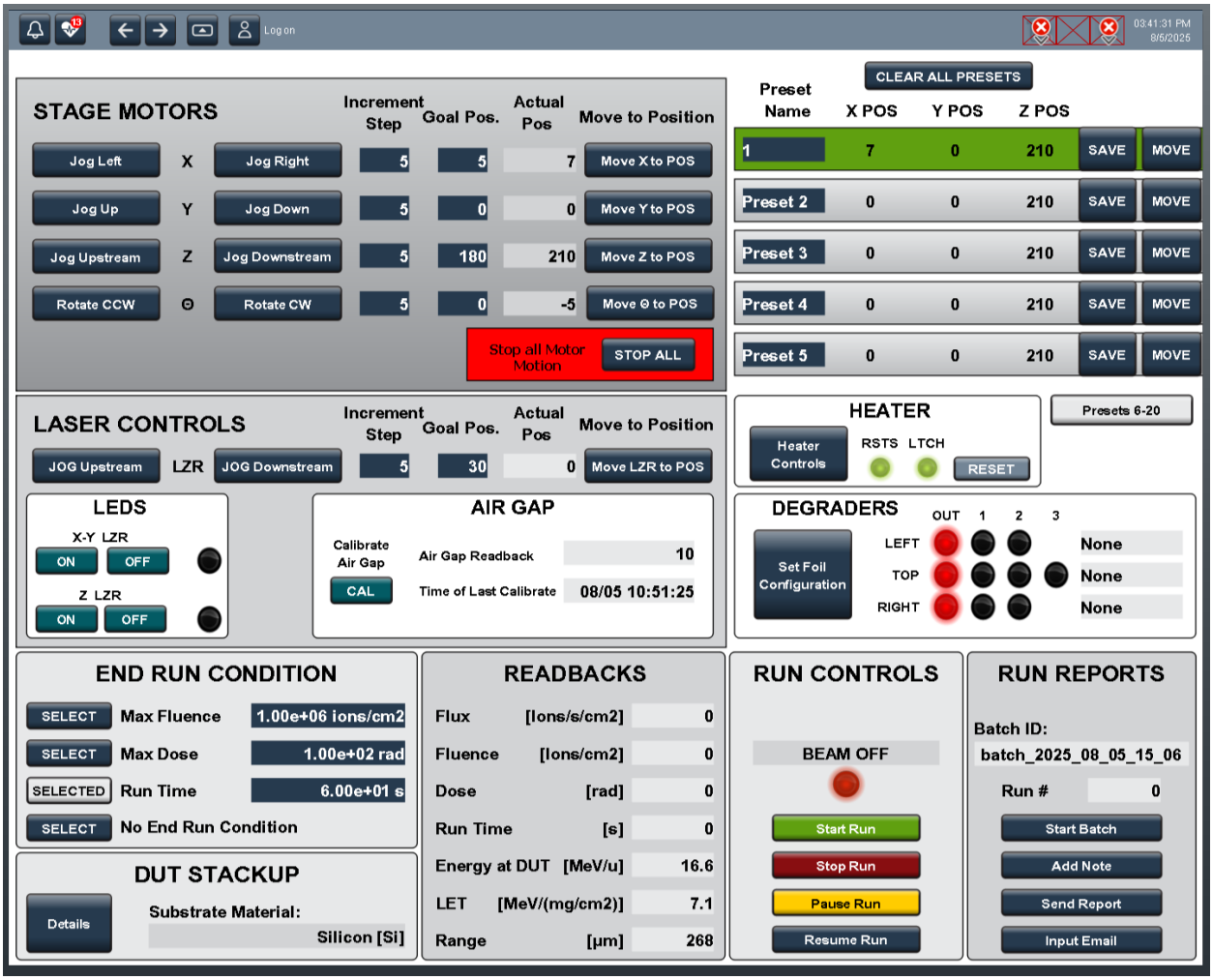
PanelView User Guide

Overview:

The Bradley PanelView 5510 is an interactive touch screen device through which all user experimental controls are located. Two identical screens exist, one in the SEE control room and one in the SEE experimental area. The PanelView gives users extensive control over experimental parameters, including when to start and stop runs, staging area position control, laser positioning controls, and more. Each section of the PanelView is described in more detail below.



Positioning

Stage Motors:

Users can control the position of the mounting stage from the PanelView screen in the experimental vault or the user control room. Stage motion controls are found in the STAGE MOTORS menu.

