

FactoryCAD Tutorial 2

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FactoryCAD Tutorial 2

This tutorial is intended to fulfill the following functions:

- Introduce FactoryCAD and its capabilities
- Train beginners in representative tasks
- Instruct beginners and users familiar with earlier versions in key features of FactoryCAD
- Provide quick look-up of representative step-by-step procedures or facts about FactoryCAD for casual users
- Elaborate on specific features of FactoryCAD directed toward factory layout design inside AutoCAD.
- Foster continued learning through familiarization with the online documentation.

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Overviews

The following overviews provide background information about essential elements of FactoryCAD.

Smart Factory Objects

Graphical objects, also known as entities, are the visible objects (lines, circles, raster images, and so forth) that make up a drawing. Each graphical object has methods that allow an application to perform most of the AutoCAD editing commands, such as Copy, Erase, Move, Mirror, and so forth. These objects also have methods for setting and retrieving extended data (xdata), highlighting and updating, and retrieving the bounding box of the object. Graphical objects have typical properties such as Layer, Linetype, Color, and Handle. They also have specific properties, depending on their object type, such as, Center, Radius, and Area.

—ActiveX Automation User’s Guide, AutoCAD help file

The Smart Factory Objects in the Factory programs bring unprecedented ease, accuracy, and speed to factory layout drafting. The Smart Factory Objects enable the user to rapidly draft and edit in 2D while simultaneously creating a sophisticated 3D model. The Smart Factory Objects are custom graphical objects.

Custom graphical objects are visible objects (e.g., conveyors, lift tables, guard rails) that are created and displayed according to information and rules that are added to the base AutoCAD package. Each custom graphical object has methods that allow an application to perform most of the AutoCAD editing commands, such as Copy, Erase, Move, and Mirror.

Custom graphical objects are typically much more complex than simple AutoCAD objects, but they are much smaller than the simple AutoCAD objects that would be required to represent the same visible objects. In addition, custom graphical objects behave according to set characteristics and rules. For example, when you stretch a guard rail, additional posts are automatically added at the specified intervals.

Connectors

Many of the Smart Factory Objects, or custom objects, developed for use with FactoryCAD and the other Factory programs include “connectors” at strategic points. For example, a hold table on a skid cross aisle transfer conveyor has a connector that can be used to automatically align and position perpendicularly a skid conveyor. When connections are joined, moving one of the connected objects moves all of them as a group.

Individual connectors can also be anchored so that connected objects cannot be moved until the anchors are removed.

Connectors can be added to custom objects, such as containers, that do not have default connectors.

Understanding the interface

FactoryCAD commands appear on pull-down menus, on toolbars, and on shortcut (right-click) menus for Smart Factory Objects. Some commands related to Smart Factory Objects appear only on toolbars and shortcut menus.

To display FactoryCAD toolbars

1. Start FactoryCAD within an AutoCAD session.
2. On the **Detail** menu, point to **FactoryCAD Toolbars**. A flyout menu listing available FactoryCAD toolbars appears.
3. Click the desired toolbar name.

The FactoryCAD tutorial introduces a number of industrial Smart Factory Objects. Generally, the text refers to the commands on the menu, but all the industrial objects are accessible through the industrial objects toolbar.

To display the Industrial_Objects toolbar

On the **Detail** menu, point to **FactoryCAD Toolbars**. A sub-menu appears. Select **FactoryCAD Industrial Objects**. A toolbar with the title **Industrial_Objects** appears.



Note: AutoCAD saves toolbar positions and configurations. If you do not immediately notice the toolbar, it may have been docked to an edge of the drawing screen, in which case its title is not displayed.

To display Smart Factory Objects shortcut menus

1. While in plan view, hold the cursor cross-hairs over a Smart Factory Object.
2. Click the right mouse button.

A pop-up menu appears containing a Factory item.

3. Click **Factory** or hold the cursor over **Factory**.

A sub-menu containing the Smart Factory Objects commands appears.

Many FactoryCAD routines include command-line prompts and options in addition to a dialog box. Be sure to check the command line for information and prompts while executing a FactoryCAD function.

Getting Help These tutorial procedures take you through a representative sample of FactoryCAD functionality. For more information on how to use any FactoryCAD feature, consult the online Help system.

To open the FactoryCAD online Help system

- On the **Factory** menu, point to **Factory Layout Software Help**. A sub-menu appears. Select **FactoryCAD Help**. The FactoryCAD online Help system appears.

-or-

- In a FactoryCAD dialog box with a help button, click **Help**. The FactoryCAD online Help system window appears, opened to a topic related to the dialog box.

Repeating the tutorial Backup copies of the files needed for both foot-inch and metric versions of the tutorial are copied to sub-folders of the \BAKTUTOR folder within the program installation folder. To repeat the tutorial with a fresh set of files, copy the appropriate version from ... \BAKTUTOR to the ... \TUTORIAL folder.

Setting up FactoryCAD FactoryCAD runs inside an open session of AutoCAD or Architectural Desktop. FactoryCAD is started by loading the Factory menu, and then selecting FactoryCAD from that menu. See the *Factory Programs Guide* for more information about installing and starting FactoryCAD.

Exercises

The tutorial exercises are brief and in some cases build upon one another. You should perform the exercises in the order they are presented.

