badge Read Window

File   View   Mode   Parameters   Help
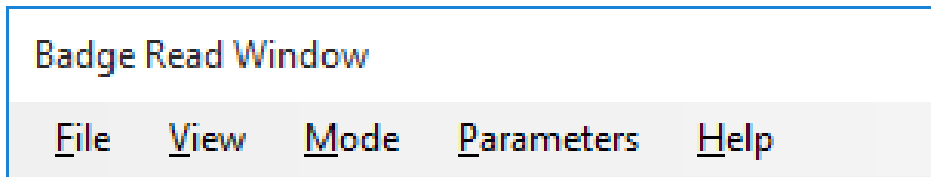
It is possible to access various functions of the application software and operate them through the menu bar.
By using the functions of the application, various processes can be executed.

File

New	►	Batch	Create a new batch	Page 22
Exit UD-7900			Exit from the application	Page 22
			Note: The is the only way to end the application.	

View

Badge Results	"Badge Results" displays all measurement results in the batch.	Page 23
Status Log	Display of unexpected events and error occurrences during processing of the current badge	Page 24
Reports	Tools for data check and analysis will be provided	Page 24
Re-Output Measured Data	Re-output of most recent measurement data output to the external PC	Page 24

Mode

Reader Check	►	Loader	Self-diagnosis tool of the loader mechanism	Page 25
	►	Changer	Self-diagnosis of the automatic changer	Page 25
	►	Lamp (F3 and F4 Check)	Check tool for Lamp F3 and F4	Page 26

Parameters

List Parameters			Display/Edit of system parameter	Page 27
Processing Modes			Display/Edit of items relating to measurement process	Page 28
Timing Parameters			Display/Edit of timing parameter	Page 30
Reader Functions			Display/Edit of reader function parameter	Page 32
Calibration Settings			Display/Edit of conversion constant	Page 33
Heat Lamp Power			Display/Control of lamp voltage	Page 34
RS232 Options			Setting of RS232 port	Page 34
Parameter Dump	►	to Computer	Host computer output of parameter	Page 35
	►	to File	File output of parameter	Page 35
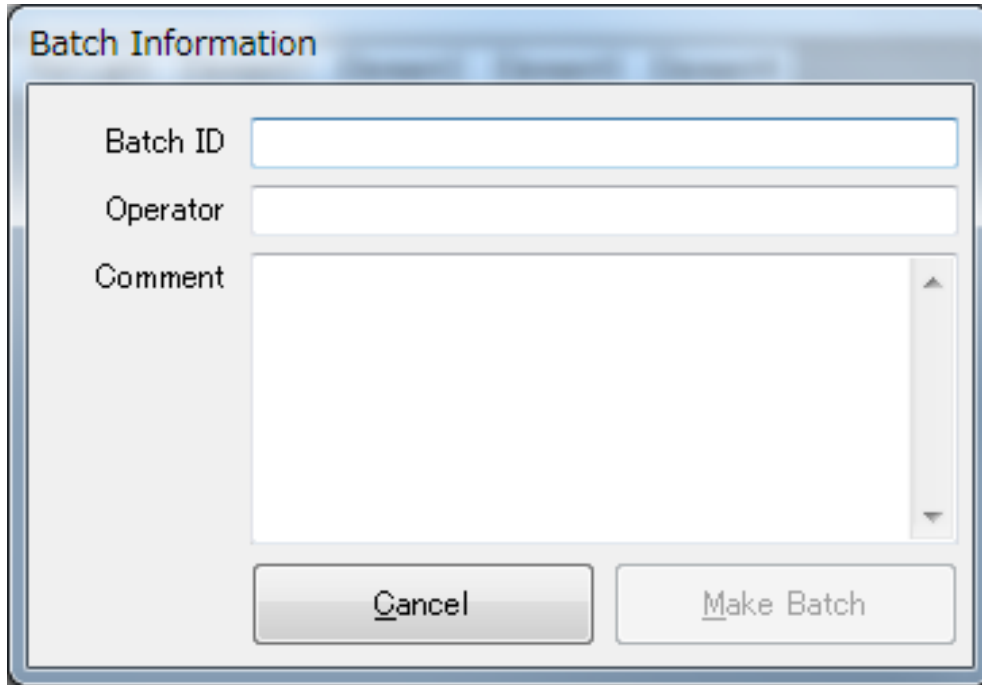
Help

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▉ Menu Bar File Command

[File/New/Batch] is the command used to create a new batch and also used to newly measure a TL badge. When [File/New/Batch] is selected from the menu of the main screen, the batch information window will be displayed. When entry for "Batch ID" (8 alphanumeric characters, required), "Operator" and "Comment" is completed and the [Make Batch] button is clicked, a new batch will be created.

After clicking the [Make Batch] button, this batch will automatically be selected as the default and measurement data will be stored in the folder whose name is the name of this batch.

Exit UD-7900 | **File/Exit UD-7900 Command**

The is the only way to end the application on "File/Exit UD-7900".
To prevent from data loss, it will be invalidated during measurement.

■ Menu Bar View Commands

| Badge Results | View/Badge Results Command |

[View/Badge Results] displays data of the currently applied batch stored in the "ProcRpt.txt" file. Data items are as shown below and use "Word Pad" to display data.

Item	Description
Title	Process report title
Operational Time:	Date and time when measurement started
Operator:	Batch operator
Comment:	Comment
Header	Data section header
Time	Badge measurement time
Try	Magazine number
Slt	Slot number
BdgNo	Badge number
Typ	Badge type
Err	Badge error code
E1	Element 1 dose value
E2	Element 2 dose value
E3	Element 3 dose value
E4	Element 4 dose value
Drk	Dark count
Ref	Reference element
Corr	Reader sensitivity correction factor
C	Rank C
E	Rank E

Example of output

```
ProcRpt.txt
|                     Batch 20150129 Processing Report

Operational Time: 01-29-2015 19:07:10     Operator:
Comment:

  Time   Try Slt BdgNo Typ Err        E1        E2        E3        E4   Drk Ref   Corr C E
16:00:41  1  1 0001034  7        0.000mSv  0.000mSv  0.000mSv  0.000mSv   4  40 0.955 0 0
16:01:52  1  1 4000053  2        0.782mSv  0.764mSv  0.792mSv  0.854mSv   0  30 0.961 7 0
16:02:29  1  1 4000053  2        0.060mSv  0.046mSv  0.002mSv  0.002mSv   2  30 0.975 7 0
16:02:29  1  2 0000000  0 EE     0.000mSv  0.000mSv  0.000mSv  0.000mSv   0   0 0.975 0 0
16:02:29  1  3 0000000  0 EE     0.000mSv  0.000mSv  0.000mSv  0.000mSv   0   0 0.975 0 0
16:02:51  1  4 4000054  2        1.325mSv  1.094mSv  0.771mSv  0.773mSv   2  24 0.974 7 6
16:03:01  1  5 0000001  2        0.000mSv  0.000mSv  0.000mSv  0.000mSv   0  28 0.949 6 1
16:03:01  1  6 0000000  0 EE     0.000mSv  0.000mSv  0.000mSv  0.000mSv   0   0 0.949 0 0
16:03:23  1  7 4000057  2        1.303mSv  1.275mSv  0.815mSv  0.795mSv   2  30 0.958 7 6
16:03:45  1  8 4000058  2        1.232mSv  1.175mSv  0.758mSv  0.820mSv   0  24 0.953 7 6
```

Status Results

View/ Status Results: Events and errors occurred in the current batch can be checked.

Example of output

```
TLDErrorLog.txt
05/05/1998  14:31:45 ** Batch 000000d1 created.
05/05/1998  14:32:21 ** START command issued
05/05/1998  14:33:23 ** STOP command issued
05/05/1998  14:34:00 -> R2 RS232 TX dose data ACK time out
05/05/1998  14:34:03 ** STOP command issued
05/05/1998  14:44:22 ** START command issued
05/05/1998  14:44:22 ** Processing started on batch 000000d1: tray 1.
```

Reports

Refer to pages 13 - 21 and Appendix-C for details of report.

Re-Output Measured Data

Refer to Appendix-D for details of the external PC re-output.

■ Menu Bar Mode Commands

Reader Check/Loader	

"Reader check/Loader" makes possible to manually control the mechanism section and to check signals. Usually, a repair man uses this for troubleshooting at trouble occurrence.
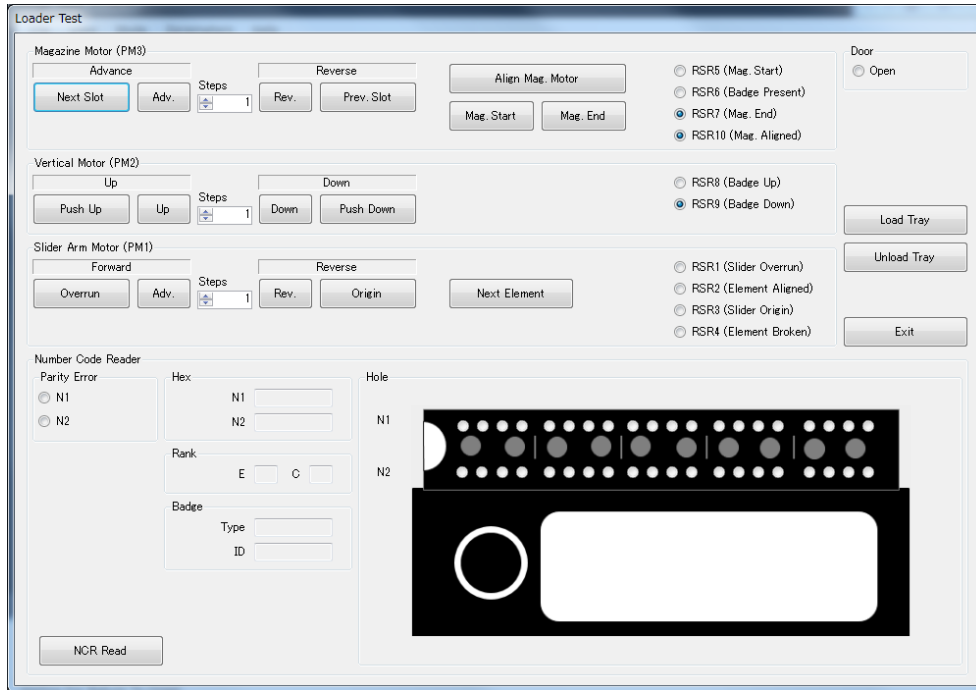
Reader Check/Changer	

