

**Robotics**  
Anything is Possible!

5 DEGREES OF FREEDOM ROBOTIC ARM

2 SIDED VACCUM ASSISTED EXTRACTION

UP-TO 50 X ZOOM AI CAMERA

ARTIFICIAL INTELLIGENCE ENHANCED EXTRACTION

100 INCHES AUGMENTED REALITY DISPLAY

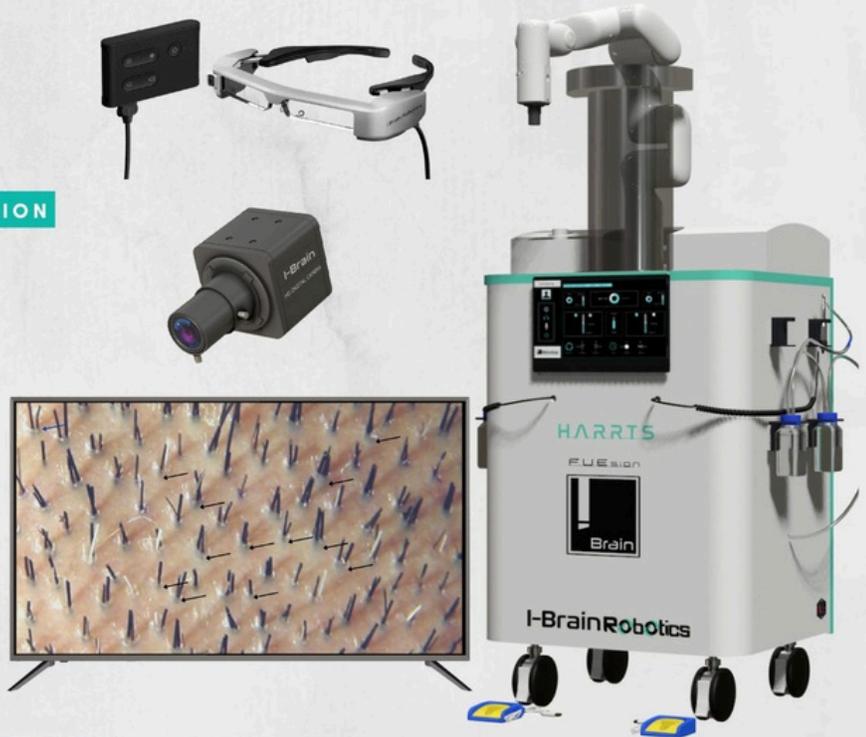
SCALABLE LARGE SCREEN HEADS-UP DISPLAY

AUTOMATIC GRAFT COUNTING

WIRELESS FOOT CONTROLS

INTERACTIVE TOUCH SCREEN DISPLAY

HANDS-FREE VOICE COMMANDS

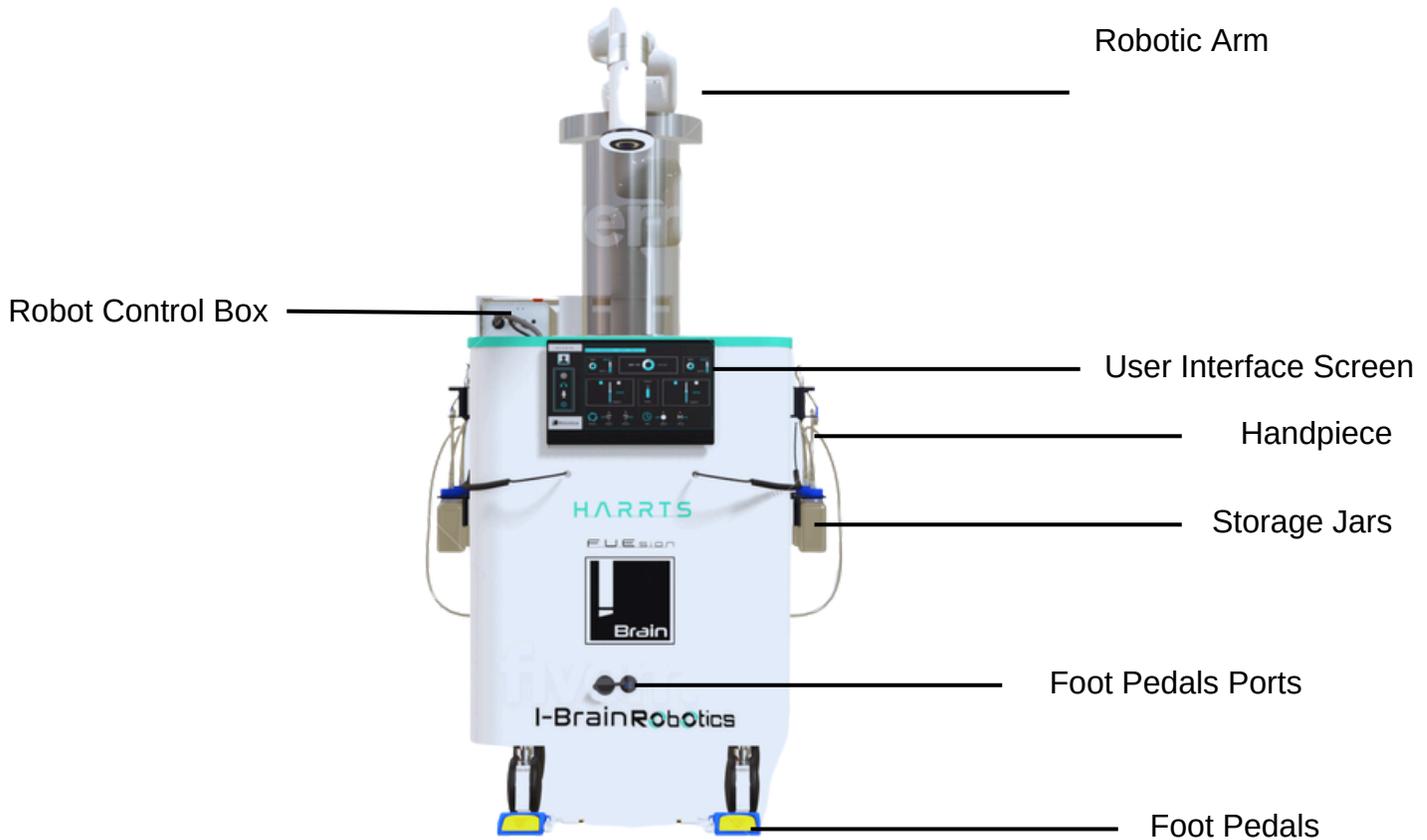
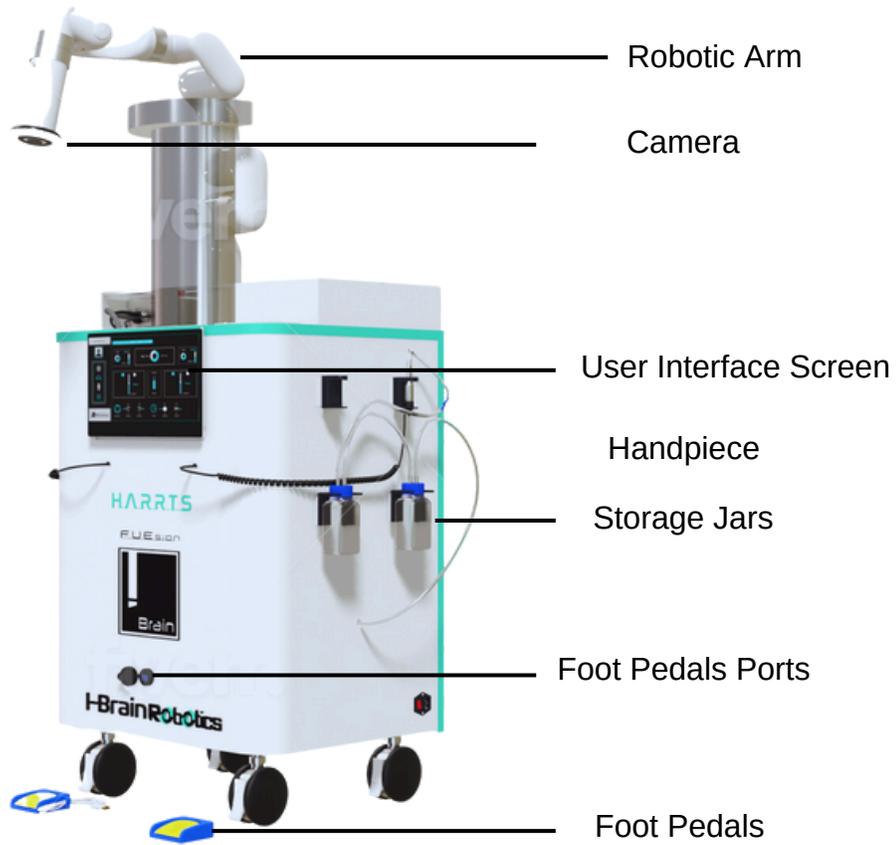


