

CASE COLLECTION

A KAWASAKI ROBOT FOR EVERY APPLICATION



Kawasaki Robotics has worked with industrial manufacturers for more than five decades.

Our experience comes from practical projects where automation must solve a clear production requirement and operate reliably over many years.

Companies look for stable output, consistent quality, and systems that can support their teams as processes change.

Robots are one part of that equation.

Each case in this collection presents a specific automation task and the solution chosen to handle it. The focus is on the production conditions, the requirements on site, and the role the robot plays in the final setup.

The examples show how different systems are used in practice and what they contribute to the daily operation of the companies involved.

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PART 1:

RS SERIES

How Kawasaki Robots Support the German Hidden Champion's Global Growth Strategy



From a compact welding system inside of a shipping container to 1.5-ton heavy-duty robots: The world market leader for filter systems relies on Kawasaki Robotics for its automation strategy.

BOLL and KIRCH: How Kawasaki Robots Support the German Hidden Champion's Global Growth Strategy.

Since the company was founded in 1950, BOLL and KIRCH has developed into the global market leader for filtration technologies. Today, more than 900 employees work on modern, sustainable and customized filter solutions for international customers from a variety of industries. In addition to technology and network, their employees are the key to success, says Jan Willkomm, Technology Manager at BOLL and KIRCH:

“From our engineering teams for development and testing to our welding experts in production: The many years of experience, close cooperation and individual commitment of our employees enable us to meet complex and new customer requirements time and time again.”

■ **Industries**

Machinery and Metal
Manufacturing

■ **Applications**

Material Handling
Machine Tending
Arc Welding

■ **Robot Series**

RS series
BA series
M series

In order to not only support the company's continued growth, but also to contribute to clean water, optimized air quality and conservation of resources with sustainable solutions, the focus is on continuous development: Research and development focuses on improving filtration efficiency, reducing energy consumption and developing new materials or technologies in order to remain competitive on the market.

More than 25 percent of the filter solutions are exported to Japan - Kawasaki Heavy Industries, for example, has been an important customer of BOLL and KIRCH for decades. The filter solutions are used in many areas of the Japanese conglomerate, including in shipbuilding and in the production of their renowned high-performance motorcycles such as the Ninja.

CHALLENGE: THE JOURNEY BEGINS: OUT OF THE BOX AUTOMATION

In this context, the topic of automation using industrial robots is becoming increasingly important, explains Dr. Basel Keita, Director Quality Management at BOLL and KIRCH:

“We have been using older industrial robots to weld filter components for some time now – but they are clearly getting on in years and are no longer sufficient for our growing requirements.”

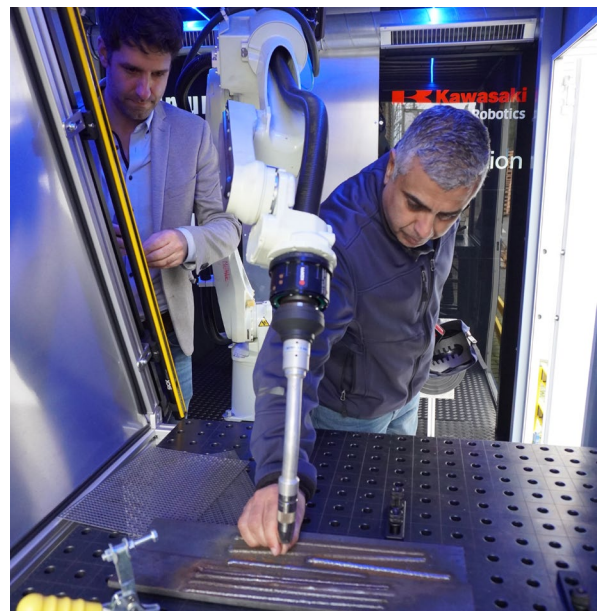
During a visit to the “Schweißen and Schneiden” welding trade fair in Essen (Germany) in 2023, Jan Willkomm and Basel Keita saw the automation solutions from Kawasaki Robotics for themselves and spoke to Kawasaki robot experts and system partners on site.

