Spectrodensitometer FD-7/FD-5

E Instruction Manual

⚠ Please read before using the instrument.

KONICA MINOLTA

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.

☢ Denotes a sentence regarding precaution for LED.
Read the sentence carefully to ensure safe and correct use.

Trademarks

• "basICColor" and "basICColor catch all" are registered trademarks of basICColor GmbH.

Notes on this Manual

• Copying or reproduction of all or part of the contents of this manual without KONICA MINOLTA's permission is strictly prohibited.

• The contents of this manual are subject to change without prior notice.

• Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact a KONICA MINOLTA 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.	❗	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.
❗	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.		
⚠☀	Do not place lenses, mirrored objects, or optical elements in the optical path of the UV-LED beam. The LED light will be focused and may damage your eyes or cause a fire or injury. So the above does not happen inadvertently, make the environment behind the target one that blocks LED light, such as a wall.	🔌	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.
⚠☀	Do not look directly into the LED light. Doing so may damage your eyes.	🚫	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.
❗	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.
		🚫	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.)	
🚫	Do not perform measurement with the specimen measuring port directed towards your eyes. Doing so may damage your eyes.	🔌	Setup the environment so there is an outlet near the instrument and the power plug can be easily plugged in and unplugged.
❗	Use caution not to get your hands stuck in the instrument's opening and closing sections. Doing so may result in an injury.	🔌	When cleaning the instrument, unplug the power plug from the outlet. Not doing so may cause electric shock.
🚫	Do not seal the instrument's air vent (refer to page E-14) with tape or any other materials. Doing so may cause a fire.		

Introduction

Thank you for purchasing this KONICA MINOLTA instrument.
This instrument is a compact, lightweight, portable fluorescent spectrodensitometer perfect for the printing and digital imaging industries, and it can measure both color and density in a single unit.

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 35°C and a relative humidity between 30% and 85% (at 35°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.).
- 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 instrument and the AC adapter supplied as a standard accessory have been designed exclusively for indoor use. They should never be used outdoors because rain or other factors may damage the instrument.

▎Measurement

- Do not allow dirt or dust to enter the instrument's port. Be sure that the specimen measuring port is always covered by either the Protection Glass or Polarization Filter.
- When not using the instrument for a long period of time, blow off dirt or dust on the Protection Glass with a blower before use.
- 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 white calibration be done regularly using the White Calibration Plate.

▎White Calibration Plate

- The White Calibration Plate must be used in combination with the instrument that bears the same pairing number.
- The calibration data for the White Calibration Plate was measured at 23°C.
- To achieve the highest accuracy when measuring absolute values (colorimetric values), calibration and measurement should be performed at 23°C.
- Do not allow the White Calibration Plate (FD-A06) to get scratched or stained.
- When not using the White Calibration Plate, always place it in the Soft Case (FD-A05), a standard accessory, and use care so the White Calibration Plate is not exposed to ambient light or dust.

Protection Glass

- The measurement value will be affected if the glass portion of the Protection Glass is dirty. Use care not to let it get dirty. 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.
- The Protection Glass should be removed from the instrument only to replace it with the Polarization Filter.
- When not attached to the instrument, be sure to store the Protection Glass carefully so that it does not get lost and protect it from dust or scratching.

Polarization Filter

- When not attached to the instrument, be sure to store the Polarization Filter carefully and protect it from dust or scratching.

Target Mask

- Do not touch the Target Mask's port by hand, let it get dirty, or scratch it.
- When not using the Target Mask, place it in the Soft Case (FD-A05), a standard accessory, and use care so the Target Mask is not exposed to ambient light or dust.

Ruler (FD-7 only)

- A coating to improve sliding has been applied to the sliding surface. 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.

Illuminance Adapter (FD-7 only)

- The Illuminance Adapter must be used in combination with the instrument that bears the same pairing number.
- Do not allow the Illuminance Adapter (FD-A03) to get dirty or scratched.
- When not using the Illuminance Adapter, always place it in the Soft Case (FD-A05), a standard accessory, and use care so the Illuminance Adapter is not exposed to ambient light or dust.

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 specimen measuring port is an extremely precise optical component, great care should be taken to prevent it from getting dirty or exposing it to impacts. Be sure that the specimen measuring port is always kept covered by either the Protection Glass or Polarization Filter, even when the instrument is not being used.
- 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 number of possible measurements per charge with the internal lithium-ion battery is 2,000. (When new, fully charged)
- When purchased, the battery is not charged. Refer to page E-25 "Connecting the AC Adapter" and charge it correctly.
- Charge the battery at a temperature from 0°C to 40°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 0°C and 45°C and a relative humidity between 0% and 85% (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 freezing or 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.
- If dust enters inside the specimen measuring port, the instrument cannot measure accurately. Be sure that the specimen measuring port is always covered by either the Protection Glass or Polarization Filter even when not using the instrument. When not using the instrument, place it in the Soft Case (FD-A05), a standard accessory, for storage.
- The White Calibration Plate (FD-A06) and the Illuminance Adapter (FD-A03) (FD-7 only) may become discolored if left exposed to light. Therefore, except when using them, always store them so they are not exposed to ambient light.
- 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.
- When the White Calibration Plate (FD-A06) is dirty, wipe it with a soft, clean dry cloth. If dirt is difficult to remove, wipe it off with a cloth dampened with commercially available lens cleaning solution. Then remove the solution with a cloth dampened with water, and leave the plate to dry.
- 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

Preparation

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

Before Using the Instrument

Preparation

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

1

Standard Accessories

Name		Description
White Calibration Plate FD-A06		Used to perform white calibration for colorimetric measurement.
Protection Glass FD-A04		Attached to the instrument. Protects the specimen measuring port so dust and dirt cannot get inside. Used for normal (non-polarized) reflectance measurements.
Polarization Filter FD-A08		Used for polarized measurements (reflectance measurements with polarized filter attached). Using the Polarization Filter for measurements can provide measurement results that take into account the effects of drydown.
Target Mask FD-A01		Used to accurately measure a specimen by aiming at the location on the specimen you wish to measure.
Ruler FD-A02		Used when connected to a PC to perform scan measurements. Memo/ Not included with the FD-5.
Illuminance Adapter FD-A03		Used when performing illuminance measurements. Memo/ Not included with the FD-5.
AC Adapter* AC-A305J (North and South America and Taiwan) FW7711/0.7 (Europe) AC-A305H (Korea) MM611 (Singapore)		Used to supply power from an AC outlet to the instrument. (North and South America and Taiwan) Input: 100-240 V $\sim$ 50/60 Hz 0.15 A Output: 5 V $=$ 1 A (Europe) Input: 100-240 V $\sim$ 50-60 Hz 100 mA Output: 5 V $=$ 700 mA (Korea) Input: 100-240 V $\sim$ 50-60 Hz 0.3 A Output: 5 V $=$ 1.0 A (Singapore) Input: 100-240 V $\sim$ 50-60 Hz Output: 5.2 V $=$ 500 mA
USB Cable* IF-A23 (worldwide except Europe) IF-A17 (Europe)		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 FD-S1w		Software for receiving data from FD-7/FD-5 into Excel, for setting color sets in the instrument, and saving/setting user illuminant data.

* Form differs according to region.

Optional Accessories

Name	Description
basICColor catch all Color Management Software	Software that can operate the instrument from a PC, perform scan measurements and data processing, and file management.
XY Automatic Color-Measurement Stage ColorScoutA3+	Stage for automatic instrument positioning and measurement of color charts with high efficiency.
Color Management Software SpectraMagic® NX CM-S100w	Software for color quality control with highly customizable display and print screens.

Before Using the Instrument

System Diagram

FD-7

USB Cable
IF-A23

AC Adapter
AC-A305J

Spectrodensitometer
FD-7

Protection Glass
FD-A04

PC
(Commercial Product)

Color Management
Software basICColor
catch all*

Color Data Software
CM-S100w
Spectra Magic® NX
Professional Edition
Lite Edition

XY-Automatic
Color-Measurement Stage
ColorScoutA3+

——— Standard
Accessories

------- Optional
Accessories

White Calibration
Plate
FD-A06

Target Mask
FD-A01

Ruler
FD-A02

Illuminance
Adapter
FD-A03

Soft Case
FD-A05

Polarization Filter
FD-A08

Data
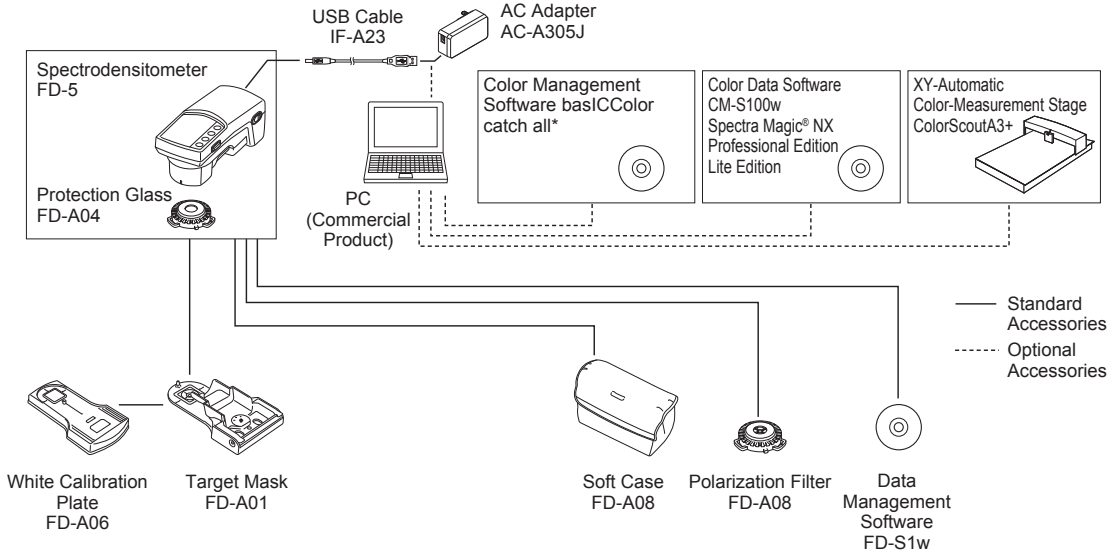Management
Software
FD-S1w

FD-5

USB Cable
IF-A23

AC Adapter
AC-A305J

Spectrodensitometer
FD-5

Protection Glass
FD-A04

PC
(Commercial Product)

Color Management
Software basICColor
catch all*

Color Data Software
CM-S100w
Spectra Magic® NX
Professional Edition
Lite Edition

XY-Automatic
Color-Measurement Stage
ColorScoutA3+

——— Standard
Accessories

------- Optional
Accessories

White Calibration
Plate
FD-A06

Target Mask
FD-A01

Soft Case
FD-A08

Polarization Filter
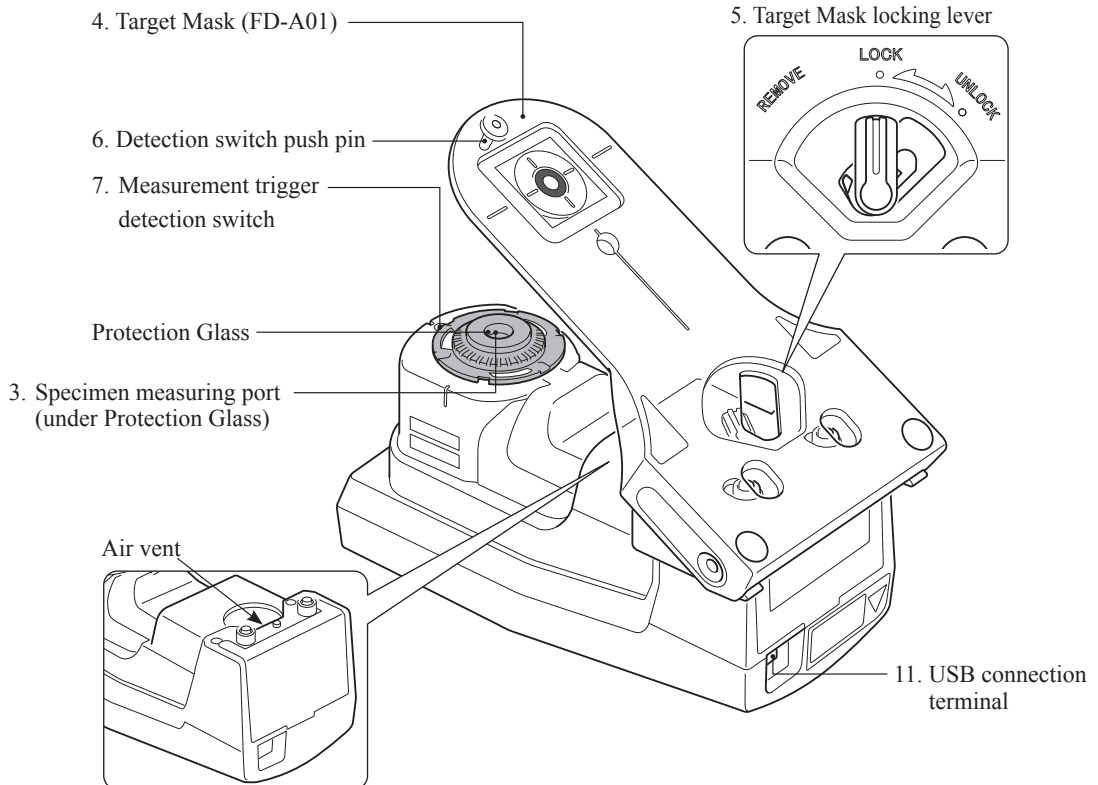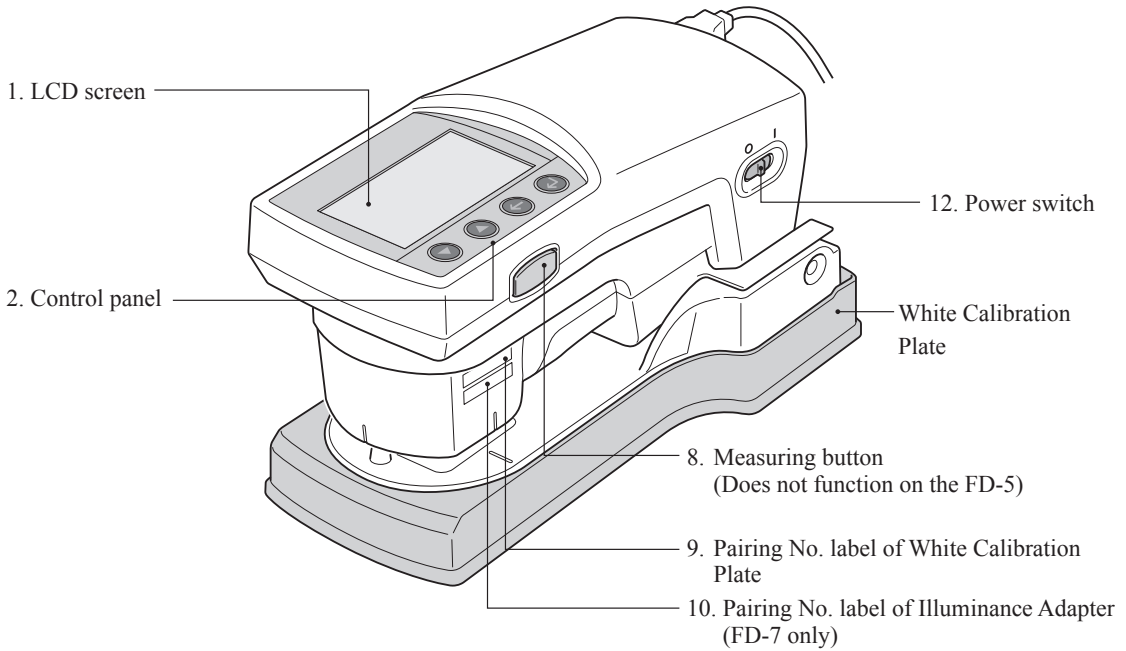FD-A08

Data
Management
Software
FD-S1w

* Capable of checking offset printing device certification (ISO 12647-2) conformance.

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-15
2. Control panel	Used to switch screens or select/determine/save setting items.	Page E-15
3. Specimen measuring port	The port for measuring the specimen.	Page E-21
4. Target Mask (FD-A01) (Standard accessory)	Used to accurately measure a specimen by aiming at the location on the specimen you wish to measure.	Page E-19, E-20
5. Target Mask locking lever	Used to lock the target mask when attaching it and to release the target mask when removing it. For details, refer to "Attaching/Removing the Target Mask" on page E-19.	Page E-19, E-20
6. Detection switch push pin	By pushing the instrument down from above, the detection switch push pin pushes the measurement trigger detection switch to execute the measurement.	—
7. Measurement trigger detection switch		—
8. Measuring button	Press this button to perform calibration or measurement. ⎯Memo⎯ Does not function on the FD-5.	Page E-108, E-130, E-134
9. Pairing No. label of White Calibration Plate	Shows the identification No. of the White Calibration Plate that can be used with the instrument.	Page E-18
10. Pairing No. label of Illuminance Adapter	Shows the identification No. of the Illuminance Adapter that can be used with the instrument. ⎯Memo⎯ FD-7 only.	Page E-23
11. USB connection terminal	Used to connect the instrument to a PC with the optional USB cable.	Page E-134
	When using AC Adapter, power can be supplied through the USB cable.	Page E-25
12. Power switch	Used to turn ON/OFF power. Setting this switch to "○" turns the power OFF, and setting it to "Ι" turns the power ON.	Page E-27

# Instrument Body, White Calibration Plate, Target Mask

1. LCD screen

12. Power switch

2. Control panel

White Calibration Plate

8. Measuring button
   (Does not function on the FD-5)

9. Pairing No. label of White Calibration Plate

10. Pairing No. label of Illuminance Adapter (FD-7 only)

4. Target Mask (FD-A01)

5. Target Mask locking lever

REMOVE   LOCK   UNLOCK

6. Detection switch push pin

7. Measurement trigger detection switch

Protection Glass

3. Specimen measuring port (under Protection Glass)

Air vent

11. USB connection terminal

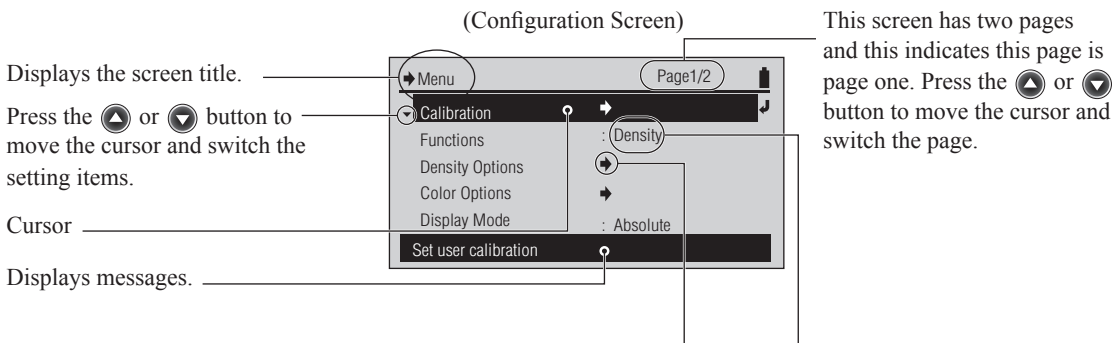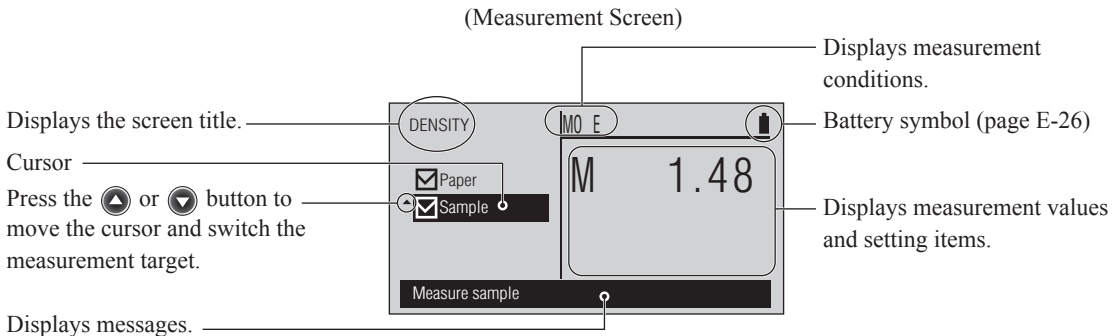# Control Panel/Screen Display (LCD Screen)

☐ 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.
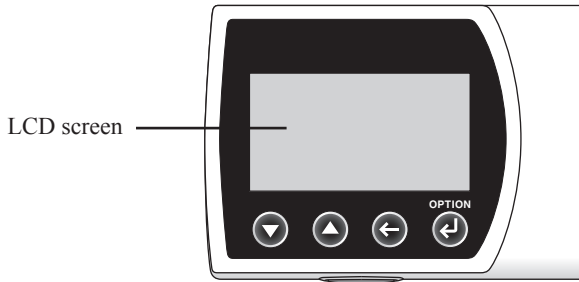
LCD screen

☐ 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)

Displays measurement conditions.

Displays the screen title.

DENSITY   M0 E

Battery symbol (page E-26)

Cursor

Press the ▲ or ▼ button to move the cursor and switch the measurement target.

☑ Paper
☑ Sample

M   1.48

Displays measurement values and setting items.

Measure sample

Displays messages.

(Configuration Screen)

This screen has two pages and this indicates this page is page one. Press the ▲ or ▼ button to move the cursor and switch the page.

Displays the screen title.

➜ Menu   Page1/2

Press the ▲ or ▼ button to move the cursor and switch the setting items.

Calibration   ➜
Functions   : Density
Density Options   ➜
Color Options   ➜
Display Mode   : Absolute

Cursor

Set user calibration

Displays messages.

For the left item ("Density Options" here), indicates settings on the next screen. Press the ⏎ (Enter)/OPTION button to go to the next screen.

For the left item ("Functions" here), the setting is displayed. To change the setting, press the ⏎ (Enter)/OPTION button to go to the next screen.

Memo You can flip the display on the LCD screen vertically. (page E-138)

Preparation

2

White Calibration Plate

White calibration data is attached to the White Calibration Plate included with the instrument, and the white calibration data is saved in the instrument.

Notes
- A five digit number, called the "Pairing Number", is included on the instrument and the White Calibration Plate and is a separate number from their respective serial numbers. The White Calibration Plate must be used in combination with the instrument that bears the same pairing number.
- When not using the White Calibration Plate, always place it in the Soft Case (FD-A05), a standard accessory, and use care so the White Calibration Plate is not exposed to ambient light or dust.

Pairing Number

White Calibration Plate

White Calibration Plate (FD-A06)
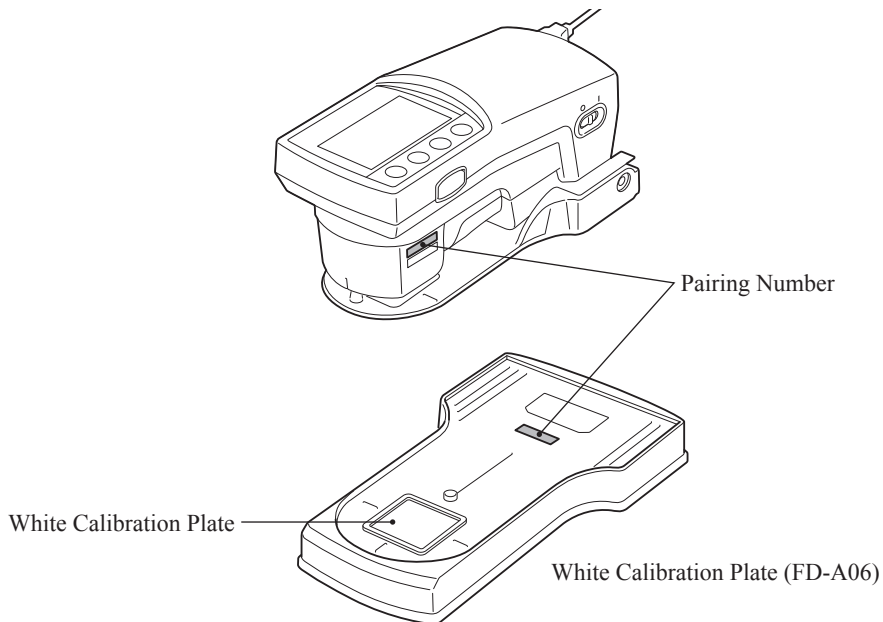
Attaching/Removing the Target Mask

The target mask is used to accurately measure a specimen by aiming at the location on the specimen you wish to measure.

Remove the Target Mask when performing illuminance measurements and when performing scan measurements connected to a PC.

Notes • The measurement value will be affected if the Target Mask's port is dirty. Use care not to let it get dirty. 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.

• Use caution as the instrument may fall if you make a mistake when attaching or removing the Target Mask or when locking or unlocking it.

Memo Illuminance measurement and scan measurement connected to a PC are FD-7-only features.
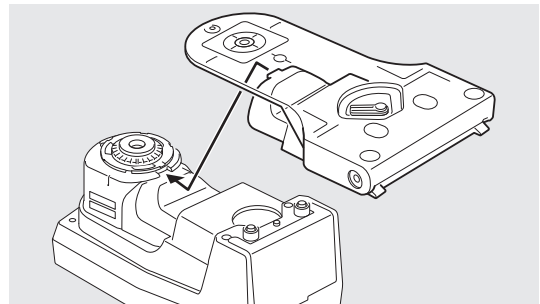
Attach or remove the Target Mask using the procedure below.
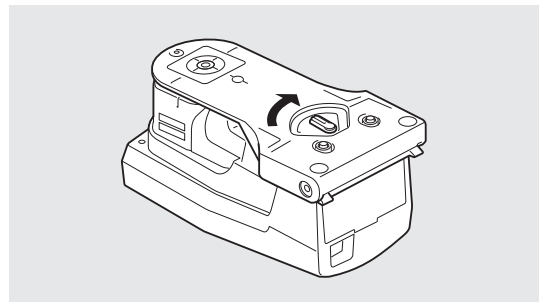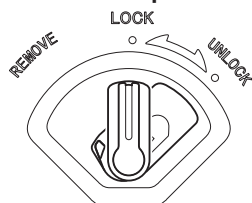
Preparation

Attaching the Target Mask

1 Align the Target Mask locking lever with "REMOVE".
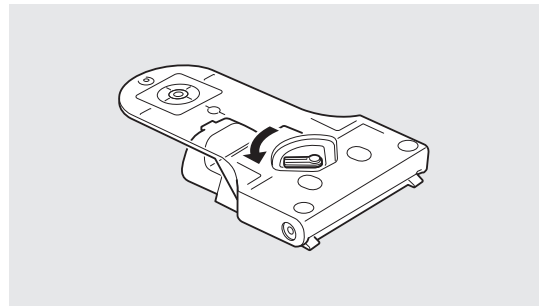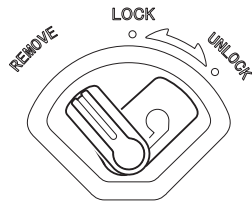
2 Push the target mask tab into the cut in the outer edge of the specimen measuring port and fit the locking lever side into the instrument.
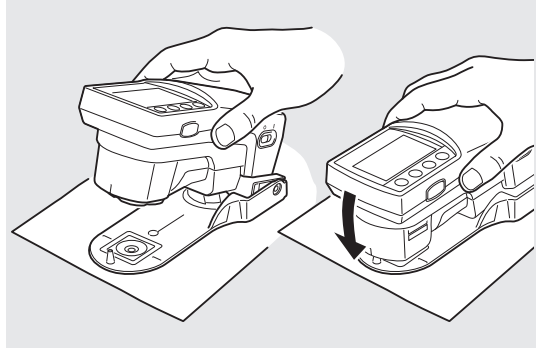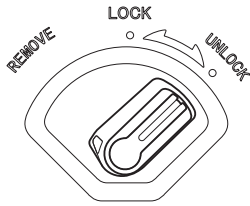

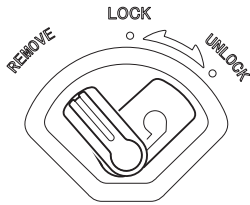**3** Align the Target Mask locking lever with "LOCK" to secure it in place.

Handling the Target Mask during Measurements

When measuring, align the Target Mask locking lever with "UNLOCK" to use the instrument.
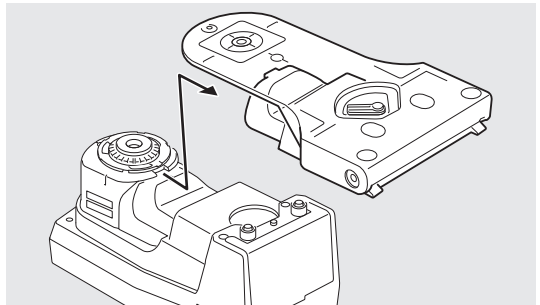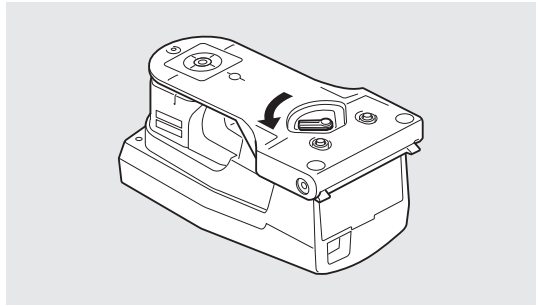
Removing the Target Mask

1 **Align the Target Mask locking lever with "REMOVE".**

2 **Pull the Target Mask from the lock lever side to remove it.**

Preparation

Changing between Protection Glass and Polarization Filter

The instrument is shipped with the Protection Glass attached over the specimen measuring port. You can attach the Protection Glass or the Polarization Filter over the specimen measuring port according to the measurement function you intend to use and your particular application.

For <PS Plate Dot %> or <PS Plate Dot Gain> measurements, it is recommended that the Polarization Filter be used.

For <Illuminance> or <Paper> measurements, the Polarization Filter should not be used. If the Polarization Filter is used with these measurement functions, measurement values may not be correct.

Changing between the two accessories can be performed according to the procedure below. (The illustrations show changing from Protection Glass to Polarization Filter.)

- To protect the specimen measuring port and prevent the entry of dust, etc., it should always be covered by either the Protection Glass or Polarization Filter.
- The Protection Glass is necessary for the instrument to perform wavelength compensation when white calibration is performed. Be careful not to lose the Protection Glass when it has been removed and replaced on the instrument by the Polarization Filter.

Notes
- The measurement value will be affected if the glass portion of the Protection Glass or Polarization Filter is dirty. Use care not to let it get dirty. 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.

- The measurement value changes depending on whether the Protection Glass or Polarization Filter is attached. When comparing measurements, be sure they were taken with the same attachment (Protection Glass or Polarization Filter) attached.

- When not in use, be sure to store the unused accessory (Protection Glass or Polarization Filter) carefully and protect it from dust or scratches.

- After attaching the Polarization Filter for the first time, it is necessary to perform zero calibration before performing white calibration. See page E-31.
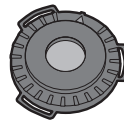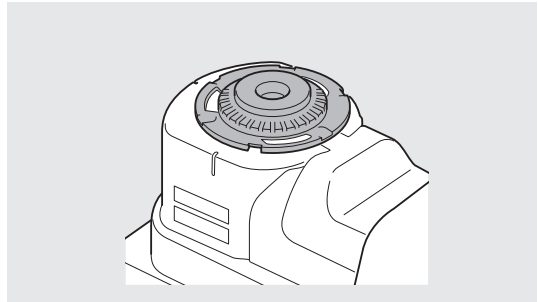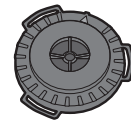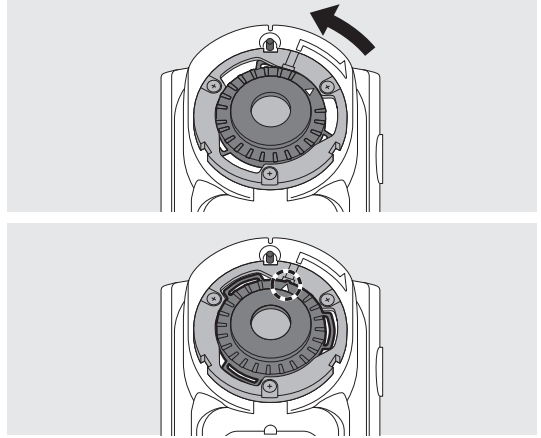
Protection Glass   Polarization Filter

❘ Removing the Protection Glass or Polarization Filter

1 While pressing down on the ribbed rim of the attachment (Protection Glass or Polarization Filter), turn it counterclockwise until it stops and the ▲ mark is aligned with the line on the black frame.

2 While being careful not to drop the attachment, turn the instrument over so that the attachment comes out in your hand.

❘ Attaching the Polarization Filter or Protection Glass

1 Place the attachment (Polarization Filter or Protection Glass) over the specimen measuring aperture with the ▲ mark on the attachment aligned with the line on the black frame around the specimen measuring aperture and fit the tabs of the attachment into the corresponding spaces in the frame.

2 While pressing down on the ribbed rim of the attachment, turn it clockwise until it clicks in place and the ▲ mark is aligned with the screw on the black frame.
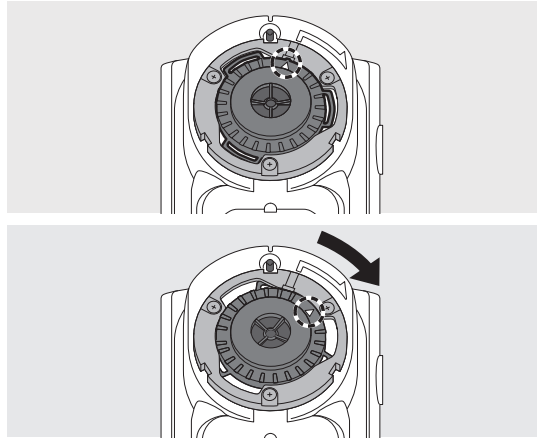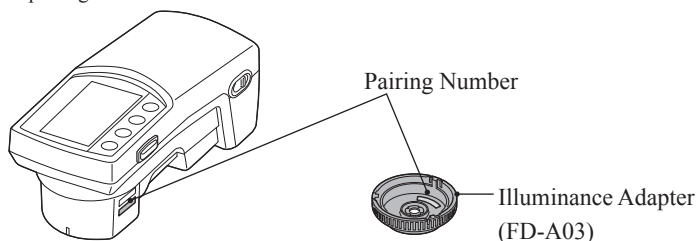
Attaching/Removing the Illuminance Adapter (FD-7-only Accessory)

The Illuminance Adapter is used when performing illuminance measurements.

Memo   Illuminance measurement is an FD-7-only feature.

Notes   • The Protection Glass should be attached to the instrument when using the Illuminance Adapter. Do not use the Illuminance Adapter with the Polarization Filter attached to the instrument.

       • A five digit number, called the "Pairing Number", is included on the instrument and the Illuminance Adapter and is a separate number from their respective serial numbers. The Illuminance Adapter must be used in combination with the instrument that bears the same pairing number.

Pairing Number

Illuminance Adapter
(FD-A03)

Attach or remove the Illuminance Adapter using the procedure below.

Memo   Attach or remove the Illuminance Adapter with the Target Mask removed.