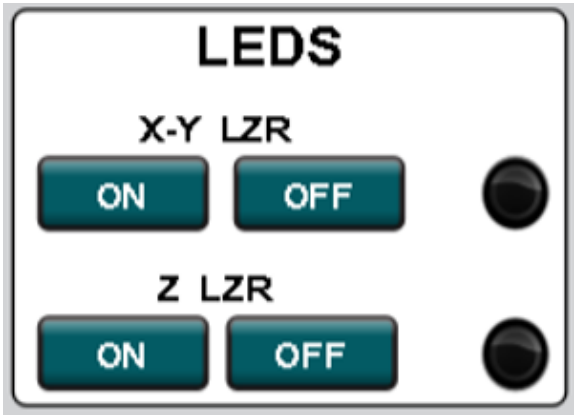
In the KSEE setup the coordinates are as follows,

- The Z direction is along the beamline axis, with Z=0 being the vacuum window and positive Z being away from beam exit
- The X direction is horizontally perpendicular to the beam axis, with positive X being to the right of the beam exit point of view and negative X being to the left the beam exit.
- The Y direction is vertically perpendicular to the beam axis, with positive Y being up from the beam exits point of view and negative Y being down from the beam exit.
- The rotation moves counterclockwise from a top-down view of the stage, with 0 degrees being parallel to the beam exit. A maximum angle of 60 degrees is allowed.
- The beam exit is defined as X=0, Y=0, Z=0.

The PanelView input options are as follows,

- **Jog Left**– Moves the stage left slightly in the chosen direction or rotation angle
- **Jog Right** – Moves the stage right slightly in the chosen direction or rotation angle
- **Increment Step** – Sets the jog distance used by jog left or jog right.
- **Goal Pos** – Coordinate where stage will be moved. This button does not move the stage; it is just the set-point input.
- **Actual Pos** – Readback of current stage coordinates.
- **Move to Position** – Moves stage from current position to the goal pos
- **Stop all** – Stop all motor motions

Laser Controls:



Users can control a laser crosshair system which assists with positioning devices in line with the beam. The Z laser position is defined as 0 at the beam exit and then increases as it moves further away from the exit. The values input are in units of millimeters.

The PanelView input options are as follows,

- **Laser Controls**: Used to reposition the Z laser prior to calibrating the airgap. See the previous section, Stage Motors, for further information.
- **X-Y LZR**: Turns on or off the lasers that are aligned with the x-y beam center. Used for centering the target device with beam exit.
- **Z LZR**: Turns on or off the laser aligned with the z beam axis. Used for measuring air gap distance from the beam exit to target device.

Saving Positions:

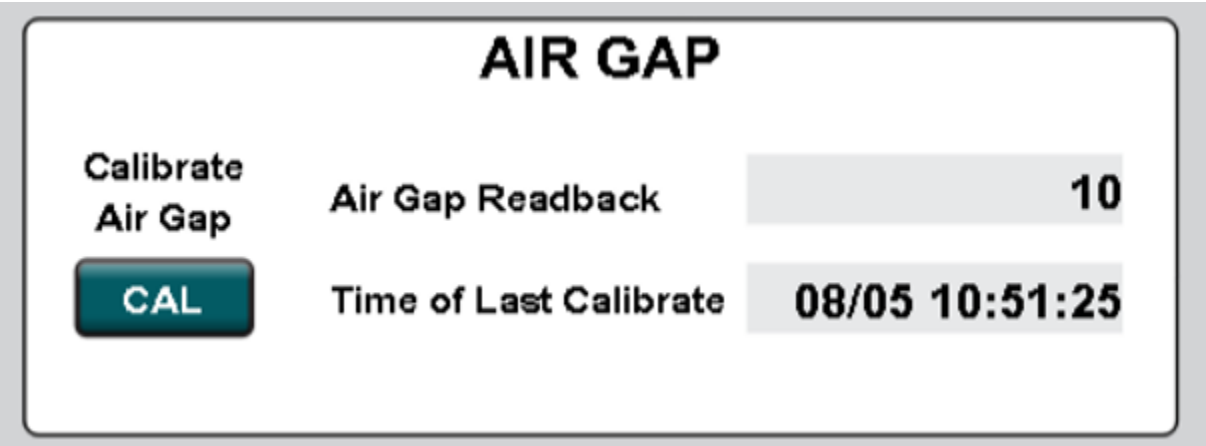
Users can save the X, Y, and Z coordinates of the stage position in any one of the available preset slots. Users can also name each saved position, and the named values will be displayed on the final batch report. Once the values are saved, users can move the stage to any saved position by clicking the MOVE button. The stage will first move to Z = 200, and then align to the saved X, Y and Z positions respectively.

