

# Morning Check Plus

User Manual



# Morning Check Plus User Manual

**Revision Date: December 4, 2025**

## i. Statement

This manual serves as the user guide for Morning Check Plus (hereinafter referred to as “MC Plus”). It is intended to assist users in the proper operation of the product, ensuring optimal performance and safe usage. The manual should be kept with the device for convenient reference at all times.

MC Plus is intended solely for the applications explicitly specified in this manual and the accompanying documentation. Any unauthorized or unspecified use is strictly prohibited. Users must comply fully with the operational guidelines and safety precautions outlined in this manual. Use beyond the specified scope will result in automatic revocation of authorization and may pose potential risks.

## ii. Product Information

- **Product Name:** Morning Check Plus
- **Model:** MC Plus
- **Production Date:** Refer to the product label

## iii. Registration Information

- **Registrant:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Registered Address:** Room 506, Building B, No. 19 Nanxiang 3rd Road, Huangpu District, Guangzhou, Guangdong Province, China
- **Manufacturer:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Supplier:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Distributor:** Guangzhou Raydose Medical Technology Co., Ltd.
- **After-sales Service Provider:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Production Address:** Room 506, Building B, No. 19 Nanxiang 3rd Road, Huangpu District, Guangzhou, Guangdong Province, China
- **Postal Code:** 510700
- **Email:** info@raydose.com
- **Website:** <https://www.raydose.com/>

# Table of Contents

1. Overview .....	1
1.1. Product Description .....	1
1.2. Intended Use .....	1
1.3. Intended Users .....	1
1.4. Contraindications .....	1
1.5. Copyright Notice .....	1
1.6. Technical Support .....	1
2. MC Plus Introduction .....	2
2.1. Structure .....	2
2.2. Technical Parameters .....	3
3. Operation Instructions .....	4
3.1. Powering On/Off .....	4
3.2. Home Screen .....	5
3.2.1. Viewing Measurement Results Details .....	6
3.2.2. Viewing Historical Records .....	6
3.2.3. Viewing Record Management .....	6
3.3. Settings - Baseline .....	7
3.3.1. Add a New Baseline .....	7
3.3.2. Delete a Baseline .....	8
3.3.3. Baseline Matching Logic Description .....	8
3.4. Settings - System .....	9
3.4.1. Configuration .....	9
3.4.2. Network .....	9
3.4.3. Sound & Display .....	10
3.4.4. Language & Date .....	10
3.5. Settings - About .....	11
4. MC Plus Client .....	12
4.1. Connect MC Plus to Computer .....	12
4.2. Data Synchronization .....	13
4.3. Consistency Calibration .....	13
4.4. About .....	15
5. Consistency Calibration Steps .....	16
6. Precautions .....	20
7. Product Maintenance .....	21

# 1. Overview

## 1.1. Product Description

MC Plus is a detector matrix specifically designed to measure radiation beam dose distributions, featuring 245 ionization chambers. It provides accurate dose measurements and analyzes key machine parameters, helping assess LINAC performance and ensure safe, precise treatment.

## 1.2. Intended Use

The MC Plus is designed for dosimetry of photon and electron beams. It is primarily used for the daily verification of a linac's output, flatness, symmetry, field size, and light-radiation field coincidence.

## 1.3. Intended Users

Personnel operating MC Plus must be trained in accordance with this user manual and possess relevant professional knowledge in the field of radiotherapy.

## 1.4. Contraindications

MC Plus is intended solely for machine QA purposes and must not be used directly on patients. The measured data are intended exclusively for evaluating the operational status of the LINAC and must not be used for direct control of the system.

## 1.5. Copyright Notice

- This manual and all accompanying documents (including electronic and printed versions) are the proprietary property of Guangzhou Raydose Medical Technology Co., Ltd. (hereinafter referred to as "Raydose") and its suppliers, and are protected by intellectual property laws.
- Without written permission from Raydose, modification, translation, or reproduction of this document is prohibited, except for limited internal reference within the same department.
- Raydose retains ultimate ownership of this manual and its accompanying documents. Any infringement will be subject to legal action.

## 1.6. Technical Support

For technical support, please contact your local distributor or sales, or reach out to Raydose's after-sales service department through the following channels:

- Website: <https://www.raydose.com/>
- Email: [service@raydose.com](mailto:service@raydose.com)

## 2. MC Plus Introduction

### 2.1. Structure

#### (1) Indicator Light Explanation



Figure 1. Structure

- Beam Delivery Indicator Light: The light flashes red when a beam is detected.
- Operating Status Indicator Light: The light remains steady green during standby.
- Charging Indicator Light: The light is on while charging and turns off when fully charged.

#### (2) Arrangement of Ionization Chambers

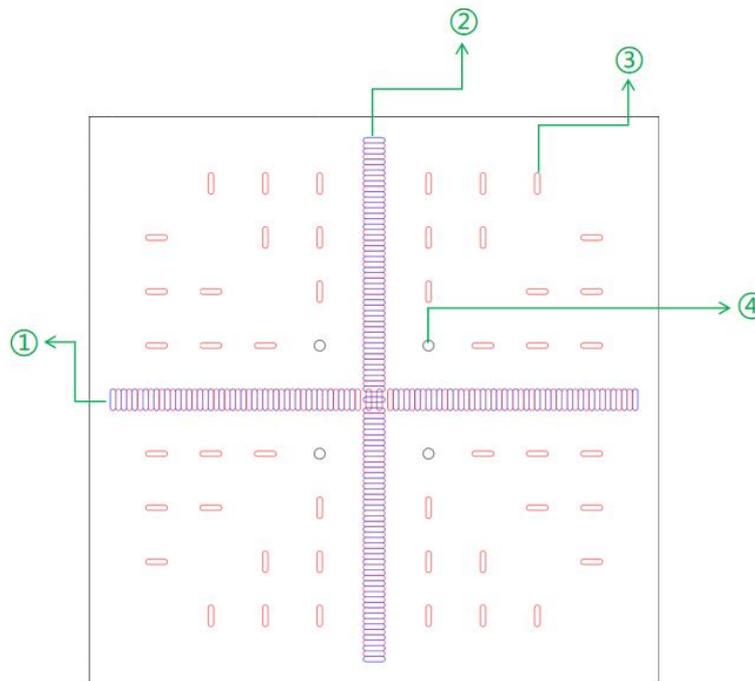


Figure 2. Schematic diagram of ionization chamber distribution

- ① Number of ionization chambers along the X-axis: 94 (48 in the upper layer, 46 in the lower layer).
- ② Number of ionization chambers along the Y-axis: 95 (46 in the upper layer, 49 in the lower layer).
- ③ Number of field-detection ionization chambers: 48 (located in the upper layer).
- ④ Number of energy-detection ionization chambers: 8 (distributed across 4 circular positions, with 2 chambers per circle arranged in an upper and lower double-layer structure, separated by a copper plate).

