Illuminance Spectrophotometer
CL-500A

Instruction Manual

⚠ Please read before
using the instrument.

KONICA MINOLTA

BC

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.
Always disconnect the AC adapter from the AC outlet.

This symbol indicates A.C.

This symbol indicates D.C.

Notes on this Manual

- Copying or reproduction of all or part of the contents of this manual without the permission of KONICA MINOLTA 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-authorized service facility.
- KONICA MINOLTA will not accept any responsibility for consequences arising from the use of the instrument.

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.

Firmly push the power plug completely into the outlet. If the power plug is not pushed completely in, it may cause a fire or electric shock.

In the event that the battery leaks, take the following actions.

- Immediately move the instrument away from any open flames. There is a risk of fire or explosion from the leaked fluid or gas igniting.
- If the leaked fluid gets in the eyes, immediately and thoroughly wash the eyes with clean water, such as tap water, without rubbing them and then seek medical attention.
- Do not taste the leaked fluid or put it in your mouth. In such a case, immediately wash the mouth with tap water and consult a physician.
- If the leaked fluid is on the body or clothes, thoroughly wash it off with water.

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 cause a fire. In such situations, turn the power OFF immediately, disconnect the AC adapter from the AC outlet and contact the nearest KONICA MINOLTA-authorized service facility.

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 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.

Do not disassemble or modify the instrument or the AC adapter. Doing so may cause a fire or electric shock.

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, and contact the nearest KONICA MINOLTA-authorized service facility.

Do not insert or disconnect the AC adapter with wet hands. Doing so may cause electric shock.

⚠ CAUTION	(Failure to adhere to the following points may result in injury or damage to the instrument or other property.)
 Setup the environment so there is an outlet near the instrument and the power plug can be easily plugged in and unplugged.	 When cleaning the instrument, unplug the power plug from the outlet. Not doing so may cause electric shock.

Introduction

Thank you for purchasing this KONICA MINOLTA instrument.
This instrument is a compact, lightweight, portable illuminance spectrophotometer ideal for evaluating CRI (color rendering index).

Packing materials of the product
Be sure to keep all packing materials used for shipping the product (cardboard box, cushioning material, plastic bags, etc.).
This instrument 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-authorized service facility.

Notes on Use

Always use the instrument correctly. If the instrument is used in a manner not described in this instruction manual, it may cause injury, electrocution, or damage to the instrument itself.

Operating Environment

- Use the instrument at an ambient temperature between -10°C and 40°C and maximum relative humidity 85% for temperatures up to 35°C decreasing linearly to 66% relative humidity at 40°C with no condensation. Be sure to use the instrument within these ranges. Do not use it in areas of rapid temperature changes.
- Do not leave the instrument in direct sunlight or near heat sources 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 instrument 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 instrument near equipment which produces a strong magnetic field (such as speakers etc.).
- This instrument complies with Electrical equipment for measurement, control and laboratory use - EMC(Electromagnetic Compatibility) requirements - Part 1: General requirements (EU Harmonized Standards EN 61326-1:2021). Conformity verification is performed under KONICA MINOLTA's test conditions in an INDUSTRIAL ELECTROMAGNETIC ENVIRONMENT specified in the relevant harmonized standards. The limit of performance degradation when subjected to continuous disturbance during immunity testing is up to 4 times KONICA MINOLTA's repeatability specifications (Ev).
- The instrument 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 instrument at altitudes higher than 2,000 m.
- 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 not using the instrument for a long period of time, blow off dirt or dust on the Receptor Window with a blower before use.
- The spherical summit of the receptor window is used as the illuminance reference plane.
- When using the instrument for long periods of time, the measurement value may change depending on changes in the environment. Therefore, in order to achieve accurate measurements, we recommend that zero calibration be done regularly using the Cap.

Power Source

- When the instrument is not being used, turn the power switch OFF.
- Charge the instrument using the AC adapter or from a PC via the USB cable.
- Always use the AC adapter supplied as a standard accessory 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 instrument to strong impacts or vibrations. Doing so may cause deterioration in performance or a breakdown.
- Since the receptor window is an extremely precise optical component, great care should be taken to prevent it from getting dirty or exposing it to impacts. Be sure to attach the cap when the instrument is not in use.
- The instrument 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.

Internal Lithium-Ion Battery

- The operating time per charge with the internal lithium-ion battery is 6 hours. (When new, fully charged)
- When purchased, the battery is not charged. Refer to page E-14 “Connecting the AC Adapter” and charge it correctly.
- Charge the battery at a temperature from 5°C to 35°C.
- The internal lithium-ion battery is fully charged in about 3.6 hours. There is no worry about overcharging the battery.

Notes

- Do not try to replace the internal lithium-ion battery yourself. Contact a KONICA MINOLTA-authorized service facility.

Notes on Storage

- The instrument should be stored at a temperature between -10°C and 45°C and a relative humidity of 85% or less (at 35°C) with no condensation. Do not store the instrument in areas subject to high temperatures, high humidity, sudden changes in temperature, or where condensation may occur, because these circumstances may cause a breakdown. We recommended you store the instrument with a drying agent at a temperature around 20°C.
- Do not leave the instrument 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 instrument. This protects the instrument from sudden changes in temperature and from vibration and shock.
- Do not store the instrument in areas where dust, cigarette smoke, or chemical gases are present. Doing so may cause deterioration in performance or a breakdown.
- 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.).
- When not using the instrument for a long period of time, we recommend you give the instrument an auxiliary charge every year to protect the battery from overdischarge.

Notes on Cleaning

- When the instrument is dirty, wipe it with a soft, clean dry cloth. Never use solvents such as thinner or benzene.
- If there is dust or dirt on it, use a blower to blow it off or gently wipe it with a soft, clean dry cloth. Never use solvents such as thinner or benzene. If you are unable to remove dirt from the instrument or should the instrument become scratched, contact a KONICA MINOLTA-authorized service facility.
- Should the instrument break down, do not try to disassemble and repair it by yourself. Contact a KONICA MINOLTA-authorized service facility.

Disposal Method

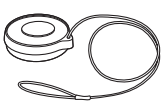
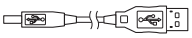
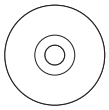
- Make sure that the instrument, its accessories, and the packing materials are either disposed of or recycled correctly in accordance with local laws and regulations.

Table of Contents

Before Using the Instrument

1

Standard Accessories

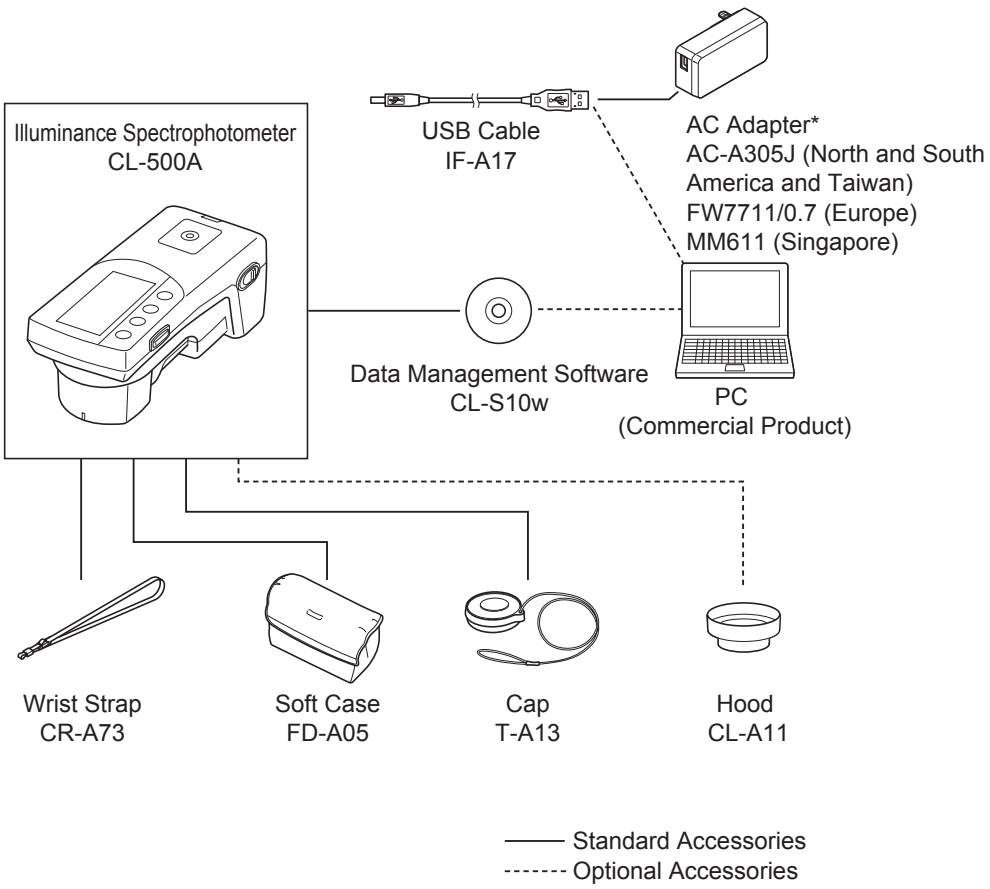
Name		Description
Cap (with Strap) T-A13		Attaches to the receptor window when performing zero calibration. Also attached to protect the receptor window during storage.
Wrist Strap CR-A73		Prevents accidental dropping of the instrument.
AC Adapter* AC-A305J (North and South America and Taiwan) FW7711/0.7 (Europe) MM611 (Singapore)		Used to supply power from an AC outlet to the instrument. (North and South America and Taiwan) Input: 100-240 V ∿ 50/60 Hz 0.15 A Output: 5 V ⎓ 1 A (Europe) Input: 100-240 V ∿ 50-60 Hz 100 mA Output: 5 V ⎓ 700 mA (Singapore) Input: 100-240 V ∿ 50-60 Hz Output: 5.2 V ⎓ 500 mA
USB Cable IF-A17		Used to connect the instrument to a personal computer (PC). When using AC Adapter, power can be supplied through the cable.
Soft Case FD-A05		Used to store the instrument together with accessories.
Data Management Software CL-S10w		Software that can operate the instrument from a PC, perform measurements and data processing, and file management.

* Form differs according to region.

Optional Accessories

Name	Description
Hood CL-A11	Used to suppress the effects of outdoor light when measuring chromaticity, color temperature, and other values.

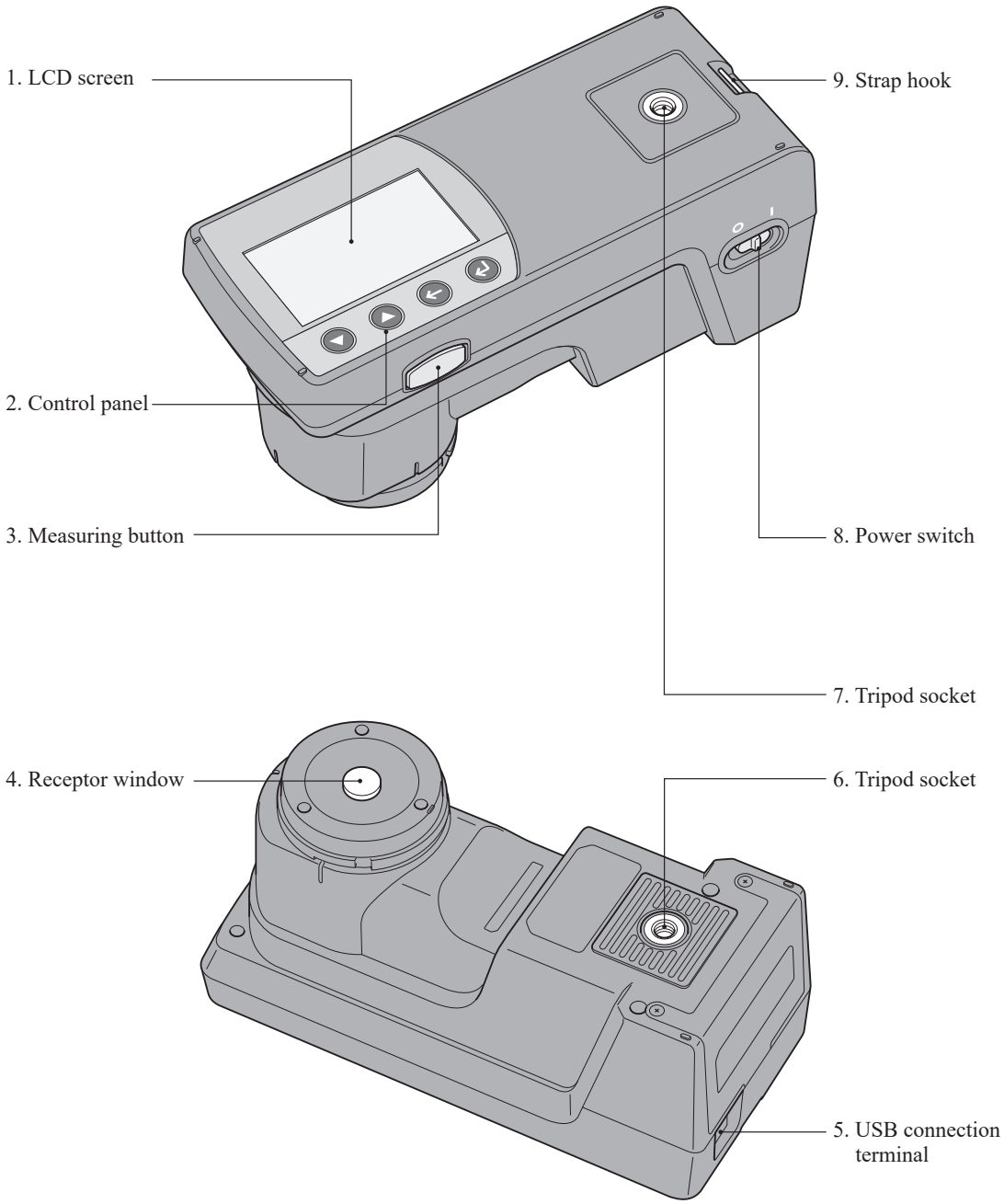
System Diagram



* Form differs according to region.