*Note- no rotations are included in the preset function, and any stage rotations should be done manually after the stage has stopped moving

The PanelView input options are as follows,

- **Preset Name:** Name of current preset values. Users can enter a custom name if desired.
- **Save**: Saves the current X, Y, and Z position of the mounting stage.
- **Move**: Moves the stage to the saved position value.
- **Clear presets:** Clears all preset names and saved positions.
- **Presets 10-20:** Allows input for additional presets if needed.

Air Gap Calibration:



The calibration allows users to compute their device's offset distance on the stage. The offset distance refers to the difference of the stage Z coordinate and the Z-laser coordinate. The air gap distance is then calculated by the difference of the stage z coordinate and the offset, which is displayed on the PanelView. The following should be noted on the PanelView:

- **Calibrate Air Gap**: this should be used when users change their device setup or rotate the stage.
- **Air Gap Readback**: this value on the PanelView will update once Calibrate button has been pressed. If the stage is moved, this value will update to reflect the live air gap distance.
- **Time of Last Calibrate**: PanelView will display the number of runs since the last air gap calibration has occurred.
- When air gap value updates, the LET and range will update automatically and will be included in your report.

For users, order of operations to set up calibration is as follows:

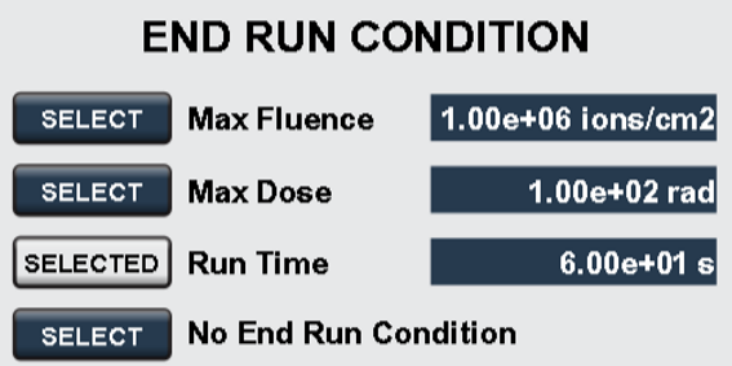
1. Set up device on the stage using a mounting plate or vice.
2. Move air gap laser (Z-laser) to desired airgap distance. (LASER CONTROLS)
3. Move the stage until the device intersects the laser using JOG functions.
4. Press CAL in the AIR GAP section of the PanelView. This will give the updated air gap distance.
5. Everything is now set up. LET and range will automatically update if stage is moved.

Exposure Controls

End Run Condition

This section lets users set end run conditions—the point at which the beam stop automatically halts delivery to the target. For example, choosing an end run condition of 100 s exposes the device to beam for 100 s, regardless of flux or fluence. Only one condition can be selected at a time. The PanelView input options are as follows,

- **Max Fluence**: Defined as the total integrated flux. End condition is when fluence value is met.
- **Max Dose**: Total dose. End condition is when dose value is met.
- **Run Time**: Total time of exposure in seconds. End condition is when time reaches setpoint value.
- **No End-Run Condition**: If selected, once a run is started it will continue until Stop Run is selected.



To choose an end-run condition click the corresponding SELECT button. To set the value of the end-run condition, select the text entry box to the right and enter in the desired value in the pop-up menu. The entered value will be displayed.

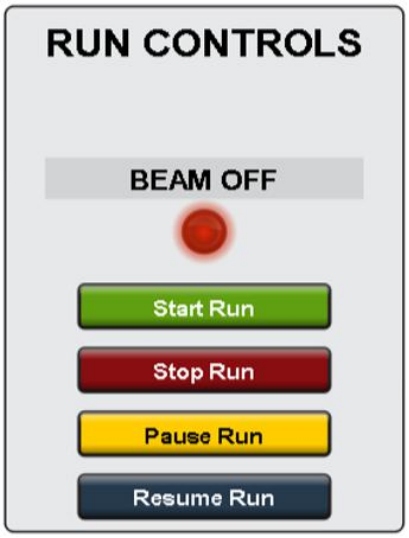
Live readbacks will be displayed in the READBACKS section located at the bottom of the PanelView.

Run Controls

This section allows users to choose how to collect data throughout an experiment. It also allows users to block beam throughout the experiment as they see fit.

