

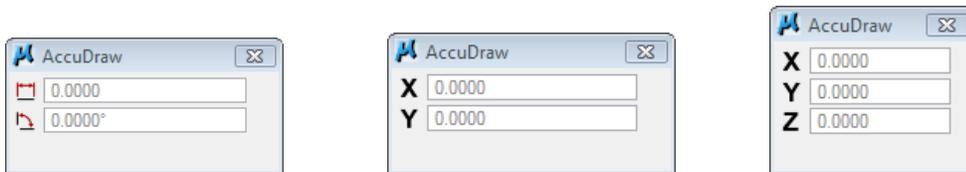
5.0 Working with AccuDraw

AccuDraw is a drafting aid that evaluates such parameters as your current pointer location, the previously entered data point, the last coordinate directive, the current tool's needs, and any directive you have entered via shortcut key-ins or AccuDraw options. AccuDraw then generates the appropriate precision coordinates and applies them to the active tool.

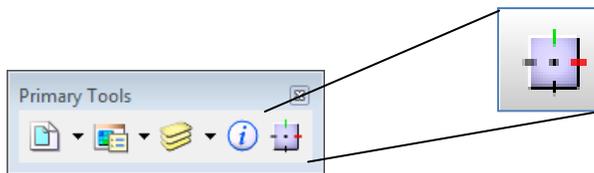
Activating AccuDraw



By default, when MicroStation is started, AccuDraw is activated automatically. With AccuDraw activated, all drawing tools utilize it for dynamic data input.



AccuDraw window: Left: Polar. Center: Rectangular 2d file. Right: Rectangular 3d file



To toggle AccuDraw on/off

- 1) In the Primary Tools toolbox, select the *Toggle AccuDraw* tool.
The AccuDraw window opens or closes.

Normally, the AccuDraw compass does not appear until you enter the first data point after selecting a tool. AccuDraw's behavior changes slightly with tools that utilize dynamics before the first data point. The *Place Text* and *Place Active Cell* tools are examples of such tools. Instead of “waiting” for the first data point to display the compass, AccuDraw activates the compass at the last data point location. In this way, you can place the element with respect to this location by using any of AccuDraw's relative directives.

AccuDraw also affects operations like placing text or cells in another way. When you place a string of text with AccuDraw active, its initial orientation will be along the current AccuDraw drawing plane. In other words, when you have a Front-oriented drawing plane, the text will be oriented along the front axis *regardless of the view orientation*.

AccuDraw will not activate when it would conflict with other tools — for instance, during fence placement and element selection operations, dimensioning, and so on.

Although most users will activate and use AccuDraw during the entire design session, there may be times when its actions might interfere with the current operation. For this reason, AccuDraw can be turned off. MicroStation's tools return to their non-AccuDraw operation.

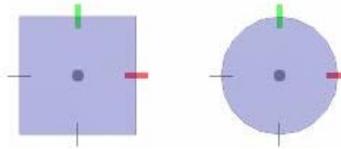
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To deactivate AccuDraw

- 1) In the Primary Tools toolbox, select the *Toggle AccuDraw* tool.
Or
With the focus in the AccuDraw window, press <Q>.

AccuDraw's compass

AccuDraw's most recognizable feature is its compass. Visible only when AccuDraw is active and has control of MicroStation's coordinate input, the compass acts as both a status indicator and a focus for your input.



AccuDraw compass. Left: Rectangular coordinate system. Right: polar coordinate system.

The origin point

At the center of the compass is AccuDraw's origin point. This is the focal point of all AccuDraw operations. As you select various AccuDraw options, their functions operate from this origin point.

This last point is important. All AccuDraw directives (distance key-ins, shortcut key-ins, and so on) operate in conjunction with the compass. In most cases, the compass is located at the last entered data point. In addition, there are AccuDraw directives that allow you to move the compass to entirely different locations without generating a new data point. This is not unlike a tentative point.

The frame (drawing plane indicator)

Surrounding the origin point is the frame, or drawing plane indicator. Its primary purpose is to show the current orientation of AccuDraw's drawing plane and the current coordinate system in effect. When the frame appears as a rectangle, the rectangular coordinate system (X, Y) is in effect. When the frame appears as a circle then the polar coordinate system (Distance, Angle) is active. By default, when AccuDraw has focus, the frame's color is grey, and its fill color is blue, but you can change this in the Display tab of the AccuDraw Settings dialog box.

To change the color of the AccuDraw frame

- 1) With AccuDraw active, open the AccuDraw Settings dialog by pressing <G> followed by <S> (Get Settings).
Or
Choose Settings > AccuDraw.
- 2) In the AccuDraw Settings dialog, click the Display tab.
- 3) From the Frame option menu, choose a new color (the button color indicates the current setting).

To change the color of the AccuDraw compass

- 1) With AccuDraw active, open the AccuDraw Settings dialog by pressing <G> followed by <S> (Get Settings).
Or
Choose Settings > AccuDraw.
- 2) In the AccuDraw Settings dialog, click the Display tab.
- 3) From the Fill option menu, choose a new color (the button color indicates the current setting).

