KUEHNOPT Embedded cutting optimization V1.01

Manual incl. examples

Dr.-Ing. Thomas Kühn

Content

1 Introduction

KUEHNOPT is a software for optimizing cutting problems. The cutting plans (layouts) are calculated and shown. Optional labels are created and can be printed.

1.1 System requirements

- TK Panel Hardware
- TK Touch PC

1.2 Benefits

- The solution is shown in a few seconds.
- The optimizaion runs in background. New data input is possible immediately.
- Detailed cutting plan.

1.3 Cutting optimization

- [1D] bars, pipes.
- [2D] panels.
- [2D] PCB.
- [2D] Circles.

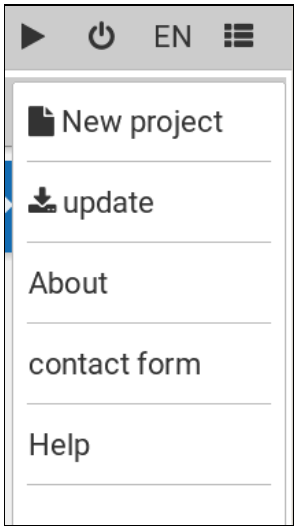
2 Customization

KUEHNOPT can be customized to your needs.

- Connection to your ERP / host system.
- Connection to your maschine, robot, plc or CNC.
- Embed or integrate into your software system.
- Support for any OS or CPU, e.g. embedded OS like Windows CE, Linux, vxworks, ECOS or QNX.

If you have any questions, please contact use.

3 Menue



Main menue on right side

The following functions are accessible from the menue:

Menue	Function	Description
New project	2D optimization	New project, clear current data
Update	Update firmware	**Before** choosing the menue item, insert an USB stick with a file kuehnopt.img.
Contact	Contact us	Show our email or homepage.
About	Information about the app	Software version and registration number.
Help	Short help	Basic steps explained.

Toolbar symbols/functions

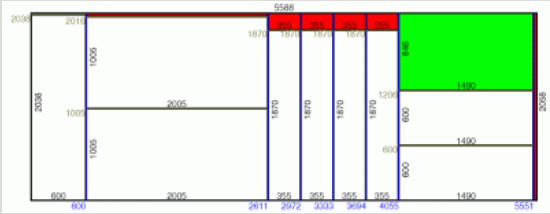
Menue	Function	Description
▶	start optimization	New project, clear current data
⏻	poweroff	shutdown the panel. **Recommended shutdown method!**
EN|DE|SP	toggle language	Switch between languages. **Project data is cleared!**
☰	Toogle menue	show/hide menue. To hide the menue, touch any area outside the menue area.

4 Optimization type

This page shows the supported optimization types.

