Dynamic Platform
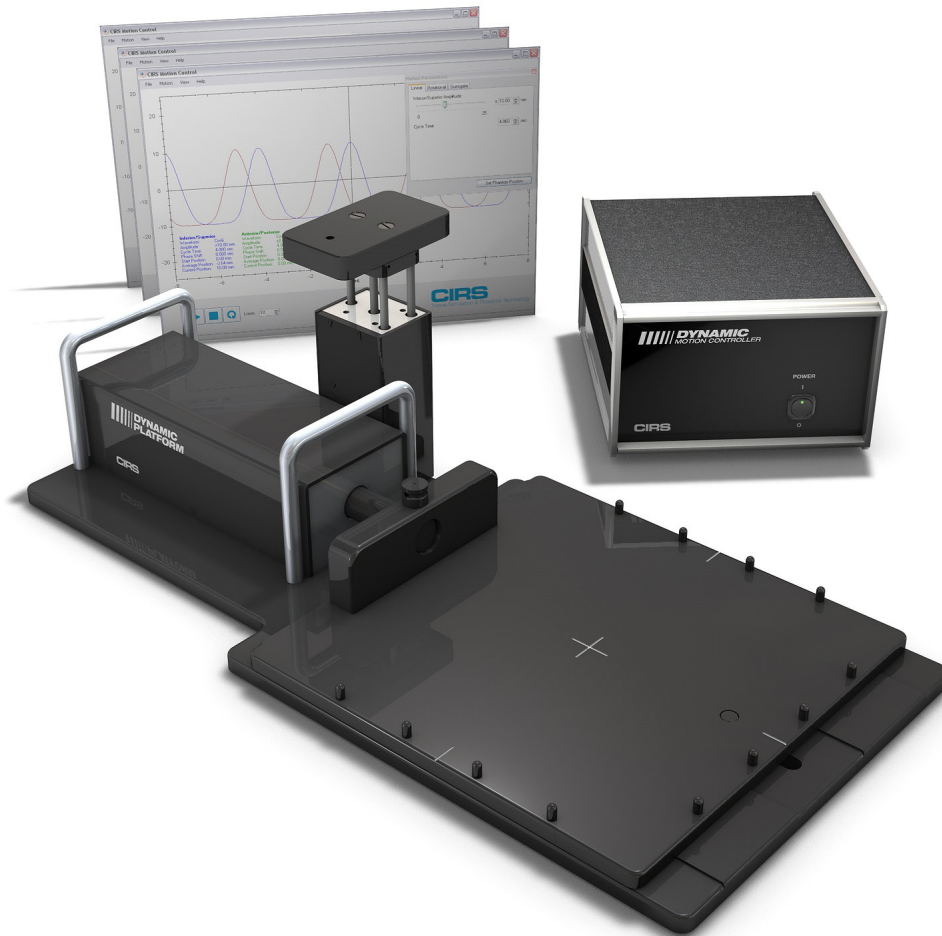
"Strict QA procedures for the imaging, planning and delivery of radiotherapy using respiratory management devices are required to ensure the safe and effective use of these devices."

AAPM TG-76 report
The management of respiratory
motion in radiation oncology

CIRS

Tissue Simulation & Phantom Technology

- Commission 4D imaging and 4D radiotherapy systems

- Quantify volumetric and positional aliasing of CT in the presence of 3D target motion

- Evaluate static and dynamic target localization accuracy of onboard imaging systems

- Test accuracy and consistency of tumor tracking and respiratory gating devices

- Assess dosimetric accuracy of temporally modulated radiation therapy

- Train and evaluate personnel during implementation of new equipment and techniques

