

SPECTROPHOTOMETER

CF-300

INSTRUCTION MANUAL



Before using this instrument,
please read this manual.



KONICA MINOLTA

Safety Symbols

The following symbols are used in this manual or CF-300 to prevent accidents which may occur as a result of incorrect use of the instrument.



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



Denotes an instruction regarding the risk of electric shock.
Read the instruction carefully to ensure safe and correct use.



Denotes an instruction regarding the risk of fire.
Read the instruction carefully to ensure safe and correct use.



Denotes a prohibited action.
This action must never be performed.



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



Denotes a prohibited action.
Never disassemble the instrument.



Denotes an instruction.
Be sure to disconnect the AC adapter from the AC outlet.



This symbol indicates A.C.



This symbol indicates D.C.



This symbol indicates class II protection against electric shock.

Trademarks

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- The KONICA MINOLTA logo and symbol mark, and SpectraMagic are registered trademarks or trademarks of Konica Minolta, Inc.

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.
- The screen images shown in this manual are for illustrative purposes only and may differ from the actual product screens.
- 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 your retailer or 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.		Do not disassemble or modify the instrument or the AC adapter. Doing so may cause a fire or electric shock.
	Always use the specified AC adapter plugged into an indoor outlet of the rated voltage of 100 to 240 V ~ (North America or Taiwan: 100 to 120 V ~; Japan: 100 V ~) at 50/60 Hz. If an AC adapter other than those specified by KONICA MINOLTA is used, or if the adapter is connected to an unsupported voltage, it may result in damage to the instrument or AC adapter, fire, or electric shock.		Take special care not to allow liquid or metal objects to enter the instrument. Doing so may cause a fire or electric shock. Should liquid or metal objects enter the instrument, turn the power OFF immediately, disconnect the AC adapter plug from the AC outlet, and contact the nearest Konica Minolta-authorized service facility.
	If the instrument will not be used for a long time, disconnect the AC adapter plug 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.		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 plug from the AC outlet and contact the nearest Konica Minolta-authorized service facility.
	Do not forcibly bend, twist, or pull the AC adapter power cable. Do not scratch or alter the power cable or place heavy objects on it. Doing so may damage the power cable and cause a fire or electric shock.		Always hold the plug itself when disconnecting the AC adapter plug from the AC outlet. Pulling on the power cable may damage it and cause a fire or electric shock.
	Insert the power plug fully and securely. Incomplete inserting may cause fire or electric shock.		Do not look directly into the lamp. The lamp is very bright, which may harm your eyes.
	Do not insert or disconnect the AC adapter plug from an AC outlet with wet hands. Doing so may cause electric shock.		

 CAUTION		(Failing 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.		Make sure that the AC outlet is located near the instrument and that the AC adapter plug can be connected to and disconnected from the AC outlet easily.
	Be careful not to pinch hands in parts of the instrument or accessories that open and close. Doing so may result in injury.		When cleaning, disconnect the power plug. Connecting may cause electric shock.
	Do not move the instrument while looking into the finder. Doing so may cause the instrument to topple over or result in other accident.		Do not place the instrument on an unstable or sloping surface. Doing so may result in its falling or overturning, causing injury. Be careful not to drop the instrument when carrying it.
	Carefully handle the glass protected target mask. Failure to do so may break the glass, resulting in injury.		

INTRODUCTION

This spectrophotometer was developed to measure the body color of reflective objects. It performs noncontact colorimetric measurements at high speed to a high degree of performance and can be used by itself or inline in various fields of industry.

■ Packing Materials

General Packing Materials

Keep all packing materials (cardboard box, cushioning material, plastic bags, etc.) in a safe place. The CF-300 is a precision measuring instrument. They can be used to protect the instrument from impact and vibration during shipment to Konica Minolta for maintenance. Should they be lost or damaged, contact the nearest Konica Minolta-authorized service facility.

Protective cap for the specimen measuring port (integrating sphere opening)

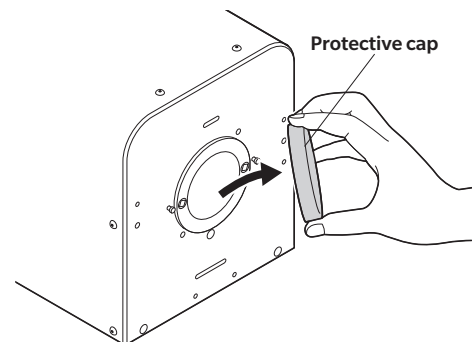
The CF-300 has been delivered with a protective cap attached to the specimen measuring port (integrating sphere aperture).

Before using the CF-300, remove the protective cap and attach a target mask.

Put the removed protective cap in the accessory case (CF-A25) to prevent it from getting lost.

When not using the CF-300, keep the protective cap attached to the measuring port.

When transporting the CF-300, be sure to attach the protective cap to the port.



■ Notes on Use

Be sure to use this instrument properly. Use of this instrument in ways other than those specified in this manual may result in risk of injury, electric shock, instrument damage, or other problems.

Operating Environment

- Use the CF-300 at an ambient temperature between 15°C and 30°C and relative humidity 80% or less (at 30°C, with no condensation.) Be sure to use the instrument within this range. Do not use it in areas of rapid temperature changes.
- Do not leave the CF-300 in direct sunlight or near sources of heat, such as stoves, etc. The internal temperature of the instrument may become much higher than the ambient temperature in such cases.
- Do not use the CF-300 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 CF-300 near equipment which produces a strong magnetic field (such as speakers, etc.).
- This instrument complies with Electrical equipment for measurement, control and laboratory use - EMC(Electromagnetic Compatibility) requirements - Part 1: General requirements (EU Harmonized Standards EN 61326-1:2021). Conformity verification is performed under KONICA MINOLTA's test conditions in an INDUSTRIAL ELECTROMAGNETIC ENVIRONMENT specified in the relevant harmonized standards. The limit of performance degradation when subjected to continuous disturbance during immunity testing is up to twice KONICA MINOLTA's repeatability specifications ($4E^*ab$).
- The CF-300 belongs to installation category I products (equipment which is powered by an AC adapter connected to commercially available power).
- The CF-300 belongs to pollution degree 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 CF-300 at altitudes higher than 2,000 m.
- The CF-300 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

- Make sure no dirt or dust gets into the specimen measuring port.
- 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.
- To achieve the highest accuracy when measuring absolute values (colorimetric values), do as follows:
 - (1) Place the powered off CF-300 in an environment where the temperature is 23°C and wait until the instrument temperature is stabilized at 23°C. It will take about 10 minutes per 1°C in difference between the environment temperature and the instrument temperature.
 - (2) Power on the CF-300 and keep it on for at least 30 minutes.
 - (3) Do zero calibration and white calibration.
 - (4) The CF-300 is now ready for accurate measurement.

Zero Calibration Box

- Do not allow the inside of the zero calibration box to get scratched or stained with e.g. fingerprints.
- If the inside of the zero calibration box becomes dirty, wipe it with a soft, clean dry cloth.
- If dirt is difficult to remove, wipe it off with a cloth dampened with a commercially available lens cleaning solution, remove the solution with a cloth dampened with water, and allow the zero calibration box to dry before using.
- Should the inside of the zero calibration box get scratched or get so dirty that it cannot be cleaned, replace the box with a new one.

White Calibration Plate

- When the white calibration plate is not in use, be sure to close the lid so that the plate is not exposed to ambient light. Failure to do so may discolor the plate due to light exposure.
- Do not allow the white calibration plate to get scratched or stained with e.g. fingerprints.
- If the white calibration plate becomes dirty, wipe it with a soft, clean dry cloth.
- If dirt is difficult to remove, wipe it off with a cloth dampened with a commercially available lens cleaning solution, remove the solution with a cloth dampened with water, and allow the plate to dry before using.
- Should the white calibration plate get scratched or get so dirty that it cannot be cleaned, replace the plate with a new one. If the white calibration plate is replaced with a new one, update the white calibration data accordingly.

Target Mask

- Do not touch, stain or scratch the inner surface (white painted area) of the target masks.
- Do not allow the target mask detection pin on the inner surface (white painted area) of the target masks to get scratched or dirty.
- When not in use, Target Masks should be stored in the accessory case (CF-A25) so that they will not be exposed to ambient light.
- Do not allow the outside glass of the target masks to get scratched or stained with e.g. fingerprints.
- Never touch the inner white painted area and the glass of the glass protected target mask. If the area and/or the glass get dirty or scratched, buy a new mask for replacement.

Power Source

- Do not short the output plug of the AC adapter. Doing so may result in electric shock or fire.
- The AC adapter is an EMC Class B device. If used in a home environment, it may jam signals used by other appliances. In such case, the user is responsible for taking suitable countermeasures.
- Make sure that the power switch is set to OFF ("I") when the CF-300 is not in use.
- Always use the specified AC adapter plugged into an indoor outlet of the rated voltage of 100 to 240 V $\sim$ (North America or Taiwan: 100 to 120 V $\sim$; Japan: 100 V $\sim$) at 50/60 Hz.
- Use an AC power supply of the rated supply voltage (within $\pm 10\%$).
- Do not connect the AC adapter to an overloaded electrical circuit. In addition, do not wrap or cover the AC adapter with cloth or other material while in use. Doing so may cause an electric shock or fire.
- In the event of trouble, unplug the power cord from the input socket of the AC adapter. Moreover, do not install the instrument in any way that makes it difficult to unplug the power cord from the input socket of the AC adapter in an emergency.

System

- Do not subject the CF-300 to strong impact or vibration. Doing so may cause deterioration of performance or breakdown.
- The specimen measuring port and integrating sphere of this instrument are important precision parts of the instrument's optical system, therefore do not dirty or impact them in any way. Moreover, when not using the instrument, attach the protective cap to prevent dust from penetrating the integrating sphere.

■ Notes on Storage

- If dust enters the integrating sphere, accurate measurement can not be performed. When not using this product, be sure to attach a protective cap and keep it.
- The CF-300 should be stored at temperatures between 0°C and 40°C, and at a relative humidity of 80% or less (35°C, without condensation.) Do not store the instrument in areas subject to high temperatures, high humidity, sudden changes in temperature, or where freezing or condensation may occur, because these circumstances may cause a breakdown. It is recommended to store the CF-300 with a drying agent at a temperature around 20°C.
- Do not leave the CF-300 inside a car such as in the 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 CF-300. This protects the instrument from vibration and shock.
- Do not store the CF-300 in areas where dust, cigarette smoke or chemical gases are present. Doing so may cause deterioration in performance or a breakdown.
- The White Calibration Plate may become discolored if left exposed to light. Therefore, make sure to close the cover when it is not in use so that the White Calibration Plate is not exposed to ambient light during storage.
- The Target Masks may discolor if they are left exposed to light. When they are not in use, keep them in a safe place to prevent exposure to light and to protect them from scratches and dust. And store them in the accessory case (CF-A25).
- 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.).

