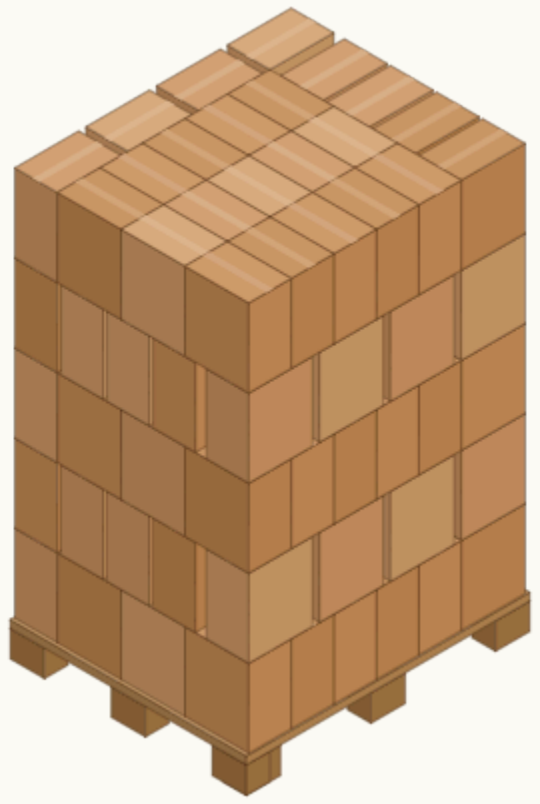
Pallet Designer

PALLETIZING CONFIGURATOR FOR INTEGRATORS AND PLANTS

From a layer pattern to data for the robot, the PLC and the HMI

You design the layer. Pallet Designer works out the complete robot move sequence by itself, checks it against your station and generates ready data for the machine. The machine program is written once – every further layout is data, not code

- Automatic robot move planning
- Data for the PLC and the HMI panel
- Any robot brand via the PLC
- Your data stays with you



5 interlocked layers, 70 placings computed by the program

WHERE THE DATA GOES

One pallet project, five kinds of files

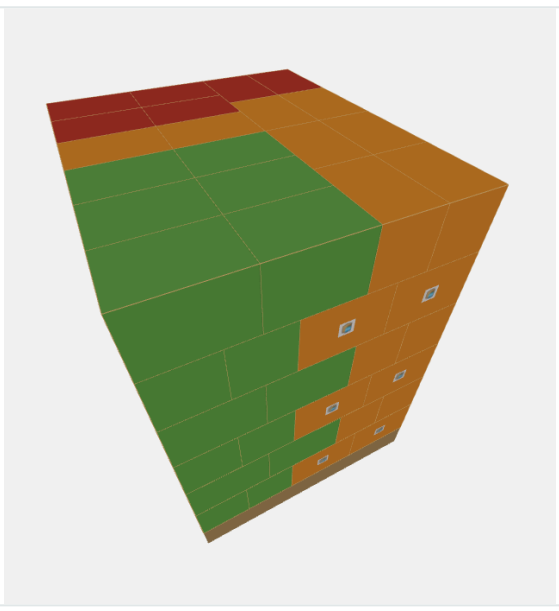
Everything below was written by Pallet Designer itself – for the example pallet “Soki obszary 3 smaki” (3 flavours in areas, 6 interlocked layers, 120 cases), an order with mixed pallets and the layer from the algorithm below

