

Spectrophotometer

CM-23d

En Basic Operating Instructions



Please read before using the instrument.

This manual explains the basic procedures for measuring color with the CM-23d spectrophotometers. Use this 2D code to download this manual in pdf form.

Note)

For setting and operation details, see the instruction manual of the CM-23d (English or Chinese Ver.).



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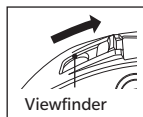
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Names of Parts

■ Instrument

**Viewfinder
(Specimen
confirmation
window)**



Viewfinder lever

LCD screen

Control panel

Charging lamp

Power switch

**USB connection
terminal
(Mini-B type)**

**Measurement button
(It is on the left and right)**

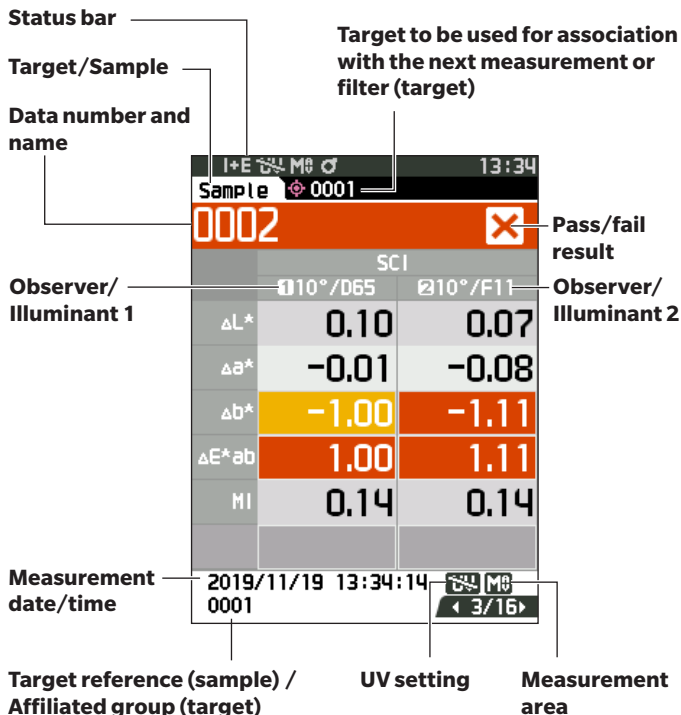
**Wrist strap
attachment hole**

**Sample
surface
aperture**

**Battery
cover**

Screw holes for securing

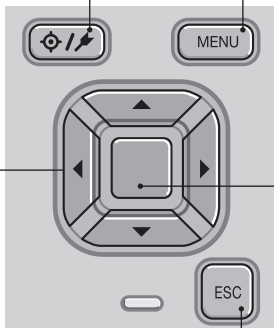
■ Display (LCD Screen) P.22, Instruction Manual



■ Operation Keys

[/⚡] (Target/Sample) key
Switches between **<Target> screen** and **<Sample> screen**.

[MENU] key
Displays the **<Settings> screen**.

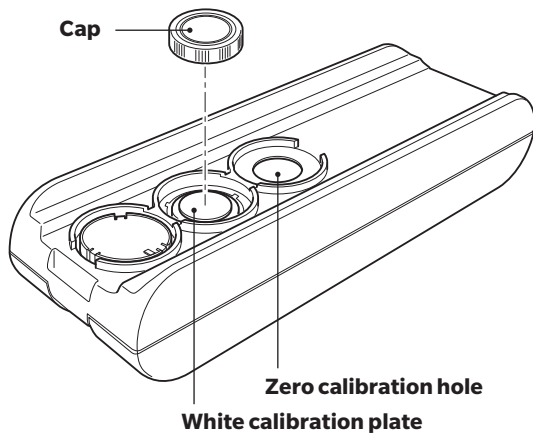


[Confirmation] key
Sets the item or setting indicated by the cursor on the various setting screens. This key also switches to detail screens for data selected in the list displayed on the **<Results Display> screen**.

[◀, ▶, ▲, ▼] keys
Switches screen tabs from the **<Results Display> screen**, moves the cursor on the **<Settings> screen**, or changes the selected value.

