

## Appendix B

# Processing AutoCAD Jobs

PlotWorks can process AutoCAD's native format (.DWG) directly. AutoCAD users do not have to create plot files. However, additional reference files, fonts and print scales must be provided as these are not incorporated in the DWG file.

### DWG Direct\*

PlotWorks can process native AutoCAD files using a special utility called DWG Direct. DWG Direct is an efficient processing tool that lets you print AutoCAD R14 or earlier files without installing AutoCAD on your Print Server. DWG Direct does not support AutoCAD 2000 or 2002 files, PostScript or TrueType fonts, 3D perspective views, or files with more than 47 viewports. Prints produced with DWG Direct can be slightly different from the original drawings.

### AutoCAD

AutoCAD can be used to process native AutoCAD files if this option is selected during installation, or by using the option provided under **AutoCAD/DWG Direct Setup** of the Job Editor.



*AutoCAD must be maximized or the AutoCAD menu bar must be visible during AutoCAD processing. If AutoCAD is minimized during processing, the pens settings assigned can change every time a file is processed.*

---

### How AutoCAD Files are Processed

PlotWorks processes AutoCAD files in three stages: prechecking, preprocessing and interaction.

#### Prechecking

Before vectorizing AutoCAD files, PlotWorks prechecks for parameter inconsistencies or other possible problems. Prechecking includes calculations to see if the specified AutoCAD Scale will produce a print that fits the specified natural paper size — within an allowable deviation range as established in the Job Editor, Setup Processing options. When discrepancies between Size and Scale parameters fall within the allowable range, processing proceeds without interruption. If an automatic adjustment is made, the software notifies the operator before printing. For inconsistencies that exceed the allowable range, PlotWorks alerts the operator and provides options.

---

## Preprocessing and Interaction

After prechecking, the software vectorizes AutoCAD files and converts them to a high-speed internal plotting format, exactly as it processes other image file formats such as HP-GL or CalComp files. If inconsistencies or other problems are detected during preprocessing, PlotWorks notifies the operator during the interaction stage, and provides options.

## AutoCAD Printing Boundaries

When printing AutoCAD drawings, be sure that you have specified the print boundaries. You can set this value in the **Plot By** field in the Job Editor or the Client.

- **Extents:** Prints the rectangular dimensions of the area that contains drawn entities. In some cases, it can include electronic traces of entities that have since been moved or deleted. To print by extents, the drawing should be zoomed to Extents from within AutoCAD before saving and closing the file. If the Zoom-Extents command is not used before saving, you can produce a clipped or undersized print.
- **View:** Prints an area defined in AutoCAD under a specified view name. If you select this Plot By option, you must enter the correct view name in the View Name field in the Job Editor.
- **Limits:** Prints the entire drawing area as defined by the drawing limits specified in AutoCAD.
- **Display:** Prints the area displayed on the screen at the time the .DWG file was saved.
- **Layout:** Print an area defined by AutoCAD 2000 or 2002 and saved as a named layout.

## PlotWorks Parameters and AutoCAD

The formulas shown below are the key to understanding AutoCAD and PlotWorks. The user creates an image in AutoCAD space in a nonspecific set of units called drawing units. Next, the creator designates an AutoCAD scale which translates the image into a specific paper size.

<b>Formula 1:</b>
$\text{AutoCAD Image} \times \text{AutoCAD Scale} = \text{Size}$
<b>Formula 2:</b>

Size x Printing Scale = Output size

Example: (36 x 24) x (1=2) = 18 x 12



*In the formula shown above, both the scale and size are specified by the creator. Thus, if the creator makes a mistake and chooses a scale that is incorrect with regard to the size, the resulting image could be wrong.*

