

DYLOS DC1100



Citizen Science Operating Procedure

Dylos DC1100

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Dylos DC1100

The Dylos DC1100 air quality monitor measures particulate matter (PM) to provide a continuous assessment of indoor air quality. The unit counts particles in two size ranges: large and small. According to the manufacturer, large particles have diameters between 2.5 and 10 micrometers (μm), where a micrometer is $1/1000^{\text{th}}$ of a meter. Small particles have diameters from 0.5 μm up to 2.5 μm . The DC1100 stores up to 30 days of air quality history. This operating procedure explains what you need to do to collect quality PM data using the Dylos DC1100 for your monitoring project.

What Is PM?

PM pollution is a mixture of particles of various sizes such as soot, smoke, dirt, and dust. Many pollutant particles that make their way indoors are generated and released into the air from outdoor sources such as power plants, industrial processes, and automobiles. Living near a major roadway, for instance, can significantly increase PM exposure. Other particles are generated within the home from activities such as cooking or burning wood in fireplaces. Small particles also include mold and bacteria, and larger particles include pollen and dust mite casings. PM can have both short- and long-term health effects, with the smallest particles posing the greatest health risk. Effects of exposure to PM pollution include increased respiratory (breathing) symptoms such as coughing and difficulty breathing as well as aggravated asthma or other existing respiratory and cardiovascular conditions. For more information on particle pollution, visit the U.S. Environmental Protection Agency's Web site at <http://www.epa.gov/airquality/particlepollution/index.html>.

What You Will Need

- ❖ DC1100 PM sensor
- ❖ 9-volt DC (battery) adapter
- ❖ 9-pin serial cable
- ❖ Dylos Logger software on accompanying compact disc (CD)
- ❖ Computer with the Windows operating system and an RS-232 serial communication port connection
- ❖ Microsoft Excel Spreadsheet Software (2003 or later) or other comparable spreadsheet software

Important Considerations

- ❖ The Dylos DC1100 must be connected to both AC (electrical wall outlet) power and a computer.
- ❖ The unit requires use of the Data Logger software to record the time of data collection.
- ❖ The DC1100 cannot be calibrated by the user. It is precalibrated by the manufacturer, and the calibration is good for 1 year from the time of purchase. The device should be returned to the manufacturer for calibration annually.
- ❖ The Dylos has no user-serviceable parts. It must be returned to the manufacturer when repairs are required.

Preparing the Device

Before collecting data with the DC1100, you need to set up the device by connecting it to a computer with the Dylos DC1100 software running and then you can verify its operation. The procedures in this section will guide you through the proper setup of your device.

Making the Connections

The DC1100 does not contain a battery and therefore must be connected to AC power using the 9-volt DC adapter. For data collection, the Dylos DC1100 must be connected to a computer by an RS-232 serial connection, which has a 9-pin serial cable. Figure 1 shows these connections on the DC1100.

