

**Help for UML Data GUI** (This is only a draft, and it certainly needs some work -- but better this than nothing...)

## Purpose

The UMLRR Data GUI plots data from the research reactor at UMass Lowell. The purpose of the GUI is to allow the user to visualize the data and perform certain functions such as smoothing and saving data.

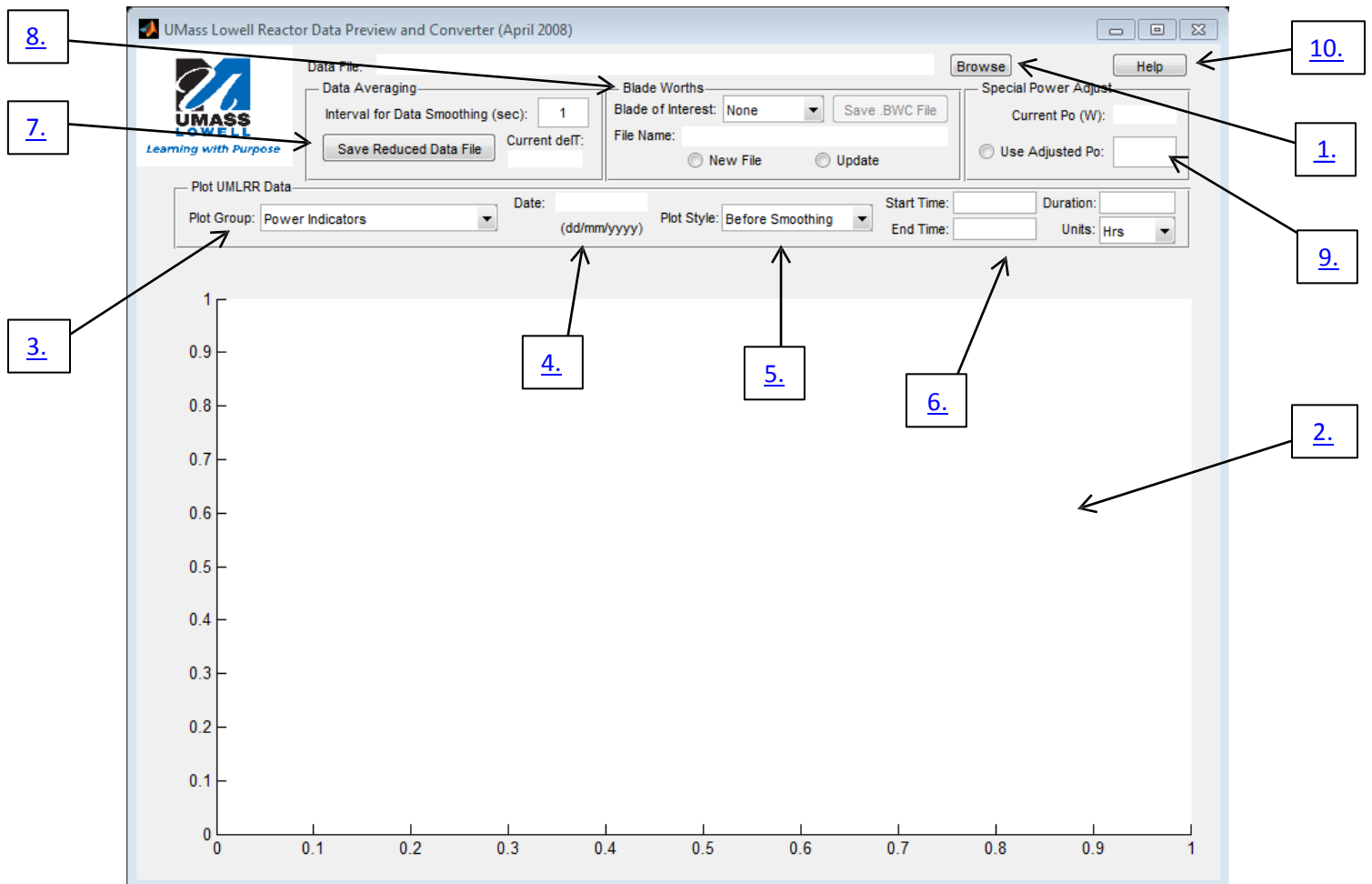
## Installation

Step 1. Unzip the full archive to a separate folder and make sure that the Matlab path includes this folder or that this directory is set as the default Matlab folder.