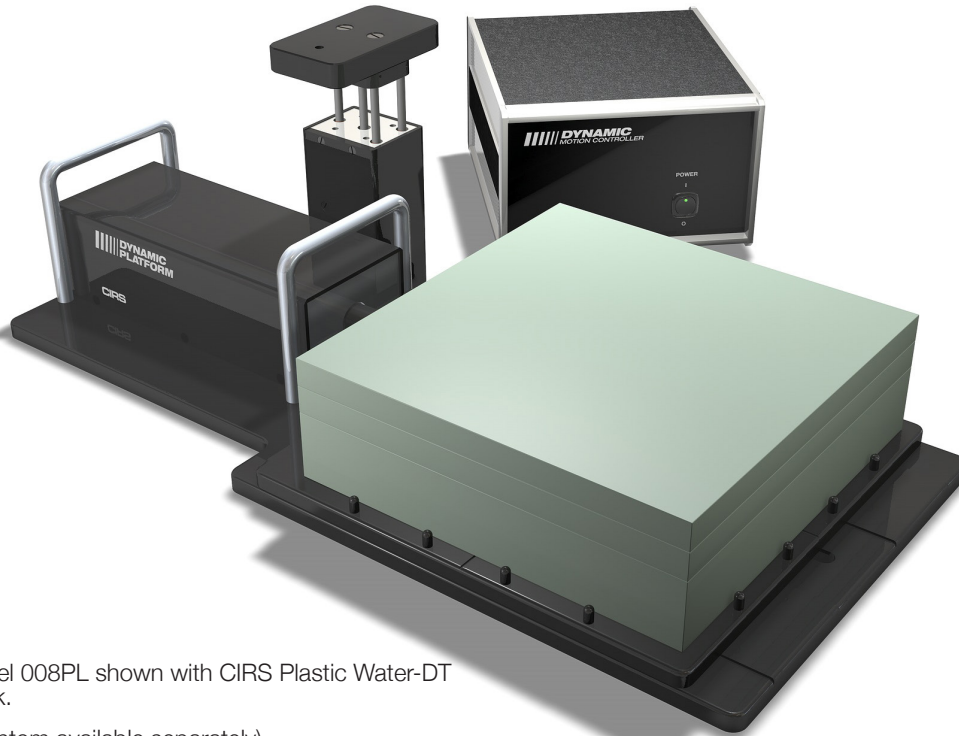- Accommodate Sun Nuclear ArcCHECK®

Overview

The CIRS Dynamic Platform provides an economical, user-friendly solution for the complex tasks associated with tumor motion and patient positioning in radiation therapy.

The platform is made from stiff, low-density plastics. The device enables precisely controlled inferior-superior motion up to 50 mm for any phantom up to 70 lbs. Multiple types of dosimeters and dosimeter arrays can be positioned on the platform and used for dose verification of moving target treatment plan. A removable pin system in the main platform allows consistent placement and fixation of almost any phantom and traditional laser alignment marks enable accurate positioning of the entire device. An independently controlled smaller platform provides Posterior-Anterior surrogate chest wall motion.

Computerized Imaging Reference Systems, Inc is recognized world wide for tissue simulation technology and is the leader in the manufacture of phantoms and simulators for medical imaging and radiotherapy.
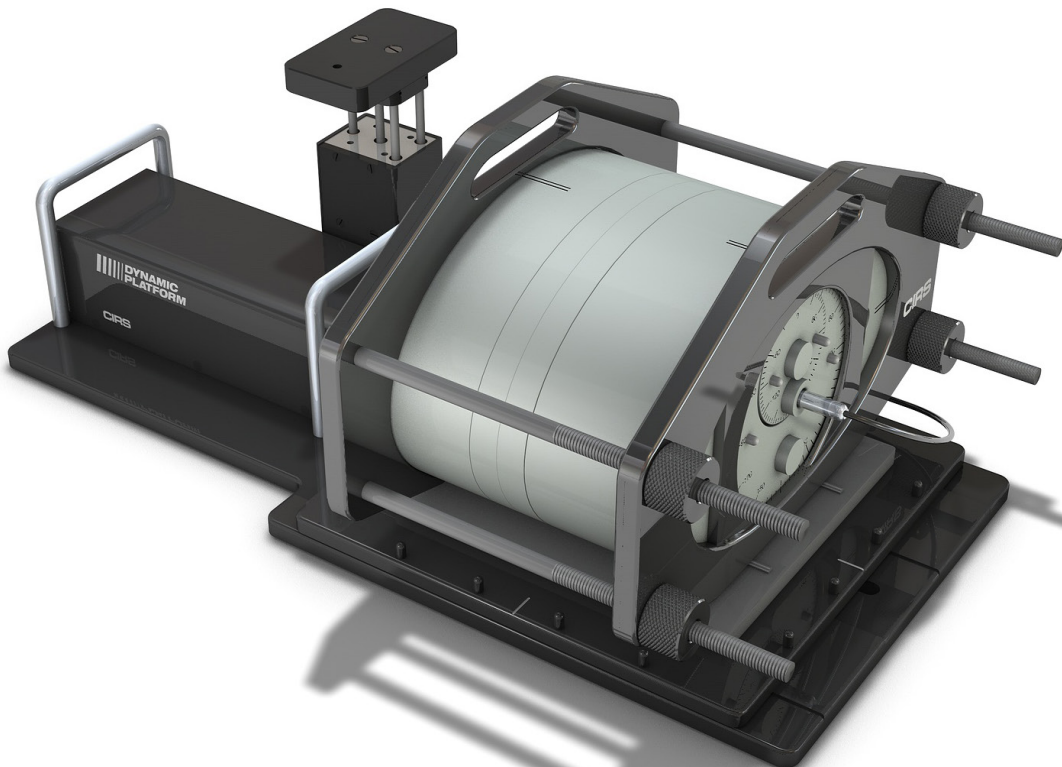**www.cirsinc.com**