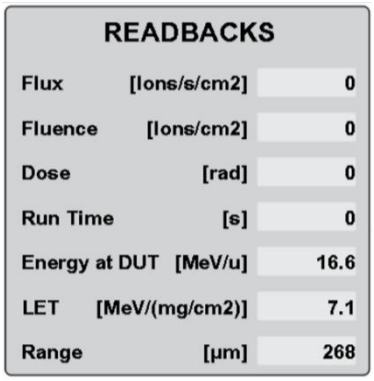
The PanelView input options are as follows,

- **Start Run:** Starts a run, automatically removing the beam stop and exposing the user end station to the beam. Run will continue until an end-run condition is met or Stop Run is selected.
- **Stop Run**: Ends a run by inserting the beam stop.
- **Pause Run**: Inserts the beam stop, preventing beam exposure until Resume Run or Stop Run is selected. Data collected after resuming the run will be appended to the current run number.
- **Resume Run:** Resumes beam exposure and data acquisition under the current run number. Run number will only increase after ending the current run and beginning a new one.



Run Data

Readbacks



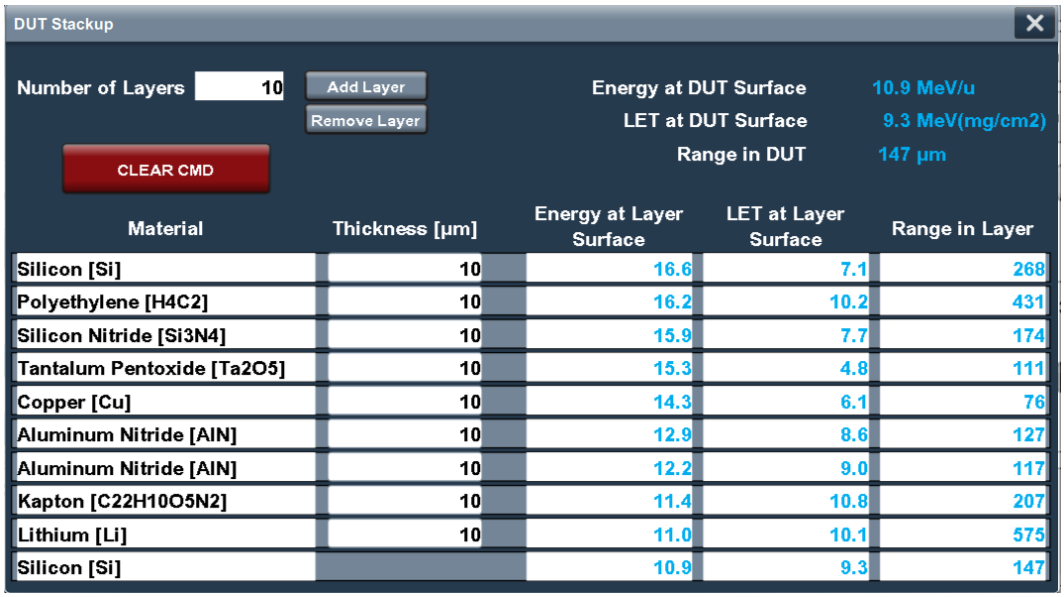
- Flux (ions/s/cm²)
- Fluence (ions/cm²)
- Dose (rad)
- Run Time (s)
- Energy at DUT (MeV/u):
- LET (MeV/mg/cm²)
- Range (µm)

Run Reports

- **Start Batch:** Starts a new batch of data. A batch contains all run data collected until a new batch is started. Typically, users choose to have one batch per experimental team, although data acquisition is ultimately up to the users.
- **Add Note**: A note of up to 40 characters may be added. This will appear in your run report for all subsequent runs or until it is removed or changed.
- **Send Report:** Complies a batch into a report and sends the report to all emails that have been entered.
- **Input Email:** All emails entered here by the user will receive a copy of the run report.

DUT Stackup

The material composition of the DUT may be entered here. Energy, LET, and range will be reported for the surface of each layer in the submenu. All other values will reflect energy, LET, and range at the surface of the last layer of the stackup. The stackup composition will be displayed along with the surface LET and range for all layers in your run report.



