

# Dynamic Phantoms User Guide

Models 008A, 008A-20, 18023A



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# User Guide, Dynamic Phantoms

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This guide is written for Model 008A, 008A-20, and 18023A

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## Health and Safety Instructions

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For instructions to report health or safety related concerns, see *Reporting Health or Safety Related Issues or Concerns* on page 28.

### General Safety Notices

Warnings and Cautions are identified throughout this user guide to alert users of dangerous conditions that are created when instructions are not followed. Operation and maintenance personnel must observe all safety regulations. For the purposes of this manual, cautions are identified as situations that can cause damage to the phantom and internal electronics. Warnings are defined as conditions that can cause injury to the operator.

### Safety Precautions

Below is a list of specific safety precautions detailed in this user guide. Please review these precautions carefully and use care while handling the phantom.



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**WARNING: High voltages capable of causing death are used in this equipment. Use extreme caution when operating and servicing the Controller. Deenergizing the Controller by using the power switch does not remove the 110-250 VAC power excitation from the Controller. These voltages remain present on the Controller power switch and power connector unless it is disconnected.**

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**WARNING: To reduce the risk of fire, electric shock, or injury when using the Motion Controller, follow the basic precautions below.**

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- There are no user-serviceable parts inside. Refer servicing to qualified service personnel.
- Use only a grounded 3 prong electrical outlet when connecting this product to a power source. If you do not know whether the outlet is grounded, check with a qualified electrician.
- Do not remove ground prong.
- Do not install or use this product near water, or when you are wet.
- Operate the product securely on a stable surface.
- Set up the product in a protected location where no one can step on or trip over the power cord and the power cord cannot be damaged.
- It is recommended that the customer install an AC surge arrestor in the AC outlet to which the Controller is connected. This is to avoid damaging the equipment by local lightning strikes and other electrical surges.
- To prevent overheating, do not block the fan on the rear panel or the ventilation holes located on the rear panel and bottom of the Controller.



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**CAUTION: Phantom assembly requires two people. One person for stabilizing and a second for assembling the phantom. Failure to stabilize the base plate can also result in damage to the phantom.**

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# 1 Introduction

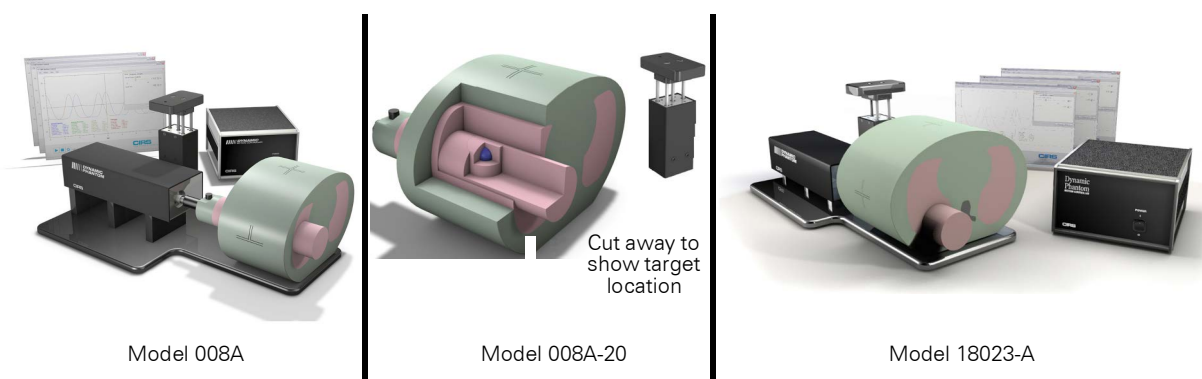
The Dynamic Phantoms are precision instruments for investigating and minimizing the impact of tumor motion inside the lung (Model 008A, 008A-20, and 18023-A). These phantoms provide known, accurate and repeatable three-dimensional motion for guided radiation therapy.

The phantom bodies represent an average human thorax in shape, proportion and composition.

**Model 008A** works with a lung-equivalent rod containing a spherical target with or without various detectors that is inserted into the lung-equivalent lobe of the phantom. The body is connected to a motion actuator box that induces three-dimensional target motion through linear translation and rotation of the lung equivalent rod. Motion of the rod itself is radiographically invisible due to its matching density with the surrounding material. The target and its motion, given its density difference, can be resolved. A programmable motion controller is used to drive the motion actuator.

**Model 008A-20** includes only the thorax body and the third-axis actuator, which simulates the motion of the chest wall or that of the diaphragm due to breathing.

**Model 18023-A** shares some components with the Model 008A Dynamic Thorax Phantom. As with the Model 008A, target and surrogate motion are independently controlled with Motion Control Software. The graphical user interface provides an unlimited variety of motions while the key differences between the Model 18023-A and the Model 008A include the length of phantom body, location of the moving rod within the lung, and the inclusion of ribs.



