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# FDSS7000EX Options Software Instruction Manual

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Version 2.9.5

Thank you for your purchase.

 **CAUTION**

- Follow the safety precautions in order to avoid personal injury and damage to property when using this system. The manual describes the correct handling method of the system and provides cautions in order to avoid accidents. **Read this manual carefully** beforehand use the system correctly. After reading the manual, store it in a location where you can refer to it at any time.

**Note**

FDSS7000EX is an upper compatible model of FDSS7000 and this software can be used for both FDSS7000 and FDSS7000EX.

Hamamatsu Photonics K.K.



**HAMAMATSU**





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# SAFETY PRECAUTIONS

## CLASSIFICATION OF WARNING

We have classified the warnings symbols that appear in this instruction manual and on the system as follows for your convenience. Make sure that you fully understand them and obey the instructions they contain.

|  |   |
|--|---|
|  <b>WARNING</b> | Improper handling of the system without observing these warnings could lead to serious injury to the user and even death.         |
|  <b>CAUTION</b> | Improper handling of the system without observing these cautions could lead to personal injury to the user or damage to property. |

|   |  |
|---|--|
|  | This symbol indicates a note to help you get the best performance from the system. Read the contents of the note carefully to ensure correct and safe use. Failure to observe one of these notes might impair the performance of the system. |
|  | This symbol indicates a cautionary item that should be obeyed when handling the system. Read the contents carefully to ensure correct and safe use.  |
|  | This symbol indicates an action that is forbidden. Read the contents carefully and be sure to obey them.   |
|  | This symbol indicates a compulsory action or instruction. Read the contents carefully and be sure to obey them.  |

|   |   |
|---|---|
|  | In the software, a character of 'μ' is not indicate. So, in the software window, a character of 'u' is used instead of 'μ'. For example, ul is used in stead of μl. |
|---|---|

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## Table of Contents

|   |    |
|---|----|
| <b>1. About this manual</b> .....                         | 7  |
| <b>2. Dispensing and measurement by Pintool</b> .....     | 9  |
| 1) About Pintool.....                                     | 9  |
| 2) Combination selection of head and tip .....            | 10 |
| 3) About the Dispenser Control box of Pintool use.....    | 12 |
| 4) About the Detail Setup box of Pintool use .....        | 13 |
| <b>3. 2 times aspiration, 1 dispensing function</b> ..... | 15 |
| 1) About this function .....                              | 15 |
| 2) Dispenser control box .....                            | 16 |
| 3) About exchange of head – tip and source plate .....    | 26 |
| 4) About Setup button .....                               | 30 |
| <b>4. Next Sequence function</b> .....                    | 35 |
| 1) About Next Sequence function .....                     | 35 |
| 2) How to setup Next Sequence function .....              | 36 |
| <b>5. Vacuum function</b> .....                           | 37 |
| 1) About vacuum function .....                            | 37 |
| 2) How to setup vacuum movement.....                      | 38 |
| <b>6. High Speed Acquisition option</b> .....             | 41 |
| 1) About high speed acquisition.....                      | 41 |
| <b>7. 2 Camera option</b> .....                           | 47 |
| 1) About 2 Camera simultaneous measurement.....           | 47 |
| <b>8. Mixing Volume Remote option</b> .....               | 53 |
| 1) About mixing volume remote control .....               | 53 |

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## 1. About this manual

**Note**

**This manual is a manual of the optional feature of FDSS7000EX.  
Please see the manual of version 2.9.5 about the manual of a  
standard function.**

The function provided in this manual is an optional feature that needs a specific hardware and software setting in FDSS7000EX.

It is necessary to note it because it is not possible to execute it in standard FDSS7000EX.

Please consult our business when it is interested.

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## **2. Dispensing and measurement by Pintool**

### **1) About Pintool**

It is possible to measure it by using the Pintool head besides the tip head in FDSS7000EX. In the system that can use Pintool, it is different from the case for the following two points to use a standard tip head.

- (1) "Tip & Head Combination Setup" box changes into the setup box including Pintool.
- (2) The dispensing parameter when Pintool is used changes for Pintool.

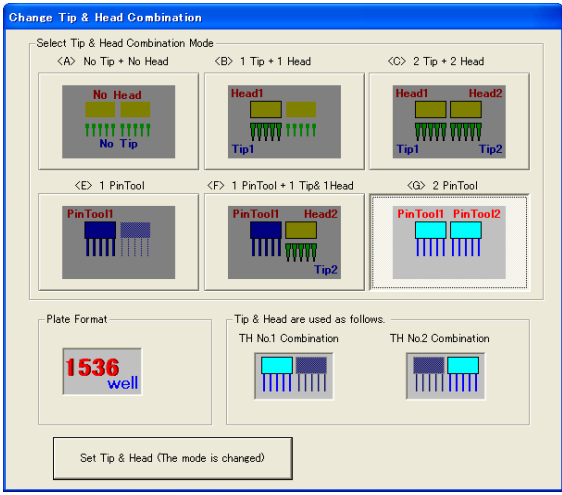
#### **Note**

This function is an optional feature of FDSS7000EX.  
A special Pintool head and special parts and adjustment of software are necessary to use Pintool. This function is Off in a standard system.

## 2) Combination selection of head and tip

When Pintool is used, the usage mode that combines Pintool besides a standard mode of dispensing head and tip can be selected.

- <A> No Pintool + No Head : Any dispensing are not performed
- <B> 1 Tip + 1 Head : Dispensing head: 1, Tip: 1
- <C> 2 Tip + 2 Head : Dispensing head: 2, Tip: 2
- <E> 1 Pintool : Pintool head: 1
- <F> 1 Head(1 Tip) + 1 Pintool : Dispensing head: 1, Tip: 1, Pintool head: 1
- <G> 2 Pintool : Pintool head: 2



**(1) Select Tip&Head Combination Mode**  
: Select the usage mode of dispensing head & tip

- <A> No Tip + No Head : Any dispensing are not performed
- <B> 1 Tip + 1 Head : Dispensing head: 1, Tip: 1
- <C> 2 Tip + 2 Head : Dispensing head: 2, Tip: 2
- <E> 1 Pintool : Pintool head: 1
- <F> 1 Head(1 Tip) + 1 Pintool : Dispensing head: 1, Tip: 1, Pintool head: 1
- <G> 2 Pintool : Pintool head: 2

**(2) Tip&Head are used as follows**  
: The combination between head, tip and Pintool to be set in above  
(The usage mode that can be selected is different according to the system)

|                       | TH No.1 Combination | TH No.2 Combination |
|-----------------------|---------------------|---------------------|
| <A> No Tip + No Head  | Be not in use       | Be not in use       |
| <B> 1 Tip + 1 Head    | Tip 1 + Head 1      | Tip 1 + Head 1      |
| <C> 2 Tip + 2 Head    | Tip 1 + Head 1      | Tip 2 + Head 2      |
| <E> 1 Pintool         | Pintool 1           | Pintool 1           |
| <F> 1 Head + 1Pintool | Tip 1 + Head 1      | Pintool 2           |
| <G> 2 Pintool         | Pintool 1           | Pintool 2           |

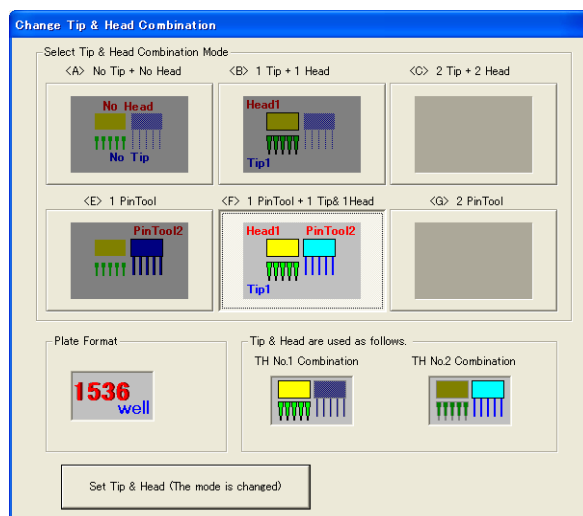
**Note**

The usage mode that can be selected is different according to the system configuration.

Please select it according to the display on the Change Tip&Head Combination box when you select the usage mode.

Moreover, the combination of the head, tip and Pintool is also similar. Please follow the combination displayed with Tip&Head are used as follows.

Example) There is only one Pintool head.



### 3) About the Dispenser Control box of Pintool use

The dispensing parameter when Pintool is used changes as follows.

The item that sets the dispensing volume disappears, and dispense/aspirate speed changes into the setting of time to soak Pintool at a set position.

**<At Pintool use>**

**Volume** : The dispensing volume can not set.(It depends on Pin used.)

**Aspirate** : Aspirating time(sec)-Height(from bottom of well) is set.

**Dispense** : Dispensing time(sec)-Height(from bottom of well) is set.

#### Note

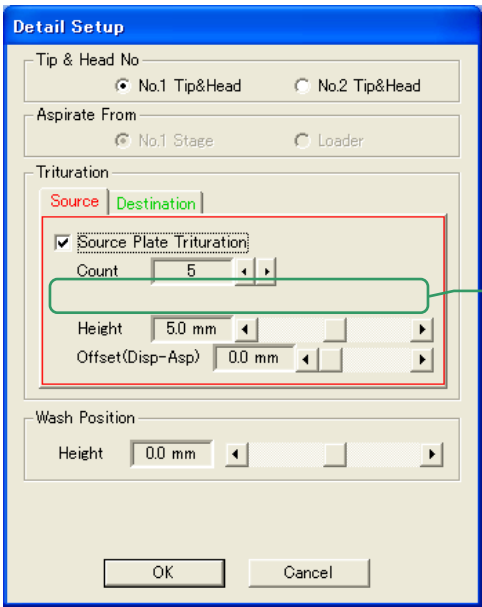
Dispensing parameter set here reflects on Assay Protocol. And when Assay Protocol is loaded after setting here, the loaded parameter is valid

#### **4) About the Detail Setup box of Pintool use**

The following Detail Setup box appears when the Detail button of the Dispenser Control box is pushed when Pintool is used.

