BOUNDY METACADY

Easy drawing editor

Basic Manual

A hands-on guide for first-time users

Software version v 1.17

This manual is based on **BOUNDY METACADY v 1.17** (2026.10).
Click the logo at the top-left of the program to check the version you are running. If your version differs, the screens and features may look slightly different.

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About This Manual

Basic Manual · Target software: BOUNDY METACADY **v 1.17** · Manual status: **Preview edition** (to be revised when the full installable version is released)

All screenshots were captured automatically from the actual program (v 1.17). The red circled numbers (①②③…) match the numbered explanations in the text. The length unit in all drawings is mm.

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Conventions

Notation	Meaning
[Move]	A button name on the screen
Ctrl + Z	A key on the keyboard
Tip …	Something handy to know
Note …	A spot where mistakes are easy
For AutoCAD users …	A note for people who have used AutoCAD (command-line entry)

Contents

Chapter 1 Getting Started 4

Chapter 2 Drawing Your First Shapes 8

Chapter 3 Drawing Precisely 12

Chapter 4 Selecting and Editing 14

Chapter 5 Text, Dimensions & Tables 21

Chapter 6 Layers, Linetypes & Drawing Scale 25

Chapter 7 P&ID / PFD and Single-Line Diagrams 26

Chapter 8 Trace — Draw Over an Underlay Image 33

Chapter 9 Save, Open & Print 35

Chapter 10 Hands-On: A Bracket Part Drawing 38

Chapter 11 Measuring, Blocks, Hatching & Arrows 40

Chapter 12 Hands-On 2: A Simple P&ID 43

Appendix Shortcuts, Help & Troubleshooting 46

Chapter 1

Getting Started

BOUNDY METACADY is a 2D drafting program made so you can use it even if you have never learned AutoCAD. You can draw mechanical part drawings and plant process & equipment drawings, open and view AutoCAD files (DWG · DXF), and print on A0–A4 · B1–B4 paper or save as PDF.

1.1 Opening the Program

1. Double-click the **METACADY(v1.17).html** file on your desktop. It opens in the Chrome or Edge browser (no installation needed).
2. The first time you open it, a welcome window appears. Click **[Open Sample Drawing]** to open a practice bracket drawing.
3. You can reopen the welcome window any time from **[Getting Started]** on the **[File & Output]** tab.

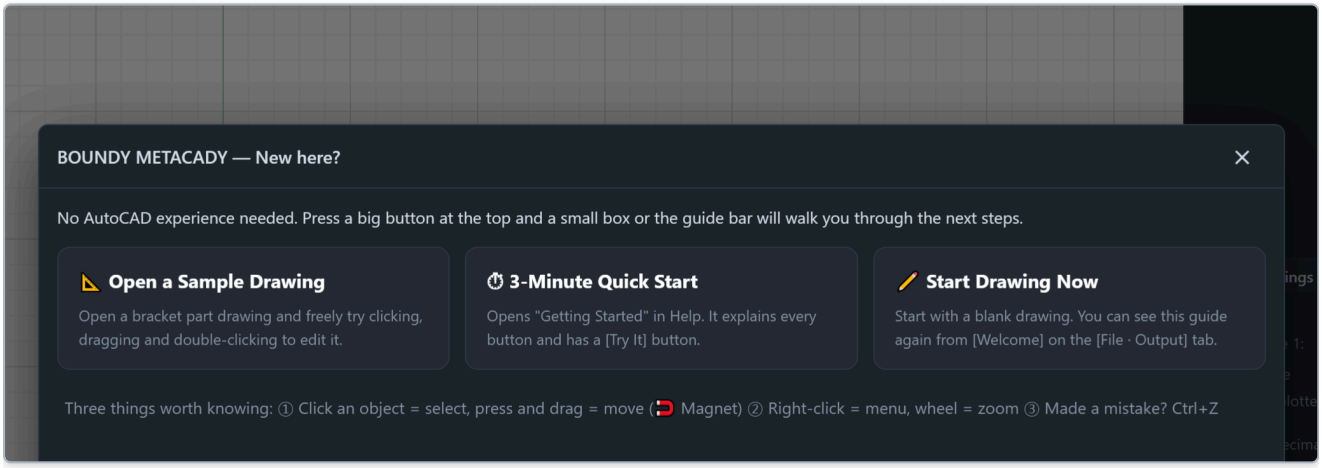


Figure 1. The welcome window that appears when you first run the program

1.2 The Screen

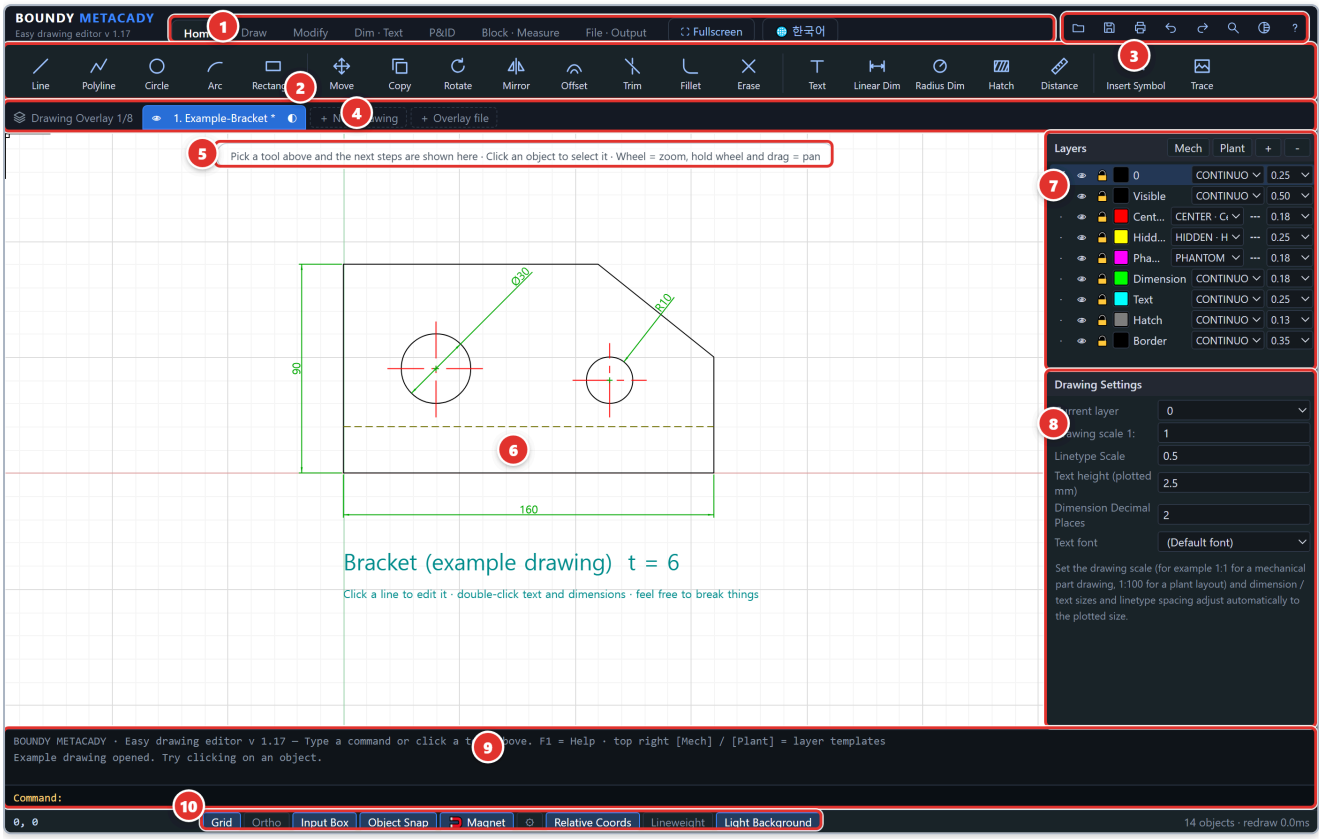
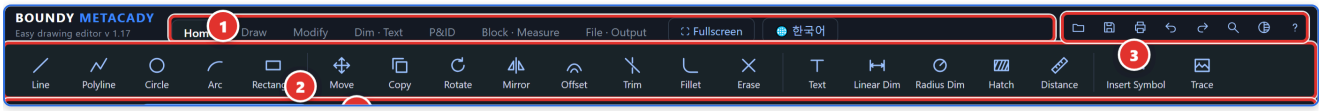


Figure 2. The whole screen. The numbers match the explanations in the table below.



▲ The top toolbar ① ② ③ enlarged — click a tab (Home · Draw · Modify …) to switch its set of big buttons



▲ The bottom command & status bar ⑨ ⑩ enlarged — type in the command box · toggle Grid · Ortho · Object Snap · Magnet

No.	Name	What it does
①	Tabs	Switch tool groups: Home · Draw · Modify · Dimension & Text · P&ID · Block & Measure · File & Output. At first the **Home** tab alone is enough. The **[⛶ Full Screen]** button on the far right (or F11) expands the drawing area to fill the browser window and stays that way until you press it again.
②	Tool buttons	Large buttons such as Line · Circle · Move. Hover over one to see a description.
③	Quick buttons	Open · Save · Print · Undo · Redo · Zoom Extents · Background color · Help
④	Sheet overlay bar	Overlay up to 8 drawings and pick between them as you work.

⑤	Guide bar	Where **what to do next** appears in yellow text. When you get stuck, look here.
⑥	Drawing (workspace)	Where you draw. Wheel = zoom in/out, hold the wheel and drag = pan.
⑦	Layer panel	Manages groups of lines by kind (Outline · Centerline · Piping …).
⑧	Properties panel	Edit the values of the selected object (coordinates · radius · font …) directly. With nothing selected, it shows the drawing settings.
⑨	History & command line	Shows the progress log; enter numbers · coordinates · commands here.
⑩	Status bar	Turn Grid · Ortho · Input Box · Object Snap · Magnet · Relative coordinates and more on and off.

1.3 Mouse and Keyboard

Action	Result
Left click	Place a point · select an object · press a button
Press and drag an object	Move that object right away (if Magnet is on, it snaps exactly onto other shapes)
Right click	While using a tool = finish (Enter) / while idle = shortcut menu
Turn the wheel · hold the wheel and drag · double-click the wheel	Zoom in/out · pan · Zoom Extents
Enter or **Space**	Confirm input · finish
Esc	Cancel · clear selection · close a window
Ctrl+**Z** / **Ctrl**+**Y**	Undo / Redo
Delete	Erase the selected object
Arrow keys	Move the selected object by 1 mm (Shift = 10 mm)

1.4 Two Ways to Work — the Input Box and the Command Line

This program lets you use the same tool in two ways.

- **Input-box method (recommended for beginners)** — press a button and a small window appears where you enter all the values at once. Example: **[Circle]** → enter diameter 20 → just click the center in the drawing.
- **Command-line method (the AutoCAD way)** — type a command such as **L**, **C**, or **M** directly in the command line below, and the program walks you through one prompt at a time in the classic ask-and-answer style.

For AutoCAD users Turn off **[Input Box]** on the status bar and even the buttons will run in ask-and-answer style. A command typed directly at the command line is always ask-and-answer. You can also switch with the **[Pick directly with mouse …]** / **[Enter at the command line]** buttons below each input box.

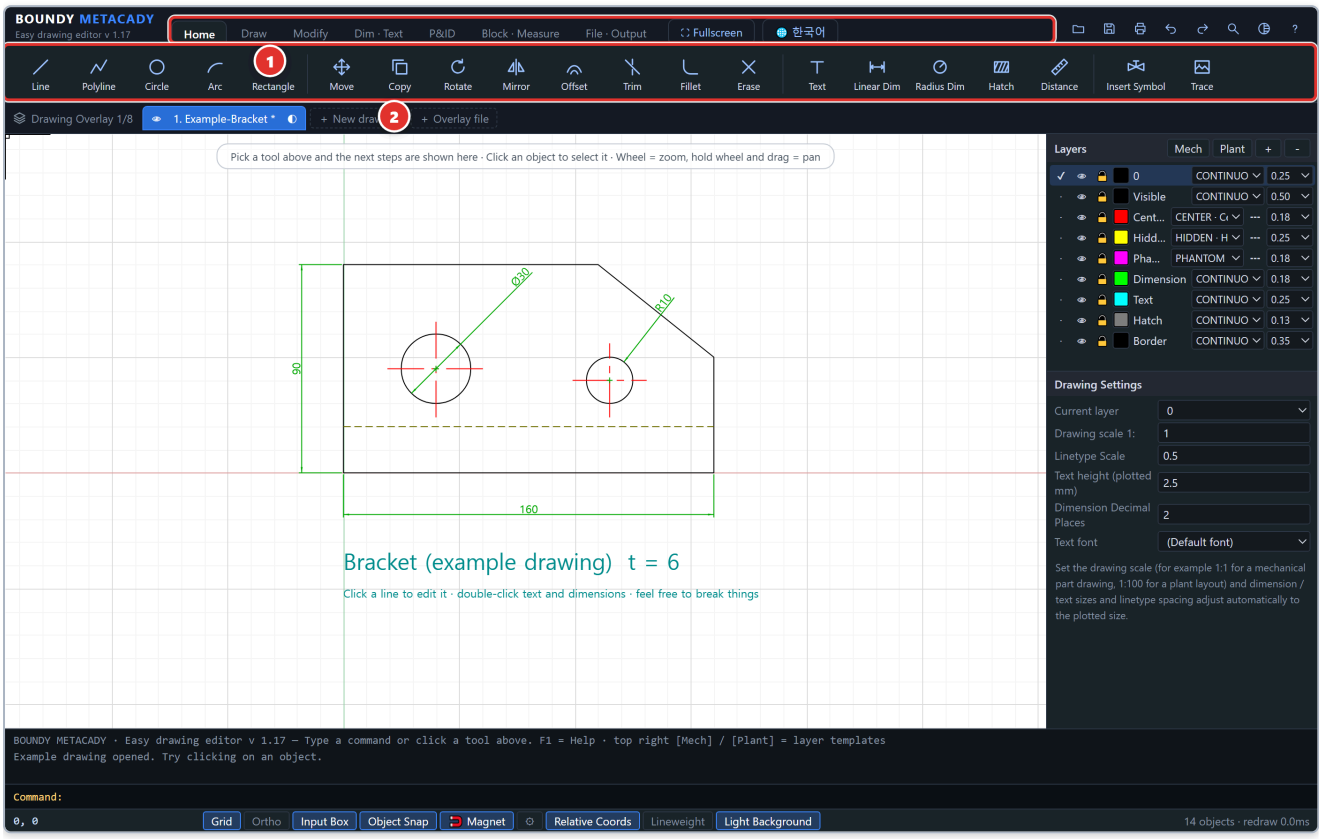


Figure 3. Switching ① the tab changes ② the tool buttons. Shown here is the [Modify] tab.

Chapter 2

Drawing Your First Shapes

When you press a tool, an **input box** appears or the **guide bar** tells you what to do next. Just follow along. The unit of length is mm.

2.1 Drawing a Line

1. **[Line]** is pressed.
2. Click a start point, then click the next point. Keep clicking to continue the line.
3. For an exact length, aim the direction with the mouse, then **type a number and press Enter**.
   Example: aim the mouse to the right and type 100 Enter → a 100 mm length.
4. Finish with the green **[Done]** button or Enter.

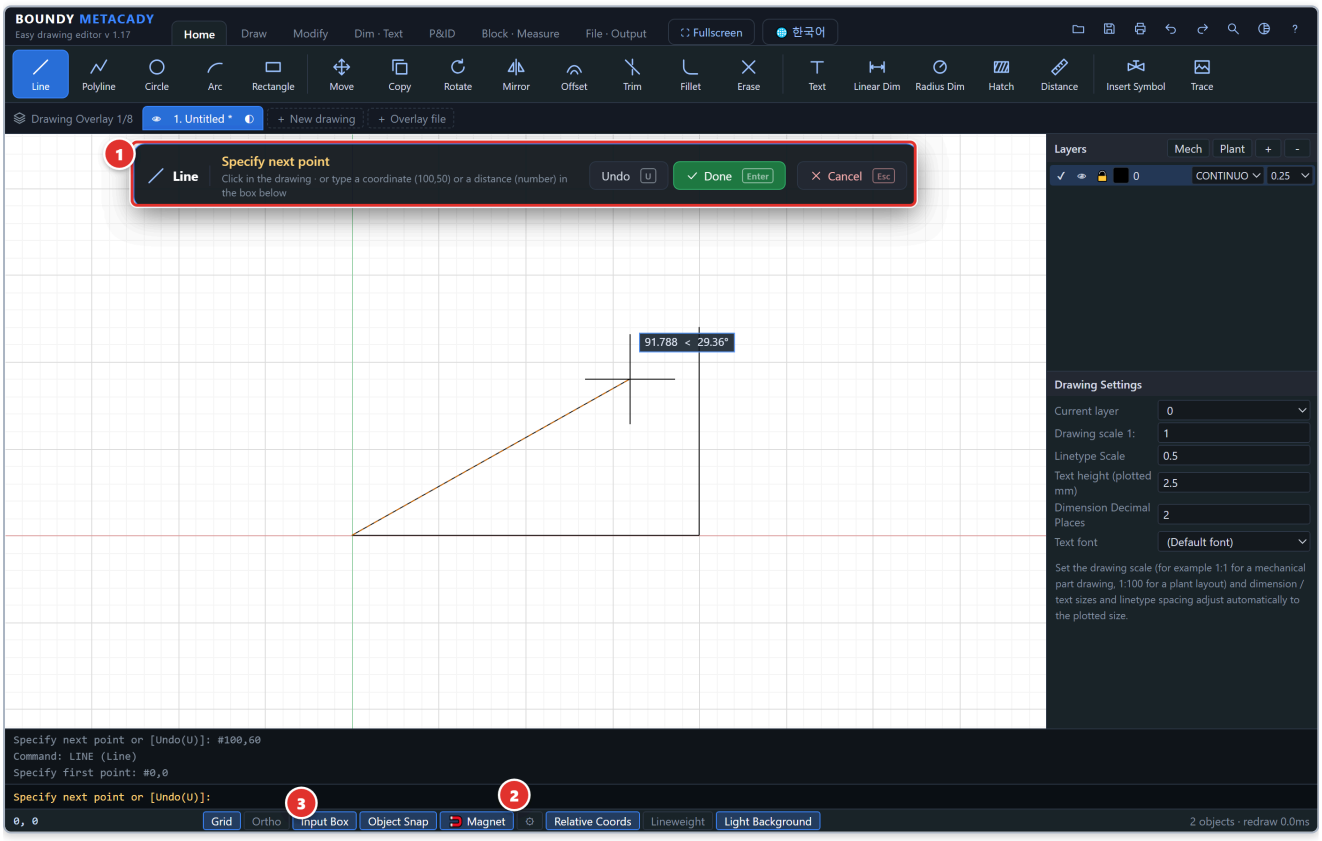


Figure 4. Drawing a line. ① The guide bar tells you what to do next, ② you can enter the length in the input box, and ③ turning on [Ortho] draws only horizontally or vertically.

2.2 Circle

1. **[Circle]** opens a small window.
2. Choose ① the size basis (diameter / radius) and enter ② the size. ③ You can also press a quick-value button: 5 · 10 · 20 …

3. Press ④ **[Place on Drawing]** and click where the center should go. Keep clicking to place several identical circles; press Enter to finish.

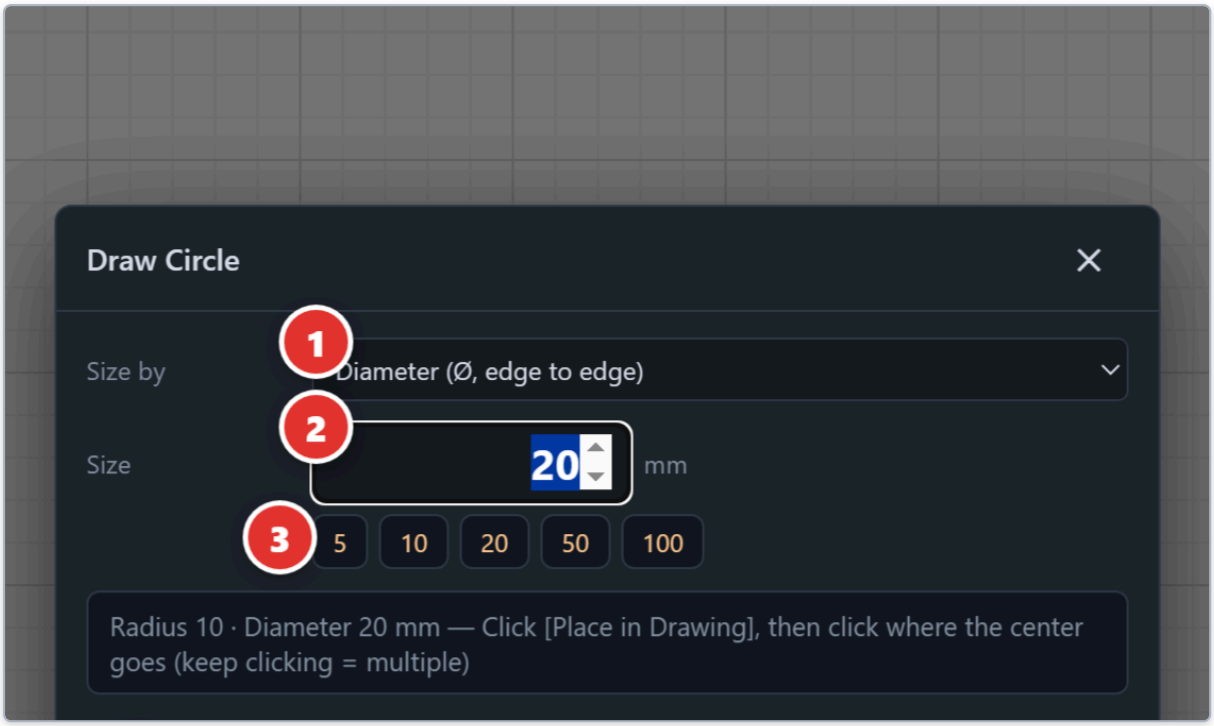


Figure 5. The [Circle] input box

2.3 Rectangle

Enter the width and height and the **rounded corner** (radius), choose where you will click (bottom-left corner / center / top-left corner), then click in the drawing.