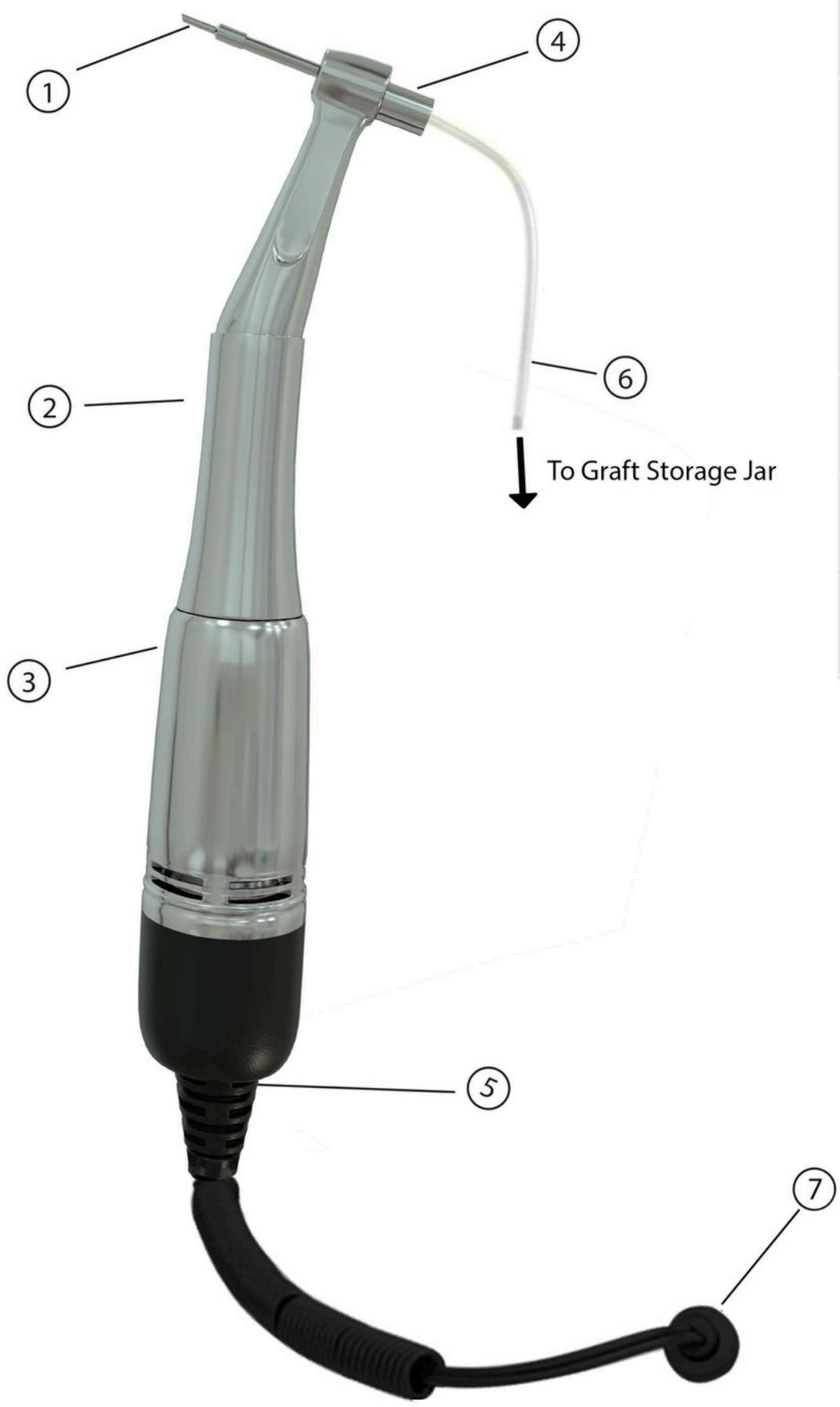
| HARRTS FUESION X |

AI,AR, Computer Vision Assisted Robotic Hair Transplant System

# FUESION X

## INSTRUCTION MANUAL





①	Safety Punch
②	Hand Piece
③	Motor
④	Handpiece Cap
⑤	Power Cord
⑥	Suction Pipe
⑦	Power Plug