The volume setting of Trituration disappears.

**<At Pintool use>**



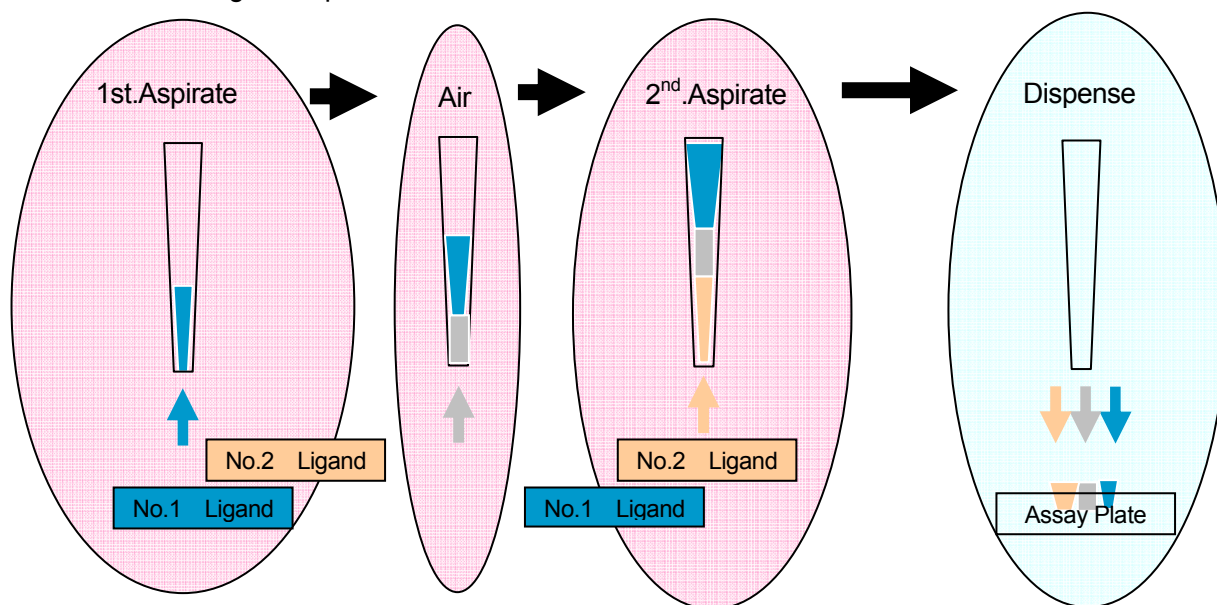
**Trituration** : To set mix-in/out at aspirating and/or dispensing.  
**Volume** : The trituration volume can not set.(It depends on Pin used.)

*(This page is blank.)*

### 3. 2 times aspiration, 1 dispensing function

#### 1) About this function

After the aspiration is performed 2 times from source plate stage or source plate loading line, dispensing to assay plate is performed. In between first aspiration and second aspiration, it is possible to aspirate air. To control this function, normal Dispenser Control box is changed to specialized box for this function.

**Note**

This function is option function only for the FDSS7000EX  
This function is set off in the standard setup

## 2) Dispenser Control box

In the case of this dispensing function, following DispenserControl box is used

The screenshot shows the 'Dispenser Control' software window. At the top, there are 'Assay Plate', 'Unload', and 'Load' buttons. Below these are tabs for 'TH1+Stage1&Stage2', 'TH1+Stage2', 'TH1+Loader', and 'TH1+Loader'. The main area contains several sections: 'Dispense Start', 'Nozzle Wash', and 'Setup' buttons; 'Select Tip&Head Combination' with radio buttons for 'Combi1' and 'Combi2'; 'Aspirate' and '2nd Aspirate' sections with fields for 'Air Gap', 'Asp. Stage', 'Volume', 'Speed', and 'Height'; 'Trituration' sections with checkboxes and fields for 'Vol.', 'Count', 'Height', and 'Offset'; 'Dispense' and 'Multi Wash' sections with similar fields; and a 'Change Head & Ligand Plate' button. At the bottom, there are checkboxes for 'Mixing Assay Plate', 'Auto Ligand Tank', and 'Wipe' (A, B, C), and a 'Change Tip / Open the door' button.

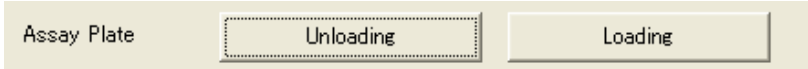
(1) Load/Unload : Loading and unloading of assay plate  
 (2) THx+StageX Tab : Switching of dispensing parameter combination  
 (3) Dispense Start : Execution of dispensing  
 (4) Setup : Setting of various setting box  
 (5) Nozzle Wash : Washing of tip nozzle  
 (6) Select Tip&Head Combination : Selecting a combination of dispensing head and tip  
 (7) Aspirate : Setting of aspiration parameter  
 (8) Dispense : Setting of dispensing parameter  
 (9) 2nd Aspirate : Setting of 2 times aspiration parameter  
 (10) Multi Wash : Setting of washing parameter  
 (11) Change Tip&Ligand Plate (Change Tip / Open the door) : Exchange of dispensing head and source plate  
 (12) Mixing Assay Plate : Setting of On/Off of mixing on assay plate  
 (13) Auto Ligand Tank : Setting of On/Off of auto ligand supply function(Optional)  
 (14) Wipe : Setting of On/Off of wiping after washing

**Note**

The dispensing parameters which were set here is used in Assay Protocol.  
And please care about when Assay Protocol file is loaded after parameter setup,  
loaded parameters are going to change.

**(2-1) Load/Unload**


Loading and unloading the plate are done.



Unloading : Unloading of assay plate and source plate  
 Loading : Loading of assay plate  
 If L.Loader is set in the aspiration of dispensing parameter, source plate is loaded.

**(2-2) THx+StageX Tab**

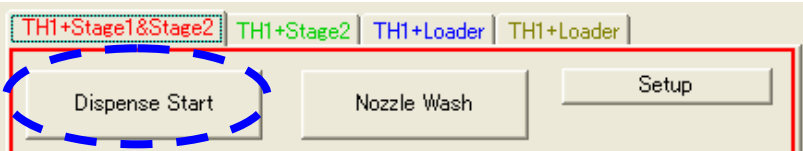
Switch of dispensing parameter.



THx+Stagex : Switch of dispensing parameter  
 Up to 4 dispensing parameter setup is possible  
 If Preparation setup is performed at Prepa tab in Assay Protocol, Available stage is limited

**(2-3) Dispense Start**

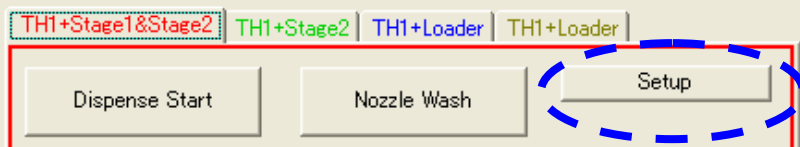
Dispensing is performed.



Dispense Start : According to the dispensing parameter set in THx+Stagex , dispensing is performed.  
 This can not be executed in AssayProtocol setup, execute it with Manual Mode.

**(2-4) Setup**

The optional function setup is available.

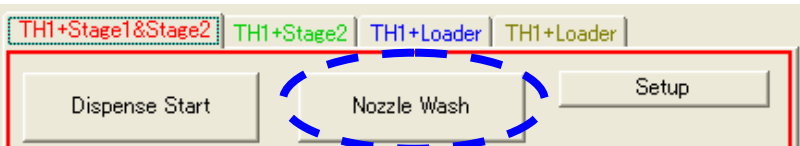


Setup : The following option function setup is available.  
(Refer to the following clause)

- 1) Height of Pintool
- 2) Setup of washing bat
- 3) Setup of vacuum operation
- 4) Setup of Auto ligand supply function

**(2-5) Nozzle Wash**

Washing is performed




Nozzle Wash : According to the dispensing parameter setup in THx+Stage, washing is performed

This can not be executed in AssayProtocol setup, execute it with Manual Mode.

**(2-6) Select Tip&Head Combination**

Selection of Tip&Head Combination

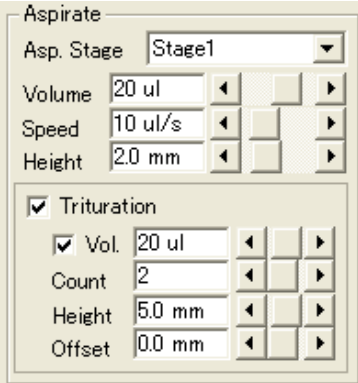


Combi.1,Combi.2 : Selection of Tip&Head Combination  
The combination which is current setup is displayed  
For example : Tip1,Tip2,Pin1,Pin2...  
(When the head is not ready to be used,  
Combi.x is displayed.)

**(2-7) Aspirate**

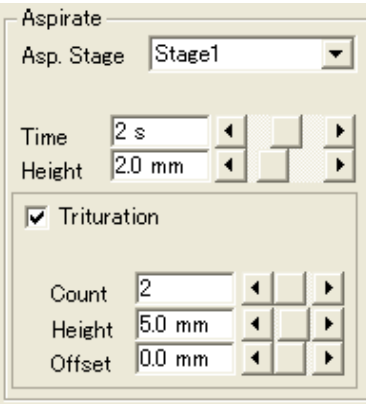
The aspirate parameter is set.

