Lines

user guide

Contents

Introduction

Lines is a simple 2D drawing app with features suitable for scale drawing and computer-aided design.

Various drawing sizes are available up to A4 and drawings can be organised on up to 10 layers. There is a range of drawing tools, including dimensions. Drawing elements can be combined into sets, and images can be included in drawings. The app uses scalable vector graphics (SVG) and can output files suitable for printing.

Lines is a progressive web app (PWA) and in addition to running online as a web app it can be installed on a computer or tablet. All data remains on the device though drawings can be saved in your cloud account such as Google Drive.

BOX 13 x 20 mm 0 ° ≡ 0123

PV array

solar meter & inverter

switch

12 11 10 9 8 7   6 5

gene
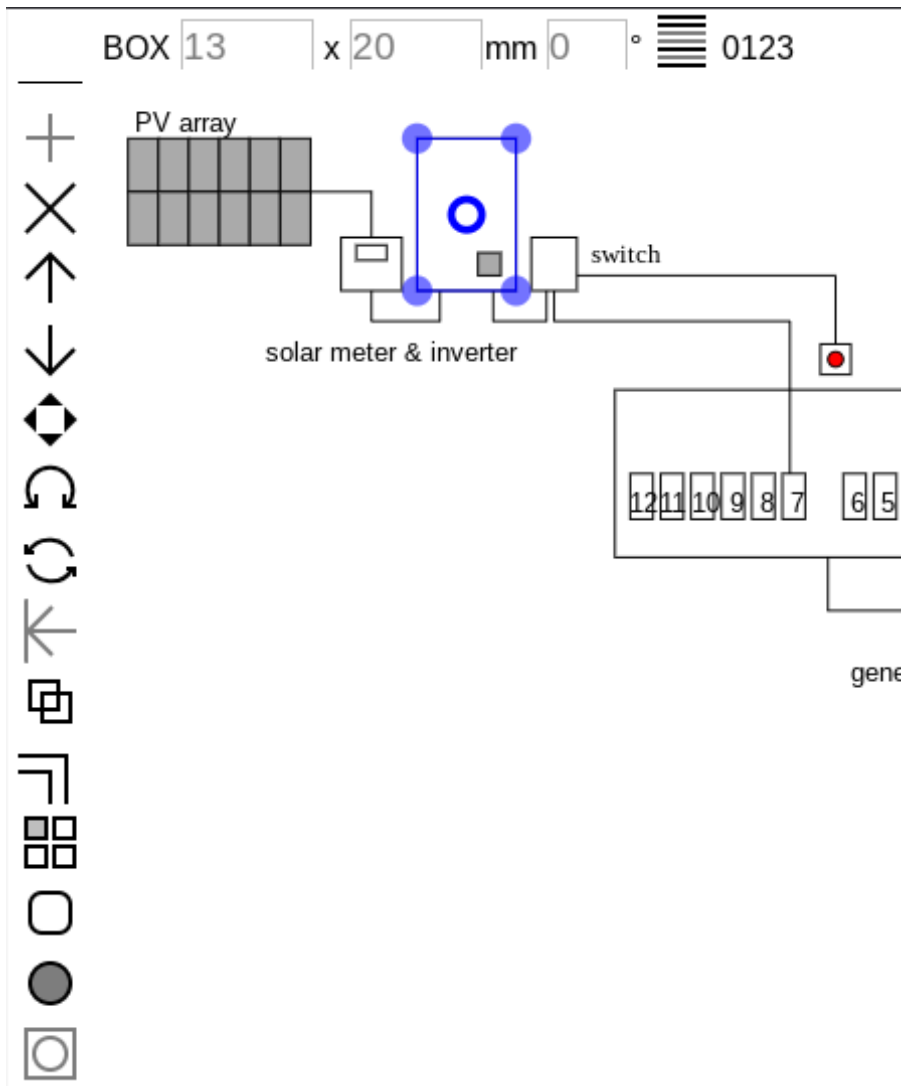
This is the screen layout, seen here in edit mode with a box element selected. On the left is the toolbox, in this case showing the edit tools. Tools in grey are disabled as they do not apply in the context shown. Across the top of the screen, from the left, are shown the style, dimensions and layer(s) of the selected element.