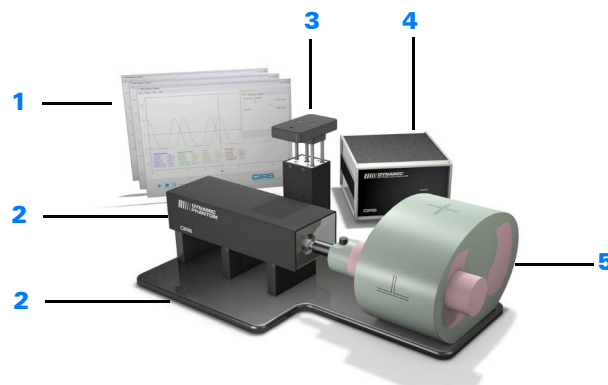
Model	Phantom Body	Phantom Body with Ribs	Lung Equivalent Rod	Motion Actuator	Motion Control Software
008A	✓		Purchased separately	✓	✓
008A-20	✓		Purchased separately		
18023-A		✓	Purchased separately	✓	✓

Figure 1-1. Comparison of Model 008A, Model 008A-20, and Model 18023-A

## Features

- Complex 3D tumor motion within the lung
- Sub-millimeter accuracy and reproducibility
- Motion software enables different cycles, amplitudes and wave forms
- Tissue equivalent from 50 keV to 15 MeV
- TLD, MOSFET, micro-chamber and film can be placed within the tumor volume.

## Parts



No.	Qty	Description
1	1	Computerized Imaging Reference Systems, Inc. (CIRS) Motion Control Software USB
2	1	Linear-Rotation actuator Base Plate assembly
3	1	3rd axis gating device (attaches to the Linear-Rotation actuator)
4	1	Dynamic Motion Controller with firmware installed (110 - 220V, 50 - 60Hz)
5	1	Dynamic Thorax Phantom Body with 3D spine (Dosimeter & QA rods not included)
--	1	Cable kit: USB 3.0 Gigabit Ethernet Adapter, Network cable CAT5e, 75', DB 25 male to male cable, DB 9 male to male cable, Power cord (not shown)
--	1	Accessories Kit: 4 in 1 screwdriver, push rod, fasteners pack, 2 spare fuses (not shown)
--	1	Adjustable legs kit: level, 4 adjustable legs with feet, post with screw (not shown)
--	1	User guide (PDF user guide and catalog included on provided USB) (not shown)
--	1	Carry case (not shown)

Figure 1-2. Model 008A Parts Included

## Optional Accessories



**Note:** Customers must complete their order with the purchase of at least one (1) interchangeable insert option.

Table 1-1. Model 008A Optional Accessories

Part Number	Description
008A-05	MOSFET configured lung equivalent rod with set of 3 target inserts
008A-06-CV*	MICRO CHAMBER configured lung equivalent rod with set of 3 target inserts
008A-08	Radiochromic film configured lung equivalent rod
008A-11	GEL DOSIMETRY configured lung equivalent rod with Model B-9, Dose Gel Container
008A-12	4D CT QA Device
008A-14	Lung equivalent Imaging Rod with set of 3 target inserts
008A-15	PET/CT configured lung equivalent rod with set of 3 target inserts
008A-19**	Ball Cube configured lung equivalent rod for film dosimetry*
008A-22	SBRT Rod with set of 3 target inserts
008A-24	OSL Dosimetry Rod with 3 cm Target insert
008A-153	Replacement Push Rod
008A-125	Chest plate with reflective 11.5 mm tracker balls
008-18	Model 008 upgrade to 008A
008A-253	Cable CAT5E 150 Feet for Dynamic Phantom (008A, 008M)

\* Refer to separate cavity and plug code list for available chamber cavities.

\*\* Ball cube film sold separately. Contact your local Ashland distributor for more information.



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# 2 Setup

## Unpacking

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- 1 Before you open the case, check the three Drop-N-Tell indicators on the right side of the case.  
A Drop-N-Tell shipping damage indicator is designed to signal if a package has experienced a drop during transit, possibly leading to damage to its contents. This sensor operates by initially displaying a red arrow when affixed prior to shipping. However, if the package undergoes a significant shock exceeding 25 G forces, the sensor's arrow indicators will switch to blue. When this sensor is activated and turns blue, it may be necessary to consider filing a claim with the shipping carrier. In such cases, it is advisable to exercise additional caution during the inspection, assembly, and testing of the package's components as they are unpacked.



**Note:** If there is any damage to the packaging case, containers, foam, and components, or operation, immediately contact the carrier and the phantom supplier, and keep all packaging for carrier inspection.



Figure 2-1. Drop-N-Tell Indicators on Case

- 2 Remove wall partition from the case and set aside.