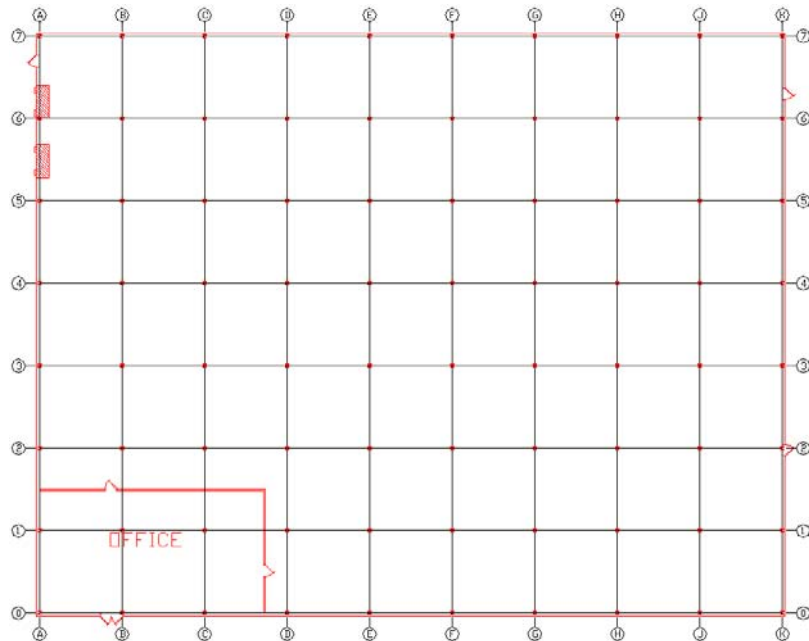
Opening the tutorial drawing

The first step in the tutorial is to open the drawing **FCAD TUTORIAL.dwg**. The drawing was copied to the TUTORIAL folder within the main installation folder during installation. The drawing contains a set of 2D walls with some doors.

Note: The walls and doors are simple entities. Because many FactoryCAD users use the wall and door custom objects of Architectural Desktop rather than the FactoryCAD routines for those items, this tutorial does not include creating walls and doors. See the FactoryCAD online Help system for a full discussion of walls and doors.

1. Start AutoCAD and open **FCAD TUTORIAL.dwg**.
2. Pull down the list of layers and notice that only layer 0 and two locked layers for the walls exist.
3. To start FactoryCAD, on the **Factory** menu, click **FactoryCAD**. The FactoryCAD program and its menu load.

Drawing a building grid



To create a building grid

1. On the **Arch** menu, select **Make Column Grid**. The **Columns** dialog box appears.

2. In **Default Column Spacing**, type 25'.
3. In **Default Row Spacing**, type 25'.
4. Click **Pick Corners**. The dialog box temporarily disappears and the command prompt displays

Specify first point:

Note: The exterior walls have been drawn so that grid spacing of 25' fits evenly inside the building. If in Steps 5 and 6 you accidentally select an outside corner, rather than an inside corner, simply cancel the command and start over.

5. Click the inside lower left corner of the building. The command prompt displays

Specify second point:

6. Click the inside upper right corner of the building.

If the spacing was set to other than 25' x 25', a message that grid spacing is uneven appears.

7. (If an uneven spacing message appears) Click **OK** to close the message.

The **Columns** dialog box appears again, and the grid coordinates you just selected appear in **Start Corner** and **Opposite Corner**.

8. Click **OK**. FactoryCAD draws the building grid.

Pull down the list of layers and notice that FactoryCAD automatically created new layers:

S-COL for the columns

S-GRD for the grid

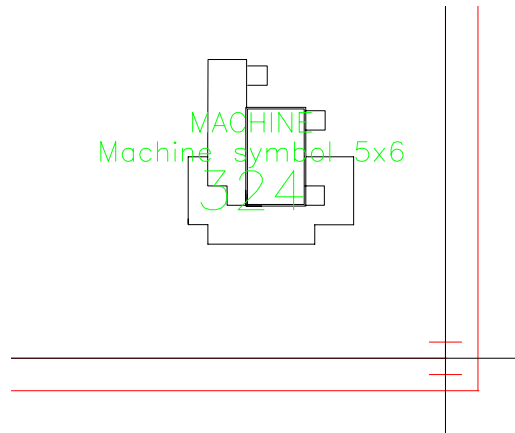
S-GRD-T for the text labels

As you go on with the tutorial, you do not need to change the grid, so click the padlock icons in the layer list now to lock S-COL, S-GRD, and S-GRD-T layers.

Note: If the layers were not created, FactoryCAD layer control is set to off. To turn on layer control, on the **Layer** menu point to **Layer Options** and then click **FactoryCAD Layer Control**. At the command line type **on** and then press **Enter**. At the prompt for phased layout layer control, type **off** and then press **Enter**.

Adding a machine from the block library

FactoryCAD's block manager enables easy, organized storage and retrieval of blocks. You can use the block manager now to get a machine for your tutorial layout drawing.

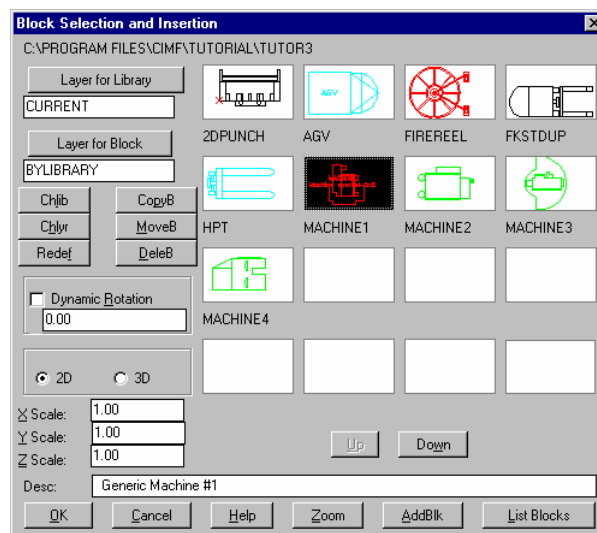


To insert a machine from the block library

1. On the **Block** menu, select **Block Manager**. The **Block Selection and Insertion** dialog box appears.

Note: When FactoryCAD is first installed, the library is automatically set to ...**TUTORIAL/TUTOR3**. If that library is not already selected, use **Chlib** to change to the **TUTOR3** library. For complete information on using the Block Manager, click **Help** in the **Block Selection and Insertion** dialog box to open the online Help system.

