

S H E L L E Y



M E D I C A L
I M A G I N G
T E C H N O L O G I E S

Setup and Reference Guide

Dynamic Heart Phantom Model: DHP01



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Triangular Symbol with a “!” in it CAUTION: Safety Instructions

1. The Two Power Supplies For the Dynamic Heart System are **120VAC INPUT ONLY!**
2. The hydrogel heart should only come in contact with distilled water in the tank and in storage.
3. Use surgical gloves or clean rubber gloves when handling the hydrogel heart.
4. Use a mild liquid soap when cleaning the acrylic tank and components that come in contact with the hydrogel heart. Rinse the acrylic tank and related components with warm water after cleaning. Be sure to clean up residual water with a dry cloth.

Before you assemble the dynamic heart phantom

1. Carefully read this manual and view the assembly video to understand thoroughly understand how to assemble and how to operate this device.
2. Remove all components from the packing cases and check for damage. If any item appears damaged take photographs of the damaged component(s) and carefully inspect the outside of the shipping container for damage. Contact the carrier and our company.
3. Check to make sure you have received all components listed on the Packing List on page.
4. Be sure that the inside of the Acrylic Tank and related components are clean and free of foreign particles.
5. Have 16 litres of distilled water ready to pour into the tank after the assembly process. It is very important to minimize the time in which the PVA heart is exposed to air. Five to ten minutes of exposure when setting up is acceptable.
6. Before assembling locate the technical drawing on [page ?](#) to help guide you through the assembly.

Product Cleaning

Use a mild soap or detergent, then dry using micro-fiber cloths. Thoroughly rinse the tank and components with clean Distilled Water. **DO NOT use chemicals to clean** the inside of the tank and related components. Chemicals can alter the imaging properties of the PVA hydrogel material, and in some cases can stiffen the material causing the PVA hydrogel material to become brittle and crack. When system is in use Distilled Water should be

replaced when a hint of cloudiness appears. This usually occurs when bare hands have been used. Distilled Water will remain clear for weeks if no bare hand contact is made.

Assembly procedure

Step 1.

Remove the screws from the lid of the **Acrylic Tank** to gain access to the inside of the tank. Care is required when removing the lid, the lid can seal/stick to the gasket and tank (suction) making it difficult to remove.

Step 2.

Once the lid is off lift off the **Acrylic Housing** (a three sided piece) that covers the area where the **Hydrogel Heart** will be mounted. [This component should be labelled with a number on the drawing and described the same \(arch bracket\).](#)

Step 3.

Remove the screws (6) from the **Heart Cradle**.

Step 4.

Remove the screws (2) from the arch shaped **Clamping Cradle Plate** that will eventually hold/secure the **Hydrogel Heart** component into position.

Step 5.

Carefully remove the motor control encasement that covers the motor controller assembly by unscrewing the brass thumb screws (2) on either side of the encasement. Removing the motor control encasement will allow access for connecting and tightening the **Servo Arm Shaft** to the **Servo Clamping Ring** and it will allow you access to the RAPU device, scan disc memory card...

Step 6.

Install 9V Battery to the 9V Battery Cradle. Secure the **Servo Hub Assembly** to the end of the tank by carefully inserting the **Servo Hub Assembly** (4) into the tanks circular **Servo Hub Port** (5), but only after applying a small amount of white lithium grease to the 2-3/4" diameter servo hub o-rings (6) and between the two 3/8" ID servo arm, sealing o-rings (7). Turn and push to insert the **Servo Hub Assembly**. Line up the four screw holes and fasten the **Servo Hub Assembly** to the tank with 4 nylon 1/4 -20 x 3/4" long nylon thumbscrews to tank servo end (8). Replace **Servo Cover** for protection when adding water or installing heart.

Step 7.

IMPORTANT: Have 16 litres of distilled water ready to fill the tank and cover the **Hydrogel Heart**.

Step 8.

Wearing surgical or rubber gloves, remove the **Hydrogel Heart** from the distilled water. You will notice that the **Hydrogel Heart** has circular grooves that match the grooves in the arched **Clamping Cradle Plate**. Position the **Hydrogel Heart** in the arched **Clamping Cradle Plate** grooves and slide the **Effector arm** (9) through the 3/8” diameter hole in the front **Clamping Cradle Plate** (10), then lower the **Hydrogel heart** into the **Clamping Cradle Plate** grooves (11) on the bottom half of the arched shaped **Clamping Cradle Plate** (12).