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The X/Y axis

To differentiate between the two axes, each is color coded. By default, the positive or +X axis is displayed in red while the positive or +Y axis is green in color. If these colors do not suit you or are hard to discern, you can change them via the Display tab section of the AccuDraw Settings dialog. As well, you can change the highlight color for when the pointer is indexed to the X or Y axes.

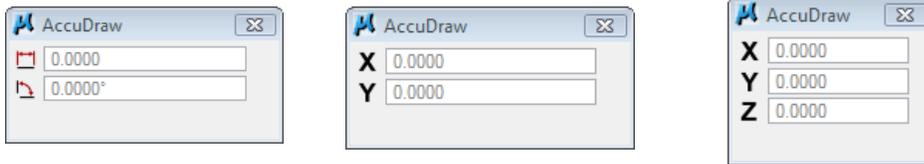
To change the colors of AccuDraw's X and Y axis, or its indexing highlight

- 1) With AccuDraw active, open the AccuDraw Settings dialog by pressing <G> followed by <S> (Get Settings).
Or
Choose Settings > AccuDraw.
The AccuDraw Settings dialog opens.
- 2) Click the Display tab.
- 3) From the X Axis or Y Axis option menu, choose a new color (the button color indicates the current setting).
- 4) From the Hilite option menu, choose a new color (the button indicates the current setting).

AccuDraw's drawing plane

AccuDraw's drawing plane is central to its operation. As you work, AccuDraw orients this drawing plane based on a number of factors including cues from the active tool, the last placed coordinate, and key AccuDraw settings. This is known as context sensitive operation.

The AccuDraw window



Used to facilitate data point entry. The AccuDraw window opens or closes when you click the AccuDraw icon on the Primary Tools toolbox. If you are using the default function key menu, pressing <F11> opens the AccuDraw window. If it is already docked or open, pressing <F11> sends focus to the AccuDraw window.

Once opened, the AccuDraw window automatically takes the focus whenever dynamic update occurs with a drawing tool selected. The AccuDraw window is dockable.

An option in AccuDraw is to use polar coordinates. To shift from rectangular to polar coordinates, first check that focus is in the AccuDraw window, then press the <spacebar>. Repeated pressing of the <spacebar> toggles between rectangular and polar coordinates. Rectangular or polar coordinates also can be set from the AccuDraw settings dialog.

The fields in the AccuDraw window depend on the type of drawing plane coordinate system in effect:

Coordinates	Fields	Used to specify
Rectangular	X,Y, (Z in 3D)	Distances along the drawing plane axes
Polar	Distance, Angle, (Z in 3D)	Distances and angles relative to the drawing plane origin, and Z value in 3D.

The coordinate type is set with a keyboard shortcut (highlight AccuDraw and tap the space bar to toggle between polar and rectangular mode).

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AccuDraw's window and the input focus

The AccuDraw window initially comes up floating just like any other window. However, it can be docked to either the top or bottom edge of the MicroStation application window.

When AccuDraw is active it becomes part of the input focus order controlled by the <Esc> key, initially, and others. How focus is controlled depends on whether or not you have Use Position Mapping enabled (Workspace > Preferences > Position Mapping).

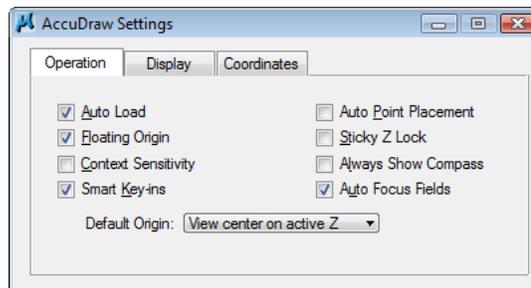
This is important to remember as no AccuDraw shortcut key-in works unless focus is in the AccuDraw window. Fortunately, after every data point or tentative point, the focus is forced to the AccuDraw window where it remains until you press the <Esc> key, or enter a Reset from a tool.

5.1 AccuDraw's Settings dialog box

Many aspects of AccuDraw's behavior are specified using the controls in the AccuDraw Settings dialog. A few have already been mentioned (such as context sensitivity, and axis display colors).

To open the AccuDraw Settings dialog box

- 1) From the Settings menu, choose AccuDraw.
Or
With the focus in the AccuDraw window, press <G>, <S>.



Operation Tab

Contains controls that are used to select preferences for operation and alter aspects of the way AccuDraw performs.

Auto Load

If on (the default), AccuDraw starts up automatically when MicroStation is started.

Floating Origin

If on (the default), the origin moves to the last point placed.

Context Sensitivity

If on (the default), enables tools to provide “hints” to AccuDraw to override its default behavior for smoother operation. This may include setting custom “Context” rotations, setting the origin, locking values, or setting the coordinate system type.

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Smart Key-ins

If on (the default), AccuDraw interprets a number as positive or negative, depending on the direction of the pointer from the compass.

In rectangular mode only, Smart Key-ins cause AccuDraw to move the focus to either the x or the y field depending on pointer position.

Auto Point Placement

If on, places data points automatically when they have been fully constrained (if you have locked both the X and Y values, or if you have locked one or the other while the pointer is indexed to zero). The default is off (this feature is recommended for experienced users).

