Spectrophotometer
CM-23d

En **Basic Operating Guide**

⚠ Please read before using the instrument.

This manual explains the basic procedures for measuring color with the CM-23d spectrophotometers.

Note)
For setting and operation details, see the instruction manual of the CM-23d. Use this 2D code to download it in pdf form.
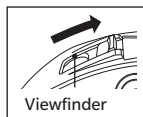
KONICA MINOLTA

Table of Contents

Names of Parts

■ Instrument

Viewfinder (Specimen confirmation window)

Viewfinder lever

LCD screen

Control panel

Charging lamp

Power switch

Viewfinder

Measurement button (It is on the left and right)

USB connection terminal (Mini-B type)

Wrist strap attachment hole

Sample surface aperture

Battery cover

Screw holes for securing

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

Status bar

Target/Sample

Data number and name

Target to be used for association with the next measurement or filter (target)

	I+E 🔋📶 M0 ⟳		13:34
	Sample ◈ 0001		
	0002		✕
		SCI	
	❶10°/D65	❷10°/F11	
ΔL*	0.10	0.07	
Δa*	−0.01	−0.08	
Δb*	−1.00	−1.11	
ΔE*ab	1.00	1.11	
MI	0.14	0.14	

2019/11/19 13:34:14 📶 M0
0001   ‹ 3/16 ›

Observer/Illuminant 1

Observer/Illuminant 2

Pass/fail result

Measurement date/time

Target reference (sample) / Affiliated group (target)

UV setting

Measurement area

■ Operation Keys

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

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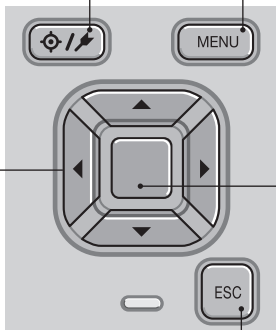
[Confirmation] key
Sets the item or setting indicated by the cursor on the various setting screens. This key also switches to detail screens for data selected in the list displayed on the **<Results Display> screen.**

[◀ , ▶ , ▲ , ▼] 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

Cap ......

Zero calibration hole

White calibration plate
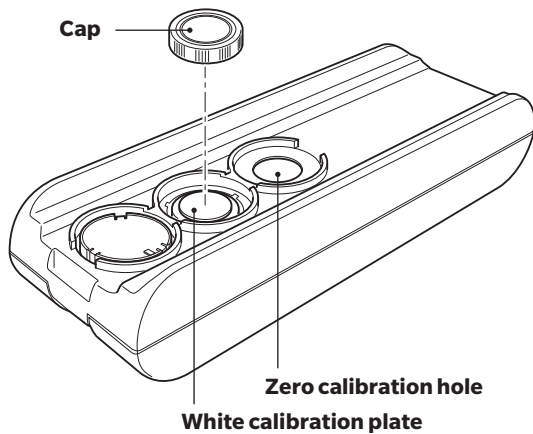
Measurement

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.
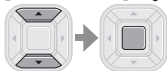
2
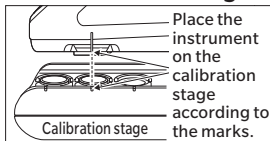## White calibration
P.36, Instruction Manual

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.**

Calibration
Calibration (Excluding Zero Cal.)
Calibration (Including Zero Cal.)
Zero calibration date 2019/11/19 08:44:31
White calibration date 2019/11/19 09:41:33
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② **Place the instrument on the calibration stage.**

Place the instrument on the calibration stage according to the marks.

Calibration stage

③ **Press the measurement button.**

Please set the instrument on the white calibration plate and press the measurement button.
White ID:40000102
KONICA MINOLTA. INC. (C)2018

· White calibration will be performed.
· Do not move the instrument until white calibration is complete.
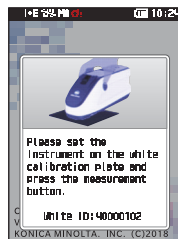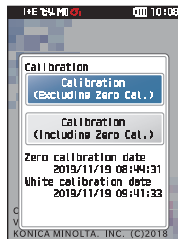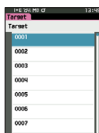
3

Measurement

P.39,
Instruction Manual

① Check the Sample screen.
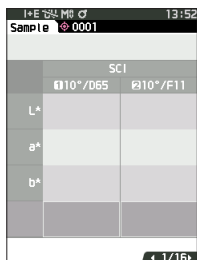
- If not displayed, switch to the Sample screen.

