

in vivo  
imaging  
facility

## Quick start guide



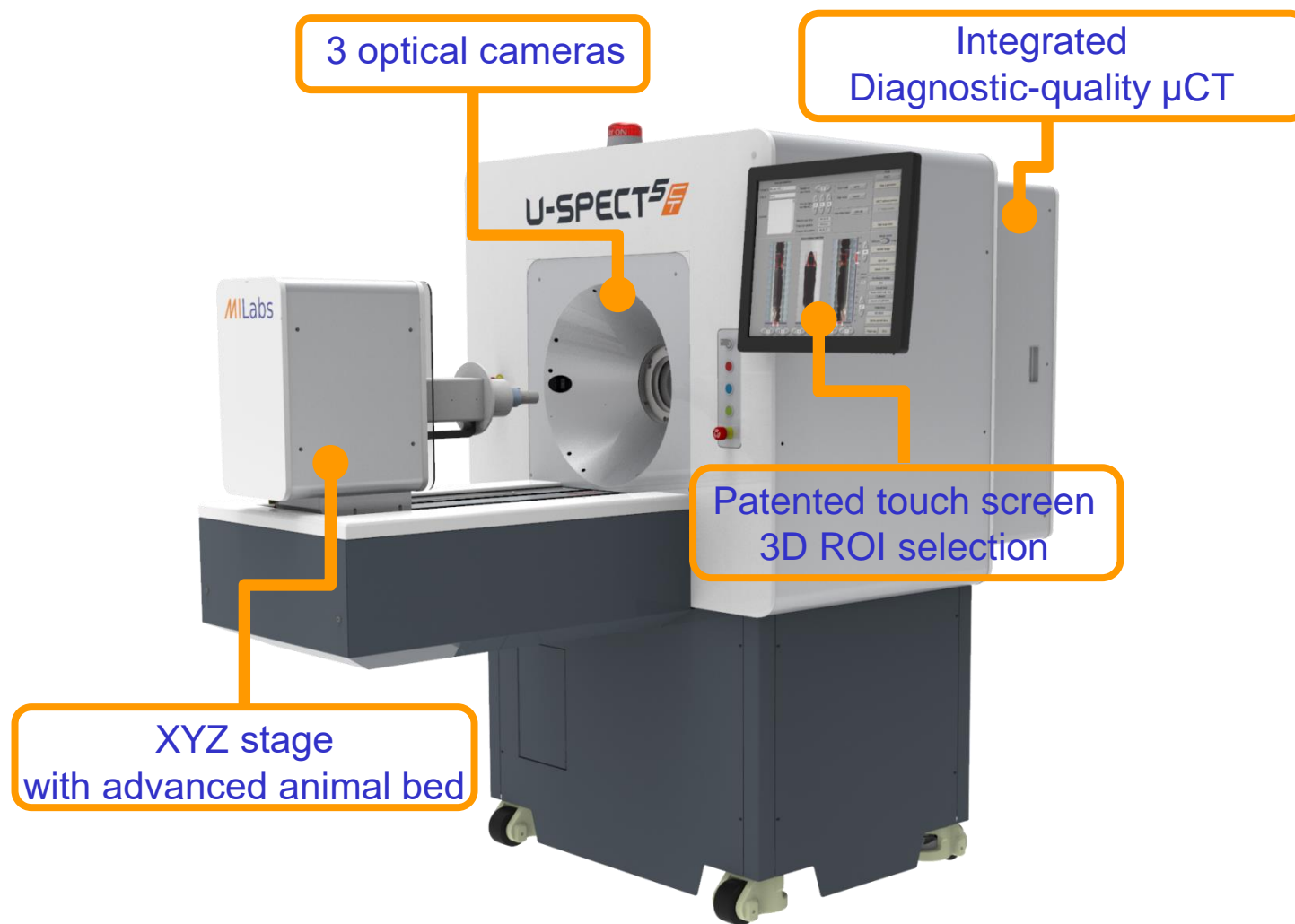
HELP!!

