SmartView Simple Imager System

Instruction Manual

Catalog No. MUV-IMG-CA
MUV-IMG-CA-01

major science

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Packing List

MUV-IMG-CA

-1 × Canon EOS R100 Digital Camera Package
(Includes all accessories and manuals)
-1 × Memory Card
-1 × Darkroom

MUV-IMG-CA-01

-1 × Camera Adapter
-1 × Darkroom

Signed by:
Date:

Major Science is liable for all missing or damaged parts / accessories within 7 days after customer received this instrument package. Please contact Major Science immediately regarding this issue. If no response within such time period from consignee party, that will be consignee party's whole responsibility.

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Warning

Major Science SmartView Simple Imager System is RoHS compliant to deliver confident product which meet the environmental directives. These limits were designed to provide reasonable protection against harmful interference when the device is operated in a commercial environment. This device can generate, use, and radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device. It is strongly recommended for the user to read the following prints carefully before operating this device:

1. Read and follow the manual instructions carefully.
2. Do not alter the device. Failure to follow these directions could result in personal and/or laboratory hazards, as well as invalidate device warranty.
3. Use a properly grounded electrical outlet with correct voltage and current handling capacity.
4. Refer servicing to qualified personnel.
5. If solution is accidentally spilled on the instrument, disconnect grounded plug and carry out appropriate decontamination measures. For instance, turn the instrument upside down to avoid solution contacting the internal components. Remove bottom cover and inspect to assure solution has not contacted inner components or connectors. Replace damaged parts accordingly.
6. Do not use in the presence of flammable or combustible material, fire or explosion may result. This device contains components which may ignite such material.
7. Refer maintenance and servicing to qualified personnel.
8. The instrument is intended for scientific research use only, and must be operated by qualified personnel who realize the potential risks of the use of this instrument. Major Science makes no claim that its instruments are designed or certified as medical device; no presentation, promises, express warranty or implied warranty will be made concerning the suitability of these instruments for any medical use. Major Science will not provide customers any notice or certification concerning its products being compliant as a medical device.

Safety Information

Use high level of precaution against any electrical device. Before connecting the electrical supply, check to see if the supply voltage is within the range stated at the rating label, and see to it that the device be seated firmly. Place the device in a safe and dry location; it must NOT touch the surrounding. Follow the safety precautions for chemicals / dangerous materials. If needed, please contact qualified service representative or service@majorsci.com

Environmental Conditions

Ensure that the instrument is installed and operated strictly under the following conditions:

1. Indoor use only
2. ≤95% RH(non-condensing)
3. 75 kPa – 106 kPa
4. Altitude must not exceed 2000 meters
5. Ambient to 40°C operating temperature
6. Pollution degree: 2
7. Mains supply voltage fluctuations up to ±10% of the normal voltage

Avoiding Electrical Shock

Follow the guidelines below to ensure safe operation of the device.

The SmartView Simple Imager System has been designed to utilize shielded wires thus minimizing any potential shock hazard to the user. Major Science recommends against the use of unshielded wires.

To avoid electrical shock:

1. In the event of solution spilling on the instrument, it must be dried out for at least 2 hours and restored to NORMAL CONDITION before each operation.
2. NEVER connect or disconnect wire leads from the power jacks when the power is on.
3. WAIT at least 5 seconds after stopping a run before handling output leads or connected apparatus.
4. ALWAYS make sure that hands, work area, and instruments are **clean** and **dry** before making any connections or operating the power supply.
5. ONLY connect the power supply to a properly grounded AC outlet.

Avoiding Damage to the Instrument

1. Do not attempt to operate the device if it is damaged.
2. Protect this device from physical damage, corrosive agents and extreme temperatures (direct sunlight, etc.)
3. For proper ventilation and safety concerns, keep at least 10 cm of space behind the instrument, and at least 5 cm of space on each side.
4. Do not operate the SmartView Simple Imager System in high humidity environments (>95%), or where condensation may occur.
5. Prior to using any cleaning or decontamination methods other than manufacturer's recommendation, users should check with the manufacturer's instruction to see if the proposed method will damage the device.