Attaching the Illuminance Adapter

1   **Place the Illuminance Adapter over the specimen measuring port so that the Illuminance Adapter's ▲ mark is aligned with the starting point of the ⬉ mark used for positioning on the outer edge of the specimen measuring port.**

2   **Hold the outer edge of the Illuminance Adapter and turn it in the direction of the arrow (clockwise). Turn it until the position where the ▲ mark aligns with and stops at the end point of the ⬉ mark to secure it.**
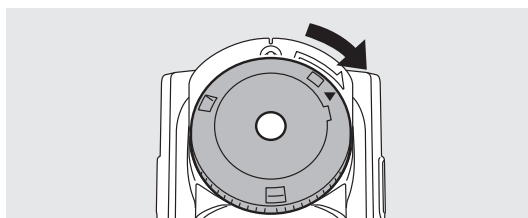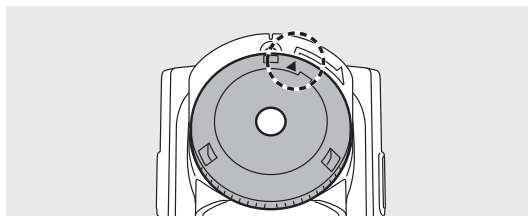
Removing the Illuminance Adapter

1   **Hold the outer edge of the Illuminance Adapter and turn it in the opposite direction of the arrow (counterclockwise) to remove it. Turn it until the Illuminance Adapter's ▲ mark is at the start position of the ⬉ mark on the instrument used for positioning.**

2   **Hold the outer edge of the Illuminance Adapter and remove it.**

Preparation
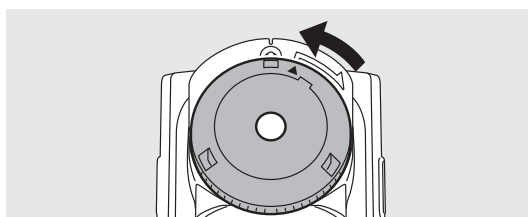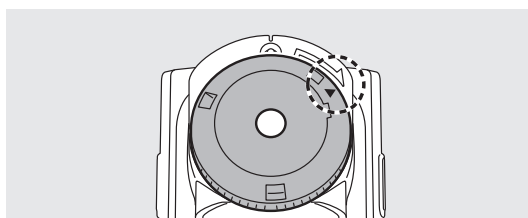
Ruler (FD-7-only Accessory)

The ruler is used when connected to a PC to perform scan measurements.

Notes • The measurement value will be affected if the Ruler's opening is dirty. Use care not to let it get dirty.
• A coating to improve sliding has been applied to the sliding surface. 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.

Memo • Scan measurement connected to a PC is an FD-7-only feature.
• The Ruler is used with the Target Mask removed.
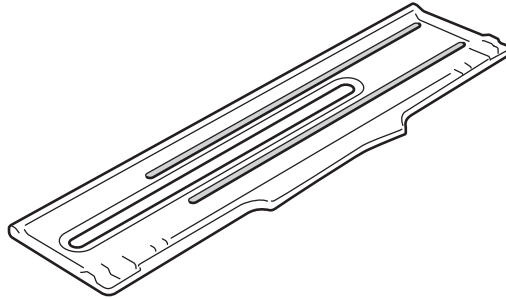
Notes • The Ruler grooves and the tip of the Protection Glass or Polarization Filter may wear by performing scan measurements over a long period of time. When they wear, the instrument slides poorly which may cause errors. If you allow the wear to advance, the measurement height will no longer be appropriate which can lead to measurement errors. We recommend regular maintenance for these accessories.

Preparation

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-A23 or 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 "○").**
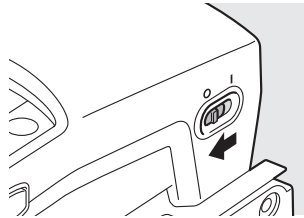
2 **Plug the USB cable's connector (A type) into the AC adapter.**

Form differs according to region.
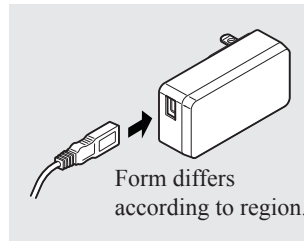
3 **Connect the USB cable's connector (B type) to the USB connection terminal.**

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

Preparation

▌ 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

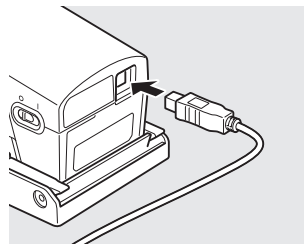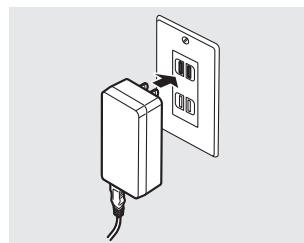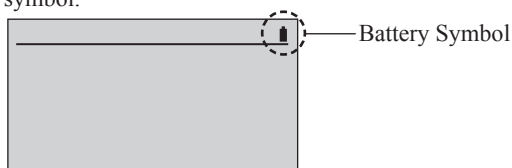| Battery Symbol	State	Description	Comment
	Charging	When charging via the AC adapter or USB bus power, the battery charging symbol is displayed as the battery symbol. **Memo** / It is not displayed when the power switch is turned OFF, but the internal lithium-ion battery is still charging. There is no worry about overcharging the battery.	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 200 times after this symbol is displayed.
	Full battery	The internal lithium-ion battery has sufficient power during battery operation.	You can measure about 2,000 times 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.

Preparation

Turning Power ON/OFF

[Operating Procedure]

Turning power ON

1 **Slide the Power switch to the "I" side.**
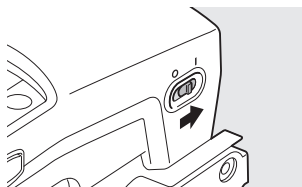
The power is ON.

Turning power OFF

1 **Slide the Power switch to the "○" side.**
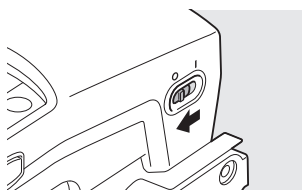
After settings such as the measurement conditions are saved to the instrument, the power turns OFF.

▌Auto Power Off Feature

This instrument is equipped with an auto power off feature. When the control buttons are not operated for approximately 1 hour, the power is turned OFF automatically.
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 "I" side. Slide it to the "○" side.

Preparation

▌ Selecting the Display Language (When First Turning ON the FD-7/5)

When you first turn ON the instrument's power after purchase, the <Language> screen is displayed in English. You can select and change the display language from a total of six languages including English.

(LCD Screen)

Indicates that "English" is currently selected as the display language.

Indicates you can move the cursor down using the ▼ button.

```
→Language          Page1/2    ▯
○⊙ English                      ↵
  ○ Japanese
  ○ German
  ○ French
  ○ Spanish
Switch to English
```

The cursor is pointing at "English".

[Operating Procedure]

1 **Move the cursor to the language you wish to select with the ▲ or ▼ button, then press the ⊕(Enter)/OPTION button.**
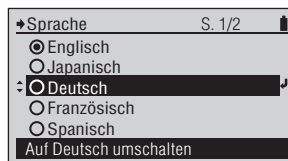
```
→Sprache           S. 1/2     ▯
  ⊙ Englisch
  ○ Japanisch
⇕ ○ Deutsch                    ↵
  ○ Französisch
  ○ Spanisch
Auf Deutsch umschalten
```
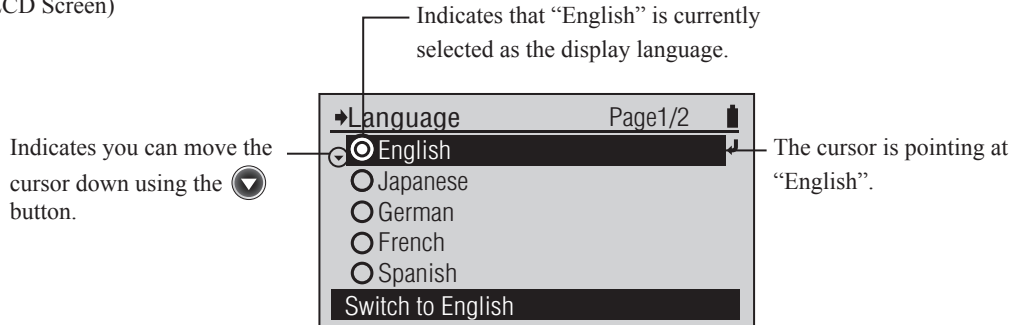
The <Änderung bestätigen> (Confirm Change) screen is displayed.

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

```
→Änderung bestätigen          ▯
Soll die Sprache
umgeschaltet werden?
↓OK                            ↵
  Abbrechen

Auf Deutsch umschalten
```

```
→Fehler                       ▯
Kalibr. nicht durchgeführt.
Kalibr. durchführen.
↓OK                            ↵
  Abbrechen

Benutzerkalibr. einstellen
```
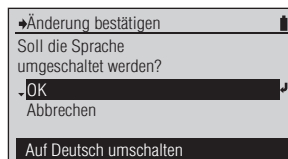
After the initial screen, the calibration prompt screen is displayed. Select "OK" to run calibration or select "Abbrechen" (Cancel) and you can skip calibration.

Preparation for Measurement

Before Using the Instrument

Preparation

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

Flow of Measurement

▌ Basic procedure　　　　　▌ Optional settings

Power ON (page E-27)

Select Display Language (page E-28)
* As necessary, such as when the power is first turned ON

Calibration (page E-31)
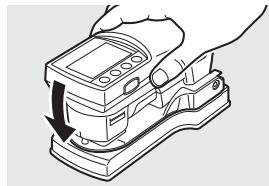
Configure the Measuring Instrument (page E-28, E-136-E-146)
* As necessary, such as when the power is first turned ON

Select Measurement Function (page E-33)
* As necessary, such as when changing the measurement item from the previous time

♦Functions	Page1/2	🔋
◉Density	○PS Dot %	
○Dot %	○PS Dot Gain	
○Dot Gain	○Spt Clr Den	
○Trapping	○Color	
○Dens Diff	○Color Diff	
Measure density		

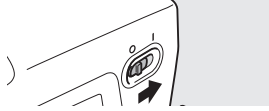| ♦Functions	Page2/2	🔋
◉Illuminance	○Paper	
○Graybalance	○Auto	
○Midtonesprd		
○ISO Check		
○Targetmatch		
Measure ambient light		
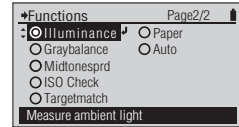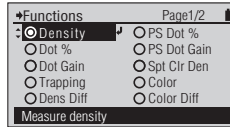
Configure the Measurement Conditions (page E-34, E-35-E-81)
* As necessary, such as when changing the measurement conditions from the previous time

♦Options	Page1/1	🔋
Den. Filter	: Auto	
Select Target	: Auto	
Edit Target	➡	
Display Mode	: Absolute	
Menu	➡	
Select from Auto,All,K,C,M,Y		
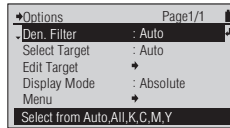
("DENSITY" Options Screen Example)

Measurement (page E-33, E-83-E-131)
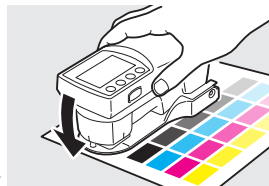
Completion of Measurement (page E-27)

Calibration

▌ Zero Calibration (necessary for Polarization Filter only)

The calibration screen requesting that zero calibration be performed will appear when "Polarized Meas." is changed from "Off" to "On", or when "Polarized Meas." is set to "Auto" and the presence of the Polarization Filter has been detected. Once zero calibration has been performed, the results of zero calibration will be kept stored in the instrument even if the power is switched off.

Memo • When using multiple instruments with multiple Polarization Filters, be sure to use the Polarization Filter together with the instrument on which zero calibration was performed for that Polarization Filter. If you are unsure whether zero calibration was performed for the Polarization Filter currently attached to the instrument, it is recommended that zero calibration be performed again.

[Operating Procedure]

1 When "Polarized Meas." is changed from "Off" to "On" and the menu is exited, the calibration screen will appear.

To run calibration when a screen other than the calibration prompt screen is displayed, run it from the <Menu> screen. Refer to page E-32.

2 Check that "Zero Calibration" is highlighted. If necessary, use the ⬆ button to move the cursor to "Zero Calibration".

"Zero Calibration" will not be shown if "Polarized Meas." is set to "Off".

3 Aim the specimen measuring aperture into the air.

1 m or more
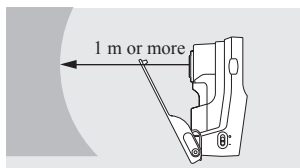
• Do not direct the specimen measuring port toward a light source (including illumination such as a fluorescent lamp).

• Keep the specimen measuring port more than 1 m away from any reflective items (hands, desks, walls etc.).

4 Close the target mask so that the detection switch push pin pushes the measurement trigger detection switch.

Target Mask

You will hear a beep and see "Calibrating..." displayed.

5 Keep the target mask closed until you hear another beep.
Zero calibration requires several seconds to complete. Keep target mask closed and instrument aimed into air until you hear another beep.
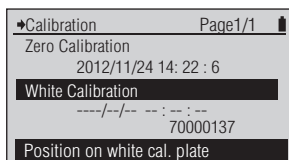
The zero calibration date and time will appear, and the cursor moves to "White Calibration".

6 Proceed with White Calibration (page E-32).

Preparation for Measurement

Calibration

White Calibration

This instrument must perform white calibration after it is first turned ON or after a fixed amount of time has elapsed from the last white calibration. White calibration must also be performed when changing between the Protection Glass and the Polarization Filter covering the specimen measuring aperture.

Memo
- Unique calibration data is attached to the included White Calibration Plate.
- 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 white calibration regularly.
- If the ambient temperature changes greatly, the calibration prompt screen may be displayed. In this case, make sure to perform white calibration.
- When a fixed amount of time elapses from the last white calibration, the calibration prompt screen is displayed. This calibration expiry can be changed. Refer to page E-141 "Configuring the White Calibration Expiry".

Notes
- If zero calibration (page E-31) is necessary, it should be performed before performing white calibration.
- A five digit number, called the "Pairing Number", is included on the instrument and the White Calibration Plate and is a separate number from their respective serial numbers. The White Calibration Plate must be used in combination with the instrument that bears the same pairing number. (page E-18)
- Perform white calibration at the same temperature conditions as when measuring.
- Allow the instrument and the White Calibration Plate to become fully accustomed to the ambient temperature before performing white calibration.
- Wavelength compensation is performed at the same time as white calibration when the Protection Glass is attached, but is not performed when white calibration is performed with the Polarization Filter is attached. When using the Polarization Filter, the message "Recommend WL Compensation." will appear about once a month. When this message appears, replace the Polarization Filter with the Protection Glass and perform white calibration in order to perform wavelength compensation.

[Operating Procedure]

1 When a calibration prompt screen* is displayed, select "OK". (Move the cursor to "OK" with the ⬆ button and press the ⏎ (Enter)/OPTION 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-34.

Notes "Error
Calibration not performed.
Perform calibration"
may also be shown.
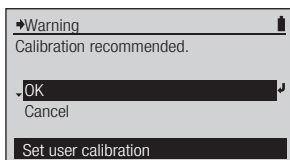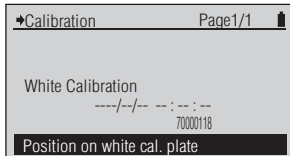
The <Calibration> screen is displayed.

2 Correctly set the instrument on the White Calibration Plate with the same pairing number.

Notes Perform calibration with the Target Mask attached.
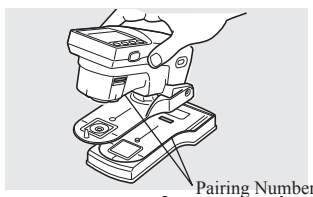
3 Push the instrument on the White Calibration Plate.
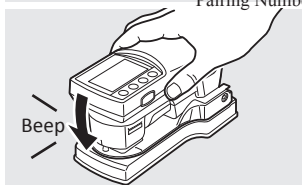
You will hear a beep and see "Calibrating..." displayed.
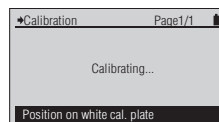
4 You will hear another beep. When the "Calibrating..." display disappears, remove the instrument.
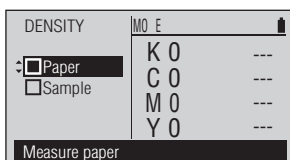
A measurement screen such as <DENSITY> is displayed. Or you return to the <Menu> screen.

Preparation for Measurement

Select Measurement Function

With this instrument, you can select and change the measurement function from the following sixteen items or "Auto".

- Density
- Dot %
- Dot Gain
- Trapping
- Density Difference
- PS Plate Dot %

- PS Plate Dot Gain
- Spot Color Density
- Color
- Color Difference
- Illuminance (FD-7 only)
- Gray Balance

- Midtone Spread
- ISO Check
- Target Match
- Paper
- Auto

[Operating Procedure]

1 When <DENSITY> or another measurement screen is displayed, move the cursor to the top level with the ▲ button and press the ⏎ (Enter)/OPTION button.
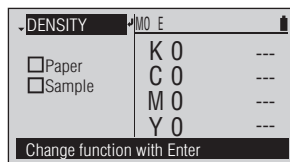
The <Functions> screen is displayed.

2 Move the cursor to the measurement function you wish to select with the ▲ or ▼ button and press the ⏎ (Enter)/OPTION button.
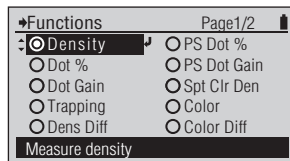
The measurement screen for the selected measurement function is displayed.

Preparation for Measurement

Measurement Functions (⊙ is the initial setting)

⊙	**Density**	Measures density.
○	**Dot %**	Measures dot area.
○	**Dot Gain**	Measures dot gain.
○	**Trapping**	Measures trapping.
○	**Den Diff**	Measures density difference.
○	**PS Dot %**	Measures dot area on PS plate.
○	**PS Dot Gain**	Measures dot gain on PS plate.
○	**Spt Clr Den**	Measures spot color density.
○	**Color**	Measures color.
○	**Color Diff**	Measures color difference.
○	**Illuminance**	Measures ambient light. (FD-7 only)
○	**Graybalance**	Measures gray balance.
○	**Midtonesprd**	Measures midtone spread.
○	**ISO Check**	Measures system conformance to ISO 12647.
○	**Targetmatch**	Measures relative density and color difference to a target color or set of target colors, and predicts required density adjustment needed to adjust sample color closer to target.
○	**Paper**	Measures paper indexes.
○	**Auto**	Measures in Auto mode and switches between "Density", "Dot %" or "Color" according to the measured sample.

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.

Measurement condition settings are configured on the <Menu> screen.   (As necessary)
Move to the <Menu> screen with the procedure below.   Change settings.

[Operating Procedure]

1 **When the cursor is not at the top level on the <DENSITY> or other measurement screen, press the (Enter)/OPTION button.**

→Options	Page1/1
Den. Filter	: Auto
Select Target	: Auto
Edit Target	→
Display Mode	: Absolute
Menu	→
Select from Auto,All,K,C,M,Y	
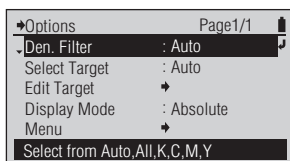
The <Options> screen is displayed.

2 **Move the cursor to "Menu" with the or button and press the (Enter)/OPTION button.**

→Menu	Page1/2
Calibration	→
Functions	: Density
Density Options	→
Color Options	→
Display Mode	: Absolute
Set user calibration	
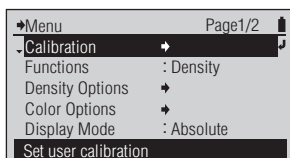
The <Menu> screen is displayed.

Memo

You can run white calibration and configure the measurement conditions on the <Menu> screen.

▌ **Density Measurement Conditions**

☐ **Density Target**

Density targets registered in the instrument are used for density difference calculations for "Difference" display mode and PASS/FAIL judgments for "Judge" display mode in <DENSITY> measurement mode.

```
→Menu                Page1/2    ▯
  Calibration           ◆
  Functions           : Density
↕ Density Options       ◆          ↵
  Color Options         ◆
  Display Mode        : Absolute
  Change density options
```
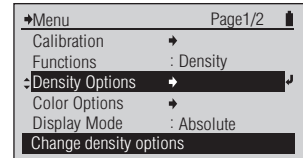
[Operating Procedure]

1 On the <Menu> screen, move the cursor to "Density Options" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

```
→Density Options      Page1/2    ▯
↕ Density Target        ◆          ↵
  Meas. Cond.        : M0(A Illum.)
  Den. White Ref.    : Paper
  Density Status     : E
  Y-N Factor            ◆
  Select, edit, tolerance, etc.
```
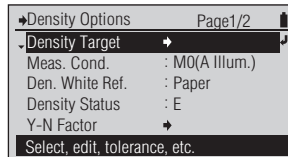
The <Density Options> configuration screen is displayed.

2 Move the cursor to "Density Target" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

```
→Density Target       Page1/2    ▯
↕ Select Target      : Auto        ↵
  Edit Target          ◆
  Default Toler.       ◆


  Select density target
```
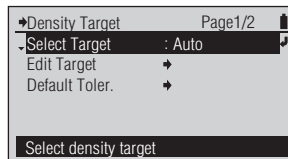
The <Density Target> screen is displayed.

Density Target has the following kind of menu.

☐ **Select Target**	:	Select the target color when measuring the density difference from the registered target color data.
☐ **Edit Target - Measure**	:	Specify a number and run a measurement. The result is registered as the target color data.
☐ **Edit Target - Delete**	:	Deletes the target color data for the specified number.
☐ **Edit Target - Den. Tolerance**	:	Sets the tolerance used in the pass/fail judgment of the measurement value for the specified number's target color data.
☐ **Edit Target - Edit**	:	Changes the target color data value for the specified number.
☐ **Edit Target - Edit Name**	:	Changes the name of the target color data for the specified number.
☐ **Default Toler.**	:	The tolerance set in advance as the default tolerance before setting individual tolerances for density target color data. This changes that default tolerance.
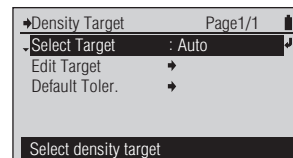
Preparation for
Measurement

☐ **Density Target - Select Target**

```
→Density Target          Page1/1    ▮
  Select Target    : Auto            ↵
  Edit Target          →
  Default Toler.       →

  Select density target
```

[Operating Procedure]

1 **On the <Density Target> screen, move the cursor to "Select Target" with the ⬆ button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Select Target> screen from the <Options> screen displayed by pressing ⏎ on the <DENSITY> measurement screen.

```
→Select Target          Page1/7    ▮
  ◉ Auto          K        ---
  ○ TD01          C        ---
  ○ TD02          M        ---
  ○ TD03          Y        ---
  ○ TD04      TD--:
  Auto select target color
```
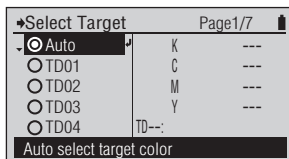
The <Select Target> screen is displayed.

2 **Move the cursor to the density target color number (Auto or TD01 to TD30) you wish to select with the ⬆ or ⬇ button.**

```
→Select Target          Page1/7    ▮
  ◉ Auto          K        1.63
  ○ TD01          C        1.69
  ○ TD02          M        1.68
  ○ TD03          Y        1.84
  ○ TD04      TD01:101214220220
  Select for target color
```

Select the setting.

3 **Press the ⏎ (Enter)/OPTION button.**

```
→Density Target          Page1/1    ▮
  Select Target    : TD01            ↵
  Edit Target          →
  Default Toler.       →

  Select density target
```

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)

◉	**Auto**	According to the measurement result, automatically selects the nearest value from the density target color that conforms to the measurement conditions.
○	**TD01 to TD30**	Specifies the density target color to use for measurements.
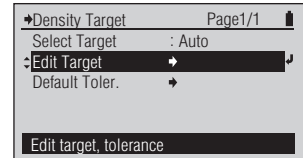
Preparation for Measurement

☐ **Density Target - Edit Target - Measure**

```
→Density Target          Page1/1   ▮
  Select Target      : Auto
↕ Edit Target              →         ↵
  Default Toler.           →

  Edit target, tolerance
```

[Operating Procedure]

1 On the <Density Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ↵ on the <DENSITY> measurement screen.

```
→Edit Target          Page1/6   ▮
 ⌐TD01      ↵     K       ---
  TD02            C       ---
  TD03            M       ---
  TD04            Y       ---
  TD05      TD01:
  Select target to edit
```
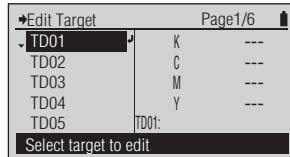
The <Edit Target> screen is displayed.

2 Move the cursor to the density target color number (TD01 to TD30) you wish to register with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.

```
→TD01:                Page1/1   ▮
 ⌐Measure               →         ↵
  Delete
  Den. Tolerance        →
  Edit                  →
  Edit Name             →
  Measure and save to target
```

The <Edit Target> screen for the selected target color number is displayed.

3 Move the cursor to "Measure" with the ⬆ button and press the ↵ (Enter)/OPTION button.

```
→Measure      M0 E            ▮
                K       ---
  ☐TD01         C       ---
                M       ---
                Y       ---
  Measure target color
```

The <Measure> screen for the density target color is displayed.

4 Align the Target Mask port with the location to be the target for the paper.
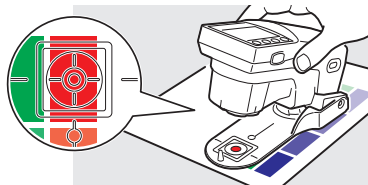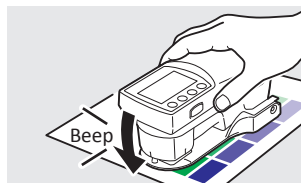
5 Push the instrument on the paper.

Beep

You will hear a beep.

[Operating Procedure]

6 **Remove the instrument when you hear the beep again.**

→Measure	M0 E	
	K	1.63
☑TD01	C	1.69
	M	1.68
	Y	1.84

Measured target color

"☐TDxx" is checked and the target color's measurement value is displayed.

The target color data is registered in the selected target color number.

7 **Press the ⬅ button.**

→TD01 : 101214220220	Page1/1
Measure	→
Delete	
Den. Tolerance	→
Edit	→
Edit Name	→

Measure and save to target

Memo

The measurement date/time is added as the target color's name.

You return to the previous screen.

☐ **Density Target - Edit Target - Delete**

```
→Density Target          Page1/1   ▮
  Select Target    : Auto
↕ Edit Target            →          ↵
  Default Toler.         →

  Edit target, tolerance
```

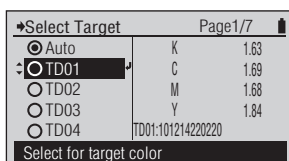## [Operating Procedure]

1 **On the <Density Target> screen, move the cursor to "Edit Target" with the ▲ or ▼ button and press the ↵ (Enter)/OPTION button.**

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ↵ on the <DENSITY> measurement screen.
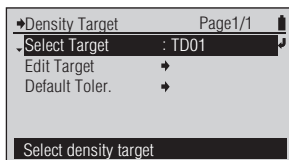
```
→Edit Target           Page1/6   ▮
↓ TD01      ↵       K        1.63
  TD02              C        1.69
  TD03              M        1.68
  TD04              Y        1.84
  TD05            TD01:
  Select target to edit
```

The <Edit Target> screen is displayed.

2 **Move the cursor to the density target number (TD01 to TD30) you wish to edit with the ▲ or ▼ button and press the ↵ (Enter)/OPTION button.**

```
→TD01:101214220220 Page1/1   ▮
  Measure           →
↕ Delete                        ↵
  Den. Tolerance    →
  Edit              →
  Edit Name         →
  Delete target color
```

The <Edit Target> screen for the selected target color number is displayed.

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

```
→Delete Target Data            ▮
  OK to delete target data?

↓ OK                            ↵
  Cancel

  Delete target color
```

The <Delete Target Data> screen is displayed.

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

```
→TD01:             Page1/1   ▮
  Measure           →
↕ Delete                        ↵
  Den. Tolerance    →
  Edit              →
  Edit Name         →
  Delete target color
```

The target color data for the selected target color number is deleted and you return to the previous screen.

Preparation for Measurement

□ **Density Target - Edit Target - Den. Tolerance**

```
→Density Target          Page1/1  ▮
  Select Target      : Auto
↕ Edit Target            →         ↵
  Default Toler.         →

 Edit target, tolerance
```

[Operating Procedure]
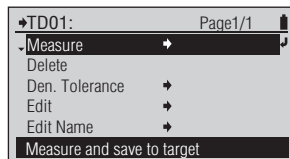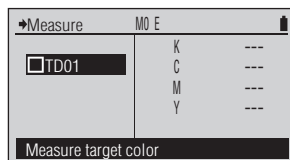
1 **On the <Density Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ⏎ on the <DENSITY> measurement screen.

```
→Edit Target             Page1/6  ▮
  TD01        ↵    K        1.63
  TD02             C        1.69
  TD03             M        1.68
  TD04             Y        1.84
  TD05         TD01:101214220220
 Select target to edit
```

The <Edit Target> screen is displayed.

2 **Move the cursor to the density target number (TD01 to TD30) you wish to edit with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→TD01:101214220220 Page1/1  ▮
  Measure            →
  Delete
↕ Den. Tolerance     →              ↵
  Edit               →
  Edit Name          →
 Change tolerance
```

The <Edit Target> screen for the selected target color number is displayed.

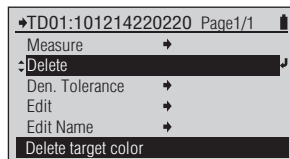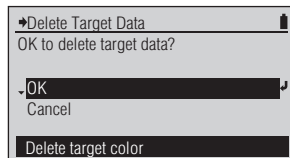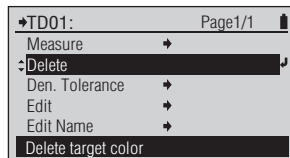**3** **Move the cursor to "Den. Tolerance" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Den. Tolerance             ▮
            ↕   K     ±0.0█   ↵
    TD01        C     ±0.05
                M     ±0.05
                Y     ±0.05
 Change value with ▼▲ keys
```

The <Den. Tolerance> configuration screen is displayed.

Memo

The tolerance displayed when you first enter the <Den. Tolerance> configuration screen for the selected target color number is the default tolerance. Refer to page E-44.

4 **Set the tolerance for the density filters.**
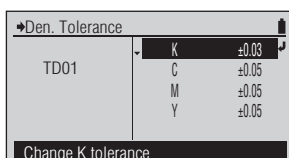
```
→Den. Tolerance             ▮
            ↵   K     ±0.03   ↵
    TD01        C     ±0.05
                M     ±0.05
                Y     ±0.05
 Change K tolerance
```

For setting numeric values, refer to page E-41.

5 **When finished setting the tolerance for the density filters, press the ⬅ button.**

```
→TD01:101214220220 Page1/1  ▮
  Measure            →
  Delete
↕ Den. Tolerance     →              ↵
  Edit               →
  Edit Name          →
 Change tolerance
```
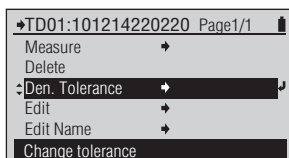
The set content is confirmed and you return to the previous screen.

Memo

Afterward, even if you change the default tolerance, the tolerance set here is not changed.

Setting

Initial setting	Setting range
±0.05 (The value set as the default density tolerance value)	0.00 to 9.99

Setting numeric values, characters

[Operating Procedure]

1 **When the screen switches to the setting mode for numeric values or characters, the cursor moves to the left-most digit or character for the value to set. Press the ⬆ or ⬇ button to change the numeric value or character.**

Den. Tolerance

	K	±0.03
TD01	C	±0.05
	M	±0.05
	Y	±0.05

Change value with ▼ ▲ keys
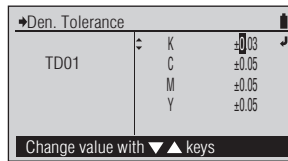
- **Numeric value**

  Press the ⬆ button to change the value in 0→1→2→ to →9→0→ order, or press the ⬇ button to change the value in reverse order.

  If you keeping pressing the button, you can continuously change the value.

- **Character**

  Press the ⬆ button to change the value in the order below, or press the ⬇ button to change the value in reverse order.

  0→1→2→ to →9→0→space→A→B→C→ to →Z→a→b→c→ to →z→!→"→#→$→%→&→'→(→)
  →*→+→,→-→.→/→:→;→<→=→>→?→@→[→\→]→^→_→`→{→|→}→0→

  If you keeping pressing the button, you can continuously change the value.

2 **Press the ⏎ (Enter)/OPTION button for each changed character or digit.**

Den. Tolerance

	K	±0.03
TD01	C	±0.05
	M	±0.05
	Y	±0.05

Change value with ▼ ▲ keys
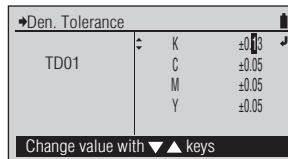
The changes for each digit or character are confirmed and the cursor moves one digit or character to the right.

Memo

The cursor position cannot be moved to the left.

3 **If the value or characters to set has multiple lines, when finished the settings up to the right-most digit or character, press the ⬆ or ⬇ button to move to the other lines.**

Den. Tolerance

	K	±0.10
TD01	C	±0.05
	M	±0.05
	Y	±0.05

Change K tolerance
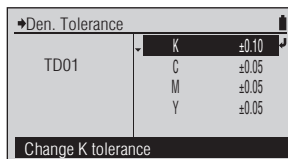
When finished setting all the lines, press the ⬅ button.

If the numeric value or characters to set has a single line, if you press the ⏎ (Enter)/OPTION button when the cursor is at the right-most character or digit, the settings for all digits or characters will be confirmed and you return to the previous screen.

Notes If you press the ⬅ button without pressing the ⏎ (Enter)/OPTION button, you return to the previous screen without changing the setting.

Preparation for Measurement

E-41

☐ **Density Target - Edit Target - Edit**

```
→Density Target        Page1/1    ▮
  Select Target      : Auto
  ‡Edit Target          →          ↵
  Default Toler.        →


  Edit target, tolerance
```

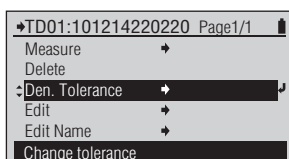## [Operating Procedure]

1 On the <Density Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

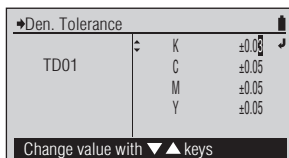Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ⏎ on the <DENSITY> measurement screen.

```
→Edit Target          Page1/6   ▮
  TD01        ↵     K      1.63  ↵
  TD02              C      1.69
  TD03              M      1.68
  TD04              Y      1.84
  TD05        TD01:101214220220
  Select target to edit
```

The <Edit Target> screen is displayed.

2 Move the cursor to the density target number (TD01 to TD30) you wish to edit with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

```
→TD01:101214220220 Page1/1   ▮
  Measure          →
  Delete
  Den. Tolerance   →
  ‡Edit            →          ↵
  Edit Name        →
  Change target color value
```

The <Edit Target> screen for the selected target color number is displayed.

3 Move the cursor to "Edit" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

```
→Edit                         ▮
                ↵   K      1.63  ↵
  TD01              C      1.69
                   M      1.68
                   Y      1.84
  Change K density value
```

The <Edit> screen for the density target color is displayed.