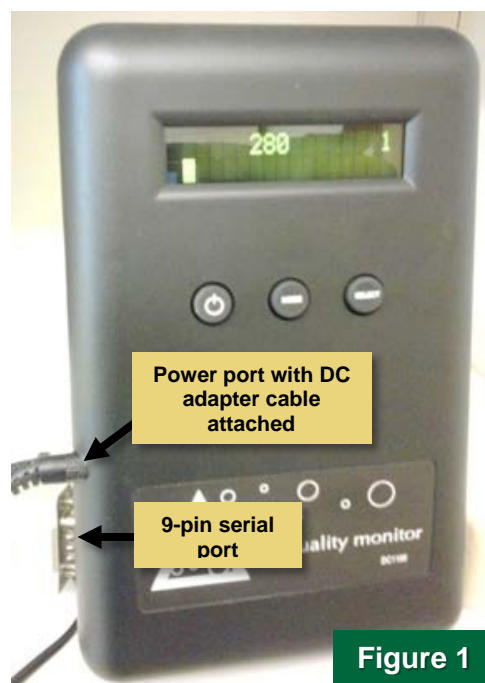


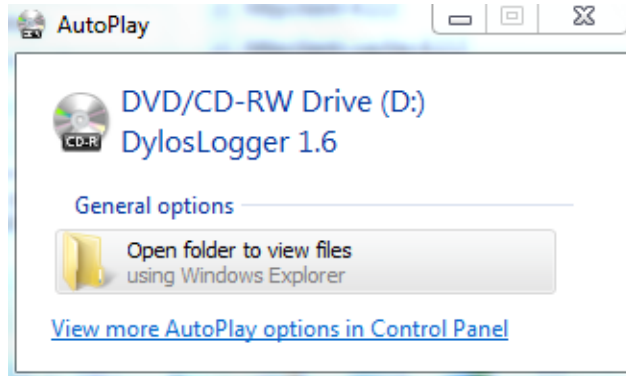
Figure 1

Installing the Software

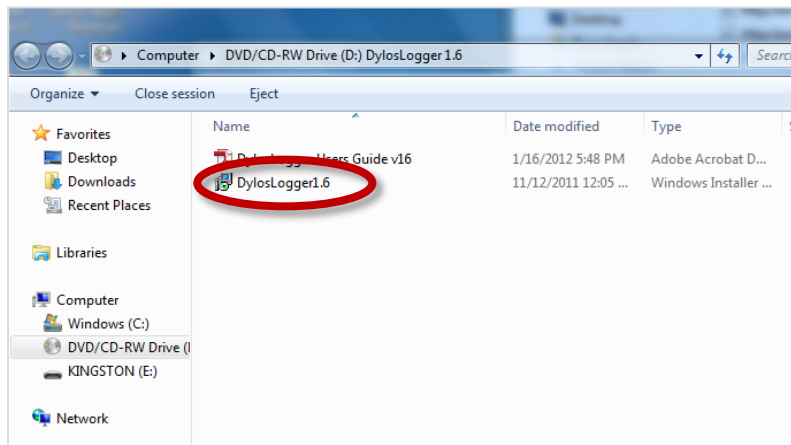
While the Dylos DC1100 can operate and save its data without using the accompanying Dylos Logger software, the time of data collection can only be recorded when using the logger software since the software uses the computer's clock to record the time. Therefore, we recommend you install the Dylos Logger software from the CD that comes with the sensor onto a computer running the Windows operating system before collecting data with the DC1100. The Dylos Logger software can also be downloaded from the Dylos Corporation's web site at <http://www.dylosproducts.com/downloads.html>. The procedures for Dylos DC1100 data collection and retrieval assumes that you have already installed the software.

Procedure: Install Software from CD

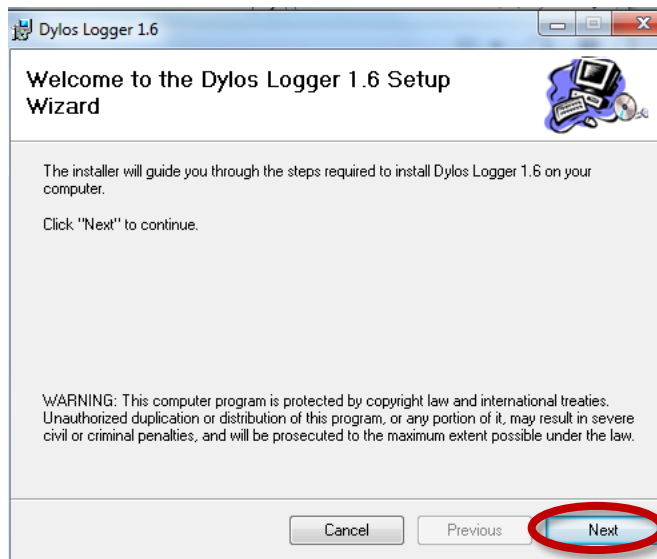
1. Insert the CD, double click '**AutoPlay**', and click '**Open folder to view files**'.



