Spectrophotometer
CM-700d/600d

Instruction Manual

KONICA MINOLTA

Notes on this Manual

- Copying or reproduction of all or part of the contents of this manual without KONICA MINOLTA SENSING's permission is strictly prohibited.
- The contents of this manual are subject to change without prior notice.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact a KONICA MINOLTA SENSING-authorized service facility.
- KONICA MINOLTA SENSING will not accept any responsibility for consequences arising from the use of the instrument.

- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.

- This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Safety Symbols

The following symbols are used in this manual to prevent accidents which may occur as result of incorrect use of the instrument.

Denotes a sentence regarding a safety warning or note.
Read the sentence carefully to ensure safe and correct use.

Denotes a prohibited operation.
The operation must never been performed.

Denotes an instruction.
The instruction must be strictly adhered to.

Denotes a prohibited operation.
Never disassemble the instrument.

Denotes an instruction.
Disconnect the AC power cord from the AC outlet.

Safety Precautions

To ensure correct use of this instrument, read the following points carefully and adhere to them. After you have read this manual, keep it in a safe place where it can be referred to anytime a question arises.

⚠ WARNING

(Failure to adhere to the following points may result in death or serious injury.)

- Do not use the instrument in places where flammable or combustible gases (gasoline etc.) are present. Doing so may cause a fire.
- Always use the AC adapter supplied as a standard accessory or the optional AC adapter, and connect it to an AC outlet of the rated voltage and frequency. If an AC adapter other than those specified by KONICA MINOLTA SENSING is used, it may result in damage to the unit, fire or electric shock.
- If the instrument will not be used for a long time, disconnect the AC adapter from the AC outlet. Accumulated dirt or water on the prongs of the AC adapter's plug may cause a fire and should be removed.
- Take special care not to allow liquid or metal objects to enter the instrument. Doing so may cause a fire or electric shock. Should liquid or metal objects enter the instrument, turn the power OFF immediately, disconnect the AC adapter from the AC outlet (or remove the batteries if they are being used), and contact the nearest KONICA MINOLTA SENSING-authorized service facility.
- Do not disassemble or modify the instrument or the AC adapter. Doing so may cause a fire or electric shock.
- The instrument should not be operated if it is damaged or the AC adapter is damaged, or if smoke or odd smells occur. Doing so may result in a fire. In such situations, turn the power OFF immediately, disconnect the AC adapter from the AC outlet (or remove the batteries if they are being used) and contact the nearest KONICA MINOLTA SENSING-authorized service facility.
- Do not insert or disconnect the AC adapter with wet hands. Doing so may cause electric shock.
- Do not dispose of batteries in fire, short their terminals, apply heat to them, or disassemble them. Also, do not recharge them (if they are not chargeable). Doing so may cause explosion or heat generation, resulting in fire or injury.

⚠ CAUTION

(Falling to adhere to the following points may result in injury or damage to the instrument or other property.)

- Do not perform measurement with the specimen measuring port directed towards your face. Doing so may damage your eyes.
- Do not use batteries other than those specified by KONICA MINOLTA SENSING. When installing batteries in the instrument, make sure that they are correctly oriented according to the (+) and (-) marks. Failure to adhere to these instructions may cause batteries to explode or leak electrolyte, resulting in fire, injury or air pollution.
- Do not place the instrument on an unstable or sloping surface. Doing so may result in its dropping or overturning, causing injury. Be careful not to drop the instrument when carrying it.
- When using the AC adapter, make sure that the AC outlet is located near the instrument and that the AC adapter can be connected to and disconnected from the AC outlet easily.

Introduction

Thank you for purchasing the CM-700d/600d.
This is a precise, lightweight and compact spectrophotometer developed for color and color difference measurement of reflective objective colors in various industries.

Packing materials of the product
Be sure to keep all packing materials used for shipping the product (cardboard box, cushioning material, plastic bags, etc.).
The CM-700d/600d is a precision measuring instrument. When transporting the instrument to a service facility for maintenance or for other reasons, be sure to use the packing materials to minimize shock or vibration.
If the packing materials are lost or damaged, contact a KONICA MINOLTA SENSING-authorized service facility.

Notes on Use

Operating Environment

- Use the CM-700d/600d at ambient temperature between 5°C and 40°C and relative humidity 80% or less (at 35°C) with no condensation.
  Be sure to use the instrument within this range. Do not use it in areas of rapid temperature changes.
- Do not leave the CM-700d/600d in direct sunlight or near sources of heat, such as stoves etc. The internal temperature of the instrument may become much higher than the ambient temperature in such cases.
- Do not use the CM-700d/600d in areas where dust, cigarette smoke or chemical gases are present. Doing so may cause deterioration in performance or a breakdown.
- Do not use the CM-700d/600d near equipment which produces a strong magnetic field (such as speakers etc.).
- The CM-700d/600d belongs to installation category II products (equipment which is powered by an AC adapter connected to commercially available power).
- The CM-700d/600d belongs to pollution level 2 products (equipment which may cause temporary electrical hazards due to contamination or condensation or products which are used in such an environment).
- Do not use the CM-700d/600d at altitudes higher than 2000 m.
- The CM-700d/600d and the AC adapter supplied as a standard accessory have been designed exclusively for indoor use. They should never be used outdoors because rain or other factors may damage the instrument.

Measurement

- When using the instrument upside-down, make sure no dirt or dust get into the specimen measuring port.
- When using the instrument for long periods of time, the displayed value may change depending on changes in the environment. Therefore, in order to achieve accurate measurements, we recommend that white calibration be done regularly using the White Calibration Cap.

White Calibration Cap

- The White Calibration Cap must be used in combination with the instrument that bears the same pairing number.
- The calibration data for the White Calibration Plate attached to the White Calibration Cap was measured at 23°C. To achieve the highest accuracy when measuring absolute values (colorimetric values), calibration and measurement should be performed at 23°C.
- Do not allow the White Calibration Plate to get scratched or stained.
- When not using the White Calibration Cap, invert it so that the White Calibration Plate is not exposed to ambient light.
- When the White Calibration Cap is attached to the instrument, do not hold on to the White Calibration Cap to move the instrument. The cap may become detached from the instrument, causing the instrument to fall and become damaged.

Target Mask

- Do not touch the Target Mask's inner surface by hand, scratch it or make it dirty.
- When not in use, Target Masks should be stored in the cardboard box used for shipment or in the optional hard case so that they will not be exposed to ambient light.

Power Source

- Make sure that the power switch is set to OFF ("○") when the CM-700d/600d is not in use.
- The CM-700d/600d can be powered from either the AC adapter (AC-A305) or AA-size alkaline or nickel-metal-hydride rechargeable batteries. Note, however, that you cannot use this AC adapter to charge the nickel-metal-hydride rechargeable batteries installed in the instrument.
- Always use the AC adapter supplied as a standard accessory (AC-A305) and connect it to an AC outlet of the rated voltage and frequency. Use an AC power supply of the rated supply voltage (within ±10%).

System

- Do not subject the CM-700d/600d to strong impact or vibration. Doing so may cause deterioration in performance or a breakdown.
- Since the specimen measuring port and integrating sphere are extremely precise optical components, great care should be taken to prevent them getting dirty or exposing them to impact.
- When not in use, the instrument must be stored with the White Calibration Cap being attached.
- The CM-700d/600d may cause interference if used near a television, radio, etc.
- When the instrument is exposed to strong external static electricity, the LCD may go blank or the measurement result may not be displayed properly. If the instrument is communicating with an external device, the communication may be interrupted. In these cases, turn the power OFF and then turn it ON again. If black smudges appear on the LCD, wait until they disappear naturally.
- When turning the power OFF and then ON again, wait several seconds after turning the power OFF.

Backup Battery

- Measured data and various settings are stored in the memory backed up by batteries. The backup batteries are automatically charged during operation of this instrument, and can retain the contents of the memory for 5 months if they have been fully charged. At the time of purchase, the backup battery may not be fully charged. To charge the backup battery, set the power switch to ON. Charging of the backup battery is performed continuously while the instrument is switched on, even while the instrument is being used. Full charging is completed in 24 hours, and there is no danger of overcharging.
- It is recommended to keep a backup for your important data on another recording medium using the optional Color Data Software SpectraMagic™ NX (CM-S100w).

Note

- ***The backup batteries' model number is ML2020 (3 V).***
- ***Do not try to replace the backup batteries by yourself. Contact a KONICA MINOLTA SENSING-authorized service facility.***

Notes on Storage

- The CM-700d/600d should be stored at temperatures between 0°C and 45°C, and at a relative humidity of 80% or less (35°C) without condensation. Do not store the instrument in areas subject to high temperatures, high humidity, sudden changes in temperature, or where freezing or condensation may occur, because these circumstances may cause a breakdown. It is recommended to store the CM-700d/600d with a drying agent (such as silica gel) at a temperature around 20°C.
- Do not leave the CM-700d/600d inside a car such as in the cabinet or trunk. Otherwise, the temperature and/or humidity may exceed the allowable range for storage during midsummer or midwinter, resulting in a breakdown.
- Keep the packing materials used for shipment and use them to transport the CM-700d/600d. This protects the instrument from sudden changes in temperature, vibration, and shock.
- Do not store the CM-700d/600d in areas where dust, cigarette smoke or chemical gases are present. Doing so may cause deterioration in performance or a breakdown.
- Entry of dust into the specimen measuring port will hinder accurate measurement. When the instrument is not in use, you must attach the White Calibration Cap to the instrument to prevent the entry of dust into the integrating sphere through the specimen measuring port.

- The White Calibration Plate attached to the White Calibration Cap may become discolored if left exposed to light. Therefore, make sure that the cap is inverted when it is not in use so that the White Calibration Plate is not exposed to ambient light.
- The Target Masks may discolor if they are left exposed to light. When they are not in use, keep them in a safe place to prevent exposure to light and to protect them from scratches and dust.
- Be sure to keep all packing materials (cardboard box, cushioning material, plastic bags, etc.). They can be used to protect the instrument during transportation to the service facility for maintenance (re-calibration etc.).
- If you are not going to use the CM-700d/600d for more than two weeks, the batteries must be removed. If the batteries are left in the instrument, battery electrolyte may leak and damage the instrument.

Notes on Cleaning

- If the CM-700d/600d becomes dirty, wipe it with a soft, clean dry cloth. Never use solvents such as thinner or benzene.
- If the White Calibration Plate attached to the White Calibration Cap becomes dirty, wipe it gently with a soft, clean and dry cloth. If dirt is difficult to remove, wipe it off with a cloth dampened with commercially-available lens cleaning solution. Then remove the solution with a cloth dampened with water, and leave the plate to dry.
- If the inner surface of the Target Masks or the inside of the integrating sphere get dirty, contact a KONICA MINOLTA SENSING-authorized service facility.
- Should the CM-700d/600d break down, do not try to disassemble and repair it by yourself. Contact a KONICA MINOLTA SENSING-authorized service facility.

Disposal Method

- When disposing of used batteries, insulate the terminals with insulating tape etc. If the terminals of the battery come into contact with metal objects, heat generation, explosion or fire may result.
- Make sure that the CM-700d/600d, its accessories and used batteries are either disposed of or recycled correctly in accordance with local laws and regulations.

Contents

Conventions

This manual describes how to safely operate the CM-700d/600d using a specific procedure to perform measurement.