■ Notes on Cleaning

- If the CF-300 becomes dirty, wipe it with a soft, clean dry cloth. Never use solvents such as thinner or benzene.
- If the White Calibration Plate becomes 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.
- If the inside the Zero Calibration Box becomes dirty, wipe it with a soft, clean dry cloth. If the dirt is difficult to remove, wipe it off with a cloth dampened with commercially available lens cleaning solution, remove the solution with a cloth dampened with water, and allow the Zero Calibration Box to dry before using.
- If the inner surface (white painted area) of a target mask gets dirty, contact the nearest Konica Minolta-authorized service facility.
- Should the CF-300 break down, do not try to disassemble and repair it by yourself. Contact a Konica Minolta-authorized service facility.
- If there is dust on the glass of the glass protected target mask, remove the mask from the CF-300 and blow the dust off with a blower. Then do not touch the inner surface (white painted area) of the mask.
- Should the inner or outer glass surface of the glass protected target mask get so dirty that it cannot be cleaned, buy a new mask to replace it.
- Do not allow the outer glass surface of the glass protected target mask to get scratched or stained with e.g. fingerprints.
- If the outer glass surface of the glass protected target mask becomes dirty, wipe it with a soft, clean dry cloth.
- If dirt on the glass protected target mask is difficult to remove, wipe it off with a cloth dampened with a commercially available lens cleaning solution, remove the solution with a cloth dampened with water, and allow the mask to dry.

■ Disposal Method

- Make sure that the CF-300 and its accessories and packing materials are either disposed of or recycled correctly in accordance with local laws and regulations.

■ Maintenance

- To maintain the measurement accuracy of the instrument, it is recommended to have the instrument serviced about once a year. For details on instrument servicing, contact your nearest Konica Minolta authorized service facility.

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Using the CF-300

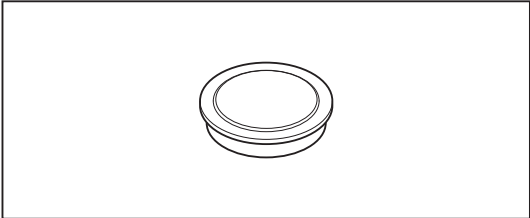
Accessories Check

This instrument works with standard and optional accessories.
Memo Some accessories may differ from their representations shown in this manual.

■ Standard Accessories

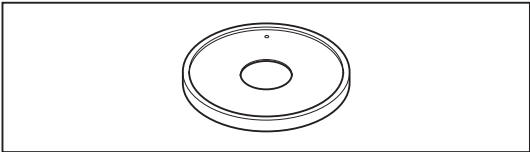
White Calibration Plate CF-A24

Used to perform white calibration for measurement of reflectance. A CD-ROM containing white calibration data and software for writing the white calibration data is supplied with this accessory.



Adapter for White Calibration

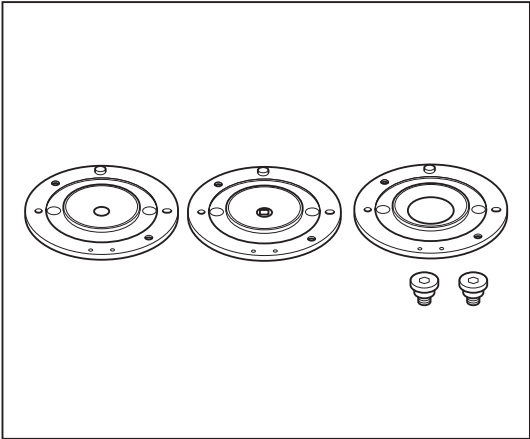
Used for white calibration during noncontact measurement. Attaching this to the CF-300 with the CF-A23 attached and setting up the CF-A24 allows white calibration to be performed.



Target Mask CF-A21, CF-A22, CF-A23

Used to match the illumination (specimen measuring port) area to the specimen. The illumination and measurement (specimen measuring port) areas are as follows when the respective target masks are attached.

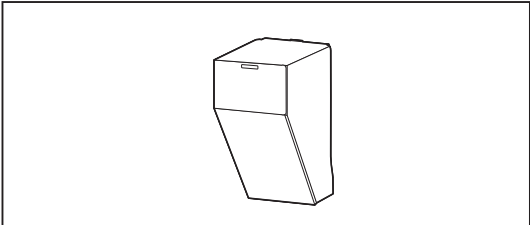
	CF-A21 (MAV)	CF-A22 (XUSAV)	CF-A23 (NC: For noncontact measurement)	
Illumination area	φ 11 mm	5 × 7 mm	φ 34 mm	
Measurement area	φ 8 mm	0.75 × 1 mm	φ 8 mm	0.75 × 1 mm



Memo Two screws are included with the target mask for securing it to the instrument.

Zero Calibration Box CM-A155

Used to perform zero calibration for measurement of reflectance.



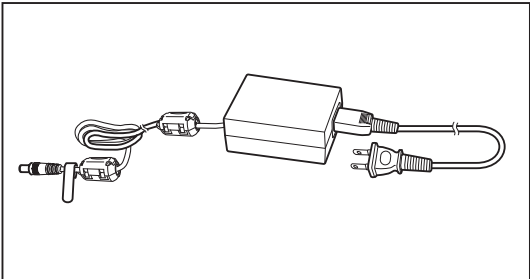
AC Adapter AC-A412 (ATS036T-A120)

Used to supply power from an AC outlet to the CF-300.

Input: 100 to 240 V ~ 50-60 Hz 1 A MAX

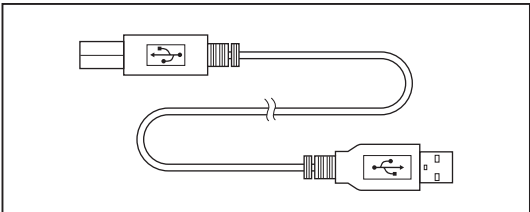
Output: 12 V $\overline{\text{---}}$ 3 A

Plug design: $\oplus \text{---} \ominus$ Center-negative



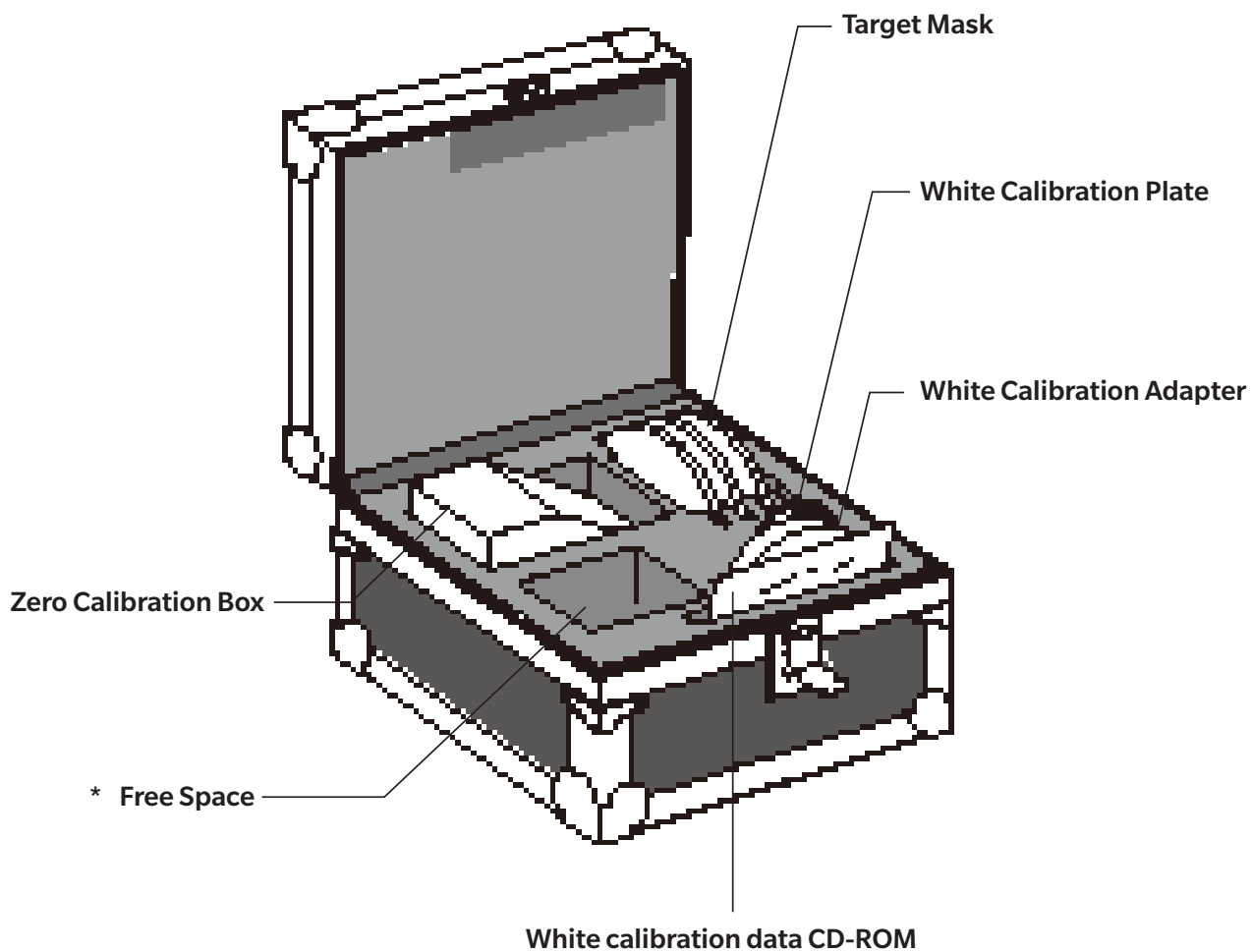
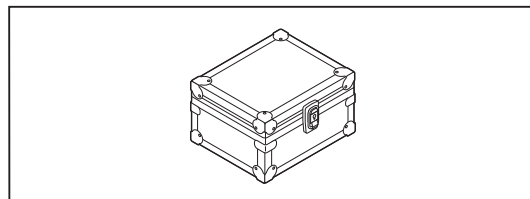
USB Cable (2 m) IF-A36

Used to connect the instrument to a PC.
The instrument is not powered by the PC when the two are connected.



Accessory Case CF-A25

Stows the target masks, zero calibration box, white calibration plate and other accessories.



■ Optional Accessories

Color Data Software SpectraMagic NX2

This software provides various functions (e.g., data processing and file management) and allows the user to operate the CF-300 using a personal computer.

You can get it on USB memory or download it from

<https://www.konicaminolta.com/instruments/download/software/color/smnx2/index.html>



Target Mask (Non-Contact) with Glass

Use to protect the inside of the specimen measuring port in an environment where the port inside may be damaged by e.g. dust particles.

Lighting area: 34 mm dia.

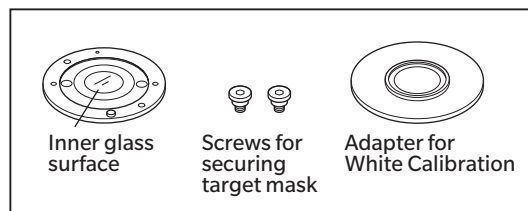
Measuring area: 8 mm dia. /0.75 x 1 mm

Memo

- Comes with two target mask fixing screws and a specific white calibration adaptor.
- When the glass protected target mask is not in use, keep the protective cap attached on the inner white painted area during storage.