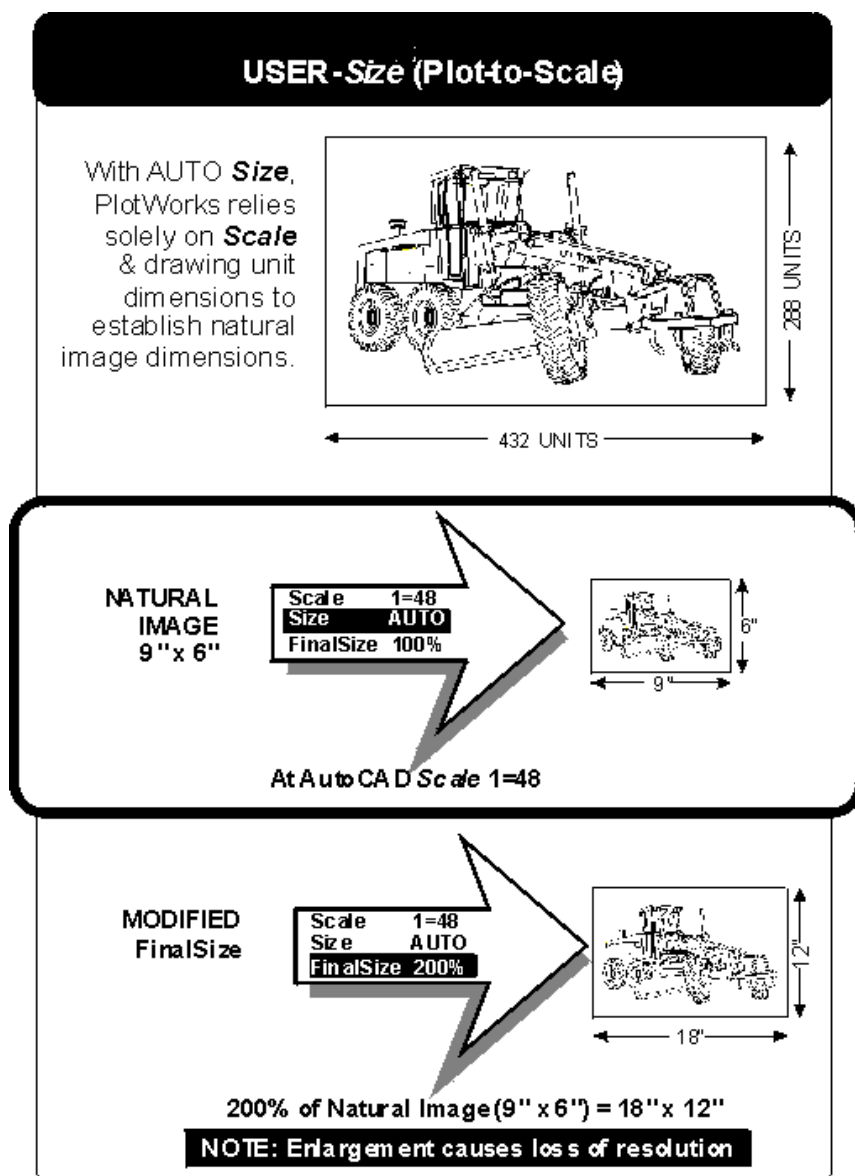
---

PlotWorks addresses this issue. The size can be independently scaled to a printed image. In this case, there is no opportunity for incorrect specification of scale. Only the final size is designated—either by specifying the scale or by designating the final size.

The relationship between these variables is best demonstrated by example. If an explicit Scale had been specified, the software could detect the error during pre-checking by comparing the specified Scale to the paper Size. PlotWorks would also calculate and display the resulting nonstandard natural image dimensions (33" x 22" or 42" x 28") so the error could be acknowledged and corrected. The software would also display the respective nonstandard scales. Refer to figures H.1, H.2, and H.3

