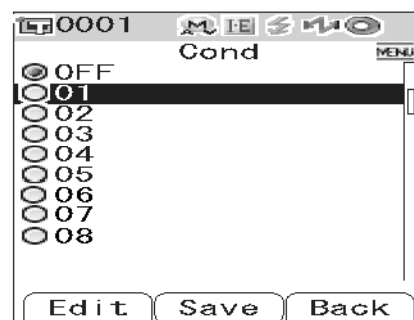


- 3** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired registration number (01 to 08), and then press the [SAMPLE] (Edit) button.

A screen used to select the display conditions for the selected registration number is displayed.



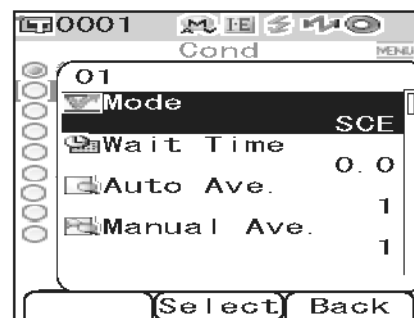
- 4** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to a desired item and then press the [SAVE/SEL] button.

**Memo**

- For the setting procedure and details of the items, refer to page E-32 “Condition Setting”.

**Settings**

- Mode: Select the mode to process specular components.
- Wait Time: Specify the delay between the press of the measuring button and the flash of the lamp.
- Auto Ave.: Specify the number of measurements for auto averaging.
- Manual Ave.: Specify the number of measurements for manual averaging.
- Disp. Type: Specify items to be displayed as measurement results.
- Color Space: Select the color space to be used.
- Equation: Select the color difference formula to be used.
- Color Index: Select the index (WI, YI, etc.) to be used.
- Observer: Select the observer angle from 2° or 10°.
- Illuminant 1: Select the illuminant used to measure colorimetric data.
- Illuminant 2: Select the secondary illuminant used for MI (metamerism index) calculation, etc.

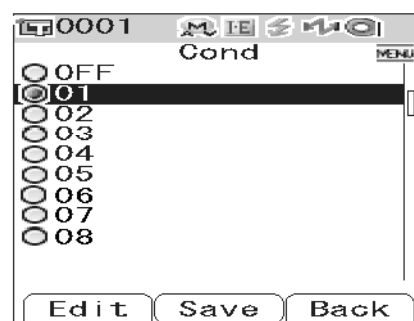


- 5** When the setting is complete, press the [TARGET] (Back) button.

The screen returns to the <Cond> screen.

**Memo**

To set two or more conditions, repeat steps 3 and 4.



- 6** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired registration number (OFF or 01 to 08), and then press the [SAVE/SEL] button.

The selection is confirmed and the screen returns to the <Option> screen.



## Naming a Condition

You can name a condition for easier management.

### [Setting Procedure]

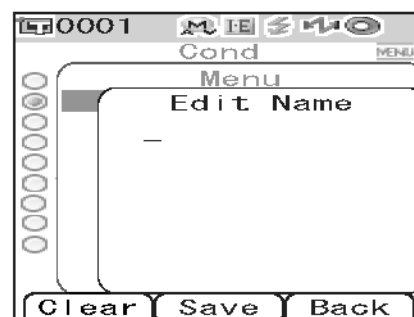
- 1 From the <Cond> screen, press the [MENU] button.

The <Menu> screen is displayed.



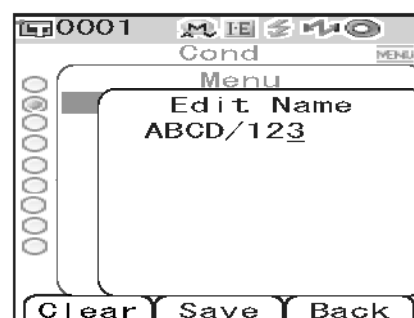
- 2 Make sure that "Edit Name" is selected, and then press the [SAVE/SEL] button.

The <Edit Name> screen is displayed.



- 3 Use the < or > button of the cross key to move the cursor, and use the Δ or ▽ button to change the letter.

- Use the < button of the cross key to move the cursor backward to correct letters.
- Pressing the [SAMPLE] (Clear) button clears all letters.
- Up to 16 characters can be used.
- The available letters are upper/lower-case alphabets, symbols, numbers (0 to 9), and a space.

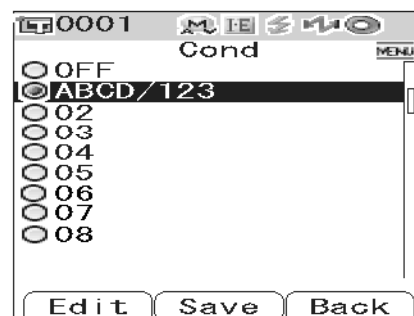


Available symbols

!	"	#	\$	%	&	'	(	)	*	+
,	-	.	/	:	;	<	=	>	?	@
[	¥	]	^	_	'	{		}		

- 4 When you finish entering letters, press the [SAVE/SEL] button.

The screen returns to the <Cond> screen.



## Setting the Default Color Difference Tolerance (Tolerance (Def.))

With the CM-700d/600d, you can preset and save tolerances which do not depend on the target color data as default values. During measurement, just selecting the tolerance No. allows automatic judgment using the target colors and tolerances.

### **M**emo

- If tolerances for each target color have not been set, the tolerance setting for the registration number selected during measurement (initial value: 01) is used as the tolerance setting for each target color.
- Up to 8 default tolerance settings can be specified to registration numbers 01 to 08. Tolerances have been factory-set to registration number 01 only. You need to set tolerances for registration numbers 02 to 08 as necessary.
- With the optional Color Data Software “SpectraMagic™ NX”, you can set or use the color difference tolerance easily.

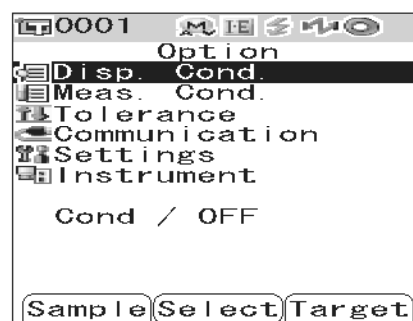
### **N**ote

*Registration 01 for tolerance settings is set as the initial setting at the time of shipment from the factory, and contains default settings for tolerance items. Even if the display conditions (such as color space or color difference equation, index, etc.) are changed, the tolerance setting items will not be automatically changed. If it is desired to set tolerance values according to the currently set display conditions, either delete the currently set tolerance settings and then create new tolerance settings, or create new tolerance settings for a registration number for which tolerances have not yet been set and select that registration number.*

## [Setting Procedure]

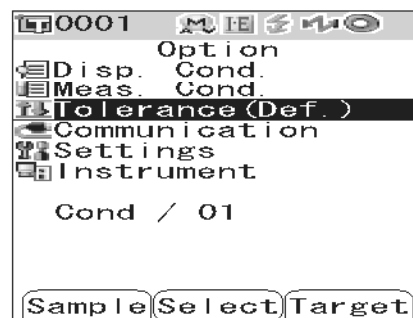
- 1** Hold down the [MENU] button and press the ▽ button of the cross key.

The <Option> screen is displayed.



- 2** Use the ▲ or ▼ button of the cross key to move the cursor to “Tolerance(Def.)” and then press the [SAVE/SEL] button.

The <Tolerance(Def.)> screen is displayed.



- 3** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired registration number (01 to 08).

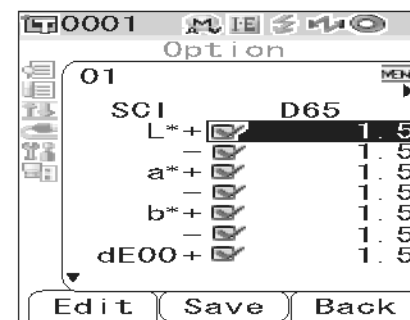


- 4** Press the [SAMPLE] (Edit) button.

A screen used to set tolerances for the selected registration number is displayed.

**Memo**

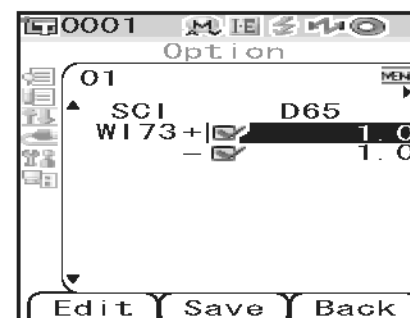
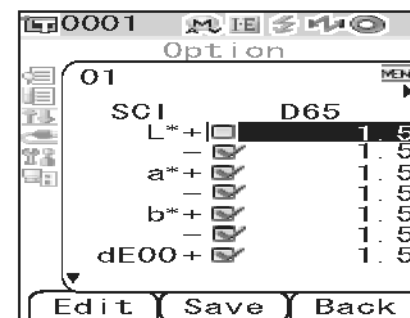
- If registration number 01 (initial setting) is selected, or if you select a number with which tolerances have already been registered, a screen used to change the current tolerance setting is displayed.
- If you select a registration number for which no tolerance has been set, a blank screen is displayed. To set tolerances, press the [MENU] button to display the <MENU> screen. Move the cursor to "Create" and press the [SAVE/SEL] button, and the tolerance setting screen is displayed.



- 5** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired item.

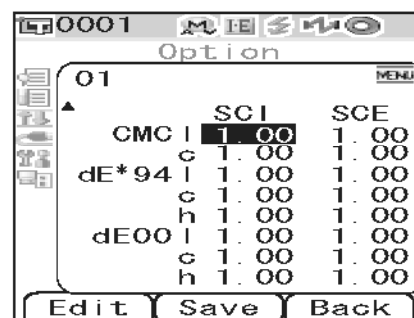
**Memo**

- If  $\blacktriangleleft/\blacktriangleright$  is displayed at the top of the screen, you can use the  $\blacktriangleleft$  or  $\blacktriangleright$  button of the cross key to change the combination of the specular component mode and illuminant used for the screen display.
- If  $\blacktriangle/\blacktriangledown$  is displayed on the left side/end of the screen, you can use the  $\Delta$  or  $\nabla$  button of the cross key to scroll the display screen upward or downward.



## 6 Press the [SAMPLE] (Edit) button and change the setting.

- When you select an item which is currently checked and press the [SAMPLE] (Edit) button, the check mark is cleared. When you press the [SAMPLE] (Edit) button again, the cursor moves to the setting value. Use the  $\Delta$  or  $\nabla$  button of the cross key to change the value.
- When you select an item which is not currently checked and press the [SAMPLE] (Edit) button, the cursor moves directly to the setting value. Use  $\Delta$  or  $\nabla$  button of the cross key to change the value.
- To set each parameter l, c and h for CMC,  $\Delta E^*94$  and  $\Delta E00$ , place the cursor on the item and press the [SAMPLE] (Edit) button, and the cursor moves to the value of the item. Press the  $\Delta$  or  $\nabla$  button of the cross key to change the value.



### Memo

You can move the cursor between the digits of the value by pressing the  $\triangleleft$  or  $\triangleright$  button of the cross key.

### Settings

$\circ \pm 0.0$  to 20.0

\* Settings of each parameter l, c and h for CMC,  $\Delta E^*94$  and  $\Delta E00$  are 0.00 to 9.99.

- You need to press the [SAVE/SEL] (OK) button to confirm the change every time you change the setting of an item.

## 7 When all items have been set, press the [SAVE/SEL] button.

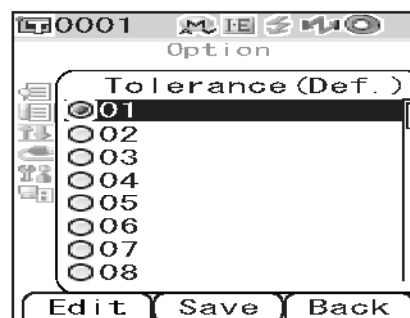
The settings are confirmed and the screen returns to the <Tolerance(Def.)> screen.

### Memo

To set two or more default tolerances, repeat steps 3 through 7.

### Note

*If you press the [TARGET] (Back) button without pressing the [SAVE/SEL] button, you return to the <Tolerance(Def.)> screen without changing the settings.*



## Selecting Color Difference Tolerances

You can set color difference tolerances to individual target colors when they are measured. You can also select one of the predefined tolerances (default tolerances) and use it for judgment.

### **Memo**

A default tolerance setting can be registered with each registration number from 01 to 08. Before shipment, registration number 01 has been selected. Its tolerance setting is used as a default tolerance setting, which can be set to each target color.

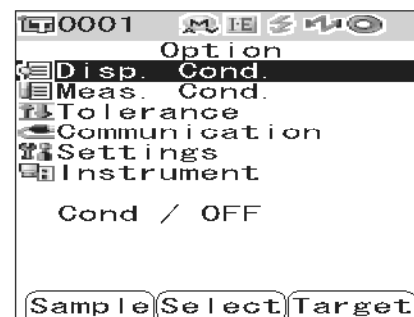
### **Note**

*When you select a registration number for which no tolerance has been set, the tolerance setting for each target color is also blank.*

## [Setting Procedure]

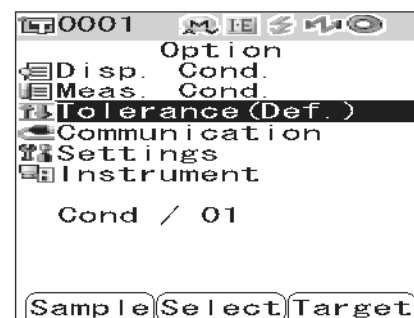
- 1 Hold down the [MENU] button and press the  $\nabla$  button of the cross key.

The <Option> screen is displayed.



- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Tolerance(Def.)" and then press the [SAVE/SEL] button.

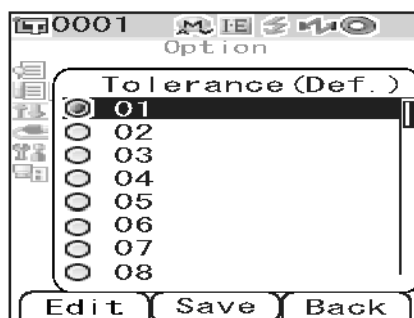
The <Tolerance(Def.)> screen is displayed.



- 3 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired registration number.

