Excel Trend Analyzer Manual

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Introduction

Overview

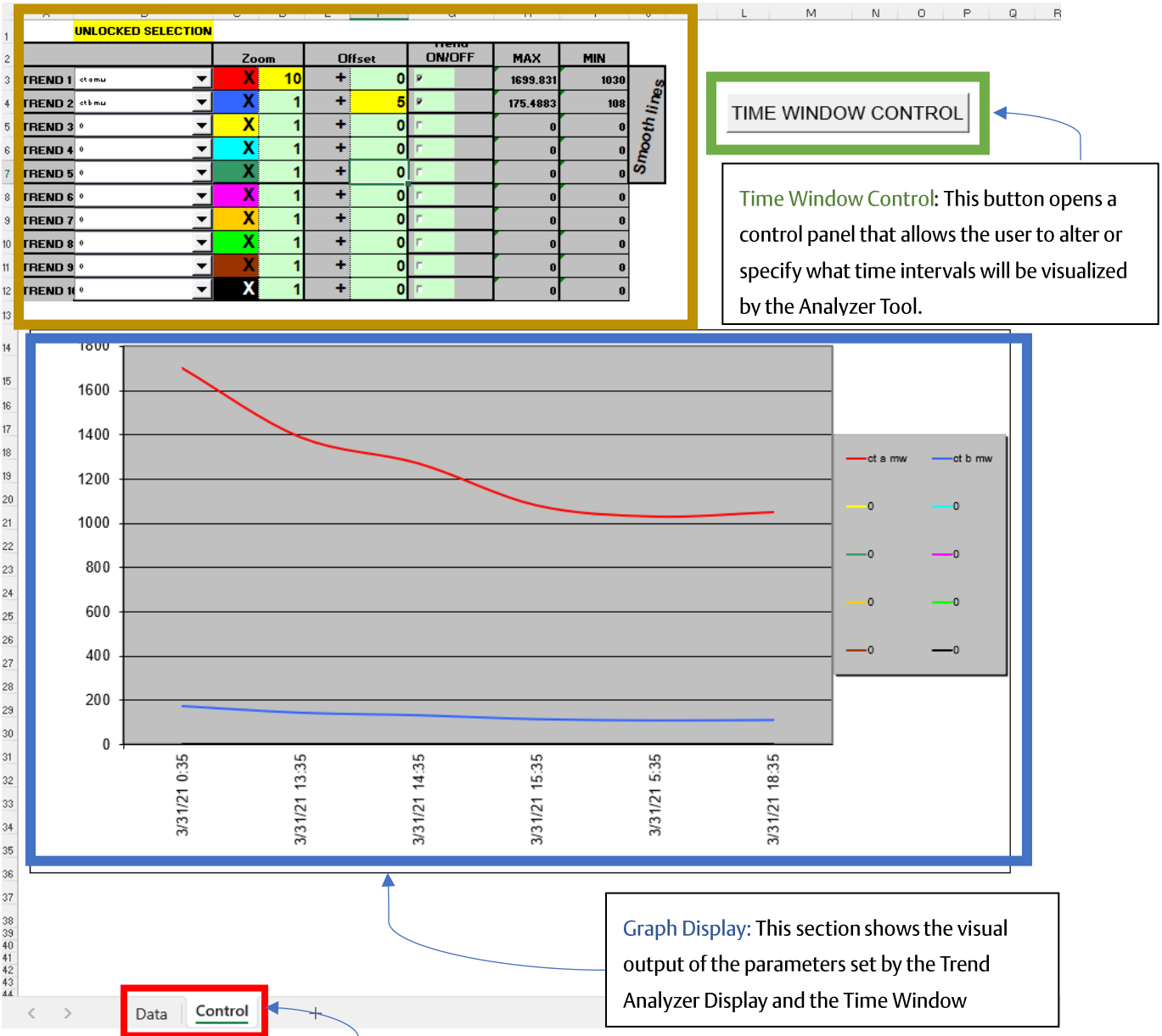
The Excel Trend Analyzer tool generates time-based graphs from numeric datasets in Excel spreadsheets. It is designed to be user-friendly and efficient by allowing users to paste their own spreadsheet data and visualize it in a customizable chart. The graph format is pragmatic and easy to understand: The x-value of the graph displays time values, and the y-values display numeric values. The graph also allows for users to zoom, offset, and activate/deactivate certain datasets in the graph, with the final graph result loaded automatically after each input. It allows for up to 10 separate trend sets to be added and displayed graphically.