When no drawing elements are selected, the drawing toolbox is shown. This includes viewing and other controls as well as the actual drawing tools. All the tools are described in the following pages but as an introduction, they are (from the top)...

The **style** control above the **layers** control, the **document** manager, then the view controls... **zoom in**, **zoom out**, **base zoom** and the **pan** control, followed by the drawing tools... free-form **curves** then **lines** and shapes, the **box** tool for drawing rectangles and squares, the **oval** tool for circles and ellipses, then tools to draw **arcs**, **text** and **dimensions**, and finally... the **set** tool - adds sets of elements - and the **image** tool - to add images to a drawing

The edit toolbox also has the style control but below it are tools to **add** or **delete** segments, nodes or elements, to move elements **forward** or **back** in the view, to **move** elements around, **spin** them, **flip** them, **align** multiple elements, **copy** elements singly, **double** in parallel or **repeat** in a multiple array, and tools to **fillet** corners, to add an **anchor** or reference point, and to **join** multiple elements into a set

Drawing tools and controls

The **document manager** control opens a dialog with details of the current drawing - its size and aspect (landscape or portrait) and its scale. Grids of various sizes can be used if needed as a drawing aid. Three buttons are available: NEW, LOAD and SAVE.

Before drawing you create a blank drawing, choosing the size (from 15x10cm to A4), the orientation (landscape or portrait) and the scale (from 1:1 to 1:100) then tapping **NEW DRAWING.**

Anything already on the screen will be removed so you might want to **SAVE** your work first. Drawings can be saved as data in JSON format or as scalable SVG images suitable for printing. You can also save any sets of elements you have defined, or, by choosing several sets, save a set of sets. When you save the SAVE button you can choose where to save the file and what to call it. You might want to have a 'Lines' folder with sub-folders for drawings, sets and images.

The **LAYERS** control shows the number of the current drawing layer. Tapping it opens the LAYERS dialog.

LAYERS

○	0	initial ☑
◉	1	stage 1 ☑
○	2	stage 2 ☑
○	3	stage 3 ☑
○	4	☐
○	5	☐
○	6	☐
○	7	☐
○	8	☐
○	9	☐

Drawings can be organised on up to 10 layers. The default layer is layer 0. Use as many layers as the drawing requires - just one will often suffice.

You can name layers, choose the current layer and which layers are visible.
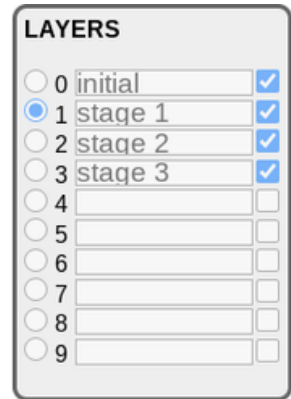
Elements can appear on one or several layers, allowing economy and flexibility in drawing organisation.

The view controls allow you to **zoom in**, **zoom out**, **pan** across the drawing, or return to the **default** view and zoom level. Zooming in and out doubles or halves the apparent size of drawing elements.

The **Curve** tool draws smooth free-form curves. It is the first of the drawing tools. Press at the start and drag along the curve you want to draw then release. As you draw, blue lines will follow your movements and when you release a smooth curve will be drawn along the same path.

*Whether you are drawing with a mouse, a trackpad, a stylus or just your finger, **tap** signifies pressing and releasing the mouse button or tapping the screen or trackpad; **press** mean touching the screen or pressing the mouse button, while **dragging** is moving the pointing device while still touching the screen or touchpad or holding the mouse button, and **release** signifies raising your stylus or finger from the screen, trackpad or mouse button.*

The **Lines and shapes** tool is for drawing single or multiple lines or closed polygonal shapes. Press at the start, drag and release then either double tap to complete a single line, or press and drag again to draw a second segment. Double tap to complete the line(s) or release on the start point to draw a closed shape.

You will notice, when drawing, that it is easy to 'snap' to nodes of elements and to align to them horizontally or vertically.

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□

The **Box** tool is for drawing squares and rectangles. Tap at the start corner, drag to the opposite corner, and release. It is easy to draw a square box as you can 'snap' to equal side lengths.