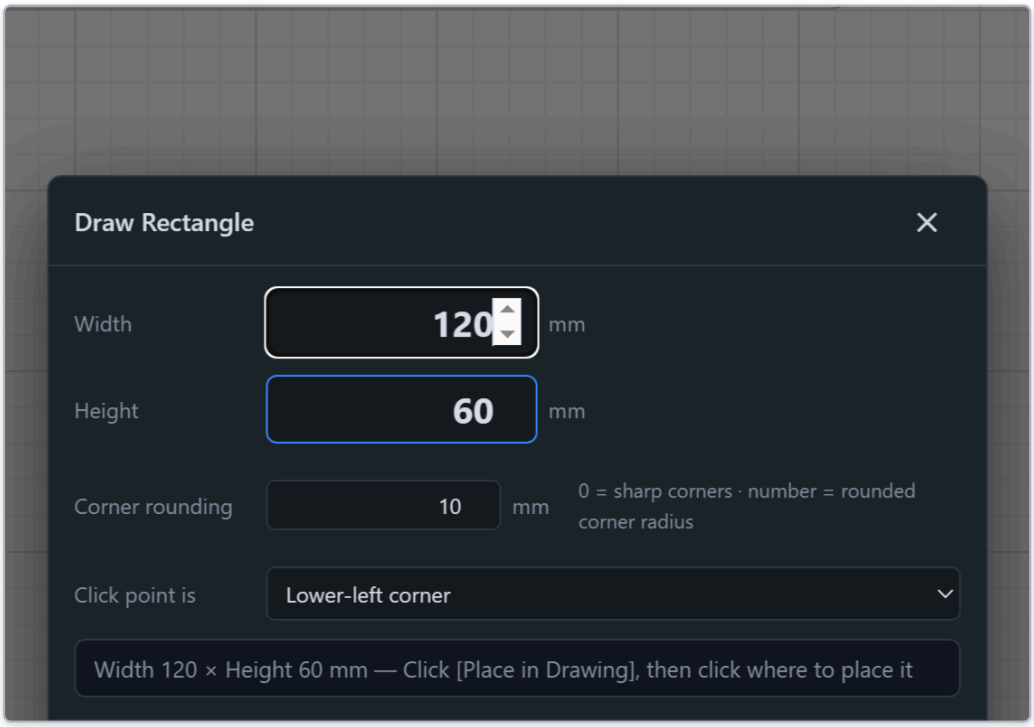


Figure 6. The [Rectangle] input box. Enter 10 for the rounded corner to get an R10 rounded rectangle.

2.4 Polygon and Ellipse

For the **[Polygon]**, choose the number of sides (buttons from triangle to dodecagon) and the size basis. For bolt heads and nuts it is easiest to enter the **across-flats distance** (wrench width). The preview on the right and the converted values below update as you type.

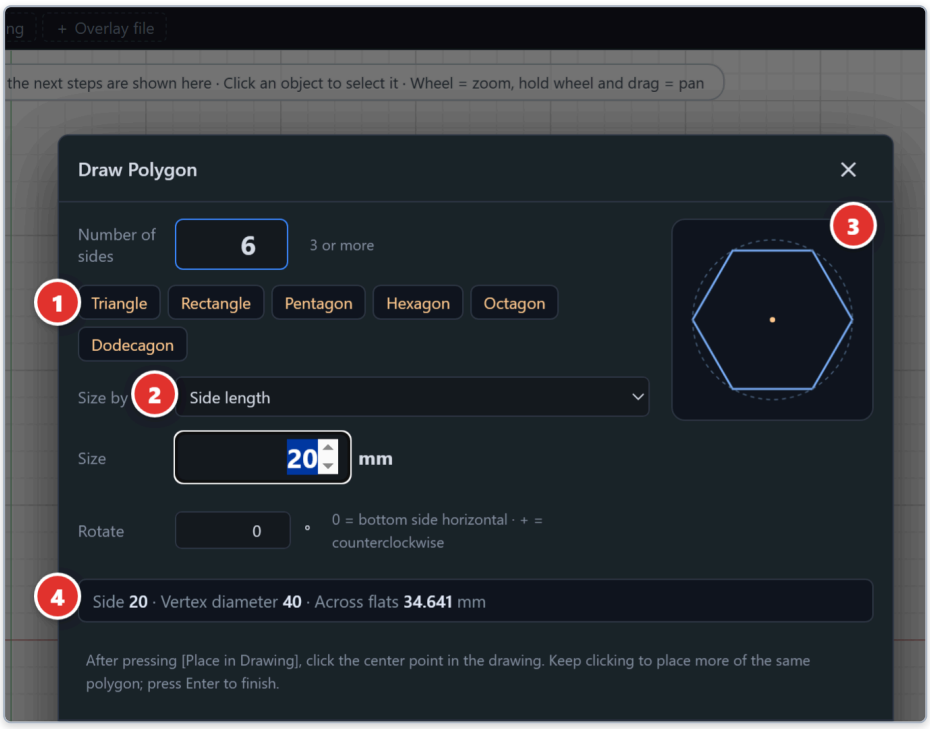


Figure 7. The [Polygon] input box. ① Number of sides ② Size basis ③ Preview ④ Converted values

For the **[Ellipse]**, enter the horizontal diameter, vertical diameter, and rotation angle, then click the center.

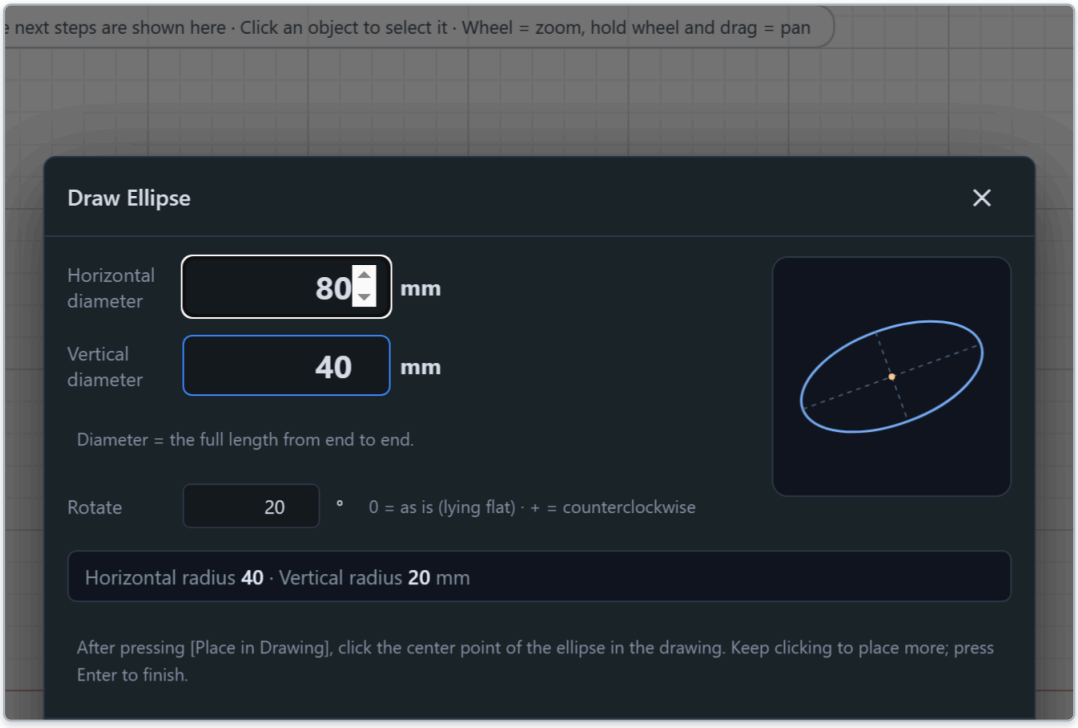


Figure 8. The [Ellipse] input box

Tip For an arc (part of a circle), press **[Arc]** and click three points in turn. For a line made of several joined segments, use **[Polyline]**.

Chapter 3

Drawing Precisely

3.1 Setting a Position with Numbers

Example input	Meaning
150	Length 150 in the direction the mouse points (the most common method)
100,50	For the first point, a position in the drawing (X=100, Y=50). From the second point on, a point 100 across and 50 up from the previous point
#100,50	Always an absolute position in the drawing
@100,50	Always relative to the previous point
100<45	Distance 100 from the previous point, at a 45° angle (right = 0°, counter-clockwise = +)

3.2 Ortho and Object Snap

Turning on **[Ortho]** (F8) draws only horizontally or vertically. With **[Object Snap]** (F3) on, a **green marker** appears when the mouse nears an endpoint, midpoint, center, or intersection, and clicking then snaps to that point with no error.

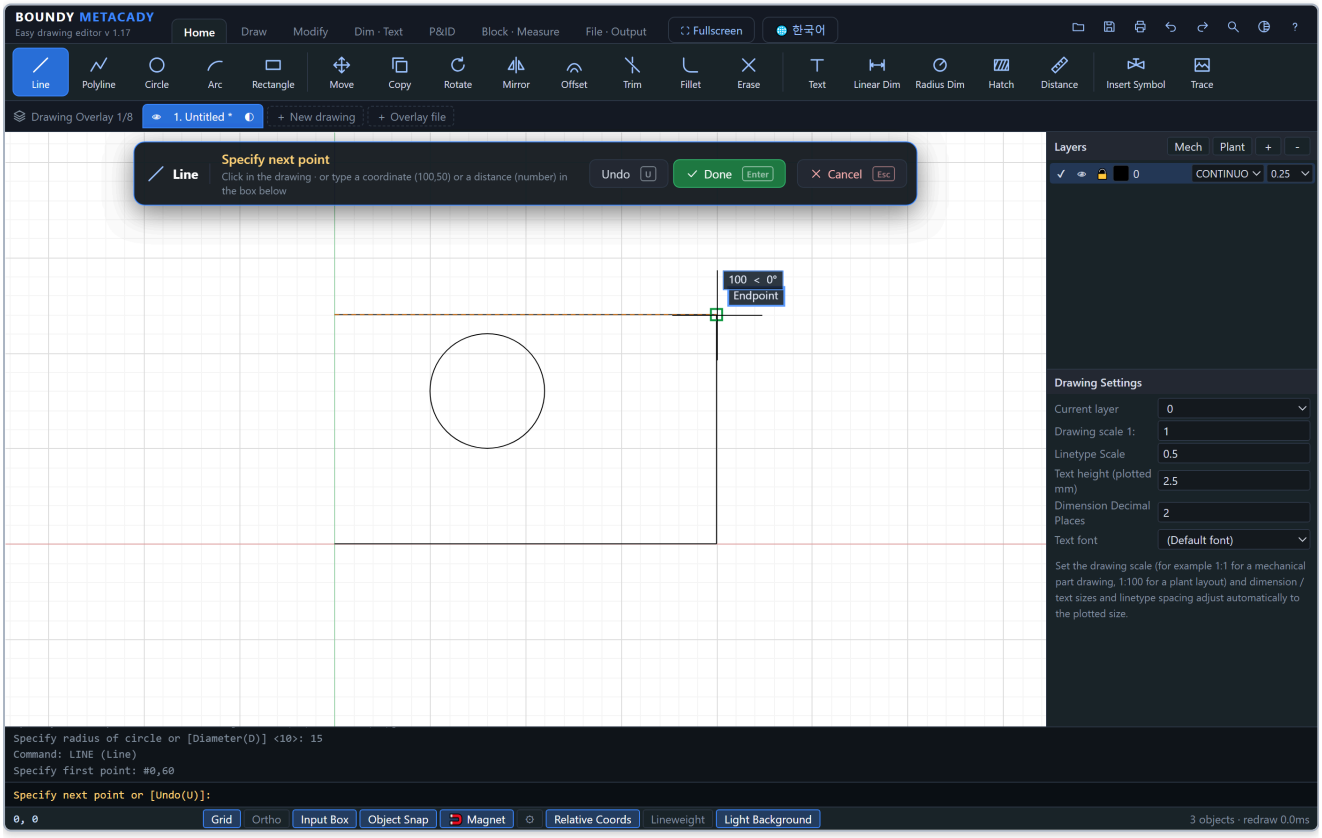


Figure 9. Move near an endpoint and a green square (endpoint snap) appears. Click now and the line connects exactly.

Marker	Name	Where it snaps
□	Endpoint	The end of a line or arc
△	Midpoint	The middle of a line or arc
○	Center	The center of a circle or arc
◇	Quadrant	The 0° · 90° · 180° · 270° points of a circle
×	Intersection	Where two objects meet
⊾	Perpendicular	The point where a perpendicular from the previous point meets the line

Tip Choose which points to snap to from the ⚙ button on the status bar.

Chapter 4

Selecting and Editing

4.1 Selecting

- **Click** an object to select it (it turns blue). Click several in turn to select them together. Shift+click removes from the selection.
- Click in an empty spot and drag **to the right**, then click again = only what is fully inside the box; drag **to the left** = everything the box touches at all.
- Esc = clear selection, Ctrl+A = select all

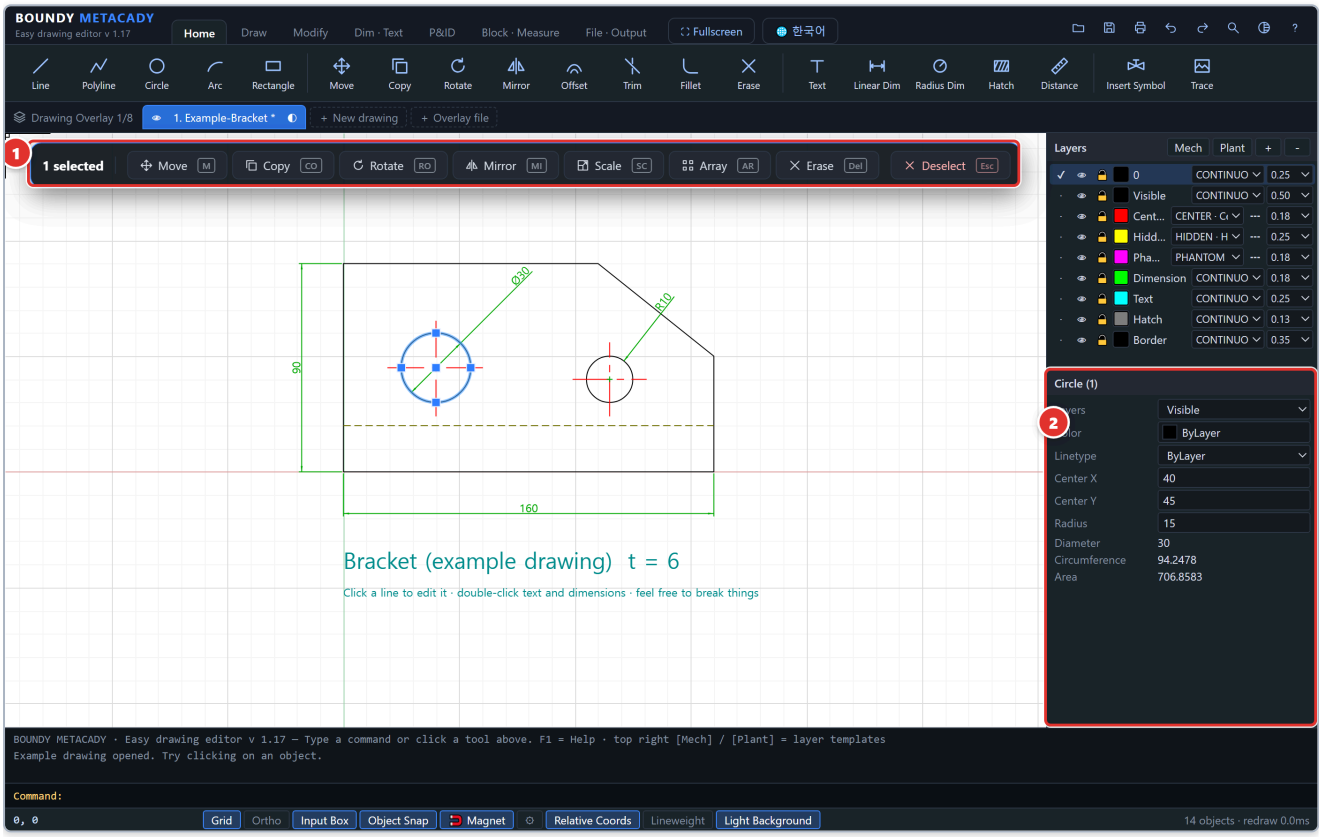


Figure 10. When you select an object, ① [Move][Copy][Rotate] … buttons appear on the guide bar and ② you can edit values directly in the Properties panel. Click a blue square (grip) to move just that point.

4.2 Dragging to Move and the Magnet

Press and drag an object with the mouse and it moves right away, just like in PowerPoint. With **[Magnet]** (F9) on the status bar turned on, a **pink marker** appears and the object snaps exactly into place when the endpoint or center of the object you are moving nears the endpoint or a line of another object.

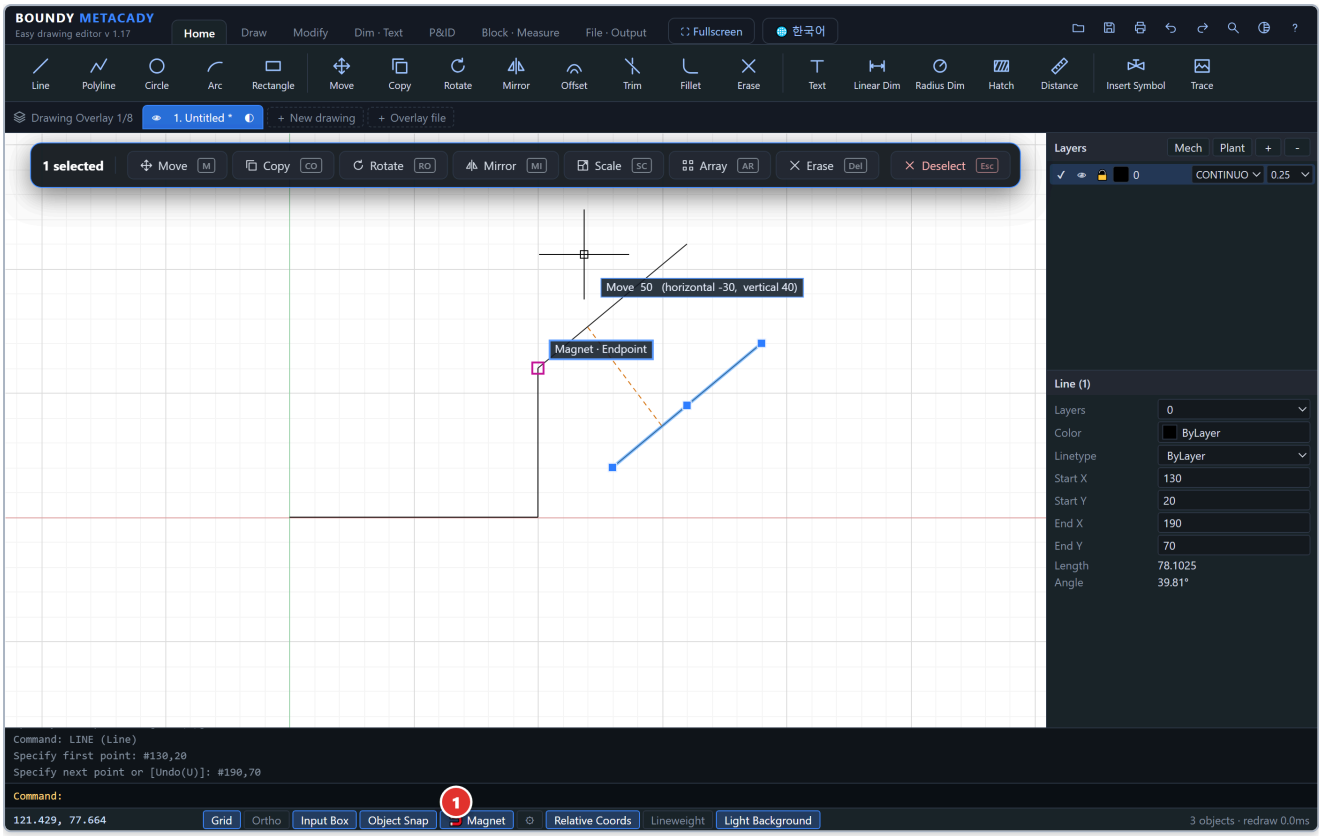


Figure 11. Drag a line toward the end of another line and a pink "Magnet · Endpoint" marker appears. Let go now and it connects exactly. ① Turn Magnet on and off

4.3 Move · Rotate · Scale

All three tools use the same style of input box. Select an object and press the button.