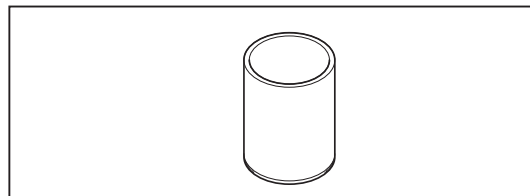
Note

- Use the glass protected target mask for color difference measurement.



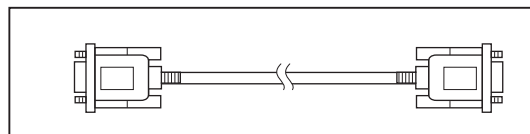
Zero Calibration Box (L:60 mm) CF-A37

Used to calibrate the zero-point for inline measurements.



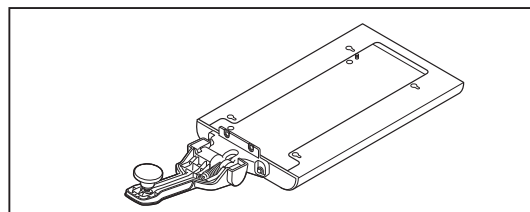
RS-232C Cable (2 m) IF-A12

Used to connect the instrument to a PC.



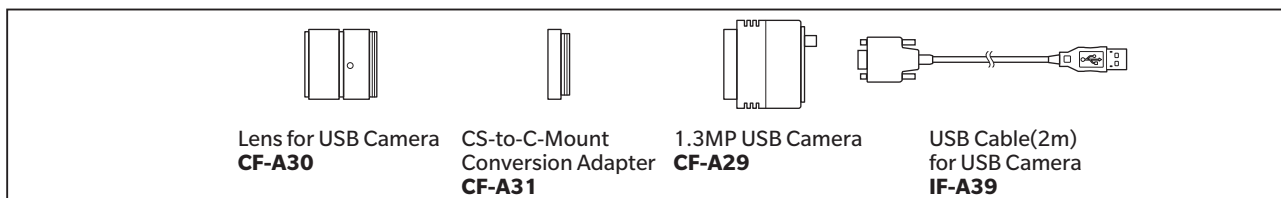
Benchtop Base CF-A26

Used to hold the white calibration plate and samples in standalone measurements.



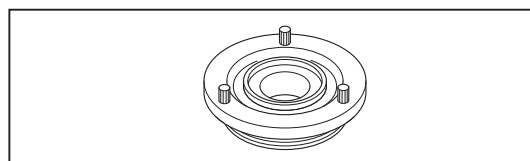
1.3MP USB Camera Set CF-A32

When a USB camera is mounted on the finder of the CF-300, the measurement target can be viewed on a PC.



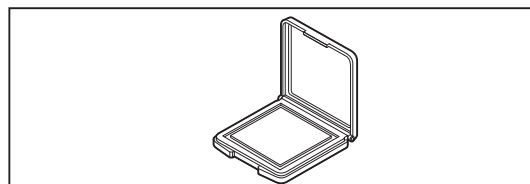
Camera Adapter CF-A27

Used to mount a USB camera on the instrument. The adapter fits between the camera and the instrument's finder.

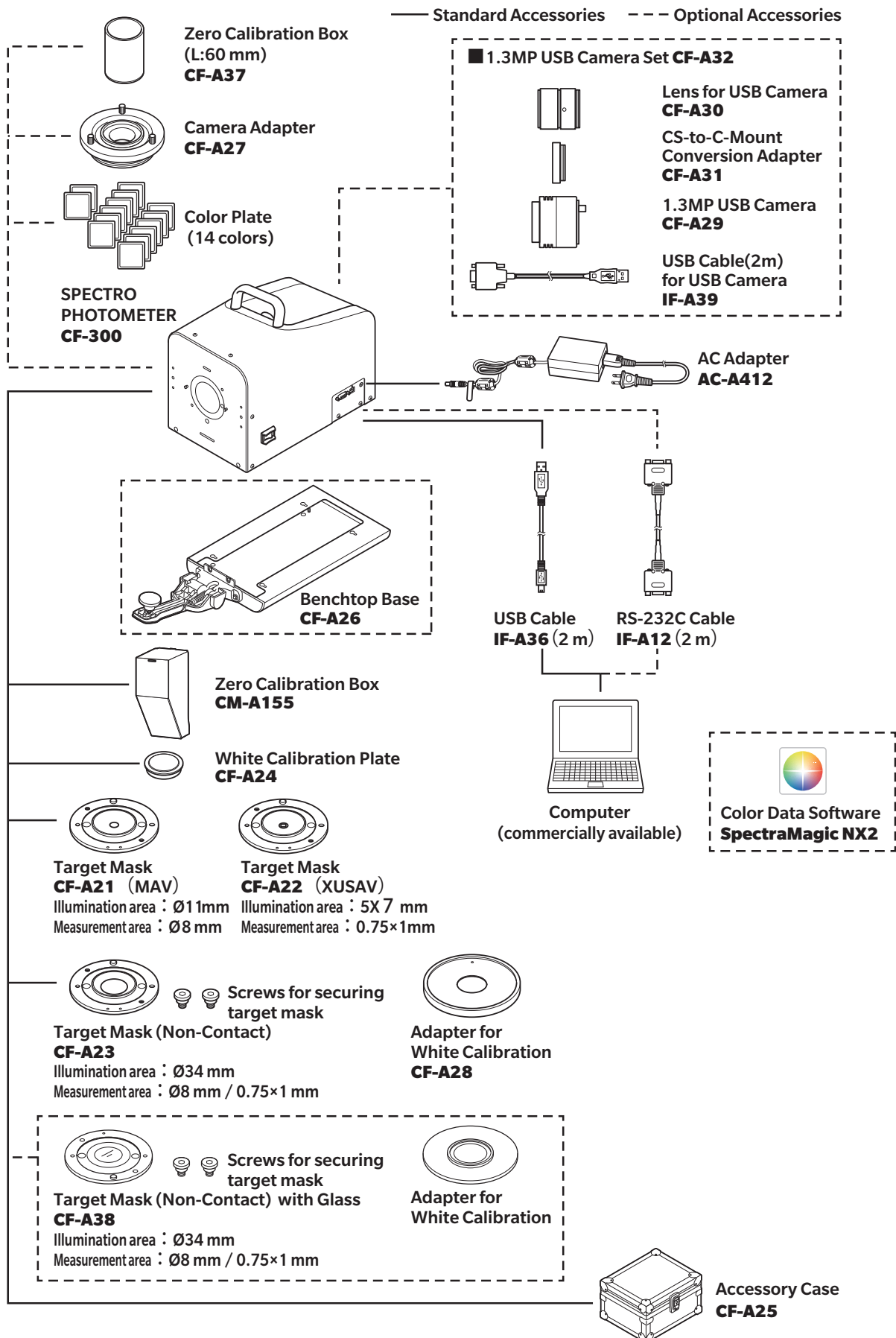


Color Plates (White, black, and 12 other colors)

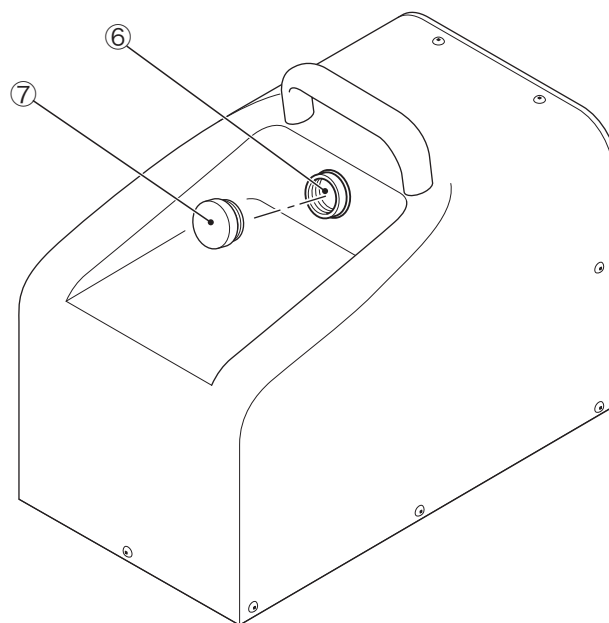
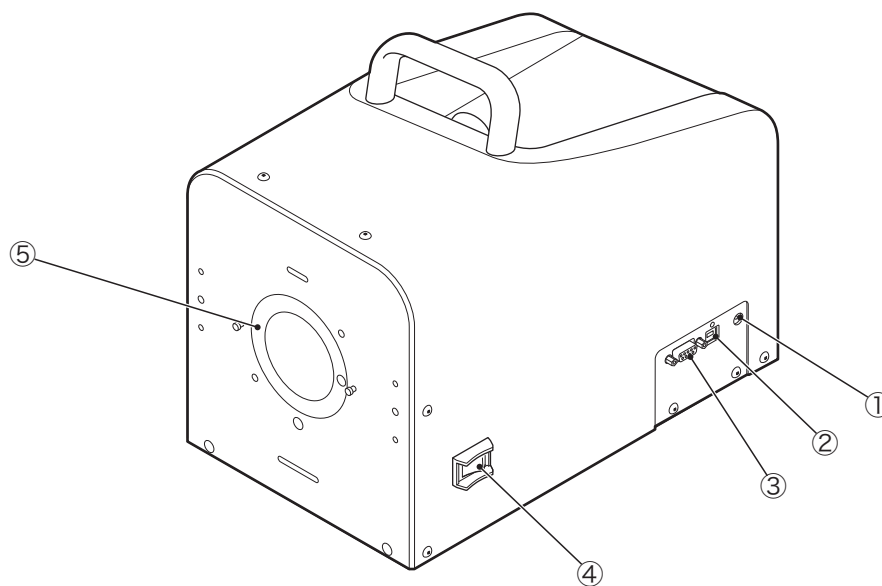
It is used for simple diagnosis of instrument measurement performance (instrumental error and repeatability).



