

DATA MERGE SOFTWARE MODULE MODEL 390069

ENABLES MERGING AND FITTING OF SMPS™
AND APS™ DATA FILES TO CREATE AND
DISPLAY A WIDE PARTICLE SIZE RANGE
FROM 0.0025 TO 20 MICROMETERS!

The Model 390069 Data Merge Software module* offers a consistent method of merging and fitting data files from two well-known TSI aerosol instruments to produce wide-range particle size distribution curves for analysis. The Scanning Mobility Particle Sizer™ (SMPS™) spectrometer is the standard for measuring particles from a few nanometers to 1 micrometer, while the Aerodynamic Particle Sizer® (APS™) spectrometer is the most accurate sizer for coarse particles. The advantage of combining these two measurement techniques is that they are related and, unlike optical methods, they require no knowledge of refractive index.

*Developed under agreement with Chimera Technologies, Inc.



Applications

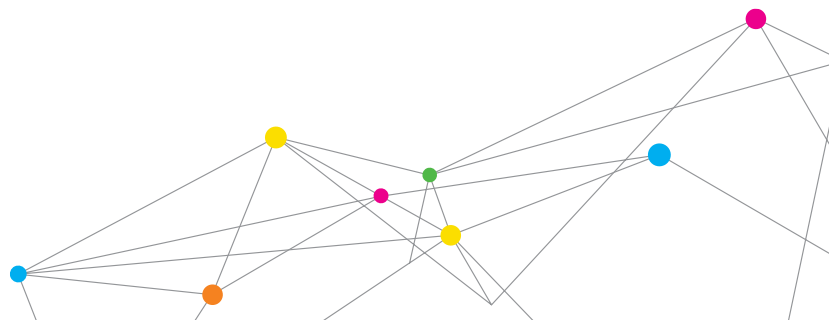
- + Atmospheric aerosol research
- + Ambient air monitoring
- + Correlation to PM_{2.5} or PM₁₀
- + Indoor air quality and source studies
- + Stack and boiler emission measurements
- + Combustion research
- + Inhalation or exposure-chamber studies
- + Particle emissions from biomass combustion
- + Characterization of particle control technologies

Features

- + Merges separate SMPS and APS data files into one comprehensive data set
- + Creates wide-range particle size distributions from 0.0025 to 20 μm
- + Fits a set of data to unimodal, bimodal, or trimodal distribution functions
- + Easy to use
- + Flexible data management options



UNDERSTANDING, ACCELERATED



GET A WIDER VIEW OF THE PARTICLE RANGE!

The Data Merge Software enables users to quickly and easily merge and fit SMPS and APS data files to produce single particle size distributions. Multimodal distribution functions can be fitted to the data, covering all three modes of particles found in the atmosphere, namely nuclei-, accumulation-, and coarse-mode aerosols. The software is designed to work with a variety of SMPS spectrometers (Model 3034 and Series 3934/3936) and APS spectrometers (Models 3310, 3310A, 3320, and 3321). The instruments may use any version of TSI Aerosol Instrument Manager® software. As a result, wide-range particle size distributions from 0.0025 to 20 µm can be created, with the lower limit determined by the SMPS configuration.

Get a Wider View of the Particle Size Range!

Size distributions of airborne particles often span a wide size range from a few nanometers to several micrometers, which typically exceeds the measurement size range of any one instrument. Researchers have frequently combined data from multiple instruments, but details of the data conversion between units have varied. Because particle sizers often use different measurement principles, the units of measure are often different, too (for example, electrical mobility diameter, aerodynamic diameter, etc.).

Features and Benefits

The Data Merge Software offers these important features and benefits:

Data merging. SMPS and APS data can be merged into a single, composite data set to create wide-range particle size distributions from 0.0025 to 20 µm.

Curve-fitting. The software fits a set of data to unimodal, bimodal, or trimodal distribution functions, based on user inputs. You may also select lognormal, Rosin-Rammler, or automatic fit functions. For lognormal distributions, the geometric mean and geometric standard deviation for each mode are provided in tabular form. Our fitting algorithms are based on the proven DISTFIT† program for general data merging and fitting in particle measuring technology.