Figure:1.1

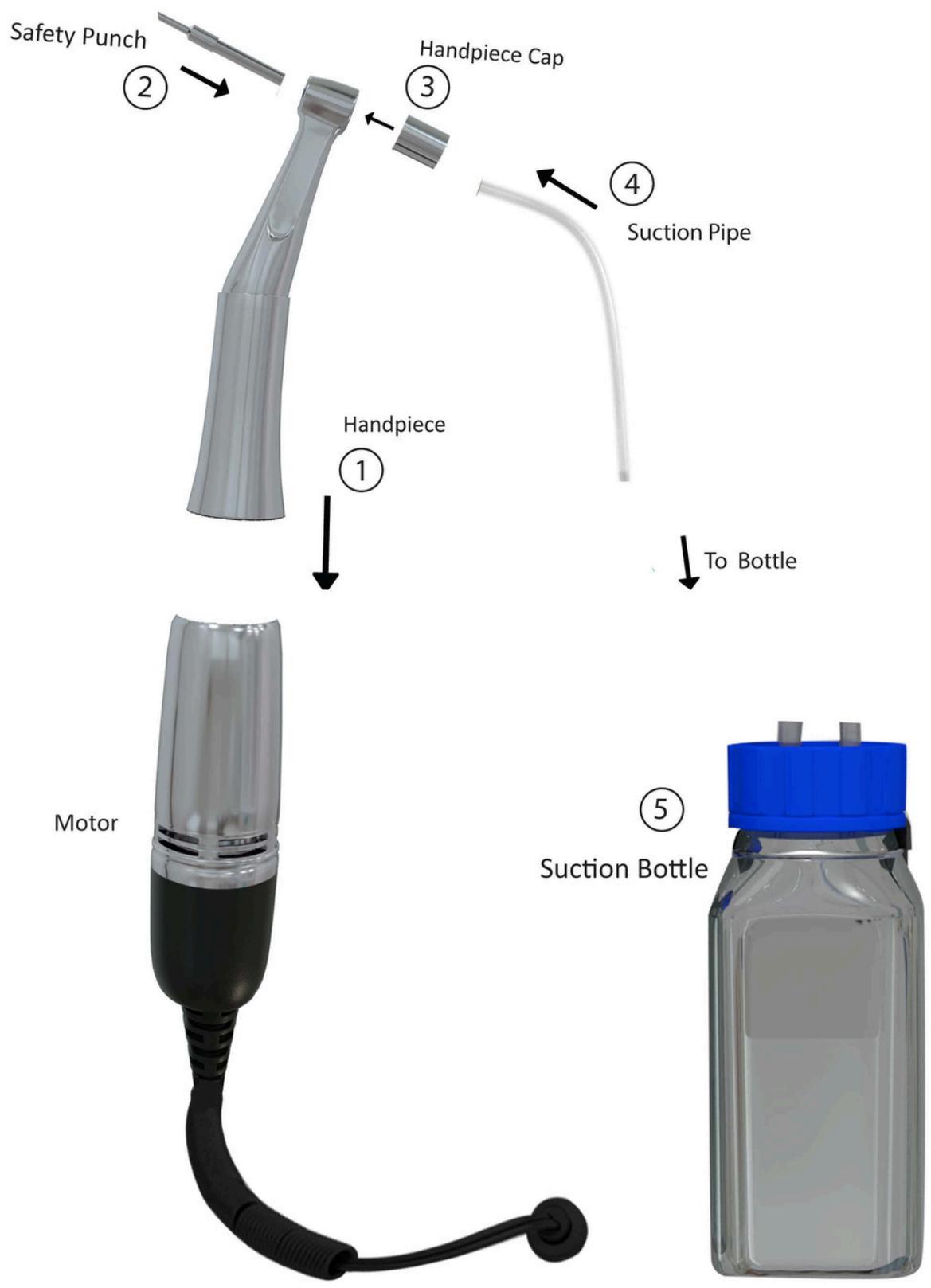


Figure:1.2

Fig 1

## Instruction Manual to use the HARRTS FUEsion X System

### Remote Switches



- The system has three wireless switches: one controls power to the main system, and two control the suction pumps.
- The wireless switch on the back of the machine turns the main system on/off.
- The two wireless switches on the top surface control suction: the left switch controls the left suction, and the right switch controls the right suction.

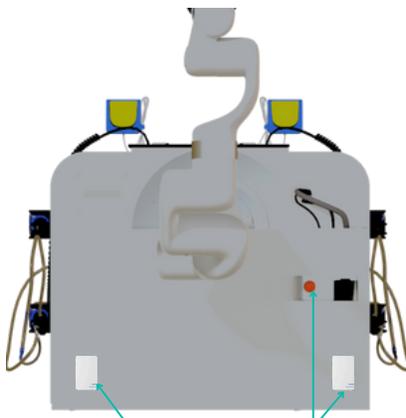
**Note:** Never power off the system without first cleanly closing the HARRTS applications and safely shut down Windows.

Fig 2..1



Reset Button

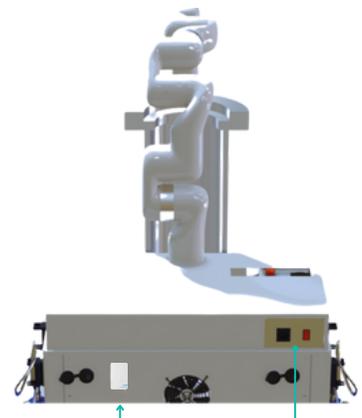
Fig 2.2



Emergency Stop Button

Suction Switches

Fig 2.3



Power Socket and Button

Main Power Switch

### Robot Control Box Components

1. **Red Power Button** – Main power for the robot
2. **Red Emergency Stop (E-Stop) Push Button** – Immediate stop; twist clockwise to reset
3. **Power Socket**
4. **Black Push Button (Secondary Power)** – Located on the front panel

### Operating Sequence

1. Power On: Press the Red Power Button to turn on the robot.
2. Release E-Stop: Rotate the Red Emergency Stop button clockwise to reset and enable motion.