One solution impressed the Boll and Kirch team so quickly that they purchased it directly at the trade fair: Robocon is a fully functional robotic welding cell based on the Kawasaki Robotics BA006L, which can be placed wherever it is needed. All that is needed is a power connection and the cell, which is integrated into a recycled shipping container, can be put into operation.

Supported by industry experts such as Kemppi, Siegmund and Nederman, the unusual project was launched by Kawasaki Robotics and the system house INperfektion. Robocon was specially developed for the low-threshold automation of welding processes in small and medium-sized companies – intuitive to operate even without programming knowledge via manual guidance and with a fast ROI.

“Robocon immediately caught our attention as an unusual solution and after discussions with Kawasaki and INperfektion, we were convinced. The cell is already the ideal introduction to modern robotics for us in element production and other welding processes. The K-DIY manual control enables us to transfer the valuable know-how of our welders 1:1 to automation.” says Jan Willkomm.

Offline programming and simulation of workpieces with the Kawasaki tool K-Virtual, based on proven CENIT technology, is the next step and the first employee training courses are already underway.



REQUIREMENTS FOR AUTOMATION

While Robocon provided the perfect introduction to a new automation phase, the next steps were planned together with Kawasaki Robotics and partners. It quickly became clear that Boll and Kirch was focusing on three aspects when it came to automation:

Quality Assurance:

Since 1950, the name Boll and Kirch has been synonymous with trust and quality. In addition to high-performance test equipment and a wide range of test procedures, the precise production of components guarantees maximum reliability. Modern robot solutions not only enable increased output, but also consistent quality at the highest level.

Agility:

Boll and Kirch deliberately does not offer standard products. Each filter solution is precisely tailored and built to individual customer requirements. This customized configuration of components, materials and coatings is a key hallmark of the long-established company and requires a high degree of agility and flexibility in automation.

Shortage of Skilled Workers:

The ongoing shortage of skilled workers is also noticeable at the main site in Kerpen near Cologne, although employee retention at Boll and Kirch is above average and is a focus for the company management. For this reason, the outsourcing of production capacities for welding is to be avoided as far as possible in the future.

“Automation with Kawasaki robots allows us to deliver more output with the same team in the long term.

Our team is our greatest strength and automated welding processes also require welding experts on site.” says Jan Willkomm.



SOLUTION:

OUTLOOK: TAILOR-MADE AUTOMATION FOR A TRADITIONAL COMPANY

For some time now, the BOLL and KIRCH team has been identifying elements of production where targeted automation will be essential in the coming years. After initial discussions with the Kawasaki Robotics experts and partners in September 2023, the plans quickly took shape and will be implemented step by step with a Kawasaki system partner as early as 2024.

An older welding system is to be replaced by two Kawasaki robots from the BA series and RS series: While the RS series high-speed robot developed for handling tasks automatically feeds and positions components, the hollow-arm robot of the proven BA series welds the component quickly, precisely and safely.

“This not only enables the highest quality, but also effectively saves a lot of time in view of the large number of individual parts and protects our employees.” explains Basel Keita.



Further automation projects are already on the agenda for other joining processes too: Some products are currently joined by machine using a special adhesive. However, this process restricts the application temperature, is maintenance-intensive and makes it difficult to achieve consistent quality. The plan is to replace these products with two BA series welding robots in 2024.

One highlight of the current automation phase at BOLL and KIRCH is the handling, assembly and production of the largest components and filter units: The Kawasaki Robotics MG15HL, by far the largest model in the Japanese manufacturer's portfolio, will be used here. With a payload of up to 1.5 tons and industry-leading precision, the powerful heavy-duty robot was quickly chosen.

Alexander Ott, welding expert at Kawasaki Robotics, has been supporting customers from a wide range of industries and company sizes for years:

“Long-term successful automation always requires a customized approach. The pace must be right and everything must be perfectly integrated into the existing structures. Automation at BOLL and KIRCH therefore builds on our strengths – including the high level of quality assurance, individual solutions and the expertise of our employees.”