2. Click the **MACHINE1** icon. The icon highlights and its description appears in the **Desc** field.



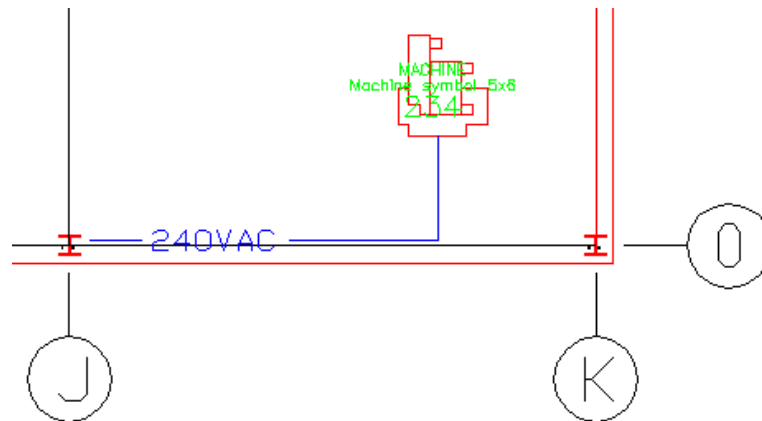
- Click **OK**. The dialog box closes and the command prompt displays
 Insertion point:
- Select a point in the lower right corner of the factory. After you select a point, an attribute dialog box appears.
- In **Asset Number** type a three- or four-digit number, and then click **OK**.

If you zoom up to the machine, you'll see that the asset number you entered appears on the machine, along with the machine description and type.

Tip: At this point you can pull down the list of layers and see that FactoryCAD has automatically created three new layers: MACH_DESC, MACH_NUM, and MACH_TYPE. The machine's text description, number, and type are on the respective layers. Thus, the text visibility can be controlled by freezing or thawing the corresponding layer.

Adding an electrical line

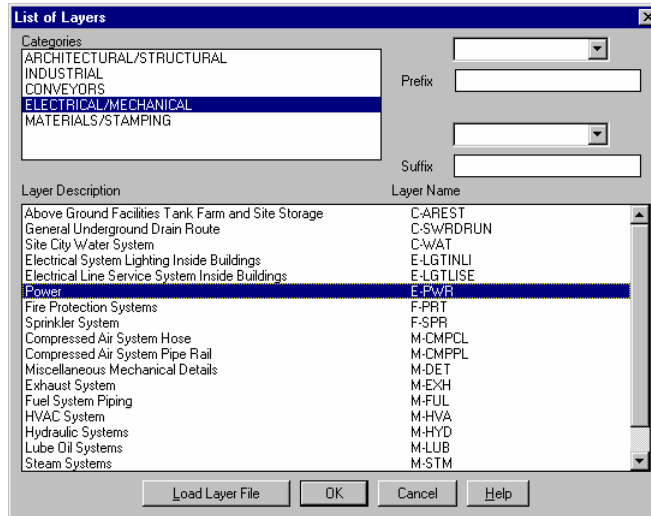
FactoryCAD's layers dialog box displays a list of standard layers and provides an easy means of adhering to drawing layer standards for items such as electrical utility lines. The dialog box can be displayed by selecting **Set Layer Dialog** from the **Layer** menu. You can also display the list just before running the respective command by selecting **Line**, **Polyline**, **Dynamic Text**, or **Multiline Text** from the **EI/Me**, **Arch**, **Ind**, or **Conv** menus.



To draw an electrical line on a standard layer

- If you are not already zoomed to the lower right corner of the building, zoom in now.
- On the **EI/Me** menu, select **Polyline**. The **List of Layers** dialog box appears. The **Electrical/Mechanical** category is already selected.

3. In the **Layer Description** list, select **Power**, and then click **OK**.



When you click **OK**, the current layer is set to **E-pwr** and the command prompt displays the first prompt for the AutoCAD **pline** command:

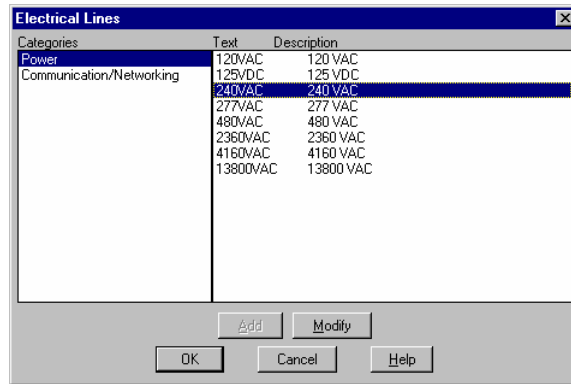
From point:

4. Select points to draw an electrical line from the machine to a location near building column J0.

You can easily label electrical and mechanical utility lines by selecting a label from a standard list.

To label an electrical line

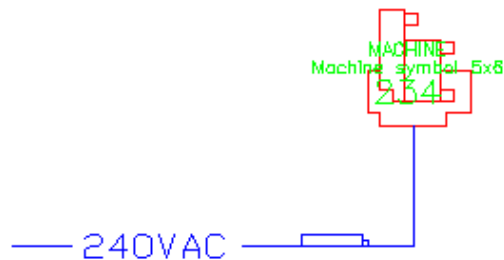
1. On the **EI/Me** menu, select **Electrical Lines**. The **Electrical Lines** dialog box appears.
2. In the **Categories** list, click **Power**. A list of predefined electrical lines appears.
3. Click **240VAC**. The 240VAC line highlights.



- Click **OK**. The dialog box closes, and the command prompt displays
Select line/polyline or (Draw pline/Change values/Rotate last/Undo last):
- Select a point near the middle of a relatively long segment of the electrical line you drew earlier. A text label is inserted into the line.
- Press **Enter** to end the command.