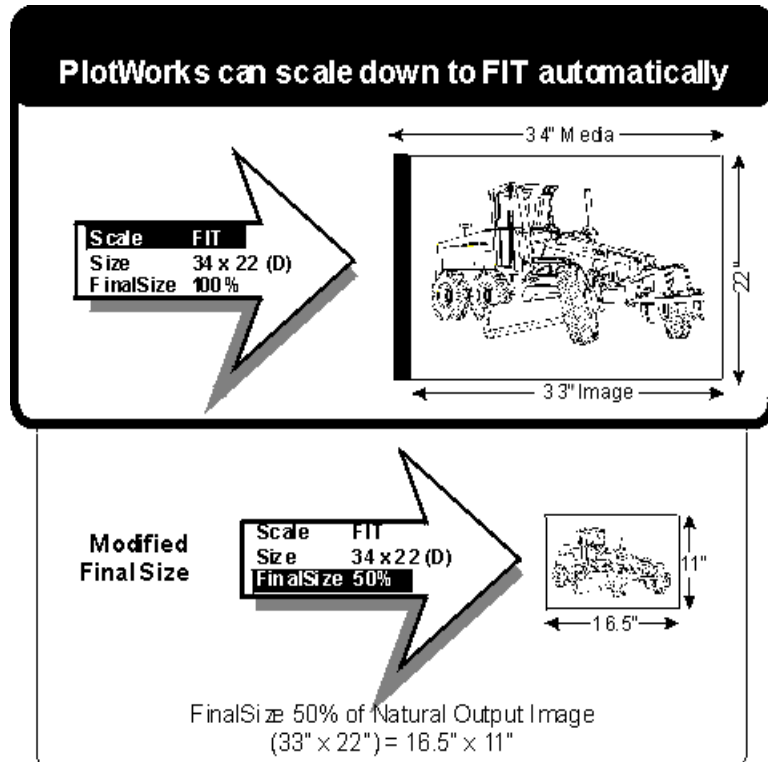
In the example on the next page, it is likely that the user intended to produce a D1-size plot (36x24), but the Scale was specified incorrectly at 1=48 instead of 1=12.

*Fig. B.1*  
**AUTO Size**  
 (Plot -to-  
 Scale)

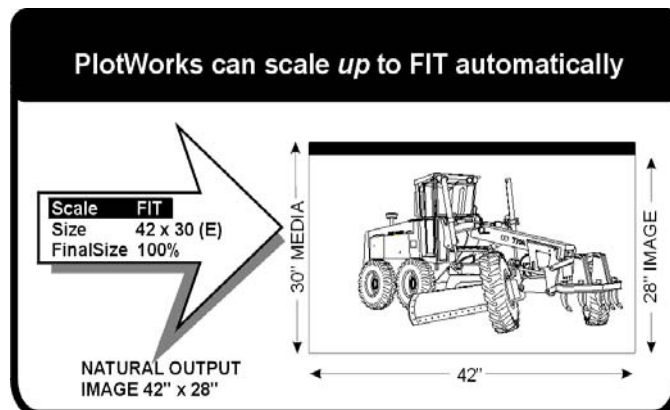


In the example below it is likely that the user intended to produce a D1-size plot (36"x24") at a Scale of 1=12, but the Size was specified incorrectly as D or E.

*Fig. B.2  
Scale  
Down to  
Fit  
Automat-  
ically*



*Fig. B.3  
Scale Up  
to Fit  
Automat-  
ically*



## Configuring AutoCAD For Use with PlotWorks

PlotWorks supports AutoCAD R14, 2000 and 2002 DWG file processing. In order to use AutoCAD processing, AutoCAD must be installed on the PlotWorks server before installing or reinstalling PlotWorks to allow both to be configured properly. It is imperative to uninstall AutoCAD R14 if AutoCAD 2000 or 2002 processing is going to be used. The following steps take you through the basic configuration required for both PlotWorks and AutoCAD.