Purpose

The purpose of this manual is to introduce data visualization with the Excel Trend Analyze Tool and to demonstrate how it can be used for practical applications with data drawn from Emerson's Ovation Process Historian (OPH) servers. This manual will specifically focus on how to analyze large Excel datasets that have the standard OPH Converter format, with the timestamps in the first column and the function IDs as the headers. Given this specialized focus, this guide is intended primarily for Emerson employees who are familiar with the OPH console and seek to visualize data taken from Emerson's servers. As it is assumed users will already be familiar with how to navigate Excel and OPH, the guide will only go over the various functions encompassed by this tool. It will first review the basic procedure of having the data recognized and visualized in the Control section, and then will explain the Lock Point Selection, Functions Recalculation, and Time Window Control parameters.

Labeled Sections of the Interface

Trend Analyzer Display: This table section displays the functions for each individual trend. The functions include Zoom, Offset, an On/Off Toggle, as well as Min and Max values. This allows the user to manipulate individual columns of data from the dataset as they appear on the graph.



Time Window Control: This button opens a control panel that allows the user to alter or specify what time intervals will be visualized by the Analyzer Tool.

Graph Display: This section shows the visual output of the parameters set by the Trend Analyzer Display and the Time Window

Datasheet Selection: These two tabs **Data** and **Control** allow the user to switch between the two spreadsheets used by the tool.

Steps

1. Input Data Format

This program runs through two spreadsheets, **Data** and **Control**. The two tabs at the bottom left allow for you to switch between these spreadsheets whenever needed. To manipulate and format the data, you will use the **Control** spreadsheet. To add values and data, you will use the **Data** spreadsheet.

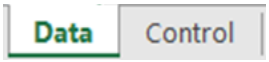
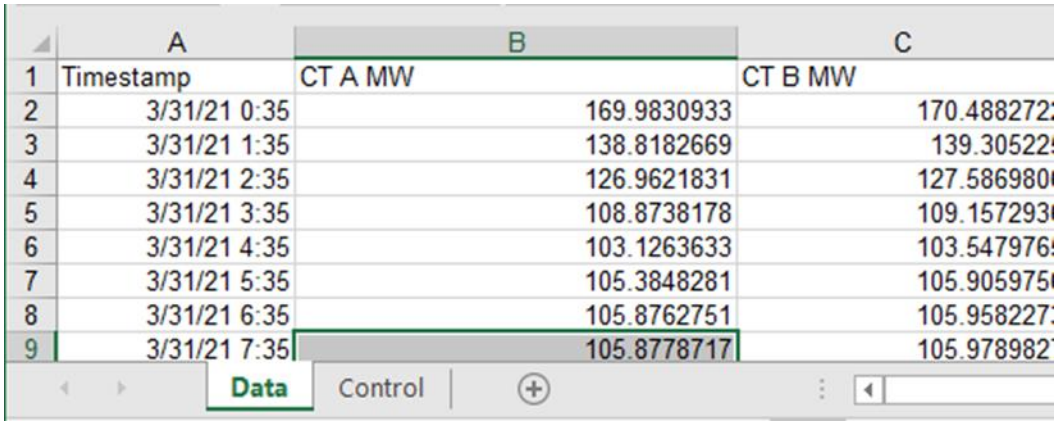


Figure 1

1. First, clear out any inputs in the **Data** spreadsheet and make sure the spreadsheet is empty.
2. Use the OPH Converter tool to properly format the server data as a .txt file before you open it in the **Data** spreadsheet.
3. Open the converted input data in the **Data** spreadsheet. The input data should consist of only one header row, in which the labels for the data displayed on the graph are added (Timestamp, CT A MW, CT B MW). The first column must contain the timestamp data for the program to work properly.