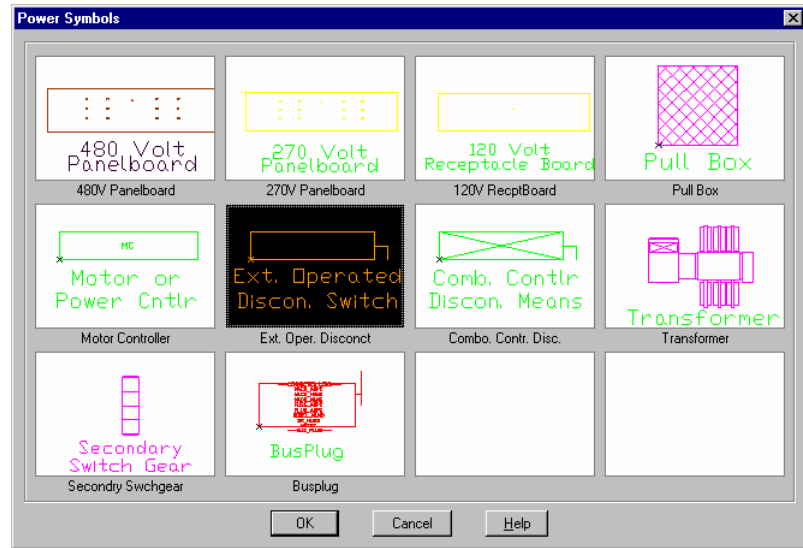
Adding a disconnect switch

Next, you can add a power disconnect switch symbol along the electrical power line you just drew.



To insert a disconnect switch

- On the **EI/Me** menu, point to **Electrical Symbols**. A fly-out menu appears.
- Click **Power**. The **Power Symbols** dialog box appears.
- Click the **Ext. Oper. Disconct** icon. The icon highlights.



4. Click **OK**. The command prompt displays

Insertion point:

5. Select a point along the 240VAC electrical line. The command prompt displays

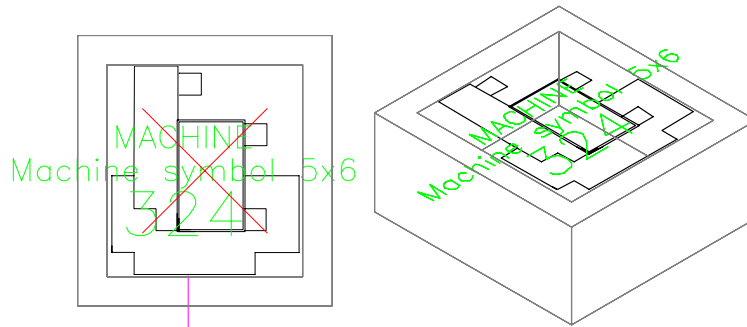
Rotation angle <0>:

6. Specify a rotation angle or simply press **Enter** to accept the default response.

Note: If you pull down the list of layers, you'll see that the layer **E-igtlise** has been created for the switch.

Adding a pit

Heavy machines can often require special reinforcement beneath them. One way to identify this architectural feature is to draw a pit, which might be filled with reinforced concrete, beneath the machine.



Pit is also available on the

To insert a pit object

1. From the **Arch** (Architectural) menu, select **Pit**. The **Pit** dialog box appears.
2. Click **Draw a rectangular pit**. The dialog box disappears and the command prompt displays

First inside corner:

3. Select a point for an inside corner of the pit. The command prompt then displays

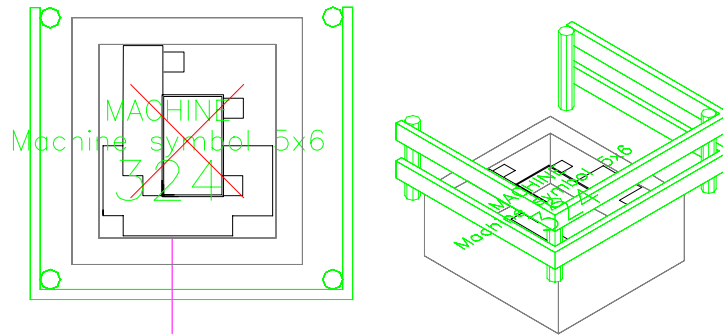
Other corner:

4. Select a point for the diagonally opposite inside corner of the pit. The **Pit** dialog box reappears.
5. Make sure that the **Show X** checkbox is marked, and then click **OK**. FactoryCAD draws the pit.

For more information about the pit object, consult the online Help system.

Adding a guardrail

You will often want a guardrail around pits or equipment. You can use the guardrail object to easily add a guardrail.



To add a guardrail

1. On the **Ind** menu, select **Guard Rail**. The **Guard Rail** dialog box appears.
2. Click **OK**. The dialog box closes and the command prompt displays

Pick first point:

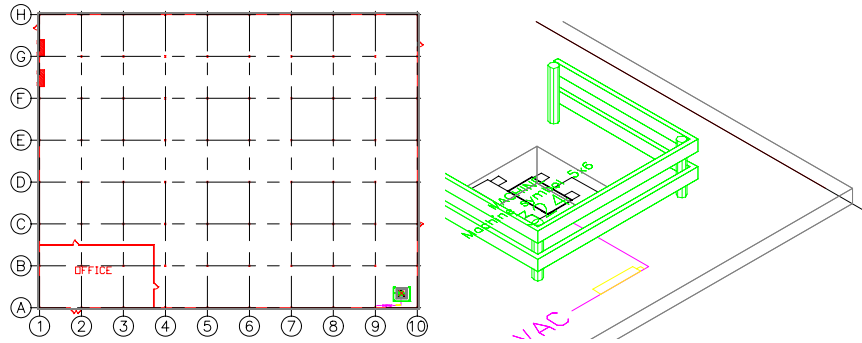
3. Select points to form the path along which you want a guardrail. When you have finished selecting points, press **Enter**. FactoryCAD draws the guardrail.



Guardrail is also available on the Industrial_Objects toolbar. Guardrail shares a toolbar location with the Handrail icon.