Sticky Z Lock

If on, when you lock the Z axis, it will remain locked through consecutive operations. Normally, locks are cleared when you enter a data point. This setting is useful, for example, where you want to draw on the one plane (that is, you want to lock Z=0), while snapping to elements that are on another plane. With Sticky Z Lock enabled, the Z value will remain locked until you turn it off.

Always Show Compass

If on, when you activate AccuDraw, the compass displays prior to you placing a data point for the current operation.

Auto Focus Fields

(Polar coordinates only) If on, the <A> and <D> AccuDraw shortcuts set focus to the selected field and lock the current value.

If off, the <A> and <D> AccuDraw shortcuts lock the current value without affecting the focus.

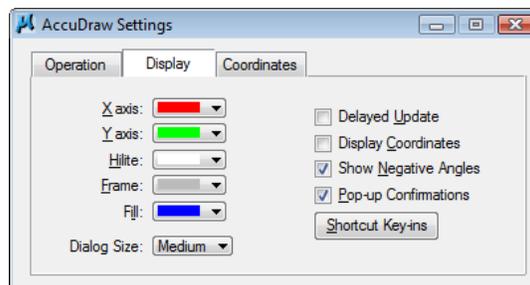
Default Option

Lets you choose the default origin. When a tool starts AccuDraw and there is no origin currently defined, then this setting specifies the default location of the AccuDraw drawing plane origin. Options are:

- View Center on active Z — Sets AccuDraw's origin to the center of the view, at the Active Z depth of the view.
- Global origin — Sets AccuDraw's origin to the Global Origin of the file.
- Global origin on active Z — Sets AccuDraw's origin to the Global Origin (X, Y) at the Active Z depth of the view.

Display Tab

Contains controls that control various display features of AccuDraw.



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X axis

Lets you select, via an option menu, the color for the positive X axis indicator on the AccuDraw compass.

Y axis

Lets you select, via an option menu, the color for the positive Y axis indicator on the AccuDraw compass.

Hilite

Lets you select, via an option menu, the color for the negative X and Y axis indicators on the AccuDraw compass.

Frame

Lets you select, via an option menu, the color for the AccuDraw compass frame.

Fill

Sets the fill color of the inside of the AccuDraw compass.

Dialog Size

Sets the width of the AccuDraw window.

- Small — 100 pixels.
- Medium — 126 pixels.
- Large — 152 pixels.

Delayed Update

If on, X/Y coordinates are updated in the AccuDraw window when the screen pointer comes to a rest. If off (default), coordinates are updated in the AccuDraw window continuously, as you move the screen pointer.

Display Coordinates

If on, a coordinate display at the pointer shows the increments in the x, y, and z (for 3D) directions from the previous data point.

Show Negative Angles

If on (default), AccuDraw displays negative angles (that is, +/-180°). If off, AccuDraw displays angles as 0° to 360°.

Pop-up Confirmation

If on (default), AccuDraw displays shortcut popups.

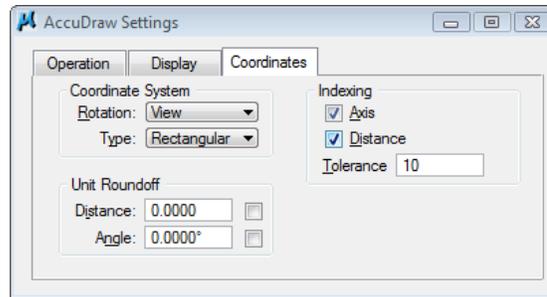
Shortcut Key-ins

Opens the AccuDraw Shortcuts window that lists AccuDraw shortcut keys.

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Coordinates Tab

Contains controls that are used set AccuDraw's Coordinate System, unit roundoff, and indexing functionality.



Rotation

Sets the rotation of the drawing plane axes, via an option menu. While the AccuDraw window has the focus, pressing the key combination indicated in parentheses has the same effect as choosing the specified Rotation.

Choosing	Aligns drawing plane
Top (T)	with axes in a standard Top view
Front (F)	with axes in a standard Front view
Side (S)	with axes in a standard (Right) side view
View (V)	with View axes
Auxiliary	with Active ACS axes
Context (R,Q)	as specified interactively, or as hinted by the current drawing tool

Unlike ACS rotation, context rotation is temporary, lasting only for the duration of the current drawing tool.

Type

Sets the method used in the AccuDraw window to specify distances and angles relative to the drawing plane origin.

Type	Effect
Rectangular	The X and Y fields (plus, in 3D, the Z field), along with their lock controls, are displayed in the AccuDraw window.
Polar	The Distance and Angle fields, along with their lock controls, are displayed in the AccuDraw window.

While the AccuDraw window has the focus, pressing <space bar> toggles Type.

Distance

Sets the roundoff value for distances relative to the drawing plane origin. While the accompanying check box is on, the roundoff value is effective, except if overridden by keyed in values or snapped tentative points. The check box turns on automatically when the Distance setting is entered.

This setting does not affect keyed in values and snapped tentative points.

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Angle

Sets the roundoff value, in degrees, for angles relative to the drawing plane origin when in Polar mode. While the accompanying check box is on, the roundoff value is effective except if overridden by keyed in values or snapped tentative points. The check box turns on automatically when the Angle setting is entered.