"Reader check/Changer" makes possible to manually control the automatic changer and to check signals. Usually, a repair man uses this for troubleshooting at trouble occurrence.
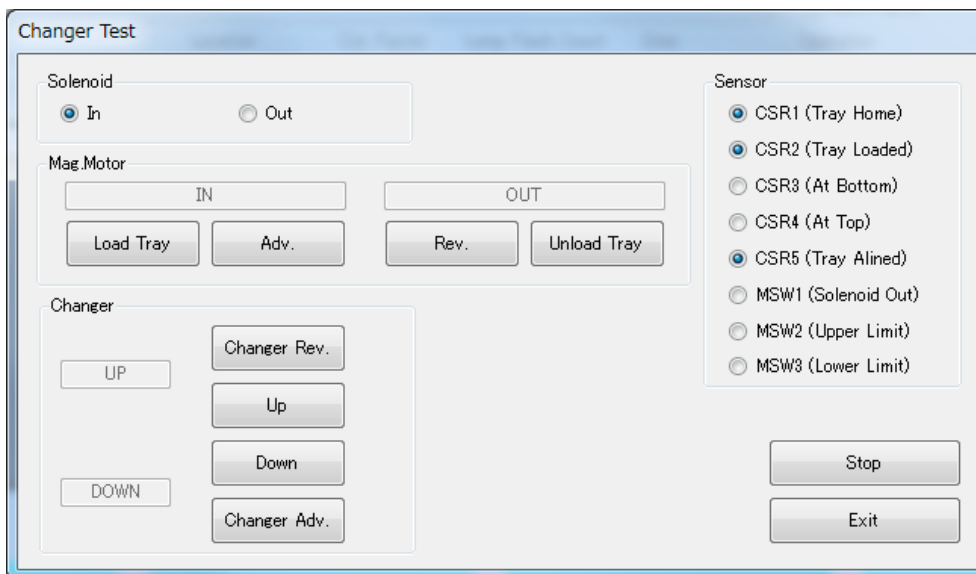
Executes the lamp check and compares the lamp voltage, current and power with reference values.

■ Menubar Parameters Commands

List Parameters	Parameters/List Parameters Command

"List Parameters" displays and edits parameter P0 - P141. Unused parameters are unavailable to edit. The [Load from File] button can be used to execute backup or load the "parametr.xml" file for work. The [Save to File As] button can be used to execute backup of the current "parametr.xml" file.

The main parameters are grouped and they can be edited on the screens on "Processing Modes", "Timing Parameters", "Reader Functions", "Calibration Settings", "Heat Lamp Power" and "RS 232 Options".
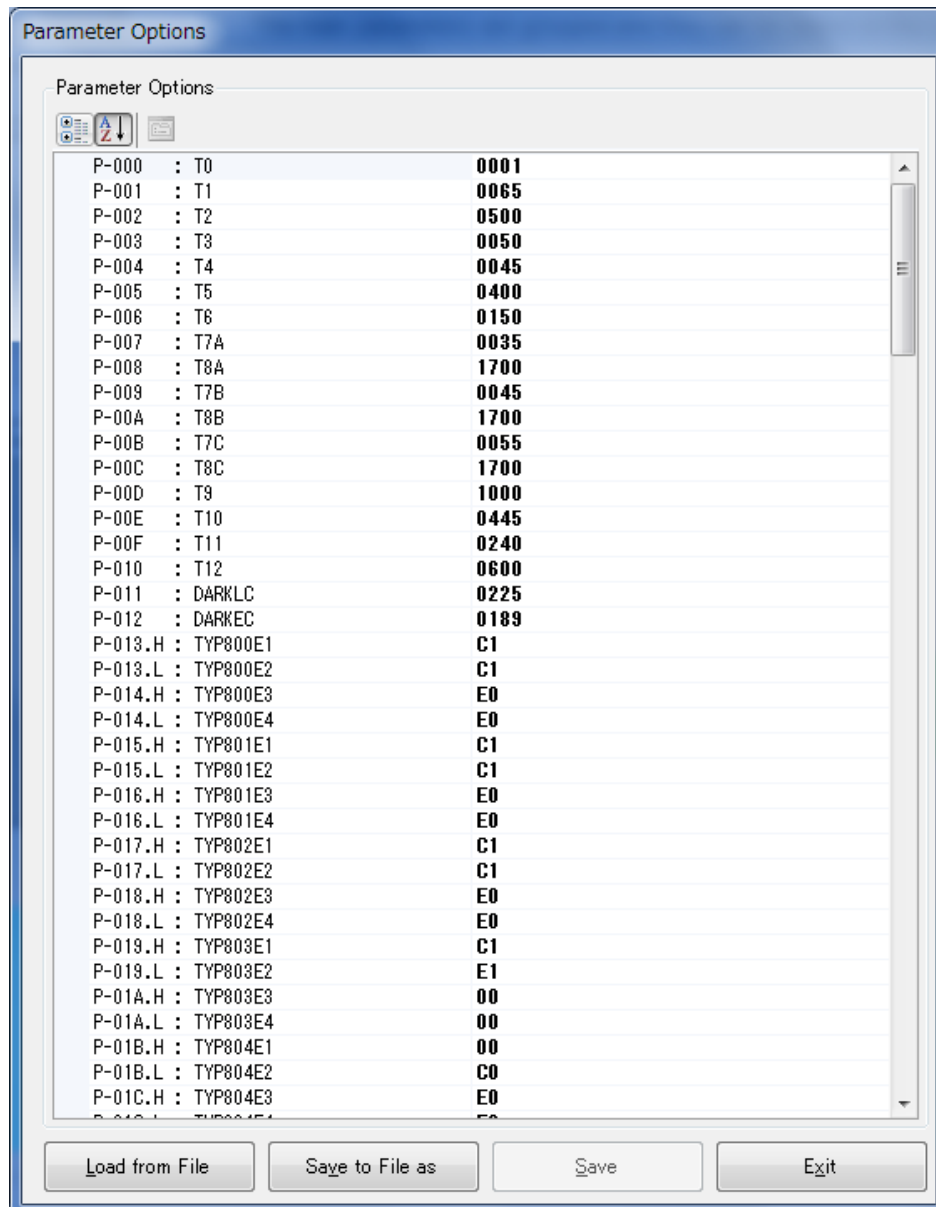
Handles all items relating to measurement process together.

Refer to Table 1 and Table 2 for setting values.
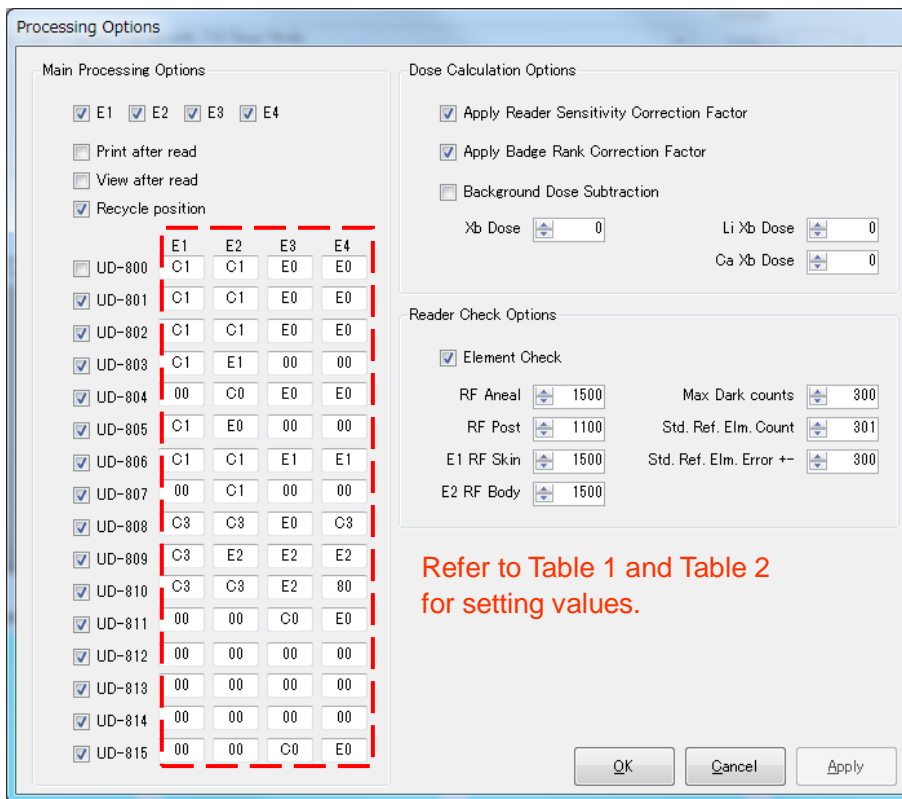
Apply Reader Sensitivity Correction Factor

Based on reference light read value before correction as reference value, the reader sensitivity correction count will be calculated from the ratio of the value read later on to the reference value. Normally, this is to be applied (having a mark on the check box) for correction of the reader sensitivity. Dirt or dust stuck on the blue filter of PMT may be the possible cause of fluctuation of the reader sensitivity.

Apply Badge Rank Correction Factors

TL badge is basically once radiated and measured in the production process at factory and the sensitivity rank is determined based on this measurement result. This rank is given to each TL badge, in form of the rank correction code, by 1 element or by 2 elements and is used to reduce sensitivity fluctuation between element at measurement. Normally, this setting is to be applied (having a mark on the check box).

Background Dose Subtraction

For parameter P-4F, set the background to be applied to all elements. The problem when using P-4F is the remaining dose indicated by LiBO element and CaSO element as the result is unequal (LiBO > CaSO). Therefore, an additional background for LiBO can be set for P-45. Generally, the background process is not executed on UD-7900 but on the PC. Thus, it is recommended to set P-45 and P-4F to "0000".