Drawing a floor object

A floor object represents the thickness of the floor, can contain pits, and provides a helpful frame of reference for rendered drawings.



To draw a floor object

1. Zoom so that the whole building is shown in plan view.
2. From the **Arch** (Architectural) menu, select **Floor**. The **Floors** dialog box appears.
3. Click **Draw Floor Boundary**. The **Floors** dialog box disappears and the command prompt displays

Select first point:

4. Select an outside corner of the building. The command prompt displays

Next point:

5. Select the next outside corner. The command prompt displays

Undo/<Next point>:

6. Select the next outside corner. Note that FactoryCAD automatically closes the boundary with a diagonal line to the first point. The command prompt displays

Close/ Perpendicular Close/Undo/<Next point>:

7. Select the last outside corner. The boundary line adjusts to form a complete perimeter of the building. The command prompt displays

Close/ Perpendicular Close/Undo/<Next point>:

8. Press **Enter** to signal that you have finished drawing the boundary. The **Floors** dialog box reappears.
9. Click **OK**. FactoryCAD creates the floor object.

Note: If you pull down the list of layers, you see that a new layer **Q-GENFLR** has been created for the floor. FactoryCAD automatically locks

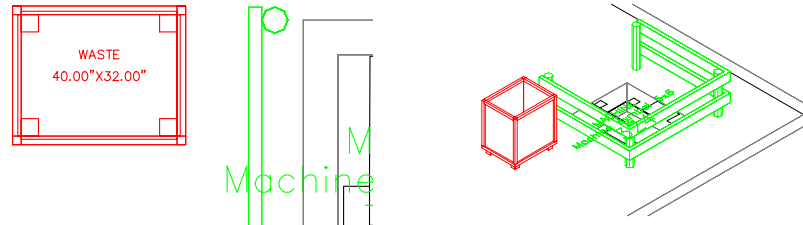


Floor is also available on the Arch toolbar.

the layer to prevent accidentally selecting and modifying the floor object. To modify a floor object, place the cursor over a floor line and right-click. Options for modifying the floor appear at the command prompt. See the online Help system for details.

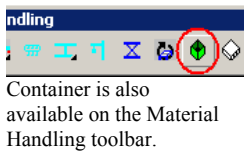
Adding a container

Containers are common objects in a factory, and FactoryCAD's container object easily models a variety of container types.



To add a container object

1. On the **Ind** (Industrial) menu, point to **Material Handling** objects and then select **Containers**. The **Containers** dialog box appears.



2. In the **Container Text** area at the bottom of the dialog box, type **WASTE** in the first box.

3. Click **OK**. The dialog box closes and the command prompt displays

<Specify base point for container>:

4. Select a point for the container location. The command prompt then displays

Rotation angle <0>:

5. To specify the rotation angle, drag the cursor and then click, or type a value and then press **Enter**. FactoryCAD inserts the container object.

To resize the container object using grips

1. Click the object. Blue grips appear at the corners.

2. Click a corner grip. The grip turns red.

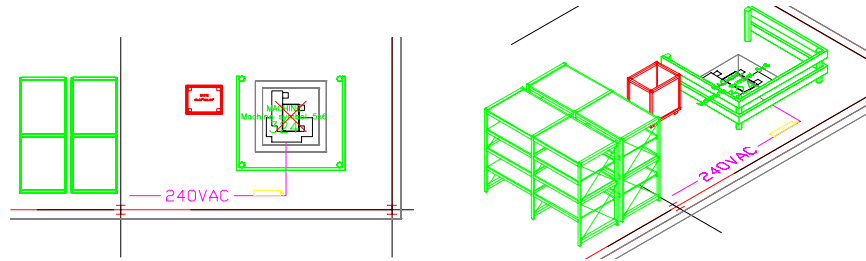
3. Drag the grip. Notice that a length and width legend appears at the top left of the drawing screen and is updated as you drag the grip.

4. When the grip is in the desired location, click. The container object and its dimension text update to the new size.

Note: The AutoCAD OSNAP setting must be turned off while resizing the container. SNAP may be turned on.

Adding a rack

Perhaps one of the most versatile Smart Factory Objects, the rack object not only models a variety of rack types, but has been creatively used to model roof trusses and other regularly repeating geometry.

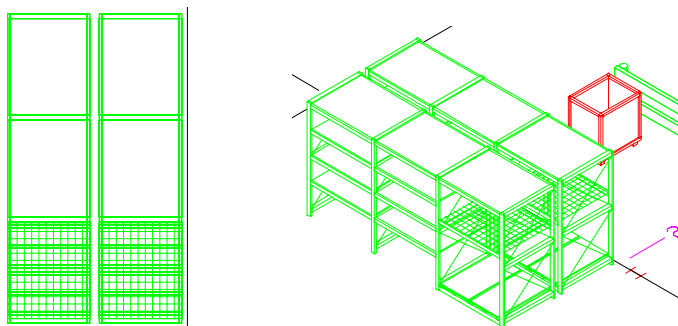


To insert a rack object

1. On the **Ind** (Industrial) menu, point to **Racks** and select **Detail Rack**. The **Racks** dialog box appears.
2. In the **Number of Bays Wide(NW)**, enter **2**.
3. In the **Bay Span(BS)** box, enter **60**.
4. Click **OK**. The dialog box closes and the command prompt displays
Specify insertion point >
5. Select a point near grid column A9. The command prompt displays
Specify rotation angle <0>:
6. Type **90**, and then press **Enter**. FactoryCAD inserts the rack object.

To add another bay using grips

1. Click the racks object. Grips appear.
2. Click a grip on the end of the rack. The grip turns red.
3. Drag the grip so it extends at least one bay width from the rack, and then click. FactoryCAD adds another bay to the rack.



2D and 3D views of rack with added bay, modified shelves in first bay




Racks is also available on the Material Handling toolbar.