4 Edit the target color value for the density filters.

```
→Edit                         ▮
                ‡   K     +1.6▮  ↵
  TD01              C      1.69
                   M      1.68
                   Y      1.84
  Change value with ▼ ▲ keys
```

The set content is confirmed and you return to the previous screen. For setting numeric values, refer to page E-41.

5 When finished editing the target color value for the density filters, press the ⬅ button.

```
→TD01:101214220220 Page1/1   ▮
  Measure          →
  Delete
  Den. Tolerance   →
  ‡Edit            →          ↵
  Edit Name        →
  Change target color value
```

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

☐ **Density Target - Edit Target - Edit Name**

```
→Density Target        Page1/1    ▯
  Select Target      : Auto
↕ Edit Target          →              ↵
  Default Toler.       →

  Edit target, tolerance
```

[Operating Procedure]

1 On the <Density Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ⏎ on the <DENSITY> measurement screen.
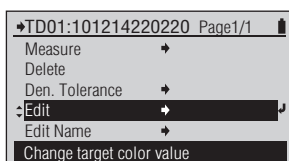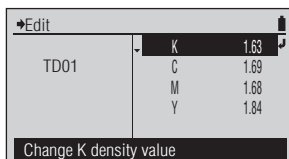
```
→Edit Target          Page1/6    ▯
↳ TD01        ↵   K        1.63
  TD02            C        1.69
  TD03            M        1.68
  TD04            Y        1.84
  TD05      TD01:101214220220
  Select target to edit
```

The <Edit Target> screen is displayed.

2 Move the cursor to the density target number (TD01 to TD30) you wish to edit with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.
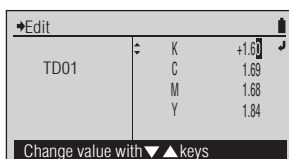
```
→TD01:101214220220 Page1/1   ▯
  Measure          →
  Delete
  Den. Tolerance   →
  Edit             →
↑ Edit Name        →              ↵
  Change target color name
```

The <Edit Target> screen for the selected target color number is displayed.

3 Move the cursor to "Edit Name" with the ⬇ button and press the ⏎ (Enter)/OPTION button.
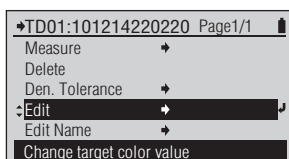
```
→Edit Name                    ▯

    TD01          │

              ↕    ▮01214220220  ↵
  Change value with ▼ ▲ keys
```

The <Edit Name> screen for the density target color is displayed.

Memo

The name displayed when you first enter the <Edit Name> screen for the selected target color number is the measurement date/time added when obtained by measuring the target color. Refer to page E-38.

4 Edit the name of the target color.
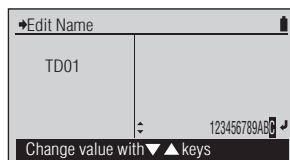
```
→Edit Name                    ▯

    TD01          │

              ↕    123456789AB▮  ↵
  Change value with ▼ ▲ keys
```

For setting characters, refer to page E-41.

5 When finished setting the right-most character (12th character), press the ⏎ (Enter)/OPTION button.

```
→TD01:123456789ABC Page1/1   ▯
  Measure          →
  Delete
  Den. Tolerance   →
  Edit             →
↑ Edit Name        →              ↵
  Change target color name
```

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

Preparation for
Measurement
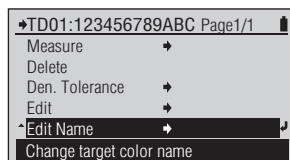
□ **Density Target - Def. Tolerance**
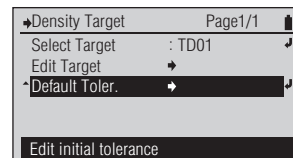
```
→Density Target          Page1/1   🔋
  Select Target    : TD01          ↵
  Edit Target            →
▲ Default Toler.         →                ↵

  Edit initial tolerance
```

[Operating Procedure]

1 On the <Density Target> screen, move the cursor to "Default Toler." with the ⏷ button and press the ⏎ (Enter)/OPTION button.

```
→Default Toler.                   🔋
                ┌ K      ±0.05    ↵
                  C      ±0.05
                  M      ±0.05
                  Y      ±0.05
  Change K tolerance
```

The <Default Toler.> screen is displayed.

2 Set the default tolerance for the density filters.

```
→Default Toler.                   🔋
                ┌ K      ±0.03    ↵
                  C      ±0.05
                  M      ±0.05
                  Y      ±0.05
  Change value with ▼ ▲ keys
```

For setting numeric values, refer to page E-41.

3 When finished setting the tolerance for the density filters, press the ⏴ button.

```
→Density Target          Page1/1   🔋
  Select Target    : TD01          ↵
  Edit Target            →
▲ Default Toler.         →                ↵

  Edit initial tolerance
```
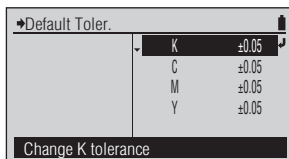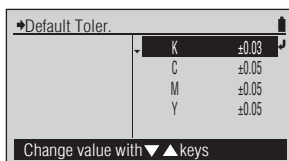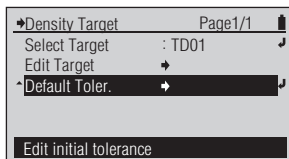
The set content is confirmed and you return to the previous screen.

Setting

Initial setting	Setting range
±0.05	0.00 to 9.99

☐ **Meas. Cond.**

```
→Density Options          Page1/2  ▮
  Density Target        →
↕ Meas. Cond.           : M0(A Illum.)  ↵
  Den. White Ref.       : Paper
  Density Status        : E
  Y-N Factor            →
Select measurement conditions
```

[Operating Procedure]

1 On the <Density Options> configuration screen, move the cursor to "Meas. Cond." with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.

```
→Meas. Cond.          Page1/1  ▮
↕ ◉ M0(A Illum.)                ↵
   O M2(UV Cut)


A illuminant
```

The <Meas. Cond.> configuration screen is displayed.

2 Move the cursor to the item you wish to select with the ⬆ or ⬇ button.

```
→Meas. Cond.          Page1/1  ▮
   ◉ M0(A Illum.)
↕ O M2(UV Cut)                  ↵


UV cut illuminant
```

Select the setting.

3 Press the ↵ (Enter)/OPTION button.

```
→Density Options          Page1/2  ▮
  Density Target        →
↕ Meas. Cond.           : M2(UV Cut)  ↵
  Den. White Ref.       : Paper
  Density Status        : E
  Y-N Factor            →
Select measurement conditions
```

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.

Preparation for Measurement
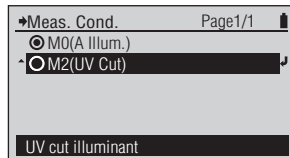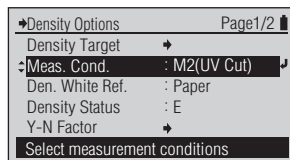
Setting (◉ is the initial setting)

◉	**M0(A Illum.)**	Standard Illuminant A; (incandescent bulb color, color temperature 2856 K)
O	**M2(UV Cut)**	Standard Illuminant A with light of 410 nm or lower cut

☐ **Den. White Ref.**

➤Density Options	Page1/2 🔋
Density Target	➤
Meas. Cond.	: M0(A Illum.)
⬍Den. White Ref.	: Paper
Density Status	: E
Y-N Factor	➤
Select absolute or paper	

[Operating Procedure]

1 On the <Density Options> configuration screen, move the cursor to "Den. White Ref." with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

➤Den. White Ref.	Page1/1 🔋
○ Absolute	
◉ Paper	
Display as paper reference	

The <Den. White Ref.> configuration screen is displayed.

2 Move the cursor to the item you wish to select with the ⬆ or ⬇ button.

➤Den. White Ref.	Page1/1 🔋
○ Absolute	
◉ Paper	
Display as absolute value	

Select the setting.

3 Press the ⏎ (Enter)/OPTION button.

➤Density Options	Page1/2 🔋
Density Target	➤
Meas. Cond.	: M0(A Illum.)
⬍Den. White Ref.	: Absolute
Density Status	: E
Y-N Factor	➤
Select absolute or paper	

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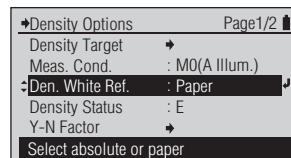
Notes

If you press ⬅ without pressing ⏎, you return to the previous screen without changing the setting.
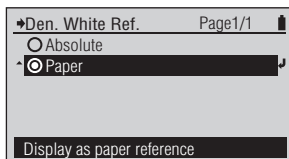
Setting (◉ is the initial setting)

○	**Absolute**	Displays the absolute value of the density.
◉	**Paper**	Displays the density with the paper color as the reference.

Memo • When "Functions" is set to "Dot %", "Dot Gain", "PS Dot %", "PS Dot Gain", "Trapping", or "Midtonesprd", the density of the solid color is always displayed with the paper color as the reference even if "Den White Ref." is set to "Absolute".

☐ **Density Status**

```
→Density Options          Page1/2 ▮
  Density Target          →
  Meas. Cond.      : M0(A Illum.)
  Den. White Ref.  : Paper
⬍ Density Status   : E              ↵
  Y-N Factor       →
  Select from T,E,A,I,DIN
```
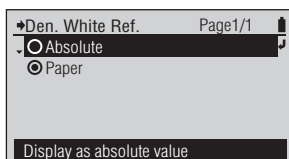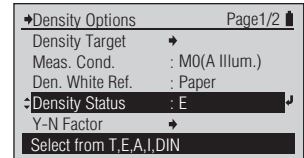
[Operating Procedure]

1 On the <Density Options> configuration screen, move the cursor to "Density Status" with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.
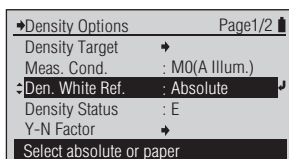
```
→Density Status      Page1/1 ▮
  ○ T
⬍ ◉ E                          ↵
  ○ A
  ○ I
  ○ DIN
  Measure with Status E
```

The <Density Status> configuration screen is displayed.

2 Move the cursor to the item you wish to select with the ⬆ or ⬇ button.

```
→Density Status      Page1/1 ▮
  ○ T                          ↵
  ◉ E
  ○ A
  ○ I
  ○ DIN
  Measure with Status T
```

Select the setting.

3 Press the ↵ (Enter)/OPTION button.

```
→Density Options          Page1/2 ▮
  Density Target          →
  Meas. Cond.      : M0(A Illum.)
  Den. White Ref.  : Paper
⬍ Density Status   : T              ↵
  Y-N Factor       →
  Select from T,E,A,I,DIN
```

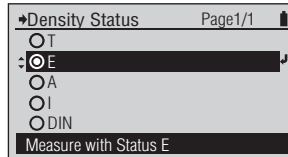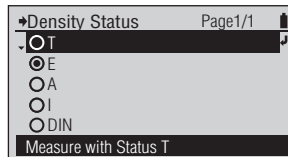The selected content is confirmed and you return to the previous screen.

Notes

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

Preparation for Measurement

Setting (◉ is the initial setting)

○	**T**	ISO Status T
◉	**E**	ISO Status E
○	**A**	ISO Status A
○	**I**	ISO Status I
○	**DIN**	DIN16536

☐ **Y-N Factor**

```
→Density Options          Page1/2 ▮
  Density Target          →
  Meas. Cond.      : M0(A Illum.)
  Den. White Ref.  : Paper
  Density Status   : E
↕ Y-N Factor             →        ↵
  Change factor
```

[Operating Procedure]

1 **On the <Density Options> configuration screen, move the cursor to "Y-N Factor" with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.**
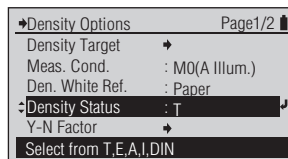
```
→Y-N Factor              Page1/1 ▮
↕ For Dot %        : n=1.00        ↵
  For PS Dot %     : n=1.00



  Change print YN-factor
```

The <Y-N Factor> configuration screen is displayed.

2 **Move the cursor to the value to set with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.**

```
→Y-N Factor                      ▮
↕              n=1.00             ↵
            (0.50~9.90)



  Change value with ▼▲ keys
```

3 **Set the factor.**

```
→Y-N Factor                      ▮
↕              n=1.50             ↵
            (0.50~9.90)



  Change value with ▼▲ keys
```

For setting numeric values, refer to page E-41.

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

```
→Y-N Factor              Page1/1 ▮
↕ For Dot %        : n=1.50        ↵
  For PS Dot %     : n=1.00



  Change print YN-Factor
```

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

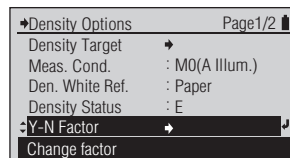**Notes**

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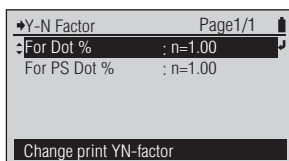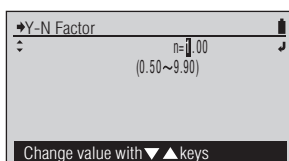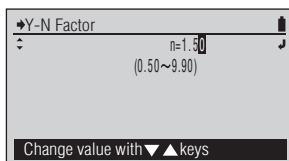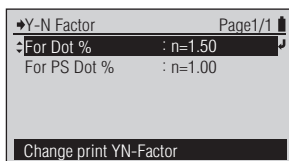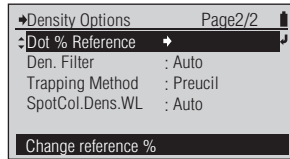
Setting

Set the Yule-Nielsen factor (n) for the Yule-Nielsen formula used to calculate dot area or PS plate dot area. To use the Murray-Davies formula, set the Yule-Nielsen factor to "1".

Type	Initial setting	Setting range
For Dot %	1.00	0.50 to 9.90
For PS Dot %	1.00	0.50 to 9.90

Preparation for Measurement

☐ **Dot % Reference: Dot Gain**
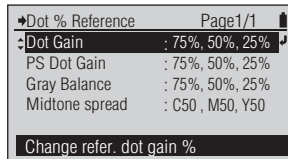
[Operating Procedure]

1 **On the <Density Options> configuration screen, move the cursor to "Dot % Reference" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Density Options        Page2/2
↕ Dot % Reference           →
  Den. Filter          : Auto
  Trapping Method      : Preucil
  SpotCol.Dens.WL      : Auto

  Change reference %
```
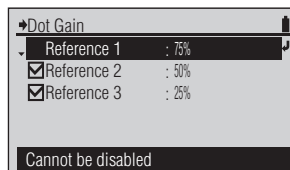
The <Dot % Reference> configuration screen is displayed.

2 **On the <Dot % Reference> configuration screen, move the cursor to "Dot Gain" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**
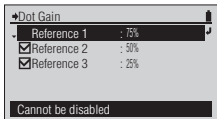
```
→Dot % Reference        Page1/1
↕ Dot Gain       : 75%, 50%, 25%
  PS Dot Gain    : 75%, 50%, 25%
  Gray Balance   : 75%, 50%, 25%
  Midtone spread : C50 , M50, Y50

  Change refer. dot gain %
```

The <Dot Gain> configuration screen for setting the values is displayed.

3 **Move the cursor to "Reference 1", "Reference 2", "Reference 3" with the ⬆ or ⬇ button and set each.**

```
→Dot Gain
↓  Reference 1     : 75%
  ☑Reference 2     : 50%
  ☑Reference 3     : 25%


  Cannot be disabled
```

4 **Set each reference value.**

For setting numeric values, refer to page E-41.

```
→Dot Gain
  Reference 1      : 75%
  ☑Reference 2     : 50%
  ☑Reference 3     : 25%

  Cannot be disabled
```
When the cursor is on "Reference 1"

Press ⏎ →

```
→Dot Gain
↕  Reference 1     : 75%
  ☑Reference 2     : 50%
  ☑Reference 3     : 25%
                    (1%~99%)
  Change value with ▼▲ keys
```
You can change the reference value for Reference 1.

```
→Dot Gain
  Reference 1      : 65%
↕☑Reference 2      : 50%
  ☑Reference 3     : 25%

  Reference is valid
```
When the cursor is on "☑ Reference 2"

Press ⏎ →

```
→Dot Gain
  Reference 1      : 65%
↕☐Reference 2      : 50%
  ☑Reference 3     : 25%

  Reference is valid
```
Reference 2 is disabled.

When the cursor is on "☐Reference 2"

Press ⏎ →

```
→Dot Gain
  Reference 1      : 65%
↕☑Reference 2      : 50%
  ☑Reference 3     : 25%
                    (1%~99%)
  Change value with ▼▲ keys
```
Reference 2 is enabled, you can change its reference value.

```
→Dot Gain
  Reference 1      : 65%
  ☑Reference 2     : 55%
↕☑Reference 3      : 25%

  Reference is valid
```
When the cursor is on "☑ Reference 3"

Press ⏎ →

```
→Dot Gain
  Reference 1      : 65%
  ☑Reference 2     : 55%
↕☐Reference 3      : 25%

  Reference is invalid
```
Reference 3 is disabled.

When the cursor is on "☐Reference 3"

Press ⏎ →

```
→Dot Gain
  Reference 1      : 65%
  ☑Reference 2     : 55%
↕☑Reference 3      : 35%
                    (1%~99%)
  Change value with ▼▲ keys
```
Reference 3 is enabled, you can change its reference value.

5 **Press the ⏎ (Enter)/ OPTION button.**

```
→Dot % Reference        Page1/1
↕ Dot Gain       : 65%, 55%, 35%
  PS Dot Gain    : 65%, 55%, 35%
  Gray Balance   : 65%, 55%, 35%
  Midtone spread : C50 , M50, Y50

  Change refer. dot gain %
```

The set 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.

Preparation for Measurement

E-49

Setting (All Dot Gain References are enabled in the initial setting.)
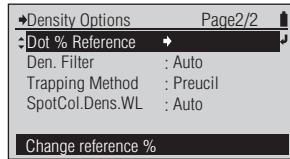
Set the tone value for the tint patch you want to measure using the "Dot Gain" measurement function.

		Initial setting	Setting range
	Reference 1	75%	1 to 99%
☑	**Reference 2**	50%	1 to 99%
☑	**Reference 3**	25%	1 to 99%

□ **Dot % Reference: PS Dot Gain**
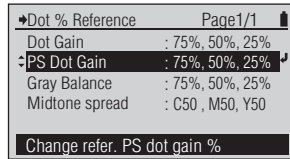
[Operating Procedure]

1 **On the <Density Options> configuration screen, move the cursor to "Dot % Reference" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
➔Density Options        Page2/2   🔋
⇕Dot % Reference         ➔
  Den. Filter           : Auto
  Trapping Method       : Preucil
  SpotCol.Dens.WL       : Auto

  Change reference %
```

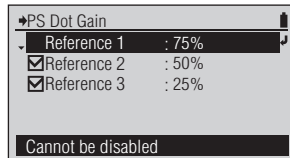The <Dot % Reference> configuration screen is displayed.

2 **On the <Dot % Reference> configuration screen, move the cursor to "PS Dot Gain" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**
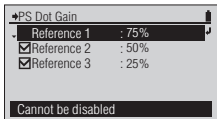
```
➔Dot % Reference        Page1/1   🔋
  Dot Gain        : 75%, 50%, 25%
⇕PS Dot Gain      : 75%, 50%, 25%
  Gray Balance    : 75%, 50%, 25%
  Midtone spread  : C50 , M50, Y50

  Change refer. PS dot gain %
```

The <PS Dot Gain> configuration screen for setting the values is displayed.

3 **Move the cursor to "Reference 1", "Reference 2", "Reference 3" with the ⬆ or ⬇ button and set each.**

```
➔PS Dot Gain                     🔋
    Reference 1      : 75%
  ☑Reference 2       : 50%
  ☑Reference 3       : 25%


  Cannot be disabled
```

4 **Set each reference value.**

```
➔PS Dot Gain              🔋
  Reference 1    : 75%
☑Reference 2     : 50%
☑Reference 3     : 25%

Cannot be disabled
```
When the cursor is on "Reference 1"

Press ⏎ →

```
➔PS Dot Gain              🔋
⇕  Reference 1    : 65%
 ☑Reference 2     : 50%
 ☑Reference 3     : 25%
          (1% ~ 99%)
Change value with ▼▲ keys
```
You can change the reference value for Reference 1.

For setting numeric values, refer to page E-41.

```
➔PS Dot Gain              🔋
  Reference 1    : 65%
⇕☑Reference 2    : 50%
 ☑Reference 3    : 25%

Reference is enabled
```
When the cursor is on "☑ Reference 2"

Press ⏎ →

```
➔PS Dot Gain              🔋
  Reference 1    : 65%
  ☐Reference 2   : 50%
  ☑Reference 3   : 25%

Reference is enabled
```
Reference 2 is disabled.

When the cursor is on "☐Reference 2"

Press ⏎ →

```
➔PS Dot Gain              🔋
  Reference 1    : 65%
⇕☑Reference 2    : 50%
 ☑Reference 3    : 25%
          (1% ~ 99%)
Change value with ▼▲ keys
```
Reference 2 is enabled, you can change its reference value.

```
➔PS Dot Gain              🔋
  Reference 1    : 65%
 ☑Reference 2    : 55%
⇕☑Reference 3    : 25%

Reference is enabled
```
When the cursor is on "☑ Reference 3"

Press ⏎ →

```
➔PS Dot Gain              🔋
  Reference 1    : 65%
  Reference 2    : 55%
  ☐Reference 3   : 25%

Reference is disabled
```
Reference 3 is disabled.

When the cursor is on "☐Reference 3"

Press ⏎ →

```
➔PS Dot Gain              🔋
  Reference 1    : 65%
  Reference 2    : 55%
⇕☑Reference 3    : 25%
          (1% ~ 99%)
Change value with ▼▲ keys
```
Reference 3 is enabled, you can change its reference value.

5 **Press the ⏎ (Enter)/ OPTION button.**

```
➔Dot % Reference        Page1/1   🔋
  Dot Gain        : 65%, 55%, 35%
⇕PS Dot Gain      : 65%, 55%, 35%
  Gray Balance    : 65%, 55%, 35%
  Midtone spread  : C50 , M50, Y50

  Change refer. PS dot gain %
```

The set 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.

Preparation for Measurement

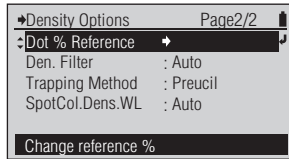**Setting** (All PS Dot Gain references are enabled in the initial setting.)

Set the tone value for the tint patch you want to measure using the "PS Dot Gain" measurement function.

		Initial setting	Setting range
	Reference 1	75%	1 to 99%
☑	**Reference 2**	50%	1 to 99%
☑	**Reference 3**	25%	1 to 99%

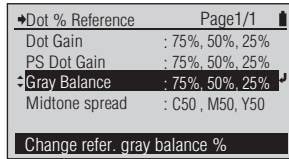☐ **Dot % Reference: Gray Balance**

[Operating Procedure]

1 On the <Density Options> configuration screen, move the cursor to "Dot % Reference" with the ▲ or ▼ button and press the (Enter)/OPTION button.
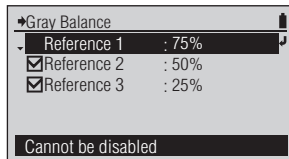
> ➔Density Options   Page2/2
> ↕ Dot % Reference   ➔
> Den. Filter   : Auto
> Trapping Method   : Preucil
> SpotCol.Dens.WL   : Auto
>
> Change reference %

The <Dot % Reference> configuration screen is displayed.

2 On the <Dot % Reference> configuration screen, move the cursor to "Gray Balance" with the ▲ or ▼ button and press the (Enter)/OPTION button.

> ➔Dot % Reference   Page1/1
> Dot Gain   : 75%, 50%, 25%
> PS Dot Gain   : 75%, 50%, 25%
> ↕ Gray Balance : 75%, 50%, 25%
> Midtone spread : C50 , M50, Y50
>
> Change refer. gray balance %

The <Gray Balance> configuration screen for setting the values is displayed.

3 Move the cursor to "Reference 1", "Reference 2", "Reference 3" with the ▲ or ▼ button and set each.
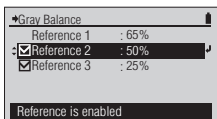
> ➔Gray Balance
> Reference 1   : 75%
> ☑Reference 2   : 50%
> ☑Reference 3   : 25%
>
> Cannot be disabled

4 Set each reference value.

> ➔Gray Balance
> Reference 1   : 75%
> ☑Reference 2   : 50%
> ☑Reference 3   : 25%
>
> Cannot be disabled

When the cursor is on "Reference 1"

Press

> ➔Gray Balance
> ↕ Reference 1   : 65%
> ☑Reference 2   : 50%
> ☑Reference 3   : 25%
>   (1% ~ 99%)
> Change value with ▼▲ keys

You can change the reference value for Reference 1.

For setting numeric values, refer to page E-41.

> ➔Gray Balance
> Reference 1   : 65%
> ↕☑Reference 2   : 50%
> ☑Reference 3   : 25%
>
> Reference is enabled

When the cursor is on "☑ Reference 2"

Press

> ➔Gray Balance
> Reference 1   : 65%
> ↕☐Reference 2   : 50%
> ☑Reference 3   : 25%
>
> Reference is enabled

Reference 2 is disabled.

When the cursor is on "☐Reference 2"

Press

> ➔Gray Balance
> Reference 1   : 65%
> ↕☑Reference 2   : 50%
> ☑Reference 3   : 25%
>   (1% ~ 99%)
> Change value with ▼▲ keys

Reference 2 is enabled, you can change its reference value.

> ➔Gray Balance
> Reference 1   : 65%
> ☑Reference 2   : 55%
> ↕☑Reference 3   : 25%
>
> Reference is enabled

When the cursor is on "☑ Reference 3"

Press

> ➔Gray Balance
> Reference 1   : 65%
> ☑Reference 2   : 55%
> ↕☐Reference 3   : 25%
>
> Reference is disabled

Reference 3 is disabled.

When the cursor is on "☐Reference 3"

Press

> ➔Gray Balance
> Reference 1   : 65%
> ☑Reference 2   : 55%
> ↕☑Reference 3   : 25%
>   (1% ~ 99%)
> Change value with ▼▲ keys

Reference 3 is enabled, you can change its reference value.

5 Press the (Enter)/ OPTION button.

> ➔Dot % Reference   Page1/1
> Dot Gain   : 65%, 55%, 35%
> PS Dot Gain   : 65%, 55%, 35%
> ↕ Gray Balance : 65%, 55%, 35%
> Midtone spread : C50 , M50, Y50
>
> Change refer. gray balance %

The set 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.
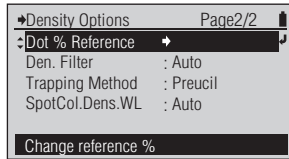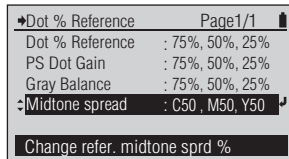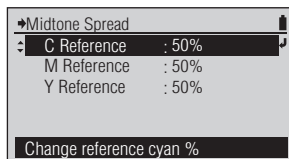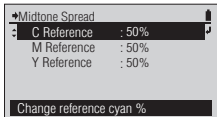
Preparation for Measurement

E-53

Setting

Set the tone value for the tint patch you want to measure using the "Graybalance" measurement function.

	Initial setting	Setting range
Reference 1	75%	1 to 99%
Reference 2	50%	1 to 99%
Reference 3	25%	1 to 99%

☐ **Dot % Reference: Midtone Spread**

[Operating Procedure]

1 **On the <Density Options> configuration screen, move the cursor to "Dot % Reference" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Density Options      Page2/2   ▮
↕ Dot % Reference        →       ↵
  Den. Filter          : Auto
  Trapping Method      : Preucil
  SpotCol.Dens.WL      : Auto

  Change reference %
```

The <Dot % Reference> configuration screen is displayed.

2 **On the <Dot % Reference> configuration screen, move the cursor to "Midtone Spread" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Dot % Reference      Page1/1   ▮
  Dot % Reference   : 75%, 50%, 25%
  PS Dot Gain       : 75%, 50%, 25%
  Gray Balance      : 75%, 50%, 25%
↕ Midtone spread    : C50 , M50, Y50  ↵

  Change refer. midtone sprd %
```

The <Midtone Spread> configuration screen for setting the values is displayed.

3 **Move the cursor to "C Reference", "M Reference", "Y Reference" with the ⬆ or ⬇ button and set each.**

```
→Midtone Spread               ▮
↕ C Reference       : 50%       ↵
  M Reference       : 50%
  Y Reference       : 50%

  Change reference cyan %
```

4 **Set each reference value.**

```
→Midtone Spread               ▮
↕ C Reference       : 50%       ↵
  M Reference       : 50%
  Y Reference       : 50%

  Change reference cyan %
```
When the cursor is on "C Reference"

Press ⏎ →
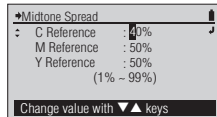
```
→Midtone Spread               ▮
↕ C Reference       : 40%       ↵
  M Reference       : 50%
  Y Reference       : 50%
               (1% ~ 99%)
  Change value with ▼▲ keys
```
You can change the reference value for cyan reference.

```
→Midtone Spread               ▮
  C Reference       : 50%
↕ M Reference       : 50%       ↵
  Y Reference       : 50%

  Change reference magenta %
```
When the cursor is on "M Reference"

Press ⏎ →
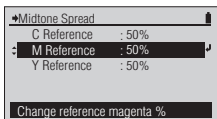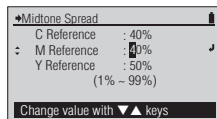
```
→Midtone Spread               ▮
  C Reference       : 40%
↕ M Reference       : 40%       ↵
  Y Reference       : 50%
               (1% ~ 99%)
  Change value with ▼▲ keys
```
You can change the reference value for magenta reference.

```
→Midtone Spread               ▮
  C Reference       : 50%
  M Reference       : 50%
↕ Y Reference       : 50%       ↵

  Change reference yellow %
```
When the cursor is on "Y Reference"

Press ⏎ →
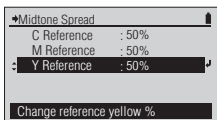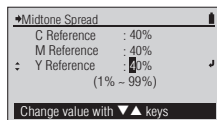
```
→Midtone Spread               ▮
  C Reference       : 40%
  M Reference       : 40%
↕ Y Reference       : 40%       ↵
               (1% ~ 99%)
  Change value with ▼▲ keys
```
You can change the reference value for yellow reference.

For setting numeric values, refer to page E-41.

5 **Press the ⏎ (Enter)/ OPTION button.**

```
→Dot % Reference      Page1/1   ▮
  Dot Gain          : 75%, 50%
  PS Dot Gain       : 75%, 50%, 25%
  Gray Balance      : 75%, 50%, 25%
↕ Midtone spread    : C40, M40, Y40  ↵

  Change refer. midtone sprd %
```

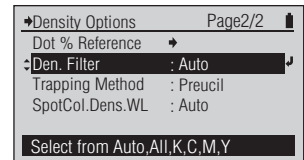Preparation for Measurement
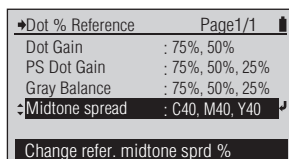
Setting

Set the cyan, magenta, and yellow tone values for the tint patch you want to measure using the "Midtonesprd" measurement function.

	Initial setting	Setting range
C Reference (Cyan)	50%	1 to 99%
M Reference (Magenta)	50%	1 to 99%
Y Reference (Yellow)	50%	1 to 99%

☐ **Den. Filter**

```
→Density Options          Page2/2   ▮
  Dot % Reference      →
↕ Den. Filter          : Auto        ↵
  Trapping Method      : Preucil
  SpotCol.Dens.WL      : Auto

 Select from Auto,All,K,C,M,Y
```

[Operating Procedure]

1 **On the <Density Options> configuration screen, move the cursor to "Den. Filter" with the ⊙ button and press the ⊙ (Enter)/OPTION button.**

Or you can also enter the <Den. Filter> configuration screen from the <Options> screen displayed by pressing ⊙ on the <DENSITY> measurement screen, <DOT %> measurement screen, or <DOT GAIN> measurement screen.

```
→Den. Filter             Page1/2   ▮
↓ ⊙ Auto                             ↵
  O All
  O Black
  O Cyan
  O Magenta
 Auto select filter
```

```
→Den. Filter             Page2/2   ▮
↓ ⊙ Yellow                           ↵




 Display Y density
```

The <Den. Filter> configuration screen is displayed.

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

```
→Den. Filter             Page1/2   ▮
  ⊙ Auto
  O All
↕ O Black                            ↵
  O Cyan
  O Magenta
 Display K density
```

Select the setting.

3 **Press the ⊙ (Enter)/OPTION button.**

```
→Density Options          Page2/2   ▮
  Dot % Reference      →
↕ Den. Filter          : Black       ↵
  Trapping Method      : Preucil
  SpotCol.Dens.WL      : Auto

 Select from Auto,All,K,C,M,Y
```
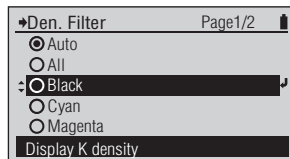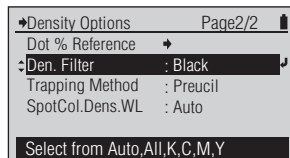
The selected content is confirmed and you return to the previous screen.

Notes

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

Setting (⊙ is the initial setting)

⊙	**Auto**	Automatically displays the density of either black, cyan, magenta, yellow depending on the measurement result.
○	**All**	Displays the density of all: black, cyan, magenta, and yellow.
○	**Black**	The density of black is displayed.
○	**Cyan**	The density of cyan is displayed.
○	**Magenta**	The density of magenta is displayed.
○	**Yellow**	The density of yellow is displayed.

Memo • When "Functions" is set to "Dot %", "Dot Gain", "PS Dot %", or "PS Dot Gain", the "All" setting for Den. Filter functions in the same way as the "Auto" setting.
• When "Functions" is set to "Trapping", "ISO Check", or "Targetmatch", the Den. Filter setting will be ignored and the function will be the same as the "Auto" setting.
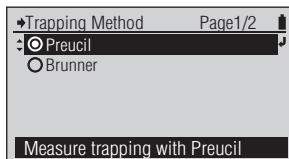
Preparation for Measurement

□ **Trapping Method**

```
→Density Options          Page2/2   ▮
  Dot % Reference       →
  Den. Filter           : Auto
⬍ Trapping Method       : Preucil    ↵
  SpotCol.Dens.WL       : Auto

  Select Preucil or Brunner
```
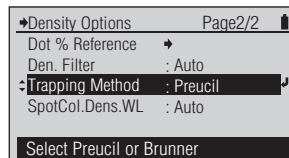
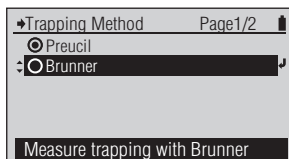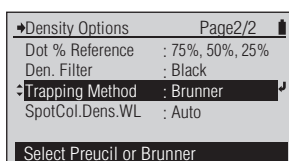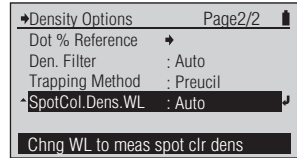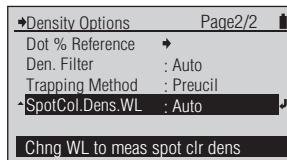## [Operating Procedure]

1 **On the <Density Options> configuration screen, move the cursor to "Trapping Method" with the ⬇ button and press the ⮐ (Enter)/OPTION button.**

Or you can also enter the <Trapping Method> configuration screen from the <Options> screen displayed by pressing ⮐ on the <Trapping> measurement screen.

```
→Trapping Method      Page1/2   ▮
⬍ ◉ Preucil                      ↵
   ○ Brunner



  Measure trapping with Preucil
```

The <Trapping Method> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**

```
→Trapping Method      Page1/2   ▮
   ◉ Preucil
⬍ ○ Brunner                      ↵



  Measure trapping with Brunner
```

Select the setting.