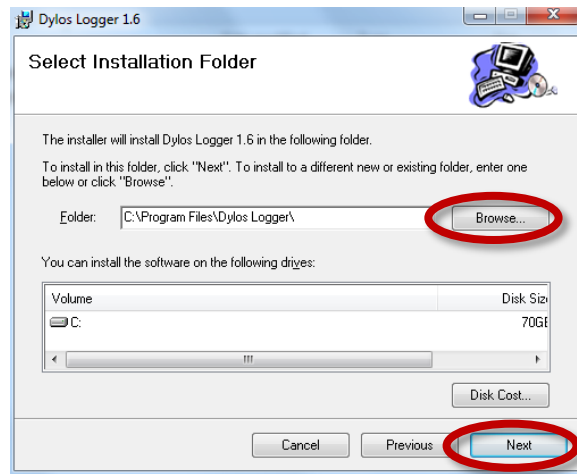
2. Double click '**DylosLogger1.6**' (Windows Installer file type).



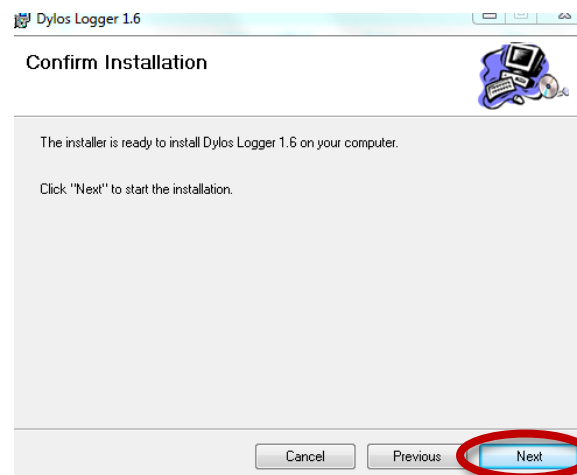
3. Click '**Next**' on the installation wizard welcome screen to proceed with setup.



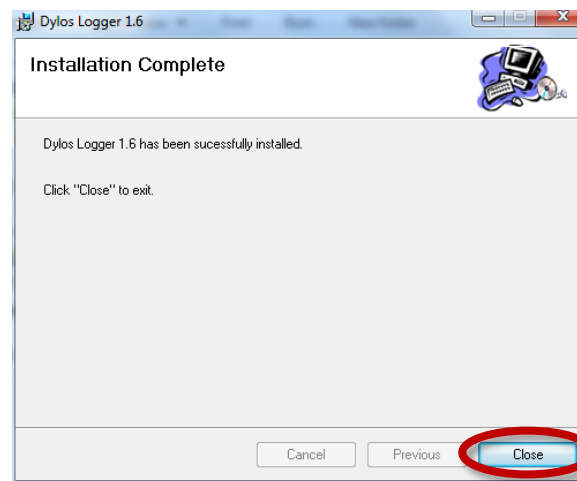
- Click '**Browse**', select the path and folder where the software should be installed, and then click '**Next**'.



- When the download is complete, click '**Next**' on the '**Confirm Installation**' screen.



- Click '**Close**' when finished to exit the installation process.



Verifying Proper Operation

Before collecting data, make sure your DC1100 is set up and operating properly. This procedure begins a brief period of data collection to ensure the device is working.

Procedure: Verify Proper Operation

1. Press the **power** button to turn on the device. The startup screens shown in Figures 2 and 3 will display for a few seconds before the sampling screen appears (Figure 4) and the unit begins taking measurements.



Figure 2



Figure 3



Figure 4


2. Open the Dylos Logger software by double clicking the desktop shortcut (Figure 5).
3. In the '**Port**' drop-down menu shown in Figure 6, select the communications port connecting the device to the computer.
4. Select '**Continuous**' in the '**Stop After**' drop-down menu (Figure 6).
5. Press the '**Record**' button () (Figure 6) and allow the device to record for at least 1 minute to verify proper operation. When data are being recorded, a line will be updated each minute in the **Data Display** field shown in Figure 6. The unit is ready for use.
6. Press the **Record** button a second time to end the recording.



