

### SG Procedure Notes

Statistical Graphics procedures use:

- standard TITLE, FOOTNOTE, BY, LABEL, FORMAT, and WHERE statements
- ODS GRAPHICS statement for image name, image type, size
- ODS destination statement for output type (HTML, PDF, etc.), style, and DPI

Statistical Graphics procedures do not use:

- SAS/GRAPH AXIS, LEGEND, NOTE, SYMBOL, PATTERN, or GOPTIONS statements

ODS Graphics has no connection to traditional device-based GRSEG graphics infrastructure.

### SAS Windowing Environment

If you are using the SAS windowing environment and the LISTING destination, view your graphs from the Results window by double-clicking the graph icons. Graphs are displayed in the default viewer that is configured on your computer.

### Output Destinations

Use ODS statements to open and close destinations:

- ```
ods html < options >;
ods listing < options >;
ods pdf < options >;
ods rtf < options >;
ods document < options >;
```

### Modifying Your Graphs

Although ODS Graphics is designed to automate the creation of high-quality statistical graphics, on occasion you might need to modify your graphs. You can make permanent changes by modifying the graph template. You can make immediate, ad hoc changes by using the ODS Graphics Editor, which provides a point-and-click interface. You can enable editing with this command:

```
ods listing sge=on;
```

### PLOTS= Option

Each statistical procedure that supports ODS Graphics has a PLOTS= option that is used to select graphs and specify options. The PLOTS= option has a common overall syntax for all statistical procedures, but the specific global plot options, plot requests, and plot options vary across procedures. Syntax:

```
PLOTS < (global-plot-options) >
< = plot-request < (options) > >
PLOTS < (global-plot-options) >
< = (plot-request < (options) >
< ... plot-request < (options) > > >
```

Examples:

```
plots=all
plots=none
plots=residuals
plots(only)=residuals
plots(unpack)=diagnostics
plots=diagnostics(unpack)
plots=residuals(smooth)
plots=(trace autocorr)
plots(unpack)
```

Most graphical details are controlled either by graph templates or by styles, not by the PLOTS= option.

For more information, see:

Kuhfeld, W. F. 2010. *Statistical Graphics in SAS<sup>®</sup>: An Introduction to the Graph Template Language and the Statistical Graphics Procedures*. Cary, NC: SAS Press.  
[support.sas.com/publishing/authors/kuhfeld.html](http://support.sas.com/publishing/authors/kuhfeld.html)

For complete information, see the SAS<sup>®</sup> 9.2 documentation at  
<http://support.sas.com/v9doc>



## ODS Graphics Tip Sheet

This tip sheet places frequently used information in one place, on one sheet of paper, so you don't have to search through the online documentation. It also gives you something to take home, type in, and try.

ODS Graphics is an extension of ODS (the Output Delivery System). ODS manages procedure output and displays it in a variety of destinations, such as HTML and RTF. With ODS Graphics, statistical procedures produce integrated output with both graphs and tables. Procedures that support ODS Graphics create graphs, some by default and some when you specify procedure options.

Three SAS/GRAPH statistical graphics procedures (SGPLOT, SGSCATTER, and SGPANEL) use ODS Graphics and provide a convenient syntax for creating a variety of graphs from raw data or from procedure output. With PROC TEMPLATE, the Graph Template Language, and PROC SGRENDER, you can create custom graphs with a powerful and detailed syntax.

This tip sheet presents the most common procedures, statements, and options used in creating graphs with ODS Graphics and SAS 9.2.



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## ODS Graphics Overview

You can enable ODS Graphics by specifying the following statement:

```
ods graphics on;
```

ODS Graphics remains enabled until you disable it with the following statement:

```
ods graphics off;
```

- The ODS **destination** specifies where you see your graphs.
- A **graph template** determines how a specific graph is constructed. A graph template is a SAS program written in the Graph Template Language (GTL) that provides instructions for creating the graph.
- An ODS **style** controls the overall appearance.
- A **style template** is a program that sets colors, fonts, and overall appearance.

