

# COLOR READER

## CR-11

OPERATION MANUAL



KONICA MINOLTA

The Color Reader CR-11 is an extremely compact, extremely easy-to-use tristimulus colorimeter specifically designed for measuring color in Munsell notation. After switching on the Color Reader and performing white calibration by placing the tip of the Color Reader against the included white tile and pressing the measuring button, measurements can be taken by simply positioning the Color Reader on the specimen and pressing the measuring button. The Color Reader can be easily operated with one hand and is battery powered for complete portability. Memory is provided for up to 50 measurements, and data can be easily sent to a separate printer for printing out.

Please read and study this manual before using the Color Reader for the first time and keep this manual handy for future reference.

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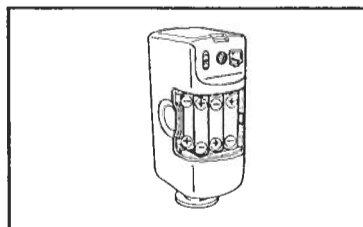
## TAKING MEASUREMENTS IMMEDIATELY

To measure the color of a specimen, follow the steps below.

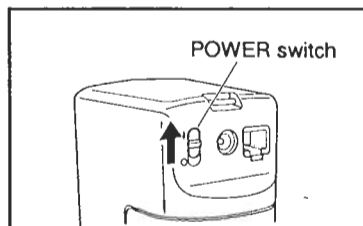
- For more information, refer to the corresponding section of this manual.

1 Install four AA-size batteries.

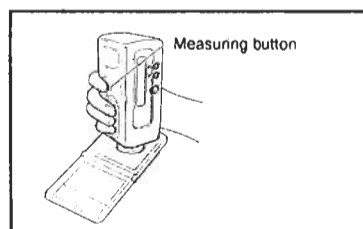
- Check that the polarities are as shown in the battery chamber.



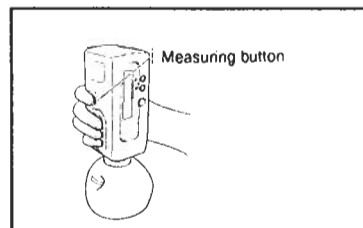
2 Switch on the instrument. The display will automatically change to the calibration display.



3 Place the tip of the Color Reader flat against the white calibration plate and press the measuring button to perform white calibration.



4 Place the tip of the Color Reader flat against the specimen to be measured and press the measuring button. The specimen will be measured and the measurement results in Munsell notation will be shown in the display.





# FUNCTIONS OF CONTROLS

Measuring button	Takes measurement.
<b>CAL.</b>	<ul style="list-style-type: none"><li>• Changes between calibration display and measurement display.</li><li>• When pressed together with ▲, starts printout of all measurement data in memory.</li></ul>
▲	<ul style="list-style-type: none"><li>• Scrolls up (toward higher specimen numbers) through stored measurement data.</li><li>• When pressed together with ▼, deletes all measurement data from memory.</li><li>• When pressed together with <b>CAL.</b>, starts printout of all measurement data in memory.</li></ul>
▼	<ul style="list-style-type: none"><li>• Scrolls down (toward lower specimen numbers) through stored measurement data.</li><li>• When pressed together with ▲, deletes all measurement data from memory.</li></ul>
LCD	Displays measurement results, etc.
POWER switch	Switches power on (I) and off (O).
Battery chamber cover	Covers battery chamber which holds four AA-size batteries.
AC adapter input socket	Used for connecting AC adapter to supply power from an AC socket. Use only AC Adapter AC-A12.
Printer output socket	Used for connecting a printer to print out data.

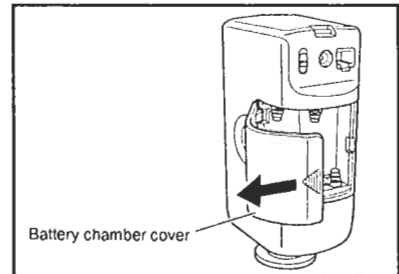
## POWER

The Color Reader can be powered by either four AA-size batteries or optional AC Adapter AC-A12.