Figure 5

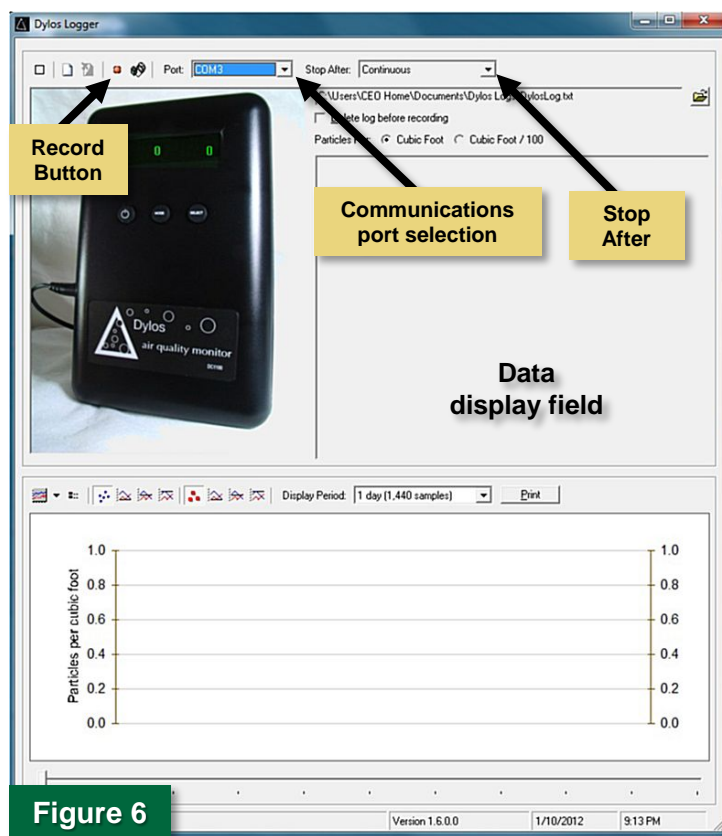




Figure 6

Routine Data Collection

After verification of proper setup, initiate Dylos DC1100 data collection using the following procedure. The DC1100 can acquire data for 30 days, but weekly data retrieval is recommended to ensure that the device is working properly and that no data are lost.

Procedure: Collect Data

1. Use the **Browse** button () to choose a path and file name where you want the data to be saved, as shown in Figure 7. It is recommended that the file name include the current date and time of collection for ease of identification. Data will be saved as a text file (*.txt) in the specified folder.
2. Press the **Record** button () (Figure 7) to begin continuous monitoring.
3. Press the **Record** button again to stop monitoring when data collection is complete.

4. Turn off the Dylos DC1100 by pressing the **power** button once.



Figure 7

Processing Data

The Dylos DC1100 records date, time, and small and large particle counts in particles per cubic foot (ft³) in a text file (*.txt). In this text file (Figure 8), the values for each measured property (e.g., date, time, etc.) are separated, or 'delimited', by commas. Most spreadsheet programs are able to read data from a text file in a delimited format. To process the collected data, you will need to transfer the text file created by the Dylos Logger software to spreadsheet software such as Microsoft Excel. Microsoft Excel 2013 is used in this procedure to illustrate the data transfer, but the relative locations of import options are similar in versions of Microsoft Excel dating back to 2003.