## 2.2. Technical Parameters

<b>MC Plus</b>	
Detector Type	Ionization chamber
Number of Detectors	245
Sensitive Volume	0.051 cc
Minimum Chamber Spacing	2.5 mm (center to center)
Dimensions (L×W×H)	392mm × 275mm × 20mm
Upper Layer Casing Water-Equivalence	10.3mm
Lower Layer Casing Water-Equivalence	17.2mm
Energy Range	4–25 MV photon beams 4–22 MeV electron beams
Battery Capacity	9200 mAh
Weight	3.5 kg
Maximum Standby Time	9h
Field Size	24 cm × 24 cm
Maximum Irradiation Area	26 cm × 26 cm
Measurement Consistency	≤ 1.5%
Repeatability	≤ ± 0.5%
Non-linearity	≤ ± 0.5%
Touchscreen Size	7.8 inches
Operating Temperature Range	5~50 °C
Atmospheric pressure Range	500~1100 hPa

## 3. Operation Instructions

### 3.1. Powering On/Off

#### (1) Power On

Press and hold the power button for 3 seconds to start the MC Plus. After powering on, it will automatically perform a self-check and background measurement.



Figure 3. Operation Instructions\_Power On

#### (2) Power Off

Press and hold the power button for 3 seconds to shut down the MC Plus. A shutdown confirmation prompt will appear on the screen. Click "OK" to power off.

#### (3) Self-Check

After powering on, MC Plus will automatically perform a self-check. If a malfunction is detected, an error message will appear on the screen.

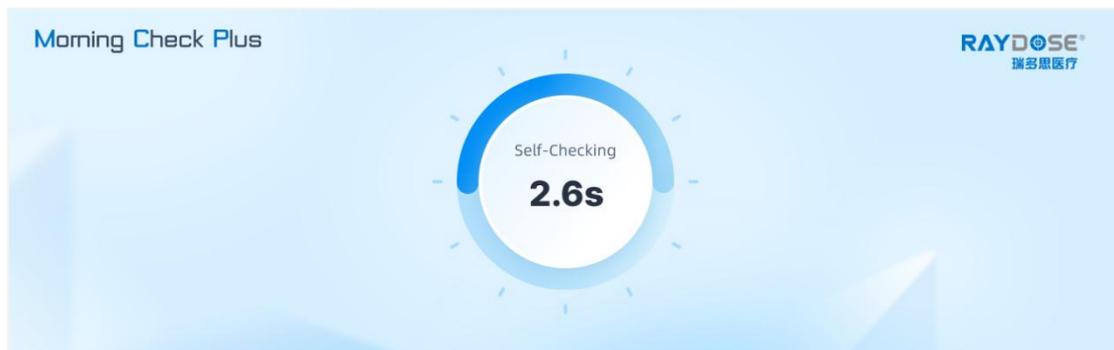


Figure 4. Operation Instructions\_Self-Check

#### (4) Background Measurement

After the self-check is completed, MC Plus will automatically perform a background measurement.

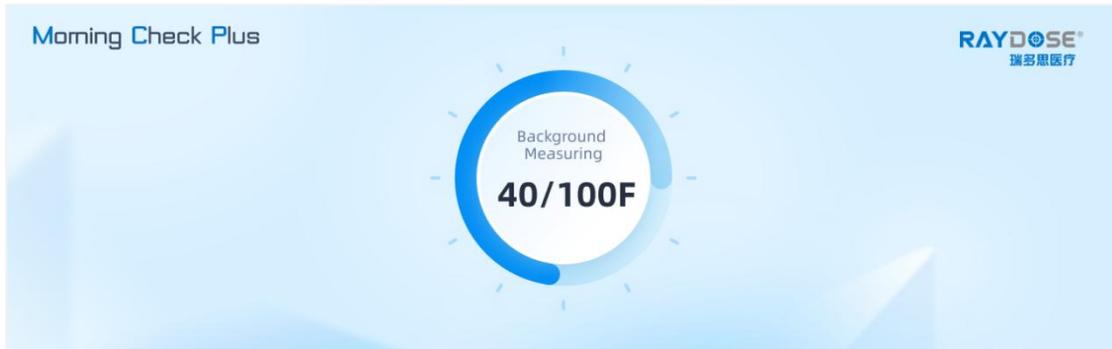


Figure 5. Operation Instructions\_Background Measurement

After the background measurement is completed, if no errors are detected, the interface will automatically switch to the home screen.

### 3.2. Home Screen

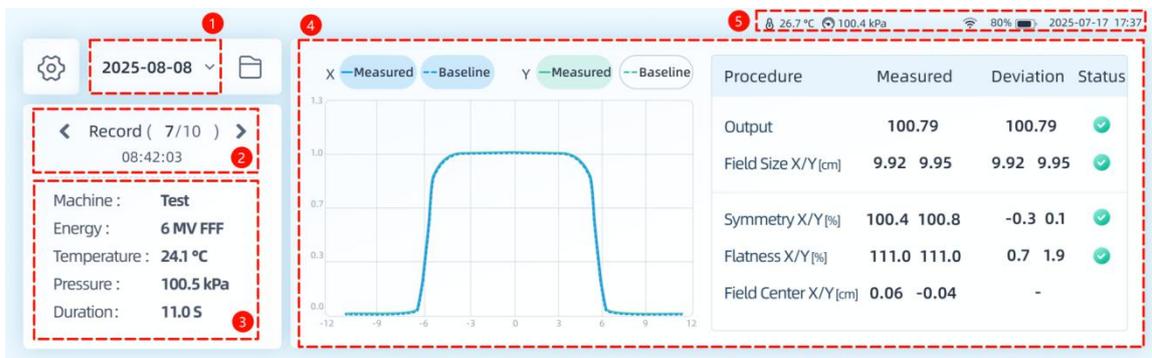


Figure 6. Home Screen

Function	Description
①	Date Selection. Click to select and view measurement records for a specific date.
②	Record Selection. Use the left and right arrows to view measurement records for the selected date.
③	Measurement Parameters. Clicking this area will open a pop-up window, allowing the user to view and switch the baseline.
④	Measurement Results. Compares measurement results with the baseline. If the deviation is within the tolerance, the status is displayed as "✓"; if it exceeds the tolerance, the status is displayed as "✗".
⑤	System Status. Displays information such as temperature, pressure, network connection status, and battery level.
⚙️	Settings. Allows user to configure reference values, system settings, and other parameters.
📁	Data Management. Enables viewing, deleting, and clearing of measurement data.

### 3.2.1. Viewing Measurement Results Details

- On the home screen, click [③ Measurement Parameters] or [④ Measurement Results] to open the measurement results detail page, as shown in Figure 7.
- Clicking on [🏠] or any area within the Figure 7 > [Measurement Result] will return to the home screen.

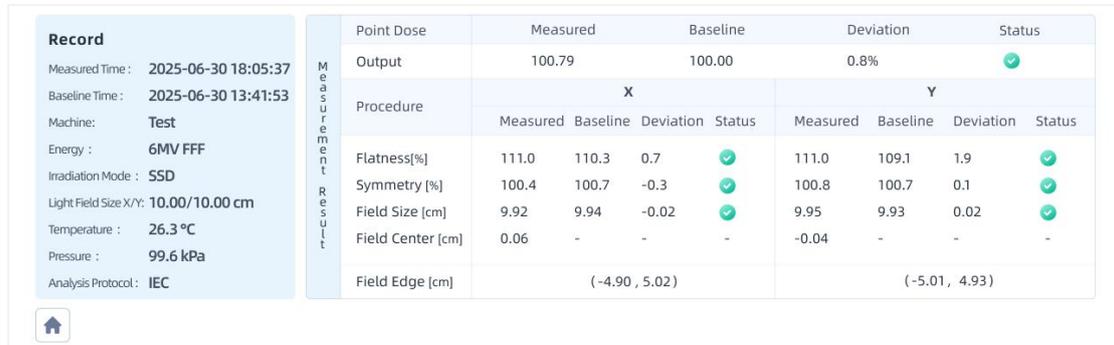


Figure 7. Measurement Results Detail Page

### 3.2.2. Viewing Historical Records

- Click on Figure 6 > [① Date Selection] to choose and view measurement records for a specific date. A blue dot next to the date indicates that test data is available for that date.