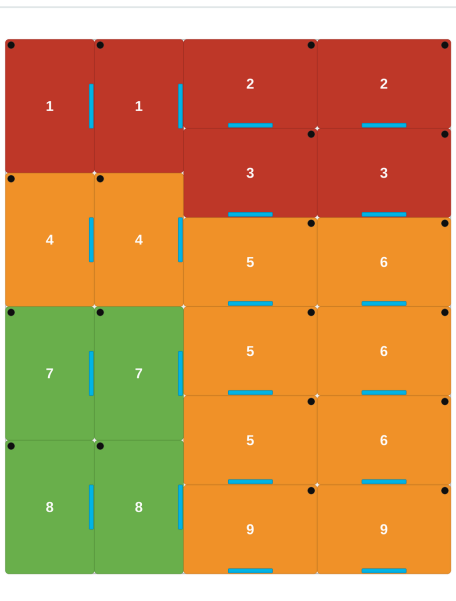
JSON

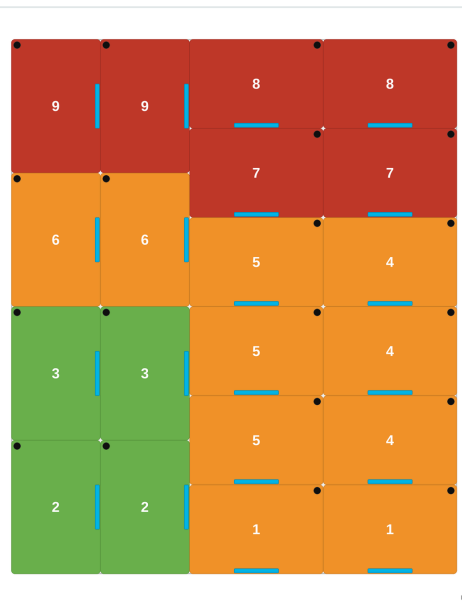
Pallet data + pictures

main route: to the HMI panel and the PLC

Pallet Designer → **JSON + PNG** → HMI panel → PLC and robot · operator







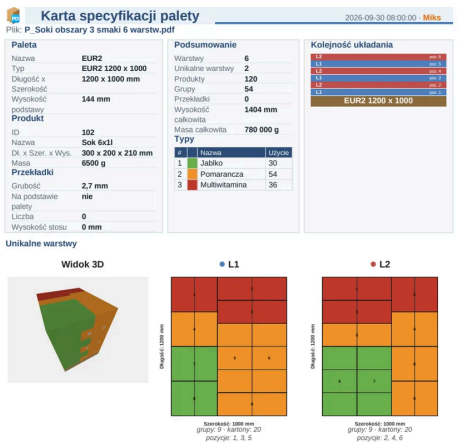
The pictures are generated with the recipe: the 3D pallet, the layer with the placing order and the depalletizing drawing. The JSON and the DB give the PLC the same values

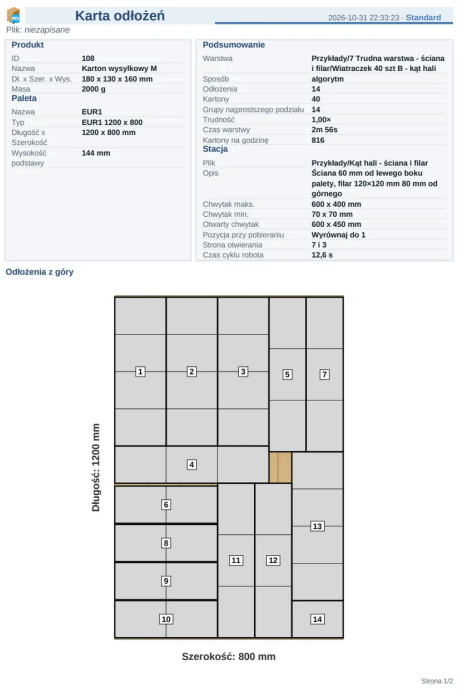
PDF

People: offer and documentation

pallet, layer, placing and mix sheets

Pallet Designer → **PDF** → offer, customer sign-off, as-built documentation





The pallet specification sheet (Polish or English, optionally with cycle time) and the placing sheet of the layer next to a wall and a pillar, with numbered picks and the layer time