System Diagram



Names and Functions of Parts

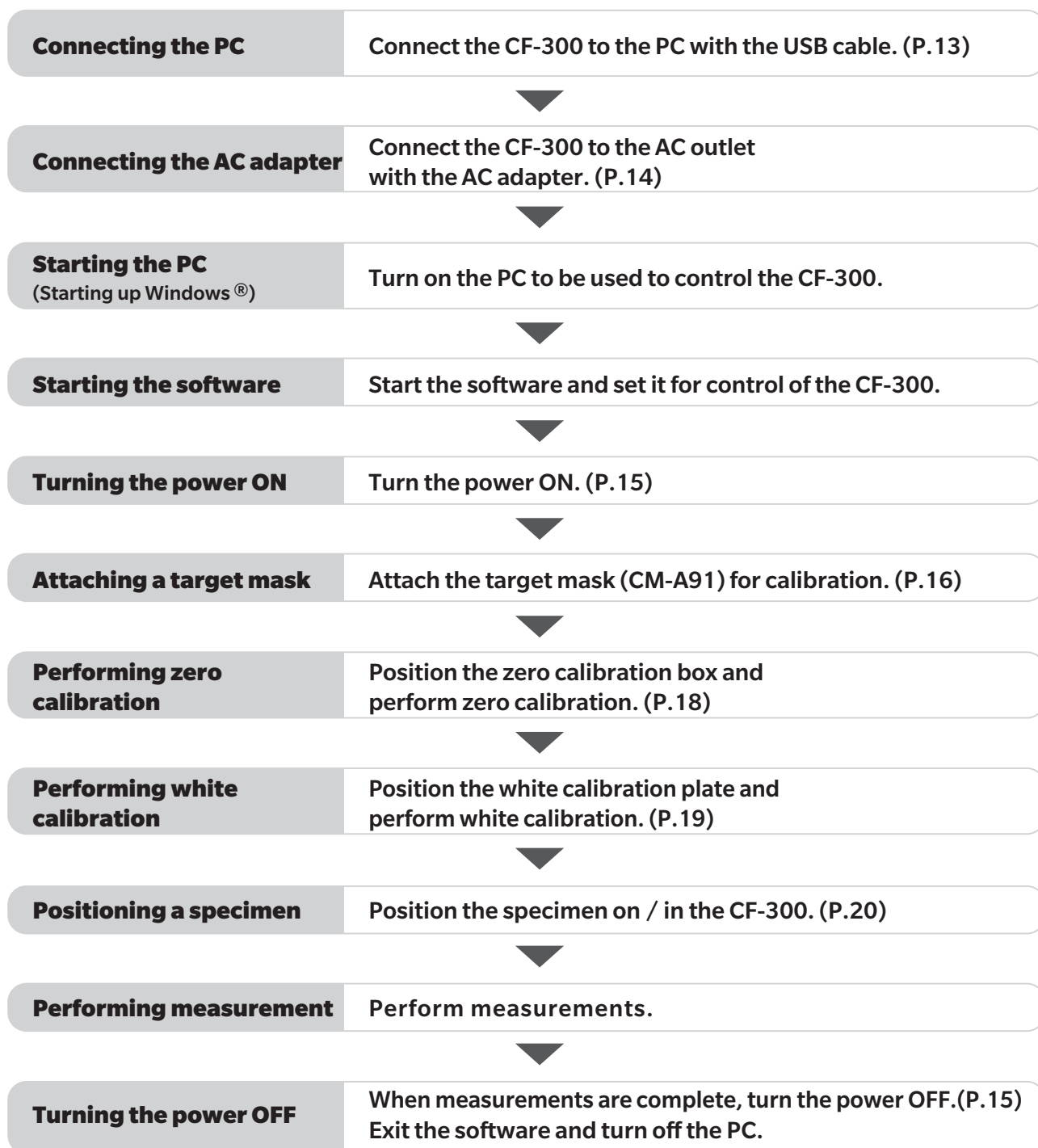


- ① AC adapter input socket..... Connects the included AC adapter to the instrument.
- ② USB port..... Connects the included USB cable to the instrument.
- ③ RS-232C port..... Connects the optional RS-232C cable to the instrument.
- ④ Power switch..... Turns power to the instrument ON (I)/OFF (O).
- ⑤ Target mask mount Mounts the target mask on the instrument. Select a target mask suited to the specimen that is to be measured.
- ⑥ Finder (Specimen viewing window) .. Allows users to view the measurement point on the specimen that is to be measured. A optional USB Camera Set CF-A32 can be mounted on the instrument here via the optional camera adaptor.
- ⑦ Finder cap Prevents dust from penetrating the finder when the finder is not being used.

Measurement Procedure

- This manual explains how to prepare the CF-300 and how to set a specimen.
- The CF-300 is controlled by a PC to perform measurements.
- For a description of measuring method using SpectraMagic NX2 (optional), refer to the SpectraMagic NX2 instruction manual.

■ Flow of Preparation and Measurement



Connecting a Personal Computer

The instrument is connected to a PC using either the included IF-A36 USB cable (2 m) or optional IF-A12 RS-232C cable (2m).

- Memo**
- To connect the instrument with a PC, it is recommended that you use software that enables connection and operation of the instrument (such as the optional Color Data Software SpectraMagic NX2).
 - The USB communication port of the instrument conforms to USB 2.0.
- To connect the instrument to a PC, you need to install the USB driver dedicated to the CF-300. Install the USB driver supplied with the software that enables connection and operation of the instrument.
 - The instrument is not designed to be powered via the USB cable. You need to connect the AC adapter.
 - Make sure that the USB connector plug is oriented correctly and connected securely.
 - When connecting/disconnecting the USB cable, be sure to hold the connector plug. Do not pull on or forcibly bend the cable. Otherwise, wire breakage may result.
 - Make sure that the cable has sufficient length. Putting tension on the cable may cause connection failure or wire breakage.
 - To connect the USB cable connector, check the shape of the receptacle (connection terminal) and insert the connector fully until it is secured.

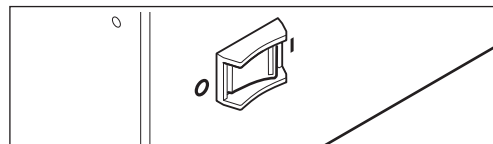
When using the optional RS-232C cable

- Screwing the connector to the port eliminates any worries of the cable disconnecting accidentally.
- Always turn power to this instrument and PC OFF before connecting the two.
- For RS-232C communications, connect this instrument to a PC using the optional RS-232C cable. Do not use a commercially available USB-serial converter cable or adapter.

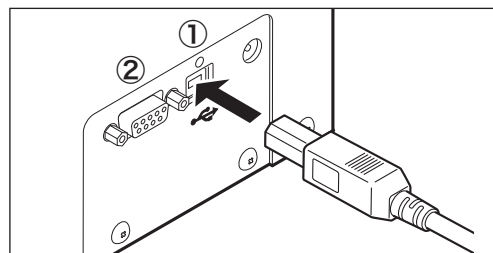
Operating Procedure

In general, a USB cable can be connected/disconnected while the instrument is turned ON; however, you need to turn OFF the instrument in the procedure below. See P.14 for how to connect the AC adapter and P.15 for how to switch the power on and off.

1. Turn OFF the instrument (Press the “○” side of the Power switch.).

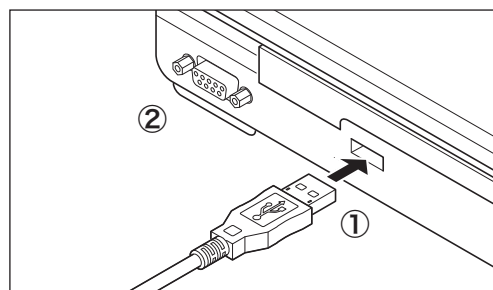


2. Connect the B connector of the USB cable to the USB port (B type) ① on the instrument. If using the optional RS-232C cable, connect the cable to ②.



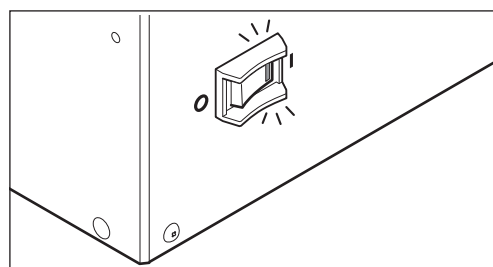
- Fully insert the connector and ensure secure connection.

3. Connect the A connector of the USB cable to the USB port ① on the PC. If using the optional IF-A12 RS-232C cable, connect the cable to ②.



4. Connect the AC adapter and turn ON the instrument (Press the “I” side of the Power switch.).

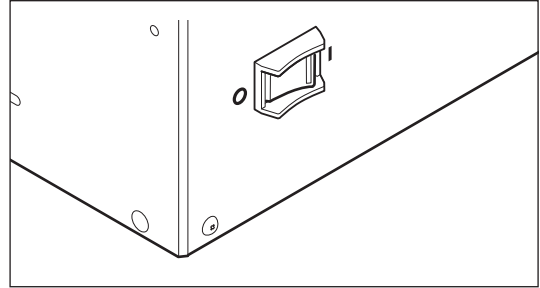
- When you are prompted to install the USB driver, specify the USB driver included with the software or the white calibration data CD and complete the installation.
- When using the optional Color Data Software SpectraMagic NX2, refer to the SpectraMagic NX2 Installation Guide.
- After installation of the USB driver has finished, switch the instrument off for a few seconds and then switch it back on.



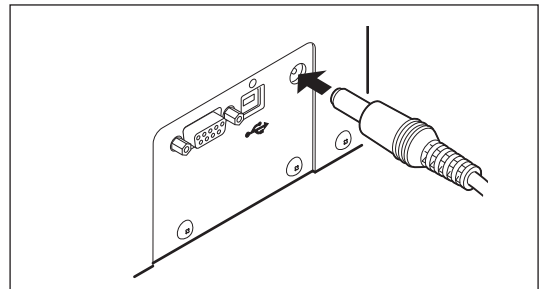
Connecting the AC Adapter

Connecting Procedure

- 1. Make sure that the power switches of both CF-300 and host PC are set to OFF ("O").**



- 2. Insert the output plug of the AC adapter into the AC adapter input socket on the rear of the CF-300.**

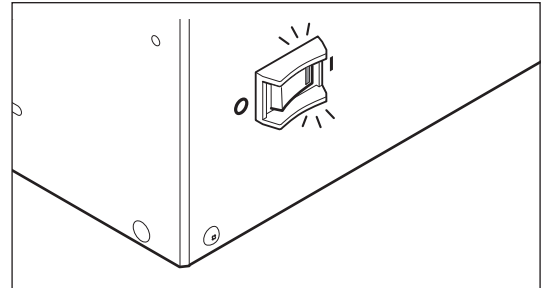


- 3. Insert the input plug of the AC adapter into an AC wall outlet.**
 - The AC Adapter AC-A412 supplied as the standard accessory must be used.
 - Before disconnecting the AC adapter, the power switch must be set to OFF ("O").

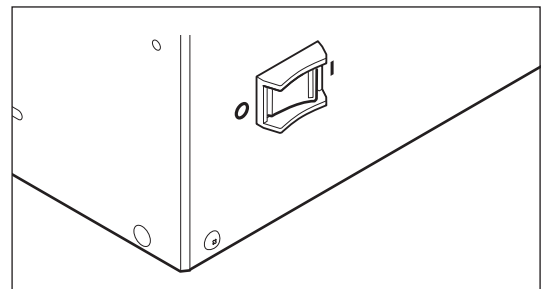
Turning Power ON and OFF

Procedure

1. To turn the power ON and to light the lamp on the power switch, set the power switch to ON ("I").



2. To turn the power OFF, set the power switch to OFF ("O").



Attaching a Target Mask

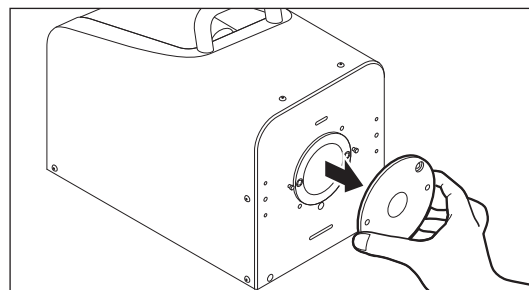
The CF-300 allows you to select a target mask according to the specimen and your application.