As you are drawing the box, its size will be shown at the top of the screen, so you can ensure it is the required dimensions.

○

The **Oval** tool is for drawing circles and ellipses. Press at the centre point and drag to size and shape the oval. As with boxes, it is easy to snap to equal radii for a circle.

When you draw a new element it will take the current style - line width and colour, fill colour, etc. There is more about styles later on.

The **Arc** drawing tool is a little more complicated. More often than not you will want an arc to start at a particular point, such as the end of a line. Press at the start point then drag in the direction of the centre of the arc's curve and release. This sets the start and centre points and you will see a line representing the arc's radius between the two with two arrows at the start end. Press and drag from the start in the direction of the arc and release at the end point and the arc will be drawn.

A

The **text** tool allows text items - captions, labels and notes - to be added to drawings. Tap where you want the text to start, type into the dialog box, tap the TEXT button, and the text will appear on the drawing.

The ENTER key will add a line break, allowing multi-line text.
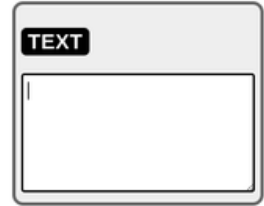
The **dimension** tool adds dimensions to drawing elements. Dimensions are associative - linked to elements - so that if you change the size of the element, a linked dimension will change to suit. First tap the start node, such as a box corner, then the end node. A dimension line is drawn between the two: drag it to where you want it.

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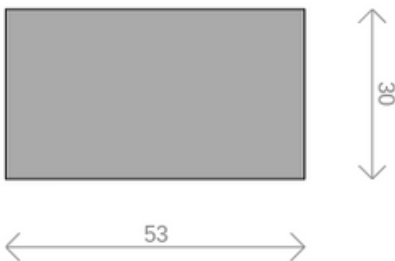
This tool is used to place a **set** in the drawing. Sets incorporate a number of drawing elements along with an anchor point into a unit - a named set.

Choose a set from the drop-down list and tap where you want it to go. The set's anchor point will be placed where you tap.

SETS

select a set ▾

🖼

Placing an **image** is similar to placing a set. Choose an image then tap on the drawing where you want the top-left corner of the image to be placed.

IMAGES

select an image ▾

Both sets and images are added to the selection available in the drawing using the LOAD option in the document control (page 6). Images must be imported from files on your device while sets are defined within the app and can be saved (as JSON files) to your device.

Styles

The **styles** dialog appears when you tap on the style control at the top-left. It is used to set the current style preferences and to set the style of a selected element. The style options are as follows.
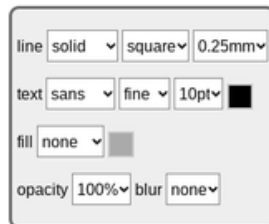
lines can be *solid* (ie. continuous), *dashed* or *dotted,* or can be *none* for filled elements with no outline. Where lines meet the corners can be *square* or *round*, and available line widths are from 0.25 to 2mm.

text can be *sans, serif*, *mono* or *cursive* and *fine, bold* or *italic* in sizes from 7pt to 28pt. The colour block next to the text size indicates the colour used for both lines and text - see below.

fill can apply to drawing elements like shapes, boxes and ovals. The options are *none* (no fill)*, solid* or *pattern*. The colour block shows the colour used for solid or pattern fills - chosen from the colour palette below. If you choose 'pattern' you can select from 15 options...
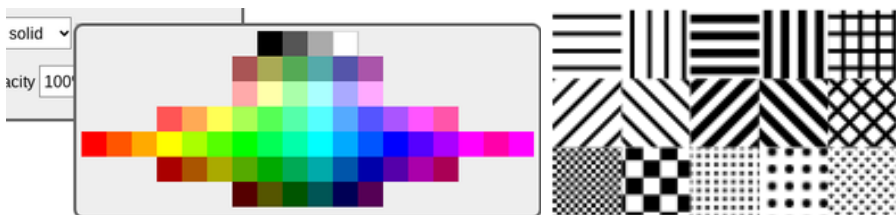

Finally, you can set the **opacity** - from 100% down to 25% - and even apply **blur** (up to 75%).
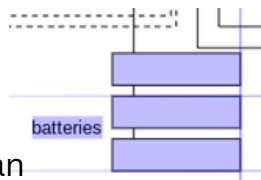
Selecting

Before looking at the editing tools, let's look at selecting drawing elements. Once you have drawn something you can just tap on it to select it. The selected element will be identified by blue lines or a blue box with selection handles. The handles are of two types: open **circles** indicate **mover** handles while **discs** are **sizer** handles.