<Tip head >



Asp.Stage : Setup of where aspiration is performed  
 Volume : Setup of aspiration volume  
 Speed : Setup of aspiration speed  
 Height : Setup of aspiration position (height from bottom of plate)  
 Trituration : Setup of On/Off of trituration at aspiration  
 Vol. : Setup of trituration volume  
 Count : Setup of how many trituration is performed  
 Height : Setup of height of trituration  
 (height from aspiration position)  
 Offset : Setup of offset of aspiration and dispensing at trituration

<Pintool>

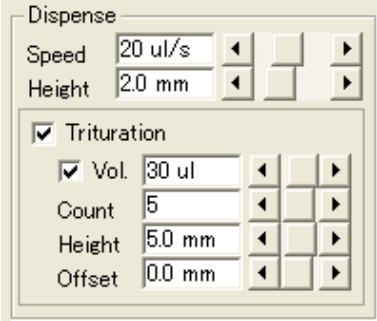


Asp.Stage : Setup of where aspiration is performed  
 Time : Setup of aspiration time  
 Height : Setup of aspiration position (Height from the bottom)  
 Trituration : Setup of On/Off of trituration at aspiration  
 Count : Setup of how many trituration is performed  
 Height : Setup of trituration position  
 (height from aspiration position)  
 Offset : Setup of offset of aspiration and dispensing at trituration

**(2-8) Dispense**

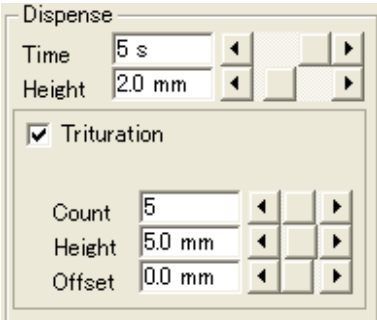
The dispense parameter is set.

<Tip head >



Speed : Setup of speed of dispensing  
 Height : Setup of dispensing position (height from bottom of plate)  
 Trituration : Setup of On/Off of trituration at dispensing  
 Vol. : Setup of volume of trituration  
 Count : Setup of how many trituration is performed  
 Height : Setup of trituration position (height from the dispensing)  
 Offset : Setup of offset of aspiration and dispensing position at trituration

<Pintool head>

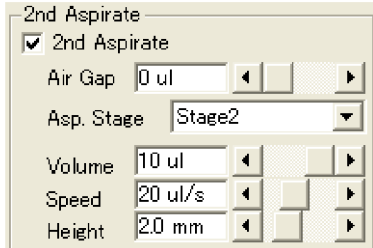


Time : Setup of dispensing time  
 Height : Setup of dispensing position  
 (height from bottom of the plate )  
 Trituration : Setup of On/Off of trituration at dispensing  
 Count : Setup of how many trituration is performed  
 Height : Setup of trituration position  
 (height from dispensing position)  
 Offset : Setup of offset of aspiration and dispensing position at trituration

**(2-9) 2nd Aspirate**

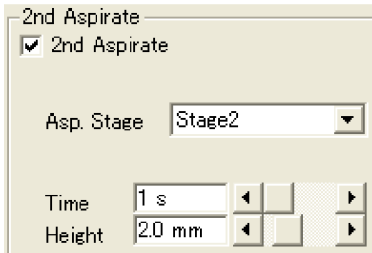
The 2<sup>nd</sup> aspirate parameter is set.

<Tip head>



2<sup>nd</sup> Aspirate : Setup of On/Off of the 2<sup>nd</sup> aspiration  
 Air Gap : Setup of air volume to aspirate before the 2<sup>nd</sup> aspiration  
 Asp.Stage : Setup of where the aspiration is performed from  
 Volume : Setup of aspiration volume  
 Speed : Setup of aspiration speed  
 Height : Setup of aspiration position (height from bottom of plate)

<Pintool head>



2<sup>nd</sup> Aspirate : Setup of On/Off of the 2<sup>nd</sup> aspiration  
 Asp.Stage : Setup of where the aspiration is performed from  
 Time : Setup of aspiration time  
 Height : Setup of aspiration position (height from bottom of plate)

**(2-10) Multi Wash**

The washing parameter is set.

| Multi Wash                               |  |        |        |
|--|--|--------|--------|
| <input checked="" type="checkbox"/> Wash | <input type="checkbox"/> After Measurement |        |        |
|  | 1st  | 2nd    | 3rd    |
| Vat                                      | A  | B      | C      |
| Cycle                                    | 4  | 7      | 2      |
| U.Sonic                                  | OFF  | OFF    | ON     |
| Method                                   | Ovr.                                       | Rep.   | Rep.   |
| Pos.                                     | 0.0 mm                                     | 0.0 mm | 0.0 mm |

Wash : Setup of On/Off of washing

After Measurement

: Setup of washing after measurement (On)  
or after dispensing (Off)

Vat : Setup of washing vat

The mounted washing bat (A, B, C) are selectable  
Vac. is for vacuum function (option)

Cycle : Setup of how many washing is performed

U.Sonic : Setup of On/Off of ultrasonic

Method : Setup of how to wash, replace of overflow

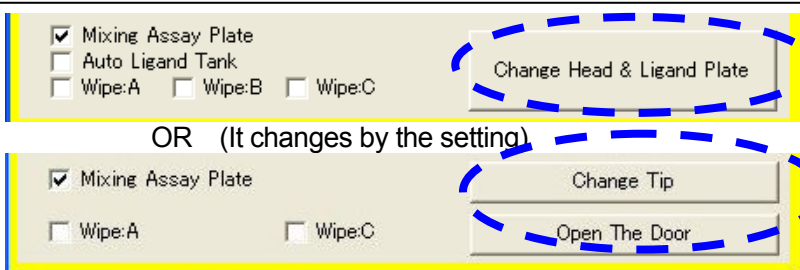
Replace : After filling the washing vat by washing solvent,  
aspirating and draining washing is performed.

Overflow : While flowing the washing solvent, washing is  
performed (special chimney is necessary )

Pos. : Setup of height of washing (for fine adjustment)

**(2-11) Change Head&Ligand Plate**

The head and the ligent plate are exchanged.



Change Head & Ligand Plate  
: Exchange of head&tip, Combination of tip and head  
Open/Close of dispensing unit door is performed.

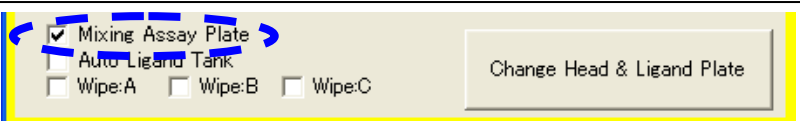
Change Tip : Exchange of head&tip and Combination of tip and head is  
performed.

Open The Door : Open/Close of dispensing unit door is performed.

(For detail, refer to 3)

**(2-12) Mixing Assay Plate**

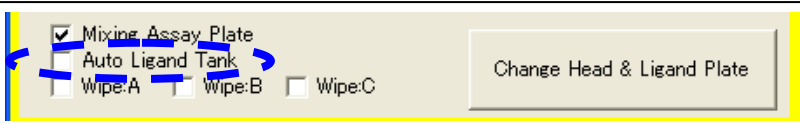
The mixing function on assay plate is set.



Mixing Assay Plate  
: Setup of On/Off of mixing function on assay plate  
This function is only available for fluorescence  
measurement  
(This display is not displayed for luminescence measurement)

**(2-13) Auto Ligand Tank (Option)**

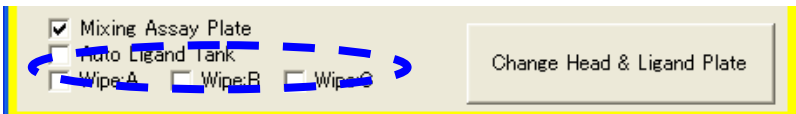
The auto ligand tank function is set.



Auto Ligand Tank  
: Setup of On/Off of the auto ligand tank.  
(If auto ligand tank is not mounted, this is not displayed)