### Important Notes

- **Emergency:** In the event of a power failure or unexpected robotic-arm behavior, press the Red Emergency Stop immediately to halt the robot.
- **Proper Shutdown:**
  - Power off from the HARRTS FUEsion application.
  - Press the Emergency Stop push button.
  - Use the Red Power Button to turn off the Robot Control Box.

## Starting the System

1. **Main power:** Use the main power switch on the back of the machine to power on the system.

### 2. Robot Control Box

- Press the red power button to turn on the control box.
- Rotate the red emergency stop button clockwise to release it.

3. **Computing platform:** Press the small red power button on the computer to turn it on.

### 4. Launch applications

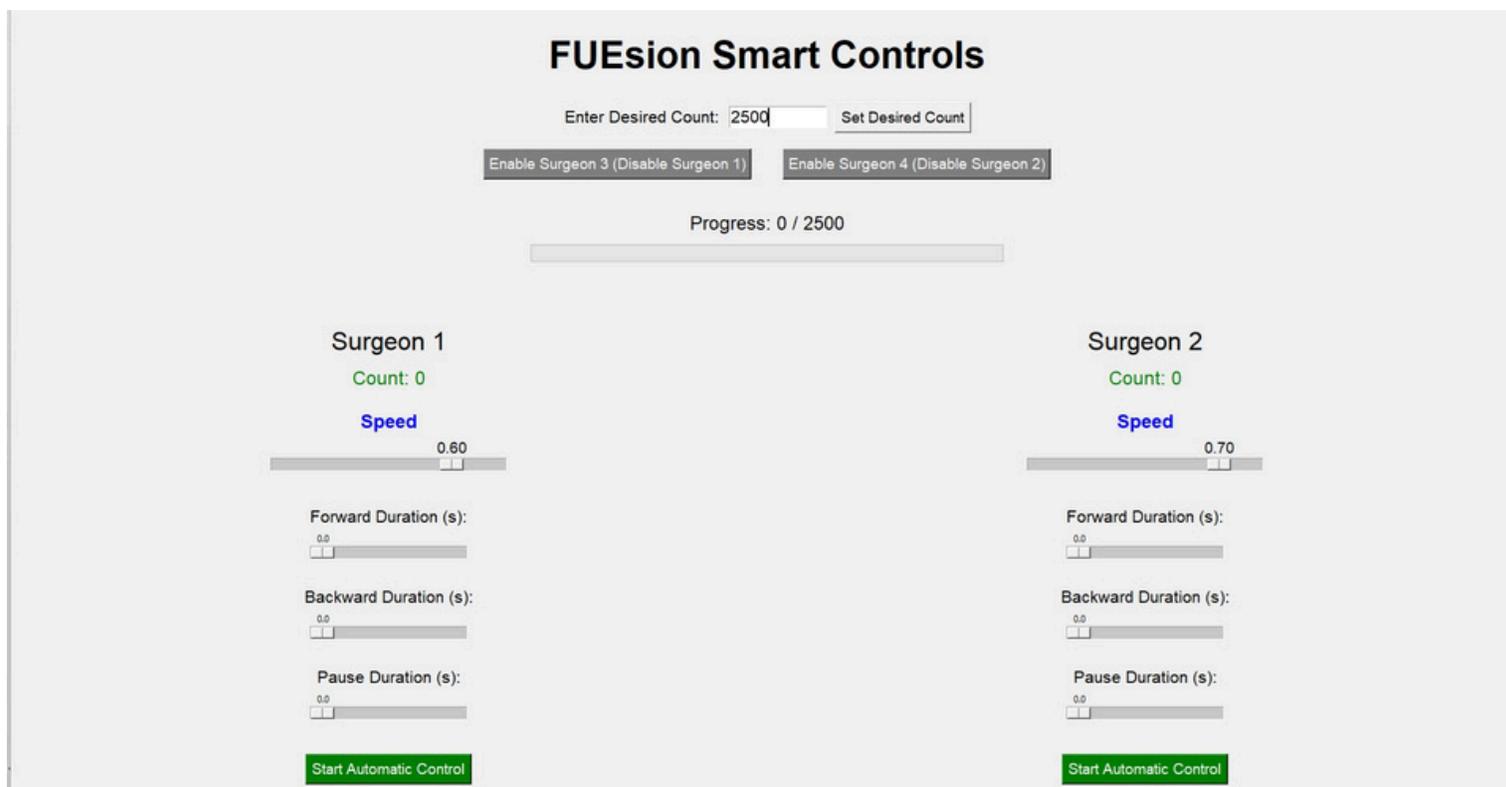
- FUEsion Smart Controls: Right-click the FUEsion Smart Controls icon and select Open to start the extraction device.
- HARRTS FUEsion-X: Right-click the HARRTS FUEsion-X icon and select Open to start the AI computation and robotic system.

5. **Using the apps:** Once both applications are running, you may use them independently. See the sections below for detailed instructions for each.

6. **Starting suction pumps:** Control the left and right suction pumps independently using the wireless suction switches described above.