CSV

Simulation and own tools

layers, groups, positions

Pallet Designer → **.csv** → robot simulation (e.g. FANUC ROBOGUIDE), own tools

```
# The ROBOT has X and Y SWAPPED: robot_X = application_Y
layer,used_in_layers,placing_order,PacketLength_x10,PacketWidth_x10,PacketMiddleX_x10,PacketMiddleY_x10,Gaopick,Gaoplace, ...
1,1 3 5,1,4000,3000,2000,1500,1,7,3,1,0,130,2, ...
1,1 3 5,2,6000,2000,7000,1000,1,7,3,1,7,130,2, ...
1,1 3 5,3,6000,2000,7000,3000,1,7,7,1,8,130,2, ...
1,1 3 5,4,4000,3000,2000,4500,1,3,3,1,2,130,2, ...
```

Every unique layer with its groups, positions, orientations and types – with a header that explains the coordinates

DB

PLC DATA_BLOCK

option: the recipe straight into the PLC

Pallet Designer → **.db** → PLC → robot, cycle by cycle

```
DATA_BLOCK "sOfflineRecipeData"
{ S7_Optimized_Access := 'TRUE' }
"tRecipeData"
BEGIN
   sgName := 'Soki obszary 3 smaki 6 warstw.json';
   sProductData.sgName := 'Sok 6x1l';
   sProductData.asTypeData[1].sgName := 'Jablko';
   sSummary.u16LayerCount := 6;
   // layer 1, placing 1: two cases of type 3 in one pick
   asLayerData[1].asPlacing[1].u16Length := 400;
   asLayerData[1].asPlacing[1].u16Width := 300;
   asLayerData[1].asPlacing[1]."i16MiddleX(FOR_ROBOT_Y)" := 200;
   asLayerData[1].asPlacing[1]."i16MiddleY(FOR_ROBOT_X)" := 150;
   asLayerData[1].asPlacing[1].i8GrippOpnSide := 3;
   asLayerData[1].asPlacing[1].ai8Btype[1] := 3;
   asLayerData[1].asPlacing[1].ai8Btype[2] := 3;
   …
```

Excerpt of the real file. The PLC hands every placing to the robot – which is why the robot brand does not matter

JSON

Production order

option: several pallets on the machine at once

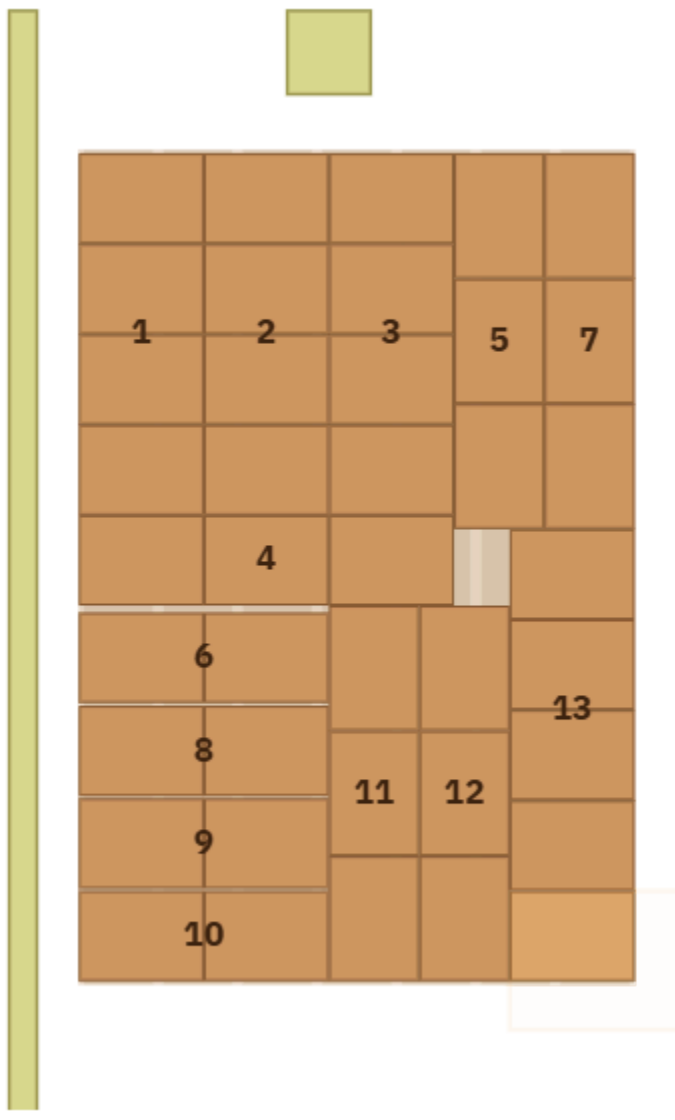
Pallet Designer → **order** → HMI: production order with several pallets