**(2-14) Wipe**

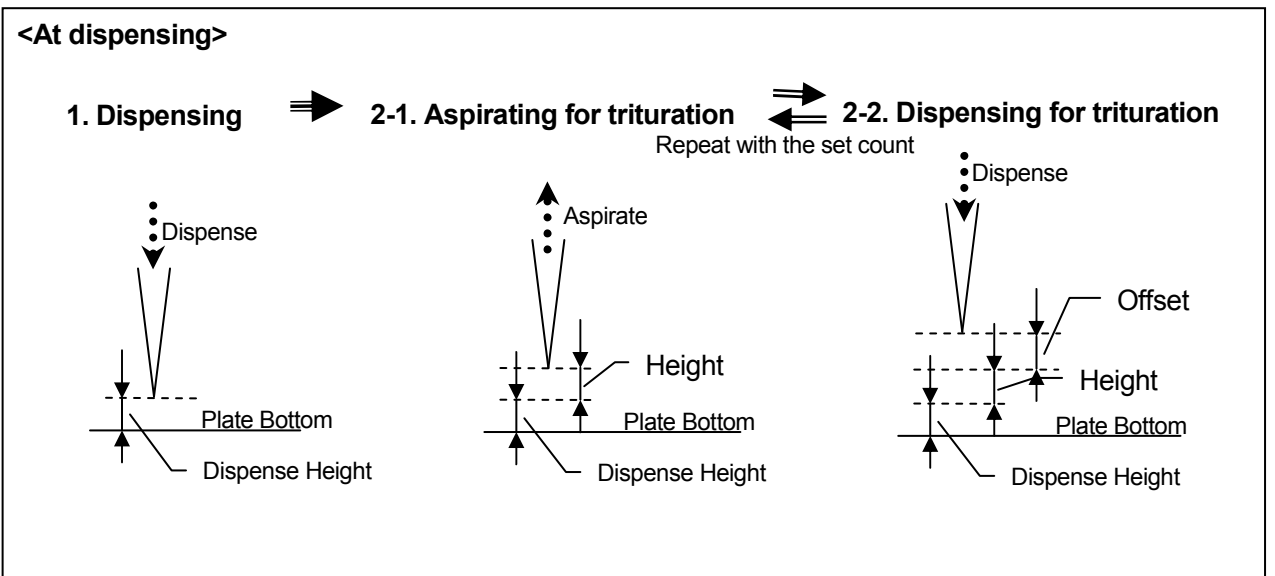
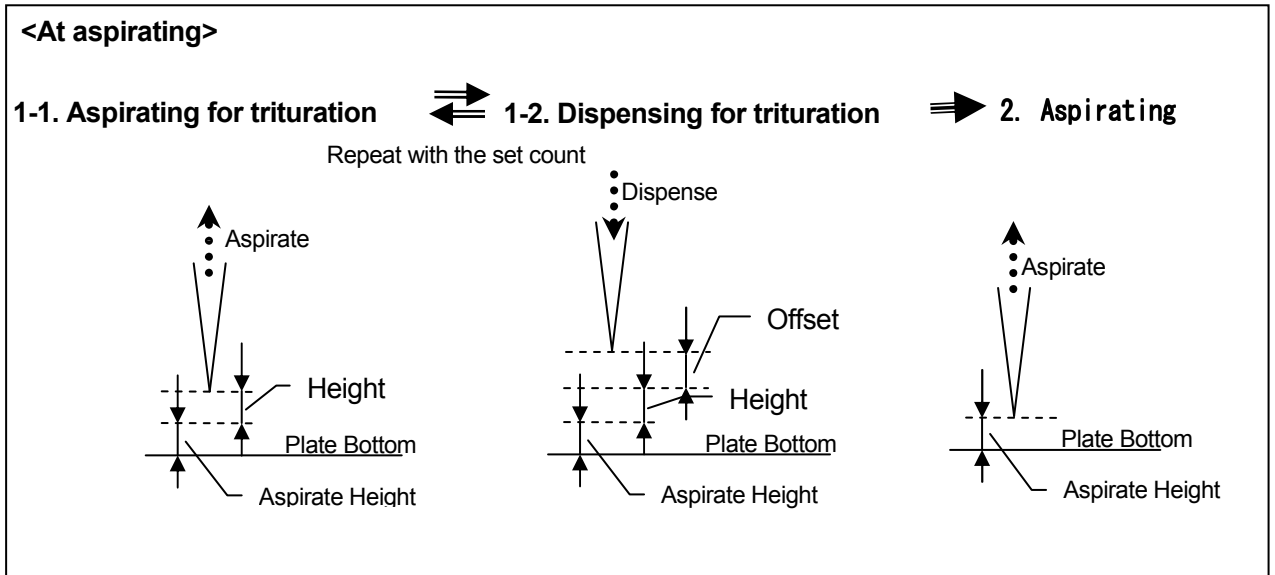
The wipe function is set.



Wipe:X : Setup of On/Off of wiping per washing unit  
(If washing vat is not mounted, this is not displayed)

**(2-15) Height setting on Trituration**

The relationship between the parameters and actual positions are shown as below. Trituration item in Detail Setup box includes Count, Height and Offset as parameters.

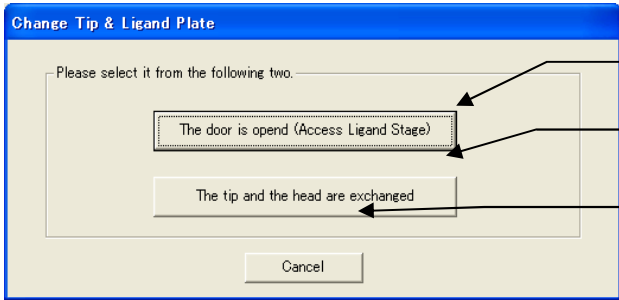


### **3) About exchange of head - tip and source plate**

By selecting Change Tip&Ligand Plate in Dispenser Control box, Change Tip&Ligand Plate is displayed as follows.

With this box, each exchange mode can be selected.

By selecting Change Tip or Open The Door in Dispenser Control box, the following box is skipped, and each interchange mode is operated directly (3-1)(3-2).



**The Door is opened**

**The tip and the head are exchanged**

**Cancel**

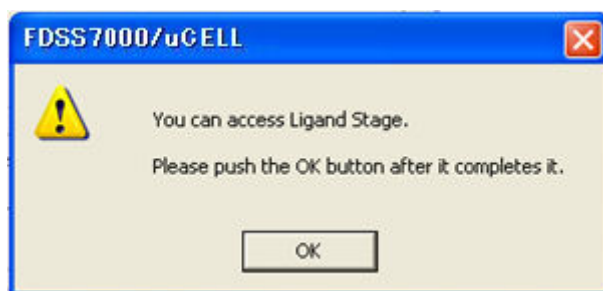
**The door is opened**  
: This is used when only source plate is exchanged  
It is not performed that exchange the head and tip

**The tip and the head are exchanged**  
: With the head and tip being ready to be exchange, the door opens  
This is used when head and tip are exchanged  
At the same time, source plate exchange is possible  
When exchanging, the combination of head and tip can be changed

**Cancel** : Without exchanging anything, the box disappears

**(3-1) How to handle 'the door is opened'**

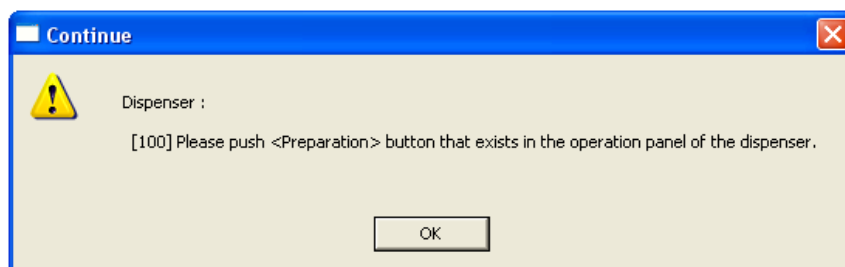
Open the door and the following box is displayed.



After exchanging source plates, click OK button

Then, door is closed

As soon as the door closes, the following box is displayed. (In some dispensing unit, this is sometimes not displayed. In this case, it is unnecessary to push preparation button mentioned below)



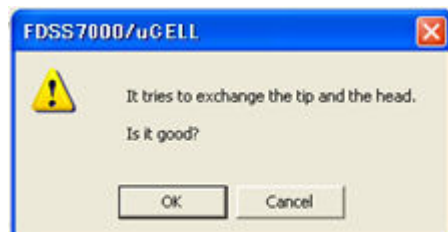
Push Preparation button in the front panel in the dispensing unit and click Ok button for above box. As soon as the handling of dispensing unit is completed, software becomes available.



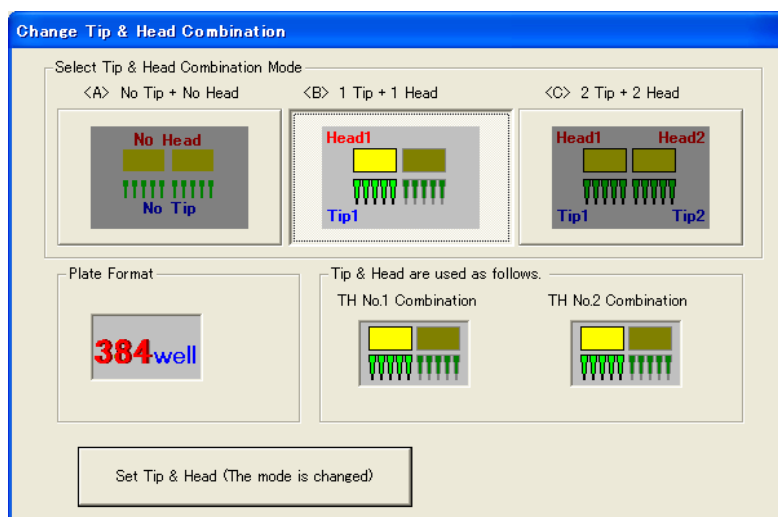
Preparation button

**(3-2)How to handle 'The tip and the head are exchanged'**

A box to confirm the tip and head exchange operation is displayed as follows.  
To exchange the tip and head, click ok button



If the dispensing unit keeps the head and tip, with the dispensing unit being reading to remove the head and tip to exchange, the door opens. And the following box is displayed after door opened.

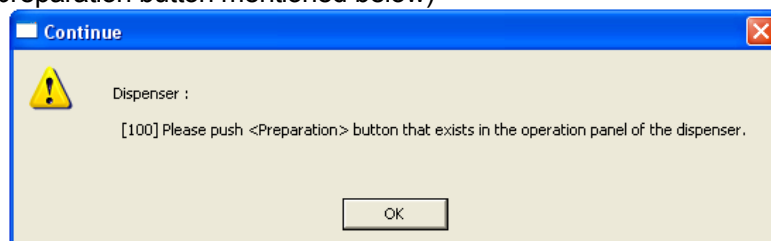


Exchange the head, tip or source plate. To do that, select the combination of head and tip to be used in the above box, click the Set Tip & Head button.

The door gets to close

As soon as the door closes, the following message is displayed.

(In some dispensing unit, this is sometimes not displayed. In this case, it is unnecessary to push preparation button mentioned below)



Push Preparation button in the front panel in the dispensing unit and click Ok button for above box. As soon as the handling of dispensing unit is completed, software becomes available.

**(3-3) About dispensing head and tip combination mode**

- In the FDSS7000EX, there are 3 patterns available in the combination of head and tip
- A. No tip and head (Dispensing operation is not performed)
  - B. Dispensing head: 1, tip: 1
  - C. Dispensing head: 2, tip: 2

The combination is selectable with the following box.

The dispensing head and tip to be used with the FDSS is set with the following box by specifying the combination of 2 dispensing head and tip. This setup is performed in the Detail setup box.