Selecting a box element, for example, draws a blue box with a mover handle in the centre and a sizer at each corner. You can drag the box around using the mover or resize it with any of the sizers.
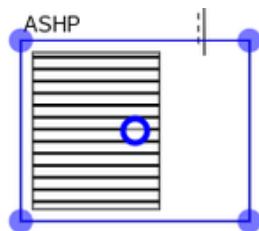
The box dimensions will appear at the top of the screen as well as the layers it will appear on, and you can adjust these values to change its size or change its layer(s).

If you tap a second (or a third or fourth) element these will be selected too, but the highlighting changes to shaded blue boxes for each selected elements. You can drag these as a group to a new location.

Finally, you can select one or more elements by dragging a selection box to select any element(s) within the box.

Once you make a selection, the drawing tools on the left of the screen will be replaced by the editing tools. Not all of them will be usable - some will be drawn grey and disabled as some tools can only be used with single selections while others only apply to multiple selections.

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Editing tools

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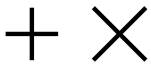
The **add** and **delete** tools are used to add or delete nodes or whole drawing elements. The **add** tool is used to add nodes to line, shape or curve elements. Tap on a node (one of the handles) and a new node will be added after it. You can then drag the new node to a new location. There are more options for the **delete** tool...

 If you select lines or a shape you can either tap on a *sizer* handle to delete that node or on the *mover* handle to delete the whole element. With other element types you just tap **DELETE** to confirm.

*Take care! While some edit operations can be reversed using the **undo** tool, you don't have this option with delete.* ↺

↑ ↓
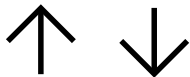
The up and down arrow tools are **forward** and **back**. They are used to adjust the drawing order for drawing elements. The first elements drawn on screen may be obscured by following elements which overlap them. **Forward** (up arrow) brings the selected element towards the top - later in the drawing sequence - while **back** has the opposite effect - pushing a selected element down and earlier in the sequence.

The **move** tool is for moving selected element(s) by a controlled amount. In the dialog, enter distances to move right and down (or left and up for negative distances) then tap **MOVE**. Alternatively, elements may be moved by a distance in a direction - measured clockwise from 'north'.


This is one of the editing tools you can reverse if you change your mind. When you make the move the undo tool will appear at the top left and you can undo the move.

The **spin** tool will rotate a selected element by a given number of degrees. Enter a spin angle and tap **MOVE**. The spin will usually be around the *mover* handle (such as the centre of a box or oval) but can be about another point, defined by an *anchor* - more about this in a few pages.

The little button with the diagonal line is a quick way to blank input fields in a dialog.

Rotated elements have the spin angle shown at the top of the screen but the selection box is not rotated, allowing easier resizing.


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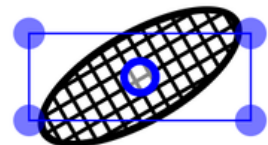
The **flip** tool is for flipping selected objects either vertically or horizontally. As with spin, they are normally flipped around the *mover* handle, but can be flipped around an *anchor*. Just tap on one of the two buttons to flip an element side to side or top to bottom.

The **align** tool is available if more than one element is selected and allows them to be aligned horizontally, by their left or right edges or their centres, or vertically by their top or bottom edges or centres. Just tap one of the six buttons.
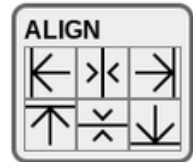
Copy is the first of three tools allowing elements to be repeated. It is also the simplest - just select an element and tap **copy**. You will not see an immediate difference because the copy will be in the same location as the original, but then you can drag it to where you want it.

The second way to repeat elements is using the **double** tool. This creates a copy parallel to the selected element. Enter an offset distance in the dialog box and tap **DOUBLE**.