Figure 2-2. Wall Partition

- 3 Pull phantom body from case.



Figure 2-3. Phantom Body

- 4 Remove motion controller from case and set aside.



Figure 2-4. Motion Controller

- 5 Remove cables.



Figure 2-5. Cables

- 6 Remove the actuator base plate assembly from case.



Figure 2-6. Actuator Base Plate Assembly

- 7 Inspect the list of parts before assembly. Refer to *Parts* on page 2. Verify all parts received. (Parts and packaging may vary.)



Figure 2-7. Parts Unpacked

## Assembly Procedure

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**CAUTION: Phantom assembly requires 2 people. One person for stabilizing and a second for assembling the phantom. Failure to stabilize the base plate can result in damage to the phantom.**

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- 1 Place base plate with actuator assembly on table. Carefully move base plate to overhang table. This allows access to holes for attaching phantom body.



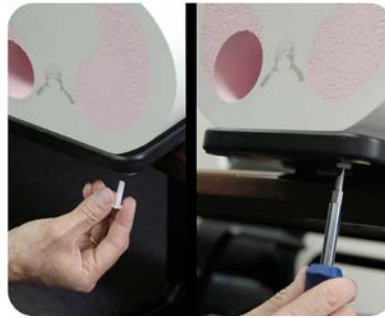
Figure 2-8. Base Plate with Actuator Assembly on Table

- 2 Position phantom body on base plate as shown. The rod hole must be on same side and aligned with the rod holder.



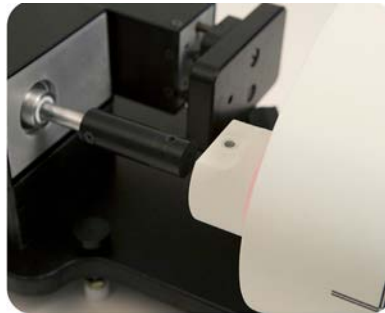
Figure 2-9. Phantom Body Positioned on Base Plate

- 3 Place one screw through bottom of base plate and screw into phantom. Continue until all screws are in place. Snug but do not tighten screws to allow minor alignment adjustments in steps 6 and 7.



*Figure 2-10. Base Plate Screwed into Phantom*

- 4 Insert lung rod through hole in phantom body. Ensure that screw hole on lung rod is aligned with screw hole on actuator rod.



*Figure 2-11. Lung Rod Inserted Through Hole in Phantom Body*

- 5 Use thumb screw to secure lung rod to actuator rod.



*Figure 2-12. Lung Rod Secured to Actuator Rod*

- 6 Push lung rod towards the motor box. Visually check gap around the rod. It should appear consistent. If not, adjust body left and right until gap is consistent around rod.



*Figure 2-13. Lung Rod Toward Motor Box*

- 7 Repeat step 6 with rod extended out. Check gap on the motor box side of body as well. Adjust phantom body to achieve best fit. Finish tightening the screws on underside of phantom.



*Figure 2-14. Lung Rod Extended*

- 8 3rd axis actuator is shipped in the horizontal position.



*Figure 2-15. 3rd Axis Actuator in Horizontal Position*

- 9 Move 3rd axis gating device to vertical position by loosening screws and repositioning as shown.



Figure 2-16. 3rd Axis Gating Device in Vertical Position

### Removal of Ball Cube Insert (Optional)

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- 1 Sun Nuclear has provided a Ball Cube Removal Tool. Please note precautions on Ball Cube insert packaging.



Figure 2-17. Ball Cube Removal Tool

- 2 Insert Ball Cube Removal Tool into back of Target Moving Rod at insertion point as shown below.



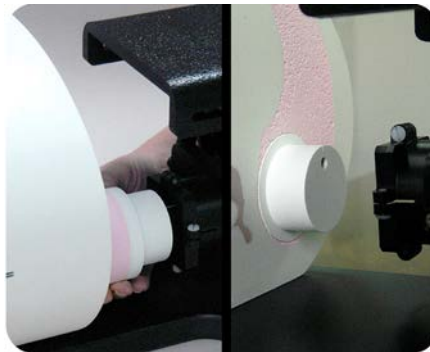
Figure 2-18. Insertion Point for Ball Cube Removal Tool

- 3 Gently push forward until Ball Cube is removed. Do not use other tools for this purpose as they may damage the surface of the Ball Cube which is fragile.



*Figure 2-19. Removing Ball Cube*

- 4 The Model 18023-A and 18043-A rods connect to the motion actuator with cup holders. Insert the lung rod through the hole of the phantom body. If the body is properly aligned the rod will slip into the cup. Ensure that the pin hole on the rod is aligned with the pin inside the cup.



*Figure 2-20. Rod Pin Hole Aligned to Pin Inside of Cup*

- 5 Use a screw driver to tighten the 4 nylon screws on the cup.