### Configuring AutoCAD R14:

1. Install AutoCAD prior to installing PlotWorks.



---

*AutoCAD must be installed prior to installing PlotWorks.*

---

2. Install PlotWorks (Chapter 2 for more information).
    - If the “Use AutoCAD” option was not selected during the original PlotWorks installation and AutoCAD was installed after installing PlotWorks, a full PlotWorks install is necessary. During the PlotWorks full install select “Use AutoCAD”. PlotWorks will then install the necessary files and registry accordingly.
    - If “Use AutoCAD” was selected during the original PlotWorks installation and AutoCAD is being upgraded from a previous install, only the PlotWorks Smart Update is required.
  3. After the PlotWorks installation is complete and you have restarted the PC, run AutoCAD.
  4. On the Start Up dialog box disable the **Show this dialog at start up** check box.
  5. At the AutoCAD command line, type *config* and press **Enter**.
  6. Go to the **Printer** tab of the Preferences dialog box.
  7. Configure a new printer and select **Hewlett-Packard HP-GL/2 devices, ADI 4.3 - for Autodesk by HP**. Click **OK**.
  8. Press **Enter**, type **3** (for the HP DesignJet 750c) and press **Enter** twice.
  9. Press **Enter** to select **Parallel Port <P>**.
  10. Press the **period ( . )** key, then press **Enter**.
  11. Press **Y** (Yes) and press **Enter** to make changes to the defaults.
  12. Select **N** (No) and press **Enter** for each selection until you get to the prompt “Write plot to file?”. Select **Yes**.
  13. Enter the desired size units (or leave the default) and press **Enter**.
  14. Select **Y** (Yes) and **Enter** to keep the default plot origin (0,0).
-

15. At the “Enter the Size or Width, Height” prompt, type **64,600** and press **Enter**.



*Due to the way AutoCAD processes plot files, you need to set the maximum plot size to prevent image rotation. A standard HP-GL file has a resolution of 1016 (steps per inch) and AutoCAD can plot widths from 0 to 65, 535 steps. Therefore, to determine the actual number of inches required, divide 65, 535 by 1016 to get approximately 64 inches. Anything larger than 64 reduces the resolution of the plot file. Most plotters have a default resolution (plotter units) of 1016.*

---

16. Accept the defaults for the rest of the settings by pressing **Enter** at each prompt.
17. Set the HP DesignJet 750c as **Current**, then select **OK** to complete configuration.

You also need to make the following change to AutoCAD to prevent a notification dialog box about Proxy objects:

18. Select **Preferences** from the AutoCAD **Tools** menu.
19. Click the **Compatibility** tab and remove the check mark (click it) from **Show Proxy Information Dialog Box**. This stops the dialog box from appearing for drawings that have proxy entities, such as zombie entities. The install script takes care of the proxy setting at install time if AutoCAD is already installed.
20. Close AutoCAD.

## Configuring AutoCAD 2000 or 2002

For AutoCAD 2000, PlotWorks will automatically install a plotter configuration file for AutoCAD processing called PLPPLOT.PC3, which includes the driver it will use. PlotWorks also installs a color table called PlotWorks.ctb.

***AutoCAD 2000 or 2002 must be installed prior to installing PlotWorks***

- If the “Use AutoCAD” option was not selected during the original PlotWorks installation and AutoCAD was installed after installing PlotWorks, a full PlotWorks install is necessary. During the PlotWorks full install select “Use AutoCAD”. PlotWorks will then install the necessary files and registry accordingly.
- If “Use AutoCAD” was selected during the original PlotWorks installation and AutoCAD is being upgraded from a previous install, only the PlotWorks Smart Update is required.



***AutoCAD 2000 or 2002 must be installed prior to installing PlotWorks.***

---

To configure AutoCAD 2000 or 2002, perform the following procedure:

1. Run AutoCAD 2000.
2. Proceed to the **Tools** menu and select **Options**.
3. Select the “**Open and Save**” tab.
4. In the ‘**ObjectARX Applications**’ section, uncheck the ‘**Show Proxy information dialog box**’ option.
5. Select the “**Plotting**” tab.
6. In the ‘**Default plot settings**’ section, select PLPPLOT.PC3 under ‘**Use as default output device**’.
7. In the ‘**Default plot style behavior**’ section, select ‘PlotWorks.ctb’ color table.
8. Close the dialog box by selecting the ‘**OK**’ button.



---

*NOTE: the PLPPLOT.PC3 file is a preconfiguration of an AutoCAD 2000 HDI driver. It is a standard AutoCAD HP-GL/2 plotter driver, with the vector graphics color depth set at ‘255 Virtual Pens’. The configuration has a 36” roll selected as the ‘loaded’ medium and a number of custom paper sizes.*

---

## **AutoCAD 2000 or 2002**

### **DWG files with PlotWorks AutoCAD Processing**

To ensure AutoCAD 2000 and 2002 DWG files are printed correctly using PlotWorks AutoCAD processing select the following options before saving and submitting the DWG file for printing.