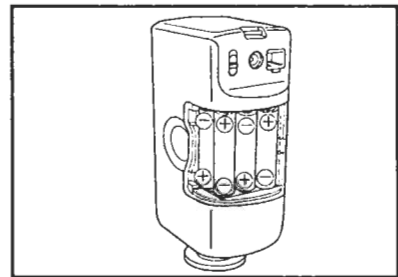
### Installing Batteries

- When installing or removing batteries, be sure the POWER switch of Color Reader is set to O (off).
- Do not mix battery types or ages. Mixing battery types or ages could result in battery leakage, reduced battery life, or damage to the Color Reader.
- Do not touch or short the battery terminals inside the battery chamber. Doing so may damage the Color Reader.
- Use alkaline-manganese or Ni-Cd batteries.

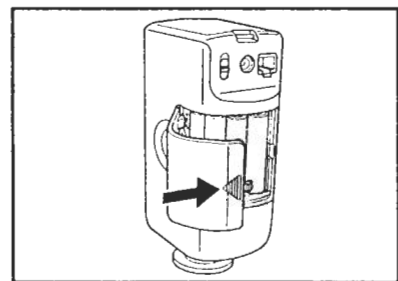
- 1 Check that the POWER switch is set to O (off) and slide the battery chamber cover in the direction of the arrow while gently pressing it in.



- 2 Install four AA-size batteries in the battery chamber with the polarities as shown inside the chamber.



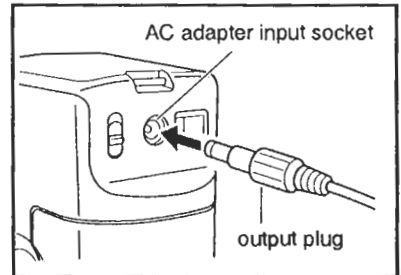
- 3 Close the battery chamber cover.
  - Be sure that both tabs on the battery chamber cover catch.



## Using AC Adapter

- Use only AC Adapter AC-A12 (available as an optional accessory). Use of other AC adapters may damage the Color Reader.
- When connecting or disconnecting the AC adapter, be sure that the POWER switch of the Color Reader is set to O (off).

- 1 Check that the POWER switch of the Color Reader is set to O (off) and insert the output plug of the AC adapter into the AC adapter input socket of the Color Reader.



- 2 Insert the input plug of the AC adapter into an AC wall outlet.

# DISPLAYS

## Calibration Display

```
Set Cal. Plate  
--> Measure
```

Calibration can be performed in this display. This display automatically appears when the Color Reader is first switched on. To enter this display later to perform calibration again, press **CAL**.

## Measurement Display

```
01 2.5 Y R      8 / 2  
02
```

When this display is shown, the Color Reader is ready to take a measurement. If there are measurement data in memory, the results for the previous measurement are shown in the display together with the next specimen number; if there are no measurement data in memory, only the specimen number "01" will be shown.

## Display with "Memory Full" Message

```
**          7.5 Y      6 / 8  
Memory Full
```

This display appears when additional measurements are taken after the number of measurements stored in memory has reached 50. When this display is shown, the data for the 51st measurement are not stored in memory and each additional measurement overwrites the displayed data for the 51st measurement.

## Display with "Printing" Message

```
Printing
```

This display appears when data is being output to a printer.

## Scroll Display

```
35 2.5 Y R      8 / 2  
36 7.5 Y R      6 / 2
```

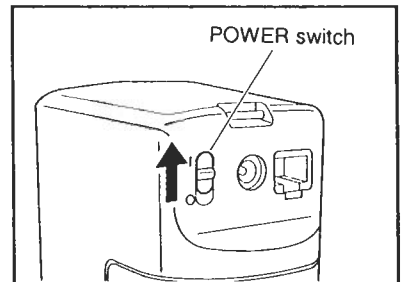
This display appears when measurement data in memory are recalled by pressing **▲** or **▼**.

# WHITE CALIBRATION

After the POWER switch is set to | (on), white calibration must be performed before measurements can be taken. White calibration can be performed only when the calibration display is shown; this display appears automatically after the POWER switch is set to | (on) and can also be reached from the measurement display by pressing **CAL**.