*Figure 2-21. Secure with 4 Nylon Screws*



## Cables and Connections

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**WARNING:** Follow the cable connection steps as they are presented in this user guide. Connecting the cables with the controller “Power On” can seriously damage the Phantom’s electronics.

---

- 1 Plug the Cable DB25 m/m to back of controller and to back of actuator.



Figure 2-22. DB25 Cable to Controller and Actuator

- 2 Plug the Cable DB9 m/m which leads from gating device to back of actuator.



Figure 2-23. DB25 Cable to Controller and Actuator

- 3 Attach ethernet cable to back of controller.



Figure 2-24. Ethernet Cable to Controller

- 4 Plug power cord into the back of controller. Plug other end of power cord into the wall outlet.



Figure 2-25. Power Cord to Controller

- 5 The controller and actuator powered and ready for use.

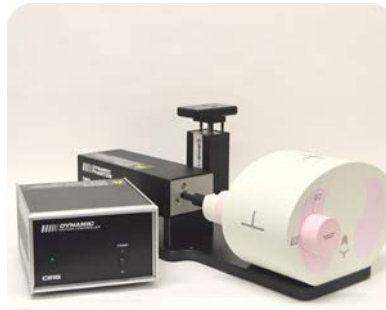


Figure 2-26. Controller and Actuator Ready for Use

- a. Adjustable legs kit (See **b** and **c** for mounting).



Figure 2-27. Adjustable Legs Kit

- b. Prior to attaching phantom body, carefully lay base plate with actuator in its side. Attach solid black post to underside of base plate as shown.

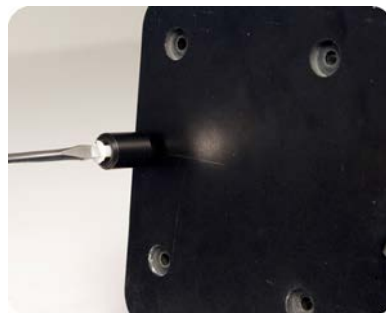


Figure 2-28. Solid Black Post to Underside of Base Plate

- c. Secure remaining 4 adjustable feet to base plate as shown.



*Figure 2-29. Adjustable Feet Secured to Base Plate*

# 3 PC/Ethernet Connection Setup

The following are the recommended steps to install the USB-to-Network Adapter that was shipped with this phantom. The new network connection must be set up as a Static IP address in order for the PC to communicate with the motion controller of the phantom.



**Note:** Steps 5 to 8 should be followed if the “PC Internal Network Adapter” is used instead of the “USB to Network Adapter”.

- 1 To install the necessary driver, unzip the “USB-to-Network Adapter” folder found on the provided USB drive or download the zipped folder from the CIRS website ([www.cirsinc.com](http://www.cirsinc.com)). Unzip to a known location and follow instructions from the Instructions.pdf document.

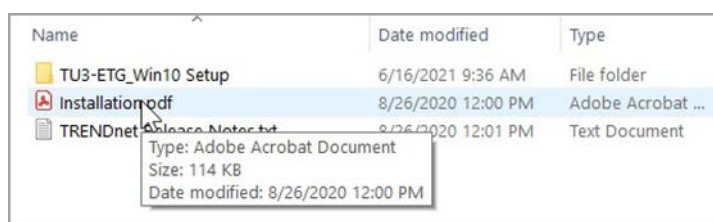


Figure 3-1. Extract USB-to-Network Adapter Folder



**Note:** The provided USB-to-Network Adapter can act as a Plug-and-Play device on most PCs, but, nonetheless it is recommended to install the driver as outlined above.

- 2 Follow the on-screen steps and acknowledge all the messages related to driver installation. Once the driver installation is finished, plug the USB-to-Network Adapter into your PC's USB port and acknowledge the Windows installation message. Exit the USB-to-Network Adapter Software menu by clicking **Exit**.
- 3 From the Control Panel, open the Network and Sharing Center and then select **Change adapter settings**.

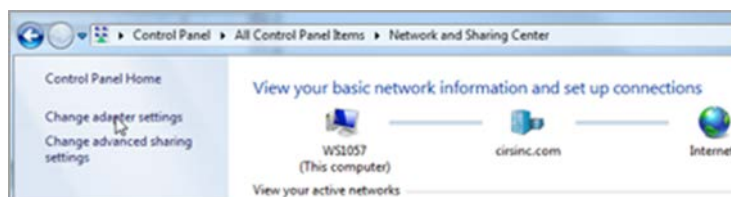


Figure 3-2. Access Adapter Settings in Network and Sharing Center

- 4 Provided that the installation of the USB-to-Network Card was successful, the newly installed network adapter should show as “ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter.” Select **Properties** using the right-click menu as shown below.