- In the Plot dialog box, under the Plot device tab set “Plotter Configuration Name” to “None” and “Plotstyle table (open assignments) Name” to “None”.
- In the Plot dialog box under the Plot Settings tab select the “Plot with plot styles” options so there is a check mark in the check box.

## **Configuring AutoCAD or DWG Direct\* in PlotWorks**

1. Start the PlotWorks Job Editor.
  2. Select **Processing Options** from the **Setup** menu.
  3. Select the **AutoCAD/DWG Direct Setup** tab.
  4. Click the radio button for **Use DWG Direct** or **Use AutoCAD** at the bottom of the dialog box.
-



5. Make sure the AutoCAD path is properly configured with the full path and filename of ACAD.EXE.
6. In the font path (using D:\ACAD as an example install path), ensure the following string is entered (without spaces):  
D : \ACAD\FONTS
7. Make sure the font referred to in the substitute font entry exists, and is correct.
8. Select **OK** to close the dialog box.

*\*DWG Direct does not support AutoCAD 2000 or 2002 files.*

## AutoCAD and “Error Free Printing™”

### Scale and Size Fields

During the prechecking pass, the software determines if there is a scale inconsistency between the data, the PlotWorks-specified AutoCAD scale, and the PlotWorks-specified size. The software will suggest a scale that will print the data to the specified size.

There are three other methods for designating the scale of the drawing:

1. Specifying “FIT” as a valid AutoCAD scale. In order to do this, you must specify a Size value (not Auto Detected).
2. Specifying “Auto Detected” as a valid Size. In order to do this, you must specify an AutoCAD scale value (not FIT).
3. Specifying “DIMSCALE” as a valid AutoCAD scale. The software will use the scale of the dimension entities within the.DWG for the drawing scale.

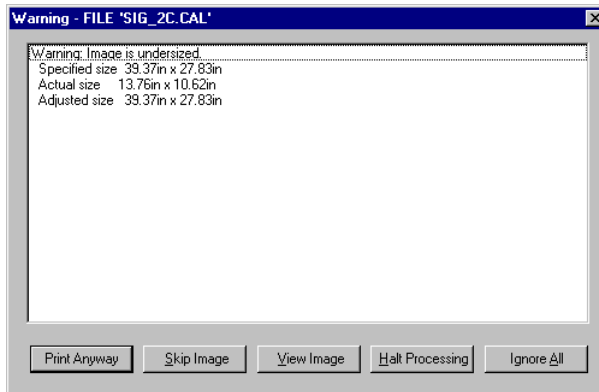
Please note that choosing any one of these options, in effect, disables the software’s ability to check on the compatibility of your specified scale with your specified size. The formula on page H-3 demonstrates this.

### Over and Under Size Errors

The Over/Under Size Error fields let you define an allowable range of error for your AutoCAD drawings. Any size errors that fall within the range will be printed accordingly. If the errors exceed the allowable range, the software generates an error message and requires one of the following operator actions:

- |                 |                    |
|-----------------|--------------------|
| 1. Print Anyway | 4. Halt Processing |
| 2. Skip Image   | 5. Ignore All      |
| 3. View Image   |                    |

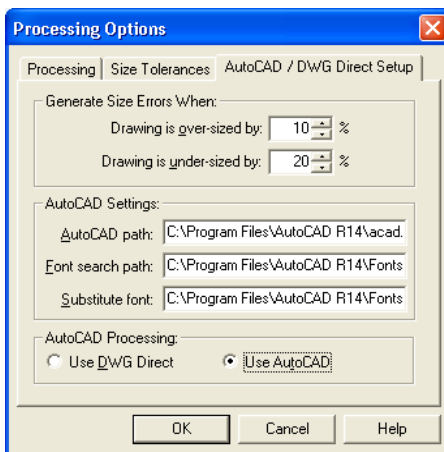
*Fig. B.4*  
*A Sample*  
*Warning*



To access the AutoCAD Setup box and define a range of error in the Job Editor,

1. Select **Processing Options** from the **Setup** menu.

*Fig. B.5*  
*Processing*  
*Options*  
*dialog box*



2. Choose the **AUTOCAD/DWG Direct Setup** property sheet.
3. Then set the desired percentages in the **Drawing is over-sized by:** and **Drawing is under-sized by:** fields. The default values are 10% for Over-sized errors and 20% for Under-sized errors.