Shelf heights can be adjusted for each individual bay using the **Bay Parameters** tab of the **Modify Racks Object** dialog box.

Note: You can right-click a smart factory object to display a menu that includes a **Modify** option. The **Modify** option displays an object's parameters dialog box. When the view angle is other than plan view, for some objects the shortcut menu is not accessible. Regardless of view angle, an object's dialog box can be displayed using the **Modify Object** button on the toolbar containing the object's creation icon.

To adjust individual bay parameters

1. On the **Industrial_Objects** toolbar, click the Modify Object icon . The command prompt displays

Select Factory Object to modify:

Note: See page 6 for a description of how to display FactoryCAD toolbars.

2. Click the rack object. The **Modify Rack Object** dialog box appears.
3. Click the **Bays Parameters** tab. The Bays Parameters page appears.
4. In the **Bay Number** box, select the bay you wish to modify.
5. Enter new settings for the selected bay.

Tip: Detailed instructions regarding the **Bays Parameters** tab are in the online Help system. Click **Help** in the dialog box to display the relevant topic.

6. Click **OK**. FactoryCAD makes the specified changes to the rack.

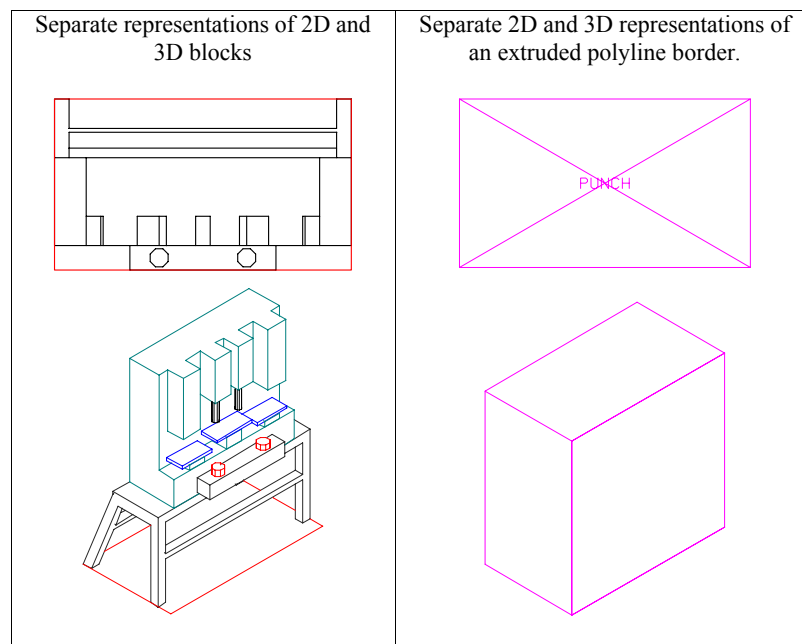
You can see the effect of shelf height settings by switching to a SW or other 3D view.

Creating a generic tool

You can use the **Generic Tool** object to automatically switch between different representations of an item, for example one representation when in plan view and another when in an isometric view. The representations are references to blocks.

The **Generic Tool** object's ability to reference blocks is valuable in several situations:

- When complex geometry is not needed and would slow down drawing response unnecessarily, the display of the referenced blocks can temporarily be disabled, and then restored later.
- When individual blocks are not available in detailed or final format at the time the layout drawing is being created, a placeholder generic tool object can be created and inserted. When new or updated tool geometry is later available, the generic tool can be modified to use that geometry.




Example 2D and 3D representations managed by a Generic Tool object

To create a generic tool

1. On the **Layers** menu, select **Set Layer Dialog**. The **List of Layers** dialog box appears.
2. In the **Categories** list, select **Industrial**. The **Layer Description** list shows a list of standard industrial layers.
3. Scroll to the bottom of the **Layer Description** list and select **Process operations/stations**.

Note: If your FactoryCAD is configured to use other than the default generic layer standards file, your list may be different. In that case, select an appropriate layer name.

4. Click **OK**.
5. On the **Industrial_Objects** toolbar, click the Generic Tool icon . The **Generic Tool** dialog box appears.
6. In the **Tool Name** box, type **Punch**.
7. Click **Top File**. The **2D Top View Block Name** file selection dialog box appears.
8. Look in the ...**Tutorial\Tutor3** folder.
9. Select **2DPUNCH.DWG**, and then click **Open**. The file selection dialog box closes and the file name 2DPUNCH appears in the **Generic Tool** dialog box.
10. Click **3D File**. The **3D Block Name** file selection dialog box appears.
11. Double-click the file **3DPUNCH.dwg**. The file selection dialog box closes and the file name 3DPUNCH appears in the **Generic Tool** dialog box.
12. Click the checkboxes for **3D Block Name** and **Top View** so that they contain a ✓.

Notice that the default **Rectangle Length** and **Rectangle Width** values are 1'.

13. Click **OK**. The dialog box closes and the command prompt displays
Specify insertion point
14. Select a location and then a rotation angle for the tool. FactoryCAD inserts the generic tool object.

At the time of insertion, FactoryCAD determines the smallest rectangular boundary that will enclose the block, and draws that rectangle around the 2D block.

To substitute an extruded polyline for referenced blocks

1. Right-click the punch generic tool object. A menu appears.
2. Select **Modify**. The **Generic Tool** dialog box appears.

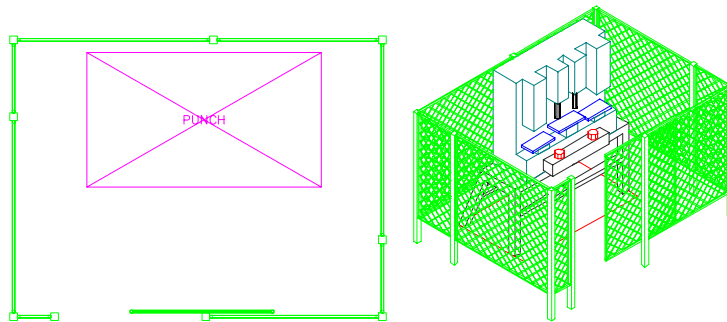
1. Click the checkboxes for **2D Block Name** and **3D Block Name** so that they are empty.