### **Memo**

If you press the [SAMPLE] (Edit) button here, you can check the tolerance setting of the registration number. After checking the setting, press the [SAVE/SEL] (OK) button to return to the <Tolerance(Def.)> screen.



- 4 Press the [SAVE/SEL] button.

The selection is confirmed and the screen returns to the <Option> screen.

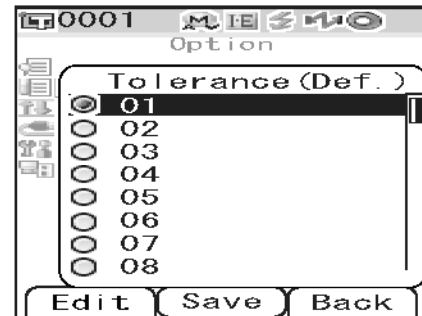
## Deleting the Default Color Difference Tolerance Setting

Delete the setting of the default tolerance of the selected registration number.

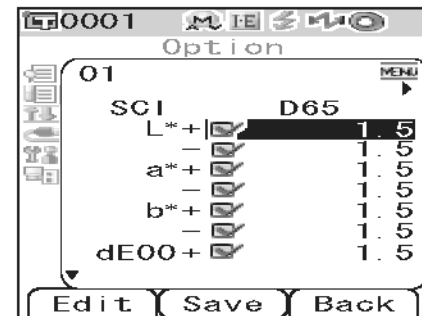
**[Setting Procedure]** Start the procedure from the <Tolerance(Def.)> screen.

- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the registration number for which you want to delete the setting, and then press the [SAMPLE] (Edit) button.

A screen used to set tolerances for the selected registration number is displayed.



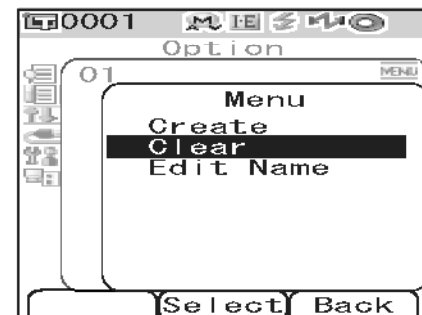
- 2 Press the [MENU] button.  
The <Menu> screen is displayed.



- 3 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Clear", and then press the [SAVE/SEL] button. The setting of the selected registration number is deleted.

### Memo

After the setting is deleted, the screen for the registration number is blank.

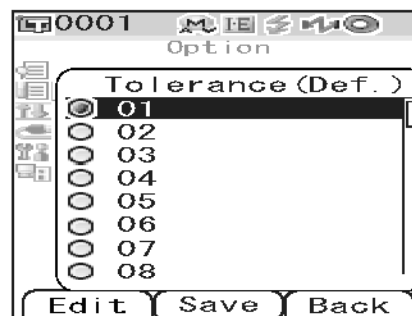


## Naming the Color Difference Tolerance Setting

**[Setting Procedure]** Start the procedure from the <Tolerance(Def.)> screen.

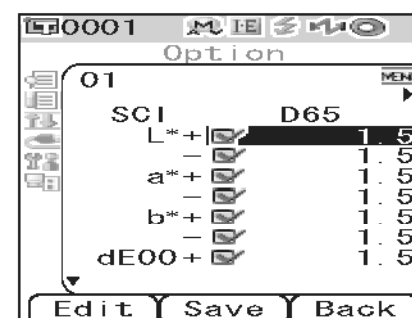
- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the registration number for which you want to edit the name, and then press the [SAMPLE] (Edit) button.

A screen used to set tolerances for the selected registration number is displayed.



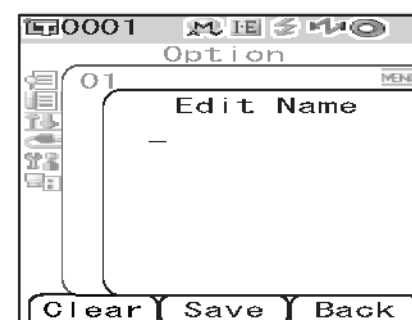
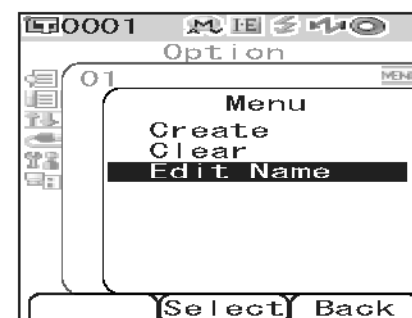
- 2 Press the [MENU] button.

The <Menu> screen is displayed.



- 3 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Edit Name" and then press the [SAVE/SEL] button.

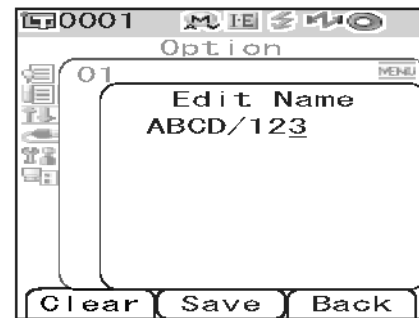
The <Edit Name> screen is displayed.





#### 4 Use the ◀ or ▶ button of the cross key to move the cursor, and use the ▲ or ▼ button to change the letter.

- Use the ◀ button of the cross key to move the cursor backward to correct letters.
- Pressing the [SAMPLE] (Clear) button clears all letters.
- Up to 16 characters can be used.
- The available letters are upper/lower-case alphabets, symbols, numbers (0 to 9), and a space.



Available symbols										
!	"	#	\$	%	&	'	(	)	*	+
,	-	.	/	:	;	<	=	>	?	@
[	\	]	^	_	`	{		}		

#### 5 When you finish entering letters, press the [SAVE/SEL] button.

The screen returns to a screen used to set tolerances for the selected registration number.

## Other Settings

### Setting the Display Language

The display language can be changed from the factory-set language. Available languages are: English, Japanese, German, French, Spanish, Italian, and Chinese.

#### [Memo]

The language is factory-set to “English”.

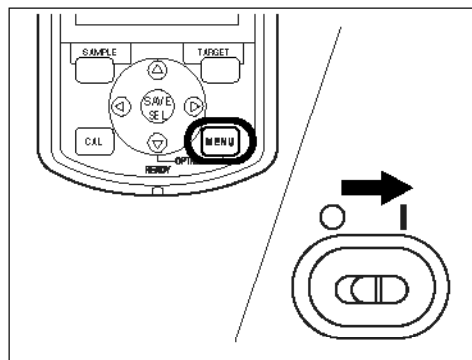
#### [Note]

*When the backup battery of the instrument has gone dead or the instrument is initialized (refer to page E-72), the display language is reset to English regardless of the set language.*

### [Setting Procedure]

- 1 Hold down the [MENU] button and turn ON the instrument.

The <Language> screen is displayed.

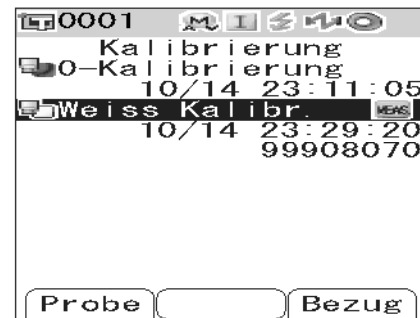


- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired language.

\* The figure shows an example when German (Deutsch) is selected.



- 3** Press the [SAVE/SEL] button.  
The <Calibration> screen is displayed in the selected language.  
\* The figure shows an example when German (Deutsch) is selected.



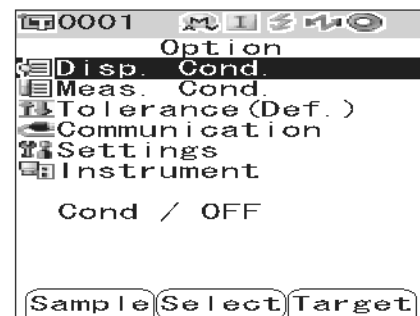
## Setting the Date and Time

The CM-700d/600d has a built-in clock to record the date and time of measurement. Since the date and time have been set at the factory, you do not need to change them under normal conditions. If necessary, you can change the date and time settings.

### [Setting Procedure]

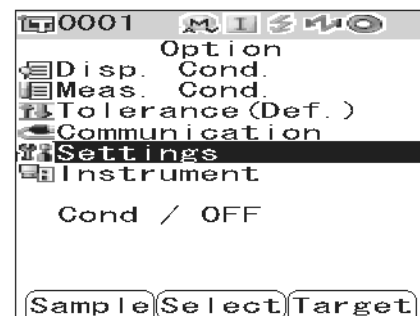
- 1** Hold down the [MENU] button and press the ▽ button of the cross key.

The <Option> screen is displayed.



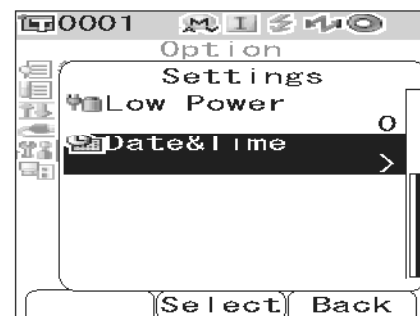
- 2** Use the ▽ button of the cross key to move the cursor to “Settings” and then press the [SAVE/SEL] button.

The <Settings> screen is displayed.



- 3** Use the ▽ button of the cross key to move the cursor to “Date&Time” and then press the [SAVE/SEL] button.

The <Date&Time> screen is displayed.

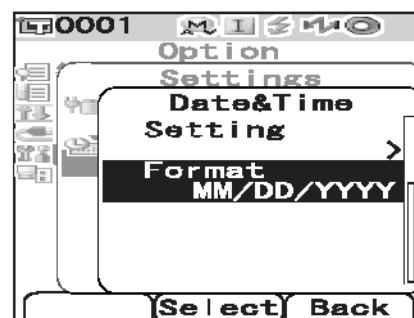


- 4** If you want to change the date format, move the cursor to “Format” and then press the [SAVE/SEL] button.

The <Format> screen is displayed.

**Memo**

This step is unnecessary if you do not change the date format. Go to step 6 on the next page.

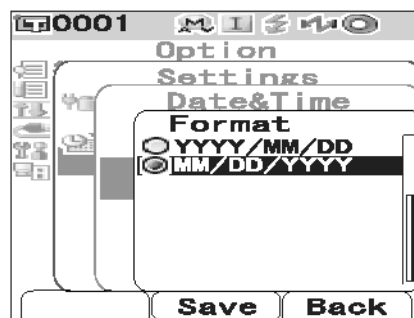


- 5** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired format and then press the [SAVE/SEL] button.

The screen returns to the <Date&Time> screen.

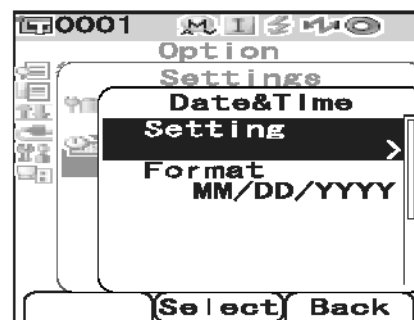
**Settings**

- YYYY/MM/DD: Display the date in the format of year/month/day.
- MM/DD/YYYY: Display the date in the format of month/day/year.



- 6** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “Setting” and then press the [SAVE/SEL] button.

The <Setting> screen is displayed.

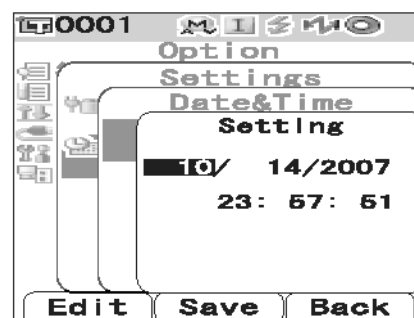


- 7** Use the  $\Delta$ ,  $\nabla$ ,  $\triangleleft$  or  $\triangleright$  button of the cross key to move the cursor to the block of the item which you want to change.

**Memo**

The date consists of blocks of the year, month and day, and the time consists of blocks of the hour, minute and second. To change the values, you need to change the blocks individually.

- Pressing the  $\Delta$  or  $\nabla$  button of the cross key moves the cursor between the date setting line and the time setting line.
- Pressing the  $\triangleleft$  or  $\triangleright$  button of the cross key moves the cursor among the blocks on either the date setting line or the time setting line.



## 8 Press the [SAMPLE] (Edit) button.

The cursor moves to the position where the setting can be changed.

- Use the  $\Delta$  or  $\nabla$  button of the cross key to change the values.

### **Note**

*Every time you change the value of a block, you need to press the [SAVE/SEL] (OK) button to confirm the change. You cannot move to the next block unless you confirm the change of the current block.*

### **Settings**

- Year: 2000 to 2050
- Month: 1 to 12
- Day: 1 to 28, 29, 30 and 31 (varies with the selected month/year)
- Hour: 0 to 23
- Minute: 0 to 59
- Second: 0 to 59

## 9 When all of the necessary items have been changed, press the [SAVE/SEL] button.

The settings are confirmed, and the screen returns to the <Date&Time> screen.

- Press the [TARGET] (Back) button twice to return to the <Option> screen.

## Setting the Power Save Mode

The CM-700d/600d features a power save function which turns off the screen display and stops the power supply to the flash circuit after no operation was made for a specified period of time. The period before the activation of the power save function can be set to 0 (OFF) or within the range from 1 to 60 minutes.

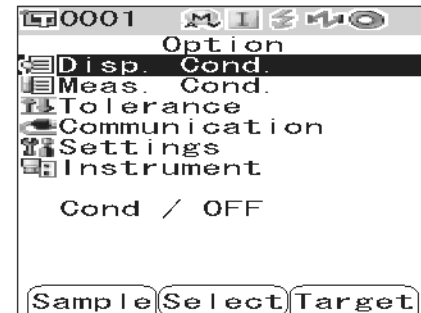
### Note

*The power save function is factory-set to OFF.*

### [Setting Procedure]

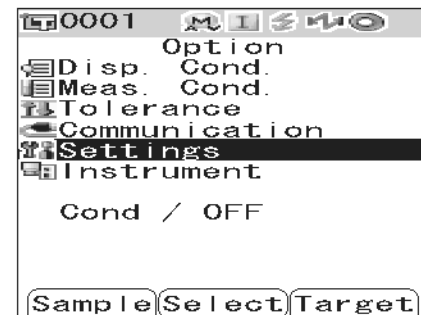
- 1 Hold down the [MENU] button and press the  $\nabla$  button of the cross key.