**Note:** Always shut down the applications cleanly before turning off power.

## How to use the HARRTS FUEsion Extraction Application:

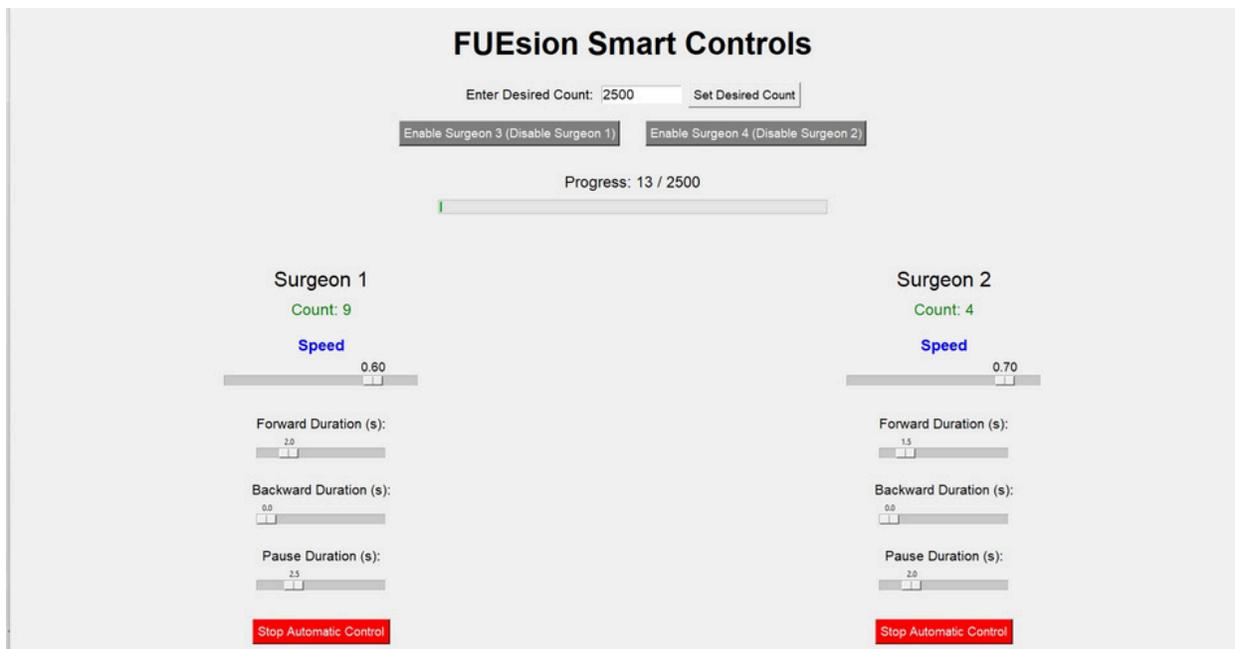


### Controls (Top Bar)

- Enter Desired Count: Type the total target (e.g., 2500).
- Set Desired Count: Applies the number and arms the progress bar (0 / target).
- Enable Surgeon 3 (Disable Surgeon 1): Routes left station control to Surgeon 3 and disables Surgeon 1 panel - only for Straight Handpieces. Use Surgeon 1 panel unless you want to use a straight handpiece..
- Enable Surgeon 4 (Disable Surgeon 2): Routes right station control to Surgeon 4 and disables Surgeon 2 panel. Use Surgeon 2 panel unless you want to use a straight handpiece.

### Station Controls (for each Surgeon panel)

- Speed: 0.00–1.00 scale (typical). Higher = faster motor movement.  
**Note:** Recommended starting speed: 0.50–0.70; adjust based on tissue response.
- Forward Duration (s): Time the motor moves forward each cycle.
- Backward Duration (s): Time the motor reverses each cycle.
- Pause Duration (s): Rest time between direction changes.
- Start Automatic Control / Stop Automatic Control: Begin or halt the automated cycle for that surgeon only.
- Count: Number of completed actions for that surgeon.
- Total progress = Sum of all active surgeons' counts.



## Foot Switch Control

- Connection options:
  - USB cable (plug-and-play)
  - Bluetooth (pair from your device’s Bluetooth settings, then select the pedals in the app if prompted)
- Use:
  - Press a pedal to start motor rotation.
  - Press again to stop motor rotation.

## Automatic Control

You can run without pedals using the Automatic Control button on each surgeon panel.

1. Set parameters:
  - Speed
  - Forward Duration (s)
  - Pause Duration (s)
  - (Set Backward Duration (s) if your workflow requires a reverse phase.)
2. Start: Click Start Automatic Control.
  - The button turns red and changes to Stop Automatic Control while running.
3. Stop: Click the same button again.
  - It turns green and switches back to Start Automatic Control.

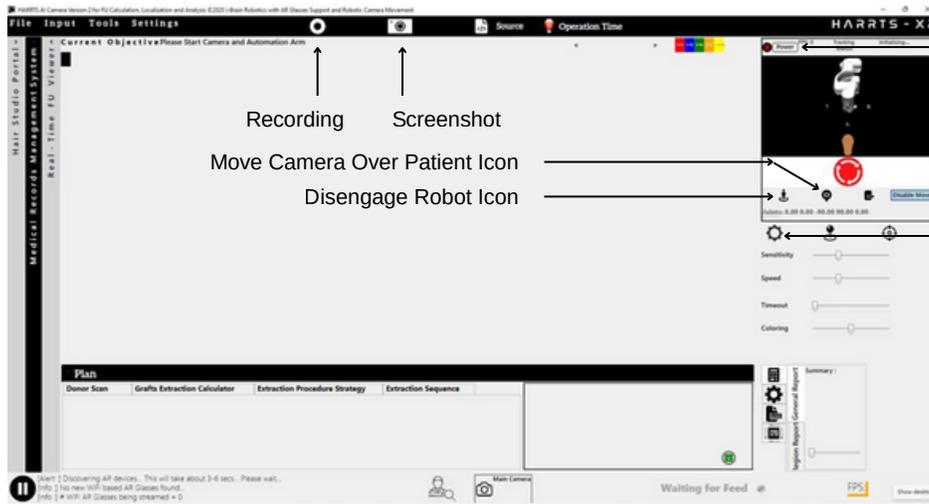
## Notes

- Automatic Control is per surgeon panel—you can run left/right independently.
- You can adjust sliders live while running.
- If both pedals and Automatic Control are available, the Stop action from either will halt motion immediately.



## How to use the FUEsion X Robotic AI Camera Application::

1. Power on the Robot using the Robot Control Box as follows:
2. Sequence of using the Robot Control Box:
  - Use the Red Power Button to Power-On the Robot
  - Rotate the Emergency Stop Push Button Clockwise to Undo the Emergency Stop function.
3. Start the FUEsion X Application
4. Click on the 'Power' button located in the Top Left Corner of the Right Column Control Panel of the Interface to Connect the Robot with the Application.
5. Click on 'Disable Movements' to enable Robot movements.
6. The camera will be selected by default.
7. If it is not selected by default, you can select 'HD Camera' from the 'Input' button located on the Top Control Bar of the Interface.