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CLE C – 01 Room 104 A

# System overview: Easy to operate



# Turning the system on and off

Main power switch **(always ON) !!! Do not touch in normal use**



Key-switch



# Emergency-Stop Button



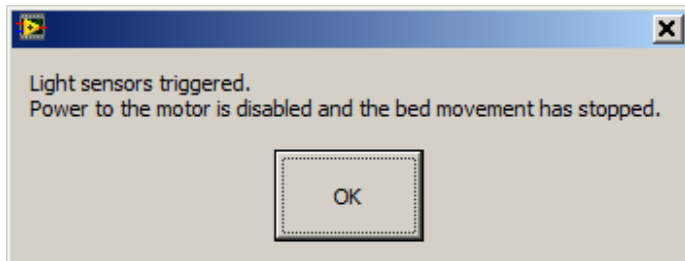
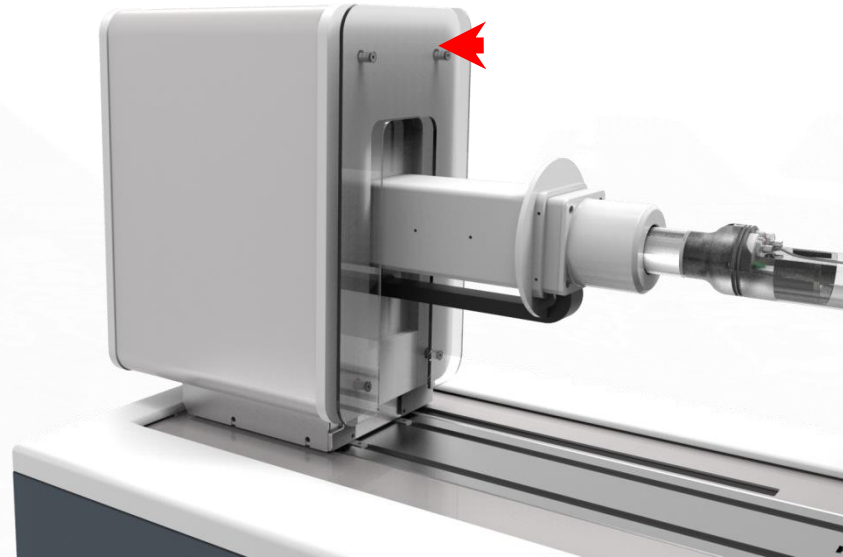
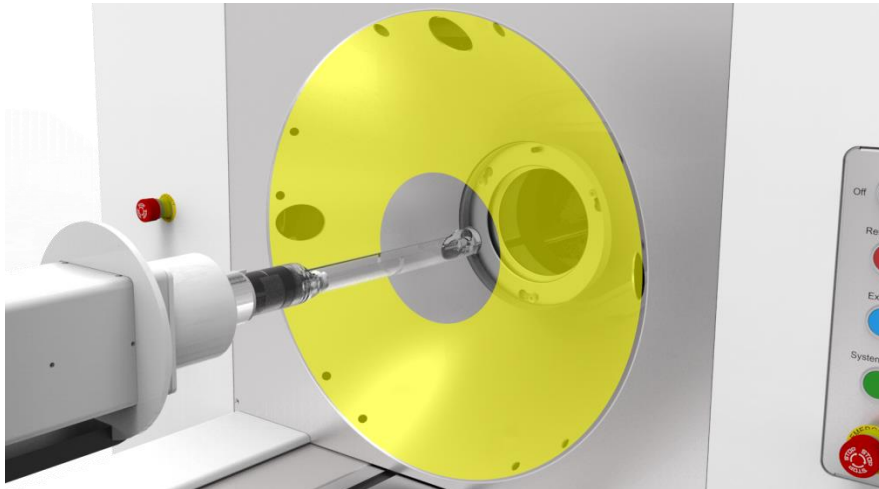
In case of possible injury to people or animals, or damage to the system, press the Emergency-Stop button.

This will immediately stop all movements

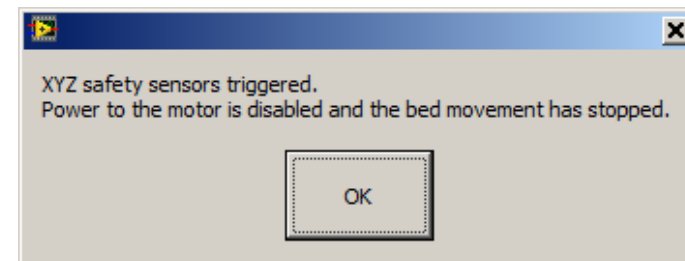
Turn the button clockwise to retract and control the animal bed

# Additional safety

Do not place your hand or an object around these safety zones – In case of such error messages appearing you will need to initialize and home the system again.



Light curtain

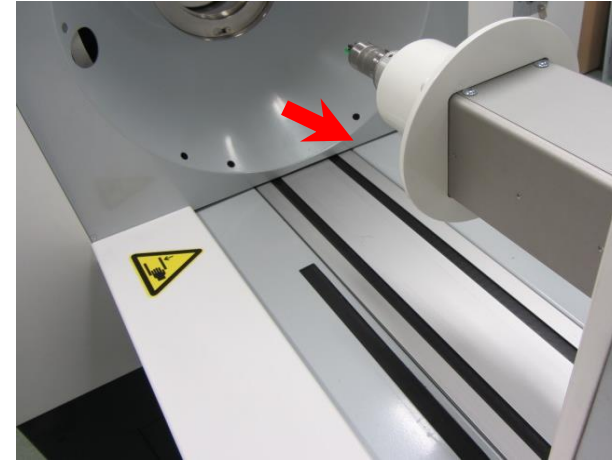
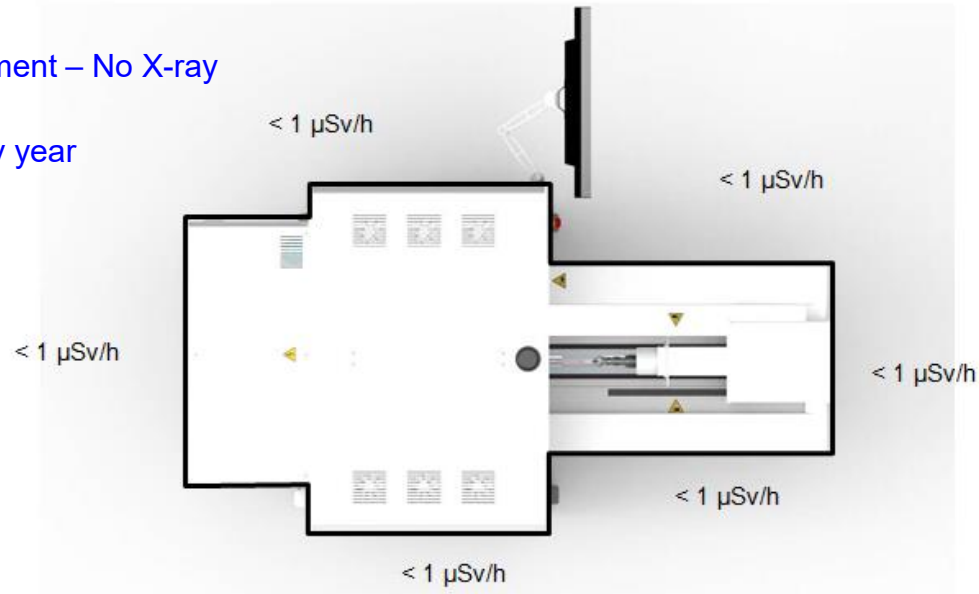