The <Option> screen is displayed.



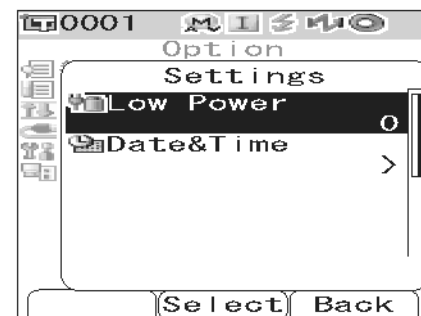
- 2 Use the  $\nabla$  button of the cross key to move the cursor to "Settings" and then press the [SAVE/SEL] button.

The <Settings> screen is displayed.



- 3 Use the  $\Delta$  button of the cross key to move the cursor to "Low Power" and then press the [SAVE/SEL] button.

The <Low Power> screen is displayed.



- 4** Use the  $\Delta$  or  $\nabla$  button of the cross key to change the time before the power save mode is activated by specifying the number of minutes.

**Memo**

Holding down the  $\Delta$  or  $\nabla$  button of the cross key changes the value continuously.

- When you finish changing the setting, press the [TARGET] (Back) button to return to the <Settings> screen of the Option menu.

**Settings**

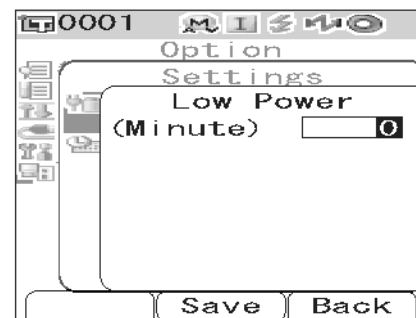
- 0: Disable the power save mode.
- 1 to 60: 1 to 60 minutes

- 5** When the change is complete, press the [SAVE/SEL] button.

The setting is confirmed and the screen returns to the <Settings> screen.

**Note**

*If you press the [TARGET] (Back) button without pressing the [SAVE/SEL] button, you return to the <Settings> screen without changing the setting.*



## Initialization

Reset the settings of the instrument to the initial status.

### [Note]

- *Do not initialize the instrument unless necessary.*
- *The measured data, target color data, tolerances set to each target color and default tolerance settings will be protected and not be deleted by initialization.*
- *After the initialization, the display language is reset to English. Change the language if necessary.*

### [Memo]

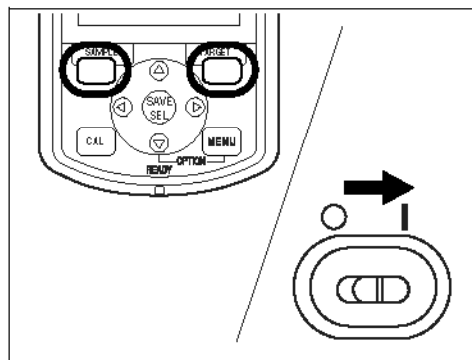
The measured data and target color data which you saved will be stored even after initialization.

For details of the initial setting values, refer to page E-114 “Initial Settings”.

## [Setting Procedure]

- 1 Turn ON the instrument while holding down the [TARGET] and [SAMPLE] buttons simultaneously.

The <Initializ> screen is displayed.



- 2 Use the ◀ or ▶ button of the cross key to move the cursor to “OK” and then press the [SAVE/SEL] button.

Initialization will be performed.



### [Memo]

When you place the cursor on “Cancel” on the <Initializ> screen and press the [SAVE/SEL] button, the initialization is canceled and the <Calibration> screen is displayed.



# Chapter 3

## Measurement

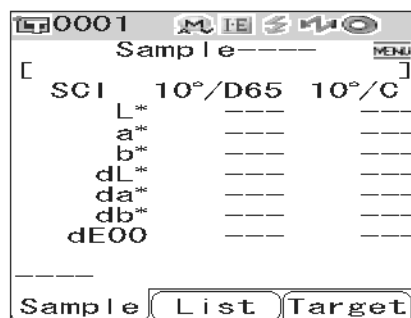
# Measurement

## Note

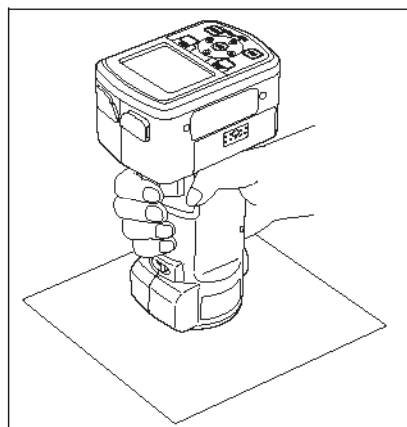
- Prior to start of measurement, be sure to perform white calibration. For details, refer to page E-29 “White Calibration”.
- To display color difference, it is necessary to set target colors before measurement.
- For accurate measurement, make sure to keep measurement conditions (ambient temperature etc.) constant.


## [Setting Procedure]

- 1 Press the [SAMPLE] button.  
The <Sample> screen is displayed.



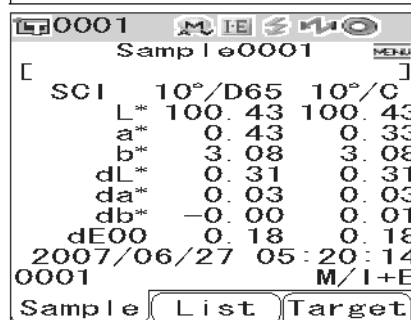
- 2 Place the specimen measuring port on the specimen.




- 3 Make sure that  (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.

The specimen is measured and the result is displayed on the screen.

- The sample data Nos. are automatically assigned sequentially in the order of measurements.



## Memo

- When the number of measured data sets stored in the memory reaches 4000, the number assigned to the subsequent measured data will always be No. 4000, and the oldest data will be deleted one by one.
- When the screen is turned OFF by the power save function, press any of the measuring or control buttons to turn ON the screen, confirm that  (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.
- When I + E (SCI + SCE) is specified as the specular component mode (refer to page E-43 “Mode”), clicks caused by opening and closing the optical trap may be heard during the measurement.

# Displaying the Measurement Results

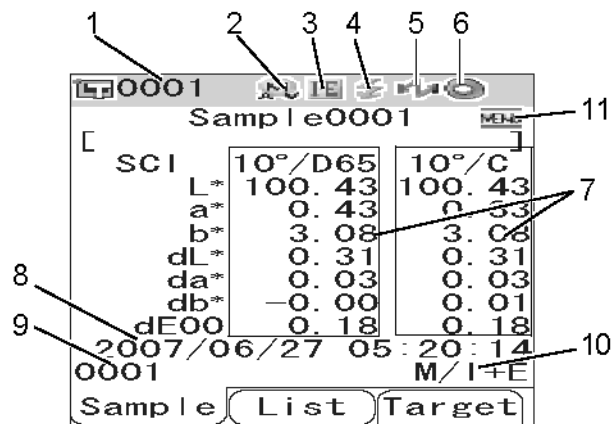
At the end of measurement, the measurement results will be displayed on the LCD according to the specified measurement conditions. Typical measurement result screens are shown below.

## [Memo]

You can switch the measurement result screens with the ◀ or ▶ button of the cross key. For details of the screen switching, refer to page E-78 “Switching the Display Contents of the Measurement Results”.

## Measured Data

The figure below shows a sample screen where “Abs. & Diff.” is selected for “Disp. Type” of the display condition.



- 1 Data No. of the currently selected target color data.
- 2 Current lens position (M: MAV, S: SAV)
  - With the CM-600d, only “MAV” can be used.
- 3 Current specular component mode (I: SCI, E: SCE, I+E: SCI + SCE)
- 4 Ready to measure
- 5 Bluetooth mode is ON.
- 6 White calibration completed
- 7 Measured data (Can be switched with the ◀ or ▶ button of the cross key.)
  - When both illuminants 1 and 2 are set, the measurement results for both illuminants are displayed. The results of the measurement using illuminant 1 are displayed on the left, and the results using illuminant 2 are displayed on the right.
  - The measured data which failed the pass/fail judgment based on the color difference tolerance will be highlighted in red.
- 8 Date and time of the measurement
- 9 Data No. of the target color data used for the measurement
- 10 Lens position and specular component mode used for the measurement
- 11 Indicates that pressing the [MENU] button will display the <Menu> screen.

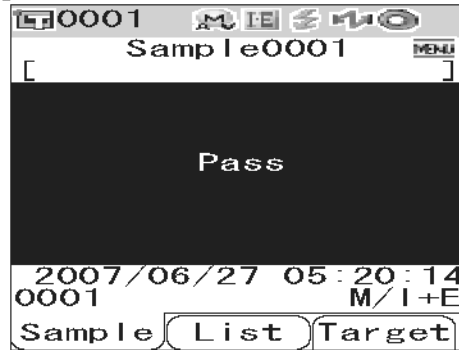
## Pass/Fail Judgment

---

The following screens are displayed when “Judge” has been selected for “Disp. Type” of the current display conditions.

- When the result was “Pass”

The background is shown in green.



- When the result was “Fail”

The background is shown in red.



## Color Difference Graph

---

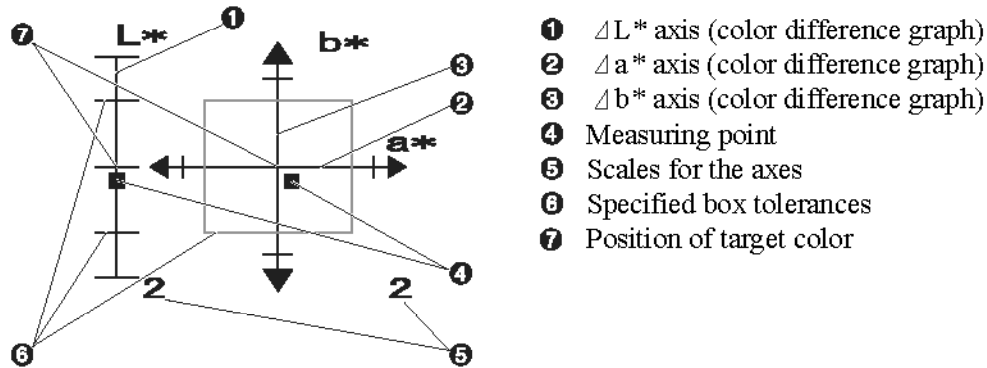
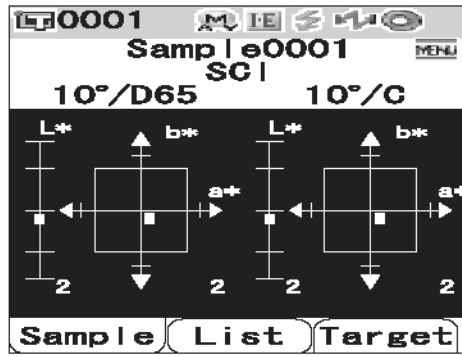
The following screen is displayed when “Graph Diff.” has been selected for “Disp. Type” of the current display conditions.

The target color will be plotted on the graph.

**Note**

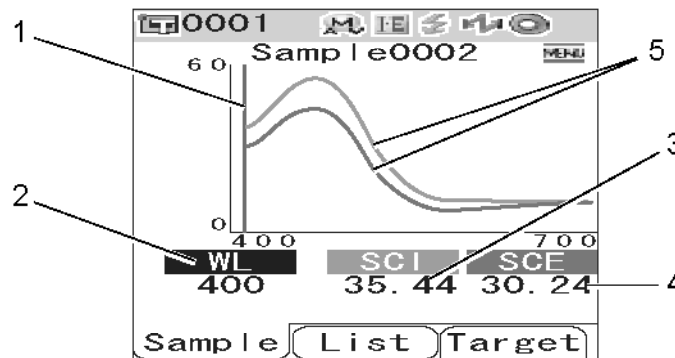
- *If a target color has not been set for the selected data No., no point is displayed on the graph.*

• Color difference graph



## Spectral Reflectance Graph

The following screen is displayed when “Graph Spec.” has been selected for “Disp. Type” of the current display conditions.



- 1 Position of the currently selected wavelength
- 2 WL: Select the wavelength used in the spectral reflectance graph.  
To select wavelength, use the ▾ button of the cross key to move the cursor to the value at the bottom of the screen (unit: nm), then press the ◀ or ▶ button of the cross key.
- 3 SCI: Spectral reflectance in SCI (Specular Component Included) mode  
\* When the specular component mode is SCE, no value is displayed.
- 4 SCE: Spectral reflectance in SCE (Specular Component Excluded) mode  
\* When the specular component mode is SCI, no value is displayed.
- 5 Spectral graph: The graph shows the spectral reflectance measured in SCI mode with a blue line, and it shows the reflectance measured in SCE mode with a green line.

## Switching the Display Contents of the Measurement Results

The contents of the measurement result display can be changed by pressing the ◀ or ▶ button of the cross key on the <Sample> screen. The contents will vary depending on the display type setting.

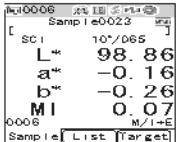
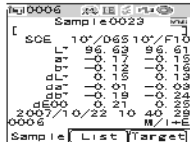
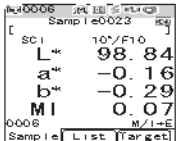
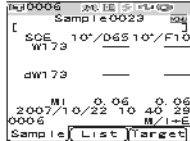
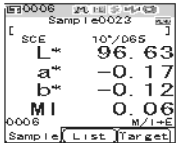

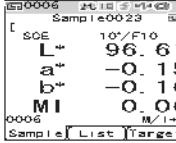
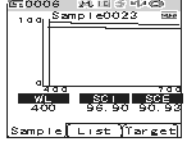
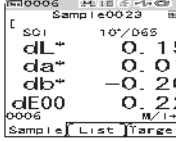
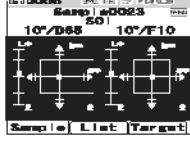

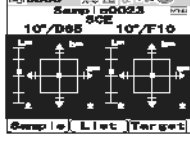

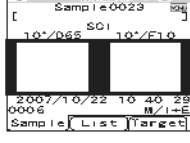
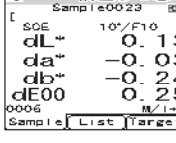
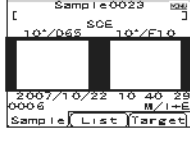
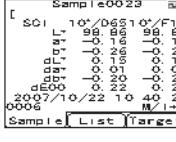
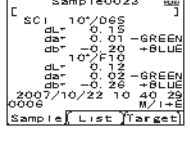
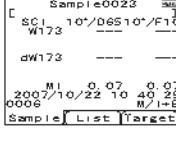
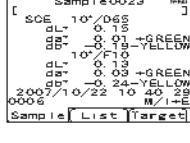
### **Memo**

The color difference is displayed only when target data has been set.