For elements like lines, a positive offset gives a copy to the right, drawn from its start point, while for a box or oval it will be outside. Negative values copy to the left or inside the original.

DOUBLE ☑

5 ⬍ mm right/outside

negative offsets are left/inside
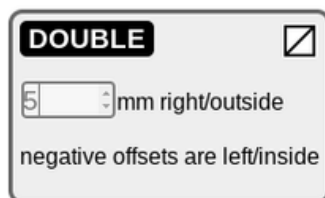
Repeat only works with single selections, but can produce a lot of copies! You can produce a number of repeats in a row, a column, or both, forming a grid.

Enter the number you want (including the element you are copying) and the offset, horizontally, vertically or both. Negative offsets copy to the left or above.

In this case the result would be a square of four elements with the original one at the bottom left.

REPEAT ☑

2 @ 50 ⬍ mm →

2 @ -50 mm ↓

◻
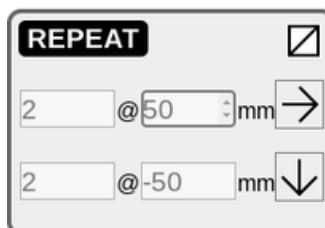
The **fillet** tool only applies to boxes - squares and rectangles -and simply rounds off their corners. Enter a radius and tap **FILLET**.

FILLET

radius: 2 ⌄ mm

⬤

This tool adds an **anchor**. Rather than acting directly on a selection, it is used in conjunction with other edit tools. Anchors are like temporary elements but they never form part of a drawing. With one or more elements selected, tap the **anchor** tool then where you want to place it. Typical locations might be the corner of a box, the centre of a circle or the end of a line.

Anchors can be used as the centre of *spin* or to mark an axis to *flip* elements, or they can be used with the following tool to mark and anchor point for a *set*.

◻

The **join** tool symbol appears in both the drawing and the edit toolboxes. As a drawing tool it is used to place a predefined *set*, but here, it is used to combine or **join** a number of selected elements to define a *set*. First,place an *anchor* at the point you want to use to place the set, then tap **join** and enter a name for the new *set*.
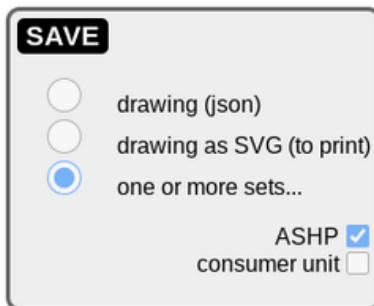
Sets

In this example, two boxes (one with a pattern fill) and some text are *joined* to form a *set* with its anchor at the top corner. We give them a name - ASHP - and tap **JOIN**.
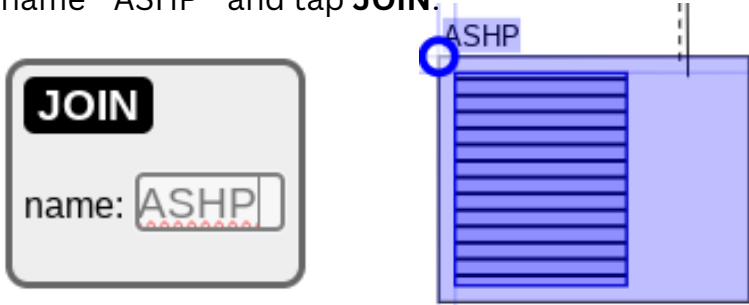
The saved set becomes part of the drawing data and more copies can be added using the **set** tool. You can also save it as a separate file for use in other drawings. Using the **document** control, choose SAVE *one or more sets...*

All the sets in the drawing are listed and you can choose one or more to save in a named file.

Sets are saved as .json files, just like the drawing data, and a set file can hold a single set or a whole collection.

You can obviously use **Lines** without creating or using sets, but they do have the potential to be great time savers.

Depending on the types of drawings you do, it may well be worthwhile creating one or two collections of sets of items you will use again and again.

Examples include sets of items like furniture, sinks and hobs, and baths and basins for use when drawing house plans, or things like batteries, diodes, switches, coils and transistors if you are drawing electrical diagrams.

It's up to you. Knock yourself out!

elvin ibbotson 2015