Main Robot Power Button

Robot UI Emergency Shut Down Button

Robot Movement Control

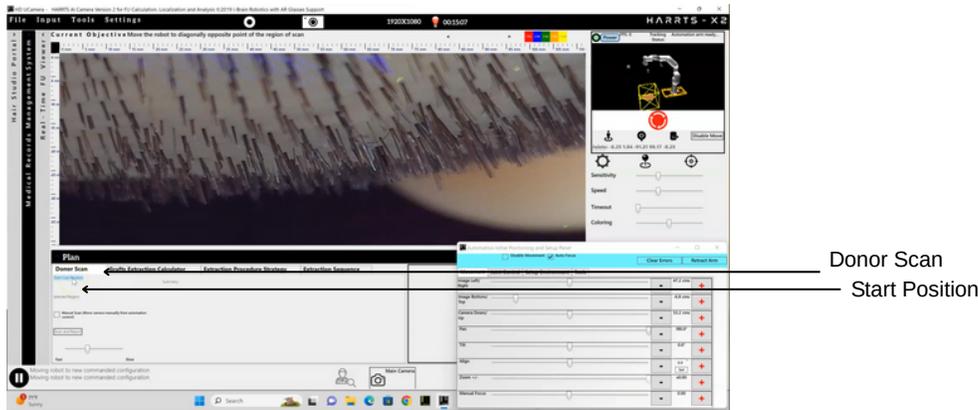


## Scanning the Donor Area

1. Click **Gear** → **Open Joint Control** → **Retract Arm**.
2. Set device resolution to **1920×1080**, then adjust **Zoom** and **Focus** so only the donor area is visible.
3. Position the patient so the camera clearly sees the **right-lower border** of the donor area.
4. Click **Start Camera Position**.
5. Use **Image Bottom/Top ±** to move the camera until the **opposite border** of the donor area is visible.
6. When the opposite border is aligned, click **Start Scan**.
7. Wait for the scan to complete.
8. **To redo the scan**, repeat the steps starting from **Retract Arm**.

**Note:** Patient positioning differs between **donor-area scanning** and **extraction**.

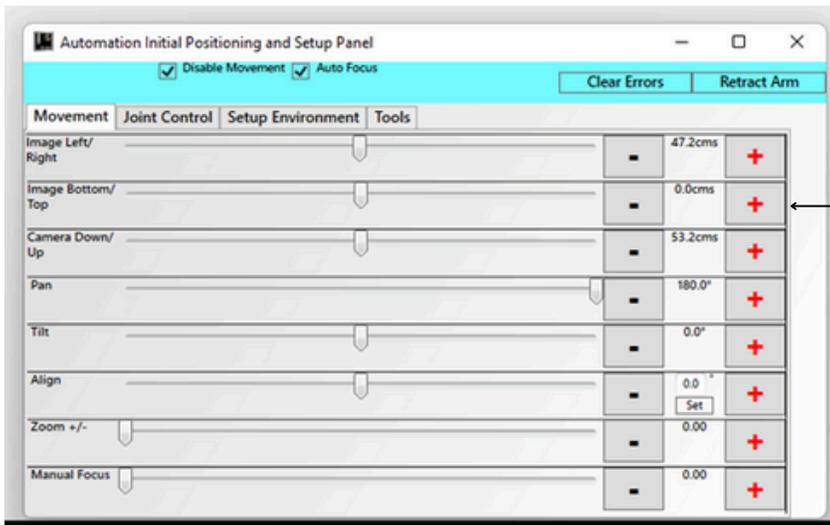
For scanning, seat the patient **very close to the machine** with the donor area **directly beneath (perpendicular to) the camera**.





## Positioning the Robot and Camera for Grafts Extraction:

1. Click the gear icon → Open Joint Controls → Retract Arm.
2. Set device resolution to 1920×1080, then adjust Zoom and Focus so only the donor area is visible.
3. Click Move camera over the patient (humanoid icon) to position the robot and camera over the operative field.
4. Tip: You can save your own custom positions for this step—see the Custom Positions section.
5. Use 1280×720 (720p) or 1920×1080 (1080p) if you want to view FU computation.
6. Ensure the donor area is positioned so the camera fully visualizes the donor region.
7. Adjust coloring/FU highlighting from the right-side control panel.
8. Use the Robot Movement Controls to fine-position the camera as needed.
9. For higher-resolution, real-time video without FU computation, stop the camera in the FUEsion X app and launch FUEsion Cam on the desktop.
10. Keep HARRTS FUEsion X – Robot Motion Controls open and floating to control camera motion.



Robot Movement Controls  
 Robot Movement Controls

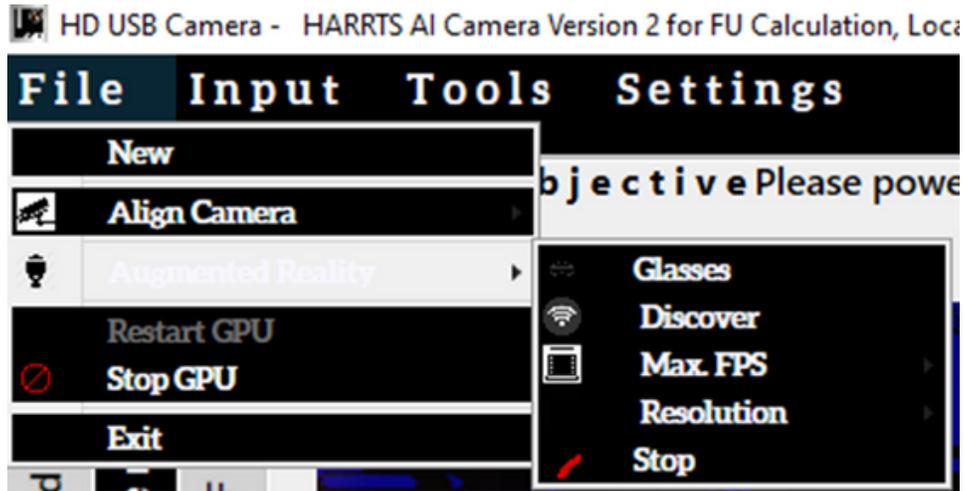
### Connecting and Disconnecting AR Glasses:

Simply connect the AR Glasses with a C-to-C Cable to the AR Glasses Connector C Port. That's it. Your AR Glasses are now connected with the FUEsion X System.

**Note:** The AR Glasses Connector Hub is situated on the Top Surface of the FUEsion X Body, just in front of the Robot Control Box.