- **Page layout**

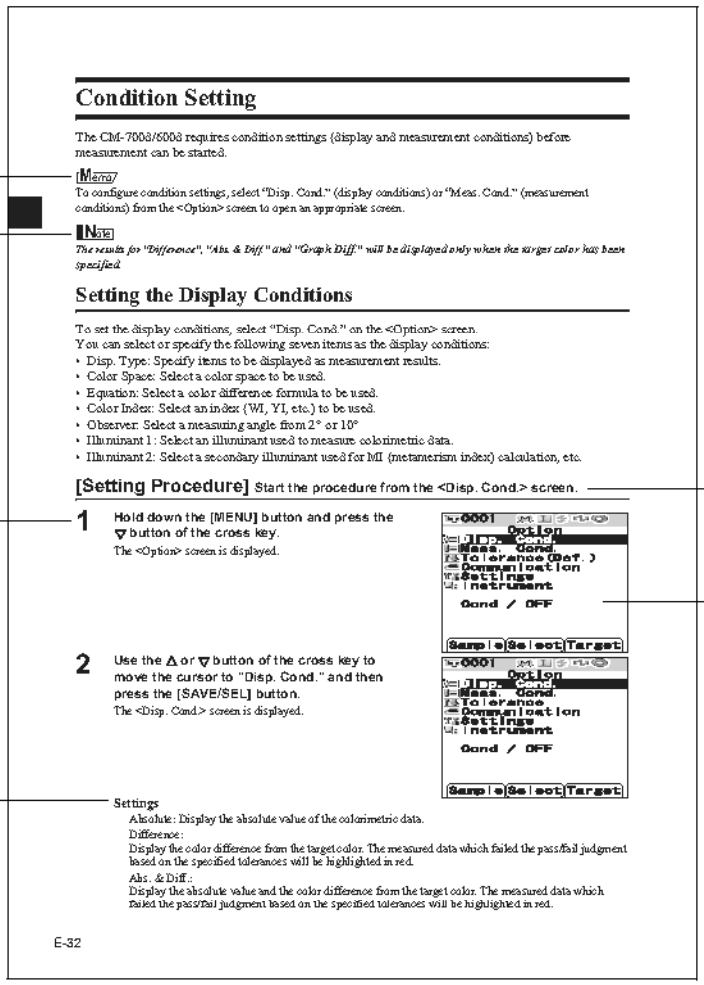
Symbols used in this manual are explained below.
*Note that the page shown in the illustration is for explanatory purposes only, and is not an actual page from this manual.

Memo
Gives useful Information and additional explanations.

Note
Gives the points that you should know to perform operations correctly. Make sure that you read the notes.

Procedure
Shows the operating procedure.

Settings
Gives the range and explanation of the values to be set in this screen.



Condition Setting

The CM-700d/600d requires condition settings (display and measurement conditions) before measurement can be started.

Memo
To configure condition settings, select "Disp. Cond." (display conditions) or "Meas. Cond." (measurement conditions) from the <Option> screen to open an appropriate screen.

Note
The results for "Difference", "Abs. & Diff." and "Graph Diff." will be displayed only when the target color has been specified.

Setting the Display Conditions

To set the display conditions, select "Disp. Cond." on the <Option> screen.
You can select or specify the following seven items as the display conditions:
- Disp. Type: Specify items to be displayed as measurement results.
- Color Space: Select a color space to be used.
- Equation: Select a color difference formula to be used.
- Color Index: Select an index (WI, YI, etc.) to be used.
- Observer: Select a measuring angle from 2° or 10°
- Illuminant 1: Select an illuminant used to measure colorimetric data.
- Illuminant 2: Select a secondary illuminant used for MI (metamerism index) calculation, etc.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

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 "Disp. Cond." and then press the [SAVE/SEL] button.
The <Disp. Cond.> screen is displayed.

Settings
Absolute: Display the absolute value of the colorimetric data.
Difference:
Display the color difference from the target color. The measured data which failed the pass/fail judgment based on the specified tolerances will be highlighted in red.
Abs. & Diff.:
Display the absolute value and the color difference from the target color. The measured data which failed the pass/fail judgment based on the specified tolerances will be highlighted in red.

E-32

Start screen
Shows the screen from which operation must be started.

Screen
Shows the contents of the current screen when the given operation is carried out.

For the version of the instrument firmware

The version of the instrument firmware can be confirmed on the <Instrument> screen. For details, refer to page E-106 "Displaying the Instrument Information" in this manual.

Chapter 1

Before Using the Instrument

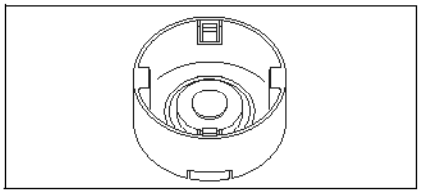
Accessories

Standard and optional accessories are available with the instrument.

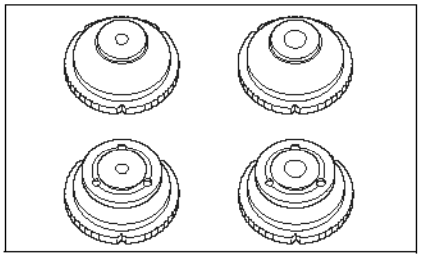
Standard Accessories

Make sure that all the following items are present.

White Calibration Cap CM-A177
(w/ white calibration data CD-R)



Target Mask
Used to switch the illumination area (specimen measuring port size) according to the specimen.

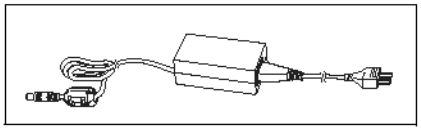


Target Mask ϕ 8 mm (w/ plate) CM-A178 <For MAV>
Target Mask ϕ 3 mm (w/ plate) CM-A179 <For SAV>
Target Mask ϕ 8 mm (w/o plate) CM-A180 <For MAV>
Target Mask ϕ 3 mm (w/o plate) CM-A181 <For SAV>

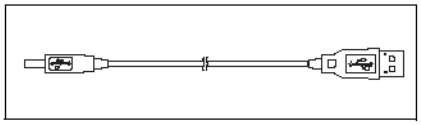
Memo

- The instrument is shipped with the CM-A178 Target Mask ϕ 8 mm with plate (for MAV) being attached.
- The CM-A179 and CM-A181 Target Masks ϕ 3 mm (for SAV) are not included in the package of the CM-600d.

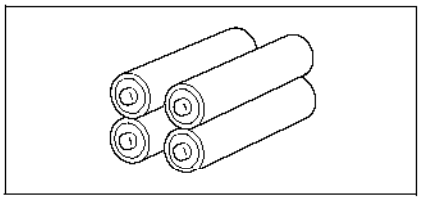
AC Adapter AC-A305
Used to supply power from an AC outlet to the instrument.
Input: 100-240 V ∿ 50/60 Hz 24-36 VA
Output: 5 V ⎓ 2 A



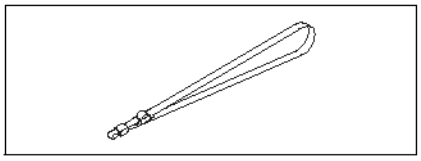
USB Cable IF-A17
Used to connect the instrument to a personal computer (PC).



4 AA-size alkaline dry batteries



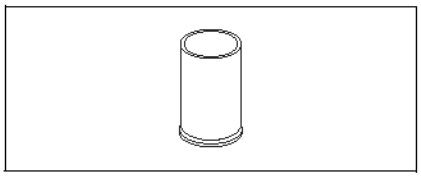
Wrist Strap CR-A73



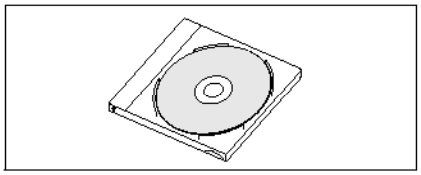
Optional Accessories

You may purchase the following accessories if necessary.

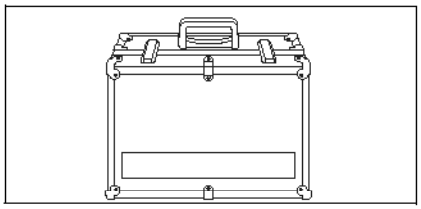
Zero Calibration Box CM-A182
Used to perform zero calibration.



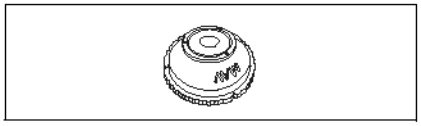
Color Data Software SpectraMagic™ NX CM-S100w
Used to operate the instrument from a PC for data processing and file management.



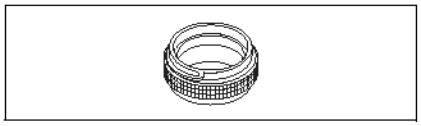
Hard Case CM-A176
Used to store the instrument together with accessories.
*Do not use the hard case for transportation purposes.



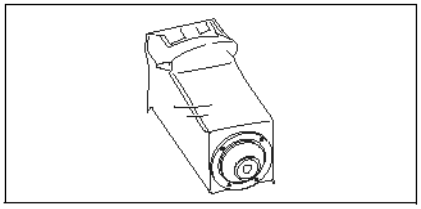
Target Mask ϕ 8 mm (with glass) CM-A183
Used to measure viscous or damp specimens.



Granular-Materials Attachment CR-A50
Used to contain paste or powder specimens to ensure measurements under stable conditions.

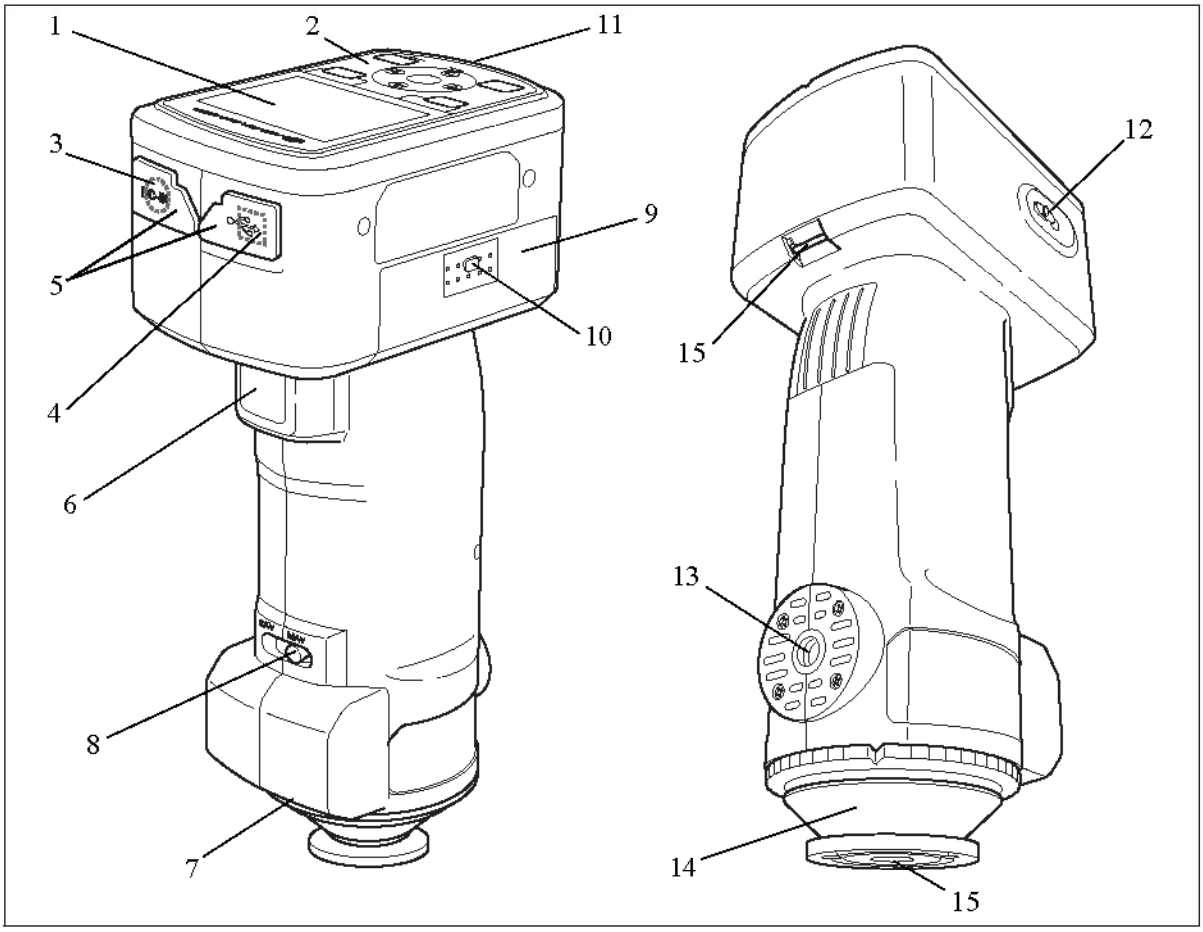


Dust Cover Set CM-A185
Prevents foreign matters from entering the instrument in dusty environments.



Replacement Dust Cover (Polyolefin) CM-A186

Names and Functions of Parts



1 **LCD screen**
Displays setting items, measurement results and messages.

2 **Control panel**
Used to switch screens or select/determine/save setting items.
For details, refer to page E-23 "Control Buttons".

3 **AC adapter terminal**
When using the supplied AC adapter (CM-A305), connect the adapter's plug to this terminal.