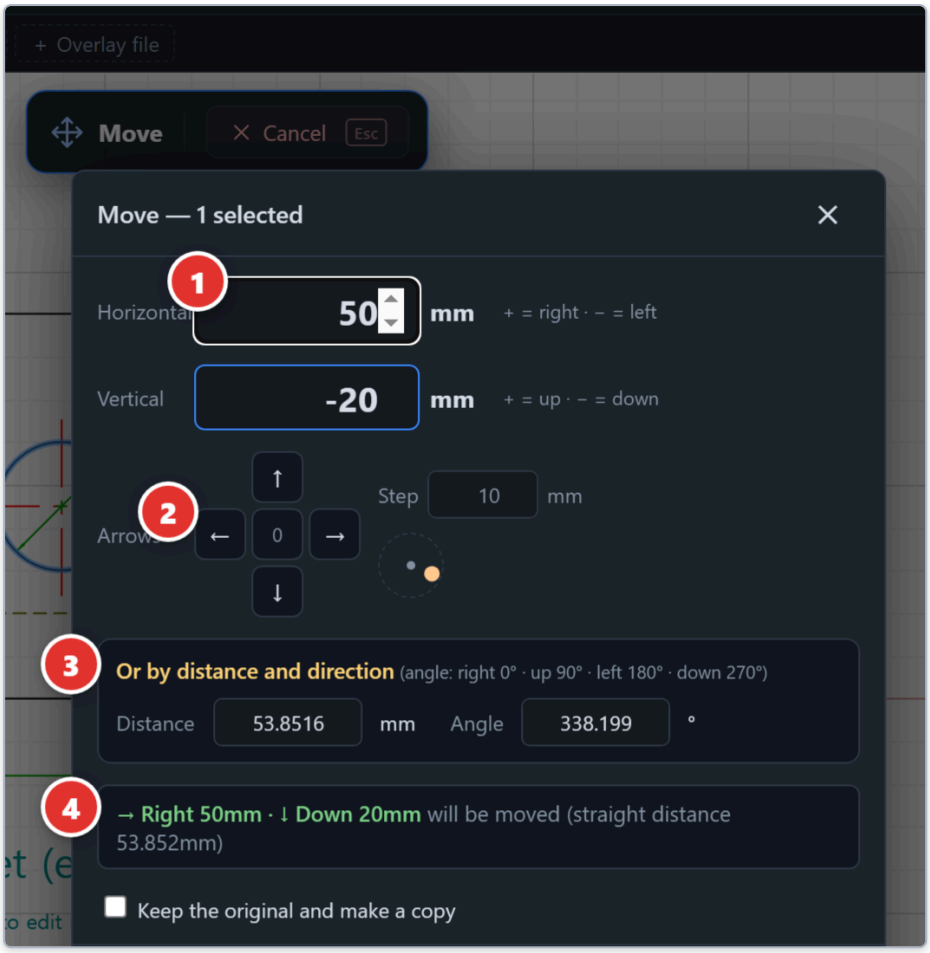


Figure 12. The [Move] window. ① Horizontal · vertical mm (+ right/up, − left/down) ② Arrow buttons ③ You can also enter a distance + angle ④ A text readout of which way and how far it moves

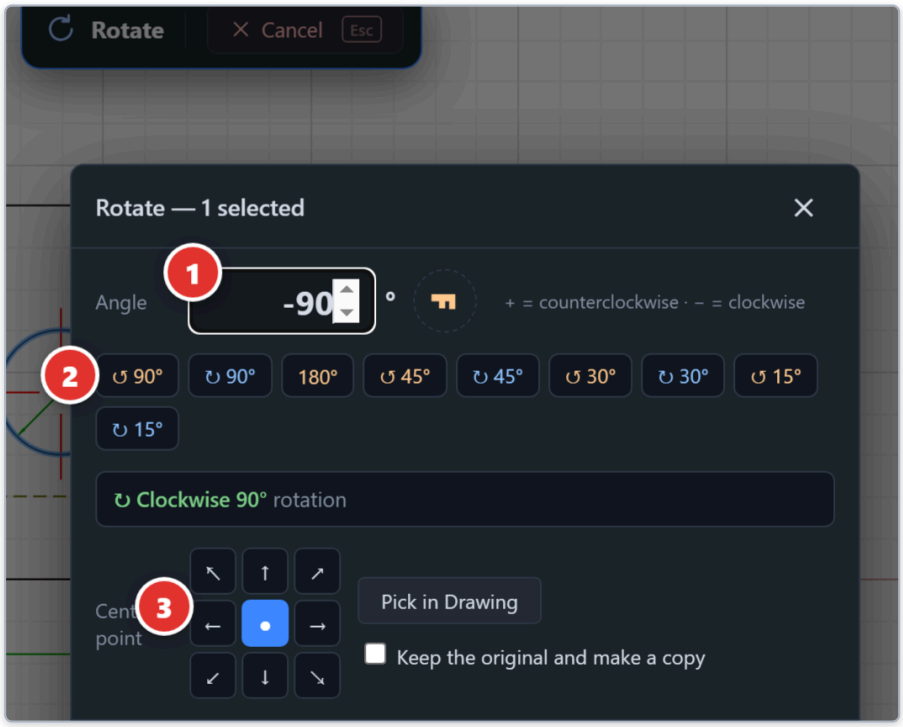


Figure 13. The [Rotate] window. ① Angle (+ left, − right) ② Quick angles ③ The center of rotation

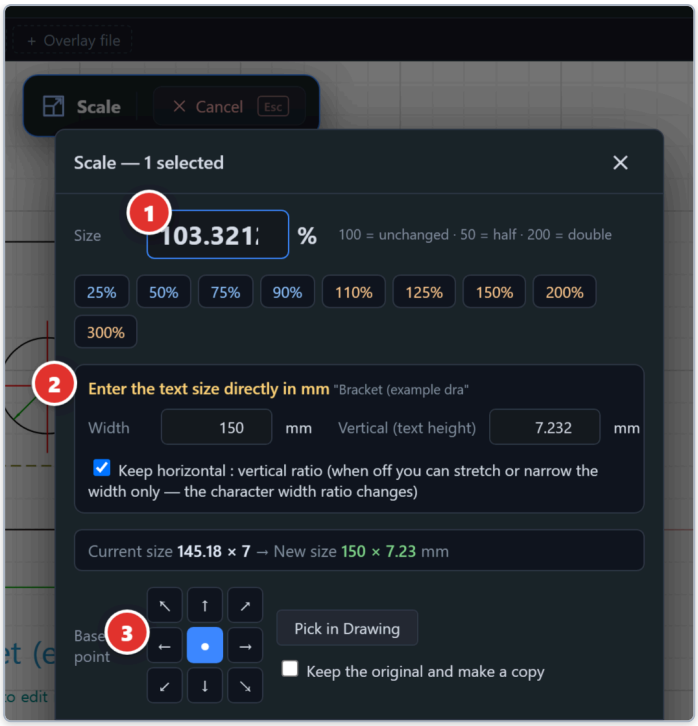


Figure 14. The [Scale] window. ① Enter a % ② When text is selected, you can enter the width and height directly in mm ③ The base point that stays in place

4.4 Copy · Duplicate · Array · Align · Group

Tool	Use
[Copy]	Pick a base point, then click wherever you want to paste, as many times as you like
[Duplicate] Ctrl + D	One more right beside it. Drag or use the arrow keys to position it
[Mirror]	A mirror image across a mirror line
[Array]	Many copies in a grid or circular pattern
[Align · Distribute]	Left · center · right · top · bottom alignment, or equal spacing (select 2 or more)
[Group] Ctrl + G	Combine several objects into one. Ungroup with Ctrl + Shift + G

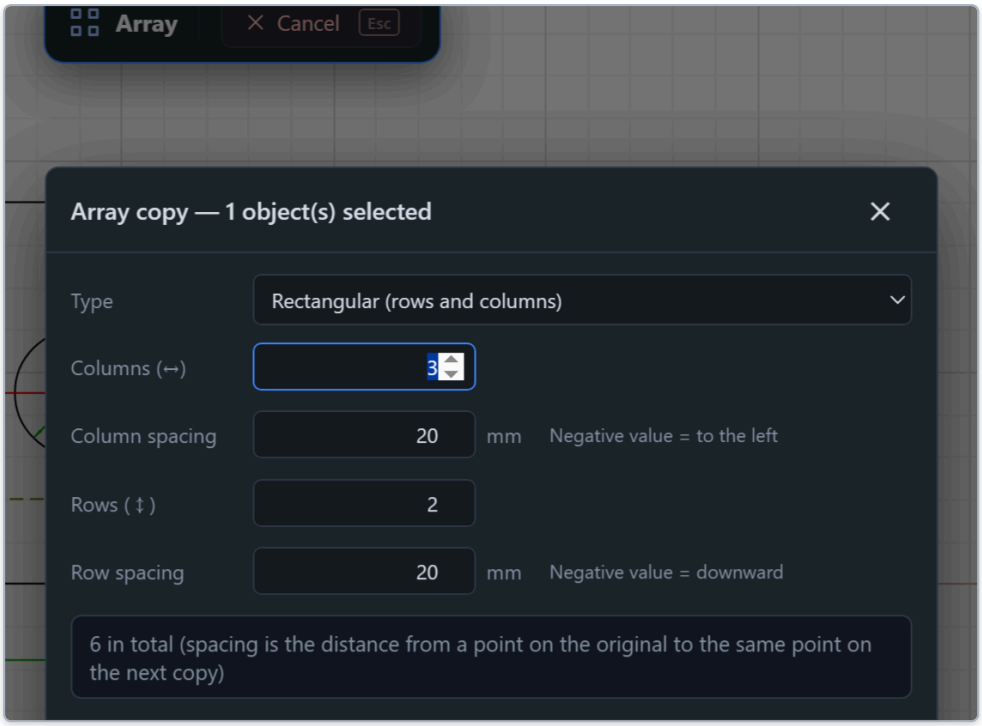


Figure 15. The [Array] window

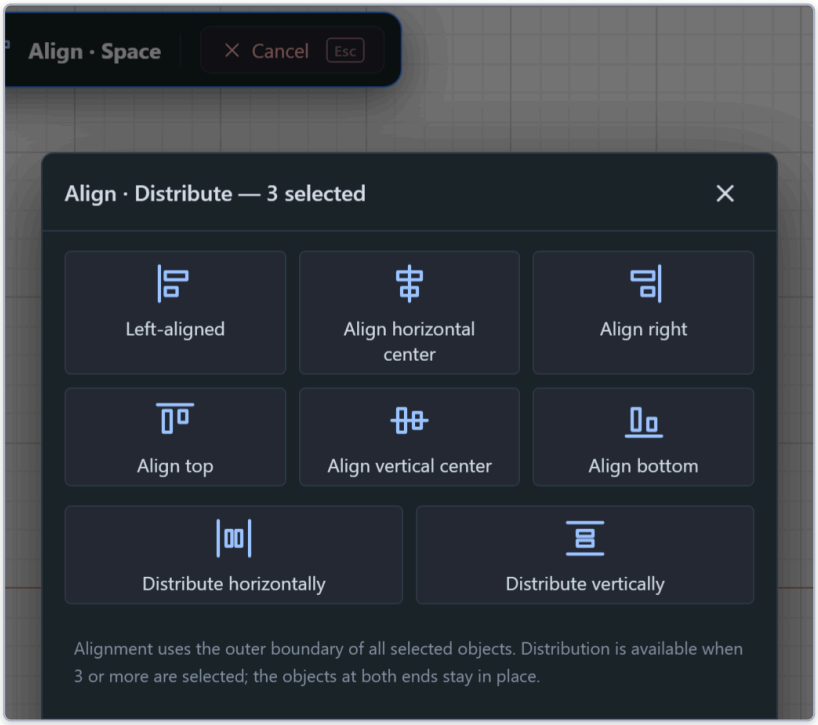


Figure 16. The [Align · Distribute] window — press a picture button and it applies right away.

4.5 Trim · Extend · Corners · Offset

- **[Trim]** — on an object that crosses another line, click the part to remove.
- **[Extend]** — lengthen a line to the nearest other line.
- **[Fillet]** (round corner) / **[Chamfer]** (cut corner) — enter a value and click the two lines in turn.

- **[Offset]** — enter a spacing, click the target object, then click the side to copy to. (Wall thickness · pipe width)

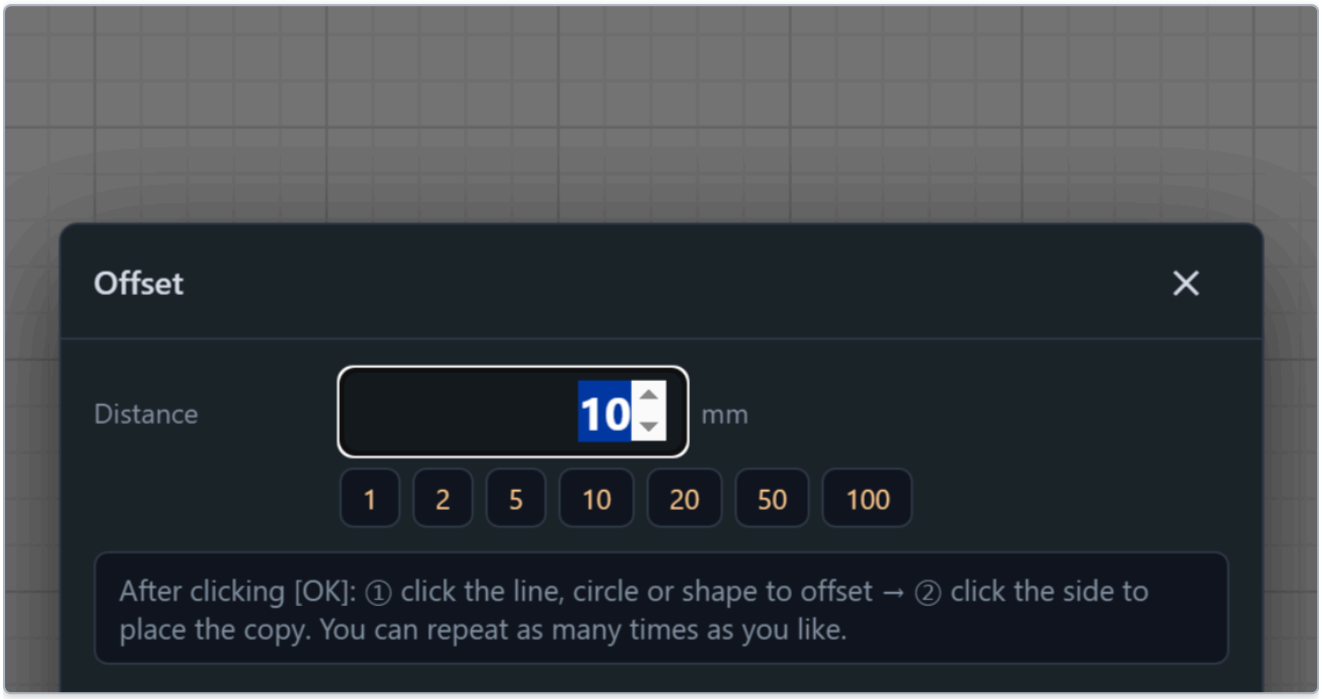


Figure 17. The [Offset] spacing input box

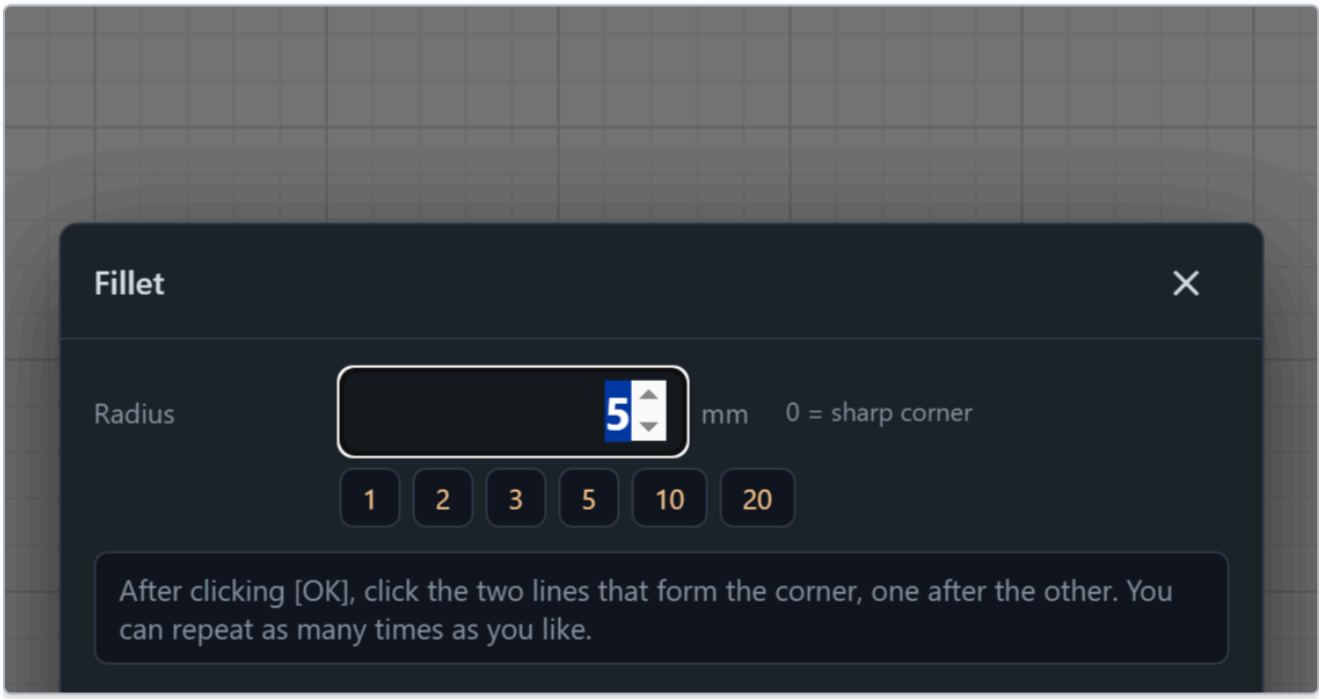


Figure 18. The [Fillet] radius input box

4.6 Right-Click Menu

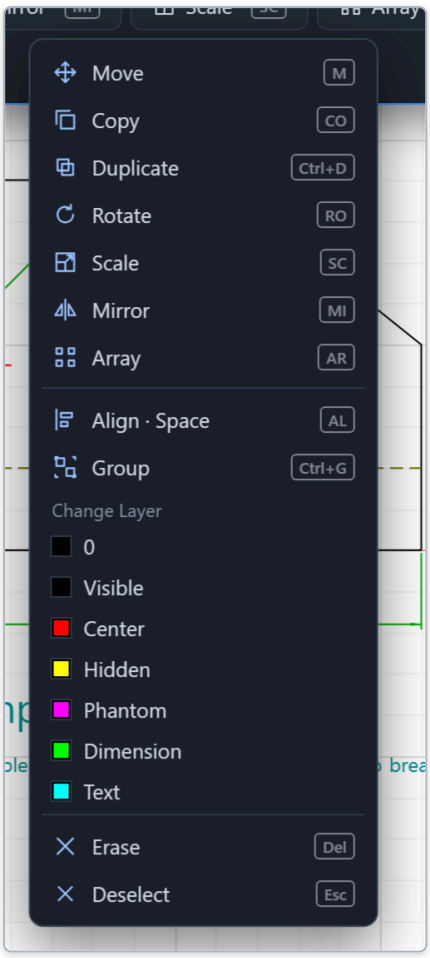


Figure 19. Right-click when you are not using a tool to get a shortcut menu. If something is selected: Move · Copy · Align · Group · Change layer · Erase.

Tip When you make a mistake, press **Ctrl**+**Z**. Press it repeatedly to keep stepping back.

Chapter 5

Text, Dimensions & Tables

5.1 Writing Text

1. **[Text]** is pressed.
2. Set the content (multiple lines allowed), character height, alignment (left / center / right), rotation, and font. Enter a number in **paragraph width** and lines wrap automatically at that width.
3. **[Place on Drawing]** and click where it should go.
4. **Double-click** text you have written to edit it.