Step 2. Run the **umlrr\_data.p** main script file in the Matlab command window by simply typing **umlrr\_data** at the command prompt within the command window.

## Features and Uses

Screenshot of UML Data GUI when it first opens.



1. Browse Button: Clicking the browse button opens a dialog box where the user can select a data file to load into the GUI. Currently, the data GUI can open files with .hst, .txt, and .dat extensions. If a .hst file is opened, the GUI will convert the file to .txt format before opening (by opening the command prompt and running the conversion program ***hst2txt.exe***). **NOTE: the *hst2txt.exe* must be in the current default folder for this to work!!!** See Warnings about restrictions on these controls.
2. Plot Window: Data will be plotted here, with axes and axis titles. If “Before and After” is selected in the Plot Style menu (see item 5), this window will split into two vertical graphs.
3. Plot Group Menu: This is a drop down box where the user can select plot groups that correspond with the plot groups in the tags window. See [Warnings](#) about restrictions on these controls.
4. Date: Displays the date of the current data set in dd/mm/yyyy format.
5. Plot Style: This drop-down list can be used to change the style of the plot. The option “Before Smoothing” plots the selected raw data. “After Smoothing” plots the data after smoothing over an interval defined by the user (see [item 7](#)). “Before and After” plots both the raw data and the data after smoothing. See [Warnings](#) about restrictions on these controls.
6. Time Controls: These control the times of the data set plotted. Start Time and End Time can be changed to provide precision selection of times. Duration (with Units) can be changed to select a specific interval (such as 1 hour, 45 minutes, or 30 seconds). See [Warnings](#) about restrictions on these controls.
7. Data Averaging: This box allows the user to smooth data over an interval, and save data that has been smoothed or reduced in time frame. Changing the interval, then selecting “After Smoothing” or “Before and After” in the Plot Style Menu, will smooth the data and plot the smoothed data. This is especially useful for curves that have significant noise. “Current delT” displays the current interval of smoothing. See [Warnings](#) about restrictions on these controls.
8. Blade Worths: This box allows the user to select a Blade of Interest and save or update a .BWC file with blade worths. See [Warnings](#) about restrictions on these controls.
9. Special Power Adjust: The user can adjust the Po (initial log power) to affect the scale of Linear Power Magnitude Adjusts. This is useful for initial log powers lower than 50 Watts, where the log power does not provide accurate values. See [Warnings](#) about restrictions on these controls.
10. The “Help” button opens this help file

Select Tags within Various Plot Groups

### Power Indicators

☐ Linear Power 1
 ☐ Linear Power 2

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☒ Log Power
 ☒ Kilowatts

☐ Calorimetric Power \*100
 ☐ N16 Power

☐ Linear Power 1 (Mag Adjust)
 ☐ Linear Power 2 (Mag Adjust)

☒ Combined Lin Pwr (Mag Adj)

### Pool & Core Temperatures

☒ Pool Inlet
 ☒ Pool (average)
 ☒ Core Inlet (top)
 ☒ Core Outlet (bottom)
 ☒ Pool Outlet