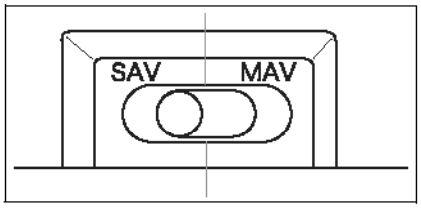
4 **USB connection terminal**
Used to connect the instrument to a PC with the supplied USB cable (IF-A17).

5 **Connector protection covers**
Protects the AC adapter terminal and USB connection terminal.

6 **Measuring button**
Push this button to perform calibration or measurement.

7 **Pairing No. label**
Shows the identification No. of the White Calibration Cap that can be used with the instrument.

8 **Measurement area selector**
Used to change the lens position according to the measurement area.



Memo
The CM-600d does not have this switch.

9 **Battery chamber cover**
The cover of the battery chamber. Four AA-size batteries must be set in the battery chamber with the correct polarity alignment.

10 **Battery chamber cover button**
Press this button to open or close the battery chamber cover.

11 **READY Lamp**
Ready to measure (and fully charged) when green.

12 **Power switch**
Used to turn ON/OFF power. Setting this switch to "O" turns the power OFF, and setting it to "|" turns the power ON.

13 **Tripod mount**

14 **Target Mask**
Used to change the measurement area according to the measurement area selector setting. Selectable from several types depending on the application.

15 **Specimen measuring port**
The port for measuring the specimen.The port size can be changed by changing the Target Masks.

Note
The measurement area cannot be changed with the CM-600d.

16 **Strap holder**
Used to attach the supplied Wrist Strap.

Memo
For details of attaching Wrist Strap, refer to "Attaching Wrist Strap to the Instrument" (page E-17).

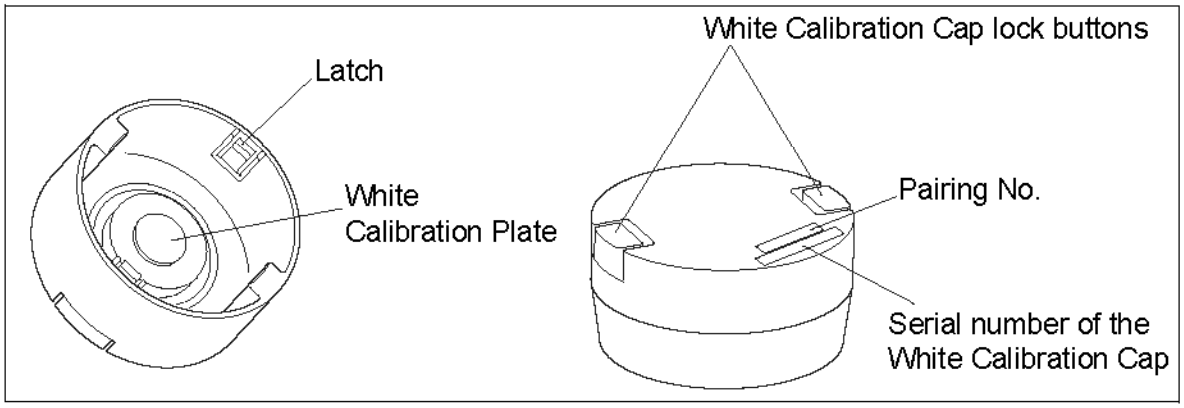
Preparation

White Calibration Cap CM-A177

The instrument is shipped with a White Calibration Cap and white calibration data CD-R.
The White Calibration Cap has the structure shown below. It should be attached to the instrument before white calibration.

Note

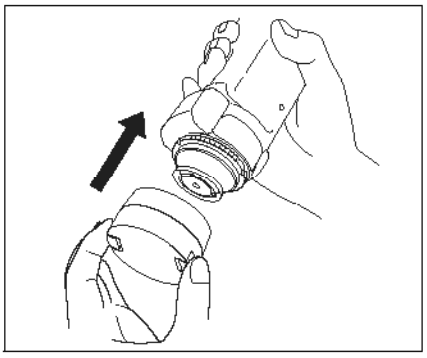
- ***The White Calibration Cap must be used in combination with the instrument that bears the same pairing number.***
- ***When the White Calibration Cap is not in use, invert it so that the White Calibration Plate is not exposed to ambient light or dust.***
- ***When the CM-700d/600d is not in use, you must attach the White Calibration Cap to the instrument to prevent the entry of dust into the integrating sphere through the specimen measuring port.***



Attachment/Removal to/from the Instrument

- **Attachment**

1. Hold the instrument securely.
2. Squeeze the White Calibration Cap lock buttons, place the White Calibration Cap on the Target Mask of the instrument, and release the lock buttons to secure the cap.

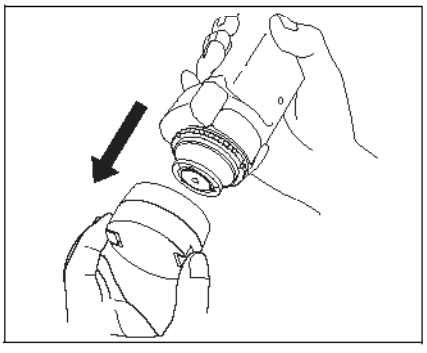


Note

Do not move the instrument by holding the White Calibration Cap. The instrument may detach from the cap, possibly resulting in the instrument falling and being damaged.

- **Removal**

1. While squeezing the White Calibration Cap lock buttons, pull the cap out straight from the instrument.



Attaching/Removing a Target Mask

The CM-700d/600d must be used with a Target Mask conforming to the selected lens position and measurement condition.
To attach/remove a Target Mask, follow the procedure given below.

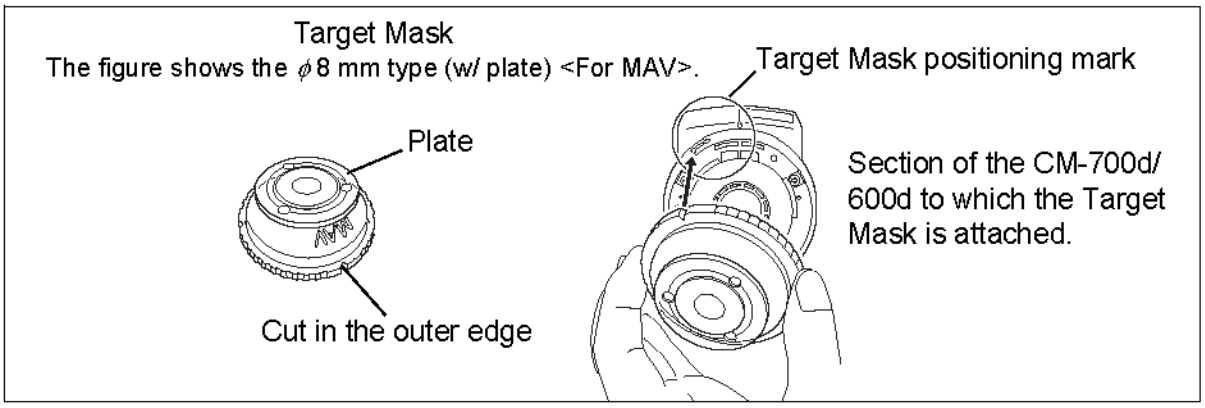
Note

- ***When attaching/removing a Target Mask, be careful not to allow dirt or dust to enter the integrating sphere though the specimen measuring port.***
- ***Do not touch the white-coated inner surface of the integrating sphere, wipe it with a cloth or put an object inside it.***
- ***Do not exert excessive force on the latch of the Target Mask. Doing so may damage the latch, disabling use of the Target Mask.***

Memo

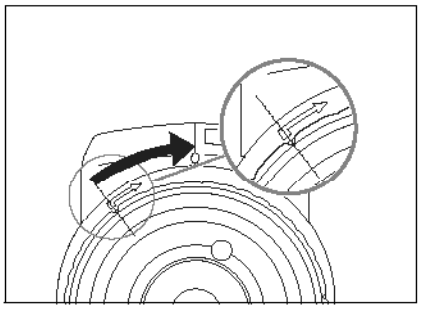
If a Target Mask is damaged, contact a KONICA MINOLTA SENSING-authorized service facility.

Attachment/Removal to/from the Instrument



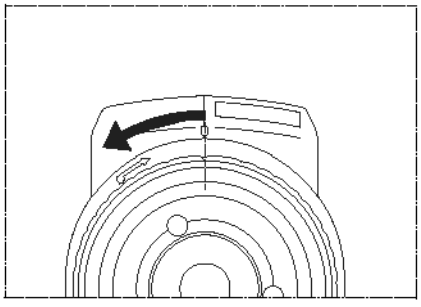
- **Attachment**

1. Place the Target Mask over the specimen measuring port so that the cut in the outer edge of the Target Mask is aligned with the starting point of the positioning mark (⇨) on the instrument.
2. Hold the outer edge of the mask, and turn it in the direction of the arrow (clockwise). Turn the mask until the cut in the outer edge is aligned with the "○" mark on the instrument and then secure the mask.



- **Removal**

1. Hold the outer edge of the mask, and turn it in the opposite direction of the arrow (counterclockwise). Turn the mask until the cut in the outer edge is aligned with the starting point of the positioning mark (⇨) of the instrument.
2. Hold the outer edge of the mask and remove it.



Cleaning Parts

This section explains how to clean the White Calibration Cap, Target Mask and the inside of the integrating sphere.

White Calibration Cap

- When the White Calibration Plate becomes dirty, gently wipe the dirt off with a soft dry cloth. If the dirt is difficult to remove, wipe it off with a cloth dampened with commercially available lens cleaning solution. Then remove the solution with a cloth dampened with water, and leave the plate to dry.
- When parts other than the White Calibration Plate become dirty, lightly wipe the dirt off with a cloth dampened with water or soapy water. Never use solvents such as thinner or benzene.

Note

Be careful not to scratch the White Calibration Plate.

Target Mask

Use a blower to remove dirt and dust from the Target Masks.

Note

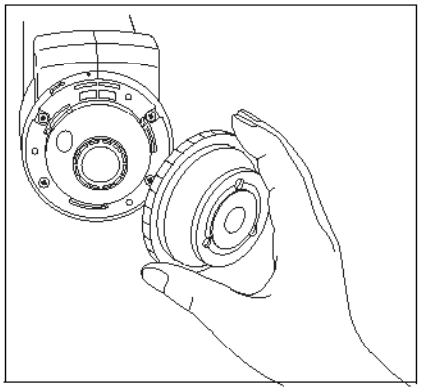
Do not touch the inner surface of the Target Masks with your fingers or wipe them with a cloth to remove dust. If the inside is so dirty that dirt cannot be removed with a blower, contact the nearest KONICA MINOLTA SENSING-authorized service facility.

Inside the Integrating Sphere

1. Remove the Target Mask.

Memo

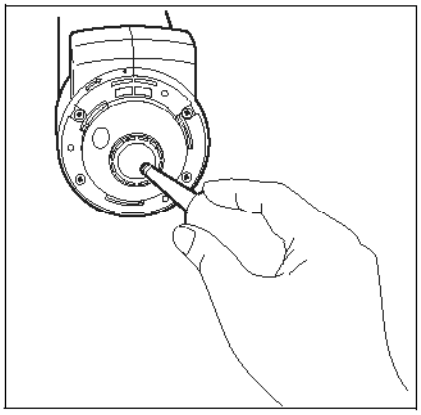
For the procedure of removing the Target Mask, refer to page E-15 “Attaching/Removing a Target Mask”.



2. Use a blower to remove dirt and dust from the integrating sphere.

Note

Do not touch the white-coated inner surface of the integrating sphere, wipe it with a cloth or put an object inside it. If the inside is so dirty that dirt cannot be removed with a blower, contact the nearest KONICA MINOLTA SENSING-authorized service facility.

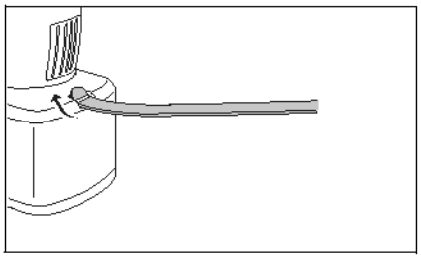


Attaching Wrist Strap to the Instrument

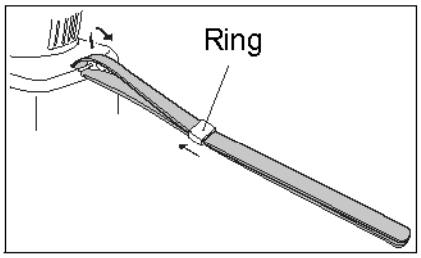
When measuring by hand, attach Wrist Strap and put your arm through Wrist Strap to prevent dropping of the instrument.