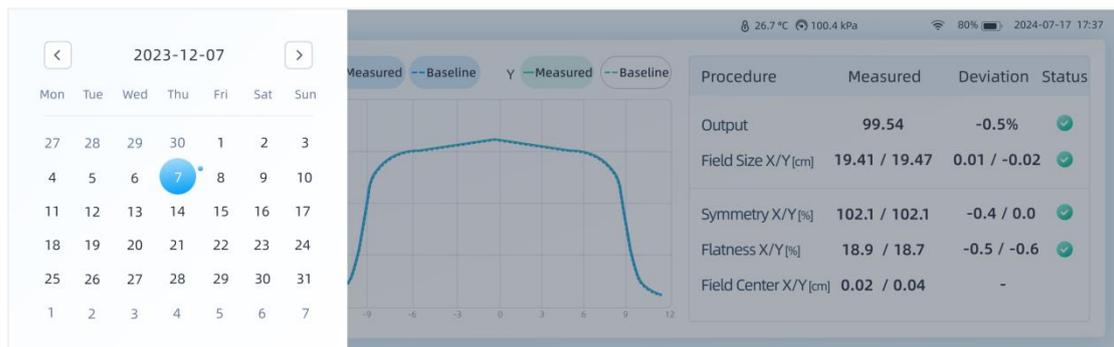


Figure 8. Viewing Historical Records

### 3.2.3. Viewing Record Management

- Click on Figure 6 > [📁] button to access the data management interface, where users can view all measurement records and perform deletion or clearing operations.
- It is recommended to back up these records to a computer before clearing them.

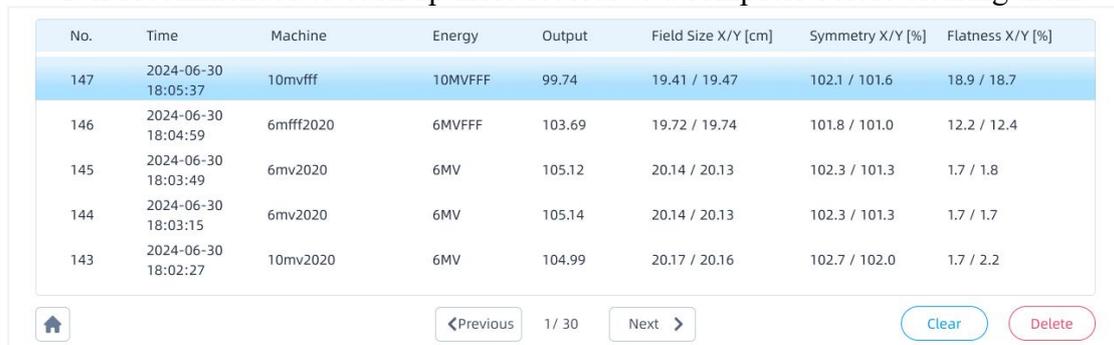


Figure 9. Data Management

### 3.3. Settings - Baseline

Click Figure 6 > [⚙️] button at the top left corner of the main interface to enter the settings menu. Then click on "Baseline" to access the baseline settings page.

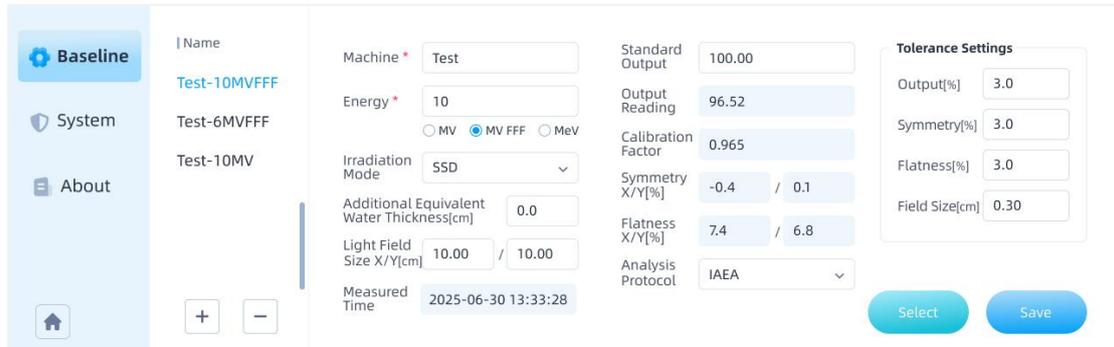


Figure 10. Settings \_Baseline\_ Baseline Settings

Among them:

- Items marked with a red “\*” are required fields.
- Items with a white background are editable fields.
- Items with a gray background are non-editable fields.

#### 3.3.1. Add a New Baseline

This setting is used to match baseline values for daily morning checks with the corresponding accelerator. The detailed steps are as follows:

**STEP 1:** Click [ + ] to add a new baseline.

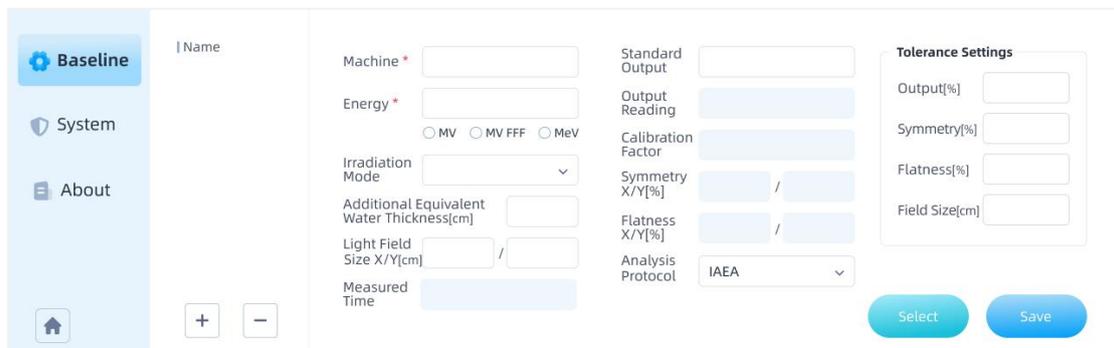


Figure 11. Settings \_Baseline\_ Add a New Baseline

**STEP 2:** Enter the Name and Energy. Click **Select** to enter the data selection interface. In the interface, select the appropriate record and click **Confirm**, then choose **YES** in the pop-up dialog to set the selected record as the baseline.