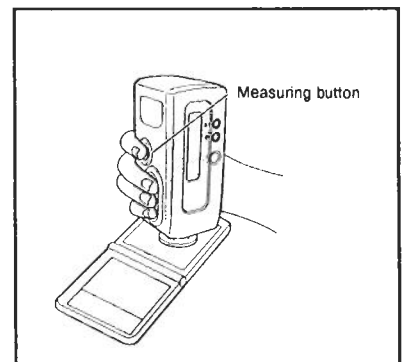
- Pressing **CAL**, when the calibration display is shown will cause the display to return to the measurement display.

- 1 Set POWER switch to | (on). The calibration display will appear.



- 2 Place the tip of the Color Reader flat against the white calibration plate.

- Use only the white calibration plate having the same serial number as the Color Reader. Use of a different white calibration plate will result in inaccurate measurements and may also result in error messages.

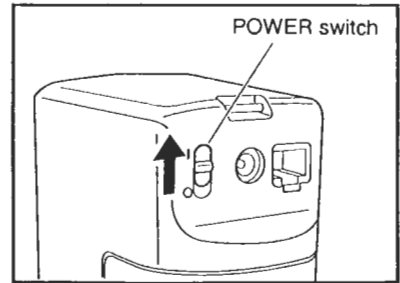


- 3 Press the measuring button. White calibration will be performed and the display will change to the measurement display (showing data if data are stored in memory).



# TAKING MEASUREMENTS

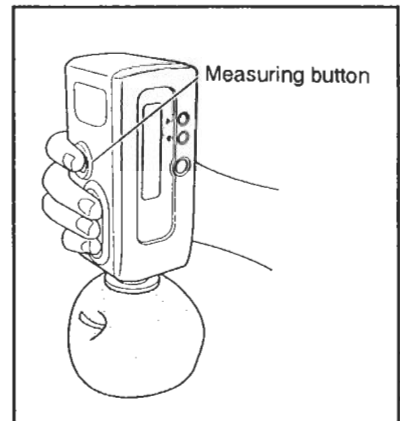
- 1 Set the POWER switch of the Color Reader to | (on) and perform white calibration (see previous page).



- 2 Place the tip of the Color Reader flat against the color to be measured and press the measuring button. When measurement has been completed, a beep will sound and the measurement results will appear in the display.

0 1	2.5 Y R	8 / 2
0 2		

- If a measurement is taken when the number of measurements stored in memory has already reached 50, "Memory Full" will appear in the display.

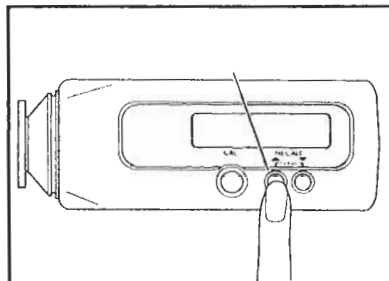


## RECALLING DATA IN MEMORY

Measurement data stored in memory can be recalled to the display by using ▲ and ▼

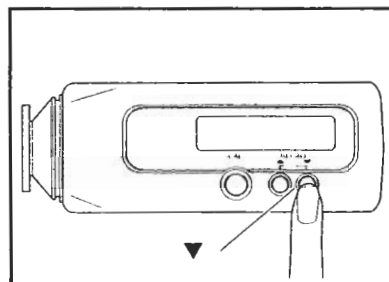
- Pressing ▲ scrolls through the data in memory toward higher specimen numbers.

3 5	2.5 Y R	8 / 2
3 6	7.5 Y R	6 / 2



- Pressing ▼ scrolls through the data in memory toward lower specimen numbers.

3 3	2.5 Y R	8 / 2
3 4	7.5 Y R	6 / 2



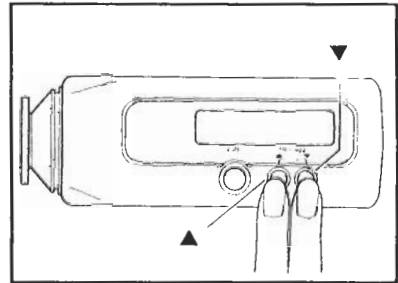
## DELETING DATA FROM MEMORY

All data stored in the Color Reader's memory can be deleted by following the procedure below.