3 **Press the ⮐ (Enter)/OPTION button.**

```
→Density Options          Page2/2   ▮
  Dot % Reference       : 75%, 50%, 25%
  Den. Filter           : Black
⬍ Trapping Method       : Brunner    ↵
  SpotCol.Dens.WL       : Auto

  Select Preucil or Brunner
```

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.

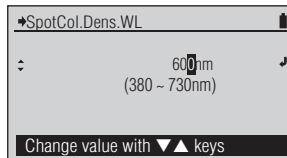**Setting** (◉ is the initial setting)

◉	**Preucil**	Measures trapping value by Preucil's method.
○	**Brunner**	Measures trapping value by Brunner's method.

☐ **SpotCol.Dens.WL**

> →Density Options Page2/2
> Dot % Reference →
> Den. Filter : Auto
> Trapping Method : Preucil
> ▲ SpotCol.Dens.WL : Auto ↵
>
> Chng WL to meas spot clr dens

[Operating Procedure]

1 On the <Density Options> configuration screen, move the cursor to "SpotCol.Dens.WL" with the ▼ button and press the ↵ (Enter)/OPTION button.

Or you can also enter the <SpotCol.Dens.WL> configuration screen from the <Options> screen displayed by pressing ↵ on the < SPT CLR DEN > measurement screen.
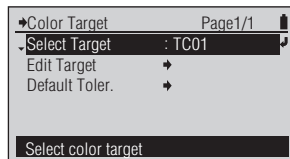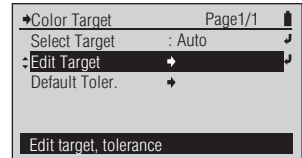
> →SpotCol.Dens.WL Page1/1
> ◉ Auto ↵
> ○ Manual : 500nm
>
> Measure density at peak WL
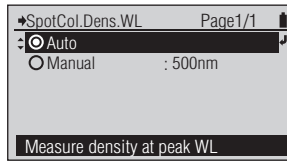
The < SpotCol.Dens.WL > configuration screen is displayed.

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

> →SpotCol.Dens.WL Page1/1
> ◉ Auto ↵
> ○ Manual : 500nm
>
> Measure density at peak WL
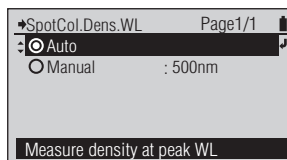
Select the setting.

3 Press the ↵ (Enter)/OPTION button.

When "Auto" is selected, the selected content is confirmed and you return to the previous screen. Setting is complete.

> →Density Options Page2/2
> Dot % Reference →
> Den. Filter : Auto
> Trapping Method : Preucil
> ▲ SpotCol.Dens.WL : Auto ↵
>
> Chng WL to meas spot clr dens

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

When "Manual" is selected, the screen for setting the spot color density wavelength appears.

> →SpotCol.Dens.WL
> 600nm ↵
> (380 ~ 730nm)
>
> Change value with ▼▲ keys

For setting numeric values, refer to page E-41.

4 Set the desired spot color density wavelength value.

> →SpotCol.Dens.WL
> 600nm
> (380 ~ 730nm)
>
> Change value with ▼▲ keys

5 Press the ↵ (Enter)/OPTION button. The setting is confirmed and you return to the previous screen.

> →Density Options Page2/2
> Dot % Reference →
> Den. Filter : Auto
> Trapping Method : Preucil
> SpotCol.Dens.WL : 600nm ↵
>
> Chng WL to meas spot clr dens

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

Preparation for Measurement

Setting (◉ is the initial setting)

◉	**Auto**	The peak wavelength of the measured spectral reflectance is automatically determined and density at that wavelength is displayed.
○	**Manual**	Set the desired wavelength to measure density at. Initial setting: 500nm Settable range: 380 to 730nm

▌ Color Measurement Conditions

□ Color Target

Color targets registered in the instrument are used for color difference calculations for "Difference" display mode and PASS/FAIL judgments for "Judge" display mode in <COLOR> measurement mode.
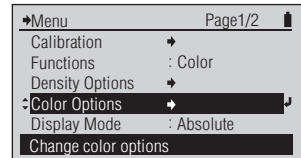
[Operating Procedure]

1 **On the <Menu> screen, move the cursor to "Color Options" with the ▲ or ▼ button and press the ⏎ (Enter)/OPTION button.**
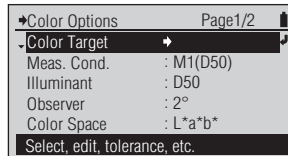
The <Color Options> configuration screen is displayed.

2 **Move the cursor to "Color Target" with the ▲ or ▼ button and press the ⏎ (Enter)/OPTION button.**
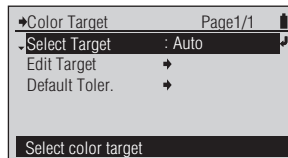
The <Color Target> screen is displayed.

Color Target has the following kind of menu.

□ **Select Target**	: Select the target color when measuring color difference from the registered target color data.
□ **Edit Target - Measure**	: Runs the measurement and registers the result as the target color data for the specified number.
□ **Edit Target - Delete**	: Deletes the target color data for the specified number.
□ **Edit Target - Color Tolerance**	: Sets the tolerance used in the pass/fail judgment of the measurement value for the specified number's target color data.
□ **Edit Target - Edit**	: Changes the target color data value for the specified number.
□ **Edit Target - Edit Name**	: Changes the name of the target color data for the specified number.
□ **Default Toler.**	: The tolerance set in advance as the default tolerance before setting individual tolerances for color difference target color data. This changes that default tolerance.
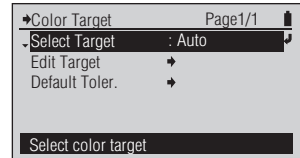
Preparation for Measurement

E-60

☐ **Color Target - Select Target**

```
→Color Target            Page1/1      ▮
 Select Target        : Auto
 Edit Target             →
 Default Toler.          →

 Select color target
```

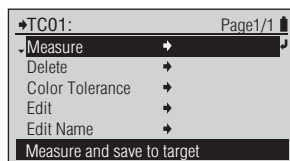## [Operating Procedure]

1 **On the <Color Target> screen, move the cursor to "Select Target" with the ⬆ button and press the ⏎ (Enter)/OPTION button.**

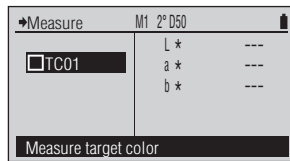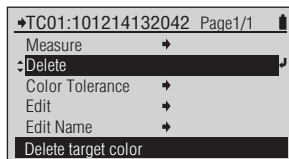Or you can also enter the <Select Target> screen from the <Options> screen displayed by pressing ⏎ on the <COLOR> measurement screen.
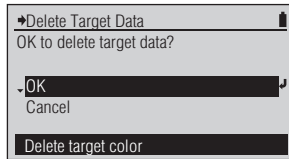
```
→Select Target          Page1/7      ▮
 ◉Auto            L ∗        ---
 ○TC01            a ∗        ---
 ○TC02            b ∗        ---
 ○TC03
 ○TC04        TC--:
 Auto select target color
```
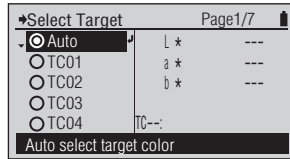
The <Select Target> screen is displayed.

2 **Move the cursor to the color difference target color number (Auto or TC01 to TC30) you wish to select with the ⬆ or ⬇ button.**

```
→Select Target          Page1/7      ▮
 ○Auto            L ∗       50.75
 ◉TC01            a ∗       74.08
 ○TC02            b ∗       52.96
 ○TC03
 ○TC04        TC01:101214132042
 Select target color
```

Select the setting.

3 **Press the ⏎ (Enter)/OPTION button.**

```
→Color Target            Page1/1      ▮
 Select Target        : TC01
 Edit Target             →
 Default Toler.          →

 Select color target
```

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)

◉	**Auto**	Automatically selects the nearest value from the color difference target colors in memory that conforms to the measurement conditions according to the measurement result.
○	**TC01 to TC30**	Specifies the color difference target color to use for measurements.

Preparation for Measurement

☐ **Color Target - Edit Target - Measure**

```
→Color Target            Page1/1   ▮
 Select Target    : Auto          ↲
⇅Edit Target             →         ↲
 Default Toler.          →
 
 Edit target, tolerance
```

[Operating Procedure]
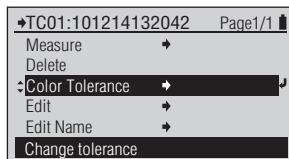
1 **On the <Color Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.**

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ↵ on the <COLOR> measurement screen.

```
→Edit Target            Page1/6   ▮
 ⌐TC01      ↲    L ★      ---
  TC02           a ★      ---
  TC03           b ★      ---
  TC04
  TC05      TC01:
 Select target to edit
```

The <Edit Target> screen is displayed.

2 **Move the cursor to the color difference target color number (TC01 to TC30) you wish to register with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.**

```
→TC01:                  Page1/1   ▮
 ⌐Measure         →                ↲
  Delete          →
  Color Tolerance →
  Edit            →
  Edit Name       →
 Measure and save to target
```

The <Edit Target> screen for the selected target color number is displayed.

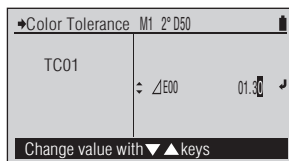**3** **Move the cursor to "Measure" with the ⬆ button, then press the ↵ (Enter)/OPTION button.**

```
→Measure    M1 2° D50            ▮
                  L ★      ---
  ☐TC01           a ★      ---
                  b ★      ---
 
 
 Measure target color
```
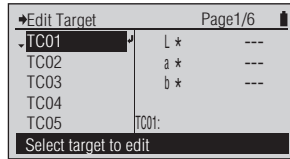
The <Measure> screen for the color target color is displayed.

4 **Align the Target Mask port with the location that is the target for the paper.**
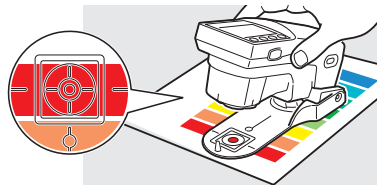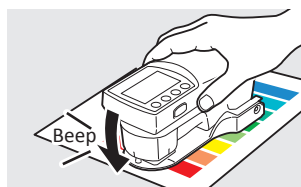
5 **Push the instrument on the paper.**

You will hear a beep.

Beep

[Operating Procedure]

6 **Remove the instrument when you hear the beep again.**

→Measure	M1 2° D50	
	L *	50.75
☑TC01	a *	74.08
	b *	52.96
Measure target color		

"□TCxx" is checked and the target color's measurement value is displayed. The target color data is registered in the selected target color number.

Memo

7 **Press the ⬅ button.**

→TC01 : 101214132042	Page1/1
Measure	→
Delete	→
Color Tolerance	→
Edit	→
Edit Name	→
Measure and save to target	

The measurement date/time is added as the target color's name.

You return to the previous screen.

Preparation for Measurement

☐ **Color Target - Edit Target - Delete**

```
→Color Target          Page1/1    ▮
  Select Target      : TC01
↕ Edit Target           →              ↵
  Default Toler.        →


  Edit target, tolerance
```

[Operating Procedure]
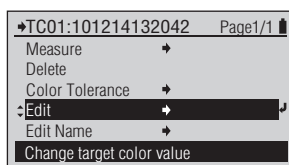
1 **On the <Color Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ⏎ on the <COLOR> measurement screen.

```
→Edit Target           Page1/6    ▮
⌐TC01          ↵   L ★        50.75
  TC02               a ★        74.08
  TC03               b ★        52.96
  TC04
  TC05          TC01:101214132042
  Select target to edit
```

The <Edit Target> screen is displayed.

2 **Move the cursor to the color difference target color number (TC01 to TC30) you wish to edit with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**
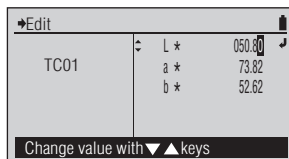
```
→TC01:101214132042 Page1/1  ▮
  Measure              →
↕ Delete                            ↵
  Color Tolerance     →
  Edit                 →
  Edit Name            →
  Delete target color
```

The <Edit Target> screen for the selected target color number is displayed.

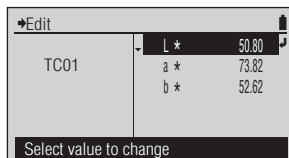**3** **Move the cursor to "Delete" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Delete Target Data              ▮
  OK to delete target data?

⌐OK                                 ↵
  Cancel

  Delete target color
```

The <Delete Target Data> screen is displayed.

4 **Move the cursor to "OK" with the ⬆ button and press the ⏎ (Enter)/OPTION button.**

```
→TC01:               Page1/1    ▮
  Measure              →
↕ Delete                            ↵
  Color Tolerance     →
  Edit                 →
  Edit Name            →
  Delete target color
```

The target color data for the selected target color number is deleted and you return to the previous screen.

☐ **Color Target - Edit Target - Color Tolerance**
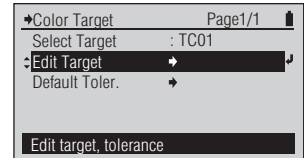
```
◆Color Target          Page1/1   🔋
 Select Target       : TC01
✦Edit Target            ➤
 Default Toler.         ➤


 Edit target, tolerance
```

[Operating Procedure]

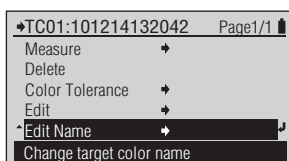**1** **On the <Color Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the 🔘 (Enter)/OPTION button.**

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing 🔘 on the <COLOR> measurement screen.
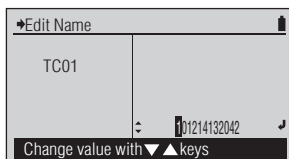
```
◆Edit Target           Page1/6   🔋
 TC01        ↵    L ★      50.83
 TC02             a ★      73.82
 TC03             b ★      52.62
 TC04
 TC05               101214132042
 Select target to edit
```

The <Edit Target> screen is displayed.

2 **Move the cursor to the color difference target color number (TC01 to TC30) you wish to edit with the ⬆ or ⬇ button and press the 🔘 (Enter)/OPTION button.**

```
◆TC01:101214132042     Page1/1   🔋
 Measure                ➤
 Delete
✦Color Tolerance        ➤         ↵
 Edit                   ➤
 Edit Name              ➤
 Change tolerance
```
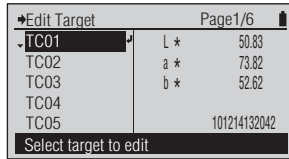
The <Edit Target> screen for the selected target color number is displayed.

3 **Move the cursor to "Color Tolerance" with the ⬆ or ⬇ button and press the 🔘 (Enter)/OPTION button.**
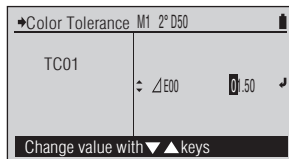
```
◆Color Tolerance  M1 2° D50      🔋

 TC01
                 ↕ △E00   0̲1.50  ↵

 Change value with ▼▲ keys
```

The <Color Tolerance> configuration screen is displayed, and the color difference formula corresponding to the set measurement conditions is displayed.

Memo

The tolerance displayed when you first enter the <Color Tolerance> configuration screen for the selected target color number is the default tolerance. Refer to page E-69.

4 **Set the tolerance for the color difference formula.**

```
◆Color Tolerance  M1 2° D50      🔋

 TC01
                 ↕ △E00   01.3̲0  ↵

 Change value with ▼▲ keys
```

• For setting numeric values, refer to page E-41.

Preparation for Measurement

[Operating Procedure]

5 **When finished setting the right-most digit, press the ⏎ (Enter)/OPTION button.**

```
◆TC01:101214132042        Page1/1 ▮
  Measure                 ◆
  Delete
⬍ Color Tolerance        ◆         ◢
  Edit                    ◆
  Edit Name               ◆
  Change tolerance
```
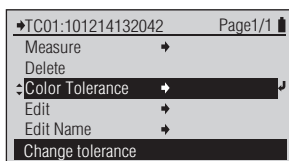
The set content is confirmed and you return to the previous screen.

Notes

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

Memo

Afterward, even if you change the default tolerance, the tolerance set here is not changed.

Setting

Initial setting	Setting range
ΔE00 1.50	0.00 to 99.99

☐ **Color Target - Edit Target - Edit**

◆Color Target	Page1/1
Select Target	: TC01
‡Edit Target	◆
Default Toler.	◆

Edit target, tolerance

[Operating Procedure]

1 **On the <Color Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the 🔵 (Enter)/OPTION button.**
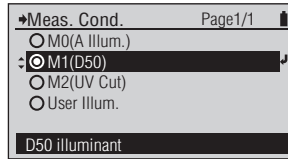
Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing 🔵 on the <COLOR> measurement screen.

◆Edit Target	Page1/6
TC01	L ★ 50.83
TC02	a ★ 73.82
TC03	b ★ 52.62
TC04	
TC05	TC01:101214132042

Select target to edit

The <Edit Target> screen is displayed.

2 **Move the cursor to the color difference target color number (TC01 to TC30) you wish to edit with the ⬆ or ⬇ button and press the 🔵 (Enter)/OPTION button.**

◆TC01:101214132042	Page1/1
Measure	◆
Delete	
Color Tolerance	◆
‡Edit	◆
Edit Name	◆

Change target color value

The <Edit Target> screen for the selected target color number is displayed.

3 **Move the cursor to "Edit" with the ⬆ or ⬇ button and press the 🔵 (Enter)/OPTION button.**

◆Edit	
	L ★ 50.83
TC01	a ★ 73.82
	b ★ 52.62

Select value to change
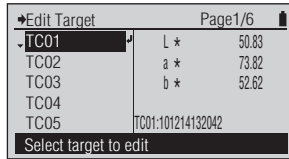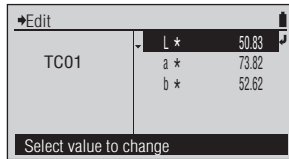
The <Edit> screen for the color difference target color is displayed, and the color space corresponding to the set measurement conditions is displayed.

4 **Edit the target color value for the color specification values.**

◆Edit	
	L ★ 050.8⬛
TC01	a ★ 73.82
	b ★ 52.62

Change value with ▼ ▲ keys

◆Edit	
	L ★ 50.80
TC01	a ★ 73.82
	b ★ 52.62

Select value to change

• For setting numeric values, refer to page E-41.

5 **When finished editing the target color value for the color specification values, press the ⬅ button.**

◆TC01:101214132042	Page1/1
Measure	◆
Delete	
Color Tolerance	◆
‡Edit	◆
Edit Name	◆

Change target color value

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

Preparation for Measurement

E-67

☐ **Color Target - Edit Target - Edit Name**

```
→Color Target          Page1/1   ▮
 Select Target      : TC01
⇕Edit Target           →            ↵
 Default Toler.        →

 Edit target, tolerance
```

[Operating Procedure]

1 **On the <Color Target> screen, move the cursor to "Edit Target" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Edit Target> screen from the <Options> screen displayed by pressing ⏎ on the <COLOR> measurement screen.

```
→Edit Target           Page1/6   ▮
⌄TC01        ↵   L *        50.80
 TC02            a *        73.82
 TC03            b *        52.62
 TC04
 TC05         TC01:101214132042
 Select target to edit
```

The <Edit Target> screen is displayed.

2 **Move the cursor to the color difference target color number (TC01 to TC30) you wish to edit with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→TC01:101214132042     Page1/1  ▮
 Measure           →
 Delete
 Color Tolerance   →
 Edit              →
⌃Edit Name         →                ↵
 Change target color name
```

The <Edit Target> screen for the selected target color number is displayed.

3 **Move the cursor to "Edit Name" with the ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Edit Name                        ▮

   TC01              │

                     │
              ⇕    ▮01214132042   ↵
 Change value with ▼ ▲ keys
```

The <Edit Name> screen for the color difference target color is displayed.

Memo

The name displayed when you first enter the <Edit Name> screen for the selected target color number is the measurement date/time added when obtained by measuring the target color. Refer to page E-63.

4 **Edit the name of the target color.**

```
→Edit Name                        ▮

   TC01              │

                     │
              ⇕     123456789AB▮C  ↵
 Change value with ▼ ▲ keys
```
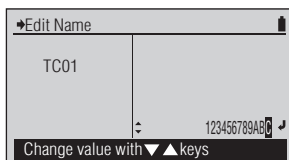
For setting numeric values, refer to page E-41.

For setting characters, refer to page E-41.

5 **When finished setting the right-most character (12th character), press the ⏎ (Enter)/OPTION button.**

```
→TC01:123456789ABC     Page1/1  ▮
 Measure           →
 Delete
 Color Tolerance   →
 Edit              →
⌃Edit Name         →                ↵
 Change target color name
```
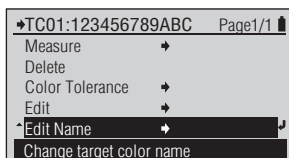
The set content is confirmed and you return to the previous screen.

☐ **Color Target - Def. Tolerance**
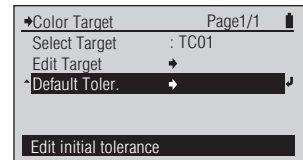
```
→Color Target          Page1/1    ▮
  Select Target    : TC01
  Edit Target          →
↑ Default Toler.       →              ↵

  Edit initial tolerance
```

[Operating Procedure]

1 **On the <Color Target> screen, move the cursor to "Default Toler." with the ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Default Toler.                    ▮


              ⬍ ⊿E00      ▯1.50   ↵

  Change value with ▼ ▲ keys
```

The <Default Toler.> screen is displayed, and the color difference formula corresponding to the set measurement conditions is displayed.

2 **Set the default tolerance for the color difference formula.**

```
→Default Toler.                    ▮


              ⬍ ⊿E00      01.3▯   ↵

  Change value with ▼ ▲ keys
```

• For setting numeric values, refer to page E-41.

3 **When finished setting the right-most digit, press the ⏎ (Enter)/OPTION button.**

```
→Color Target          Page1/1    ▮
  Select Target    : TC01
  Edit Target          →
↑ Default Toler.       →              ↵

  Edit initial tolerance
```

The set 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

Initial setting	Setting range
ΔE00 1.50	0.00 to 99.99

Preparation for Measurement

☐ **Meas. Cond.**

```
→Color Options          Page1/2    ▮
  Color Target        →              ↵
⇕ Meas. Cond.         : M1(D50)      ↵
  Illuminant          : D50
  Observer            : 2°
  Color Space         : L∗a∗b∗
  Select measurement conditions
```
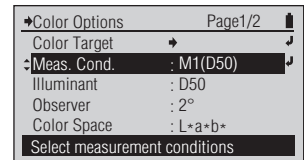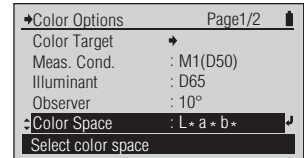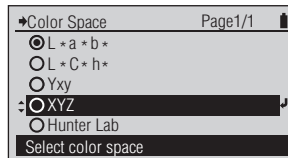
[Operating Procedure]

1 On the <Color Options> configuration screen, move the cursor to "Meas. Cond." with the ▼ button and press the ⏎ (Enter)/OPTION button.
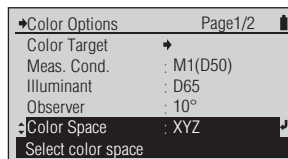
```
→Meas. Cond.           Page1/1    ▮
  ○ M0(A Illum.)
⇕ ◉ M1(D50)                          ↵
  ○ M2(UV Cut)
  ○ User Illum.

  D50 illuminant
```

The <Meas. Cond.> configuration screen is displayed.

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

```
→Meas. Cond.           Page1/1    ▮
  ○ M0(A Illum.)
  ○ M1(D50)
⇕ ◉ M2(UV Cut)                       ↵
  ○ User Illum.

  UV cut illuminant
```

Select the setting.

3 Press the ⏎ (Enter)/OPTION button.

```
→Color Options          Page1/2    ▮
  Color Target        →              ↵
⇕ Meas. Cond.         : M2(UV Cut)   ↵
  Illuminant          : D50
  Observer            : 2°
  Color Space         : L∗a∗b∗
  Select measurement conditions
```

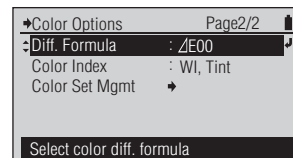The selected content is confirmed and you return to the previous screen.

Notes

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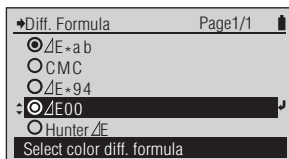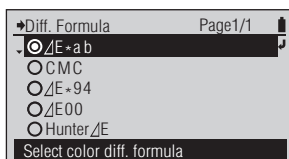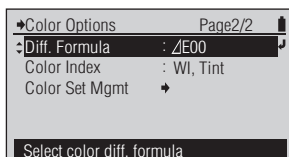

Setting (◉ is the initial setting)

This instrument uses proprietary VFS (Virtual Fluorescence Standard) technology to calculate colorimetric values and spectral reflectance data by switching the lighting used for measurement. MO, M1, and M2 are measurement conditions described in "4.2.2 Illumination requirements and measurement conditions" in ISO 13655.

○	**M0(A Illum.)**	Standard Illuminant A; (incandescent bulb color, color temperature 2856 K)
◉	**M1(D50)**	Supplementary Illuminant D_{50} (daylight, color temperature 5003 K)
○	**M2(UV Cut)**	Standard Illuminant A with light of 410 nm or lower cut
○	**User Illum.**	The illuminant registered as the user illuminant by measuring illuminance (FD-7 only)

Notes

Please note that "Meas. Cond." setting is ignored when taking paper index measurements. (Refer to page E-76.)

Preparation for Measurement

| Density Measurement Conditions | Color Measurement Conditions | Display Mode | Polarized Measurement Settings |

☐ **Illuminant**

```
→Color Options        Page1/2   ▮
  Color Target         →
  Meas. Cond.         : M1(D50)
↕ Illuminant          : D50      ↵
  Observer            : 2°
  Color Space         : L∗a∗b∗
Select illuminant
```
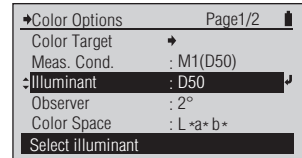
[Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Illuminant" with the ⬇ button and press the 🔵 (Enter)/OPTION button.**

Or you can also enter the <Illuminant> configuration screen from the <Options> screen displayed by pressing 🔵 on the <PAPER> measurement screen.

```
→Illuminant          Page1/3   ▮
  ○A
  ○C
↕ ⦿D50                          ↵
  ○D65
  ○ID50
Select illuminant
```
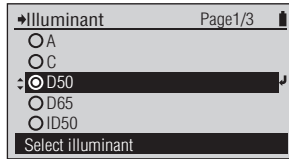
The <Illuminant> configuration screen is displayed.

Notes

Please refer to page E-76 to set "Illuminant" when taking paper index measurements.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**

```
→Illuminant          Page1/3   ▮
  ○A
  ○C
  ⦿D50
↕ ○D65                          ↵
  ○ID50
Select illuminant
```

Select the setting.

3 **Press the 🔵 (Enter)/OPTION button.**

```
→Color Options        Page1/2   ▮
  Color Target         →
  Meas. Cond.         : M1(D50)
↕ Illuminant          : D65      ↵
  Observer            : 2°
  Color Space         : L∗a∗b∗
Select illuminant
```

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.

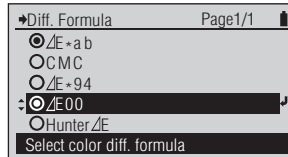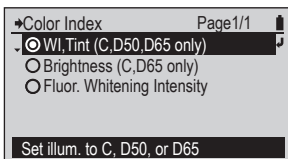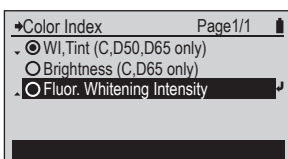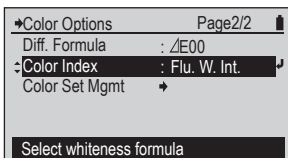**Setting** (⦿ is the initial setting)

○	**A**	Standard Illuminant A; (incandescent bulb color, color temperature 2856 K)
○	**C**	Supplementary Illuminant C; (daylight, however the relative value of the spectral distribution in the UV region is small, color temperature 6774 K)
⦿	**D50**	Supplementary Illuminant D_{50} (daylight, color temperature 5003 K)
○	**D65**	Supplementary Illuminant D_{65} (daylight, color temperature 6504 K)
○	**ID50**	Indoor Daylight Illuminant ID_{50} (daylight, color temperature 5000 K)
○	**ID65**	Indoor Daylight Illuminant ID_{65} (daylight, color temperature 6500 K)
○	**F2**	White (overseas fluorescent lamp)
○	**F6**	White (domestic Japanese fluorescent lamp)
○	**F7**	Color rendering A daylight color (overseas fluorescent lamp)
○	**F8**	Color rendering AAA daylight color (domestic Japanese fluorescent lamp)
○	**F9**	Color rendering AAA white (domestic Japanese fluorescent lamp)
○	**F10**	Three band daylight color (domestic Japanese fluorescent lamp)
○	**F11**	Three band white (overseas fluorescent lamp)
○	**F12**	Three band incandescent bulb color (overseas fluorescent lamp)
○	**User Illum.**	The illuminant registered as the user illuminant by measuring illuminance (FD-7 only)

Preparation for Measurement

☐ **Observer**

→Color Options	Page1/2 🔋
Color Target	→
Meas. Cond.	: M1(D50)
Illuminant	: D65
Observer	: 2°
Color Space	: L∗ a∗ b∗
Select observer	
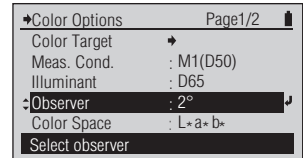
[Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Observer" with the ⬇ button and press the 🔵 (Enter)/OPTION button.**

Or you can also enter the <Observer> configuration screen from the <Options> screen displayed by pressing 🔵 on the <PAPER> measurement screen.

→Observer	Page1/1 🔋
⦿ 2°	
○ 10°	
Select observer	
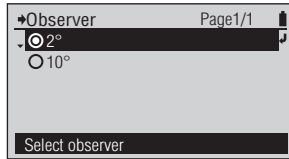
The <Observer> configuration screen is displayed.

Notes

Please refer to page E-76 to set "Observer" when taking paper index measurements using WI or Tint.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**
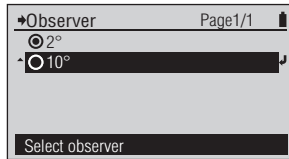
→Observer	Page1/1 🔋
⦿ 2°	
○ 10°	
Select observer	

Select the setting.

3 **Press the 🔵 (Enter)/OPTION button.**

→Color Options	Page1/2 🔋
Color Target	→
Meas. Cond.	: M1(D50)
Illuminant	: D65
Observer	: 10°
Color Space	: L∗ a∗ b∗
Select observer	
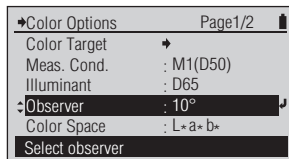
The selected content is confirmed and you return to the previous screen.

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)

☐ **Color Space**

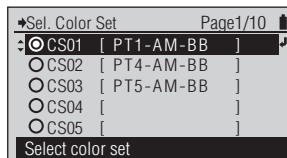| →Color Options	Page1/2	▮
Color Target	→	
Meas. Cond.	: M1(D50)	
Illuminant	: D65	
Observer	: 10°	
‡Color Space	: L∗ a ∗ b ∗	⏎
Select color space		

[Operating Procedure]

1 On the <Color Options> configuration screen, move the cursor to "Color Space" with the ⬇ button and press the ⏎ (Enter)/OPTION button.
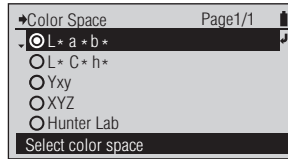
→Color Space	Page1/1	▮
◉ L∗ a ∗ b ∗		⏎
○ L∗ C∗ h∗		
○ Yxy		
○ XYZ		
○ Hunter Lab		
Select color space		

The <Color Space> configuration screen is displayed.

2 Move the cursor to the item you wish to select with the ⬆ or ⬇ button.

→Color Space	Page1/1	▮
◉ L ∗ a ∗ b ∗		
○ L ∗ C∗ h∗		
○ Yxy		
‡○ XYZ		⏎
○ Hunter Lab		
Select color space		

Select the setting.

3 Press the ⏎ (Enter)/OPTION button.

→Color Options	Page1/2	▮
Color Target	→	
Meas. Cond.	: M1(D50)	
Illuminant	: D65	
Observer	: 10°	
‡Color Space	: XYZ	⏎
Select color space		

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.

Preparation for Measurement

Setting (◉ is the initial setting)

◉	**L*a*b***	L*a*b* color space
○	**L*C*h**	L*C*h color space
○	**Yxy**	Yxy color space
○	**XYZ**	XYZ color space
○	**Hunter Lab**	Hunter Lab color space

☐ **Diff. Formula**

```
→Color Options          Page2/2    ▮
‡Diff. Formula      : ⊿E00         ↵
  Color Index       : WI, Tint
  Color Set Mgmt    →

Select color diff. formula
```

[Operating Procedure]

1 **On the <Color Options>
configuration screen, move the
cursor to "Diff. Formula" with
the ▲ or ▼ button and press
the ⊕ (Enter)/OPTION button.**

```
→Diff. Formula        Page1/1    ▮
  ◉⊿E＊ab
  ○CMC
  ○⊿E＊94
‡◉⊿E00                          ↵
  ○Hunter⊿E
Select color diff. formula
```

The <Diff. Formula>
configuration screen is displayed.

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

```
→Diff. Formula        Page1/1    ▮
‡◉⊿E＊ab                         ↵
  ○CMC
  ○⊿E＊94
  ○⊿E00
  ○Hunter⊿E
Select color diff. formula
```

Select the setting.

3 **Press the ⊕ (Enter)/OPTION button.**

```
→Color Options          Page2/2    ▮
‡Diff. Formula      : ⊿E00         ↵
  Color Index       : WI, Tint
  Color Set Mgmt    →

Select color diff. formula
```

When selecting "ΔE*ab" or
"Hunter ΔE", the selected content
is confirmed and you return to
the previous screen.
When selecting "CMC",
"ΔE*94", or "ΔE00", the screen
switches to the <Parameters>
configuration screen.

Notes

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

**4** **When selecting "CMC", "ΔE*94",
or "ΔE00", set the parameters.**

```
→Parameters                      ▮
  l                : 1.00        ↵
  c                : 1.00
  h                : 1.00

Change factor l
```
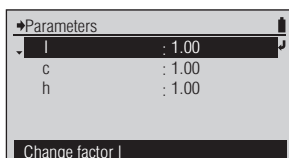
The <Parameters> configuration
screen is displayed.