Table 1 Element definition of TL badge

Dosimeter	Parameter		Hexadecimal		Binary Code for Each Element			
Described	E1E2	E3E4	E1E2	E3E4	E1	E2	E3	E4
UD-800	13	14	C1C1	E0E0	11000001	11000001	11100000	11100000
UD-801	15	16	C1C1	E0E0	11000001	11000001	11100000	11100000
UD-802	17	18	C1C1	E0E0	11000001	11000001	11100000	11100000
UD-803	19	1A	C1E1	0000	11000001	11100001	00000000	00000000
UD-804	1B	1C	00C0	E0E0	00000000	11000000	11100000	11100000
UD-805	1D	1E	C1E0	0000	11000001	11100000	00000000	00000000
UD-806	1F	20	C1C1	E1E1	11000001	11000001	11100001	11100001
UD-807	21	22	00C1	0000	00000000	11000001	00000000	00000000
UD-808	23	24	C3C3	E0C3	11000011	11000011	11100000	11000011
UD-809	25	26	C3E2	C2E2	11000011	11100010	11100010	11100010
UD-810	27	28	0000	0000	00000000	00000000	00000000	00000000
UD-811	29	2A	0000	C0E0	00000000	00000000	11000000	11100000
UD-812	2B	2C	0000	0000	00000000	00000000	00000000	00000000
UD-813	2D	2E	0000	0000	00000000	00000000	00000000	00000000
UD-814	2F	30	0000	0000	00000000	00000000	00000000	00000000
UD-815	31	32	0000	C0E0	00000000	00000000	11000000	11100000

Table 2 Bit definition of binary code for each element

Bit #	Description
Bit 7	Is this element present in this dosimeter? 0 = no, 1 = yes
Bit 6	Is a rank correction factor to be applied to this element? 0 = no, 1 = yes
Bit 5	Which rank correction factor is to be applied to this element? 0 = C rank, 1 = E rank
Bit 4	Not used (always 0)
Bit 3	Not used (always 0)
Bit 2	Not used (always 0)
Bit 1	Which phosphor sensitivity ratio is used for this element? 00 = CaSO/CaSO (P-3B),
Bit 0	01 = CaSO/nLinBO (P-3C),10 = CaSO/6Li10BO (P-3D),11=CaSO/7LI11BO (P-3E)

All items relating to heating and measurement will be handled together.
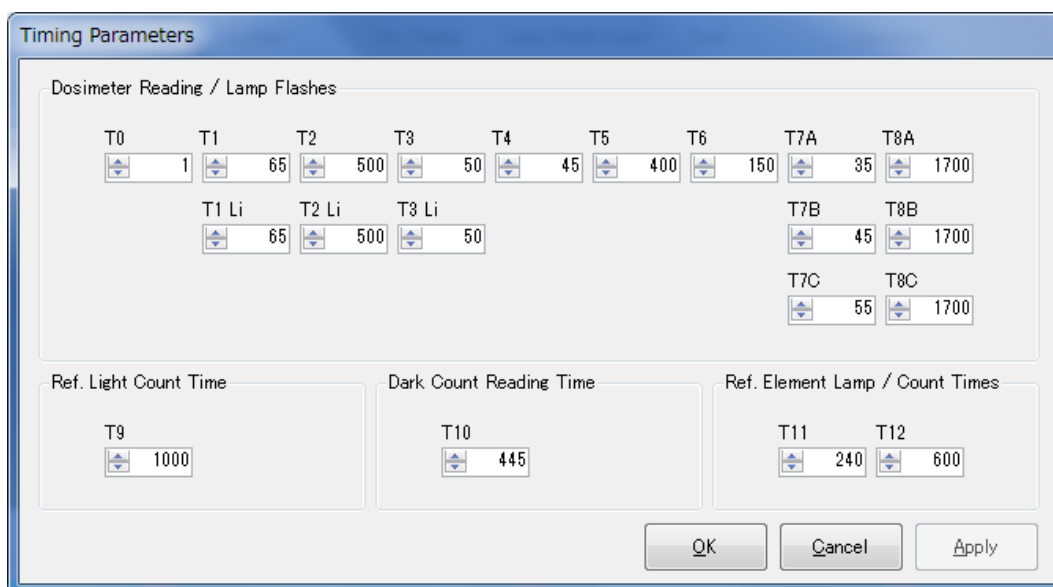
Timing parameter (T1-T12)

T1'	Factory setting: LiBO Pre-lamp On time (ms)	Time to replace the heating lamp can be changed
T2'	Factory setting: LiBO Pre-lamp Off time (ms)	Time to replace the heating lamp can be changed
T3'	Factory setting: LiBO Main-lamp On time (ms)	Time to replace the heating lamp can be changed
T0	Factory setting: Pre-heating time (ms)	
T1	Factory setting: CaSO Pre-lamp On time (ms)	Time to replace the heating lamp can be changed
T2	Factory setting: CaSO Pre-lamp Off time (ms)	Time to replace the heating lamp can be changed
T3	Factory setting: CaSO Main-lamp On time (ms)	Time to replace the heating lamp can be changed
T4	Factory setting: Main-lamp On time (ms) - Main count time	
T5	Factory setting: Main-lamp Off time (ms) - Main count time	
T6	Factory setting: Main-lamp Off time (ms)	
T7A	Factory setting: Post-lamp On time (A)	
T8A	Factory setting: Next heating interval time	
T7B	Factory setting: Post-lamp On time (B)	
T8B	Factory setting: Next heating interval time	
T7C	Factory setting: Post-lamp On time (C)	
T8C	Factory setting: Next heating interval time	
T9	Factory setting: Carbon-14 measurement time	
T10	Factory setting: Dark measurement time	
T11	Factory setting: Reference element lamp On time	
T12	Factory setting: Reference element lamp Off time	

Value	T0	T1	T2	T3	T4	T5	T6	T7	T8
Example of typical times *(ms)*	1	65	500	50	45	400	150	35	1700

Lamp Flash

Integrator   PRE   DOSE   POST

Integrator

Value   T10
Example of typical time *(ms)*   445
(T10 = T4+T5)

Reader Functions (710 Read Mode)

"Reader Functions (710 Read Mode)" has a collection of frequently-used functions on UD-710 and it is easy to change the reader operation on this screen.

Reader Functions (UD-710)

- ☑ [P_50.11] Check TLB for Parity
- ☑ [P_50.10] Calculate Reader Sensitivity Value
- ☐ [P_50.07] Use Conventional Units of "R"
- ☑ [P_51.06] Check Carbon-14 Light Source
- ☐ [P_51.02] Data String Includes CR and LF
- ☐ [P_50.12] Anneal Mode(Use T7C and T8C)

[OK]   [Cancel]   [Apply]
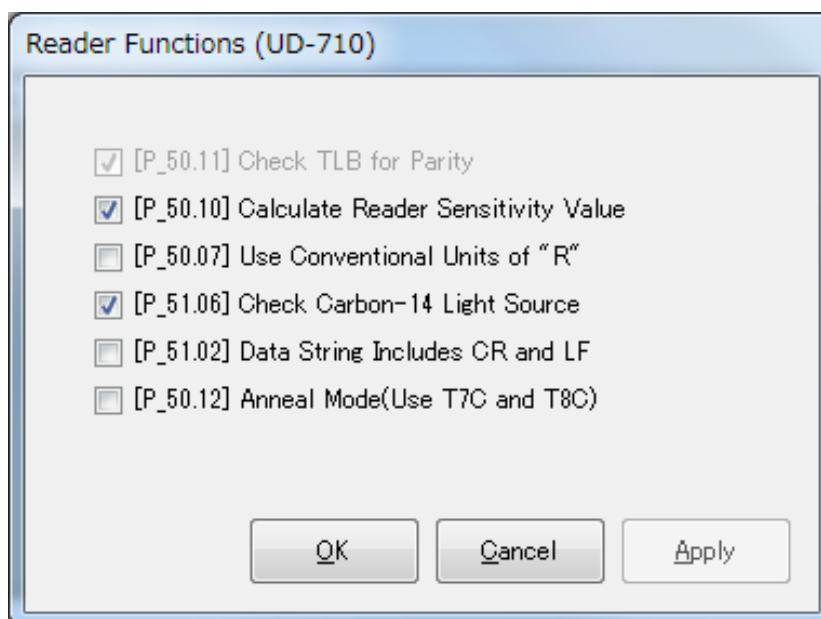
Check TLD Badge for Parity
Designates presence or absence of parity of punched hole on TL badge. Normally, this setting is to be applied (having a mark on the check box).

Calculate Reader Sensitivity Value
When this option is designated, the reader will determine the latest reader sensitivity at load of magazine or at start of measurement. At the above timing, Carbon-14 measurement will be executed and the ratio to the reference value will be calculated. This value will be displayed on the screen, stored in P-57 and inserted in transmission data.

Use Conventional Units of R
When this option is designated, "R" will be used for the unit of dose. When not designated, "Sv" will be used.

Check Carbon-14 Light Source

When this option is designated, the reader will execute the sensitivity check by Carbon-14 before measuring each TL badge. When the reader sensitivity is out of the reference range, an error occurs and the operation will automatically stop.

Data String Includes CR and LF

When this option is designated, CR and LF codes will be attached to the end of transmission data.

Anneal Mode (Use T7C and T8C)

When this option is designated, the anneal time will be extended. "T7C" or "T8C" will automatically be selected according to the measurement results.

Reader Functions (716 Read Mode)	<u>Parameters/Reader Functions Command</u>

"Reader Functions (716 Read Mode)" has a collection of frequently-used functions on UD-716 and it is easy to change the reader operation on this screen.
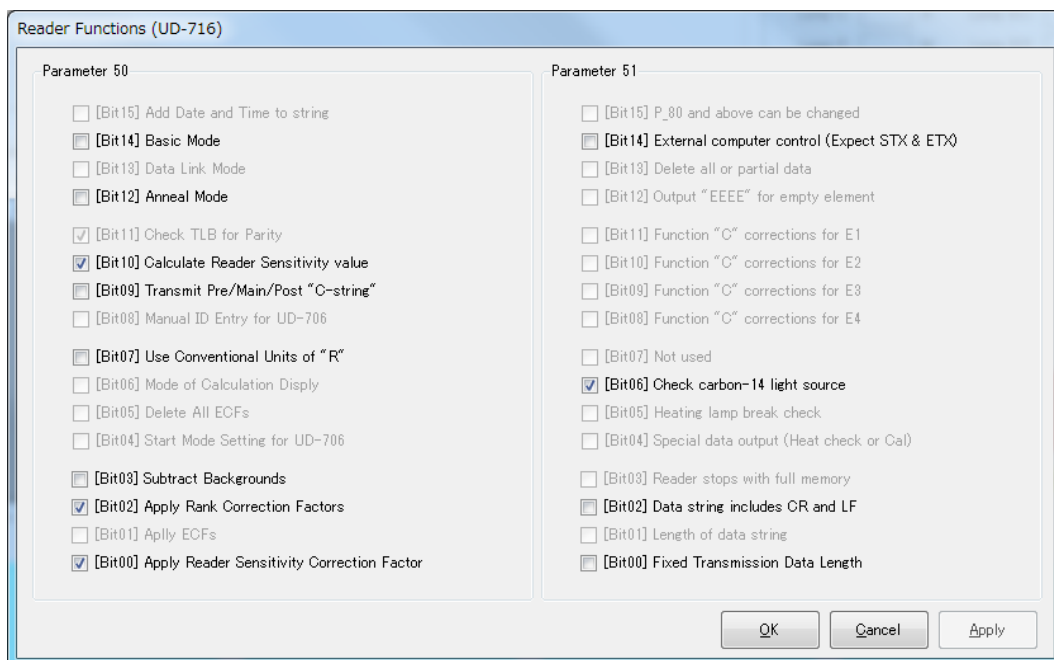
Basic Mode, Transmit PRE-MAIN-POST "C-string", Fixed Transmission Data Length

Refer to the "RS232 Options" screen.