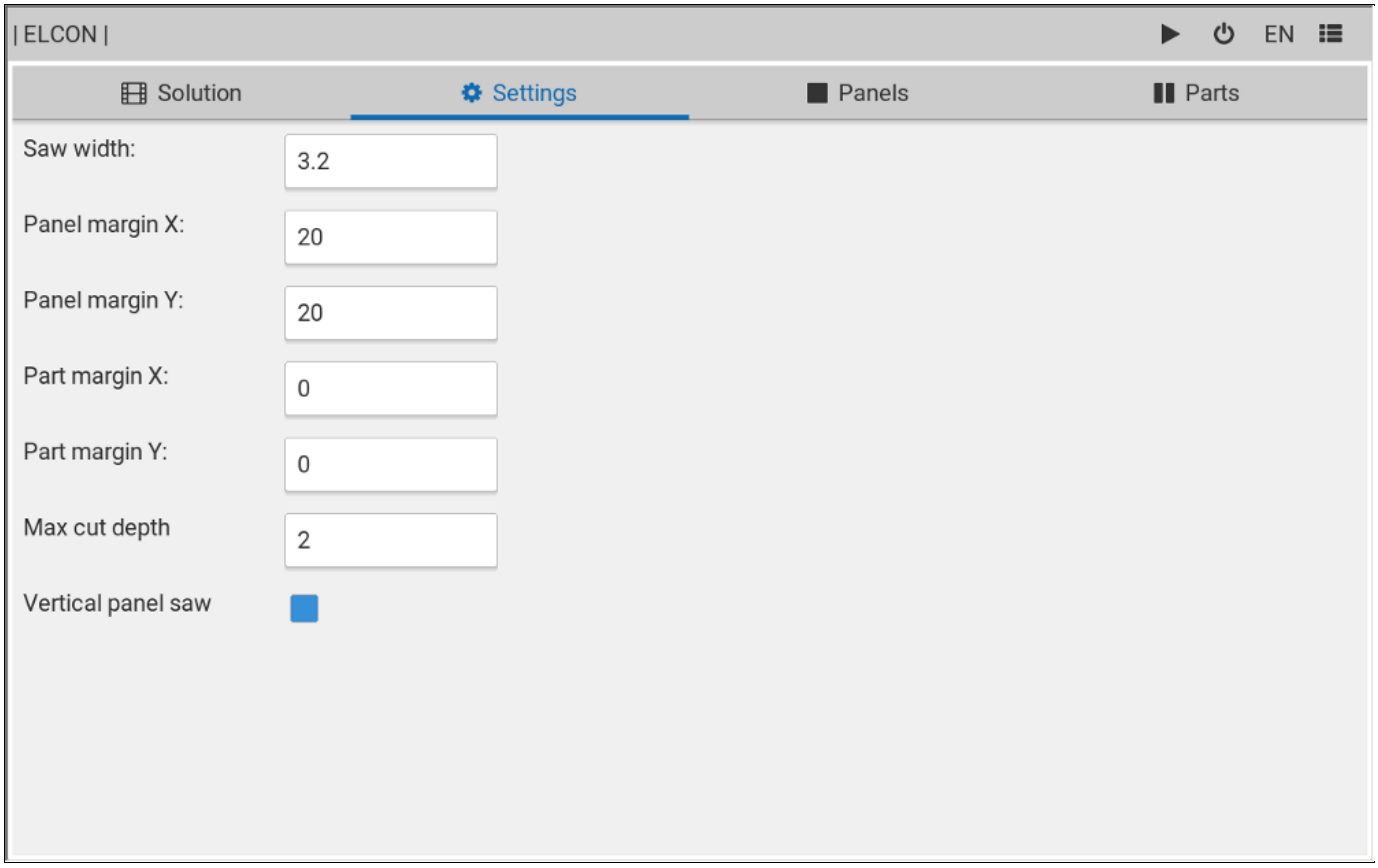
4.1 Cutting

Cutting panels [2D] stripe
Panel cutting optimization. Optional material, grain and saw width input. Choose this type to get a simple and fast cutable solution.



5 Create and edit a project

5.1 Cutting project fields

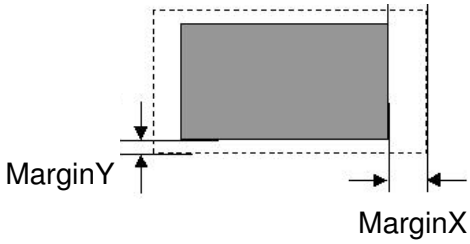


Cuttting project data

Saw width	Saw blade width, widthout unit. E. g. 3, for 3mm.
Max cut depth	Cutting complexity. The default value is 3. For higher values the layout is more nested and needs more cutting time, but the offcut is decreased. For best utilization set the value to greater than 40.
Vertical panel saw	Choose this option for a vertical panel saw. The bottom panel margin is cut at the end. The cuts are shown with the bottom margin offset.