Display type	Illuminant setting	Mode	1		2		3		4		5	6	7	8	9		10		
			SCI				SCE				SCI		SCE		SCI				
			Absolute value/ Illuminant 1		Absolute value/ Illuminant 2		Absolute value/ Illuminant 1		Absolute value/ Illuminant 2		Color difference + Equation		Color difference + Equation		Color difference + Absolute value		Color index		
		Absolute value	MI	Absolute value	MI	Absolute value	MI	Absolute value	MI	Illuminant 1	Illuminant 2	Illuminant 1	Illuminant 2	Illuminant 1	Illuminant 2	Color index	MI		
Absolute value	Illuminants 1 and 2	I+E	○		○		○		○										
		SCI	○		○		---		---										
		SCE	---		---		○		○										
	Illuminant 1 only	I+E	○	X	---	X	○	X	---	X									
		SCI	○	X	---	X	---	X	---	X									
		SCE	---	X	---	X	○	X	---	X									
Color difference	Illuminants 1 and 2	I+E								○	○	○	○						
		SCI								○	○	---	---						
		SCE									---	---	○	○					
	Illuminant 1 only	I+E									○	---	○	---					
		SCI									○	---	---	---					
		SCE									---	---	○	---					
Color difference and Absolute value	Illuminants 1 and 2	I+E													○		○		
		SCI													○		○		
		SCE													---		---		
	Illuminant 1 only	I+E													○	---	○	X	
		SCI													○	---	○	X	
		SCE													---	---	---	X	
Judgment	Illuminants 1 and 2	I+E																	
		SCI																	
		SCE																	
	Illuminant 1 only	I+E																	
		SCI																	
		SCE																	
Spectral graph	Illuminants 1 and 2	I+E																	
		SCI																	
		SCE																	
	Illuminant 1 only	I+E																	
		SCI																	
		SCE																	
Color difference graph	Illuminants 1 and 2	I+E																	
		SCI																	
		SCE																	
	Illuminant 1 only	I+E																	
		SCI																	
		SCE																	
Pseudo color	Illuminants 1 and 2	I+E																	
		SCI																	
		SCE																	
	Illuminant 1 only	I+E																	
		SCI																	
		SCE																	
Color assessment	Illuminants 1 and 2	I+E																	
		SCI																	
		SCE																	
	Illuminant 1 only	I+E																	
		SCI																	
		SCE																	



Display order of the measurement result screens (when all the items are selected for “Disp. Type”.)

- |   |   |   |   |
|---|---|---|---|
| <p>1 Absolute value/SCI/<br/>Illuminant 1</p> <p style="text-align: center;">↓</p>                                    |    | <p>11 Color difference &amp;<br/>Absolute value/SCE/<br/>Illuminants 1 and 2</p> <p style="text-align: center;">↓</p> |    |
| <p>2 Absolute value/SCI/<br/>Illuminant 2</p> <p style="text-align: center;">↓</p>                                    |    | <p>12 Color index/SCE/<br/>Illuminants 1 and 2</p> <p style="text-align: center;">↓</p>                               |    |
| <p>3 Absolute value/SCE/<br/>Illuminant 1</p> <p style="text-align: center;">↓</p>                                    |    | <p>13 Judgment</p> <p style="text-align: center;">↓</p>   |    |
| <p>4 Absolute value/SCE/<br/>Illuminant 2</p> <p style="text-align: center;">↓</p>                                    |    | <p>14 Spectral graph</p> <p style="text-align: center;">↓</p>   |    |
| <p>5 Color difference/SCI/<br/>Illuminant 1</p> <p style="text-align: center;">↓</p>                                  |    | <p>15 Color difference graph/<br/>SCI</p> <p style="text-align: center;">↓</p>  |    |
| <p>6 Color difference/SCI/<br/>Illuminant 2</p> <p style="text-align: center;">↓</p>                                  |  | <p>16 Color difference graph/<br/>SCE</p> <p style="text-align: center;">↓</p>  |  |
| <p>7 Color difference/SCE/<br/>Illuminant 1</p> <p style="text-align: center;">↓</p>                                  |  | <p>17 Pseudo color/SCI</p> <p style="text-align: center;">↓</p>   |  |
| <p>8 Color difference/SCE/<br/>Illuminant 2</p> <p style="text-align: center;">↓</p>                                  |  | <p>18 Pseudo color/SCE</p> <p style="text-align: center;">↓</p>   |  |
| <p>9 Color difference &amp;<br/>Absolute value/SCI/<br/>Illuminants 1 and 2</p> <p style="text-align: center;">↓</p>  |  | <p>19 Color assessment/SCI</p> <p style="text-align: center;">↓</p>   |  |
| <p>10 Color difference &amp;<br/>Absolute value/SCI/<br/>Illuminants 1 and 2</p> <p style="text-align: center;">↓</p> |  | <p>20 Color assessment/SCE</p> <p style="text-align: center;">↓</p>   |  |

Continues to 11

Returns to 1



---

# Measured Data Operation

---

The following operations are available for the measured data.

- Print: Print the measured data.
- Delete: Delete the measured data.
- Edit Name: Name the measured data.
- List: Specify the columns displayed for each sample data No. in the list.
- Auto Target: Automatically select a target color with the smallest color difference for measurement.
- DeleteAll: Delete all the measured data.

## [Operating Procedure]

---

- 1** From the <Sample> screen, press the [MENU] button.

The <Menu> screen is displayed.



- 2** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to an item to select or execute, and then press the [SAVE/SEL] button.

The setting screen for the selected item is displayed.

For the operating procedure of each item, refer to the following sections.



- 3** To return to the <Sample> screen, press the [MENU] button while the <Menu> screen is displayed.

## Print

---

Print the measured data.

You need to establish a connection between the instrument and a Bluetooth printer in advance.

### Note

*If proper connection is not established, you cannot select "Print" on the <Menu> screen.*

**[Operating Procedure]** Start the procedure from the <Menu> screen of the <Sample> screen.

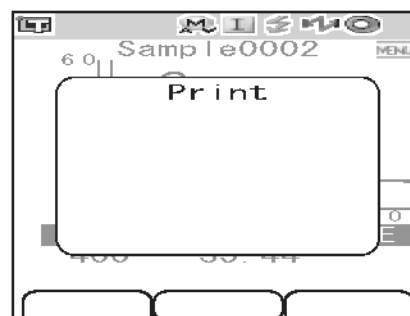
---

- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Print".



- 2 Press the [SAVE/SEL] button. The <Print> screen is displayed and the data is printed from the connected printer.

When the printing is complete, the screen returns to the <Sample> screen.



## Delete

---

Delete the measured data.

**[Operating Procedure]** Start the procedure from the <Menu> screen of the <Sample> screen.

---

- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Delete" and then press the [SAVE/SEL] button.

The <Delete> screen is displayed.



- Use the  $\triangleleft$  button of the cross key to move the cursor to “OK” and press the [SAVE/SEL] button. Data will be deleted.

**Memo/**

When data is deleted, the subsequent sample data Nos. will be reassigned, reducing them by one.

- When the deletion is complete, the screen returns to the <Menu> screen.
- When you place the cursor on “Cancel” and press the [SAVE/SEL] button, the deletion is canceled and the screen returns to the <Menu> screen.



## Edit Name

Name the measured data.

**[Setting Procedure]** Start the procedure from the <Menu> screen of the <Sample> screen.

- Use the  $\triangle$  or  $\nabla$  button of the cross key to move the cursor to “Edit Name” and then press the [SAVE/SEL] button.

The <Edit Name> screen is displayed.

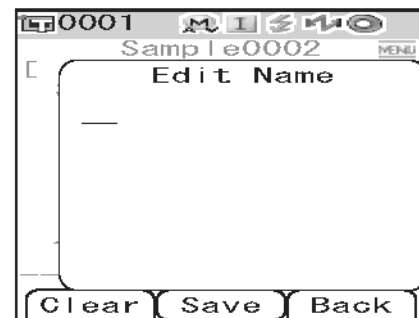
**Memo/**

The initial value for the name is “No Name”.



- Use the  $\triangleleft$  or  $\triangleright$  button of the cross key to move the cursor, and use the  $\triangle$  or  $\nabla$  button to change the letter.

- Use the  $\triangleleft$  button of the cross key to move the cursor backward to correct letters.
- Pressing the [SAMPLE] (Clear) button clears all letters.



- Up to 16 characters can be used.
- The available letters are upper/lower-case alphabets, symbols, numbers (0 to 9), and a space.

Available symbols										
	"	#	\$	%	&	'	(	)	*	+
,	-	.	/	:	;	<	=	>	?	@
[	¥	]	^	_	'	(		)		

- When you finish entering letters, press the [SAVE/SEL] button.

The name is confirmed, and the screen returns to the <Menu> screen.

**Note**

*If you press the [TARGET] (Back) button without pressing the [SAVE/SEL] button, you return to the sample data screen without changing the name.*

## Setting the List (List)

When the <Sample> screen is displayed, pressing the [SAVE/SEL] button switches the screen between the list display and detail display. Specify the columns displayed for each sample data No. in the list.

**[Setting Procedure]** Start the procedure from the <Menu> screen of the <Sample> screen.

- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “List” and then press the [SAVE/SEL] button.

The <List> screen is displayed.



- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the desired item.

### Settings

- Name: Display the name specified with Edit Name in the list.
- Date&Time: Display the date and time of the measurement in the list.
- Pseudo Color: Display the pseudocolor in the list.



- 3 Press the [SAVE/SEL] button.

The selection is confirmed and the screen returns to the <Menu> screen.

### Note

*If you press the [TARGET] (Back) button without pressing the [SAVE/SEL] button, you return to the sample data screen without changing the setting.*

## Auto Target

Automatically select the target color with the smallest color difference ( $\Delta E^*ab$ ) for measurement.

### Memo

The target color will be selected from those with the same specular component mode setting as the measurement. For example, when the specular component mode “I + E” is used for the measurement, the target color is selected from those for which “I + E” has been set.

### Note

- Do not use this function if you want to check the color difference from a specific target color.
- This setting will not be applied to the measured data obtained before this function is set to ON.

## [Setting Procedure] Start the procedure from the <Menu> screen of the <Sample> screen.

- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “Auto Target” and then press the [SAVE/SEL] button.

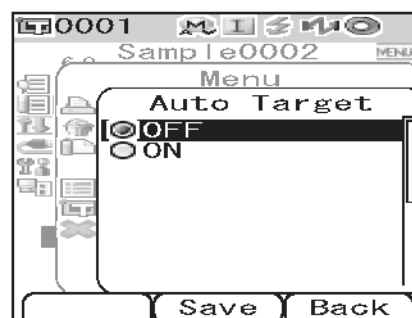
The <Auto Target> screen is displayed.



- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “ON” or “OFF”.

### Settings

- ON: Use the Auto Target function for measurement.
- OFF: Do not use the Auto Target function.



- 3 Press the [SAVE/SEL] button.

The selection is confirmed and the screen returns to the <Menu> screen.

### Note

*If you press the [TARGET] (Back) button without pressing the [SAVE/SEL] button, you return to the sample data screen without changing the setting.*

## DeleteAll

Delete all the measured data.

## [Operating Procedure] Start the procedure from the <Menu> screen of the <Sample> screen.

- 1 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “DeleteAll” and then press the [SAVE/SEL] button.

The <DeleteAll> screen is displayed.



**2** Use the  $\triangleleft$  button of the cross key to move the cursor to “OK” and press the [SAVE/SEL] button, and the data is deleted.

- When the deletion is complete, the screen returns to the <Menu> screen.
- When you place the cursor on “Cancel” and press the [SAVE/SEL] button, the deletion is canceled and the screen returns to the <Menu> screen.



# Chapter 4



## Other Functions

---

# Average Measurement

---

When taking measurements or setting target colors, more accurate data can be obtained if the averaging function is used.

With the CM-700d/600d, the following two averaging functions are available.

- **Manual Averaging** : When the color of the specimen is not uniform, measurements are performed at different positions on the specimen and then the average of the measured spectral reflectance data is calculated. This gives the average data of the entire specimen.
- **Auto Averaging** : The specified number of measurements are repeated at the same position on the specimen and then the average of the measured spectral reflectance data is calculated. This will improve the accuracy of the measured data.

These two functions can also be used in combination. In this case, it is necessary to make settings for both auto and manual averaging. For details, refer to page E-45 “Auto Averaging (Auto Ave.)” and page E-46 “Manual Averaging (Manual Ave.)”.

## Note

*For average measurement, the average of the measured spectral reflectance data is calculated first, then colorimetric data is calculated based on that calculated average. Thus, the result may not match the average of the measured colorimetric data.*

---

## Manual Averaging

---

This method is used when the color of the specimen is not uniform. Measurements are performed at different positions on the specimen and then the average of the measured spectral reflectance data is calculated, to obtain the average data of the entire specimen.

## Note

*Before using manual averaging, you must complete the settings for manual averaging. For details, refer to page E-46 “Manual Averaging (Manual Ave.)”.*

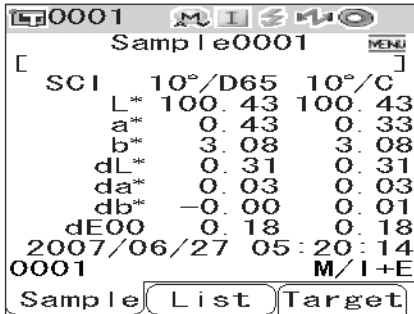
---

## [Setting Procedure]

---

- 1** Press the [SAMPLE] button.

The <Sample> screen is displayed.




