

The complete  
**Robot Palletizer**  
**Buyer's Guide**



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## Start your automation journey with our end-to-end guide.

Get answers to your questions about the pros and cons of automation, match your needs to different palletizer types, and follow a proven process for automating your manual stacking tasks.

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# To Automate or Not Automate?

## The pros and cons of manual labor and automation

Palletizing is one of the most popular production processes to automate. Compared to manual labor that is injury-prone and becoming more difficult to hire and retain, robotic palletizing provides clear benefits in the form of reliable “push button” production that is easy to manage.

### Manual Stacking



- ☒ Dynamic capabilities to take on multiple tasks and learn quickly
- ☐ Frequent injuries from bending, twisting and repetitive lifting
- ☐ High turnover (every 2-4 weeks)  
Unexpected production disruptions from breaks and not showing up to work
- ☐ Rapidly increasing wages

### Robot Palletizer



- ☐ Requires programming to learn something new
- ☒ No injuries
- ☒ No turnover
- ☒ No unexpected sick or vacation days
- ☒ Low cost of ownership (utilities and quarterly maintenance)

**Want to calculate your Return on Investment (ROI) for automation projects?**

Check out Vention's free online ROI calculator to estimate the payback for your own business, which is typically 12-18 months.



# Types of Palletizers

## Single In-Line Palletizer

The Single In-Line palletizer is the most common and straightforward setup, involving one robotic system that may handle picking, placing (stacking), slip sheet dispensing, and pallet dispensing. It can work across multiple lines with different SKUs, offering versatility. However, it has lower throughput compared to other types due to its single-unit design.

## Layer-Forming Palletizer

A Layer-Forming Palletizer features multiple robots working together. One assembles product layers while another stacks them, boosting overall throughput. Some designs mix conventional and robotic palletizing (hybrid systems), where the layer formation is done traditionally, and robots handle stacking.

## Mixed-Configuration Palletizer

A Cartesian Palletizer operates along three axes (X, Y, Z) and is best for applications with uniform products. While it's slower, it handles heavier payloads and is a cost-effective solution for simple, lower throughput operations.

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## Gantry Palletizer

The Gantry Palletizer moves along one horizontal axis and can handle heavier loads than Cartesian models due to its size and design. Though slower, it is ideal for applications requiring large payloads and stability.

## 7th Axis Palletizer

The 7th Axis Palletizer adds a new level of movement, expanding the robot's reach and flexibility. This extra axis makes it ideal for tight spaces and higher stacking applications, enhancing efficiency in storage and distribution.





# Connecting the Dots Between Your Needs and Palletizing Robot Features



## Package type

The package type describes the object that you are trying to pick, move, and palletize, which could vary from a cardboard box to a tray or a bag, or something else. Package type affects the **gripper** selection. Light-to-medium weight, top-sealed cases can be grasped by a common suction gripper, but other packages may need more custom tooling.