**Select Tip&Head Combination Mode**  
: Select the usage mode of dispensing head & tip

- <A> No Tip + No Head : No tip and head (Dispensing operation is not performed)
- <B> 1 Tip + 1 Head : Dispensing head: 1, tip: 1
- <C> 2 Tip + 2 Head : Dispensing head: 2, tip: 2

**Tip&Head are used as follows**  
: The combination between dispensing head and tip to be set in above

|                      | TH No.1 Combination | TH No.2 Combination |
|----------------------|---------------------|---------------------|
| <A> No Tip + No Head | Be not in use       | Be not in use       |
| <B> 1 Tip + 1 Head   | Tip 1 + Head 1      | Tip 1 + Head 1      |
| <C> 2 Tip + 2 Head   | Tip 1 + Head 1      | Tip 2 + Head 2      |

**Plate Format** : Plate format is selected at start-up

**Set Tip & Head** : Set the selected head and tip

## **4) About Setup button**

If Dispenser Control Setup button is clicked, according to the installed option and user authority, following setup tab is displayed

- 1) Setup of washing vat
- 2) Setup of Wash Param.
- 3) Setup of auto ligand supply
- 4) Setup of vacuum operation
- 5) Setup of Pintool height

### **(4-1) About washing vat setup (Wash Vat tab)**

Setup of how many washing vats are installed and set up of the use or disuse

This setup is reflected to the vat selection in the washing parameter

The screenshot shows a dialog box titled "Option Setup" with a blue header. Below the header is a tabbed interface with four tabs: "Wash Vat" (highlighted in red), "Auto Ligand", "Vacuum", and "Pintool". The "Wash Vat" tab is active and contains the following settings:

- Number of vat: 3 (text input field)
- Vat A:  Disable,  Enable
- Vat B:  Disable,  Enable
- Vacuum:  Disable,  Enable

At the bottom of the dialog, there is a note: "This parameter influences all the measurements of Fluorescence 384wells." Below the note are "OK" and "Cancel" buttons.

Number of vat : Setup of how many washing vat are installed.  
If vacuum function is installed, please set to 3

Vat A,B,C(Vacuum)  
: Select of disable or enable  
If different chimney from the setup is installed, make the vat disable.

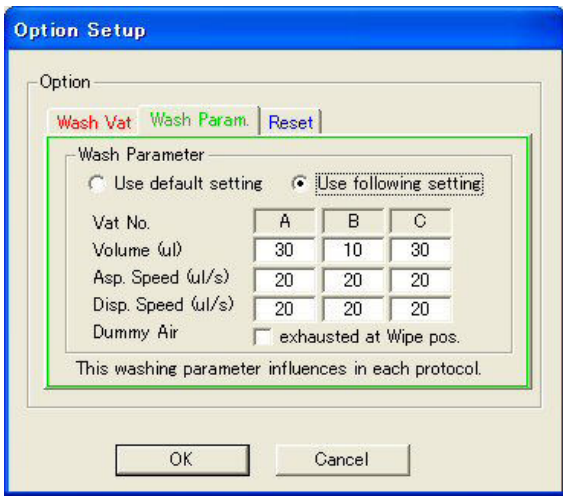
#### **Note**

These parameters are reflected to the all protocol with the selected plate format.

Even if the parameters were setup for Fura2/384wells, the parameters are also supposed to be used for the other measurement with 384 format. (e.g. Fluo3/384wells)

**(4-2) Wash Parameter Edit (Wash Param. tab)**

This Option Setup window is to configure the Wash Parameter. It is possible to configure the wash volume, speed of aspiration/dispense when wash at each wash vat. It is also possible to use wipe position for the dummy air exhausting after wash.



| Vat No.            | A  | B  | C  |
|--------------------|----|----|----|
| Volume (ul)        | 30 | 10 | 30 |
| Asp. Speed (ul/s)  | 20 | 20 | 20 |
| Disp. Speed (ul/s) | 20 | 20 | 20 |

Dummy Air  exhausted at Wipe pos.

This washing parameter influences in each protocol.

OK Cancel

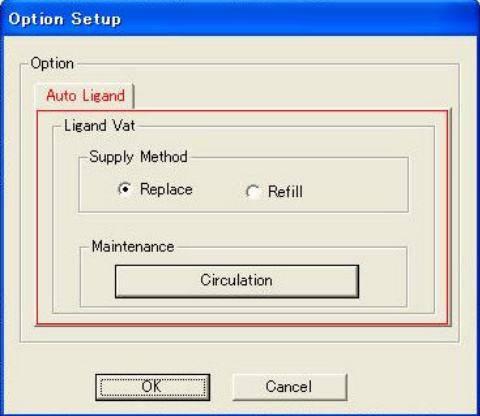
**Use default setting / Use following setting**  
 : Choose default wash Parameter or the user edited wash parameter (following setting).  
**Vat No.** : Shows the vat number to edit parameter.  
**Volume** : Set the volume for aspiration/dispense (unit :  $\mu\text{l}$ )  
**Asp.Speed** : Set the speed of aspiration in wash (unit :  $\mu\text{l/s}$ )  
**Disp.Speed** : Set the speed of dispense in wash (unit :  $\mu\text{l/s}$ )  
**Dummy Air**  exhausted at Wipe Pos.  
 : Please check here when you want to exhaust dummy air at wipe position.

**Note**

These parameters are associated to each assay protocol.  
This function is OPTION so it may not be shown in your system.

**(4-3) About auto ligand exchange (Auto Ligand)**

The auto ligand supply devices are exchanged or it washes it.



Option Setup

Option

Auto Ligand

Ligand Vat

Supply Method

Replace  Refill

Maintenance

Circulation

OK Cancel

Supply Method (automated supply and discharge type)  
: The supply method of a reagent is chosen

- Replace : It supplies before dispensing and discharges after dispensing
- Refill : A reagent added and refilled before dispensing

Ligand Vat button (automated supply type)  
: Exchange of reagent vat is performed  
After the reagent vat move to the position to be exchanged, the door opens/closes

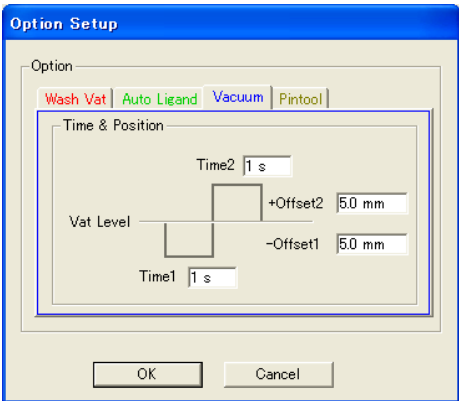
Circulation button (automated supply and discharge type)  
: By operation a pump of auto ligand supply device, reagent circulation is performed  
(After 30 sec, it automatically stops)  
In stead of reagent, by using washing liquid, washing of tube is possible.  
To exchange the reagent vat, open the door and exchange it.

**Note**

The button to be displayed is according to the installed auto ligand supply devices.

**(4-4) About vacuum operation (Vacuum tab)**

(About the detail of vacuum operation, refer to the vacuum option term)



Option Setup

Option

Wash Vat | Auto Ligand | Vacuum | Pintool

Time & Position

Time2 | 1 s

Vat Level

+Offset2 | 5.0 mm

-Offset1 | 5.0 mm

Time1 | 1 s

OK Cancel

Time1 : Setup of stop time in No.1 position  
-Offset1 : Setup of No1 offset position (Off set from vat position)  
(- make it goes up)  
Time2 : Setup of stop time in No.2 position  
+Offset2 : Setup of No2 offset position (Off set from vat position)  
(- make it goes down)

**Note**

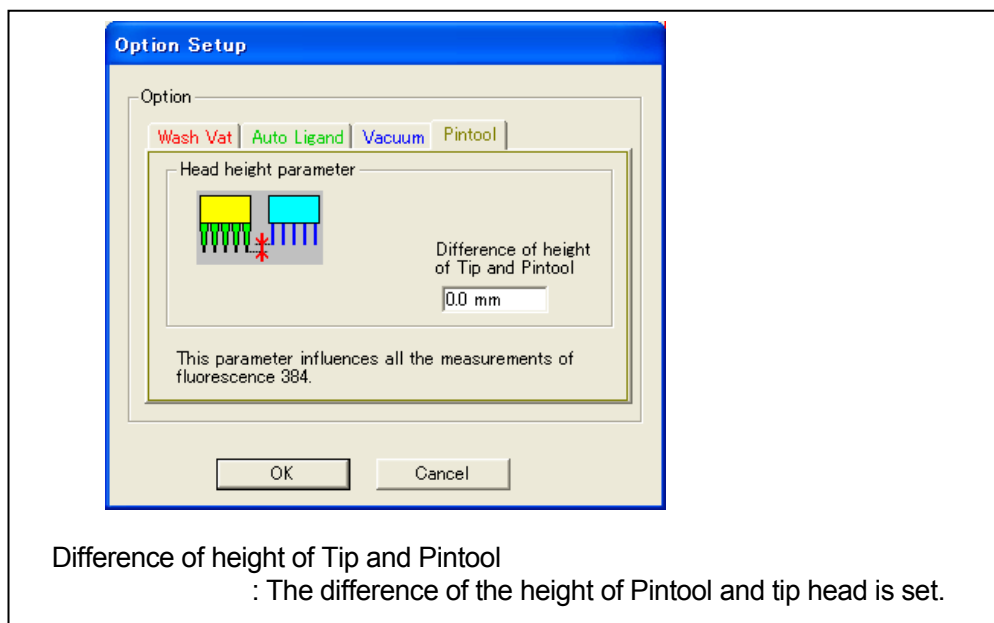
These parameters have to be setup every protocol

**(4-5) About Pintool height setup (Pintool tab)**

Setup of height difference between Pintool and tip head

If the height is same, set 0. If the height is different, set the offset

If offset is set, using the tip height as the standard, the pintool height changes.