<Reference color screen> <Sample screen>

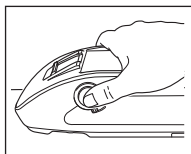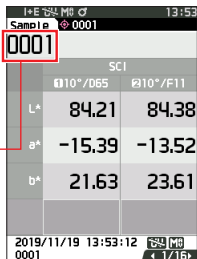## ② Set the specimen measuring port on the sample to measure.

- 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".

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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)

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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\>
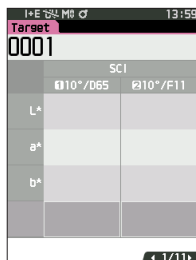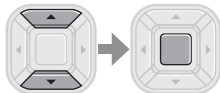
1-a

Color difference target settings

P.39,
Instruction Manual

Setting color difference by measuring a target
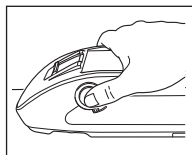
① **Display the target or target list screen.**

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

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.

	SCI	
	❶10°/D65	❷10°/F11
L*	75.89	76.00
a*	−0.24	0.01
b*	2.59	2.79

2019/11/19 14:00:49

The target is set.

1-b
Color difference target settings
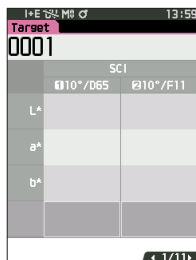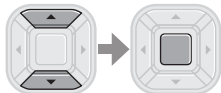
Setting colorimetric data by numerical input

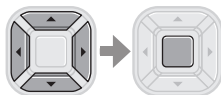① **Display the target or target list screen.**
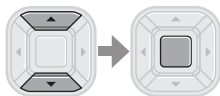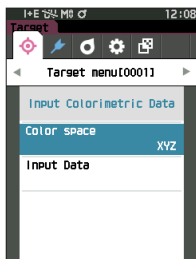

· Set the target number with the [▲] and [▼] keys before imparting measurement.

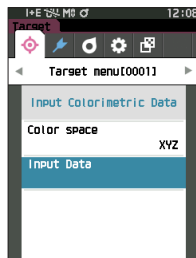
② **Select <Target menu> - <Input Colorimetric Data>**

MENU

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③ **Select the item to set.**

Settings
○ XYZ
○ L*a*b*

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

MENU

⑤ **Input settings.**

I+E MO 12:09

Input Data
◄ SCI ►
⊘10°/D65
X: +001.00
Y: +001.00
Z: +001.00
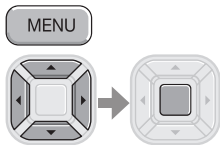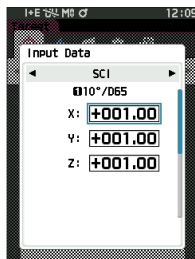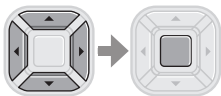
Settings
○ X·Y·Z : 0.01 ~ +300.000
○ L : 0.00 ~ +300.000
○ a·b : -300.00 ~ +300.00

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

I+E MO 12:09

Input Data
◄ SCI ►
⊘10°/F11
X: +001.00
Y: +001.00
Z: +001.00

OK Cancel

The target is set.

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Pass/fail judgment criteria settings

P.70, Instruction Manual

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

MENU

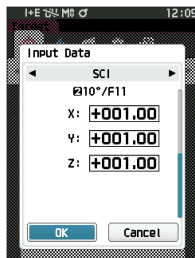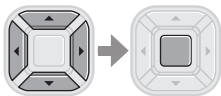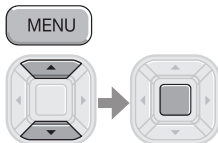I+E ᵗ⁵ˡ M0 ⚙   14:01
Target
Target menu[0001]

Pass/Fail

Edit tolerance

Tolerance list

Warning level   80%

Parametric coef.

② Input settings.

