chapter 3

Drawing with Precision

Summary

In this chapter, you learn about:

Polar Tracking

Polar Snap

Object Snap Tracking

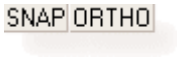
New Object Snaps

Polar Tracking

Polar Tracking is similar to the Ortho - it restricts movement of the cursor to an angle (90 degree increments by default). However, if Polar is on, you can pick arbitrary angles too. Try the following exercise to understand Polar...

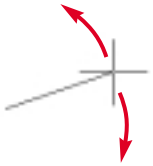
Exercise 1 - Understanding Polar Tracking

1. Begin a new, empty drawing.
2. Make sure both Polar and Ortho are OFF. Their Status Bar buttons should appear as shown here



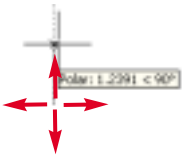
3. Start the Line command, pick a first point, then move the cursor around that point in a circular motion.

   Notice you can freely move the cursor in all directions.



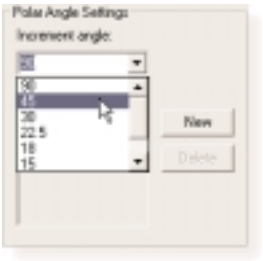
4. Turn Polar ON, by clicking on Polar on the status bar, or by pressing F10.

   Notice as you approach 0, 90, 180, and 270 degrees, the cursor tracks to those angles.



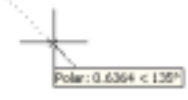
5. Right-click over Polar on the Status Bar, then click Settings.

6. In Polar Angle Settings, change the Incremental angle to 45, then click OK to close the Drafting Setting dialog.



7. While still in the Line command, move the cursor around the first point.

   Notice as you approach 45, 135, 225, and 315 degrees, the cursor tracks to those angles, in addition to 0, 90, 180, and 270.



   Because you cannot have Ortho mode and polar tracking turned on at the same time, AutoCAD turns polar tracking off when you turn on Ortho mode. If you turn polar tracking back on, AutoCAD turns Ortho mode off.

8. Continue with the Line command - picking points using Polar Tracking.

This completes Exercise 1.

Exercise 2 - Polar Tracking with Object Snaps

This exercise illustrates how Polar Tracking and Object Snaps work together.

1. Begin a new, empty drawing, or erase the objects you created in exercise 1.
2. Make sure your Polar angle settings, incremental angle is set to 45 degrees - see steps 5 and 6 in exercise 1.
3. Make sure Polar is ON.
4. Draw a horizontal line - length is unimportant.
5. Right-click on OSNAP on the status bar, then click Settings. Clear all object snap modes, except Intersection (only Intersection is checked). Click OK
6. Make sure Osnap is ON, if it's not click OSNAP on the status bar or press F3.
7. Start the Line command, pick a first point below the horizontal line, shown here in blue.

8. Move the cursor at about a 45 degree angle so that the rubber-band line crosses over the existing line.

   Notice how the tool-tip displays Polar: Intersection.

9. Pick the Intersection point with your left mouse button. Press Enter to complete the Line command.

This completes exercise 2.

Polar Snap

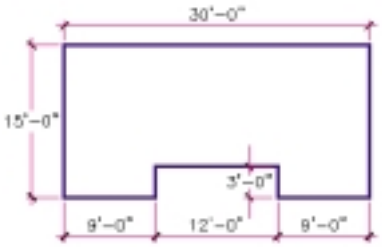
Snap is a feature that makes your cursor move across the screen in increments. Polar brings new usefulness to the Snap feature by displaying a distance/angle tool-tip. In addition, there are now three snap modes; rectangular, isometric and the new mode, polar.

Exercise 3 - Snap

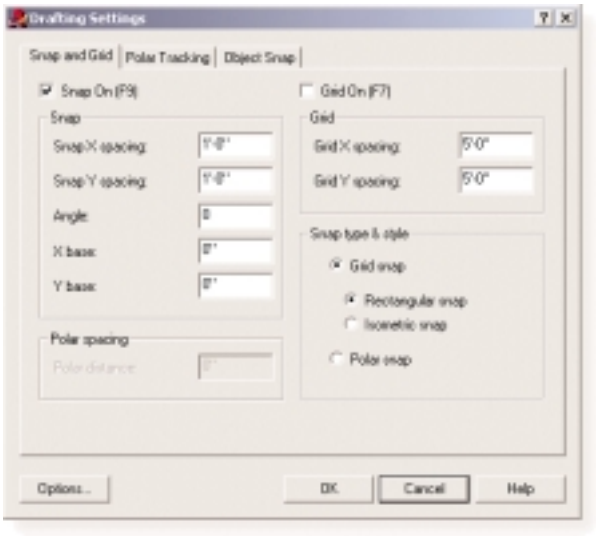
This exercise illustrates how snap and polar tool-tips work.