## Package weight

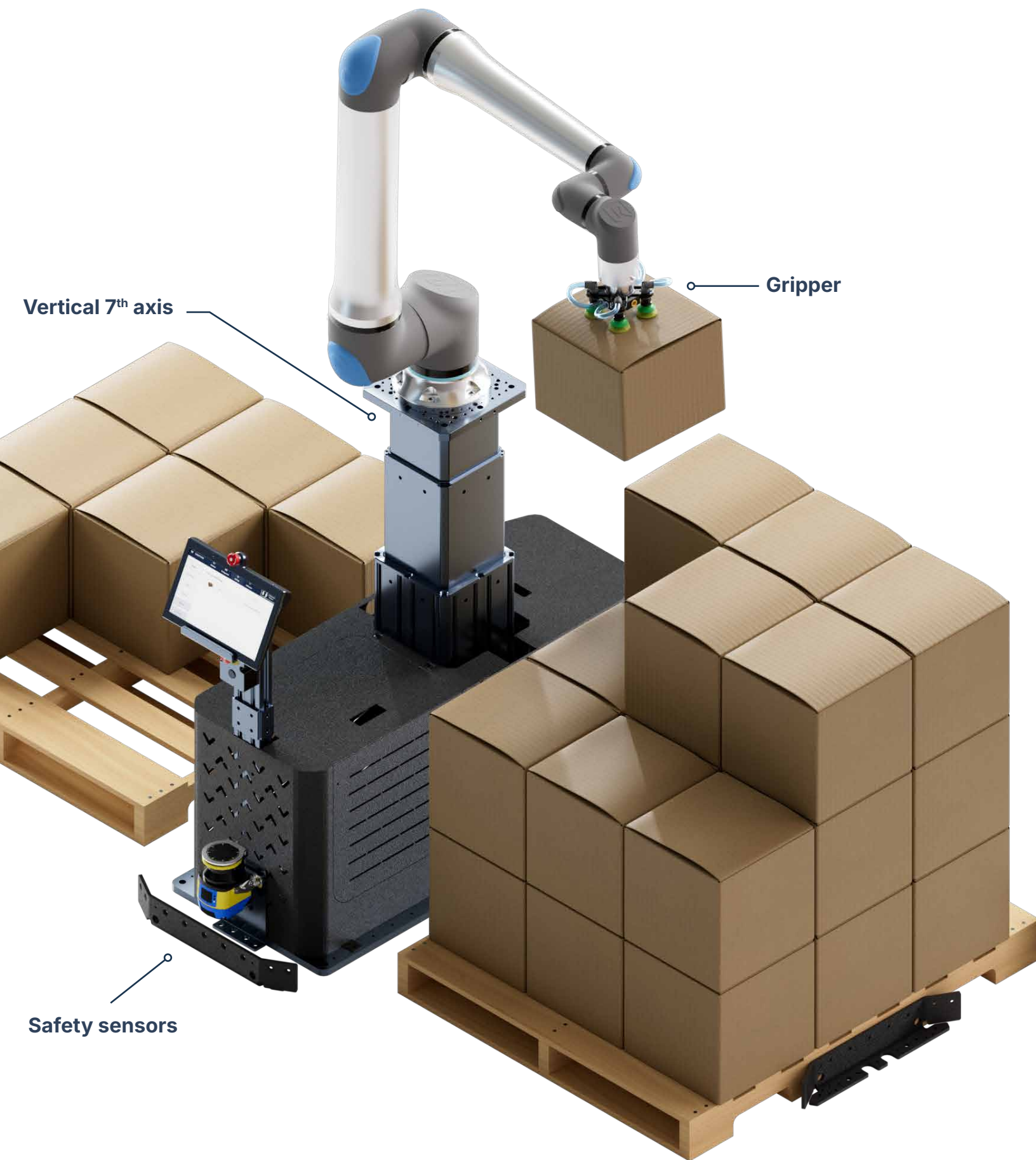
Correlated to package type is the package weight, which affects the **robot**, the **gripper**, and the palletizing speed. Collaborative robots' maximum payload, including the gripper, is 35 kg (77 lbs). However, operating at higher payloads will force lower robot speeds. Also, suction grippers need to be replaced by clamp tools at higher payloads and speeds.