Memo Use the same target mask that you are using or plan to use in measurements when calibrating the instrument's zero-point and white sensitivity.

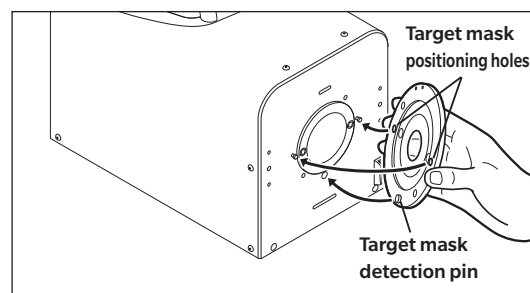
Procedure

- 1. Position the instrument so as to pull the currently attached target mask to the front and detach the mask.**

Memo The target mask attaches to the instrument by way of a magnet.



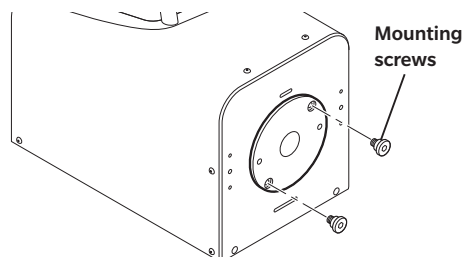
- 2. With target mask detection pin downward, align it with the main body hole, align the positioning holes on the target mask with the target mask positioning pins on the instrument, and attach the target mask to the instrument.**



Note

When using the instrument by incorporating it into equipment, secure the target mask to the instrument in two places with the target mask mounting screw.

Memo Tighten the screws with a 2 mm hex key.



■ Notes on Use of Target Mask

- Do not touch, stain or scratch the inner surface (white painted area) of the target masks.
- Take care to avoid scratching the target mask detection pin on the inner surface (white-coated surface) of the target mask or getting it dirty.
- The target masks may become discolored if left in areas exposed to light. Therefore, make sure that target masks which are currently not in use are kept inside the accessory case (CF-A25) to prevent exposure to light.
- When not using the CF-300, attach one of the target masks or the protective cap to prevent dust from entering the integrating sphere.
- Take care not to leave the CF-300 for a long period of time with a target mask attached. The sample holder may stick to the target mask.
- If there is dust on the inner glass surface of the glass protected target mask, blow it off with a blower.
- Never touch the inner white painted area and the glass of the glass protected target mask. If the area and/or the glass get dirty or scratched, buy a new mask for replacement.

Calibration

■ Calibration for Reflectance Measurements

After the Spectrophotometer has been switched on, zero calibration and white calibration must be performed before spectral reflectance measurements are taken. Zero calibration is performed using the Zero Calibration Box (which has a reflectance of 0%) to set the zero reference point for reflectance measurements; white calibration is performed using a white calibration plate (which has a reflectance of approximately 100% and for which spectral reflectance data are provided as white calibration data) to set a high-reflectance reference point for reflectance measurements.

■ White calibration data

The white calibration data of the white calibration plate are determined before shipping from the factory and set in the instrument at the time of purchase.

■ Performing calibration

If it is switched off and then switched on again, both zero calibration and white calibration must be performed before measurements are taken.

Also, zero calibration and white calibration must be performed under the same conditions as will be used for measurements.

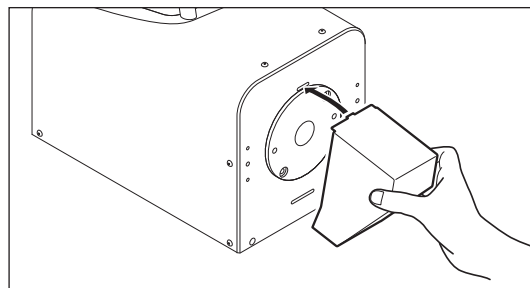
- The instrument can be calibrated for 8 separate sets of measurement conditions, so if wanting to alternate between SCI and SCE measurements or conduct sequential measurements in different measurement areas, calibrating the instrument's zero-point and white sensitivity for all of the different sets of measurement conditions in advance eliminates the need to recalibrate the instrument every time measurement conditions are changed. However, for more accurate results, it is recommended to calibrate the instrument's zero-point and white sensitivity every time measurement conditions are changed.
- If the instrument is recalibrated for the same measurement conditions as previously conducted measurements, the recalibrated settings remain in effect because they are the most recent.
- Due to temperature changes in the surrounding environment and heat generation caused by repeated applications, the indicated values may subtly deviate, but if the calibration is regularly performed, the measurement accuracy will improve.

Attaching the Zero Calibration Box

- Attach the target mask that is to be used in measurements to the instrument before performing calibration.

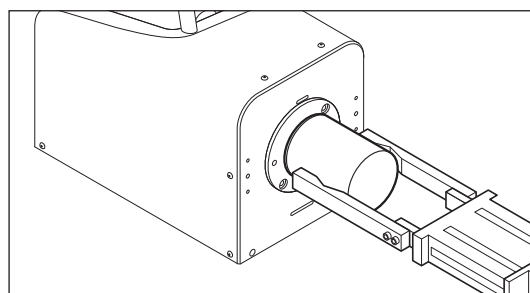
Procedure

- 1. Fit the projections on the zero calibration box into the recesses in the instrument, and press the zero calibration box flush against the instrument with your hand.**



<For inline measurement>

Facing the groove of the zero calibration box CF-A37 (60 mm length) to the CF-300, cover the port while aligning the center of the target mask attached to the CF-300 with that of the zero calibration box.



■ Notes on Use of Zero Calibration Box

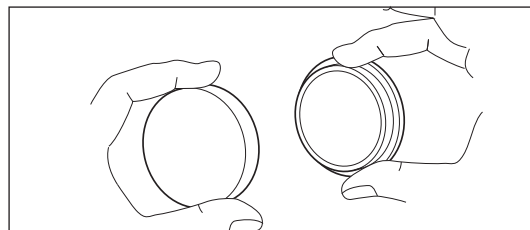
- Take care not to scratch, touch, or make the inside of the zero calibration box dirty with such as fingerprints.
- If the inside of the zero calibration box gets dirty, wipe it with a soft, clean, dry cloth.
- If dirt is difficult to remove, dampen a cloth with commercially available lens cleaning liquid and wipe the zero calibration box. Then wipe off the liquid with a cloth dampened with water, and leave the box to dry.
- Should the inside of the zero calibration box get so dirty that it cannot be cleaned, replace the box with a new one.

Attaching the White Calibration Plate

- Attach the target mask that is to be used in measurements to the instrument before performing calibration.

Procedure

1. Remove the cap from the white calibration plate.



2. <For contact measurements>

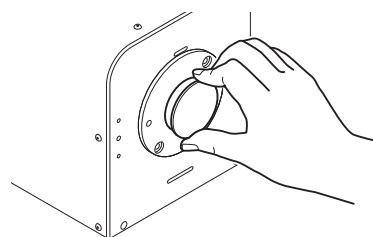
Press the white calibration plate flush against the instrument with your hand so that it covers the measurement side of the target mask.

<For noncontact measurements>

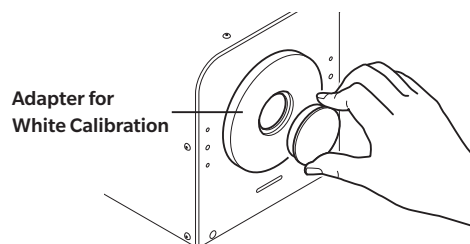
Attach the white calibration adapter over the target mask, then fit the white calibration plate into the specimen measuring port of the adapter with the white side of the white calibration plate facing inward (towards the CF-300) and press it into the hole with your hand.

- Memo**
- Do not forget to attach the white calibration adapter.
 - Use the white calibration adaptor suited to the target mask used, according to the following combinations.
 - Be careful not to move the white calibration plate when calibrating the instrument's white sensitivity.

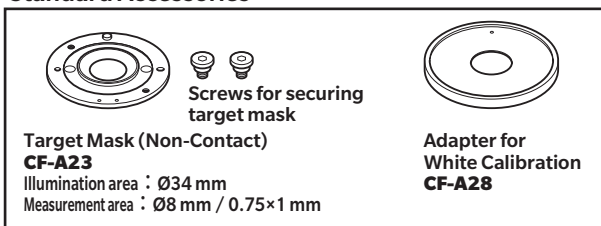
<For contact measurements>



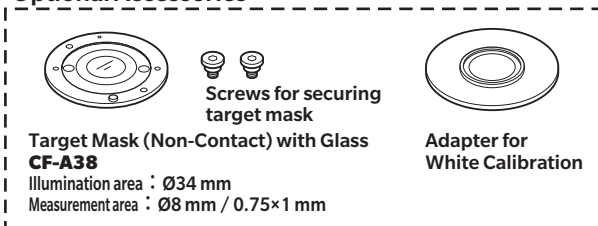
<For noncontact measurements>



Standard Accessories



Optional Accessories



■ Notes on Use of White Calibration Plate

- Memo**
- When performing white calibration, the white calibration data for the white calibration plate being used is required. The white calibration data for the white calibration plate included with the instrument is stored in the instrument's memory at the time of shipment.

- The white calibration plate may become discolored if left exposed to light. Therefore, when not in use, make sure that the lid is closed to prevent exposure to light.
- Take care not to scratch, touch, or make the white calibration plate surface dirty with such as fingerprints.
- If the white calibration plate gets dirty, wipe it with a soft, clean, dry cloth.
- If dirt is difficult to remove, dampen a cloth with commercially available lens cleaning liquid and wipe the white calibration plate. Then wipe off the liquid with a cloth dampened with water, and leave the plate to dry. Should the white calibration plate get so dirty that it cannot be cleaned, replace the plate with a new one. If the White Calibration Plate is changed, reset the white calibration data to the new plate's.

■ Updating White Calibration Data

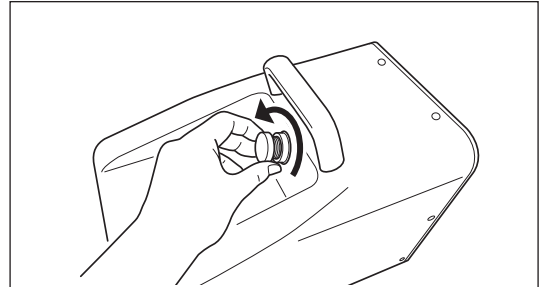
- You may use the "Data Setting Tool software" stored on the CD-ROM accompanying White Calibration Plate CM-A24 or the optional Color Data Software SpectraMagic NX2 to set the white calibration data.

Setting a Specimen

- Attach the target mask that is to be used in measurements to the instrument before performing calibration.

Procedure

1. Remove the finder cap.

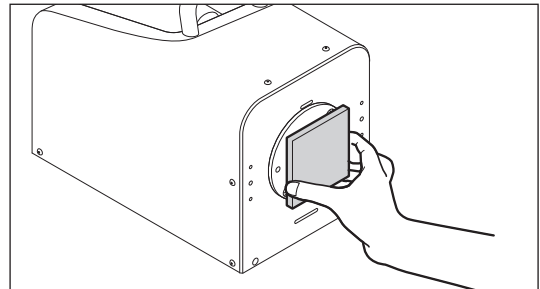


2. <For contact measurements>

Face the part of the specimen that is to be measured towards the instrument and press it flush against the instrument with your hand so that it covers the specimen measuring port.

