



RushVision 2.5 Instruction Manual

For Rush Machinery Wheel Truing and Dressing Machines

Machine Serial No. _____

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1. Turning on the Computer

Be sure that the large gray computer box, light source, video camera, monitor, keyboard, and mouse have been installed.

To turn on the computer, rotate the ON/OFF knob to ON and press the green “Start” button. The computer should start and the monitor should show a standard Windows desktop.

2. RushVision Installation

NOTE: Your machine was shipped with RushVision already installed. This procedure is only necessary if you need to reinstall RushVision.

To install RushVision from CD-ROM, put your RushVision CD in the D: drive. If it doesn't load within a few seconds, double click on the D: drive icon under “My Computer” to load the RushVision CD-ROM. InstallShield will load up and the installation menu will appear on the screen. Double click on “Install”. Next it will ask you to choose the file destination (where you want to save the program to). Click “Next” to install to the default location, or use “Browse” to select your own file destination. After selecting the file destination, the program files will load up after a few minutes. After installation is completed, you should have a RushVision Program under your Start >> Programs menu. You can now remove the CD-ROM from your D: drive. Installation is complete.

3. Starting Up RushVision

To start RushVision, go to the “Rush Machinery” folder in the “Programs” menu and click on RushVision. The main screen will appear with an “Initializing Drive...” box. Click on “OK” and the computer will initialize and home the camera zoom drive. A dialog box will appear instructing you to pin the C axis at 0°. Pin the C axis and click “OK”. At the top of the main window is the menu bar that contains the pull-down menus: File, Edit, View, etc.

4. Using the Pull-Down Menu Commands

There are two ways to access the main menu commands:

1. Use your mouse to click on a menu name and select from the list of commands.
2. Use custom keyboard shortcuts to execute commands (for example, Alt + F for “File”).

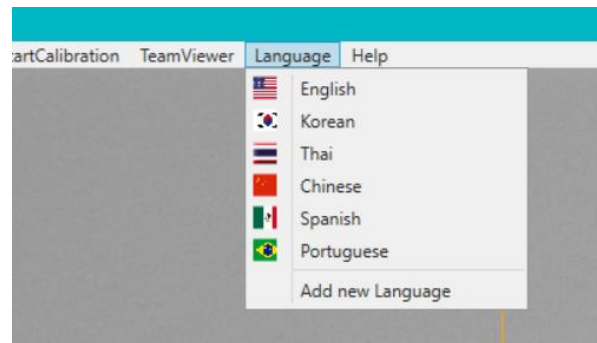
Keyboard shortcuts (or “hot keys”) are displayed next to the appropriate command in the pull-down menu. Using shortcuts is recommended in this program, as it not only makes commands easier and faster, but also saves you from having to move your mouse back and forth between the drawing and command menus.

5. “File” Pull-Down Menu



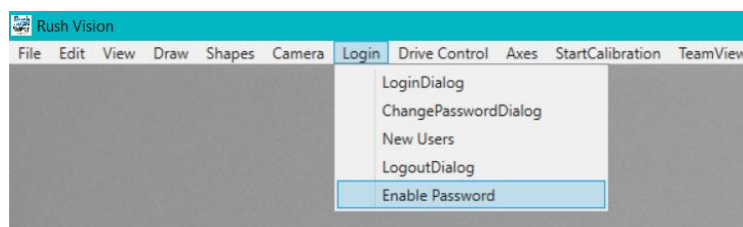
5.1 Language

You may select different languages. To change language, use pull down under **Language** and select the language required. Other languages are easily added by contacting *Rush Machinery and making a request*.



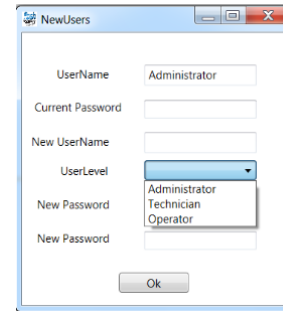
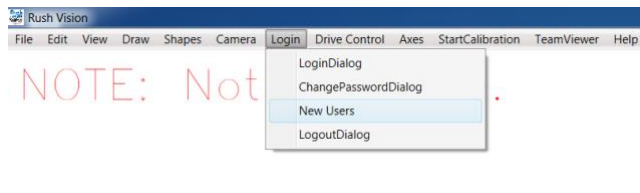
5.2 Login

To log into Rush Vision click on the login tab and fill out the user name and password when prompted. Login may be disabled by pulling down the login tab and disabling.



5.3 Creating Users

Creating new users and log in information can be done using an administrator account. Click on the Login tab then click New Users. Fill out the information in the New Users window when prompted. You can choose from three different user levels with the drop-down menu: administrator, technician, or operator. When completed click Ok to finish.



5.4 Save

To save a drawing/file, you can use the shortcut “Ctrl + S” or select “Save” under the “File” pull-down menu. This command will save the drawing/file in its current location, overwriting the current file. If the drawing/file has not yet been saved, it will prompt you to choose a file name and a location to save it.

5.5 Save As

To save a drawing/file, you can use the shortcut “Ctrl + S” or select “Save As” under the “File” pull-down menu. This command will prompt you to select a file name and location to save the drawing/file. Drawings/files will be saved as .dxf files.

5.6 Open

To open an existing file, use the shortcut “Ctrl + O” to select the file from its location in the C: drive, using the Windows scroll-down screen if necessary. Alternatively, you may use your mouse to click on “File” from the main menu and select “Open” under the pull-down menu.

RushVision has the capability to open both .dxf and .edf files.

5.7 Close

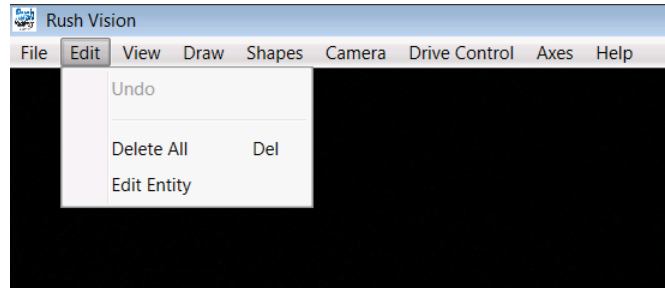
When you have finished with a drawing/file, you must close it by simply clicking “Close” under the “File” pull-down menu. It is recommended that you first close any working files (and save if necessary) before exiting RushVision to avoid any system errors or file fragmentation, which could otherwise occur by neglecting to do so. After closing your file, RushVision will display the default crosshairs until you open another file.

5.8 Exit

To exit RushVision, first close out any working drawings/files to avoid system errors or file corruptions. Then use the shortcut “Alt + F4” or click “Exit” under the “File” pull-down menu.

NOTE: Any unsaved drawings or information will be lost at this time.

6. “Edit” Pull-Down Menu



6.1 Undo

The “Undo” command under the “Edit” pull-down menu allows you to delete ONLY the most recent action performed. For example, if you drew a line incorrectly, you could select “Undo” and it would erase just that line. (This is useful when you make a mistake but don’t want to use the “Delete All” command.)

6.2 Delete All

The “Delete All” command can be selected under the “Edit” pull-down menu. Once you have clicked on “Delete All”, a box will appear asking if you are sure you want to perform the action. If so, click “OK” to delete all or “Cancel” to cancel the delete. Note that “Delete All” will delete the entire drawing **and** any unsaved data.

6.3 Edit Entry

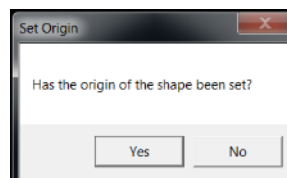
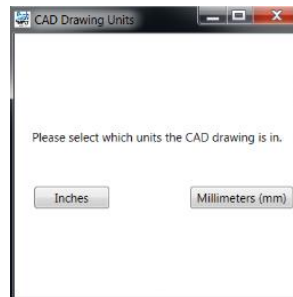
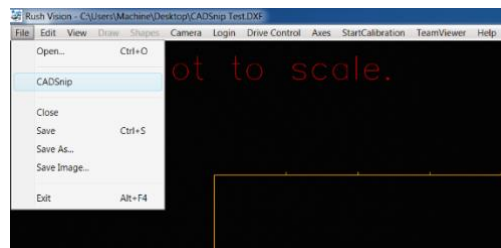
The “Edit Entry” command can be used to change the specifications of entities on your drawings (lines, arcs, etc.). It is important that we first go over entity selection in RushVision.

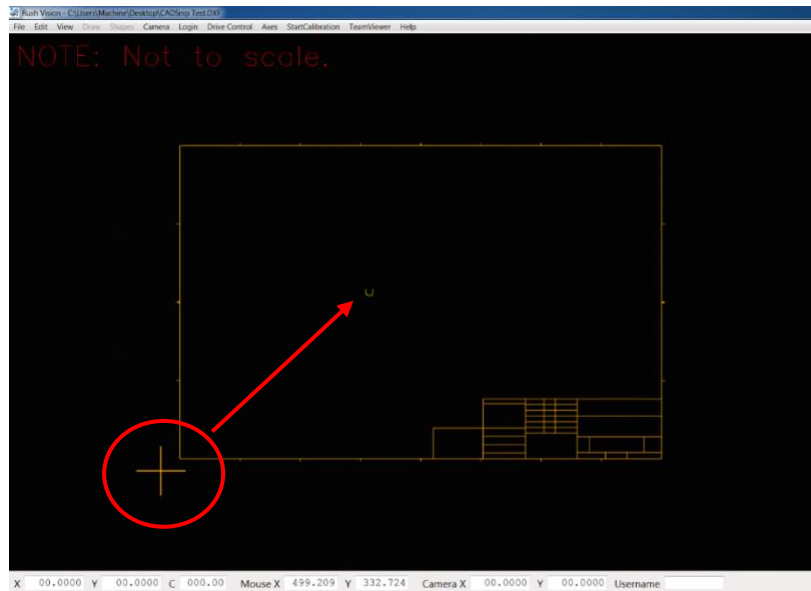
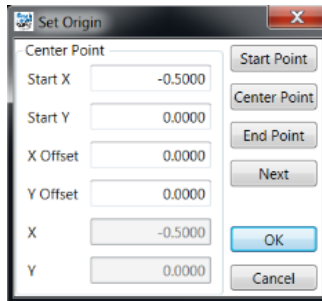
RushVision was designed to be user-friendly, so the RushVision method of selecting entities in the drawing has been made easy-to-use. When an entity is selected, RushVision will indicate three points of the line, each with a different color: starting point, endpoint, and midpoint. The starting point (green) is where the line starts from and is the first point defined when creating an entity. The endpoint is indicated in red and the midpoint is indicated in blue; these points can also be redefined. This system is also used for drawing lines, arcs, etc. in RushVision.

By clicking the “Next” tab, you can change the entity selected and thus the entry start point, endpoint, and midpoint indicators. (If you pass the entity you want, just continue clicking “Next” and it will come back around after it cycles through the other entities.) The “Details” button can be clicked to remove or restore the entity details from the menu box. As can be seen, the details feature allows you to view important details about the entity, such as type of entity, length, etc. Once you have selected an entity, you can edit the starting and endpoints by typing the desired value into the textboxes for X and Y coordinates. You can also delete an entity by selecting it and clicking on the “Delete” button. Make sure you have selected the right entity to delete—once an entity is deleted you can’t get it back. After you finish editing, either click “OK” to keep the changes or “Cancel” to cancel the changes and exit the editing menu.

6.4 CAD Snip

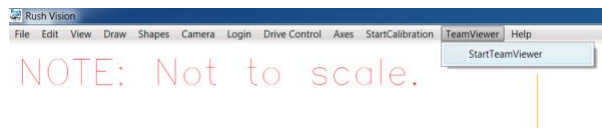
CAD Snip is a feature used to reset the origin and size of a drawing that will not fit within each zoom level. You may have a drawing with multiple views or a title block, however you may just want to use a single view within that drawing. To start, open the drawing you would like to use. Then click File, CAD Snip. Select the units that the drawing was originally drawn in. The next prompt will be asking if the origin of the drawing is set choose yes or no. If you choose no, the last prompt will ask you to set the new origin. Note: you want the origin of the drawing to be within your wheel profile in order for the drawing to be visible in all zoom levels. You can either save this file as a new drawing or overwrite the original drawing file.

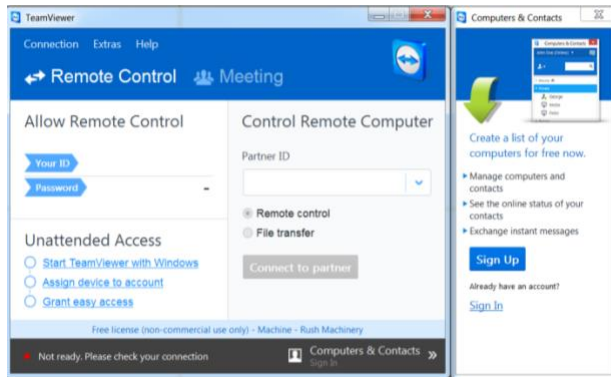




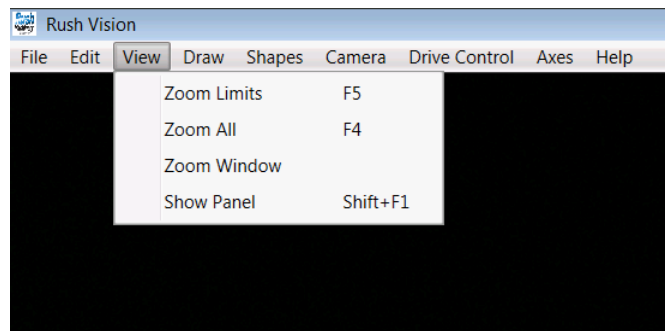
6.5 TeamViewer

Team Viewer is software that allows Rush Machinery Technicians to remotely access your computer system. TeamViewer can be opened within the RushVision software. Click on the TeamViewer tab then click Start TeamViewer. TeamViewer will now open and you can login to use the program. Note: the computer must be connected to a network to use TeamViewer. Technical support is offered on their website at <https://www.teamviewer.com/en/support/>





7. “View” Pull-Down Menu



7.1 Zoom Limits

The “Zoom Limits” command is used to show the camera field of vision limits on the drawing. The “Zoom Limits” command can be executed by pressing F5 or selecting “Zoom Limits” from the “View” pull-down menu. When the “Zoom Limits” command is selected, a dashed line box will appear on the screen. The borders of this box delineate the field of vision limits for the camera when it is set to Zoom 3 (Lowest Magnification).

7.2 Zoom All

The “Zoom All” command is used to zoom the viewing window to include all the entities in the drawing. The “Zoom All” command can be executed by pressing F4 or selecting “Zoom All” from the “View” pull-down menu. This function is quick and convenient for zooming out after using the zoom window command explained below.

7.3 Zoom Window

The “Zoom Window” command is used to zoom in on part of a drawing in RushVision. You can select “Zoom Window” under the “View” pull-down menu. Once selected, you must specify a box in which to zoom. Use your mouse to left click the first corner, then move your mouse and click where you want the second corner of the box to be. This will zoom the viewing window to show only what is in the box on the screen.

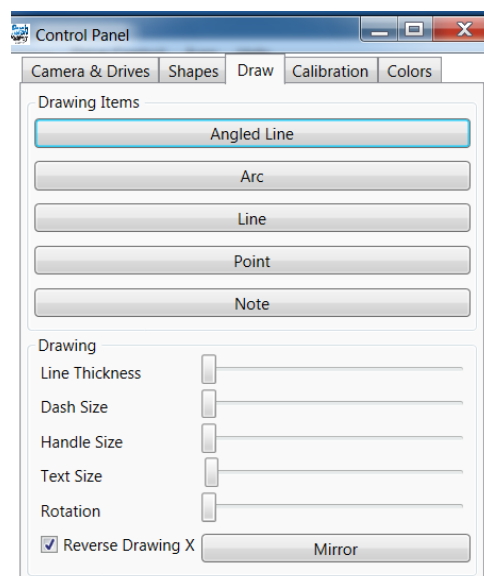
7.4 Control Panel

Camera & Drives:

Under the “Camera & Drives” tab in the Control Panel are the zoom options (Zoom 1, Zoom 2, Zoom 3, Zoom D1, Zoom All, and Zoom Window). Also, there are selections for Axis Alignment and Initialize. The Shapes tab contains all of the same shapes available under the “Shapes” pull-down menu.

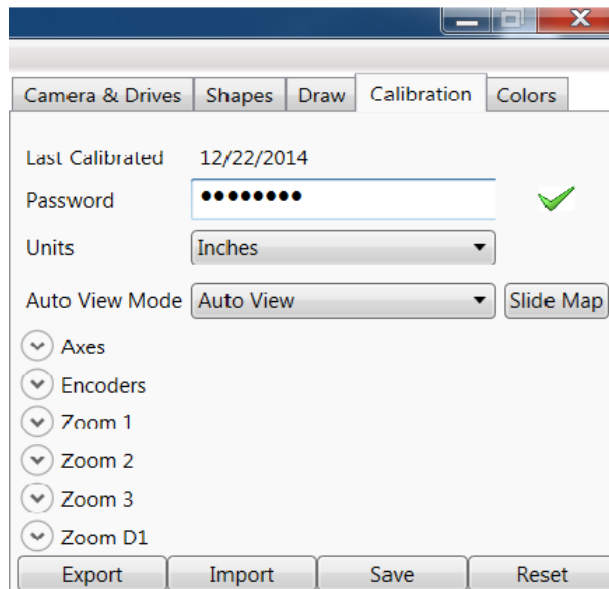
Draw:

The “Draw” tab in the Control Panel contains some of the same functions found under the “Draw” pull-down menu (Angled Line, Arc, Line, Point, and Note). There are also some additional functions such as Line Thickness, Dash Size, Handle Size, Text Size, Rotation, Reverse Drawing X, and Mirror. Line Thickness changes how thick the lines on the screen are portrayed. Dash Size changes the sizes of the dashes in the line. This allows you to create the drawing to your preference. Handle Size increases or decreases the size of the handle on the screen. Text Size allows you to adjust the size of any text that may be part of your drawing. Using the “Rotation” command, the drawing can be rotated 360 degrees. “Mirror” lets you mirror the drawing the Y-axis. The “Reverse Drawing X” acts as a permanent mirroring function for all drawings imported.



Calibration:

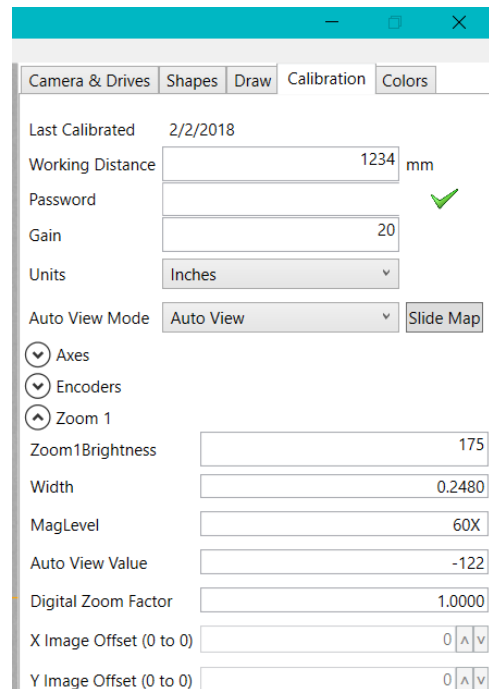
The “Calibration” tab feature is used to configure how RushVision is set up and calibrated and is not intended to be changed by the operator. The system is password protected to ensure that nothing gets changed by unauthorized personnel. To ensure machine accuracy, please do not attempt to alter the setup unless under direct authorization from Rush Machinery or its authorized distributor.