	A	B	C
1	Timestamp	CT A MW	CT B MW
2	3/31/21 0:35	169.9830933	170.488272
3	3/31/21 1:35	138.8182669	139.30522
4	3/31/21 2:35	126.9621831	127.586980
5	3/31/21 3:35	108.8738178	109.157293
6	3/31/21 4:35	103.1263633	103.547976
7	3/31/21 5:35	105.3848281	105.905975
8	3/31/21 6:35	105.8762751	105.958227
9	3/31/21 7:35	105.8778717	105.978982

Data Control

Figure 2

2. Visualization Procedure

The visualization functions of this program, located in the **Control** spreadsheet, interpret the formatted data stored in the **Data** spreadsheet.

a.) Switch to the **Control** spreadsheet.

b.) After adding data in the **Data** spreadsheet, you will see in the **Control** spreadsheet that the program has preloaded the **Data** header cells into dropdown lists. To view this data, press the triangle drop down button on the left of the label. Select the label to be shown on the chart by selecting header. To leave the trend blank, enter zero. Trends 1-5 will be displayed as a smooth line type on the graph.

Figure 3

c.) To enable the trend and have it displayed in the graph, check the check box in the *Trend ON/OFF* column. The graph will be generated underneath the interface.

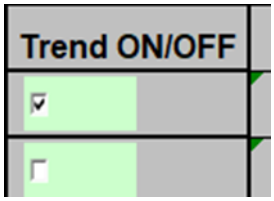


Figure 4

Here is an example of a successfully generated graph:

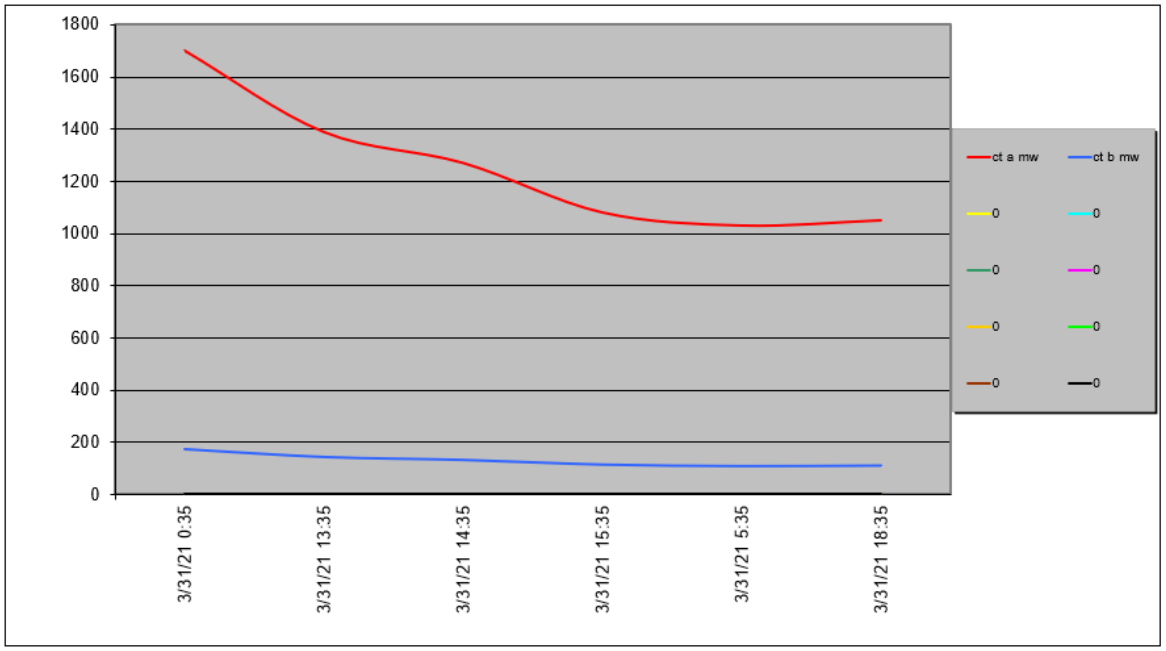


Figure 5

The Trend Analyzer graph feature also allows for users to personalize their graphs by manipulating the *Zoom* and *Offset* values corresponding to each trend. To alter the data visualization, press on the light green boxes with numbers located in the *Zoom* and *Offset* columns. The default value for the *Zoom* column is 1, whereas the default value of the *Offset* column is 0. If the cell in either column is shaded light green and displays its default value, it means that the data has not been altered. To alter the data as it appears on the graph:

- Enter a *Zoom* value to multiply the dataset values by a constant. This will magnify smaller trend changes on the graph.
- Enter an *Offset* value to add/subtract constants from the dataset's y-values. This will shift the trend up or down on the graph.