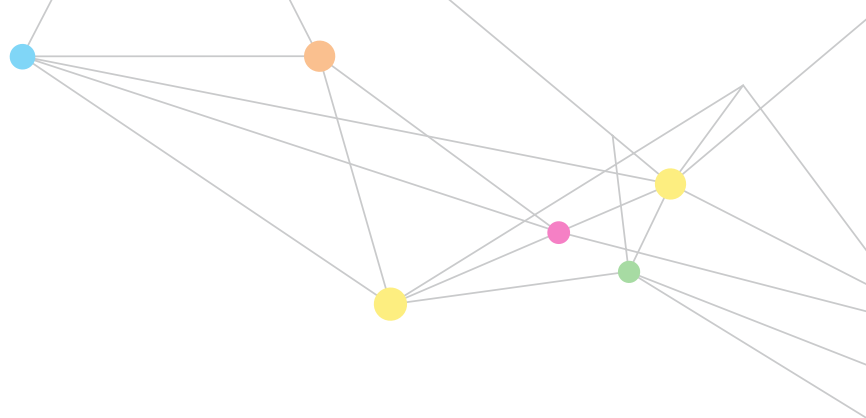
Ease of use. The software module can be accessed from within TSI's Aerosol Instrument Manager software or used as a stand-alone program. It features a browser that allows user's to select data files. Users can merge and fit data by selecting:

- + Individual files
- + Batch mode to merge large sets of data
- + Averaging groups of like data files
- + Specific time intervals or dates

Flexible data management. The software features a variety of graph settings to view and adjust individual size distributions and the composite fit. Once merged, data can be "windowed" to adjust the goodness of fit and display the statistics of each mode. Graphical and tabular data can be printed, copied to the clipboard, and saved.

Merged data can be exported in a variety of formats. Also, it can be expressed in units of electrical mobility diameter or aerodynamic diameter. Users enter a shape factor and density to get a "best fit." The software allows for weighted moments of number, including surface area, volume, and mass. Additionally, data files include information on the source (file name, sample numbers, etc.) of the data used.

Saves time. This software processes large amounts of data efficiently and alleviates a tedious task that used to take weeks or even months to complete.