1. Open Chap03Ex03.dwg.
2. Make sure Polar and Snap are both ON (their buttons on the Status Bar should appear depressed).
3. Start the Polyline command - click Draw ➔ Polyline from the menu bar, or pick Polyline from the draw toolbar.
4. Pick an arbitrary start point on the screen, then drag the cursor to the right. If you're close to horizontal, you'll see a tool-tip similar to the one shown here, which displays distance and angle.

5. Pick a second point at 9'-0" < 0, then continue around using these dimensions. Complete and exit the Polyline command.



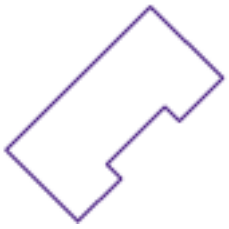
6. Right-click over Snap on the Status Bar, then click Settings.



7. Notice the Snap X & Y spacing are set to 1'. This explains why your cursor moved in 1' increments. Notice also that the Grid type and style is set to Rectangular.

8. Change the Snap type and style to Polar snap. Change the Polar spacing distance to 6", then click OK to exit Drafting Settings.
9. Start the Polyline command - click Draw ➔ Polyline from the menu bar, or pick Polyline from the draw toolbar.
10. Pick an arbitrary start point on the screen, then drag the cursor around that point. Notice how the cursor stops at each 6" increment - that's Snap working. Notice how the tool-tip displays a distance and angle - that's Polar working. Together, Snap and Polar makes it easy for you to draw certain shapes very quickly.

11. Pick a second point of the polyline at 9'-0" < 45 using your cursor.
12. Continue to draw the object shown in step 5, except with the entire shape rotated at 45 degrees - all by using your mouse - no keyboard entry allowed. Using Snap and Polar, it should go quickly.



This completes Exercise 3. Close Chap03Ex3.dwg, discard changes.

Object Snap Tracking

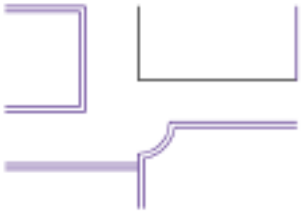
Using Object Snap Tracking, without ever having to touch the keyboard, you can more intuitively and efficiently create and accurately position new geometry based on existing drawing objects. A visual display of temporary construction lines enhances editing - a real timesaver since actual construction lines need never be drawn.

Exercise 4 - Object Snap Tracking

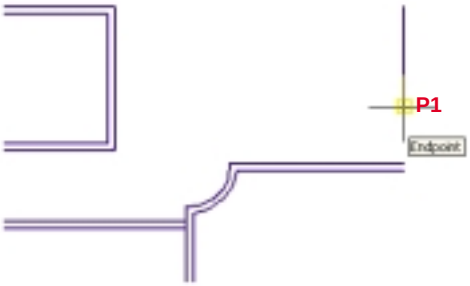
This exercise illustrates how Object Snap Tracking displays temporary construction lines based on existing geometry.

1. Open Chap03Ex04.dwg.
2. Make sure Polar, Osnap, and Otrack are ON (their buttons on the Status Bar are depressed).

Our goal in this exercise is to complete the drawing as shown here (the black lines), using object snap tracking.

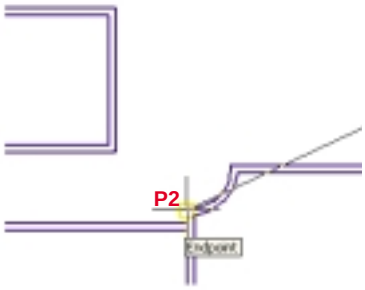


3. Start the Line command - click Draw ➔ Line from the menu bar, or pick Line from the draw toolbar.



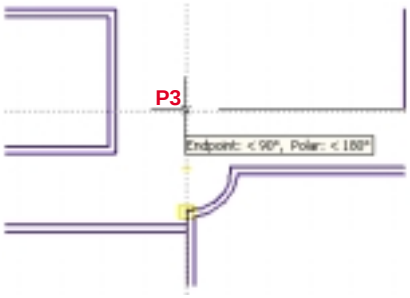
4. Begin the first line as shown above, using the endpoint object snap at the bottom of the existing vertical line (**P1**).