Symbols

The symbols used on the SmartView Simple Imager System are explained below:

Indicates disposal instruction

DO NOT throw this device into a municipal trash bin when this device has reached the end of its lifetime. To ensure utmost protection of the global environment and minimize pollution, please recycle this device

Section 1 Introduction

1.1 Overview

The SmartView Simple Imager System offers you convenience and preference. The feature of its portable and light design, you are able to carry the equipment with ease. Also, with the compact camera, you can adapt the Imager System to our MS UV Transilluminator , and take pictures of your experiment results and view them directly on the camera screen. Or you can remove the memory card from the camera, and view the pictures on the personal computer for better resolution.

1.2 Features

- Compact and lightweight
- Easy to install, ready to use out of the box
- Use with scientific-grade camera
- Filter interchangeable for flexibility
- Basic gel analysis software included for convenience and immediate result.

1.3 Components guide

▲ **Front view**

▲ **Rear view**

Section 2 Technical Specifications

MUV-IMG-CA	
Camera ** For detailed specification of Canon EOS R100 Camera, please refer to Canon EOS R100 Camera User Guide.*	
Model	Canon EOS R100
Camera Type	24.1MP digital camera, Wi-Fi function
Effective Pixels	Approx. 24.1 megapixels (Total Pixels Approx. 25.8 megapixels)
Sensor	22.3 x 14.9mm CMOS sensor
Max. Aperture	f/4.5-6.3 (IS STM Lens)
Shutter Speed	30 - 1/4000 sec (1/3 stop increments), Bulb (Total shutter speed range. Available range varies by shooting mode)
Storage Media	SD memory card, Wi-Fi to PC, Smartphone or Tablet
Computer Interface	USB Type-C, HDMI(Micro), WiFi connection
Other Interface	HDMI(Micro), Wireless LAN, Bluetooth
Video Out	MP4, Full HD / HD / 4K
Image Resolution	(3:2)6000x4000
Lens	35mm film equivalent to 1.6x the focal length
File Format	Designed rule for Camera File system 2.0
Data Type	JPEG, RAW(CR3 14-bit), RAW+JPEG, simultaneous recording
Weight (body only)	Approx 356g
Operating Environment	0 – 40 °C, 85% or less humidity
Filter (for camera) ***Optional, ordered separately***	EtBr filter / SYBR Green filter / Amber filter (49 mm)
Darkroom(Hood)	
Darkroom Material	Acrylonitrile Butadiene Styrene (ABS)
Camera Adapter Material	Aluminum
Darkroom Dimensions (W × L ×H)	9.29" x 12.48" x 16.54" (236x317x420 mm)

Weight	Approx. 3.19lbs. (1.45Kg)
MUV-IMG-CA-01	
Darkroom(Hood)	
Darkroom Material	Acrylonitrile Butadiene Styrene (ABS)
Camera Adapter Material	Aluminum
Darkroom Dimensions (W × L ×H)	9.29" x 12.48" x 16.54" (236x317x420 mm)
Weight	Approx. 3.1lbs. (1.4Kg)

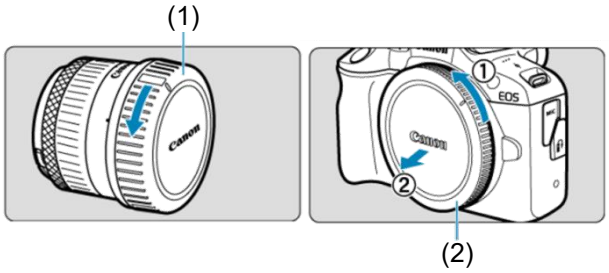
Note: Parts of the contents in this manual are excerpt from Canon EOS R100 Camera user guide. For detailed camera specification and setting, please refer to Canon EOS R100 user guide on Canon official website.
https://www.canon.com.cy/cameras/eos-r100/specifications/

Section 3 Installation Instructions

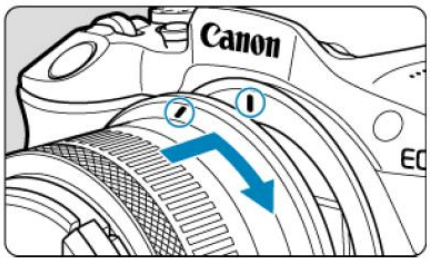
3.1 Pre-install the Camera

In normal situation, Step 1-5 have been done in the factory before shipping; user could directly jump to Step 6.