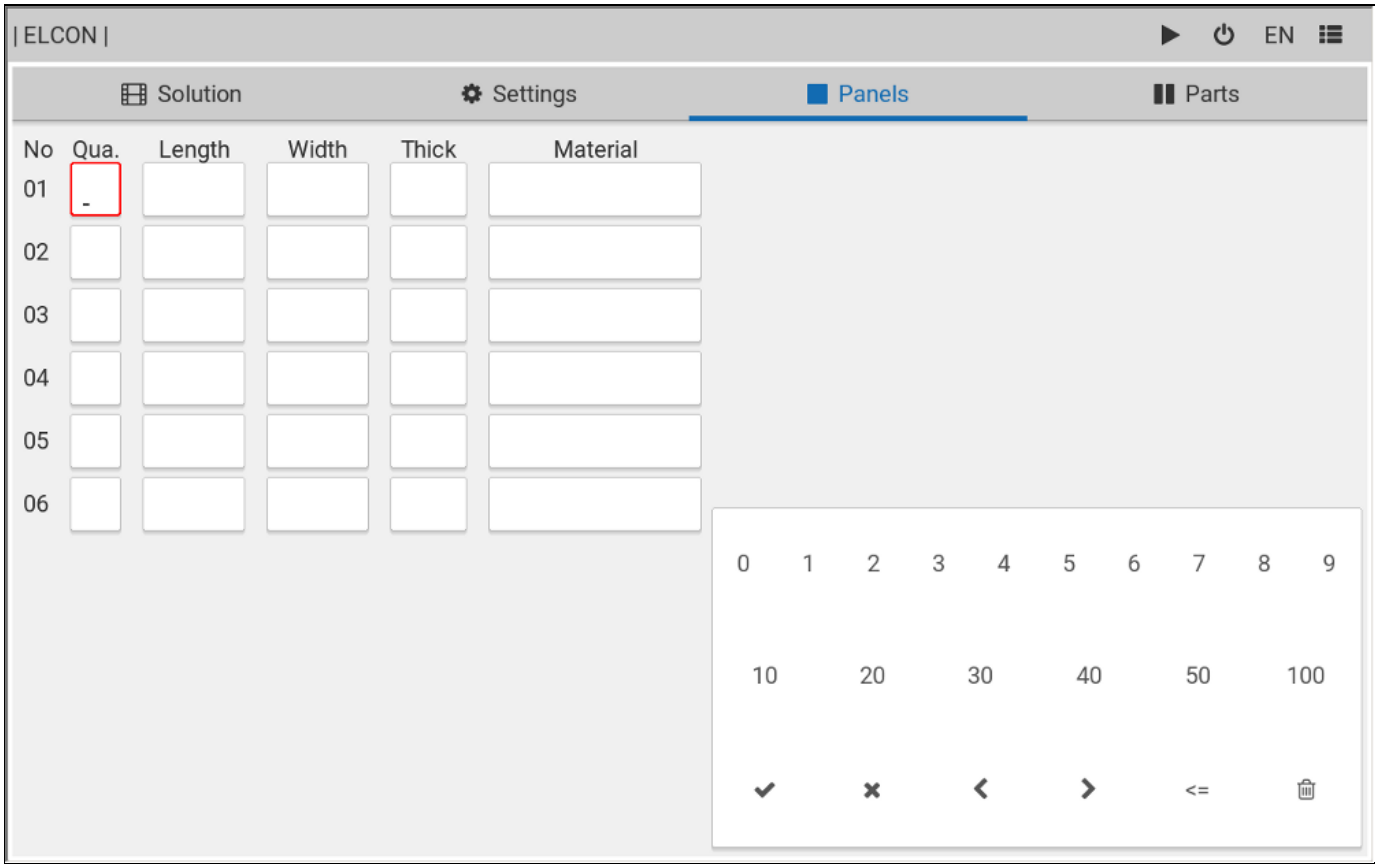
5.2 Margins

Margins may be added to pallets, panels and parts. For palletizing the margins increase the base area. That means, the number of palletized parts may increase. For panel margins the cutable area is decreased.


MarginY
MarginX

6 Panels

On this page the panel data can be edited.



Edit panels

Touch ✔ to get to the next field and ✖ to close the keyboard.

The default unit is mm, if no other unit is shown.
E. g. set length to 2000 means 2000mm.