**Note**

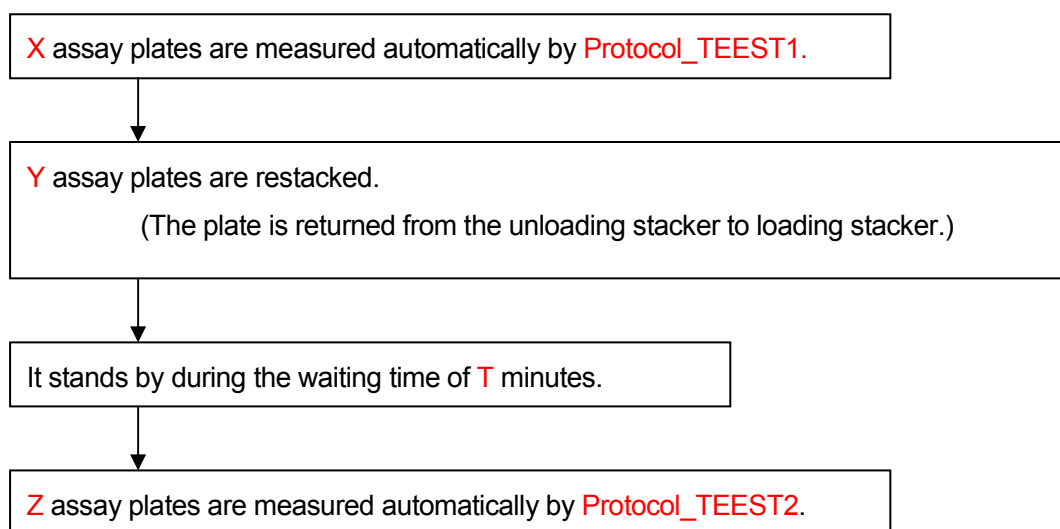
These parameters are reflected to the all protocol with the selected plate format.

Even if the parameters were setup for Fura2/384wells, the parameters are also supposed to be used for the other measurement with 384 format. (e.g. Fluo3/384wells)

## 4. Next Sequence Function (Restacking Function)

### 1) About Next Sequence function

This function is a function that measures the assay plate by the specified protocol after restacking it after a certain measurement ends.



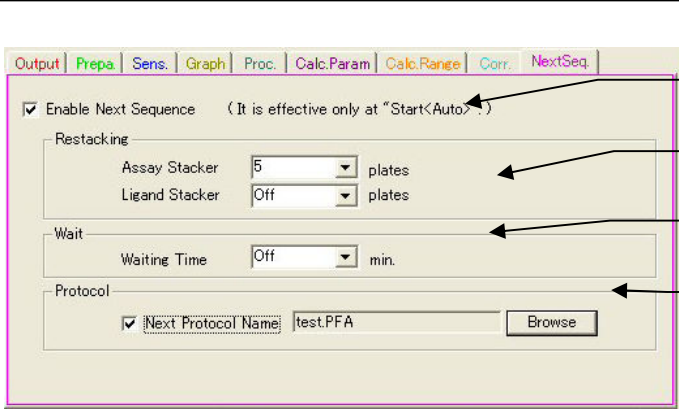
#### **Note**

This function is an optional feature of FDSS7000EX.  
A special stacker unit is necessary to use the Next Sequence function.  
As standard, this function is set to OFF.

## 2) How to setup Next Sequence function

The setting of the Next Sequence function is NextSeq tab of the assay protocol setting screen.

Effective of the Next Sequence function, the restacked number of the plate, the protocol name used for the next measurement and waiting time until the next measuring can be set on this set screen.



The screenshot shows the 'NextSeq' tab with the following settings:

- (1) Enable Next Sequence**: A checked checkbox with the text '( It is effective only at "Start<Auto>" )'.
- (2) Restacking**: A section containing two dropdown menus: 'Assay Stacker' set to '5 plates' and 'Ligand Stacker' set to 'Off plates'.
- (3) Wait**: A section containing a dropdown menu for 'Waiting Time' set to 'Off min.'.
- (4) Protocol**: A section containing a checked checkbox for 'Next Protocol Name' with the text 'test.PFA' and a 'Browse' button.

(1) Enable Next Sequence : The Next Sequence function is effective and invalidated.

(2) Restacking : Setting of restacking after measurement ends  
 Assay Stacker : Setting of number of restacking of assay plates.  
 Ligand Stacker : Setting of number of restacking of ligand plates.

(3) Wait : Waiting time after restacking  
 Waiting Time : The waiting time is set at minutes how many.

(4) Protocol : Setting of protocol used by the next sequence.  
 Next Protocol Name : The protocol name used by the next sequence is set.  
 After restacking, it ends when there is no setting.

### Note

When the Next Sequence is set to the protocol used next, the Next Sequence function set after the next measurement ends is executed.

Therefore, the Next Sequence function of two or more times can be executed.

## 5. Vacuum function

### 1) About vacuum function

By replacing washing vat C in the FDSS7000EX with the vacuum vat and connecting it with vacuum system, this function become possible. This function is mainly to wipe residual liquid in pintool using vacuum after washing.

In the FDSS software, the following can be controlled.

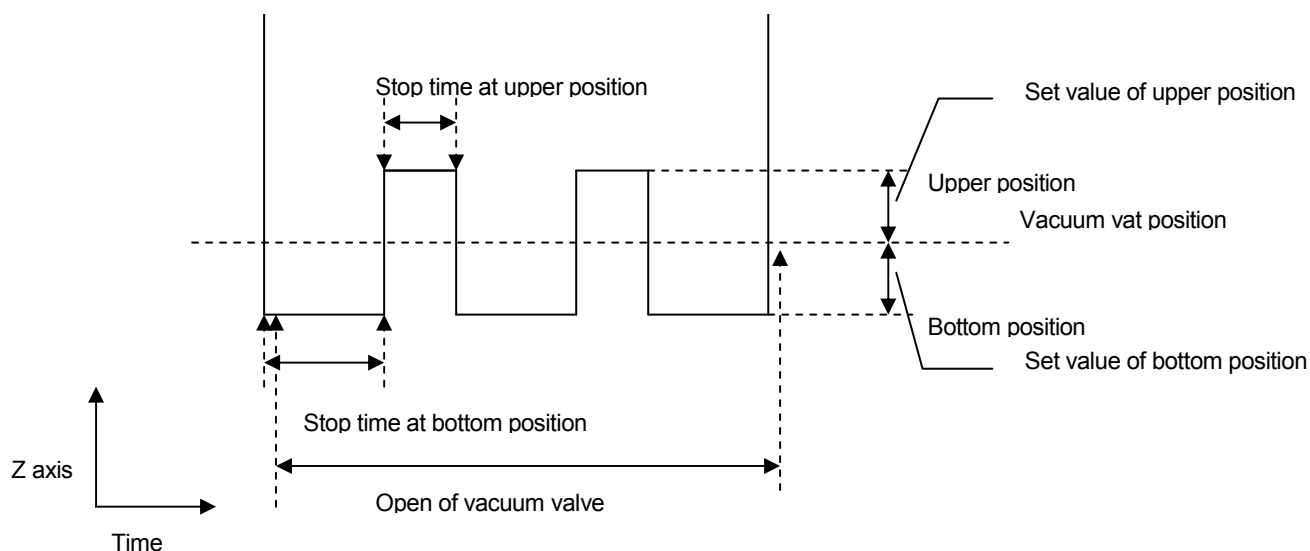
- Move the head to vacuum vat
- Open of vacuum valve
- Vertical movement of head according to setup number
- Close of vacuum valve
- Wipe (when wipe is setup)
- Move head to home position

And, in the FDSS software, to control mentioned above, the following parameters can be also setup.

- Setup the order of vacuum and washing (e.g A->B->Vaccum)
- Setup of the number of vertical movement
- Height and stop time in the bottom position of vertical movement
- Height and stop time in the upper position of vertical movement

Movement of head when vacuum operates

( For example, how the head move vertically when Cycle is 3 times. )



#### Note

This function is option function only for the FDSS7000EX.  
To use this function, the special vacuum vat, piping, vacuum system, software adjustment is necessary.  
This function is set off in the standard setup.

## **2) How to setup vacuum movement**

Vacuum set up is performed with the following 2.

1)Washing parameter setup

-> Set up of the order of washing and the number of vertical movement

2)Vacuum movement setup

-> Setup of the time and position of vertical movement

### **(2-1) How to setup washing parameter**

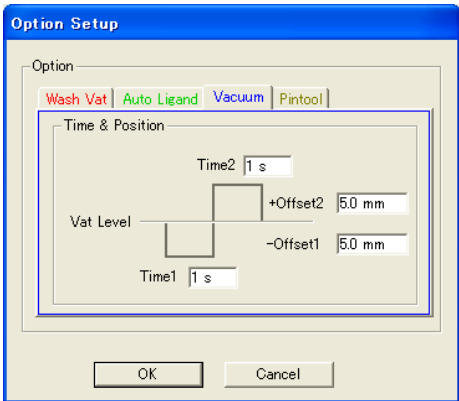
In the washing parameter setup of Dispenser Control box, the order of washing and the number of vertical movement can be setup.

| Multi Wash                                 |        |        |        |
|--|--------|--------|--------|
|  | 1st    | 2nd    | 3rd    |
| <input checked="" type="checkbox"/> Wash   |        |        |        |
| <input type="checkbox"/> After Measurement |        |        |        |
| Vat  | A      | B      | Vac.   |
| Cycle                                      | 4      | 7      | 2      |
| U.Sonic                                    | OFF    | OFF    |        |
| Method                                     | Ovr.   | Rep.   |        |
| Pos.                                       | 0.0 mm | 0.0 mm | 0.0 mm |

Vat : To choose washing vat and/or vacuum vat  
Cycle : In the case of Vac., the number of the head vertical movement has to be setup  
Pos. : Setup of height of vat

**(2-2) How to setup vacuum parameter**

The operation parameter of the vacuum function can be setup.