[Procedure]

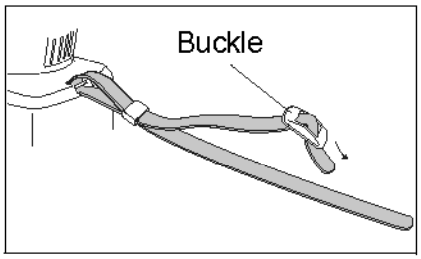
1 **Pass one end of Wrist Strap through the strap holder of the instrument.**



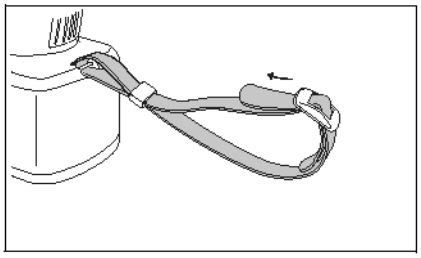
2 **Pass other end of Wrist Strap through the ring, and pass the strap that passed through the strap holder through the ring too.**



3 **Pass one end of Wrist Strap that passed through the ring through the buckle.**



4 **Pass other end of the strap through the buckle from the other side.**



Memo

If necessary, after passing the arm through the strap, move the position of the ring so that the strap is snug your arm.

Inserting the Batteries

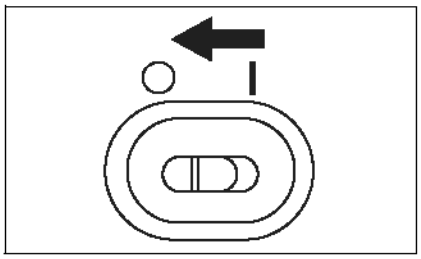
For the CM-700d/600d, the supplied AC adapter (AC-A305) or four AA-size batteries (alkaline or nickel-metal-hydride rechargeable batteries) must be used as a power supply. Use either the AC adapter or batteries according to your application.

Note

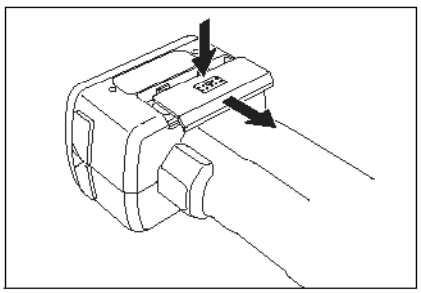
- ***Do not use manganese batteries.***
- ***if you are not going to use the CM-700d/600d for more than two weeks, the batteries must be removed. If the batteries are left in the instrument for a long time, battery electrolyte may leak and damage the instrument.***
- ***Do not use batteries of different types or mix new batteries with old ones. Doing so may result in battery explosion or shorter battery life.***
- ***Do not touch or short-circuit the terminals inside the battery chamber. Doing so may result in breakdown of the instrument.***

[Procedure]

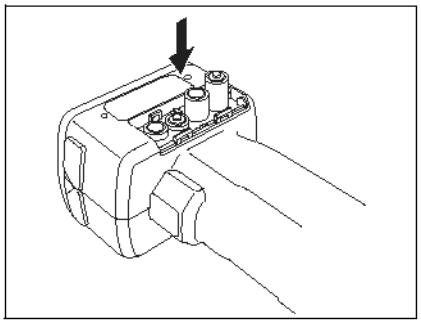
1 Make sure that power is OFF (Power switch is set to "O").



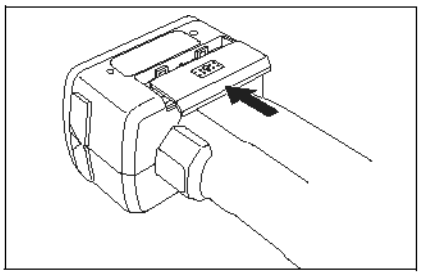
2 Press the battery chamber cover button on the side of the instrument and slide the cover downward to open it.



3 Place four AA-size batteries in the battery chamber. Make sure that the batteries are placed in the correct direction.



4 Align the grooves of the cover with the guides on the edge of the battery chamber opening. Press down lightly on the cover and slide it upward to close it.



Connecting the AC Adapter

Memo

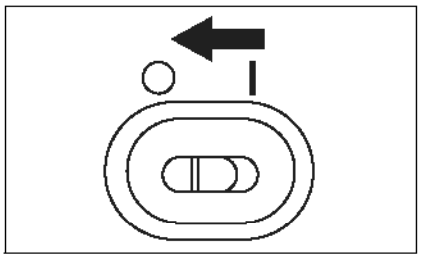
When the external output terminal is used for data communication or printing, more power will be required. In this case, it is recommended to use the AC adapter (AC-A305) rather than batteries.

Note

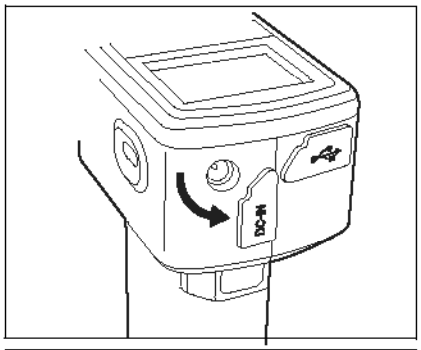
- ***To supply AC power to the instrument, always use the AC adapter (AC-A305) supplied with the instrument.***
- ***Before connecting or disconnecting the AC adapter jack or plug, make sure that the instrument is turned OFF.***

[Operating Procedure]

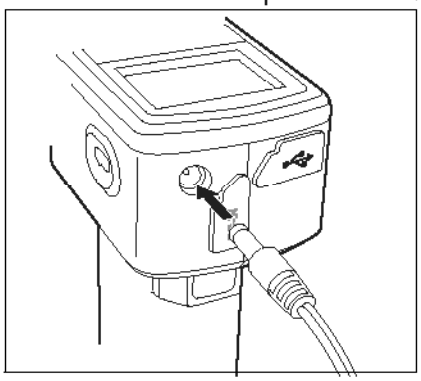
1 Make sure that power is OFF (Power switch is set to "O".).



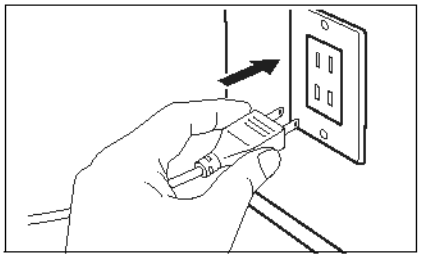
2 Open the connector protection cover of the AC adapter terminal on the instrument.



3 Connect the AC adapter connector jack to the AC adapter terminal.



4 Insert the AC adapter power plug to an AC outlet (100 to 240 VAC, 50-60 Hz).



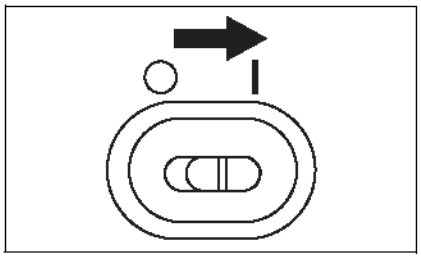
Turning Power ON/OFF

[Operating Procedure]

Turning power ON

1 **Slide the Power switch to the "|" position.**

The power will be turned ON (energized).

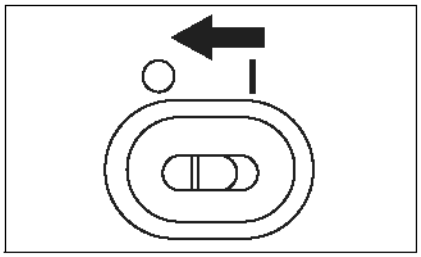


[Operating Procedure]

Turning power OFF

1 **Slide the Power switch to the "O" position.**

The power will be turned OFF.



Power Save Function

The CM-700d/600d features a power save function which activates the power save mode when none of the measuring and control buttons is operated for a specified period of time. In the power save mode, the screen display is turned off and the flash circuit will not be charged.
You can return to the normal mode by pressing any of the measuring or control buttons.

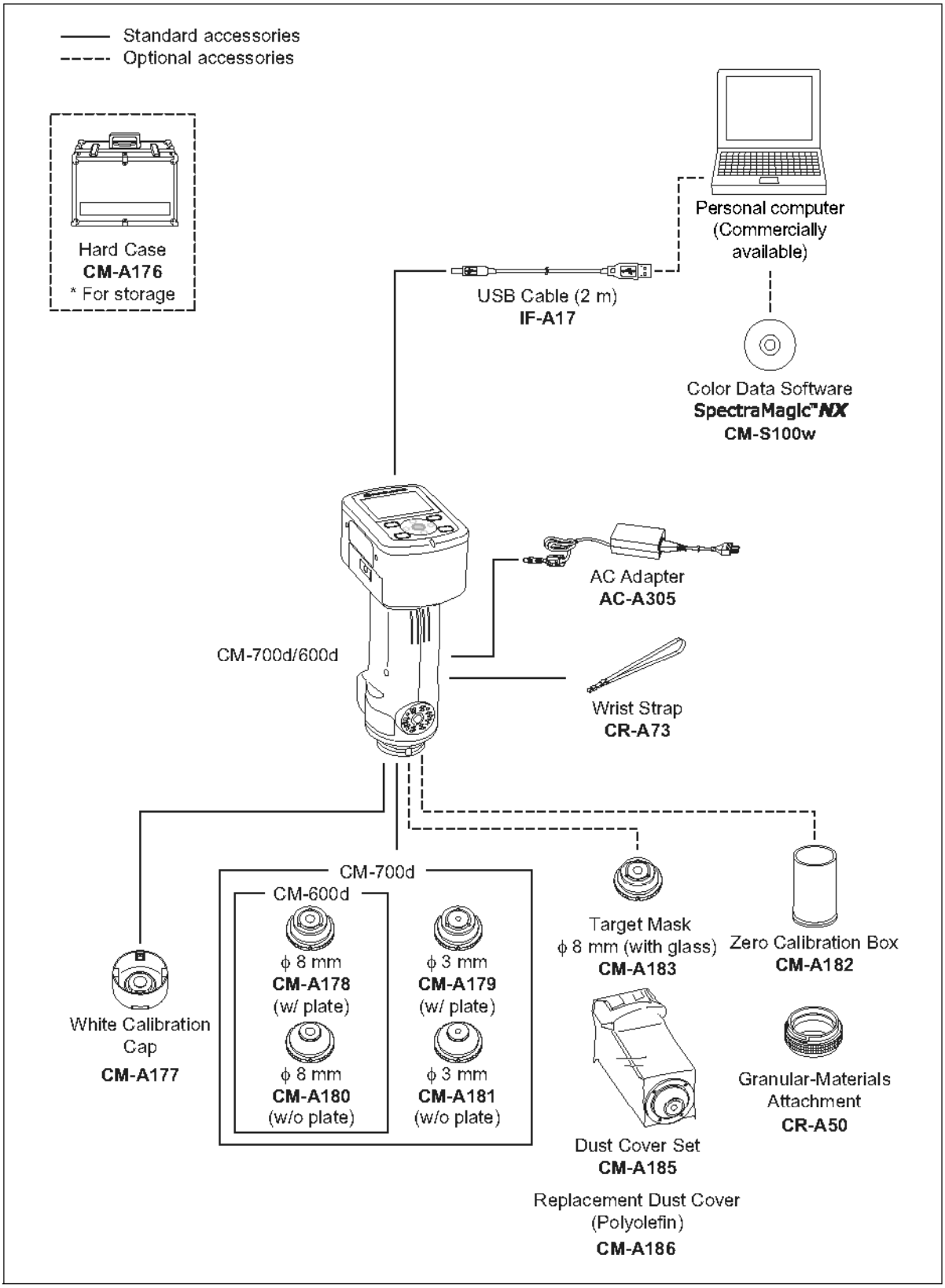
Memo

The period of time before the power save mode is activated can be set on the <Option> screen. For details, refer to page E-70 "Setting the Power Save Mode".

Note

The power save function is factory-set to OFF.