Names and Functions of Parts

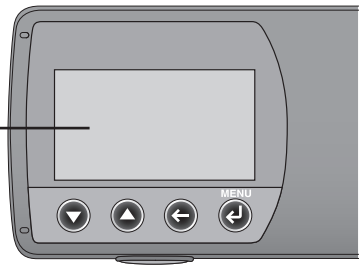
Name	Function	Reference Page
1. LCD screen	Displays setting items, measurement results, and messages. For details, refer to “Control Panel”.	Page E-12
2. Control panel	Used to switch screens or select/determine/save setting items.	Page E-12
3. Measuring button	Press this button to perform calibration or measurement.	Page E-21, E-36
4. Receptor window	Receptor for illuminance measurement.	
5. USB connection terminal	Used to connect the instrument to a PC with the optional USB cable.	Page E-54
	When using AC Adapter, power can be supplied through the USB cable.	Page E-14
6,7. Tripod socket	Used to set this instrument on tripod or jig.	
8. Power switch	Used to turn ON/OFF power. Setting this switch to “○” turns the power OFF, and setting it to “▌” turns the power ON.	Page E-16
9. Strap hook	For attachment of the wrist strap (CR-A73).	Page E-13


1. LCD screen
2. Control panel
3. Measuring button
9. Strap hook
8. Power switch
7. Tripod socket
4. Receptor window
6. Tripod socket
5. USB connection terminal

Control Panel/Screen Display (LCD Screen)

☐ Control Panel

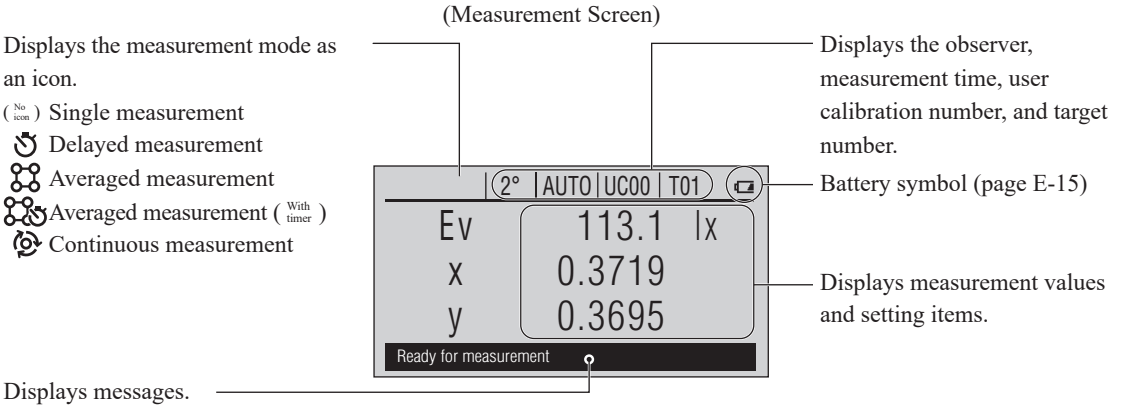
Located on the upper surface of the instrument is the LCD screen for displaying measurement results with the instrument and messages, and the control buttons for configuring the various settings for measurements and switching the display.



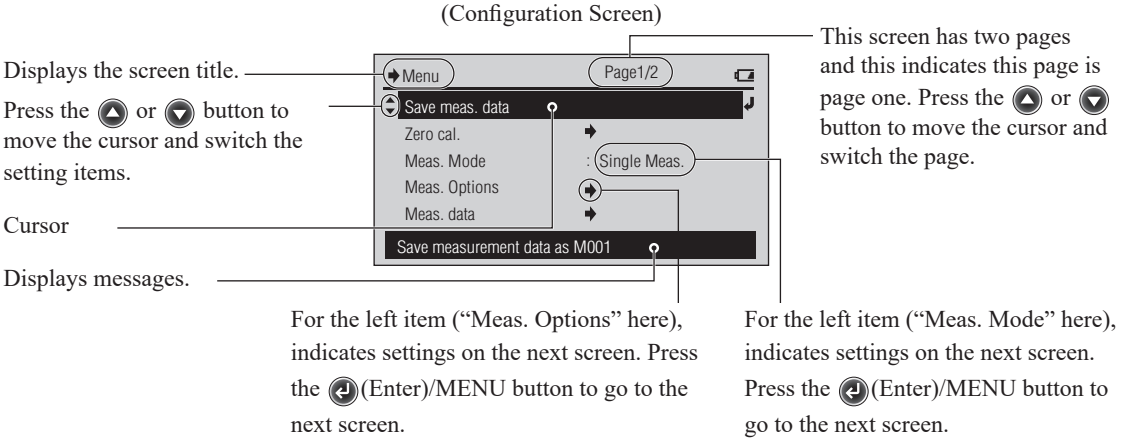
☐ Screen Display (LCD Screen)

The LCD screen displays setting items, measurement results, and messages. The basic screen configuration is shown in the figures below.

(Measurement Screen)



(Configuration Screen)



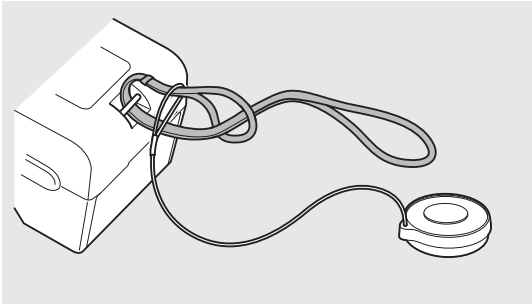
Memo You can flip the display on the LCD screen vertically. (Page E-58)

Attaching the Wrist strap and the Cap

Attaching the Wrist strap and the Cap

If you are using the wrist strap, attach the cap to the strap as shown below.

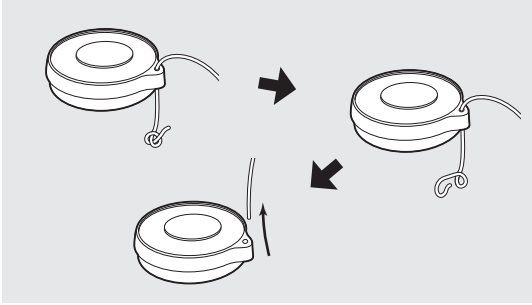
1 **Pass the wrist strap through loop of the cap string and then through the strap hook, and then pass one end of the wrist strap through the other.**



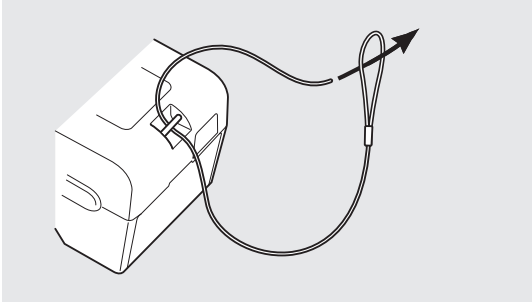
Attaching the Cap (Without the Strap)

If you are using the wrist strap, attach the cap to the main body as follows.

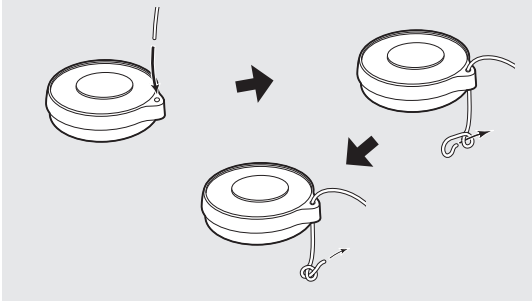
1 **Untie the knot holding the cap string to the cap, and remove the string from the cap.**



2 **Attach the string to the strap hook as shown in the illustration.**



3 **Pass the string back through the hole in the cap, and tie a knot at the end of the string so that the cap cannot come off.**



Connecting the AC Adapter

This instrument runs on its internal lithium-ion battery, but we recommended using the AC adapter or USB bus power when using the instrument for a long period of time.
The internal lithium-ion battery is charged by the AC adapter or USB bus power.

Notes
- Always use the included AC adapter as the instrument's AC adapter.

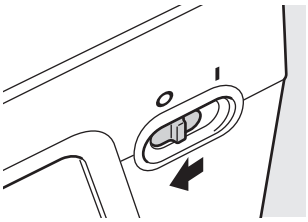
Memo
- The AC adapter connects via the USB cable (IF-A17).
- USB bus power is a way to supply power from a PC through the USB cable.

Attaching the AC Adapter

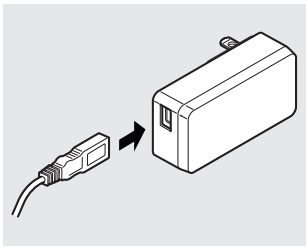
[Operating Procedure]

The AC adapter can be plugged in or unplugged even when the instrument's power is ON, but here it is connected with the power turned OFF.

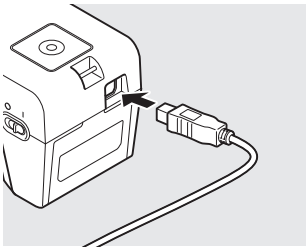
1 Make sure that the power is OFF (Power switch is set to "○").



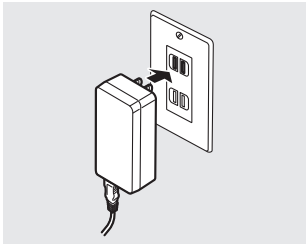
2 Plug the USB cable's connector (A type) into the AC adapter.



3 Connect the USB cable's connector (B type) to the USB connection terminal.

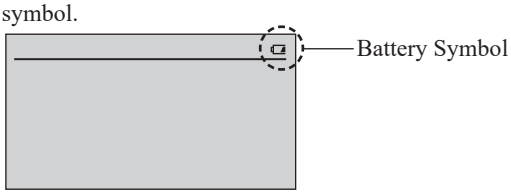


4 Insert the AC adapter power plug to an AC outlet.



Battery Warning

When the battery's capacity runs out when running on the internal lithium-ion battery, the battery symbol on the LCD screen changes to the low battery symbol.



Battery Symbol	State	Description	Comment
	Charging	When charging via the AC adapter or USB bus power, the battery charging symbol is displayed as the battery symbol. Memo • It is not displayed when the power switch is turned OFF, but the internal lithium-ion battery is still charging. There is no worry about overcharging the battery. • When charging the battery, turn the power switch ON, and check that the battery symbol on the LCD screen changes to the charging symbol.	With the power switch turned OFF, the battery can be fully charged in about 3.6 hours.
	Low battery	Even when this symbol is displayed, you can still continue measurements for a while, but we recommend you soon charge the internal lithium-ion battery via the AC adapter or USB bus power.	You can measure about 2 hours after this symbol is displayed.
	Dead battery	The battery is dead. Use the AC adapter or USB bus power to charge the internal lithium-ion battery.	You can measure about 15 minutes after this symbol is displayed.
(No indicator displayed)	Full battery	The internal lithium-ion battery has sufficient power during battery operation.	You can measure about 6 hours with a new, fully charged battery.

When the Low Battery Voltage Message is Displayed

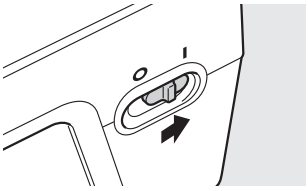
If you continue using the instrument with the low battery symbol displayed, the low battery voltage message is displayed and the instrument automatically turns off after a few seconds.
Please use the AC adapter or USB bus power immediately. This will charge the internal lithium-ion battery. When battery voltage is low, the instrument may not start up immediately after the AC adapter is connected. In this case, allow the battery to charge for a few minutes and then turn on the instrument.

Turning Power ON/OFF

[Operating Procedure]

Turning power ON

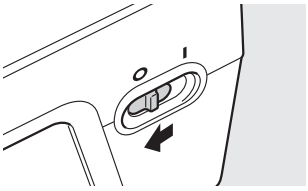
1 Slide the Power switch to the "▌" side.



The power is ON.

Turning power OFF

1 Slide the Power switch to the "○" side.



After settings such as the measurement conditions are saved to the instrument, the power turns OFF.

▌Auto Power Off Feature

This instrument is equipped with an auto power off feature. When running the instrument on its built-in lithium-ion battery without AC adapter or USB bus power, auto power off automatically turns power OFF if no control button operation is performed for more than15 minutes.

The settings such as the measurement conditions are saved when the power is turned OFF, so the next time the power is turned ON, you can start operating the instrument with the same settings as when last turned OFF.

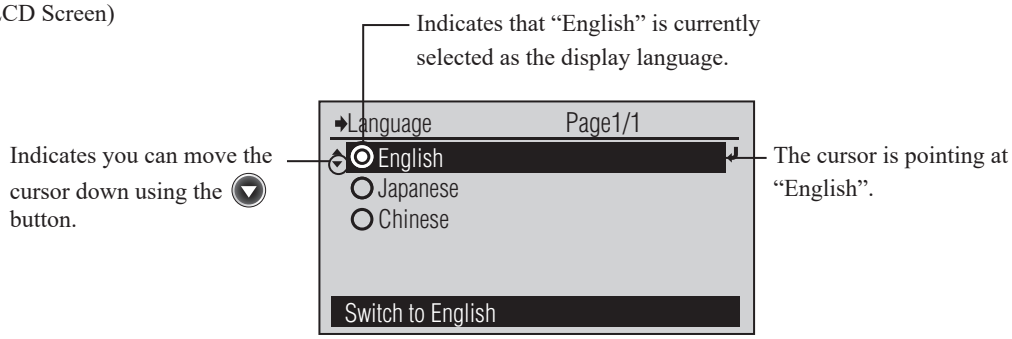
Memo

- When the power is turned OFF with the auto power off feature, the power switch is left on the "▌" side. Slide it to the "○" side.
- You also can configure the instrument to disable Auto Power Off. (Page E-61)

When First Turning ON the CL-500A

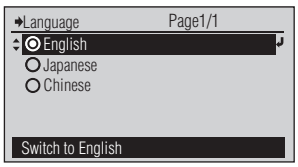
The first time you turn ON the instrument after purchase, the <Language> and <Date/Time> screens will appear in English.
You can select and change the display language from a total of three languages including English.

(LCD Screen)



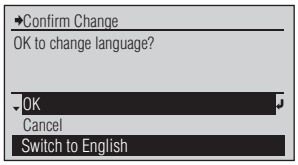
[Operating Procedure]

1 **Move the cursor to the language you wish to select with the or button, then press the (Enter)/MENU button.**

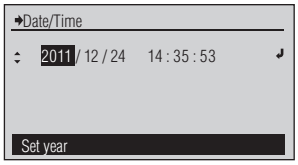


The <Confirm Change> screen is displayed.

2 **Move the cursor to "OK" with the button, then press the (Enter)/MENU button.**

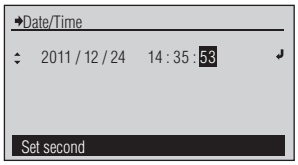


3 **Move the cursor to "Date/Time" with the or button and press the (Enter)/MENU button.**



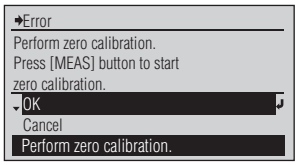
The <Date/Time> configuration screen is displayed.

4 **Set the year/month/day/hour/minute/second. Press the button to increase the selected value or the button to decrease it. Holding down either button will change the selected value at high speed. Press the (Enter)/MENU button for each value to apply its setting.**



This applies the changes you made to the setting and moves the cursor to the next value to the right.

Memo
Note that you cannot move the cursor to the left during the setting procedure.



After the initial screen, the calibration prompt screen is displayed. Select "OK" to run calibration or select "Cancel" and you can skip calibration.

Preparation for Measurement

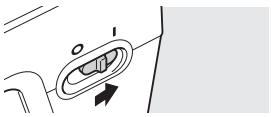
2

Flow of Measurement

Basic procedure

Optional settings

Power ON (page E-16)



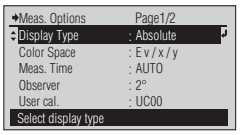
Zero Calibration (page E-21)

Configure the Display Language and Date/Time (page E-17, E-56)
* As necessary, such as when the power is first turned ON

Configure the Measuring Instrument (page E-17, E-56)
* As necessary, such as when the power is first turned ON

Setting the Measurement Modes (page E-22)
* As necessary, such as when changing the measurement mode from what was used previously

Configure the Measurement Conditions (page E-24)
* As necessary, such as when changing the measurement conditions from the previous time



("Display Type" Options Screen Example)

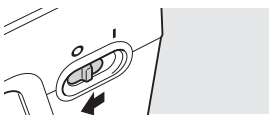
Select the User Calibration Channel (page E-33)
* As required when changing the user calibration channel from what was used previously, etc.