5. Position the cursor over the point shown in the example to the right (**P2**), but DO NOT PICK with the mouse button.



The Endpoint tool-tip should display, and as you hover the cursor over that point for several seconds, you should see a + appear as well. This + indicates that you have "acquired" that point for use with object snap tracking.

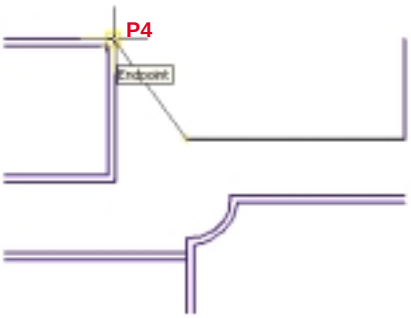
As you drag your mouse up, you'll see a dotted construction line which extends vertically from the acquired point.



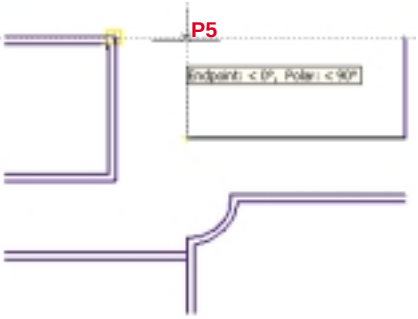
6. Position your mouse approximately at the point shown in the above example (**P3**). You should see a tool-tip that says Endpoint: < 90, Polar: < 180. This means that your mouse will snap to a point 90 degrees from the acquired endpoint (that's Object Snap Track working), and 180 degrees from the line start point (that's Polar working).

7. Pick point **P3** with your left mouse button. Your new horizontal line stops even with the vertical wall below.

8. "Acquire" the point at **P4** by hovering over the endpoint several seconds, then drag your cursor to the right. Again, you should see a temporary horizontal construction line - that's Object Snap Tracking doing its job.



9. As you move your mouse to the position shown here (**P5**), a tool-tip should display Endpoint: < 0, Polar: < 90. This indicates that your cursor is positioned at 0 degrees from the acquired endpoint (**P4**), and 90 degrees from the line start point (**P3**).



10. Pick the point at **P5**, then press Enter to exit the line command.

This completes exercise 4. Close Chap03Ex04.dwg, discard changes.

Exercise 5 - Snap

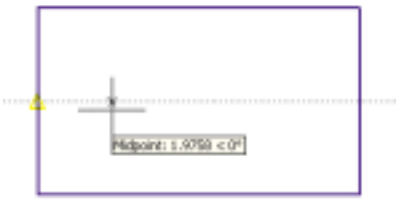
This exercise presents another Object Snap Tracking application - to draw a circle at the exact centroid of an existing rectangle.

1. Begin a new, empty drawing.
2. Draw a rectangle - click Draw ➔ Rectangle from the menu bar, or type REC<Enter>, then pick two corners to complete your rectangle; size is unimportant.
3. Right-click over Osnap on the Status Bar, then click Settings. Clear all object snaps except for Midpoint, then click OK.
4. Make sure Polar, Osnap and Otrack are ON (their buttons on the Status Bar are depressed).

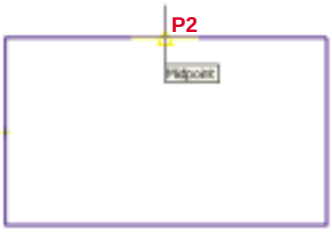
5. Start the circle command - type C<Enter> or click Circle from the Draw toolbar.

   We'll use Object Snap Tracking to locate the center of the circle at the centroid of the rectangle...

6. Position your cursor over the midpoint of the left vertical line of the rectangle (**P1**). After several seconds, a + will appear at the cursor, indicating that this point has been "acquired" for Object Snap Tracking.