### Heat Exchanger Temperatures

Primary Side:
 ☒ Inlet
 ☒ Outlet

Secondary Side:
 ☒ Inlet
 ☒ Outlet

### Control Blade & SUC Positions

☒ 1
 ☒ 2
 ☒ 3
 ☒ 4

☒ Reg Blade
 ☒ Auto Mode

☐ Counter Position

### Reactivity

☒ Plot Reactivity vs. Time
 ☐ Before Rebank
 ☒ After Rebank

### Pump & Fan Status

☒ Primary Pump
 ☒ Secondary Pump
 ☒ Cooling Fan #1
 ☒ Cooling Fan #2
 ☐ Primary Makeup Pump
 ☐ Cleanup Pump

### Flow Rates

☒ Primary Loop
 ☒ Secondary Loop
 ☐ Cleanup System
 ☐ Secondary Makeup Flow

### Heat Exchanger DeltaP

☒ Primary DeltaP
 ☒ Secondary DeltaP

### Environmental Temperatures

☒ Air Temp (inside)
 ☒ Air Temp (pump room)
 ☒ Air Temp (outside)
 ☒ Sump Temp
 ☐ Sump Inlet Temp

### Start-Up Counter

☒ Count Rate

### Blade Worth Curve Fit

☒ Curve Fit

Tags Selection Window: This window appears alongside the main data GUI window. Each titled box in this window corresponds to a Plot Group in the Plot Group drop-down menu. The user can select or deselect the check-boxes next to the signal names to view data from different signals. The “Kilowatts” radio button in the Power Indicators plot group changes the units of the power indicators from Log Power to Combined Lin Pwr into Kilowatts. See [Warnings](#) about restrictions on these controls.

## Special Cases/Warnings

1. Browse Button Warnings: “No valid file selected -- previous file is still being used...” occurs when the user cancels the dialog box for opening data files.

Special Cases: When the linear powers are selected in the tags window along with other power signals, the linear powers are plotted in percent of scale while the other powers are plotted in either percent of power or Kilowatts (depending on selection of Kilowatts radio button).

2. Plot Window Special Cases:

3. Plot Group Menu Special Cases: When either “Reactivity” or “Blade Worth Curve Fit” is selected, smoothing is not available. The interval for smoothing, saving reduced data, and plotting after smoothing are disabled for these plot groups.

Warnings: \*\*\* No blade selected for this plot group \*\*\* occurs if “Reactivity” or “Blade Worth Curve Fit” is selected, but no Blade of Interest is selected. A red arrow will point to the Blade of Interest list to indicate that a blade of interest needs to be selected.

4. Date Special Cases:

5. Plot Style Special Cases: When either “Reactivity” or “Blade Worth Curve Fit” is selected, smoothing is not available, and the plot style menu will be disabled.

6. Time Controls Special Cases: If the user inputs a start time before the start time of the data of interest, the start time will reset to the data of interest start time. This is useful for when the user wants to know the original start time. Also, if the user inputs an end time after the end time of the data, the end time will reset to the end time of the data.

Warnings: \*\*\* Check Start and End Time Entries in GUI \*\*\* occurs if the start time is set to a time after the end time (or end time set to before start time).

\*\*\* Check Start Time Entry in GUI \*\*\* occurs if the start time is set to a time before the start time for the data of interest.

\*\*\* Check End Time Entry in GUI \*\*\* occurs if the end time is set to a time after the end time for the data of interest.

7. Data Averaging Special Cases: When either "Reactivity" or "Blade Worth Curve Fit" is selected, smoothing is not available. "Save Reduced Data File" and "Interval for Data Smoothing" will be disabled for those two plot groups.

When any file with smoothed data (on an interval greater than 1) is opened, the interval and saving will be disabled. This occurs so that smoothing can only be done on the original data (multiple levels of smoothing is problematic).

8. Blade Worthy Special Cases:

9. Power Adjust Special Cases: If the initial power level of the log power for the selected times is greater than 50 Watts, power adjust will be disabled. The log power does not accurately measure at power levels below 50 Watts, so adjusted initial power levels may be needed.

Tags Window Warnings: \*\*\* No tags selected for this plot group \*\*\* occurs when no tags are checked in the tags window.

Other Special Cases: