

JUMBO BLOCK ENGINEERING SUITE

JUMBO BLOCK Calc

User Manual · Version 2.0.0

© 2026 ZANNI GROUP
<https://jumboblock.org>

Table of Contents

1. Overview
2. Getting Started
3. Basic Calculator
4. Scientific Functions and Memory
5. Percentage Calculation
6. Geometry Calculator
7. JUMBO BLOCK Area Fit
8. Unit Conversion
9. JUMBO BLOCK Module Calculator
10. Calculation History
11. Exporting and Importing History
12. PDF Report
13. Language (German/English)
14. Keyboard Controls
15. Limitations, Notes and Best Practices
16. Quick Reference of Icons and Buttons

1. Overview

JUMBO BLOCK Calc is the fast scientific web calculator of the JUMBO BLOCK Engineering Suite. It combines a basic calculator with scientific functions, a geometry calculator with direct JUMBO BLOCK area fitting, a unit converter, a JUMBO BLOCK module calculator, and a searchable calculation history with PDF report.

The program runs entirely locally in the browser as a single HTML file. There is no cloud connection, no server, and no user account.

Unlike HYDRO, PLAN, BUDGET, STATIC and TEMP, CALC does not read or write the suite's shared project.dbm. The calculation history is instead exported and imported in its own, CALC-specific file format (chapter 11) — there is no direct data exchange with the other suite tools.

CALC is one of several standalone tools in the suite (including HYDRO, PLAN, BUDGET, STATIC, TEMP, Project).

2. Getting Started

When calc.html is opened for the first time, the display shows “0”, the calculation history is empty, and the “Geometry” tab is active. Operation is via the on-screen keys, the keyboard (chapter 14), or a combination of both.

There is no persistent storage of the calculation history in the browser (only the selected language is remembered locally). The history exists only in the memory of the open page until it is deliberately saved as a file via “Export” (chapter 11); reloading the page discards it.

3. Basic Calculator

The display shows the running expression at the top (grey) and the current result or input below it (large, white). Digits 0–9, the four basic operations ($\div$, $\times$, $-$, $+$), parentheses, and a decimal separator (comma in German, period in English) are available as keys.

CE clears only the current entry, C clears the entire expression, the Backspace button deletes backward character by character, $\pm$ reverses the sign of the current entry.

Opening parentheses automatically insert a multiplication sign where needed, if a number or closing parenthesis directly precedes the parenthesis (e.g. “5(” automatically becomes “5×(”) — matching the implicit multiplication common in calculators. Pressing “=” automatically completes any missing closing parentheses.

Every basic calculation completed via “=” is automatically added to the calculation history (chapter 10). If an expression is invalid (e.g. incomplete or a division by zero), “Error” is shown in the display.

4. Scientific Functions and Memory

The second row of keys provides scientific functions: π (pi), $\sqrt{}$ (square root), x^2 (square), x^3 (cube), x^y (power, treated like an operator), $1/x$ (reciprocal), $x\%$ (direct percentage conversion), EXP (scientific power-of-ten entry), and sin, cos, tan, asin, acos and atan.

All trigonometric functions work in degrees, not radians. tan refuses the calculation for values whose cosine is practically zero (vertical asymptote); asin and acos refuse the calculation outside the valid range of -1 to 1.

Four memory keys are available: MC clears the memory, MR recalls the stored value, M+ adds the current entry to the memory, M- subtracts it. A small “M” appears in the top-left of the display as soon as a non-zero value is held in memory.

5. Percentage Calculation

The % key on the basic keypad behaves contextually: if it directly follows an addition or subtraction (e.g. “200 + 10 %”), the percentage is automatically calculated relative to the preceding base value — so the result of “200 + 10 %” is 220, not 200.10. In all other cases (e.g. after multiplication, division, or as a standalone entry), the current number is simply divided by 100.

The scientific x% key behaves differently: it always converts the current entry directly into a percentage value (division by 100), regardless of the preceding operator.

6. Geometry Calculator

The “Geometry” tab offers five calculation types: rectangle area (length × width), cuboid volume (length × width × height), circle area ($\pi \times \text{radius}^2$), cylinder volume ($\pi \times \text{radius}^2 \times \text{height}$), and triangle area (base × height ÷ 2). Depending on the selected calculation type, only the actually required input fields (value A/B/C) are automatically enabled and labelled accordingly.

A unit selector (mm, cm, or m) determines the unit in which values are entered; the result appears in the corresponding area (²) or volume (³) unit of the same base unit. There is no automatic unit conversion between the input fields — all values in a calculation must be given in the same selected unit.

The “=” button calculates the result and adds it to the calculation history. If a required value is missing or not positive, “Error” is shown.

7. JUMBO BLOCK Area Fit

For the rectangle area, circle area, and triangle area calculation types, an additional “JUMBO BLOCK” button is available (it is hidden for cuboid volume and cylinder volume, since these are not flat areas). It determines how many square JUMBO BLOCK modules (2.5 × 2.5 m) fit completely inside the entered area.

An additional “Working clearance per edge” field (default 0.50 m) defines a surrounding safety margin from the area’s edge, which is subtracted from the usable area before module fitting.