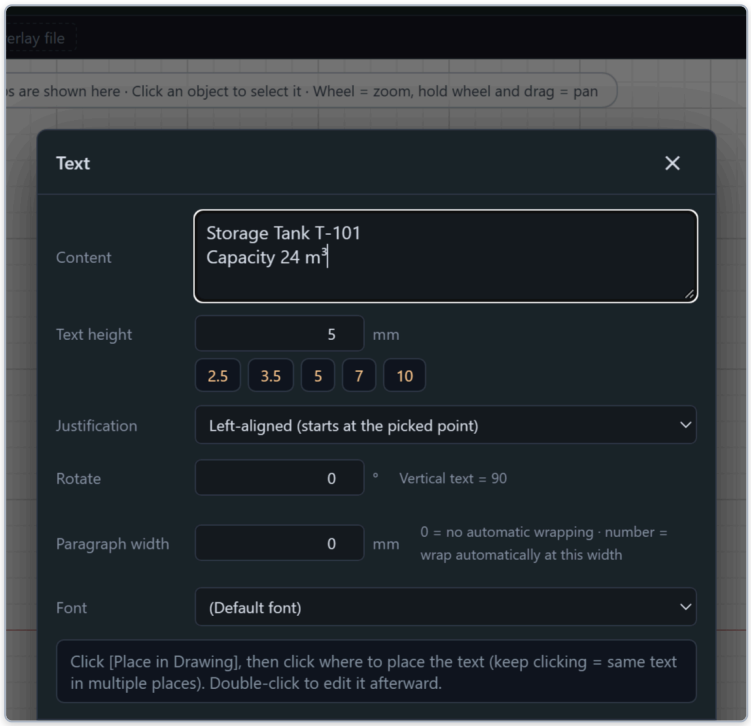


Figure 20. The [Text] window

Fonts

The text [Font] list shows ★ registered fonts and the Windows fonts on this PC. Allow **[+ Load all Windows fonts…]** once at the bottom of the list and every installed font is linked.

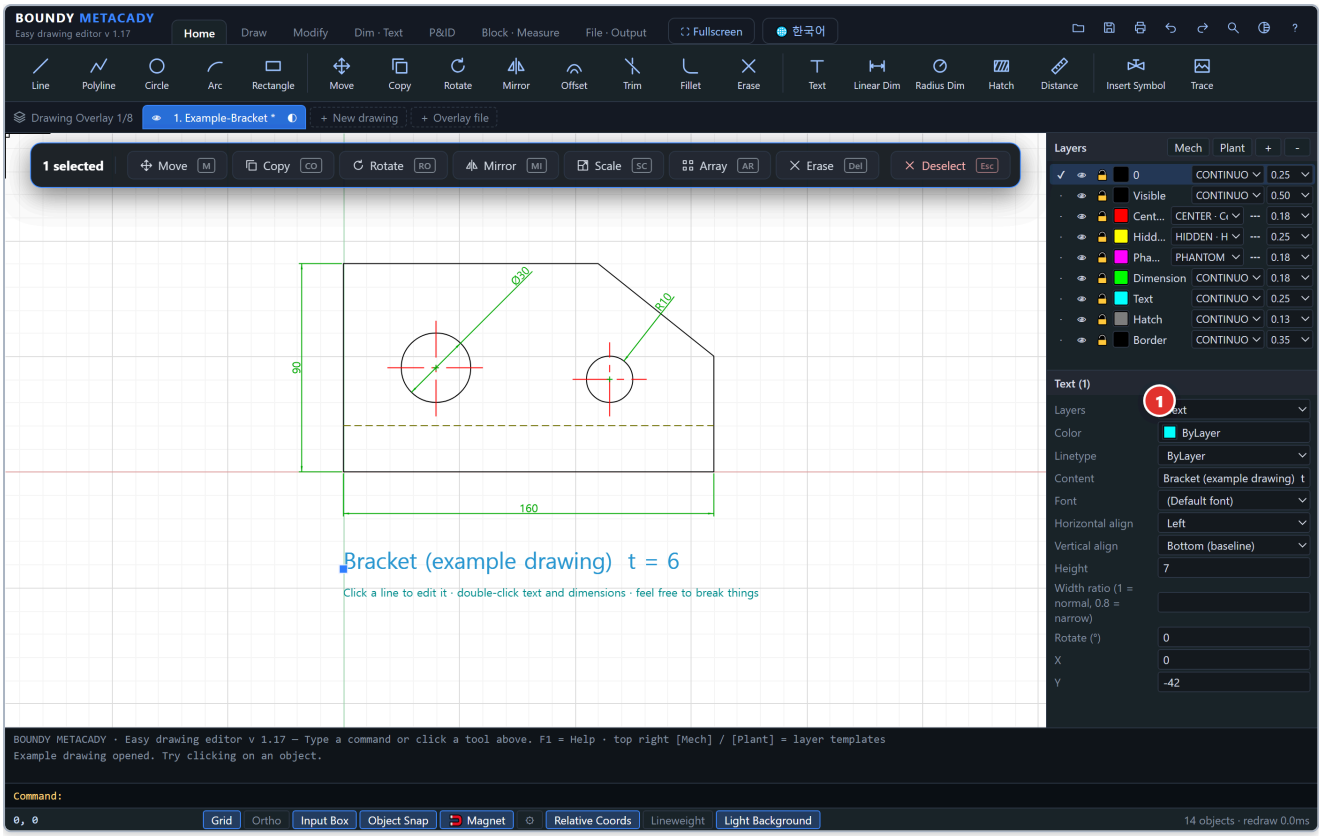


Figure 21. When you select text, the Properties panel lets you change its content · font · alignment · height · width ratio.

5.2 Dimensions

Tool	Use
[Linear Dimension]	Pick two points and click where the dimension line goes
[Aligned Dimension]	The true length between two points on a slope
[Radius Dimension] / [Diameter Dimension]	Click a circle or arc, then click where the text goes (R · Ø automatic)
[Angular Dimension]	Click two lines
[Dimension Settings]	Drawing scale · text height · decimal places · font, all in one window

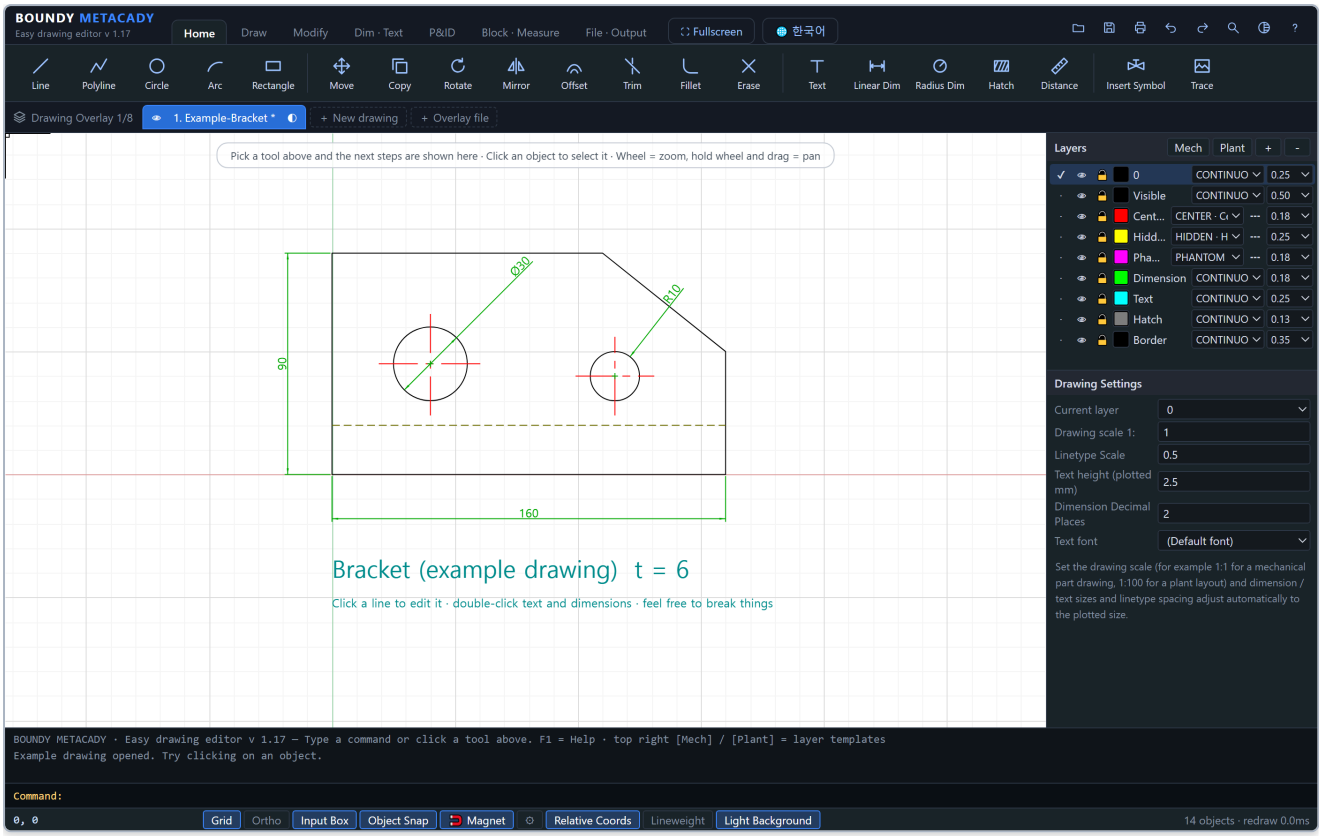


Figure 22. A sample drawing with dimensions. You can also edit a dimension number by double-clicking it.

5.3 Making a Table

1. **[Table]** is pressed.
2. Set ① the number of rows & columns and the text height & row height, then ③ click a cell to type (Tab = next cell, Enter = cell below).
3. Paste a range copied from Excel into any cell with **Ctrl** + **V** to fill it all at once.
4. ② Merge cells: click the first cell → **Shift** +click the last cell → **[Merge Cells]**. To split, use **[Split Cells (horiz/vert)]**.
5. **[Insert into Drawing]** → click the top-left corner of the table.

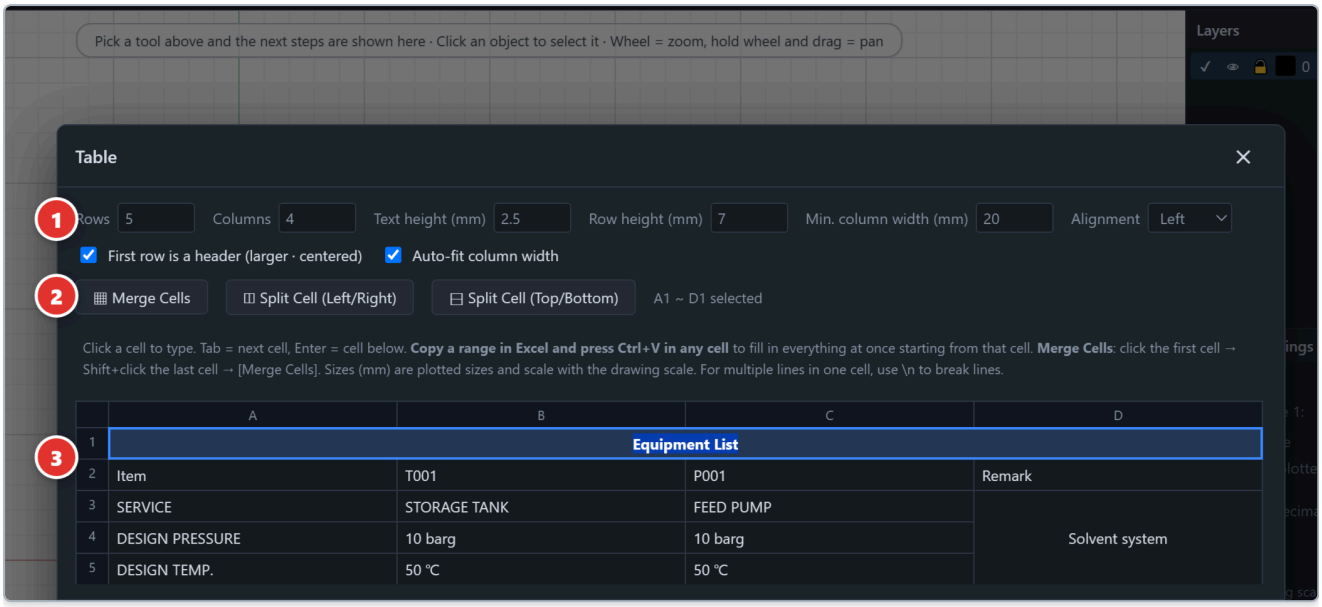


Figure 23. The [Table] window

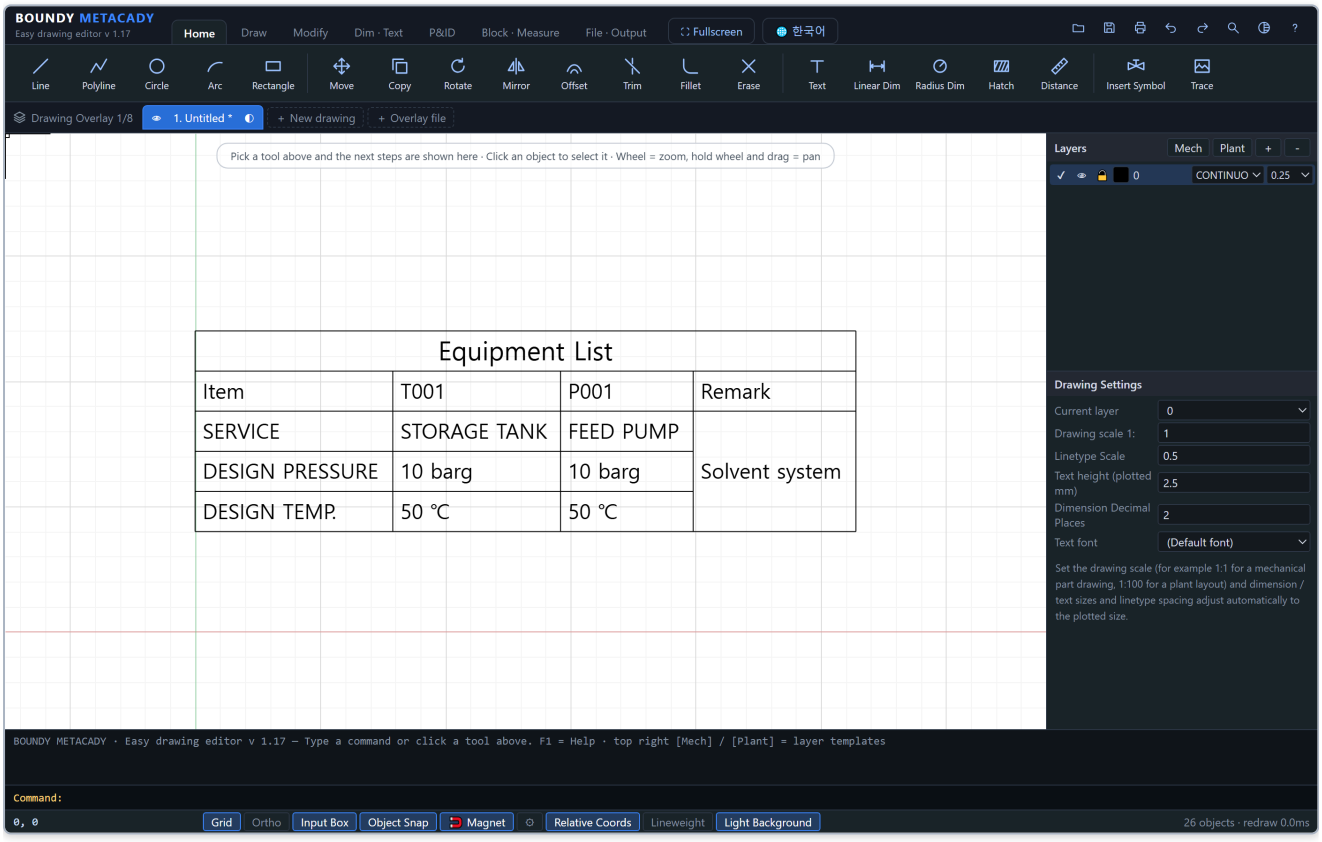


Figure 24. A table placed in the drawing. Column widths are set automatically to fit the text.

Chapter 6

Layers, Linetypes & Drawing Scale

Layers are like several sheets of transparent paper stacked together. Dividing lines by kind — outline, centerline, dimension — lets you manage color, linetype, and weight all at once and hide what you do not need for a moment.

6.1 Building Them All at Once from a Template

On the layer panel, **[Mechanical]** creates the layers for a mechanical part drawing (outline · centerline · hidden · dimension …) all at once, and **[Plant]** creates the layers for a plant drawing (architecture · equipment · piping · duct · electrical …).

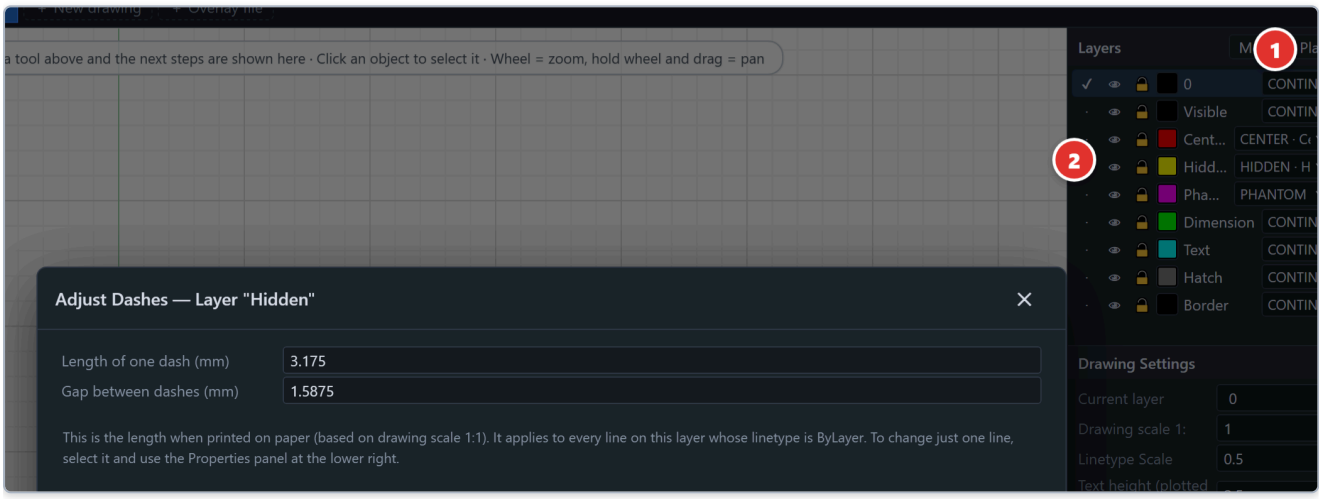


Figure 25. ① [Mechanical] / [Plant] templates and + / − ② The layer list: ✓ current layer · 👁 on/off · 🔒 lock · color · linetype · weight. Press [---] on a dashed-line layer to open a window for setting the dash length and gap in mm.

6.2 Drawing Dashed Lines

- **By layer**: make a layer whose linetype is HIDDEN · CENTER · DASHED the current layer (✓) and draw.
- **Changing a line you already drew**: select the line and change [Linetype] in the Properties panel. Adjust the look with [Dash length] · [Dash gap].
- **Moving only the selected objects to another layer**: choose from the [Layer] list at the top of the Properties panel, or use [+ Create a new layer and move them…] at the bottom.

6.3 Drawing Scale

Always draw at **actual size (mm)**. Set the drawing scale to 1 for a mechanical part drawing or to 100 for a plant layout, and the dimension arrows · text sizes · dash gaps · symbol sizes are adjusted automatically to print scale. Change it from [Drawing scale 1:] in the Properties panel with nothing selected, or from **[Dimension Settings]**.

Chapter 7

P&ID / PFD and Single-Line Diagrams

The **[P&ID]** tab gathers the tools for drawing piping & instrumentation diagrams. Draw pipes with **[Line]** or **[Polyline]** and lay symbols on top.

7.1 Inserting Symbols

1. **[Insert Symbol]** opens the symbol list. ② You can search by name, and pressing ☆ on a card marks it a favorite so it gathers at the top.
2. Click a symbol picture, then click where to place it in the drawing.
3. **Click on a pipe** and the symbol rotates to match the line's direction, and the line breaks automatically for the width of the symbol.
4. You can use the **[Rotate 90°]** · **[Size]** · **[Other Symbol]** buttons, and press Enter to finish.