Programmable Motion for Any Phantom

Model 008PL shown with CIRS Plastic Water-DT stack.

(Phantom available separately)

Model 008PL shown with CIRS Model 002H9K IMRT Head and Torso Freepoint Phantom.
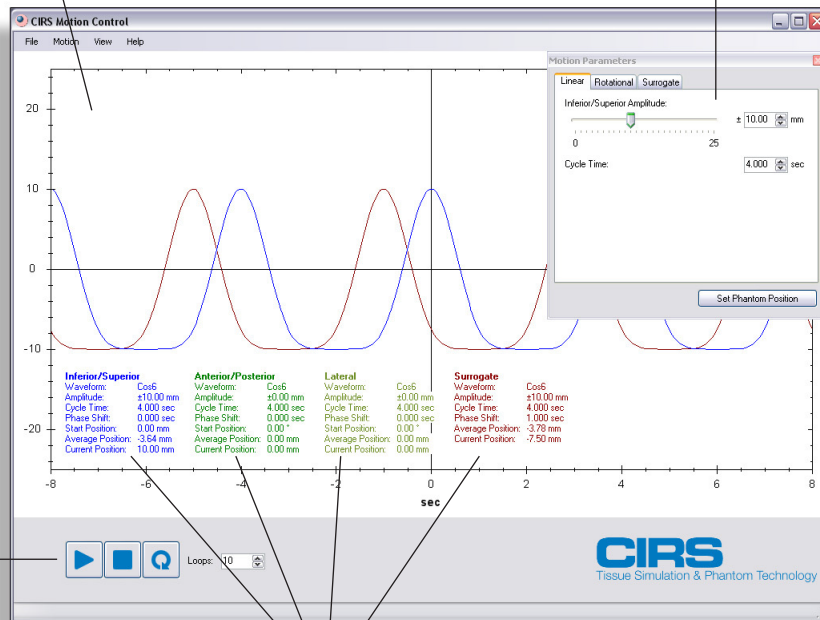
(Phantom available separately)

Easy To Use Software

Graphical user interface simplifies operation of the Model 008A

Adjust motion amplitude, cycle time and phase shift with pull down menus and slider bars

Instantly Start, Stop, Pause or Loop motion

Real-time display of target and surrogate motion parameters

Import patient specific waveforms from tab delimited or comma separated file formats