The screenshot shows the 'Option Setup' dialog box with the 'Vacuum' tab selected. The 'Time & Position' section contains the following fields:

- Time2: 1 s
- +Offset2: 5.0 mm
- Offset1: 5.0 mm
- Time1: 1 s

Below the fields is a diagram of a 'Vat Level' with a head moving up and down. The 'OK' and 'Cancel' buttons are at the bottom.

Time1 : Setup of stop time in the No1 (bottom position)  
-Offset1 : Setup of No1 offset position (Offset from vat position)  
(- (minus) means that head moves up )  
Time2 : Setup of stop time in the No1 (upper position)  
+Offset2 : Setup of No2 offset position (Offset from vat position)  
(- (minus) means that head moves down )

**Note**

This parameter is setup for every assay protocol.

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## **6. High Speed Acquisition option**

### **1) About high speed acquisition**

In FDSS/ $\mu$ CELL, besides the standard measurement, it is possible to have high speed acquisition function making use of the camera's internal synchronized acquisition. Below three points are different from the standard function.

1. FDSS Application Box Interval setting
2. FDSS Application Box Dispense setting
3. Real time graph display

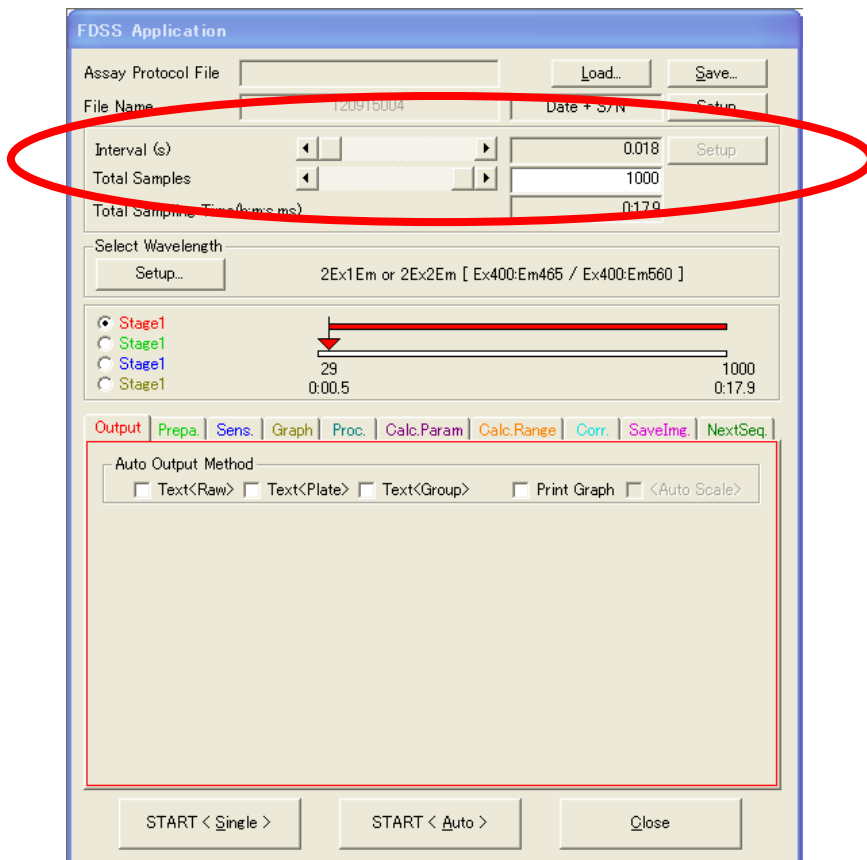
#### **Note**

This function is option function only for the FDSS7000EX.  
To use this function, the special camera, data analysis unit, special software and protect key are necessary.  
This function is set off in the standard setup.

**(1-1) Interval setting**

Interval setting is different from the standard software in this option.  
Two points are different.

1. Interval is not equal to the exposure time.
2. Double interval function is not available in this option.



(1-1-1) Interval is not exactly equal to exposure time

In the high speed acquisition mode, sampling interval is almost the same as the camera exposure time, but not exactly the same.

In the standard software, exposure time was fixed and sampling interval were flexible to configure. However, in high speed acquisition mode, interval is not exactly equal to, it is not possible to configure the interval as you wish.

Instead, it is possible to acquire the data with more higher sampling interval.

Interval has 5 steps to choose in high speed acquisition mode.

Minimum interval x 1, x 2, x3, x4, x5

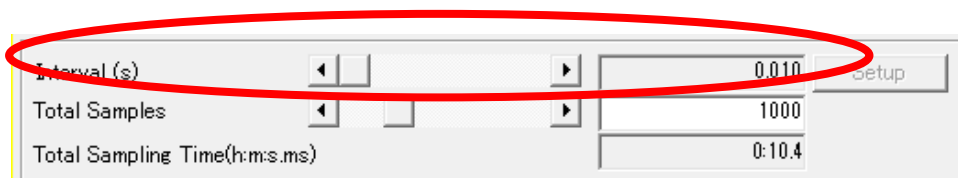
Minimum interval depends on camera number and the settings such as binning.

1 camera, binning 4x4 : Minimum interval is approximately 8.2 ms

1 camera, binning 2x2 : Minimum interval is approximately 15.6 ms

2 camera, binning 4x4 : Minimum interval is approximately 10.5 ms

2 camera, binning 2x2 : Minimum interval is approximately 18.0 ms



Interval : 5 steps(linked to exposure time)

(1-1-2) Double interval settings are not available

Double interval function is not available in high speed acquisition mode.

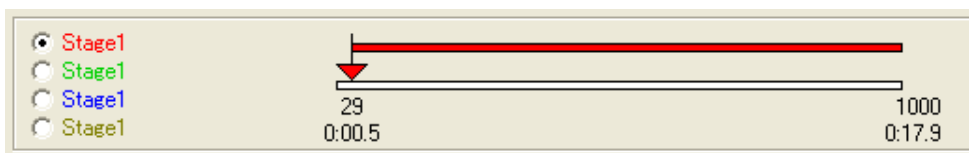


Setup Button : Inactivated

**(1-2) Dispense timing**

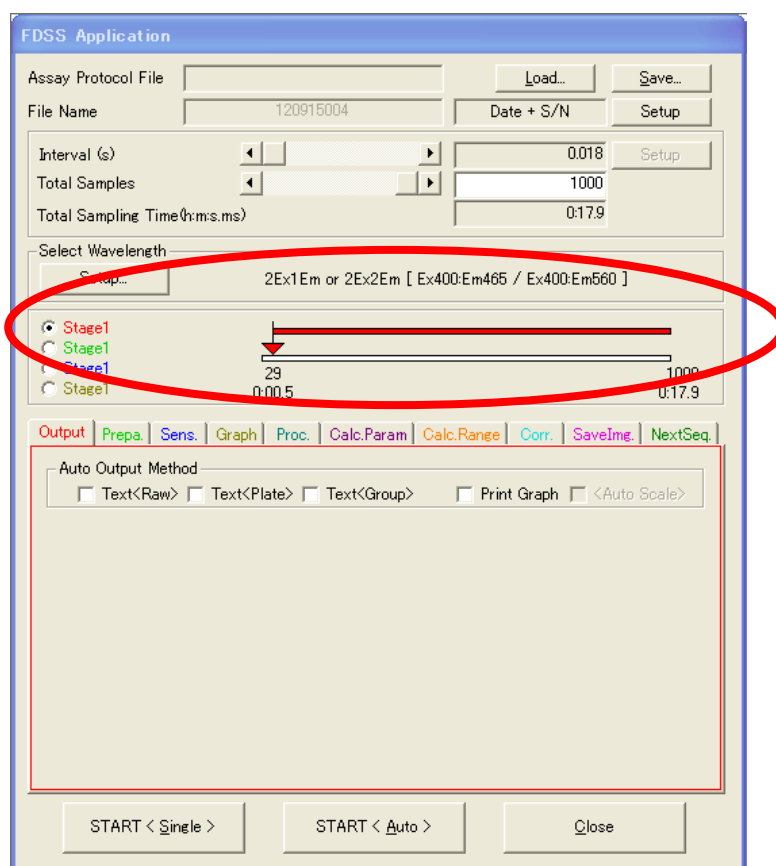
In high speed acquisition mode, dispense timing is fixed. (500ms from start), Only one time dispense is possible.

Dispense parameter could be configured as same as the standard software setting.



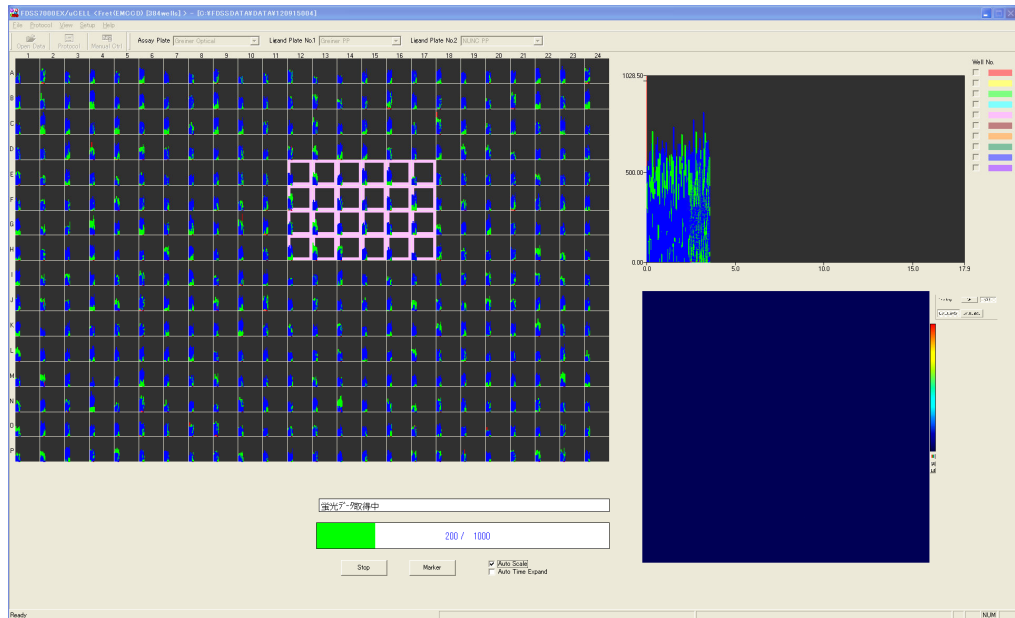
Stage X bullet button  
Arrow

: Select the dispense parameter to be used.  
: Shows the dispense timing  
(timing is fixed to 500ms after start)



### **(1-3) Real time graph display**

In high speed acquisition mode, the graph will be displayed however, it is not realtime. Thus, sometimes it moves to the next step before the graph display is not completed, but the data is all acquired.