<For noncontact measurements>

Face the part of the specimen that is to be measured towards the instrument and immobilize it 1 mm (0.7 mm when using the glass protected target mask) from the specimen measuring port so that it covers the specimen measuring port.

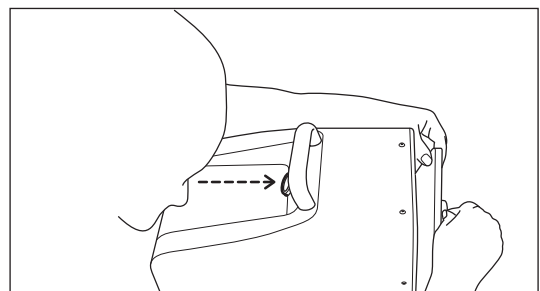


Note

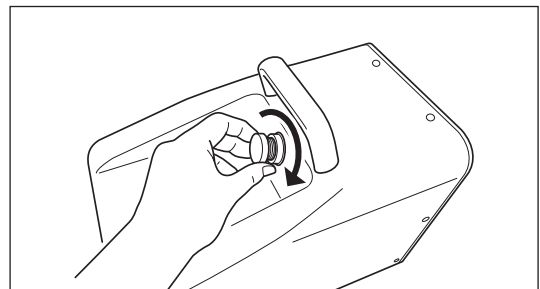
- The above specified distance may vary ± 0.15 mm.
- Do not remove the glass protected target mask from the CF-300 while measuring.

3. Look into the finder to verify that the measurement point is properly positioned for measurement.

Memo If using the optional SpectraMagic NX2, the pointer LED can be used to verify that the measurement point is properly positioned for measurement.



4. Attach the finder cap.



Attaching/Detaching the Benchtop Base (Optional)

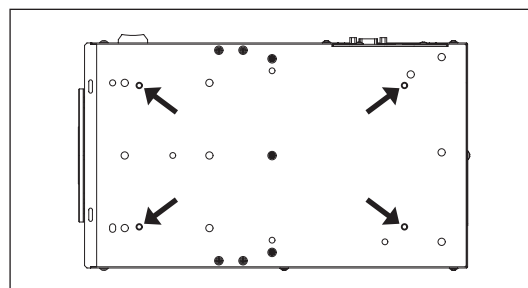
Note

- The sample holder is positioned to ensure proper measurement before leaving the factory. For that reason, never detach the sample holder.
- If the sample holder is detached by mistake, contact the nearest Konica Minolta-authorized service facility. The sample holder requires repositioning by the manufacturer.

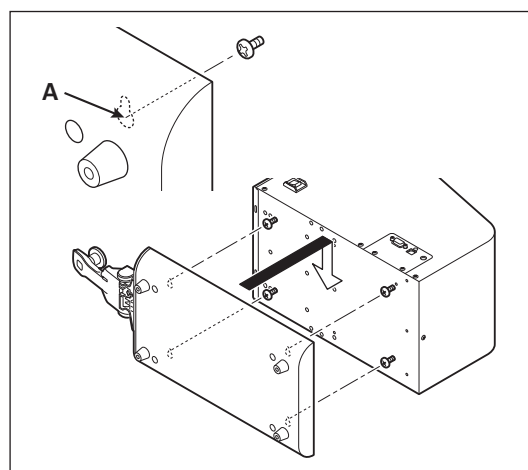
Memo Before attaching or detaching the benchtop base, unplug the AC adaptor and cables from the instrument.

■ Attaching the Benchtop Base

- 1. Loosely install the included screws in the four screw holes on the bottom of the instrument indicated by arrows at right.**
(Leave a gap of 2 to 3 mm between the screw head and the bottom)



- 2. Slide the four mounting holes (A) of the benchtop base over the heads of the screws and shift the base in the direction of the arrow.**

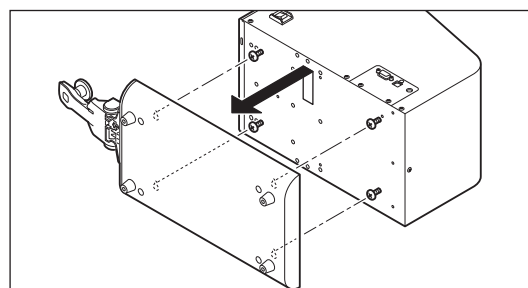


- 3. Fully tighten the the 4 screws.**

■ Detaching the Benchtop Base

- 1. Loosen the 4 screws that lock the benchtop base to the instrument.**
- 2. Lift the bench top base upward in the direction of the arrow in the figure, and then pull the bench top base straight away from the instrument to detach it. Remove the 4 screws remaining in the instrument.**

Memo Stow the removed screws inside the carrying case etc. so that they do not become lost.



Attaching the Zero Calibration Box

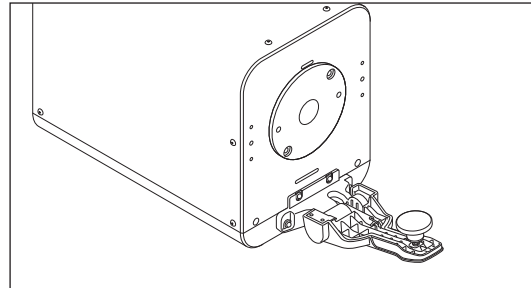
(When using the benchtop base)

The zero calibration box is used to perform zero calibration for measurement of reflectance.

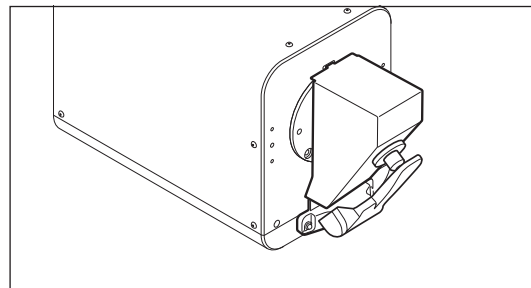
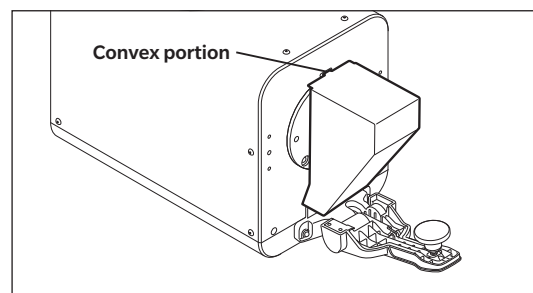
- Before performing zero calibration, attach the target mask for calibration.

Procedure

- 1. Pull the sample holder toward you and keep it open.**



- 2. Fit the projections of the zero calibration box into the grooves on the CF-300 and then close the sample holder to hold the box in place.**



■ Notes on Use of Zero Calibration Box

- Take care not to scratch, touch, or make the inside of the zero calibration box dirty with such as fingerprints.
- If the inside of the zero calibration box gets dirty, wipe it with a soft, clean, dry cloth.
- If dirt is difficult to remove, dampen a cloth with commercially available lens cleaning liquid and wipe the zero calibration box. Then wipe off the liquid with a cloth dampened with water, and leave the box to dry.
- Should the inside of the zero calibration box get so dirty that it cannot be cleaned, replace the box with a new one.

Attaching the White Calibration Plate

(When using the benchtop base)

The white calibration plate is used to perform white calibration for measurement of reflectance.

- Before performing white calibration, attach the target mask for calibration.

Procedure

1. Remove the cap from the white calibration plate.

2. <For contact measurements>

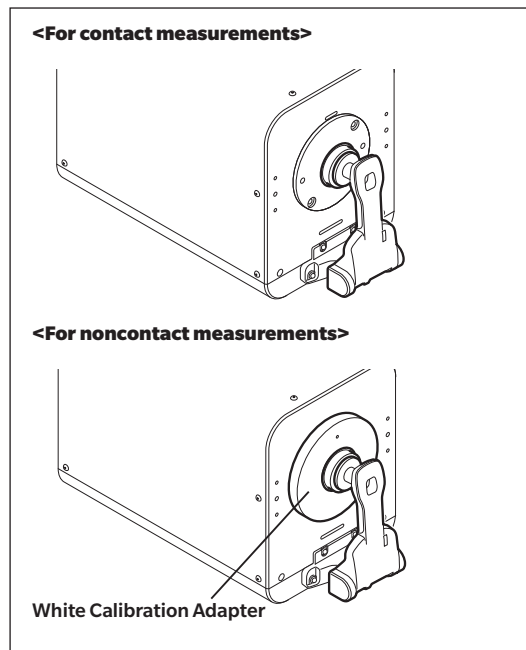
Press the white calibration plate flush against the instrument with the sample holder fit into the groove on the backside of the white calibration plate.

<For noncontact measurements>

Attach the white calibration adapter over the target mask, then press the white calibration plate flush against the instrument with the sample holder by fitting the holder into the recess on the backside of the white calibration plate.

Memo

- Do not forget to attach the white calibration adapter.
- Be careful not to move the white calibration plate when calibrating the instrument's white sensitivity.



■ Notes on Use of White Calibration Plate

Memo

- When performing white calibration, the white calibration data for the white calibration plate being used is required. The white calibration data for the white calibration plate included with the instrument is stored in the instrument's memory at the time of shipment.
- The white calibration plate may become discolored if left exposed to light. Therefore, when not in use, make sure that the lid is closed to prevent exposure to light.
- Take care not to scratch, touch, or make the white calibration plate surface dirty with such as fingerprints.
- If the white calibration plate gets dirty, wipe it with a soft, clean, dry cloth.
- If dirt is difficult to remove, dampen a cloth with commercially available lens cleaning liquid and wipe the white calibration plate. Then wipe off the liquid with a cloth dampened with water, and leave the plate to dry. Should the white calibration plate get so dirty that it cannot be cleaned, replace the plate with a new one. If the White Calibration Plate is changed, reset the white calibration data to the new plate's.

■ Updating White Calibration Data

- You may use the "Data Setting Tool software" stored on the CD-ROM accompanying White Calibration Plate CM-A24 or the optional Color Data Software SpectraMagic NX2 to set the white calibration data.

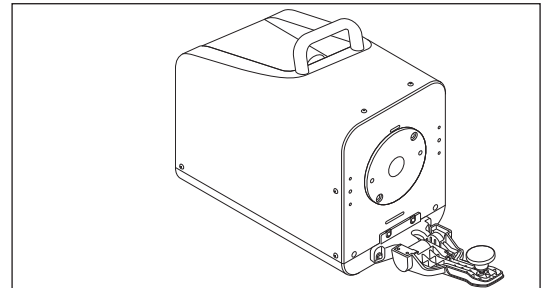
Setting a Specimen (When using the benchtop base)

■ Reflectance measurement

- Before starting reflectance measurements, attach the target mask to be used for measurements

Procedure

1. Pull the sample holder to the front and hold it in the extended posture.



2. <For contact measurements>

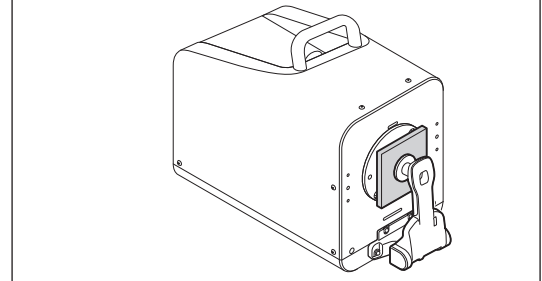
Clasp a specimen in the sample holder.