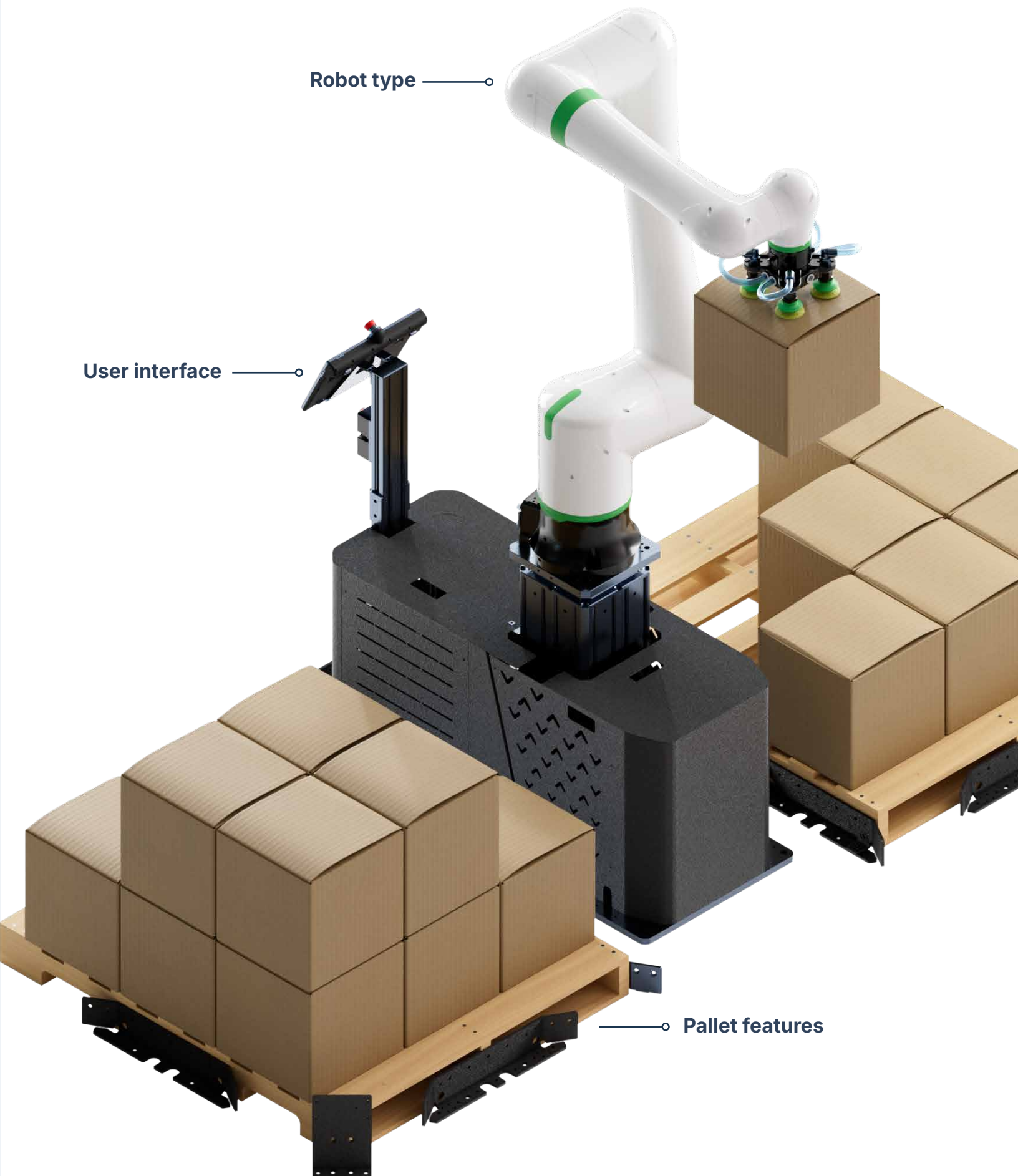


## Throughput

Driven more by production demand than physical characteristics is the throughput requirement, or how many items that need to be palletized each day. Typically specified on a "per minute" scale, **collaborative robots** can achieve speeds up to 13 cycles per minute, **industrial robots** can achieve up to 20 cycles per minute, and large industrial palletizers (from Honeywell Intelligrated) can handle entire pallets each minute.







Robot type —○

User interface —○

—○ Pallet features





## Floorspace

A common constraint is operational floor space and layout. Floor space constraints can lead to changes in **robot selection** (collaborative vs. industrial), **infeed conveyor configurations**, **operational workflows**, **scanner placement**, and more.



