

# TSI<sup>®</sup> AirAssure<sup>™</sup> and BlueSky<sup>™</sup> Air Quality Monitors



## Data File Formatting

Application Note ENVTL-001 (A4)

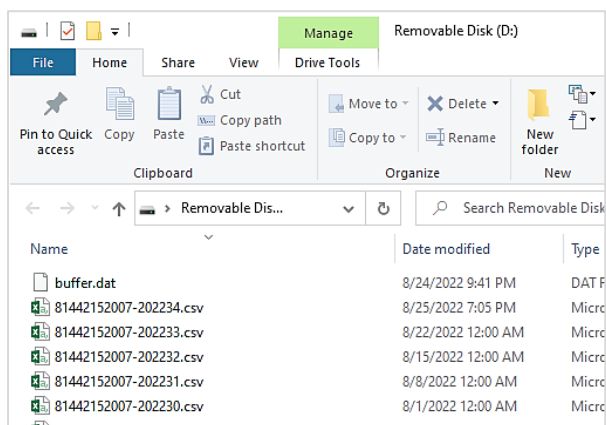
### Introduction

The AirAssure<sup>™</sup> and BlueSky<sup>™</sup> air quality monitors are connected to the TSI Link<sup>™</sup> cloud solution using Wi-Fi<sup>®</sup>. Both monitors also contain SD cards, to serve as a backup in case of loss of Wi-Fi<sup>®</sup> connectivity. The instructions below give details on how to review the data on a computer and understand and manipulate the data.

### Downloading Data from SD Card

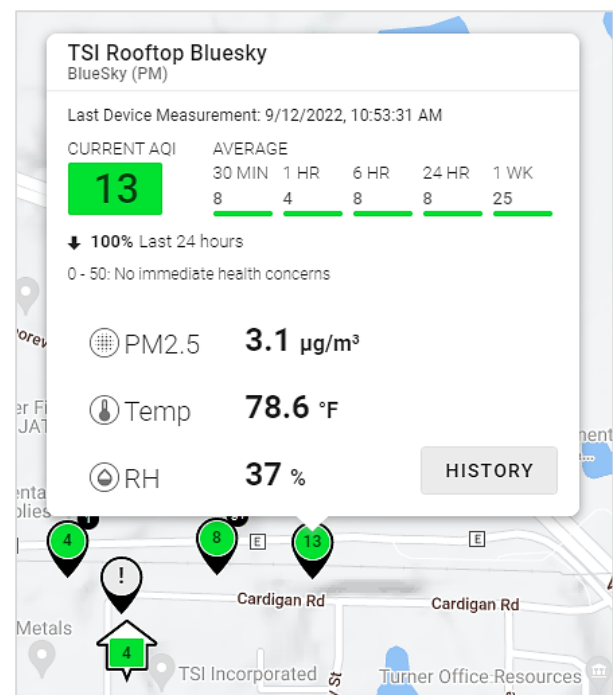
Please refer to the manuals for the AirAssure<sup>™</sup> or BlueSky<sup>™</sup> air quality monitors to locate and remove the SD card from the device. Power should be off before removing the SD card to prevent the small risk of data loss. Both devices use a microSD card that is commonly supported by computers using built in readers or a USB accessory. The examples shown below are from an AirAssure device. The BlueSky air quality monitor is similar, although the exact data shown in the examples will be different.

When opening the SD card folder on a computer, you will see files such as shown below. The filename indicates the serial number of the device with a dash and then the year and week of the year of the data file.