USER FRIENDLY MOTION CONTROL

The CIRS Dynamic Platform is operated using CIRS Motion Control Software, a user-friendly graphical user interface that can be installed on any computer running Windows platform.
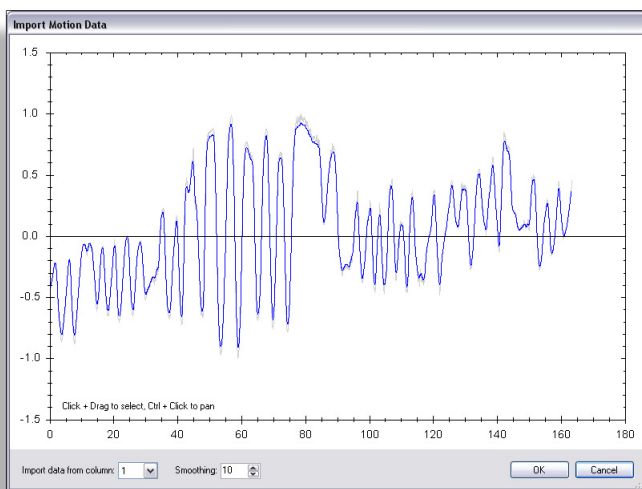
Amplitude, cycle time and phase shift can be applied to both the surrogate and main platform using slider bars or by entering desired values within the limits of the system. Five different waveforms are available from a standard pull down menu.

An unlimited number of clinically relevant and patient specific waveforms or correlation models can be imported from tab delimited or comma separated file formats.

There are also waveform editing, smoothing and analyzing tools to ease the optimization of custom waveforms. All motion files can be saved for future use.

The software also provides a convenient, real-time graphic display of pre-selected target start position, current position during operation and average time weighted position. In addition the ROI analyzing function provides the time spent by the target between two chosen amplitudes and the average time weighted position for that particular ROI.

Users can instantly start, stop or pause the motion at any time. New start positions can be graphically selected and applied making the device very useful for static test as well as dynamic testing. Users can also select the number of cycles to be looped by entering the desired value or choose continuous looping (1 million cycles).

Independently Controlled Surrogate Motion

The surrogate motion is mechanically independent of platform motion and programmable through the CIRS Motion Control Software. This feature provides even greater flexibility to the clinician and is useful in assessing correlation between surrogate and phantom motion.

Surrogate AP motion range of up to 50 mm can be achieved. The surrogate platform motor is powerful enough to accommodate bellows and other belts in addition to Varian RPM and various tracking fiducials.

- Maximum surrogate motion is 50 mm
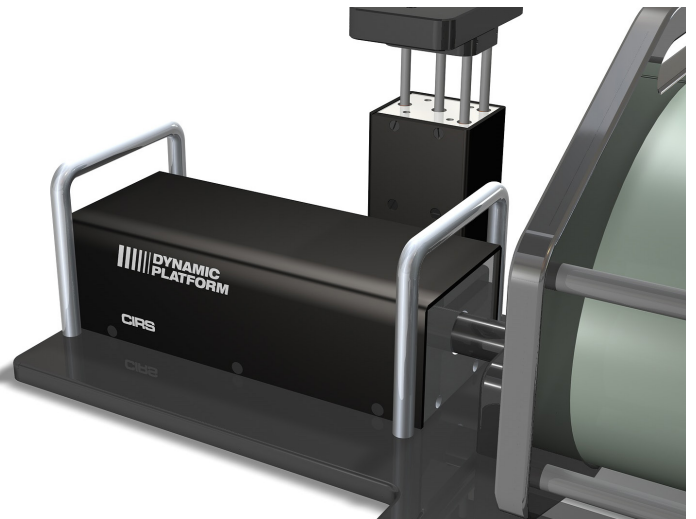- Minimum cycle time is 1 second
- Maximum cycle time is unlimited

Advanced Electromechanical Components

CONTROLLER

Motions are generated through a multi-axis motion controller. A USB port enables interfacing with most computers. The controller sends instructions as well as supplies and conditions power to the actuators thru a 25 pin serial cable. The motion controller can be fully operated through CIRS Motion Control Software from a distance of up to 70 feet with the Ethernet/USB cable provided.

ACTUATOR

Housed within anodized aluminum enclosures, the actuators contains bipolar stepper motors. Maximum range of inferior-superior (IS) platform motion is 50mm with an accuracy of 0.05 mm. Maximum range of anterior-posterior (AP) surrogate motion is 50mm with an accuracy of 0.05 mm. Motions can be synchronized to one another with accuracy better than 20 msec. Motion cycle time accuracy is better than 5 msec. Optical sensors ensure precise mechanical positioning. The actuators are designed for continuous operation. If not manually stopped and reset by the user, they will perform 1,000,000 (in continuous mode) cycles then stop automatically.