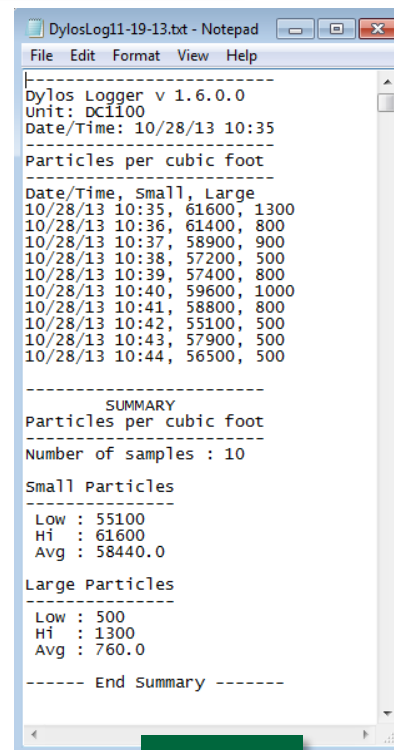
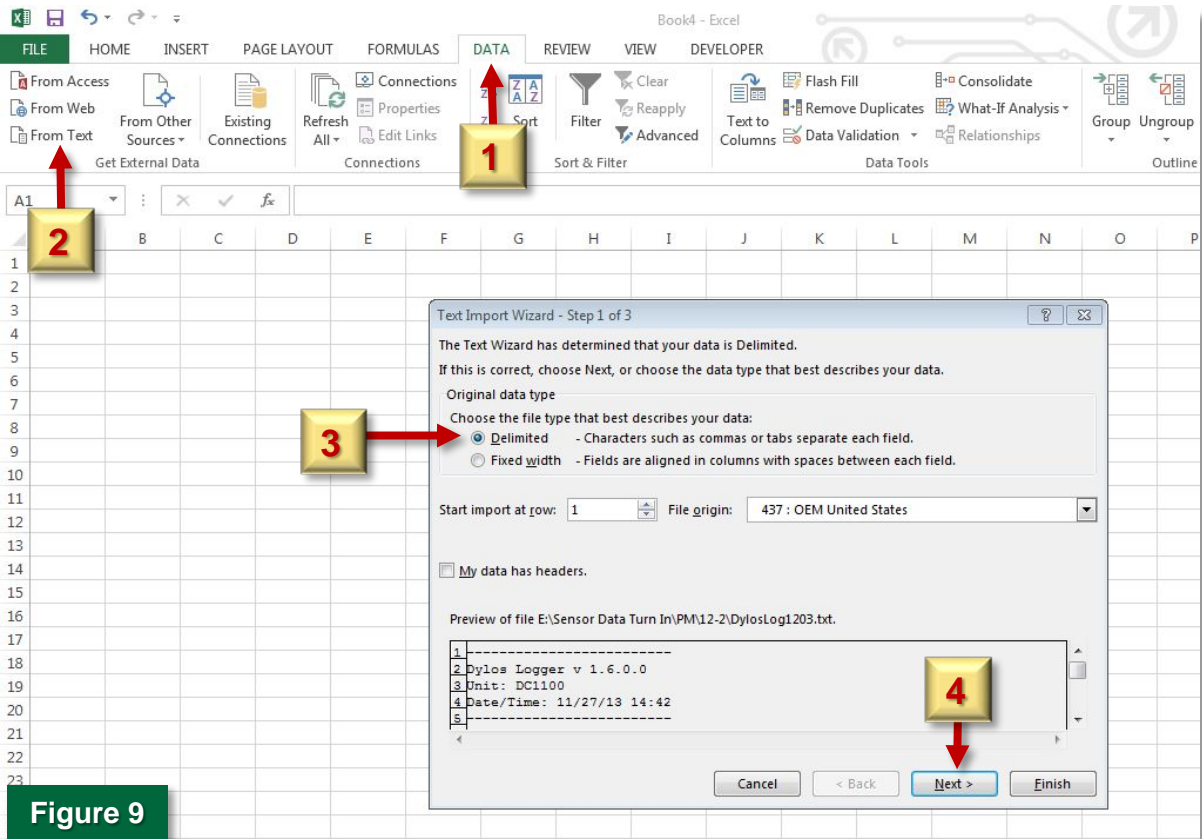