Six pallet frames around one robot: three single-flavour pallets come in (depalletizing), two mixed pallets go out (palletizing) – 288 cases in, 192 out, 3 types, with an estimate of the whole order time

THE CORE OF THE PROGRAM

This is the order the algorithm chose



- **which cases go together** – 4, 3 or 2 at a time, and a column longer than the gripper in two picks: 4 + 1
- **where the gripper stands** – the orange outline of the 560 × 200 mm gripper, free of collisions
- **from where it arrives** – one of 8 approach directions
- **what it avoids** – the wall on the left and the pillar above

40 → 14
cases → placings

12.6 s
robot cycle from station settings

816
cases per hour – a quick estimate

FOR YOUR TEAM

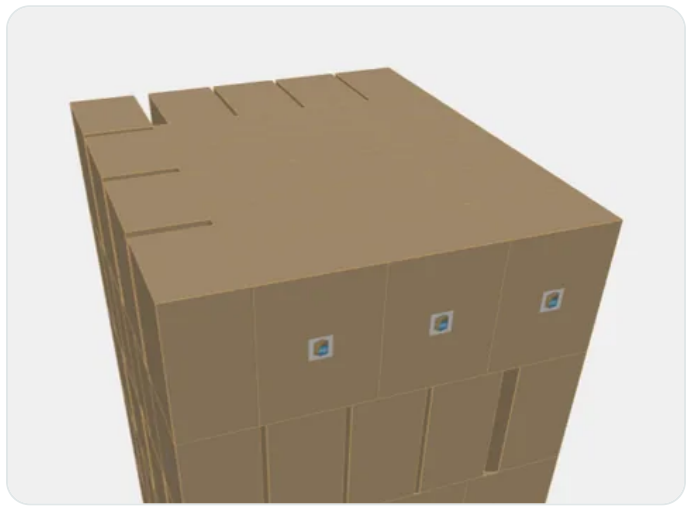
What changes for whom

SALES

A concrete answer during the meeting

The customer asks “how many of our cases fit on a EUR pallet, and in how many layers?” – you type in their carton and show the layout, the number of placings and the 3D pallet live

- PDF sheet for the offer in a few seconds
- the layout from the offer goes straight to design – nobody types it again
- a quick estimate of pallet time and cases per hour – you see at once whether the machine meets the required output



DESIGN

The gripper checked before it is built

Every format of the project is checked against the gripper's footprint, opening side and allowed orientations. Two gripper variants? Two station files – the same layout computed on each

- auto fill with “Optimum” and the interlocked layer A/B
- labels outward, overhang plus or minus as the receiver wants
- obstacles of the station drawn once