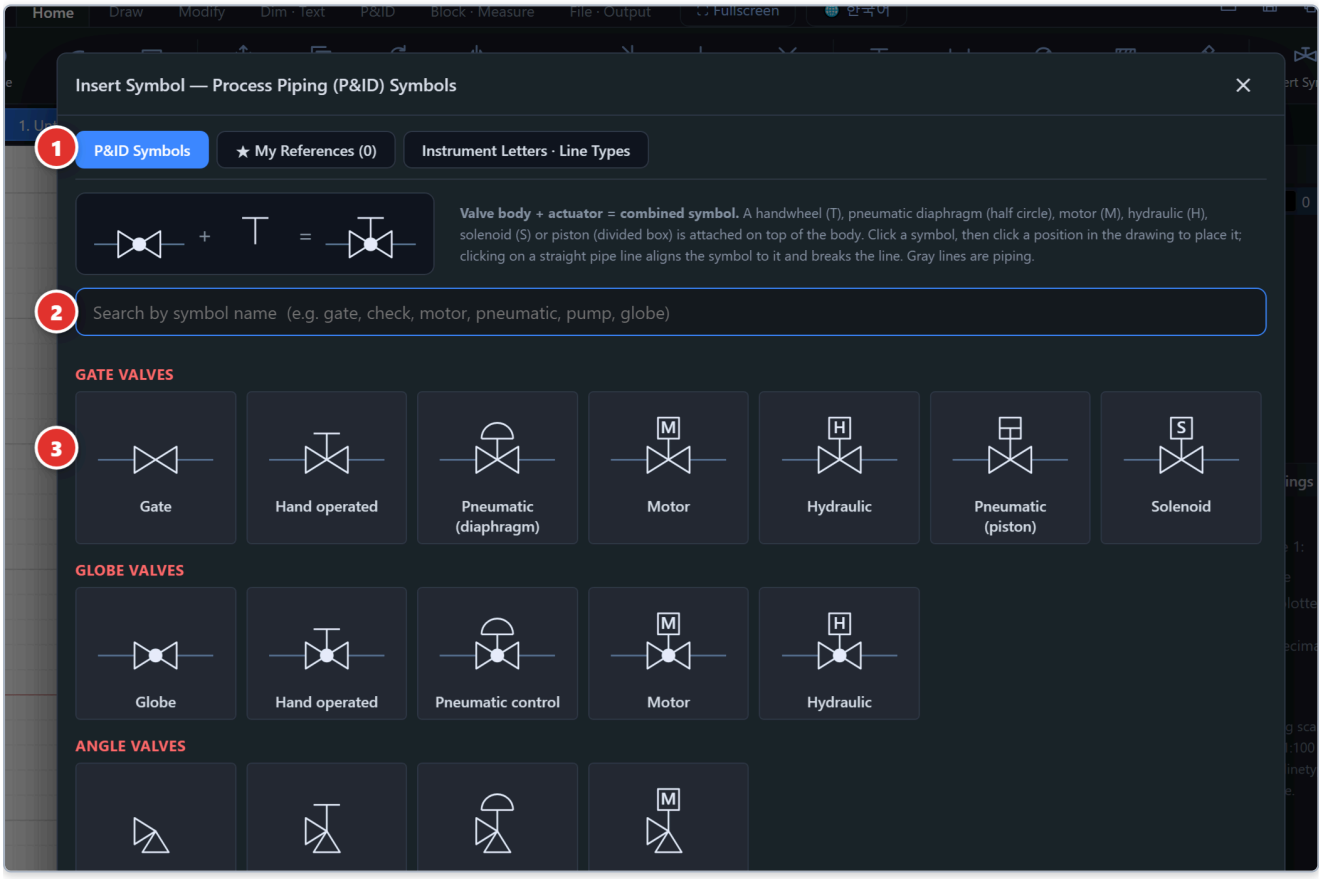


Figure 26. The symbol list. ① P&ID symbols / ★ My references / Instrument letter table ② Search ③ Symbol cards — valves · actuators · equipment · ISA/ISO symbols · single-line diagram symbols and more, 143 symbols in all

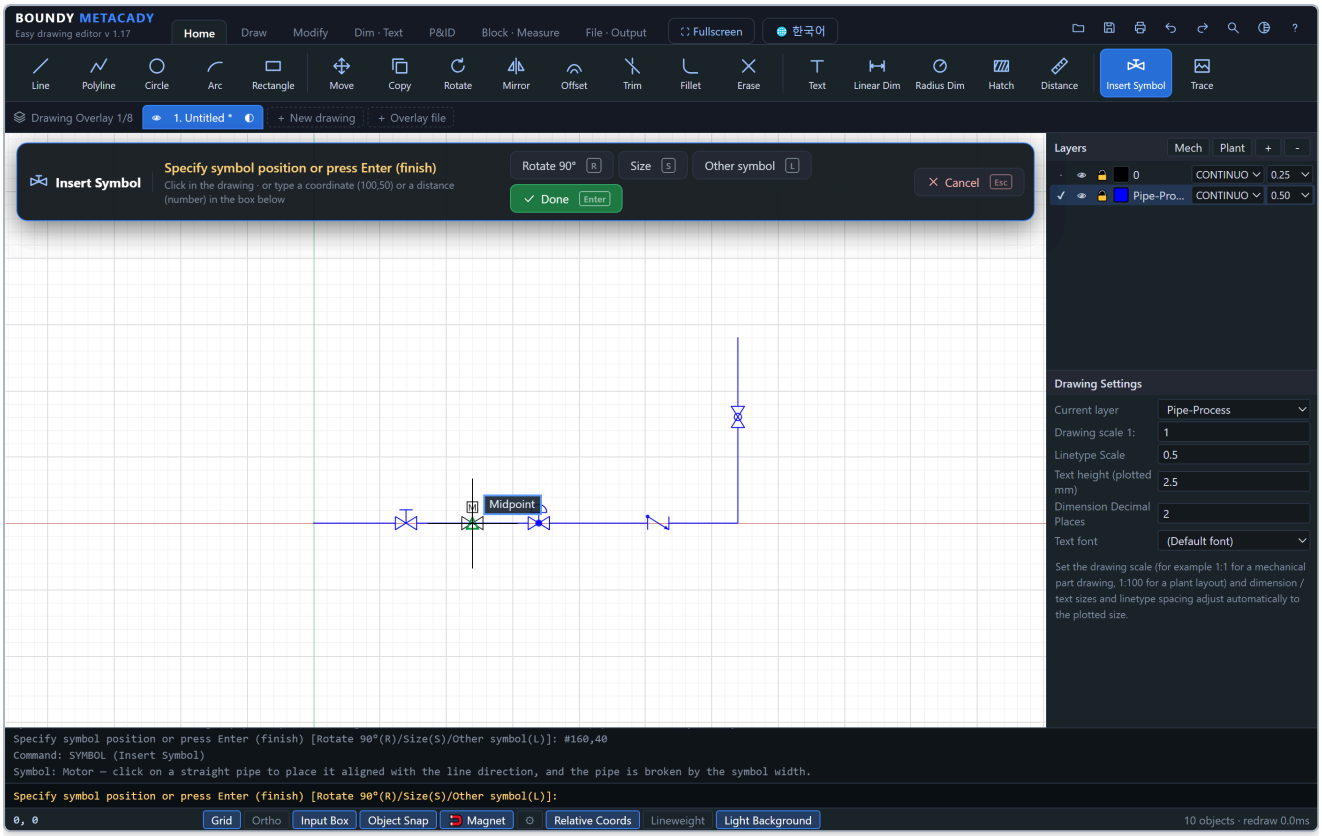


Figure 27. Valves placed on a pipe. The line breaks automatically for the symbol width. The white symbol that follows the mouse is a preview before placement.

7.2 Instrument Tags · Signal Lines · Connector Labels · Balloons

Tool	Use
[Instrument Tag]	Function letters (e.g. FIC) + number (101) + type (field / control room / DCS / PLC ...). The number increases by 1 each time you place one.
[Signal Line]	A line with automatic markings for pneumatic (//) · electric (dashed) · capillary (X) · hydraulic (L) · data link (○)
[Pipe Number]	Writes a number along a pipe line, on top of it. Example: 4"-P-1001-A1A
[Connector Label]	A pentagon flag such as "OIL OUTLET ▷". Sized automatically to fit the text
[Balloon]	A number inside a circle or diamond. Used for the flow numbers of a process flow diagram (PFD)
[Pipe Crossing]	Finds a crossing line and either breaks one side or hops over it with a half-circle

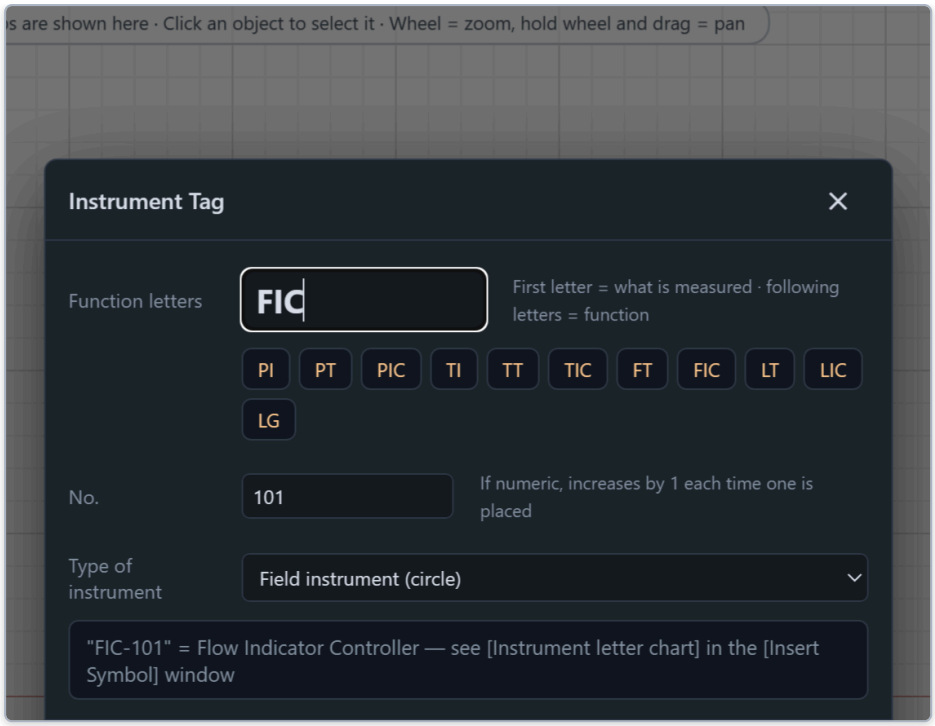


Figure 28. The [Instrument Tag] window. As you type it tells you the meaning, like "FIC-101 = Flow Indicating Controller".

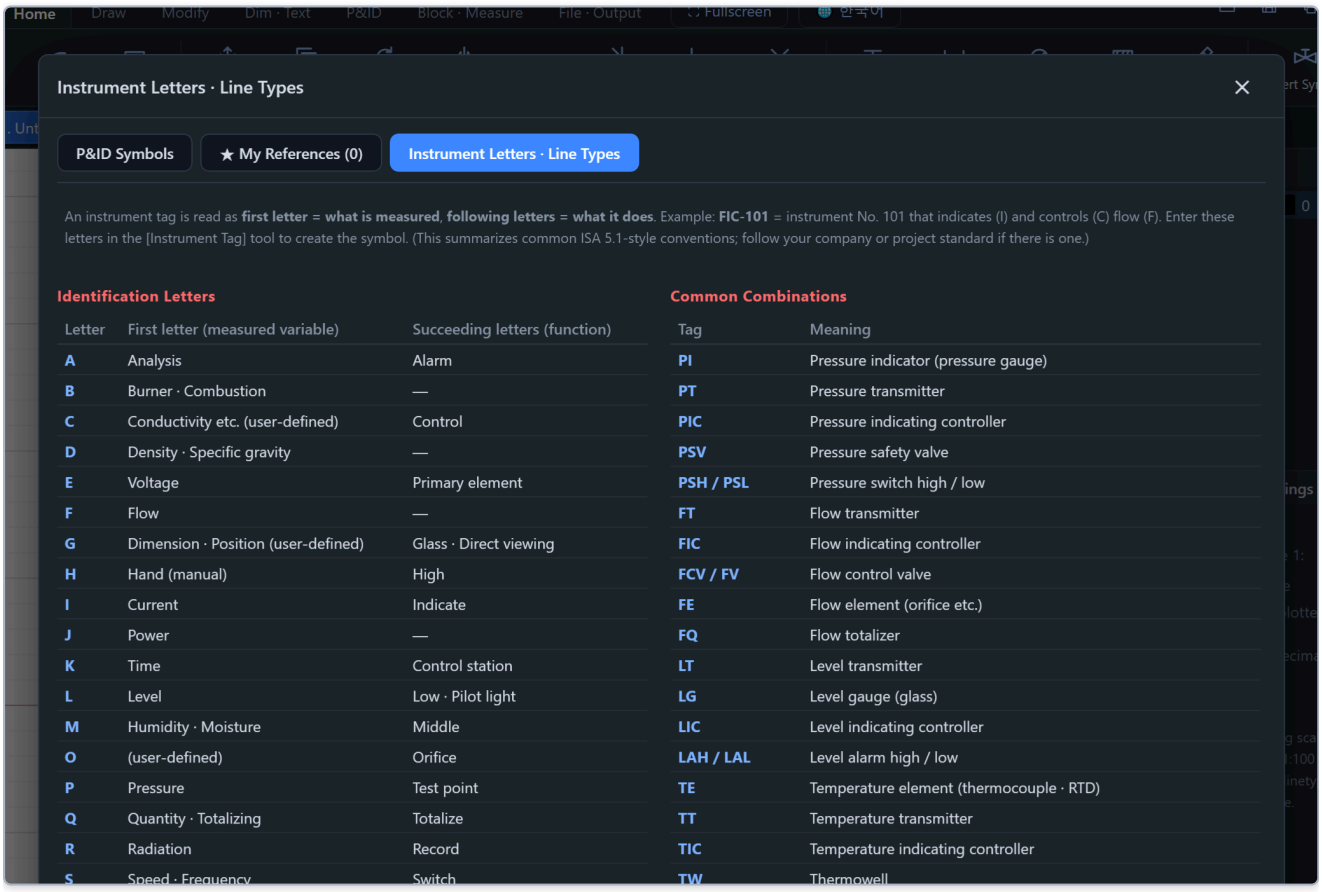


Figure 29. The [Instrument Letter Table · Line Types] — first letter = what is measured, following letters = what it does

7.3 A Finished Example

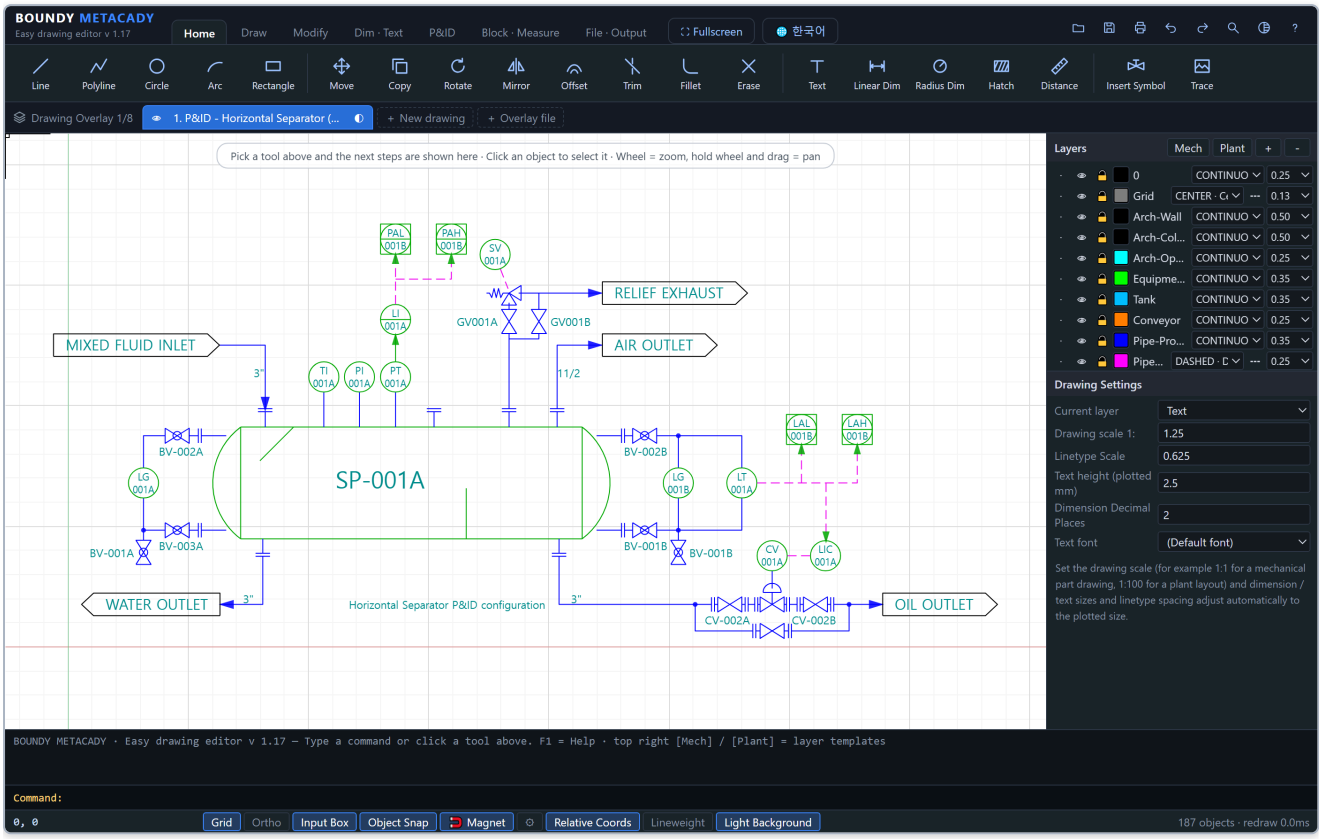


Figure 30. A horizontal-separator P&ID — an example drawn with this program's tools alone (pid3-1-manual.mcd in the samples folder)

7.4 Tag List · Legend · Drawing Border

[Tag List] gathers the instrument tags and symbol counts in the drawing and lets you insert them as a table or save them as a CSV for Excel. **[Legend]** builds a legend of only the symbols actually used. **[Border & Title Block]** draws a border and title block for A0–A4 · B1–B4 paper sizes.