## Pallet features

In addition to picking and stacking items, some pallets require more features such as inter-layer slip/tie sheets, corner boards, automatic pallet dispensing, and future integration with AMRs. Many of these features can be handled by robot-based palletizers, but they require additional hardware and software functionalities.



## Experience

Although it is often a forgotten variable, in-house automation experience also affects your solution. Lower robotics experience increases the importance of the **User Interface** (UI), **software**, and **support**, all of which impact the ease of ownership and production uptime.



# Polykar Boosts Production by 30% with Two Cobot Palletizers



## About Polykar

Polykar is a leader in manufacturing sustainable packaging solutions. They specialize in environment-friendly industrial garbage bags, compostable bags for organic waste collection, food packaging, and recycled polyethylene.

## Challenge

Their packaging process was highly labor-intensive and prone to human error. As a result, employees had to manually pick up bags at the end of the line, fill and tape boxes, apply labels, and stack them on pallets. Polykar was seeking a scalable and ergonomic solution that could help their business meet their growing demand.

## Solution

Two FANUC-based collaborative palletizers for their Edmonton and Montreal facilities. Each solution included end-to-end scoping, design, MachineApps software, installation, and ongoing support from Vention.

## Results

Polykar increased productivity, efficiency, and safety across their two plants.

**"This project has had 3 major benefits: employee satisfaction and retention, improved productivity which I would estimate about 30% more output, and the predictability of production."**