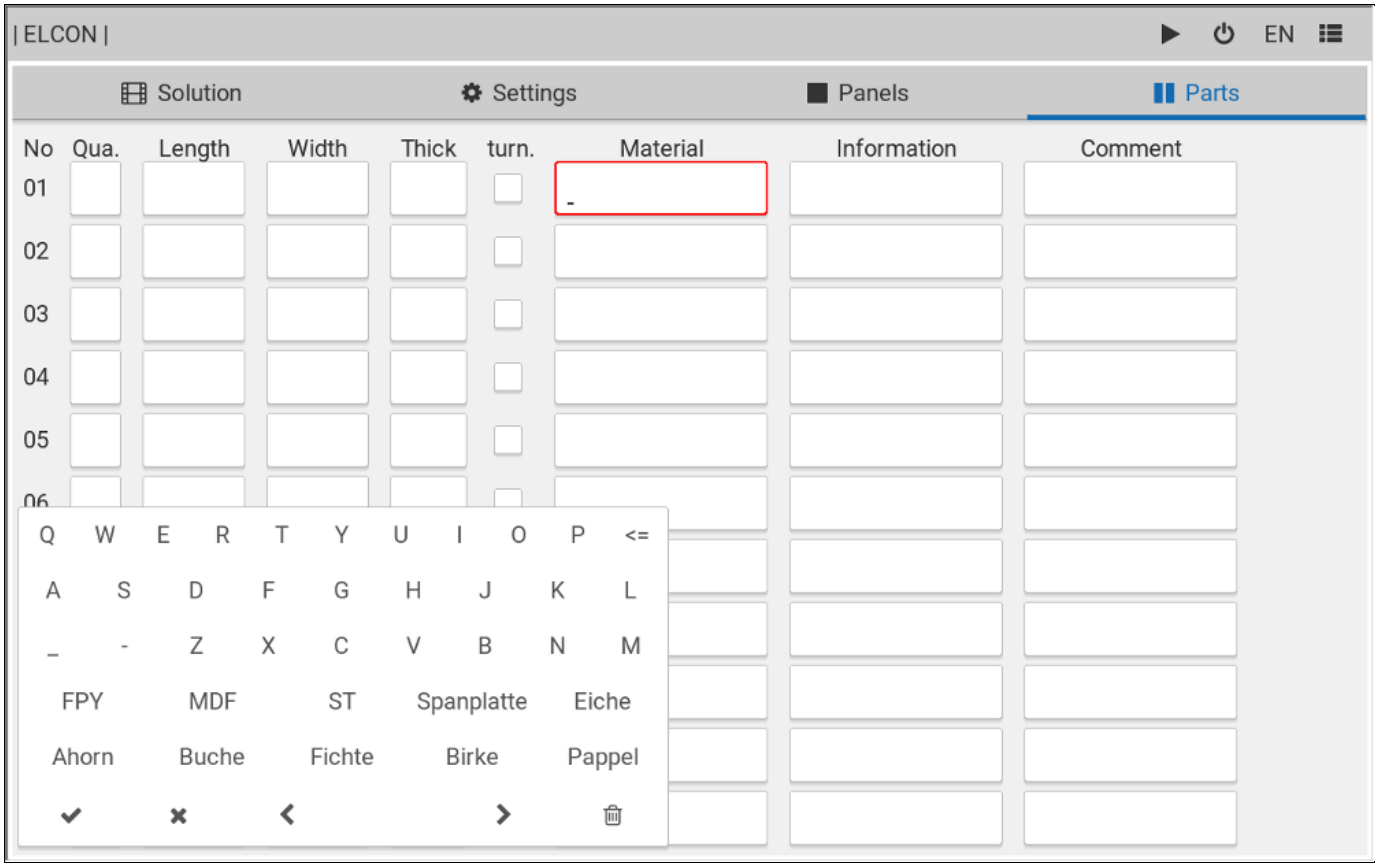
6.1 Panels input fields

Quantity	[Option] Number of usable panels (in stock). If there is no limit for the number of panels, clear the field (blank) or set the number to 0.
Length	Panel length. Example: 2000, means 2000mm
Width	Panel width. Example: 1000, means 1000mm
Thick/height	Panel height (thick). Example: 12, means 12mm
Material	[Option] Please enter your material and make sure that you are using the **exactly the same text** for panels and part. Example: MDF or FPY19.

7 Parts

On this page the part data can be edited.