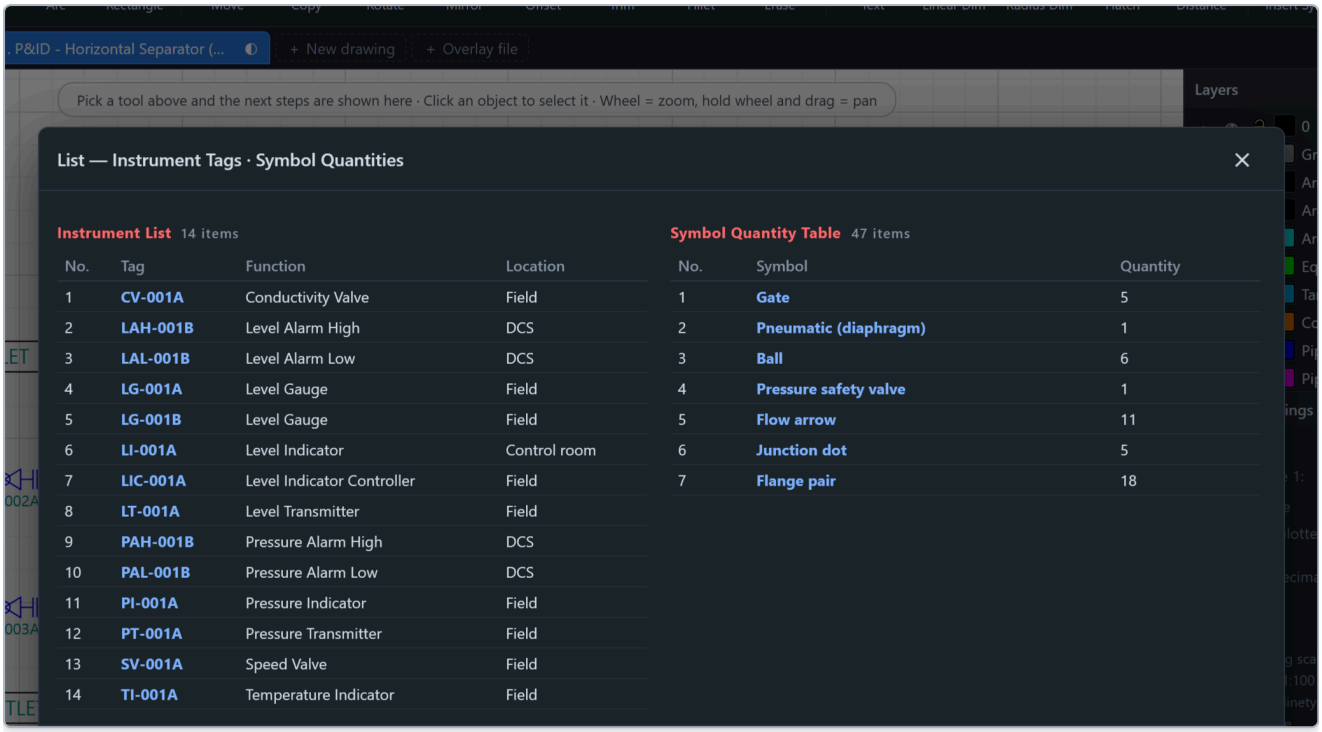


Figure 31. The [Tag List] window

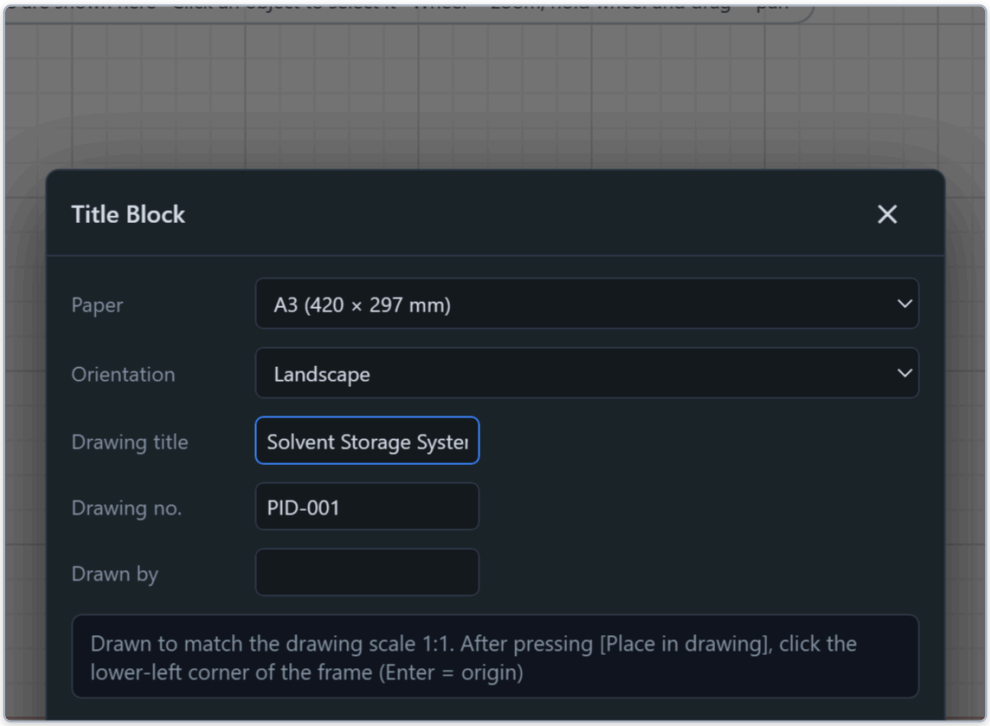


Figure 32. The [Border & Title Block] window

7.5 Process Flow Diagrams (PFD) and Single-Line Diagrams

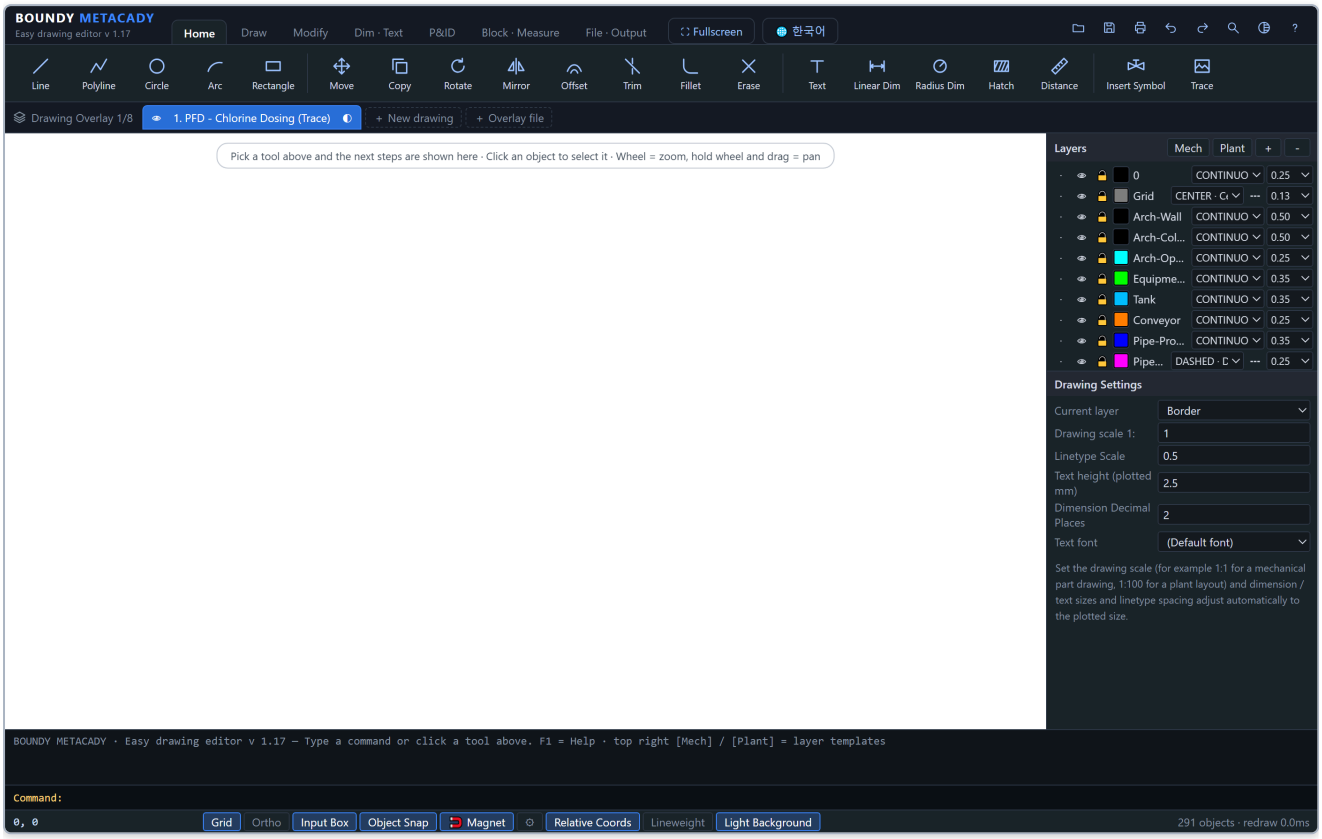


Figure 33. Part of a chlorination-equipment process flow diagram (PFD) — made with balloons · a scrubber · a mass-balance table ([Table])

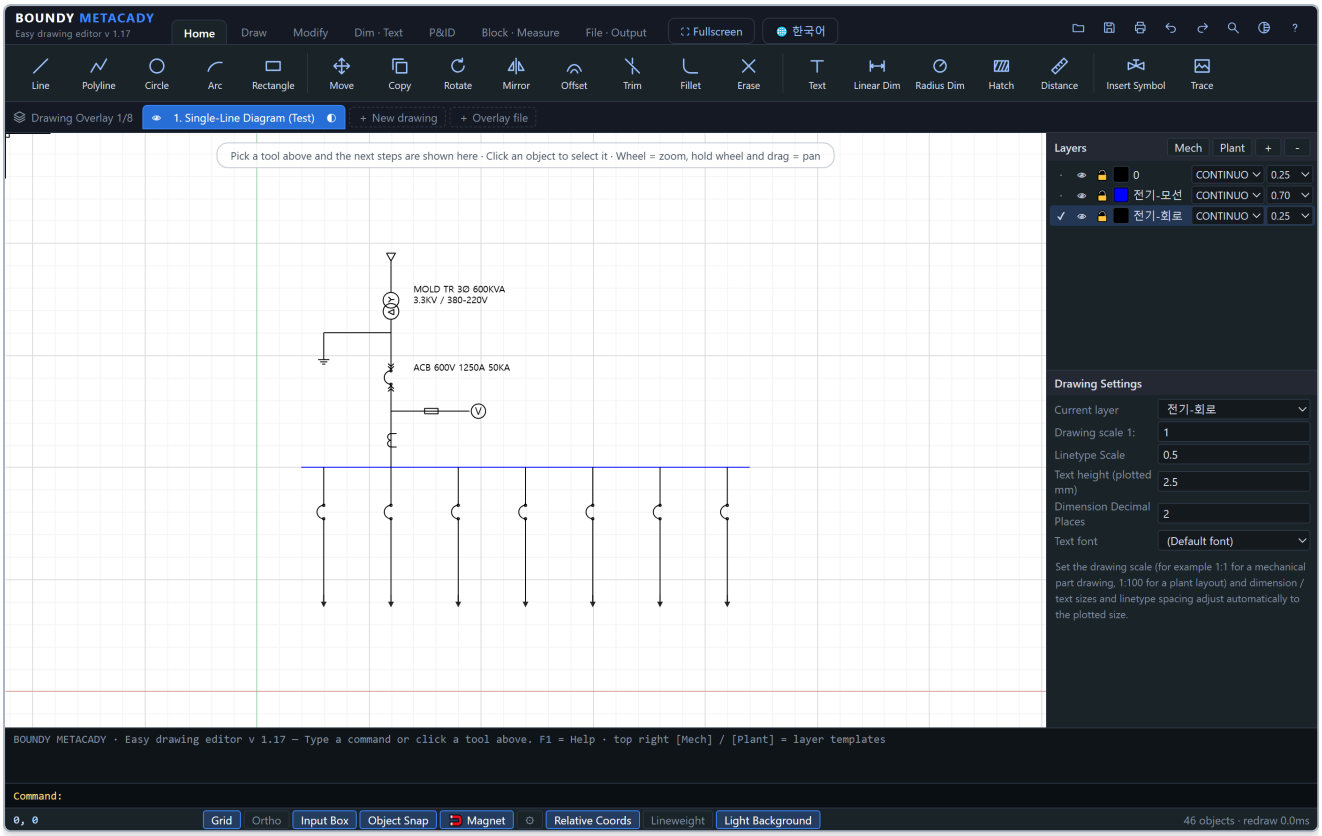


Figure 34. A single-line diagram example — transformer · ACB · MCCB · CT · fuse · voltmeter · ground symbols. Placed on a vertical circuit line, they orient themselves and break the line.

7.6 My References (.rfdt)

Select equipment · symbols · title blocks you drew yourself and use **[Save as Reference]** to pull them out in any drawing. In the **[My References]** window, save or load a **.rfdt file** to move them to another PC or share them with a colleague.

Chapter 8

Trace — Draw Over an Underlay Image

This feature lays a paper drawing photo · scan · screenshot as a translucent underlay for you to trace. Press **[Trace]** and choose an image file, or copy / capture an image and Ctrl+V, or drag a file onto the screen.

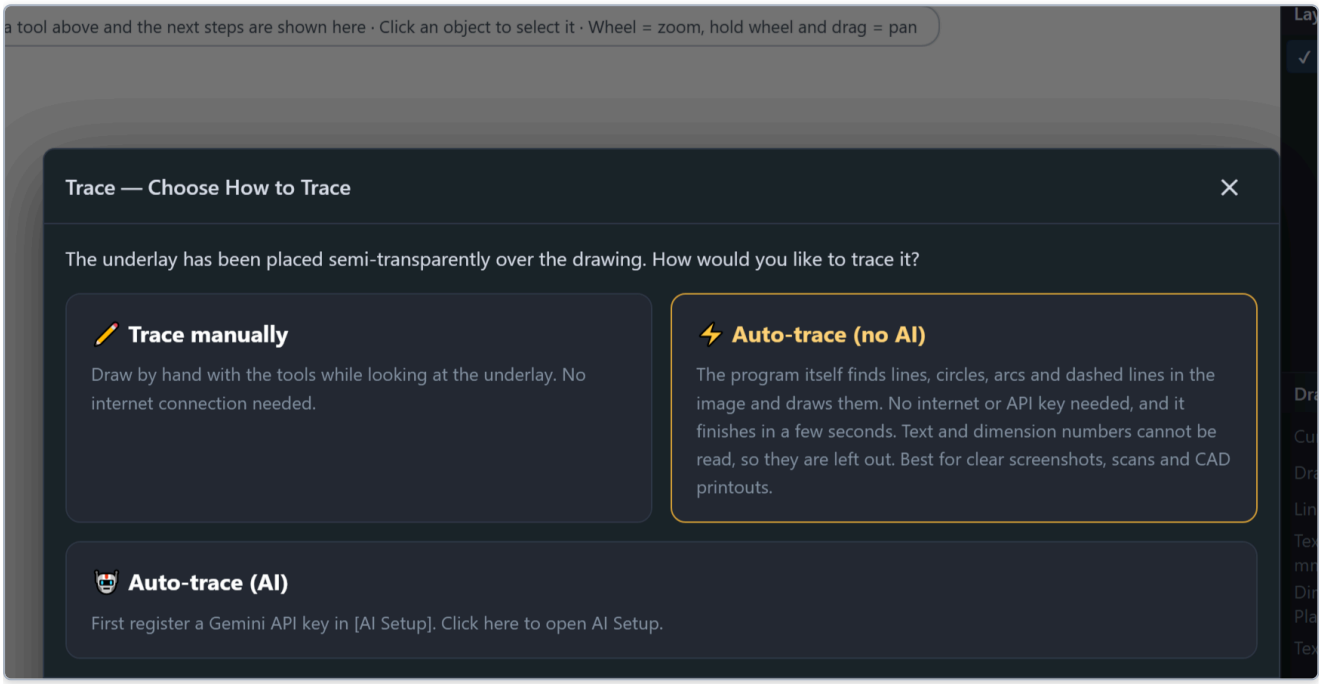


Figure 35. With an underlay placed, it asks how you want to trace: Manually / ⚡ Auto (no AI) / 😈 Auto (AI)

Method	Description
✏️ Trace manually	Draw with the tools while looking at the underlay. Use **[📏 Set Real Length]** first to match the size and your dimensions will be accurate.
⚡ Auto (no AI)	The program finds and draws the lines · circles · arcs · dashed lines itself. No internet or key is needed and it finishes in a few seconds. It cannot read text or dimension numbers.
😈 Auto (AI)	Gemini AI reads even the text and dimensions and draws them. You must register a paid API key in **[AI Settings]**, and the image is sent to Google's servers.

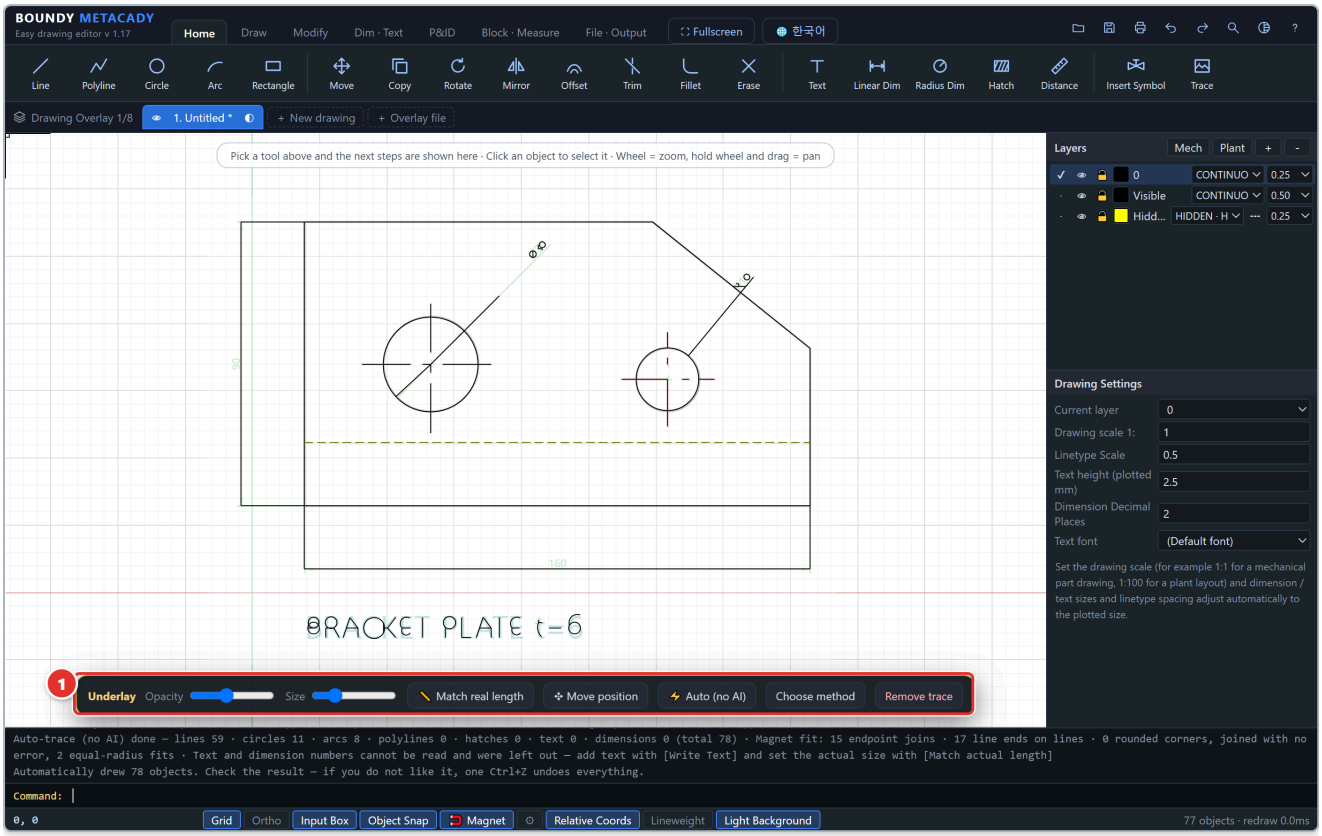


Figure 36. The ⚡ Auto (no AI) result. ① The underlay bar: transparency · size · set real length · reposition · auto · choose method · remove underlay

Tip After auto-drawing, a "magnet cleanup" runs that snaps touching endpoints · rounded corners together with no error. If you don't like the result, a single Ctrl+Z undoes the whole thing.

Chapter 9

Save, Open & Print

9.1 Saving and Opening

Format	Use
.mcd	This program's native format. You can reopen it to keep editing, and overlaid sheets are saved with it. **[Save]** (Ctrl + S)
DWG	AutoCAD files, **open only** (AutoCAD 2004 – 2018 formats). After editing, save as .mcd or DXF.
DXF	The format for exchanging with other CAD programs. Both open and save are supported. Saving uses AutoCAD 2000 format, so hatches · multiline text · dimensions are kept as-is; open it in AutoCAD and save as DWG.
PDF · JPG · PNG · transparent PNG · SVG	Choose from **[Export]**. You can set the paper · orientation · scale · resolution.

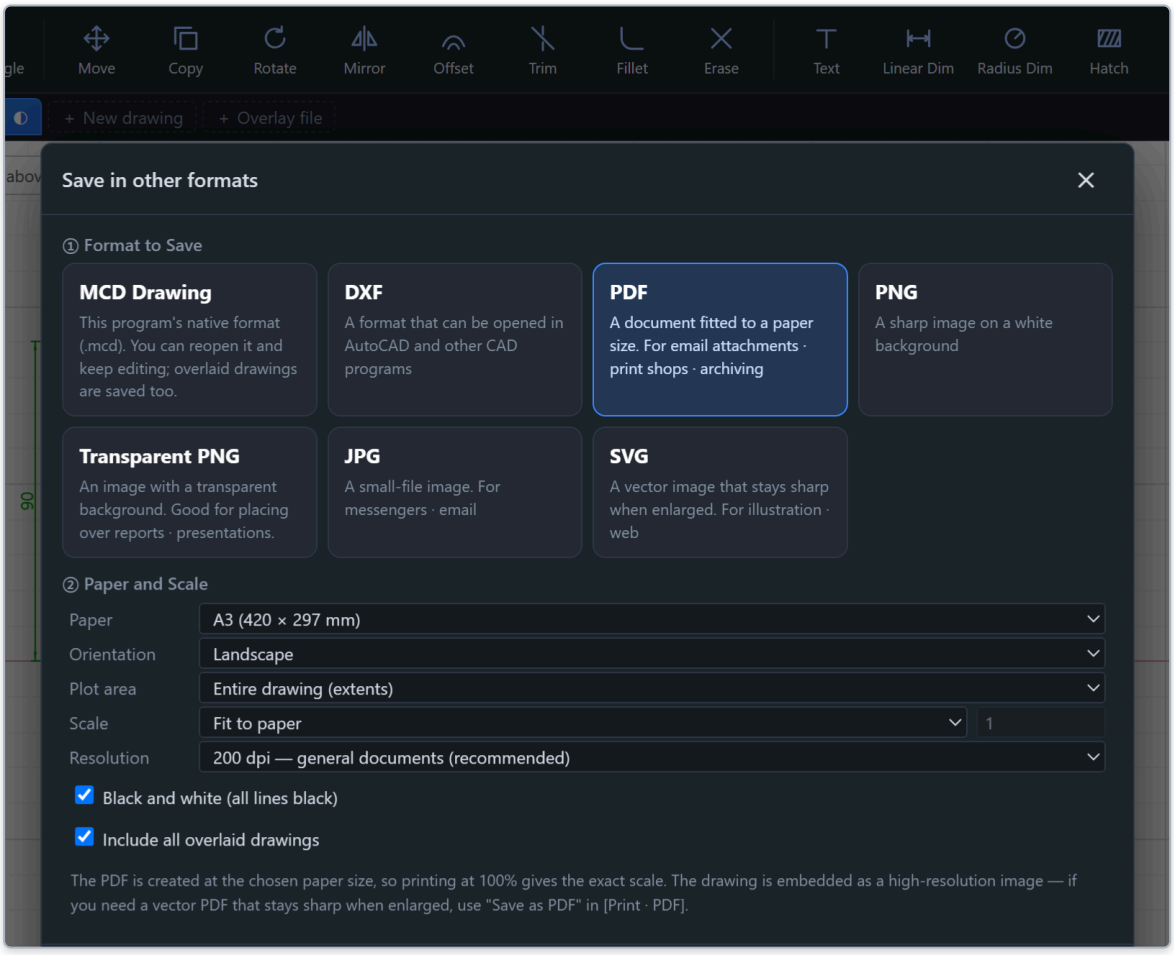


Figure 37. The [Export] window

Note The program auto-saves, but for important drawings always make a .mcd file with **[Save]**.