Bump plate

# CT safety

Leaded instrument – No X-ray leakage

Checked every year



Leaded plate avoid leakage during X-ray production

Two red lights during X-ray production



# Basic use

# Basic operation

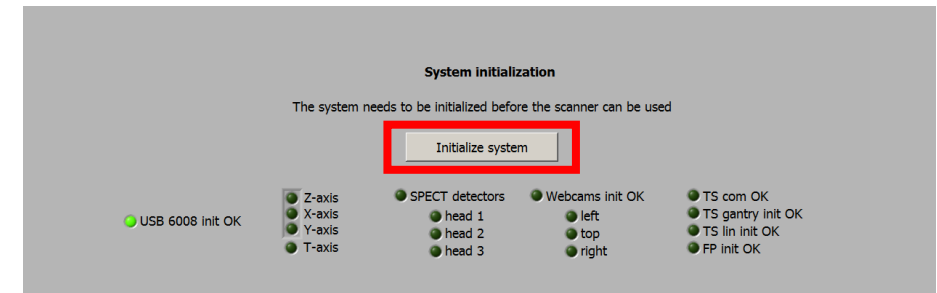
1. Start the system using key



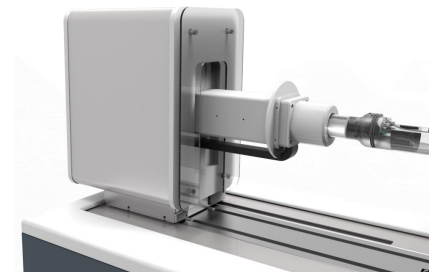
2. Start acquisition software on the system



3. Press “Initialize system”  
Wait for initialization to finish



4. Home XYZ stage (don't touch the robot arm)

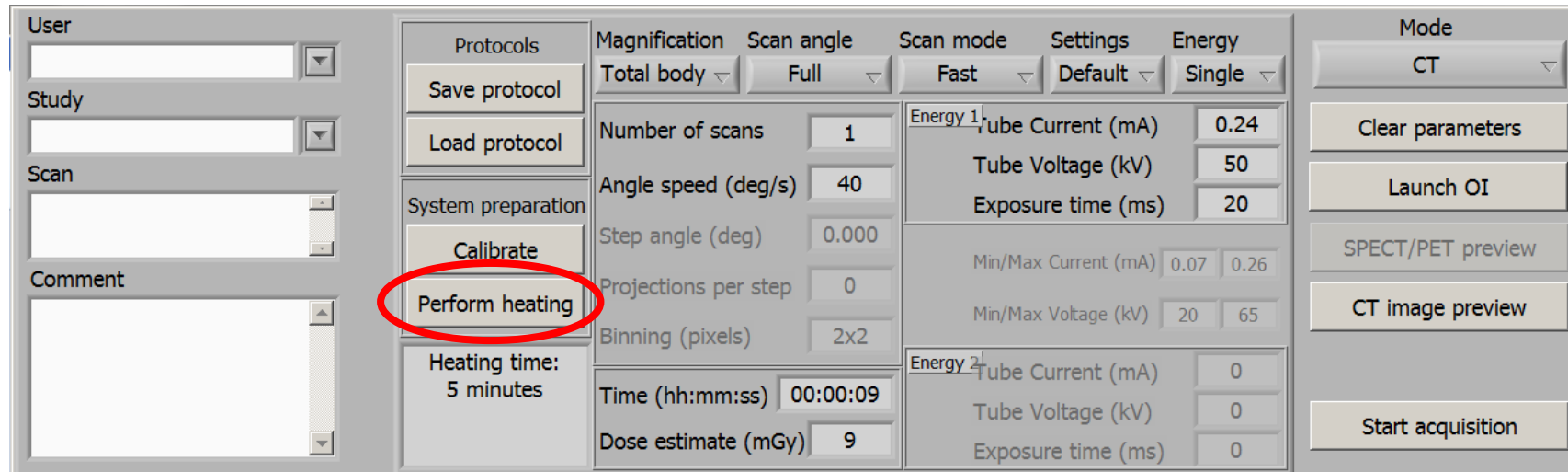




# Basic operation

## 5. Press «Perform Heating before» before use

(The X-ray source needs a warm-up time when it has not been used for more than 2 hours. This extends the lifetime of the X-ray tube. Depending on when the source was last used, the warm-up time can vary from 15 seconds to 80 minutes)