The screenshot shows the 'Calibration' tab of a software interface. It includes fields for 'Last Calibrated' (12/22/2014), 'Password' (masked with dots), 'Units' (Inches), and 'Auto View Mode' (Auto View). There are also expandable sections for Axes, Encoders, Zoom 1, Zoom 2, Zoom 3, and Zoom D1. At the bottom are buttons for Export, Import, Save, and Reset.

Brightness:

The brightness on all the zoom levels can be digitally changed, so that the imaging will be consistent throughout all the zoom levels. Higher zoom levels have a narrow focus which allows in less light to compensate, you can either adjust the aperture on the lens assembly or make the digital adjustment. Making a digital adjustment will ease the burden of having to adjust the aperture between zoom levels. The brightness can be adjusted with values 1-300 in each zoom level on the calibration tab.

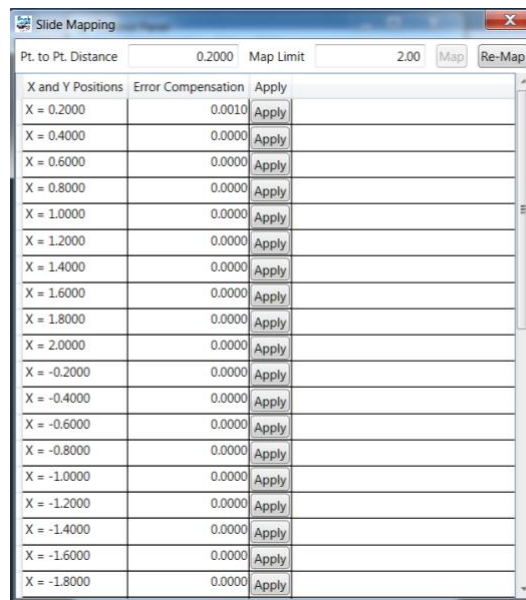


This screenshot shows the 'Calibration' tab with more detailed settings. It includes fields for 'Last Calibrated' (2/2/2018), 'Working Distance' (1234 mm), 'Password' (masked), 'Gain' (20), 'Units' (Inches), and 'Auto View Mode' (Auto View). There are also expandable sections for Axes, Encoders, and Zoom 1. The Zoom 1 section shows 'Zoom1Brightness' (175), 'Width' (0.2480), 'MagLevel' (60X), 'Auto View Value' (-122), 'Digital Zoom Factor' (1.0000), 'X Image Offset (0 to 0)' (0), and 'Y Image Offset (0 to 0)' (0).

Slide Map:

Note: This function is only for machines equipped with the optional Auto-View option.

The “Slide Map” menu is used to compensate for variations during slide movement. The slide mapper is used during RushVision setup procedure and is not intended to be changed or tampered with unless completely necessary or by direct instruction from Rush Machinery.

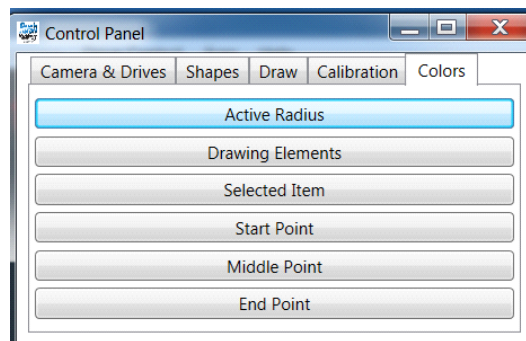


The Slide Mapping dialog box is used for compensating for variations during slide movement. It features a table with columns for X and Y Positions, Error Compensation, and an Apply button. The table lists X positions from 0.2000 to -1.8000 in increments of 0.2000. The Error Compensation column shows values, and the Apply button is present for each row. The dialog also includes fields for Pt. to Pt. Distance (0.2000) and Map Limit (2.00), along with Map and Re-Map buttons.

X and Y Positions	Error Compensation	Apply
X = 0.2000	0.0010	Apply
X = 0.4000	0.0000	Apply
X = 0.6000	0.0000	Apply
X = 0.8000	0.0000	Apply
X = 1.0000	0.0000	Apply
X = 1.2000	0.0000	Apply
X = 1.4000	0.0000	Apply
X = 1.6000	0.0000	Apply
X = 1.8000	0.0000	Apply
X = 2.0000	0.0000	Apply
X = -0.2000	0.0000	Apply
X = -0.4000	0.0000	Apply
X = -0.6000	0.0000	Apply
X = -0.8000	0.0000	Apply
X = -1.0000	0.0000	Apply
X = -1.2000	0.0000	Apply
X = -1.4000	0.0000	Apply
X = -1.6000	0.0000	Apply
X = -1.8000	0.0000	Apply

Colors:

The “Colors” tab contains an array of options to change the colors of the drawing. You can change the Active Radius, Drawing Elements, Selected Item, Start Point, Middle Point, and End Point.



The Control Panel dialog box is used for changing the colors of the drawing. It features a tabbed interface with tabs for Camera & Drives, Shapes, Draw, Calibration, and Colors. The Colors tab is selected, showing a list of color options: Active Radius, Drawing Elements, Selected Item, Start Point, Middle Point, and End Point. Each option is represented by a button.

Color Option
Active Radius
Drawing Elements
Selected Item
Start Point
Middle Point
End Point