Both *Offset* and *Zoom* values can be applied to the same trend. In the below example, all **CT A MW** values are multiplied by 10 and all **CT B MW** values are increased by 5. The cells

with altered Zoom and Offset values turn yellow to distinguish which values have been altered.

		Zoom		Offset	
TREND 1	CT A MW	X	10	+	0
TREND 2	CT B MW	X	1	+	5

Figure 6

The graph on the left displays how the graph would appear without the above *Zoom* and *Offset* values. The graph on the right displays how the example inputs above have altered the display of the data.

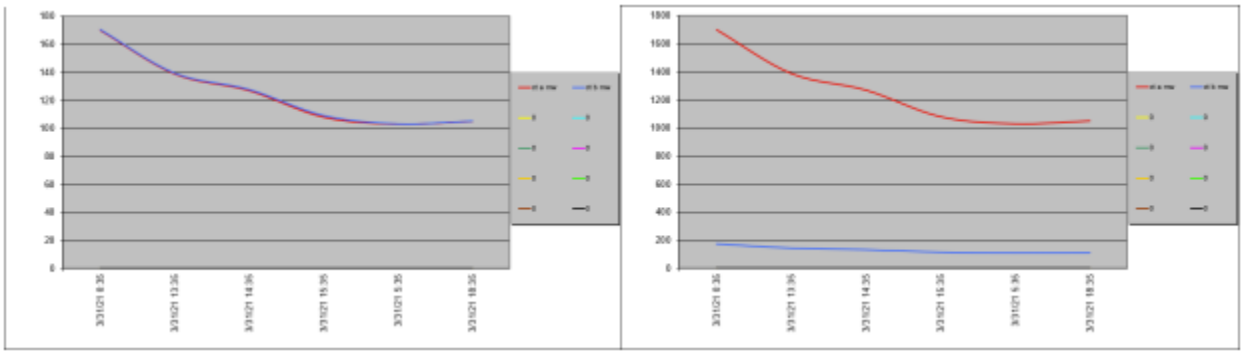


Figure 7

3. Lock Point Selection and Functions Recalculation

Working with large datasets may dramatically slow down the data window manipulation due to the program having to recalculate every function at each click. Engage the *Lock button* seen in Row 1 of the **Control** spreadsheet to hold this recalculation process. Once locked, only the time manipulation window will be active, and it will remain this way until the button is once again toggled off. The updating of new trend selections, biases, offsets, and on/off check box statuses will be paused and the yellow note “LOCKED SELECTION” will be displayed in cell B1.

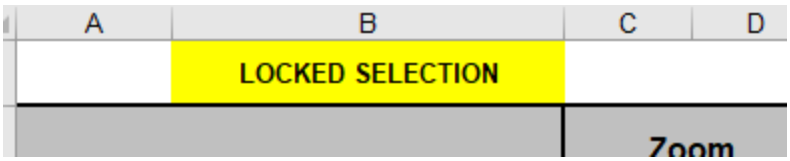


Figure 8

4. Time Window Control

Press the TIME WINDOW CONTROL button located on the right side to open the time manipulation window.