SCI	10°/D65	10°/C
L*	100.43	100.43
a*	0.43	0.33
b*	3.08	3.08
dL*	0.31	0.31
da*	0.03	0.03
db*	-0.00	0.01
dE00	0.18	0.18

2007/06/27 05:20:14  
0001 M/I+E  
Sample List Target

- 2** Place the specimen measuring port on the specimen.

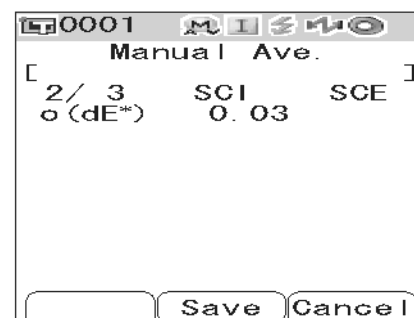


**3** Make sure that  (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.

The number of completed measurements and the measured value will be displayed during measurement.

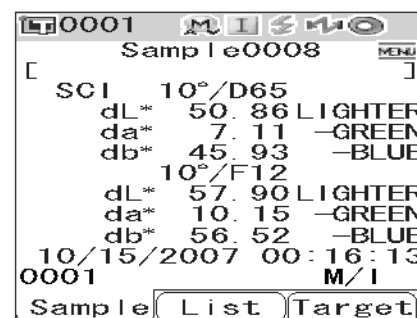
**Memo/**

To cancel the measurement, press the [TARGET] (Cancel) button. If canceled, the measurement will not be saved.




**4** Place the specimen measuring port at the next position and repeat the steps from 1 to 3.

When the specified number of measurements has been completed, the averaging result will be displayed on the screen.



**Memo/**

- To finish manual averaging and display the result before the specified number of measurements is completed, press the [SAVE/SEL] button.
- When the screen is turned OFF by the power save function, press any of the measuring or control buttons to turn ON the screen, confirm that  (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.

## Auto Averaging

Measurement is repeated the specified number of times at the same position on the specimen and then the average of the measured spectral reflectance data is calculated. This will improve the accuracy of the measured data.

The measurement procedure is as shown below.

### Note

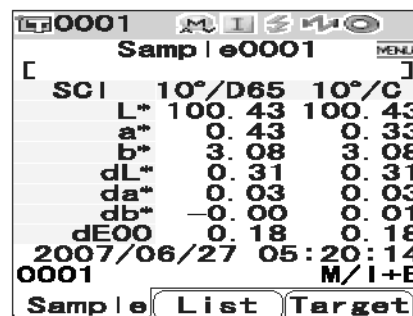
*Before starting auto averaging, you must complete the settings for auto averaging.*

*For details, refer to page E-45 "Auto Averaging (Auto Ave.)".*

## [Setting Procedure]

### 1 Press the [SAMPLE] button.

The <Sample> screen is displayed.



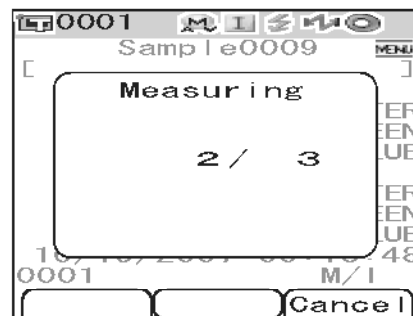
### 2 Place the specimen measuring port on the specimen.

### 3 Make sure that (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.

The number of completed measurements will be displayed during measurement.

### Memo

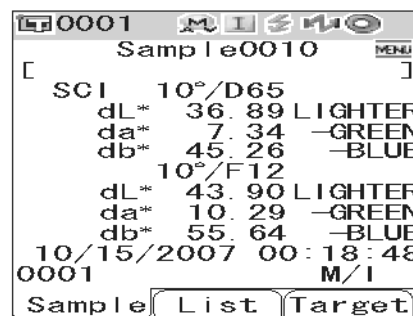
To cancel the measurement, press the [TARGET] (Cancel) button. It may take some time before the cancellation is accepted. Continue pressing the button until Error Message WR120 (measurement interrupted) is displayed.



When the specified number of measurements has been completed, the averaging result will be displayed on the screen.

### Note

*If you cancel measurement before the measurement is repeated for the specified number, the measured value is not displayed.*



## Pass/Fail Judgment for Color Difference

You can set tolerances for the color difference of the measured data from the target color data to make pass/fail judgment. The CM-700d/600d uses box tolerances for judgment.

The tolerances can also be set for “Cond 01 to 08” on the <Option> screen. For details, refer to page E-50 “Tolerance (Box Tolerance) Setting”.

The pass/fail judgment will be based on the target color data of the number selected for measurement, and on either of the tolerances specified for the target color data or the tolerances set for “Cond 01 to 08”. If target color data is deleted, neither the color difference display for the data nor the pass/fail judgment based on the tolerances set to the data will be performed. Even if other target color data is selected, recalculations and pass/fail judgments will not take place.

## Pass/Fail Judgment Based on Tolerances

If the measured color difference is outside the tolerances set for the target color, the value will be highlighted in red to indicate that the judgment result is “Fail”. Both + and - tolerances can be set for each target color.

To perform pass/fail judgment based on box tolerances, follow the procedure given below.

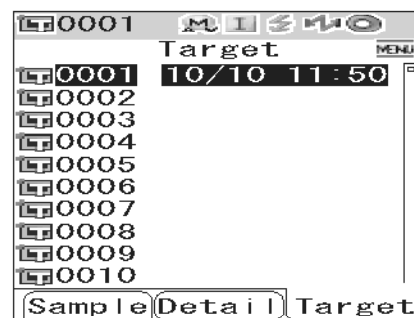
### **Note**

*Before using this function, you must set color difference tolerances.*

## [Setting Procedure]

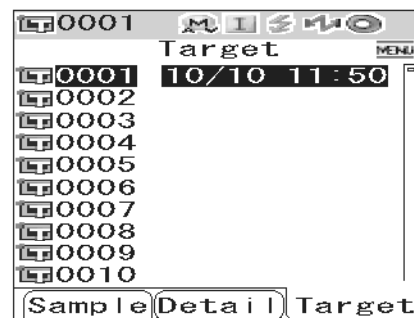
### **1** Press the [TARGET] button.

The <Target> screen is displayed.



### **2** Use the $\Delta$ or $\nabla$ button of the cross key to select the target color No.

- If you want to select the target color by its name or date, press the [SAVE/SEL] button to show the list display.
- In the list, you can press the  $\triangleleft$  or  $\triangleright$  button to change the screen entirely to the next screen.
- To change the target color No. while the spectral reflectance graph is displayed, you need to press the  $\Delta$  or  $\nabla$  button twice.



**3** Press the [MENU] button.

The <Menu> screen is displayed.

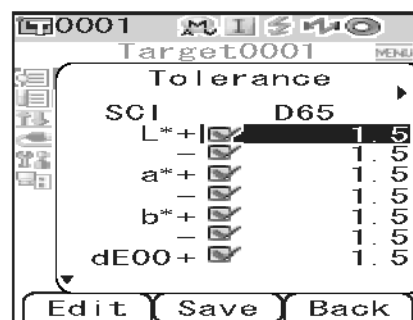


**4** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Tolerance" and then press the [SAVE/SEL] button.

The <Tolerance> screen is displayed.

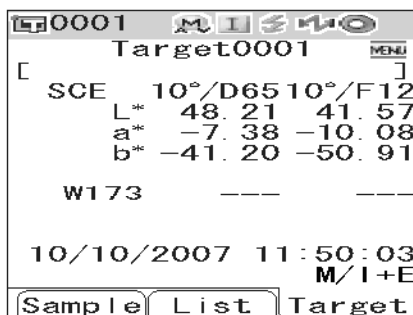


- To display the other tolerance setting items, press the  $\Delta$  or  $\nabla$  button of the cross key.



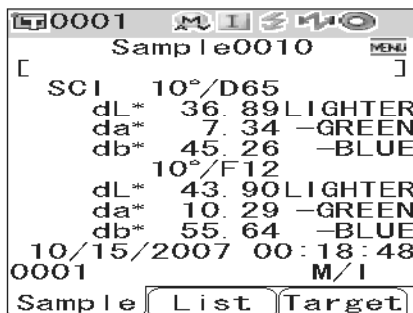
**5** Make sure that the values are set properly, and then press the [SAVE/SEL] button.

The <Target> screen is displayed.



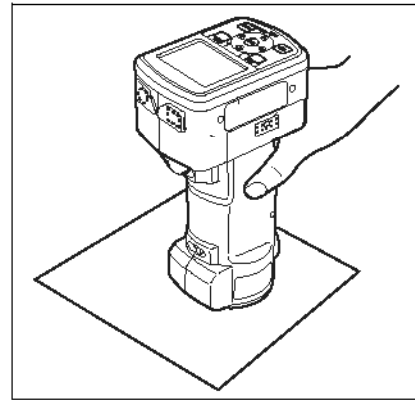
**6** Press the [SAMPLE] button.

The <Sample> screen is displayed.



## 7 Place the specimen measuring port on the specimen, and press the measuring button.

The specimen is measured and the judgment results are displayed according to the display type specified for the display conditions.



- When the display type is “Absolute” or “Abs. & Diff.”  
The values which failed the judgment are highlighted in red.

0001		M I S M O	
Sample0010			
SCI	10°/D65	10°/F12	
L*	100.89	101.26	
a*	-0.08	0.22	
b*	4.07	4.89	
dL*	50.86	57.90	
da*	7.11	10.15	
db*	45.93	56.52	
dE00	45.72	53.06	
10/15/2007 00:16:13			
0001		M/I	
Sample	List	Target	

- When the display type is “Judge”

When at least one item failed the judgment, “Fail” is displayed; when all items passed the judgment, “Pass” is displayed.


- When the judgment result is “Pass”, the results are displayed as the screen on the right according to the condition setting at the time of the measurement.

0001		M I S M O	
Sample0001			
Pass			
2007/06/27 05:20:14			
0001		M/I+E	
Sample	List	Target	

- When the judgment result is “Fail”, the results are displayed as the screen on the right according to the condition setting at the time of the measurement.

0001		M I S M O	
Sample0002			
Fail			
2007/06/27 05:21:23			
0001		M/I+E	
Sample	List	Target	

### **Memo**

- When “Judge” is selected as the display type, “Pass” will be displayed only when all the items have passed the judgment.
- When “Absolute” or “Abs. & Diff.” is selected as the display type, the values for the items which have failed the judgment will be highlighted in red.
- If the tolerances have not been set, or the target color data of the number selected for the measurement has been deleted, “None” will be displayed instead of the judgment results.
- When the screen is turned OFF by the power save function, press any of the measuring or control buttons to turn ON the screen, confirm that  (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.

---

## Connecting to an External Device

---

The CM-700d/600d features both USB and Bluetooth capability. You can establish data communication or print data by connecting the instrument to a PC with the supplied USB cable IF-A17, or by connecting it to a PC or a printer via Bluetooth.

### **Note**

*When the instrument is exposed to strong external static electricity during communication with an external device, the communication may be interrupted. In this case, turn the power OFF and then turn it ON again.*

## Connecting a Personal Computer

---

You can establish connection between the CM-700d/600d and a PC by connecting them with a USB cable or by using the Bluetooth capability of the instrument.

### **Note**

- *To use the Bluetooth capability to establish connection to a PC, the PC must be equipped with a Bluetooth adapter and the Bluetooth communication link must be opened by using the utility software supplied with the adapter.*
- *The USB cable connection will be given priority over the Bluetooth communication link.*

### **Memo**

- When connected to a PC, the instrument enters the communication mode automatically. The LCD screen displays “Communicating” and the measuring and control buttons are disabled.
- If a command to enable the measuring button is sent from the PC to the instrument, you can use the measuring button to start measurement. Note, however, that, in this case, the measured data is not stored in the memory of the instrument, but is transferred to the PC.
- To connect the instrument with a PC, it is recommended that you use software that enables connection and operation of the instrument (such as the optional Color Data Software SpectraMagic NX CM-S100w).

## Connecting the Instrument with a USB Cable

---

Connect the instrument to a PC with the supplied USB cable IF-A17 (2 m).

### **Note**

- *To connect the instrument to a PC, you need to install the USB driver for the CM-700d/600d. Install the USB driver supplied with the software that enables connection and operation of the instrument.*
- *The instrument is not designed to be powered via the USB cable. You need to connect the AC adapter or install batteries in the instrument.*
- *Make sure that the USB connector plug is oriented correctly and connected securely.*
- *When connecting/disconnecting the USB cable, be sure to hold the connector plug. Do not pull on or forcibly bend the cable. Otherwise, wire breakage may result.*
- *Make sure that the cable has sufficient length. Putting tension on the cable may cause connection failure or wire breakage.*
- *To connect the USB cable connector, check the shape of the receptacle (connection terminal) and insert the connector fully until it is secured.*

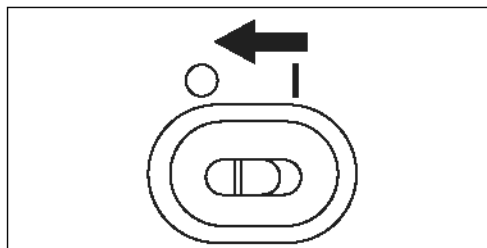
### **Memo**

The USB communication port of the instrument conforms to USB 1.1.

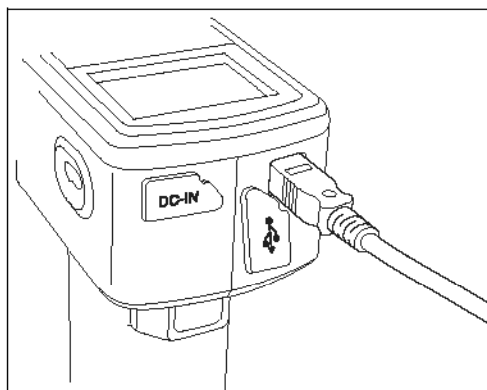
## [Operating Procedure]

In general, a USB cable can be connected/disconnected while the instrument is turned ON, however, you need to turn OFF the instrument in the procedure below.

- 1 Turn OFF the instrument (Slide the Power switch to “O”).

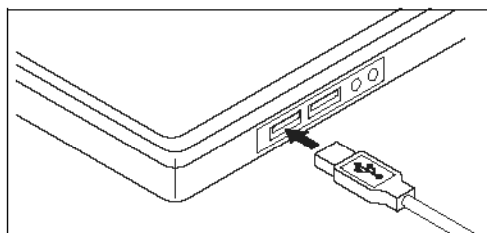


- 2 Open the connector protection cover and connect the B connector of the USB cable to the USB connection terminal.



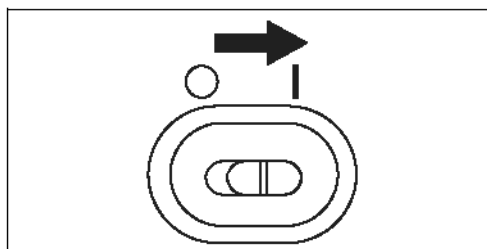
- 3 Connect the A connector of the USB cable to the USB port of the PC.

- Fully insert the connector and ensure secure connection.



- 4 Turn ON the instrument (Slide the Power switch to “|” ).

- When you are prompted to install the USB driver, specify the USB driver included with the software and complete the installation.



## Connecting the Instrument via Bluetooth Communication

Use the built-in Bluetooth capability of the instrument to establish connection between the instrument and a PC.

### **Note**

- *The Bluetooth capability of the instrument enables data communication with a PC equipped with a Bluetooth adapter, or data printout with a Bluetooth-capable printer. Note, however, that a PC and a printer cannot be connected simultaneously.*
- *The USB cable connection and Bluetooth communication link cannot be used simultaneously. When both connections are made, priority is given to the USB cable connection.*

**Memo**

To use the Bluetooth capability of the instrument to connect a PC, you need to prepare both the instrument and the PC to establish Bluetooth communication. For details, refer to the instruction manual of the Bluetooth adapter.

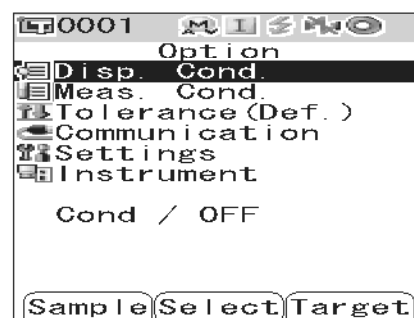
**Preparation of the Instrument**

Set the Bluetooth capability of the instrument to ON.

**[Operating Procedure]**

- 1 Hold down the [MENU] button and press the ▽ button of the cross key.

The <Option> screen is displayed.



- 2 Use the ▲ or ▽ button of the cross key to move the cursor to “Communication” and then press the [SAVE/SEL] button.

The <Communication> screen is displayed.



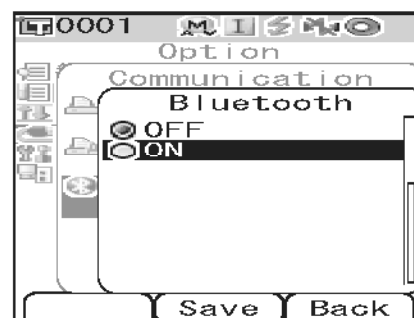
- 3 Use the ▲ or ▽ button of the cross key to move the cursor to “Bluetooth” and then press the [SAVE/SEL] button.

The <Bluetooth> screen is displayed.



- 4 Use the ▽ button of the cross key to move the cursor to “ON” and then press the [SAVE/SEL] button.

The Bluetooth capability of the instrument is set to ON and the screen returns to the <Communication> screen.





**Preparation of the PC**

Attach the Bluetooth adapter to the PC to enable Bluetooth communication.

**Note**

*The following describes a basic procedure. For details, refer to the instruction manual of the Bluetooth adapter.*

**[Operating Procedure]**

- 1** Install the utility software supplied with the Bluetooth adapter on the PC.
- 2** Attach the Bluetooth adapter to the USB port of the PC, and ensure that the PC properly recognize the adapter.

**Establishing the Connection between the Instrument and PC**

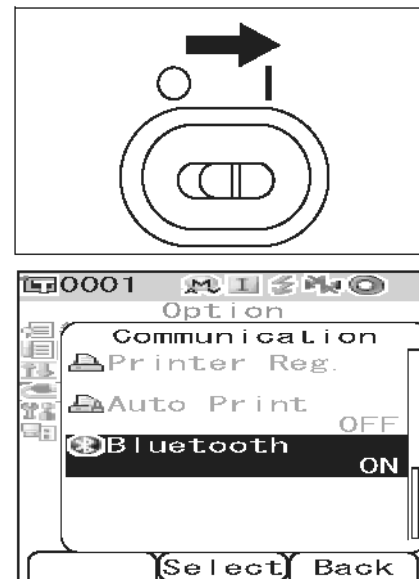
Establish the connection between the instrument and PC via Bluetooth communication by setting the PC as a host.

**Note**

*Do not use the “Auto Connect function” of the utility software of the Bluetooth adapter. Using this function may cause intermittent disconnection of the Bluetooth communication, resulting in malfunction of the instrument.*

**[Operating Procedure]**

- 1** Make sure that the instrument is turned ON (The Power switch is set to “|” .).
- 2** Make sure that the Bluetooth capability of the instrument is set to ON. Also check that a printer is not connected with the Bluetooth capability and that the instrument is not connected to the PC with a USB cable.
- 3** Start the Bluetooth utility software installed on the PC.



- 4 From the PC, search for Bluetooth devices and select “KMSEA\_XXXXXXXX (where XXXXXXXX is the serial number of the instrument)” from the listed devices.
- 5 Execute the “Bluetooth to serial connection”. When the connection is established, the LCD display of the instrument shows “Communicating”.



## Connecting a Printer

---

By connecting the instrument and a printer with Bluetooth capability, you can print measurement results and other data from the printer.

### Note

- *The Bluetooth capability of the instrument enables data communication with a PC equipped with a Bluetooth adapter, or data printout with a Bluetooth-capable printer. Note, however, that a PC and a printer cannot be connected simultaneously.*
- *Although the maximum communication distance for printing is 10 m, the actual distance for successful printing may vary depending on the radio wave condition of the surrounding environment.*
- *The Bluetooth printer can print text data only. Note that you cannot print graphs even when you selected spectral graph or color difference graph for the display type for the instrument.*

### Memo

To use the Bluetooth capability to connect a printer, you need to prepare both the instrument and printer to establish Bluetooth communication.

### Preparation of the Printer

Prepare the Bluetooth printer so that it is recognized as a Bluetooth device by the instrument.

### Note

*The following describes the basic procedure. For details, refer to the separate manual “Bluetooth Setting-up Guide” and the instruction manual of the Bluetooth printer.*

## [Operating Procedure]

---

- 1 Set the printer so that it can be used in Bluetooth communication.
  - Check that the communication mode of the printer is set to “Bluetooth”. And if it is necessary, charge batteries and set print paper in the printer.
- 2 Check the Bluetooth address of the printer.

## Preparation of the Instrument

Set the Bluetooth capability of the instrument to ON.

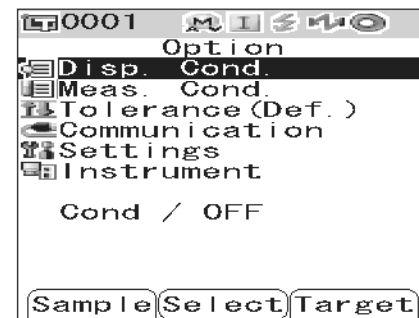
### Note

*You cannot register a Bluetooth printer or set Auto Print until the Bluetooth capability of the instrument is set to ON.*

## [Operating Procedure]

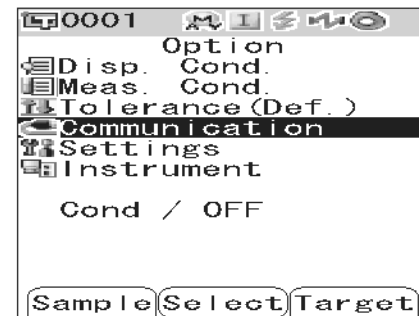
- 1 Hold down the [MENU] button and press the  $\nabla$  button of the cross key.

The <Option> screen is displayed.



- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Communication" and then press the [SAVE/SEL] button.

The <Communication> screen is displayed.



- 3 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Bluetooth" and then press the [SAVE/SEL] button.

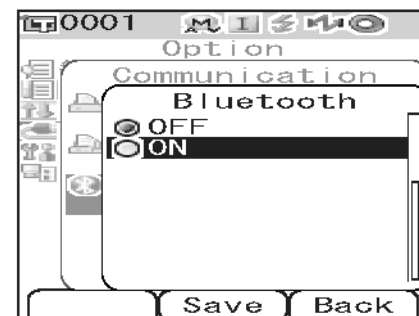
The <Bluetooth> screen is displayed.



- 4 Use the  $\nabla$  button of the cross key to move the cursor to "ON" and then press the [SAVE/SEL] button.

The Bluetooth capability of the instrument is turned ON and can be used.

When the setting finishes, the screen returns to the <Communication> screen.



### Establishing the Connection between the Instrument and Printer

Set the instrument as a host and establish a connection between the instrument and Bluetooth printer via Bluetooth communication.

#### Note

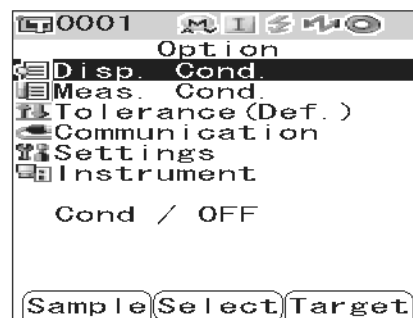
Confirm the following before starting the procedure below.

- The printer is turned ON and its battery has been fully charged.
- The instrument is turned ON (The Power switch is set to “|”).
- The Bluetooth capability of the instrument is set to ON.
- A PC is not connected by Bluetooth or USB cable.

## [Operating Procedure]

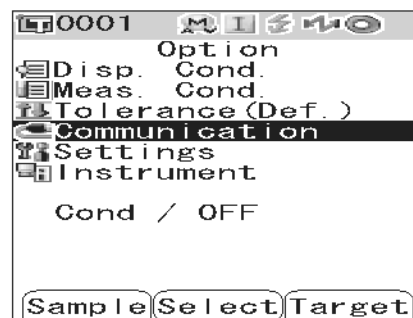
- 1 Hold down the [MENU] button and press the ▽ button of the cross key.

The <Option> screen is displayed.



- 2 Use the △ or ▽ button of the cross key to move the cursor to “Communication” and then press the [SAVE/SEL] button.

The <Communication> screen is displayed.



- 3 Use the △ or ▽ button of the cross key to move the cursor to “Printer Reg.” and then press the [SAVE/SEL] button.

The <Printer Reg.> screen is displayed.



- 4** Confirm that “Search” is highlighted and then press the [SAVE/SEL] button. Available Bluetooth devices are searched for and the result is listed on the LCD screen.

- From the list, find the Bluetooth address of the printer you checked during the procedure of page E-98 “Preparation of the Printer”.
- The search result may not be correct depending on the radio wave condition of the surrounding environment. If you cannot find the Bluetooth address of your printer in the list, make sure that the printer is turned ON and its battery is fully charged, and then try the search again.



- 5** Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to the Bluetooth address of the printer and then press the [SAVE/SEL] button. The printer is registered as the printing destination of the instrument. Now you can print measured data or other data from the printer.



## Printing Measured Data

Print the measured data with the printer.

### Note

- You need to establish the connection between the instrument and printer in advance.
- The Bluetooth printer can print text data only. Note that you cannot print graphs even when you selected spectral graph or color difference graph for the display type for the instrument.

**[Operating Procedure]** Start the procedure from the screen where the measured data is displayed.

- 1 Press the [MENU] button.  
The <Menu> screen of the <Sample> screen is displayed.

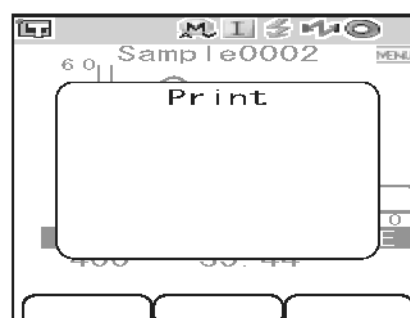


- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Print".



- 3 Press the [SAVE/SEL] button. The <Print> screen is displayed and the data is printed from the connected printer.

When the printing is complete, the screen returns to the <Sample> screen.



## Auto Print

Print measurement results automatically from the printer every time measurement is performed.

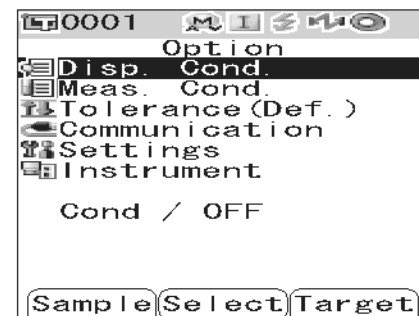
### Note

- You need to establish the connection between the instrument and printer in advance.
- The Bluetooth printer can print text data only. Note that you cannot print graphs even when you selected spectral graph or color difference graph for the display type for the instrument.

## [Printing procedure]

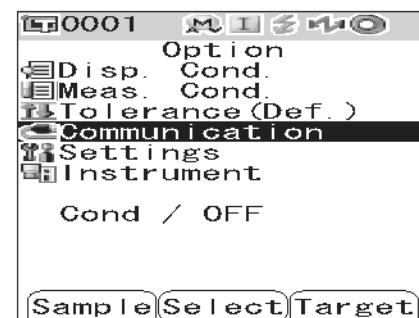
- 1 Hold down the [MENU] button and press the  $\nabla$  button of the cross key.

The <Option> screen is displayed.



- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “Communication” and then press the [SAVE/SEL] button.

The <Communication> screen is displayed.



- 3 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to “Auto Print” and then press the [SAVE/SEL] button.

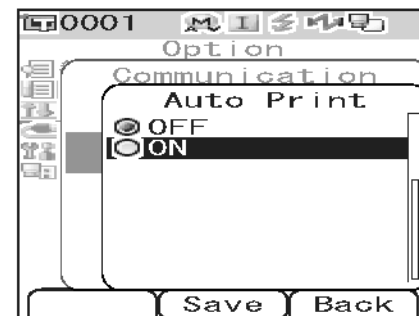
The <Auto Print> screen is displayed.



- 4 Use the  $\nabla$  button of the cross key to move the cursor to “ON” and then press the [SAVE/SEL] button.

The Auto Print function is set to ON and measurement results will be printed automatically every time measurement is performed.

When the setting finishes, the screen returns to the <Communication> screen.



• **Print Example 1**

Display type is Graph Spec (spectral graph).

SAMPLE	0001	
[No Name		]
	SCI	SCE
400nm	13.53	14.29
410nm	11.43	12.16
420nm	9.89	10.52
430nm	8.68	9.22
440nm	8.06	8.55
450nm	7.95	8.43
460nm	8.12	8.62
470nm	8.51	9.05
480nm	9.47	10.10
490nm	12.24	13.11
500nm	18.15	19.50
510nm	30.49	32.86
520nm	45.40	49.09
530nm	54.55	59.11
540nm	58.12	63.01
550nm	59.35	64.34
560nm	59.92	64.98
570nm	60.22	65.31
580nm	60.33	65.43
590nm	60.31	65.41
600nm	60.20	65.30
610nm	59.97	65.05
620nm	59.55	64.58
630nm	58.89	63.85
640nm	58.07	62.95
650nm	57.23	62.04
660nm	56.52	61.25
670nm	55.98	60.68
680nm	55.62	60.29
690nm	55.36	59.99
700nm	55.18	59.78
11/05/2007 11:19:08		
0001		M/I+E

• **Print Example 2**

Display type is Graph Diff. (color difference graph).

SAMPLE	0001	PASS
[No Name		]
SCI	2 /D65	2 /C
dL*	-0.02	-0.02
dA*	-0.01	-0.01
dB*	0.51	0.52
dE00	0.13	0.13
11/05/2007 11:19:08		
0001		M/I+E



• **Print Example 3**

Display type is Judge.

SAMPLE	0001	PASS
[No Name		]
SCI	2 /D65	2 /C
L*	77.41	77.38
a*	-6.58	-8.03
b*	68.60	69.06
dL*	-0.02	-0.02
da*	-0.01	-0.01
db*	0.51	0.52
dE00	0.13	0.13
MI	0.01	0.01
SCE	2 /D65	2 /C
L*	79.94	79.92
a*	-6.75	-8.25
b*	71.00	71.47
dL*	-0.03	-0.03
da*	-0.01	-0.02
db*	0.55	0.56
dE00	0.13	0.14
MI	0.01	0.01
11/05/2007	11:19:08	
0001	M/I+E	

• **Print Example 4**

Display type is Abs. & Diff. (absolute value & color difference)/Assessment (color assessment).

SAMPLE	0001	PASS
[No Name		]
SCI	2 /D65	2 /C
L*	77.41	77.38
a*	-6.58	-8.03
b*	68.60	69.06
dL*	-0.02	-0.02
da*	-0.01	-0.01
db*	0.51	0.52
dE00	0.13	0.13
11/05/2007	11:19:08	
0001	M/I+E	

• **Print Example 5**

Display Type is Pseudo Color.

SAMPLE	0001	PASS
[No Name		]
SCI	2 /D65	2 /C
L*	77.41	77.38
a*	-6.58	-8.03
b*	68.60	69.06
dL*	-0.02	-0.02
da*	-0.01	-0.01
db*	0.51	0.52
dE00	0.13	0.13
MI	0.01	0.01
11/05/2007	11:19:08	
0001	M/I+E	

# Displaying the Instrument Information

Display the model name, version, and serial number of the instrument.

## [Operating Procedure]

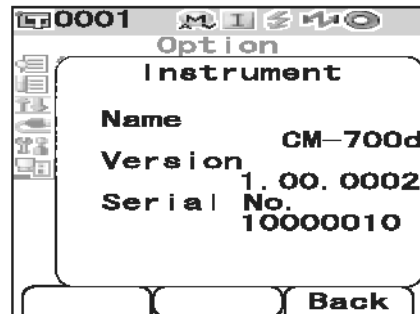
- 1 Hold down the [MENU] button and press the  $\nabla$  button of the cross key.

The <Option> screen is displayed.



- 2 Use the  $\Delta$  or  $\nabla$  button of the cross key to move the cursor to "Instrument" and then press the [SAVE/SEL] button.

The <Instrument> screen is displayed.



- 3 Press the [TARGET] (Back) button to return to the <Option> screen.

# Chapter 5

## Troubleshooting



# Error Messages

The following messages may appear while you are using the instrument. If such messages appear, take the necessary actions shown in the table below. If the trouble does not go away in spite of taking action, contact a KONICA MINOLTA SENSING-authorized service facility.

## Note

Messages that may be displayed on the LCD are given in the table below. For communication error check codes, refer to the separate document.

	Symptom/Possible Cause	Corrective Action
ER002 LOW BATTERY	(When the instrument is powered by batteries) • Battery voltage drop	Turn the power OFF, and then turn it ON again after changing batteries to new ones or connecting the AC adapter.
ER005 ERROR IN FLASHING	Xenon lamp does not flash properly. • Xenon lamp has blown. • Faulty flash circuit. • Faulty sensor	If this message keeps appearing, contact a KONICA MINOLTA SENSING-authorized service facility.
ER007 INCORRECT CLOCK OPERATION	Clock IC is not working correctly. • Since power voltage of backup battery is exhausted due to instrument not being used for a long time, data of calendar or clock has been lost. • Internal backup battery has reached the end of its life. • Breakdown of circuits relating to the clock IC.	Set date and time after charging the internal backup battery. If this message keeps appearing, contact a KONICA MINOLTA SENSING-authorized service facility.
ER010 NO DATA IN MEMORY	Data for performing user calibration has not been input in the instrument's memory.	For performing user calibration, the user calibration data must be input to the instrument's memory by connecting with computer and using the optional software before user calibration setting is set to ON. For details of the optional software, read the software manual.
ER011 FAILED IN CALIBRATION	Zero calibration or white calibration has not been performed correctly.	For zero calibration, the specimen measuring port must be directed into the air. For white calibration, the White Calibration Cap must be used.
	Target Mask is not correct.	Attach the correct Target Mask.
ER013 ERROR IN A/D	Failed during A/D conversion. • Faulty A/D converter • Breakdown of circuits relating to the A/D converter	Turn the power OFF, and then turn it ON again. If this message keeps appearing, contact a KONICA MINOLTA SENSING-authorized service facility.
ER024 WHITE CALIBRATION INCOMPLETE	White calibration has not been completed.	White calibration must be performed the first time the instrument is turned ON for any measurement area. It is also recommended that white calibration be performed whenever the instrument is switched from OFF to ON or when the measurement area or specular component setting is changed.
ER025 MEASUREMENT AREA CHANGED	Measurement area has been changed. Set the correct area and measure again.	Confirm the measurement area, and then perform the measurement. Do not change the measurement area while performing a measurement.

Messages	Symptom/Possible Cause	Corrective Action
ER027 ERROR IN CHARGING	Charging for flashing of xenon lamp cannot be completed. <ul style="list-style-type: none"> <li>• Battery exhausted</li> <li>• Breakdown of charging circuit</li> </ul>	When batteries are used, replace them with new ones. If this message is still displayed after battery replacement, contact a KONICA MINOLTA SENSING-authorized service facility.
ER030 MEMORY ERROR	Data has been lost since the memory's backup battery is exhausted.	Turn the power ON to charge the memory's backup battery. The backup battery can be fully charged in 24 hours when the power of this instrument is turned ON. After the battery is fully charged, data backup can be stored for approximate 5 months.
ER036 USER CALIBRATION INCOMPLETE	User calibration has not been performed.	When user calibration is set to on, calibration must be performed the first time the instrument is switched ON for any measurement area. It is also recommended that calibration be performed whenever the instrument is switched from OFF to ON or when the measurement area or specular component setting is changed.
ER069 PROTECTED DATA	Color difference target data have been protected and cannot be overwritten.	If it is necessary to rewrite or delete the protected target data, change the data protect setting of the target to OFF.
WR002 LOW ILLUMINATION	Amount of light from the xenon lamp has dropped to 50% of its initial level. <ul style="list-style-type: none"> <li>• Deterioration of xenon lamp</li> <li>• Dirt on integrating sphere</li> </ul>	Clean the integrating sphere as explained in "Cleaning Parts" (page E-16). If the problem still remains, contact a KONICA MINOLTA SENSING-authorized service facility.
WR050 WE RECOMMEND RE-CALIBRATION SERVICE	Since a certain period of time has passed since the instrument was last calibrated, recalibration is recommended.	For recalibration service, contact a KONICA MINOLTA SENSING-authorized service facility.
WR112 USER CALIBRATION DATA NOT SET	It is necessary to input data for user calibration before setting the user calibration ON.	For performing user calibration, the user calibration data must be input to the instrument's memory by connecting with computer and using the optional software before user calibration setting is set to ON. For details of the optional software, read the software manual.
WR120 MEASUREMENT PROCESS INTERRUPTED	Measurement has been canceled.	When the averaging measurement setting is set to ON, pressing any button other than measuring button can cancel the measurement. If it is not necessary to cancel the measurement, do not touch any button other than the measurement button during measurement.
WR121 CALIBRATION RECOMMENDED	White calibration (or user calibration when the user calibration setting is ON) has not been performed yet after the power was switched on.	In order to ensure the reliability of white calibration, performing white calibration is recommended when the power is switched from OFF to ON or when the measuring environment (measurement area, etc.) has changed.

# Troubleshooting

If an abnormality has occurred with the instrument, take necessary actions as given in the table below. If the instrument still does not work properly, turn the power OFF, and then turn it ON again. If the symptom remains, contact a KONICA MINOLTA SENSING-authorized service facility.

Symptom	Check Point	Action
LCD is blank.	Are batteries inserted? Is the AC adapter connected?	Insert the batteries. Connect the AC adapter.
	Is  displayed? Or are batteries extremely low?	Replace the batteries with new ones. Or connect the AC adapter.
	Are batteries inserted correctly?	Reinsert the batteries correctly.
Measuring button is not effective.	Is measurement still in progress?	Wait until measurement is complete, and then press the button.
	Is a screen where measurements are possible displayed?	Measuring button must be pressed while a screen that allows measurements (e.g. Calibration, Target, or Measurement screen) is shown.
Abnormal measurement result	Is the instrument directed perpendicular to the specimen?	Make sure that the instrument is directed perpendicular to the specimen, to prevent leakage of light.
	Was the correct White Calibration Cap used for calibration?	Use the correct White Calibration Cap (the cap with same pairing number as the instrument) to perform white calibration. (page E-24)
	Was white calibration performed correctly?	
	Was zero calibration performed correctly?	Direct the specimen measuring port into the air or use the optional Zero Calibration Box and perform zero calibration.
Measurement results fluctuate.	Is instrument kept stationary during measurement?	Do not allow the instrument to move during measurement.
Not possible to input data to the computer. No commands from computer are accepted. Commands cannot be accepted correctly.	Is the USB cable connected correctly?	Connect the instrument's USB connecting terminal to the computer's USB port with the USB cable supplied with the instrument.
	Is the USB cable supplied with the instrument used?	
	Is Bluetooth communication functioning correctly?	Install a Bluetooth adapter on the computer or enable the computer's Bluetooth function (if computer is so equipped), and then check that communication between the computer and instrument is functioning correctly.
Not possible to print.	Is Bluetooth communication functioning correctly?	Check that Bluetooth communication between this instrument and the Bluetooth printer is functioning correctly.
Measurement data or settings are not held in memory, and disappear immediately.	The instrument's backup battery may be low immediately after purchase or following a period of prolonged non-use. Turn the power of the instrument ON to charge the backup battery. Under this condition, the battery can be fully charged in 24 hours.	The backup battery has an expected service life of approximately ten years. If you find that the instrument fails to retain data in memory even after the battery has been fully charged, however, then it is likely that your battery has reached the end of its life and requires replacement. Note that you cannot replace the battery yourself. For information, please contact a KONICA MINOLTA SENSING-authorized service facility.

# Chapter 6

## Appendix



---

# Principles of Measurement

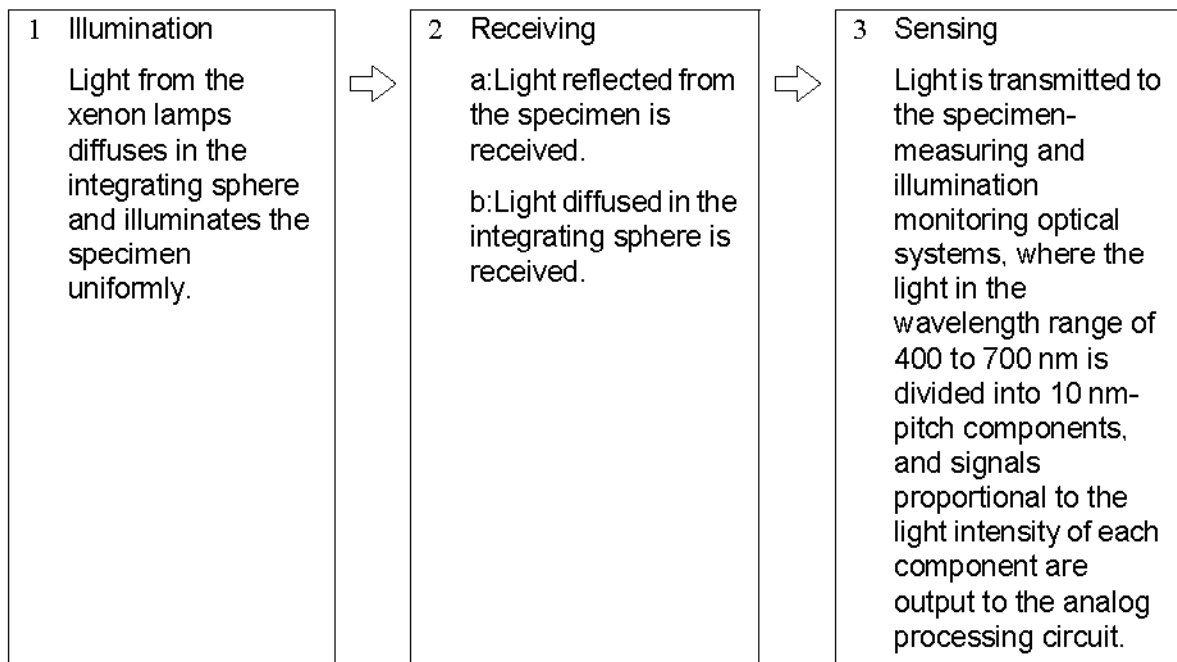
---

## Illuminating/Viewing System

---

This instrument utilizes the  $di:8^\circ/de:8^\circ$  geometry conforming to CIE No. 15, ASTM E1164, DIN 5033 Teil 7, ISO 7724/1, and JIS Z8722-1982 (diffused illumination, 8-degree viewing angle) standards, and offers measurement with automatic SCI (specular component included) and SCE (specular component excluded) switching.