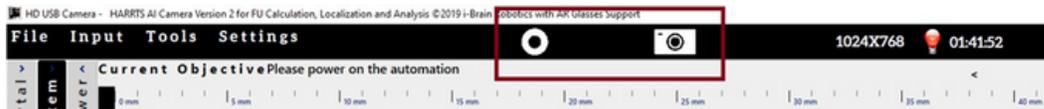


### Aligning Camera::



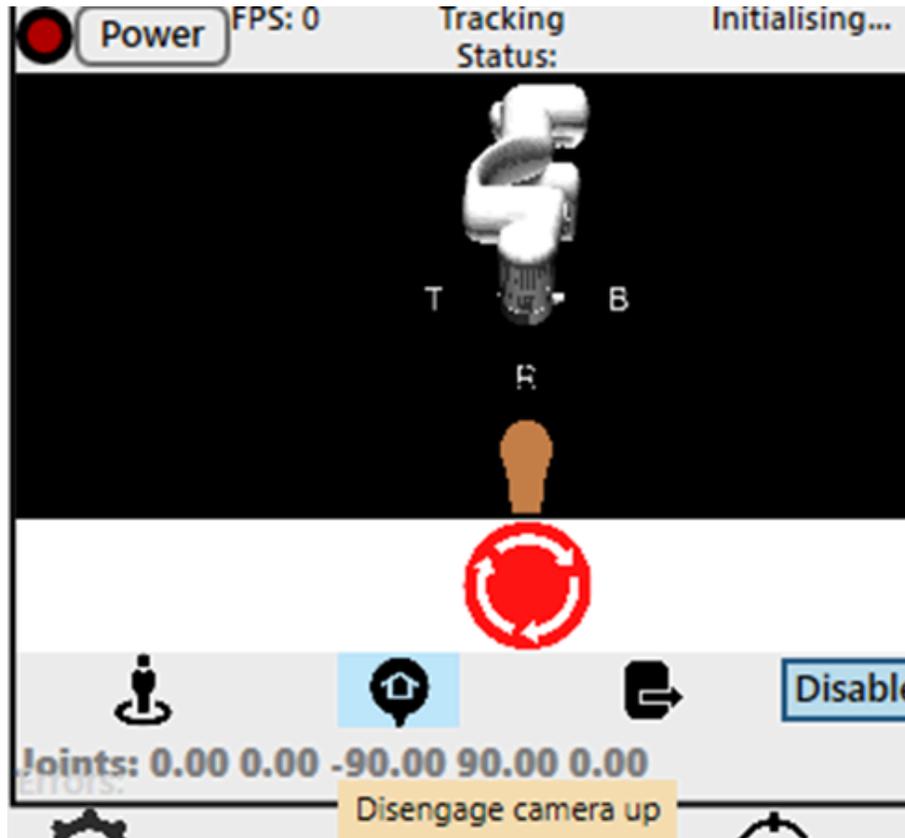
For aligning the camera feed for the machine display, Go to File --> Click Align Camera --> Select Alignment options as per your needs.

### Screenshot and Recording:



You can use the Camera button and the Record button to take snapshots and record the procedure respectively. The snapshots and the videos will be stored on the Desktop in the 'I- Brain-Robotics' folder.

### Disengaging the Robot:



To disengage the Robotic Arm, click on the Disengage Camera (HOME) icon. The Robotic Arm will move the camera away from the operative field.

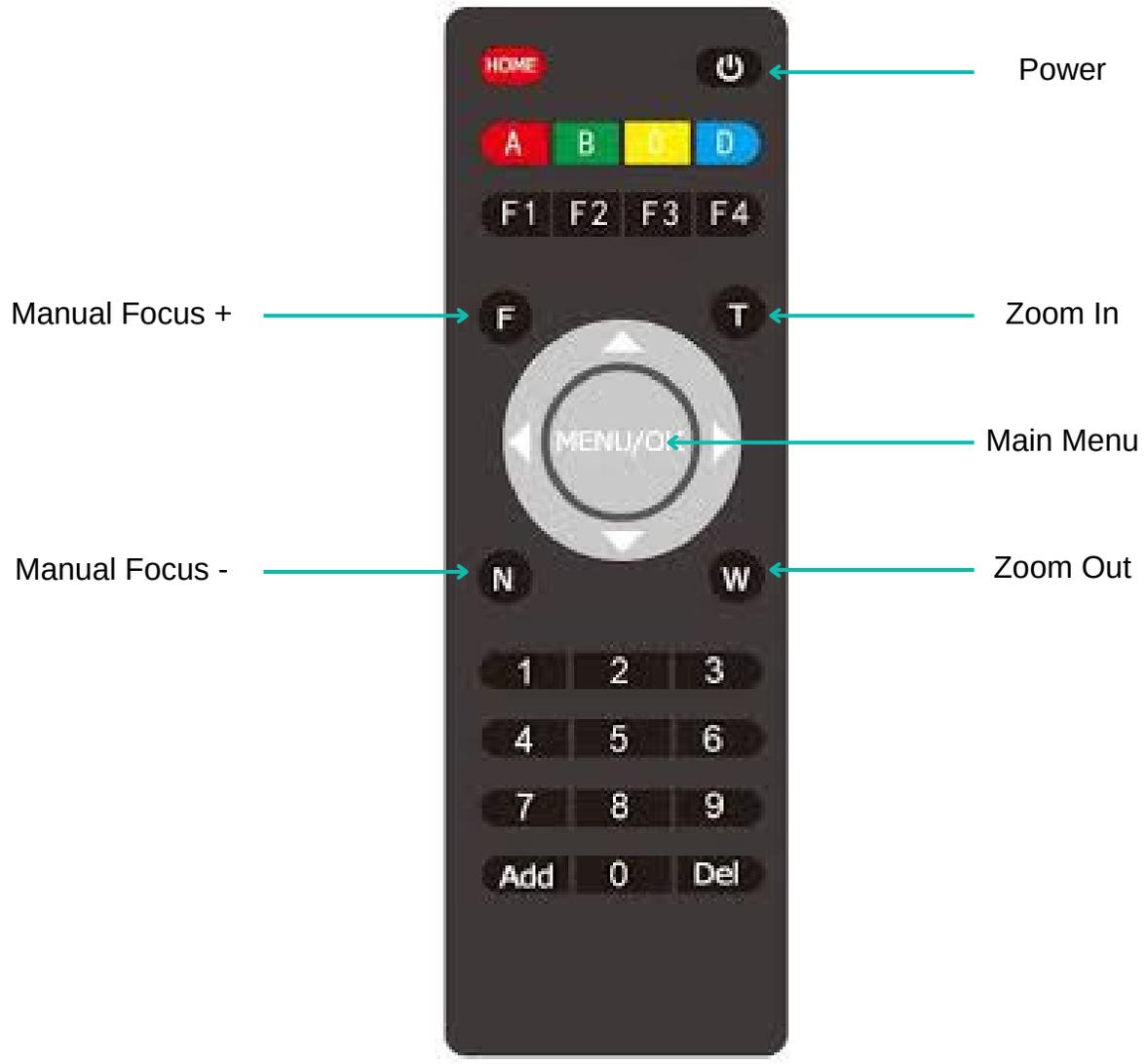
### Shutting Down:

1. After completing the procedure, click the 'Power' button on the interface to disconnect the Robot from the application.
2. Go to file and click 'Exit'
3. Now, after closing the HARRTS Application, shut down the computing platform.
4. Press the 'Emergency Stop' Push Button.
5. Switch-off the Robot Control box using the red switch on the Control Box.
6. Power-off the machine using the #3 button on the Remote Control



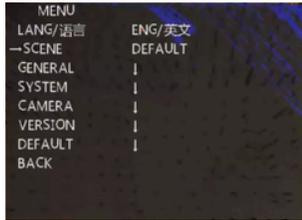
### Instructions to use the FUEsion AI Camera

Orient yourself with the AI Camera Remote Control Buttons

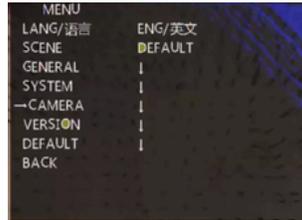




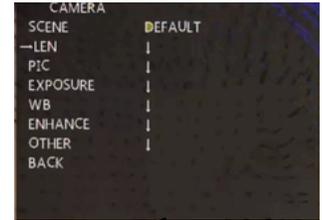
## FUEsion AI Camera Menu and Settings



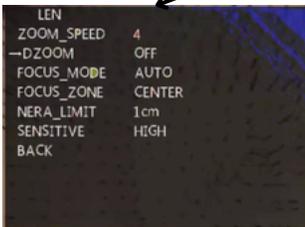
Camera Menu Main Screen



Select Camera From Menu List



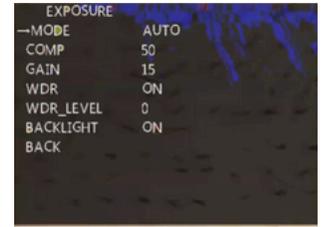
Select Len



Toggle DZOOM to On if not already On



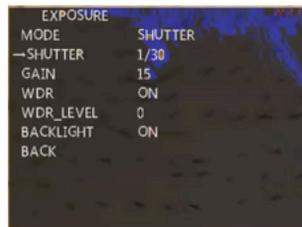
You can toggle Exposure between Auto and Shutter



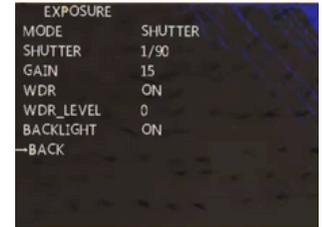
Change from Auto to Shutter if You Want To Alter Exposure Values



Change from Auto to Shutter if You Want To Alter Exposure Values



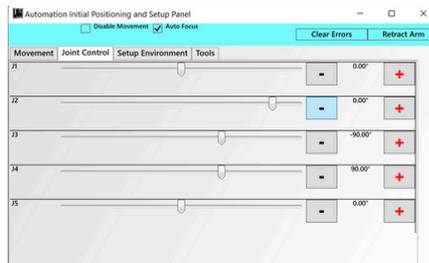
You can change shutter values to achieve your custom desired results



Finally, go back and exit the menu

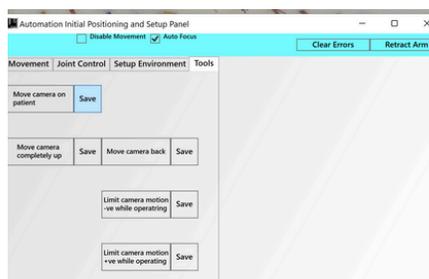
**Note:** These settings might reset to default values once you restart the system, and you may have to do these settings again if you want them. You will have to experiment with these settings to understand which setting suits you the best.

## Setting Custom Robot Positions



### Saving Custom Positions for 'Move Camera Over Patient' and 'Disengage Robot':

In the Robot Movement Controls Settings, go to the 'Joint Controls', change the J2 and/or J3 positions to suit your needs for 'Move Camera Over the Patient' and 'Disengage Robot' positions.



### Move Camera Over Patient Position Saving:

Once you are sure of the position, go to 'Tools' tab in the same window, and click 'Save' next to 'move Camera Over Patient'



### Disengage Robot Position Saving:

Once you are sure of the position, go to 'Tools' tab in the same window, and click 'Save' next to 'Move Camera Completely Up'

**Powering ON and Off:**

- The HARRTS FUEsion X should be powered through a 110 V Power supply.
- Always use the provided Battery Back Up and Surge Protector provided for the power supply.
- While starting the machine, first power on the main machine, then power on the robot control box, then release the emergency button, then start the computation platform, then start the applications.
- Always cleanly exit the Application. After exiting the Application, shut down the Computing System and then power it off. Do not close the Application directly without cleanly exiting the application. Do not shut down the computing system without cleanly exiting the Application.
- Always push the emergency button down after closing the application. Then also power off the robot control box. Only after this step should you completely switch off the power to the main machine.

**Sterilization:**

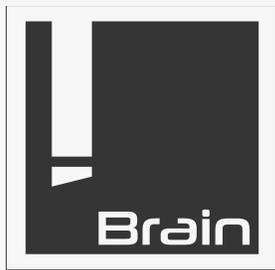
- Always autoclave the handpieces and the punches before using them.
- Never use the same punches without autoclaving them.
- Always autoclave the suction tubes before using them.
- Always discard the suction tubes after a single use.
- Always autoclave the Collection Jars/Storage Jars, Silicone rings of the jars, Extraction Punches, and Implanter Pens before use.
- Autoclave the Collection Jars, and its Caps separately, after removing the Jar caps from the jars.
- Use new and sterile (autoclaved) suction tubes for every procedure.

**Proper Use:**

- Make sure that the silicon ring of the collection jars are securely placed for each procedure to avoid air/vacuum leak.
- Make sure that the handpiece caps are secured tightly to avoid any vacuum leak.
- Autoclave the Hand-pieces before every use.
- Lubricate the Hand-piece after every use with dental handpiece lubricant.



**Reach out to us at [info@ibrainrobotics.net](mailto:info@ibrainrobotics.net) if you have any questions.**



# Robotics

Anything is Possible!

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