# Basic operation

6. Press the exhaust button for extra isoflurane extraction



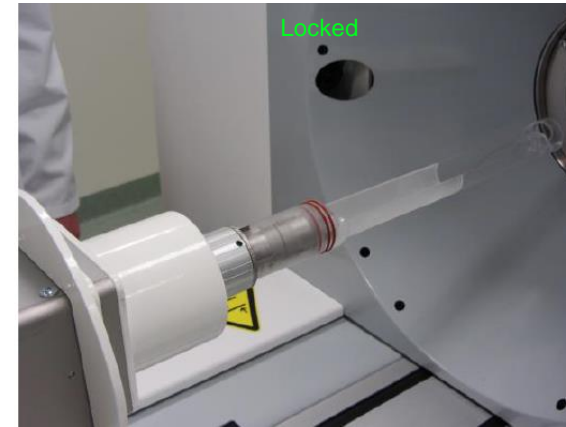
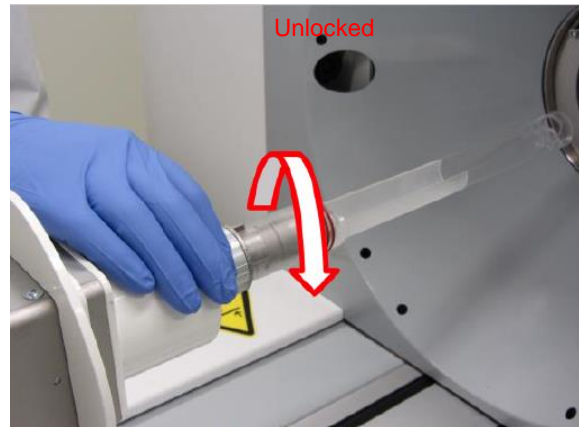
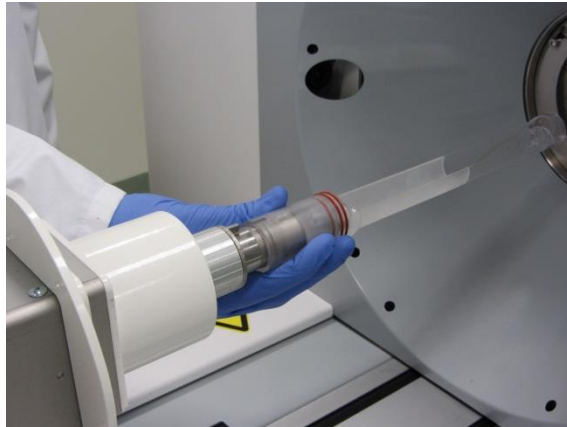
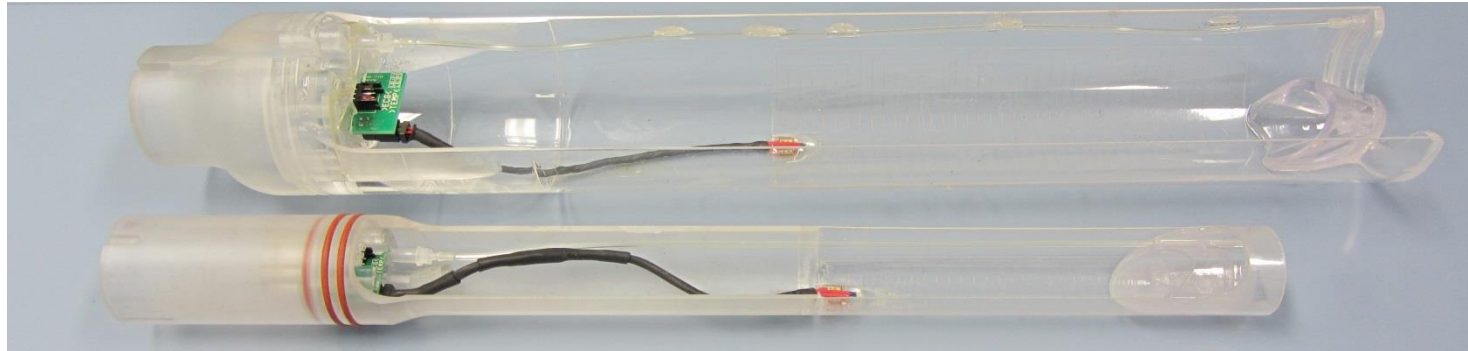
7. Weight the canister to make sure it is not full