1. Make sure the camera is off, and then remove the camera cap(1) & lens cap(2).

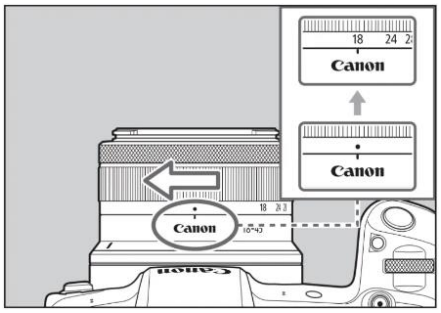


2. Align the red mount index on the lens with the red mount index on the camera to attach the lens.



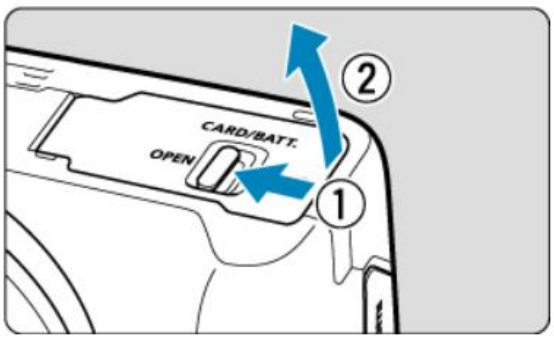
3. Remove the front cap.

4. Preparations from Retraction to Shooting. Rotate the zoom ring in the direction of the white arrow until you hear a click to set the lens in the preparatory shooting position.

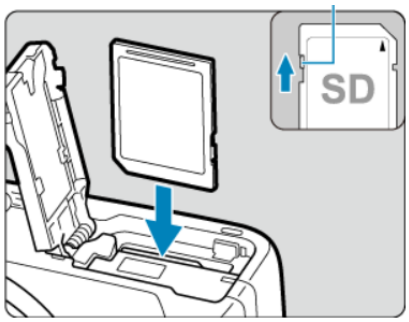


5. Loose the screw and remove form camera adaptor.

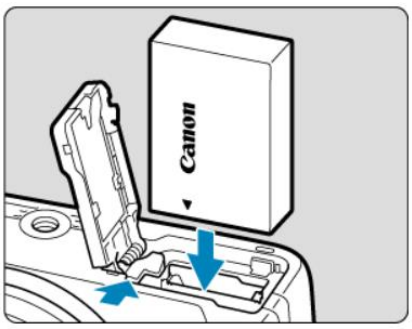
6. Slide the battery cover and open it.



7. Insert the card with the label facing the front of the camera until it clicks into place.



8. Insert the end with the electrical contacts and insert the battery until it locks in place.

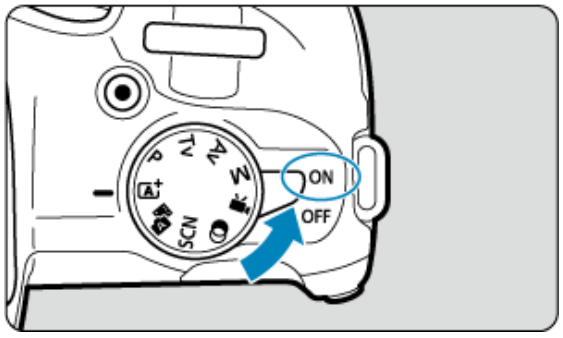


9. Turn the lens to preparatory shooting position.

10. Prepare filter.

11. Fit and fix the filter on top of the lens.

3.2 Mount the Camera

1. Fix camera to the camera adaptor on the chamber. 	**2.** Turn on the camera. It's ready for use. 

Note:

1. Make sure you have closed the battery cover properly; otherwise the camera cannot be activated.

2. Charge the battery on the day before or on the day it is to be used.

3. Charged batteries gradually lose their charge, even when they are not used.

4. After charging the battery, remove it and disconnect the charger from the power outlet.

5. When not using the camera, remove the battery.

6. Store the battery with the protective cover attached. Storing the battery when it is fully charged may lower the battery performance.