Select the Target (page E-43)
* As required during difference measurement when changing the target from what was used previously.

Measurement (page E-36)

Data Saving (page E-36, E-49)

Completion of Measurement (page E-16)



Zero Calibration

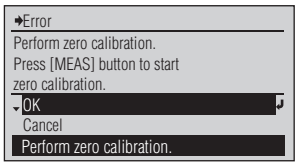
This instrument must perform zero calibration after it is first turned ON or after a fixed amount of time has elapsed from the last zero calibration.

Memo
- The reading may fluctuate slightly due to changes in the ambient temperature or due to heat generation caused by the repeated operation of the instrument. In this case, make sure to perform zero calibration regularly.
- If the ambient temperature changes greatly, the calibration prompt screen may be displayed. In this case, make sure to perform zero calibration.
- Frequent short zero calibration is recommended for better accuracy when measuring low illuminance.
- When a fixed amount of time elapses from the last zero calibration, the calibration prompt screen is displayed. This calibration expiry can be changed. You also can disable display of the calibration prompt screen. Refer to page E-62 “Configuring the Zero Calibration Expiry”.

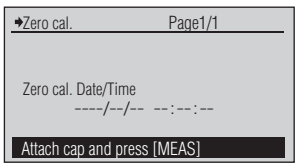
Notes
- Allow the instrument to become fully accustomed to the ambient temperature before performing zero calibration.

[Operating Procedure]

1 When the calibration prompt screen is displayed, select “OK”. (Move the cursor to “OK” with the ▲ button and press the ↵(Enter)/MENU button.)

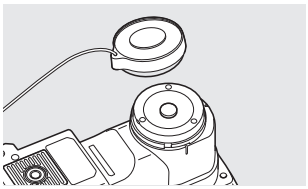


To run calibration when a screen other than the calibration prompt screen is displayed, run it from the <Menu> screen. Refer to page E-24.

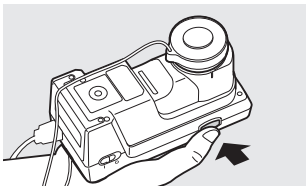


The <Zero cal.> screen is displayed.

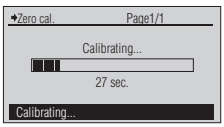
2 Correctly set the cap to the Receptor Window of the instrument.



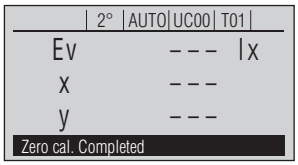
3 Push the Measuring button.



You will hear a beep and see “Calibrating...” displayed.



4 You will hear another beep. When “Calibrating...” no longer displays, zero calibration is complete.



A measurement screen is displayed. Or you return to the <Menu> screen.

Setting the Measurement Modes

You must configure the measurement mode on the instrument before performing measurements, but the instrument is set to the normal “single measurement” mode in its initial settings, making it possible to measure as-is.

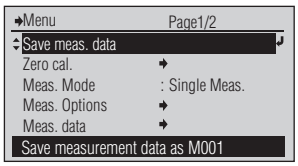
Use the <Meas. Mode> screen, which is accessed from the <Menu> screen, to set the measurement mode.
Move to the <Meas. Mode> screen with the procedure below.

As necessary

Change settings.

[Operating Procedure]

1 **While the measurement screen is displayed, press the (Enter)/MENU button.**

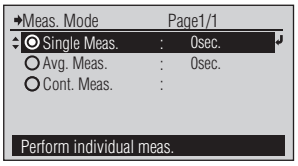


The <Menu> screen is displayed.

Memo

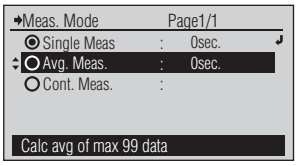
You can use the <Menu> screen to configure settings for measurement data storage, zero calibration, and various measurement options.

2 **Move the cursor to “Meas. Mode” with the or button and press the (Enter)/MENU button.**



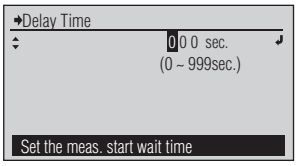
The <Meas. Mode> screen is displayed.

3 **Move the cursor to the item you wish to select with the or button.**



Select the setting.

4 **Press the (Enter)/MENU button.**



If you select “Single Meas.” or “Avg. Meas.”, the <Delay Time> screen is displayed.

If you select “Cont. Meas.”, the setting is confirmed and you return to the <Menu> screen.

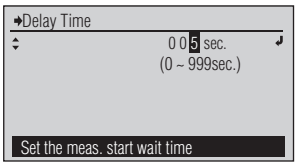
Notes

If you press without pressing , you return to the previous screen without changing the delay time setting.

5 **Set the delay time.**

Press the ▲ button to increase the selected value or the ▼ button to decrease it. Holding down either button will change the selected value at high speed.

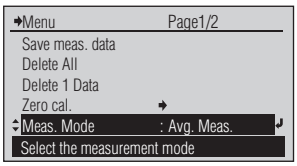
Press the ↵ (Enter)/MENU button for each digit to apply its setting.



This applies the changes you made to the digit and moves the cursor to the next value to the right.

Memo
Note that you cannot move the cursor to the left during the setting procedure.

6 **While the cursor is located at the rightmost digit, press the ↵ (Enter)/MENU button.**



Your setting is applied and the display returns to the <Menu> screen.

Memo
If you selected “Avg. Meas.”, “Delete All” and “Delete 1 Data” will be added to the menu.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the delay time setting.

Setting (◉ is the initial setting)

◉	**Single Meas.**	Each time the Measuring button is pressed, a single measurement will be performed. You can perform timer measurement by setting the delay time. After you press the Measuring button, the measurement is performed after the set delay time elapses.
	Averaged Meas.	You can use this measurement mode to display the average value from multiple measurements. All the measured data acquired while the power is ON and the measurement mode is set to “Avg. Meas.” is averaged. You can perform timer measurement by setting the delay time. After you press the Measuring button, the measurement is performed after the set delay time elapses.
	Cont. Meas.	After you press the Measuring button, measurements are repeated automatically until you press the Measuring button again.

Memo For examples of the measurement condition screen in accordance with the items selected for the measurement mode, see page E-37.

Setting the Measurement Conditions

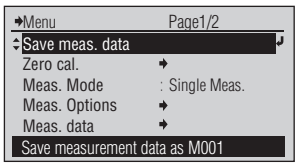
You must configure measurement conditions on the instrument before performing measurements, but each item has been configured with an initial setting, making it possible to measure as-is.

Use the <Meas. Options> screen, which are accessed from the <Menu> screen, to configure measurement option settings.
Move to the <Meas. Options> screen with the procedure below.

As necessary
Change settings.

[Operating Procedure]

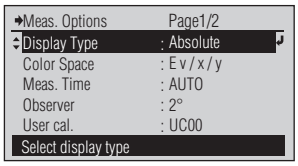
1 **While the measurement screen is displayed, press the (Enter)/MENU button.**



The <Menu> screen is displayed.

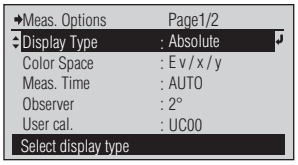
Memo
You can use the <Menu> screen to configure settings for measurement data storage, zero calibration, and various measurement options.

2 **Move the cursor to "Meas. Options" with the or button and press the (Enter)/MENU button.**



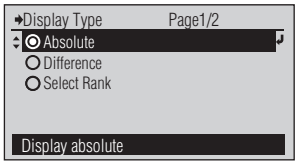
The <Meas. Options> screen is displayed.

Display Type



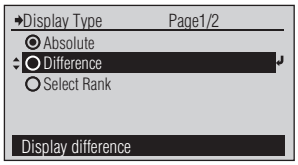
[Operating Procedure]

1 **On the <Meas. Options> screen, move the cursor to "Display Type" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



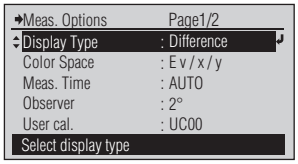
The <Display Type> screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

3 **Press the ↵ (Enter)/MENU button.**



The selected content is confirmed and you return to the previous screen.

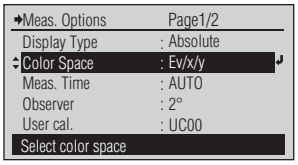
Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**Absolute**	Displays the absolute value for the colorimetric value without using the target color.
○	**Difference**	Displays the density difference for the target color.
○	**Select Rank**	Displays a screen that ranks the chromaticity value within one of five fluorescent lamp classifications as defined by JIS Z 9221. • D (Daylight) • N (Natural) • W (White) • WW (Warm White) • L (Incandescent) "----------" (outside of ranks) is displayed when the chromaticity value is not within any of the ranks (chromaticity ranges). (Note, however, that the ranking result is not displayed when "CRI" or "Spectral" is selected for "Color Space". **Memo** You can use the CL-S10w data management software that comes with the instrument to modify the classification rank (chromaticity range) settings and the display names.

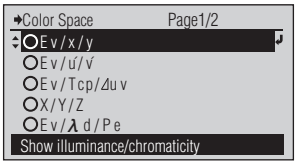
Memo For examples of the measurement condition screen in accordance with the items selected for the display type, see page E-37.

Color Space



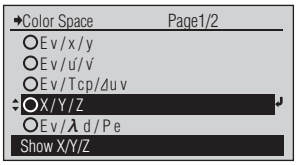
[Operating Procedure]

1 **On the <Meas. Options> screen, move the cursor to "Color Space" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



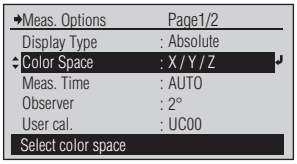
The <Color Space> screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

3 **Press the ↵ (Enter)/MENU button.**



The selected content is confirmed and you return to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**Ev/x/y**	Illuminance Ev[*1], xy chromaticity
○	**Ev/u'/v'**	Illuminance Ev[*1], u'v' chromaticity (CIE 1976 UCS Chromaticity Diagram)
○	**Ev/Tcp/Δuv**	Illuminance Ev[*1], correlated color temperature Tcp, color difference Δuv from black body locus
○	**X/Y/Z**	Tristimulus values X, Y, Z
○	**Ev/λd/Pe**	Illuminance Ev[*1], dominant wavelength λ d, excitation purity Pe[*2]
○	**CRI**	Ra, R1-R15
○	**Spectral**	Spectral irradiance graph, peak wavelength
○	**Custom**	Displays user-specified chromaticity values in measurement display items 1 through 4. In addition to the color space described above, you can select the scotopic lux, S/P ratio, and spectral irradiance[*3].

*1 Ev (Y of 2° field view) is displayed even when the observer is 10°.

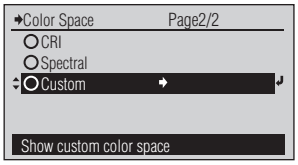
*2 The complementary wavelength value is displayed as a negative value when the "Display Type" setting is "Absolute" and the measured value is a non-spectral color.
In this case, the symbol remains λc.
When the "Display Type" setting is "Difference", the difference between the measured value and the target is displayed, even if either the measured value and target or both of them are a complementary wavelength. In this case, the symbol is Δλ d when the target is a spectral color, regardless of its relationship with the measured value, and Δλ c when the target is a non-spectral color.

*3 The value whose unit is $W/m^2/nm$ is displayed.

* "---" is displayed when the calculated value is a combination that is rejected in the color space.

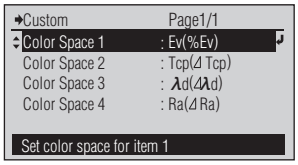
Memo For examples of the measurement condition screen in accordance with the items selected for the color space, see page E-37.

☐ Custom



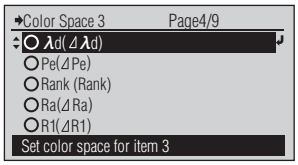
[Operating Procedure]

1 **On the <Color Space> screen, move the cursor to "Custom" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



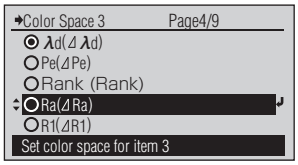
The <Custom> screen is displayed. Symbols in parentheses show what is displayed when the "Display Type" setting is "Difference".

2 **Move the cursor to the item that you want to change such as "Color Space 3" with the ▲ or ▲ button and press the ↵ Enter)/MENU button.**

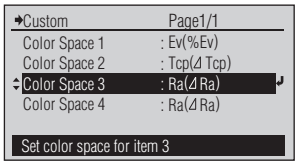


Color Space 1:
Color space shown in item 1 of the measurement screen.
〜
Color Space 4:
Color space shown in item 4 of the measurement screen.

3 **Move the cursor to the item you wish to select with the ▲ and ▼ button.**



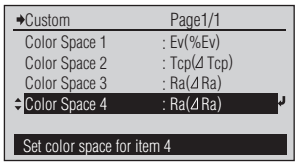
4 **Press the ↵ (Enter)/MENU button.**



If you selected an item other than spectral irradiance Ee, the selected content is confirmed and you return to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

5 **Repeat steps 3 and 4 as required to configure settings for other items, and then press the ← button when you are done.**

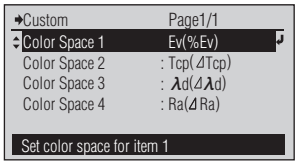


Returns to the <Color Space> screen.

☐ When You Select Spectral Irradiance Ee

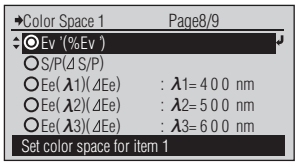
[Operating Procedure]

1 **On the <Color Space> screen, move the cursor to "Custom" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



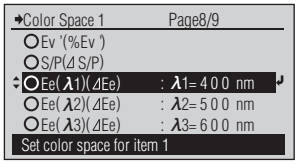
The <Custom> screen is displayed. Symbols in parentheses show what is displayed when the "Display Type" setting is "Difference".

2 **Move the cursor to the item that you want to change such as "Color Space 1" with the ▲ or ▲ button and press the ↵ Enter)/MENU button.**

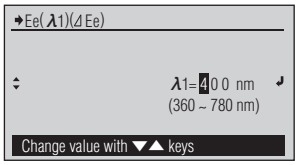


Color Space 1:
Color space shown in item 1 of the measurement screen.
〜
Color Space 4:
Color space shown in item 4 of the measurement screen.

3 **Move the cursor to the item you wish to select with the ▲ or ▲ button.**



4 **Press the ↵ (Enter)/MENU button.**

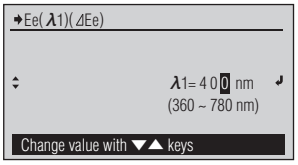


A screen for setting which you can set the wavelength of spectral irradiance appears.

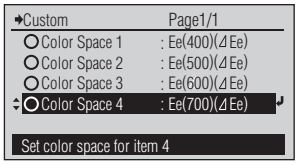
Notes

If you press ← without pressing ↵, you return to the previous screen without changing the setting.