9.2 Printing

1. **[Print · PDF]** (Ctrl+P) is pressed.
2. Choose the paper (A0–A4 · B1–B4), orientation, print area, scale (fit to paper or 1:n), and whether to print in black and white.
3. Plant process drawings are usually printed on **A3**. Draw the **[Border & Title Block]** at the same paper and the same scale and it fits the sheet exactly.

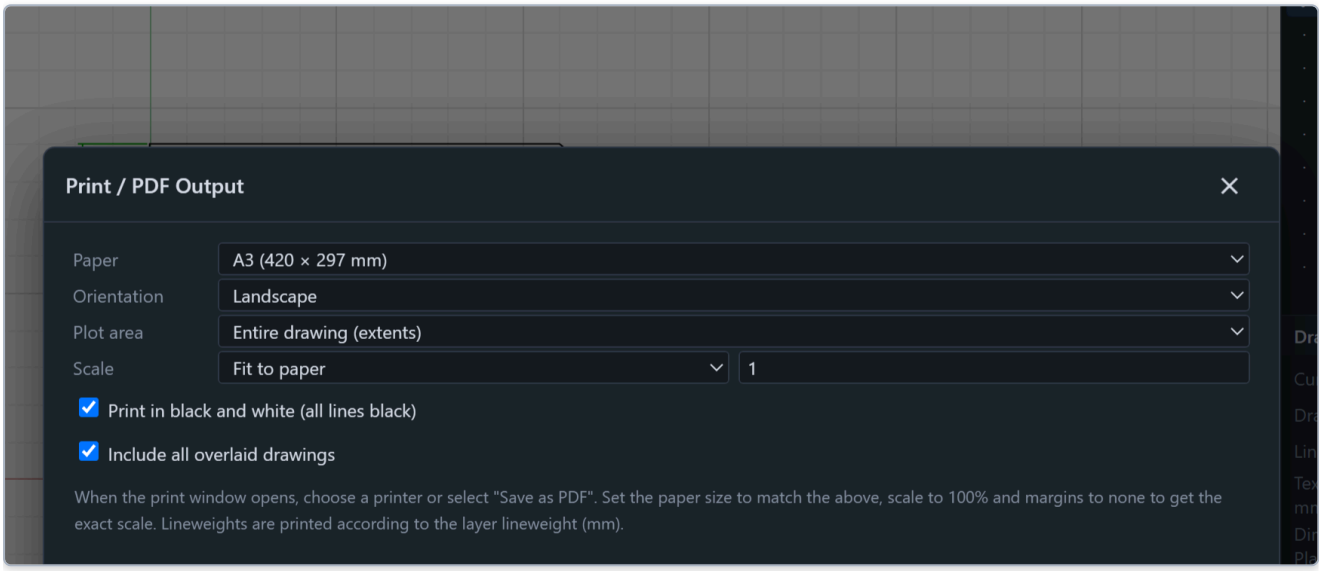


Figure 38. The [Print · PDF] window

9.3 Overlaying Drawings

Just as you overlay equipment · piping drawings on an architectural drawing, you can overlay up to 8 drawings. Only the active (blue tab) drawing is edited; the rest show faintly as an underlay, and snaps still work on them.

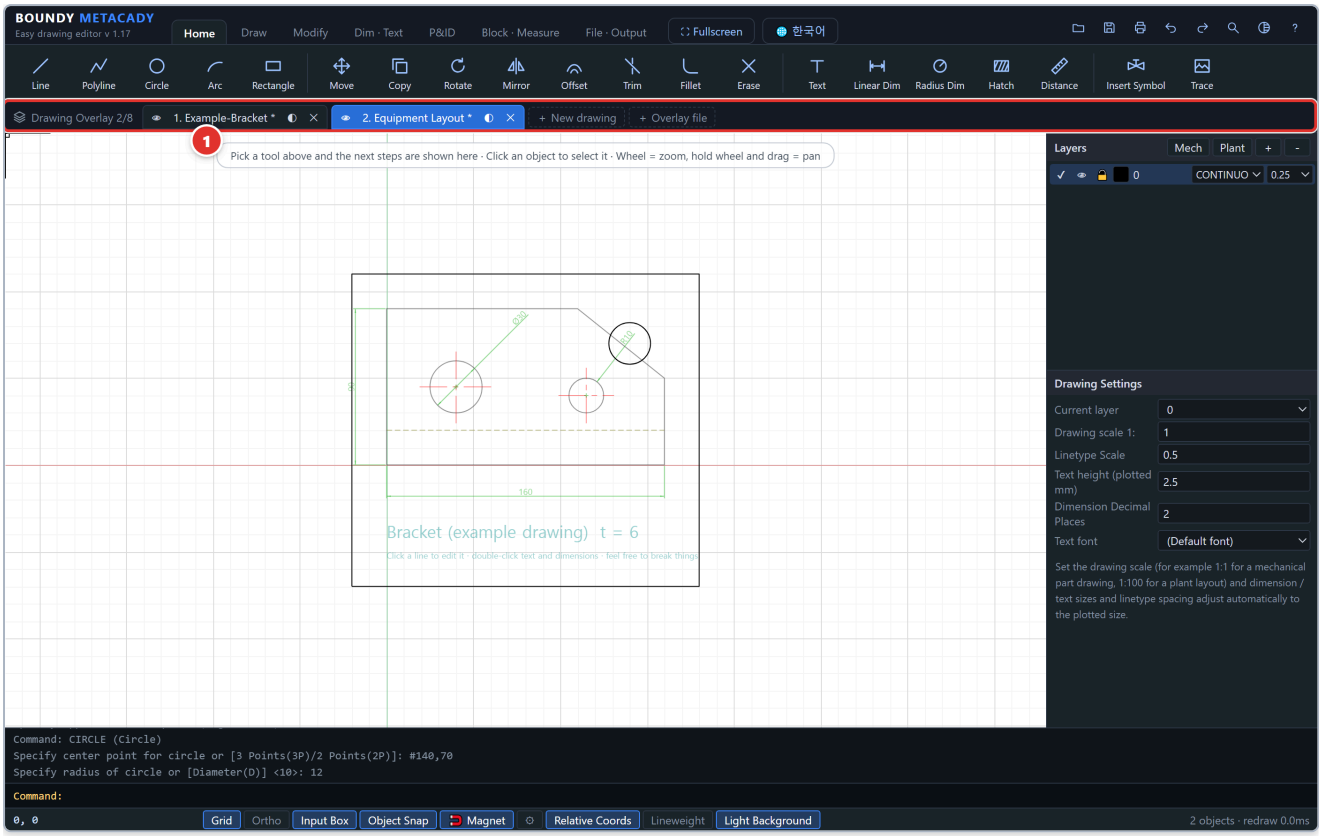


Figure 39. ① The sheet overlay bar: click a tab = switch the active drawing, 👁 show/hide, ◐ faint/strong, ✕ remove, + new drawing / overlay a file

Chapter 10

Hands-On: A Bracket Part Drawing

Draw the same bracket as the sample drawing from scratch. It takes about 10 minutes.

1. Press **[Mechanical]** on the layer panel to create the mechanical-part layers. Click the [·] at the front of the **Outline** row to make it the current layer (✓).
2. Press **[Polyline]** and type in turn in the input box: **0,0** Enter → **160,0** Enter → **0,50** Enter → **-50,40** Enter → **-110,0** Enter → **[Close]** on the guide bar. (From the second point on, values are relative to the previous point.)
3. **[Circle]** → diameter 30 → **[Place on Drawing]** → type **#40,45** Enter in the input box → Enter. In the same way, place a diameter-20 circle at **#115,40**.
4. Make the **Centerline** layer current and press **[Centerline]**, then click the two circles.
5. Make the **Hidden** layer current and press **[Line]** → **#0,20** Enter → **#160,20** Enter → Enter.
6. **[Linear Dimension]**: click the two endpoints of the bottom edge and click a spot below for the dimension line. Do the left edge the same way.
7. Use **[Diameter Dimension]** on the large circle and **[Radius Dimension]** on the small circle, then click where the text goes.
8. **[Text]** → content "Bracket t = 6", height 7 → **[Place on Drawing]** → click below the shape.
9. **[Border & Title Block]** → A4 landscape → enter the drawing name → click the bottom-left corner so the shape falls inside the border.
10. Make a .mcd file with **[Save]**, then try **[Print · PDF]** → A4 landscape · 1:1.

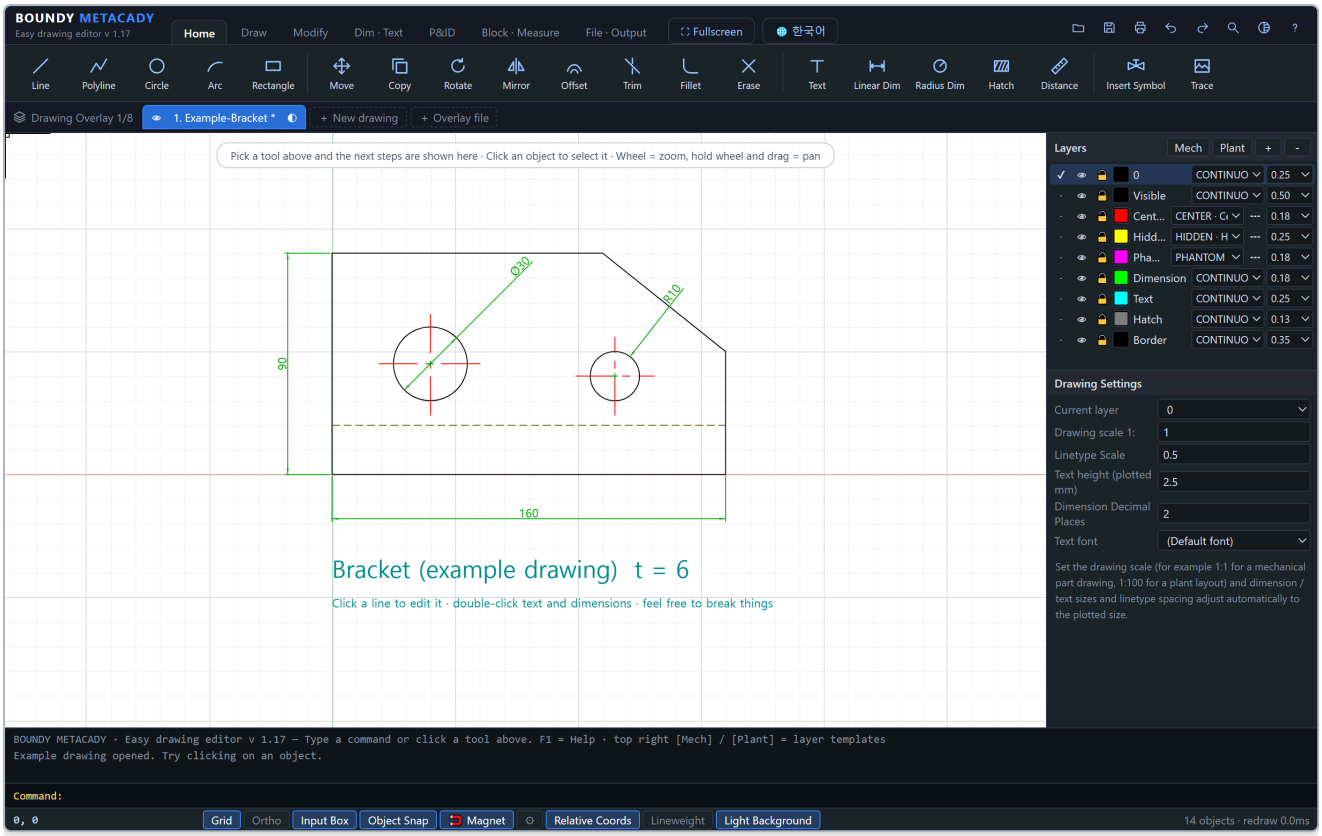


Figure 40. The finished result (same as the sample drawing)

Tip If you get stuck, press **Esc** to quit and start over. If you placed a point wrong, press **Ctrl**+**Z**.

Chapter 11

Measuring, Blocks, Hatching & Arrows

11.1 Measuring

Tool	Use
[Measure Distance]	Click two points and the distance · angle · horizontal · vertical length appear in the history log.
[Measure Area]	Click points in turn to measure the enclosed area and perimeter.
[Object Info]	View the length · radius · area and more of a selected object. Select a single object and the length · angle · area also appear at the bottom of the Properties panel.

11.2 Blocks — Making a Frequently Used Shape into One Piece

1. Select the objects to make into a block and press **[Create Block]**.
2. Enter a block name and click the insertion base point (the point that sticks to the mouse when placing).
3. **[Insert Block]** → choose the name and place it as many times as you like. You can set scale · rotation.
4. To break a block into individual pieces, use **[Explode]**.

> **Tip** For shapes you will reuse across many drawings, **[Save as Reference]** (section 7.6) is handier than a block. A block lives only inside that one drawing, while a reference can be pulled into any drawing. If you just want to treat things as one piece for a moment, **[Group]** (Ctrl+G) is simplest.

11.3 Hatching

1. Select the shape to fill (a closed rectangle · circle, or lines whose ends meet).
2. Press **[Hatch]** and set the pattern (diagonal / grid / solid), color, line spacing, and slope.
3. Press **[Apply]**. [Solid] is sent to the back so it does not cover lines and text.

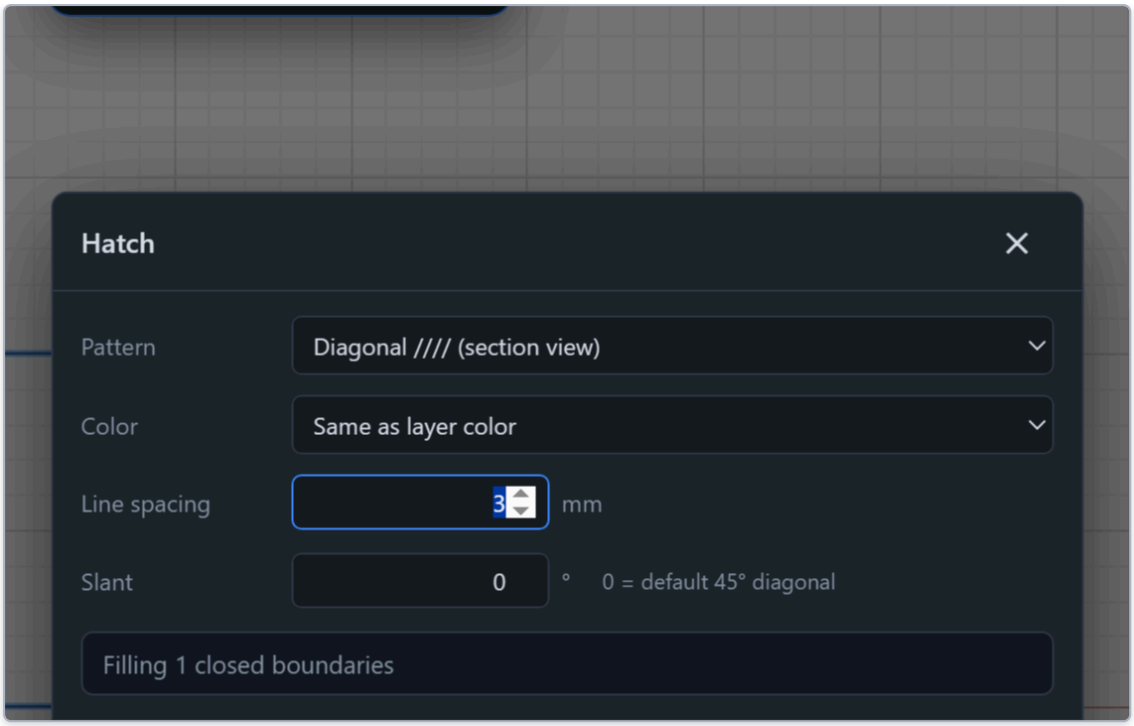


Figure 41. The [Hatch] window

11.4 Block Arrows · Balloons · Connector Labels

These three are used often in explanatory drawings and process flow diagrams. For the **[Block Arrow]**, set the thickness and head size, then click the start and end points. The **[Balloon]** number increases by 1 each time you place one. The **[Connector Label]** box is built to fit the text length.