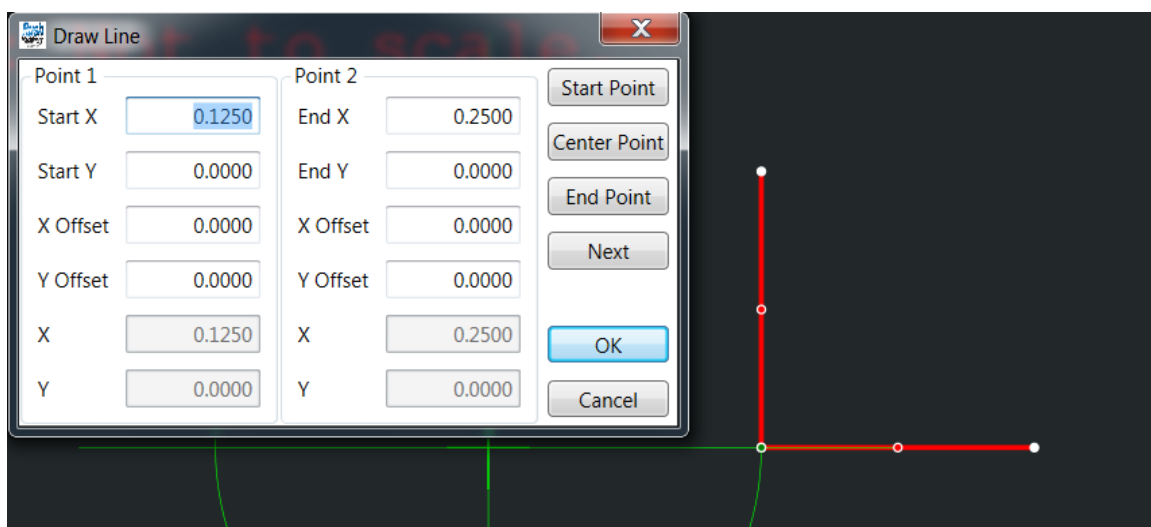
8. “Draw” Pull-Down Menu

8.1 Tracer

The “Tracer” command can be used by selecting “Tracer” under the “Draw” pull-down menu. The “Tracer” command is used to assist in taking measurements, determining angles, distances, etc. When the “Tracer” command is used, a temporary dashed line will appear on the screen. After you have activated the tracer command, you can set the start point for the tracer by either: pressing “Enter” (this will place the start point at 0 for X and Y on the drawing); or, you can click once anywhere on the drawing to set the start point. Then move the mouse pointer to the desired location for an end point. The properties of the tracer line are shown in the lower left corner of the screen. D shows the length of the line; A is the angle; and X and Y are the coordinates of the endpoint of the tracer line. You can click once to set the endpoint. Once you have set the endpoint, you can change its location by clicking once anywhere in the drawing. Move the mouse pointer appropriately and click again to set the new point. Note that the tracer line is not considered an entity and cannot be changed by using the “Edit Entity” command. The tracer line cannot be saved on a drawing and will disappear when a drawing is closed. It is intended for temporary use only. Use the “Draw Line” command to place a permanent line on the drawing. To eliminate a tracer line from the screen, click on the “Draw” pull-down menu and click on “Tracer”. The line should disappear.

8.2 Line

The “Line” command can be selected under the “Draw” pull-down menu. The “Line” command box has most of the same features as the “Edit Entity” command: Details, Starting Point, Endpoint, Midpoint, and Next. You can snap to start point, midpoint, and End point of an existing entity to specify the position of the line, as shown below:



By clicking “Next” you can move to the next entity in the drawing, which will also move the starting point, mid-point, and end point markers to the next entity in the drawing. You can

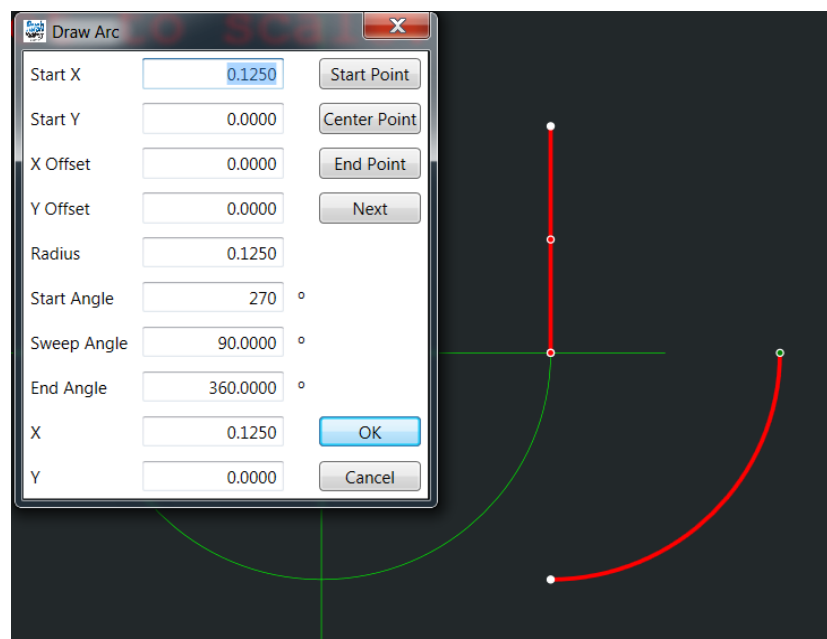
continue to click “Next” until the indicators are on the entity you want to snap to; you can then snap its starting point by clicking the “Start Point” button (or the corresponding “Center Point” or “End Point” buttons). The coordinates of the given point will then appear in the X and Y boxes. If you pass the object you want while clicking next, don’t worry—by continuing to click “Next” you can cycle through all the objects until you come back to the one you missed.

Once you have selected your start point, you can use the same method to select your end point or type the coordinates into the box to finish the line. If you have the coordinates for your line already, you may simply input these into the X and Y boxes for the Start Point and End Point instead. The offsets are used to “offset” the X and Y coordinates of the line by the specified amount. This feature is useful when you would like to draw a line a given distance away from an existing line. To do this, you can snap to a point on the existing line with the starting and end points and then type in the offset distance. For example, typing 1 in the “Y Offset” box means the new line will be drawn 1 inch away in the Y direction. (This is the same offset feature in AutoCAD.)

8.3 Angled Line

The “Angled Line” command can be selected from the “Draw” pull-down menu. The “Angled Line” command box works just like “Line”, except only the first point of the line is specified by X and Y coordinates. The second point is defined by the angle (typed in the “Angle” text box) and the “Control Method” selection. The control method allows you to choose one of three ways to “control” the length of the angular line by ΔX (change in X), ΔY (change in Y), or overall length. Click on the preferred method with your mouse and enter the desired value into the given text box, clicking “OK” when finished defining the line.

8.4 Arc



Drawing an arc in RushVision is easy with the “Arc” command by selecting “Arc” from the “Draw” pull-down menu. Drawing an arc is much like drawing a line, but specifying the arc’s center instead of start and end points.

“Arc” defines a center point for the arc to be drawn from by snapping to the start point, midpoint, or end point of other objects in the drawing. By clicking “Next” you can move to the next entity in the drawing, which will also move the starting point, end point, and midpoint markers to the next entity in the drawing. You can continue to click “Next” until the indicators are on the entity you want. You can then snap to its starting point by clicking the “Start Point” button (or the corresponding “Mid-Point” or “Center Point” buttons). The coordinates of the given point will then appear in the X and Y boxes.