[ESC] key
Returns to the previous screen without configuring the settings when pressed on the **<Settings> screen**, and returns to list screen when pressed on the sample details screen.

■ Calibration Stage



Measurement

1 Turning the Power ON (P.6)



Language selection

P.104, Instruction Manual

* As necessary (after initialization, etc.)



Measurement cond. setting **P.85, Instruction Manual**



Zero calibration

P.34, Instruction Manual

* Only when required (when changing the measurement conditions, etc.)



2 White calibration (P.6)

White calibration



3 Measurement (P.7)

1

Turning the Power ON

P.32,
Instruction Manual

- 1 Press and hold the power switch for about 1 second.



- When first turning the instrument ON after purchasing, the language setting screen will be displayed, followed by the date and time setting screen. Configure the settings according to P.104 - 106.

2

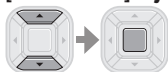
White calibration

P.36,
Instruction Manual

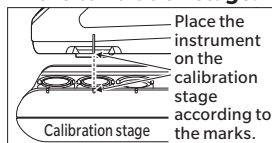
To perform white calibration

Note: Zero calibration must be performed before white calibration if there have been significant changes in the measurement environment.

- 1 Select "Calibration (Excluding Zero Cal.)" and press the [Confirmation] key.



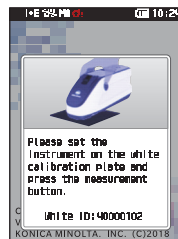
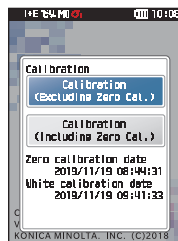
- 2 Place the instrument on the calibration stage.



- 3 Press the measurement button.



- White calibration will be performed.
- Do not move the instrument until white calibration is complete.



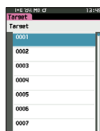
3

Measurement

P.39,
Instruction Manual

① Check the Sample screen.

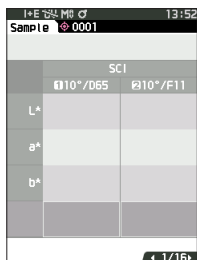
- If not displayed, switch to the Sample screen.



<Reference
color screen>

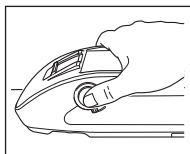


<Sample
screen>



② Set the specimen measuring port on the sample to measure.

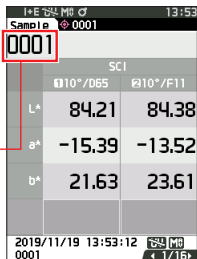
- Take care to prevent floating or tilting from occurring.



③ Press the measurement button.



- The results are displayed on the screen. The sample was saved as "0001".



When color difference is measured

<Measuring color difference in the normal mode>

1 Color difference target settings (P.9)

1-a Setting color difference by measuring target

1-b Setting colorimetric data by numerical input



2 Measurement cond. setting (P.18)



3 Pass/fail judgment criteria settings (P.13)



4 Measurement (P.15)

<Measuring color difference in the simple mode>

1 Set to "Simple mode". (P.16)



2 Measurement cond. setting (P.18)



3 Measuring a target (P.17)



4 Measuring a sample (P.17)

<Measuring color difference in the normal mode>

1-a Color difference target settings

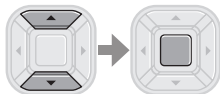
P.39,
Instruction Manual

Setting color difference by measuring a target

① Display the target or target list screen.



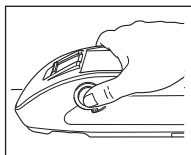
- Set the target number with the [▲] and [▼] keys before imparting measurement.



Target		
0001		
SCI		
110°/D65 210°/F11		
L*		
a*		
b*		
1/11		

② Set the specimen measuring port on the sample to measure.

- Take care to prevent floating or tilting from occurring.



③ Press the measurement button.



- The results are displayed on the screen.
- The selected number is used as the target data number. If data already exists under that number, the instrument asks whether to overwrite that data or not, therefore enter the target by pressing the [Confirmation] key.

Target		
0001		
SCI		
110°/D65 210°/F11		
L*	75.89	76.00
a*	-0.24	0.01
b*	2.59	2.79
2019/11/19 14:00:49 1/11		

The target is set.