- 1 Press ▲ and ▼ together. "Data Clear" will appear in the display.



- 2 Continue holding both ▲ and ▼ pressed until "Data Clear Completed" appears in the display. Deletion of all data previously stored in the Color Reader's memory has been completed.
  - The display will change to the measurement display, showing only the specimen number "01".
  - To interrupt deletion of all data in memory, release ▲ and ▼ before "Data Clear Completed" appears in the display.



# PRINTING MEASUREMENT DATA

By connecting a printer to the Color Reader, measurement data can be printed out at the time of measurement or all data in memory can be printed out.

## Suitable Printers

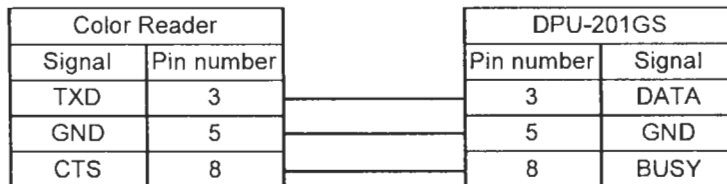
Printers which have the following specifications can be used with the Color Reader:

Number of printed columns:	At least 27
Data input:	RS-232C standard
Data control:	BUSY
Baud rate:	9600
Character length:	7 bits
Parity:	Even
Number of stop bits:	2 bits
Basic operating codes:	Carriage return CR (0D hexadecimal)

An example of a printer which meets the above specifications is Standalone Thermal Printer Unit DPU-201GS from Seiko Instruments Inc.

## Connections

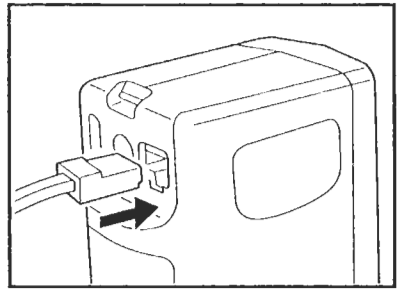
When connecting a DPU-201GS printer, the connections between the Color Reader and the DPU-201GS should be as follows:



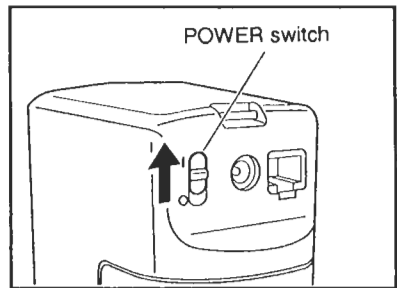
- The connections of Printer Cable CR-A75 (available as an optional accessory) correspond to the above diagram.
- When connecting or disconnecting the Color Reader and the printer, be sure that both units are switched off.
- Always switch on the Color Reader before switching on the printer.

## Printing Data at Time of Measurement

- 1 Check that the POWER switch of the Color Reader is set to O (off) and that the printer is switched off, and connect the Color Reader to the printer.
  - When the printer being used is the DPU-201GS, it should be connected to the Color Reader using Printer Cable CR-A75 (available as an optional accessory).

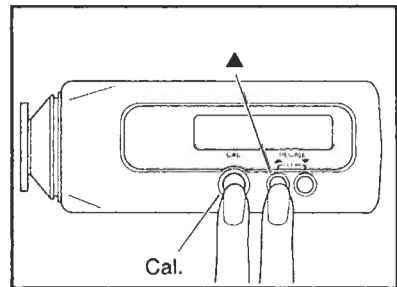


- 2 Set the POWER switch of the Color Reader to I (on) and then switch on the printer.
- 3 After performing white calibration, take measurements according to the procedure on p. 10. The measured data will be printed out each time a measurement is taken.



## Printing All Data in Memory

After completing steps 1 and 2 above, press **CAL.** and **▲** together and hold them pressed for at least 3 seconds to print all data in memory (maximum of 50 measurements). "Printing" will be shown in the display while printing is performed.



