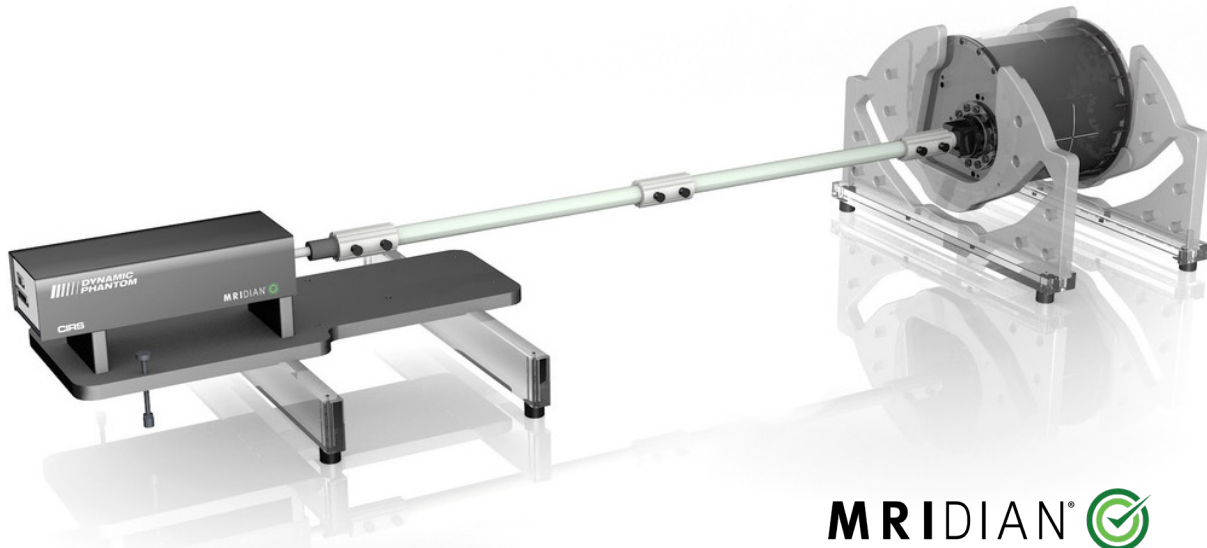


Viewray® Dynamic Phantom

Model 008V



MRIDIAN® 

IMAGE ACQUISITION • TREATMENT PLANNING • DOSE DELIVERY

The Viewray® Dynamic Phantom is used to validate the unique capabilities of the Viewray System to track and deliver a gated treatment based on real-time MRI imaging. Dosimetry capabilities of the phantom enhance the validation of the Viewray system from the planning phase to the final stage of gated treatment delivery. This phantom was designed in collaboration with Viewray® and complies with Viewray Requirements Specification document RQ-0034 Rev C. Refer to Viewray® protocol FTP-06 Rev B "Functional Test Procedure" for detailed instructions regarding how to use this phantom with the MRIdian system.

The Model 008V body represents an average human thorax and is comprised of a plastic shell with a cylindrical through hole to accommodate a moving rod with simulated target. The embedded MRI/CT target is made of an MRI target gel that provides contrast with respect to the surrounding MRI background gel so as to allow tracking of tumor motion. The target can receive an ion chamber for treatment dose verification. The moving rod is connected to a motion actuator box that induces three-dimensional target motion through linear translation and rotation of the rod. In addition to the dosimetry target, the rod also contains an offset target and a cylindrical region made of MRI target gel to increase the targets' tracking accuracy.

Our Viewray® Dynamic Phantom includes four spherical static targets and a fifth rectangular parallelepiped target to simulate organs at risk. Each of these three targets receives an ion chamber for dosimetry measurements. The body targets,

made of MRI target gel, are surrounded by the same MRI background gel used in the moving rod. These targets allow for dosimetry measurements with the same ion chamber as the one used for the moving rod. Also, they can be used to check for the automatic target delineation.

The phantom is equipped with a target motion position output, which provides two square-waves that can be analyzed on an oscilloscope against "Beam On" – "Beam Off" to determine beam latency, which is important in gated treatments.

The phantom comes in two custom hard-sided cases and is equipped with a user guide and one-year warranty.