7. If the battery becomes exhausted quickly even after having been fully charged, the battery has reached the end of its service life.
Purchase a new battery, please.

***source:** https://cam.start.canon/fa/C015/manual/html/UG-01_Preparations_0020.html

Section 4 Set the Camera

★ In this chapter we provide table of recommended values, and they have already been set before shipping. You can go back and refer to this chapter anytime if you are not sure about the original setting before shipping.

★ Some common and most-used settings are provided below. For more detailed table, please refer to **4.2**.

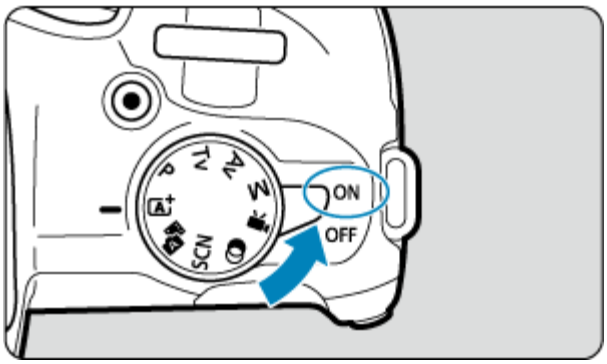
Rec. Mode	M mode
Focus mode	MF
ISO speed	800
Shutter speed	1 sec.
Aperture	F4.3*

*The aperture value may change when you zoom in/out images by rotating the lens. This is a normal situation which every camera would correct aperture itself automatically. You **shall not** enter the setting page and change the aperture yourself.

★ If you find the original settings cannot fit your needs--for example, the after-shot picture is too bright (over-exposure) or too dark (under-exposure), please first change the value of shutter speed. Shorten shutter speed for too bright picture; prolong shutter speed for too dark picture. If it still cannot meet your requirement, then consider change the ISO sensitivity. Lower ISO value for too bright picture; enhance ISO value for too dark picture.

4.1 Turn on the Camera

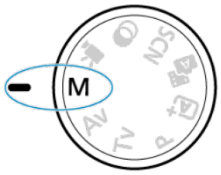
Set the power switch to "**ON**" to turn on the camera. Switch the mode dial to "M".



4.2 Setting M Mode and Each Parameter

This camera has different custom modes which could be selected via Mode Switch. We suggest switch the mode dial to **M Mode** and set **M mode** for black& white photo.

1. Use the mode dial to switch to **M** mode.



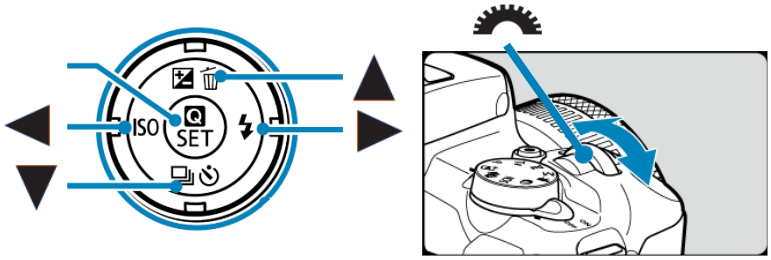
2. Press **MENU** button to enter ***Change Shooting Settings*** and set the recommended parameter value as follows:

	Menu Item(SHOOT)	**Setting**
	Shooting mode	**M**
1	Image quality	L
	Still Image Aspect Ratio	16:9
	Image review	2 sec.
	ISO speed settings	
	ISO speed	800
	Max for Auto	12800
	Auto Lighting Optimizer	Disable
	Highlight tone priority	OFF
2	***Flash Control***	
	Flash firing	
	E-TTL II meter.	Evaluative
	Red-eye reduc.	Enable
	Slow synchro	1/200 -1/60 A
	Build-in flash settings	
	Flash mode	E-TTL II
	Shutter sync.	1st curtain
	exp. comp.	±0
3	Picture Style	Monochrome *Monochrome M : for capturing images of DNA gels. *Standard S : for Coomassie Blue and silver stain protein gels.