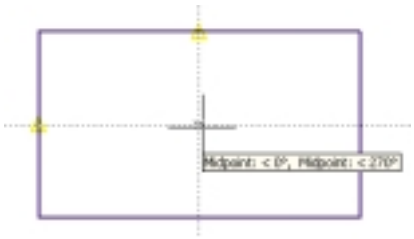


7. Move your cursor to the right, you'll see the horizontal temporary object snap, created by Object Snap Tracking and Polar.



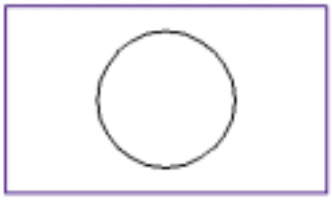
8. Position your cursor over the midpoint of the upper horizontal line of the rectangle (**P2**). After several seconds, a + will appear at the cursor.

   We have now acquired two tracking points; **P1** and **P2**.



9. Move your cursor near the centroid of the rectangle. A tool-tip should display Midpoint: < 0, Midpoint: <270, which means the cursor will snap to 0 degrees from **P1** and 270 degrees from **P2** - the centroid of the rectangle! Pick the center of the circle now, then drag and click an arbitrary radius point to complete the circle command.

   Your objects should look something like this example. If you want, use the distance command to verify that the circle is centered in the rectangle.



This completes exercise 4. Close your drawing, discard changes.

New Object Snaps

AutoCAD 2000 brings us two new object snap modes - extension and parallel. Extension causes a temporary extension line to display when you pass the cursor over the endpoint of objects. Parallel draws a vector parallel to another object whenever AutoCAD prompts you for the second point of a vector.

Exercise 6 - Extension and Parallel Object Snap

1. Open Chap03Ex06.dwg.

   The goal of this exercise is to complete the right leader line, making it parallel with the existing leader, using extension and parallel object snaps.

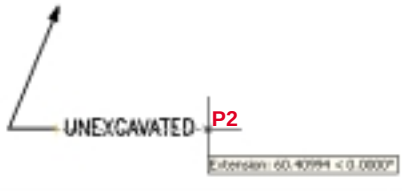
2. Right-click over Osnap on the Status Bar, then click Settings. Clear all object snaps except for Extension and Parallel, then click OK.

3. Make sure Polar and Osnap are ON (their buttons on the Status Bar are depressed).

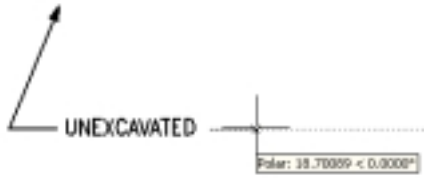
4. Start the line command - type L<Enter>, click Draw ➔ Line from the menu bar, or click Line from the Draw toolbar.

5. Position the cursor over the point shown here (**P1**). A tool-tip should display Extension: <etc>. As you move the cursor horizontally to the right, you'll see the

temporary construction line; that's the Extension object snap working.

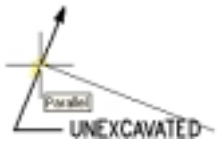


6. Position the cursor approximately as shown above (**P2**), then pick that point as the first point of the line.

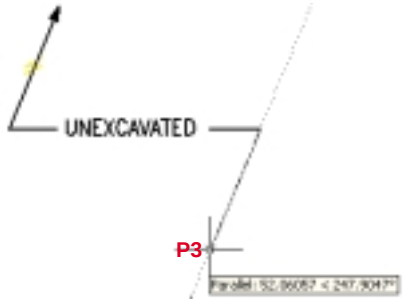


7. Move your cursor to the right, then press 20<Enter> on the keyboard. Since Polar was on, it maintained a zero degree angle - entering 20 on the keyboard caused a line of 20 units to be drawn. This completes the tag line of your new leader. It is exactly inline with the other leaders tag line.

To complete the leader, we'll use the Parallel object snap...



8. Position your cursor above the left, angled leader line until the Parallel tool-tip appears.



9. As you move the cursor down near **P3**, a tool-tip will display Parallel: [distance] < 247.9047. Notice how the Parallel Object Snap tracks your cursor along a path which is parallel to the existing leader line.

10. Pick a point at **P3**, approximately 50 units in length, then press Enter to complete the line command.

This completes exercise 6. Close Chap03Ex06.dwg, discard changes.

This completes Chapter 3.