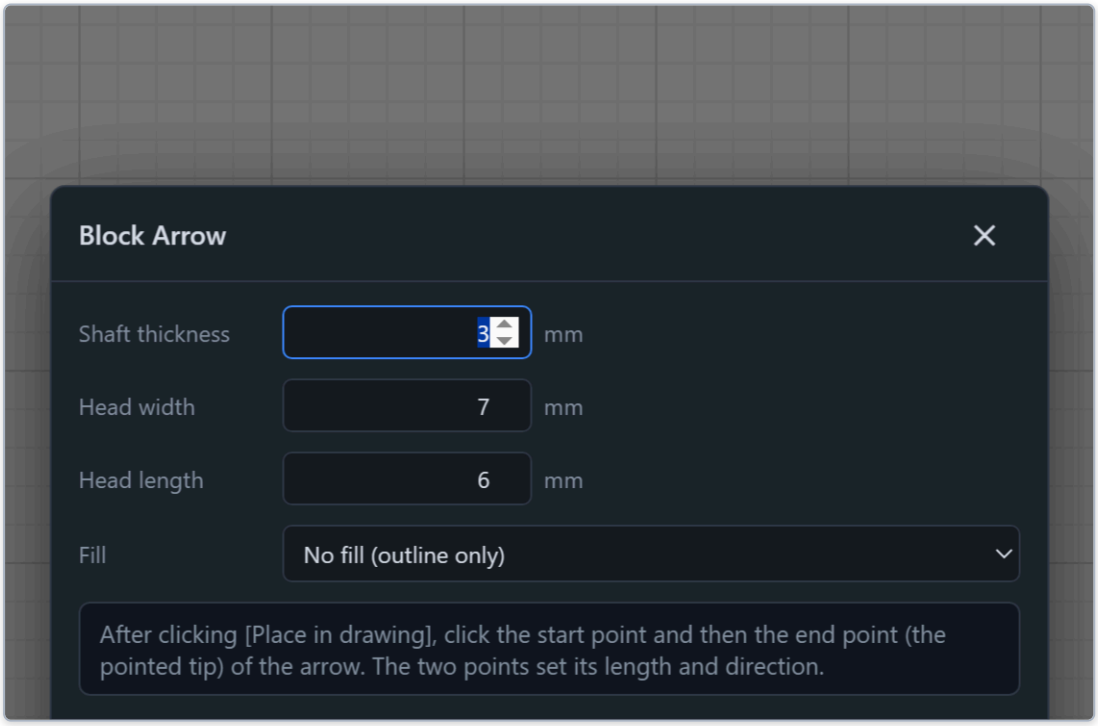


Figure 42. The [Block Arrow] window

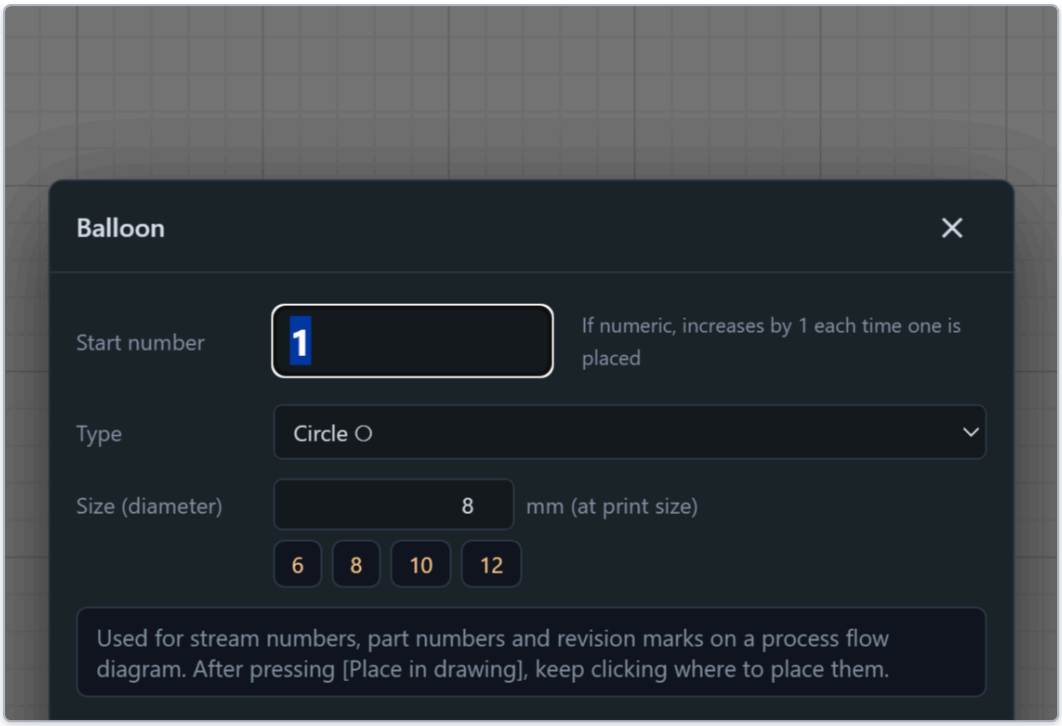


Figure 43. The [Balloon] window

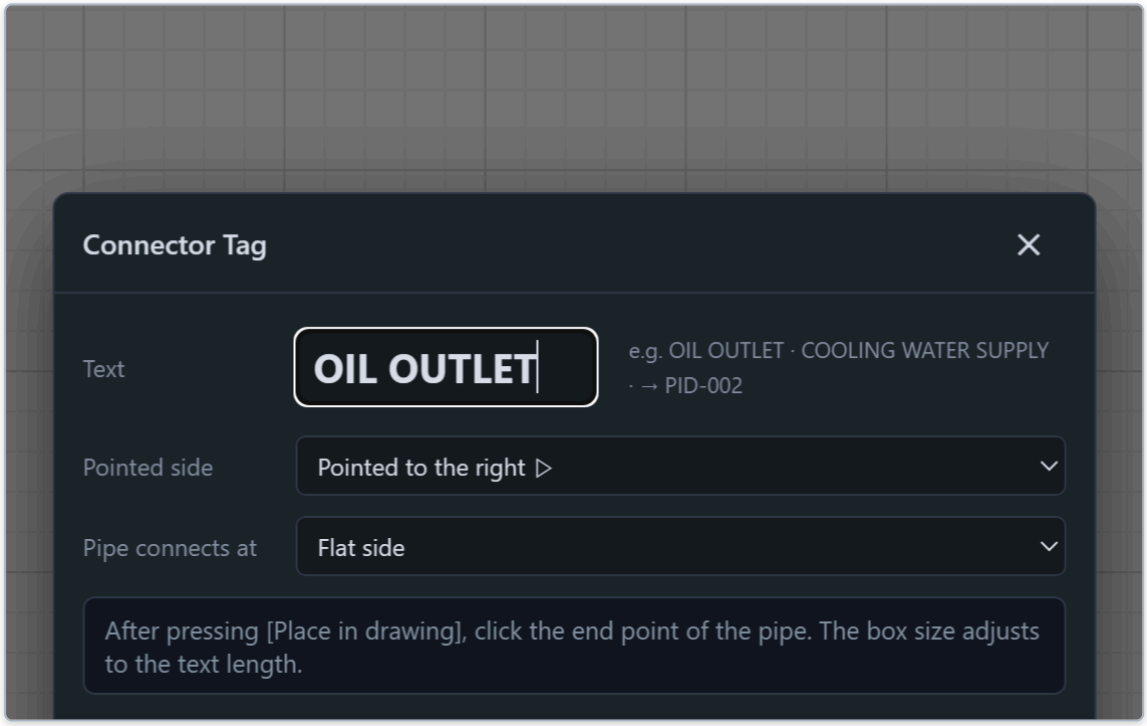


Figure 44. The [Connector Label] window

Chapter 12

Hands-On 2: A Simple P&ID

Draw a simple diagram of flow from a tank, through a pump, and out. It takes about 15 minutes and practices the Chapter 7 tools in order.

1. Press **[Plant]** on the layer panel to create the plant-drawing layers. Make **Piping-Process** the current layer (✓).
2. With nothing selected, leave **Drawing scale 1:** in the Properties panel at 1 (symbols are drawn at exactly print size).
3. **[Line]** to draw the pipe: **#0,0** → **#200,0** Enter, then **[Line]** again → **#200,0** → **#200,60** Enter. Turn on **[Ortho]** (F8) and the mouse draws straight too.
4. **[P&ID]** tab → **[Insert Symbol]** → click **Manual Gate Valve** → click near (40,0) on the pipe → Enter. The line breaks automatically and the symbol goes in.
5. In the same way, add a **Centrifugal Pump** (near 90,0), a **Check Valve** (near 130,0), and a **Pneumatic Control Valve** (near 170,0). Placed on the vertical pipe, symbols turn vertical on their own.
6. **[Insert Symbol]** → place a **Storage Tank** from the equipment group above the left end of the pipe.
7. **[Instrument Tag]** → function letters **FIC**, number **101**, type **DCS screen** → click an empty spot above the control valve → Enter. Then **[Instrument Tag]** again → **FT** / 101 / field instrument → click above the pipe.
8. **[Signal Line]** → **Electric signal** → click the turning points from FT to FIC → Enter. Then with **Pneumatic signal**, draw from FIC to the head of the control valve.
9. **[Pipe Number]** → **2"-P-1001-A1A** → click on the pipe.
10. **[Connector Label]** → text **TO REACTOR** → pointed on the right, flat side → click the top end of the vertical pipe.
11. **[Border & Title Block]** → A3 landscape → enter the drawing name · number → click the bottom-left corner so the drawing falls inside the border.
12. **[Legend]** and **[Tag List]** → use **[Insert as table into drawing]** to place the legend and instrument list in empty spots.
13. **[Save]**, then **[Print · PDF]** → A3 landscape · 1:1.

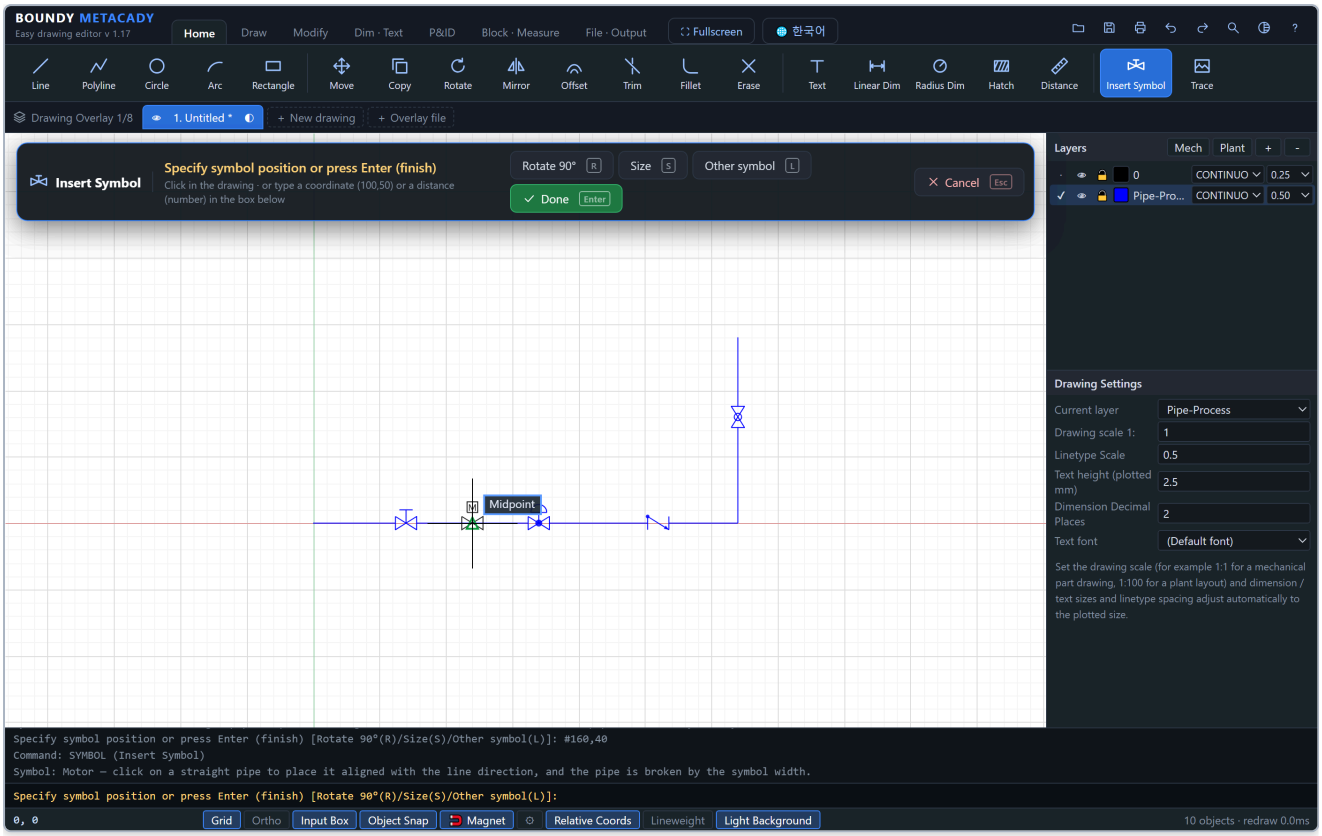


Figure 45. Steps 4–5: placing symbols on the pipe

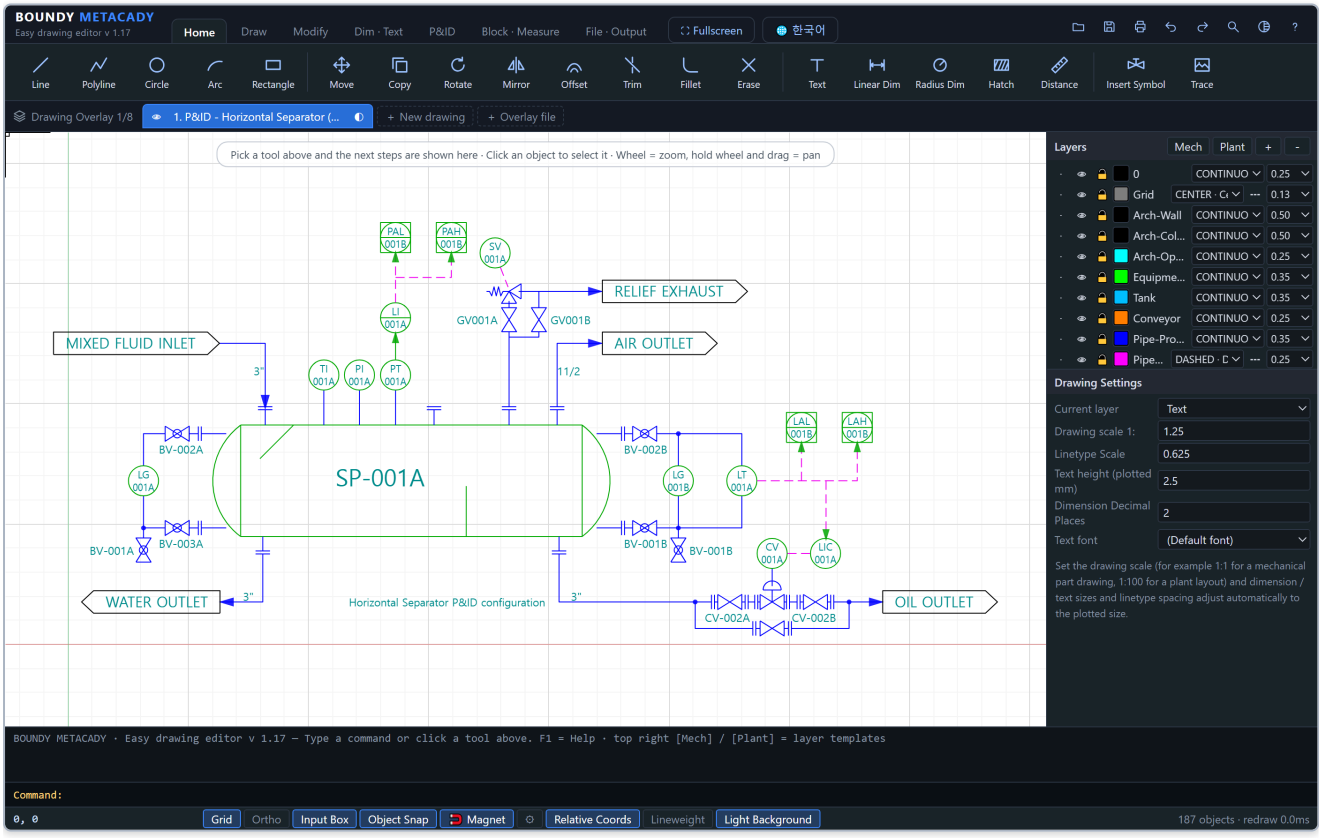


Figure 46. When finished, you can draw a diagram like this (a horizontal-separator example)

For AutoCAD users The same work at the command line: L (Line) · SYM (Insert Symbol) · INST (Instrument Tag) · SIG (Signal Line) · LN (Pipe Number) · TB (Title Block) · LEG (Legend) · TL (Tag List)

Appendix

Shortcuts, Help & Troubleshooting

A. Shortcuts

Key	Function
F1	Help (descriptions of every button · search · [Try it])
F3 F7 F8 F9 F12	Toggle Object Snap · Grid · Ortho · Magnet · Relative coordinates
Ctrl + Z / Y	Undo / Redo
Ctrl + S / O / N / P	Save / Open / New drawing / Print
Ctrl + A / C / V / D	Select all / Copy / Paste / Duplicate
Ctrl + G / Ctrl + Shift + G	Group / Ungroup
Arrow keys (Shift = 10×)	Nudge the selected object
Delete / Esc	Erase / Cancel · clear selection

The small letters inside a button (M · CO · RO · Enter · Esc …) are that button's shortcut. For a letter shortcut, type the letter in the input box and press Enter.

B. Help and Checking the Version

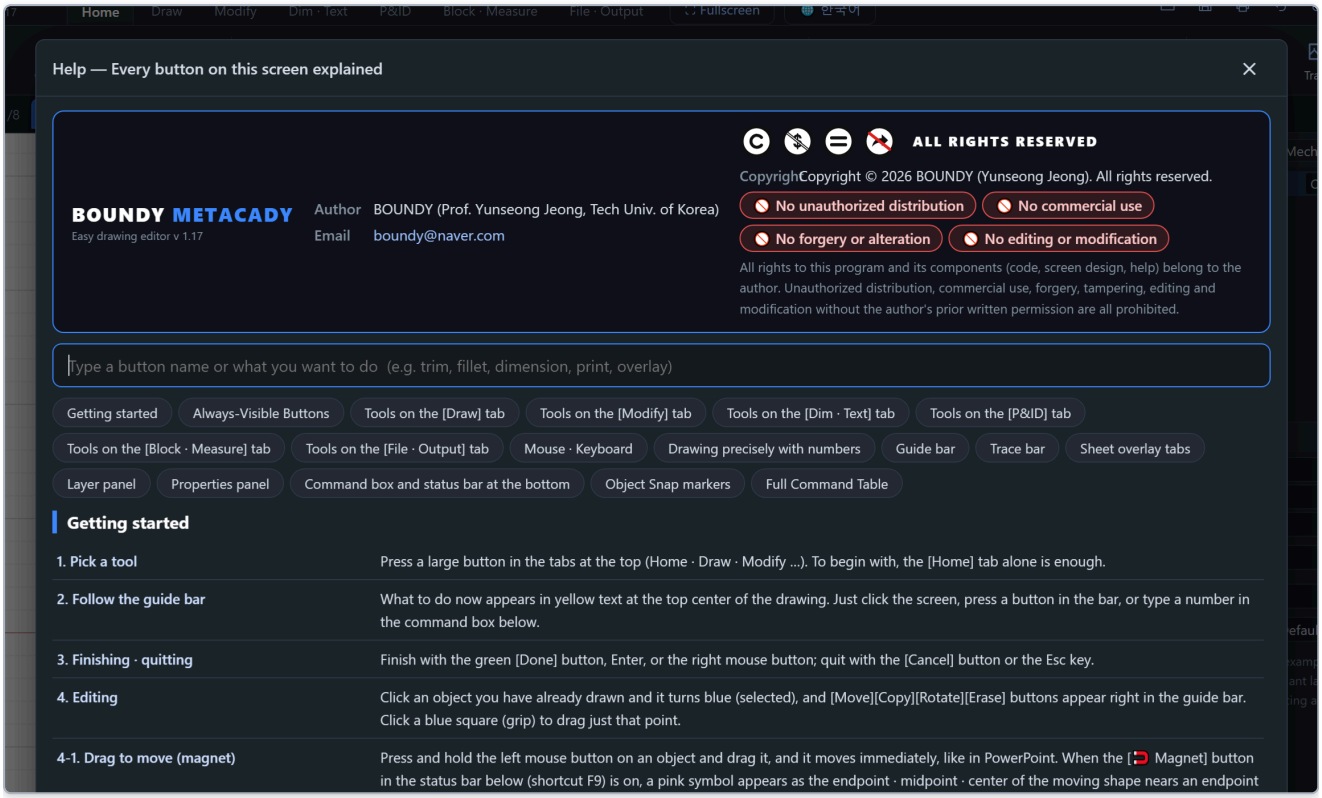


Figure 47. [Help] (F1) — the order of use, a description of every button, search, and [Try it]

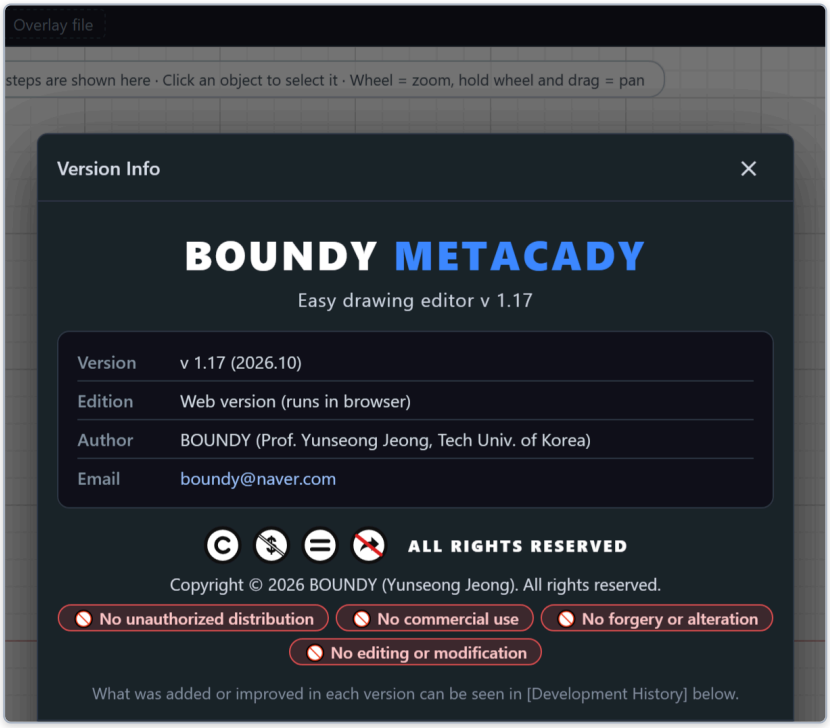


Figure 48. Click the logo at the top-left to see the version info and the [Revision History]. This manual is based on v 1.17.

C. Troubleshooting

Symptom	Fix
The drawing is not visible or looks tiny	**[Zoom Extents]** or double-click the wheel
Lines draw only horizontally or vertically	**[Ortho]** (F8) is on. Turn it off.
The mouse keeps sticking to something	Turn off **[Object Snap]** (F3) or **[Magnet]** (F9).
I pressed a button but no window appeared	**[Input Box]** on the status bar is off. Turn it on.
Dashed lines look like solid lines	With nothing selected, lower [Linetype scale] in the Properties panel, or adjust [Dash length · gap].
A DWG file will not open	Formats before AutoCAD 2000 are not supported. Save as a 2004-or-later format or as DXF in AutoCAD.
Only a few fonts show up	Press **[+ Load all Windows fonts...]** at the bottom of the font list and allow it.
AI auto-trace does not work	If the **[AI Settings]** button is red, the key is missing or expired. Register the key again or use Auto (no AI).