# Installing beds (Mouse, Rat/Mouse)

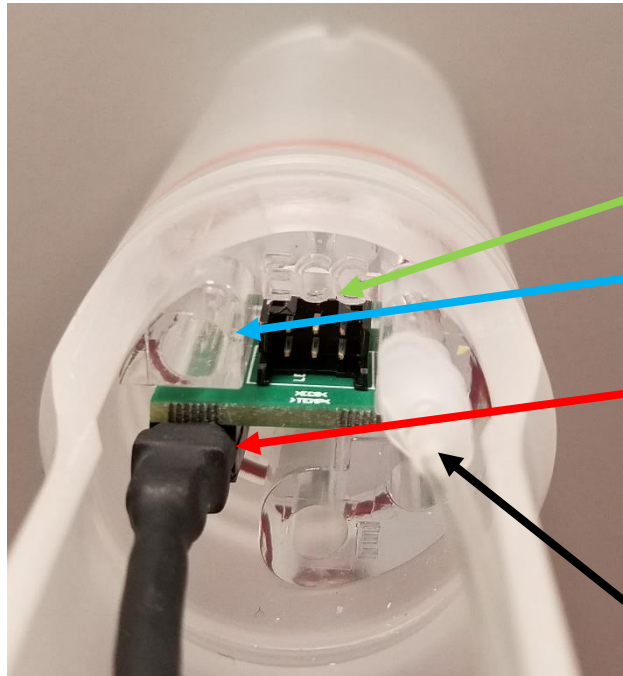
Rat/Mouse  
large sample

Mouse

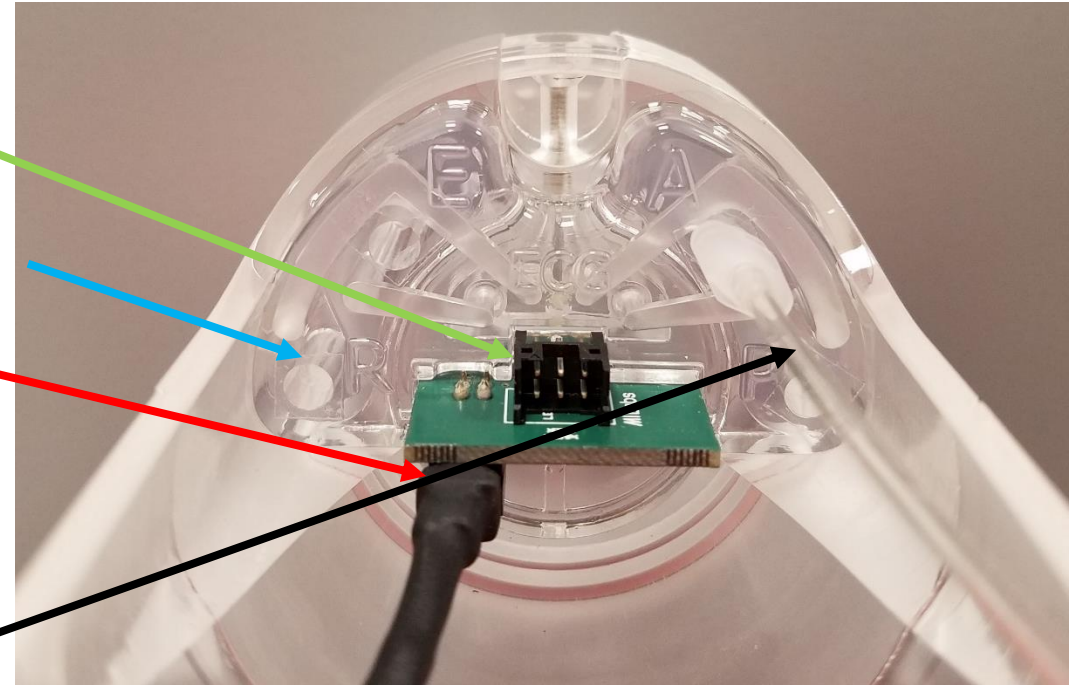


# Bed connections: Temperature, Anesthesia, ECG, Respiration

Mouse bed



Rat/mouse bed



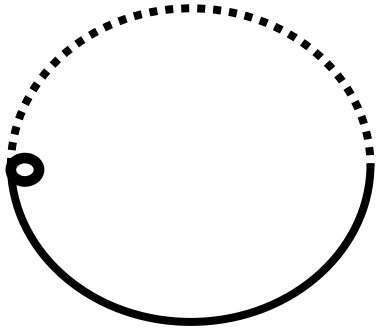
ECG

Respiration

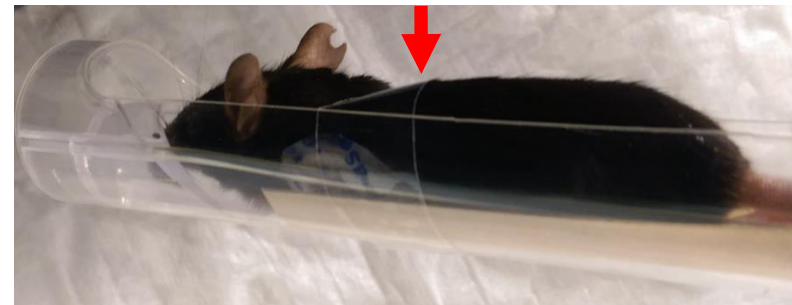
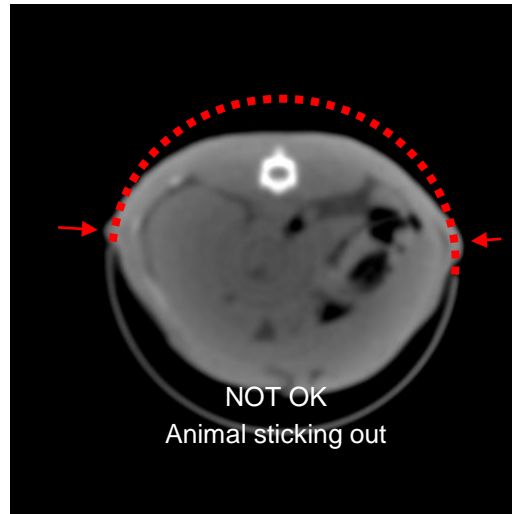
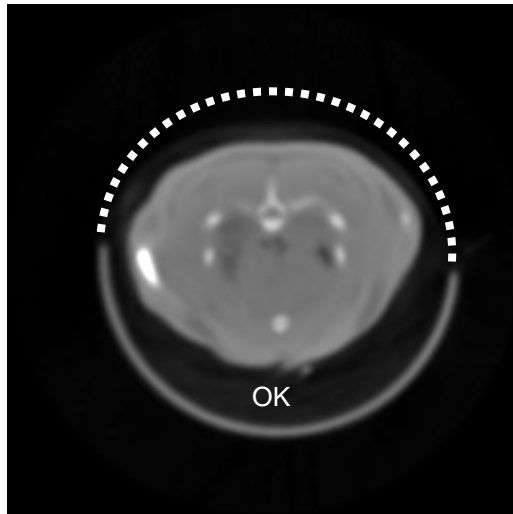
Heater