Anneal Mode

When this option is designated, the anneal time will be extended. "T7C" or "T8C" will automatically be selected according to the measurement results.

Calculate Reader Sensitivity value

When this option is designated, the reader will determine the latest reader sensitivity at load of magazine or at start of measurement. At the above timing, Carbon-14 measurement will be executed and the ratio to the reference value will be calculated. This value will be displayed on the screen, stored in P-57 and inserted in transmission data.

Use Conventional Units of R

When this option is designated, "R" will be used for the unit of dose. When not designated, "Sv" will be used.

Subtract Backgrounds, Apply Rank Correction Factor, Apply Reader Sensitivity Factor
Refer to the "Processing Options" screen.

Check Carbon-14 light Source
When this option is designated, the reader will execute the sensitivity check by Carbon-14 before measuring each TL badge. When the reader sensitivity is out of the reference range, an error occurs and the operation will automatically stop.

Data string include CR and LF
When this option is designated, CR and LF codes will be attached to the end of transmission data.

External computer control (Expect STX & ETX)
When this option is designated, the format of [STX][ETX][BCC] will be used for reception in the BASIC mode. When not designated, the format will be [CR][LF].

Calibration Settings	<u>Parameters/Calibration Settings Command</u>

"Calibration Settings" handles all of each coefficient value together.

Phosphor Sensitivity Ratios
These parameters are used as a multiplier to the count value of the fluorescent material other than CaSO. The sensitivity ratio of CaSO to each fluorescent material other than CaSO will be displayed.

Reader Sensitivity
P-57 stores Carbon-14 reference count of the P-counter. Carbon-14 will be read in each time of magazine loading and the read value will be stored in P-67 for the P-counter and in P-68 for the frequency counter. The average value will be stored in P-5E. The sensitivity correction coefficient value of the reader will be calculated by "P-5E/P-57". When "P-5E/P-57" is within "100%+/- P-78H", the sensitivity correction coefficient value will be stored in P-71.
The reader will execute calculation of "P-67/P-57" for the sensitivity check. If "P-67/P-57" is within "100% +/- P-78H", the value will be stored in P-6D.
The sensitivity correction coefficient value will be used for the dose correction. The sensitivity check will be executed in each time of badge measurement, but this value will not be applied to the dose correction.

When cleaned the reader measuring-related section, set a value to P-57 so that P-71 is close to "1".
However, when changed the reference value, it is necessary to execute the correction.

CCF
The unit used for PCCF is "10-5 mR/P-count".
(Do not change it from the factory setting.)

Heat Lamp Power	

"Heat Lamp Power" controls the heating lamp.
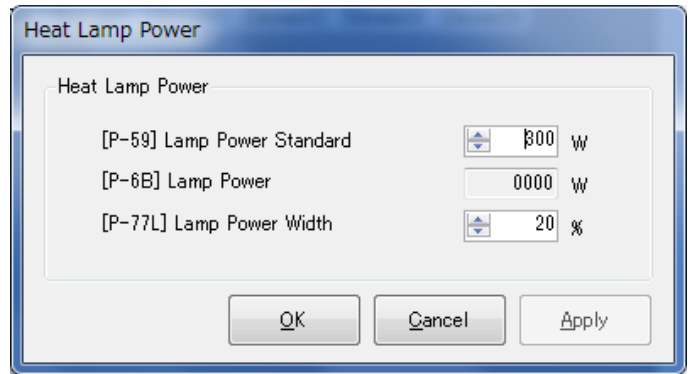
Heat Lamp Power
P-59 stores the reference value of the heating lamp power. If the deviation from the reference value of the actual lamp power (P-6B) exceeded the allowable range (stored in P-77, usually 20%), an error occurrence will be made to interrupt the measurement.

RS232 Options	

The settings relating to the RS232 communication port and the serial printer can be configured.
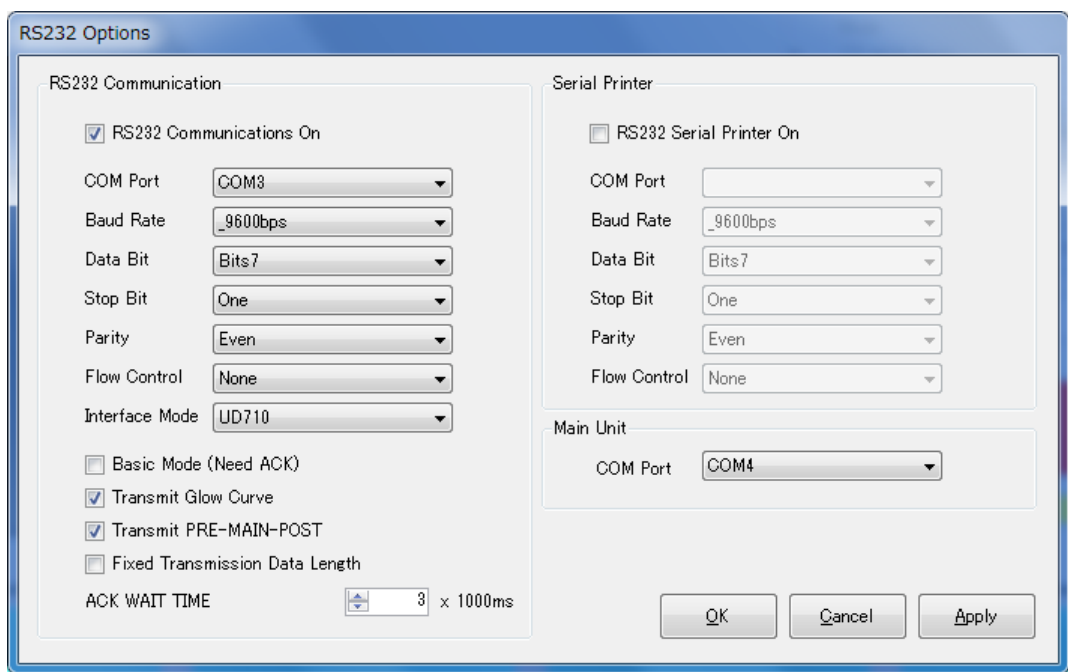
RS232 Communication ON

When this option is selected by putting a mark on the check box, the reader will transmit data to the designated port with the designated conditions (transmission speed, data length, stop bit number, parity, flow control and interface mode).

RS232 Serial Printer ON

When this option is selected by putting a mark on the check box, the reader will output data to the printer using the designated port and transmission speed.

Basic Mode

When this option is selected by putting a mark on the check box, the reader will be operated in the BASIC mode. In this mode, the reader will request reception check of transmission data from the external device. The external device will transmit ACK if received correctly and transmit NAK to the reader if not.

Transmit Glow Curve

When this option is selected by putting a mark on the check box, the reader will output glow data (format code "G").

Transmit PRE-MAIN-POST

When this option is selected by putting a mark on the check box, the reader will also output PMP data (format code "C") containing PRE, DOSE-P, DOSE-F and POST in addition to the normal measurement data (format code "G"). This data is useful to determine the crossover point.

Fixed Transmission Data Length

When this option is selected by putting a mark on the check box, length of output data in the BASIC mode will be fixed.

ACK WAIT TIME

"ACK WAIT TIME" determines the ACK wait time.

Main Unit COM port

Set the COM port to be connected with the main unit.

Parameter Dump to Computer	**Parameters/COM Dump to Computer Command**

Sends the parameters to the external device. At that time, the format will be applied by following the interface mode designated in "RS232C Options". Data of this time will be also be stored in the "710pdump.txt" file or the "716pdump.txt" file.

Parameter Dump to File	**Parameters/COM Dump to File Command**

Outputs the parameters as a file.

■ Menu Bar Help

About UD-7900

Displays the application version and the system information.
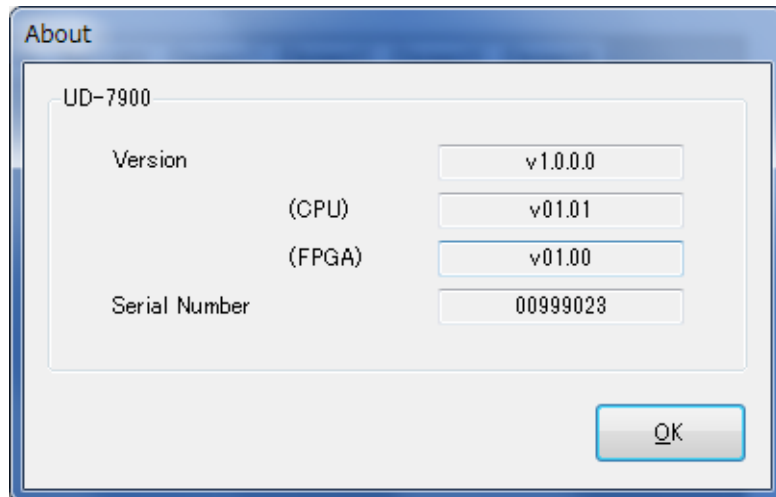
3. How to Operate Windows

■ Menu bar navigation

With the menu bar as the starting-point, accessing various functions is available in the common manner of Windows operation.
As an example, see the following procedures of how to display the batch creation screen.

Step 1
Search for [File] on the menu bar.

Badge Read Window

File View Mode Parameters Help
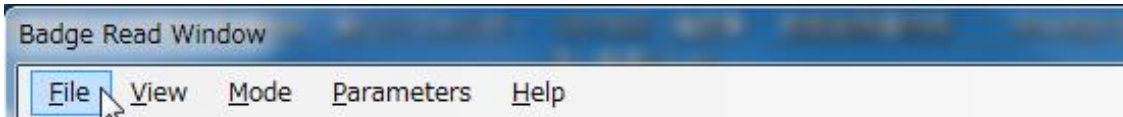
Step 2
When the [File] is clicked, the pull-down menu will be displayed.

Badge Read Window

File View Mode Parameters Help
  New   ▶
  Exit UD7900   '900 Program Started with 710 Read Mode.
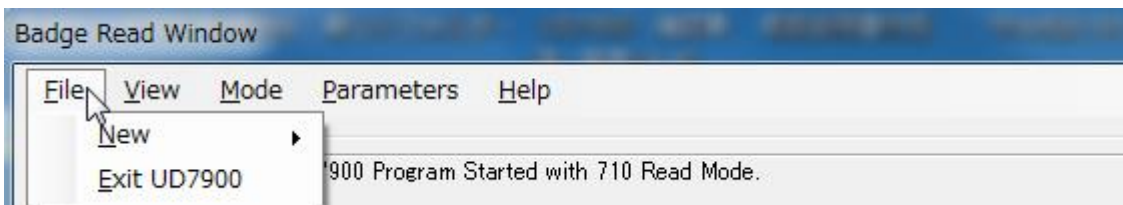
Step 3
Move the mouse pointer onto [New].
"■" indicates that the sub-pull-down menu is available.