[Operating Procedure]

5 **When finished setting all the parameters, press the** ⬅ **button.**

```
➔Diff. Formula          Page1/1   🔋
  ◉ΔE⋆ab
  ○CMC
  ○ΔE⋆94
⬍◉ΔE00                            ↵
  ○HunterΔE
  Select color diff. formula
```

The <Diff. Formula> configuration screen is displayed.

Setting (◉ is the initial setting)

○	**ΔE*ab**	$\Delta E^{\star}_{ab}$ (CIE 1976) color difference formula
○	**CMC**	CMC color difference formula; The parameters can be changed.
○	**ΔE*94**	$\Delta E^{\star}$ (CIE 1994) color difference formula; The parameters can be changed.
◉	**ΔE00**	ΔE_{2000} (CIE 2000) color difference formula; The parameters can be changed.
○	**Hunter ΔE**	Hunter ΔE color difference formula

Preparation for
Measurement

E-75

☐ **Color Index**

> ✦Color Options   Page2/2 ▮
> Diff. Formula   : ⊿E00
> ⬍Color Index   : WI, Tint
> Color Set Mgmt   ➔
>
> Select whiteness formula
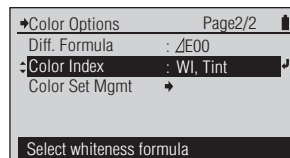
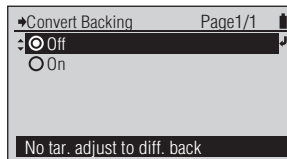### [Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Color Index" with the ⬇ button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Color Index> configuration screen from the <Options> screen displayed by pressing ⏎ on the <PAPER> measurement screen.
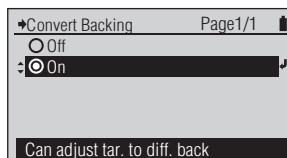
> ✦Color Index   Page1/1 ▮
> ⊙ WI,Tint (C,D50,D65 only)
> ○ Brightness (C,D65 only)
> ○ Fluor. Whitening Intensity
>
> Set illum. to C, D50, or D65

The <Color Index> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**

> ✦Color Index   Page1/1 ▮
> ⊙ WI,Tint (C,D50,D65 only)
> ○ Brightness (C,D65 only)
> ○ Fluor. Whitening Intensity
>

Select the setting.

3 **Press the ⏎ (Enter)/OPTION button.**

> ✦Color Options   Page2/2 ▮
> Diff. Formula   : ⊿E00
> ⬍Color Index   : Flu. W. Int.
> Color Set Mgmt   ➔
>
> Select whiteness formula

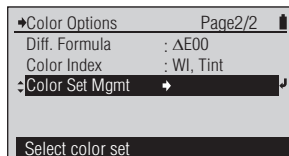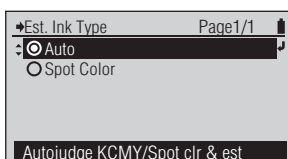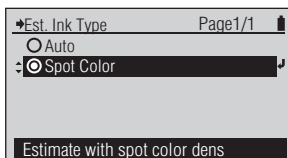The selected content is confirmed and you return to the previous screen.
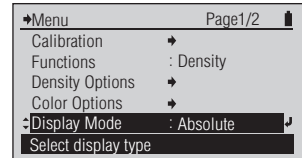
Notes

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

Setting (⊙ is the initial setting)

⊙	**WI,Tint (C,D50,D65 only)**	Whiteness index (ASTM E313-96)	Set "**Illuminant**" to C, D50, or D65.	Set "**Observer**" to 2° or 10°.	"**Meas. Cond.**" setting is not used in calculations, so any setting can be selected.
○	**Brightness (C,D65 only)**	ISO brightness (ISO 2470-1)	Set "**Illuminant**" to C.	"**Observer**" setting is not used in calculations, so either setting can be selected.	
		D65 brightness (ISO 2470-2)	Set "**Illuminant**" to D65.		
○	**Fluor. Whitening Intensity**	Calculated as an index of the fluorescent whitening intensity of the paper using the formula below. $\Delta B = B(D65) - B(UV\ Cut)$ B(D65): D65 brightness B(UV Cut): D65 brightness for illuminant A with light of 410 nm or lower cut			

Illuminant: Refer to page E-71.   **Observer**: Refer to page E-72.   **Meas. Cond.**: Refer to page E-47.

Notes

On these instruments, when taking paper index measurements, the "**Illuminant**" setting indicates the light source used for measurement illumination.
Ex.: When measuring D65 Brightness
Set "**Illuminant**" to D65. The instrument uses proprietary VFS
(Virtual Fluorescence Standard) technology to create the D_{65} light source used for measurement illumination.
Please note that the "**Meas. Cond.**" setting (page E-47) is ignored when taking paper index measurements.

Preparation for Measurement

▌ **Color Set Management**

→Color Options Page2/2
Diff. Formula : ΔE00
Color Index : WI, Tint
Color Set Mgmt →

Select color set

Color sets are used for the ISO Check measurement function and the Target Match measurement function. Up to 50 sets of colors with up to 15 target colors per set can be stored in the instrument. Color sets can be set only by using the included Data Management Software FD-S1w.
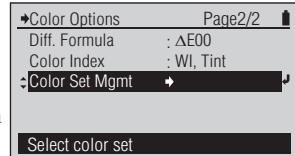
☐ **Selecting Color Set**

[Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Color Set Mgmt" with the ▼ button and press the (Enter)/OPTION button.**

→Color Set Mgmt Page1/1
Sel. Color Set : PT1-AM-BB
Set Backing : White
Convert Backing : Off
Est. Ink Type : Auto

Select color set

The <Color Set Mgmt> configuration screen is displayed.

Or you can also enter the <Color Set Mgmt> configuration screen from the <Options> screen displayed by pressing ⊙ on the <ISO CHECK> or <TARGETMATCH> measurement screen.
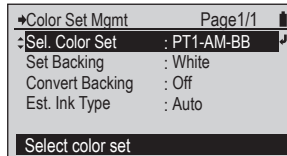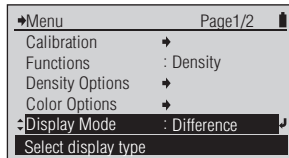
2 **Move the cursor to "Sel. Color Set" with the ▲ or ▼ button and press the (Enter)/OPTION button.**

→Sel. Color Set Page1/10
◉CS01 [PT1-AM-BB]
○CS02 [PT4-AM-BB]
○CS03 [PT5-AM-BB]
○CS04 [ ]
○CS05 [ ]
Select color set

The <Sel. Color Set> configuration screen is displayed, with a list of the color sets currently stored in the instrument.

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

→Sel. Color Set Page1/10
○CS01 [PT1-AM-BB]
◉CS02 [PT4-AM-BB]
○CS03 [PT5-AM-BB]
○CS04 [ ]
○CS05 [ ]
Select color set

Select the setting

• When measurement function is set to <Targetmatch>, "Meas. Target" can be selected if you want to measure a target shortly before measuring the sample or samples to compare to it.

• "Meas. Target" will not be shown if measurement function is set to <ISO Check>
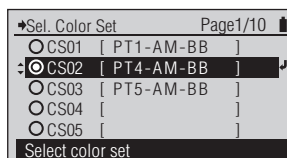
4 **Press the (Enter)/OPTION button**

The instrument contains the following color sets by default:

Name	ISO 12467-2 type
PT1-AM-BB	Paper Type 1; Black backing
PT4-AM-BB	Paper Type 4; Black backing
PT5-AM-BB	Paper Type 5; Black backing
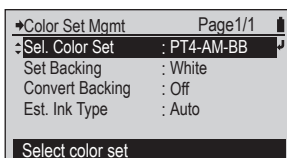
→Color Set Mgmt Page1/1
Sel. Color Set : PT4-AM-BB
Set Backing : White
Convert Backing : Off
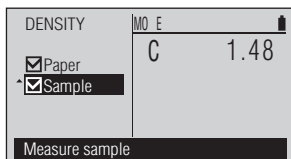Est. Ink Type : Auto

Select color set

The selected color set 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.

Notes

When the measurement function is set to "Targetmatch", an additional setting "Meas. Target" is available as the first setting. When this setting is selected, the target can be measured immediately before measuring the sample without needing to store the target in the instrument beforehand using the Data Management Software FD-S1w.

Preparation for Measurement

☐ **Setting Backing**

Backing information is normally stored with the target colors for ISO Check or
Target Match. The backing which will be used for measurements should be selected.
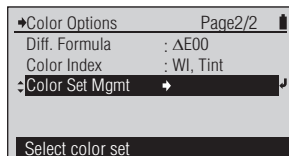
```
→Color Options          Page2/2  ▮
  Diff. Formula        : ΔE00
  Color Index          : WI, Tint
↕ Color Set Mgmt       →              ↵

  Select color set
```
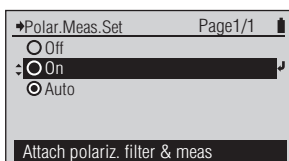
[Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Color Set Mgmt" with the ▼ button and press the ⊕ (Enter)/OPTION button.**
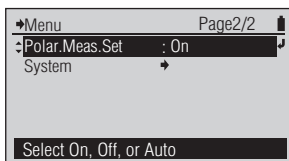
Or you can also enter the <Color Set Mgmt> configuration screen from the <Options> screen displayed by pressing ⊕ on the <ISO CHECK> or <TARGETMATCH> measurement screen.

```
→Color Set Mgmt         Page1/1  ▮
  Sel. Color Set       : ABC_New
↕ Set Backing          : White       ↵
  Convert Backing      : Off
  Est. Ink Type        : Auto

  Select backing
```
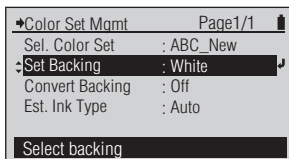
The <Color Set Mgmt> configuration screen is displayed.

2 **Move the cursor to "Set Backing" with the ▲ or ▼ button and press the ⊕ (Enter)/OPTION button.**
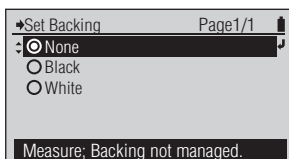
```
→Set Backing            Page1/1  ▮
↕ ◉ None                              ↵
  ○ Black
  ○ White

  Measure; Backing not managed.
```

The <Set Backing> configuration screen is displayed.

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

```
→Set Backing            Page1/1  ▮
  ○ None
↕ ◉ Black                            ↵
  ○ White

  Measure with black backing
```

Select the setting.

4 **Press the ⊕ (Enter)/ OPTION button.**

```
→Color Set Mgmt         Page1/1  ▮
  Sel. Color Set       : ABC_New
↕ Set Backing          : White       ↵
  Convert Backing      : Off
  Est. Ink Type        : Auto

  Select backing
```
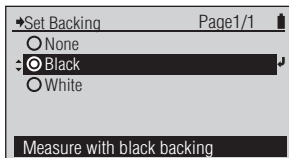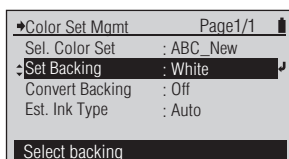
The selected backing setting is confirmed and you return to the previous screen.

Notes

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

Setting (◉ is the initial setting)

◉	**None**	Measurements will be taken without reference to backing.
○	**White**	Measurements will be taken over a white backing.
○	**Black**	Measurements will be taken over a black backing.

☐ **Convert Backing**

```
→Color Options          Page2/2  ▮
 Diff. Formula      : ΔE00
 Color Index        : WI, Tint
⇕Color Set Mgmt       →            ↵

 Select color set
```

If a backing different from the one stored with the target colors in the color set will be used for measurements, the instrument can be set to convert the target values to the measurement backing.

Memo • Backing conversion is performed only for ISO Check or Targetmatch functions.
• Backing conversion is performed according to the method described in ISO 13655. Conversion is possible only for 100% solid colors.
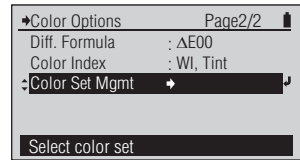
[Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Color Set Mgmt" with the ⬇ button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Color Set Mgmt> configuration screen from the <Options> screen displayed by pressing ⏎ on the <ISO CHECK> or <TARGETMATCH> measurement screen.

```
→Color Set Mgmt        Page1/1  ▮
 Sel. Color Set    : ABC_New
 Set Backing       : White
⇕Convert Backing    : Off         ↵
 Est. Ink Type     : Auto

 Can adjust tar. to diff. back
```
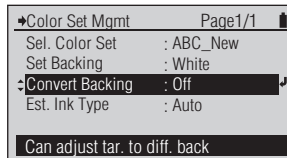
The <Color Set Mgmt> configuration screen is displayed.

2 **Move the cursor to "Convert Backing" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Convert Backing       Page1/1  ▮
⇕◉ Off                             ↵
 ○ On



 No tar. adjust to diff. back
```

The <Convert Backing> configuration screen is displayed.

3 **Move the cursor to the backing you wish to select with the ⬆ or ⬇ button.**

```
→Convert Backing       Page1/1  ▮
 ○ Off
⇕◉ On                             ↵



 Can adjust tar. to diff. back
```

Select the setting

4 **Press the ⏎ (Enter)/OPTION button.**

```
→Color Set Mgmt        Page1/1  ▮
 Sel. Color Set    : ABC_New
 Set Backing       : White
⇕Convert Backing    : On          ↵
 Est. Ink Type     : Auto

 Can adjust tar. to diff. back
```
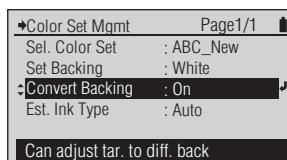
The selected color set is confirmed and you return to the previous screen.

Notes

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

Setting (◉ is the initial setting)

◉	**Off**	Target values are used without conversion.
○	**On**	Target values are converted to the measurement backing.

Preparation for Measurement

☐ **Est. Ink Type**

This setting is used for only the Targetmatch function..

```
→Color Options          Page2/2  ▮
  Diff. Formula      : ΔE00
  Color Index        : WI, Tint
↕ Color Set Mgmt     →            ↵

  Select color set
```

[Operating Procedure]

1 **On the <Color Options> configuration screen, move the cursor to "Color Set Mgmt" with the 🔽 button and press the ⏎ (Enter)/OPTION button.**

Or you can also enter the <Color Set Mgmt> configuration screen from the <Options> screen displayed by pressing ⏎ on the <TARGETMATCH> measurement screen.

```
→Color Set Mgmt        Page1/1  ▮
  Sel. Color Set    : ABC_New
  Set Backing       : White
  Convert Backing   : Off
↕ Est. Ink Type     : Auto        ↵

  Set dens. to est. tar. match
```
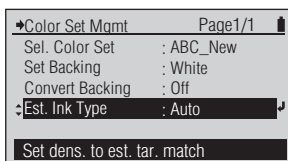
The <Color Set Mgmt> configuration screen is displayed.

2 **Move the cursor to "Est. Ink Type" with the 🔼 or 🔽 button and press the ⏎ (Enter)/OPTION button.**

```
→Est. Ink Type         Page1/1  ▮
↕ ⦿ Auto                          ↵
  ○ Spot Color



  Autojudge KCMY/Spot clr & est
```

The <Estimated Ink Type> configuration screen is displayed.

3 **Move the cursor to the backing you wish to select with the 🔼 or 🔽 button.**

```
→Est. Ink Type         Page1/1  ▮
  ○ Auto
↕ ⦿ Spot Color



  Estimate with spot color dens
```

Select the setting.

4 **Press the ⏎ (Enter)/ OPTION button.**

```
→Color Set Mgmt        Page1/1  ▮
  Sel. Color Set    : ABC_New
  Set Backing       : White
  Convert Backing   : Off
↕ Est. Ink Type     : Spot Color  ↵

  Set dens. to est. tar. match
```

The selected color set 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)

⦿	**Auto**	Estimated adjustment color is displayed as CMYK if adjustment can be performed with a process color or as a spot color (with wavelength of maximum absorbance) if adjustment requires a process color.
○	**Spot Color**	Estimated adjustment color is displayed as a spot color (with wavelength of maximum absorbance) regardless of adjustment color.

▎**Display Mode**

```
→Menu                    Page1/2   🔋
  Calibration              ➡
  Functions              : Density
  Density Options          ➡
  Color Options            ➡
↕ Display Mode           : Absolute  ↵
  Select display type
```

[Operating Procedure]

1 **On the <Menu> screen, move the cursor to "Display Mode" with the ⬆ or ⬇ button and press the 🔵 (Enter)/OPTION button.**

Or you can also enter the <Display Mode> configuration screen from the <Options> screen displayed by pressing 🔵 on the <DENSITY> measurement screen or <COLOR> measurement screen.

```
→Display Mode            Page1/1   🔋
  ◉ Absolute                        ↵
  ○ Difference
  ○ Judge

  Set to display absolute value
```

The <Display Mode> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**

```
→Display Mode            Page1/1   🔋
  ◉ Absolute
↕ ○ Difference                      ↵
  ○ Judge

  Display color/density diff.
```

Select the setting.

3 **Press the 🔵 (Enter)/OPTION button.**

```
→Menu                    Page1/2   🔋
  Calibration              ➡
  Functions              : Density
  Density Options          ➡
  Color Options            ➡
↕ Display Mode           : Difference ↵
  Select display type
```

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 density or colorimetric value without using the target color.
○	**Difference**	Displays the density difference or color difference for the target color.
○	**Judge**	The density difference or color difference for the target color is judged on whether or not it falls within the density tolerance or color difference tolerance range set in advance. Displays "Pass" when it passes and "Fail" when even a single one fails. The density judgment is conducted with the displayed density filter. The color judgment is conducted with the color difference formula. (Ex. When the C density filter is displayed, "Pass" is displayed if C falls within the tolerance range even if M, Y, and K fall outside the range.)

```
DENSITY        M0 E        🔋
  ☑Paper        C    1.48
↕ ☑Sample

  Measure sample
```
Example <DENSITY> measurement screen when "Absolute" is selected
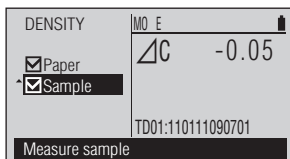
```
DENSITY        M0 E        🔋
  ☑Paper       ⊿C   -0.05
↕ ☑Sample
              TD01:110111090701
  Measure sample
```
Example <DENSITY> measurement screen when "Difference" is selected
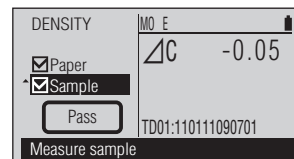
```
DENSITY        M0 E        🔋
  ☑Paper       ⊿C   -0.05
↕ ☑Sample
   Pass       TD01:110111090701
  Measure sample
```
Example <DENSITY> measurement screen when "Judge" is selected

Preparation for Measurement

▌ Polarized Meas.

```
→Menu                Page2/2  ▮
↕Polar.Meas.Set    : Auto     ↵
  System              →

Select On, Off, or Auto
```
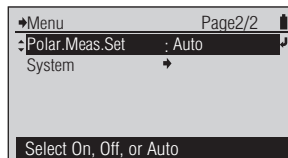
[Operating Procedure]

1 **On the \<Menu\> configuration screen, move the cursor to "Polarized Meas." with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
→Polar.Meas.Set      Page1/1  ▮
  ○ Off
  ○ On
↕ ◉ Auto                      ↵

Autodetect plrz filter at cal
```

The \<Polarized Meas.\> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**

```
→Polar.Meas.Set      Page1/1  ▮
  ○ Off
↕ ○ On                        ↵
  ◉ Auto

Attach polariz. filter & meas
```

Select the setting.

3 **Press the ⏎ (Enter)/OPTION button.**

```
→Menu                Page2/2  ▮
↕Polar.Meas.Set    : On       ↵
  System              →

Select On, Off, or Auto
```

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)

○	**On**	Enables polarized measurements. Take measurements with Polarization Filter attached.
○	**Off**	Disables polarized measurements. Take measurements with Protective Glass attached.
◉	**Auto**	Whether or not Polarization Filter is attached is detected at the time of calibration and polarized measurements are enabled or disabled accordingly.

Memo • When "Polarized Meas." is set to "On" or when "Polarized Meas." is set to "Auto" and the Polarization Filter is detected as being attached, the M3 Meas. Cond. will automatically be used, regardless of the Meas. Cond. setting in the menu.

     • When "Polarized Meas." is set back to "Off" or when "Polarized Meas." is set to "Auto" and the Polarization Filter is not detected as being attached, the Meas. Cond. setting will be used.

Preparation for Measurement

Measurement

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

Before Using the Instrument

Preparation

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

Density Measurement

FD-7 FD-5 (⊚)

(Page E-85)

As necessary

Density Target	E-35-E-43	Density Status	E-47
Def. Tolerance	E-44	Den. Filter	E-57
Meas. Cond. (Density)	E-45	Display Mode	E-81
Den. White Ref.	E-46		

Dot Area Ratio Measurement

FD-7 FD-5 (⊚)

(Page E-87)

As necessary

Meas. Cond. (Density)	E-45
Density Status	E-47
Y-N Factor for Dot %	E-48
Den. Filter	E-57

Dot Gain Measurement

FD-7 FD-5 (⊚)

(Page E-89)

As necessary

Meas. Cond. (Density)	E-45	Den. Filter	E-57
Density Status	E-47		
Y-N Factor for Dot %	E-48		
Dot % Reference for Dot Gain	E-49		
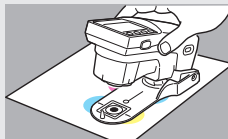
Trapping Measurement

FD-7 FD-5 (⊚)

(Page E-92)

As necessary

Meas. Cond. (Density)	E-45
Density Status	E-47
Trapping Method	E-58

Density Difference Measurement

FD-7 FD-5 (⊚)

(Page E-94)

As necessary

Meas. Cond. (Density)	E-45
Den. White Ref.	E-46
Density Status	E-47
Den. Filter	E-57
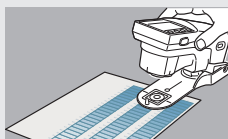
PS Plate Dot Area Ratio Measurement

FD-7 FD-5 ⊚

(Page E-96)

As necessary

Meas. Cond. (Density)	E-45
Density Status	E-47
Y-N Factor For PS Dot %	E-48
Den. Filter	E-57
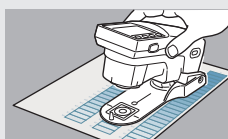
PS Plate Dot Gain Measurement

FD-7 FD-5 ⊚

(Page E-99)

As necessary

Meas. Cond. (Density)	E-45	Den. Filter	E-57
Density Status	E-47		
Y-N Factor For PS Dot %	E-48		
Dot % Reference PS Dot Gain	E-51		
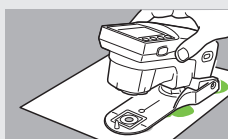
Spot Color Density Measurement

FD-7 FD-5 (⊚)

(Page E-103)

As necessary

Meas. Cond. (Density)	E-45
Den. White Ref.	E-46
SpotCol.Dens.WL	E-59
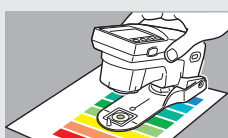
Color Measurement

FD-7 FD-5 (⊚)

(Page E-105)

As necessary

Color Target	E-60-E-68	Observer	E-72
Def. Tolerance	E-69	Color Space	E-73
Meas. Cond. (Color)	E-70	Diff. Formula	E-74
Illuminant	E-71	Display Mode	E-81

Before Using the Instrument

Handling the Instrument

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

Color Difference Measurement   As necessary

FD-7 FD-5 (◎)
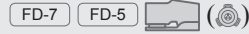
(Page E-106)

Meas. Cond. (Color)	E-70		Diff. Formula	E-74
Illuminant	E-71			
Observer	E-72			
Color Space	E-73			

Illuminance Measurement   As necessary

FD-7

(Page E-108)

Observer	E-72

Gray Balance Measurement   As necessary

FD-7 FD-5 (◎)

(Page E-110)

Dot % Reference Gray Balance	E-53
Meas. Cond. (Color)	E-70
Illuminant	E-71
Observer	E-72

Midtone Spread Measurement   As necessary

FD-7 FD-5 (◎)

(Page E-113)

Meas. Cond. (Density)	E-45
Density Status	E-47
Y-N Factor For Dot %	E-48
Dot % Reference Midtone Spread	E-55

ISO Check Measurement   As necessary

FD-7 FD-5 (◎)

(Page E-117)

Sel. Color Set	E-77
Set Backing	E-78
Convert Backing	E-79
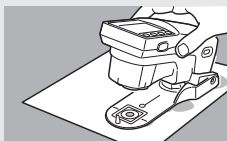
Target Match Measurement   As necessary

FD-7 FD-5 (◎)
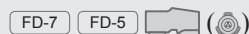
(Page E-120)

Meas. Cond. (Density)	E-45		Diff. Formula	E-74
Density Status	E-47		Sel. Color Set	E-77
Meas. Cond. (Color)	E-70		Set Backing	E-78
Illuminant	E-71		Convert Backing	E-79
Observer	E-72		Est. Ink Type	E-80
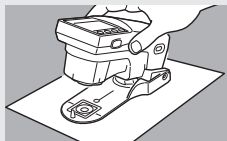
Paper Index Measurement   As necessary

FD-7 FD-5

(Page E-126)

Illuminant	E-71
Observer	E-72
Color Index	E-76
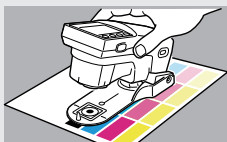
Auto Measurement   As necessary

FD-7 FD-5

(Page E-127)

Meas. Cond. (Density)	E-45		Meas. Cond. (Color)	E-70
Den. White Ref.	E-46		Illuminant	E-71
Density Status	E-47		Observer	E-72
Y-N Factor for Dot %	E-48		Color Space	E-73

Scan Measurement

FD-7 (◎)

(Page E-130)

4

Density Measurement FD-7 FD-5

Density measurements are performed on the <DENSITY> measurement screen.

Measurements results can be displayed as density ("Absolute" display mode), density difference from a registered density target ("Difference" display mode), or judgment of density difference against tolerances ("Judge" display mode).

• Density Difference Measurement on page E-94 can be used for simple measurements of density difference without having to register the density target first

As necessary

Set the measurement conditions below in advance.

Density Target	E-35-E-43	Density Status	E-47
Def. Tolerance	E-44	Den. Filter	E-57
Meas. Cond. (Density)	E-45	Display Mode	E-81
Den. White Ref.	E-46		

[Operating Procedure]
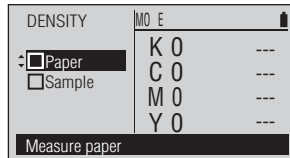
1 Move the cursor to "☐Paper" with the 🔼 or 🔽 button.

> DENSITY   M0 E
> ☐Paper   K 0   ---
> ☐Sample   C 0   ---
>   M 0   ---
>   Y 0   ---
> Measure paper

Memo

"☐Paper" is not displayed if "Den. White Ref." is set to "Absolute". Proceed to step 5.

2 Align the Target Mask port with an unprinted location on the paper.

3 Push the instrument on the paper.

Beep

You will hear a beep.
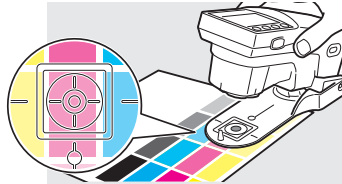
4 Remove the instrument when you hear the beep again.
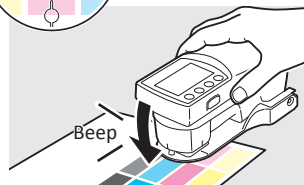
This indicates the paper has been measured.

> DENSITY   M0 E
> ☑Paper   K 0   0.02
> ☐Sample   C 0   0.02
>   M 0   -0.01
>   Y 0   0.02
> Measure sample
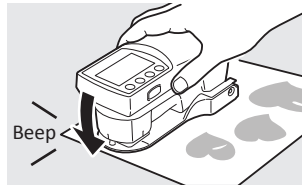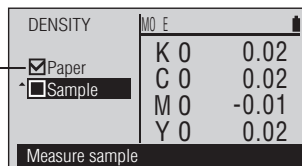
"☐Paper" is checked, the cursor moves to "☐Sample", and the paper's measurement value is displayed.

Memo

The paper's measurement value is also used when measuring dot area ratio and dot gain. It is not erased even if the measurement function is changed or the instrument is turned off.

5 Align the Target Mask port with a printed location on the paper to measure.
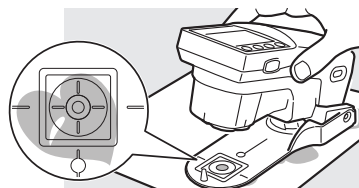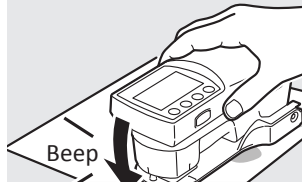
Measurement

[Operating Procedure]

6 **Push the instrument on the paper.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

This indicates the sample has been measured.

DENSITY   MO E

M   1.47

☑Paper
☑Sample
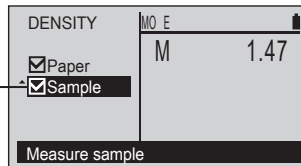
Measure sample

"☐Sample" is checked and the measurement value is displayed.

Repeat steps 5 through 7 to measure a different location on the same paper.

Display Examples

DENSITY   MO E

M   1.47

☑Paper
☑Sample

Measure sample

<Display mode>: Absolute

DENSITY   MO E

⊿M   -0.05

☑Paper
☑Sample

TD01:110111090701

Measure sample

<Display mode>: Difference

DENSITY   MO E

⊿M   -0.05

☑Paper
☑Sample
Pass

TD01:110111090701

Measure sample
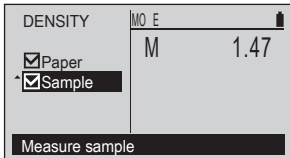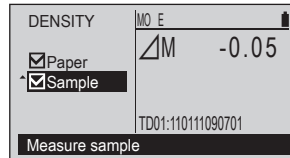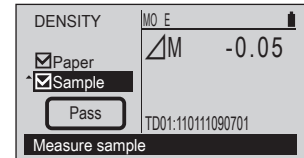
<Display mode>: Judge

Measurement

Dot Area Ratio Measurement FD-7 FD-5

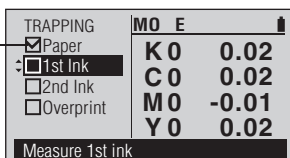Dot area ratio measurements are performed on the <DOT %> measurement screen.

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45
Density Status	E-47
Y-N Factor for Dot %	E-48
Den. Filter	E-57

[Operating Procedure]

1 **Move the cursor to "□Paper" with the ▲ or ▼ button.**

DOT %　　MO E
- ☐Paper
- ☐Solid
- ☐Tint

K 0　---
C 0　---
M 0　---
Y 0　---

Measure paper

Memo

"□Paper" is not displayed if "Den. White Ref." is set to "Absolute". Proceed to step 5.

2 **Align the Target Mask port with an unprinted location on the paper.**

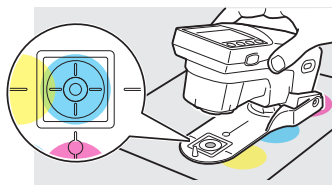**3** **Push the instrument on the paper.**

Beep

You will hear a beep.

4 **Remove the instrument when you hear the beep again.**

DOT %　　MO E
- ☑Paper
- ☐Solid
- ☐Tint

K 0　0.02
C 0　0.02
M 0　-0.00
Y 0　0.02

Measure solid

This indicates the paper has been measured.

"□Paper" is checked, the cursor moves to "□Solid", and the paper's measurement value is displayed.

Memo

The paper's measurement value is also used when measuring density and dot gain. It is not erased even if the measurement function is changed or the instrument is turned off.

5 **Align the Target Mask port with a solid color patch location on the paper.**

[Operating Procedure]

6 **Push the instrument on the paper.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

DOT %   MO E
         Ks   1.90
☑Paper
☑Solid   Ak   ---
☐Tint
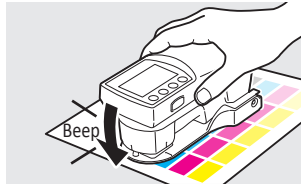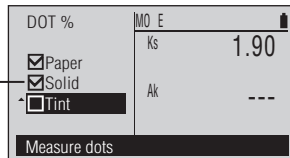
Measure dots

This indicates the solid color patch has been measured.

"☐Solid" is checked, the cursor moves to "☐Tint", and the solid color patch's measurement value is displayed.

Memo

The solid color patch's measurement values are recorded for K, C, M, and Y, and are also used when measuring dot gain. They are not erased even if the measurement function is changed or the instrument is turned off.

8 **Align the Target Mask port with a tinted location on the paper.**
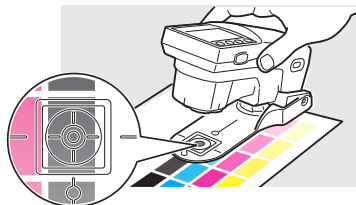
9 **Push the instrument on the paper.**
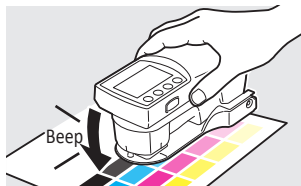
Beep

You will hear a beep.

10 **Remove the instrument when you hear the beep again.**
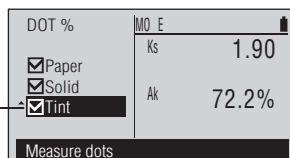
This indicates the tint patch has been measured.

DOT %   MO E
         Ks   1.90
☑Paper
☑Solid   Ak   72.2%
☑Tint

Measure dots

"☐Tint" is checked and the measurement value is displayed.

Repeat steps 8 through 10 to measure a different tint on the same paper and same solid color patch.

Dot Gain Measurement [FD-7] [FD-5]

Dot gain measurements are performed on the <DOT GAIN> measurement screen.

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45	Den. Filter	E-57
Density Status	E-47		
Y-N Factor for Dot %	E-48		
Dot % Reference	E-49		

[Operating Procedure]
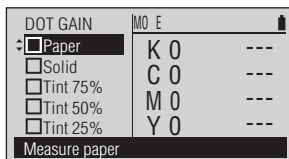
1 **Move the cursor to "□Paper" with the ⬆ or ⬇ button.**

```
DOT GAIN        M0  E              ▮
⇕□Paper          K 0       ---
  □Solid          C 0       ---
  □Tint 75%       M 0       ---
  □Tint 50%       Y 0       ---
  □Tint 25%
Measure paper
```

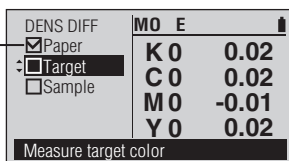**2** **Align the Target Mask port with an unprinted location on the paper.**

3 **Push the instrument on the paper.**

Beep

You will hear a beep.