Alternatively, you can type in the coordinates. The X and Y offset works the same way, offsetting the arc center by the given value in the X or Y direction. Radius, of course, defines the radius at which the arc is drawn. Next, use the start angle and end angle to specify length and angular coordinates of the arc. For example, an arc with a specified radius of 1 inch (or 1mm if working in metric), a start angle of 0° and ending angle of 90° will create an arc which forms the first quadrant of a 1 inch (or 1mm) radius circle. The green and red circles indicate the starting and ending points of the angle, as demonstrated in the picture above.

8.5 Point

The “Point” command can be selected by clicking on “Point” under the “Draw” pull-down menu. The “Point” command box has most of the same features as the “Line” command: Details, Start Point, End Point, Center Point, and Next. If you know the coordinates for your point already, you may simply input these into the X and Y boxes for the Center Point and click “OK”. You can also snap to the Start Point, Midpoint, and Center of an existing entity to specify the position of the point. By clicking “Next”, you can move to the next entity in the drawing, which will also move the Start Point, End Point, and Center Point markers to the next entity in the drawing. You can continue to click “Next” until the indicators are on the entity you want to snap to (again, the “Next” button will continue to cycle through all entities until you select one). You can then snap the object’s start point, end point, or center point by clicking the appropriate button. The coordinates of the given point will then appear in the X and Y boxes.

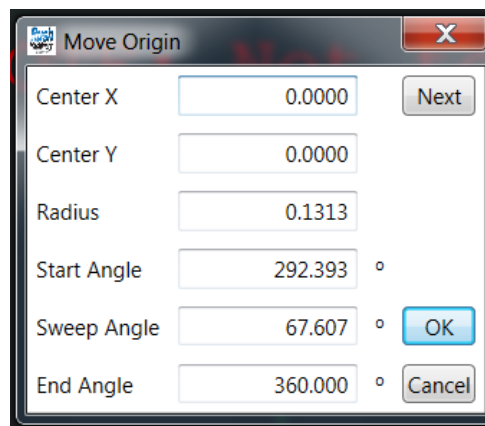
The offsets are used to “offset” the X and Y coordinates of the new point by the specified amount from a point (start, end, or center) of a selected entity. This feature is useful when you would like to draw a point a given distance away from an existing point. To do this, you can snap to a point on the existing entity with the starting and end points and then type in the offset distance. For example, typing 1 in the “Y Offset” box means the new point will be drawn 1 inch away in the Y direction.

8.6 Note

The “Note” command can be used to add text to a drawing. Simply select “Note” from the “Draw” pull-down menu to get a “Note” text box, then type in the desired text and click “OK”. You will see a rectangular box appear on the screen; move this box with your mouse and click to choose where the text will go.

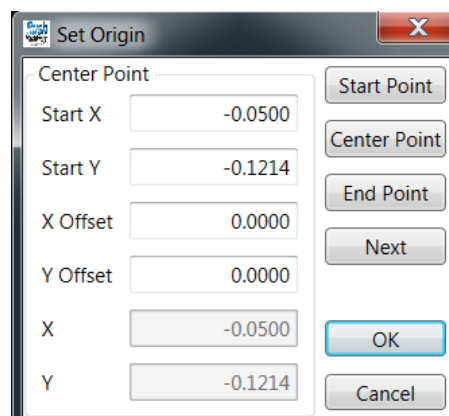
8.7 Move Origin

The “Move Origin” command can be used to move the origin of the drawing to the center of an arc. First, select the desired arc using the “Next” button until you have the one you want. When you have the right origin point (or arc) selected, click “OK” to change the origin of that point.



8.8 Set Origin

The “Set Origin” command can be used to set the origin of the drawing to the center of an arc. First, select the desired arc using the “Next” button, selecting a point, or choosing the desired location. When you have the right origin point selected, just click “OK” to set the origin.

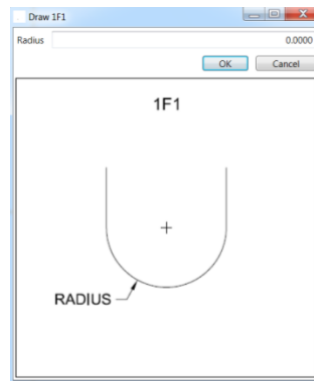


9. “Shapes” Pull-Down Menu

RushVision is designed with custom commands to automatically draw selected shapes. Under the “Shapes” pull-down menu, you can select from various custom shapes and specify the necessary parameters to automatically draw the given shape. This not only saves time—and thus improves efficiency—but also helps eliminate operator error. The operator need only enter in the parameters for a given shape, and RushVision generates the drawing for it automatically. If the operator enters values which don’t work or accidentally doesn’t enter a number in, RushVision gives the user an error message to correct it before continuing.

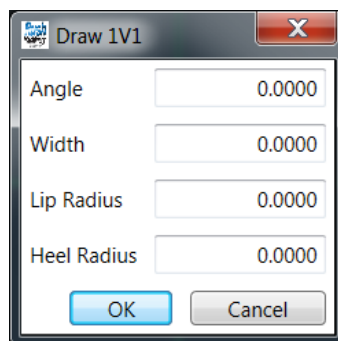
9.1 1F1

To draw a 1F1 shape, select “1F1” under the “Shapes” pull-down menu. A text box will appear asking for a radius size. Type in the desired radius and click “OK” to draw.



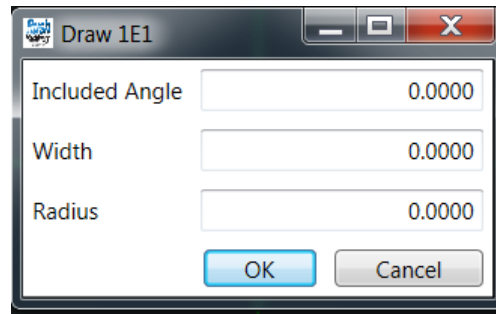
9.2 1V1

For a 1V1 shape, select “1V1” from the “Shapes” pull-down menu and give the specifications for Angle, Width, Lip Radius, and Heel Radius in the text boxes allotted. An error message will come up if the radii are not possible for the given width, etc.



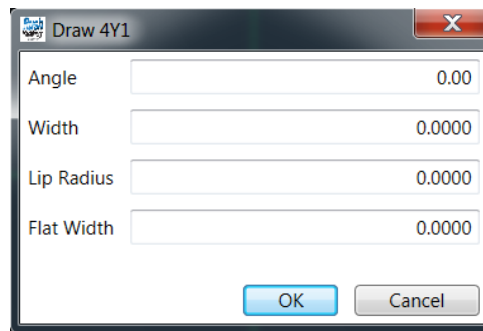
9.3 1E1

1E1, under the “Shapes” pull-down menu, is used just like the 1V1 and 1F1, except the specified parameters are Included Angle, Radius, and Width.