5 **Set the wavelength.**
Press the ▲ button to increase the selected value or the ▼ button to decrease it. Holding down either button will change the selected value at high speed.
Press the ↵ (Enter)/MENU button for each digit to apply its setting.



6 **While the cursor is located at the rightmost digit, press the (Enter)/MENU button.**



A screen for setting which you can set the wavelength of spectral irradiance appears.

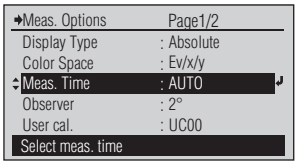
Notes

If you press ← without pressing ↵, you return to the previous screen without changing the setting.

7 **Repeat steps 3 to 6 to set the items that you want to configure, and then press the ← button.**

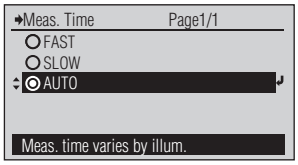
Returns to the <Color Space> screen.

Meas. Time



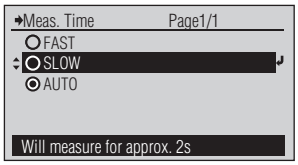
[Operating Procedure]

1 **On the < Meas. Options> screen, move the cursor to "Meas. Time" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**

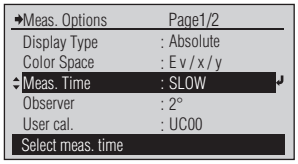


The <Meas. Time> screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



3 **Press the ↵(Enter)/MENU button.**



The selected content is confirmed and you return to the previous screen.

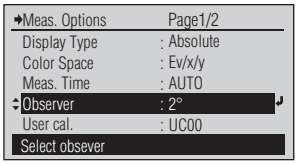
Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

○	**FAST**	Mode that measures with a 0.5-second exposure time.
○	**SLOW**	Mode that measures with a 2-second exposure time.
◉	**AUTO**	High accuracy that automatically sets the exposure time (0.5 to 27 seconds) in accordance with the brightness of the light source being measured and then performs measurement.

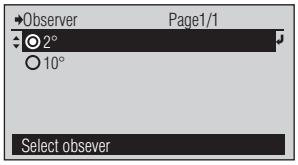
Memo The Accuracy and Repeatability values shown in the specifications (page E-82) are for when AUTO is selected. In the case of a short exposure time, Accuracy and Repeatability are lower at low illumination.

Observer



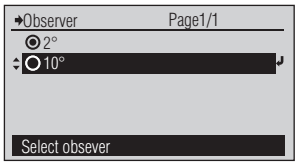
[Operating Procedure]

1 **On the <Meas. Options> screen, move the cursor to "Observer" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



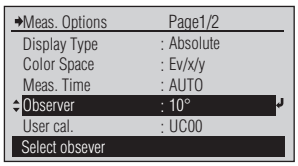
The <Observer> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

3 **Press the ↵ (Enter)/MENU button.**



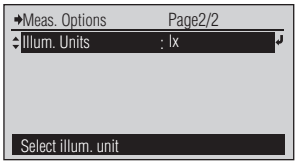
The selected content is confirmed and you return to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**2°**	2° observer (CIE 1931)
○	**10°**	10° observer (CIE 1964)

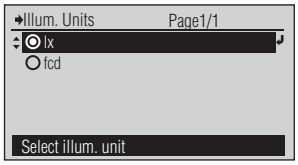
Illum. Units



* If this screen cannot be displayed, turn the power OFF, and then turn it back ON while holding the measuring button pressed, and then access the <Meas. Options> screen again. (Initial setting: Hidden)

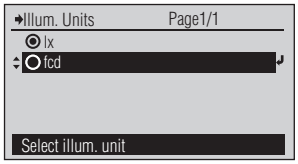
[Operating Procedure]

1 **On the <Meas. Options> screen, move the cursor to "Illum. Units" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



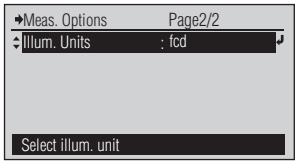
The <Illum. Units> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

3 **Press the ↵ (Enter)/MENU button.**



The selected content is confirmed and you return to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**lx**	lux
○	**fcd**	foot-candela

User calibration

This instrument has 11 user calibration channels numbered UC00 to UC10.
UC00 is a channel for performing measurement in accordance with Konica Minolta calibration standards. Before your instrument is shipped from the factory, or during servicing or maintenance by Konica Minolta, the UC00 channel is preset with correction coefficients obtained during factory calibration. They correction coefficients cannot be changed by you.
Channels UC01 through UC10 can be configured with the settings below using the CL-S10w data management software that comes with your instrument as standard.
See the CL-S10w user documentation for information about actually using the software to configure settings.

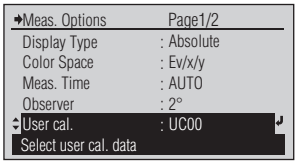
- User calibration correction coefficients
- Correction coefficient name (ID)

The procedure below shows how to select a user calibration channel and how to change the items displayed in the list on the <User cal.> screen.

As necessary

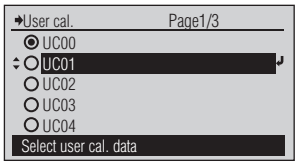
Change settings.

Selecting a User Calibration Channel



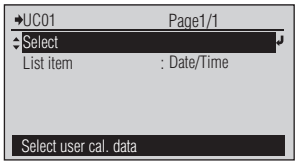
[Operating Procedure]

1 **On the < Meas. Options> screen, move the cursor to “User cal.” with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



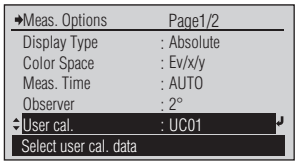
The <User cal.> screen is displayed.

2 **Move the cursor to the user calibration channel you want to select with the ▲ or ▼ button, and then press the ↵(Enter)/MENU button.**



The setting screen for the user calibration channel you selected appears.

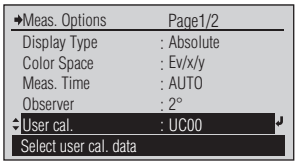
3 **Move the cursor to “Select” with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



The selected content is confirmed and you return to the previous screen.

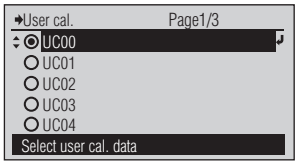
Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Changing the Items in the List on the <User cal.> Screen



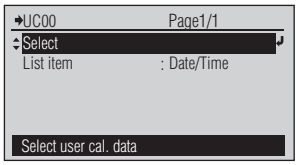
[Operating Procedure]

1 **On the < Meas. Options> screen, move the cursor to "User cal." with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



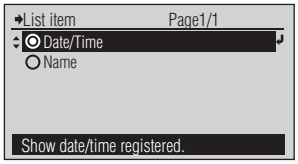
The <User cal.> screen is displayed.

2 **While the cursor is located at any user calibration channel, press the ↵ (Enter)/MENU button.**



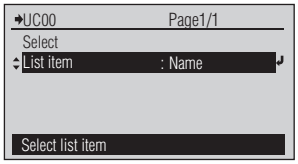
The setting screen for the user calibration channel you selected appears.

3 **Move the cursor to "List item" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



The <List item> screen is displayed.

4 **Use the ▲ and ▲ buttons to move the cursor to item you want to select, and then press the ↵ (Enter)/MENU button.**



This applies the settings for the selected item (regardless of which user calibration channel you originally selected) and returns to the previous screen.

Notes

If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**Date/Time**	Date and time a correction coefficient is registered
○	**Name**	Correction coefficient name (ID) (Name is specified with CL-S10w.)

Measurement

This chapter describes operating procedures for measurement functions. Set measurement conditions in advance as necessary before using each measurement function.

3

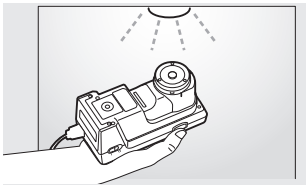
Measurement

Illuminance measurements are performed on the measurement screen.
A warm up period of at least 30 minutes is required under the following conditions to ensure good measurement accuracy.

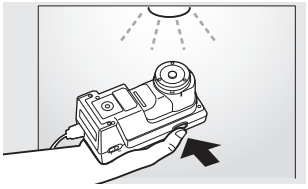
- When the item being measured has low luminance (approximately 30 lx or less for Standard Illuminant A equivalent)
- When the ambient temperature of the measurement environment is outside the range of normal temperature

[Operating Procedure] —When the Measurement Mode is Set to “Single Meas.”—

1 **Point the receptor window toward the illuminant to measure.**

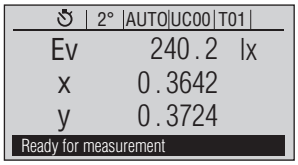


2 **Press the measuring button.**



You will hear a beep.

3 **The measurement is finished when you hear the beep again.**



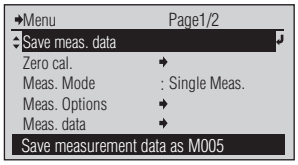
The measurement value is displayed.

When you have specified timer measurement, the measurement is performed after the delay time elapses.

The icon is displayed.

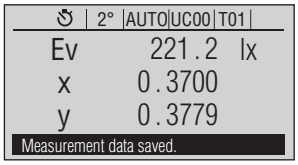
Next you can save measurement data.

4 **Press the (Enter)/MENU button.**



The <Menu> screen is displayed.

5 **Press the (Enter)/MENU button with the cursor on “Save meas. data”.**

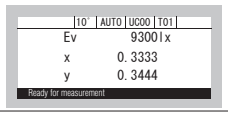
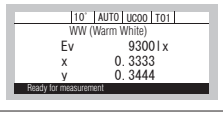
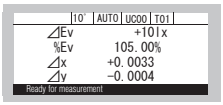
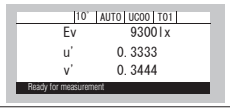
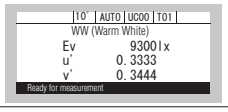
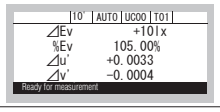
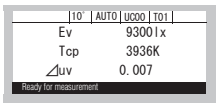
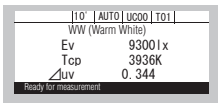
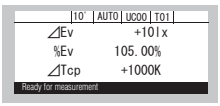
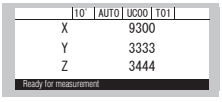
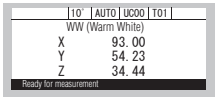
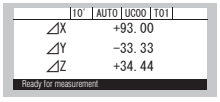
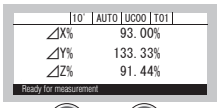
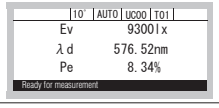
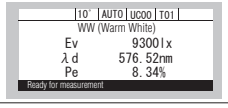
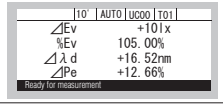
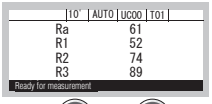
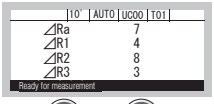
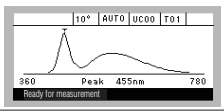
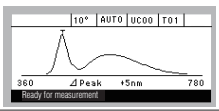
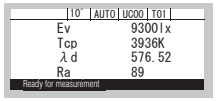
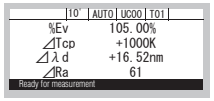


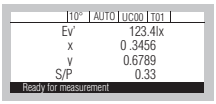
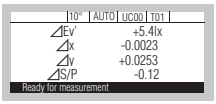
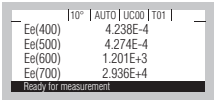
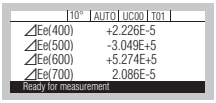
This saves the measurement data as measured data.

Up to a total of 100 measurement data items can be saved by the instrument in sequence from M001 to M100.
When measurement data is already saved up to M100, the <Overwrite> screen appears. If you decide to save your new data, the M001 data will be deleted, all data from M002 will be shifted up one position, and the new data will be saved as M100.

Measurement Screen

The table below shows how measurement data is displayed in accordance with the display type and color space. You can use the ▲ or ▼ button to switch the color space.

Color Space	Display Type			Color Space Explanation
	Absolute	Select Rank	Difference	
Ev/x/y				Illuminance Ev[*1], xy chromaticity
Ev/u'/v'				Illuminance Ev[*1], u'v' chromaticity (CIE 1976 UCS Chromaticity Diagram)
Ev/Tcp/Δuv			 There is no difference in Δuv so it is not displayed.	Illuminance Ev[*1], correlated color temperature Tcp, color difference Δuv from black body locus
X/Y/Z			  Use the ▲ and ▼ buttons to switch between “Difference with Target” and “Percentage of Target”.	Tristimulus values X, Y, Z
Ev/λd/Pe				Illuminance Ev[*1], dominant wavelength λ d, excitation purity Pe[*2]
CRI	 Use the ▲ and ▼ buttons to switch between “R1 to R3”, “R4 to R6”, “R7 to R9”, “R10 to R12”, and “R13 to R15”.		 Use the ▲ and ▼ buttons to switch between “ΔR1 to ΔR3”, “ΔR4 to ΔR6”, “ΔR7 to ΔR9”, “ΔR10 to ΔR12”, and “ΔR13 to ΔR15”.	Ra, R1 to R15
Spectral				Spectral irradiance graph, peak wavelength
Custom				Displays user-specified chromaticity values in measurement display items 1 through 4.

Color Space	Display Type			Color Space Explanation
	Absolute	Select Rank	Difference	
Custom example 1 Ev', x, y, S/P				Scotopic lux Ev', xy chromaticity, S/P ratio
Custom example 2 Spectral irradiance				Spectral irradiance*3 at 400 nm, 500 nm, 600 nm, and 700 nm

*1 Ev (Y of 2° field view) is displayed even when the observer is 10°.

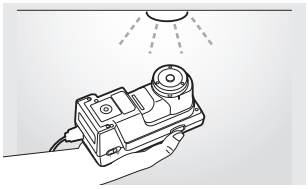
*2 The complementary wavelength value is displayed as a negative value when the "Display Type" setting is "Absolute" and the measured value is a non-spectral color.
In this case, the symbol remains λc.
When the "Display Type" setting is "Difference", the difference between the measured value and the target is displayed, even if either the measured value and target or both of them are a complementary wavelength. In this case, the symbol is Δλ d when the target is a spectral color, regardless of its relationship with the measured value, and Δλ c when the target is a non-spectral color.

*3 The value whose unit is $W/m^2/nm$ is displayed.

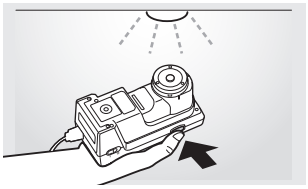
* "---" is displayed when the calculated value is a combination that is rejected in the color space.

[Operating Procedure] —When the Measurement Mode is Set to “Avg. Meas.”—

1 **Point the receptor window toward the illuminant to measure.**

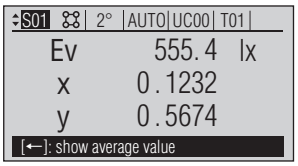


2 **Press the measuring button.**



You will hear a beep.

3 **The measurement is finished when you hear the beep again.**



The measurement value is displayed.

The icon is displayed.