	Lens aberration correction	
	Peripheral illum corr	OFF
	Digital Lens Optimizer	ON
	Long exp. noise reduction	AUTO
	High ISO speed NR	Standard
4	AF operation	ONE SHOT AF
	AF method	AF
	Eye Detection AF	Disable
	Continuous AF	Disable
	Focus mode	MF
5	***MF peaking setting***	
	Peaking	Off
	Level	High
	Color	Red
	AF-assist beam firing	OFF
	Lens electronic MF	OFF
	Focus/control ring	FOCUS
6	Drive mode	Single shooting ( )
	IS (Image Stabilizer) mode	
	IS mode	On
	Digital IS	Enable
	Review duration	2 sec.
	Metering timer	8 sec.
	Expo. simulation	Enable
7	***Shooting info. Disp.***	
	VF vertical display	On
	Grid display	Off
	Histogram	Brightness
	VF display format	Display 1
	Disp. performance	Power saving
8	Movie rec quality	FHD 25.00P IPB
	Sound recording	Auto
	ISO speed settings	
	Max for Auto	12800
	Movie Servo AF	Enable
	Auto slow shutter	A-SLOW ON
	Shutter btn function for movies	Meter.+ Servo AF

4.3 Set Shutter Speeds & Aperture Values ([M] Mode)

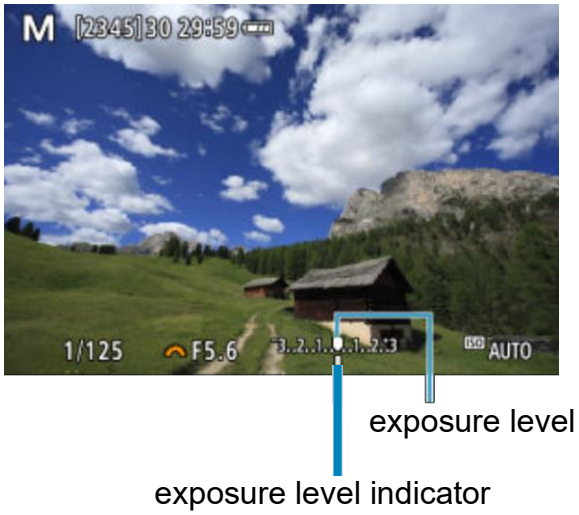
The following camera buttons and controls are represented by icons.



I. When in the [M] mode, press the [▲] button, choose adjustment of shutter speed or aperture value, and when [ ] is displayed, turn the [ ] dial to set a value.

II. Press [ISO] button and set a value of ISO speed by press [◀] [▶] or dial. (When the camera is connected to the TFT screen, Press [ISO] button and set a value of ISO speed by press [◀] [▶] or dial.

III. When the ISO speed is fixed, an exposure level mark based on your specified values is shown on the exposure level indicator for comparison to the standard exposure level. The exposure level mark is shown as [◀] or [▶] when the difference from standard exposure exceeds 3 stops.



4.4 Condition Settings

Applications	*ISO*	*Exposure Time*	*Aperture*
DNA Sample	800	1” or longer	F4.3
Protein Sample	800	1/100, 1/200, 1/300, …	F4.3
Western Blot	800	1/10, 1/20, 1/30,	F4.3
Radiographic Film	800	1/100, 1/200, 1/300, …	F4.3

Section 5 Operation Instructions

The SmartView Simple Imager System provides various applications in gel documentation. Please refer to the operation guide below for detailed instruction.

5.1 DNA Sample Imaging

1. Place gel onto the center of UV transilluminator plate.

2. Put the hood onto UV transilluminator.

3. Turn on camera and adjust the position of hood.

4. Turn on the UV light source.

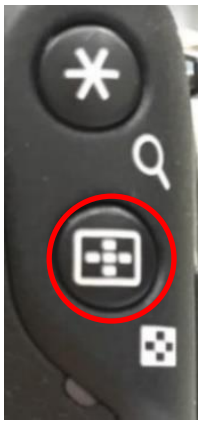
5. Change the Shutter Speed (1/4000 - 30”). For this application, we recommend setting it to 1” (Factory setting) or longer.