Material	Thickness [µm]	Energy at Layer Surface	LET at Layer Surface	Range in Layer
Silicon [Si]	10	16.6	7.1	268
Polyethylene [H4C2]	10	16.2	10.2	431
Silicon Nitride [Si3N4]	10	15.9	7.7	174
Tantalum Pentoxide [Ta2O5]	10	15.3	4.8	111
Copper [Cu]	10	14.3	6.1	76
Aluminum Nitride [AlN]	10	12.9	8.6	127
Aluminum Nitride [AlN]	10	12.2	9.0	117
Kapton [C22H10O5N2]	10	11.4	10.8	207
Lithium [Li]	10	11.0	10.1	575
Silicon [Si]		10.9	9.3	147

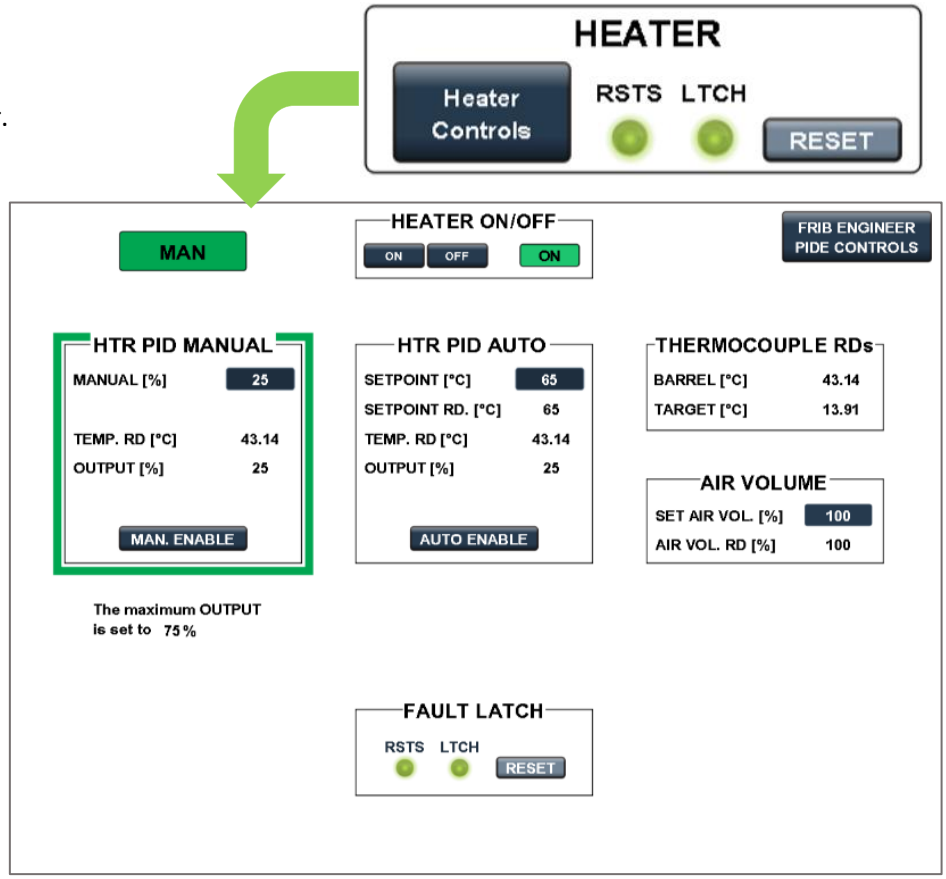
Heater

Heater On/Off

Binary on and off control of the heater.

HTR PID Tuning

- **Setpoint:** Temperature setpoint in degrees Celsius.
- **Temp. RD:** Live air temperature readback from the barrel of the heater.
- **Target:** Target temperature in degrees Celsius.
- **Output:**
- **Manual:** Controls the percentage output



Thermocouple RDs

Provides live temperature readbacks at the barrel and target.

Fault Latch

Should the heater fail to function as intended, the fault LED will illuminate red. Any issue should be investigated and resolved before resetting the fault including verifying adequate airflow through the heater and ensuring the output and temperature setpoints do not exceed the limit.

If the RSTS LED illuminates red, the heater has exceeded the internal temperature limit. If the heater exceeds the limit for more than 3 seconds, the LTCH LED will illuminate red. Once the heater has cooled down you can select RESET.

Once resolved, you may press RESET and power on the heater.

Functioning normally.

Heater internal temperature exceeds 650°C

Heater internal temperature exceeds 650°C and has latched. Heater will power off.

Degraders

A series of in-vacuum, user-controlled degrader ladders are easily inserted from the PanelView located at the experimental area or the user control room. The ladders contain aluminum foils varying in thickness, providing a comprehensive range of energy degradation. LET and range values are calculated referencing the selected foil configuration and updated in real time.

Users can select a desired LET and range from the “Set Foil configuration” submenu and the required foils will be inserted automatically.