This setting does not affect keyed in values and snapped tentative points

Axis

If on, indexing is activated for AccuDraw's drawing plane X and Y axes. The distance required to move the pointer from the indexed axis is controlled by the Tolerance setting.

Distance

If on, sets the minimum distance that the pointer must move from the AccuDraw origin in order to place a new data point. The minimum distance is controlled by the Tolerance setting.

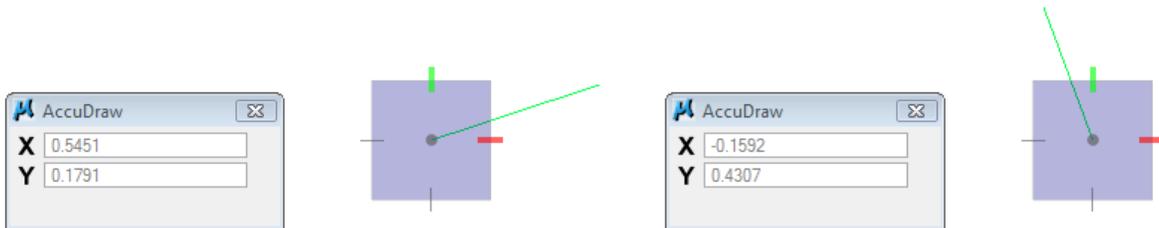
Tolerance

Sets the minimum distance, in screen pixels, used by the Axis and Distance settings. Allowable values 1–99.

5.2 Controlling and Using AccuDraw

How AccuDraw reacts to pointer movement

When active, AccuDraw reacts to pointer movement by trying to anticipate your intent.



Moving the pointer (Rectangular coordinates). Left: Toward the x-axis; Right: Toward the y-axis.

As you move the pointer, the fields in the AccuDraw window automatically update to reflect the drawing plane coordinates of the current pointer location (expressed as relative x, y, and z offsets, or as a distance and an angle) with respect to the location of the AccuDraw compass.

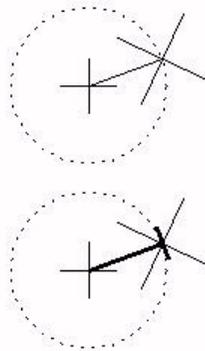
Furthermore, the AccuDraw window's input focus automatically adjusts, based on the general direction of the pointer movement. As you move the pointer in the same direction as either drawing plane axis the focus moves to the field that you would use to precisely locate the data point along that axis.

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Previous Distance Recall

Another example of how AccuDraw tries to help you is its previous distance feature. As you place elements in your model, AccuDraw keeps track of the distance between your last two data points. Known as the Previous Distance, AccuDraw uses this distance as a hint for your next data point.

Think of previous distance as a radius length from the compass origin. When you move the pointer within the Tolerance distance to this radius, AccuDraw displays a small tangent line called the previous distance indicator, and locks the pointer to this point.



Previous distance indicator.

As you keep the pointer within the Tolerance distance of this previous distance, AccuDraw will keep it locked. This, of course, only works with Polar coordinates. If you are using Rectangular coordinates, the previous distance only works when you are indexed to either drawing plane axis.

A data point will result in an offset distance from your last data point precisely the same as the distance between your previous two data points.

This “lock” on feature is not hard to override. Just continue dragging the pointer until it is outside the Tolerance and the previous distance lock disengages.

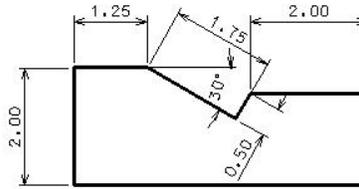
Recalling previous values

AccuDraw stores all entered values for its X, Y, Distance, and Angle fields for recall as needed. When in the X, Y, (Z in 3D), Distance, or Angle fields, pressing the <PgUp> key recalls the last distance or angle value entered in any of these fields. Pressing <PgUp> again recalls the next to last entered value and so on. You should note that the X, Y, Z, and Distance fields share a common value buffer but that Angular data is stored separately. This means you can enter a value in the X field, for instance, change the input focus to Y, and by pressing <PgUp>, enter the same value as placed in the X field.

A Simple Example of Using AccuDraw

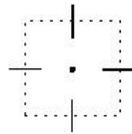
To help you understand what AccuDraw does, the following is a description of a simple design session using AccuDraw and the Place SmartLine tool. The task presented is the creation of a simple bracket. If a 3D file is used, the Top view is assumed in the exercise.

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The design subject is a simple bracket with the important dimensions and features noted.

With AccuDraw activated (*Toggle AccuDraw* tool in the Primary Tools toolbox), select the *Place SmartLine* tool in the Linear Elements toolbox. When you enter your first data point for the lower left corner of the bracket, AccuDraw displays a square or circular shaped “compass.”



The AccuDraw compass appears whenever AccuDraw is active and a data point is placed

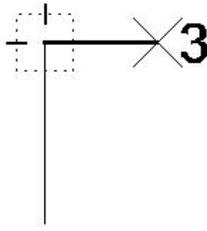
Next, you need to draw the left edge of the bracket. As you move the dynamic line around the view window nothing interesting happens until you get close to one of the axes of the AccuDraw compass. In this case, because you want a vertical edge, you should move the line close to the Y axis. When AccuDraw senses the axis, the line snaps or *indexes* to it. While the axis is highlighted you can key in a number for the vertical distance, in this case, 2 inches. Don't worry about telling AccuDraw the direction, it has already figured that out and also has placed the input focus (where the key-in data will appear) in the correct field, in this case the Y field. After keying in the distance value, entering a data point results in what you would expect, a line segment oriented along the vertical axis and exactly two inches long.