I+E ᵗ⁵ˡ M0 ⚙   14:02
Target
0001
Edit tolerance
◄ SCI ►
❶10°/D65 ❷10°/F11
ΔL* ▲ +1.00   +1.00
     ▼ -1.00   -1.00
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
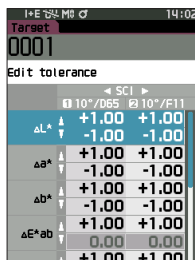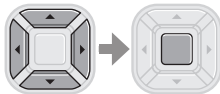
Settings
◯ x / y : -0.2000 to 0.2000
◯ Equation / MI : 0.00 to 20.00
◯ Other than the above : -20.00 to 20.00

I+E ᵗ⁵ˡ M0 ⚙   14:04
Target
0001
Edit tolerance
SCI :ΔL*
❶10°/D65 ☑ ▲+00.50
          ☑ ▼-00.50
❷10°/F11 ☑ ▲+00.50
          ☑ ▼-00.50

    OK   Cancel

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

④ **Close the "Edit tolerance" screen.**

ESC

Target menu[0001]

Pass/Fail

Edit tolerance

Tolerance list

Warning level
80%

Parametric coef.

14

When color difference is measured

3

Measurement

① **Display the Sample screen.**

$\boxed{\odot/\digamma}$ $\boxed{\odot/\digamma}$

· Select a target number before imparting measurement.

	Sample ⊕ 0001	14:09
0001		✕
	SCI	
	①10°/D65	②10°/F11
L*	84.21	84.38
a*	-15.39	-13.52
b*	21.63	23.61
2019/11/19 13:53:12	0001	◄ 1/16 ►

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.**

$\boxed{\odot}$
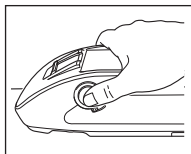
· The results are displayed on the screen.
· A sample number is automatically assigned in the order of measurement.

	Sample ⊕ 0001	14:10
0002		✓
	SCI	
	①10°/D65	②10°/F11
L*	75.90	76.01
a*	-0.23	0.01
b*	2.63	2.84
2019/11/19 14:10:14	0001	◄ 1/16 ►

⊘ Mark signifying a "Pass" judgment

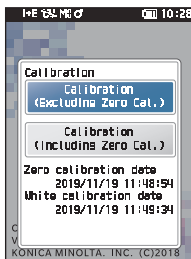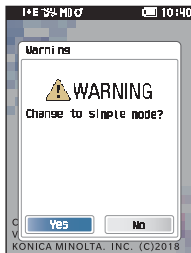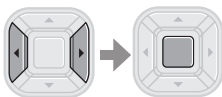# \<Measuring color difference in the simple mode\>

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.**

ESC

Calibration
Calibration
(Excluding Zero Cal.)
Calibration
(Including Zero Cal.)
Zero calibration date
2019/11/19 11:48:54
White calibration date
2019/11/19 11:49:34

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

Warning

⚠ WARNING

Change to simple mode?

Yes   No

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. . . .

Or,

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

Sample

Setting

Instrument Mode
Simple
Default data setup
Calibration setup
Communication setup
Instrument setup
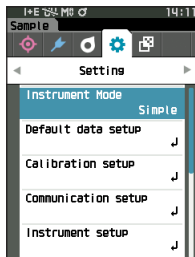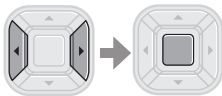
② **Press the [Target/Sample] button or [ESC] button to switch to the simple measurement screen.**

$\bigcirc\!\!/\!\!\nearrow$ or ESC

2

Measuring a target:

Absolute value measurement

P.46, Instruction Manual

① **Press the measurement button.**

I+E M0
Target

	SCI	
	①10°/D65	②10°/F11
L*	75.80	75.91
a*	−0.20	0.03
b*	2.50	2.70

2019/11/19 15:11:02
◀ 1/ 2▶

3

Measuring a sample:

Difference measurement

P.46, 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 M0
Sample ✓

	SCI	
	①10°/D65	②10°/F11
ΔL*	0.03	0.03
Δa*	−0.03	−0.03
Δb*	−0.08	−0.10
ΔE*ab	0.09	0.11
MI	0.02	0.02

2019/11/19 15:11:32
◀ 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

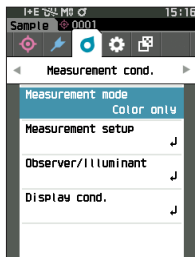Observer/Illuminant*

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
Wake On Mode
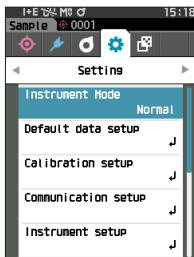
MEMO

MEMO

KONICA MINOLTA