Step 9.

Position the top of the arch shaped **Clamping Cradle Plate** over top of the **Hydrogel Heart** grooves and fasten with 2 - 1/4-20 x 1-1/4” long nylon thumbscrews (13). Fasten the **Effector Hub** (13) to the **Effector Arm** (9), and secure with a screw.

Step 10.

Attach **Servo Arm Hub** (14) to the **Effector Arm** with 4 - 6-32 x 1/2” nylon thumbscrews.

Step 11.

Slide the secured **Hydrogel Heart** and **Heart Cradle** towards the servo hub (4) and insert the Servo Arm (15) through the 3/8” diameter hole in the **Servo Hub Port**.

Step 12.

Insert the **Servo Arm** into the **Servo Clamping Ring** (16) and turn the setscrew with a 3/32 Allen wrench to tighten. **IMPORTANT.** Be sure the **Servo Arm** is fully positioned into the **Servo Clamping Ring**.

Step 13.

Fasten **Heart Cradle** base (17) to **Heart Cradle Base Plate** (1) with 6 - 1/4-20 x 1-1/4” long nylon thumbscrews plus 3 pieces 1/4” nylon washers, making sure the heart cradle (17) is sitting parallel to the inside walls of tank.

Note: Removing the mylar window may help in accessing the heart cradle mounting screws.

Step 14.

Add distilled water to the tank. Make sure the **Hydrogel Heart** is adequately covered with the distilled water.

Step 15.

To **Remove Air Bubbles from Heart** gently squeeze a few times. Be careful as to not damage the Heart.

Step 16.

Position the **Tank Lid** on top of the gasket. Align the lid with alignment markings in the top right corner of the tank. Put the screws (12 - 1/4-20 x 1-1/4" length nylon thumbscrews) in each hole, tightening them slightly. Once all screws are aligned, then tighten all screws. Do not over tighten.

Electrical Connections:

Caution Symbol The Two Power Supplies For the Dynamic Heart System are **120VAC INPUT ONLY!**

Plug In the power supply with output 5Vdc, 2.6A into a 110 VAC source. Then plug in the output end into the connector near the on switch. This is the power for the Servo's. Then remove Servo Cover. Next connect the 9V Battery to the 9V Battery Cradle near the Mini SSC II Board, if it has not been done already.

Plug in the power supply with output 6Vdc, 500mA into a 110 VAC source. Then plug in the output end into the green RAPU remote board. The LCD Screen should light up once this is done.

Next connect the 9V Battery to the 9V Battery Cradle near the 'Mini SSC II Board. This is the dc power for the Mini SSC II Board.

The Electrical Connections are complete.

Turn the switch for the RAPU/ Servo Electronic Assembly on.

Please go to the Software section.

Caution Symbol The Two Power Supplies For the Dynamic Heart System have different DC power outputs and are color coded. **Do not mix up or damage will occur!**

Programming Heart Motion Events

*** Please Refer To RAPU User Guide***

O-Ring Care & Sizes

Care must be taken not to damage o-rings during assembly/disassembly. When assembling servo hub to servo hub port, apply the two 2-3/4" diameter o-rings with a small amount of white lithium grease. Also insert a dab of grease between the two 3/8" diameter o-rings before inserting the servo arm through the 3/8" diameter hole in the servo hub when installing.

- Servo Hub Exterior: 2-3/4" O-Rings #146 Buna .103 wide 2.818OD, 2.612 ID.
- Servo Hub Interior: 3/8" O-Rings, #012 Buna .070 wide, .504OD, .364ID
- Mylar Window Face Mount: O-Ring #266 Buna .139 wide, 7.984ID, 8.262 OD

3D Grip System (X-Ray Imaging) For MR Version Only

Reference marks have been added to the Heart Cradle and Cradle Cover in four different locations.

This has been done to facilitate setting up a 3D grid system for measuring images. A 1mm SS Ball can be set in one of the two holes to be picked up during x-ray imaging. The other hole that is 5mm (.197") offset is to be used as a known distance from the SS ball. This hole is there so if instruments are used to locate the SS ball they will not receive a distorted reading. Set "A" is located on side of the front cradle plate near the top corner; this set is used for an overall reference when overlapping images.