## Example Statements and Options

```
ods trace output notes; /* trace output in log */
ods graphics on; /* enable ODS Graphics*/
  reset=all; /* reset all options */
  antialias=on; /* cleaner edges, default*/
  antialiasmax=1000; /* max antialias points */
  height=4.8in; /* default image height */
  width=6.4in; /* default image width */
  imagename='graph'; /* image name prefix */
ods html; /* open html destination*/
  path='C:\mydir'; /*HTML & images path */
  (url=none); /* all can move together*/
  file='sasoutput.htm'; /* file name for HTML */
  image_dpi=300; /* image dots per inch */
  style=statistical; /* output style */
proc reg plots=all; /* create all graphs */
  model weight = height;
quit;
ods _all_ close; /* close all destinations */
```

## PROC SGPLOT

PROC SGPLOT creates single-cell plots with a variety of plot and chart types.

```
proc sgplot < options >;
  band x=x-var upper=u-var lower=l-var /
    < options >;
  density var / <type=type> < options >;
  dot var / <response=r-var> <stat=stat>
    < options >;
  ellipse y=y-var x=x-var / < options >;
  hbar var / <response=r-var> <stat=stat>
    < options >;
  hbox var / <category=c-var> < options >;
  histogram var / < options >;
  hline var / <response=r-var> <stat=stat>
    < options >;
  inset inset-text / < options >;
  keylegend names / < options >;
  loess y=y-var x=x-var / < options >;
  needle y=y-var x=x-var / < options >;
  pbspline y=y-var x=x-var / < options >;
  refline value / axis=x|y < options >;
  reg y=y-var x=x-var / <group=g-var>
    <degree=d> < options >;
  scatter y=y-var x=x-var / < options >;
  series y=y-var x=x-var / < options >;
  step y=y-var x=x-var / < options >;
  vbar var / response=r-var stat=stat /
    < options >;
  vbox var / <category=c-var> < options >;
  vector y=y-var x=x-var / < options >;
  vline var / <response=r-var> <stat=stat>
    < options >;
  xaxis options;
  xaxis2 options;
  yaxis options;
  yaxis2 options;
run;
```

## PROC SGSCATTER

PROC SGSCATTER creates a rectangular display of graphs.

```
proc sgscatter < options >;
  compare y=y-var-list x=x-var-list / < options >;
  matrix var-list / < options >;
  plot y-var * x-var / < options >;
run;
```

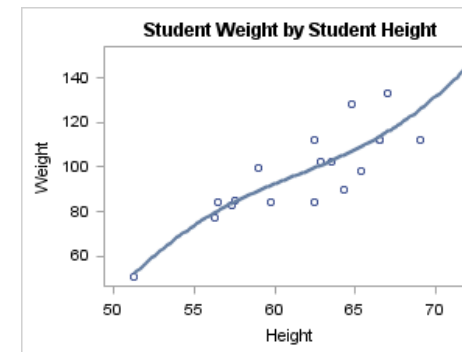
## PROC SGPANEL

PROC SGPANEL creates a matrix of graphs, with one graph for each combination of levels of a list of classification variables.

```
proc sgscatter < options >;
  panelby var-list / < options >;
  many-proc-sgplot-statements
run;
```

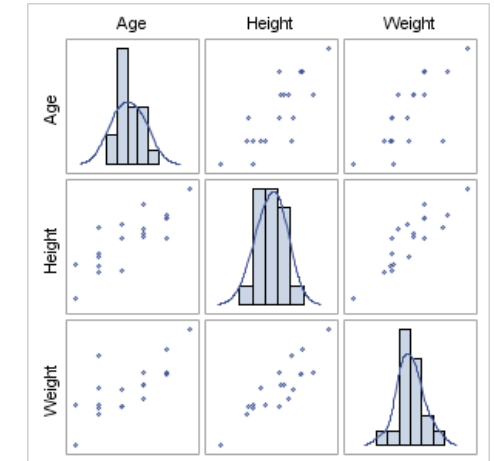
## SG Procedure Examples

```
title 'Student Weight by Student Height';
proc sgplot data=sashelp.class noautolegend;
  pbspline y=weight x=height;
run;
```



## SG Procedure Examples

```
proc sgscatter data=sashelp.class;
  matrix _numeric_ /
    diagonal=(kernel histogram);
run;
```



```
title 'Cars by Make';
proc spanel data=sashelp.cars;
  panelby make / rows=2 columns=3;
  scatter x=mpg_city y=mpg_highway;
run;
```