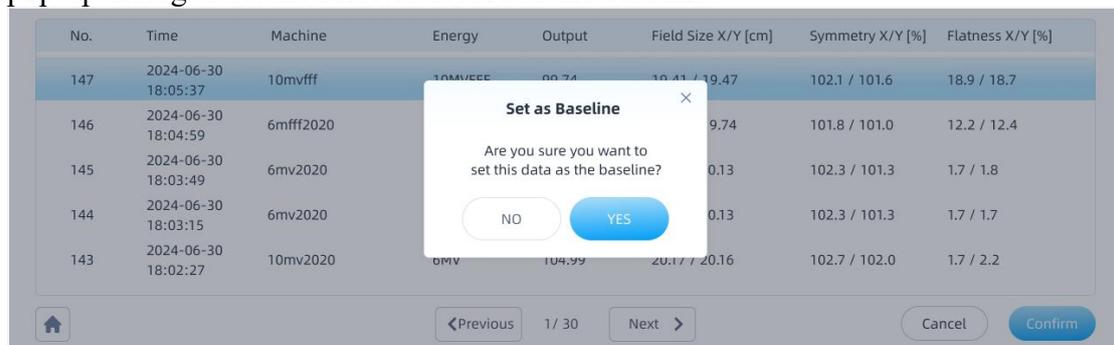


Figure 12. Settings \_Baseline\_ Data Selection

**STEP 3:** After returning to the baseline setting page, click  to save the changes.

**STEP 4 (OPTIONAL):** Users can enter the Standard Output as needed; the system will automatically calculate the corresponding calibration factor. After saving, if MC Plus automatically matches this baseline, the output will be calibrated according to the calculated factor.

**Note:**

- The data selected through  will be automatically populated in Figure 11 but will not overwrite any previously filled fields.
- After modifying fields, click . If any required fields are left blank, the system will prompt the user to complete them. Ensure that all required fields are correctly filled.
- Historical measurement results will not change due to updates of the matched baseline (such as data replacement or analysis protocol modification). Modifying the baseline only affects subsequent measurement data matched with the new baseline. If you need to reanalyze historical records using the new analysis protocol, you can re-match the updated baseline in the main interface after the baseline update.

**3.3.2. Delete a Baseline**

Click [  ] to delete the selected baseline.

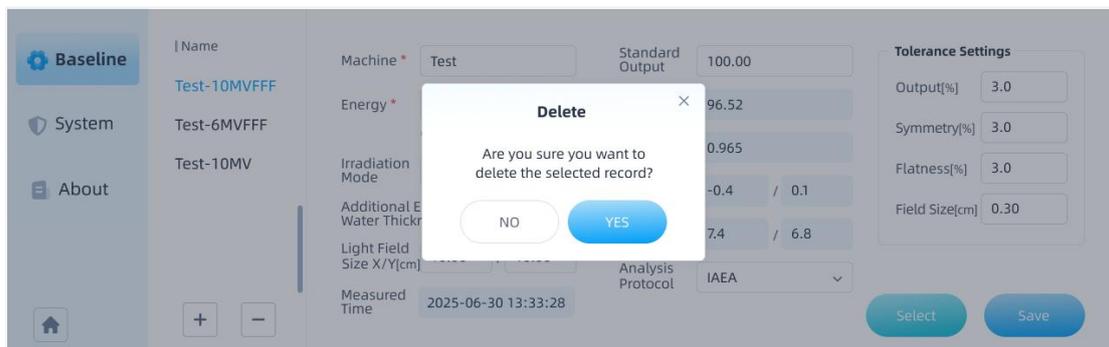


Figure 13. Settings \_Baseline\_ Delete a Baseline

**3.3.3. Baseline Matching Logic Description**

MC Plus adopts an automatic matching principle: after the measurement is completed, the system automatically identifies and matches the measured data with the most similar baseline according to the energy and dosimetric information, and then performs the analysis. The matching logic is as follows:

**① When measuring a single machine**

When MC Plus measures a single machine, the machine may contain one or more energy types (photon or electron beams). MC Plus automatically matches the corresponding baseline for each energy and completes the analysis.

**② When measuring multiple machines simultaneously**

When MC Plus is used to measure multiple machines simultaneously, regardless of whether the models are the same, it is recommended to assign distinct output as measurement conditions for each machine. For example:

- For all energies of Linac A, use 100 MU.
- For Linac B, use 50 MU or 150 MU.
- More machines can be set in the same way.

**Explanation:**

- Multiple machines may have identical models or even be Beam Matched. In such cases, relying solely on energy or dosimetric parameters (output, flatness, symmetry) may not distinguish specific machines. Setting distinctly different output measurement conditions helps MC Plus accurately match the correct baseline and avoid misidentification.
- If a mismatch still occurs, users can click the measurement parameters area on the home screen. A pop-up window will display all possible matching baseline data, allowing users to manually select and modify the correct one.

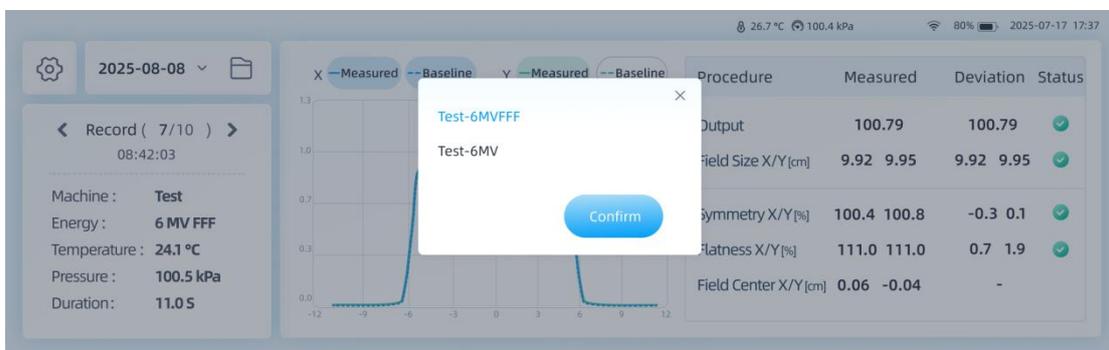


Figure 14. Settings\_Baseline\_Re-matching the Baseline

### 3.4. Settings - System

#### 3.4.1. Configuration

- It is recommended to select the appropriate measurement range based on the actual measurement scope to avoid deviations.
- If the measurement value exceeds the measurement range, an "OVERRANGE" warning will appear on the home screen.

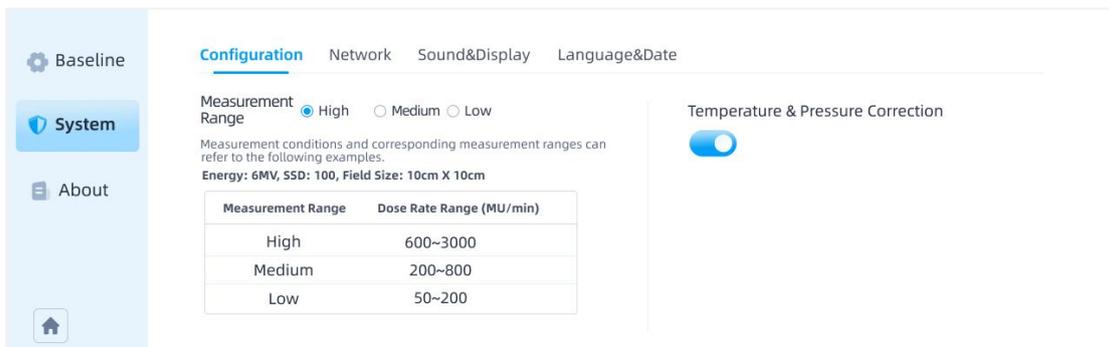


Figure 15. Settings\_System\_Configuration

#### 3.4.2. Network

- The wireless network will connect automatically when enabled.
- The wired network is enabled by default. To customize the IP address and other

settings, click the box to enter the necessary information, then click the [Save IP Settings] button to save your changes.

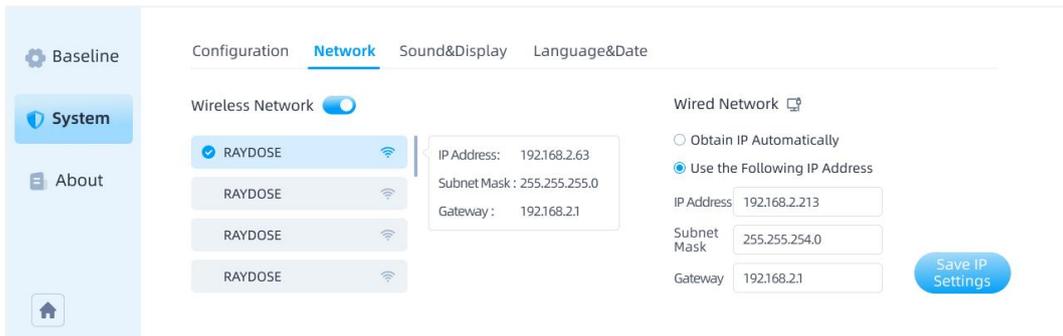


Figure 16. Settings\_System\_Network

### 3.4.3. Sound & Display

- You can configure the system sound and interface display in this interface.

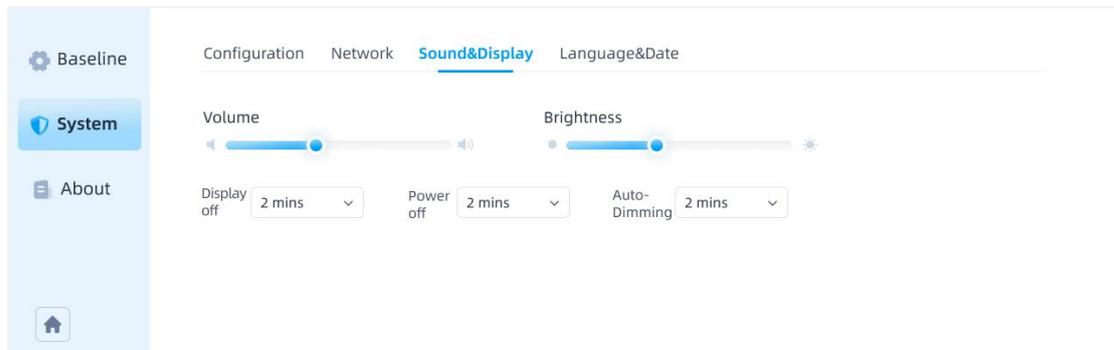


Figure 17. Settings\_System\_Sound & Display

### 3.4.4. Language & Date

- You can switch the system language (Chinese/English) in this interface.
- You can modify the system date and time in this interface.

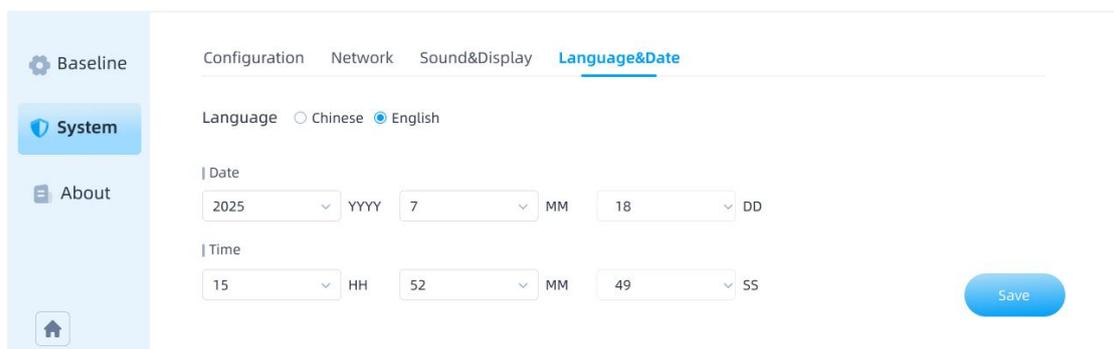


Figure 18. Settings\_System\_Language & Date

### 3.5. Settings - About

- You can view product information, as well as the company's website and contact email, in this interface.
- The software version and serial number are subject to the actual delivered product.

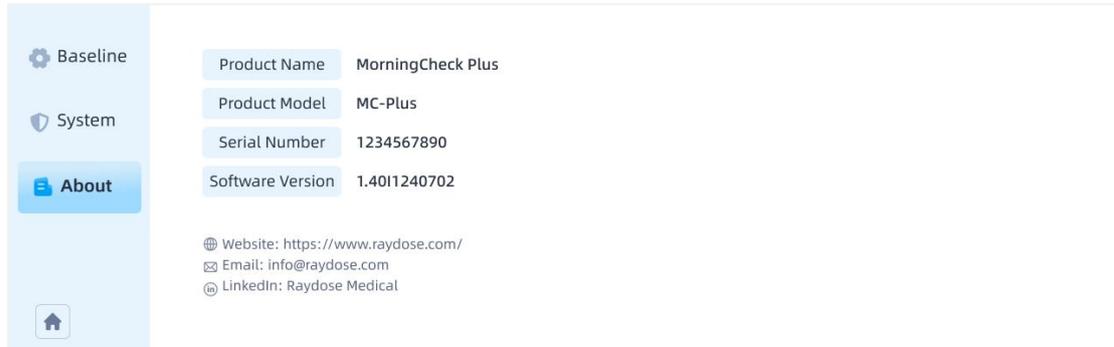


Figure 19. Settings \_About

## 4. MC Plus Client

### 4.1. Connect MC Plus to Computer

The MC Plus Client allows user to synchronize data from the MC Plus to your computer, perform consistency calibration, and view the version information of the MC Plus. The steps to operate the client are as follows.

**STEP 1:** Connect the MC Plus to your computer using one of the following methods.

- **Wireless Connection:** Connect both the MC Plus and the computer to the same wireless network.
- **Wired Connection:** Connect the MC Plus Ethernet port to the computer using an Ethernet cable.

**STEP 2:** Open the MC Plus Client, click on the icon  in the upper right corner, and then, depending on the connection method chosen in **STEP 1**, enter the MC Plus IP information to complete the connection. If the connection is successful, the icon will change from  to .

The IP information can be found on the MC Plus device under [Settings - System - Network], as shown in Figure 16.

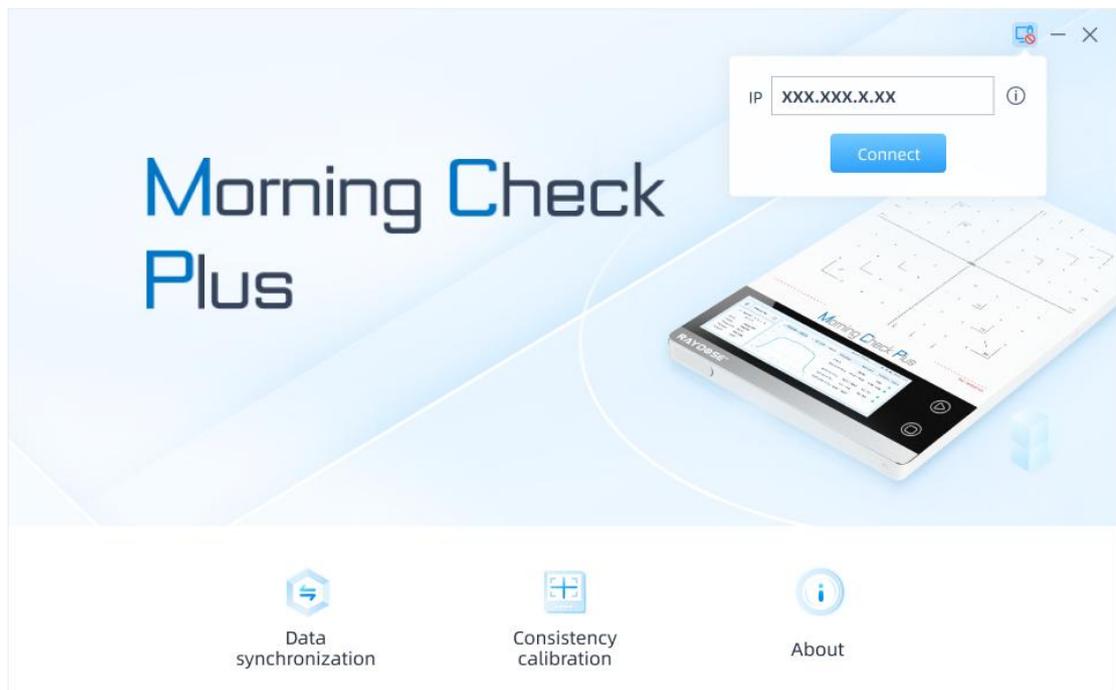


Figure 20. MC Plus Client

**Note:**

- If the connection fails, user may need to manually set the IP address of the computer. Open the interface shown in Figure 21 in the computer's system settings, double-click ① to enter the properties settings, and input the IP address information shown in ②.
- If the connection still cannot be established after restarting the client, please

contact our after-sales service for assistance.

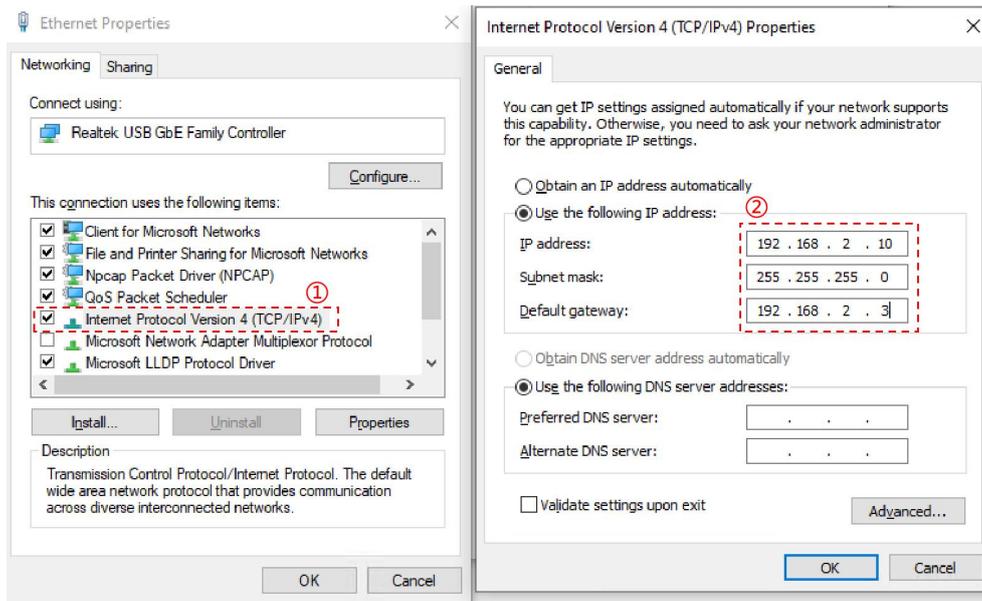


Figure 21. IP Address Settings

## 4.2. Data Synchronization

- In the "Data Synchronization" interface, click [Back up to PC](#) to export the data from the MC Plus to the computer.
- If the user has subscribed to our IQA service, they can also click the "Export to IQA" button to export the MC Plus data to the IQA platform for management.

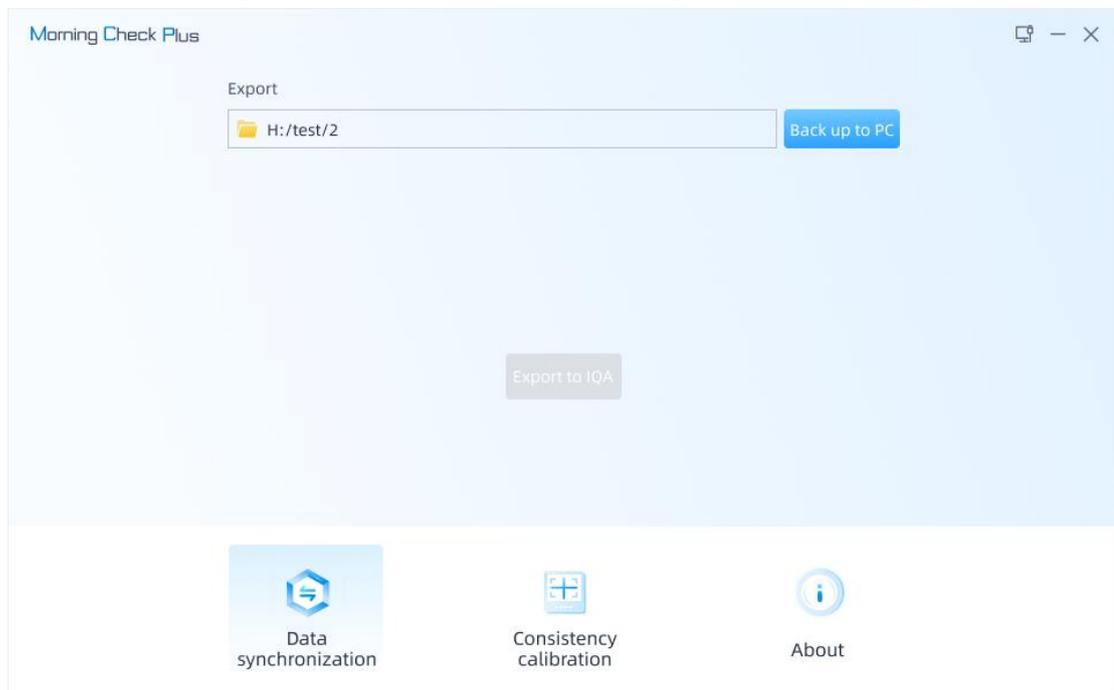


Figure 22. Data Synchronization

## 4.3. Consistency Calibration

The MC Plus undergoes consistency calibration before leaving the factory. It is

recommended to perform calibration every six months to a year. If significant measurement deviations are observed during use, and the linac being tested is confirmed to be functioning normally, it is also advisable to perform a consistency calibration on the MC Plus. The calibration steps are as follows:

**STEP 1: STABILIZATION**

- Place the MC Plus in the treatment room for 30 minutes to allow its pressure and temperature to stabilize.

**STEP 2: POSITIONING AND SETUP**

- Ensure that the linac being measured is in good condition. Position the MC Plus so that the crosshairs on both sides align with the laser lines.
- Set the field size to 26cm×26 cm, the dose rate to 400 MU/min, and deliver 100 MU per beam.

**STEP 3: MEASUREMENT**

- In the client, navigate to the Consistency Calibration interface (Figure 23) and follow the 8-step calibration diagram to perform beam measurements. Each step requires two beam deliveries, resulting in a total of 16 measurements.
- To minimize errors, it is recommended to move only the couch during translational measurements, while keeping the MC Plus stationary.

**STEP 4: CALIBRATION**

- After completing all measurements, connect the MC Plus to the computer. For connection methods, please refer to chapter 4.1.
- Click Calibration in the "Consistency calibration" interface (Figure 23), select the corresponding 16 sets of data, and click OK (16/62) (Figure 24). Once calibration is complete, the client will display a confirmation window indicating that it was successful.

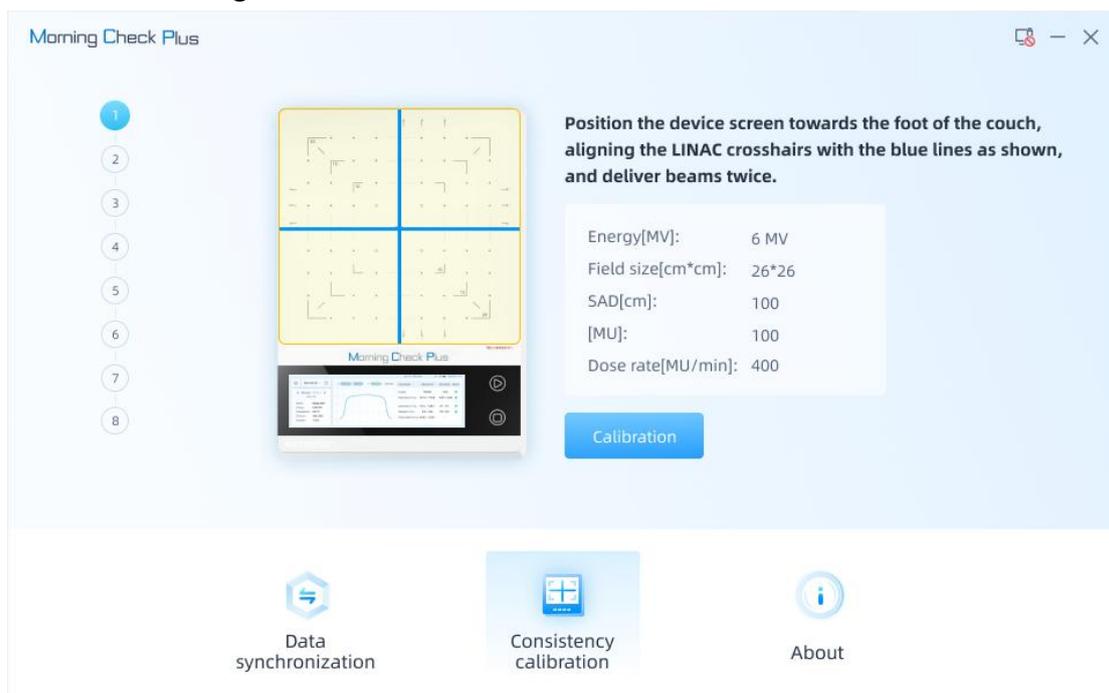


Figure 23. Consistency Calibration\_Step-by-Step Instructions

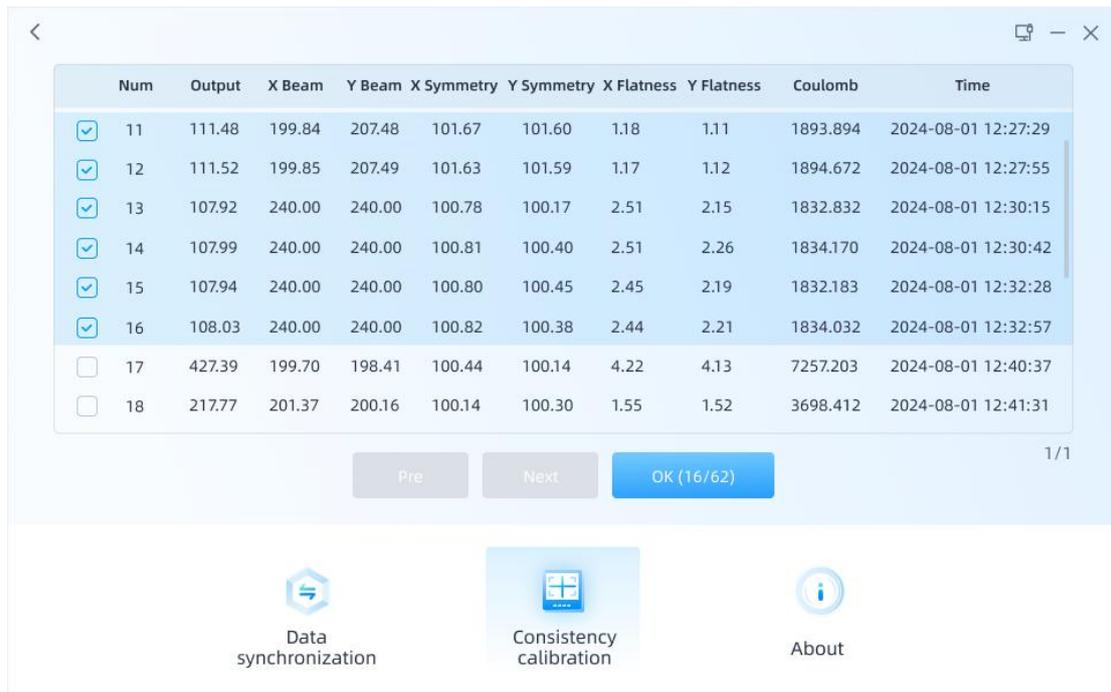


Figure 24. Consistency Calibration\_Data Selection

#### 4.4. About

Click "About" to view the product information of MC Plus. When a new hardware version is released, users can download the updated installation package to the local computer and complete the hardware update by clicking [update](#).