The other 3 sets of holes have been set up on the front surface of the front cradle plate, the cradle cover top and the cradle cover (window) side. Be sure to align the marks on the top of the cover to the top of the front cradle plate for proper orientation. The drawings that show where these holes are located are shown below. This grid will allow the set-up of the 3D grid.

Packing List:

The following items ship with every Dynamic Heart system. You may have some additional options and accessories not listed here.

- ❑ Dynamic Heart Plexiglass Tank with Lid
- ❑ Rubber Gasket For Tank Lid
- ❑ Silicon Heart
- ❑ Plexiglas Heart Cradle

- ❑ (2 Pieces) One Meter 3/8" I.D. Braided Drain Hoses
- ❑ RAPU/ Servo Electronic Assembly
- ❑ Lid For RAPU/ Servo Electronic Assembly
- ❑ (4 Pieces) 1/4"-20 x 3/4" Plastic Thumb Screws For RAPU/ Servo Electronic Assembly
- ❑ (8 Pieces) 1/4"-20 x 1" Plastic Thumb Screws For Plexiglas Heart Cradle
- ❑ (12 Pieces) 1/4"-20 x 1 1/4" Plastic Thumb Screws For Tank Lid
- ❑ (8 Pieces) 1/4"-20 x 3/4" Plastic Thumb Screws For Tank Window
- ❑ (4 Pieces) 6-32" x 1/2" Plastic Thumb Screws To Join Effector And Servo Arms
- ❑ (1 Piece) 10-32" x 1/2" Slot Screw For Effector Arm
- ❑ Operating Manual
- ❑ Instruction Video Disc
- ❑ RAPU Software – Installed on Remote/Disc
- ❑ VSA 3.0 Software Disc
- ❑ (1 Piece) 9V Battery
- ❑ Communication Cable
- ❑ Infrared Remote (For X-Ray Only)
- ❑ 2 Gig. SD Card For RAPU
- ❑ Power Supply Output 5Vdc, 2.6A For Servo's
- ❑ Power Supply Output 6Vdc, 500mA For RAPU
- ❑ RC to DC Converter (only for MR model)
- ❑ Surgical gloves – 1 pair

SPARE PARTS KIT:

- ❑ (2 Pieces) 'O' Rings 2 3/4" For RAPU/ Servo Hub Exterior
- ❑ (1 Piece) 'O' Ring 3/8" For RAPU/ Servo Hub Interior
- ❑ (1 Piece) 'O' Ring 266 BUNA For Mylar Window Facemount
- ❑ (2 Pieces) 1/4"-20 x 3/4" Plastic Thumb Screws For RAPU/ Servo Electronic Assembly
- ❑ (4 Pieces) 1/4"-20 x 1" Plastic Thumb Screws For Plexiglas Heart Cradle
- ❑ (6 Pieces) 1/4"-20 x 1 1/4" Plastic Thumb Screws For Tank Lid
- ❑ (4 Pieces) 1/4"-20 x 3/4" Plastic Thumb Screws For Tank Window

- ❑ (4 Pieces) 6-32" x 1/2" Plastic Thumb Screws To Join Effector And Servo Arms
- ❑ (1 Piece) 10-32" x 1/2" Slot Screw For Effector Arm
- ❑ (1 Piece) 9V Battery

Warranty Statement

WARRANTY NEW EQUIPMENT

Equipment and systems supplied by Shelley Medical Imaging Technologies (hereinafter 'Shelley') are warranted to be free from defect in materials and workmanship for a period of one year from date of shipment. We agree to either repair or replace the defective material, at our option, as quickly as possible. This warranty does not cover normal wear items, damage due to accidents or misuse, or failure to follow maintenance or operation instructions. This warranty is F.O.B. North York, Ontario and all shipments must be made prepaid. Equipment and systems distributed by Shelley are protected by warranties established by the respective manufacturer. In most cases, it will be necessary for the manufacturer to evaluate the failed equipment in order to determine if warranty applies.

REPAIRS

All repairs (exclusive of those items covered by the warranty above) done by Shelley are warranted to be free from defects in material and workmanship for a period of 90 days from the repair date. All of the other terms mentioned above still apply. Except as specifically set forth above, Shelley makes no other representations, warranties or conditions, either expressed or implied, with regard to any goods or services provided by Shelley to the purchaser, including but not limited to, all other implied warranties or conditions of completeness or accuracy or of merchantable quality and fitness for a particular purpose and those arising by statute or otherwise in law or from a course of dealing or usage of trade.

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