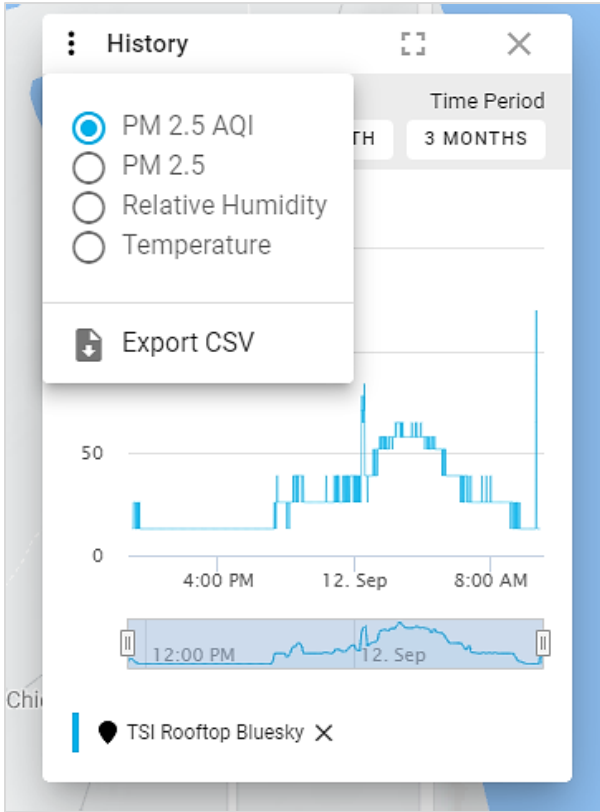


### Downloading Data from the Cloud

When viewing data on [www.tsilink.com](http://www.tsilink.com), it is possible to download the historical data. One way to do this is by clicking on the device on the map, then clicking on the **HISTORY** button.



Next, click on the 3 bar icon on the graph. Then click **Export CSV**.



## Opening the File

If you have a .csv (comma separated value) compatible program loaded on your computer (such as Microsoft® Excel® spreadsheet program, in this case), you can open the file directly by double-clicking on the filename. Otherwise, open your data analysis program and browse to the file of interest. Select import or open and use .csv as the file type.

### NOTICE

The following images are of SD card data.

	A	B	C	D	E	F	G
1	# TSI AirAssure IAQ						
2	#						
3	# Model: 8144 Part Number: 8144-6						
4	# Serial: 81442152007						
5	# Firmware: v1.2.0						
6	#						
7	# Temperature/Relative Humidity sensor						
8	# Serial: 814402232009						
9	# Usercal:						
10	# Temperature: Slope: 1.00 Offset: 0.00						

For the AirAssure™ air quality monitor, there are many rows of header information that can be used, ignored or deleted depending on user interest. The bulk of the data is farther down and begins with header rows that do not have a # as a starting character.

	A	B	C	D	E	F	G
58	# tVOC: Slope: 1.00 Offset: 0.00						
59	#						
60	Timestamp	System St	Temperat	Relative H	Temperat	Barometri	Barometri F
61	UTC		C	%		inHg	L
62	#####	0	22	49	0	29.26	0
63	#####	0	22	49	0	29.26	0
64	#####	0	22.1	49	0	29.26	0
65	#####	0	22.1	49	0	29.26	0
66	#####	0	22.1	49	0	29.26	0
67	#####	0	22.2	49	0	29.26	0
68	#####	0	22.2	49	0	29.26	0
69	#####	0	22.2	49	0	29.26	0
70	#####	0	22.3	48	0	29.26	0
71	#####	0	22.3	48	0	29.26	0
72	#####	0	22.3	48	0	29.26	0
73	#####	0	22.4	48	0	29.26	0
74	#####	0	22.4	48	0	29.26	0
75	#####	0	22.4	48	0	29.26	0

The header in row 60 above is fairly self-explanatory for describing the measurement numbers that each column. Row 61 gives the units of each measurement. Note that the ##### in the first column is a feature of Microsoft® Excel® program that indicates the column width is too small to show the data. Widening the column will show the data as below.

	Timestamp	System St	Temperat	Relative H	Temperat	E
61	UTC		C	%		i
62	8/22/2022 0:00		0	22	49	0
63	8/22/2022 0:01		0	22	49	0
64	8/22/2022 0:02		0	22.1	49	0
65	8/22/2022 0:03		0	22.1	49	0
66	8/22/2022 0:04		0	22.1	49	0
67	8/22/2022 0:05		0	22.2	49	0
68	8/22/2022 0:06		0	22.2	49	0
69	8/22/2022 0:07		0	22.2	49	0
70	8/22/2022 0:08		0	22.3	48	0
71	8/22/2022 0:09		0	22.3	48	0
72	8/22/2022 0:10		0	22.2	48	0

## Date and Time Considerations

To prevent confusion between files in different time zone or daylight savings time, all dates and times are shown in UTC format with local time converted to GMT or UTC+0). Most people would prefer to convert this back to their local time. This is generally easy to do with a simple spreadsheet formula. Below, Microsoft® Excel® spreadsheet program is used as an example but other software would have similar tools. Insert a new column between the A and B column to hold the local time. Note that this does not have to be just local time. You may want to use this same method to correct for any offsets between the instrument time and actual time or convert to a different time zone.