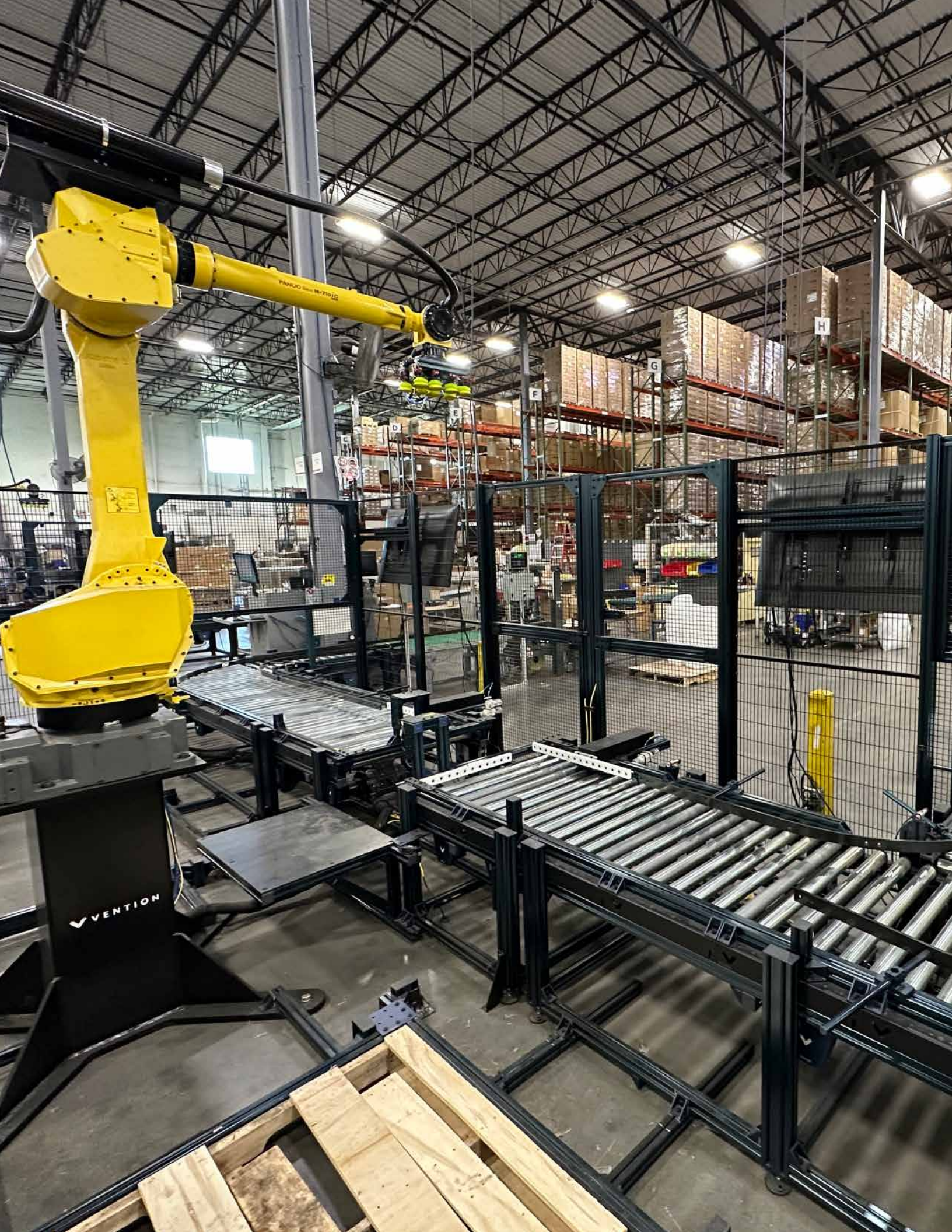
-Amir Karim, President & CEO













# Rev-A-Shelf Turns to Automation to Keep up with Growing Demand



## About Rev-A-Shelf

Rev-A-Shelf is a manufacturing company based in Louisville, Kentucky, specializing in innovative storage and organizational solutions for residential cabinetry. Founded in 1984, Rev-A-Shelf aims to enhance home organization through its diverse offerings.

## Challenge

As Rev-A-Shelf experienced continuous business growth, the company faced challenges in attracting additional workers due to ongoing labor shortages. To enhance productivity with their current workforce, they prioritized the automation of various processes in their factories.

## Solution

Vention designed and deployed two industrial palletizer cells that serve 4 of Rev-a-Shelf's production lines. The palletizers utilize FANUC M-710ic robots for their higher reach and payload capacity.

## Results

Rev-A-Shelf repurposed 8 manual operators, increased safety and efficiency, and achieved positive ROI in 20 months.

**"I was challenged with one specific goal:  
Find a partner that could work with in automation.  
I'm very confident that I found that partner in Vention."**

-Kevin Bott, Plant Equipment-Controls Engineer



# Frequently Asked Questions

## Are collaborative robots better (safer) to use around manual workers?

Collaborative robots ("cobots") have become popular in space-constrained applications where throughput is low-to-medium (less than 13 cycles per minute). In those scenarios, collaborative robot systems provide a cost-effective solution that can safely operate around humans with other built-in safety features and without bulky physical guarding (fencing) or larger industrial robots. Both collaborative and industrial systems can be designed to operate safely around humans, but cobot solutions are more physically compact.

## Can palletizers handle more than 1 SKU at a time?

Yes. Handling multiple SKUs can be architected a few different ways. If an operation only requires two SKUs, a "2-in/2-out" palletizer can be used to dedicate separate lines to each SKU. If more than two SKUs are being handled simultaneously, any palletizer infeed and outfeed can be used, but the system will require barcode scanners or vision systems to dynamically handle packages. In any scenario, production programs reside on the palletizer's Human Machine Interface (HMI) touchscreen and can be selected by operators to change over the program quickly within minutes.

## How long does it take to "change over" my line to another product?

Changing over the software program takes less than 1 minute. If any mechanical changes are needed (such as changing the gripper), change over might take 5 minutes.

## What type of safety features do I need for my robot palletizer?

Safety features depend on the robot type and speed and the pallet height. Palletizing solutions providers like Vention will work with you to install the right solution for your floor layout and operation, which may include safety sensors, light curtains, hard guarding, and other necessary features.

## How much maintenance is required for robotic palletizers?

Robotic palletizers are one of the most reliable and proven robotic applications in manufacturing (99% uptime is common), but quarterly preventative maintenance is recommended. If the system does fail, it is rarely the robot. Failure modes usually include operator errors such as wrong program selection or settings, a misaligned sensor, or a collision that results in some other failed system behavior.