System Diagram



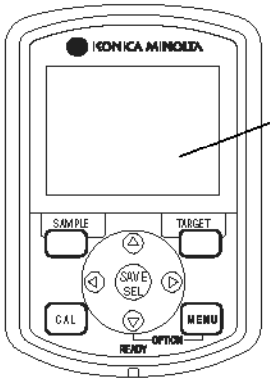
Items You Must Know

Initial Settings of the CM-700d/600d

When the instrument is turned ON, the <Calibration> screen will appear automatically in English. For normal measurement, you do not need to change the initial settings.
It is recommended that you check the date and specify the power save mode in the <Option> screen before using the instrument.
The display language can be selected from seven languages including Japanese.
For details, refer to page E-66 “Other Settings”.

Control Panel

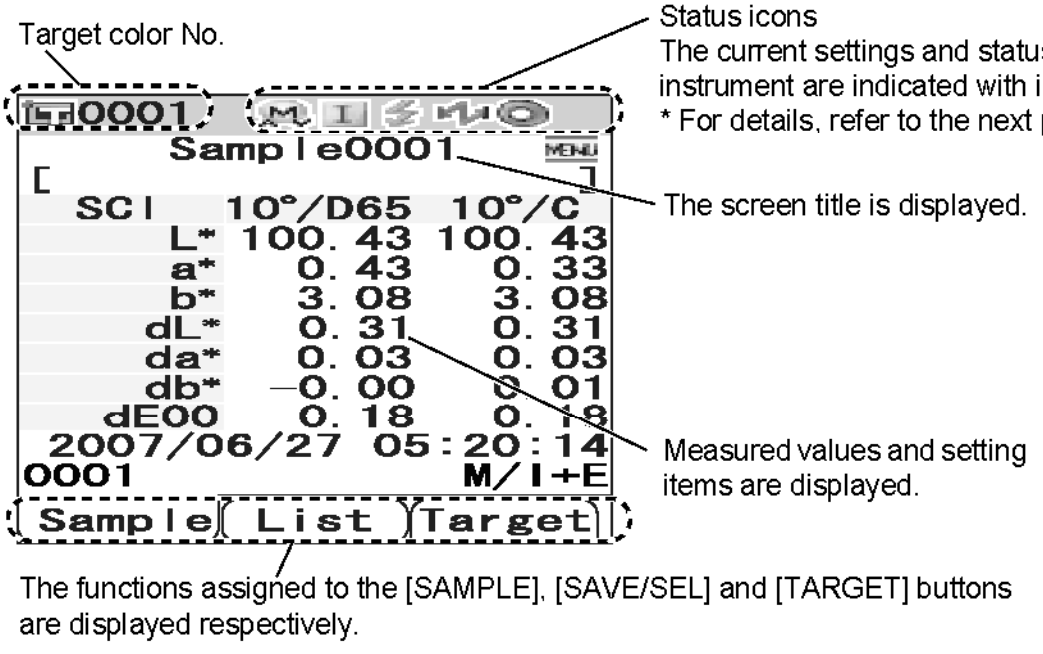
The top of the CM-700d/600d contains the LCD screen on which the instrument displays measurement results and messages, and the control buttons which are used to set measurement options or to change displays.



LCD screen

Screen Display (LCD Screen)

The LCD screen displays measurement settings, measurement results and messages. It also indicates the status of the instrument with icons.
The basic screen layout is shown below.

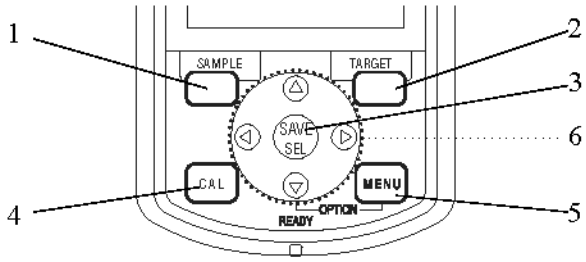


Status Icons

Status icon	Description (Status)	Meaning
	Measurement area (Measurement area selector setting)	MAV/SAV
	* The CM-700d shows either the MAV or SAV icon. The CM-600d shows only the MAV icon.	
	Specular component mode setting	SCI/SCE/I + E (SCI + SCE)
	Bluetooth capability setting	ON/OFF
	Calibration necessity	Zero calibration required/White calibration required/User calibration required
	White calibration after power-on	Performed/Not performed
	Flash circuit charging	Completed/Not completed

Control Buttons

Use these buttons to set items or change screens according to the guide on the LCD screen.



1 **[SAMPLE] button:**
Press this button to display the <Sample> screen.

2 **[TARGET] button:**
Press this button to display the <Target> screen.

3 **[SAVE/SEL] button:**
Use this button to determine the item indicated by the cursor or to save the setting.
When the <Sample> or <Target> screen is displayed, use this button to switch between the detail display and list display.

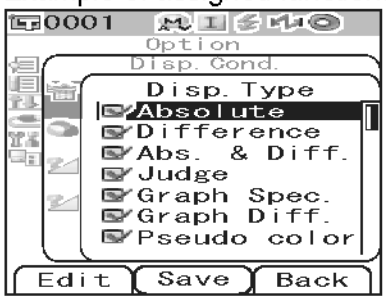
4 **[CAL] button:**
Press this button to display the <Calibration> screen.

5 **[MENU] button:**
Press this button to display the <Menu> screen.
The screens and setting items for which menu setting is available are indicated with MENU (MENU mark) at the top of the screen.
You can display the <Option> screen by pressing the [MENU] button while holding down the ▽ button of the cross key.

6 **Cross key (◁/△/▽/▷):**
Use this key to move the cursor on the screen or to change the selected value.
To determine the item indicated by the cursor, press the [SAVE/SEL] button.

Memo
The [SAMPLE], [SAVE/SEL] and [TARGET] buttons may be assigned different functions depending on the screen. In this case, the guidance at the bottom of the screen indicates the current functions (Edit, etc.).

Example of assigned functions



For example, when the screen shows the guidance [Edit] [Save] [Back], the [SAMPLE], [SAVE/SEL] and [TARGET] buttons are assigned with the Edit, Save and Back functions respectively. In this manual, when the button name and the function assigned to the button are different, the button name and function are described as "the [SAMPLE] (Edit) button" or "[TARGET] (Back) button".

Battery Alarm

The CM-700d/600d can be powered from the standard AC adapter (AC-A305) or AA-size alkaline or nickel-metal-hydride rechargeable batteries. When the instrument is used with batteries, two types of battery alarm indication will appear when battery power level is low. When the battery power is sufficient, no battery alarm indication is displayed.

(Low battery indication)
When this indication appears, new batteries or the AC adapter should be prepared in the near future. Even with this indication displayed, measurements are still possible.

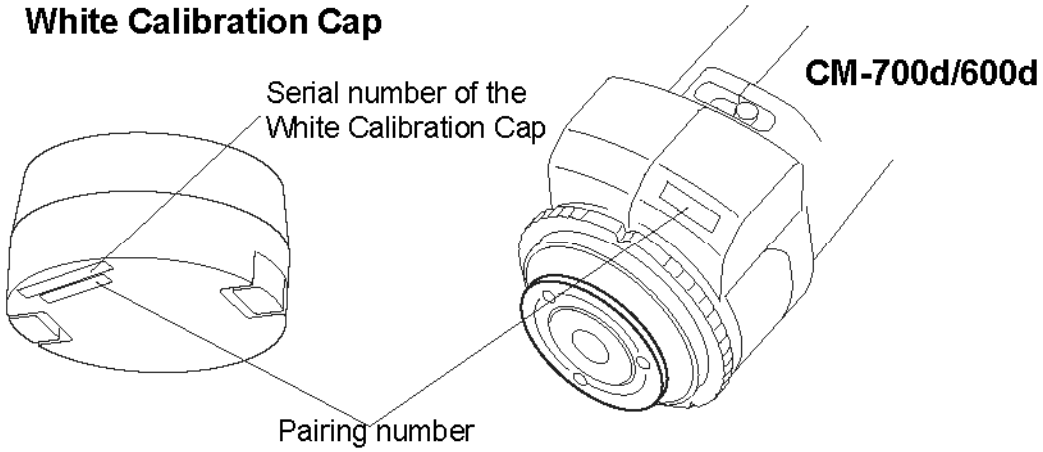
If you continue using the instrument with the low battery indication being displayed, ER002 (low battery voltage error) is displayed. When this error is displayed, replace the batteries immediately with new ones or connect the AC adapter.

Data Saving

Data used with this instrument are saved automatically. The white calibration data stored in the internal memory after you perform white calibration is retained even after the instrument is turned off.

Pairing Number

In addition to individual serial numbers, the instrument and White Calibration Cap bear 5-digit numbers called "pairing number". Before starting white calibration, confirm that the instrument and White Calibration Cap have the same pairing number.



The instrument and White Calibration Cap to be used together must have the same pairing number.

Chapter 2

Preparation for Measurement

Flow of Measurement

Calibration

Zero Calibration

Since the CM-700d/600d stores the data of the zero calibration performed at the factory, it is unnecessary to repeat the zero calibration every time you turn ON the instrument. However, if the measurement conditions change greatly, or if you use the optional dust cover set or Target Mask ϕ 8 mm (with glass), you need to perform zero calibration before white calibration.

Memo

- The effects of stray light inside the measuring part (i.e. light generated due to the flare characteristics of the optical system) will be compensated for automatically by the zero calibration data.
- The amount of stray light may change because of dust or dirt which has collected in the optical system, humidity, repeated operation, or vibration and shock exerted on the instrument. In this case, performing zero calibration periodically is recommended.
- 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.

Note

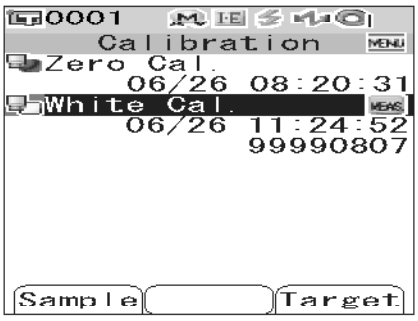
- ***If the instrument is not used for long periods of time, the zero calibration data stored in the instrument may be lost. If the data is lost, zero calibration must be performed again.***
- ***When the instrument is used for the first time after purchase at a given measurement area setting (MAV or SAV; SAV is available on CM-700d only), zero calibration must be performed.***
- ***If you performed zero calibration using the optional dust cover set or Target Mask ϕ 8 mm (with glass), you must perform zero calibration again before starting measurement using the standard Target Mask.***

[Setting Procedure]

1 **Confirm the type of attached target mask and the setting of the measurement area selector of the instrument.**

2 **Turn the instrument ON.**

The <Calibration> screen is displayed.

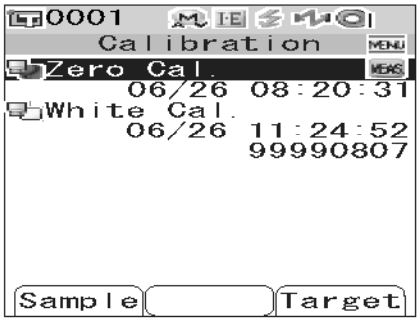


Note

Check the status icons displayed at the top of the screen to verify that the lens position (MAV/SAV) icon is correct for the measurement area selector setting and for the type of attached Target Mask.

- If a different screen is displayed, press the [CAL] button.

3 Use the △ button of the cross key to move the cursor to "Zero Cal."

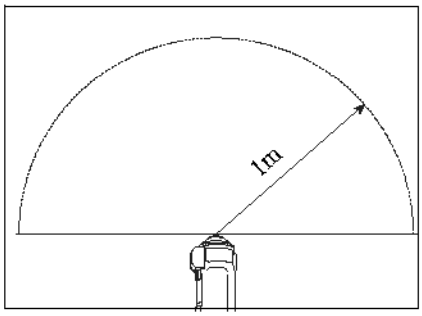


4 Direct the specimen measuring port to midair.

- Do not direct the specimen measuring port toward a light source (including illumination such as a fluorescent lamp).
- Keep the specimen measuring port more than 1 m away from any reflective items (hands, desks, walls etc.).

Memo

Use of the optional Zero Calibration Box CM-A182 ensures proper zero calibration.