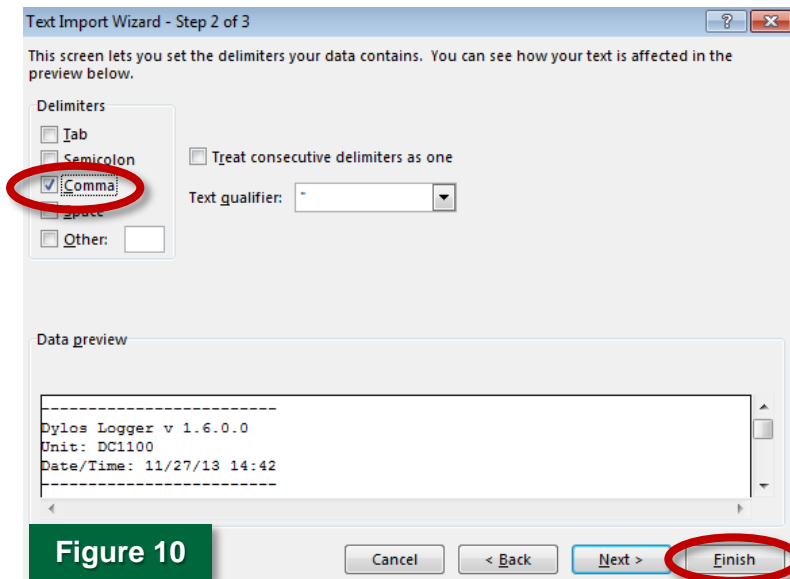
Figure 8

Procedure: Process Data

1. Open a new Microsoft Excel spreadsheet and select **Data > From Text** ([1] > [2] in Figure 9) on the '**Get External Data**' tab. The first of three **Text Import Wizard** windows will open in a pop-up box.
2. Under '**Original data type**', select '**Delimited**' [3], and then click '**Next**' [4] to proceed.



3. In step 2 of the Wizard (Figure 10), check the '**Comma**' box to indicate the type of delimiter, and then click '**Finish**'.



4. In the 'Import Data' pop-up window (Figure 11), select '**Existing worksheet**' and click the button on the right to navigate to the folder containing the text file specified at the start of data collection.
5. Press '**OK**' to display the data in columns in the Microsoft Excel spreadsheet, as shown in Figure 12.

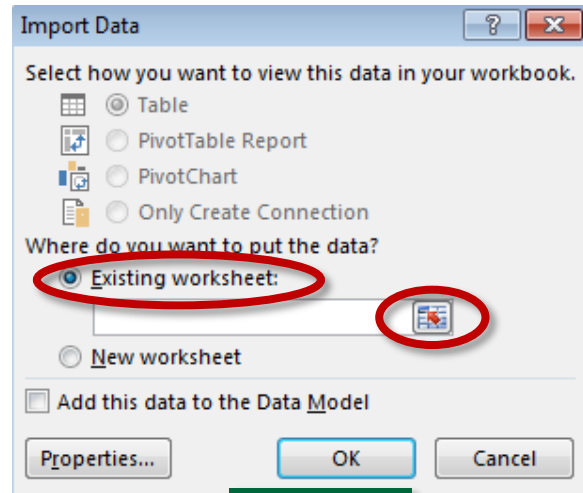


Figure 11

	A	B	C	D	E
1	-----				
2	Dylos Logger v 1.6.0.0				
3	Unit: DC1100				
4	Date/Time: 10/28/13 10:35				
5	-----				
6	Particles per cubic foot				
7	-----				
8	Date/Time	Small	Large		
9	10/28/2013 10:35	61600	1300		
10	10/28/2013 10:36	61400	800		
11	10/28/2013 10:37	58900	900		
12	10/28/2013 10:38	57200	500		
13	10/28/2013 10:39	57400	800		
14	10/28/2013 10:40	59600	1000		
15	10/28/2013 10:41	58800	800		
16	10/28/2013 10:42	55100	500		
17	10/28/2013 10:43	57900	500		
18	10/28/2013 10:44	56500	500		
19					
20	-----				
21	SUMMARY				
22	Particles per cubic foot				
23	-----				
24	Number of samples : 10				
25					
26	Small Particles				
27	-----				
28	Low : 55100				
29	Hi : 61600				
30	Avg : 58440.0				
31					
32	Large Particles				
33	-----				
34	Low : 500				
35	Hi : 1300				
36	Avg : 760.0				
37					
38	----- End Summary -----				

Figure 12

For Additional Help

Dylos Logger software, v. 1.6, Dylos Corporation, <http://www.dylosproducts.com/downloads.html>, last accessed May 13, 2015.

U.S. Environmental Protection Agency, Particulate Matter (PM), <http://www.epa.gov/airquality/particulatepollution/index.html>, last accessed May 13, 2015.

User Manual: DC1100 Air Quality Monitor, 2012., Dylos Corporation, 2900 Adams Street, C37, Riverside, CA.

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