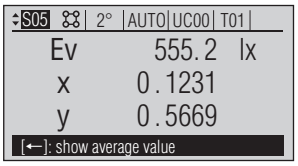
The measured data number (which indicates which number this piece of data is among the average measurements) is displayed. You can use the or button to switch the measured data number.

When you have specified timer measurement, the measurement is performed after the delay time elapses.

The icon is displayed.

You can use the or button to change the measured data number (to a value from S01 to S99).

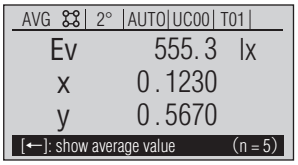
4 **Repeat steps 1 to 3 multiple times.**



Memo

When measured data is already saved up to S99, the <Overwrite> screen appears. If you decide to save your new data, the S01 data will be deleted, all data from S02 will be shifted up one position, and the new data will be saved as S99.

5 **Press the ← button to confirm the average value of all the previous measurements.**



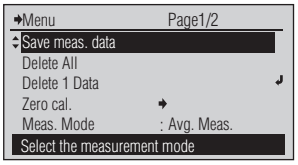
While the power is ON, the measurement mode is set to "Avg. Meas.", and the user calibration channel is the same, the averaged value of all the measured data is displayed.

Press the ← button again to display the screen from step 4.

Each time you press the ← button, the display switches between the screen from step 4 and the screen from step 5.

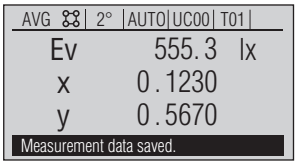
You can perform the next step of saving or deleting measured data from the screen from step 4 or the screen from step 5.

6 **Press the ↵ (Enter)/MENU button.**



The <Menu> screen is displayed.

1. [Saving]
Press the ↵ (Enter)/MENU button with the cursor on "Save meas. data" on the screen from step 6.

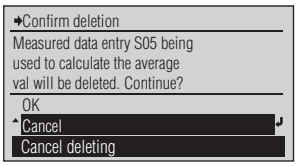


The data displayed on the measurement screen is saved when you execute the "Save meas. data" command. For example, if you execute this command while the screen from step 4 is displayed, the S05 measured data is saved. If you execute this command while the screen from step 5 is displayed, the average value is saved as 1 piece of saved data.

Up to a total of 100 measurement data items can be saved by the instrument in sequence from M001 to M100.

When measurement data is already saved up to M100, the <Overwrite> screen appears. If you decide to save your new data, the M001 data will be deleted, all data from M002 will be shifted up one position, and the new data will be saved as M100.

2. [Deleting]
Press the (Enter)/MENU button with the cursor on "Delete 1 Data" or "Delete All" on the screen from step 6.



The <Confirm deletion> screen is displayed.

Use the or button to move the cursor to "OK", and then press the (Enter)/MENU button to delete the data and return to the <Menu> screen.

Memo

If you select "Delete 1 Data", the measured data displayed on the screen from step 4 is deleted.

If you select "Delete All", all the measured data used to calculate the average value is deleted.

Memo

- If you delete a single data entry from the S numbers except the latest S number, the data of that number becomes blank.
- If you perform a measurement while this number is displayed, the measured value will be stored in the data corresponding to this number.
- If a blank S number exists, and you perform a measurement without displaying this blank S number, the latest S number will be added.

○**Differences between S## data and M### data**

S##

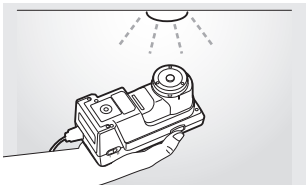
- Deleted when the power is turned OFF (including the auto power off function).
- Deleted when the instrument is connected to a PC (software) and switches to remote mode.
- Deleted when the user calibration channels are changed.

M###

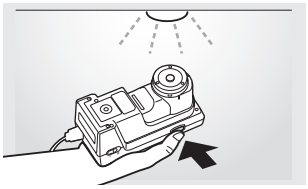
- Not deleted when the power is turned OFF.
- Can be read on a PC by using a software such as the CL-S10w.

[Operating Procedure] —When the Measurement Mode is Set to “Cont. Meas.”—

1 **Point the receptor window toward the illuminant to measure.**

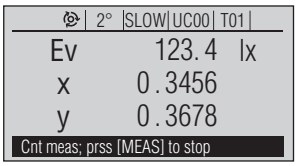


2 **Press the measuring button.**



You will hear a beep, and the continuous measurement will start.

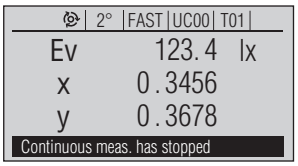
3 **You will hear a beep each time that a measurement is performed, and the measured value is displayed on the screen.**



The measurement value is displayed.

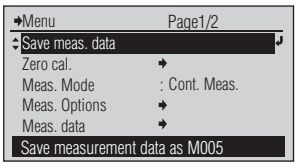
The icon is displayed.

4 **Press the measuring button.**



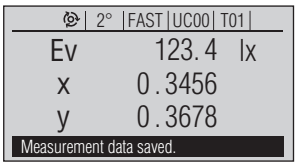
When the final measured value is displayed, the continuous measurement will stop. Next, you can save the measured data.

5 **Press the (Enter)/MENU button.**



The <Menu> screen is displayed.

6 **Press the (Enter)/MENU button with the cursor on "Save meas. data".**



This saves the measurement data as measured data.

Up to a total of 100 measurement data items can be saved by the instrument in sequence from M001 to M100.

When measurement data is already saved up to M100, the <Overwrite> screen appears. If you decide to save your new data, the M001 data will be deleted, all data from M002 will be shifted up one position, and the new data will be saved as M100.

About Targets

A target is a target color that is used during measurement to determine to what extent measured values deviate from a particular color.
A target is required when “Difference” is specified for the “Display Type” setting.
This instrument supports registration of up to a total of 20 targets, numbered T01 through T20.

To change the current target setting, perform the target selection procedure. Even if you change the target, the current user calibration correction coefficient does not change.
The target setting is common to each color space.

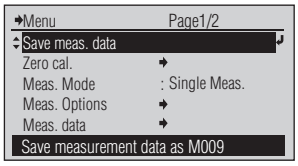
Target operations are performed on the <Target data> screen, which is accessed from the <Menu> screen.
Use the procedure below to display the <Target data> screen.

As necessary

Change settings.

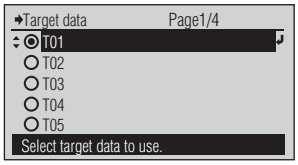
[Operating Procedure]

1 **While the <measurement> screen is displayed, press the (Enter)/MENU button.**



The <Menu> screen is displayed.

2 **Move the cursor to “Target data” with the or button and press the (Enter)/MENU button.**



The <Target data> screen is displayed.

Registering a Target

The following are the different methods that can be used to register a target.
1. Registering measurement data
2. Registering selected measured data
3. Registering with the CL-S10w data management software that comes as standard with the instrument

See the CL-S10w user documentation for information about using the software to configure settings.

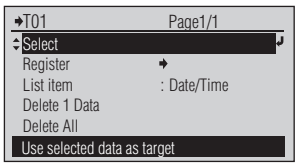
[Operating Procedure]

Memo If you are planning to register measurement data as a target, you will need to perform the measurement before beginning the procedure below.

1 **While the <Target data> screen is displayed, use the ▲ and ▲ buttons to move the cursor to the target number to which you want to register data (T01 through T20), and then press the ↵ (Enter)/MENU button.**

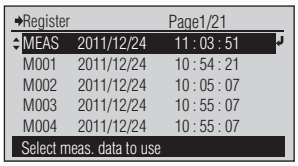
The screen for the target number you selected appears, showing any target data currently registered to that target number. If there is no data currently registered, "---" is displayed.

2 **Press the ↵ (Enter)/MENU button.**



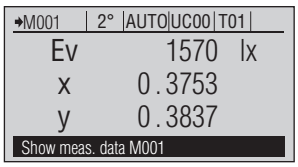
The setting screen for the target number you selected appears.

3 **Move the cursor to "Register" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



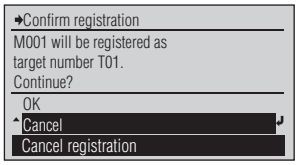
The <Register> screen is displayed.

4 **Use the ▲ and ▲ buttons to move the cursor to "MEAS" or to the number (M001 through M100) of the measured data you want to register, and then press the ↵ (Enter)/MENU button.**



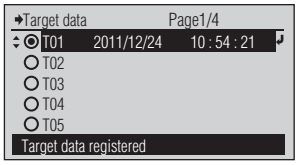
If you selected <MEAS>, the <MEAS> screen appears showing the new measurement data.
Or, the selected measured data screen is displayed and the measurement data appears.

5 **Press the ↵ (Enter)/MENU button.**



The <Confirm registration> or <Overwrite> screen appears.

6 Move the cursor to “OK” with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.



The data is registered to the selected target number and the <Target data> screen reappears.

Memo

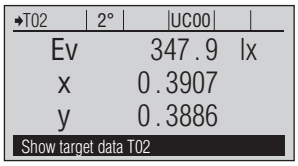
When the measurement mode is set to “Avg. Meas.”, the value displayed on the measurement screen is registered as a target. For example, if you register the target while the screen from step 4 on Page E-39 is displayed, the S05 measured data is registered as the target. If you register the target while the screen from step 5 on Page E-40 is displayed, the average value is registered as 1 target.

Changing the Target

You can select the target to be used for difference measurement by selecting one of the registered targets from T01 through T20.
The newly selected target is applied to the measurement values currently displayed on the measurement screen.

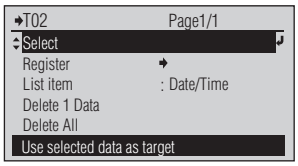
[Operating Procedure]

1 **While the <Target data> screen is displayed, use the ▲ and ▼ buttons to move the cursor to the target number to which you want to select data (T01 through T20), and then press the ↵ (Enter)/MENU button.**



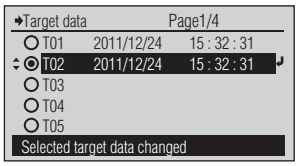
The screen for the target number you selected appears, showing any target data currently registered to that target number. If there is no data currently registered, "---" is displayed.

2 **Press the ↵ (Enter)/MENU button.**



The screen for the target number you selected appears.

3 **Move the cursor to "Select" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



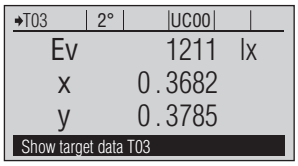
The data is changed to the selected target number and the <Target data> screen reappears.

Deleting a Target

You can use the procedure below to delete a registered target.

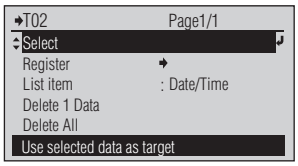
[Operating Procedure]

1 **While the <Target data> screen is displayed, use the ▲ and ▲ buttons to move the cursor to the target number to which you want to delete data (T01 through T20), and then press the ↵ (Enter)/MENU button.**



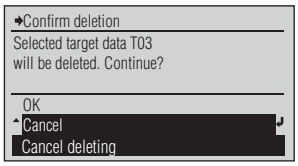
The screen for the target number you selected appears, showing any target data currently registered to that target target number. If there is no data currently registered, "---" is displayed.

2 **Press the ↵ (Enter)/MENU button.**



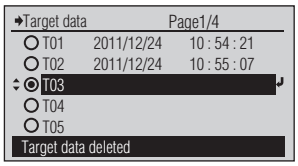
The screen for the target number you selected appears.

3 **Press the ↵ (Enter)/MENU button, use the ▲ and ▲ buttons to move the cursor to "Delete 1 Data", and then press the ↵ (Enter)/MENU button.**



The <Confirm deletion> screen is displayed.

4 **Move the cursor to "OK" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



The target number data you selected is deleted and the <Target data> screen reappears.

Memo

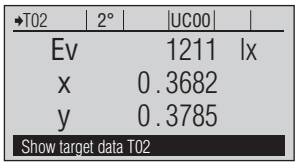
If you selected "Delete All" in step 3, the data assigned to all target numbers is deleted.

Changing the Items Displayed in the <Target data> Screen List

Use the procedure below to change the items displayed in the <Target data> screen list.

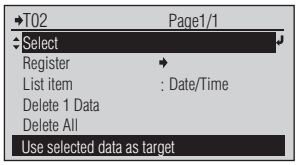
[Operating Procedure]

1 **While the <Target data> screen is displayed and the cursor is located at any target number, press the (Enter)/MENU button.**



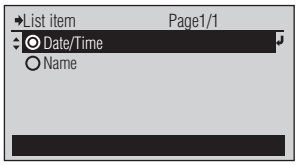
The screen for the target number that was selected appears, showing any target data currently registered to that target number. If there is no data currently registered, "---" is displayed.

2 **Press the (Enter)/MENU button.**



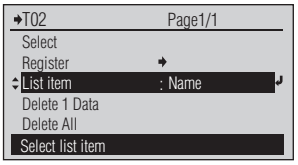
The setting screen for the target number that was selected appears.

3 **Move the cursor to "List item" with the or button and press the (Enter)/MENU button.**



The <List item> screen is displayed.

4 **Use the and buttons to move the cursor to item you want to select, and then press the (Enter)/MENU button.**



This applies the settings for the selected item (regardless of which target number was originally selected) and returns to the previous screen.

Notes

If you press without pressing , you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**Date/Time**	Date and time target data was measured
○	**Name**	Target data name (ID) (Target names cannot be edited. This is indicated on the display by square brackets [ ].) **Memo** You can use the CL-S10w data management software that comes with the instrument to modify the target settings and the display names.

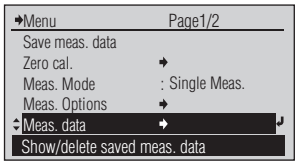
Measured Data Operations

Up to a total of 100 measurement data items can be saved by the instrument in sequence from M001 to M100. When measurement data is already saved up to M100, the <Overwrite> screen appears. If you decide to save your new data, the M001 data will be deleted, all data from M002 will be shifted up one position, and the new data will be saved as M100.

Measured data operations are performed on the <Meas. data> screen, which is accessed from the <Menu> screen. Use the procedure below to display the <Meas. data> screen.

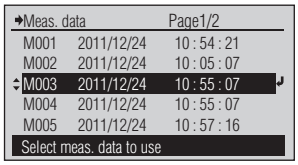
[Operating Procedure]

1 **While the <measurement> screen is displayed, press the (Enter)/MENU button.**



The <MENU> screen is displayed.

2 **Move the cursor to “Meas. data” with the or button and press the (Enter)/MENU button.**



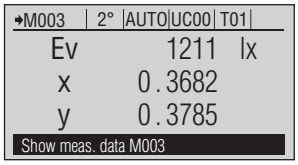
The <Meas. data> screen is displayed.

Registering Target Data

In addition to the procedure shown on page E-44 of this manual, you also can use the procedure below to register target data.

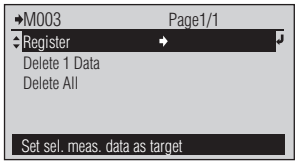
[Operating Procedure]

1 **While the <Meas. data> screen is displayed, use the ▲ and ▲ buttons to move the cursor to the measured data you want to select (M001 through M100), and then press the ↵(Enter)/MENU button.**



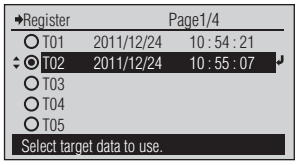
The selected measured data screen is displayed and the measurement data appears. If there is no data currently stored, "---" is displayed.