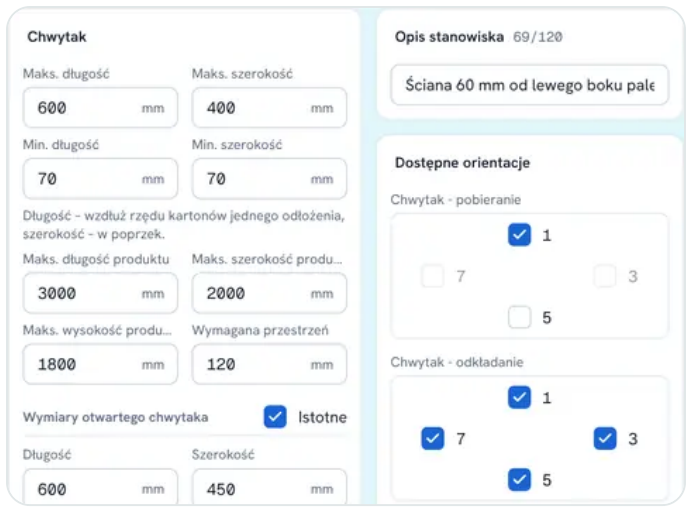


PLC / HMI

No more recipes typed by hand

Data for the panel and the PLC, CSV and PDF come from one pallet project. The PLC array limits are checked before the export, so the recipe always fits

- ready PLC blocks, HMI screens and scripts
- Polish letters replaced for the PLC automatically
- the old way still works – the data can be checked or filled by hand

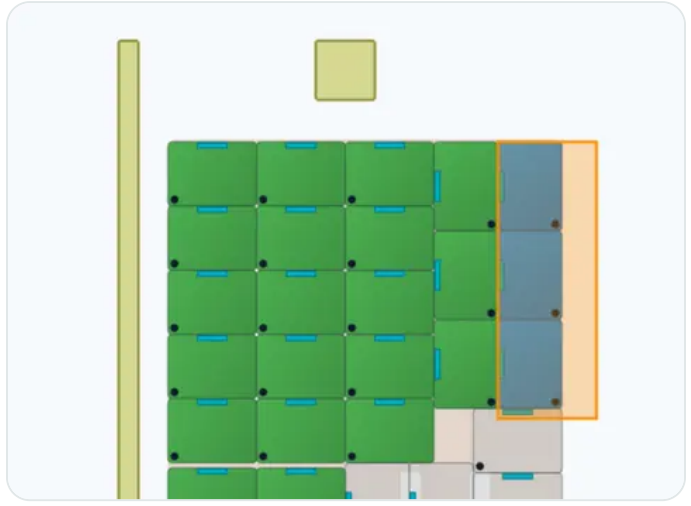


ROBOTICS

The split into picks is computed

Groups, gripper positions, approach directions and the placing order come from the program. The robot reads them from the PLC – the same data for every robot brand you use

- CSV for the simulator instead of building the layout by hand
- layer time and cases per hour as soon as the placings are computed
- manual control whenever you want to place a layer your own way – a colliding position is shown in red and refused

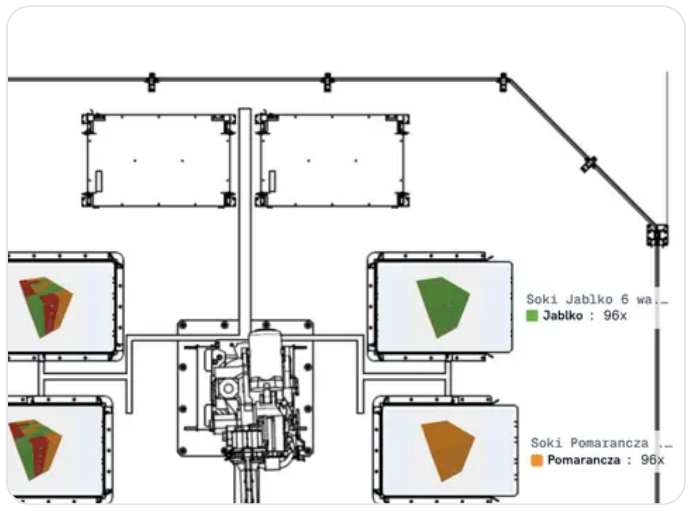


SERVICE

The commissioning engineer stays where they are

A new carton or a new receiver after start-up: the new layout is prepared in the company and the files are sent to the machine. A trip is needed only when something physical changes

- layouts and station settings in files, not in one person's head
- a PDF of the new layout for the customer to approve first