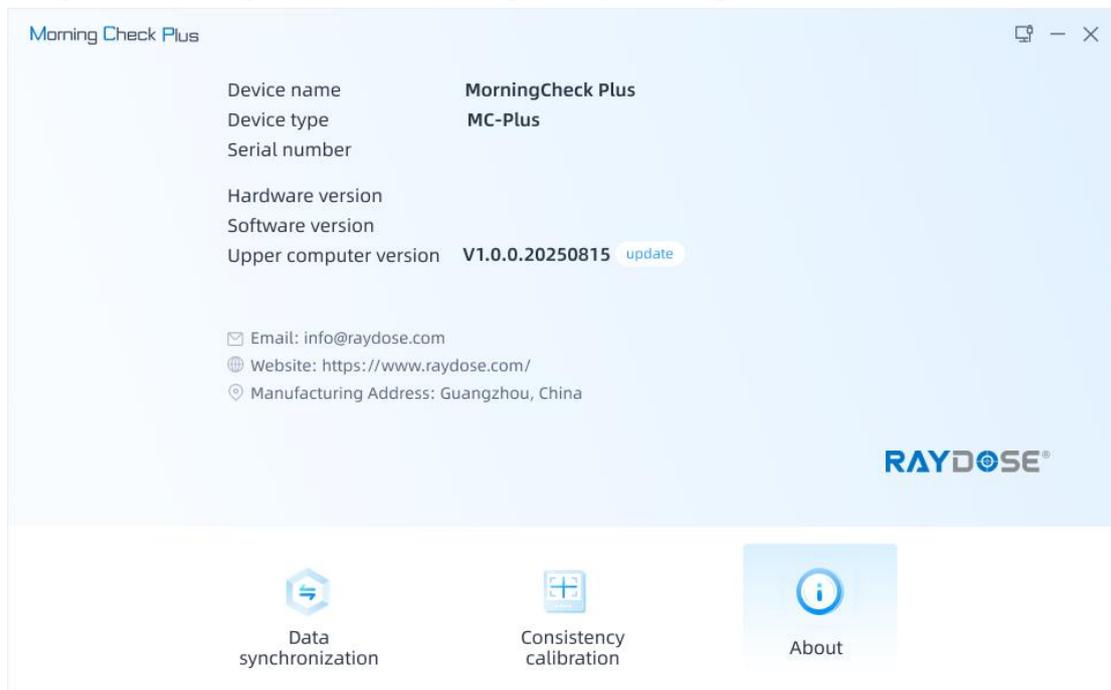


Figure 25. Consistency Calibration\_About

## 5. Consistency Calibration Steps

Morning Check Plus

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Position the device screen towards the foot of the couch, aligning the LINAC crosshairs with the blue lines as shown, and deliver beams twice.

Energy[MV]: 6 MV  
Field size[cm\*cm]: 26\*26  
SAD[cm]: 100  
[MU]: 100  
Dose rate[MU/min]: 400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus

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→ A

Move the couch along the X-axis to Position A, align the crosshairs with the blue lines, and deliver beams twice.

Energy[MV]: 6 MV  
Field size[cm\*cm]: 26\*26  
SAD[cm]: 100  
[MU]: 100  
Dose rate[MU/min]: 400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus

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→ B

Move the couch along the X-axis to Position B, align the crosshairs with the blue lines, and deliver beams twice.

Energy[MV]: 6 MV  
Field size[cm\*cm]: 26\*26  
SAD[cm]: 100  
[MU]: 100  
Dose rate[MU/min]: 400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus

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C ↑

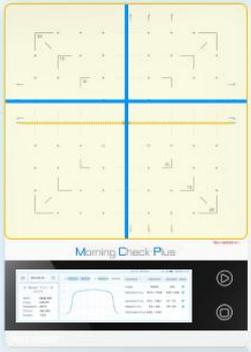
Return the device to its original position. Move the couch along the Y-axis to Position C, align the crosshairs with the blue lines, and deliver beams twice.

Energy[MV]: 6 MV  
Field size[cm\*cm]: 26\*26  
SAD[cm]: 100  
[MU]: 100  
Dose rate[MU/min]: 400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus



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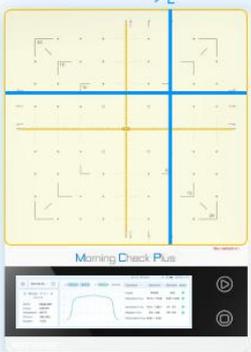
**Move the couch along the Y-axis to Position D, align the crosshairs with the blue lines, and deliver beams twice.**

Energy[MV]:	6 MV
Field size[cm*cm]:	26*26
SAD[cm]:	100
[MU]:	100
Dose rate[MU/min]:	400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus



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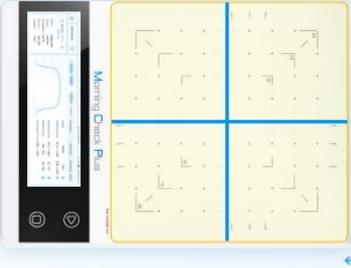
**Return the device to its original position. Move the couch along both X and Y axes to Position E, align the crosshairs with the blue lines, and deliver beams twice.**

Energy[MV]:	6 MV
Field size[cm*cm]:	26*26
SAD[cm]:	100
[MU]:	100
Dose rate[MU/min]:	400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus



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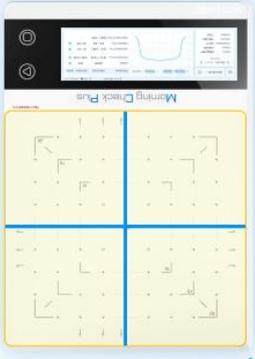
**Return the device to its original position. Rotate the device clockwise 90°, align the crosshairs with the blue lines, and deliver beams twice.**

Energy[MV]:	6 MV
Field size[cm*cm]:	26*26
SAD[cm]:	100
[MU]:	100
Dose rate[MU/min]:	400

Calibration

Data synchronization      Consistency calibration      About

Morning Check Plus



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**Return the device to its original position. Rotate the device clockwise 180°, align the crosshairs with the blue lines, and deliver beams twice.**

Energy[MV]:	6 MV
Field size[cm*cm]:	26*26
SAD[cm]:	100
[MU]:	100
Dose rate[MU/min]:	400

Calibration

Data synchronization      Consistency calibration      About

## 6. Precautions

### (1) Field Size

When measuring with MC Plus, the field size must not exceed 26 cm × 26 cm.

### (2) Power and Charging

- MC Plus is powered by a lithium polymer battery, providing up to approximately 9 hours of continuous operation on a full charge.
- Always use the power adapter provided with the product for charging. When charging, open the interface cover and connect the charging cable to the USB Type-C port. The charging indicator light will flash during charging and will remain steady once fully charged.

### (3) Consistency Calibration

When calibrating MC Plus, strictly follow the calibration steps provided by the client software.

### (4) Electromagnetic Interference

The MC Plus may be affected by magnetic and electric field interference, which can impact measurement results. When using the MC Plus for measurements, ensure that nearby external devices comply with electromagnetic compatibility requirements.

### (5) Operating Environment

The operating temperature range of the MC Plus is 5°C to 50°C, and the operating pressure range is 500 to 1100 hPa.

### (6) Troubleshooting

If you encounter program interruptions or other abnormal conditions, try restarting the device. If the issue persists after restarting, please contact our technical support.

## 7. Product Maintenance

### (1) Storage and Operating Environment

Keep the device dry and avoid using or storing it in high-humidity environments to prevent short circuits.

### (2) Regular Cleaning

Before cleaning, power off the device. Use a small amount of screen cleaner, water, or 75% ethyl alcohol, and spray it onto a soft, clean, lint-free cloth. Gently wipe the screen to remove stains or particles. Do not spray liquids directly onto it.

### (3) Avoid Physical Damage

Avoid dropping, bumping, or subjecting the device to strong vibrations to prevent damage.

### (4) Charging Maintenance

If the device is not used for an extended period, charge it once every three months.

### (5) Safety Precautions

The device contains high voltage up to 300V. If a malfunction occurs, contact the manufacturer for after-sales service. Do not attempt to disassemble or repair the device yourself.

### (6) Avoid Placing Items on It

Do not place any objects or heavy items on the device, as this could deform the ionization chamber and affect the accuracy of measurement data.

### (7) Contact Us

- Email: [info@raydose.com](mailto:info@raydose.com)
- Website: <https://www.raydose.com/>