7.1 Cutting part input fields



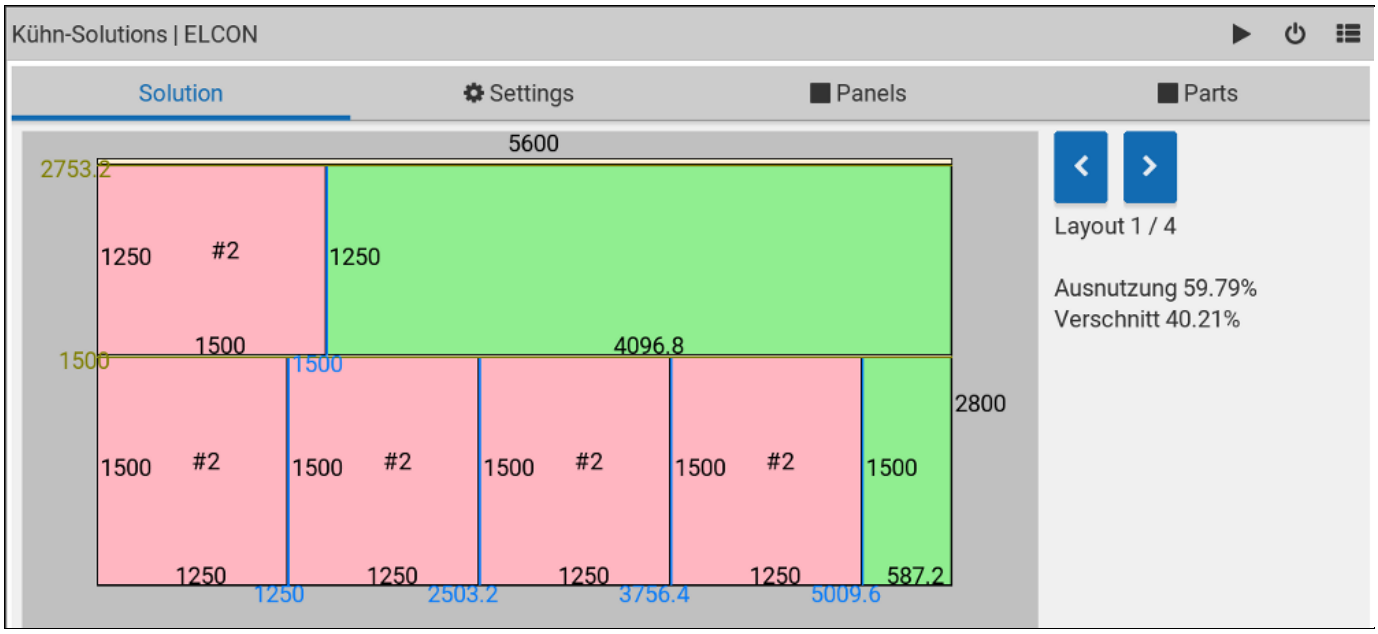
Edit parts

Quantity	Number of parts to be cut. Must be greater 0! Example: 100.
Length	Part length. Example: 400, means 400mm
Width	Part width. Example: 250, means 250mm
Thick	[Option] Part thick or height. Example: 12, means 12mm
turnable	[Option] Select turnable, if you have a material without grain, e. g. FPY19. The utilization will be much higher. If you have a grained Material, deselect the turnable option !
Material	[Option] Please enter your material and make sure that you are using the exactly the same text for panels and part. Example: MDF or FPY19.
Information	[Option] The information is shown in the cut plan if possible.
Comment	[Option] The comment is shown in the cut plan if possible.

For better utilization, select the turnable option if possible.

Finally touch  to start optimization.

7.2 Solution



Solution tab

To print a label, touch the part area (e.g. #2)!
Touch > to see the next layout, < for previous layout.

8 Samples

8.1 Sample cutting panel [2D]

A customer order contains the folowing values:

No.	Quantity	Length	MarginX	Width	MarginY	Thick	Material	Turnable	Information	Comment
1	unlimited	2540	0	1270	0	12	MDF	-	panel	no margin
#1	6	600	0	497	0	12	MDF	yes	door1	turnable
#2	2	620	0	1034	0	12	MDF	yes	door2	turnable

The sawwidth is 3 mm
Parts can be turned.