Notice that the **Rectangle Length** and **Rectangle Width** values have been adjusted.

2. In **Extrusion Depth**, type 60.
3. Click **OK**. The dialog box closes and the punch generic tool object now appears using a representation of the extruded polyline border, rather than the referenced blocks.

Adding a safety fence

Safety fence around tools is a common requirement. You can use the safety fence object to easily create a range of safety fence configurations, including a variety of door options.



To create a safety fence

1. On the **Ind** (Industrial) menu, point to **Safety Fence**. A sub-menu appears.
2. Select **Safety Fence...** The **Safety Fence** dialog box appears.
3. Click **OK**. The dialog box closes and at the command line a prompt for the first point appears.
4. Select points to form a path along which you want a safety fence. When you have finished selecting points, press **Enter**. FactoryCAD draws the safety fence.

To add a door to a safety fence

1. Move the cross-hairs over the safety fence and right-click. The **safety fence** shortcut menu appears.

Note: If snap is on and your snap settings are such that the cursor cross-hairs do not actually line up over safety fence geometry, the **safety fence** shortcut menu does not appear. In that case, turn snap off temporarily.

2. Select **Add Door**. The **Safety Fence Door** dialog box appears.
3. From the **Style** drop-down list, select **Sliding Door**.
4. Click **OK**. The dialog box closes and the command prompt displays

Select safety fence and location:

5. Select a point on the safety fence. A door symbol appears on the selected safety fence.
6. Drag the door symbol around the fence until it is in a position you want, then click. FactoryCAD draws the door.

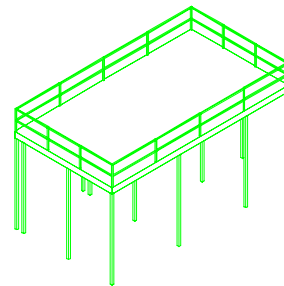
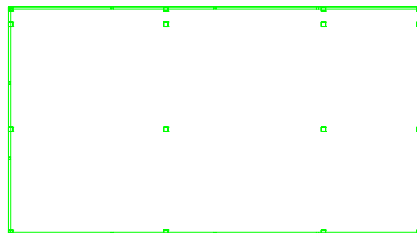
The side of the safety fence on which the sliding door is initially inserted depends on which direction you went when you drew the safety fence. The side can easily be changed using grips.

To change the fence side of a sliding safety fence door


1. Click the door. Three grips appear along the door opening and one along the door.
2. Click the grip along the door. The grip turns red.
3. Drag the pointer to the other side of the safety fence, and then release the mouse button. FactoryCAD moves the door to the other side of the fence.

Adding a mezzanine

FactoryCAD's mezzanine object can model an infinite variety of mezzanine constructions. You can use the following steps to create a rectangular mezzanine.



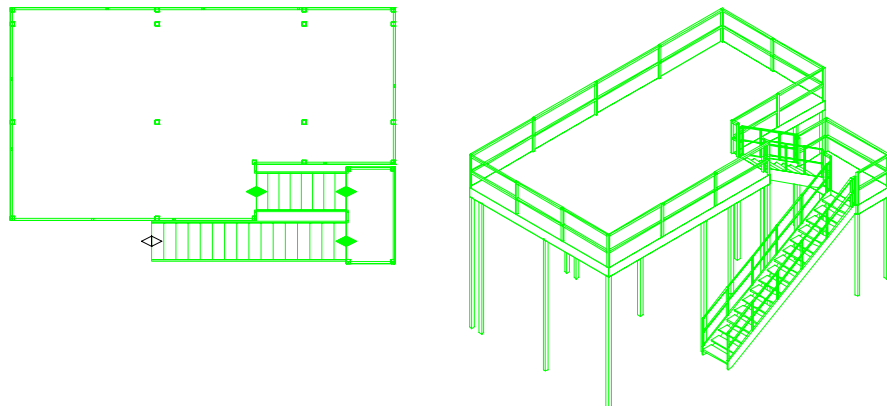
To insert a rectangular mezzanine

1. Zoom to display a plan view of the area in which you want to insert the mezzanine.
2. On the **Industrial_Objects** toolbar, click the mezzanine icon . The **Mezzanine** dialog box appears.
3. In the **Mezzanine Outline** area, select **Draw New Rectangle**.
4. Click **OK**. The dialog box closes and at the command line a prompt for the first point appears.
5. Select a location for the first corner of the mezzanine. At the command line a prompt for the next point appears.
6. Select the diagonally opposite corner of the mezzanine. FactoryCAD draws the mezzanine.

Modifying a mezzanine

Mezzanines are highly customizable, ready for you to add stairs, ramps, and ladders; create holes; join with other mezzanines; create gaps in railing; cut out sections; and more.

The following mezzanine example has a section cut out to make room for stairs. Similar mezzanine shapes could have been achieved by adding a second mezzanine object, then joining the two mezzanines into one object.



To find a description of how to cut out a section of a mezzanine

1. Start the FactoryCAD online Help system in one of these ways:
 - On the **Factory** menu, point to **Factory Layout Software Help**. A sub-menu appears. Select **FactoryCAD**. The FactoryCAD online Help system appears.

-or-

- In a FactoryCAD dialog box with a help button, such as the **Mezzanine** dialog box, click **Help**. The FactoryCAD online Help system window appears, opened to a topic related to the dialog box.
2. In the navigation pane at the left of the Help window, click **Search**. The Search tab appears.
 3. In the **Type in the keyword to find** box, type **mezzanine**.
 4. Click **List Topics**. A list of topics containing the word mezzanine appears in the **Select topic** area.
 5. In the list of topics, double-click **Cutting a mezzanine section**. The topic **Cutting sections from a mezzanine or platform** appears.