1-b

Color difference target settings

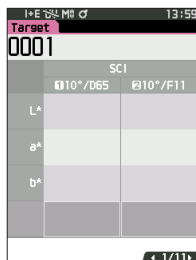
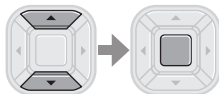
P.74,
Instruction Manual

Setting colorimetric data by numerical input

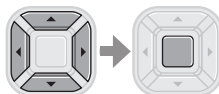
- ① Display the target or target list screen.



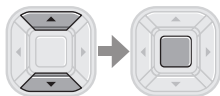
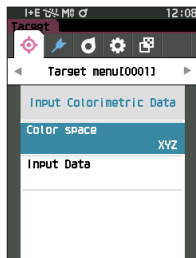
- Set the target number with the [▲] and [▼] keys before imparting measurement.



- ② Select <Target menu> - <Input Colorimetric Data>

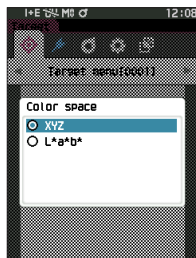


③ Select the item to set.

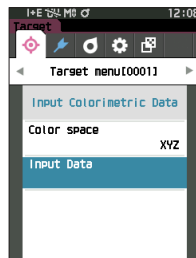
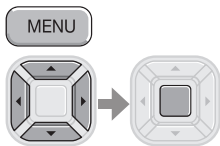


Settings

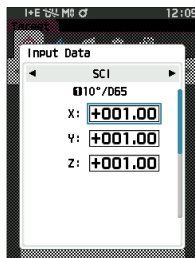
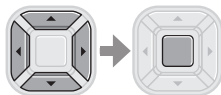
- ☐ XYZ
- ☐ L*a*b*



④ Select <Target Menu>
- <Input Colorimetric Data> - "Input Data".



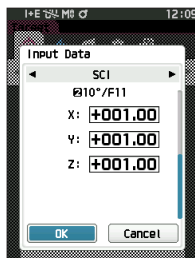
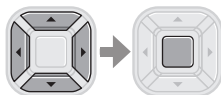
⑤ Input settings.



Settings

- ☐ X·Y·Z : 0.01 ~ +300.000
- ☐ L : 0.00 ~ +300.000
- ☐ a·b : -300.00 ~ +300.00

⑥ Once settings have been completed, select "OK" to establish them.



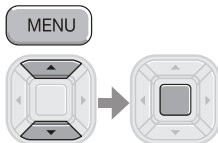
The target is set.

2

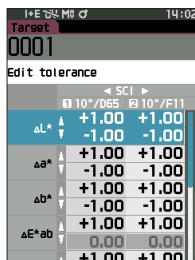
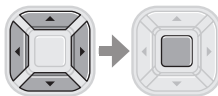
Pass/fail judgment criteria settings

P.70,
Instruction Manual

- ① Select <Target Menu> - <Pass/Fail> - "Edit tolerance".

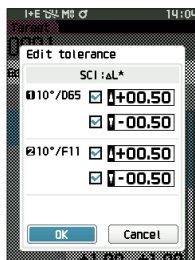
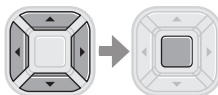


- ② Input settings.

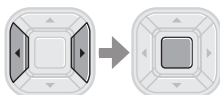


Settings

- ☐ x / y : -0.2000 to 0.2000
- ☐ Equation / MI : 0.00 to 20.00
- ☐ Other than the above : -20.00 to 20.00



- ③ Once settings have been completed, select "OK" to establish them.



1+E S&L M0 14:05

Target

0001

Edit tolerance

SCI

10°/D65 2 10°/F11

ΔL^*	+0.50	+0.50
	-0.50	-0.50
Δa^*	+1.00	+1.00
	-1.00	-1.00
Δb^*	+1.00	+1.00
	-1.00	-1.00
ΔE^*_{ab}	+1.00	+1.00
	0.00	0.00
	+1.00	+1.00

- ④ Close the "Edit tolerance" screen.



1+E S&L M0 14:06

Target

Target menu[0001]

Pass/Fail

Edit tolerance

Tolerance list

Warning level

80%

Parametric coef.