6. Change the metering mode (Evaluative, Spot AE Point, Partial Metering, Center Weighted Avg.). For this application, we recommend setting it to **Center Weighted Avg.**

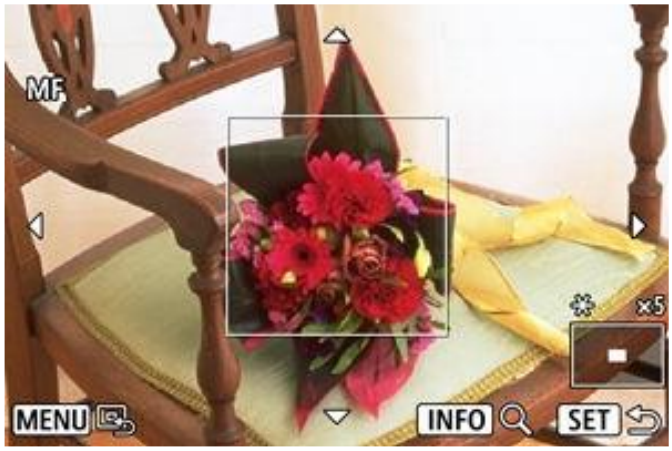
7. Change the ISO value (ISO 100-12800 and Auto). For this application, we recommend using ISO 800 to get the highest Signal to noise ratio (Factory setting).

8. Display the magnifying frame. Press[ ] button, the magnifying frame is shown[ ]. The magnification area and magnified ratio are shown in the lower right.

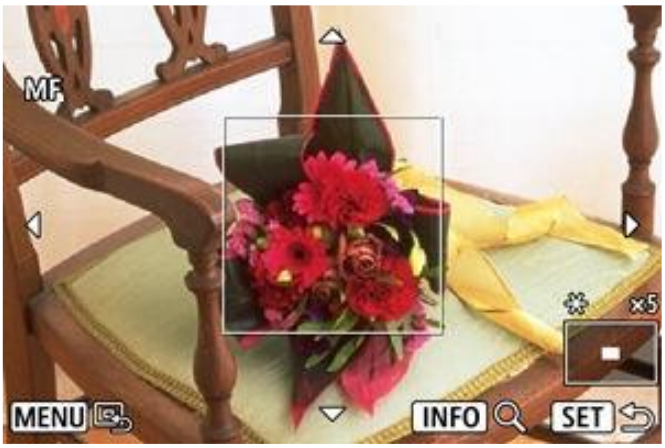
Step 8-Step 10 can be preset before shooting. Please refer to Section 4 Set the Camera.



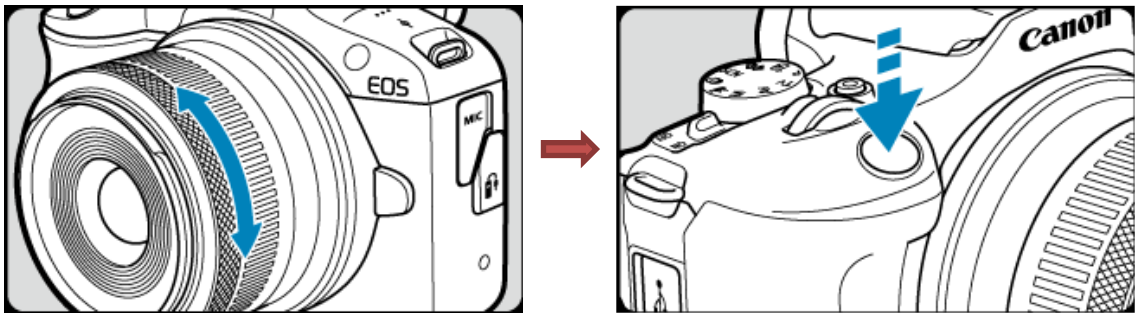
9. DSelect the area to magnify by press [◀] [▲] [▼] [▶].



10. Activate magnification. Touch [INFO] to magnification between 1x, 5x, and 10x. The magnification area and magnified ratio are shown in the lower right.