Badge Read Window

File View Mode Parameters Help
  New   ▶   Batch
  Exit UD7900   900 Program Started with 710 Read Mode.
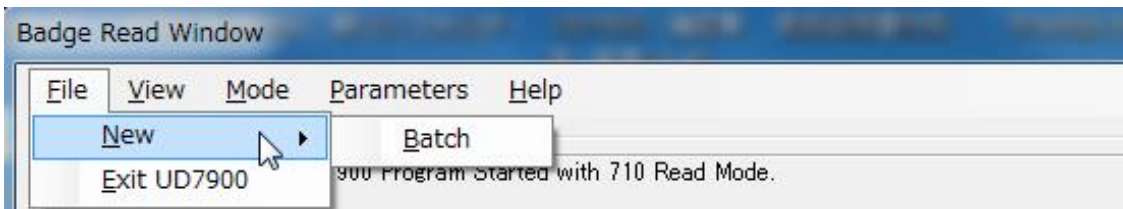
Step 4
Move the pointer onto "Batch" and click it.

Badge Read Window

File View Mode Parameters Help
  New   ▶   Batch
  Exit UD7900   900 Program Started with 710 Read Mode.
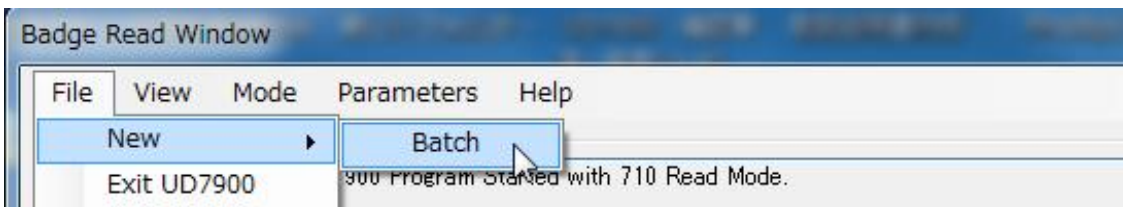
Appendix-A Error Code

▌ Error code table

A Automatic Magazine Changer	A3	Error in up/down operation of the magazine shelf
	A5	Operation error to PUSH the magazine to the reader main body or to PULL out of the reader main body
	A6	Solenoid operation error
	A8	Detected existence of magazine in both the measurement section and the magazine changer section
	A9	M1 motor alarm
	AA	M2 motor alarm
	AB	M1 motor (Upper shelf overrun)
	AC	M1 motor (Lower shelf overrun)
B Badge Inserter	B0	Badge push-up operation error
	B1	Badge pull-down operation error
	B2	Magazine return error
	B3	Slider origin error
	B4	Slider end position undetected
	B5	Slider overrun error
	B7	Element position detection error
	BA	1) Element breakage detection error when the card carrier is at the origin point 2) Element breakage detection error
	BE	PM2-related sensor failure
	BF	Irradiation position detection error
C Controller	C1	FPGA start error
	C2	FPGA bus error
	C3	FPGA click cut-off
	C4	System parameter error (checksum error, illegal value)
	C5	System parameter error (Shall be BCD format or 2-byte pack format, but HEX format is applied)
	C7	Power voltage error (15V)
	C8	Front door open
	C9	Power shut-down during element measurement or dose transmission
	CA	PC operation section - Communication error between the control sections
D Dosimeter	D0	No element or breakage
	D1	Exceeded the management dose (Element 1, 2)
	D2	Exceeded the management dose (All elements)
	D4	Badge type out-of-designation
	D5	Exceeded the post management dose
H Heating Lamp Driver	H0	Lamp power exceeded the reference value
	H1	Timing parameter error
	H2	Exceeded the lamp flash count (1,000,000 times)

	H3	Error occurred in I2C for halogen lamp voltage current monitoring	
I Hybrid Integrator	I2	Out of measurement range at TL badge measurement	
	I3	Abnormal value for calibration light source (CAL)	
	I4	Exceeded the dark count reference value(both of P-/F-counters)	
	I5	Exceeded the reference value	
M Magazine Driver	M0	Slot sending error (Cannot send to the next slot)	
	M3	Magazine end point error (Magazine is not being sent to the end point position)	
N Number Code Reader	N2	NCR parity error	
	N3	NCR I2C error	
T Temperature	T0	Thermal error around the photomultiplier during measurement	
PCI Device Error	Appendix-F	Refer to "Measurement and Automation Explorer".	

Appendix-B Example of Report

Export Data

```
ExportDose - Notepad
File  Edit  Format  View  Help

eCnts E3MCnts E3PostCnts E3Err E4Dose E4Cnts E4Pre  E4Main E4Post E4PreCnts E4MCnts E4PostCnts E4Err  Drk Ele  Light C E    Unit
0009  0077    1122       0230  1196   0052   0230   1186   0440   1196      2159   0006 0661 2214 0 2          R
0019  0063    0959       0243  1208   0067   0243   1189   0575   1208      2161   0007 0414 2214 1 1          R
0008  0039    1120       0203  1168   0037   0203   1173   0309   1168      2143   0013 0332 2207 1 1          R
0014  0548    1475       0171  1144   0048   0171   1169   0400   1144      2142   0010 0400 2210 0 1          R
0008  0433    1400       0203  1172   0021   0203   1176   0177   1172      2149   0011 0416 2212 1 1          R
0024  0688    1540       0218  1184   0076   0218   1195   0640   1184      2165   0004 0424 2211 0 1          R
0006  0428    1432       0244  1204   0043   0244   1161   0360   1204      2134   0014 0374 2209 0 1          R
0019  0581    1553       0268  1225   0037   0268   1215   0309   1225      2181   0006 0418 2210 1 1          R
0020  0503    1465       0252  1212   0037   0252   1182   0309   1212      2153   0011 0395 2211 1 1          R
0023  0546    1441       0292  1248   0057   0292   1191   0480   1248      2162   0008 0332 2212 0 0          R
0002  0430    1473       0156  1133   0000   0156   1195   0000   1133      2165   0018 0379 2212 1 1          R
0031  0593    1530       0316  1265   0037   0316   1170   0309   1265      2143   0008 0391 2210 1 2          R
0038  0584    1454       0182  1155   0042   0182   1182   0354   1155      2155   0011 0381 2213 1 2          R
0021  0507    1373       0296  1248   0053   0296   1226   0442   1248      2189   0009 0352 2209 1 2          R
0010  0425    1425       0256  1212   0043   0256   1201   0360   1212      2167   0007 0392 2207 0 1          R
0024  0534    1548       0319  1270   0099   0319   1214   0840   1270      2181   0005 0379 2212 1 1          R
0007  0528    1500       0203  1168   0048   0203   1195   0400   1168      2161   0009 0364 2207 0 0          R
0023  0454    1427       0378  1314   0069   0378   1217   0575   1314      2180   0008 0398 2208 1 1          R
0022  0394    1465       0167  1141   0037   0167   1149   0309   1141      2126   0009 0298 2212 1 1          R
0020  0475    1458       0190  1160   0033   0190   1167   0280   1160      2140   0007 0352 2210 0 2          R
0034  0469    1453       0187  1156   0053   0187   1151   0440   1156      2126   0006 0335 2209 0 1          R
0017  0448    1454       0280  1234   0058   0280   1215   0486   1234      2179   0006 0335 2209 1 1          R
0011  0441    1492       0286  1236   0073   0286   1200   0600   1236      2165   0007 0401 2207 0 1          R
0007  0506    1417       0282  1236   0053   0282   1152   0440   1236      2128   0012 0360 2210 0 2          R
0023  0473    1443       0215  1181   0052   0215   1166   0434   1181      2139   0007 0384 2210 7 1          R
```

Badge Results

```
ProcRpt - Notepad
File  Edit  Format  View  Help

        Batch 500Badge Processing Report

Operational Time: 12/13/2016 4:40:19 PM  Operator: test
Comment: test

    Time Try Slt BadgeNo Typ Err    E1      E2      E3      E4    Drk Ref   Corr C E
16:40:20  01  01 0000000  08      122uSv  169uSv   9uSv  230uSv 006 661 0.207 0 2
16:40:53  01  02 0000000  08      145uSv  135uSv   7uSv  243uSv 007 414 0.207 1 1
16:41:13  01  03 0000000  08      101uSv  155uSv   5uSv  203uSv 013 332 0.207 1 1
16:41:33  01  04 0000000  08      157uSv  162uSv  65uSv  171uSv 010 400 0.207 0 1
16:41:54  01  05 0000000  08       89uSv  151uSv  51uSv  203uSv 011 416 0.207 1 1
16:42:15  01  06 0000000  08      171uSv  175uSv  82uSv  218uSv 004 424 0.207 0 1
16:42:35  01  07 0000000  08       91uSv   91uSv  51uSv  244uSv 014 374 0.207 0 1
16:42:56  01  08 0000000  08      105uSv  179uSv  69uSv  268uSv 006 418 0.207 1 1
16:43:16  01  09 0000000  08      136uSv  131uSv  60uSv  252uSv 011 395 0.207 1 1
16:43:36  01  10 0000000  08      179uSv  118uSv  64uSv  292uSv 008 332 0.207 0 0
16:43:56  01  11 0000000  08       89uSv   73uSv  51uSv  156uSv 018 379 0.207 1 1
16:44:16  01  12 0000000  08      185uSv  111uSv  71uSv  316uSv 008 391 0.207 1 2
16:44:36  01  13 0000000  08       99uSv  130uSv  69uSv  182uSv 011 381 0.207 1 2
16:44:56  01  14 0000000  08      174uSv   85uSv  61uSv  296uSv 009 352 0.207 1 2
16:45:15  01  15 0000000  08      155uSv  193uSv  51uSv  256uSv 007 392 0.207 0 1
16:45:36  01  16 0000000  08      146uSv  115uSv  63uSv  319uSv 005 379 0.207 1 1
16:45:57  01  17 0000000  08      121uSv   92uSv  64uSv  203uSv 009 364 0.207 0 0
16:46:18  01  18 0000000  08      101uSv  160uSv  55uSv  378uSv 008 398 0.207 1 1
16:46:37  01  19 0000000  08      152uSv  120uSv  47uSv  167uSv 009 298 0.207 1 1
16:46:57  01  20 0000000  08      110uSv  138uSv  57uSv  190uSv 007 352 0.207 0 2
```