<For noncontact measurements>

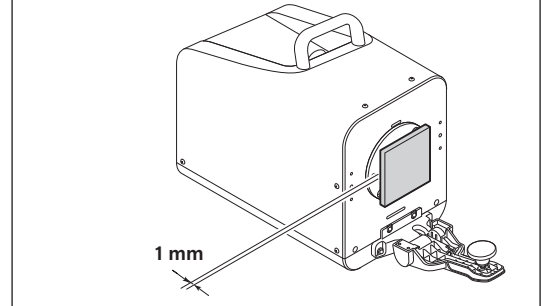
Pull the sample holder to the front and hold it in the extended posture.

Face the part of the specimen that is to be measured towards the instrument and immobilize it 1 mm from the specimen measuring port so that it covers the specimen measuring port.

<For contact measurements>

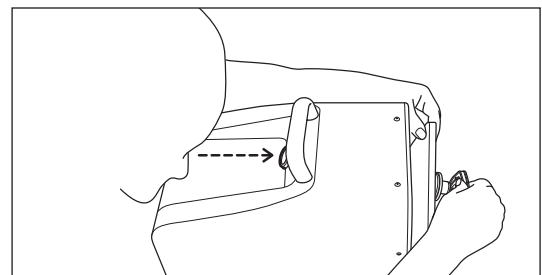


<For noncontact measurements>



3. Remove the finder cap and look into the finder to verify that the measurement point is properly positioned for measurement.

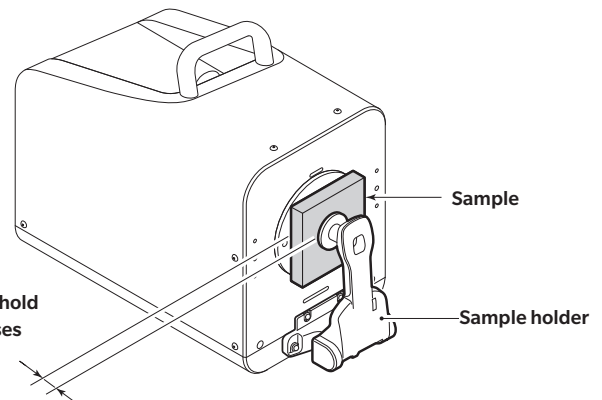
Memo If using the optional SpectraMagic NX2, the pointer LED can be used to verify that the measurement point is properly positioned for measurement.



■ The sample holder for measuring the reflectance

To measure the reflectance of film or plate-like specimens, clasp the specimen in the sample holder. When measuring specimens that cannot be clasped in the specimen holder, detach both the specimen holder and the benchtop base, and position the specimen flush against the specimen measuring port.

The sample holder can hold samples with thicknesses up to 30 mm.



Cleaning the CF-300 and Accessories

■ Zero Calibration Box and White Calibration Plate

Wipe gently with a dry soft cloth. If dirt is difficult to remove, dampen a cloth with commercially available lens cleaning liquid and wipe. Then wipe off the liquid with a cloth dampened with water, and leave it to dry.

- When cleaning, take care not to scratch the zero calibration box or white calibration plate.

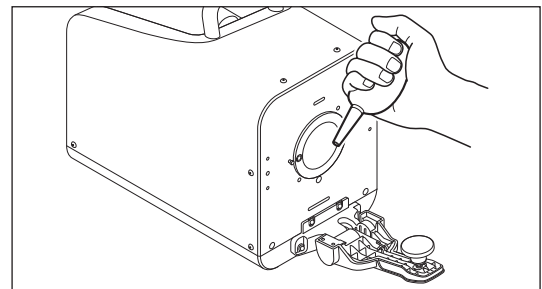
■ Target Mask

Use a blower to remove dirt and dust from the target masks.

- Do not touch the inner surface (white painted area) of the target masks or wipe it with a cloth. If it gets so dirty that it cannot be cleaned, contact the nearest Konica Minolta-authorized service facility.
- If there is dust on the glass of the glass protected target mask, remove the mask from the CF-300 and blow the dust off with a blower. Then do not touch the inner surface (white painted area) of the mask.
- Should the inner or outer glass surface of the glass protected target mask get so dirty that it cannot be cleaned, buy a new mask to replace it.
- Do not allow the outer glass surface of the glass protected target mask to get scratched or stained with e.g. fingerprints.
- If the outer glass surface of the glass protected target mask becomes dirty, wipe it with a soft, clean dry cloth.
- If dirt on the outer surface of the glass protected target mask is difficult to remove, wipe it off with a cloth dampened with a commercially available lens cleaning solution, remove the solution with a cloth dampened with water, and allow the mask to dry.

■ Inside Integrating Sphere

- 1. Set the specular component to SCI using the software.**
- 2. Remove the target mask and protective cap, then blow dust and dirt from the integrating sphere opening with a blower.**
 - Do not touch the white-coated inner surface of the integrating sphere, wipe it with a cloth or place any object against it. If the white-coated surface gets so dirty that dirt cannot be removed using a blower, contact the nearest Konica Minolta-authorized service facility.



Error message

The following error messages may appear when you use SpectraMagic NX2, optional Color Data Software, to control the instrument.

If you see an error message, follow the instructions shown in the table below. If a problem persists, contact the nearest Konica Minolta-authorized service facility.

Event	Displayed message	Presumed cause	Remedial action
Warning	The instrument's place of use is outside of the instrument's working temperature range.	Instrument reliability has decreased because the temperature in the place of use is outside the specified working temperature range.	Restore the place of use to the working temperature range.
	Calibration is recommended.	The temperature in the place of use changed after the instrument's white sensitivity was calibrated. Or, a set amount of time has passed since the last time that the instrument's white sensitivity was calibrated.	Recalibrate the instrument's white sensitivity.
	Periodic servicing is recommended.	It is time for the instrument's periodic servicing.	It is time for regular servicing, contact the nearest Konica Minolta-authorized service facility.
	The intensity of the instrument's light source has dropped.	The intensity of the LED light source is 50% or less than it was when the instrument was shipped from the factory. • Failing LED light source • Dirty integrating sphere	Clean the integrating sphere as explained in "Cleaning the Instrument and Accessories" on pg. 26. If the problem does not improve, contact the nearest Konica Minolta-authorized service facility.

Event	Displayed message	Presumed cause	Remedial action
Error	Memory error	Something is wrong with the instrument's memory.	Turn power to the instrument OFF, then back ON. If this error message does not clear, contact the nearest Konica Minolta-authorized service facility.
	Light receiving circuit error	The light receiving circuit is not working properly.	Turn power to the instrument OFF, then back ON. If this error message does not clear, contact the nearest Konica Minolta-authorized service facility.
	Light emitting circuit error	The light emitting circuit is not working properly.	Turn power to the instrument OFF, then back ON. If this error message does not clear, contact the nearest Konica Minolta-authorized service facility.
	Drive unit error	The measurements, SCI/SCE changeover or LED pointer drive unit is not working properly.	Turn power to the instrument OFF, then back ON. If this error message does not clear, contact the nearest Konica Minolta-authorized service facility.
	Perform calibration in the proper sequence.	Calibration was not performed in the proper sequence. An appropriate count is not indicated for either zero-point or white sensitivity calibration.	Calibrate the instrument's zero-point using the included zero calibration box, and the instrument's white sensitivity using the included white calibration plate.
	The instrument's zero-point has not been calibrated.	The instrument's zero-point has not been calibrated.	Calibrate the instrument's zero-point.
	White calibration was not performed.	The instrument's white sensitivity has not been calibrated.	Calibrate the instrument's white sensitivity.
	Calibration data has not been set.	White calibration data has not been written.	Write calibration data in the instrument.
	The target mask is not fit for the specimen.	An unsuited target mask is attached to the instrument. Or, a target mask has not been attached to the instrument.	Attach the correct target mask.
	The instrument is communicating with another host.	Another application is already connected to the instrument.	Disconnect the instrument from the current application and connect it to SpectraMagic NX2.
	The instrument is not responding.	Communication with the instrument failed. • Power to the instrument is OFF. • The wrong COM port has been set. • The wrong communication conditions are set.	Turn power to the instrument ON. Check the COM port and communication conditions, and set the proper conditions.

TROUBLESHOOTING GUIDE

If a problem occurs with the Spectrophotometer, please check the following points before requesting service. If the problem continues to occur even after the suggested corrective actions have been taken, contact the nearest Konica Minolta-authorized service facility.

Condition	Checkpoint	Recommended action	Refer to page
The instrument is producing abnormal measurement results.	Is the specimen set in the proper position?	Open the finder, check the measurement point and set the specimen in the correct position.	20
	Is the white calibration data wrong?	Set the correct white calibration data.	19
	Was the instrument's white sensitivity calibrated properly?	Properly attach the white calibration plate and calibrate the instrument's white sensitivity.	19
	Was the instrument's zero-point calibrated properly?	Properly attach the white calibration box and calibrate the instrument's zero-point.	18
The instrument is producing inconsistent measurement results.	Did either the instrument or specimen move during measurement?	Do not move the instrument or specimen during measurement.	—
Data cannot be input from the instrument to the PC. The instrument does not accept commands from the PC at all or does not properly accept commands from the PC.	Is the USB cable or RS-232C cable connected properly? Is the cable being used the standard accessory USB cable or the optional accessory RS - 232C cable?	Properly connect the USB port on the instrument with the USB port on the PC using the USB cable that came with the instrument. Properly connect the RS port on the instrument with the RS port on the PC using the specified optional RS-232C cable.	13



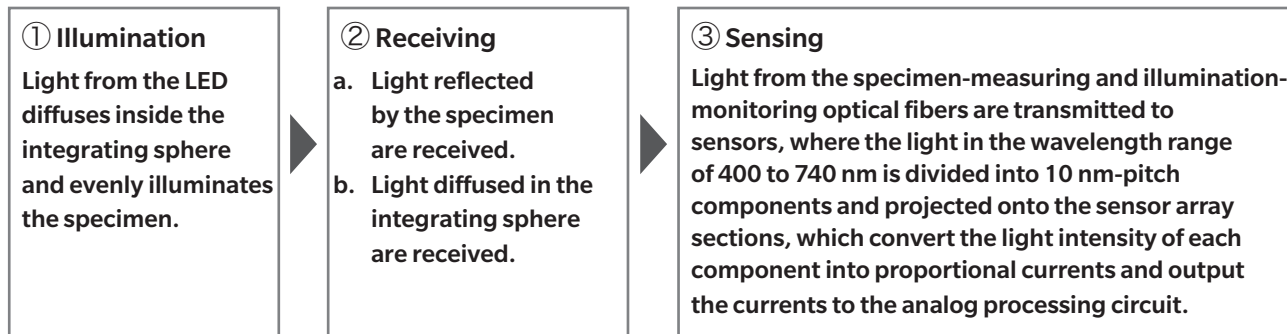
Explanations

Illumination/Viewing System

■ Measuring Reflected Colors

The flow of measurement is shown below.