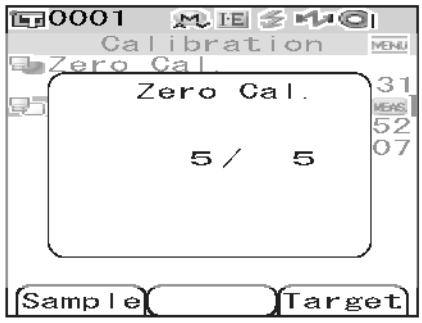


5 Make sure that ⚡ (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.

Zero calibration will be performed.

The Xe lamp flashes five times for each SCI and SCE measurement.

During zero calibration, the screen shows the number of flashes performed.



When zero calibration is finished, the screen returns to the <Calibration> screen.

Memo

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.

Note

- ***After zero calibration finished, perform white calibration. Go to step 3 of "White Calibration" on page E-29.***
- ***Even though you performed white calibration after turning ON the power, you need to perform it again if you performed zero calibration after the first white calibration.***

White Calibration

White calibration must be performed prior to start of measurement after the power is turned ON for the first time after purchase at the current settings.
When white calibration finishes, <white calibration completed icon> is displayed.
Once white calibration is completed, measurement is possible without white calibration when the instrument is turned ON the next time. However, the measurement result is not accurate.

Memo

- The calibration data for the White Calibration Cap supplied with the instrument are stored in the instrument.
- Although the white calibration results stored in the internal memory are retained even after the instrument is turned off, it is recommended that you repeat white calibration each time you switch the power back on.
- The reading may fluctuate slightly due to changes in the ambient temperature or due to heat generation caused by repeated operation of the instrument. In this case, make sure to perform white calibration regularly.
- 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.

Note

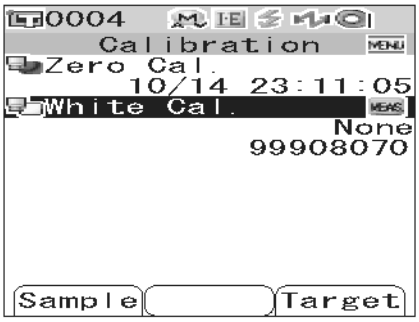
- ***White calibration must be performed at the same temperature as the one at which measurement will be performed.***
- ***Before starting white calibration, make sure that the instrument is sufficiently acclimatized to the ambient temperature.***
- ***Whenever the measurement area setting has been changed between MAV and SAV, white calibration must be performed.***

[Setting Procedure]

1 **Confirm the type of attached target mask and the setting of the measurement area selector of the instrument.**

2 **Turn the instrument ON.**

The <Calibration> screen is displayed.



Note

Check the status icons displayed at the top of the screen to verify that the lens position (MAV/SAV) icon is correct for the measurement area selector setting and for the type of attached Target Mask.

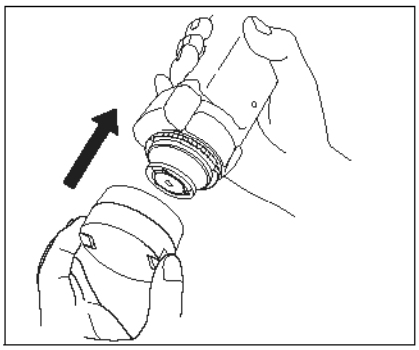
- If a different screen is displayed, press the [CAL] button.

Memo

- The <Calibration> screen shows two items: "Zero Cal." and "White Cal." The date of the last calibration is displayed under each item. If no calibration has been performed yet, "***None***" is displayed.
- Under "White Cal.", the serial number of the White Calibration Cap to be used for the instrument is displayed.

3 **If necessary, use the ▽ button of the cross key to move the cursor to "White Cal."**

4 **Properly attach the White Calibration Cap, which has the same pairing number as the instrument.**



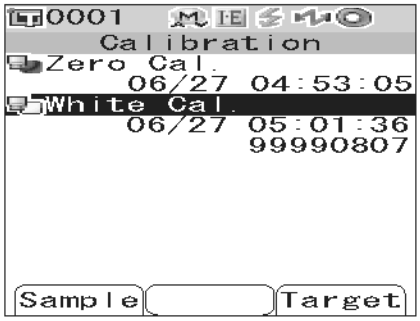
5 **Make sure that ⚡ (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.**

White calibration will be performed.

The Xe lamp flashes five times for each SCI and SCE measurement.

During white calibration, the screen shows the number of flashes performed.

When white calibration finishes, the screen returns to the <Calibration> screen.



Note

The instrument contains the data for the White Calibration Cap which has the same pairing number. Therefore, you must use the instrument and corresponding White Calibration Cap for white calibration.

Memo

- If you change the measurement area or change the specular component mode from a setting other than "I + E" after white calibration, you must perform white calibration under the changed conditions.
- If you performed white calibration in "I + E" mode and then switched the mode to "SCI" or "SCE", it is considered that white calibration has been completed and you do not need to repeat it.
- 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.

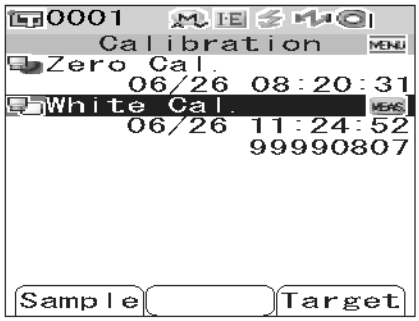
User Calibration

You can perform calibration by using your own reference plate and calibration data instead of the white calibration data. The calibration data for user calibration can be specified by connecting the instrument to a PC and using the optional Color Data software "SpectraMagic™ NX".
You can select whether to use the user calibration data for measurement on the <User Cal.> screen of the instrument.

[Setting Procedure]

1 Turn the instrument ON.

The <Calibration> screen is displayed.



- If a different screen is displayed, press the [CAL] button.

2 Press the [MENU] button.

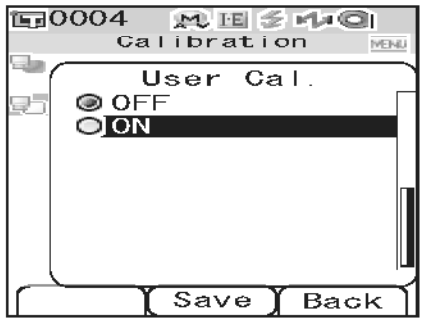
The <User Cal.> screen is displayed.

3 Use the ▽ button of the cross key to move the cursor to "ON" and then press the [SAVE/SEL] button.

Now you can perform white calibration using your own calibration data.

Note

You need to prepare user calibration data and write it to the instrument memory before you can set user calibration to ON.



Condition Setting

The CM-700d/600d requires condition settings (display and measurement conditions) before measurement can be started.

Memo

To configure condition settings, select "Disp. Cond." (display conditions) or "Meas. Cond." (measurement conditions) from the <Option> screen to open an appropriate screen.

Note

If any predefined condition is selected, the condition setting (display/measurement conditions) is disabled. Set the condition to OFF before starting condition setting.

Setting the Display Conditions

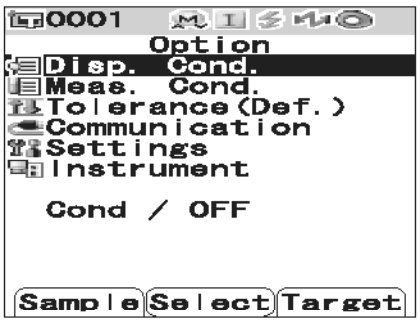
To set the display conditions, select "Disp. Cond." on the <Option> screen.
You can select or specify the following seven items as the display conditions:

- 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: 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.

[Setting Procedure]

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

The <Option> screen is displayed.

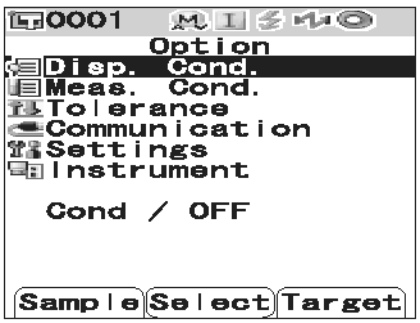


2 **Use the △ or ▽ button of the cross key to move the cursor to "Disp. Cond." and then press the [SAVE/SEL] button.**

The <Disp. Cond.> screen is displayed.

Note

When setting of "Cond" is "ON" (refer to page E-56), "Disp. Cond" and "Meas. Cond" cannot be selected.



- The <Disp. Cond.> screen shows the current settings.

3 **After you set the display conditions, press the [TARGET] (Back) button to return to the <Option> screen.**

Disp. Type

Specify items to be displayed as measurement results.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

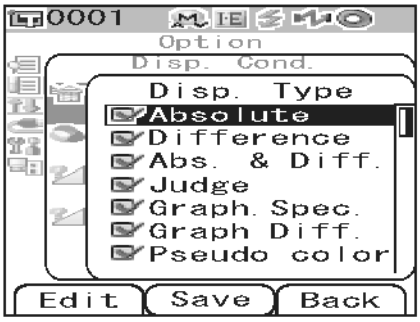
1 **Use the △ or ▽ button of the cross key to move the cursor to "Disp. Type." and then press the [SAVE/SEL] button.**

The <Disp. Type> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Memo

- Press the [SAMPLE] (Edit) button to check or uncheck the "Disp. Type" options indicated by the cursor.
- The checked option is currently selected.



Settings

○Absolute: Display the absolute values of the colorimetric data.

○Difference:
Display the color difference from the target color. The measured data which failed the pass/fail judgment based on the specified tolerances will be highlighted in red.

○Abs. & Diff.:
Display the absolute value and the color difference from the target color. The measured data which failed the pass/fail judgment based on the specified tolerances will be highlighted in red.

○Judge:
Perform judgment of whether the color difference from the target color is within the range of the predefined tolerances. "Pass" indicates that all the items passed the judgment, and "Fail" indicates at least one item failed the judgment.

○Graph Spec.: Display a spectral reflectance graph.

○Graph Diff.: Display a graph indicating the color difference from the target color.

○Pseudo Color: Display a pseudocolor.

○Assessment: Display deviations in hue or other factors from the target color with specific words. With the CM-700d/600d, the words are in English.

The table below shows the words to be used.

Δa*/Δb*/Hue (h, a*, b*)		Lightness (L*)	Chroma (C*)
+ RED	- RED	LIGHTER	VIVID
+ GREEN	- GREEN	DARKER	DULLER
+ YELLOW	- YELLOW		
+ BLUE	- BLUE		

* When the L*C*h color space is selected, the color assessment is indicated in the + direction only.
* The saturation is displayed only when the L*C*h color space is selected.

Note

The results for "Difference", "Abs. & Diff." and "Graph Diff." will be displayed only when the target color has been specified.

3 **Press the [SAVE/SEL] button.**

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

Note

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

Color Space

Select the color space to be used.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Color Space" and then press the [SAVE/SEL] button.**

The <Color Space> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Settings

- ○L*a*b: L*a*b color space
- ○L*C*h: L*C*h color space
- ○Hunter Lab: Hunter Lab color space
- ○Yxy: Yxy color space
- ○XYZ: XYZ color space
- ○Munsell: Munsell color space

3 **Press the [SAVE/SEL] button.**

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

Note

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

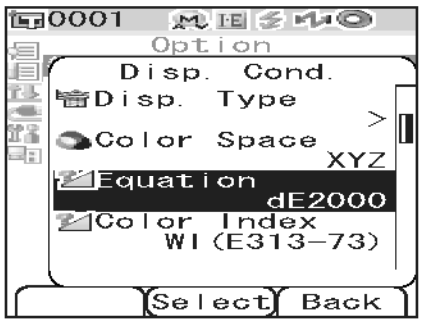
Equation

Select the color difference formula to be used.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Equation" and then press the [SAVE/SEL] button.**

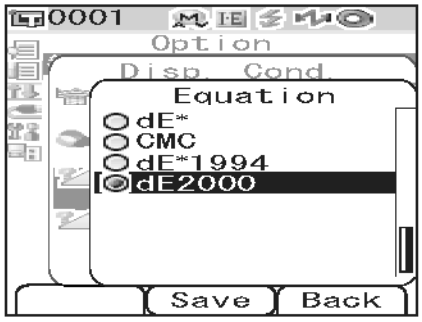
The <Equation> screen is displayed.