2 **Press the ↵(Enter)/MENU button.**



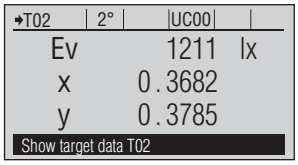
The operation screen for the measured data number you selected appears.

3 **Move the cursor to "Register" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



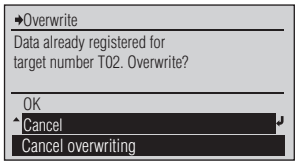
The <Register> screen is displayed.

4 **Use the ▲ and ▲ buttons to move the cursor to the target number to which you want to register data (T01 through T20), and then press the ↵(Enter)/MENU button.**



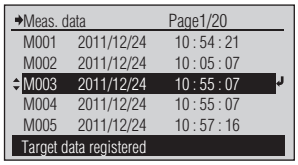
The screen for the target number you selected appears, showing any target data currently registered to that target number. If there is no data currently registered, "---" is displayed.

5 **Press the ↵(Enter)/MENU button.**



The <Confirm registration> screen or the <Overwrite> screen is displayed.

6 **Move the cursor to "OK" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



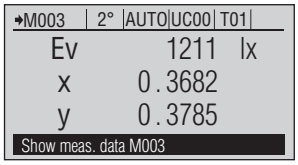
The selected measured data is registered as a target and the <Meas. data> screen reappears.

Deleting Measured Data

You can use the procedure below to delete measured data.

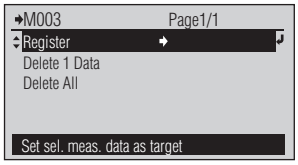
[Operating Procedure]

1 **While the <Meas. data> screen is displayed, use the ▲ and ▲ buttons to move the cursor to the measured data you want to delete (M001 through M100), and then press the ↵ (Enter)/MENU button.**



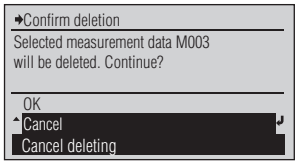
The selected measured data screen is displayed and the measurement data appears. If there is no data currently stored, "---" is displayed.

2 **Press the ↵ (Enter)/MENU button.**



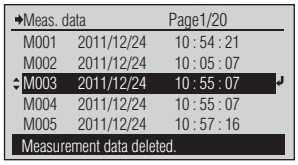
The operation screen for the measured data number you selected appears.

3 **Move the cursor to "Delete 1 Data" with the ▼ or ▼ button and press the ↵ (Enter)/MENU button.**



The <Confirm deletion> screen is displayed.

4 **Move the cursor to "OK" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



The selected measured data is deleted and the <Meas. data> screen reappears.
Deleting a data item causes the data items below it to shift upwards on the screen.

Memo

If you selected "Delete All" in step 3, all measured data is deleted.

Other Functions

4

Connecting to a PC

The instrument is equipped with a USB connection terminal. Using the included USB cable, you can connect the instrument to a PC and transmit data.

Notes

- Do not connect a cable other than the designated cable to the USB connection terminal.
- When the instrument is connected to an external device and communicating with it, communications may be interrupted by being exposed to strong external static electricity or radio waves from the surrounding area. In these cases, turn the power OFF and then turn it ON again.

Memo

- When connected to a PC, the instrument automatically enters communication mode when the PC attempts to connect. “Communicating...” is displayed on the LCD screen, and the instrument’s control buttons and measuring button are disabled.
- When the command to enable the measuring button is used from the PC for the instrument, it is possible to measure by pressing the instrument’s measuring button.
- When connecting to the PC, we recommend using software that can connect to and use the instrument.
- The instrument’s USB communications port is USB 2.0 compliant.
- The instrument supports running on power from the USB cable.

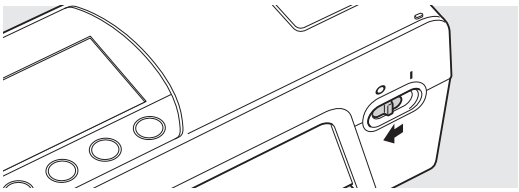
Notes

- To connect the instrument to a PC, the dedicated USB driver must be installed. For the USB driver, use the driver included with the software that can connect to and use the instrument.
- Connect the USB connector plug firmly and with the correct orientation.
- Always connect and disconnect the USB cable by the connector’s plug. Do not pull it out by the cable itself or bend it with unreasonable force. Doing so may break the cable.
- Connect the instrument with a cable of a suitable length. If the cable lacks the suitable length, this may cause connection problems or cable breaks.
- Firmly push in the USB cable connector that matches the shape of the port (connection terminal) until it can go in no further.

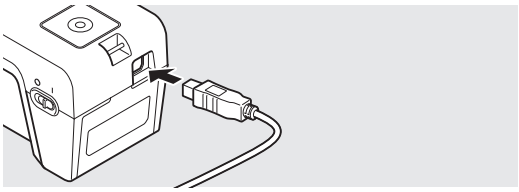
[Operating Procedure]

The USB cable can be connected and disconnected even when the instrument's power is ON, but here it is connected with the power turned OFF.

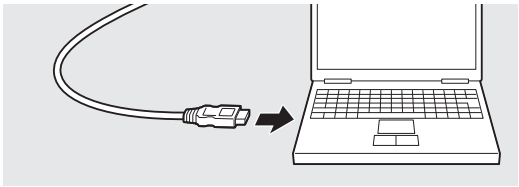
1 **Turn OFF the instrument (Slide the Power switch to "○").**



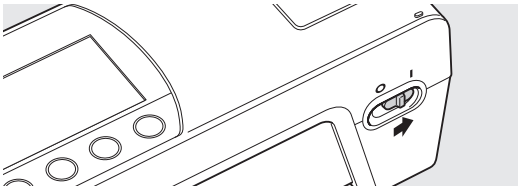
2 **Connect the USB cable's B connector to the instrument's USB connection terminal.**
- **Firmly push it in until it can go no further and check that it is securely connected.**



3 **Connect the USB cable's A connector to the PC's USB port.**



4 **Turn ON the instrument (Slide the Power switch to "I").**
- **The PC recognizes the connection, and the USB driver is installed. Complete the installation. (Only when instrument is connected for the first time.)**



CL-500A Settings

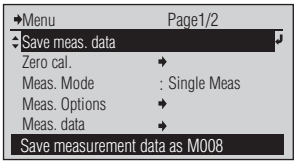
You set the display language for the instrument when first turning it on after purchase, but the other measuring instrument items are set with their initial settings, so the instrument can be used without configuring other settings. Please change these settings as necessary.

Measuring instrument settings are configured on the <System> screen.
Move to the <System> screen with the procedure below.

As necessary
Change settings.

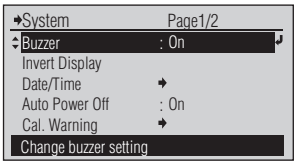
[Operating Procedure]

1 **While the measurement screen is displayed, press the (Enter)/MENU button.**



The <Menu> screen is displayed.

2 **Move the cursor to “System” with the or button and press the (Enter)/MENU button.**



The <System> screen is displayed.

Setting items

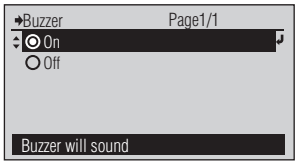
Buzzer	Changes the buzzer setting.
Invert Display	Changes the orientation of the display.
Date/Time	Sets the display format for the current time and date.
Auto Power Off	Changes the auto power off setting.
Cal. Warning	Factory calibration expiry, etc.
Language	Selects the display language.
Initialize	Initializes the device’s settings.
Info(SerNo/Ver)	Displays information about the device.

Buzzer Sound On/Off

You can switch the buzzer sound on and off.

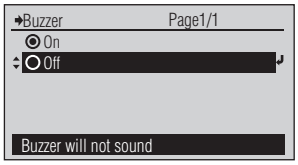
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Buzzer" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



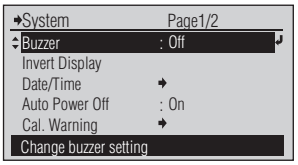
The <Buzzer> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

3 **Press the ↵(Enter)/MENU button.**



If you turned on the buzzer, it will sound once.

Your setting is applied and the display returns to the previous screen.

Notes

If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

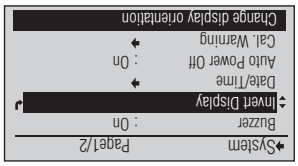
◉	On: The buzzer sounds when measurement starts and stops, and when a button is pressed.
○	Off: The buzzer does not sound when measurement starts and stops, or when a button is pressed.

Invert Display

You can flip the display on the LCD screen vertically.

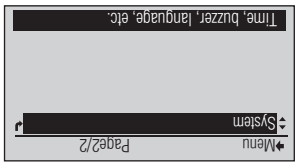
[Operating Procedure]

1 **On the <System> screen, move the cursor to “Invert Display” with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



The display on the LCD screen is flipped vertically.

2 **Press the ↩ button.**



You return to the previous screen.

Notes

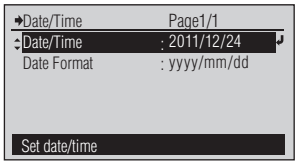
If you press ↩ without pressing ↵ in step 1, you return to the previous screen without changing the setting.

Configuring the Date and Time

The instrument contains an internal clock and records the measurement date and time when measuring. You can change the date and time.

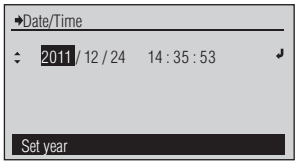
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Date/Time" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



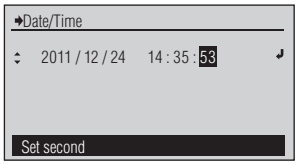
The <Date/Time> screen is displayed.

2 **Move the cursor to "Date/Time" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



The <Date/Time> configuration screen is displayed.

3 **Set the year/month/day/hour/minute/second. Press the ▲ button to increase the selected value or the ▼ button to decrease it. Holding down either button will change the selected value at high speed. Press the ↵(Enter)/MENU button for each value to apply its setting.**

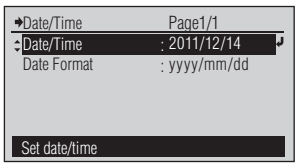


This applies the changes you made to the setting and moves the cursor to the next value to the right.

Memo

Note that you cannot move the cursor to the left during the setting procedure.

4 **While the cursor is located at the rightmost value (seconds), press the ↵(Enter)/MENU button.**



All of your settings are applied and the display returns to the previous screen.

Notes

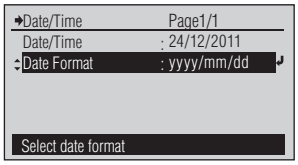
Pressing ← without pressing ↵ during this procedure will return to the previous screen without changing any of the settings.

Configuring the Date Display Format

You can change the date display format.

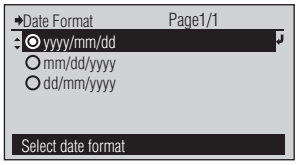
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Date/Time" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



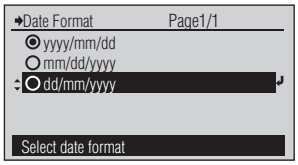
The <Date/Time> screen is displayed.

2 **Move the cursor to "Date Format" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



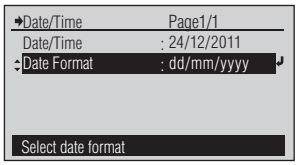
The <Date Format> screen is displayed.

3 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

4 **Press the ↵(Enter)/MENU button.**



Your setting is applied and the display returns to the previous screen.

Notes

If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

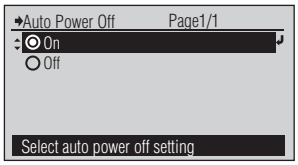
◉	**yyyy/mm/dd**	Display the date in year/month/day order.
○	**mm/dd/yyyy**	Display the date in month/day/year order.
○	**dd/mm/yyyy**	Display the date in day/month/year order.

Auto Power Off Function

This instrument has an auto power off function. When running the instrument on its built-in lithium-ion battery without AC adapter or USB bus power, auto power off automatically turns power OFF if no control button operation is performed for more than 15 minutes.
You can enable or disable the auto power off function as required.

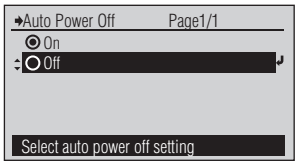
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Auto Power Off" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



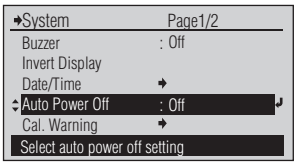
The <Auto Power Off> screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

3 **Press the ↵(Enter)/MENU button.**



Your setting is applied and the display returns to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	On: Power turns off automatically if no button operation on the instrument is performed for more than 15 minutes.
○	Off: Auto power off not performed.

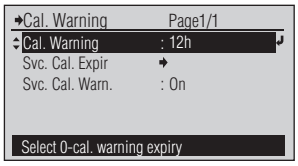
Configuring the Zero Calibration Expiry

The instrument displays the calibration prompt screen when a fixed amount of time elapses from the last white calibration. The initial setting for this calibration expiry is set to 12 hours when shipped from the factory. You can change this zero calibration expiry.

Memo Frequent short zero calibration is recommended for better accuracy when measuring low illuminance.

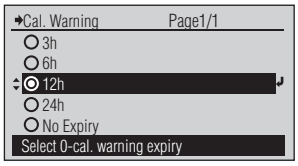
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Cal. Warning" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



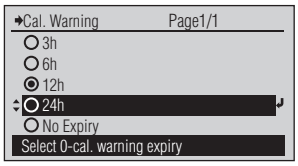
The <Cal. Warning> screen is displayed.

2 **Move the cursor to "Cal. Warning" with the ▲ or ▼ button and press the ↵ (Enter)/MENU button.**



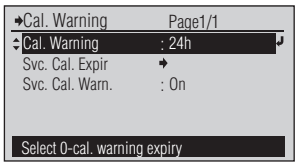
The <Cal. Warning> screen is displayed.

3 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

4 **Press the ↵ (Enter)/MENU button.**



Your setting is applied and the display returns to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

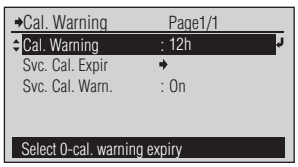
○	**3h**	
○	**6h**	
◉	**12h**	
○	**24h**	
○	**No Expiry**	The calibration prompt screen is not displayed. **Memo** Even when "No Expiry" is selected, the calibration prompt screen may appear if there is a large change in ambient temperature.

Turning Service Calibration Warning On or Off

When the service calibration warning feature of this instrument is enabled, a message is displayed when the instrument is turned on to suggest periodic calibration about one year after shipment from the factor or after the last calibration service or maintenance was performed on the instrument.
You can use the procedure below to disable display of the service calibration warning message.