Model 008PL Specifications

Overall Dimensions:	71 x 35 x 28 cm
Overall Weight:	17.2 kg
Power:	110-250 VAC, 50/60 Hz
Platform Dimensions:	35 x 35 cm
Max. Platform Load:	32 kg (70 lbs)
Amplitude, IS:	± 25 mm
Amplitude, AP Surrogate:	±25 mm
Max. Surrogate Platform Load	5.4 kg (12 lbs.)
Motion Accuracy:	±0.1 mm
Cycle Time:	1 - ∞ (adjusted based on amplitude)
Editable built-in waveforms:	$\sin(t)$, $1-2\cos4(t)$, $1-2\cos6(t)$, sawtooth, sharkfin

CIRS Motion Control Software: Minimum Hardware Requirements

Windows XP® or later version (32 and 64 bit)

Pentium 3® or equivalent

512 MB RAM

2 MB of available disk space

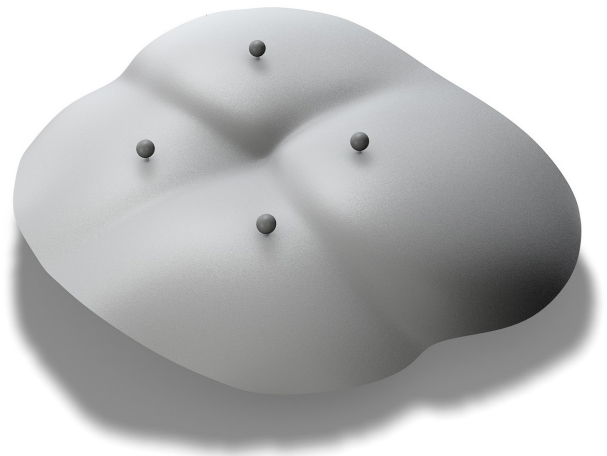# Ordering Information

INCLUDED WITH MODEL 008PL

Part No.	Qty	Component Description
008PL	1	Dynamic Platform
	1	Dynamic Motion Controller with firmware installed (110 - 220V, 50 - 60Hz)
	1	Actuator attached to platform
	1	3rd axis gating device (mounted to actuator)
	1	CIRS Motion Control Software USB
	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
	2	2 Amp fast acting fuses
	16	Platform pins
	1	User's guide
	1	Carry Case

OPTIONAL ITEMS

008A-125	Chest plate with reflective 11.5 mm tracker balls
008A-253	Cable CAT5E 150 Feet for Dynamic Phantoms (008A, 008M, 008PL)

Optional chest plate for collecting chest motion and breathing data using an optical tracking system

LIMITED WARRANTY

All standard CIRS products and accessories are warranted by CIRS against defects in material and workmanship for a period as specified below. During the warranty period, the manufacturer will repair or, at its option, replace, at no charge, a product containing such defect provided it is returned, transportation prepaid, to the manufacturer. Products repaired in warranty will be returned transportation prepaid.

There are no warranties, expressed or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description on the face hereof. This expressed warranty excludes coverage of, and does not provide relief for, incidental or consequential damages of any kind or nature, including but not limited to loss of use, loss of sales or inconvenience. The exclusive remedy of the purchaser is limited to repair, recalibration, or replacement of the product at manufacturer's option.

This warranty does not apply if the product, as determined by the manufacturer, is defective because of normal wear, accident, misuse, or modification.

Non-Warranty Service
If repairs or replacement not covered by this warranty are required, a repair estimate will be submitted for approval before proceeding with said repair or replacement.

Product	Warranty Period
Non-Standard or customized products	3 months
Training Phantoms and Disposable Products	12 months
Electrical Products and Dynamic Phantoms	**24 months**
All other standard products	60 months
Plastic Water	60 months

MODEL 008PL FEATURES

- Move any phantom with sub-millimeter accuracy and reproducibility

- Surrogate and phantom motion fully and independently programmable

- Easy transport, set-up and operation

- Motion software enables different cycles, amplitudes and waveforms

- Surrogate breathing platform accommodates numerous gating devices

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