## Examples of parameter settings

### Parameter Settings

1. To produce final output that is scaled to match other prints and engineering

documents, use the following PlotWorks settings:

<i>Scale</i>	Explicit AutoCAD scale string, such as 1=1, 1=12, or Dimscale
<i>Specified Size</i>	Industry-standard size, or specific width and height
<i>Output Size</i>	100% (unless you are producing check prints or enlargements)

2. To produce final output of a specific media size, you can use the following PlotWorks settings:

<i>Scale</i>	FIT
<i>Specified Size</i>	Industry-standard size, or specific width and height
<i>Output Size</i>	100%

3. To produce full-size prints, check prints or other variations of a specific paper size (that is, an industry standard size, or an explicit width and height), use the following PlotWorks settings:

<i>Scale</i>	Explicit AutoCAD scale string, such as 1=1, 1=12, or Dimscale
<i>Specified Size</i>	Industry-standard size, or a specific width and height
<i>Output Size</i>	A percentage (100%, 25%, 200%, etc.)

### Prechecking Messages

When the software detects inconsistent parameters, which ordinarily would result in an incorrect print, a Critical Error message or Warning displays — along with the options available to the printer attendant. Also, when appropriate, PlotWorks computes and/or displays detailed parameter-related information to help the attendant make an informed decision and produce a valid print without delay.

---

### Critical Error Options

The attendant is offered options to **Halt** and modify the parameters, or **Skip** the file for later attention. In either case, the file will not be printed until a modification is made.

### Warning Options

Warning options can include: Print Anyway; Skip the file for later attention; Halt and modify the parameters; View the image on-screen, or Ignore all the warnings in this image and all other images currently being processed with identical errors.

### Messages

A prechecking message can include some or all of the following information: the presumed image dimensions; the dimensions of the specified paper Size; an alternative Scale string that shows the relationship between the specified paper Size and the presumed AutoCAD image dimensions.

### Using Prechecking Messages to Identify Errors

If the software issues a warning during prechecking, one of the following errors exists:

- The specified AutoCAD Scale is incorrect,
- The wrong paper size is specified in the Size field
- The presumed AutoCAD drawing dimensions are not the actual dimensions
- The image was not zoomed to Extents

Usually, with the detailed information PlotWorks provides, you can spot an incorrect parameter immediately, because it stands out as an obvious deviation from (1) standard industry parameters and/or (2) the parameters specified for other images in the project.

### Identifying Errors

#### Example 1: Invalid Size

The specified Scale is 1=12, and the specified paper Size is 34" x 22" (D-size). Along with the specified paper Size, the software displays the following:

- Presumed image dimensions: 36" x 24" (industry standard D1-size)
- Alternate scale string: 1=13.09 (nonstandard)

Because the presumed image dimensions reflect an industry standard, but the alternate scale string does not, it is likely that the specified Scale is correct and the specified paper Size should be changed to D1-size to match the presumed image dimensions. This is further confirmed if D1 is the specified paper Size for other images in the project.

---

**Example 2: Invalid Scale**

The specified Scale is 1=48, and the specified paper Size is 36" x 24" (D1-size). Along with the specified paper Size, the software displays:

- Presumed image dimensions: 9" x 6" (nonstandard)
- Alternate scale string: 1=12 (standard AutoCAD scale)

Because the alternate scale string reflects an industry standard, but the presumed image dimensions do not, it is likely that the specified natural paper Size is correct and the specified Scale should be changed to 1=12 to match the alternate scale string. This is further confirmed if 1=12 is the specified Scale for other images in the project.