The start of the bracket's left edge with its 2 inch measurement courtesy of AccuDraw.

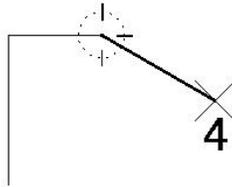
At this point the AccuDraw compass moves to the end point of the line you just placed. Moving the dynamic line segment around, it acts as before. This time you need to place the line with a fixed length of 1.25 inches in the horizontal direction. You do this by moving the dynamic line so that it snaps onto the positive horizontal axis, key in 1.25, and enter a data point.

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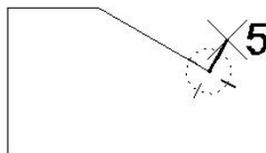
The bracket's top edge is taking shape as the indexed line is placed along the horizontal axis

The next part of the bracket involves going off at a 30 degree angle for a given distance. Pressing the Space bar changes the AccuDraw compass to its polar mode (indicated by a circular compass), which lets you enter an angle and a distance. Entering 30 degrees in the Angle field and 1.75 inches in the Distance field locks the line in the right direction. A data point accepts the new location.



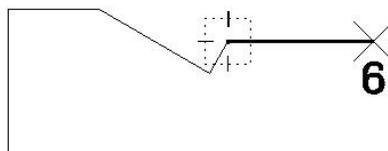
The notch appears next with the Polar compass oriented along the new line.

Note how the compass orients along the 30 degree line. This illustrates AccuDraw's context sensitivity. AccuDraw provides a method for associating coordinate information with respect to existing elements. To place the half inch line at a right angle to the 30 degree line only requires indexing to the appropriate axis, keying-in 0.5 and entering a data point to accept.



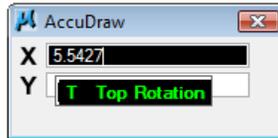
The notch is nearing completion.

With the bracket's notch complete, all that remains is the completion of the bracket's right edge. Currently, however, the compass still is rotated to the 60 degree angle of the notch and not the horizontal direction you need. To override the context nature of AccuDraw you press <T> to orient the compass to the Top view (the default). Pressing the Space bar brings up the rectangular compass. Indexing, again, to the X axis and keying in 2 inches followed by a data point locks the final known dimension of the bracket.

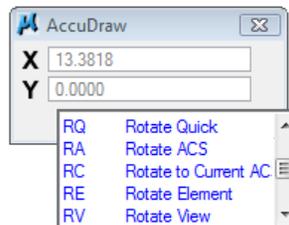


5.4 AccuDraw’s shortcut key-ins

Although AccuDraw tries to anticipate your next move it cannot always predict your intentions. AccuDraw therefore includes a wide variety of single and double character command directives known as the shortcut key-ins. By pressing the appropriate key, you can direct AccuDraw to perform a specific task. In operation, AccuDraw is the default input focus in most cases, thus letting you just type in the shortcut without having to consider where the input focus is.



Pop-ups confirm single letter shortcuts below the focused input field. This function is not only useful to confirm the key-in, but also it serves to communicate that the shortcut is received via AccuDraw's input fields.



Two letter shortcuts appear attached to the focused input field, and confirm the action through the temporary appearance of the AccuDraw Shortcuts window. The pop-down list adjacent to the input field illustrates where the shortcut comes from, thereby making it easy to “follow the action.”

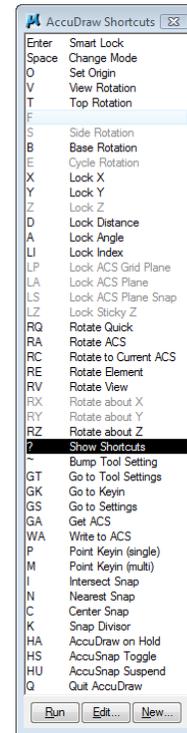
The following is a list of the more common shortcut key-ins:

Key	Effect
<?>	Opens the AccuDraw Shortcuts window.
<Enter>	Smart Lock <ul style="list-style-type: none"> In Rectangular coordinates, locks X to 0 if the pointer is on the drawing plane y-axis or Y to 0 if the pointer is on the x-axis. In Polar coordinates, locks Angle to 0°, 90°, -90°, or 180° if the pointer is on a drawing plane axis or otherwise locks Distance to its last entered value.
<space bar>	Switches between Rectangular and Polar coordinates.
<O>	Moves the drawing plane origin to the current pointer position. This can also be used to explicitly activate AccuDraw before you enter a data point.
<X>	Toggles the lock status for the X value.
<Y>	Toggles the lock status for the Y value.
<D>	Toggles the lock status for the Distance value.
<A>	Toggles the lock status for the Angle value.

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To review a list of the available AccuDraw shortcuts

- 1) Within the focus of the AccuDraw window, press the <?> key. The AccuDraw Shortcuts window opens.