The geometry of the CF-300 conforms to ISO 7724/1 and JIS Z 8722 condition c (diffused illumination/perpendicular viewing system) standards, and offers both di:8° (SCI: specular component included ; Total reflectance) and de:8° (SCE: specular component excluded ; Diffuse reflectance) measurements. (SCI/SCE switchable)

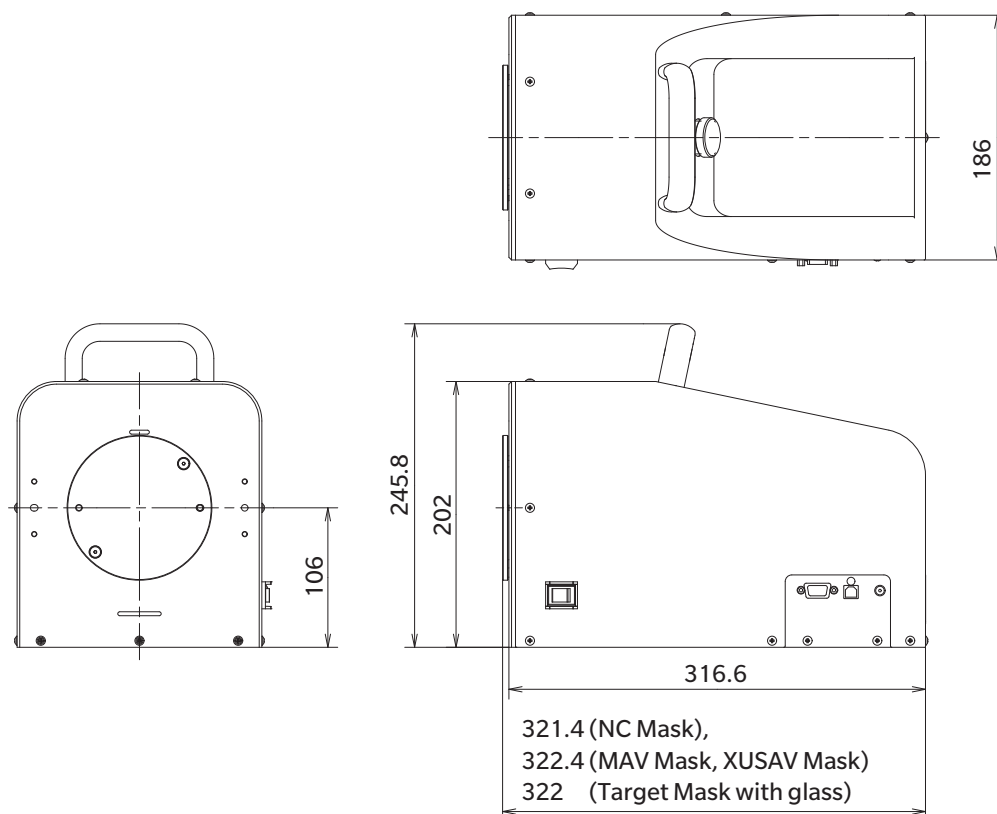


- ① Light from the LED diffuses inside the integrating sphere by reflecting off the internal walls, and evenly illuminates the specimen's surface.
- ②
 - a. The light reflected by the specimen surface at an angle of 8° to the normal to the surface is received by the specimen-measuring optical system and guided to the sensor.
 - b. The diffused light in the integrating chamber is received by the illumination-monitoring optical fiber and guided to the sensor.
- ③ The light from the specimen-measuring optical fiber and from the illumination-monitoring optical fiber is divided into each wavelength component and projected onto the sensor array sections, which convert the light into proportional currents and output the currents to the analog processing circuit.

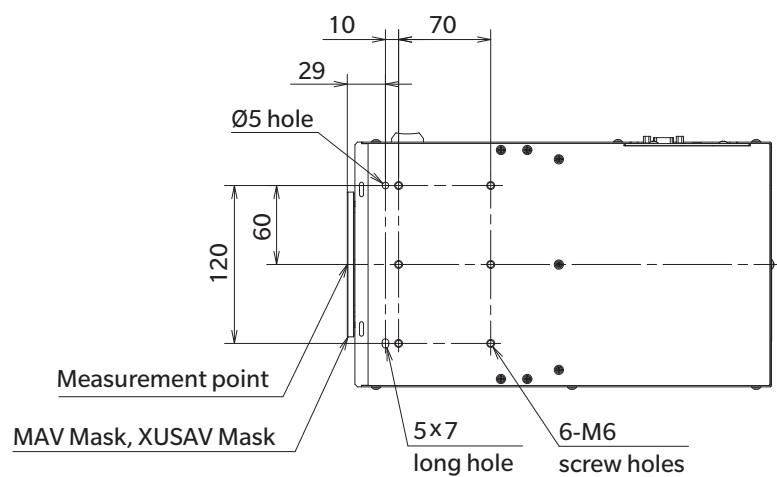
Memo By using the outputs from the specimen-measuring sensor and the illumination-monitoring sensor for calculations, compensation for slight differences in the spectral characteristics and intensity of the illumination light is performed (double-beam system).

Dimensions

(Unit: mm)

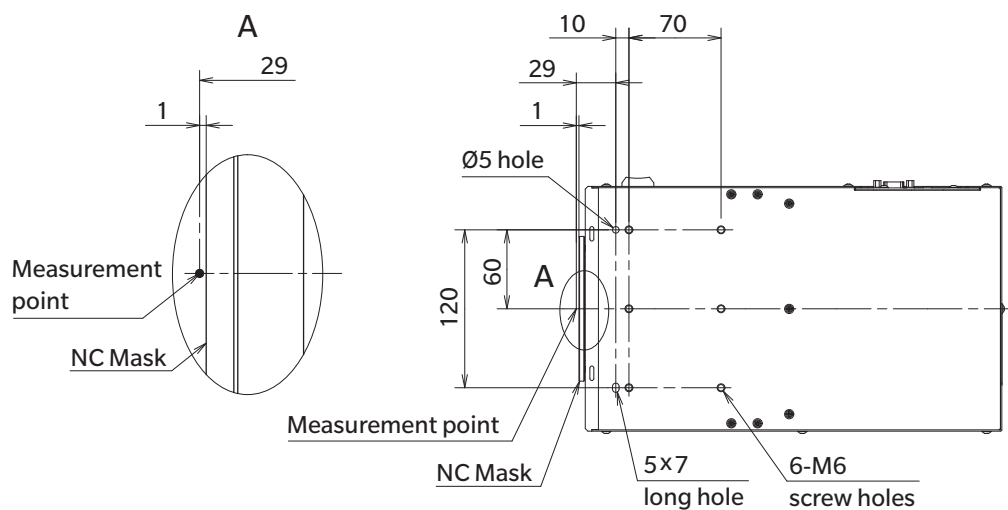


Contact measurement (when using the target mask CF-A21 or CF-A22)

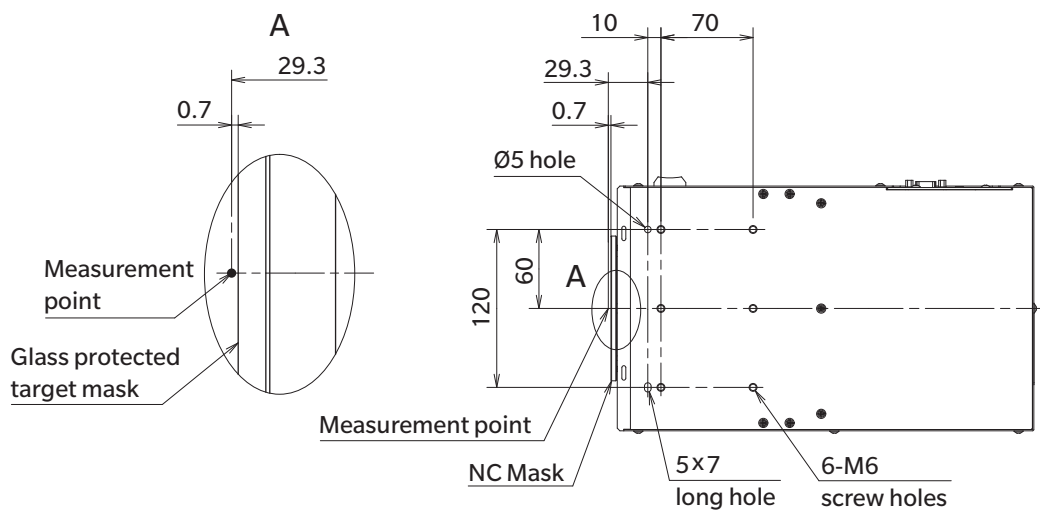


(Unit: mm)

**Non-contact measurement
(When using the Target Mask CF-A23)**



**Non-contact measurement
(When using the Target Mask with glass CF-A38)**



Specifications

Model	Spectrophotometer CF-300						
Illumination/ viewing system	di:8°, de:8° (diffuse illumination: 8° viewing)						
	SCI (specular component included)/SCE (specular component excluded) switchable						
	Conforms to JIS Z 8722 condition c, ISO 7724/1						
Integrating sphere size	Ø152 mm						
Detector	Dual 40-element silicon photodiode arrays						
Spectral separation device	Planar diffraction grating						
Wavelength range	400 to 700 nm						
Wavelength pitch	10 nm						
Measurement range	0 to 175%; Output/display resolution: 0.01%						
Light source	High-CRI white LED						
Illumination area	MAV	φ 11 mm	XUSAV	5×7 mm	NC/NC with glass (Non-contact measurement)	φ 34 mm	
Measurement area		φ 8 mm		0.75×1 mm		φ 8 mm	0.75×1 mm
Measurement distance	Contact measurements (MAV/XUSAV target mask): 0.0 mm Non-contact measurements (NC target mask): 1.0 mm Non-contact measurements (NC target mask with glass): 0.7 mm						
Measurement time	Approx. 0.1 seconds						
Minimum measurement interval	Approx. 0.2 seconds						
Repeatability	Chromaticity value: Standard deviation within ΔE*ab 0.02 (When MAV/SCI contact measurements of a white calibration plate are taken 30 times at 1-second intervals after white calibration)						
Inter-instrument agreement	Within ΔE*ab 0.15 (Based on MAV/SCI contact measurements of 12 BCRA Series II color tiles compared to values measured with a master body under Konica Minolta standard conditions)						
Interface	USB 2.0, RS-232C						
Power	Dedicated AC adapter (AC 100 to 240 V, 50/60 Hz)						
Operation temperature/ humidity range	15 to 30°C, relative humidity is 80% or less (at 30°C) with no condensation						
Storage temperature/ humidity range	0 to 40°C, relative humidity is 80% or less (at 35°C) with no condensation						
Size (W×H×D)	Approx. 186 × 202 × 317 mm (Including handle height: 246 mm)						
Weight	Approx. 7.3 kg						

The specifications and appearance shown herein are subject to change without notice.

< CAUTION >

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