Anesthesia

# Animal positioning inside the bed



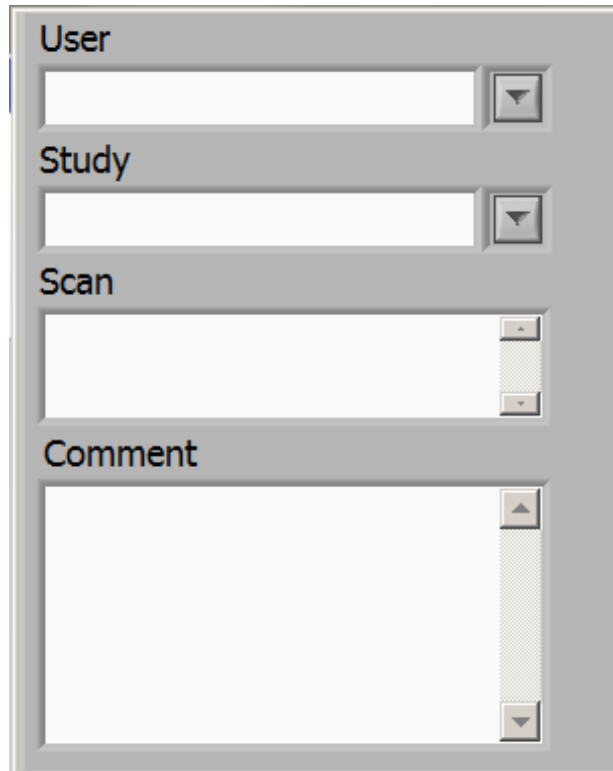
Make sure nothing sticks out of the bed  
Keep the animal at the bottom of the bed  
Check all connections (including anaesthetic tube)  
after animal is positioned



A bad position may lead to collision with the gantry during scans

# Basic operation

## 7. Enter your scan info



The image shows a software interface with four input fields, each with a dropdown arrow on the right side. The fields are labeled 'User', 'Study', 'Scan', and 'Comment' from top to bottom. Blue lines connect the right side of each field to its corresponding explanation on the right.

Researcher's name (ask the staff to create your ID)

**This will be the name of your folder in the Data drive**  
Write GROUP\_STUDY ex: SMITH\_ LUNGTUMOR

DATE or EXPERIMENT'S NAME

Comments ex: KO MOUSE, TIME POINT

# Basic operation

8. For a preview press «update image» webcam or X ray for deep tissues.

PREVIEW

# Basic operation

## 9. Select the scan area by moving cursors up and down

The screenshot displays the control interface for a CT scanner. The interface is divided into several sections:

- Scan parameters:** Includes fields for Animal ID, Scan ID, and Comment.
- Scan settings:** Includes Magnification (Total body), Scan angle (Full), Scan mode (Normal), Settings (Default), and Energy (Single).
- Energy 1:** Tube Current (mA) is set to 0.24, and Tube Voltage (kV) is set to 50.
- Energy 2:** Tube Current (mA) and Tube Voltage (kV) are both set to 0.
- Other settings:** Angle speed (deg/s) is 0, Number of steps is 480, Time per step (s) is 0.30, Total scan time is 00:02:29, Binning (pixels) is x11, and Exposure time (ms) is 75.
- CT calibration:** Heating time is 10 minutes, with a Perform heating button.
- Scan volume selection:** Three vertical panels show the animal in the scanner bed. A vertical scale on the left, labeled "CT positions", ranges from -70 to 70. The current position is set to 1, with a value of -41 displayed. The scale is highlighted with a red box.
- Image source:** Webcam and X-ray options are available, with X-ray selected.
- Hardware status:** Shows Idle, Animal Bed, Mouse total body long, and Collimator (Not applicable).
- Injection:** Shows 00:00:00 and a Set to current time button.
- Buttons:** Clear parameters, SPECT pinhole preview, CT image preview, Start acquisition, Update image, Eject bed, Unlock CT door, Minimize, and Exit.