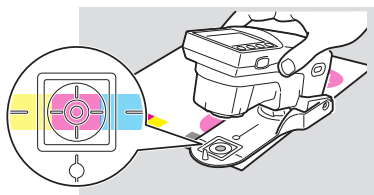**4** **Remove the instrument when you hear the beep again.**

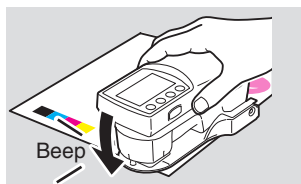This indicates the paper has been measured.

```
DOT GAIN        M0  E              ▮
  ☑Paper          K 0     -0.03
⇕□Solid          C 0     -0.03
  □Tint 75%       M 0     -0.05
  □Tint 50%       Y 0     -0.03
  □Tint 25%
Measure solid
```
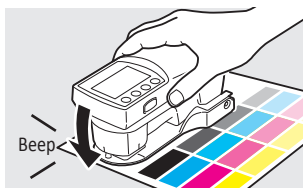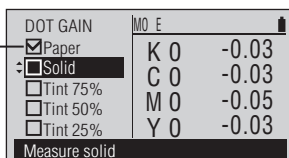
"□Paper" is checked, the cursor moves to "□Solid", and the paper's measurement value is displayed.

Memo

The paper's measurement value is also used when measuring density and dot area ratio.
It is not erased even if the measurement function is changed or the instrument is turned off.

5 **Align the Target Mask port with a solid color patch location printed on the paper.**
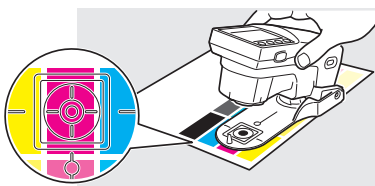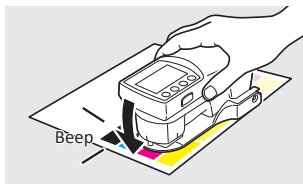
Measurement

[Operating Procedure]

6 **Push the instrument on the paper.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

```
DOT GAIN        MO E              ▮
☑Paper          Ms         0.45
☑Solid
⇕☐Tint 75%      Gm75%      ---
 ☐Tint 50%      Gm50%      ---
 ☐Tint 25%      Gm25%      ---
Measure dots
```

This indicates the solid color patch has been measured.

"☐Solid" is checked, the cursor moves to "☐Tint 75%", and the solid color patch's density measurement value is displayed.

Memo

The solid color patch's measurement values are recorded for K, C, M, and Y, and are also used when measuring dot area ratio. They are not erased even if the measurement function is changed or the instrument is turned off.

8 **Align the Target Mask port with 75% tint patch on the paper.**
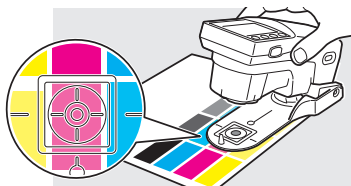
9 **Push the instrument on the paper.**
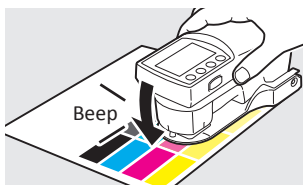
Beep

You will hear a beep.

10 **Remove the instrument when you hear the beep again.**

```
DOT GAIN        MO E              ▮
☑Paper          Ms         0.45
☑Solid
☑Tint 75%       Gm75%      43.0%
⇕☐Tint 50%      Gm50%      ---
 ☐Tint 25%      Gm25%      ---
Measure dots
```

This indicates the 75% tint patch has been measured.

"☐Tint 75%" is checked, the cursor moves to "☐Tint 50%", and the 75% tint patch's measurement value is displayed.

Measurement

[Operating Procedure]

11 **Align the Target Mask port with 50% tint patch on the paper.**

12 **Push the instrument on the paper.**
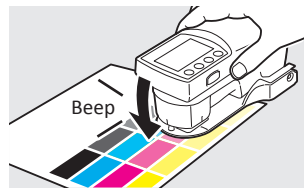
You will hear a beep.

Beep

13 **Remove the instrument when you hear the beep again.**
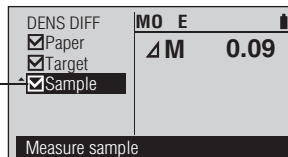
This indicates the 50% tint patch has been measured.

DOT GAIN	MO E	▮
☑Paper	Ms	0.45
☑Solid		
☑Tint 75%	Gm75%	43.0%
☑Tint 50%	Gm50%	27.0%
☐Tint 25%	Gm25%	---
Measure dots		

"☐Tint 50%" is checked, the cursor moves to "☐Tint 25%", and the 50% tint patch's measurement value is displayed.

14 **Align the Target Mask port with 25% tint patch on the paper.**
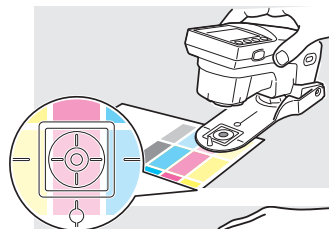
15 **Push the instrument on the paper.**

You will hear a beep.

Beep

16 **Remove the instrument when you hear the beep again.**

This indicates the 25% tint patch has been measured.

DOT GAIN	MO E	▮
☑Paper	Ms	0.45
☑Solid		
☑Tint 75%	Gm75%	43.0%
☑Tint 50%	Gm50%	27.0%
☑Tint 25%	Gm25%	29.2%
Measure dots		

"☐Tint 25%" is checked and the measurement value is displayed.

Repeat steps 5 through 16 to measure a different tint on the same paper.

Measurement

Memo / Each of the tint targets, 75%, 50%, and 25%, can be changed. Refer to page E-49.

Trapping Measurement `FD-7` `FD-5`

Trapping measurements are performed in the <TRAPPING> measurement screen.

[Operating Procedure]

1 **Move the cursor to "☐Paper" with the ▲ or ▼ button.**

```
TRAPPING       M0  E        ▮
 ☐Paper        K 0      ---
  ☐1st Ink     C 0      ---
  ☐2nd Ink     M 0      ---
  ☐Overprint   Y 0      ---
Measure paper
```

2 **Align the Target Mask port with an unprinted location on the paper.**

3 **Push the instrument down against the paper.**

You will hear a beep

Beep

4 **Remove the instrument when you hear the beep again.**

```
TRAPPING       M0  E        ▮
 ☑Paper        K 0     0.02
 ☐1st Ink      C 0     0.02
  ☐2nd Ink     M 0    -0.01
  ☐Overprint   Y 0     0.02
Measure 1st ink
```
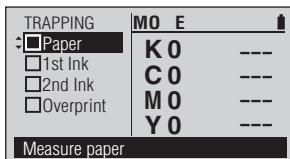
This indicates the paper has been measured.

"☐Paper" is checked, the cursor moves to "☐1st ink", and the paper's measurement value is displayed.

5 **Align the Target Mask port with a location on the paper printed with only the first ink to measure.**

You will hear a beep.

6 **Push the instrument down against the paper.**

Beep

7 **Remove the instrument when you hear the beep again.**

```
TRAPPING       M0  E        ▮
 ☑Paper
 ☑1st Ink      C        0.50
 ☐2nd Ink      —      — — —
  ☐Overprint   —/C    — — —
Measure 2nd ink
```
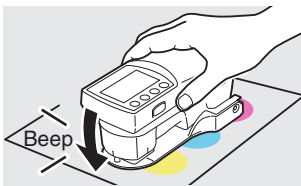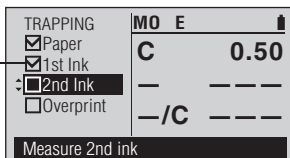
This indicates the 1st ink has been measured.

"☐1st ink" is checked, the cursor moves to "☐2nd ink", and the first ink's measurement value is displayed.

[Operating Procedure]

8 **Align the Target Mask port with a location on the paper printed with only the second ink to measure.**
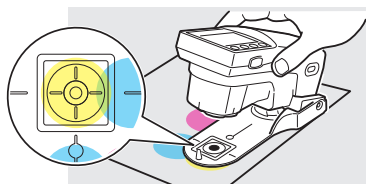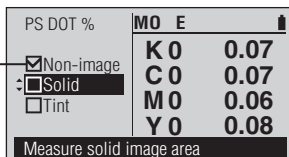
9 **Push the instrument down against the paper.**

You will hear a beep.

Beep

10 **Remove the instrument when you hear the beep again.**

This indicates the 2nd ink has been measured.

TRAPPING   MO   E
☑Paper   C   0.50
☑1st Ink
☑2nd Ink   Y   0.51
☐Overprint   Y/C   — — —
Measure overprint
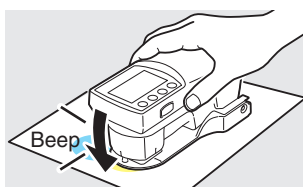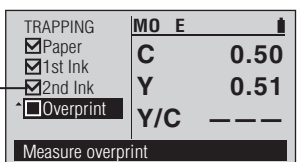
"☐2nd ink" is checked, the cursor moves to "☐Overprint", and the second ink's measurement value is displayed.

11 **Align the Target Mask port with a location on the paper printed with the first ink overprinted by the second ink.**
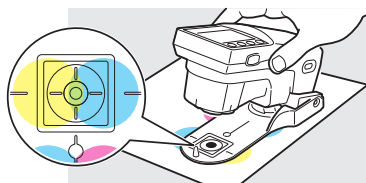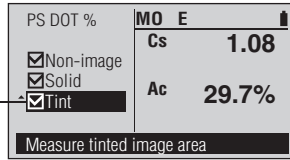
12 **Push the instrument down against the paper.**

You will hear a beep.

Beep

13 **Remove the instrument when you hear the beep again.**

This indicates the overprinted area has been measured.

TRAPPING   MO   E
☑Paper   C   0.50
☑1st Ink
☑2nd Ink   Y   0.51
☑Overprint   Y/C   79.0%
Measure 1st ink
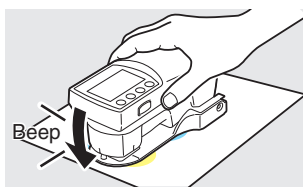
Trapping percentage
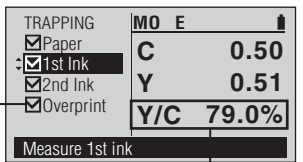
"☐Overprint" is checked, the cursor moves back to "☐1st ink", and the measurement value of the overprinted area is displayed together with the trapping percentage.

Measurement

E-93

Density Difference Measurement FD-7 FD-5

Simple measurements of density difference between two colors measured in succession are performed in the <DENS DIFF> measurement screen.

- For measurements of density difference from a registered density target and/or judgment of density difference against tolerances, please refer to Density Measurement on page E-85

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45
Den. White Ref.	E-46
Density Status	E-47
Den. Filter	E-57

[Operating Procedure]

1 **Move the cursor to "☐Paper" with the ▲ or ▼ button.**

```
DENS DIFF    M0  E        ▮
 ☐Paper       K 0      ---
  ☐Target     C 0      ---
  ☐Sample     M 0      ---
              Y 0      ---
Measure paper
```
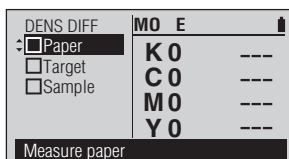
Memo

"☐Paper" is not displayed if Density White Ref. is set to "Absolute". Proceed to step 5.

2 **Align the Target Mask port with an unprinted location on the paper.**
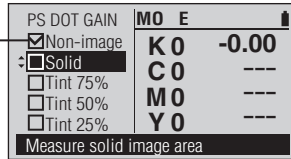
3 **Push the instrument down against the paper.**

Beep

You will hear a beep.

4 **Remove the instrument when you hear the beep again.**

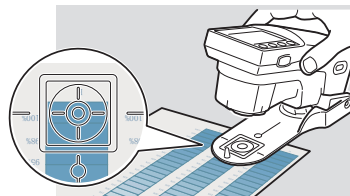This indicates the paper has been measured.

```
DENS DIFF    M0  E        ▮
 ☑Paper       K 0     0.02
 ☐Target      C 0     0.02
  ☐Sample     M 0    -0.01
              Y 0     0.02
Measure target color
```

"☐Paper" is checked, the cursor moves to "☐Target", and the paper's measurement value is displayed.

The paper's measurement value is displayed for all filters even if a single filter or "Auto" is selected as the Den. Filter.
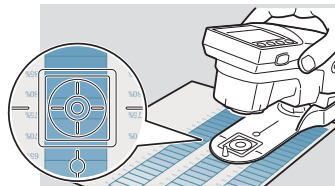
5 **Align the Target Mask port with a location on the paper printed with the target ink to measure.**

6 **Push the instrument down against the paper.**

Beep

You will hear a beep.

[Operating Procedure]

7 **Remove the instrument when you hear the beep again.**

This indicates the target ink has been measured.

DENS DIFF MO E
☑Paper
☑Target
□Sample

M   1.47

Measure sample

"□Target" is checked, the cursor moves to "□Sample", and the target ink's measurement value is displayed.

8 **Align the Target Mask port with a location on the paper printed with the sample ink to measure.**

9 **Push the instrument down against the paper.**

Beep

You will hear a beep.

10 **Remove the instrument when you hear the beep again.**

This indicates the sample ink has been measured.

DENS DIFF MO E
☑Paper
☑Target
☑Sample

⊿M   0.09

Measure sample

"□Sample" is checked and the density difference between the target and sample is displayed.

Repeat steps 8 through 10 to measure a different sample against the same target.
Use the ⬤ button to move the cursor to □Target and repeat steps 5 through 10 to measure a different target and different samples.

Measurement

PS Plate Dot Area Ratio Measurement FD-7 FD-5

PS plate dot measurements are performed in the <PS DOT %> measurement screen.

Notes

PS plate dot area measurements should be taken with the Polarization Filter attached. If Polarized Meas. (page E-82) is set to "Off", a warning message will be displayed when the mode is first entered.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45
Density Status	E-47
Y-N factor For PS Dot %	E-48
Den. Filter	E-57

[Operating Procedure]

1 Move the cursor to "☐Non-image" with the ⬆ or ⬇ button.

PS DOT %	M0 E	
☐Non-image	K 0	* *
☐Solid	C 0	* *
☐Tint	M 0	* *
	Y 0	* *
Measure non-image area		

2 Align the Target Mask port with a non-image area location on the plate.

3 Push the instrument down against the plate.

Beep

You will hear a beep.

4 Remove the instrument when you hear the beep again.

This indicates the non-image area has been measured.

| PS DOT %	M0 E	
☑Non-image	K 0	0.07
☐Solid	C 0	0.07
☐Tint	M 0	0.06
	Y 0	0.08
Measure solid image area		

"☐Non-image" is checked, the cursor moves to "☐Solid", and the non-image area measurement value is displayed.

Memo

The non-image area's measurement value is also used when measuring PS plate dot gain. It is not erased even if the measurement function is changed or the instrument is turned off.

5 Align the Target Mask port with a solid color area on the plate.

You will hear a beep.

Measurement

[Operating Procedure]

6 **Push the instrument down against the plate.**

Beep

7 **Remove the instrument when you hear the beep again.**

This indicates the solid color area has been measured.
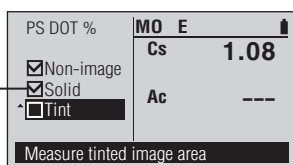
PS DOT %	**MO** E	
	Cs	**1.08**
☑Non-image		
☑Solid	**Ac**	**– – –**
☐Tint		
Measure tinted image area		

"☐Solid" is checked, the cursor moves to "☐Tint", and the solid color area measurement value is displayed.

Memo

The solid color area's measurement values are recorded and are also used when measuring PS plate dot gain. They are not erased even if the measurement function is changed or the instrument is turned off.

Measurement

8 **Align the Target Mask port with a tint area on the plate.**
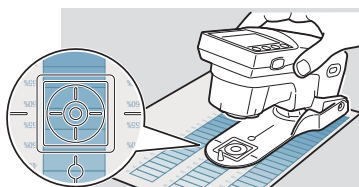
9 **Push the instrument down against the plate.**
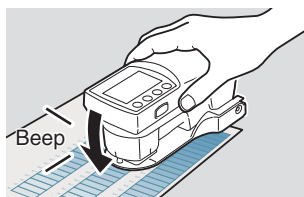
Beep

You will hear a beep.

E-97

[Operating Procedure]

10 **Remove the instrument when you hear the beep again.**

This indicates the tint area has been measured.

Repeat steps 8 through 10 to measure a different tint area for the same solid.

PS DOT %	**MO** E	
	Cs	**1.08**
☑Non-image		
☑Solid	Ac	**29.7%**
☑Tint		
Measure tinted image area		

"☐Tint" is checked and the measured tint area percentage value is displayed.

PS Plate Dot Gain Measurement FD-7 FD-5

PS plate dot gain measurements are performed in the <PS DOT GAIN> measurement screen.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45	Den. Filter	E-57
Density Status	E-47		
Y-N Factor for PS Dot %	E-48		
Dot % Reference: PS Dot Gain	E-51		

Notes

PS plate dot gain measurements should be taken with the Polarization Filter attached. If Polarized Meas. (page E-82) is set to "Off", a warning message will be displayed when the mode is first entered.

[Operating Procedure]

1 Move the cursor to "☐Non-image" with the ▲ or ▼ button.

```
PS DOT GAIN     MO  E          🔋
  ☐Non-image    K 0      ---
  ☐Solid        C 0      ---
  ☐Tint 75%     M 0      ---
  ☐Tint 50%     Y 0      ---
  ☐Tint 25%
Measure non-image area
```

2 Align the Target Mask port with a non-image area location on the plate.

3 Push the instrument down against the plate.

Beep

You will hear a beep.

4 Remove the instrument when you hear the beep again.

```
PS DOT GAIN     MO  E          🔋
  ☑Non-image    K 0     -0.00
  ☐Solid        C 0      ---
  ☐Tint 75%     M 0      ---
  ☐Tint 50%     Y 0      ---
  ☐Tint 25%
Measure solid image area
```

This indicates the non-image area has been measured.

"☐Non-image" is checked, the cursor moves to "☐Solid", and the non-image area measurement value is displayed.

Memo

The non-image area's measurement value is also used when measuring PS plate dot gain. It is not erased even if the measurement function is changed or the instrument is turned off.

5 Align the Target Mask port with a solid color area on the plate.

Measurement
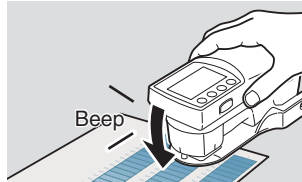
E-99

[Operating Procedure]

6 **Push the instrument down against the plate.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

This indicates the solid area has been measured.

PS DOT GAIN	**MO E**	
☑Non-image	**Cs**	**1.36**
☑Solid		
⬍☐Tint75%	**Gc75%**	**- - -**
☐Tint50%	**Gc50%**	**- - -**
☐Tint25%	**Gc25%**	**- - -**
Measure tinted image area		

"☐Solid" is checked, the cursor moves to "☐Tint75%", and the solid color area measurement value is displayed.

Memo

The solid color area's measurement values are recorded and are also used when measuring PS plate dot gain. They are not erased even if the measurement function is changed or the instrument is turned off.

8 **Align the Target Mask port with the area on the plate for Tint75%.**

9 **Push the instrument down against the plate.**
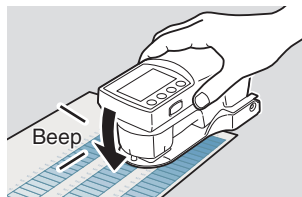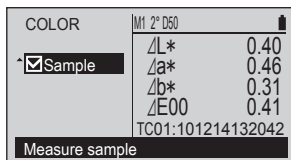
Beep

You will hear a beep.

Measurement

[Operating Procedure]

10 **Remove the instrument when you hear the beep again.**

This indicates the Tint75% area has been measured.

PS DOT GAIN	**M0 E**	
☑Non-image	**Cs**	**1.36**
☑Solid		
☑Tint75%	**Gc75%**	**10.8%**
☐Tint50%	**Gc50%**	**---**
☐Tint25%	**Gc25%**	**---**
Measure tinted image area		

"☐Tint75%" is checked, the cursor moves to "☐Tint50%", and the Tint75% area measurement value is displayed.

11 **Align the Target Mask port with the area on the plate for Tint50%.**
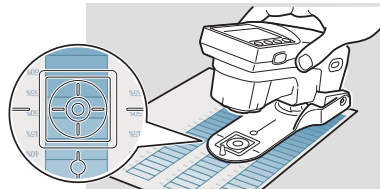
12 **Push the instrument down against the plate.**
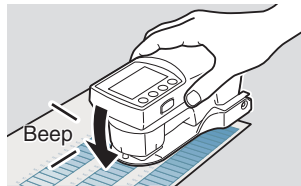
Beep

You will hear a beep.

13 **Remove the instrument when you hear the beep again.**

This indicates the Tint50% area has been measured.

PS DOT GAIN	**M0 E**	
☑Non-image	**Cs**	**1.36**
☑Solid		
☑Tint75%	**Gc75%**	**10.8%**
☑Tint50%	**Gc50%**	**14.2%**
☐Tint25%	**Gc25%**	**---**
Measure tinted image area		

"☐Tint50%" is checked, the cursor moves to "☐Tint25%", and the Tint50% area measurement value is displayed.

14 **Align the Target Mask port with the area on the plate for Tint25%.**
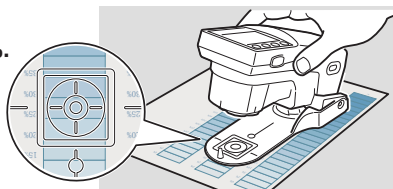
15 **Push the instrument down against the plate.**
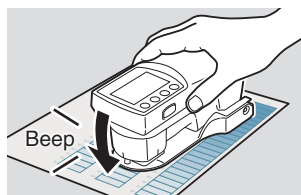
Beep

You will hear a beep.

Measurement

[Operating Procedure]

16 **Remove the instrument when you hear the beep again.**

```
PS DOT GAIN   MO  E                    ▮
☑Non-image    Cs          1.36
↕☑Solid
 ☑Tint75%     Gc75%      10.8%
 ☑Tint50%     Gc50%      14.2%
 ☑Tint25%     Gc25%       9.6%
Measure solid image area
```

This indicates the Tint25% area has been measured.

"☐Tint25%" is checked, the cursor moves to "☐Solid", and the Tint25% area measurement value is displayed.

Repeat steps 5 through 16 to measure a different tint area for the same solid.

Memo／ Each of the PS Dot Gain targets, 75%, 50%, and 25%, can be changed. Refer to page E-51.

Measurement

Spot Color Density Measurement FD-7 FD-5

Spot color measurements are performed in the <SPT CLR DEN> measurement screen.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)   E-45
Dens. White Ref.   E-46
SpotCol.Dens.WL   E-59

[Operating Procedure]

1 **Move the cursor to "☐Paper" with the ⬆ or ⬇ button.**

SPT CLR DEN	MO E	
☑Paper	K 0	0.06
☐Sample	C 0	0.06
	M 0	0.07
	Y 0	0.08
Measure paper		

2 **Align the Target Mask port with an unprinted location on the paper.**
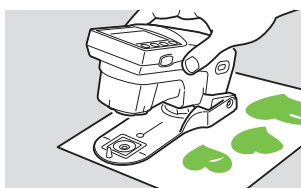
3 **Push the instrument down against the paper.**

You will hear a beep.

Beep

4 **Remove the instrument when you hear the beep again.**
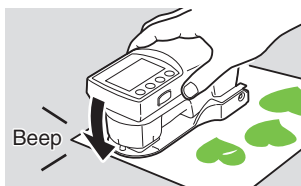
"☐Paper" is checked, the cursor moves to "☐Sample", and the paper's measurement value is displayed.

SPT CLR DEN	MO E	
☑Paper	K 0	0.07
☐Sample	C 0	0.06
	M 0	0.07
	Y 0	0.08
Measure sample		

This indicates the paper has been measured.

5 **Align the Target Mask port with a location on the paper printed with the spot color ink to measure.**
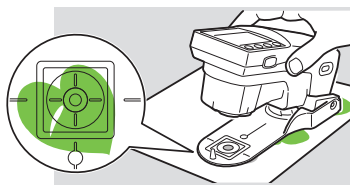
6 **Push the instrument down against the paper.**
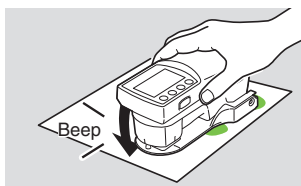
You will hear a beep.

Beep

Measurement

[Operating Procedure]

7 **Remove the instrument when you hear the beep again.**

SPT CLR DEN **MO E**

☑Paper
☑Sample

D(442)

0.49

Measure sample

This indicates the spot color ink has been measured.
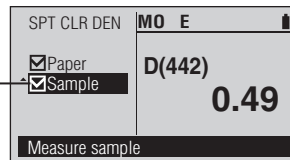
"☐Sample" is checked and the wavelength and density at that wavelength will be displayed.

If SpotCol.Dens.WL is set to "Auto", the displayed wavelength will be the wavelength of maximum absorbance, and the density at that wavelength will be displayed. If SpotCol. Dens.WL is set to Manual, the displayed wavelength will be the set wavelength and the density at that wavelength will be displayed.

Repeat steps 5 through 7 to measure a different spot color.

Measurement

Color Measurement FD-7 FD-5

Color measurements are performed on the <COLOR> measurement screen.

Measurements results can be displayed as colorimetric values ("Absolute" display mode), color difference from a registered color target ("Difference" display mode), or judgment of color difference against tolerances ("Judge" display mode).

- Color Difference Measurement on page E-106 can be used for simple measurements of color difference without having to register the color target first.

As necessary

Set the measurement conditions below in advance.

Color Target	E-60-E-68	Observer	E-72
Def. Tolerance	E-69	Color Space	E-73
Meas. Cond. (Color)	E-70	Diff. Formula	E-74
Illuminant	E-71	Display Mode	E-81

[Operating Procedure]

1 **Align the Target Mask port with the location to measure.**
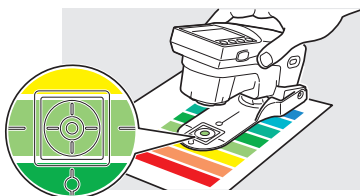
2 **Push the instrument on the specimen.**
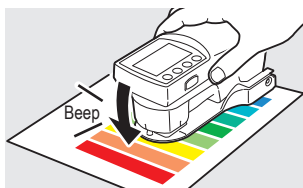
You will hear a beep.

Beep

3 **Remove the instrument when you hear the beep again.**

This indicates the sample has been measured.

"☐Sample" is checked and the measurement value is displayed.

```
COLOR          M1 2° D50
              L *      72.17
☑Sample       a *     -32.87
              b *      35.53
Measure sample
```

Measurement

Display Examples

```
COLOR          M1 2° D50
              L *      72.17
☑Sample       a *     -32.87
              b *      35.53
Measure sample
```
<Display mode>: Absolute

```
COLOR          M1 2° D50
              ⊿L∗      0.40
☑Sample       ⊿a∗      0.46
              ⊿b∗      0.31
              ⊿E00     0.41
              TC01:101214132042
Measure sample
```
<Display mode>: Difference
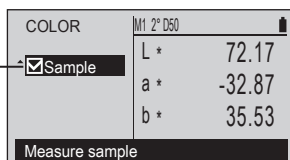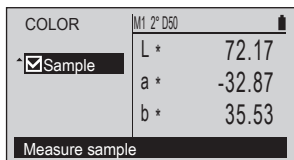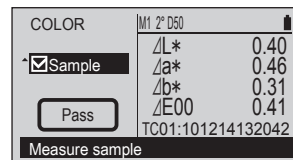
```
COLOR          M1 2° D50
              ⊿L∗      0.40
☑Sample       ⊿a∗      0.46
  Pass        ⊿b∗      0.31
              ⊿E00     0.41
              TC01:101214132042
Measure sample
```
<Display mode>: Judge

Color Difference Measurement FD-7   FD-5

Simple measurements of color difference between two colors measured in succession are performed in the <COLOR DIFF> measurement screen.

- For measurements of color difference from a registered color target and/or judgment of color difference against tolerances, please refer to Color Measurement on page E-105.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Color)	E-70	Diff. Formula	E-74
Illuminant	E-71		
Observer	E-72		
Color Space	E-73		

[Operating Procedure]

1 Move the cursor to "☐Target" with the ⏶ or ⏷ button.
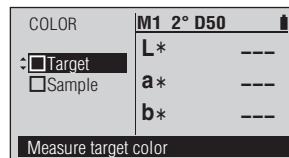
```
COLOR          M1  2° D50      ▮
⇕ ☐Target      L∗        ---
  ☐Sample      a∗        ---
               b∗        ---
Measure target color
```

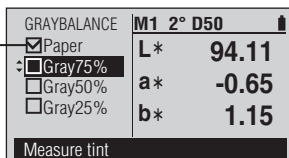**2** Align the Target Mask port with a location on the paper printed with the target ink to measure.

3 Push the instrument down against the paper.

Beep

You will hear a beep.

4 Remove the instrument when you hear the beep again.

```
COLOR          M1  2° D50      ▮
  ☑Target      L∗       74.42
▲ ☐Sample      a∗       28.06
               b∗        7.17
Measure sample
```
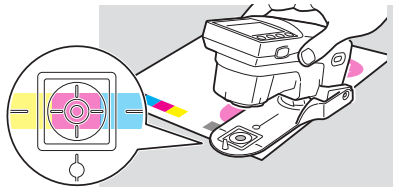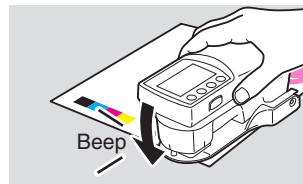
This indicates the target ink has been measured.

"☐Target" is checked, the cursor moves to "☐Sample", and the target ink's measurement value is displayed.

5 Align the Target Mask port with a location on the paper printed with the sample ink to measure.

6 Push the instrument down against the paper.
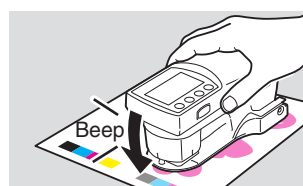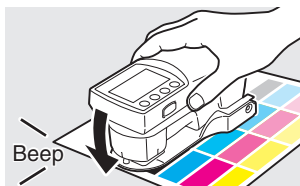
Beep

You will hear a beep.

Measurement

[Operating Procedure]

7 **Remove the instrument when you hear the beep again.**
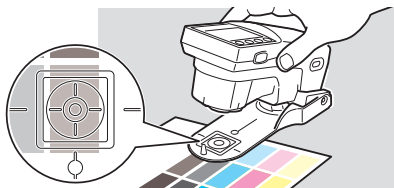
This indicates the sample ink has been measured.

COLOR	M1 2° D50	
	⊿L∗	**0.08**
☑Target	⊿a∗	**0.01**
☑Sample	⊿b∗	**0.10**
	⊿E00	**0.09**
Measure sample		

"□Sample" is checked and the color difference between the target and sample is displayed.

Repeat steps 5 through 7 to measure a different sample against the same target.

Illuminance Measurement `FD-7`

Illuminance measurements are performed on the <ILLUMINANCE> measurement screen.
However, this measurement does not conform to JIS C 1609:2006. Use it as a simple illuminance measurement function.

As necessary

Set the measurement conditions below in advance.
Observer   E-72

[Operating Procedure]

1 **Remove the target mask.**
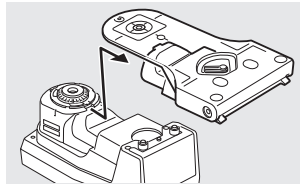
Refer to page E-19.

2 **Correctly attach the Illuminance Adapter with the same pairing number as the instrument.**

Refer to page E-23.
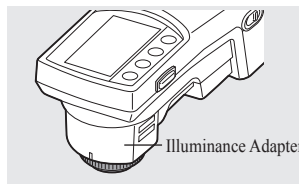
Illuminance Adapter

3 **Point the specimen measuring port on the instrument with the attached Illuminance Adapter toward the illuminant to measure.**
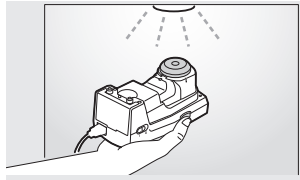
4 **Press the measuring button.**
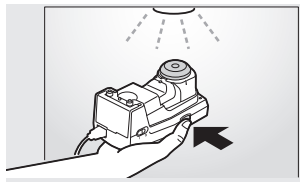
You will hear a beep.

5 **The measurement is finished when you hear the beep again. Next, you can set the measured illuminance as the illuminance for the user illuminant.**

"☐Sample" is checked and the measurement value is displayed.
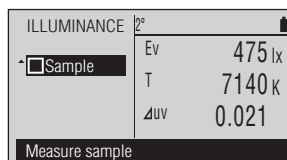
ILLUMINANCE	2°	
☐Sample	Ev	475 lx
	T	7140 K
	⊿uv	0.021
Measure sample		

Measurement

[Operating Procedure]

6 **Press the 🔵 (Enter)/OPTION button.**

```
→Options           Page1/1   🔋
 ⌄Register Illum.              ↲
  Menu            →


 Register result to user
```
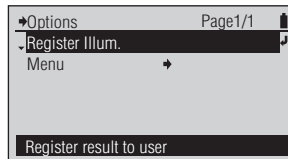
The <Options> screen is displayed.

7 **Press the 🔵 (Enter)/OPTION button with the cursor on "Register Illum.".**

```
→Confirm Overwrite          🔋
 OK to overwrite
 user illuminant data?
  OK
 ⌃Cancel                     ↲

 Cancel
```
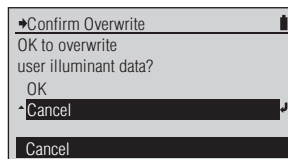
The measured illuminant's illuminance is set as the user illuminant's illuminance. When a user illuminant has already been registered, the <Confirm Overwrite> screen is displayed.

Memo • Unique correction data is attached to the Illuminance Adapter (optional accessory).

Notes • A five digit number, called the "Pairing Number", is included on the instrument and the Illuminance Adapter and is a separate number from their respective serial numbers. The Illuminance Adapter must be used in combination with the instrument that bears the same pairing number.

• The illuminance measurement function is intended for measuring the illuminance and color temperature of the environment used to observe printed materials. Using the function in bright sunlight and other environments that are too bright will result in an error.

Measurement

Gray Balance Measurement [FD-7] [FD-5]

Gray balance measurements are performed in the <GRAYBALANCE> measurement screen.

Memo

Gray balance is determined according to the method described in The G7® Specification 2008 published by IDEAlliance®.

As necessary

Set the measurement conditions below in advance.

Dot % Reference Gray Balance	E-53
Meas. Cond. (Density)	E-70
Illuminant	E-71
Observer	E-72

[Operating Procedure]
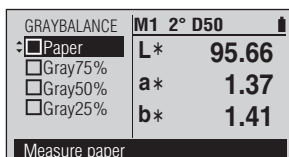
1 Move the cursor to "☐Paper" with the ⬆ or ⬇ button.

```
GRAYBALANCE   M1 2° D50        ▮
⬍☐Paper       L∗      95.66
  ☐Gray75%    a∗       1.37
  ☐Gray50%    b∗       1.41
  ☐Gray25%
Measure paper
```

2 Align the Target Mask port with an unprinted location on the paper.

3 Push the instrument down against the paper.

Beep

You will hear a beep.

4 Remove the instrument when you hear the beep again.

This indicates the paper has been measured.

```
GRAYBALANCE   M1 2° D50        ▮
  ☑Paper      L∗      94.11
⬍☐Gray75%     a∗      -0.65
  ☐Gray50%    b∗       1.15
  ☐Gray25%
Measure tint
```
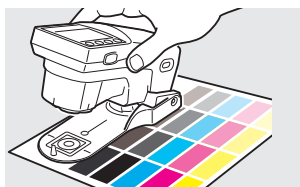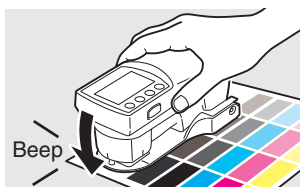
"☐Paper" is checked, the cursor moves to "☐Gray75%", and the paper's measurement value is displayed.