2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Settings

- ○dE*: ΔE*ab (CIE1976) color difference formula
- ○CMC: CMC color difference formula
- ○dE*1994: ΔE*94 (CIE1994) color difference formula
- ○dE2000: ΔE00 (CIE2000) color difference formula



3 **Press the [SAVE/SEL] button.**

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

Note

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

Color Index

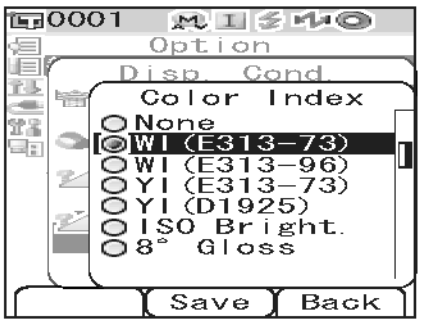
Select the index (WI, YI, etc.) to be used.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Color Index" and then press the [SAVE/SEL] button.**

The <Color Index> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**



Settings

- ○None
- ○WI (E313-73): Whiteness index (ASTM E313-73)
- ○WI (E313-96): Whiteness index (ASTM E313-96)
- ○YI (E313-73): Yellowness index (ASTM E313-73)
- ○YI (D1925): Yellowness index (ASTM D1925)
- ○ISO Bright.: ISO Brightness
- ○8° Gloss: The gloss value calculated with the specular reflection in the direction of 8°. This value can be used for relative management of glossiness.

Memo

8° Gloss will be displayed when "I+E" for specular component mode is selected.

3 **Press the [SAVE/SEL] button.**

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

Note

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

Observer

Select the observer angle: 2° or 10°.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Observer" and then press the [SAVE/SEL] button.**

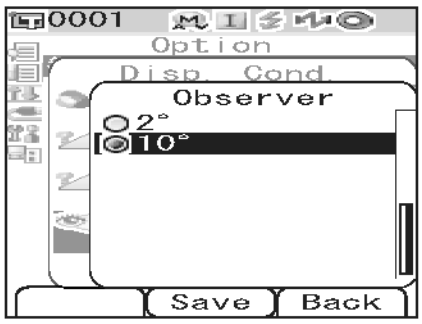
The <Observer> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Settings

○2°: 2° observer (CIE1931)

○10° : 10° observer (CIE1964)



3 **Press the [SAVE/SEL] button.**

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

Note

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

Illuminant 1

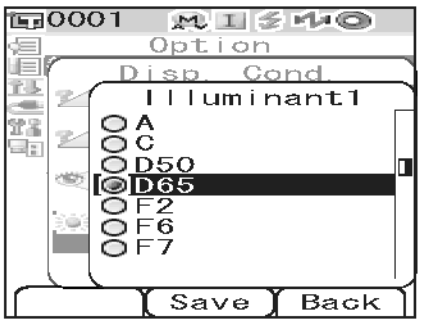
Select the illuminant used to measure colorimetric data.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Illuminant 1" and then press the [SAVE/SEL] button.**

The <Illuminant 1> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**



Settings

- ○A: Standard illuminant A (Incandescent lamp, Color temperature: 2856K)
- ○C: Illuminant C (Daylight, The relative value of the spectral distribution in the ultraviolet region is small; Color temperature: 6774K)
- ○D_{50}: Illuminant D_{50} (Daylight, Color temperature: 5003K)
- ○D_{65}: Standard illuminant D_{65} (Daylight, Color temperature: 6504K)
- ○F2: Cool white (fluorescent lamp)
- ○F6: Cool white (fluorescent lamp)
- ○F7: Color rendering A daylight white (fluorescent lamp)
- ○F8: Color rendering AAA natural white (fluorescent lamp)
- ○F10: 3-band type natural white (fluorescent lamp)
- ○F11: 3-band type cool white (fluorescent lamp)
- ○F12: 3-band type warm white (fluorescent lamp)

3 **Press the [SAVE/SEL] button.**

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

Note

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

Illuminant 2

Select the secondary illuminant used for MI (metamerism index) calculation, etc.

[Setting Procedure] Start the procedure from the <Disp. Cond.> screen.

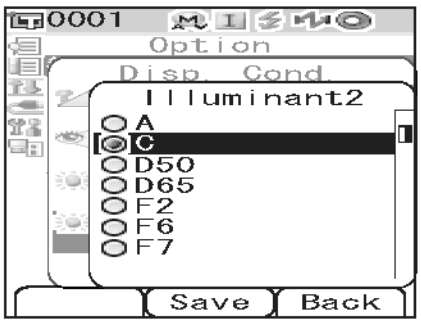
1 **Use the △ or ▽ button of the cross key to move the cursor to "Illuminant 2" and then press the [SAVE/SEL] button.**

The <Illuminant 2> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Settings

○The setting values are the same as those for "Illuminant 1" and "None".



3 **Press the [SAVE/SEL] button.**

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

Note

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

Setting the Measurement Conditions

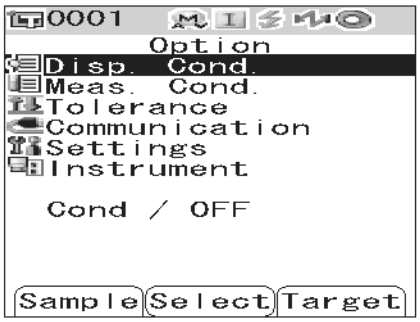
To set measurement conditions, select "Meas. Cond." from the <Option> screen.
You can select or specify the following four items as the measurement conditions:

- Mode: Select the specular component mode.
- 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.

[Setting Procedure]

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

The <Option> screen is displayed.

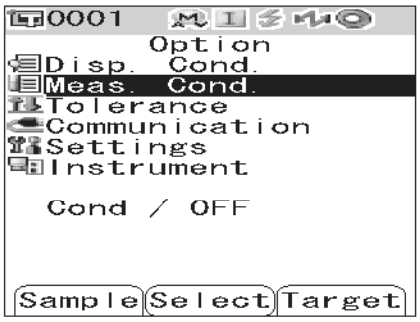


2 **Use the △ or ▽ button of the cross key to move the cursor to "Meas. Cond." and then press the [SAVE/SEL] button.**

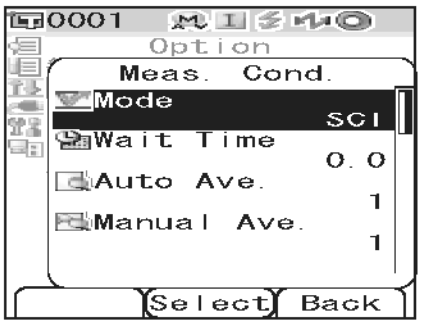
The <Meas. Cond.> screen is displayed.

Note

When setting of "Cond" is "ON" (refer to page E-56), "Disp. Cond" and "Meas. Cond" cannot be selected.



- The <Meas. Cond.> screen shows the current settings.



3 **After you set the measurement conditions, press the [TARGET] (Back) button to return to the <Option> screen.**

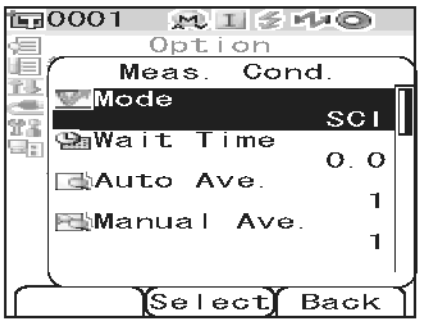
Mode

Select the specular component mode.

[Setting Procedure] Start the procedure from the <Meas. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Mode" and then press the [SAVE/SEL] button.**

The <Mode> screen is displayed.



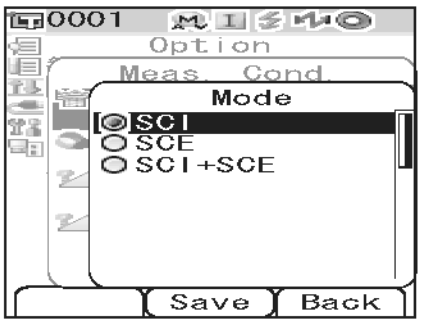
2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Settings

○SCI: Specular component included

○SCE: Specular component excluded

○SCI+SCE: Automatic SCI/SCE switching



3 **Press the [SAVE/SEL] button.**

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

Note

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

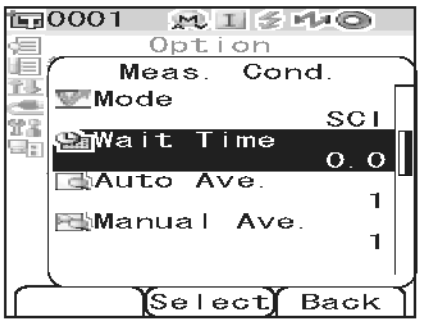
Wait Time

Specify the delay between the press of the measuring button and the flash of the lamp

[Setting Procedure] Start the procedure from the <Meas. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Wait Time" and then press the [SAVE/SEL] button.**

The <Wait Time> screen is displayed.

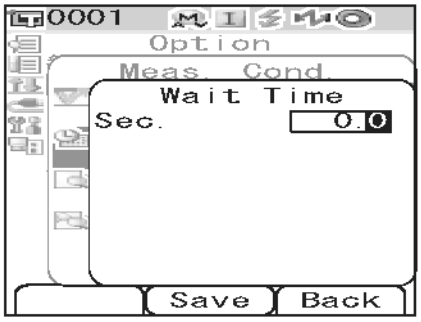


2 **Use the △ or ▽ button of the cross key to specify a value.**

- Use the ◁ or ▷ button of the cross key to move the cursor to the digit on the left or right.

Setting

○Sec. [0.0 to 3.0]:
To eliminate the influence of instrument shake, provide a period between the press of the measuring button and the flash of the lamp for measurement in increments of 0.1 seconds. When 0.0 seconds is specified, measurement starts immediately.



3 **Press the [SAVE/SEL] button.**

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

Note

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

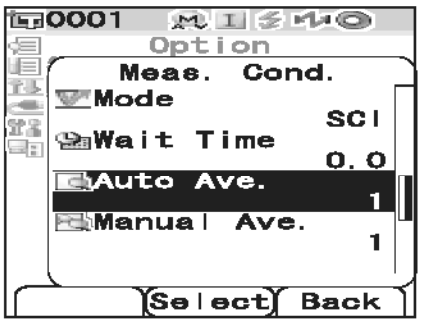
Auto Averaging (Auto Ave.)

Specify the number of measurements for auto averaging.

[Setting Procedure] Start the procedure from the <Meas. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Auto Ave." and then press the [SAVE/SEL] button.**

The <Auto Ave.> screen is displayed.

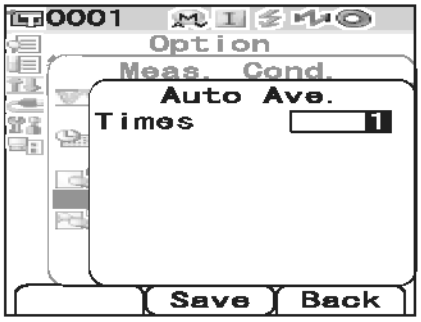


2 **Use the △ or ▽ button of the cross key to specify a value.**

- Use the ◁ or ▷ button of the cross key to move the cursor to the digit on the left or right.

Setting

○Times [1 to 10]:Specify the number of measurements, from 1 to 10, to perform when using auto averaging.



3 **Press the [SAVE/SEL] button.**

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

Note

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

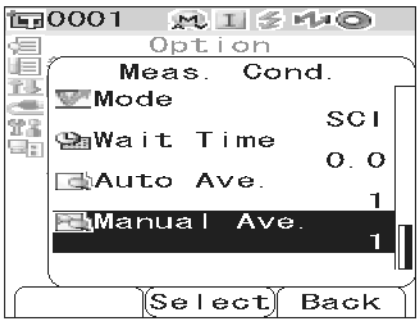
Manual Averaging (Manual Ave.)

Specify the number of measurements for manual averaging.

[Setting Procedure] Start the procedure from the <Meas. Cond.> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Manual Ave." and then press the [SAVE/SEL] button.**

The <Manual Ave.> screen is displayed.



2 **Use the △ or ▽ button of the cross key to specify a value.**

- Use the ◁ or ▷ button of the cross key to move the cursor to the digit on the left or right.

Setting

○Times [1 to 30]:Specify the number of measurements, from 1 to 30, to perform when using manual averaging.

3 **Press the [SAVE/SEL] button.**

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

Note

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

Color Difference Target Color Data Operation

Setting a Target Color

To measure the color difference between two specimens, the color of one of the specimens must be set as the target color. The CM-700d/600d can store up to 1,000 target colors.
When using the instrument alone, measure a target specimen by following the procedure below and set the result as the target color.