Tray Summary

```
Tray01Rpt - Notepad                                                    —    □    ×
File  Edit  Format  View  Help

          Batch DefaultBatch2 Tray  Report
Operational Time: 12/15/2016 5:31:59 PM  Operator:
Comment:

------------------------------------------------------------
Slt BadgeNo    E1      E2      E3      E4     Average  Sigma
------------------------------------------------------------
01 0000000  122uSv  169uSv    9uSv  230uSv  132uSv   80.93
02 0000000  145uSv  135uSv    7uSv  243uSv  132uSv   83.85
03 0000000  101uSv  155uSv    5uSv  203uSv  116uSv   73.55
04 0000000  157uSv  162uSv   65uSv  171uSv  138uSv   42.87
05 0000000   89uSv  151uSv   51uSv  203uSv  123uSv   58.14
06 0000000  171uSv  175uSv   82uSv  218uSv  161uSv   49.46
07 0000000   91uSv   91uSv   51uSv  244uSv  119uSv   73.85
08 0000000  105uSv  179uSv   69uSv  268uSv  155uSv   76.22
09 00)0000  136uSv  131uSv   60uSv  252uSv  144uSv   68.83
10 0000000  179uSv  118uSv   64uSv  292uSv  163uSv   84.74
...

40 0000000  165uSv   80uSv   52uSv  293uSv  147uSv   93.75
41 0000000  137uSv  158uSv   59uSv  274uSv  157uSv   76.96
42 0000000  191uSv  187uSv   55uSv  292uSv  181uSv   84.16
43 0000000  158uSv  138uSv   68uSv  224uSv  147uSv   55.61
44 0000000  210uSv  167uSv   65uSv  247uSv  172uSv   68.09
45 0000000  131uSv  113uSv   57uSv  179uSv  120uSv   43.65
46 0000000  127uSv  137uSv   65uSv  245uSv  143uSv   64.77
47 0000000  155uSv  165uSv   41uSv  257uSv  154uSv   76.65
48 0000000  207uSv  185uSv   65uSv  344uSv  200uSv   99.04
49 0000000  126uSv  101uSv   55uSv  266uSv  137uSv   78.71
50 0000000  150uSv  107uSv   59uSv  238uSv  138uSv   65.85
------------------------------------------------------------
No. of Data    050     050     050     050
Average      137uSv  131uSv   54uSv  246uSv
Sigma         31.21   33.66   14.29   47.64
```

Status

```
StatusLog - Notepad                                                    —    □    ×
File  Edit  Format  View  Help

2016/12/13 16:40:19 START button pressed.
2016/12/13 16:40:20 Processing started on batch 500Badge: tray 1.
2016/12/13 16:57:53 Processing started on batch 500Badge: tray 2.
2016/12/13 17:15:36 Processing started on batch 500Badge: tray 3.
2016/12/13 17:33:14 Processing started on batch 500Badge: tray 4.
2016/12/13 17:50:57 Processing started on batch 500Badge: tray 5.
2016/12/13 18:08:34 Processing started on batch 500Badge: tray 6.
2016/12/13 18:26:37 Processing started on batch 500Badge: tray 7.
2016/12/13 18:44:41 Processing started on batch 500Badge: tray 8.
2016/12/13 19:02:49 Processing started on batch 500Badge: tray 9.
2016/12/13 19:20:35 Processing started on batch 500Badge: tray 10.
2016/12/13 19:38:46 Processing stopped on batch 500Badge.
2016/12/13 19:48:48 UD-7900 Program Shutdown.
```

Appendix-C Communication Specifications

Basic specifications

The following are descriptions about the communication specifications between UD-7900 and an external device (host computer, printer, etc.).
RS-232C is used for communication.

Communication: RS-232C
Communication speed: 1200-115200 baud rate
Communication method: Half-duplex
Synchronization: Start-stop synchronization
Character code: ASCII 7 bits ＋ parity
Time-out: 3 sec (Changeable by parameter)
Error detection: Parity (Character unit), BCC (Block unit)
Error correction: Re-send
Connection type: 1:1
Communication mode: Basic mode/No Data Link mode

Character configuration:

ST	B1	B2	B3	B4	B5	B6	B7	P	SP

→ Transmission sequence
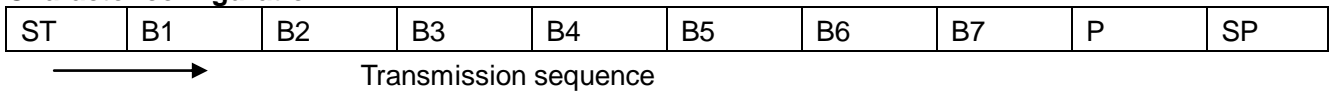
Bit weight:

Bit	b1 b2 b3 b4 b5 b6 b7
Weight	(LSB) 1 2 4 8 16 32 64 (MSB)

Telegram configuration:
(1) Control sequence – ACK(06), NAK(21), DC1(17), DC2(18), DC3(19), DC4(20)
(2) Data telegram

Pause	STX(02)	Data section	ETX(03)	BCC	Pause

710/791 Interface mode

TLD measurement data (Format code '2')

#	
0	stx
1	2
2	number of characters
3	
4	reader code
5	(device address)
6	text number (00-99)
7	
8	space
9	magazine slot number
10	
11	badge code type
12	badge code e-rank
13	badge codec-rank
14	
15	
16	
17	personnel id code
18	
19	
20	
21	element 1 measured data
22	
23	
24	
25	element 2 measured data
26	
27	
28	
29	element 3 measured data
30	
31	
32	
33	element4 measured data
34	
35	
36	
37	dark counts
38	
39	
40	reference element counts
41	
42	
43	reader sensitivity
44	
45	
46	
47	space
48	error code (1)
49	
50	error code (2)
51	
52	error code (3)
53	
54	error code (4)
55	
56	ETX
57	BCC

CAL data (Format code '1')

#	
0	stx
1	1
2	number of characters
3	
4	reader code
5	(device address)
6	text number (00-99)
7	
8	S
9	status
10	magazine number (01-10)
11	
12	Wear-term year
13	
14	wear-term month
15	
16	reference level for element 1
17	(control dose)
18	
19	
20	reference level for element 2
21	(control dose)
22	
23	
24	background level by natural dose
25	
26	
27	
28	sensitivity correction factor
29	
30	
31	
32	operating hour (0000-9999)
33	
34	
35	
36	operating minute (00-59)
37	
38	lamp flash times
39	
40	
41	
42	
43	
44	
45	
46	operating year (lower 2 digit)
47	
48	Operating month (01-12)
49	
50	operating date (01-31)
51	
52	space
53	error code (1)
54	
55	error code (2)
56	
57	error code (3)
58	
59	error code (4)
60	
61	etx
62	bcc

PMP (Pre Main Post) data (Format code 'C')

#	Field
0	stx
1	C
2	element 1 pre dose
3	
4	
5	
6	element 1 main p-count
7	
8	
9	
10	element 1 main f-count
11	
12	
13	
14	element 1 post dose
15	
16	
17	
18	space
19	element 2 pre dose
20	
21	
22	
23	element 2 main p-count
24	
25	
26	
27	element 2 main f-count
28	
29	
30	
31	element 2 post dose
32	
33	
34	
35	space
36	element 3 pre dose
37	
38	
39	
40	element 3 main p-count
41	
42	
43	
44	element 3 main f-count
45	
46	
47	
48	element 3 post dose
49	
50	
51	
52	space
53	element 4 pre dose
54	
55	
56	
57	element 4 main p-count
58	
59	
60	
61	element 4 main f-count
62	
63	
64	
65	element 4 post dose
66	
67	
68	
69	space
70	space
80	
81	etx
82	bcc

Glow curve data (Format code 'G')

#	Field
0	stx
1	G
2	number of characters
3	
4	
5	
6	curve source (P)
7	id no.
8	
9	
10	
11	
12	
13	
14	element no (1-4)
15	measured dose (2 byte pack)
16	
17	
18	
19	11 (sample time)
20	
21	space
22	1st data
23	space
24	2nd data

data
(256 points)

	space
	etx
1236-1559	bcc

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716 Interface mode

TLD measurement data (Format code '2')

#	Field
0	stx
1	2
2	number of characters
3	
4	reader code
5	(device address)
6	text number (00-99)
7	
8	Space
9	magazine slot number
10	
11	badge code type
12	badge code e-rank
13	badge codec-rank
14	personnel id code
15	
16	
17	
18	
19	
20	
21	element 1 measured data
22	
23	
24	
25	element 2 measured data
26	
27	
28	
29	element 3 measured data
30	
31	
32	
33	element4 measured data
34	
35	
36	
37	dark counts
38	
39	
40	reference element counts
41	
42	
43	reader sensitivity check factor
44	
45	
46	
47	p-f flag
48	'Y' (716 mark)
49	sequence number
50	
51	
52	error code (1)
53	
54	error code (2)
55	
56	error code (3)
57	
58	error code (4)
59	
60	etx
61	bcc

CAL data (Format code '1')

#	Field
0	stx
1	1
2	number of characters
3	
4	reader code
5	(device address)
6	text number (00-99)
7	
8	Space
9	measuring year
10	
11	measuring month
12	
13	measuring day
14	
15	space
16	
17	reference light counts
18	
19	
20	
21	background level by natural dose
22	
23	
24	
25	sensitivity correction
26	factor
27	
28	
29	high voltage
30	
31	
32	lamp voltage
33	
34	
35	lamp flash times
36	
37	
38	
39	
40	
41	
42	
43	space
44	
45	reader function
46	
47	
48	
49	'Y' (716 mark)
50	p-counter conversion coeff
51	
52	
53	
54	f-counter conversion coeff
55	
56	
57	
58	error code (1)
59	
60	error code (2)
61	
62	error code (3)
63	
64	error code (4)
65	
66	etx
67	bcc

PMP (Pre Main Post) data (Format code 'C')

#	Field
0	stx
1	C
2	element 1 pre dose
3	
4	
5	
6	element 1 main p-count
7	
8	
9	
10	element 1 main f-count
11	
12	
13	
14	element 1 post dose
15	
16	
17	
18	space
19	element 2 pre dose
20	
21	
22	
23	element 2 main p-count
24	
25	
26	
27	element 2 main f-count
28	
29	
30	
31	element 2 post dose
32	
33	
34	
35	space
36	element 3 pre dose
37	
38	
39	
40	element 3 main p-count
41	
42	
43	
44	element 3 main f-count
45	
46	
47	
48	element 3 post dose
49	
50	
51	
52	space
53	element 4 pre dose
54	
55	
56	
57	element 4 main p-count
58	
59	
60	
61	element 4 main f-count
62	
63	
64	
65	element 4 post dose
66	
67	
68	
69	space
70	space
80	
81	etx
82	bcc

GLOW data (Format code 'G')