## What if my operational requirements change? What can I do?

Robotic palletizers are designed to operate within specific speed and payload limits. If new requirements fall within those limits, programs and tooling can be adjusted in days. If the new requirements exceed the limits, a new equipment design may be needed.

# Pitfalls to Avoid



## Missed Variables During Testing

Palletizer testing should recreate the production environment as best as possible. Replicating the production environment means using similar material, similar upstream packing equipment, simulating nearby foot traffic, and any other variables that could affect the speed or fidelity of the palletizer. If any issues arise from missed variables, they can typically be overcome during installation, but at the cost of delayed onsite integration.



## Layout and Workflow Surprises

Some of the overlooked aspects of palletizer layout planning are the manual workflows that surround the palletizer. For example, people walking by the palletizer might trigger a safety sensor or the forklift operator who removes the finished pallets might hold up the production line. To ensure a smooth orchestra of people and robots working together, it is best to do a detailed assessment and simulation prior to installation.



## Not Future Proofing the Solution

Understanding the future production needs should also play a role in the decision-making process. Certain palletizer solutions are fully programmed to work within specific scopes and cannot be easily modified for ad-hoc changes. Becoming independent in the creation of new pallet patterns and box types, being able to swap grippers based on changing needs and having the flexibility to change your setup is essential when the future is unpredictable.



## Lack of Robust Service and Support

Even large automation teams rely on external support from their automation partners. To maximize the uptime and lifetime of the equipment, manufacturers should work with the automation partner to create a maintenance schedule, which typically involves quarterly preventative maintenance. Additionally, manufacturers should take advantage of optional features like remote support (with real-time cameras) and annual service packages that keep the equipment running as much as possible.

# Steps to Automate Your Stacking Process

## Assessment

### Gather Your Requirements

Gather the necessary information that is listed on pages 6-9 or use the “Cheat Sheet” on page 17. Once you have your operational information (input requirements), you are ready to explore solutions and submit your information to suppliers for proposals and quotes.

### Research / Get Quotes

If you already have an automation partner in mind, you can submit your information to them. If you are not sure which supplier to contact, consider researching suppliers at trade shows like Pack Expo or through educational entities like A3 or Packaging World. It is best to work with a solutions-oriented partner that can find the right offering to fit your needs.

### Demo / Try it Out

At this point, you might have a good idea of the solution you need. Ask the supplier if you can see a demo. Vention offers remote demos and a 1-month “Try Before You Buy” trial for qualified applications.



**1-Month Trial**

## Purchase & Production

### Prepare Your Facility and Spur Excitement

Prepare your people, place, and processes for your new robot. This involves change management for managers and floor personnel, coordinating an installation plan parallel to production, and ensuring adequate utilities and IT infrastructure. Also, update your workflow and training documents to support the integration.

### Integration & Training

During integration and acceptance, ensure that the system is meeting all your production requirements that were scoped in the beginning. Also, this is a great time to train your operators. Ask questions and capture videos!