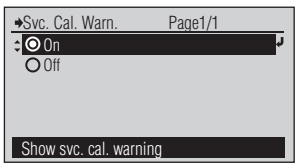
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Cal. Warning" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



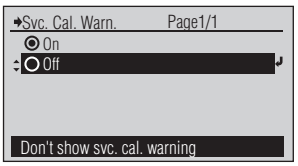
The <Cal. Warning> screen is displayed.

2 **Move the cursor to "Svc. Cal. Warn." with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



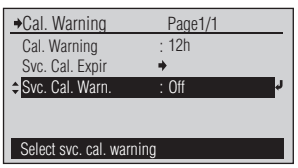
The <Svc. Cal. Warn.> screen is displayed.

3 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



Select the setting.

4 **Press the ↵(Enter)/MENU button.**



Your setting is applied and the display returns to the previous screen.

Notes
If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

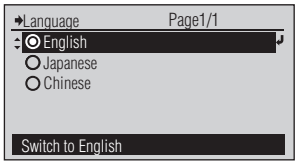
◉	On: Enables display of the periodic calibration warning message.
○	Off: Disables display of the periodic calibration warning message.

Configuring the Display Language

You can change the display language from the language set when the power was first turned on after purchase.

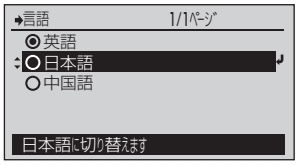
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Language" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



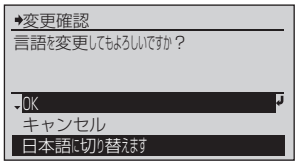
The <Language> screen is displayed.

2 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



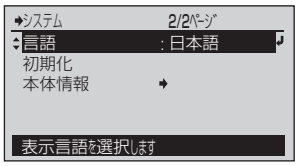
Select the setting.

3 **Move the cursor to the item you wish to select with the ▲ or ▼ button.**



The <Confirm Change> screen is displayed.

4 **Move the cursor to "OK" with the ▲ or ▼ button, then press the ↵(Enter)/MENU button.**



Your setting is applied and the display returns to the previous screen.

Notes

If you press ← without pressing ↵, you return to the previous screen without changing the setting.

Setting (◉ is the initial setting)

◉	**English**
○	**Japanese**
○	**Chinese**

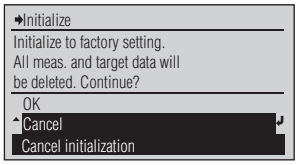
Initialize

Returns the settings for the instrument back to their initial state.

Notes
- **Do not initialize the instrument except when necessary.**
- When the instrument is initialized, the zero calibration execution records and target color data are deleted.

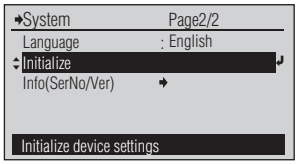
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Initialize" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



The <Initialize> screen is displayed. The cursor is initially on "Cancel".

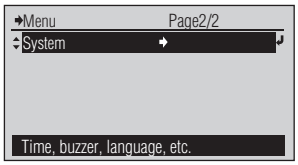
2 **Move the cursor to "OK" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



The instrument is initialized.

Memo
The instrument does not restart. The display language for the LCD screen changes to English, the initial setting.

3 **Press the ← button.**



You return to the previous screen.

Initial settings

Item			Initial setting
Meas. Mode			Single Meas.
		Delay Time	0sec.
Meas. Options	Display Type		Absolute
	Color Space		Ev/x/y
	Meas. Time		AUTO
	Observer		2°
	Illum. Units		lx
	User cal.		(UC01 to UC10) not registered
		User calibration channel	UC00 (factory calibration)
Zero cal.			Not completed
Target data			Not registered
	Target data		T00
Meas. data			Not completed
Select Rank			D (Daylight) N (Natural) W (White) WW (Warm White) L
System	Buzzer		On
	Invert Display		Normal
	Date/Time	Date Format	yyyy/mm/dd
	Auto Power Off		On
	Cal. Warning	0-cal. warning	12h
		Svc. Cal. Warn.	On
	Language		English

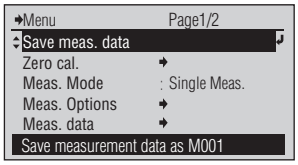
* Instrument settings may be initialized by causes other than the initialize operation (such as complete discharge of the built-in battery).

Checking CL-500A Information

You can check information about the instrument.
Check measuring instrument information on the <System> screen. Move to the <System> screen with the procedure below.

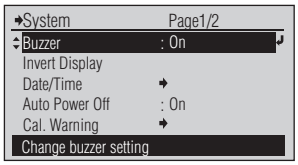
[Operating Procedure]

1 **While the measurement screen, press the (Enter)/MENU button.**



The <Menu> screen is displayed.

2 **Move the cursor to “System” with the or button and press the (Enter)/MENU button.**



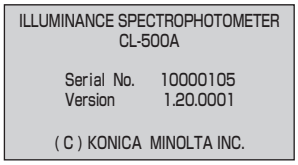
The <System> screen is displayed.

Displaying Device Information

The instrument's model name, serial number, and version are displayed.

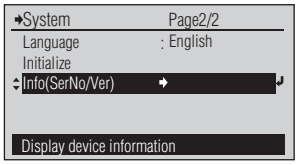
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Info(SerNo/Ver)" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



The <Info(SerNo/Ver)> screen is displayed.

2 **When finished checking the information, press the ← button.**



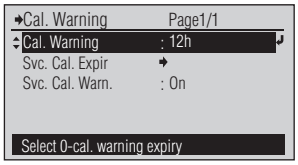
You return to the previous screen.

Checking the Annual Service Recalibration Expiry

After approximately one year elapses after the instrument is shipped from the factory or after KONICA MINOLTA calibration service (or maintenance), a message will be displayed when the power is turned on that recommends annual service recalibration.
You can check the time limit until the annual service recalibration recommendation message is next displayed here.

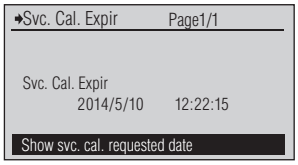
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Cal. Warning" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



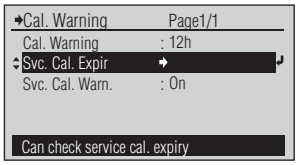
The <Cal. Warning> screen is displayed.

2 **Move the cursor to "Svc. Cal. Expir" with the ▲ or ▼ button and press the ↵(Enter)/MENU button.**



The <Svc. Cal. Expir> configuration screen is displayed, and the time limit when the next factory calibration is required is shown.

3 **Press the ← button.**



You return to the previous screen.

Troubleshooting

5

Error Messages

The messages below may be displayed when using the instrument. When one of these messages is displayed, please take the action indicated below. When you perform the action but the instrument does not return to normal, or when the power does not turn on even when the internal battery is charged, contact a KONICA MINOLTA-authorized service facility.

Notes
- The messages below may be displayed on the LCD screen. Refer to the separate materials for the communication error check codes.

No.	Error Message	Problem/possible cause	Action
1	Perform zero calibration. Press [MEAS] button to start zero calibration.	Measurement performed without zero calibration.	Perform zero calibration.
2	Error. Calibrate again.	Some abnormality occurred during calibration.	Perform zero calibration again. If this message continues to appear, immediately contact a KONICA MINOLTA-authorized service facility.
3	Zero calibration recommended. Press [MEAS] button to start zero calibration.	The zero calibration warning time limit has expired. Or there was a large change in ambient temperature since the last zero calibration was performed.	Perform zero calibration.
4	No measurement data.	There is no data registered to the selected measured data number.	Select a measured data number that has data and try again.
5	No target data.	There is no data registered to the selected target number.	Select a target number that has data and try again.
6	No user cal. data.	There is no data registered to the selected user calibration channel.	Select a user calibration channel that has data and try again.
7	Input value outside range. Enter again.	A non-existent date was input.	Re-input a valid date.
8	Over measurement range.	The illuminance exceeds the level that can be measured by the CL-500A.	Increase the distance between the CL-500 and the light source being measured, or use an ND filter to reduce the intensity of the light.
9	Chroma at < 5 lx out of spec.	The illuminance obtained by the measurement is less than 5 lx, so chromaticity calculation performance is low.	Decrease the distance between the CL-500 and the light source being measured, or increase the intensity of the light.
10	More error at set meas. time.	Any one of the following can cause failure to satisfy Accuracy specifications. • Less than 50 lx obtained by measurement when measurement time is FAST • Less than 10 lx obtained by measurement when measurement time is SLOW	Change the measurement time setting to AUTO and measure again.
11	Over dom. wl. calc. range.	The dominant wavelength could not be calculated.	The dominant wavelength cannot be calculated with the light source being used. This does not indicate malfunction.
12	Over Tcp calc. range.	The correlated color temperature could not be calculated.	The correlated color temperature cannot be calculated with the light source being used. This does not indicate malfunction.

No.	Error Message	Problem/possible cause	Action
13	Over CRI calc. range.	The CRI could not be calculated.	The CRI cannot be calculated with the light source being used. This does not indicate malfunction.
14	No custom color space is set.	The settings of none of the items from Color Space 1 through 4 are configured. (“None” selected for all items.)	Configure the settings of one of the items from Color Space 1 through Color Space 4. Or change to another Color Space.
15	No valid rank list is set.	The chromaticity range settings required to perform ranking are not configured.	Use the CL-S10w data management software that comes with the instrument as standard to configure the rank list.
16	Battery voltage is low. Recharge battery.	Battery voltage is low and there is enough for only a small number of measurements.	Use the AC adapter or USB power bus to charge the battery. The instrument may not start up immediately after the AC adapter is connected. In this case, allow the battery to charge for a few minutes and then turn on the instrument.
17	The battery is degrading. Contact Service Center.	An abnormality was detected in the battery.	Immediately stop using the instrument and contact a KONICA MINOLTA-authorized service facility.
18	Circuit malfunction. Contact Service Center.	An abnormality was detected in the measurement circuit, etc.	Immediately stop using the instrument and contact a KONICA MINOLTA-authorized service facility.
19	Clock malfunction. Charge battery. Set clock.	An abnormality was detected in the clock data. • Battery voltage may be too low.	Use the AC adapter or USB power bus to charge the battery, and then set the correct time and date.
20	Time for service calibration. Contact Service Center.	It is time to perform periodic calibration.	Contact a KONICA MINOLTA-authorized service facility and request periodic calibration.

Checking for Malfunction

In the event that something goes wrong with the instrument, carry out the measures below. If the instrument does not return to normal, try turning the power off. If this does not work, contact the nearest KONICA MINOLTA-authorized service facility.

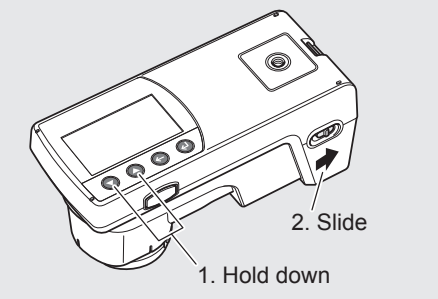
Condition	Cause	Action
The LCD is blank.	Is the battery low?	Charge the instrument using the AC adapter or USB bus power. If the instrument does not work even after the battery has been charged, it is possible that overcurrent may have occurred and burned out the internal fuse. Immediately stop using the instrument and contact a KONICA MINOLTA-authorized service facility.
	If recharging the battery does not solve the problem, it could mean there is some problem with the CPU.	Slide the Power switch to the "▌" side, and then hold down the ▼ button and the ← button for at least four seconds. This will reset the CPU and restart the CL-500A. **Notes** Performing the reset operation will result in the following. • Data measured immediately prior to the reset will be lost. • Target data (including names) saved the last time power was turned on, changed settings (including display language), and zero calibration records may be deleted. If your display language setting is deleted, use the procedure under "Starting Up from the Language Screen" on page E-75 to display the <Language> screen and select the display language you want.
	If resetting the CPU does not solve the problem, it could mean that over current has blown the instrument's fuse.	Immediately stop using the instrument and contact a KONICA MINOLTA-authorized service facility.
Measurement results are abnormal.	Did you perform zero calibration correctly?	Use the cap and correctly perform zero calibration.
The instrument cannot be controlled from a PC.	Is the USB cable connected correctly?	Connect the USB connection terminal on the instrument correctly to the PC's USB port using the USB cable supplied as a standard accessory.
	Are you using the USB cable supplied as a standard accessory?	
	Is the CL-500A being correctly recognized by the PC as a USB device?	Refer to the installation guide that comes with the CL-S10w (Ver.1.1 or greater) software and reinstall the USB device driver.
The battery is low even though it has just been charged.	The internal lithium-ion battery can be charged around 500 times.	If the battery is low even though it has just been fully charged, the battery must be replaced. Contact the nearest KONICA MINOLTA-authorized service facility.

Special Startup Procedures

Initialization

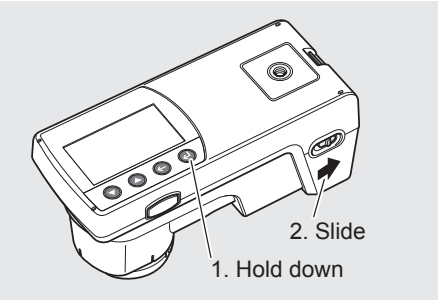
While holding down the ▲ button and ▼ button, slide the power switch to the "**I**" side. This will start up the instrument from the <Initialize> screen.
For information about the <Initialize> screen, refer to page E-65.

Memo Even if you perform an initialization, the CPU will not be reset.



Starting Up from the Language Screen

While holding down the ↵(Enter)/MENU button, slide the power switch to the "**I**" side. This will start up the instrument from the <Language> screen.
For information about the <Language> screen, refer to page E-64.



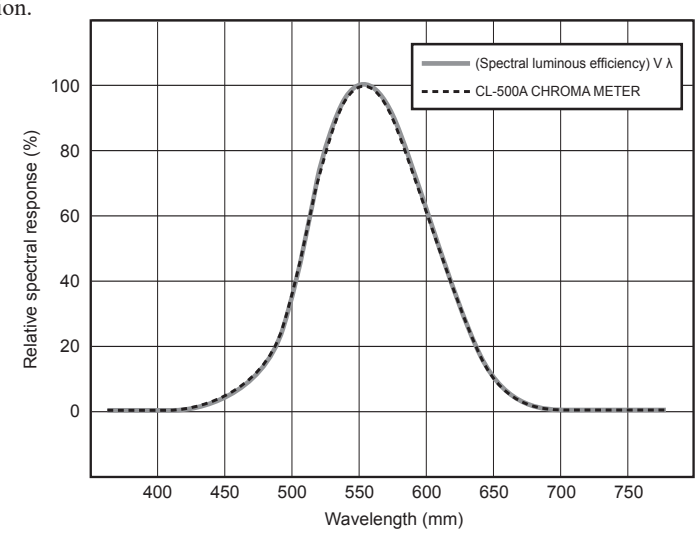
Appendix

6

Luminance Measurement Capabilities

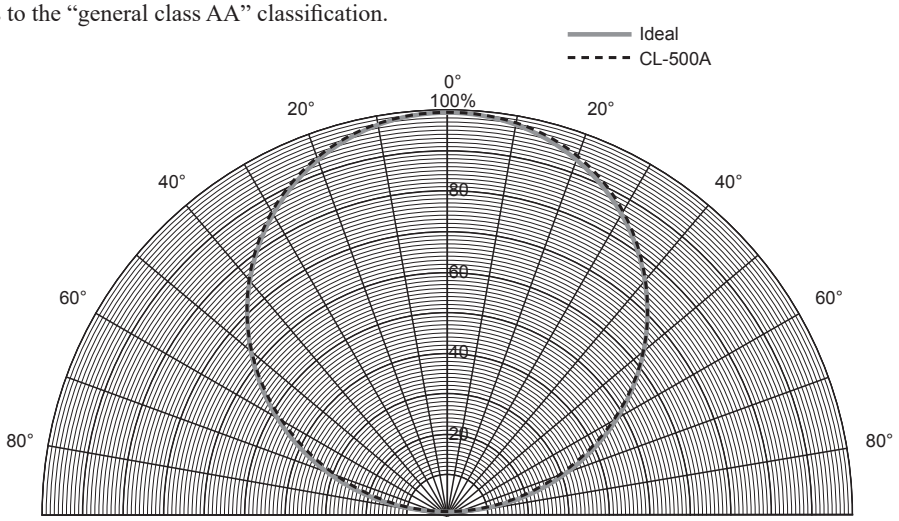
Relative Spectral Response

The spectral response of an ideal illuminance meter would match V(l),+the spectral luminance efficiency function for photopic vision. JIS (Japan Industrial Standards) has established a rating system that classifies illuminance meters according to how closely they match this function. The CL-500A CHROMA METER conforms to the “general class AA” classification.