#	Field
0	stx
1	G
2	number of characters
3	
4	
5	
6	curve source (P)
7	id no.
8	
9	
10	
11	
12	
13	
14	element no (1-4)
15	measured dose (2 byte pack)
16	
17	
18	
19	11 (sample time)
20	
21	space
22	1st data
23	space
24	2nd data

data
(256 points)

#	Field
	space
	etx
1236-1559	bcc

45

Appendix-D Parameter list

Adr.	Item	Format	Default	Description
00	T0	BCD	0001	Lamp on time（ms）.
01	T1	BCD	0065	Lamp on time（ms）for Pre.
02	T2	BCD	0500	Lamp off time（ms）for Pre.
03	T3	BCD	0050	Lamp on time（ms）for Pre.
04	T4	BCD	0045	Lamp on time（ms）for Main.
05	T5	BCD	0400	Lamp off time（ms）for Main.
06	T6	BCD	0150	Lamp off time（ms）for Post.
07	T7A	BCD	0035	Lamp on time（ms）for Post. DOSE＜CMPDS1
08	T8A	BCD	1700	Lamp off time（ms）for Post. DOSE＜CMPDS1
09	T7B	BCD	0045	Lamp on time（ms）for Post. CMPDS1≦DOSE＜CMPDS2
0A	T8B	BCD	1700	Lamp off time（ms）for Post. CMPDS1≦DOSE＜CMPDS2
0B	T7C	BCD	0055	Lamp on time（ms）for Post. CMPDS2≦DOSE
0C	T8C	BCD	1700	Lamp off time（ms）for Post. CMPDS2≦DOSE
0D	T9	BCD	1000	Reference Right count time.
0E	T10	BCD	0445	Dark count time.
0F	T11	BCD	0240	Lamp on time（ms）for Reference Element.
10	T12	BCD	0600	Lamp off time（ms）for Reference Element.
11	DARKLC	BCD	0225	Coefficient for converting to DARK value for CAL 1 time (T9). Fixed point (99.99).
12	DARKEC	BCD	0189	A factor for calculating the DARK value for the Reference Element. Fixed point (99.99).
13.H	TYP800E1	HEX	C1	
13.L	TYP800E2	HEX	C1	
14.H	TYP800E3	HEX	E0	
14.L	TYP800E4	HEX	E0	
15.H	TYP801E1	HEX	C1	
15.L	TYP801E2	HEX	C1	
16.H	TYP801E3	HEX	E0	
16.L	TYP801E4	HEX	E0	
17.H	TYP802E1	HEX	C1	
17.L	TYP802E2	HEX	C1	
18.H	TYP802E3	HEX	E0	
18.L	TYP802E4	HEX	E0	
19.H	TYP803E1	HEX	C1	
19.L	TYP803E2	HEX	E1	
1A.H	TYP803E3	HEX	00	
1A.L	TYP803E4	HEX	00	
1B.H	TYP804E1	HEX	00	
1B.L	TYP804E2	HEX	C0	
1C.H	TYP804E3	HEX	E0	
1C.L	TYP804E4	HEX	E0	
1D.H	TYP805E1	HEX	00	
1D.L	TYP805E2	HEX	C0	
1E.H	TYP805E3	HEX	E0	
1E.L	TYP805E4	HEX	E0	
1F.H	TYP806E1	HEX	C1	
1F.L	TYP806E2	HEX	E0	

Element definition.

The meaning of each bit of element information is as follows. (i = element numbers 1 to 4)

- E_i [b7] : Presence / absence of element
  0 = No, 1 = Yes
- R_i [b6] : With or without rank correction
  0 = No, 1 = Yes
- C_i [b5] : Selection of rank code
  0=upper row (C) rank, 1=lower row (E) rank
- I_i [b4] : Presence or absence of I rank correction. This bit is effective only when P51.07 = 1. Function that has rank code (7th digit & 0x7 of badge ID) instead of C_i
  0 = No, 1 = Yes
- [b3] : Reserve
- CEF_n [b2 to 0] : Conversion constant number (CEF0 to 7)
  0 to 7 = CEF0 to ECF7

20.H	TYP806E3	HEX	00		
20.L	TYP806E4	HEX	00		
21.H	TYP807E1	HEX	C1		
21.L	TYP807E2	HEX	C1		
22.H	TYP807E3	HEX	E1		
22.L	TYP807E4	HEX	E1		
23.H	TYP808E1	HEX	00		
23.L	TYP808E2	HEX	C1		
24.H	TYP808E3	HEX	00		
24.L	TYP808E4	HEX	00		
25.H	TYP809E1	HEX	C3		
25.L	TYP809E2	HEX	C3		
26.H	TYP809E3	HEX	E0		
26.L	TYP809E4	HEX	C3		
27.H	TYP810E1	HEX	C3		
27.L	TYP810E2	HEX	E2		
28.H	TYP810E3	HEX	E2		
28.L	TYP810E4	HEX	E2		
29.H	TYP811E1	HEX	C3		
29.L	TYP811E2	HEX	C3		
2A.H	TYP811E3	HEX	E2		
2A.L	TYP811E4	HEX	80		
2B.H	TYP812E1	HEX	00		
2B.L	TYP812E2	HEX	00		
2C.H	TYP812E3	HEX	C0		
2C.L	TYP812E4	HEX	E0		
2D.H	TYP813E1	HEX	00		
2D.L	TYP813E2	HEX	00		
2E.H	TYP813E3	HEX	00		
2E.L	TYP813E4	HEX	00		
2F.H	TYP814E1	HEX	00		
2F.L	TYP814E2	HEX	00		
30.H	TYP814E3	HEX	00		
30.L	TYP814E4	HEX	00		
31.H	TYP815E1	HEX	00		
31.L	TYP815E2	HEX	00		
32.H	TYP815E3	HEX	C0		
32.L	TYP815E4	HEX	E0		
33	RNK0	BCD	1000	Rank correction factor 0.	
34	RNK1	BCD	1105	Rank correction factor 1.	
35	RNK2	BCD	1222	Rank correction factor 2.	
36	RNK3	BCD	1350	Rank correction factor 3.	
37	RNK4	BCD	1000	Rank correction factor 4.	
38	RNK5	BCD	0741	Rank correction factor 5.	
39	RNK6	BCD	0819	Rank correction factor 6.	
3A	RNK7	BCD	0905	Rank correction factor 7.	
3B	CEF0	2byte pack	0100	CaSO4 :Tm 0100 (fixed)	Sensitivity coefficient A value 100 times the reciprocal of the sensitivity to CaSO4 is set as the
3C	CEF1	2byte pack	1450	Li2B4O7 :Cu	
3D	CEF2	2byte pack	1692	6Li2B4O7 CEF1/0.65	
3E	CEF3	2byte pack	1600	Li2B4O7:Cu CEF1/0.75	

Address	Name	Type	Default	Description
3F	CEF4	2byte pack	0100	E Reserve
40	CEF5	2byte pack	0100	F Reserve
41	CEF6	2byte pack	0100	G Reserve
42	CEF7	2byte pack	0100	H Reserve
43	CSOGND	2byte pack	0000	Background dose of CaSO. (unit of measurement is applied for dose unit)
44	-	-	-	-
45	LBOGND	2byte pack	0000	Background dose of LiBO. (unit of measurement is applied for dose unit)
46	T1_LI	BCD	0065	T1 for LiBO.
47	T2_LI	BCD	0500	T2 for LiBO.
48	T3_LI	BCD	0050	T3 for LiBO.
49.H	YOBI	HEX	-	Reserve
49.L 4A	MRYCKB	HEX	-	Memory check code.
4B	CMPDS1	2byte pack	1100	Post annealing switching value 1, 2. (Reference value for selecting T7, T8) (unit of measurement is applied for dose unit)
4C	CMPDS2	2byte pack	1500	
4D	-	-	-	-
4E	-	-	-	-
4F	BKGND	2byte pack	0000	Background dose. (unit of measurement is applied for dose unit)
50.15	TXDATEDATA	bool	false	Add time information to measurement data (Format 2) (true) or not (false).
50.14	BASIC	bool	false	BASIC mode (true), No data link mode (false).
50.13	-	-	-	-
50.12	ANNEALMODE	bool	false	Annealing measurement mode (true), normal measurement mode (false).
50.11	NCRPT	bool	true	Check the parity of NCR (true), do not (false)
50.10	CALCC14	bool	true	Updates the reader sensitivity correction coefficient[P71] during CAL measurement (true) and does not (false).
50.09	TXPMPDATA	bool	false	Outputs PRE/MAIN/POST to RS232 (true) or not (false).
50.08	-	-	-	-
50.07	USEREM	bool	false	The dose is R unit (true), Sv unit (false).
50.06	-	-	-	-
50.05	-	-	-	-
50.04	-	-	-	-
50.03	BGCOR	bool	false	Background correction (true), not (false).
50.02	BDCOR	bool	true	Apply the rank correction coefficient (true), do not (false).
50.01	-	-	-	-
50.00	RDCOR	bool	true	Apply the reader sensitivity correction factor [P71] (true), do not (false).
51.15	-	-	-	-
51.14	STX_ETX	bool	false	Set the reception in BASIC mode to [STX] [ETX] [BCC] format (true), set to [CR] [LF] format (false).
51.13	-	-	-	-
51.12	-	-	-	-
51.11	-	-	-	-
51.10	-	-	-	-
51.09	-	-	-	-
51.08	-	-	-	-
51.07	RNK_I	bool	false	Rank correction follows (true), not obey (false) according to li

Note: coefficient of each material. That is, the relative ratio when CaSO4 is set to 100.

				[b4] of Badge Table [P13 to 32].
51.06	CHECKC14	bool	true	CAL operation switching. (True): [START] and 10 times when magazine is inserted (store the average in [P5E]), once every badge measurement (SNS unsaved). (False): [START] and 5 times when magazine is inserted (store accumulation in [P5E]), 0 times for badge measurement (without CAL).
51.05	-	-	-	-
51.04	-	-	-	-
51.03	-	-	-	-
51.02	ADD_CR	bool	false	[CR] [LF] is added (true) or not (false) to the transmission message in BASIC mode.
51.01	-	-	-	-
51.00	DATA_FIXED	bool	false	Send transmission message in BASIC mode with fixed length (64 bytes) (true) or not (false).
52	-	-	-	-
53	SREFEL	2byte pack	0300	Ref. Element reference value (count).(P53 - P56) ≤ Ref. Ele. <(P53 + P56) I5 error if it is out of range.
54	SDARKP	2byte pack	0300	DARK reference value (count). I4 error when exceeding.
55	-	-	-	-
56	SREFER	2byte pack	0300	Ref. Element Check width (count). (P53 - P56) $\leqq$ Ref. Ele. <(P53 + P56) I5 error if it is out of range.
57	SNSSTD	2byte pack	2500	Ref. Light (CAL) reference value (count). P57-P57 × P78.H ÷ 100 ≤ P67 (CAL value) ≤ P57 + P57 × P78.H ÷ 100
58	-	-	-	-
59	LPWST	BCD	0300	Heating lamp power reference value. If it is outside the range, H0 error.
5A	CNVCEP	BCD	0160	Conversion constant. Dose per 4th power of 10 (uSv). In the case of R units, it is interpreted as the dose per 10 5 power (mR).
5B	-	-	-	-
5C	-	-	-	-
5D	-	-	-	-

5E	SNS	2byte pack	–	Ref. Light (CAL) reading (count).
				When P51.06 = 1
				    Update with [CALA] 10 times CAL average value at [START] and magazine insertion. However, it does not update when a CAL error occurs.
				When P51.06 = 0
				    It is updated with [CAL integrated value 5 times at the time of [START] and magazine insertion. However, it does not update when a CAL error occurs.