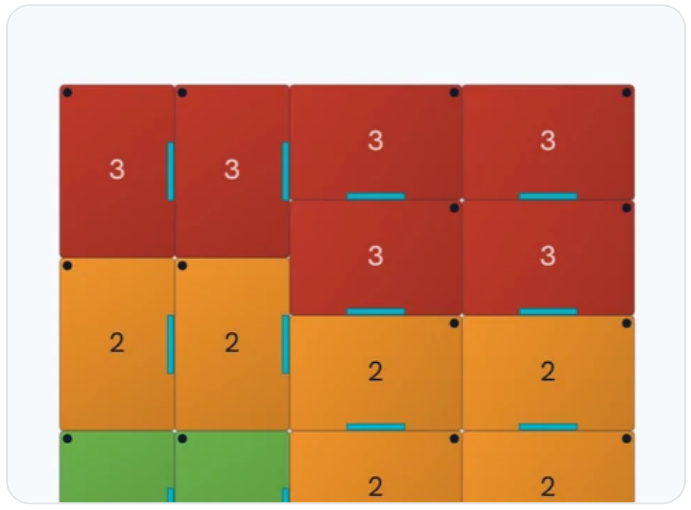


PLANT

New layouts at the plant, within safe limits

With the plant edition the plant's process engineer or operator designs new layers, mixes, pallets and orders – but only on station files signed by the integrator

- no service call for every new carton or flavour
- retail chain limits (height, overhang) set once



TWO GROUPS OF USERS, ONE INSTALLER

A tool for the integrator and a configurator for the plant

INTEGRATOR EDITION

Faster layouts for every machine you build

- all six tabs, station settings included: gripper, limits, obstacles
- new layouts for customers in minutes instead of days
- every station file is digitally signed: the file shows who signed it and when, and changing even one value outside the integrator's program breaks the signature

PLANT EDITION

Everything except station settings

- the plant designs layouts itself
- uses only signed station files – a changed file is refused
- for the integrator: an extra line item in the machine offer

~4,000
automated tests – the full suite must pass before every release

32
checks before the pallet data is written – 28 of them against the station settings

7
rejection reasons checked for every gripper position – collisions, approach, clearance – manual ones too

4 days
of work offline after the last licence check

QUESTIONS

Questions engineers ask

Which control systems does it work with?

The data are in open formats (JSON, CSV, DB), so any system can be set up to read them. We can also prepare a dedicated format or take on the PLC, HMI, robot or other side – quoted by scope. Ready package for Siemens

Which robots?

The robot takes every pick and place from the PLC, so the brand does not matter. For simulation the program writes a CSV (e.g. for FANUC ROBOGUIDE), which can be adapted to your needs

Can we still work “the old way”?

Yes. The generated data go into the PLC blocks, and the programmer can still check them or fill them in by hand or with their own tools

How long does the deployment take?

The application: usually one day to learn it and set up the station. Bringing it into your control system (PLC blocks, HMI screens) with training: usually about a week. Each further machine builds on ready modules

Where are our data and does it need the internet?

On your computer or your plant server – nothing goes to a cloud. The internet is needed only for a periodic licence check; a server without internet gets a signed licence file

We have an earlier version. What about our files?

Layers, pallets, mixes, placings, station settings and orders open in the current version without conversion, and at the first start the program can copy your data folder

Can we try it before deciding?

Yes: a 20-minute online demo on your own layout, and on request your own demo instance in the browser for your team

NEXT STEP

Show us your pallet layout – we will compute it in Pallet Designer

1 **Send one sentence and a photo**
carton dimensions and weight, the pallet, the number of layers, the gripper if known

2 **20-minute online demo on your example**
show us your layout and we will compute it in Pallet Designer. After the meeting you can get the PDFs and the data files

3 **Your own demo in the browser**
a separate instance for your company at its own address (your-company.palletdesigner.com) – your team tries it, nothing to install

4 **Pilot on one station**
integration: PLC blocks, HMI screens and scripts, training and assistance at the first start-up

WWW palletdesigner.com – video

WWW Benefits calculator – on your numbers



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