3

Measurement

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Instruction Manual

① Display the Sample screen.

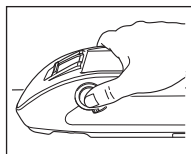


- Select a target number before imparting measurement.

Sample 0001		14:09
0001		X
SCI		
	10°/D65	2°/F11
L*	84.21	84.38
a*	-15.39	-13.52
b*	21.63	23.61
2019/11/19 13:53:12		
0001		

② Set the specimen measuring port on the sample to measure.

- Take care to prevent floating or tilting from occurring.



③ Press the measurement button.



- The results are displayed on the screen.
- A sample number is automatically assigned in the order of measurement.

Sample 0001		14:10
0002		✓
SCI		
	10°/D65	2°/F11
L*	75.90	76.01
a*	-0.23	0.01
b*	2.63	2.84
2019/11/19 14:10:14		
0001		

✓ Mark signifying a "Pass" judgment

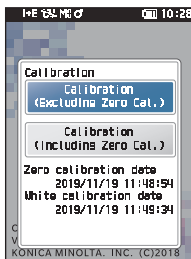
<Measuring color difference in the simple mode>

1

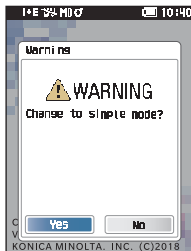
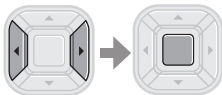
Set to "Simple mode".

P.46,
Instruction Manual

- ① Press the [ESC] button to skip the calibration prompt displayed immediately after turning the power ON.

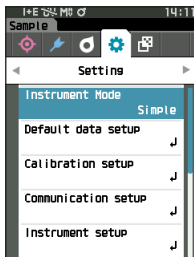
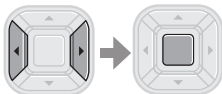


- ② Select "Yes" when "Change to the simple mode?" appears on the display.



Or,

- ① Select <Settings> - <Instrument Mode> - "Simple".



- ② Press the [Target/Sample] button or [ESC] button to switch to the simple measurement screen.



2

Measuring a target:

Absolute value measurement

P.46,
Instruction Manual

- ① Press the measurement button.



I+E SCI MO 15:11		
Target		
SCI		
	10°/D65	2°/F11
L*	75.80	75.91
a*	-0.20	0.03
b*	2.50	2.70
2019/11/19 15:11:02 SCI MO 1/2		

3

Measuring a sample:

Difference measurement

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Instruction Manual

- ① Press the measurement button.



Notes

- Measurement data is not saved in the simple mode.
- The opacity mode cannot be selected while the instrument is in the simple mode. Moreover, the simple mode cannot be engaged while the opacity mode is active.

I+E SCI MO 15:11		
Sample		
SCI		
	10°/D65	2°/F11
ΔL*	0.03	0.03
Δa*	-0.03	-0.03
Δb*	-0.08	-0.10
ΔE*ab	0.09	0.11
HI	0.02	0.02
2019/11/19 15:11:32 SCI MO 3/5		

Setting measurement conditions

Measurement conditions (Measurement mode, SMT Times, Observer/Illuminant, Display) must be set before imparting measurement.

The menu items that can be set are as follows.

P.85 - 101, Instruction Manual

Measurement cond.

Measurement mode

Color only / Opacity

Measurement setup*

Specular component

Auto average

Manual average

Manual average option

Observer/Illuminant*

Observer/Illuminant 1

Observer/Illuminant 2

Display cond.

Display type

Color space*

Color difference equation*

Custom 01 to 14



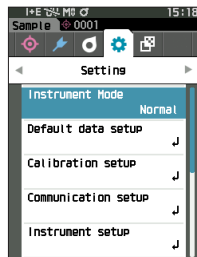
*Settable conditions in simple mode

How to set the measuring instrument

To set measurement instrument options, select “Instrument setup” from the <Setting> screen.

The menu items that can be set are as follows.

P.102 - 111, Instruction Manual



Instrument setup

User type

Language

Date format

Date & time

Brightness

Direction

Beep

Auto power off

Password setting

MEMO

MEMO



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CBHAKK