1. Choose tab [Settings] saw width (e. g. **3** for 3mm).
2. Change to tab [Panels] and enter the panel data. For unlimited quantity, clear the input field. For limited stock, enter the number of panels left. Using the data from above:

   2540 **1270** **12** Material MDF

3. Change to tab [parts] and add parts. Using the data from above:

   6 **600** **497** **12** touch [turn] Material MDF

   2 **620** **1034** **12** touch [turn] Material MDF

4. Touch the arrow symbol to start the optimization. Then is optimization is started and the solution ls shown.

Partnumber always starts with **#**.
Example part no. 2: **#2**

Saw width: 3

time limit: 3

Max cut depth: 2

8.1.1 Input Panels/Parts

No	QTY	Length	Width	Height	Material	Turn	Information	Comment	Prod.	Rest
1	no limit	2540	1270	12	MDF	-	Panel to be cut	no margins. Unlimited panels	1	-
#1	6	600	497	12	MDF	yes	bottom plate	no grain	6	0
#2	2	620	1034	12	MDF	yes	door plate	no grain	2	0

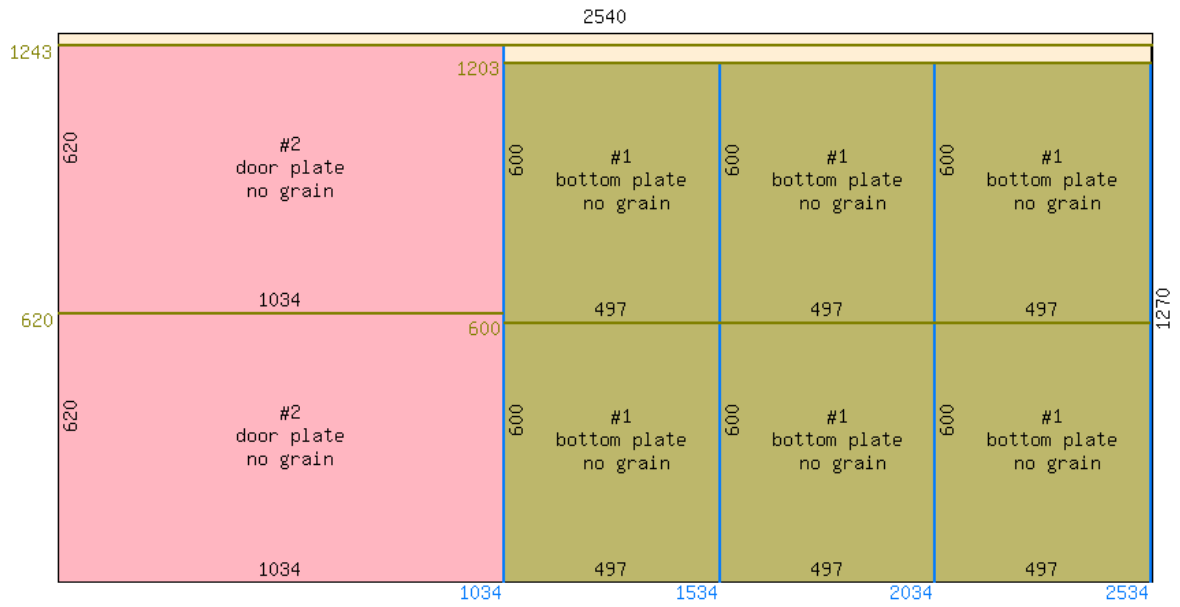
8.1.2 Solution Panels

Utilization: 95.21% Offcut: 4.79%

Quantity	Length	Width	Height	Material	Information	Comment	Area [m2]
1	2540	1270	12	MDF	Panel to be cut	no margins. Unlimited panels	3.2258
			12	MDF		all parts	3.07136

8.2 Layout 1 of 1: 1x (2540 x 1270 x 12) MDF

8.2.1 Utilization 95.21% Offcut 4.79%



No	Quantity	Length	Width	Information	Comment	prod. date	Labels
	1	3	1203		Offcut		
	1	1503	37		Offcut		
	1	2540	24		Offcut		
#1	6	600	497	bottom plate	no grain		Print#1

#2	2	620	1034	door plate	no grain	Print#2

We need one panel 2540 mm x 1270 mm
Total area is 3.22 m².

9 History

V 1.00
  - Start version
V 1.01 (May 2020)
  - Enhancements softkeyboard
  - Languages DE/EN/SP

10 Contact

Dr.-Ing. Thomas Kühn
KUEHN SOLUTIONS
Hauptstr.2

31552 Rodenberg
Germany

Phone:	++49 (0) 511 87459916
Email:	info@kuehn-solutions.de
Internet:	www.kuehn-solutions.de