5 Align the Target Mask port with a location on the paper printed with the gray patch to measure for Gray75%.
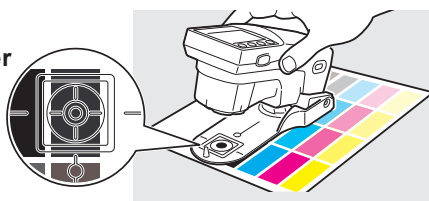
6 Push the instrument down against the paper.

Beep

You will hear a beep.

[Operating Procedure]

7 **Remove the instrument when you hear the beep again.**

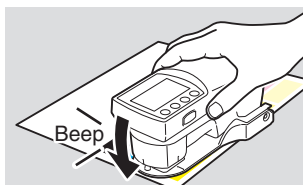This indicates the first gray patch has been measured.

GRAYBALANCE	M1 2° D50	🔋
☑Paper	⊿a∗	⊿b∗
☑Gray75%	**0.09**	**-0.01**
☐Gray50%	---	---
☐Gray25%	---	---
Measure tint		

"☐Gray75%" is checked, the cursor moves to "☐Gray50%", and the measurement value (color difference from desired gray color) for "Gray75%"is displayed.

8 **Align the Target Mask port with a location on the paper printed with the gray patch to measure for Gray50%.**
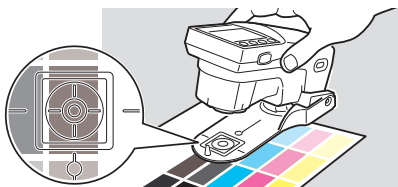
9 **Push the instrument down against the paper.**
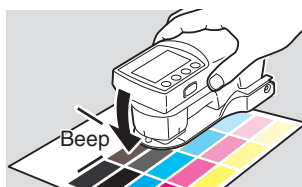
Beep

You will hear a beep

10 **Remove the instrument when you hear the beep again.**

This indicates the second gray patch has been measured.

| GRAYBALANCE	M1 2° D50	🔋
☑Paper	⊿a∗	⊿b∗
☑Gray75%	**0.09**	**-0.01**
☑Gray50%	**0.08**	**-0.02**
☐Gray25%	---	---
Measure tint		

"☐Gray50%" is checked, the cursor moves to "☐Gray25%", and the measurement value (color difference from desired gray color) for "Gray50%"is displayed.

11 **Align the Target Mask port with a location on the paper printed with the gray patch to measure for Gray25%.**

**12** **Push the instrument down against the paper.**
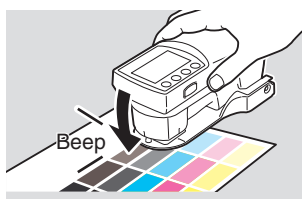
Beep

You will hear a beep.

Measurement

[Operating Procedure]

13 **Remove the instrument when you hear the beep again.**

```
GRAYBALANCE   M1  2° D50
 ☑Paper              �⅄a*      ⅄b*
⇕☑Gray75%         0.09    -0.01
 ☑Gray50%         0.08    -0.02
 ☑Gray25%         0.08     0.02

Measure tint
```

This indicates the third gray patch has been measured.

"☐Gray25%" is checked and the measurement value (color difference from desired gray color) for "Gray25%"is displayed.

Repeat steps 5 through 13 to measure a different set of gray patches on the same paper.

Memo / Each of the Gray Balance targets, 75%, 50%, and 25%, can be changed. Refer to page E-53.

Midtone Spread Measurement FD-7 FD-5

Midtone spread measurements are performed in the <MIDTONESPRD> measurement screen.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)   E-45
Density Status   E-47
Y-N Factor For Dot %   E-48
Dot % Reference Midtone Spread   E-55

[Operating Procedure]

1 Move the cursor to "☐Paper" with the ⬆ or ⬇ button.

```
MIDTONESPRD  MO  E
 ☐Paper        K 0    0.02
 ☐C Solid      C 0    0.02
 ☐M Solid      M 0   -0.01
 ☐Y Solid      Y 0    0.02
   1/ 7
 Measure paper
```

2 Align the Target Mask port with an unprinted location on the paper.

3 Push the instrument down against the paper.
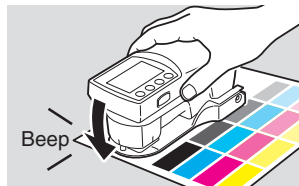
You will hear a beep.

Beep

4 Remove the instrument when you hear the beep again.

This indicates the paper has been measured.

```
MIDTONESPRD  MO  E
 ☑Paper        K 0    0.02
 ☐C Solid      C 0    0.02
 ☐M Solid      M 0   -0.01
 ☐Y Solid      Y 0    0.02
   1/ 7
 Measure cyan solid
```

"☐Paper" is checked, the cursor moves to "☐C Solid", and the paper's measurement value is displayed.

5 Align the Target Mask port with a location on the paper printed with the cyan solid patch to measure.
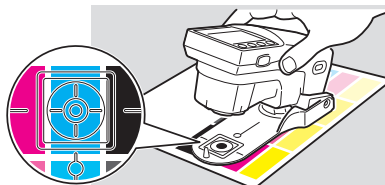
6 Push the instrument down against the paper.
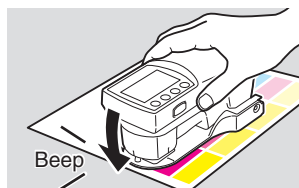
You will hear a beep.

Beep

Measurement

E-113

[Operating Procedure]

7 **Remove the instrument when you hear the beep again.**

This indicates the cyan solid patch has been measured.

MIDTONESPRD **MO E**
☑Paper **Cs** **1.30**
☑C Solid
↕☐M Solid **Ms** −−−
☐Y Solid **Ys** −−−
2/ 7
Measure magenta solid

"☐C Solid" is checked, the cursor moves to "☐M Solid", and the cyan solid patch measurement value is displayed.

**8** **Align the Target Mask port with a location on the paper printed with the magenta solid patch to measure.**
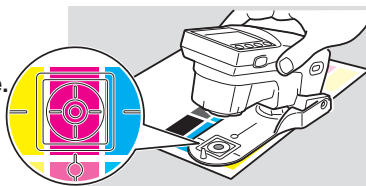
9 **Push the instrument down against the paper.**

Beep

You will hear a beep.

10 **Remove the instrument when you hear the beep again.**

This indicates the magenta solid patch has been measured.

MIDTONESPRD **MO E**
☑Paper **Cs** **1.30**
☑C Solid
☑M Solid **Ms** **1.29**
↕☐Y Solid **Ys** −−−
3/ 7
Measure yellow solid

"☐M Solid" is checked, the cursor moves to "☐Y Solid", and the magenta solid patch measurement value is displayed.

11 **Align the Target Mask port with a location on the paper printed with the yellow solid patch to measure.**
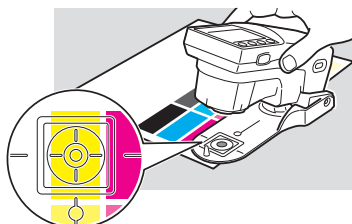
12 **Push the instrument down against the paper.**
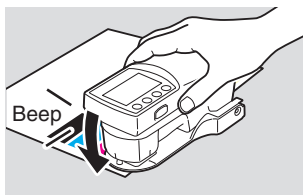
Beep

You will hear a beep.

[Operating Procedure]

13 **Remove the instrument when**
you hear the beep again.

MIDTONESPRD	**MO E**	
↕ ☐C Tint50%	**Cs**	**1.30**
☐M Tint50%	**Ms**	**1.29**
☐Y Tint50%	**Ys**	**1.16**
4/ 7		
Measure cyan tint		

"☐Y Solid" is checked, the cursor moves to "☐C Tint50%", and the yellow solid patch measurement value is displayed.

14 **Align the Target Mask port with a**
location on the paper printed with
the cyan tint patch to measure.
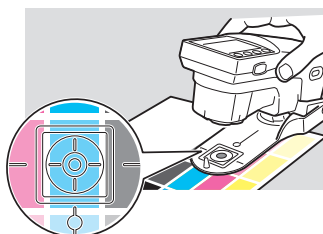
15 **Push the instrument down**
against the paper.
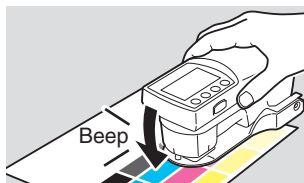
Beep

You will hear a beep.

16 **Remove the instrument when**
you hear the beep again.

This indicates the cyan tint patch has been measured.

MIDTONESPRD	**MO E**	
☑C Tint50%	**Gc50%**	**14.4%**
↕ ☐M Tint50%	**Gm50%**	**– – –**
☐Y Tint50%	**Gy50%**	**– – –**
5/ 7	**S**	**– – –**
Measure magenta tint		

"☐C Tint50%" is checked, the cursor moves to "☐M Tint50%", and the cyan tint patch measurement value is displayed.

17 **Align the Target Mask port with a**
location on the paper printed with
the magenta tint patch to measure.

Measurement
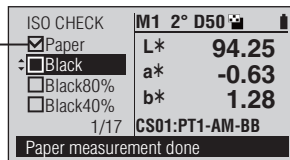
E-115
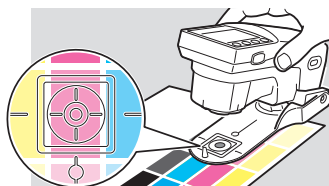
[Operating Procedure]

18 **Push the instrument down against the paper.**
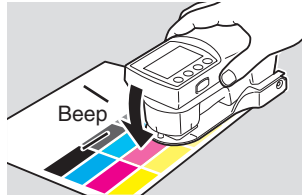
Beep

You will hear a beep.

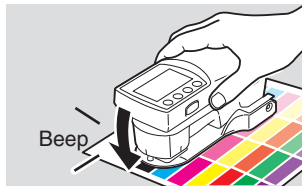**19** **Remove the instrument when you hear the beep again.**

This indicates the magenta tint patch has been measured.

MIDTONESPRD | MO E
☑C Tint50% | Gc50% | 14.4%
☑M Tint50% | Gm50% | 15.3%
↕☐Y Tint50% | Gy50% | –––
| S | –––
6/ 7
Measure yellow tint

"☐M Tint50%" is checked, the cursor moves to "☐Y Tint50%", and the magenta tint patch measurement value is displayed.

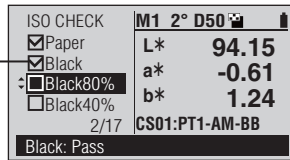**20** **Align the Target Mask port with a location on the paper printed with the yellow tint patch to measure.**
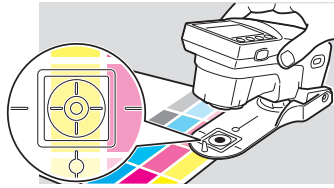
21 **Push the instrument down against the paper.**
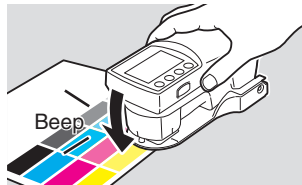
Beep

You will hear a beep.

22 **Remove the instrument when you hear the beep again.**

MIDTONESPRD | MO E
☑Paper | Gc50% | 14.4%
↕☑C Solid | Gm50% | 15.3%
☑M Solid | Gy50% | 18.3%
☑Y Solid | S | 3.9%
7/ 7
Measure cyan solid

"☐Y Tint50%" is checked, the cursor moves to "☐C Solid", and the yellow tint patch measurement value and midtone spread value S is displayed.

Repeat steps 5 through 22 to measure a different set of solid and tint patches on the same paper.

Memo ╱ • Each of the Midtone Spread targets, CTint50%, M Tint50%, and Y Tint50%, can be changed. Refer to page E-55.

Measurement

ISO Check Measurement `FD-7` `FD-5`

ISO check measurements are performed in the <ISO CHECK> measurement screen. Verification of conformance to ISO 12647 can be checked.

As necessary

Set the measurement conditions below in advance.

Sel. Color Set	E-77	Convert Backing	E-79
Set Backing	E-78		

Memo

The measurement conditions (Color Options: Meas. Cond., lluminant, Observer; Density Options: Meas. Cond., Density Status, Y-N Factor) will be set automatically to the measurement conditions stored in the selected color set.
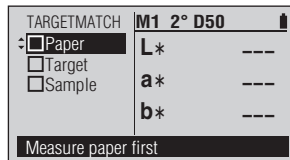
[Operating Procedure]

The default color set "PT1-AM-BB" is initially selected. To change the color set, press the (Enter)/OPTION button and select Sel. Color Set from the <Options> screen.

1 **Move the cursor to "☐Paper" with the ⬆ or ⬇ button.**

Indicates the type of backing set for the color set:
🔲 : White backing
⬛ : Black backing
(No icon will be shown if backing for the color set was set to None.)

```
ISO CHECK        M1 2° D50 🔲
⬍ ☐Paper        L*        ---
  ☐Black        a*        ---
  ☐Black80%     b*        ---
  ☐Black40%
        0/17    CS01:PT1-AM-BB
Measure paper first
```

If Convert Backing is set to "On" and Set Backing is set to a different backing than was set for the selected color set, the screen will show "☐Paper 🔲" and "☐Paper ⬛" before "☐Paper" and it will be necessary to measure the paper over the white backing and black backing as follows in order to enable backing conversion:

- With the cursor on "☐Paper 🔲", place the paper over the white backing, place the Target Mask port on an unprinted area of the paper, and push the instrument down against the paper. You will hear a beep. Hold the instrument down until you hear a second beep indicating that measurement has been completed.

- With the cursor on "☐Paper ⬛", place the paper over the black backing, place the Target Mask port on an unprinted area of the paper, and push the instrument down against the paper. You will hear a beep. Hold the instrument down until you hear a second beep indicating that measurement has been completed.

2 **Align the Target Mask port with an unprinted location on the paper.**

Measurement

[Operating Procedure]

3 **Push the instrument down against the paper.**

Beep

You will hear a beep.

4 **Remove the instrument when you hear the beep again.**
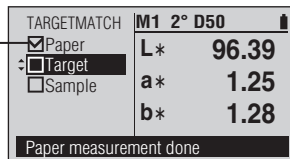
This indicates the paper has been measured.

ISO CHECK	M1 2° D50	
☑Paper	L*	**94.25**
☐Black	a*	**-0.63**
☐Black80%	b*	**1.28**
☐Black40%		
1/17	CS01:PT1-AM-BB	
Paper measurement done		

"Paper" is checked, the cursor moves to the first target color, and the paper's measurement value is displayed.

5 **Align the Target Mask port with a location on the paper printed with the first color patch to measure.**
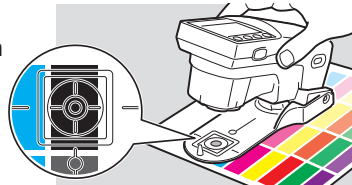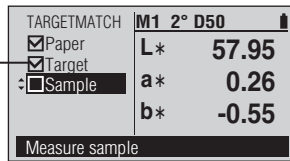
6 **Push the instrument down against the paper.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

This will change to indicate that the color patch has been measured.

ISO CHECK	M1 2° D50	
☑Paper	L*	**94.15**
☑Black	a*	**-0.61**
☐Black80%	b*	**1.24**
☐Black40%		
2/17	CS01:PT1-AM-BB	
Black: Pass		

If the measured values are within the acceptable range for the color, a circle with a checkmark will appear instead of the ☐ and the message area will show "Pass" for the target color; if the measured values are outside the acceptable range, an x will appear in the ☐ and the message area will show "Fail" for the target color.

The measurement values are displayed. If any of the measured values failed, the failed value will be highlighted.

The cursor moves to the next target color.

Measurement

[Operating Procedure]

8 **Repeat steps 5 through 7 for the color patches for the remaining target colors in the color set.**
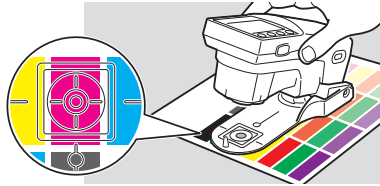
When the final color patch has been measured, the message area will also show the overall results: "All: Fail" or "All: Pass".

To move back and review the results for any of the target colors in this color set, press the ⊙ button repeatedly to move to the desired target color result.

Memo • The estimated density adjustments required to bring each measured color patch into tolerance can be viewed after ISO Check Measurements have been completed by switching the Measurement Function to "Targetmatch" and selecting each of the target colors that failed. As each target color is selected, the <TARGETMATCH> measurement values screen will be displayed. Please refer to page E-125.

Measurement

Target Match Measurement FD-7 FD-5

Target match measurements are performed in the
<TARGETMATCH> measurement screen.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45	Diff. Formula	E-74
Density Status	E-47	Sel. Color Set	E-77
Meas. Cond. (Color)	E-70	Convert Backing	E-79
Illuminant	E-71	Set Backing	E-78
Observer	E-72	Est. Ink Type	E-80

Memo

Target match can be used to measure samples against a target measured
shortly before measuring a sample or against a set of targets in a color set.
To measure samples against a single target measured shortly before
measuring the sample, select "Meas. Target" in the <Sel. Color Set>
configuration screen.
To measure samples against a set of targets in a color set, select one of the
color sets stored in the instrument in the <Sel. Color Set> configuration
screen.
When a color set is selected, the measurement conditions (Color Options: Meas. Cond., lluminant, Observer; Density Options:
Meas. Cond., Density Status, Y-N Factor) will be set automatically to the measurement conditions stored in the selected color set.

[Operating Procedure]

If "Sel. Color Set" is set to "Meas. Target":

1 Move the cursor to "☐Paper"
with the ⬆ or ⬇ button.

```
TARGETMATCH  M1 2° D50        ▮
  ☐Paper       L∗      ---
  ☐Target      a∗      ---
  ☐Sample      b∗      ---

Measure paper first
```

2 Align the Target Mask port with an
unprinted location on the paper.

3 Push the instrument down
against the paper.

You will hear a beep.

Beep

4 Remove the instrument when
you hear the beep again.

This indicates the paper has
been measured.

```
TARGETMATCH  M1 2° D50        ▮
  ☑Paper       L∗    96.39
  ☐Target      a∗     1.25
  ☐Sample      b∗     1.28

Paper measurement done
```

"☐Paper" is checked, the cursor
moves to "☐Target", and the
paper's measurement value is
displayed.

5 Align the Target Mask port with
a location on the paper printed
with the target ink to measure.

[Operating Procedure]

6 **Push the instrument down against the paper.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

This indicates the target ink has been measured.

TARGETMATCH	M1 2° D50	
☑Paper	**L**∗	**57.95**
☑Target	**a**∗	**0.26**
⬍☐Sample	**b**∗	**-0.55**
Measure sample		

"☐Target" is checked, the cursor moves to "☐Sample", and the target ink's measurement value is displayed.

8 **Align the Target Mask port with a location on the paper printed with the sample ink to measure.**
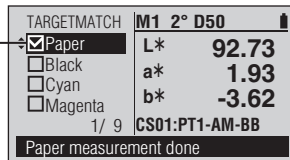
9 **Push the instrument down against the paper.**

Beep

You will hear a beep.

10 **Remove the instrument when you hear the beep again.**

This indicates the sample ink has been measured.

TARGETMATCH	M1 2° D50	
☑Paper	⊿K	**+0.15D**
☑Target	⊿E∗ab	
⬍☑Sample		**5.48@ 1.30D**
	≫	**3.42@ 1.45D**
Measure sample		

"☐Sample" is checked and the measurement values are displayed.

Measurement

E-121

Measurement

[Operating Procedure]

Measurement values:

```
TARGETMATCH  M1  2° D50
☑Paper          ⊿K        +0.15D
☑Target        ⊿E∗ab
↕☑Sample           5.48@ 1.30D
               >>  3.42@ 1.45D

Measure sample
```

Adjustment color → ⊿K   **+0.15D** ← Estimated density adjustment

⊿E∗ab

Measured color difference → **5.48@ 1.30D** ← Measured density

>> **3.42@ 1.45D** ← Predicted density after adjustment

Predicted color difference after adjustment

Memo

The Adjustment color will be displayed according to
the "Est. Ink Type" setting and measured sample.
If "Est. Ink Type" is set to "Auto", whether
adjustment should be performed by adjusting
process color (KCMY) or spot color density will be
automatically determined and displayed.
If "Est. Ink Type" is set to "Spot Color", the spot
color density adjustment will be displayed.

**Repeat steps 8 through 10 to
measure a different sample
against the same target.
Press the ⬆ button to move
the cursor to Target and repeat
steps 5 through 10 to measure
a different target and sample.**

[Operating Procedure]

If "Sel. Color Set" is set to a stored color set:

1 Move the cursor to "☐Paper" with the ⬆ or ⬇ button.

Indicates the type of backing set for the color set:
▣ : White backing
▣ : Black backing
(No icon will be shown if backing for the color set was set to None.)

```
TARGETMATCH   M1  2° D50 ▣    ▮
 ☐Paper        L∗         ---
  ☐Black        a∗         ---
  ☐Cyan         b∗         ---
  ☐Magenta
        0/ 9   CS01:PT1-AM-BB
 Measure paper
```

If Convert Backing is set to "On" and Set Backing is set to a different backing than was set for the selected color set, the screen will show "☐Paper ▣" and "☐Paper ▣" before "☐Paper" and it will be necessary to measure the paper over the white backing and black backing as follows in order to enable backing conversion:

• With the cursor on "☐Paper ▣", place the paper over the white backing, place the Target Mask port on an unprinted area of the paper, and push the instrument down against the paper. You will hear a beep. Hold the instrument down until you hear a second beep indicating that measurement has been completed.

• With the cursor on "☐Paper ▣", place the paper over the black backing, place the Target Mask port on an unprinted area of the paper, and push the instrument down against the paper. You will hear a beep. Hold the instrument down until you hear a second beep indicating that measurement has been completed.

2 Align the Target Mask port with an unprinted location on the paper.

[Operating Procedure]

3 **Push the instrument down against the paper.**

Beep

You will hear a beep.

4 **Remove the instrument when you hear the beep again.**

This indicates the paper has been measured.

TARGETMATCH	M1 2° D50	
☑Paper	L✳	**92.73**
☐Black	a✳	**1.93**
☐Cyan	b✳	**-3.62**
☐Magenta		
1/ 9	CS01:PT1-AM-BB	
Paper measurement done		

"☐Paper" is checked, the cursor moves to the first color, and the paper's measurement value is displayed.

The ⬆ or ⬇ button can be used to move to any desired color in the set.

5 **Align the Target Mask port with a location on the paper printed with the ink sample to measure for the highlighted color.**
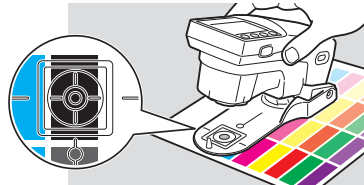
6 **Push the instrument down against the paper.**

Beep

You will hear a beep.

7 **Remove the instrument when you hear the beep again.**

This indicates the sample ink has been measured.

TARGETMATCH	M1 2° D50	
☑Paper	⊿K	+0.120D
☑Black	⊿E✳ab	
☐Cyan		3.75@ 1.460D
☐Magenta	>>	2.02@ 1.580D
2/ 9	CS01:PT1-AM-BB	
Measured Black		
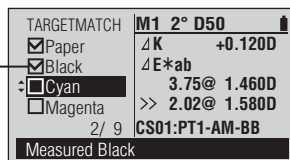
The "☐" for the highlighted color is checked and the sample measurement values are displayed.

[Operating Procedure]
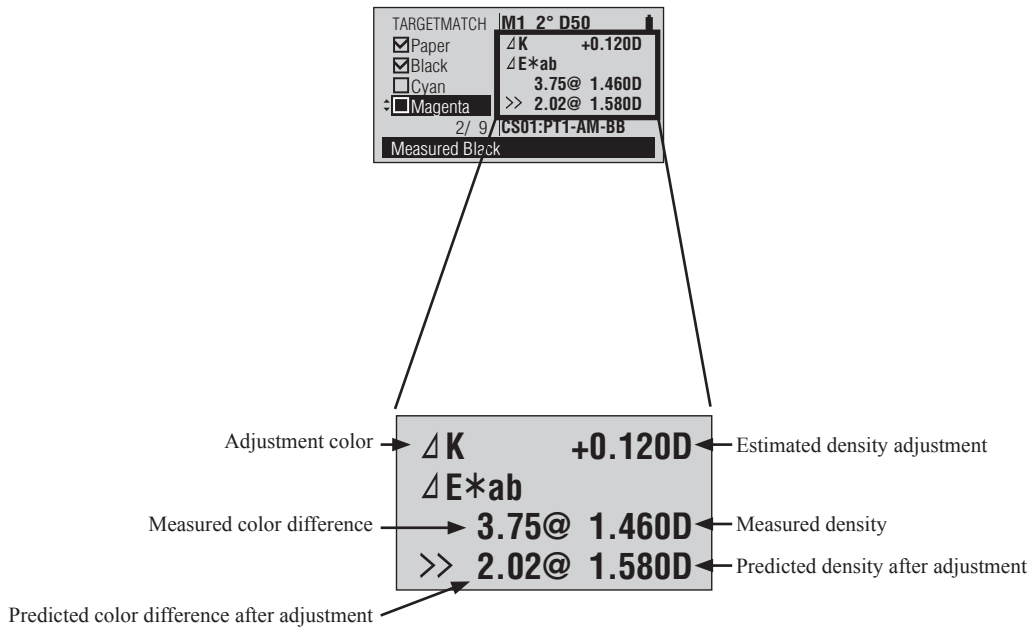
Measurement values:

```
TARGETMATCH  M1  2° D50
☑Paper        ⊿K        +0.120D
☑Black        ⊿E✻ab
☐Cyan            3.75@ 1.460D
⬍☐Magenta    ≫ 2.02@ 1.580D
         2/ 9 CS01:PT1-AM-BB
Measured Black
```

Adjustment color → ⊿K   +0.120D ← Estimated density adjustment

⊿E✻ab

Measured color difference → 3.75@ 1.460D ← Measured density

≫ 2.02@ 1.580D ← Predicted density after adjustment

Predicted color difference after adjustment

* The Adjustment color will be displayed according to the "Est. Ink Type" setting and measured sample.

If "Est. Ink Type" is set to "Auto", whether adjustment should be performed by adjusting process color (KCMY) or spot color density will be automatically determined and displayed.

If "Est. Ink Type" is set to "Spot Color", the spot color density adjustment will be displayed.

The cursor moves to the next color.

Repeat steps 5 through 7 to measure the samples for the remaining colors.

Paper Index Measurement FD-7 FD-5

Paper index measurements are performed on the <PAPER> measurement screen.

As necessary

Set the measurement conditions below in advance.

Illuminant	E-71
Observer	E-72
Color Index	E-76

[Operating Procedure]
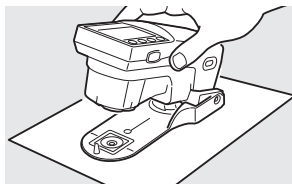
1 **Align the Target Mask port with an unprinted location on the paper.**

2 **Push the instrument on the paper.**

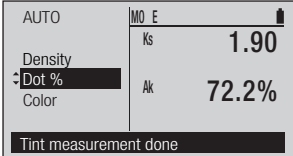Beep

You will hear a beep.

3 **Remove the instrument when you hear the beep again.**

This indicates the sample has been measured.

PAPER	2° D50	
☑Sample	WI	67.92
	Tw	-0.46
Measure sample		

"□Sample" is checked and the measurement value is displayed.

Measurement

E-126
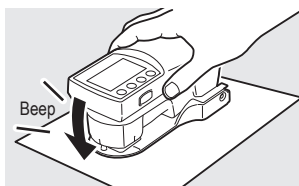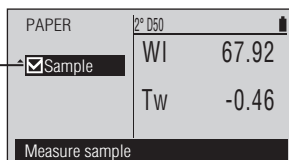
Auto Measurement `FD-7` `FD-5`

Auto measurements are performed in the <AUTO> measurement screen.

In Auto mode, the instrument judges whether to measure the density, dot area ratio, or color of the area being measured. This is convenient for when a single color chart contains a mixture of density, tint, and color patches.

As necessary

Set the measurement conditions below in advance.

Meas. Cond. (Density)	E-45	Meas. Cond. (Color)	E-70
Den. White Ref.	E-46	Illuminant	E-71
Density Status	E-47	Observer	E-72
Y-N Factor for Dot %	E-48	Color Space	E-73

[Operating Procedure]

Memo

Although this function automatically judges the measurement type, in order to provide a baseline for such judgment, it is recommended that the paper be measured first, followed by the K, C, M, and Y solid color patches, before performing other measurements.

1 **Measure the paper.**

Align the Target Mask port with an unprinted location on the paper.

2 **Push the instrument on the paper.**
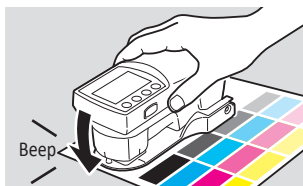
Beep

You will hear a beep.

3 **Remove the instrument when you hear the beep again.**

AUTO	M0 E	
‡Density	K 0	0.08
Dot %	C 0	0.07
Color	M 0	0.08
	Y 0	0.07
Paper measurement done		

The measured values for paper will be displayed, and the message "Paper measurement done" will be shown.

Memo

The paper's measurement values are also used when measuring density, dot area ratio and dot gain. They are not erased even if the measurement function is changed or the instrument is turned off.

4 **Measure a solid patch.**
Align the Target Mask port with a solid color patch location on the paper.
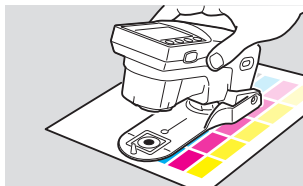
Measurement

[Operating Procedure]

5   **Push the instrument on the paper.**
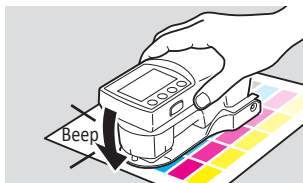
You will hear a beep.

6   **Remove the instrument when you hear the beep again.**

```
AUTO        M0  E
          K      1.75
⇕Density
 Dot %
 Color

Density measurement done
```
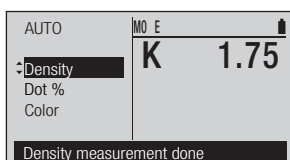
The measured values for the solid color patch will be displayed, and the message "Density measurement done" will be shown.

Memo

7   **Repeat steps 4 through 6 for the remaining solid color patches.**

The measurement values for the solid color patches are also used when measuring dot area ratio and dot gain. They are not erased even if the measurement function is changed or the instrument is turned off.

Continue by measuring other patches as desired.

8   **Align the Target Mask port with the location to be measured.**
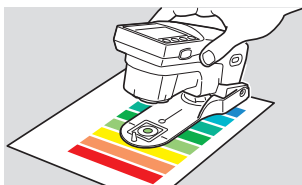
9   **Push the instrument down against the paper.**
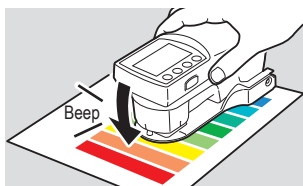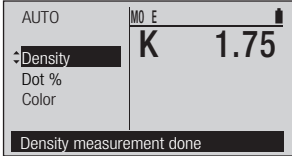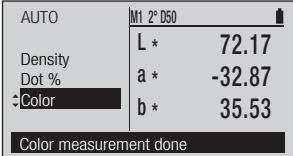
You will hear a beep.

10   **Remove the instrument when you hear the beep again.**

The instrument will judge what type of measurement to take and the measured values will be displayed.

Measurement

[Operating Procedure]

Measurement values:

Density measurement	Dot % measurement	Color measurement
AUTO M0 E K 1.75 ‡Density Dot % Color Density measurement done	AUTO M0 E Ks 1.90 Density ‡Dot % Ak 72.2% Color Tint measurement done	AUTO M1 2° D50 L* 72.17 Density a* -32.87 Dot % b* 35.53 ‡Color Color measurement done

Memo

- After measurement, the measurement values can be converted to values in the other measurement types by using the ⬆ or ⬇ button.
- If another patch with measurement values close to the paper or solid patch values is measured, the paper or solid patch values may change.
- If the instrument judgment of the measurement type is not as desired, it is recommended that the instrument be set to the desired measurement function instead of Auto mode.
- If paper is somewhat dark or is colored, the instrument judgment may be incorrect and the paper measurement may not be recognized as "Paper". In such case, set the instrument to the desired measurement function instead of Auto mode.
- In Auto mode, the setting of the Density Filter will be ignored.

Measurement

Scan Measurement FD-7 (⌾)

You can perform a "scan measurement" to measure a chart with many color patches lined up in a single action by connecting the FD-7 to a PC and controlling it from that PC. For conditions regarding charts that can be used for scan measurement, refer to "Scan Measurement Chart Conditions" on page E-154.
Connect the FD-7 to the PC in advance and start the software. For instructions on connecting the FD-7 to a PC, refer to "Connecting to a PC" on page E-134. For how to operate the software, refer to software's instruction manual.

Memo

Scan measurements can be performed with either the Protection Glass or Polarization Filter attached to the instrument. However, when taking scan measurements with the Polarization Filter attached, the slide speed should be much slower.

[Operating Procedure]

1 **Connect the FD-7 to the PC and set the software so it can start scan measurements.**
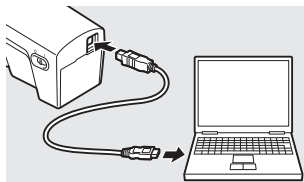
2 **Place the Ruler (optional accessory) on the chart, then align the opening to the location on the chart to measure.**
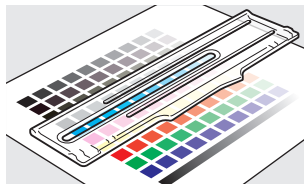
The measurement region is the region between the △ symbols.

Measurement Region
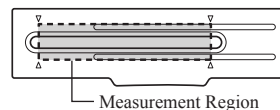
3 **Place the instrument's two feet in the Ruler's grooves and align the specimen measuring port with the position where it touches the Ruler's opening.**
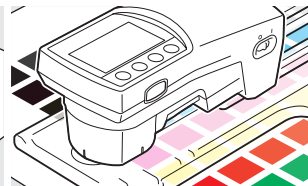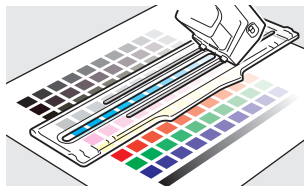
4 **Press the measuring button.**
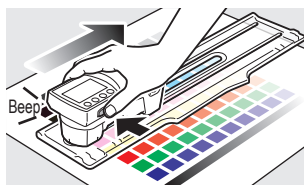
You will hear a beep after about 1 sec.

Beep

5 **While pressing the measuring button, slide the instrument along the Ruler.**
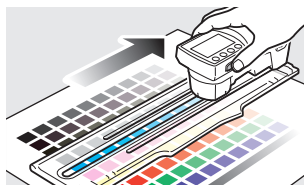
Memo

Try to slide the instrument at a constant speed.
For an optimal slide speed, the instrument should take about 2 to 4 seconds with Protection Glass attached (5 to 7 seconds with Polarization Filter attached) to move from one end of the ruler to the other. If the speed is too fast or too slow, an error may occur.

Measurement

[Operating Procedure]

6 **When the specimen measuring port comes to the position where it touches the other end of the Ruler's opening, release the measuring button.**
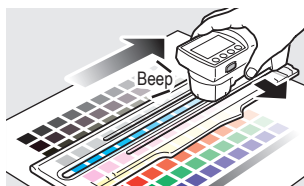
You will hear a beep and see the measurement values displayed on the PC's screen.