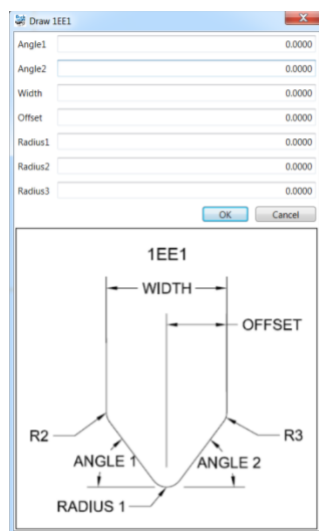


9.4 4Y1

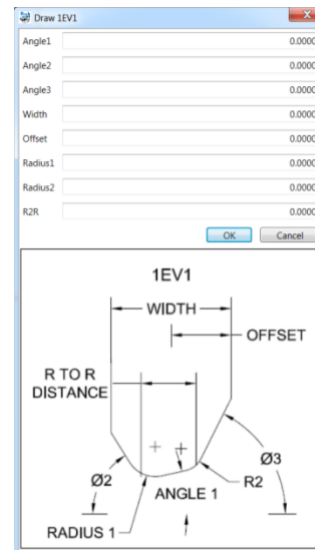
4Y1, under the “Shapes” pull-down menu, is used just like the 1V1, 1F1, and 1E1, except the specified parameters are Angle, Width, Lip Radius, and Flat Width.



1EE1

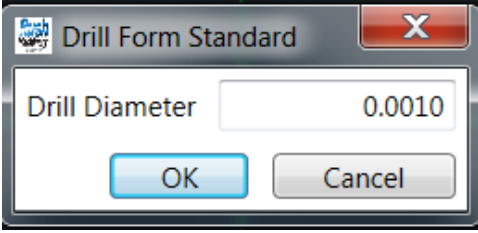


1EV1



9.5 Drill Form Standard

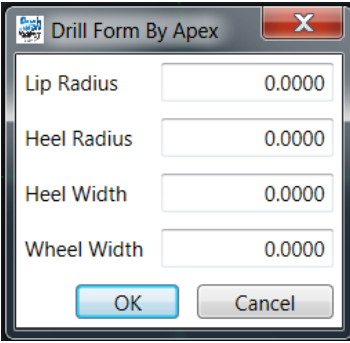
“Drill Form Standard”, under the “Shapes” pull-down menu, can be used to automatically draw standard drill form dimensions by giving the drill diameter size in the pop-up text box.



A dialog box titled "Drill Form Standard" with a close button (X) in the top right corner. It contains a text input field labeled "Drill Diameter" with the value "0.0010". At the bottom, there are two buttons: "OK" and "Cancel".

9.6 Drill Form by Apex

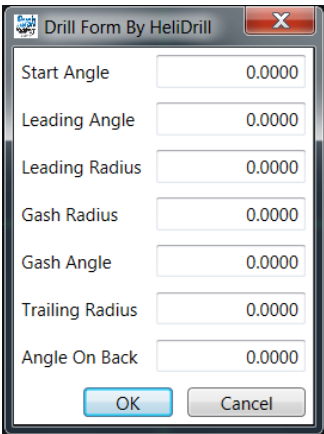
“Drill Form by Apex” can also be selected under the “Shapes” pull-down menu. Lip Radius, Heel Radius, Heel Width, and Wheel Width must be entered into the appropriate text boxes to draw the drill form by apex.



A dialog box titled "Drill Form By Apex" with a close button (X) in the top right corner. It contains four text input fields, each with the value "0.0000": "Lip Radius", "Heel Radius", "Heel Width", and "Wheel Width". At the bottom, there are two buttons: "OK" and "Cancel".

9.7 Drill Form by HeliDrill

“Drill Form by HeliDrill” can also be selected under the “Shapes” pull-down menu. Just enter in the values as shown from a Water Grinder HeliDrill report, click “OK”, and RushVision will generate the drawing for the given points.

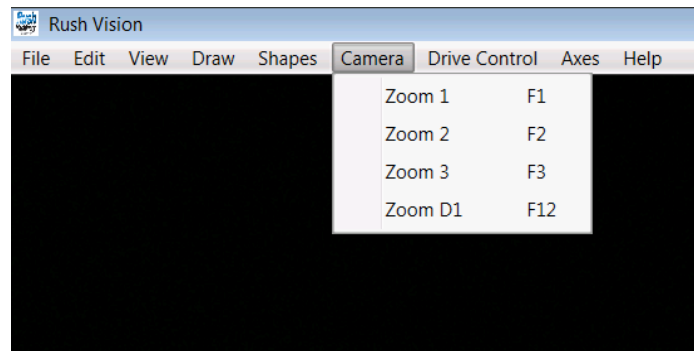


A dialog box titled "Drill Form By HeliDrill" with a close button (X) in the top right corner. It contains seven text input fields, each with the value "0.0000": "Start Angle", "Leading Angle", "Leading Radius", "Gash Radius", "Gash Angle", "Trailing Radius", and "Angle On Back". At the bottom, there are two buttons: "OK" and "Cancel".

10. Draftsight

Draftsight is a 2D modeling software installed on every Rush Machinery wheel truer. If you cannot achieve results with the drawing software within RushVision, you may use Draftsight to draw custom profiles. RushVision supports .dwg, .edf, and .dxf file types. Draftsight also offers support and learning resources through their website <https://www.3ds.com/products-services/draftsight-cad-software/>

11. “Camera” Pull-Down Menu



It is first important to note that the following commands and functions can only be performed on a system with the correct hardware for RushVision. On the computer system shipped with the FC-250W / FC-350W machine, these features will function normally. If installed on a computer without the proper hardware, RushVision will load an alternate version of the software without working video functions. This includes the brightness adjustment and video zoom features of the software. (Note that the previously mentioned zoom options are actually graphical zooms and do not apply to the video applications.)

11.1 Zoom 1

“Zoom 1” is the first zoom selection under the “Camera” pull-down menu, and can also be directly accessed by pressing F1. Unlike “Zoom All” and “Zoom Window”, which are software zoom functions, the RushVision zoom commands actually change the camera zoom setting. “Zoom 1” zooms to 60x magnification.

For machines equipped with the Auto-View option or if the machine is configured for large radius work, after selecting a zoom—either under the pull-down menu or through a keyboard shortcut—a zoom box will be displayed on the screen. You can then use the mouse to click on a center point to zoom in at, use the spacebar to select the X and Y coordinates to zoom in to, and press the “Enter” key to zoom to where X and Y = 0; or, right click to preview the zoom window before selecting.