Note: You could also find the topic in the table of contents at **Adding objects > Adding industrial objects > Mezzanines and platforms > Cutting holes in decks**.

To add stairs to a mezzanine

1. Select a mezzanine object and then right-click. The mezzanine shortcut menu appears.
2. On the shortcut menu, point to **Factory** and then select **Add Stairs**. The **Stairway** dialog box appears.
3. Click **OK**. The dialog box closes and a stair icon appears at the crosshairs. At the command line a prompt for the insertion point appears.
4. Move the stairs into position along the mezzanine. As long as you stay near the mezzanine edge, the stairs snap to the edge of the mezzanine.
5. When the stairs are in position, click the left mouse button. FactoryCAD draws the stairs.

Note: The stairs object will not draw stairs that exceed the maximum change in elevation allowed by OSHA for a single flight of stairs. If a greater change in elevation is needed, add a landing at the end of the stairs object, and then add another set of stairs.

To add a landing to a stairs object

1. In plan view, move the pointer over a stairs object and right-click. The stairs shortcut menu appears.

2. Select **Add Landing**. A landing object appears at the pointer location.
3. Move the landing into position at the foot of the stairs. When you are near the connector at the end of a stairs object, the landing snaps into place.
4. When the landing is in position, click the left mouse button. FactoryCAD draws the landing.

To add stairs to a landing

Follow the same procedure as for adding stairs to a mezzanine. Note that you can have FactoryCAD automatically adjust the stairs to meet a specific height by entering a value in **Ending Elevation** of the stairway dialog box.

Appendix A — Movie files

The following movie files are available from the Factory file download area of the GTAC support site, <http://support.plms-eds.com>.

- auto_conv_1.avi** Shows the use of Smart Factory Objects to construct and modify an automotive floor conveyor system. In a 2D top view, a skid conveyor is inserted, a cross aisle transfer and lift table are snapped on, and another skid is added. Switches to 3D view, drags a grip to lengthen the last skid, drags another grip to simultaneously shorten the cross aisle transfer conveyor and move the connected skid conveyor.
- belt conveyor.avi** Shows simultaneous 2D and 3D views as a belt conveyor section is inserted, and then lengthened using a grip. Drive side is changed using the shortcut menu and object dialog box. A new section is added using the shortcut menu and object dialog box. The conveyors are rendered.
- bridge_crane.avi** Shows simultaneous 2D and 3D views as a two-rail bridge crane system is created between building columns. The crane is dropped into the drawing and modified using grip points. The shortcut menu and object dialog box are used to switch the crane from below the rails to above the rails.
- buff_calc3.avi** Shows selection of generic tools and connecting floor conveyors, then shows the use of the Production Throughput Optimization Calculator to compute required buffer size, buffer allocation, and throughput.
- cabinets.avi.** Shows simultaneous top and front views as a cabinet is inserted and modified. Grips are used to stretch the cabinet width and automatically add doors. The shortcut menu and object dialog box are used to change the cabinet height and alternate the door swing. The front view is changed to a SW view to show the 3D appearance of the cabinet.
- container.avi** Shows simultaneous 2D and 3D views as a series of containers are inserted and modified. Solid wall, mesh, and no wall containers are inserted. A tote with different dimensions and elevation is inserted. Containers are repositioned and resized using grips.
- convanim.avi** Shows construction of an overhead power and free conveyor, including modification to add a vertical curve section, followed by animation of a carrier and load along the track.
- CostEst0006.avi** Shows simultaneous 2D and 3D views of modification of a mezzanine/platform, addition of a guard rail, then cost estimation: extracts information, compiles estimate, looks at computed costs.

CostEst0009.avi	Similar to CostEst0006.avi except final phase is a little shorter.
GMdemo_short_7Mg.avi	Simultaneous fly-through and animation of rendered layout with engines on roller package conveyor. Created in VisMockUp.
grc.avi	Shows simultaneous 2D and 3D views as a gravity roller conveyor straight section is dropped in, then lengthened using grips. Note the automatic addition of standard length sections. Adds a curve section using the shortcut menu and object dialog box. Adds a new straight section with Wheel Rollers option; renders the conveyors to show render view.
guardrail.avi	Shows simultaneous 2D and 3D views of the creation of a guard rail, modifies the length by dragging a grip, modifies rail type (2 rails to 3 rails) using the shortcut menu and object dialog box.
jib_crane.avi	Shows simultaneous 2D and 3D views of creation of jib crane, modification of jib length and swing arc by dragging a grip.
mezzanine.avi	Shows 2D creation of a rectangular mezzanine, cutting out a section, and addition of stairs. Switches to 3D view, adds landing and stairs. Modifies bottom stairs to extend to floor level.
overhead.avi	Shows simultaneous 2D and 3D views of the creation of an overhead power and free conveyor, including vertical curve and addition of bias bank section.
platform.avi	Shows 2D creation of dual-sided platform and modification of one side using grips. Switches to 3D view, uses the shortcut menu and object dialog box to show railing. Note that by design, the inside platform edge does not have a railing.
racks.avi	Shows simultaneous top and front views as a rack is created. Shows modification of shelf height in one bay of a rack using the shortcut menu and object dialog box. Switches front view to SW view to show 3D rack.
safety_fence.avi	Shows simultaneous 2D and 3D views of creation of safety fence around a tool. Modifies fence using grips. Uses shortcut menu and door dialog box to add a door. Uses shortcut menu and object dialog box to change the fence pattern.
vblr conveyor.avi	Shows simultaneous 2D and 3D views of the creation of v-belt live roller conveyor sections. Initial straight segment length is modified using grips. Display of a motor is added using the shortcut menu and object dialog box. A new curved segment is added using the shortcut menu and object dialog box. The curve section is dragged to a new location, and a new straight section is automatically added to lengthen the system accordingly. The views are then rendered.

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