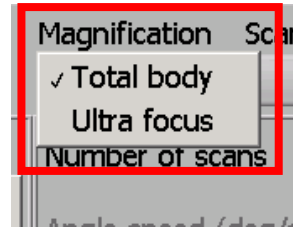
Pay attention to CT positions

Increasing bed CT positions will double the scan time

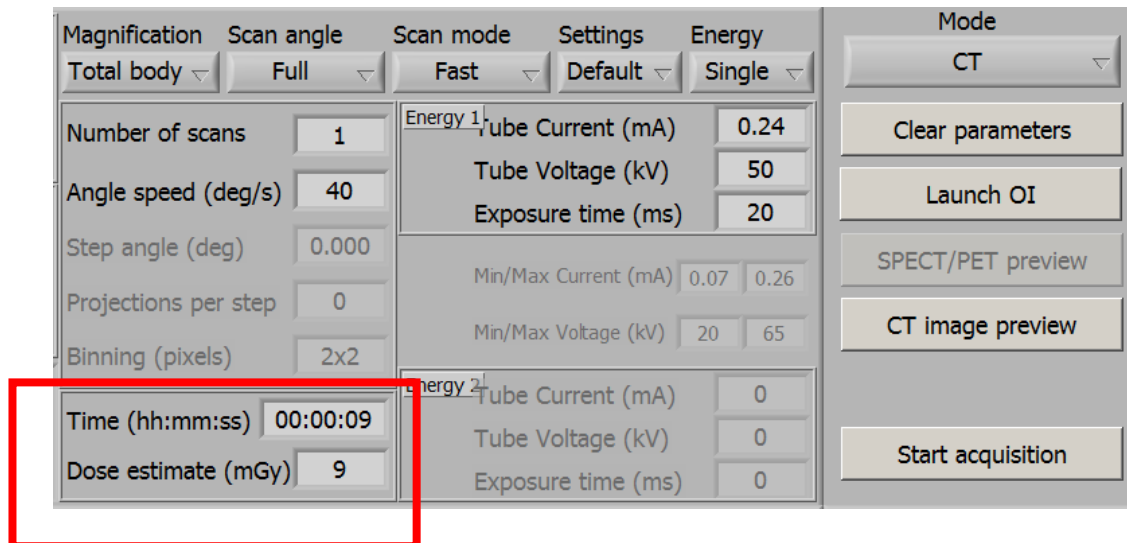


# Basic operation

## 9. Select magnification



«Ultra focus» will bring the X-ray source close to the animal bed decreasing the field of view but increasing your resolution.

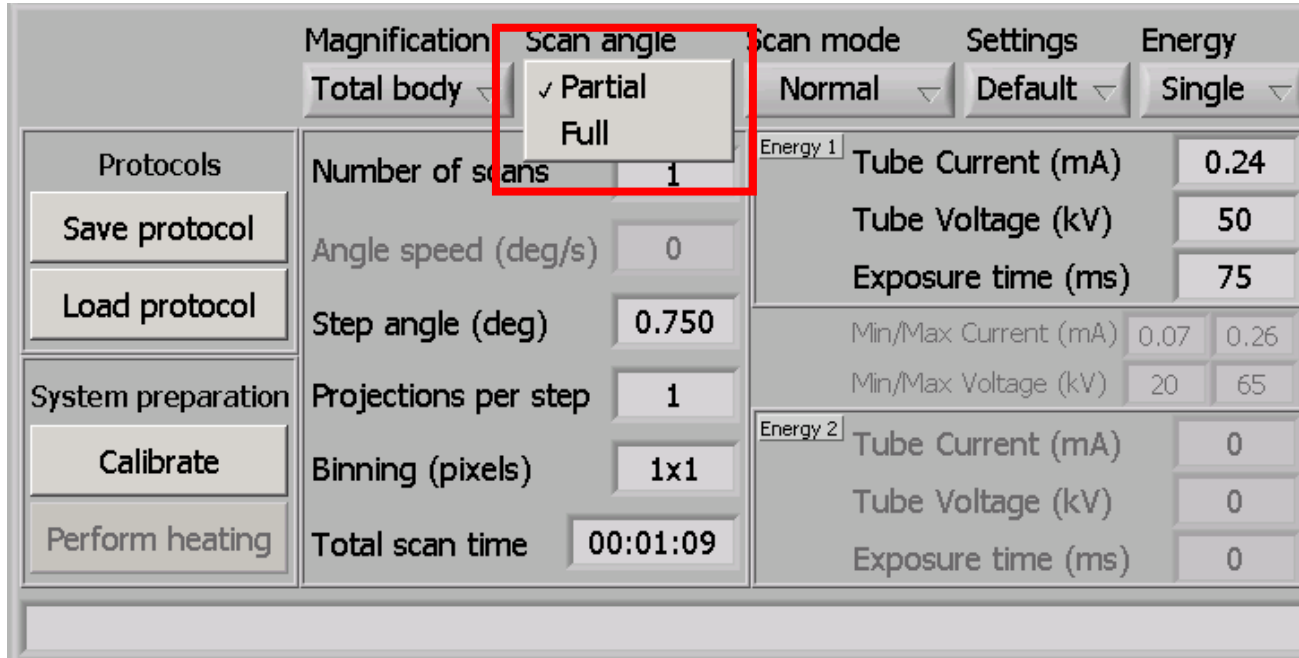
A screenshot of a CT scan control panel. The panel is divided into several sections. At the top, there are dropdown menus for 'Magnification' (set to 'Total body'), 'Scan angle' (set to 'Full'), 'Scan mode' (set to 'Fast'), 'Settings' (set to 'Default'), and 'Energy' (set to 'Single'). Below these are input fields for 'Number of scans' (1), 'Angle speed (deg/s)' (40), 'Step angle (deg)' (0.000), 'Projections per step' (0), and 'Binning (pixels)' (2x2). To the right, there are sections for 'Energy 1' and 'Energy 2', each with 'Tube Current (mA)', 'Tube Voltage (kV)', and 'Exposure time (ms)' fields. The 'Energy 1' section has values 0.24, 50, and 20. The 'Energy 2' section has values 0, 0, and 0. Below these are 'Min/Max Current (mA)' (0.07, 0.26) and 'Min/Max Voltage (kV)' (20, 65). At the bottom left, there are fields for 'Time (hh:mm:ss)' (00:00:09) and 'Dose estimate (mGy)' (9), which are highlighted with a red rectangular border. On the right side, there are buttons for 'Clear parameters', 'Launch OI', 'SPECT/PET preview', 'CT image preview', and 'Start acquisition'. The 'Mode' dropdown is set to 'CT'.