Memo

- Target colors are stored with setting numbers from 0001 to 1000 being assigned. Even when the data at some midpoint is deleted, these setting numbers do not change. It is useful to group data by assigning numbers of specific digits.
- The color difference tolerances used for pass/fail judgment are generally set for each target color. Consequently, you can set the tolerances using the menu of a target color.
- To set more accurate target color data, use averaging to measure the target specimen. For details, refer to "Average Measurement" on page E-88.

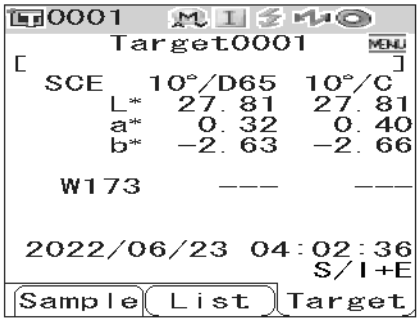
Note

- ***Be sure to perform white calibration before setting target colors.***
- ***To ensure measurement accuracy, make sure to keep ambient conditions (temperature, etc.) constant.***

[Setting Procedure]

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

The <Target> screen is displayed.

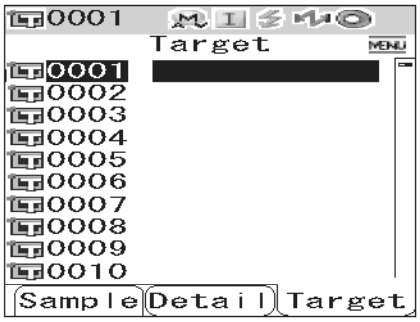


- Pressing the [SAVE/SEL] (List/Detail) button switches the screen between detail display and list display.

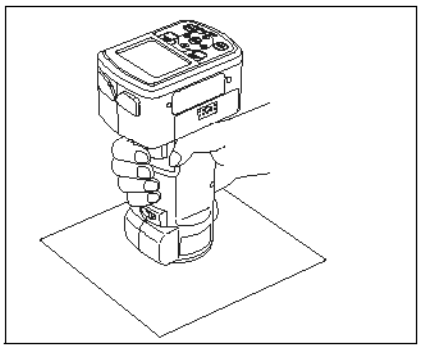
2 **Use the △ or ▽ button of the cross key to move the cursor to a desired target color No.**

Note

Unlike measured data, the numbers assigned to target color data do not change automatically. When you measure colors continuously to set target colors, you need to move the cursor manually to set each data.



3 **Place the specimen measuring port on the specimen.**

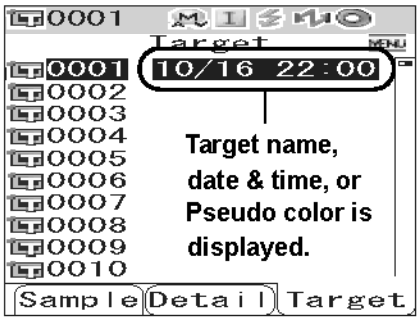


4 **Make sure that ⚡ (Ready to measure) is displayed or Ready lamp is green, and then press the measuring button.**

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

Note

If you selected a number to which target color data has already been set, a message is displayed to confirm overwriting.



5 **To set more target colors, repeat steps 2 to 4.**

Target Color Menu

The target color menu allows the following operations for target color data.

- Print: Print the target color data. This option can be selected only when a printer has been connected.
- Delete: Delete the target color data.
- Tolerance: Specify the tolerance (box tolerance) used for pass/fail judgment of measured data.
- Edit Name: Name the target color data.
- List: Specify the columns displayed for each target color No. in the list.
- Data Protect:
  Disable the deletion of the target color data. When Data Protect is specified, “Delete” and “DeleteAll” in the <Menu> screen cannot be selected.
- DeleteAll: Delete all the target color data except for protected data.

[Setting Procedure]

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

The <Menu> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the item to select or execute, and then press the [SAVE/SEL] button.**

The setting screen for the selected item is displayed.

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

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

Print

Print the target color data.
You need to establish a connection between the instrument and a Bluetooth printer in advance.

Note

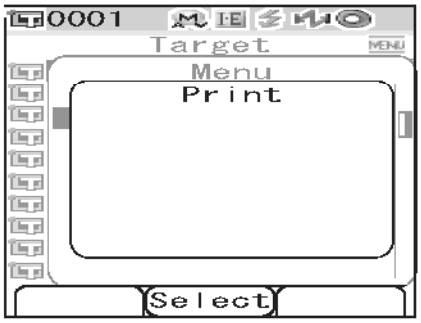
- ***If proper connection is not established, you cannot select "Print" on the <Menu> screen.***
- ***Even if the connection has been established, printing may fail for reasons such as, the printer is turned off when printing is attempted.***

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

1 **Use the △ or ▽ 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 <Target> screen.



Delete

Delete the target color data.

Note

When the data is protected, you cannot select "Delete" on the <Menu> screen.

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

1 **Use the △ or ▽ button of the cross key to move the cursor to "Delete" and then press the [SAVE/SEL] button.**

The <Delete> screen is displayed.

2 **Use the ◁ 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 <Target> screen.
- When you place the cursor on "Cancel" and press the [SAVE/SEL] button, the deletion is canceled and the screen returns to the <Target> screen.

Tolerance (Box Tolerance) Setting

Specify the tolerance (box tolerance) used for pass/fail judgment of measured data to each target color.

Memo

- Before you set tolerance to each target color, the default tolerance selected for the measurement is set (factory setting: No. 01). For details, refer to page E-59 "Setting the Default Color Difference Tolerance (Tolerance (Def.))".
- With the optional Color Data Software "SpectraMagic™ NX", you can set or use the color difference tolerance easily.

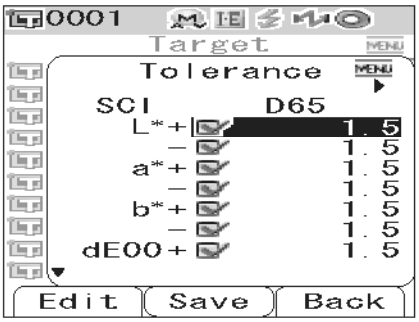
Note

The items which can be set as tolerance settings are the items for the currently selected default tolerance registration number (initial setting at time of shipment: registration 01). Even if the display conditions (such as color space or color difference equation, index, etc.) are changed, the tolerance setting items will not be changed. If it is desired to change the tolerance setting items, after changing the display conditions, it is necessary to create new tolerance settings in the Tolerance (Def.) screen.

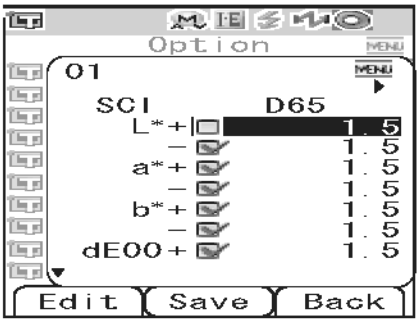
[Setting Procedure] Start the procedure from the <Menu> screen of the <Target> screen.

1 **Use the △ or ▽ button of the cross key to move the cursor to "Tolerance" and then press the [SAVE/SEL] button.**

The <Tolerance> screen is displayed.

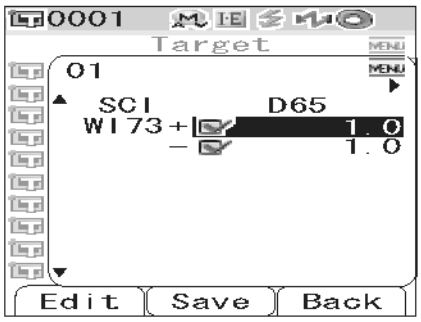


2 Use the △ or ▽ button of the cross key to move the cursor to the desired item.

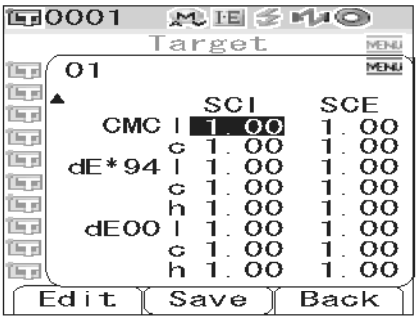


Memo

- If ◀/▶ is displayed at the top of the screen, you can use the ◁ or ▷ button of the cross key to change the combination of the specular component mode and illuminant used for the screen display.
- If ▲/▼ is displayed on the left side/end of the screen, you can use the △ or ▽ button of the cross key to scroll the display screen upward or downward.



3 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 △ or ▽ 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 the △ or ▽ button of the cross key to change the value.
- To set each parameter l, c and h for CMC, ΔE*94 and ΔE00, place the cursor on the item and press the [SAMPLE] (Edit) button, and the cursor moves to the value of the item. Press the △ or ▽ button of the cross key to change the value.

Memo

You can move the cursor between the digits of the value by pressing the ◁ or ▷ button of the cross key.

Settings

○±0.0 to 20.0

* Settings of each parameter l, c and h for CMC, ΔE*94 and ΔE00 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.

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

The settings are confirmed and the screen returns to the <Target> screen.

Note

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

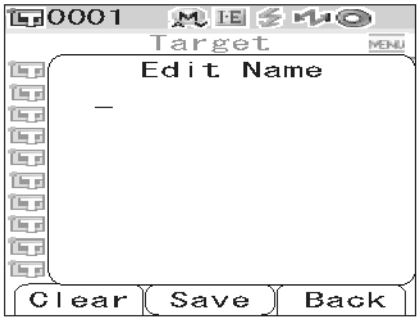
Edit Name

Name the target color data.

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

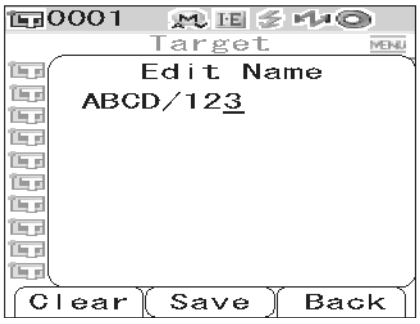
1 **Use the △ or ▽ button of the cross key to move the cursor to "Edit Name" and then press the [SAVE/SEL] button.**

The <Edit Name> screen is displayed.



2 **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

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

3 **When you have entered the name, press the [SAVE/SEL] button.**

The screen returns to the <Target> screen.

Setting the List (List)

Specify the column displayed for each target color No. in the list.

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

1 **Use the △ or ▽ 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 △ or ▽ 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 settings are confirmed and the screen returns to the <Target> screen.

Note

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

Data Protection

You can specify data protection so that the saved target color setting will not be deleted by accident. When the data protection is specified, "Delete" and "DeleteAll" in the <Menu> screen cannot be selected.

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

1 **Use the △ or ▽ button of the cross key to move the cursor to "Data Protect" and then press the [SAVE/SEL] button.**

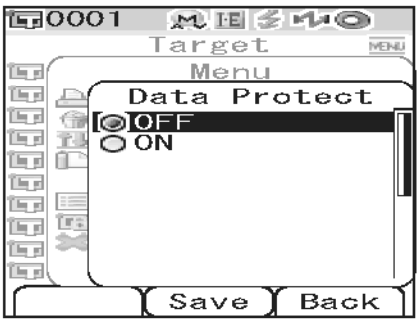
The <Data Protect> screen is displayed.

2 **Use the △ or ▽ button of the cross key to move the cursor to the desired item.**

Settings

○ON: Protect the data.

○OFF: Do not protect the data.



3 **Press the [SAVE/SEL] button.**

The settings are confirmed and the screen returns to the <Target> screen.

Note

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

Delete All

Delete all the target color data which have been set.

Note

When the data is protected, you cannot select "DeleteAll" on the <Menu> screen.

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

1 **Use the △ or ▽ 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 ◁ button of the cross key to move the cursor to "OK" and press the [SAVE/SEL] button, and all of the data is deleted.**

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

Registering Conditions (Cond)

The CM-700d/600d allows registration of up to 8 conditions (display and measurement conditions) in advance.
You can display measurement results under desired conditions by switching registered conditions stored as "Cond 01 to 08".

Note

When "Cond" is ON (When one of Cond 01 to 08 is selected), you cannot set the display and measurement conditions with the <Option> screen.

Memo

To register conditions, select one of Cond 01 to 08 before setting details. When Cond is OFF (normal condition setting), the settings are not saved.

[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 "Disp. Cond" and then press the [SAVE/SEL] button.**

The <Cond> screen is displayed.