General Procedure – To activate a shortcut key-in

- 1) With the focus in the AccuDraw window, simply press the keyboard key(s) that correspond(s) to the shortcut you wish to use. If the first letter is, by itself, a valid shortcut, the shortcut activates. Otherwise, the AccuDraw Shortcuts window opens. The window lists the available shortcuts. Typing the second letter activates the shortcut.

Complete List of AccuDraw Shortcut Key-ins

Key	Effect
<Enter>	Smart Lock In Rectangular coordinates, locks X to 0 if the pointer is on the drawing plane y-axis or Y to 0 if the pointer is on the x-axis. In Polar coordinates, locks Angle to 0°, 90°, -90°, or 180° if the pointer is on a drawing plane axis or otherwise locks Distance to its last entered value.
<Space bar>	Switches between Rectangular and Polar coordinates.
<O>	Moves the drawing plane origin to the current pointer position.
<V>	Rotates the drawing plane to align with the view axes. Pressing this key a second time restores context-sensitive rotation.
<T>	Rotates the drawing plane to align with the axes in a standard Top view. Pressing this key a second time restores context-sensitive rotation.
<F>	Rotates the drawing plane to align with the axes in a standard Front view. Pressing this key a second time restores context-sensitive rotation.
<S>	Rotates the drawing plane to align with the axes in a standard Side view. Pressing this key a second time restores context-sensitive rotation.
	Rotates the drawing plane to align with the active ACS, or if you set up a rotation in the dialog, it will return you to that rotation. In a new file (where you haven't used an ACS yet) it will be the rotation of the view.
<E>	Rotates between three main planes: top, front, and side (3D only). This also works when your original plane is an ACS or context rotation, so you do not have to use RX, RY to rotate to a 90° plane.
<X>	Toggles the lock status for the X value.
<Y>	Toggles the lock status for the Y value.
<Z>	Toggles the lock status for the Z value.

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<D>	Toggles the lock status for the Distance value.
<A>	Toggles the lock status for the Angle value.
<L>,<I>	Locks the current index state. If an axis or distance is not indexed, indexing is disabled. If an axis or distance is indexed, it is locked. The effect is temporary, lasting until a data point is entered or the shortcut is run again. This is useful if you need to index to one axis but not the other, or to enter a data point very close to an axis but not on the axis.
<L>,<P>	Toggles ACS Grid Plane lock, which toggles the ACS Plane and ACS Plane Snap locks, and the Grid view attribute for all views.
<L>,<A>	Toggles ACS Plane lock.
<L>,<S>	Toggles ACS Plane snap lock.
<L>,<Z>	Toggles Sticky Z Lock, which is used in conjunction with ACS Plane Snap Lock to force a series of snap points to lie on the active ACS' XY plane (Z=0).
<R>,<Q>	Used to quickly and temporarily rotate the drawing plane. The procedure is described in The Rotate Quick keyboard shortcut.
<R>,<A>	Used to permanently rotate the drawing plane. Because it rotates the current ACS, this rotation will still be active after the tool in use is exited. If on, the tool setting Use Current Origin causes the drawing plane origin to be used as the x-axis origin, thereby eliminating the need to enter an extra data point. Of course, in many cases it is desirable to be able to define the x-axis origin at a different location than the drawing plane origin.
<R>,<C>	Rotates the drawing plane to the current ACS.
<R>,<E>	Rotates the drawing plane to match the orientation of a selected element.
<R>,<V>	Rotates the active view to match the current drawing plane.
<R>,<X>	Rotates the drawing plane 90° about its x-axis.
<R>,<Y>	Rotates the drawing plane 90° about its y-axis.
<R>,<Z>	Rotates the drawing plane 90° about its z-axis.
<?>	Opens the AccuDraw Shortcuts window.
<~>	Bumps an item in the tool settings dialog (shortcut is ~, usually right under the <Esc> key — there is no need to press the <Shift> key). It finds the first enabled item in the tool settings dialog that is a toggle button or an option button, and either toggles it or bumps it to the next valid value. For instance, if you are drawing a SmartLine and the focus is in the AccuDraw window, you can just press the <~> key and it switches to arcs without moving the focus from the AccuDraw window.
<G>,<T>	Moves focus to the Tool Settings window.
<G>,<K>	Opens (or moves focus to) the Key-in window (same as choosing Utilities > Key-in).
<G>,<S>	Opens (or moves focus to) the AccuDraw Settings dialog (same as choosing Settings > AccuDraw).
<G>,<A>	Opens the Get ACS dialog, which lets you select a saved Auxiliary Coordinate System.
<W>,<A>	Opens the Write to ACS dialog, which lets you save the drawing plane alignment as an ACS.
<P>	Opens the Data Point Key-in dialog for entering a single data point.
<M>	Opens the Data Point Key-in dialog for entering multiple data points.
<I>	Activates Intersect snap mode.
<N>	Activates Nearest snap mode.
<C>	Activates Center snap mode.
<K>	Opens the Keypoint Snap Divisor dialog, which is used to set the Snap Divisor for keypoint snapping.
<H>,<A>	Suspends AccuDraw for the current tool operation. Selecting a new tool or entering a Reset re-enables AccuDraw.

