

X-RAD 320 Biological Irradiator



Precision X-RAY irradiator for animals and cells

Location: B045 CSRB-Basement

Operated and Maintained by DCM

For training and access:

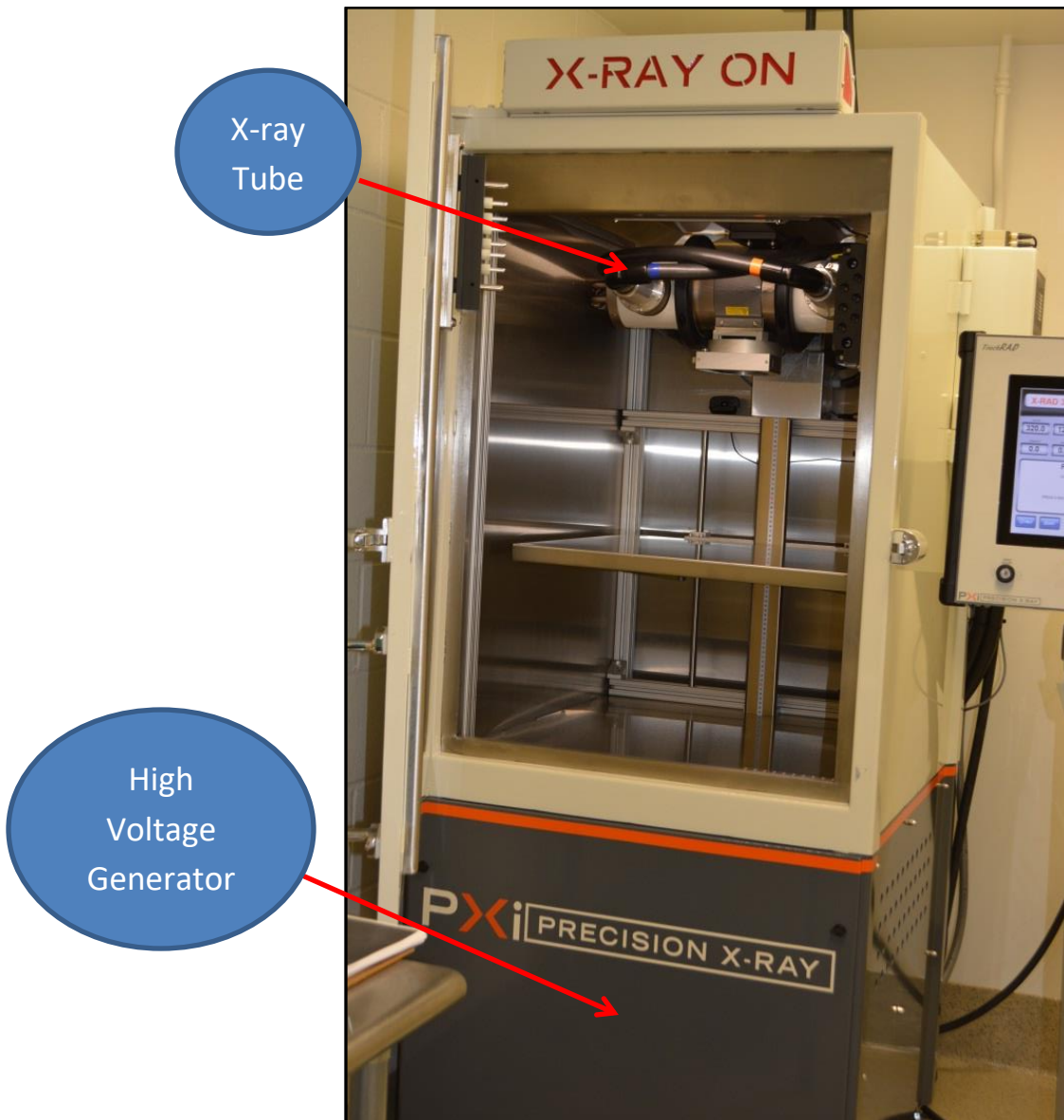
Amy Dillard 314-362-3860 dillard.a@wustl.edu

Dr. Jenny Kalishman 314-362-8120 kalishmanj@wustl.edu

This manual can be found online: <https://research.wustl.edu/xray-irradiator/>

Inside the Cabinet:

Lined with $\frac{3}{4}$ inch lead—provides protection from X-ray radiation
Safety interlocks located on the cabinet door and the baffle



Instructions

1) On the TouchRAD panel, the system key switch should be turned ON.

*No X-rays can be produced in the OFF or STAND-BY positions.

* If turned to the OFF position, wait at least 30 seconds the TouchRAD interface to shut down before turning it back on

2) Login Screen

Login: **user**

Password: **user**

3) The X-ray system requires a warm up:

- If the system has been down less than 3 days:
20 minute warm-up
- If the system has been down more than 3 days:
50 minute warm-up
- DCM will turn on the machine M-F (~ 7 am) to warm it up.



4) To start the system:

Recall program/Select a program/Start

Warm up required if a program has not run within 8 hours

Do not put animals in the chamber during warm-up mode. If animals are in the chamber and the display indicates warm-up (exposure not being counted), stop the cycle and remove the animals until warm-up is complete. Push X-ray START to resume the warm-up cycle.