	A	B	C	D	E
58	# tVOC: Slope: 1.00	Offset: 0.00			
59	#				
60	Timestamp		System St	Temperat	Relative H Te
61	UTC		C	%	
62	8/22/2022 0:00		0	22	49
63	8/22/2022 0:01		0	22	49
64	8/22/2022 0:02		0	22.1	49
65	8/22/2022 0:03		0	22.1	49
66	8/22/2022 0:04		0	22.1	49
67	8/22/2022 0:05		0	22.2	49
68	8/22/2022 0:06		0	22.2	49

Add a header called "local time" and perhaps a descriptor below (in this case CDT for central daylight time).

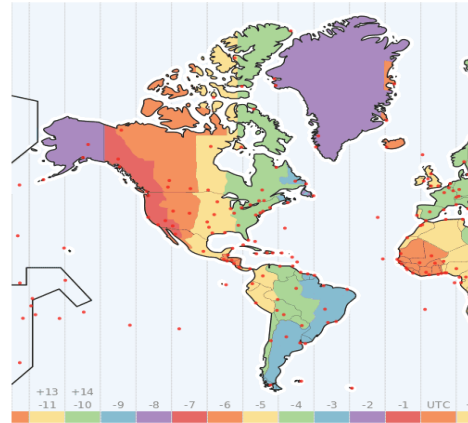
	A	B	C	D	E
58	# tVOC: Slope: 1.00	Offset: 0.00			
59	#				
60	Timestamp	Local time/date	System St	Temperat	Relative H Ten
61	UTC	CDT	C	%	
62	8/22/2022 0:00		0	22	49
63	8/22/2022 0:01		0	22	49
64	8/22/2022 0:02		0	22.1	49
65	8/22/2022 0:03		0	22.1	49
66	8/22/2022 0:04		0	22.1	49
67	8/22/2022 0:05		0	22.2	49
68	8/22/2022 0:06		0	22.2	49

The formula is the current UTC time that is actually stored in Excel® spreadsheet program as a very long number equal to the number of days since January 1, 1900. So, you can shift the date by subtracting any number of days plus or minus the current date. Adding 1 to the UTC date will shift it forward by one day. Subtracting 1 will shift the UTC data back by one day. Subtracting a fraction of one will shift by hours, minutes or seconds. You can search the internet for the time zone of interest compared to GMT, such as here:

<https://www.timeanddate.com/time/map/>

You will see along the bottom of the figure that for CDT, you are -6 hours compared to UTC.

### Time Zone Map



So, to shift the time to CDT, subtract 6 hours or 6/24 of a day from the UTC time.

	A	B	C	D	E
58	# tVOC: Slope: 1.00	Offset: 0.00			
59	#				
60	Timestamp	Local time/date	System St	Temperat	Relative H Te
61	UTC	CDT	C	%	
62	8/22/2022 0:00	=A62-6/24	0	22	49
63	8/22/2022 0:01		0	22	49
64	8/22/2022 0:02		0	22.1	49
65	8/22/2022 0:03		0	22.1	49
66	8/22/2022 0:04		0	22.1	49
67	8/22/2022 0:05		0	22.2	49
68	8/22/2022 0:06		0	22.2	49

Excel® spreadsheet program calculates this as 18:00 or 6 pm the previous day. You can change the format of the date and time with Excel® spreadsheet formatting. Copy this formula to the rest of the column.

	A	B	C	D	E
58	# tVOC: Slope: 1.00	Offset: 0.00			
59	#				
60	Timestamp	Local time/date	System St	Temperat	Relative H Te
61	UTC	CDT	C	%	
62	8/22/2022 0:00	8/21/2022 18:00	0	22	49
63	8/22/2022 0:01	8/21/2022 18:01	0	22	49
64	8/22/2022 0:02	8/21/2022 18:02	0	22.1	49
65	8/22/2022 0:03	8/21/2022 18:03	0	22.1	49
66	8/22/2022 0:04	8/21/2022 18:04	0	22.1	49
67	8/22/2022 0:05	8/21/2022 18:05	0	22.2	49
68	8/22/2022 0:06	8/21/2022 18:06	0	22.2	49

Some other examples of formulas and their results are listed below. [cell] is the cell with UTC date/time such as A26 in this example.