11. Rotate the lens to zoom in and out to focus on the magnified image. Full press the shutter button to take a picture.

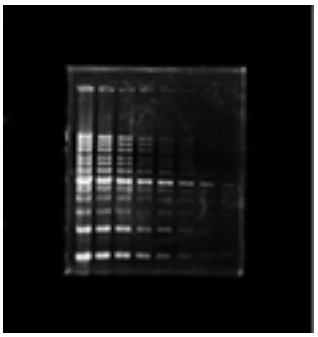


12. Press [▶] button and then press [Q SET] button to view the pictures on the memory card full-frame in the monitor. Press [◀] [▶]button to view the previous/ next picture. Press[▶] button again to return image shooting mode.
13. Under image viewing mode, press the [🗑] button to delete the displayed image.

To center the magnified area, press the [✳] button, Press [◀] [▶] button to move the area of image.

14. **Finish capturing image, please switch Camera off, and then turn off UV Transilluminator and main power.**

15. Remove gel from Hood.
16. Clean the UV transilluminator and dry the filter area. For more detailed information, please consult the instruction manual of UV transilluminator.



DNA sample imaging example: ISO 400; f/4.3; Shutter speed: 1 Sec.

5.2 Protein Sample Imaging

1. Place gel onto the center of White light plate.
2. Put the hood onto additional White light plate.
3. Turn on camera and adjust the position of hood.
4. Turn on the White light source.
5. Use the mode dial to switch to A (for color photo).
6. Set the aperture fixed on F4.3, change the Shutter Speed from 1/10, 1/20, 1/30.
7. Use the DNA sample imaging procedure **(Section 5.1 step 5 – 16)** for protein sample image capture.
8. **Finish capturing image, please switch Camera off, and then turn off White light plate.**
9. Take off hood and remove gel from White light plate.
10. Clean the White light plate and dry the plate area.

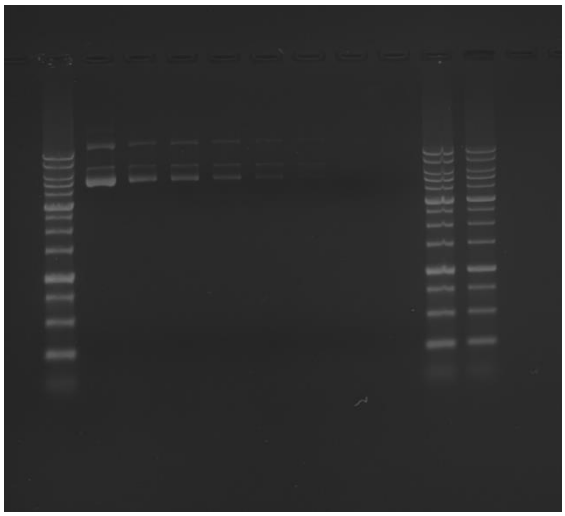
5.3 Western Blot

1. Place gel onto the center of additional White light plate.
2. Put the hood onto additional White light plate.
3. Turn on camera and adjust the position of hood.
4. Turn on the White light source.
5. Use the mode dial to switch to A (for color photo).
6. Set the aperture fixed on F4.3, change the Shutter Speed from 1/10, 1/20, 1/30.
7. Use the DNA sample imaging procedure **(Section 5.1 step 5 – 16)** for protein sample image capture.
8. **Finish capturing image, please switch Camera off, and then turn off White light plate.**
9. Take off hood and remove gel from White light plate.
10. Clean the White light plate and dry the plate area.

5.4 Radiographic Film

1. Place film onto the center of additional White light plate.
2. Put the hood onto additional White light plate.
3. Turn on camera and adjust the position of hood.
4. Turn on the White light source.
5. Use the mode dial to switch to M mode (for Black/White photo).
6. We recommend setting Aperture fixed on F4.3; and the Shutter Speed from 1/100, 1/200, 1/300….
7. Use the DNA sample imaging procedure **(Section 5.1 step 5 – 16)** for protein sample image capture.
8. **Finish capturing image, please switch Camera off, and then turn off White light plate.**
9. Take off hood and remove gel from White light plate.
10. Clean the White light plate and dry the plate area.