Operation

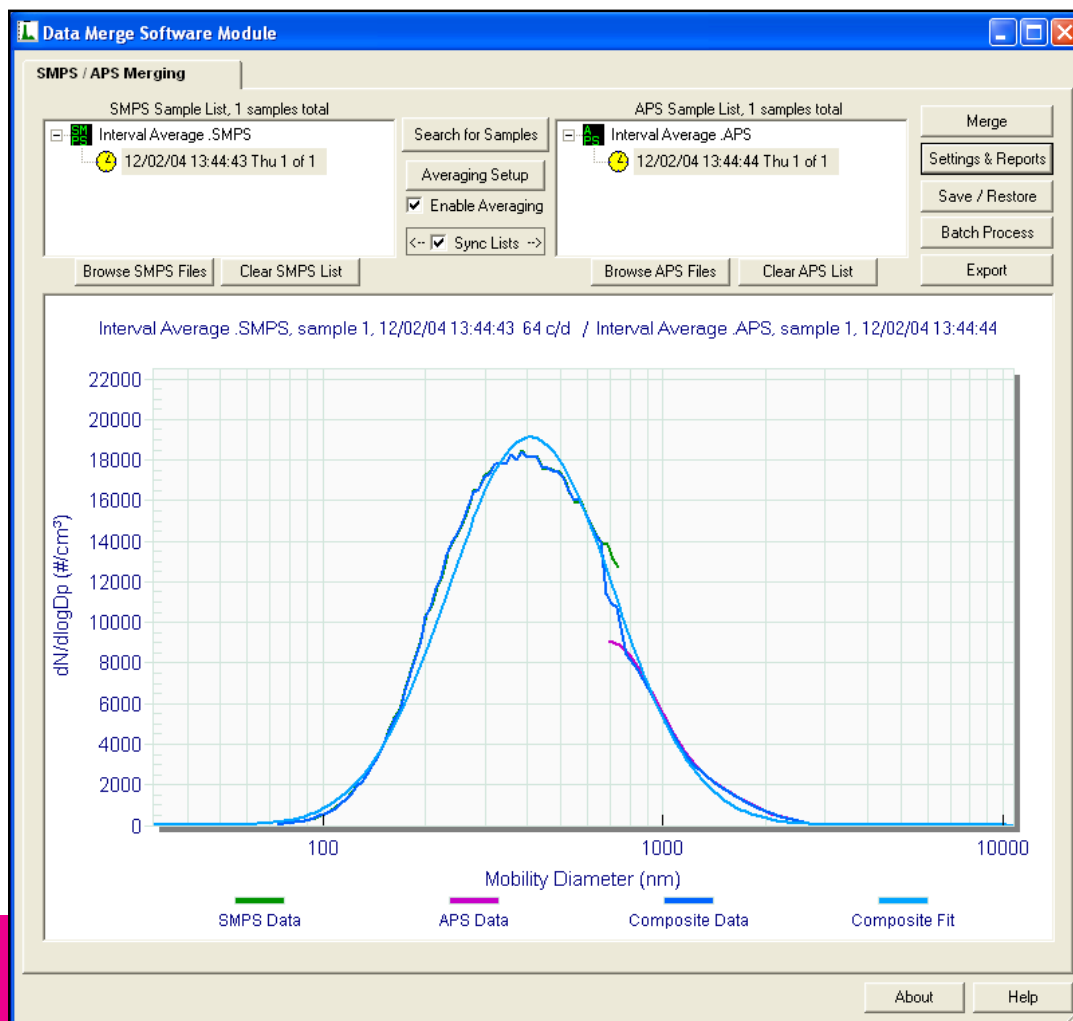
The APS spectrometer is generally limited to particle sizing in the 0.5 to 20 μm diameter range, while the SMPS spectrometer is limited to 0.0025 to 1.0 μm (depending on SMPS configuration). Although these instruments measure different units and size ranges, have different resolutions, and overlap in the fine-mode region, the Data Merge Software combines SMPS and APS data to create a new data set in the particle size range from 0.0025 to 20 μm .

Simply select the data files you want to merge. The software allows you to select data files from one or multiple samples and combine the averaged data separately for each instrument. Data merging always requires converting the aerodynamic diameter number concentration data set to mobility diameter by entering the particle density and shape factor. Once merged, the composite fit can be displayed in units

of either aerodynamic diameter or mobility diameter, and the algorithm will create a new data set with uniform channel resolution.

The software provides a variety of graph selections to view either data from the individual instruments, or the merged and fitted data. Distribution modes can be summed or plotted separately using either linear or log scaling. The range limit for each instrument can be displayed and adjusted (that is, "windowed") to control the data used for fitting and to calculate the goodness of fit and statistical summary information.

A Merge Settings menu provides additional controls. Users may select from a variety of fit functions such as lognormal, Rosin-Rammler, or automatic, as well as select unimodal, bimodal, and trimodal distribution functions.



SPECIFICATIONS

DATA MERGE SOFTWARE MODULE MODEL 390069

Data File Format

Requires SMPS and APS data files in the format of TSI Aerosol Instrument Manager® software

Computer Requirements

Pentium® 4 processor, 2 GHz speed or better, at least 512 MB RAM

Operating System Required

Microsoft Windows® 2000 or XP

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Acknowledgment

The Model 390069 Data Merge Software module was developed by TSI under agreement with Chimera Technologies, Inc., of Forest Lake, MN, USA. We gratefully acknowledge the contributions from the people at Chimera Technologies, Inc., during the development of this product.

To Order

Specify	Description
390069	Data Merge Software Module Software on CD-ROM and operation manual



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