### Manage Your System, Monitor Your Success

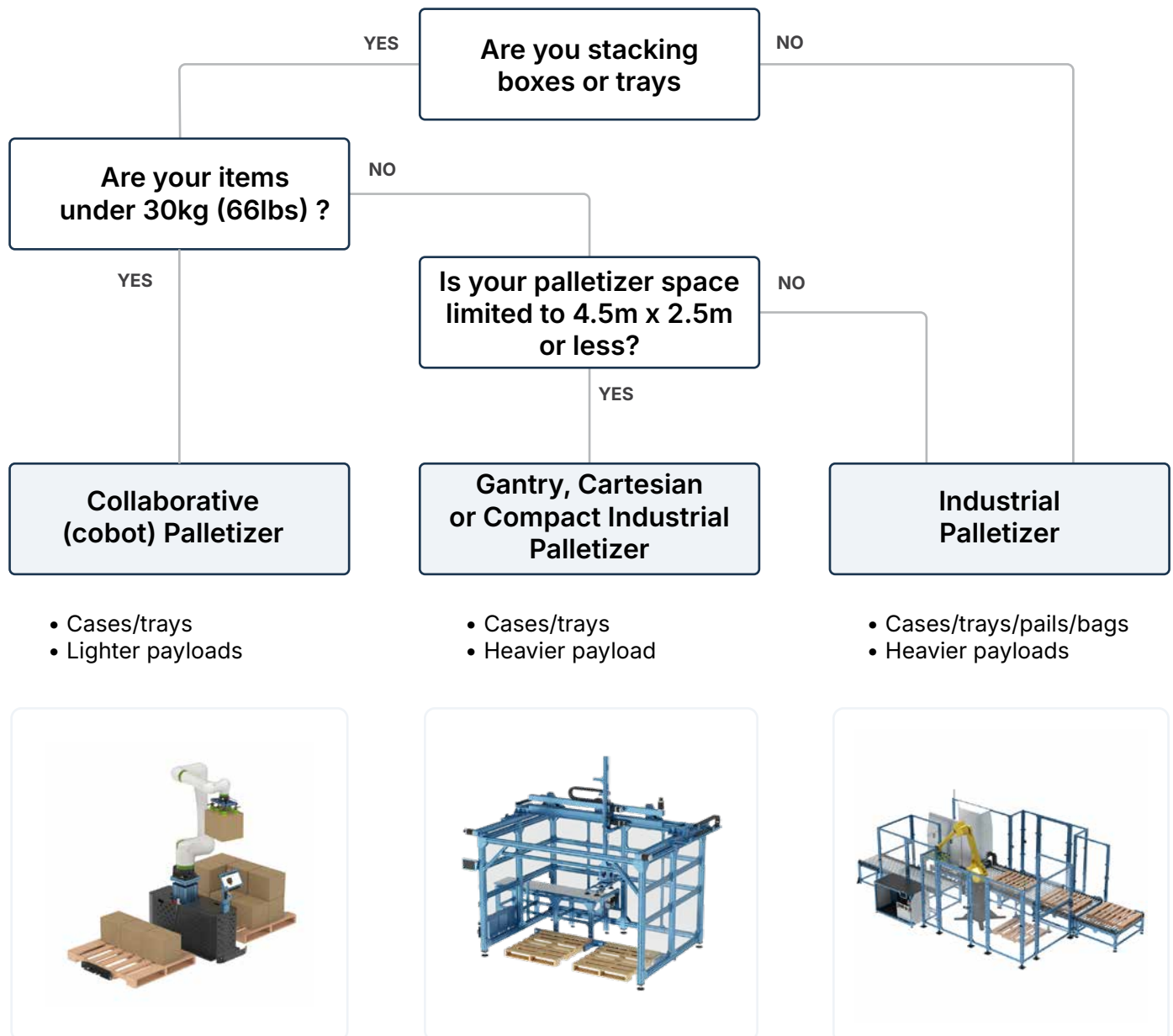
Track your new automated production data. How does the weekly, monthly, and quarterly production compare to the previous manual set up? Check in with your team and learn what else can be optimized over time.