5F	DARKP	2byte pack	–	DARK reading (count). DARK count value for T10. I4 error when exceeding.
60	-	-	-	-
61	DARKEP	2byte pack	–	DARK value (for Ref. Ele.) (Count). = P5F × (T11 + T12) ÷ T10
62	-	-	-	-
63	REFELP	2byte pack	–	Ref.Element value (count). (T11 + T12)
64	-	-	-	-
65	DARKLP	2byte pack	–	DARK value (for Ref. Light) (count). = P5F × T9 ÷ T10
66	-	-	-	-

67	REFLP	2byte pack	–	Ref. Light value (count). (T9)
68	-	-	-	-
69	-	-	-	-
6A	LMPVLT	BCD	–	Heating lamp voltage reading. Fixed point (99.99 V)
6B	LMPPWR	BCD	–	Heating lamp power value. H0 error if it is out of range.
6C	LMPCUR	BCD	–	Heating lamp current reading. Fixed point (99.99 A)
6D	B_LMPVLT	BCD	–	Heating lamp voltage reading at lamp OFF. Fixed point (99.99 V)
6E	B_LMPPWR	BCD	–	Calculated heating lamp power at lamp OFF.
6F	B_LMPCUR	BCD	–	Heating lamp current reading value when lamp is off. Fixed point (99.99 A)
70	-	-	-	-
71	SCEF	BCD	1000	Leader sensitivity correction coefficient. Fixed decimal point (9.999)
72.H	ELEMENT	HEX	0F	Designated element (00 to 0F). ELEMENT: Necessity of measurement for each element number. When 0 is set to the relevant bit, measurement of the corresponding element number is prohibited. Applicable Bit (arrangement) → Bit 3 to 0 = Elements 1 to 4
72.L	-	-	-	-
73	-	-	-	-
74	-	-	-	-
75	-	-	-	-
76.H	ACKTIM	BCD	03	ACK wait time. (sec)
76.L	TRTMR	BCD	10	Transmission delay timer. (100 msec unit)
77.H	-	-	-	-
77.L	LPWER	BCD	20	Heating lamp power check width(%). If it is outside the range, H0 error.
78.H	SNSER	BCD	20	Ref. Light check width(%). I3 error if it is out of range.
78.L	RDERCD	BCD	01	Reader number.
79	-	-	-	-
7A	-	-	-	-
7B	-	-	-	-
7C	FLASH	BCD	00000000	Number of times the heating lamp was flashed. H2 error when exceeding.
7D				
7E.H	PROM_NO	BCD	–	Program No. Unused.
7E.L	PRONO	BCD	–	Production number (6 digits). Unused.
7F.H				
80	-	-	-	-
81	-	-	-	-
82	-	-	-	-
83	FPGAVER	BCD	–	FPGA program Ver. Unused.
84	CPLDVER	BCD	–	CPLD program Ver. Unused.
85	-	-	-	-
86	-	-	-	-
87	-	-	-	-
88	-	-	-	-
89	-	-	-	-
8A	-	-	-	-
8B	-	-	-	-
8C	-	-	-	-

8D	-	-	-	-
8E	-	-	-	-
8F	-	-	-	-
90	RFSKIN	2byte pack	1500	E1 controlled dose. D1 error when exceeding.(unit of dosage applied at the time of measurement)
91	RFBODY	2byte pack	1500	E2 controlled dose. D1 error when exceeding.(unit of dosage applied at the time of measurement)
92	RFANL	2byte pack	1500	Controlled dose of all elements. D2 error when exceeding. (Unit of measurement is applied for dose unit)
93	RFPOST	2byte pack	1100	Controlled Post dose of all elements. D5 error when exceeding. (Unit of measurement is applied for dose unit)
94	RLCEF	BCD	—	Badge sensitivity. (= Ref. Light 1 - Readout ÷ Standard) Fixed point (9.999).
95	-	-	-	-
96.H	TRAY	HEX	—	TRAY (Magazine) No.
96.L	SLOT	HEX	—	Slot No.
97	-	-	-	-
98	-	-	-	-
99	BADGE	HEX	7FFF	Badge Assigment (0000 - FFFF). D4 error if unspecified Badge. Specify validity / invalidity of UD-800 (b 0) to 815 (b 15) with 16 bits.
9A	OVRDS1	2byte pack	0000	LiBO limit value.
9B	OVRDS2	2byte pack	0000	CaSO limit value.
9C	-	-	-	-
9D	-	-	-	-
9E	-	-	-	-
9F	-	-	-	-
A0.15	DCCOR	bool	true	Dark Correct (true) or not (false).
A0.14	-	-	-	-
A0.13	-	-	-	-
A0.12	ELEMENTCH	bool	true	Check element break (true), not (false). D0 error when element breaks.
A0.11	CYCLELOC	bool	true	Restore Location at startup (true), not (false).
A0.10	DOORCHK	bool	true	Door check (true), do not (false). Unused.
A0.09	-	-	-	-
A0.08	-	-	-	-
A0.07	-	-	-	-
A0.06	-	-	-	-
A0.05	-	-	-	-
A0.04	-	-	-	-
A0.03	-	-	-	-
A0.02	-	-	-	-
A0.01	-	-	-	-
A0.00	-	-	-	-
A1	-	-	-	-
A2	-	-	-	-
A3	-	-	-	-
A4	-	-	-	-
A5	-	-	-	-
A6	-	-	-	-
A7	-	-	-	-
A8	-	-	-	-

A9	-	-	-	-
AA	-	-	-	-
AB	-	-	-	-
AC	-	-	-	-
AD.H	ACKTRN	BCD	02	ACK retry count. If retry over, R1 error.
AD.L	-	-	-	-
AE	-	-	-	-
AF	-	-	-	-
B0	-	-	-	-
B1	-	-	-	-
B2	-	-	-	-
B3	-	-	-	-
B4	-	-	-	-
B5	-	-	-	-
B6	-	-	-	-
B7	PMP1PRE	2byte pack	−	E1 Pre dose.
B8	PMP1MAIN	2byte pack	−	E1 Main dose.
B9	PMP1POST	2byte pack	−	E1 Post dose.
BA	PMP2PRE	2byte pack	−	E2 Pre dose.
BB	PMP2MAIN	2byte pack	−	E2 Main dose.
BC	PMP2POST	2byte pack	−	E2 Post dose.
BD	PMP3PRE	2byte pack	−	E3 Pre dose.
BE	PMP3MAIN	2byte pack	−	E3 Main dose.
BF	PMP3POST	2byte pack	−	E3 Post dose.
C0	PMP4PRE	2byte pack	−	E4 Pre dose.
C1	PMP4MAIN	2byte pack	−	E4 Main dose.
C2	PMP4POST	2byte pack	−	E4 Post dose.
C3	-	-	-	-
C4	-	-	-	-
C5	FULPMP1PREP	2byte pack	−	E1 Pre count.
C6	-	-	-	-
C7	FULPMP1MAINP	2byte pack	−	E1 Main count.
C8	-	-	-	-
C9	FULPMP1POSTP	2byte pack	−	E1 Post count.
CA	-	-	-	-
CB	FULPMP2PREP	2byte pack	−	E2 Pre count.
CC	-	-	-	-
CD	FULPMP2MAINP	2byte pack	−	E2 Main count.
CE	-	-	-	-
CF	FULPMP2POSTP	2byte pack	−	E2 Post count.
D0	-	-	-	-
D1	FULPMP3PREP	2byte pack	−	E3 Pre count.
D2	-	-	-	-
D3	FULPMP3MAINP	2byte pack	−	E3 Main count.
D4	-	-	-	-
D5	FULPMP3POSTP	2byte pack	−	E3 Post count.
D6	-	-	-	-
D7	FULPMP4PREP	2byte pack	−	E4 Pre count.
D8	-	-	-	-

D9	FULPMP4MAINP	2byte pack	–	E4 Main count.
DA	-	-	-	-
DB	FULPMP4POSTP	2byte pack	–	E4 Post count.
DC	-	-	-	-
DD	-	-	-	-
DE	-	-	-	-
DF	-	-	-	-
E0	DEADTIME	BCD	0200	Dead time of photomultiplier tube (0.1 ns unit).
E1	-	-	-	-
E2	-	-	-	-
E3	-	-	-	-
E4	PROCOT	HEX	–	Count value.
E5				
E6	-	-	-	-
E7	-	-	-	-
E8	-	-	-	-
E9	-	-	-	-
EA	-	-	-	-
EB	-	-	-	-
EC	-	-	-	-
ED	-	-	-	-
EE	-	-	-	-
EF	-	-	-	-
F0	-	-	-	-
F1	-	-	-	-
F2	-	-	-	-
F3.15	-	-	-	-
F3.14	-	-	-	-
F3.13	-	-	-	-
F3.12	-	-	-	-
F3.11	-	-	-	-
F3.10	-	-	-	-
F3.09	-	-	-	-
F3.08	-	-	-	-
F3.L	-	-	-	-
F4	-	-	-	-
F5	-	-	-	-
F6	SENDGLOWTHR ESHOLD	2byte pack	0000	Glow data output threshold. (Dose unit applies unit of measurement point)
F7	-	-	-	-
F8	-	-	-	-
F9	-	-	-	-
FA.15	-	-	-	-
FA.14	-	-	-	-
FA.13	-	-	-	-
FA.12	-	-	-	-
FA.11	-	-	-	-
FA.10	-	-	-	-
FA.09	-	-	-	-
FA.08	TXGLOWDATA	bool	false	Output glow data (true), do not output (false).
FA.L	-	-	-	-

FB	-	-	-	-
FC	-	-	-	-
FD	-	-	-	-
FE	-	-	-	-
FF	-	-	-	-