Sample Imaging



EtBr

Camera

Camera maker	Canon
Camera model	Canon PowerShot G15
F-stop	f/1.8
Exposure time	1 sec.
ISO speed	ISO-80
Exposure bias	0 step
Focal length	6 mm
Max aperture	1.6875
Metering mode	Pattern
Subject distance	
Flash mode	No flash, compulsory
Flash energy	
35mm focal length	

Camera setting

Note: ***The above setting condition is for reference, user can adjust setting according to the sample situation.***
For detailed camera operating and setting, please refer to Canon EOS R100 user guide on Canon official website.
https://cam.start.canon/fa/C015/manual/html/index.html

Section 5 Troubleshooting Guide and Maintenance

Many operating problems may be solved by carefully reading and following the instructions in this manual accordingly. Some suggestions for troubleshooting are given below. Should these suggestions not resolve the problem, please contact our SERVICE DEPARTMENT or a distributor in your region for assistance. If troubleshooting service is required, please include a full description of the problem.

Problem	Suggestion
The camera cannot be activated	➢ Check if the camera battery has charged. ➢ Check if the battery cover has been closed properly.
Weak signals or no image	➢ Please first change the value of shutter speed. Shorten shutter speed for too bright picture; prolong shutter speed for too dark picture. ➢ If it still cannot meet your requirement, then consider change the ISO sensitivity. Lower ISO value for too bright picture; enhance ISO value for too dark picture.
Unclear Image for the Printed Photos	➢ Make sure to press the ▶ key first to review the images, and then print the image.

Maintenance

The digital camera should be cleaned with general camera cleaning kit. Dry the filter surface with a soft cloth after each operation. Never use abrasive cleaners, solvent based cleaners, or souring pads.

Note: Do not cleaning the SmartView filters with alcohol.

Section 6 Ordering Information

MODELS & APPLICATIONS	
Cat. No.	***Description***
MUV-IMG-CA	SmartView Simple 310 Imager System, with 24.1MP digital camera with built-in WiFi
FILTER (FOR CAMERA)	***★Optional, Ordered Separately.***
DI-EB49	EtBr optical filter, 49mm
DI-SG49	SYBR Green optical filter, 49mm
DI-AM49	Amber filter, 49mm
Note: *For use with UV light as activation source, optical filters should be used.* *For use with blue light as activation source, amber filters should be used.*	
Cat. No.	***Description***
MUV-IMG-CA-01	SmartView 310 holder kit, includes hood and camara adapter only

PACKAGES	
Cat. No.	***Description***
MUV21-CP-02	Complete package of MUV21-312 Transilluminator and SmartView Simple 310 Imager System (MUV-IMG-CA).
MUV26-CP-02	Complete package of MUV26-312 Transilluminator and SmartView Simple 310 Imager System (MUV-IMG-CA).
MUVB-111-CP-02	Complete package of SmartView 111 Transilluminator and SmartView Simple 310 Imager System (MUV-IMG-CA).
MUVB-114-CP-02	Complete package of SmartView 114 Transilluminator and SmartView Simple 310 Imager System (MUV-IMG-CA).

Note: Parts of camera icons in this manual are excerpt from Canon EOS R100 Camera user guide. For more detailed of camera icons, please refer to Canon EOS R100 user guide on Canon official website.

https://cam.start.canon/fa/C015/manual/html/index.html

Section 7 Warranty

Major Science warrants apparatus of its manufacture against defects in materials and workmanship, under normal service, for ***one year from the shipping date to purchaser***. This warranty excludes damages resulting from shipping, misuse, carelessness, or neglect. Consumable parts (**UV lamps and the filters**) and the camera (**Canon EOS R100**), including those purchased from Major Science or other distributors, are not covered by our warranty. Major Science's liability under the warranty is limited to the receipt of reasonable proof by the customer that the defect is embraced within the terms of the warranty. All claims made under this warranty must be presented to Major Science within one year following the date of delivery of the product to the customer.

***About the maintenance service of camera, please contact the local Canon Customer Care Center. (https://global.canon/en/support/)**

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