# Cheat Sheet

## Still overwhelmed?

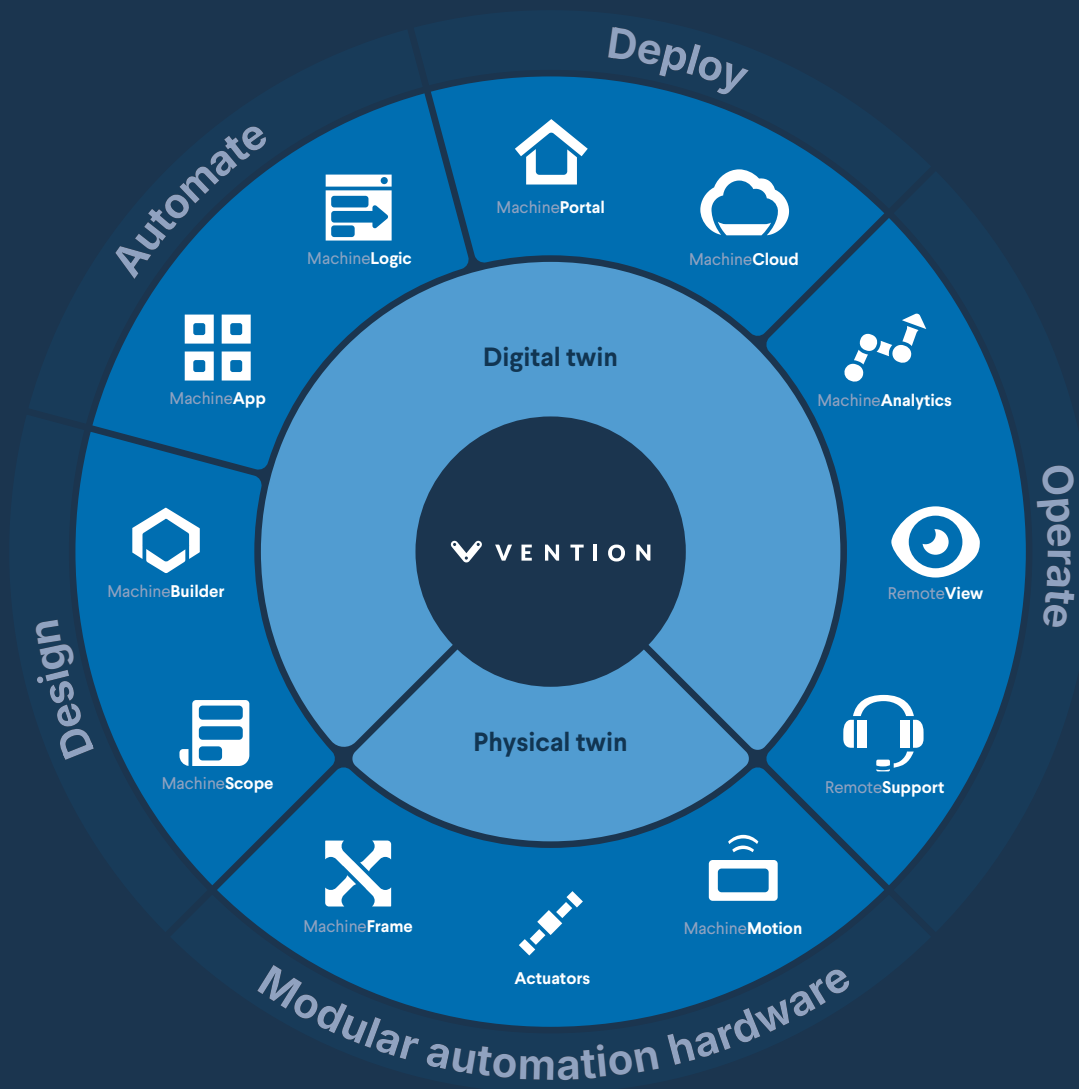
Don't worry. The best way to find your solution is to meet with an automation engineer, but if you're not ready, these critical questions will help steer you in the right direction.



# About Vention



Vention helps some of the most innovative manufacturers automate their production floors in just a few days through a democratized user experience. Vention's digital manufacturing automation platform allows clients to design, automate, deploy and operate automated equipment directly from their web browsers. Headquartered in Montreal, Canada, with offices in Berlin, Vention's 300 employees serve 4,000+ customers on five continents and 25 manufacturing industries.



**5000**  
users

rely on MAP for  
their automation needs  
each month

**18,000**  
machines

Worldwide network of  
operational machines

**4000**  
factories

Serving global factories  
with excellence

**100+**  
partners

Supported by leading  
integrated automation  
partners