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## **7. 2 Camera option**

### **1) About 2 camera simultaneous measurement**

In 2 camera option, it is possible to acquire the image with 2 camera simultaneously. In the standard FDSS/ $\mu$ CELL, normally filter exchanger is used to get different wavelength emission fluorescence but the timing was not at the same. However, this option is to acquire different emission wavelength at the same timing by using 2 camera. Below 4 points are the different points from the standard software.

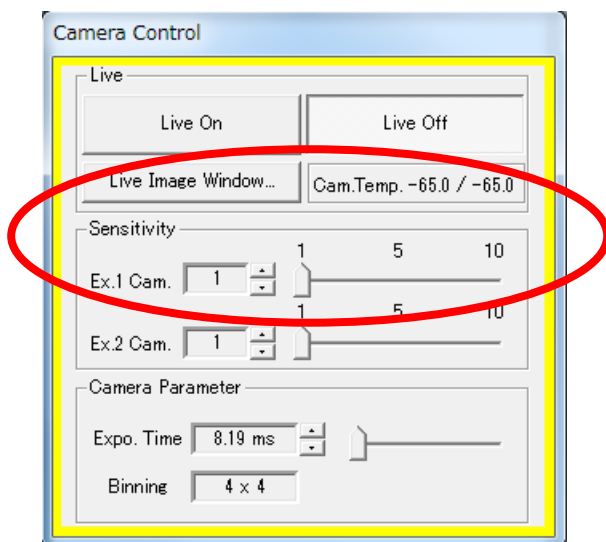
1. Camera Control Box Sensitivity setting
2. Live Image Window
3. FDSS Application Box Sens. TAB Setting
4. Sensitivity Adjustment Box

#### **Note**

This function is option function only for the FDSS7000EX.  
2 camera option requires dedicated optics for 2 camera, dedicated camera, and dedicated software.

**(1-1) Camera control box sensitivity setting**

Below is the Camera Control Box when we have 2 camera options.  
There are two Sensitivity settings to be configured for camera1 and camera2.  
(Exposure time and Binning will be same for both camera.)

**Sensitivity**

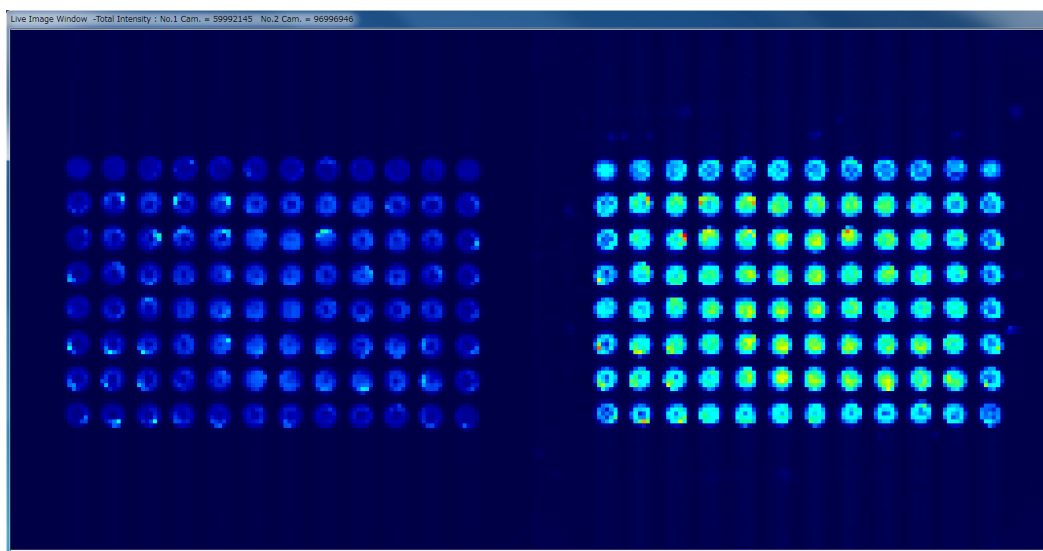
- Ex.1 Cam. : Adjust the sensitivity for camera1  
(Camera for Excitation wavelength 1)
- Ex 2 Cam. : Adjust the sensitivity for camera2  
(Camera for Excitation wavelength 2)

**(1-2) Live image window**

Below Live Image Window show up when Live ON is pushed.

This displays the real live image (without any processing) from the camera.

In case of using 2 camera option, two image will be displayed



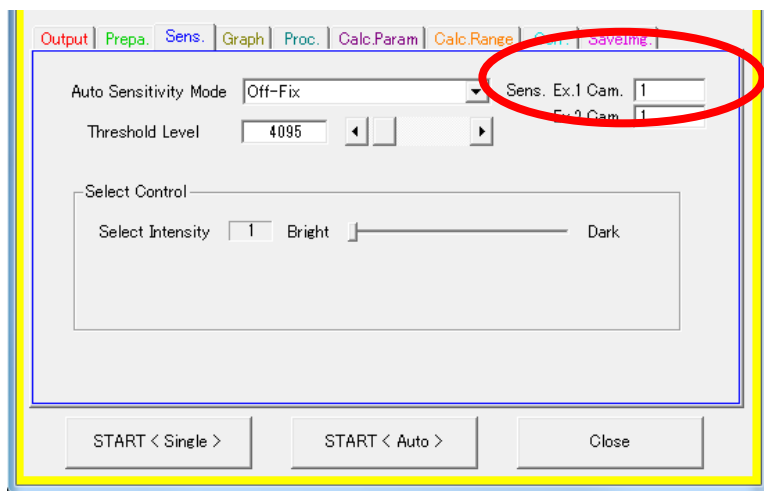
Left image : No.1 Camera Image(camera for excitation wavelength1 )

Right image : No.2 Camera Image(camera for excitation wavelength2 )

(Please refer to FDSS7000EX/ $\mu$ CELL Software instruction manual for changing LUT)

**(1-3) Camera sensitivity adjustment parameter**

Each camera could have different sensitivity adjustment.



When "Auto Sensitivity Mode" is "Off-Fix" below parameters could be configured.

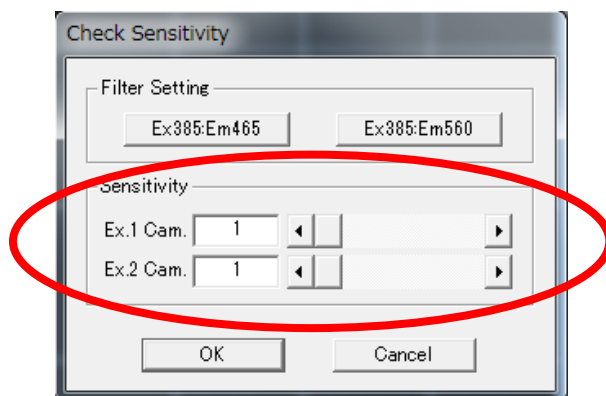
Sens. Ex.1 Cam : No.1 Camera sensitivity (camera for excitation wavelength1 )

Sens. Ex.2 Cam : No.2 Camera sensitivity (camera for excitation wavelength2)

(Threshold Level is applied for both camera)

**(1-4) Sensitivity adjustment in the measurement**

Sensitivity adjustment in the measurement could be done in below "Check Sensitivity" window. In 2 camera option mode, after auto-sensitivity adjustment, below box will show up and possible to configure the sensitivity for each camera.

**Sensitivity**

- Ex.1 Cam. : No.1 Camera sensitivity (Camera for excitation wavelength1 )
- Ex.2 Cam. : No.2 Camera sensitivity (Camera for excitation wavelength2 )

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## **8. Mixing Volume Remote option**

### **1) About mixing volume remote control**

In the standard configuration, mixing volume need to be set in manual by the knob on the front panel. However, there is an option to control the volume by the FDSS software. By this option, it is possible to On/Off control the mixing and the mixing volume could be controlled, too.

1. Control the Mixing Volume from FDSS Software.
2. Mixing Volume value is managed by in the Assay protocol
3. Save the Mixing Volume value in the data.

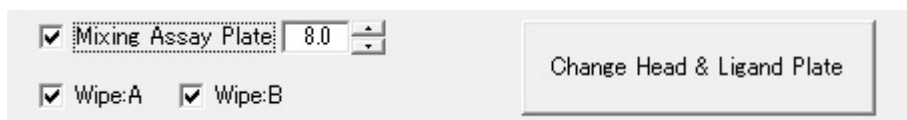
**Note**

This is an optional function of FDSS7000EX only.  
In order to activate this option, FDSS7000EX main unit hardware requires  
Mixing Volume Remote Unit installation.  
This Unit is not in the standard configuration.

**(1-1) Mixing volume settings**

If this option is activated, below value window will appear next to the Mixing control On/Off check box, in the Dispenser Control box. Set your desirable value in this window, or change the value using the scroll box.

(Range which could be set is 0.1 ~ 8.0, 0.1 step)



**Mixing Assay Plate Setting**

- CheckBox : Configure On/Off of the Mixing function
- Edit Box : Mixing volume value can be directly typed in.
- UpDownScroll : Mixing volume value can be changed up/down.