11.2 Zoom 2

“Zoom 2” works just like “Zoom 1”, except it has a magnification of 30x rather than 60x. The zoom selection window works the same. “Zoom 2” can also be selected from the pull-down menu or by pressing F2.

11.3 Zoom 3

“Zoom 3” works just like “Zoom 1” and “Zoom 2”, except it has a magnification of 15x. The zoom selection window works the same. “Zoom 3” can also be selected from the pull-down menu or by pressing F3.

11.4 Zoom D1

“Zoom D1” is different from other zooms in that it digitally zooms the camera image to double magnification of “Zoom 1”, thus giving a magnification of 120x instead of 60x. Because this is a digital, rather than optical zoom, the resolution doesn’t increase—only the image display on the screen is increased. “Zoom D1” can be selected under the “Camera” pull-down menu or by pressing F12.

12. Axis Alignment

Due to variations in mass caused by thermal expansion and contraction, the alignment between the video image and the C axis center may float throughout the workday. However, this calibration is easily kept in proper alignment by regularly (once or twice a day, or before performing a critical arc) aligning the video image with the central swivel axis of the C axis dressing wheel head. **This calibration has no effect whatsoever upon any operation except arc scanning.**

Axis Alignment is a camera alignment technique that utilizes the computer to align the center point of the video image over the C axis. This is utilized best when the camera has been previously aligned to the C axis swivel by using the “Camera Manual Alignment Procedure” (see the chapter titled “RushVision Video System Calibration and Alignment” for more information). To perform axis alignment:

1. Bring the machine and camera up to normal operating temperature (usually after dressing the first wheel).
2. Click on the “Shapes” pull-down menu and select the 1F1 shape. Create a drawing that has the largest radius that is fully visible on the monitor at Zoom 1. For a machine calibrated in inches, this radius will be .075” for standard 60x magnification. For a machine calibrated in metric units, this radius will be 1.9mm for a standard 60x system.

3. Click on the “Drive Control” pull-down menu and select “Initial Drives”. Click “OK” in the “Initial Drives Control” box.
4. Press F1 and “Enter” to set the camera to “Zoom 1”.
5. Jog the dressing wheel oscillation and stop it at a point where the wheel is visible on the screen.
6. Click on the “Drive Control” pull-down menu and select “Axis Alignment”.
7. Using a dressing wheel that has been trued (used), swing the dressing wheel head to the left until it reaches 90°. Use the dressing wheel infeed and bring the edge of the wheel up to the center vertical line on the screen.
8. Swing the dressing wheel head 180° to the right and note distance between the edge of the wheel and the vertical line.
9. Enter a number in the X axis box of the Axis Alignment display box and press “Enter” or click “OK”. This will shift the drawing slightly to align the drawing with the C axis on the machine.
10. Repeat steps 6–8 until there is no deviation between the wheel edge and the center vertical line as the dressing wheel head is swung from one side to the other.
11. Swing the dressing wheel head until the wheel edge is parallel with the center horizontal line. Using only the Axis Alignment Y axis adjustment box, enter numbers to bring the center horizontal line to exactly the edge of the wheel. Do not move the dressing wheel infeed.
12. Perform a final check by swinging the dressing wheel head around the radius on the drawing. The wheel edge should pivot exactly around the curved line. If not, make minor adjustments to correct any deviation.

13. Call Auto-View Drives

This function is used to “home” the camera and Auto-View slides (if equipped). In order to operate the camera and Auto-View system, it must first be initialized and homed when RushVision starts up. When RushVision starts up, you will see a box titled “Drive Control” appear. The menu boxes should say “Initializing...” for all X, Y, and Z axes (Z axis only for machines equipped with the optional Auto-View feature). If it doesn’t say “initializing” for any of the axes, click the “Initialize” button on the menu box and it should initialize all axes. The click “OK” to home the drives.

Note: You will need to select a zoom level in order to bring the camera and slides to absolute home.

14. “Axes” Pull-Down Menu

Under the “Axes” pull-down menu, there are the option for “Zero X” or “Zero Y”. These commands make the DRO readout on the display “0” for either the X or Y axis.

15. RushVision Video System Calibration and Alignment

15.1 Calibration

All of the calibrations are made at the factory during final assembly and testing of each machine prior to partial breakdown for shipment. This simplifies the final setup at the customer’s facility and ensures accurate and reliable operation with a minimal amount of time and effort spent by the setup technician. Once calibrated, the overall system settings will need no attention for many hours of use. If you feel your machine is no longer calibrated properly, please contact Rush Machinery for assistance.

15.2 Alignment

Periodically, you will need to align the center point of the video image over the C axis. It is recommended that you perform this alignment procedure several times per day and **every time** before a high-tolerance radius will be dressed. For machines not equipped with the Auto-View option, either of the techniques below can be used; but, we do recommend that the manual alignment method be used first, before the Axis Alignment is used. Major adjustments should always be done with the manual method (for example, when the manual camera slides have been used to measure a part or work with a large radius).

15.3 Manual Camera Alignment Procedure

Note: This procedure is best done with a dressing wheel that has already been in use. This will ensure a flat and true wheel that will give the greatest accuracy for this setup.

1. Click on the “Shapes” pull-down menu and select the 1F1 shape. Create a drawing that has the largest radius that is fully visible on the monitor at Zoom 1. For a machine calibrated in inches, this radius will be .075” for a standard 60x magnification. For a machine calibrated in metric units, this radius will be 1.9mm for a standard 60x system.
2. Press F1 to set the camera to Zoom 1.
3. Jog the dressing wheel oscillation and stop it at a point where the wheel is visible on the screen.
4. Swing the dressing wheel head to the left until it reaches 90°.

5. Use the dressing wheel infeed and bring the edge of the wheel up to the center vertical line on the screen.
6. Swing the dressing wheel head to 180° to the right and note the distance between the edge of the wheel and the vertical line.
7. Move the camera X axis so that the vertical line moves one-half of the distance noted in Step 5. Use the dressing wheel infeed to move the wheel edge to the other half of the distance.
8. Swing the head to the left 180° and repeat Steps 5–7 until there is no deviation between the wheel edge and the center vertical line as the dressing wheel head is swung from one side to the other.
9. Swing the dressing wheel head until the wheel edge is parallel with the center horizontal line. Use only the camera Y axis adjustment to bring the center horizontal line to exactly the edge of the wheel. Do not move the dressing wheel infeed.
10. Perform a final check by swinging the dressing wheel head around the radius on the drawing. The wheel edge should pivot exactly around the curved line. If not, make minor adjustments to correct any deviation.