Take into account that «Ultra focus» will also increase the dose apply to the mouse and as well as the scan time as more CT positions may be needed

Keep an eye on the dose estimation

# Basic operation

## 10. Select the scan angle



The screenshot shows a software interface for configuring a scan. The 'Scan angle' dropdown menu is open, showing two options: 'Partial' (selected with a checkmark) and 'Full'. The interface includes various settings for Magnification, Scan mode, Settings, and Energy. The 'Scan mode' is set to 'Normal', 'Settings' to 'Default', and 'Energy' to 'Single'. The 'Number of scans' is set to 1, 'Step angle (deg)' is 0.750, and 'Total scan time' is 00:01:09. The 'Energy 1' section shows Tube Current (mA) at 0.24, Tube Voltage (kV) at 50, and Exposure time (ms) at 75. The 'Energy 2' section shows Tube Current (mA) at 0, Tube Voltage (kV) at 0, and Exposure time (ms) at 0.

Magnification	Scan angle	Scan mode	Settings	Energy
Total body	✓ Partial Full	Normal	Default	Single
Number of scans	1	Energy 1	Tube Current (mA)	0.24
Angle speed (deg/s)	0		Tube Voltage (kV)	50
Step angle (deg)	0.750		Exposure time (ms)	75
Projections per step	1		Min/Max Current (mA)	0.07 0.26
Binning (pixels)	1x1		Min/Max Voltage (kV)	20 65
Total scan time	00:01:09	Energy 2	Tube Current (mA)	0
			Tube Voltage (kV)	0
			Exposure time (ms)	0

«full» means a rotation of the gantry of 360°

«partial» means a rotation of the gantry of 220°

# Basic operation

## 11. Select the scan angle

	Magnification	Scan angle	Scan mode	Settings	Energy
	Total body ▾	Partial ▾	✓ Fast Normal Accurate Gated	Default ▾	Single ▾
Protocols	Number of scans	1		Current (mA)	0.24
Save protocol	Angle speed (deg/s)	40		Voltage (kV)	50
Load protocol	Step angle (deg)	0.000		Exposure time (ms)	20
System preparation	Projections per step	0		Min/Max Current (mA)	0.07 0.26
Calibrate	Binning (pixels)	2x2		Min/Max Voltage (kV)	20 65
Perform heating	Total scan time	00:00:05	Energy 2	Tube Current (mA)	0
				Tube Voltage (kV)	0
				Exposure time (ms)	0

«fast» means a non stop rotation of the gantry

«Normal» and «accurate» means a step and shoot rotation of the gantry, with accurate being slower and more precise.

# Basic operation

## 11. Select the scan angle

Protocols	Magnification	Scan angle	Scan mode	Settings	Energy	
Save protocol	Total body ▾	Full ▾	Accurate ▾	Custom ▾	Single ▾	
Load protocol	Number of scans	1	Energy 1	Tube Current (mA)	0.24	
System preparation	Angle speed (deg/s)	0	Tube Voltage (kV)	50	Exposure time (ms)	75
Calibrate	Step angle (deg)	0.500	Min/Max Current (mA)	0.07	0.26	
Perform heating	Projections per step	1	Min/Max Voltage (kV)	20	65	
Heating time: 5 minutes	Binning (pixels)	1x1	Energy 2	Tube Current (mA)	0	
	Time (hh:mm:ss)	00:02:41	Tube Voltage (kV)	0	Exposure time (ms)	0
	Dose estimate (mGy)	83				

«custom» will allow you to change Step angle, projections per step and binning.

In that case a new calibration will have to be performed.

For new calibration once the acquisition is done, remove the animal bed and press calibrate. This will create a new calibration file to copy into the calibration folder of your experiment.

# Exit

**Scan parameters**

Animal ID

Scan ID

Comment

Magnification  Scan angle  Scan mode  Settings  Energy

Total body  Full  Normal  Default  Single

Nr Scans

Angle speed (deg/s)

Number of steps

Time per step (s)

Total scan time

Binning (pixels)

Exposure time (ms)

Energy 1  
Tube Current (mA)

Tube Voltage (kV)

Min/Max Current (mA)

Min/Max Voltage (kV)

Energy 2  
Tube Current (mA)

Tube Voltage (kV)

Mode

Clear parameters

SPECT pinhole preview

CT image preview

Start acquisition

CT calibration Heating time: 10 minutes Perform heating

**Scan volume selection**

CT positions

1

Image source  
Webcam  X-ray

Update image

Eject bed

Unlock CT door

**Hardware status**

Idle

Animal Bed

Mouse total body long

Collimator

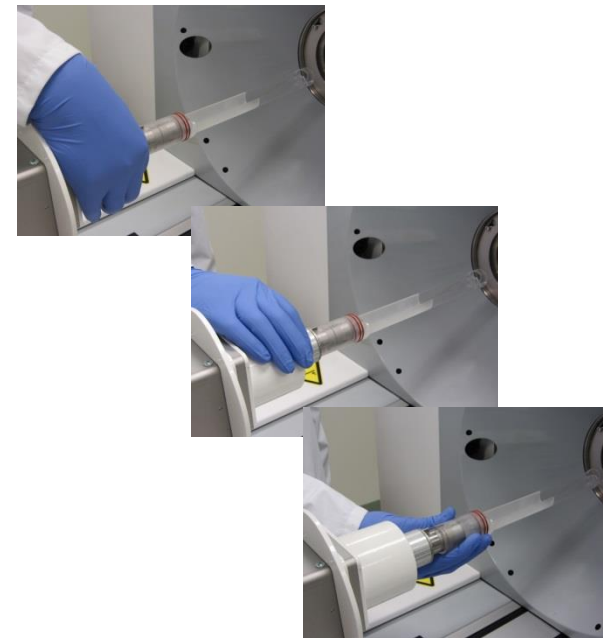
Not applicable

**Injection**

00:00:00

Set to current time

Minimize **Exit**



End of the day?