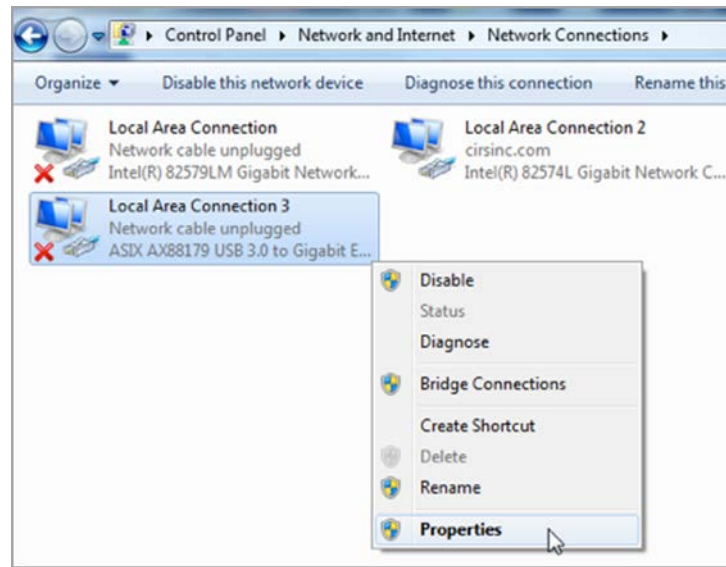


Figure 3-3. Access Network Adapter Properties

- 5 Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.

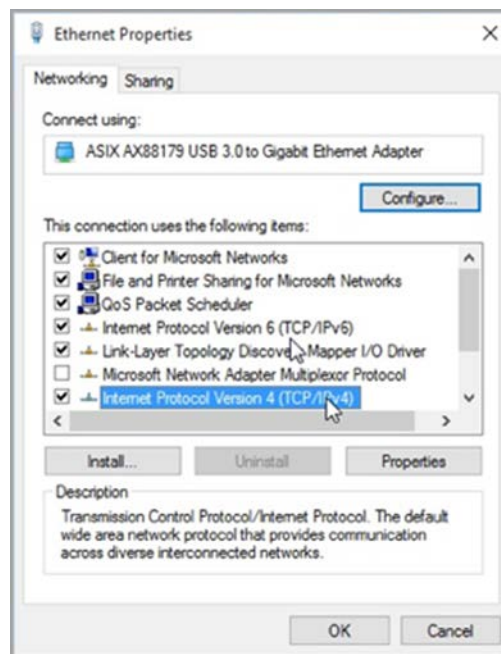


Figure 3-4. Set up Ethernet Properties

- 6 In the Internet Protocol Version 4 (TCP/IPv4) Properties window, change from the default option “Obtain an IP address automatically” to “Use the following IP address.” Enter “192.168.0.101” as the IP address and “255.255.255.000” as the Subnet mask.



**Note:** If an IP address conflict occurs because IP address 192.168.0.101 is already assigned to another network adapter, the user can try any other IP address between 192.168.0.102 and 192.168.0.249.

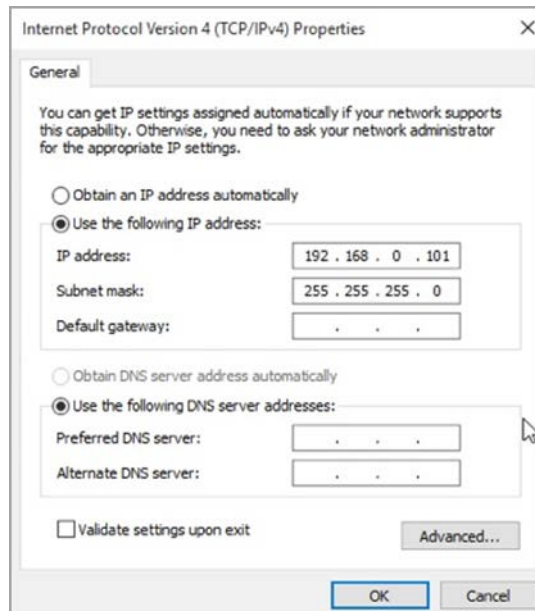


Figure 3-5. Specify IP Address

- 7 Once the IP address is entered, click **OK**. Connect the PC to the Controller using the provided Ethernet cable by inserting one end of the cable into the controller's Ethernet port and the other one into the USB-to-Network Adapter. Power on the controller. To check that the PC-to-controller connection was successful, ensure the icon of the "ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter" in the Control Panel matches the image below. Network connection can be renamed using the right-click menu.

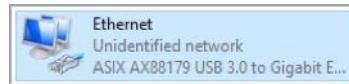


Figure 3-6. ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter Icon

- 8 A more in-depth check of the PC-to-controller communication connection can be done by running a "ping" command in Command Prompt as seen in the image below. To ping the controller, type "ping 192.168.0.250" and press **Enter**. Ping certifies IP-level connectivity to another TCP/IP device. If you receive Ping statistics for IP address 192.168.0.250 (controller IP address), the communication connection between the PC and controller was successful.