The flow of measurement is shown below.



- 1 Light from the xenon lamps diffuses on the inner surface of the integrating sphere and illuminates the specimen uniformly.
- 2
  - a: The light reflected from the specimen surface at an angle of  $8^\circ$  to the normal of the surface is received by the specimen-measuring optical system.
  - b: The light diffused in the integrating sphere is received by the illumination-monitoring optical system and guided to the sensor.
- 3 The light reflected from the specimen surface and the diffused light are divided into each wavelength component by the specimen-measuring optical system and illumination-monitoring optical sensor respectively, and then signals proportional to the light intensity of each component are output to the analog processing circuit.

By processing the outputs from the specimen-measuring optical system and the illumination-monitoring sensor with the calculation by the CPU, the instrument compensates for slight fluctuations in the spectral characteristics and intensity of the illumination light. (Double-beam system)



## Illumination Area and Measurement Area

---

The CM-700d/600d allows selection from two measurement areas, SAV ( $\phi$  3 mm) and MAV ( $\phi$  8 mm), according to the specimen and applications. A Target Mask (illumination area) suitable for the selected measurement area must be attached to the instrument.

### Note

*With the CM-600d, only MAV ( $\phi$  8 mm) is available.*

### Target Mask (illumination area)

The CM-700d/600d does not have a function to automatically detect whether the currently-attached Target Mask is for SAV or MAV. You need to attach the correct Target Mask according to the selected measurement area.

Since the Target Mask's tip condition affects measured values, do not touch the inner surface by hand, scratch it or allow it to get dirty.

### Measurement Area

The measurement area can be switched by sliding the measurement area selector.

### Note

*With the CM-600d, only MAV ( $\phi$  8 mm) is available. Consequently, it does not have a measurement area selector.*

## Simultaneous SCI/SCE Measurement

---

The CM-700d/600d offers simultaneous SCI (Specular Component Included)/SCE (Specular Component Excluded) measurement by using "automatic SCI/SCE switching with an automatic optical trap mechanism".

### Automatic optical trap mechanism

An optical trap automatically opens or closes according to the specular component mode (SCI/SCE/I + E) specified with the instrument.

The light source flashes once for SCI measurement and once for SCE measurement respectively. When Auto Averaging is specified, the flash is repeated for the specified number of measurements.

In either SCI or SCE mode, the automatic optical trap mechanism is not used. In I + E (SCE + SCE) mode, the automatic optical trap mechanism is enabled. For the first flash, SCI measurement is performed with the optical trap closed. For the second flash, SCE measurement is performed with the optical trap open.

## Communication Mode

---

The CM-700d/600d is set to the communication mode when it is connected to a PC. When the instrument is controlled from the PC, the instrument's LCD screen shows "Communicating". While this message is displayed, the buttons of the instrument are disabled.

You can, however, send a command from the PC to the instrument to set it to the measuring button enabled mode, so that you can start measurement by pressing the measuring button of the instrument. In this case, the measured data is transferred to the PC and is not stored in the memory of the instrument. If you want to control the instrument from a PC, you need software that allows the connection and operation of the instrument.

If you want to develop your own program to control the instrument from a PC, contact a KONICA MINOLTA SENSING-authorized service facility.

## Initial Settings

- \* Initialization of the instrument will reset the settings to the initial values shown in the table below. The measured data, target color data and tolerances set for each target color are protected and not cleared by the initialization.
- \* The zero calibration data will be reset to the factory-set data. If you performed zero calibration due to a change in the measurement environment, you will need to perform zero calibration again after the initialization.
- \* In certain cases, the instrument is initialized due to another cause other than the initialization operation (e.g. when the built-in backup battery life expired). In this case, the measured data, target color data and tolerance setting will also be reset to the initial status (no measured data, no target color data, default tolerance setting).

Item		Initial setting
<b>Display language</b>		English
<b>Measurement condition</b>	Mode (specular component mode)	I + E (SCI + SCE)
	Number of auto averaging	1
	Number of manual averaging	1
	Wait time	0 seconds
<b>Display condition</b>	Display type	Abs. & Diff., Judge, Graph Diff.
	Color space	L* a* b*
	Equation	$\Delta E_{00}$ (CIE2000)
	Color index	WI (ASTM E313-73)
	Observer	10° observer
	Illuminant 1	D65
	Illuminant 2	None
<b>Condition (Cond)</b>		OFF
<b>Tolerance (Default)</b>	*Set for No. 01 only (No setting for Nos. 02 to 08)	
*They are the factory-set value. Initialization of the instrument will not reset the settings to this initial value.	Color space	Upper limit: + 1.5/Lower limit: - 1.5 of L* a* b*, enabled
	Equation	Upper limit + 1.5 of $\Delta E_{00}$ , enabled
	Color index	Upper limit: + 1.5/Lower limit: -1.5 of None, enabled
	CMC factor	1.00
	$\Delta E_{94}$ factor	1.00
	$\Delta E_{00}$ factor	1.00
<b>Zero calibration</b>		Completed (factory-set value)
<b>White calibration</b>		Not performed
<b>User calibration</b>		Not performed

# Specifications

Model		CM-700d	CM-600d
Optical system	Geometry	di:8°, de:8° (diffused illumination, 8-degree viewing angle), SCI (specular component included)/SCE (specular component excluded) selectable (with automatic-switching function) (Conforms to CIE No. 15, ISO 7724/1, DIN5033 Teil7, ASTM E 1164, JIS Z 8722)	
	Light source	Pulsed xenon lamp (with UV cut filter)	
	Measurement/illumination area	MAV: $\phi$ 8 mm/ $\phi$ 11 mm SAV: $\phi$ 3 mm/ $\phi$ 6 mm selectable * Changeable by replacing Target Mask and selecting lens position	MAV: $\phi$ 8 mm/ $\phi$ 11 mm only
	Size of integrating sphere	$\phi$ 40 mm	
	Detector	Silicon photodiode array (dual 36-element)	
	Spectral separation device	Diffraction grating	
Unit specification	Wavelength range	400 nm to 700 nm	
	Wavelength pitch	10 nm	
	Half bandwidth	Approx. 10 nm	
	Measuring range	0 to 175%	
	Resolution	0.01%	
	Measurement time	Approx. 1 second	
Minimum measurement interval	Approx. 2 seconds (in SCI or SCE mode)		
Performance	Repeatability	Spectral reflectance: Standard deviation within 0.1%, Colorimetric value: Standard deviation within $\Delta E^*_{ab}$ 0.04 * When the White Calibration Plate is measured 30 times at 10-second intervals after white calibration	
	Inter-instrument agreement	Within $\Delta E^*_{ab}$ 0.2 (MAV/SCI) * Based on 12 BCRA Series II color tiles compared to values measured with a master body at 23°C	
Dimensions/weight	Size	73 (W) x 211.5 (H) x 107 (D) mm	
	Weight	Approx. 550 g (without White Calibration Cap and batteries)	
Function	Display	2.36-inch TFT color LCD	
	Interfaces	USB 1.1; Bluetooth® standard version 1.2*	
	Storable data sets	Measured data: 4,000 sets/Target color data: 1,000 sets	
Power	Power	4 AA-size alkaline dry batteries or nickel-metal-hydride rechargeable batteries; Special AC adapter	
	Ratings (AC adapter)	Input: 100-240 V $\sim$ 50/60 Hz 24-36 VA Output: 5 V $\text{---}$ 2 A	
	Battery life	With alkaline dry batteries: Approx. 2,000 measurements With nickel-metal-hydride rechargeable batteries (2300 mAh): Approx. 2,000 measurements with full charge * Stand-alone measurement fixed to either SCI or SCE mode at 10-second intervals at 23°C	
Environment	Operating temperature/humidity range	5 to 40°C; relative humidity 80% or less (at 35°C); with no condensation	
	Storage temperature/humidity range	0 to 45°C; relative humidity 80% or less (at 35°C); with no condensation	

<b>Observation</b>	<b>Displayed data</b>	Spectral values/graph, colorimetric values, color difference values/graph, PASS/FAIL result, pseudocolor, color assessment
	<b>Illuminant</b>	A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12 (Simultaneous evaluation with two illuminants possible)
	<b>Observer</b>	2°, 10°
	<b>Color spaces</b>	L*a*b*, L*C*h, Hunter Lab, Yxy, XYZ, Munsell, and color difference in these spaces (except for Munsell)
	<b>Colorimetric data</b>	MI, WI (ASTM E313-73/E313-96), YI (ASTM E313-73/ASTM D1925), ISO Brightness, 8° gloss value
	<b>Color difference formulas</b>	$\Delta E^*ab$ (CIE1976), $\Delta E^*94$ (CIE1994), $\Delta E00$ (CIE2000), CMC (l:c)

The above specifications are subject to change without prior notice.

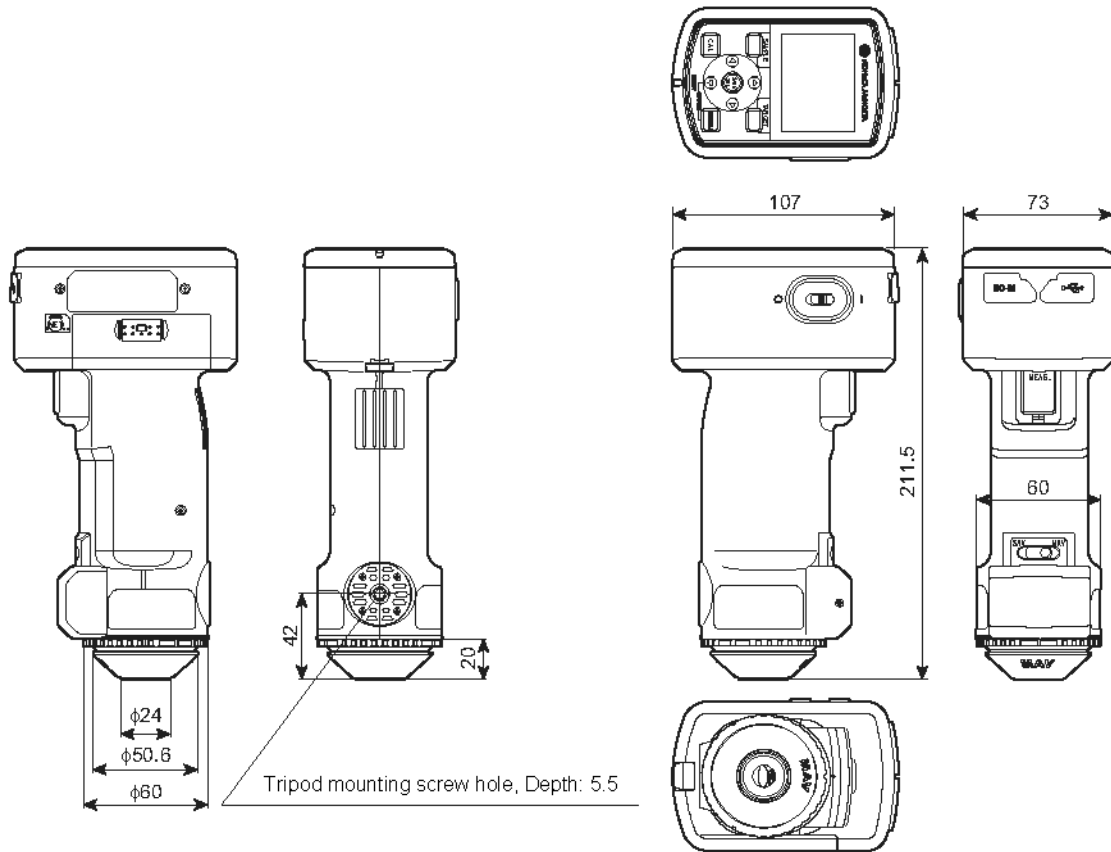
\* Applicable Bluetooth<sup>®</sup> profile: Serial Port Profile, Output: Bluetooth<sup>®</sup> Power Class 1  
 The communication distance may vary depending on obstacles and radio wave conditions between the devices.  
 Successful wireless communication is not guaranteed with all Bluetooth<sup>®</sup>-ready equipment.  
 Bluetooth<sup>®</sup> is a registered trademark of Bluetooth<sup>®</sup> SIG, Inc. and it is used under license agreement.  
 The CM-700d/600d incorporates the eT-Kernel/Standard and PrUSB/Device from eSOL Co., Ltd.

Model	CM-700d	CM-600d
<b>Standard accessories</b>	White Calibration Cap (w/ white calibration data CD-R): CM-A145	
	Target Mask $\phi$ 8 mm (w/ plate) <For MAV>: CM-A178 * Attached to the instrument at the time of shipment	Target Mask $\phi$ 8 mm (w/ plate) <For MAV>: CM-A178 * Attached to the instrument at the time of shipment
	Target Mask $\phi$ 3 mm (w/ plate) <For SAV>: CM-A179 Target Mask $\phi$ 8 mm (w/o plate) <For MAV>: CM-A180 Target Mask $\phi$ 3 mm (w/o plate) <For SAV>: CM-A181	Target Mask $\phi$ 8 mm (w/o plate) <For MAV>: CM-A180
	USB Cable (2 m): IF-A17	
	AC Adapter: AC-A305	
	4 AA-size alkaline dry batteries	
	Wrist Strap: CR-A75	
	<b>Optional accessories</b>	Zero Calibration Box: CM-A182
Hard Case: CM-A176*		
Granular-Materials Attachment: CR-A50		
Dust Cover Set: CM-A185		
Replacement Dust Cover (Polyolefin): CM-A186		
Color Data Software SpectraMagic™ NX : CM-S100w		
Target Mask $\phi$ 8 mm (with glass) <For MAV>: CM-A183		

\* The hard case is intended for storing the instrument. Do not use it for transportation.

# Dimensions

(mm)









**KONICA MINOLTA**