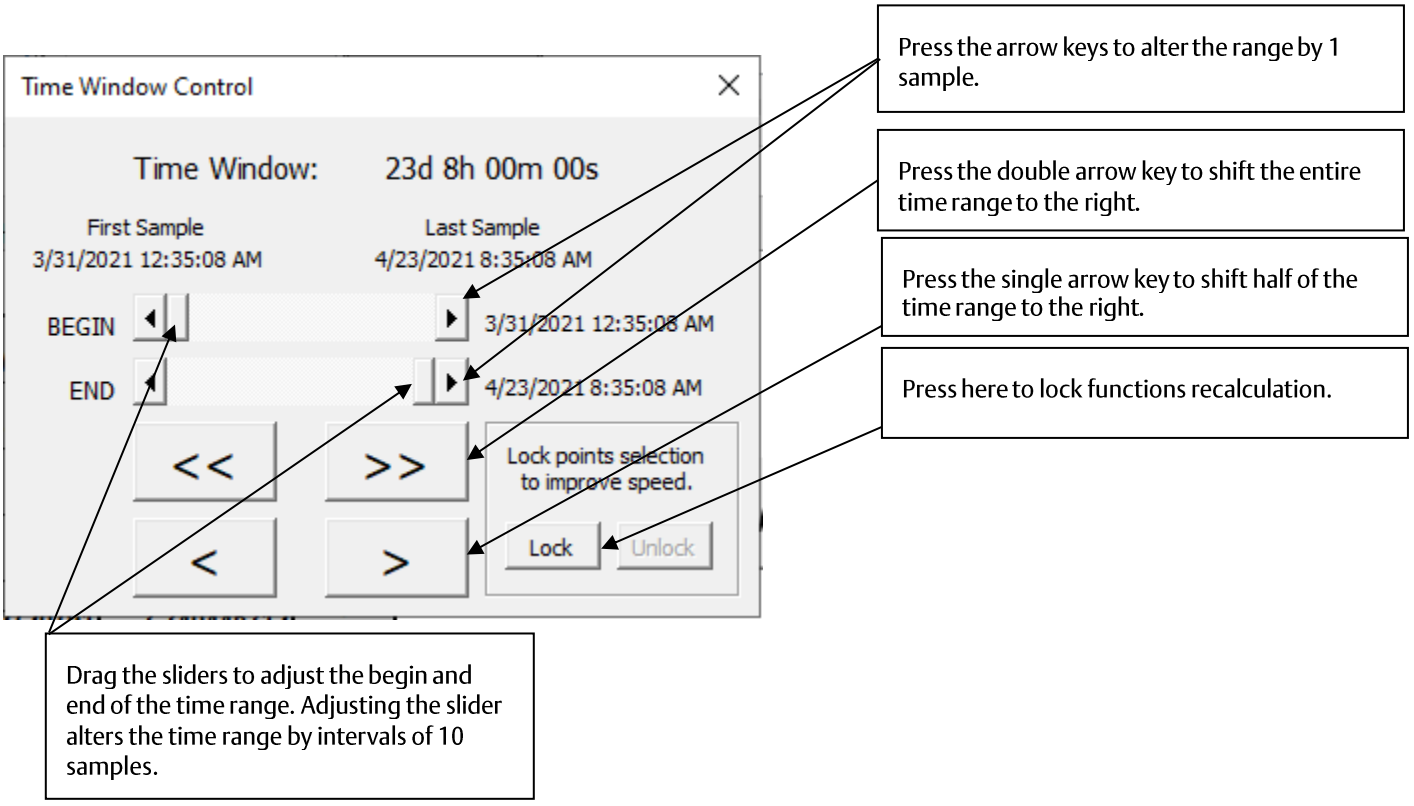


Figure 9

Troubleshooting

If you are encountering errors with the graphical output, ensure that:

- The parameters set in the *Zoom* and *Offset* columns are either correct or set to default. Remember, light green signifies that the values are set to default, whereas yellow indicates that the values have been altered.
- The data is properly formatted in the **Data** spreadsheet.
- The Lock Point Selection option is toggled off when appending or evaluating new or different data.
- The Time Window Control parameters are all set correctly. The beginning and ending time sample value will be displayed in the Time Window Control panel.

Conclusion

In conclusion, this document has overviewed the basic procedure for visualizing data using the Excel Trend Analyzer Tool. It has first identified where each section is located on the program, defined the basics of visualizing the data taken from the **Data** spreadsheet in the **Control** spreadsheet, and explained what the different parameters do as well as how to adjust them. To find more information regarding this tool, check Emerson's documentation hub at https://www.emerson.com/en-gb/documents-and-drawings.