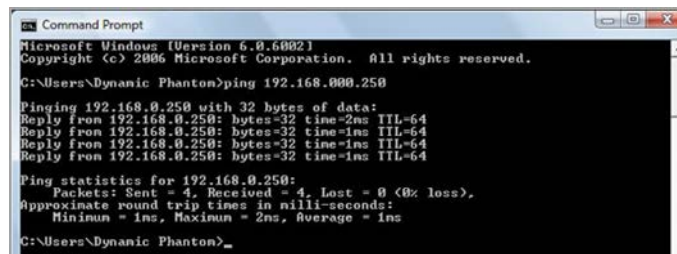


Figure 3-7. Ping Command

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# 4 Motion Control Software

## Introduction

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CIRS Motion Control is an application which allows you to control the movement of the CIRS motion phantoms. With CIRS Motion Control, you can quickly set up a movement based on a library of predefined motions, including Sin, Cos4, Cos6, Sawtooth, Sharkfin, Hysteresis (Model 008A only), or you can import custom motion data from any tab-delimited or comma-separated text file. CIRS Motion Control also allows you to save any motion to easily access the same parameters for repeated calibration and testing.

For software system requirements, see *CIRS Motion Control Software Minimum System Requirements* on page 25.

## Installation

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The CIRS Motion Control application requires the Trio PC Motion library, which allows the computer to recognize the Trio controller board in the phantoms motion controller boxes.

To install CIRS Motion Control, go to this website, [https://www.cirsinc.com/wp-content/uploads/2022/10/TrioPCMotion\\_4\\_0\\_6x86.zip](https://www.cirsinc.com/wp-content/uploads/2022/10/TrioPCMotion_4_0_6x86.zip), extract the downloaded zip file (**TrioPCMotion\_4\_0\_6x86.zip**) to your local hard drive, double-click the extracted file (**PCMotion Setup x86-4.0.6.msi**), and then follow the steps in the InstallShield Wizard.

Microsoft.NET Framework Version 4.8 is required for the CIRS Motion Control application to run.

## General Use

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The CIRS Motion Control software is preinstalled on the optional computer. Help can be launched from the Help Menu. A copy of the software is included on a USB drive.

The software automatically creates a log file where data about waveform parameters are saved. The log file is usually located under the current user in the Application Data folder. A Windows OS search function can be used to find the log file. Searching hidden files and folders should be enabled.

The log file provides a record of the motion history of the device and can be used as objective evidence that proper QA was performed.

## Software User Manual and Software Upgrades

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CIRS Motion Control software has an online user manual. After software installation, a copy may be viewed and downloaded using either the **Check for Updates** button from the Help Menu and selecting **Motion Control User Manual.pdf**, or by pointing a web browser to the CIRS Software Updates webpage: [https://www.cirsinc.com/wp-content/uploads/2023/03/CIRS\\_Motion\\_Control\\_User\\_Guide.pdf](https://www.cirsinc.com/wp-content/uploads/2023/03/CIRS_Motion_Control_User_Guide.pdf)

If the end-user is offline during use of the phantom, it is recommended that a copy of the CIRS Motion Control User Manual is downloaded and saved. Once a copy of the manual is saved in a known location, the PDF document can be opened and viewed in a window separate from the CIRS Motion Control software window to aid in phantom setup and use.

The user manual is regularly updated to incorporate new information based on the addition and/or modification of features as well as end-user feedback.

It is recommended that the end-user routinely check the CIRS Software Update webpage using the *Check for Updates* option from the Help Menu. This page indicates the current software version (Figure 4-1). The latest free software upgrade is posted as soon as it becomes available. Instructions for updating the software are also posted.





**Note:** Controllers with serial numbers containing P136 may experience PC communication failures upon updating Windows OS. If this occurs, consider ordering a motion controller update. For details on how to upgrade, refer to the Model 008A product brochure.

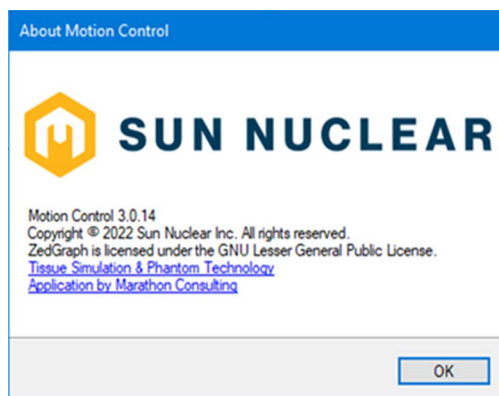
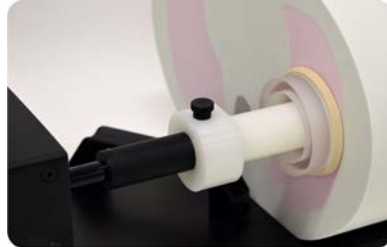


Figure 4-1. About CIRS Motion Control Software Window

# 5 4D CT QA Insert

- 1 Insert the 4D CT QA moving rod into the rod holder and secure using nylon screws.  
Insert the 4D CT QA static cylinder into the phantom's horizontal hole and secure using the rubber gasket.