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<H>,<S>	Toggles AccuSnap on/off.
<H>,<U>	Suspends AccuSnap for the current tool operation. Selecting a new tool or entering a Reset re-enables AccuSnap.
<Q>	Deactivates AccuDraw.

Keyboard shortcuts are *not* case sensitive.

5.5 Smart Lock

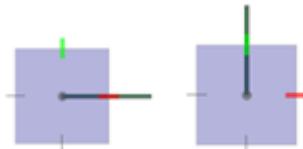
One of the first keyboard shortcuts you will use is Smart Lock. Similar in operation to striking a line along a T-square, Smart Lock is invoked by pressing the <Enter> key. Depending on where the pointer is located, at the time you select Smart Lock, one of two things will occur:

- If the pointer is oriented closer to the X axis of the compass, the pointer will lock to the X axis.
- If the pointer is oriented closer to the Y axis of the compass, the pointer will lock to the Y axis.

You know the pointer is locked on an axis when the dynamic line highlights. Pressing the <Enter> key again deactivates Smart Lock and releases the dynamic line back to free motion.

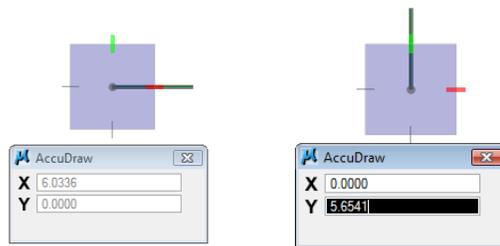
To constrain the pending data point to a drawing plane axis

- 1) Position the pointer near the desired axis. When the pointer is on an axis, a highlighted line is displayed from the drawing plane origin to the pointer location.



Positioning the pointer on a drawing plane axis – Left: on the x-axis. Right: on the y-axis

- 2) Press the <Enter> key.
Smart Lock is engaged. Its effect is to constrain the pending data point to the axis.

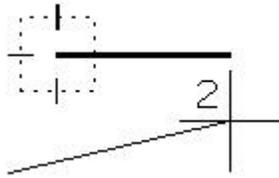


Constraining the data point along the x-axis (left) and the y-axis (right)

You now can constrain the pending data point to a precise distance along the axis by keying in a value, or simply by snapping a tentative point to an element or monument point and accepting the tentative point as the data point location.

To disengage Smart Lock and unconstrain the pending data point, press <Enter> again. The <Enter> key toggles Smart Lock.

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Snapping to constrain the pending data point to a precise distance along the x-axis.

Smart Lock will not lock to an axis when you are entering coordinate values into its field. Instead, AccuDraw returns the dynamic element to free motion.

X and Y locks

When using the Rectangular coordinate system, you can force AccuDraw to lock the current distance along an axis by activating the <X> or <Y> keyboard shortcut. AccuDraw responds by locking the dynamic line to the chosen axis at the current pointer distance from the origin point of the compass. Having done this, the focus of the complement AccuDraw axis data field becomes the focus for your next keyboard entry.

- AccuDraw automatically switches its coordinate system to rectangular in response to the X or Y lock.
- All X and Y values entered are relative to the plane of the previous element segment.
- To override this, AccuDraw provides an option in its settings called Context Sensitivity. Turning this off forces AccuDraw to stay oriented to the DGN file's XY axes

Distance lock

You can use the <D> shortcut to lock the distance from the compass origin point to the current location of the pointer and, if necessary, change AccuDraw's coordinate system to Polar. The input focus automatically shifts to the Angle field.

To interactively enter the distance of the dynamic element

- 1) In the AccuDraw window's Distance field (Polar coordinates), type the distance.
The pending data point is constrained automatically, as indicated by the pressed Distance button.
Dynamic update occurs in response to each keystroke.

Alternative Method – To interactively enter the distance of the dynamic element

- 1) Move the pointer away from the drawing plane origin until the desired distance is displayed in the AccuDraw window's Distance field. As the pointer is moved, the displayed distance is rounded off to the increment specified by the Unit Roundoff's Distance setting (if the setting is turned on) in the Coordinates tab section of the AccuDraw Settings dialog.
- 2) Press the <D> key.

Angle lock

You can use the <A> shortcut to set the angle portion of the polar drawing plane and, if necessary, change AccuDraw's coordinate system to Polar. AccuDraw sets the angle to the current position of the pointer.

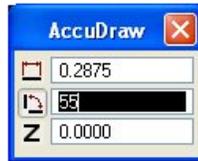
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To interactively lock the angle of a dynamic element

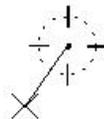
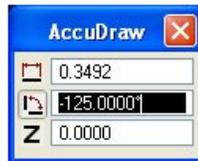
- 1) In the AccuDraw window's Angle field (Polar coordinates), type the angle, in degrees.
The pending data point is constrained automatically, as indicated by the pressed Angle button. Dynamic update occurs in response to each keystroke.

Alternative Method – To interactively lock the angle of a dynamic element

- 1) Move the pointer around the drawing plane origin until the desired angle is displayed in the AccuDraw window's Angle field. As the pointer is moved, the displayed angle is rounded off to the increment specified by the Unit Roundoff's Angle setting (if the setting is turned on) in the Coordinates tab section of the AccuDraw Settings dialog.
 - 2) Press the <A> key.
- The Angle value automatically switches to the “opposite” angle if the pointer position dictates.