Features

- Validated specifically for Viewray Systems
- 3D target motion and static targets receive ion chambers
- Adaptive RT plan verification
- Voltage output to verify gating
- End-to-end commissioning
- Body & rod filled with gels to eliminate liquid specific image artifacts

*Viewray® is a registered trademark (Oakwood Village, OH)

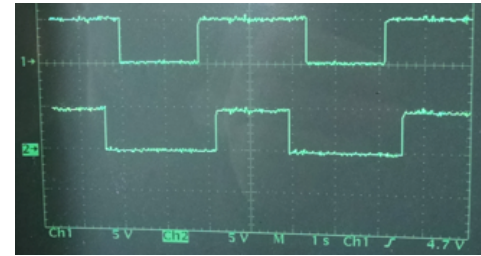
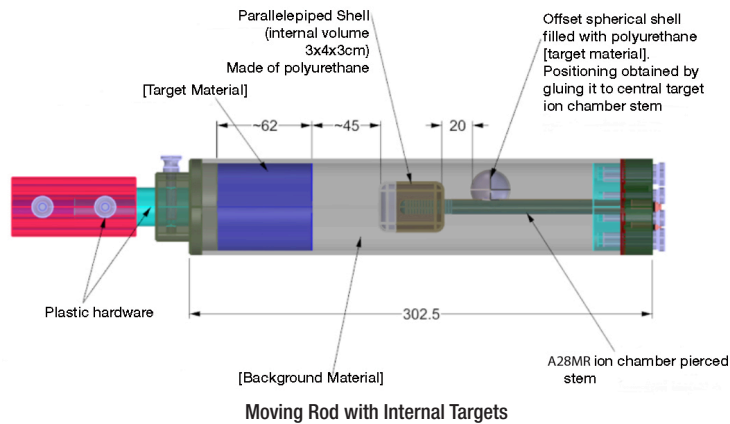
**Other ion chambers are available. Refer to CIRS cavity codes at www.cirsinc.com/support for corresponding CV number.
Patent # US 7,151,253 B2

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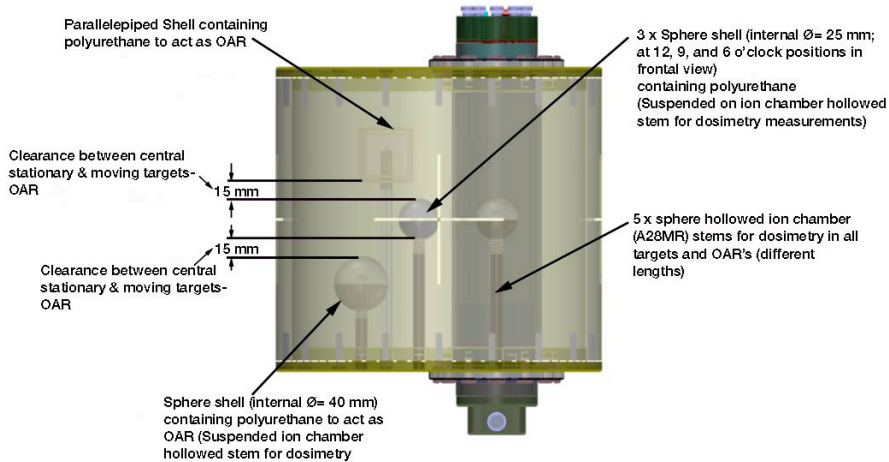
WWW.CIRSINC.COM

CIRS

Tissue Simulation & Phantom Technology



Square-waves of the target motion position as seen on an oscilloscope



SPECIFICATIONS

MOTION CONTROLLER

| | |
|--------------------|-------------------------------------------------------------------------------------------|
| OVERALL DIMENSIONS | 67 cm x 32 cm x 20 cm |
| OVERALL WEIGHT | 10 kg (22 lb) |
| AMPLITUDE, IS | ± 25 mm |
| AMPLITUDE, AP/LR | ± 5 mm |
| MOTION ACCURACY | ± 0.1 mm |
| CYCLE TIME | 1 - ∞ (adjusted based on amplitude) |
| WAVEFORMS | sin (t), 1-2cos ⁴ (t), 1-2cos ⁶ (t), sawtooth, sharkfin, hysteresis |

PHANTOM BODY

| | |
|--------------------|--------------------------------------------------------------------------------------------------------------------|
| OVERALL DIMENSIONS | 54 cm x 31.5 cm x 35 cm (With supports) Ø 25.4 cm x 23.6 cm (Without supports) (Gel Volume Ø 22.8 cm x 24.0) |
| OVERALL WEIGHT | 13.6 kg (30 lb) Gel only 10 Kg (22 lb). |
| MATERIALS | Body Housing – Acrylic; Body and Body targets – CIRS proprietary gels |

USER FRIENDLY MOTION CONTROL

The CIRS Viewray® Dynamic Phantom target motion is independently controlled using CIRS Motion Control Software. The graphical user interface provides an unlimited variety of motions while simplifying the operation of the phantom to an intuitive level. Patient specific motion profiles are easily imported and there is no need to make hardware adjustments or have special programming skills.

MOVING ROD

| | |
|--------------------|----------------------------------------------------------------------|
| OVERALL DIMENSIONS | Ø 6.3 cm x 30.2 m |
| OVERALL WEIGHT | 1.2 kg (2.6 lb) |
| MATERIALS | Rod Housing – Acrylic; Rod and Rod target – CIRS proprietary gels |