*Figure 5-1. Moving Rod Into Rod Holder and Static Cylinder into Phantom's Horizontal Hole*

- 2 For IS and AP tests, position static cylinder with square end mark at 9 o'clock using level or machine square.  
For IS and LR tests, position static cylinder with square end mark at 12 o'clock using level or machine square.



**Left:** IS and AP Tests, **Right:** IS and LR Tests

*Figure 5-2. Positioning Static Cylinder Square End Mark*

- 3 Run phantom Homing (automatic when powered on). Perform a preliminary CT scan in “home” position without motion in order to verify alignment of moving fiducial to static grid fiducials. The 4D CT QA Moving Rod position may need to be adjusted to ensure proper alignment. Adjustments can be made by changing “Start Position” in the Advanced Motion Parameters window.



**Note:** CIRS Motion Control software has an online user manual. See *Software User Manual and Software Upgrades* on page 18 for details.

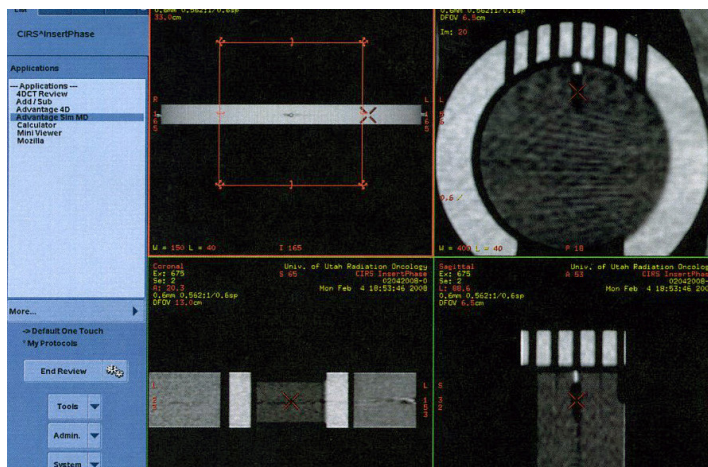


Figure 5-3. Static Position on a Preliminary CT Scan

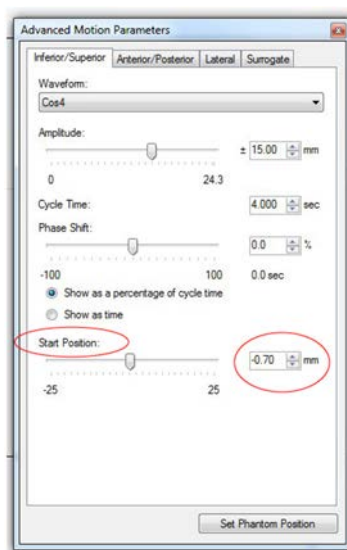
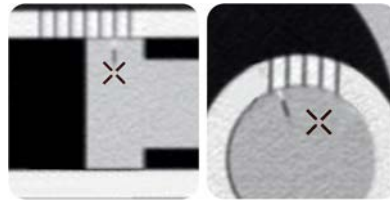


Figure 5-4. CIRS Motion Software Advanced Motion Parameters

- 4 Static grid fiducials have an increment of 5 mm and provide maximum displacement of  $\pm 15$  mm in IS direction and  $\pm 10$  mm in LR or AP directions. Set motion amplitudes within these limits in increments of 5 mm:
  - For IS: IS per your choice, LR and AP= 0, start angle 0 or 90 degrees
  - For LR: IS= 0, LR per your choice, AP= 0, start angle 0 degree
  - For AP: IS= 0, LR= 0, AP per your choice, start angle 90 degree

- 5 Run phantom and perform 4D CT imaging. Obtain test results from the 4D CT sorted images. Report results as the difference (in mm) between the moving and static fiducials when positioned at 0% and 50% phases.



**Left:** Linear Phase 0% at 10 mm amplitude,  
**Right:** Rotation Phase 50% lateral 5 mm amplitude

*Figure 5-5. Moving and Static Fiducials When Positioned at 0% and 50% Phases*

- 6 If the moving fiducial starting position is aligned with the static fiducial during preliminary static CT scan, then the results of 4D CT binning can be checked for the maximum and minimum amplitudes, respectively 0% and 50% phases. Since both static and moving fiducials measure 1 mm in diameter, misalignments as small as 0.5 mm can be easily visualized. The software measurement tool allows precise evaluation of these misalignments. If a discrepancy is discovered, check equipment and/or adjust treatment safety margins.
- 7 Due to its regular size and cylindrical shape, the moving rod can be used for motion artifact evaluation. The plunger that carries the moving fiducial is cylindrical in shape (45.7 mm diameter x 20.0 mm long) and can be used to investigate artifacts, volumes, and shapes during different breathing motions, including patient-specific motion profiles.