Formula	Meaning
= [cell] -1	Subtract 1 day
= [cell] -365	Subtract 1 year
= [cell] +3/24	Add 3 hours
= [cell] +20/24/60	Add 20 minutes
= [cell] -42/24/3600	Subtract 42 seconds

## Graphing Data

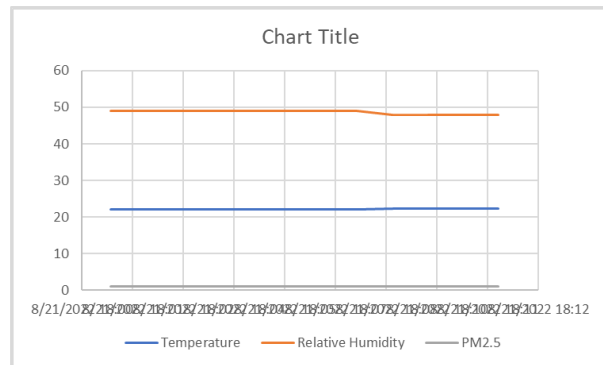
Often you will want to graph the data or create a smart table. For this you will want to have the header right above the data rather than the units. You can swap rows 60 and 61 to do this (row cut and insert).

60	UTC	CDT		C	%	
61	Timestamp	Local time/date	System St	Temperat	Relative H	Te
62	8/22/2022 0:00	8/21/2022 18:00	0	22	49	
63	8/22/2022 0:01	8/21/2022 18:01	0	22	49	
64	8/22/2022 0:02	8/21/2022 18:02	0	22.1	49	
65	8/22/2022 0:03	8/21/2022 18:03	0	22.1	49	
66	8/22/2022 0:04	8/21/2022 18:04	0	22.1	49	
67	8/22/2022 0:05	8/21/2022 18:05	0	22.2	49	
68	8/22/2022 0:06	8/21/2022 18:06	0	22.2	49	
69	8/22/2022 0:07	8/21/2022 18:07	0	22.2	49	

To create a graph in Excel® program simply highlight the time and parameters of interest.

60	UTC	CDT	C	D	E	F	G	H	I	J
61	Timestamp	Local time/date	System St	Temperat	Relative H	Temperat	Barometri	Barometri	PM1	PM2.5
62	8/22/2022 0:00	8/21/2022 18:00	0	22	49	0	29.26	0	1	1
63	8/22/2022 0:01	8/21/2022 18:01	0	22	49	0	29.26	0	1	1
64	8/22/2022 0:02	8/21/2022 18:02	0	22.1	49	0	29.26	0	1	1
65	8/22/2022 0:03	8/21/2022 18:03	0	22.1	49	0	29.26	0	1	1
66	8/22/2022 0:04	8/21/2022 18:04	0	22.1	49	0	29.26	0	1	1
67	8/22/2022 0:05	8/21/2022 18:05	0	22.2	49	0	29.26	0	1	1
68	8/22/2022 0:06	8/21/2022 18:06	0	22.2	49	0	29.26	0	1	1
69	8/22/2022 0:07	8/21/2022 18:07	0	22.2	49	0	29.26	0	1	1
70	8/22/2022 0:08	8/21/2022 18:08	0	22.3	48	0	29.26	0	1	1
71	8/22/2022 0:09	8/21/2022 18:09	0	22.3	48	0	29.26	0	1	1
72	8/22/2022 0:10	8/21/2022 18:10	0	22.3	48	0	29.26	0	1	1

Then select **Insert | Graph**. The example below uses an XY line graph. There are many good tutorials on the internet that will help you with different styles of graphs, formatting and labeling. Pivot tables and graphs are also a very useful tool but beyond the scope of this application note.



When you save your reformatted data file, you will want to save it as a native Excel® spreadsheet program or other program rather than as a .csv file otherwise some of your changes may be lost.

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