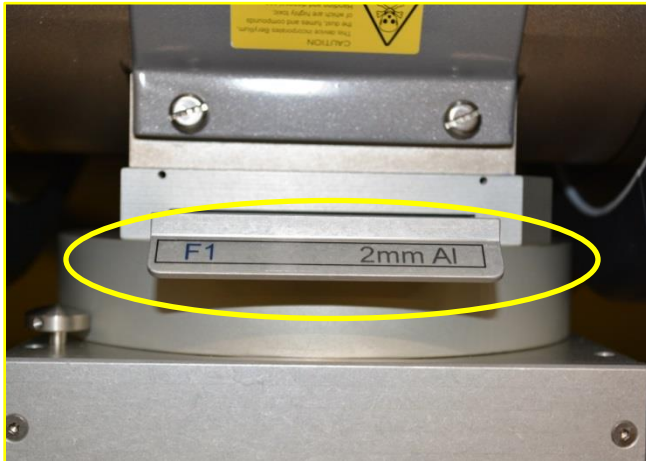
- 5) Emergency Stop: this is hardwired into the X-Ray power supply via the safety circuit and will instantly stop X-Rays when activated. Push the button to activate; twist the button counterclockwise to inactivate. When inactivated, the program will resume from where it was interrupted.
- 6) X-RAYS STOP: This button will interrupt the cycle if needed. The cycle can be resumed where it left off by pushing X-RAY start.
- 7) Total Body Irradiation:

Preset Programs have been entered that are calibrated at different shelf heights using 3 different filters:

*Other preset programs can be entered by request. An external dosimeter should be used to calibrate.

<p><i>F5: Custom Filter</i></p> <p><i>F2: Animals: cuts out low energy x-rays that don't penetrate</i></p> <p><i>F1: Cells: lowers the dose rate</i></p>	
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8) The correct filter (according to the preset program) must be placed in the cabinet for the program to start.



9) Set the desired dose (cGy=Rads) and the shelf will automatically move to where it is specified. After the cabinet is loaded and the door is closed tightly, the program is ready to turn on (**green** button).

10) Loading the chamber: The shelf template can be used to determine the usable space on the shelf at different heights.

11) When the x-rays are produced, you will see the **X-RAY ON** sign above the cabinet and the yellow indicator light flashing on the TouchRad panel.

If the yellow light blows out and needs to be replaced, no x-rays can be produced until the bulb is replaced.



12) When the program is running and the x-ray tubes are up to full power, the dose rate and time will be displayed.

13) Manual mode (Program 0): can be used for parameters that are not in the preset programs. In this mode, total dose or dose rate cannot be set. An external dosimeter can be used to determine total dose.

14) Set kV, MA, time, filter (if desired), offset, and SSD (see below).



SSD: Source to Specimen Distance

- The Offset is relative to the SSD. The SSD is the calibrated distance, so if the specimen is 2cm tall you want the specimen centered to the SSD which will require a 1cm offset.

15) Other information about the Xrad 320

- X-ray beam will always come out at a 32° angle
- Safety Interlocks prevent accidental radiation exposure. If one or more of the interlocks are disabled, X-rays will not be produced.
- The shelf can hold up to 40 pounds
- The settings are calibrated to the center of the field
 - Model Pie-M12 with HEPA
 - Holds 11 mice in individual slots

Irradiator Pies

This is the standard size pie that fits under the X-ray beam.



Irradiator pies can be ordered from:

Precision X-Ray, Inc

www.PXinc.com

203-484-2011

[Braintree Scientific](http://BraintreeScientific.com)

P. O. Box 850498
Braintree, MA 02185

781-917-9526

info@braintreesci.com

16) Reports:

Review mode can be used (by Super Users only) to review all of the exposures by date, start time, stop time, and program number.

Once a month, Super Users will download the Database to the USB flash drive in case of an interruption or computer crash. All exposure information will be saved and can be reloaded.

Create Report: downloads all of the exposures into an Excel file

The TouchRad screen is WiFi-enabled, but not currently connected to the internet.

17) Other suggestions for Users:

Always use the same irradiator pie for consistency

Follow the animal handling policy: Pies should be loaded in the animal rooms* and double-bagged before entering the irradiator room. Remove

the outer bag and place the singly-bagged irradiator pie into the irradiation chamber. The operator must not leave the animals unattended while they are being irradiated. Following irradiation, the irradiator pie is removed from the chamber and placed back into the second bag.

*A biosafety cabinet within the room can be used for loading the pie cage in the room. The pie cage should be put inside a plastic bag before being loaded into the irradiator chamber.

Put only one animal per “slice” in the pie. Animals climbing on top of each other during irradiation will introduce dose variability

Irradiate control and experimental mice in the pie at the same time (if needed)

To reduce inter-experimental variability, use the same mouse strain and the same program to achieve the final dose required.

If soiled, wipe down the chamber with the disinfectant provided in the room. Do not use Clidox or alcohol in the chamber.