Cosine Correction Characteristics

Because the brightness at the measurement plane is proportional to the cosine of the angle of incidence, the response of the receptor must also be proportional to this cosine.
The graph below shows the cosine correction characteristics of the CL-500A CHROMA METER. This instrument confororms to the “general class AA” classification.



Correlated Color Temperature T_{cp} and Δuv

Following factors can be acquired as measurement value with E_vT_{cp}Δuv as color space of this instrument.

E_v :Illuminance

T_{cp} :Correlated color temperature

Δuv :Color difference from blackbody locus

While E_v stands for illuminance, T_{cp} and Δuv for color in E_vT_{cp}Δuv.

<Relation between correlated color temperature T_{cp} and color difference from blackbody locus Δuv>

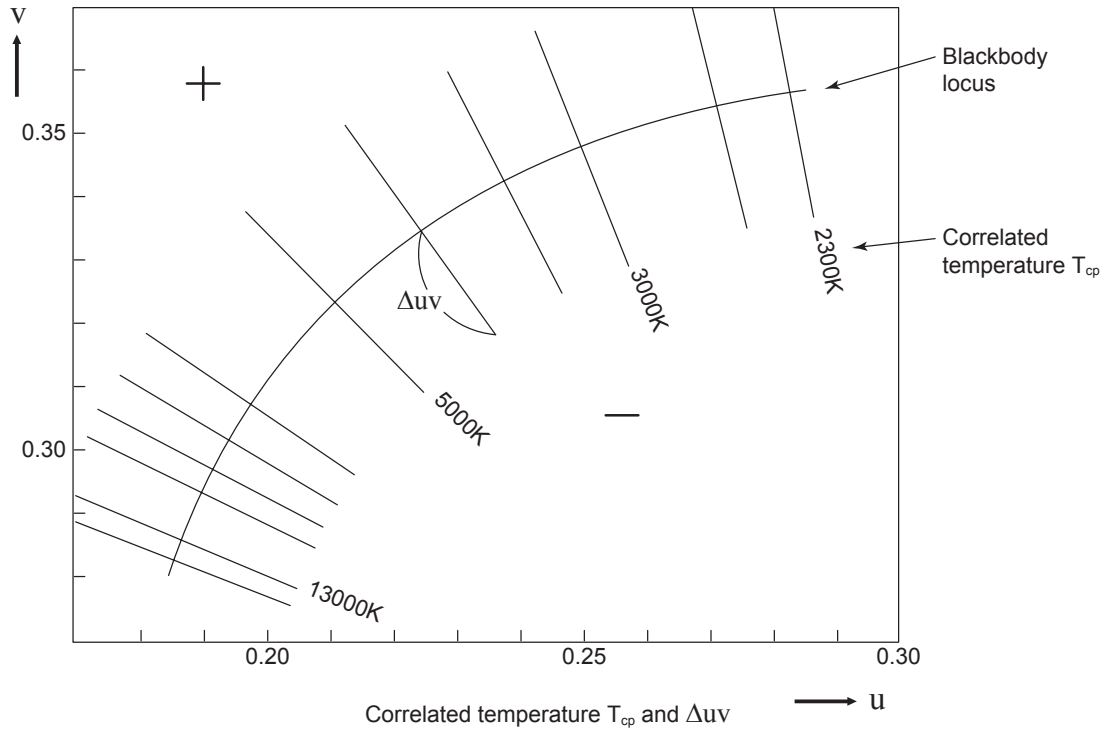
Color temperature refers to the temperature of black body (perfect radiator) which has equal chromaticity coordinates to certain light. However, color temperature only represents colors on blackbody locus.

Correlated color temperature, slightly wider interpretation of color temperature, is very useful to eliminate such problem. Here, correlated color temperature covers those which are slightly outside the range of that of blackbody locus.

If a certain color positions on isotemperature line, the intersection point of isotemperature line and blackbody locus is indicated as correlated color temperature for the color. Isotemperature line means line on chromaticity coordinates which is a set of colors visually close to color temperature on blackbody locus.

However, since all colors on a color-matching temperature line are represented with equal correlated color temperature, it is not possible to describe color only with correlated color temperature. To solve that, Δuv, deviation of correlated color temperature T_{cp} from blackbody locus, is to apply for that purpose.

If Δuv exists above blackbody locus, it is represented with "+", and below, with "-".



Correlated temperature T_{cp} and Δuv

Dominant wavelength/Excitation purity

In the x, y chromaticity diagram shown below, the curve VS_cSR is the spectrum locus, and point N is the white point.
Colors located in the region enclosed by the spectrum locus and the straight lines VN and NR are referred to as spectral colors; colors located in the triangle NVR with the white point N at the apex and the pure purple line VR as the base are referred to as nonspectral colors.

<Dominant wavelength and excitation purity (spectral colors)>
When the chromaticity point obtained by the measurement is C, the wavelength corresponding to the intersection point S of the extension of NC with the spectrum locus (curve VS_cSR) is referred to as the dominant wavelength and indicated by the symbol λd.
The ratio of the lengths of the straight lines NC and NS is referred to as the excitation purity of color excitation C and indicated by the symbol p_e.

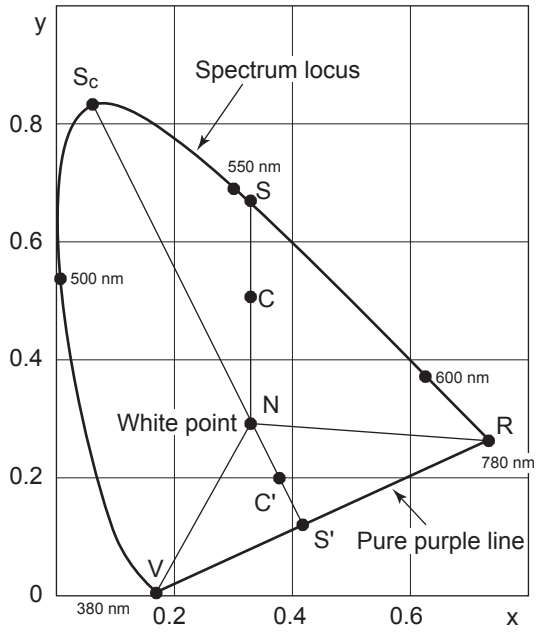
<Complementary wavelength (non-spectral colors)>
When the chromaticity point obtained by measurement is C', the extension of NC' toward C' does not intersect with the spectrum locus but only the pure-purple lines. In this case the wavelength corresponding to the intersection point Sc of the extension of NC' toward N with the spectrum locus is referred to as the complementary wavelength and indicated by the symbol λc.
When the intersection point of the extension of the line NC' with the line VR (pure-purple locus) is designated by S', the ratio of the lengths of NC' to NS' is referred to as excitation purity and indicated by the symbol p'v.
The following equations are formulated, if each point is designated as the following coordinates: (x_n, y_n): chromaticity coordinate of point N; (xc, yc): chromaticity coordinate of point C; (x_λ, y_λ): chromaticity coordinate of point S, (x_c', y_c): chromaticity coordinate of point C', and (x_p, y_p): chromaticity coordinate of point:

Excitation purity (spectral colors)

$$p_e = \frac{x_c - x_n}{x - x_n} = \frac{y_c - y_n}{y - y_n}$$

Excitation purity (non-spectral colors)

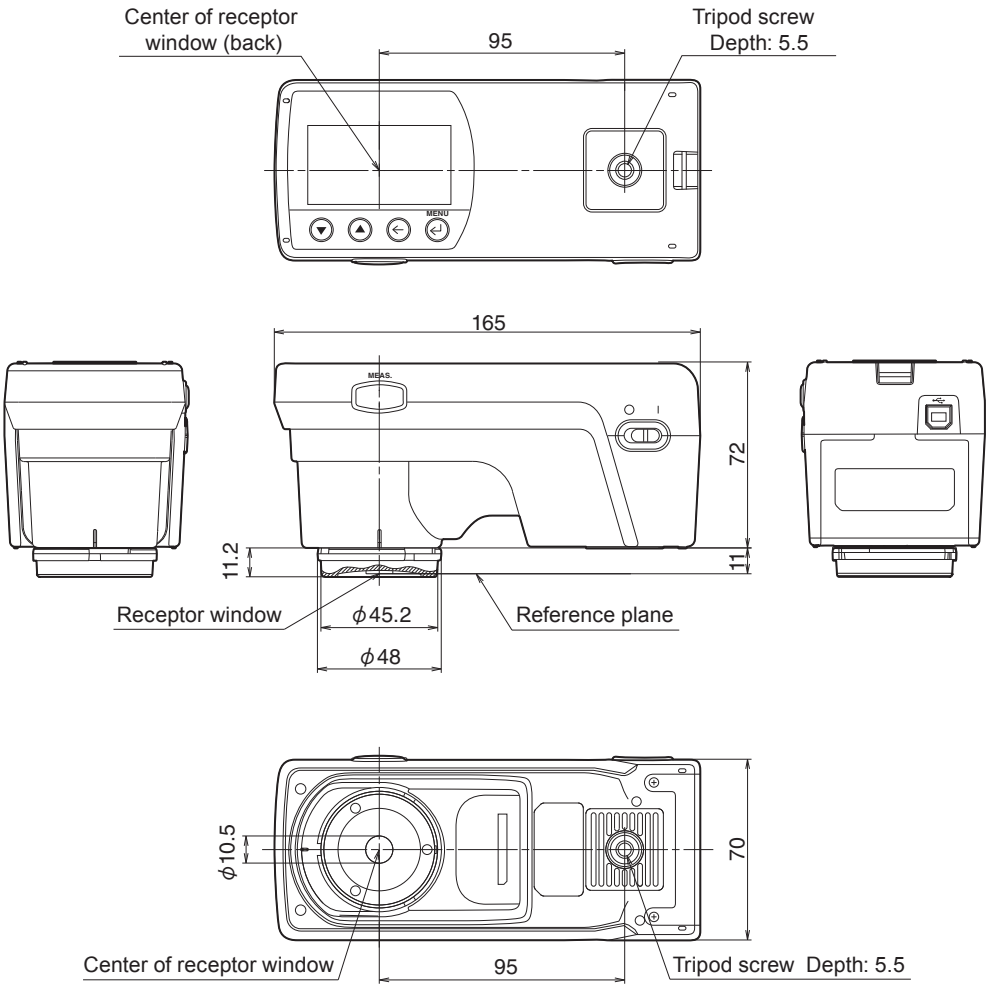
$$p_e' = \frac{x_c' - x_n}{x - x_n} = \frac{y_c' - y_n}{y - y_n}$$



Dominant wavelength on chromaticity diagram

External Dimensions

(Unit: mm)



Specifications

Model name	Illuminance Spectrophotometer CL-500A
Illuminance meter class	Conforms to JIS C 1609-1: 2006 for General Class AA Illuminance Meters[*1] Conforms to DIN 5032 Part 7 Class B
Spectral wavelength range	360 to 780 nm
Output wavelength pitch	1 nm
Spectral bandwidth	Approximately 10 nm (half bandwidth)
Wavelength precision	±0.3 nm (Median wavelengths of 435.8 nm, 546.1 nm, and 585.3 nm[*2] as specified in JIS Z 8724:1997)[*3]
Measuring range	0.1 to 100,000 lx (Chromaticity display requires at least 5 lx.)
Accuracy[*4] [*5] (Standard Illuminant A)	Ev: ±2% ±1digit of displayed value
	xy : ±0.0015 (10 to 100,000 lx) xy: ±0.002 (5 to 10 lx)
Repeatability (2σ)[*4] (Standard Illuminant A)	Ev: 0.5% + 1digit
	xy: 0.0005 (500 to 100,000 lx) xy: 0.001 (100 to 500 lx) xy: 0.002 (30 to 100 lx) xy: 0.004 (5 to 30 lx)
Visible-region relative spectral response characteristics (f_1')	1.5% or less
Cosine response (f_2)	Ev: 3% or less
Temperature drift (f_T)	Ev: ±3% of displayed value Xy: ±0.003
Humidity drift (f_H)	Ev: ±3% of displayed value Xy: ±0.003
Measurement time	Super Fast Mode : Approximately 0.2 seconds (When connected to PC only) FAST Mode : Approximately 0.5 seconds SLOW Mode : Approximately 2.5 seconds Automatic exposure time setting (high accuracy mode): Approximately 0.5 to 27 seconds
Display mode	XYZ; $X_{10}Y_{10}Z_{10}$; Ev xy; Ev u'v'; dominant wavelength; excitation purity; Ev; Correlated color temperature; Δ uv; General color-rendering index (Ra); Special color-rendering indexes (Ri (i=1-15)); spectral graph; peak wavelength; Δ (XYZ); Δ ($X_{10}Y_{10}Z_{10}$); Δ (Ev xy); Δ (Ev u'v'); rank display; scotopic lux; S/P ratio; spectral irradiance
Other functions	Data memory: 100 items; user calibration (when connected to computer); continuous measurement; average measurement; delayed measurement; auto power off
Display languages	Japanese, English, Chinese
Interface	USB2.0
Power	Built-in lithium-ion battery *Possible operation time:6 hours operation (between full charges, for a new product); AC adapter; USB power bus
Operation temperature and humidity ranges	-10 to 40°C, relative humidity of 85% or less (at 35°C) with no condensation
Storage temperature and humidity ranges	-10 to 45°C, relative humidity of 85% or less (at 35°C) with no condensation
Dimensions	70 (W) x 165 (D) x 83 (H) mm
Weight	350 g

*1 "Section 7.6.3 Response Time" conforms when measurement speed mode is FAST.

*2 585.3 nm evaluation performed using substitute wavelength of 587.6 nm.

*3 Based on Konica Minolta test standards (5°C or less temperature change after zero calibration).

*4 Automatic exposure time setting (high accuracy) mode

*5 Linear for Ev (illuminance)

En 9222-A53C-17

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