Notes   Always start and finish scanning from a white area of the paper that has nothing printed on it.

Repeat steps 2 through 6 to measure a different location on the same chart. You can slide the ruler on the chart in the direction vertical to the scan direction.

Measurement

Other Functions

Before Using the Instrument

Preparation

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

5

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.

Other Functions

[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.**
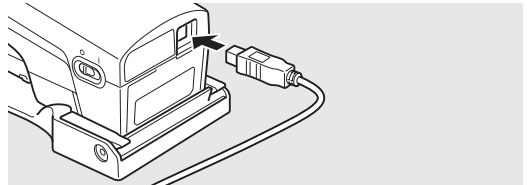
3 **Connect the USB cable's A connector to the PC's USB port.**
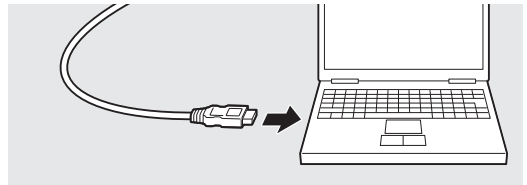
4 **Turn ON the instrument (Slide the Power switch to "I").**
・ **The PC recognizes the connection, and the USB driver is installed. Complete the installation. (Only when instrument is connected for the first time.)**

Other Functions
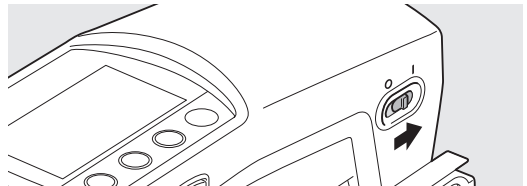
FD-7/5 Settings

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.

[Operating Procedure]

`As necessary`

Change settings.

1 When the cursor is not at the top level on the <DENSITY> or other measurement screen, press the ⏎ (Enter)/OPTION button.

→Options	Page1/1	▮
▾Den. Filter	: Auto	↵
Select Target	: Auto	
Edit Target	➔	
Display Mode	: Absolute	
Menu	➔	
Select from Auto,All,K,C,M,Y		

The <Options> screen is displayed.

2 Move the cursor to "Menu" with the ▾ button and press the ⏎ (Enter)/OPTION button.

→Menu	Page1/2	▮
▾Calibration	➔	↵
Functions	: Density	
Density Options	➔	
Color Options	➔	
Display Mode	: Absolute	
Set user calibration		

The <Menu> screen is displayed.

3 Move the cursor to "System" with the ▾ button and press the ⏎ (Enter)/OPTION button.

→System	Page1/2	▮
▾Buzzer	: On	↵
Invert Display	:	
Date/Time	➔	
Cal. Warning	➔	
Language	: English	
Change buzzer setting		
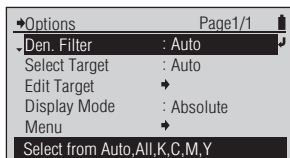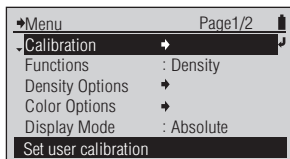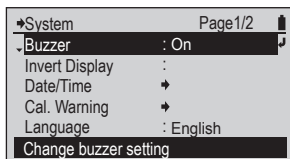
The <System> screen is displayed.

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.
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.

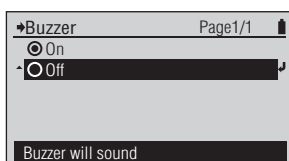## ▌ **Buzzer Sound On/Off**

You can switch the buzzer sound on and off.

[Operating Procedure]

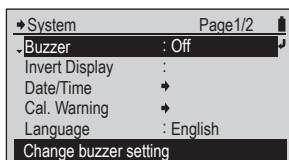**1** **On the <System> screen, move the cursor to "Buzzer" with the ⬆ button and press the ↵ (Enter)/OPTION button.**

```
→Buzzer              Page1/1  ▯
  ⊙ On
  ○ Off


  Buzzer will sound
```

The <Buzzer> configuration screen is displayed.

2 **Move the cursor to the item you wish to select with the ⬆ or ⬇ button.**

```
→Buzzer              Page1/1  ▯
  ⊙ On
  ○ Off


  Buzzer will sound
```

Select the setting.

3 **Move the cursor to "System" with the ⬇ button and press the ↵ (Enter)/OPTION button.**

```
→System              Page1/2  ▮
  Buzzer          : Off
  Invert Display  :
  Date/Time         →
  Cal. Warning      →
  Language        : English
  Change buzzer setting
```

You will hear a beep.

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, when the instrument is started, and when a button is pressed.
○	Off: The buzzer does not sound when measurement starts and stops, when the instrument is started, or when a button is pressed.

Other Functions

▌ Invert Display

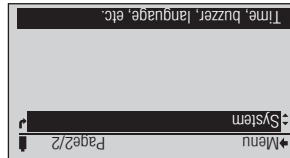You can flip the display on the LCD screen vertically.

[Operating Procedure]

1 **On the <System> screen, move the cursor to "Invert Display" with the ⬆ button and press the 🔄 (Enter)/OPTION button.**
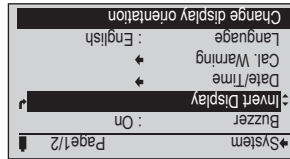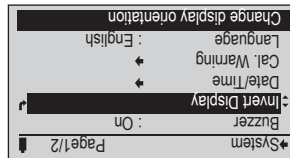
The display on the LCD screen is flipped vertically.

2 **Press the ⬅ button.**

You return to the previous screen.

3 **Move the cursor to "System" with the ⬇ button and press the 🔄 (Enter)/OPTION button.**
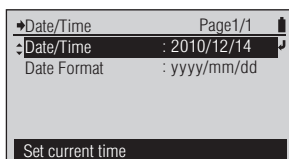
You will hear a beep.

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.
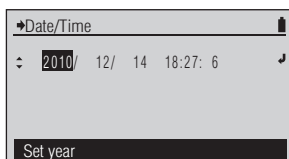
[Operating Procedure]

1 On the <System> screen, move the cursor to "Date/Time" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.
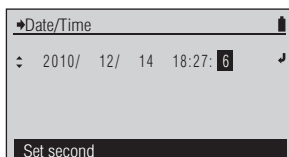
```
→Date/Time          Page1/1   ▮
⇕ Date/Time         : 2010/12/14  ↵
  Date Format       : yyyy/mm/dd

  Set current time
```

The <Date/Time> screen is displayed.

2 Move the cursor to "Date/Time" with the ⬆ button and press the ⏎ (Enter)/OPTION button.

```
→Date/Time                    ▮
⇕  2010/  12/  14   18:27: 6    ↵

  Set year
```

The <Date/Time> configuration screen is displayed.

3 Set the year/month/day/ hour/minute/second.

```
→Date/Time                    ▮
⇕  2010/  12/  14   18:27: 6    ↵

  Set second
```

For setting numeric values, refer to page E-41.

4 When finished setting all the items, press the ⬅ button. The selected content is confirmed and you return to the previous screen.

```
→Date/Time          Page1/1   ▮
⇕ Date/Time         : 2010/12/14  ↵
  Date Format       : yyyy/mm/dd

  Set current time
```
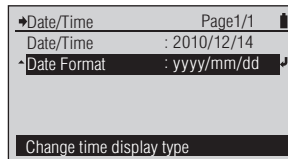
Other Functions
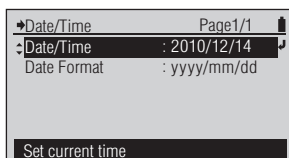
▍Configuring the Date Display Format
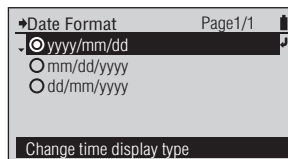
You can change the date display format.

[Operating Procedure]

1 **On the <System> screen, move the cursor to "Date/Time" with the ⏶ or ⏷ button and press the ⏎ (Enter)/OPTION button.**
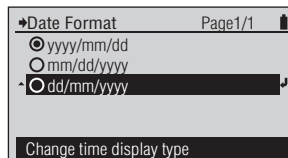
```
→Date/Time          Page1/1   🔋
 Date/Time        : 2010/12/14
▲Date Format      : yyyy/mm/dd  ↵


 Change time display type
```

The <Date Format> screen is displayed.

2 **Move the cursor to "Date Format" with the ⏷ button and press the ⏎ (Enter)/OPTION button.**

```
→Date Format         Page1/1   🔋
▼◉ yyyy/mm/dd                   ↵
  ○ mm/dd/yyyy
  ○ dd/mm/yyyy

 Change time display type
```

Select the setting.

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

```
→Date Format         Page1/1   🔋
  ◉ yyyy/mm/dd
  ○ mm/dd/yyyy
▲ ○ dd/mm/yyyy                  ↵

 Change time display type
```

You will hear a beep.

4 **Press the ⏎ (Enter)/OPTION button. The selected content is confirmed and you return to the previous screen.**

```
→Date/Time          Page1/1   🔋
 Date/Time        : 2010/12/14
▲Date Format      : dd/mm/yyyy  ↵


 Change time display type
```
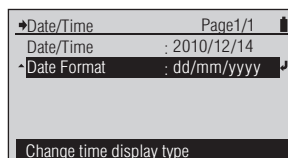
Notes

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

Setting (◉ is the initial setting)

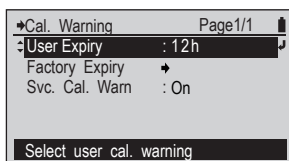|		
◉	**yyyy/mm/dd**	Display the date in year/month/day order.
○	**mm/dd/yyyy**	Display the date in month/day/year order.
○	**dd/mm/yyyy**	Display the date in day/month/year order.

▎Configuring the White 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 white calibration expiry.
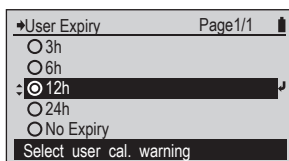
[Operating Procedure]

1 **On the <System> screen, move the cursor to "Cal. Warning" with the ▲ or ▼ button and press the ↵ (Enter)/OPTION button.**
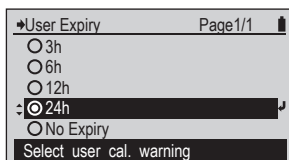
```
→Cal. Warning        Page1/1  ▮
↕User Expiry      : 12h        ↵
  Factory Expiry     →
  Svc. Cal. Warn   : On

  Select  user  cal.  warning
```

The <Cal. Warning> screen is displayed.

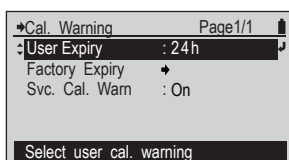**2** **If necessary, move the cursor to "User Expiry" with the ▲ or ▼ button and press the ↵ (Enter)/OPTION button.**

```
→User Expiry        Page1/1  ▮
  ○3h
  ○6h
↕◉12h                          ↵
  ○24h
  ○No Expiry
  Select  user  cal.  warning
```

The <User Expiry> configuration screen is displayed.

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

```
→User Expiry        Page1/1  ▮
  ○3h
  ○6h
  ○12h
↕◉24h                          ↵
  ○No Expiry
  Select  user  cal.  warning
```

Select the setting.

4 **Press the ↵ (Enter)/OPTION button. The selected content is confirmed and you return to the previous screen.**

```
→Cal. Warning        Page1/1  ▮
↕User Expiry      : 24h        ↵
  Factory Expiry     →
  Svc. Cal. Warn   : On

  Select  user  cal.  warning
```

Notes

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

Setting (◉ is the initial setting)

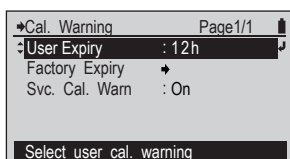|		
○	**3h**	
○	**6h**	
◉	**12h**	
○	**24h**	
○	**No Expiry**	The calibration prompt screen is not displayed.

Other Functions

▌ **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. You can set whether or not the annual service recalibration recommendation message is displayed by following the procedure on page E-143.

[Operating Procedure]

1 On the <System> screen, move the cursor to "Cal. Warning" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

```
→Cal. Warning          Page1/1  ▮
↕ User Expiry        : 12 h      ↵
  Factory  Expiry      →
  Svc.  Cal.  Warn   : On

  Select  user  cal.  warning
```

The <Cal. Warning> screen is displayed.

2 Move the cursor to "Factory Expiry" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.

```
→Factory Expiry        Page1/1  ▮


  Calibration Expiry
        2011/11/18  18 : 37 : 24

```

The <Factory Expiry> configuration screen is displayed, and the time limit when the next factory calibration is required is shown.

3 Press the ⬅ button.

```
→Cal. Warning          Page1/1  ▮
  User Expiry        : 12 h      ↵
↕ Factory  Expiry      →
  Svc.  Cal.  Warn   : On

  Select  user  cal.  warning
```

You return to the previous screen.

Other Functions

▌ Configuring the Service Calibration Warning

Whether or not the instrument displays the Service Calibration Warning (annual service recalibration recommendation) screen when approximately one year has elapsed from the last service calibration can be set.

The initial setting for the Service Calibration Warning is On (warning will be shown) when shipped from the factory. You can change this setting.

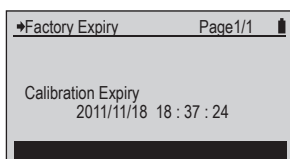### [Operating Procedure]

1 **On the <System> screen, move the cursor to "Cal. Warning" with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**
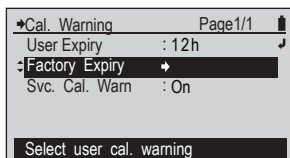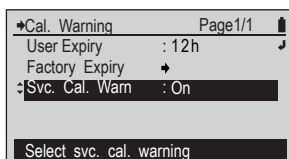
```
➜Cal. Warning        Page1/1  ▮
  User Expiry        : 12h      ↵
  Factory Expiry     ➜
⇕ Svc. Cal. Warn     : On


  Select svc. cal. warning
```

The <Cal. Warning> screen is displayed.

2 **If necessary, move the cursor to "Svc. Cal. Warn." with the ⬆ or ⬇ button and press the ⏎ (Enter)/OPTION button.**

```
➜Svc. Cal. Warn.     Page1/1  ▮
⇕ ◉ On                          ↵
  ○ Off


  Show svc. cal. warning
```

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

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

```
➜Svc. Cal. Warn.     Page1/1  ▮
  ◉ On
⇕ ○ Off                         ↵


  Don't show svc. cal. warning
```

Select the setting.

4 **Press the ⏎ (Enter)/OPTION button. The selected content is confirmed and you return to the previous screen.**

```
➜Cal. Warning        Page1/1  ▮
  User Expiry        : 12h      ↵
  Factory Expiry     ➜
⇕ Svc. Cal. Warn     : Off


  Select svc. cal. warning
```
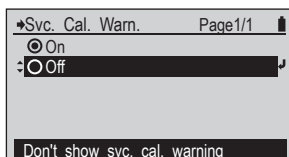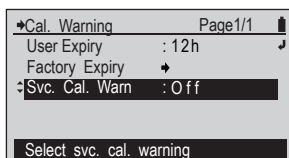
Notes

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

Setting (◉ is the initial setting)

◉	**On**	Service Calibration Warning will be shown when approximately one year has elapsed since last service calibration.
○	**Off**	Service Calibration Warning will not be shown.

Other Functions

▌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)/OPTION button.**

```
→Language          Page1/2  ▮
┌ ◉ English
  ○ Japanese
  ○ German
  ○ French
  ○ Spanish
Switch to English
```

The <Language> screen is displayed.

2 **Move the cursor to the item you wish to select with the ⏶ or ⏷ button.**

```
→Sprache            S. 1/2  ▮
  ◉ Englisch
  ○ Japanisch
⬍ ○ Deutsch
  ○ Französisch
  ○ Spanisch
Auf Deutsch umschalten
```

Select the setting.

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

```
→Änderung bestätigen        ▮
Soll die Sprache
umgeschaltet werden?
┌ OK
  Abbrechen

Auf Deutsch umschalten
```

The <Änderung bestätigen> (Confirm Change) screen is displayed.

4 **Move the cursor to "OK" with the ⏶ button, then press the ⏎ (Enter)/OPTION button. The selected content is confirmed and you return to the previous screen.**

```
→System             S. 1/2  ▮
Summer          : Ein
Anz. invert.
Datum/Uhrzeit        →
Kal.-Warnung         →
⬍ Sprache       : Deutsch
Anzeigesprache auswählen
```
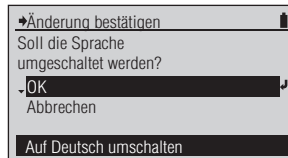
Notes

If you press ⏴ without pressing ⏎, you return to the previous screen without changing the setting.
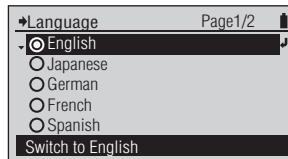
Setting (◉ is the initial setting)

◉	**English**
○	**Japanese**
○	**German**
○	**French**
○	**Spanish**
○	**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 white calibration execution records and target color data (including the tolerance value and name for each target color) are deleted.

[Operating Procedure]

1 On the <System> screen, move the cursor to "Initialize" with the ⬆ or ⬇ button and press the ↵ (Enter)/OPTION button.
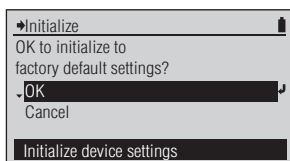
```
→Initialize                    🔋
OK to initialize to
factory default settings?
↓OK                             ↵
 Cancel

Initialize device settings
```

The <Initialize> screen is displayed.

2 Move the cursor to "OK" with the ⬆ button and press the ↵ (Enter)/OPTION button.

```
→System            Page2/2     🔋
⇕Initialize                    ↵
 Info(SerNo/Ver)      →



Initialize device settings
```
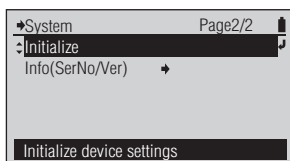
The instrument is initialized.

Memo

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

3 Press the ← button.

```
→Menu              Page2/2     🔋
▲System               →        ↵



Time, buzzer, language, etc
```
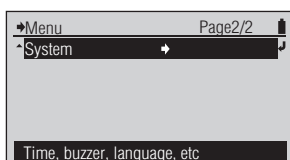
You return to the previous screen.

Other Functions

Initial settings

Item			Initial setting
Functions			Density
Density Options	Density Target	Select Target	Auto
		Default Toler.	0.05
	Meas. Cond.		M0
	Den. White Ref.		Paper
	Density Status		E
	Y-N Factor	For Dot %	1.00
		For PS Dot %	1.00
	Dot % Reference	Dot Gain	75%, 50%, 25%
		PS Dot Gain	75%, 50%, 25%
		Gray Balance	75%, 50%, 25%
		Midtone Spread	C50%, M50%, Y50%
	Den. Filter		Auto
	Trapping Method		Preucil
	SpotCol.Dens.WL		Auto
Color Options	Color Target	Select Target	Auto
		Default Toler.	ΔE00, 1.50
	Meas. Cond.		M1
	Illuminant		D50
	Observer		2°
	Color Space		L*a*b*
	Diff. Formula		ΔE00
	Color Index		WI, Tint
	Color Set Mgmt	Sel. Color Set	Meas. Target
		Set Backing	None
		Convert Backing	Off
		Est. Ink Type	Auto
Display Mode			Absolute
Polar.Meas.Set			Auto
System	Buzzer		On
	Invert Display		Normal
	Date/Time	Date Format	yyyy/mm/dd
	User Expiry		12h
	Svc. Cal. Warn.		On
	Language		English
White Calibration			Not completed
Target Data			Not registered

The settings may be initialized for reasons other than the initialize operation (for example, the internal battery was completed discharged).

Checking FD-7/5 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 **When the cursor is not at the top level on the <DENSITY> or other measurement screen, press the ⏎ (Enter)/OPTION button.**

```
→Options              Page1/1  ▌
 Den. Filter        : Auto      ↵
 Select Target      : Auto
 Edit Target        →
 Display Mode       : Absolute
 Menu               →
 Select from Auto,All,K,C,M,Y
```

The <Options> screen is displayed.

2 **Move the cursor to "Menu" with the ▼ button and press the ⏎ (Enter)/OPTION button.**

```
→Menu                 Page1/2  ▌
 Calibration        →            ↵
 Functions          : Density
 Density Options    →
 Color Options      →
 Display Mode       : Absolute
 Set user calibration
```

The <Menu> screen is displayed.

3 **Move the cursor to "System" with the ▼ button and press the ⏎ (Enter)/OPTION button.**

```
→System               Page1/2  ▌
 Buzzer             : On         ↵
 Invert Display     :
 Date/Time          →
 Cal. Warning       →
 Language           : English
 Change buzzer setting
```

The <System> screen is displayed.

Other Functions
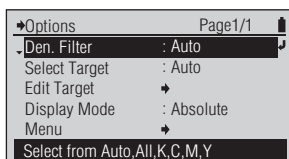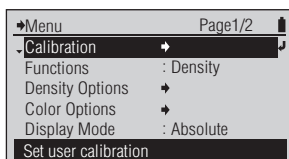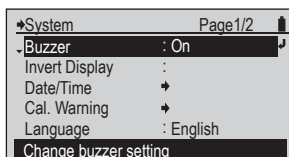
❙ Displaying Device Information

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)/OPTION button.

```
     SPECTRODENSITOMETER
            FD-7

     Serial No.    10000118
     Version       1. 30. 0000

     ( C ) KONICA  MINOLTA, INC.
```
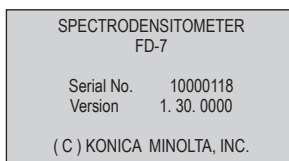
The <Info(SerNo/Ver)> screen is displayed.

2 When finished checking the information, press the ⬅ button.

```
➜System                Page2/2   ▮
  Initialize
⌃ Info(SerNo/Ver)    ➜              ↵


  Display device information
```
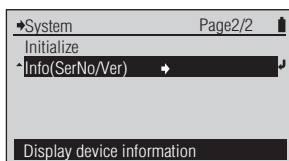
You return to the previous screen.

Troubleshooting

Before Using the Instrument

Preparation

Preparation for Measurement

Measurement

Other Functions

Troubleshooting

Appendix

6

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	Error. Measure again.	The Target Mask rose up during measurement.	Measure again.
2	Outside measurement range.	Over or under the possible measurement range.	Move further away from the illuminant and measure again.
3	Calibration not performed. Perform calibration.	A measurement was run with no white calibration.	Perform white calibration.
		Polarization setting was changed. When polarization settings are changed, zero calibration (if not yet performed with Polarization Filter) and white calibration must be performed.	Perform zero calibration and white calibration.
4	Error. Calibrate again.	The Target Mask rose up during white calibration.	Perform white calibration again.
		Instrument was not properly set on White Calibration Plate.	Set instrument properly on White Calibration Plate and perform white calibration again.
		The White Calibration Plate, Protection Glass, or Polarization Filter is dirty.	Clean the White Calibration Plate, Protection Glass, or Polarization Filter and perform white calibration again.
5	Not correctly calibrated. Correctly set on cal. plate.	A problem occurred during calibration.	Calibrate again. When this message continues to be displayed, contact a KONICA MINOLTA authorized service facility.
6	Calibration recommended.	The white calibration expiry exceeded the warning time.	Perform white calibration.
7	No target data.	No data is registered to the selected target color number.	Reselect a target color with data.
8	Input value outside range. Enter again.	Outside the possible setting range.	Check the numeric value and enter the numeric value again.
9	Outside storable range. Perform illum. meas. again.	Outside the illuminance range that can be registered.	The illuminance range that can be registered starts at 500 lx. Perform the illuminance measurement again.
10	Battery voltage is low. Recharge battery.	The battery's voltage has fallen and the number of times the instrument can take measurements has decreased.	Charge the battery via the AC adapter or USB bus power.
11	The battery is degrading. Contact Service Center.	A battery error has been detected.	Immediately stop using the instrument and contact a KONICA MINOLTA authorized service facility.
12	Circuit malfunction. Contact Service Center.	A problem has been detected in the measurement circuit.	Immediately stop using the instrument and contact a KONICA MINOLTA authorized service facility.

13	Clock malfunction. Charge battery. Set clock.	A problem has been detected in the clock data. • The voltage may have dropped too much.	Charge the battery via the AC adapter or USB bus power, then set the date/time again.
14	Time for periodic cal. Contact Service Center.	Approximately one year has elapsed since the instrument was first started or one year has elapsed since the annual service recalibration.	Contact a KONICA MINOLTA authorized service facility and submit the instrument for annual service recalibration.
15	Recommend WL comp.	The instrument has been used with the Polarization Filter attached for more than 30 days and automatic wavelength compensation has not been performed. Normally, automatic wavelength compensation is performed at the same time as white calibration when the Protection Glass is attached, but when white calibration is performed with the Polarization Filter attached, automatic wavelength compensation is not performed.	Replace Polarization Filter with Protection Glass and follow screen instructions to perform white calibration.
16	No polar meas w/cur meas func. Switch to dens meas.	Illuminance measurement or paper index measurement was attempted with Polarization Filter attached.	Select a different measurement function or remove the Polarization Filter (and set Polarized Meas. To Off) and take illuminance or paper index measurement.
17	Color set not selected. Select color set.	No color set is selected when performing ISO Check or Targetmatch measurement.	Select a color set from those stored in the instrument* or select a different measurement function. * Color set data must be set in advance using Data Management Software FD-S1w (standard accessory).
18	Attach polarization filter and perform zero calibration.	Polarized Meas. is set to On or Polarization Filter was detected with Polarized Meas. set to Auto and zero calibration has not been performed.	Check that Polarization Filter is properly attached and perform zero calibration and then white calibration.

Troubleshooting

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 LCD remains blank even though battery has been charged, the CPU may require resetting. See below. If the instrument does not work even after the battery has been charged and the CPU has been reset, 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.
Measurement results are shown as "---".	Did you measure all the required items?	Measure the paper, solid, etc. again as required for the current measurement function. If measuring color difference, check that the target color settings are properly set.
Measurement results are abnormal.	Are you pressing the instrument directly against the measurement specimen?	Press the instrument firmly onto the measurement specimen so that it is held flat against it.
	Are you using the correct White Calibration Plate?	Perform white calibration using the White Calibration Plate that bears the same pairing number as the instrument.
	Did you perform white calibration correctly?	
Data from the instrument cannot be transmitted to a PC. The instrument ignores commands from the PC. Commands are not received properly.	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?	
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.

Resetting CPU

If the LCD remains blank even though the instrument battery has been charged and the instrument is switched on, the CPU may require resetting by performing the following operation:

With the instrument switched on, simultaneously press the ⊙ and ⊙ buttons and hold them pressed for at least 4 seconds. The CPU will be reset and the instrument will restart.

Resetting the CPU may cause the following:
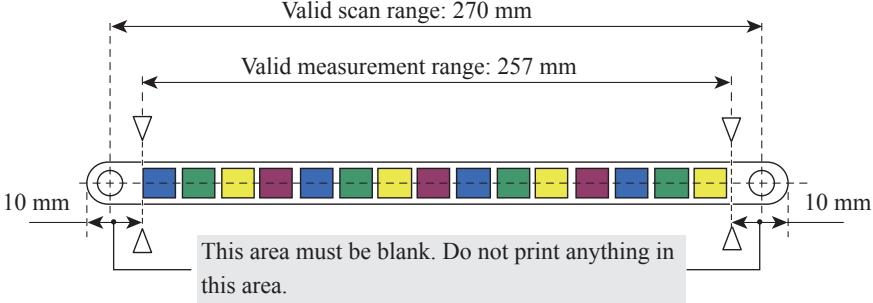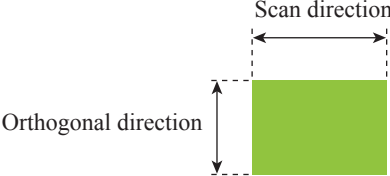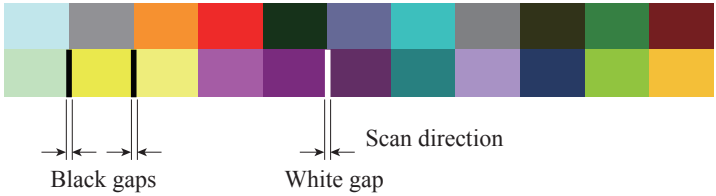
- Values for the last measurement performed prior to resetting will be lost.
- In some cases, changes to target data (including tolerances and name for each target), setting changes (including display language), and record of white calibration being performed since power was most recently switched on may be erased.
- If the display language setting has been erased, it can be set again according to the procedure on page E-144.

Appendix

7

Scan Measurement Chart Conditions

Item	Details/Description
Color patch location range	Scan direction 257 mm or less Valid scan range: 270 mm Valid measurement range: 257 mm 10 mm · · · 10 mm This area must be blank. Do not print anything in this area.
Patch size	Scan direction: 10 mm or longer Orthogonal direction: 8 mm or longer Scan direction Orthogonal direction
Patch lines	Scan direction: Max. 26 Orthogonal direction: Max. 43
Patch order	A) Color difference between neighboring patches in scan direction: Δ E > Approx. 20 B) If condition A cannot be satisfied or an error occurs during scanning even though condition A is satisfied, insert a black or white gap between the patches as appropriate. C) Insert a black gap between bright colors and a white gap between darker colors. D) Size of gaps in scan direction: 0.5 mm–1.0 mm Scan direction Black gaps · White gap

External Dimensions

(Unit: mm)

171.5

165

SCAN / ILLUMINANCE

84.2

90

70

25

φ6.2
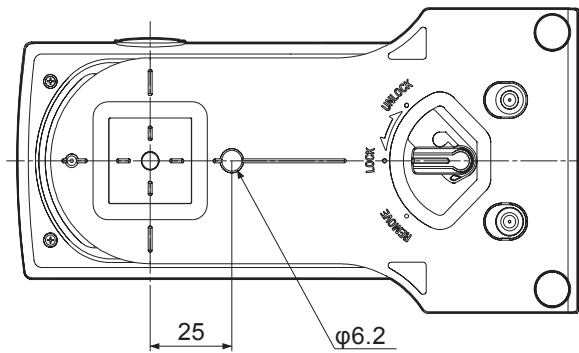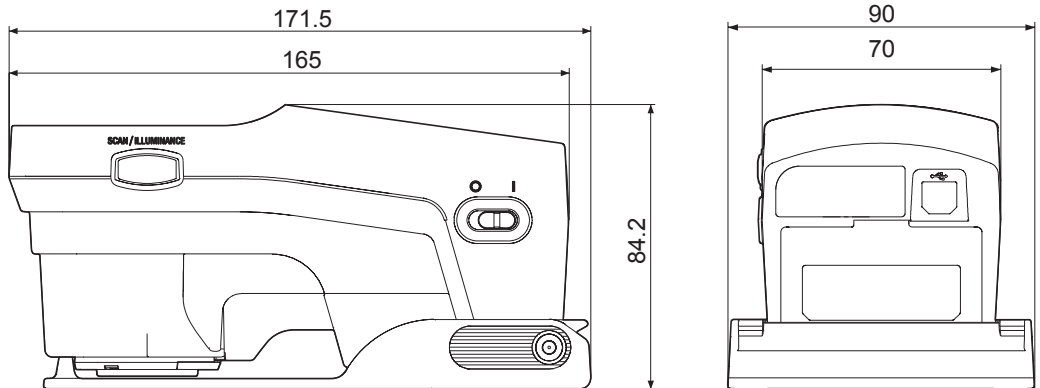
Specifications

Model	FD-7	FD-5
Illumination/viewing system	45°a: 0°(annular illumination)*¹ Conforms to CIE No. 15, ISO 7724/1, DIN5033 Teil 7, ASTM E 1164, and JIS Z 8722 Condition a for reflectance measurements.	
Spectral separation device	Concave grating	
Wavelength range	Spectral reflectance: 380 to 730 nm; Spectral irradiance: 360 to 730 nm	Spectral reflectance: 380 to 730 nm
Wavelength pitch	10 nm	
Half bandwidth	Approx. 10 nm	
Measurement area	Ø3.5 mm	
Light source	LED	
Measurement range	Density: 0.0D to 2.5D; Reflectance: 0 to 150%	

Short-term repeatability	Density: σ0.01D
	    Without polarization filter: 0.0D ~ 2.5D, Yellow 0.0D ~ 2.0D
	    With polarization filter: 0.0D ~ 2.5D, Yellow 0.0D ~ 1.8D
	    (When measurements taken 30 times at 10-second intervals after white calibration has been performed)
	Colorimetric: Within σDE00 0.05 (Without polarization filter)
	    (When white plate is measured 30 times at 10-second intervals after white calibration has been performed)	

Inter-instrument agreement	Within ΔE00 0.3 (Average of 12 BCRA Series II color tiles compared to values measured with a master body under Konica Minolta standard conditions; without polarization filter)	
Measurement time	Approx. 1.4 s (single-point reflectance measurement without polarization filter)	
Displayed values	Colorimetric values, color-difference values, density values, density-difference values, dot area ratio, dot gain, PS plate dot area ratio, PS plate dot gain, trapping percentage, gray balance, midtone spread percentage, ISO 12647 check results, PASS/FAIL judgment, illuminance, correlated color temperature	Colorimetric values, color-difference values, density values, density-difference values, dot area ratio, dot gain, PS plate dot area ratio, PS plate dot gain, trapping percentage, gray balance, midtone spread percentage, ISO 12647 check results, PASS/FAIL judgment
Measurement conditions	Corresponding to ISO 13655 Measurement Conditions M0 (CIE Illuminant A), M1 (CIE Illuminant D50), M2 (illumination with UV-cut filter), and M3 (M2 + polarization filter); User-defined illuminant	
Illuminants	A, C, D50, ID50, D65, ID65, F2, F6, F7, F8, F9, F10, F11, F12, User-defined illuminant	
Observers	2° Standard Observer, 10° Standard Observer	
Color spaces	L*a*b*, L*C*h, Hunter Lab, Yxy, XYZ and color-difference in these color spaces	
Indexes	WI (ASTM E313-96); Tint (ASTM E313-96); ISO Brightness (ISO 2470-1); D65 Brightness (ISO 2470-2); Fluorescence index	
Color-difference equations	ΔE*ab (CIE 1976), ΔE*94 (CIE 1994), ΔE00 (CIE 2000), ΔE (Hunter), CMC (l:c)	
Density	ISO Status T, ISO Status E, ISO Status A, ISO Status I; DIN16536	
Storable data	Colorimetric target data: 30 data; Density target data: 30 data	
Display language	English, French, German, Spanish, Japanese, Chinese (Simplified)	
Interface	USB2.0	
Output data*²	Displayed values; Spectral reflectance data; Spectral irradiance data	Displayed values
Scanning measurements*²	Scanning measurement of a color chart can be performed.	N/A
Power	Rechargeable internal lithium-ion battery (Number of measurements per charge: Approx. 2,000 when new without using polarization filter); AC adapter; USB bus power	
Dimensions (W × D × H)	70 × 165 × 83 mm (Body only); 90 × 172 × 84 mm (With target mask attached)	
Weight	Approx. 350 g (Body only); Approx. 430 g (With target mask attached)	
Operating temperature/ humidity range	10 to 35°C, 30 to 85% relative humidity with no condensation	
Storage temperature/ humidity range	0 to 45°C, 0 to 85% relative humidity with no condensation	

*1   Illumination for wavelengths under 400 nm is unidirectional.

*2   Available when using PC software.

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