*Figure 5-6. Static Position on a Preliminary CT Scan*

# 6 Support and Maintenance

## Hardware Maintenance

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### Inspection

Periodically inspect the phantom and accessories for damage. If damage is visible, if any mechanical or electrical degradation is suspected, or if errors are suspected, discontinue use and contact Sun Nuclear Support. See *Contacting Sun Nuclear Support*.

### Repair

The phantom and the parts provided with the phantom cannot be repaired by the user. If there are problems with any of the devices, contact Sun Nuclear Support.

### Cleaning

You can clean the phantom with a soft cloth dampened with water and mild detergent. Do not use disinfectants or solvent-based cleaners or sprays.

### Disposal and Recycling



*Do not discard unit as waste. Recycle the components in accordance with local regulations.*

## Contacting Sun Nuclear Support

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You may request support in two ways:

- Submit a support request using our online form. See *Support Website* below.
- Contact the Sun Nuclear Support team by telephone:
  - U.S.A.: +1 321-259-6862, Option 3
  - Netherlands: +31 20 399 90 41, Option 1
  - Germany: +49 61 02 50 49 500, Option 2

### Support Website

- 1 Open an internet browser and navigate to [www.sunnuclear.com/support](http://www.sunnuclear.com/support).
- 2 Enter your email address and password and then click **Login**.
  - To download product information, click **Products and Devices**, select the product, and then select the download type.
  - To open a Support request, click **Open New Case**, complete the form, and then click **Create Case**.

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# 7 Specifications

## Product Specifications

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Table 7-1. Model 008A Specifications

Characteristic	Specification
Overall Dimensions	67 cm x 32 cm x 28 cm (26" x 13" x 11")
Overall Weight	17.2 kg (37.9 lb)
Power	110-250 VAC, 50/60 Hz
Amplitude, IS	± 25 mm
Amplitude, AP/LR	± 5 mm
Amplitude, Surrogate	± 25 mm
Max. Surrogate Platform Load	5.4 kg (12 lb)
Motion Accuracy	± 0.1 mm
Cycle Time	1 - ∞ (adjusted based on amplitude)
Waveforms	sin (t), 1-2 cos ^ 4(t), 1-2 cos ^ 6(t), Sawtooth, Sharkfin

## CIRS Motion Control Software Minimum System Requirements

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- Windows XP® or later
- Pentium 3® or equivalent
- 512 MB RAM
- 2 MB of available disk space

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# Appendix A: Regulatory Supplement

## Sun Nuclear Corporation Symbols

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The following symbols are used in this guide and in Sun Nuclear Corporation's product labels.



**WARNING:** This symbol indicates a risk of electric shock. (EN ISO 7010, W012)



**WARNING:** This symbol indicates a hazard that could result in major injury or equipment damage. (EN ISO 7010, W001)



**CAUTION:** This symbol indicates a potential hazard that could result in minor injury or equipment damage. (EN ISO 15223-1, 5.4.4)



**CAUTION:** This symbol indicates a pinch hazard. (EN ISO 7010, W024)



**Note:** Important or supporting information.



Manufacturer's Identification (name and address). (EN ISO 15223-1, 5.1.1)



Date of Manufacture. (EN ISO 15223-1, 5.1.3)



Temperature limitation. (EN ISO 15223-1, 5.3.7)



Humidity limitation. (EN ISO 15223-1, 5.3.8)



Atmospheric pressure limitation. (EN ISO 15223-1, 5.3.9)



Catalog Number. (EN ISO 15223-1, 5.1.6)



Consult instructions for use. This equipment must be used in accordance with the instructions in this manual. Read all instructions and safety labels before use. (EN ISO 15223-1, 5.4.3)



*Do not throw in trash; dispose of in an environmentally friendly way. (EN 50419)*



*This symbol indicates a general mandatory action. (EN ISO 7010, M001)*

## **Operator Responsibility**

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The instructions in this manual are intended for trained clinical personnel. The operator is solely responsible for the accurate setup and use of the phantom.

## **Reporting Health or Safety Related Issues or Concerns**

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Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

To report any safety or health related issues or concerns regarding the use of Sun Nuclear products, contact Sun Nuclear directly. See *Contacting Sun Nuclear Support* on page 23.

## **Modifications to Equipment**

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Any changes or modifications to the device that are not expressly approved by Sun Nuclear Corporation could void your warranty.



**+1 321 259 6862 // [sunnuclear.com](http://sunnuclear.com)**

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