## Printout Example

Specimen number	Hue	Value	Chroma
01	7.5YR	6/ 2	
02	7.5YR	6/ 2	
03	N	9.5	
Achromatic specimen	04	N	9.5
	05	N	7.5
	06	10 BG	2/ 1
	07	7.5YR	6/ 2
	08	N	9.5
	09	10 B	6/ 6
	10	2.5PB	7/ 2

When an achromatic specimen is measured, only lightness is displayed.

Battery warning

## ERROR MESSAGES

- If any of the following messages continue to be displayed after the suggested corrective action has been taken, contact the nearest authorized service facility.

Error message	Cause	Corrective action
Measure Again	Measurement was not taken correctly (Color Reader was moved during measurement, ambient light entered measurement aperture, etc.)	Take measurement again, being sure tip of Color Reader is flat against the specimen and that the Color Reader is not moved until the beep indicating completion of measurement has sounded.
Sample Too Dark	Reflectance of specimen is low.	Specimens with low reflectance cannot be measured.
Change Battery	Battery power is almost exhausted.	Replace batteries or use optional AC adapter.
Illumination Error	Lamp filament is broken or measurement circuit is malfunctioning.	Contact the nearest Minolta authorized service facility.
Cal. Again	White calibration was performed using something other than the white calibration plate.	Use only the white calibration plate included with the Color Reader.

## CAUTION

- The Color Reader should be used at temperatures between 0 and 40°C (32 and 104°F). Do not use the Color Reader at temperatures outside this range. Also, do not subject the Color Reader to sudden changes in temperature.
- Do not use the Color Reader in an explosive atmosphere, such as one containing gasoline fumes.
- Do not leave the Color Reader in direct sunlight or near sources of heat, such as stoves, etc. The internal temperature of the Color Reader may become much higher than the ambient temperature in such cases.
- Do not use the Color Reader in extremely dusty areas or in areas filled with smoke or chemical fumes.
- Do not use the Color Reader near equipment which produces a strong magnetic field (such as speakers, large motors, etc.)
- When the Color Reader is not in use, be sure to set the POWER switch to O (off) and cover the measurement aperture with the protective cap.
- Do not mix battery types or ages. Mixing battery types or ages could result in battery leakage, reduced battery life, or damage to the Color Reader.
- Use only optional AC Adapter AC-A12 to supply power to the Color Reader from an AC outlet. Use the AC Adapter AC-A12 only with the rated power source.
- Do not subject the Color Reader to strong impact or vibration.
- If the instrument malfunctions, do not disassemble the instrument or attempt to repair it yourself. Any necessary repairs should be performed only by a authorized service facility.

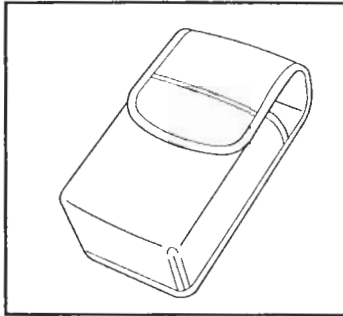
## CARE AND STORAGE

- To protect the white surface of the white calibration plate from changing color due to exposure to ambient light, and also to protect it from being scratched or stained, be sure to close the cover of the white calibration plate after use.
- If the Color Reader becomes dirty, it can be cleaned by wiping with a soft, dry cloth. Do not use benzene, paint thinner, or other chemicals to clean the Color Reader.
- If the white calibration plate becomes dirty, it can be wiped with a clean, dry cloth. If the stain is difficult to remove, a soft cloth moistened with lens-cleaning fluid may be used. After cleaning the surface with lens-cleaning fluid, wipe the surface with a cloth moistened with water and then let the surface dry before use. If the white calibration plate is scratched or has a stain which cannot be removed, it should be replaced. Contact the nearest Minolta authorized service facility to purchase a replacement.
- The Color Reader should be stored at temperatures between -20 and 40°C (-4 and 104°F). Do not store the Color Reader in areas subject to high temperatures, high humidity, or where condensation may occur.
- Do not leave or store the Color Reader in direct sunlight, inside a closed motor vehicle, in the trunk of a motor vehicle, or in any other area subject to extremely high temperatures.
- Do not store the Color Reader in extremely dusty areas or in areas filled with smoke or chemical fumes.
- If the Color Reader will not be used for more than two weeks, remove the batteries to avoid the possibility of damage due to battery leakage or corrosion.

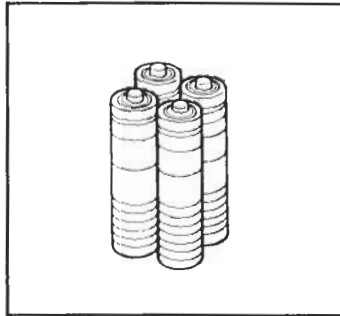
# ACCESSORIES

## Standard Accessories

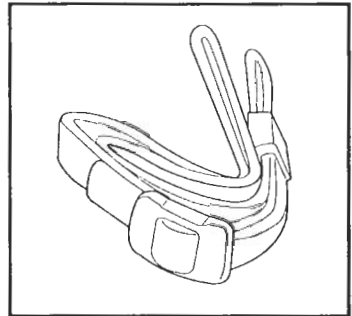
Soft Case CR-A68



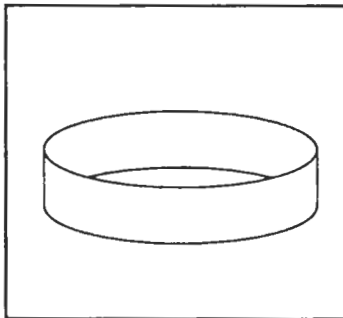
AA-size batteries (4)



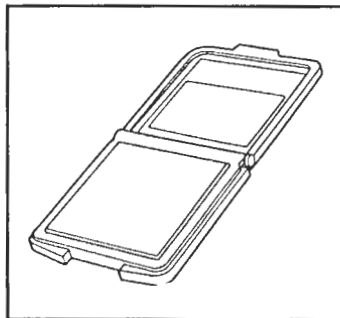
Wrist Strap CR-A73



Protective Cap CR-A72

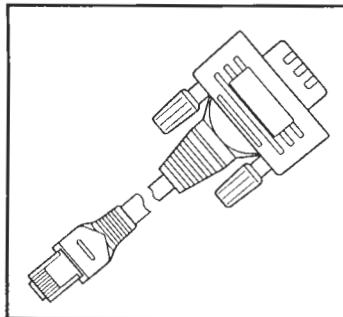


White Calibration Plate CR-A74

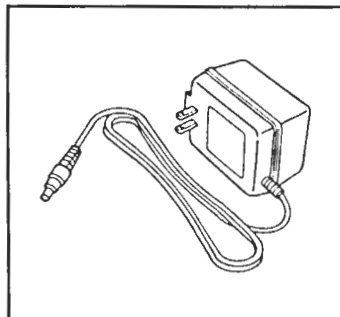


## Optional Accessories

Printer Cable CR-A75



AC Adapter AC-A12



## SPECIFICATIONS

Model	CR-11
Illuminating/viewing geometry	8/d (8° illumination angle/diffuse viewing; specular component included)
Measuring area	Approximately Ø8mm
Light source	Gas-filled tungsten lamp
Detector	6 silicon photocells
Display modes	Munsell (based on Japanese Industrial Standards method)
Memory	Maximum of 50 measurements
Minimum interval between measurements	Approx. 1.5 sec.
Power source	Four AA-size batteries or optional AC Adapter AC-A12
Battery life	Alkaline-manganese: Approx. 2000 measurements at 10-sec. intervals Ni-Cd: Approx. 600 measurements at 10-sec. intervals
Display	16-character × 2-row dot-matrix LCD
Operation temperature range	0 to 40°C (32 to 104°F); less than 85% relative humidity
Storage temperature range	-20 to 40°C (-4 to 104°F)
Dimensions (W × H × D)	59 × 158 × 85mm (2-5/16 × 6-1/4 × 3-3/8 in.)
Weight	360g (12.7 oz.) not including batteries
Standard accessories	White Calibration Plate CR-A74; Soft Case CR-A68; Protective Cap CR-A72; Wrist Strap CR-A73; AA-size batteries (4)
Optional accessories	AC Adapter AC-A12; Printer Cable CR-A75



KONICA MINOLTA