**Example 3: Inaccurate Image Dimensions**

The specified Scale is 1=12, and the specified natural paper Size is 36" x 24" (D1). Along with the specified paper Size, the software displays:

- Presumed image dimensions: 36" x 39" (nonstandard)
- Alternate scale string: 1=19.5 (nonstandard)

In this example, neither the alternate scale string or the presumed image dimensions reflect an industry standard, so it is likely that both the specified Scale and paper Size are correct. (This is further confirmed if the specified Scale and Size match the parameters for other images in the project.) With this information, the attendant can logically assume that the presumed image dimensions are not the actual image dimensions. Since PlotWorks determines the actual dimensions when the file is vectorized, and the parameters appear to be correct, the attendant can choose the option to Print Anyway.

If the parameters match after vectorization, a valid print is produced. If the actual image dimensions do not fit the specified natural paper Size, the software will issue a Warning and provide options. Changes made in the Viewer during processing are not saved.

**Printing with AutoCAD using Network Polling Mode 1**

The processing of AutoCAD drawing files (DWGs) is unique because of the need to specify an AutoCAD scale. Since both AutoCAD scale and paper size (SIZE) are specified in PlotWorks, they must be consistent or an error will occur, producing either a clipped or undersized print.

Since Network Polling Mode 1 is a noninteractive submission mode, the creator cannot easily communicate the desired scale to the printer operator. Network Polling Mode 1 entails the copying of image files to a specified directory and subsequent printing of files according to the parameters of that directory.

---

Given this scenario, the user would have to create a different subdirectory for each possible AutoCAD scale. When coupled with other required printing parameters, the need for subdirectories quickly exceeds the limits of practicality.

Fortunately, PlotWorks provides two very practical methods to work around this impasse:

### Method 1

Set up the parameters to accept any scale under the assumption that the customer has properly specified the size (paper size).

1. In the JOB section of the default PFS file for the directory, type **ACADPARMS=FIT**.
2. On the next line, type **SIZE=(desired size)**. For example, **SIZE=D**.
3. On the next line, type **FinalSize=(desired output size)**. For example, **FinalSize=100%**.
4. Save the PFS file.

Network Polling takes the AutoCAD drawing dimensions and processes the data such that the print will end up as the specified size.

The risk is simple: If the user made a mistake in specification of size, the ensuing print will not scale as expected. For example: let us say that the user had a 1/8 inch = 1 foot AutoCAD scale and, using this scale, an E-size drawing would have been printed. By specifying a D-size print, and an AutoCAD scale of FIT, you would get an inaccurate print.

### Method 2

Embed a scale in AutoCAD using one of the five user parameters (USERR1 through USERR5) and allow the software to read that embedded scale or use **DIMSCALE** as the scale value for the drawing.

1. Within AutoCAD, embed the scale of the print into the DWG file:
    - At the AutoCAD command line, type **setvar** and press **Enter**.
    - AutoCAD prompts you to enter the variable name. Type **USERR1** (or the desired user variable (USERR1 through USERR5) and press **Enter**.
    - AutoCAD now prompts you to enter the new value for USERR1 (or the variable you entered).
    - Enter the desired drawing scale and press **Enter**. For example, **1=48** or **48**. Or use the same scale value for the dimension entities as for the entire image file.
-



---

*Be sure to normalize the scale relationship such that the relationship is “1=xxxx”; enter the “xxxx” value. In other words, 1/8 inch = 1 foot should be written as 1=96 (1/8 inch = 12 inches or 1 inch equals 96 inches or 1 plotting unit equals 96 drawing units); enter 96 as the value for the variable.*

---

2. In the Network Polling directory default PFS file, use the chosen AutoCAD variable, i.e., R1 for USERR1, R2 for USERR2, etc., or DIMSCALE (if defined in AutoCAD) for the scale value.



---

*If there is no embedded value for the specified user variable, the program assumes a value of 1 and tries to print it.*

---

3. In the default PFS file, set **SIZE**=AUTO and **FinalSize**=(desired size, normally 100%).

The embedded scale will be used to generate a print and, with SIZE set to AUTO, you will get a print as specified. Please note that setting SIZE=AUTO removes the ability of PlotWorks to compare specified size with the actual data.

In this scenario, we are once again in a situation in which the software will not be able to determine if an inconsistency has occurred between the final size and specified size, as determined by AutoCAD scale.

---