For the rectangle area, the module count is calculated directly from the usable length and width (each rounded down to whole 2.5 m steps, then multiplied). For circle and triangle areas, CALC uses a grid-based search: it tests several possible grid offsets for a 2.5 m grid (up to 20 test positions for smaller areas, fewer for very large areas for performance reasons) and selects the position with the highest number of modules lying completely inside the area.

The result shows module count, occupied footprint (count × 6.25 m²), unoccupied remaining area, net volume (count × 13.9 m³), gross volume (count × 15.625 m³), and total weight (count × 4.205 t), and is also added to the calculation history.

8. Unit Conversion

The “Units” tab offers 14 fixed technical conversions: mm ↔ m, cm ↔ m, m² ↔ ha, l ↔ m³, kg ↔ t, kN ↔ N, and MPa ↔ N/mm² (numerically identical, conversion factor 1). Enter a value, select the conversion, press “=” — the result appears in the target unit and is added to the calculation history.

9. JUMBO BLOCK Module Calculator

The “JUMBO BLOCK” tab directly multiplies an entered module count by the fixed technical figures of the standard module: net volume 13.9 m³ per module (water storage), gross volume 15.625 m³ per module (excavation), and total weight 4.205 t per module. The three result values already update live with every input, without needing to press “=”, “=” additionally adds the current state to the calculation history.

10. Calculation History

Every completed calculation from the basic calculator, the geometry calculator (including the JUMBO BLOCK area fit), the unit converter, and the module calculator appears consecutively numbered in the right-hand column, with the original expression or inputs and the complete result. Results with multiple figures (e.g. area fitting) show all values as detail lines underneath.

Clicking a history entry with a single numeric result (basic calculation or unit conversion) loads that value directly back as a new entry in the basic calculator — allowing an earlier result to be reused immediately. Entries with multiple figures (geometry, area fit, module calculator) are not clickable in this way.

The “Clear history” button empties the list immediately and without confirmation.

11. Exporting and Importing History

“Export” saves the entire current calculation history as a standalone JSON file named YYYYMMDD_HHMMSS_calc.dbm. This file is explicitly not an excerpt of the suite's shared project.dbm, but its own CALC format, identifiable by the field “application”: “CALC” within the file; unlike HYDRO, PLAN, BUDGET, STATIC and TEMP, no SHA-256 hash check takes place.

“Import” opens the file selection dialog and reads a file previously exported by CALC. If the file is not a valid CALC format (missing or incorrect “application” field, no history array), the message “Invalid CALC file.” appears and nothing is applied. A successful import completely replaces the currently displayed history with the file's contents.

12. PDF Report

The “PDF Report” button opens a new window with a standalone, print-ready report: date/time of creation, the complete numbered calculation history with all expressions and result lines, and a footer with a copyright notice. Within the report window, a separate “Print / PDF” button triggers the browser's print dialog.

If the calculation history is empty, the report shows a corresponding empty-state text instead of a list.

13. Language (German/English)

Language switching is handled via the suite's global menu (menue.js) above the tool. CALC fully switches all labels, the decimal separator (comma in German, period in English), and the PDF report between German and English, without altering the calculation history. The most recently selected language is remembered locally in the browser and automatically reapplied the next time the tool is opened.

14. Keyboard Controls

CALC can be operated entirely via the keyboard, as long as focus is not in an input field of another tab:

- 0–9: digit entry
- +, −, *, /, ^: basic operations and power
- (and): parentheses
- , or .: decimal separator
- %: percent (same logic as the on-screen key)
- Enter or =: calculate the result
- Backspace: delete the last character
- Escape: clear the entire expression (equivalent to “C”)
- Delete: clear only the current entry (equivalent to “CE”)

15. Limitations, Notes and Best Practices

- CALC does not exchange data with the shared project.dbm of the other suite tools; the export/import mechanism serves solely to save and restore its own calculation history.
- The JUMBO BLOCK area fit for circle and triangle areas uses a grid-based approximation with a limited number of tested grid offsets; for very large areas, the number of test positions is reduced for performance reasons. The result is a good approximation for axis-aligned fitting, but not an optimisation across arbitrary rotation angles.
- Without persistent browser storage, the calculation history is lost when the page is closed or reloaded, unless an export has been made.
- The tool's header shows Version 2.0.0; the exported .dbm file and the PDF report instead contain the version designation 1.7.7 — this discrepancy exists in the current source code and should be kept in mind when cross-checking version numbers.
- “Clear history” takes effect immediately and without confirmation; exporting beforehand is recommended if the current history should be preserved.

16. Quick Reference of Icons and Buttons

Icon / Button	Meaning
CE	Clears only the current entry
C	Clears the entire expression
Backspace	Deletes backward character by character

Icon / Button	Meaning
±	Reverses the sign of the current entry
M+ / M- / MR / MC	Add / subtract / recall / clear memory
JUMBO BLOCK	Calculates the module fit for the entered area
PDF Report	Opens the print-ready report of the calculation history
Export	Saves the calculation history as a standalone .dbm file
Import	Reads in a previously exported CALC history file
Clear history	Empties the calculation history immediately and without confirmation