Angle value automatically switches to the “opposite” value.



Angle value automatically switches to the “opposite” value.

5.6 Unit roundoffs and their effect on AccuDraw

Distance Roundoff

When you enable the Distance field in Unit Roundoff, AccuDraw acts as if there is an invisible grid in effect. The Distance Roundoff, however, always is calculated from the current compass location. In addition, at any time you can override this value by snapping to an element, or entering a value in the X, Y, Z, or Distance fields of the AccuDraw window.

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To round off the values displayed in AccuDraw's X, Y, Z and Distance fields as the pointer moves

- 1) In the AccuDraw Settings dialog, click the Coordinates tab.
- 2) In the Unit Roundoff section, turn on Distance.
- 3) In the Distance field, key in the desired increment.

To cancel distance roundoff

- 1) In the AccuDraw Settings dialog, click the Coordinates tab.
- 2) In the Unit Roundoff section, turn off Distance.

Angle roundoff

You can use the Angle Unit Roundoff to lock elements along specific axes. For instance, setting the Angle Roundoff to 30 degrees assures that all elements placed will occur along one of the normal isometric drawing axes. As with the X, Y, Z, or Distance fields, at any time you can override this value by snapping to an element, or entering a value in the Angle field of the AccuDraw window.



Drawing in progress showing AccuDraw window with angle locked to 30 degrees

To round off the values displayed in the AccuDraw's Angle field as the pointer moves

- 1) In the AccuDraw Settings dialog, click the Coordinates tab.
- 2) In the Unit Roundoff section, turn on Angle.
- 3) In the Angle field, key in the desired increment in degrees.

To cancel angle roundoff

- 1) In the AccuDraw Settings dialog, click the Coordinates tab.
- 2) In the Unit Roundoff section, turn off Angle.

5.7 Moving the AccuDraw Compass

By default, AccuDraw places its compass at the last data point location. There are, however, times when you need to take over control of the AccuDraw compass. Tentative point operations can take better advantage of AccuDraw's capabilities when you "unlock" the compass and place it wherever needed. The following covers how you do this and some interesting ways in which you can use AccuDraw to accomplish otherwise difficult operations.

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The floating origin option

At any time, you can move AccuDraw's compass to the pointer location. You do this with the "O" keyboard shortcut, which forces AccuDraw to move the compass to the current pointer location.

This occurs *regardless of the tool or operation currently selected*. This last point is important to recognize. AccuDraw is considered a non-modal feature in that you don't have to be in a predetermined part of a procedure in order for it to operate.

In practice, the most common use for a relocated compass origin point is to index the element under construction from an existing point. For instance, if you want to locate the corner of a block a specified distance from a given location, you can tentative snap to the given location, then press O to move the drawing plane origin to the snap. From there you can use AccuDraw to position the tentative point from this relocated origin point. This procedure is explained in AccuDraw and the tentative point.

Rotating the drawing plane in 2D

Along with the standard drawing plane orientations, the rotation of the drawing plane axes can be altered using keyboard shortcuts. In 2D, you are limited to rotating AccuDraw's drawing plane about the view axis. This matches the same restriction placed on rotating views in 2D.

Rotation sensitive tools

Depending on the tool in use, dynamically rotating the drawing plane axes yields slightly different results. For example, consider the scenario of placing a block (rectangle) with the Place Block (Orthogonal) tool, which takes its orientation from the drawing plane XY axes.

Once the drawing plane axes are rotated, the block's main axis is constrained to the rotated XY axis.

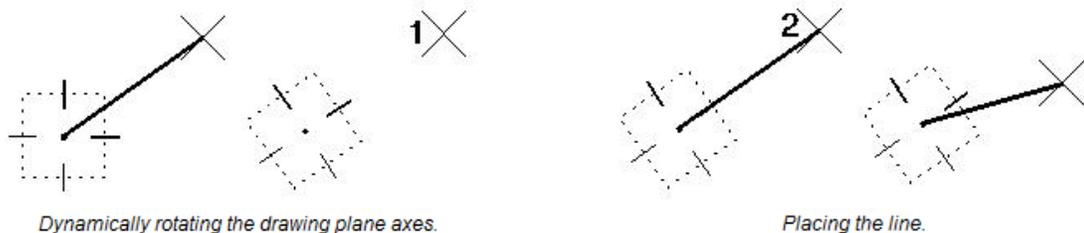
Contrast this to the effect when using the Place Line tool: The drawing plane axes rotate, and while dynamic readout is a function of the newly rotated system, the tool itself remains available to dynamically place the line wherever desired.

The Rotate Quick shortcut key-in

You can use the Rotate Quick (<R>, <Q>) shortcut to change the orientation of the drawing plane only for the current data point, after which it resumes its normal orientation. This will vary, depending on the tool being used.

To quickly rotate the drawing plane axes

For example, suppose you are using the Place Line tool to start a construction and wish to align the drawing plane axes with the new line. After establishing the drawing plane origin (with the first data point of the line), pressing <R>, <Q> lets you rotate the drawing plane axes interactively



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