Jan Willkomm is also certain:

“It wasn't just the technology from Kawasaki Robotics that convinced us from the outset, but in particular the open communication and advice. The resulting trust is the best possible basis for us to automate our production together and also to involve and convince all employees.”



ASSOCIATED PRODUCTS:

High speed, high performance robot

The R series robots are setting the benchmark for all small to medium duty industrial robots.

The compact design, along with industry leading speed, reach and work range make the R series robots ideal for a wide range of applications throughout a multitude of diverse industries.

Learn more about the RS020N [here](#).

Learn more about the RS003N [here](#).



ASSOCIATED PRODUCTS:

Through-arm cable arc welding robot

The BA006N is a small model of the BA Series arc welding robot. The long reach (1,445mm), yet compact arm is best suited to arc welding of various workpieces.

Learn more about the BA006N [here](#).



Through-arm cable arc welding Robots

The BA006L is an arc welding robot with a hollow wrist. The long reach of 2,036mm enables arc welding of large workpieces.

Learn more about the BA006L [here](#).



Innovative high wrist torque robot

The MG15HL model is a highly rigid, wide motion range robot with an ultra-high payload capacity of 1,500 kg and maximum reach of 4,005 mm.

Kawasaki's patented hybrid link mechanism for JT2 (arm out-in) and JT3 (arm up-down) makes it possible to achieve a maximum payload capacity without the use of bulky and limiting counterweights.

The hybrid link mechanism gives the robot the power to lift and manipulate heavy loads with great ease and high repeatability. The second and third axes that affect motion accuracy use highly rigid ball screws with minimal backlash. This reduces arm deflection while enabling high positioning accuracy.

The robot's unprecedented rigidity makes it ideal for high counterforce applications such as riveting, drilling, machining and friction spot joining.

Learn more about the MG15HL [here](#).



Supporting the Future of German Automotive Suppliers



An industry in transition: German automotive suppliers are currently facing difficult challenges amid rising costs, overcapacity and high uncertainty.

Theilinger has been close to the industry for 30 years and knows its needs inside out. With robots from Kawasaki Robotics, the Nuremberg-based company supports its customers with tailor-made automation, even in difficult times.

- **Industries**
Machinery & Metal Manufacturing,
Automotive
- **Applications**
Machine tending
- **Robot Series**
RS-series

There are few standards; for company founder and owner Richard Meyer-Theilinger, custom-made products are the key to continued success:

“Our company motto is ‘Do the right thing at the right time, in the right place’, and that means that every customer request, and therefore every order, offers the opportunity to take functionality to the highest level.”

AUTOMATION FOR SIEMENS, SCHAEFFLER AND ZF FRIEDRICHSHAFEN

Theilinger’s beginnings more than 30 years ago were already based on these customer requirements: Meyer-Theilinger was project manager for automation of ball bearing production at GMN in Nuremberg.

After the automation division was discontinued in 1993 due to restructuring, Meyer-Theilinger

was approached directly by former GMN customers for his services as an engineering office – including existing customers such as Schaeffler, ZF Friedrichshafen and Siemens. In addition to planning, there was a growing demand from customers for a comprehensive range of services – which he built up over the next two years, including production.



Today, 25 employees work at Theilinger on the development, design and production of turnkey automation solutions – with a focus on automated handling solutions.

The company places particular emphasis on innovative concepts and the development of new areas of application. Here, the focus is particularly on bin picking – an advanced solution in which robots use highly developed image processing technology to precisely remove unsorted parts (bulk goods) from containers and optimally feed them into the subsequent production process. Bin picking with reliable quality detection is the specialty of the Nuremberg-based special machine builders.

Three programmers are currently working on the development of robot and software solutions, while three other experts specialize in PLC programming for conveyor and machine control systems. Image processing is a key topic for the future, which Theilinger has already successfully implemented in numerous projects and demonstrates in videos on its website.

Due to increasing demand, a wide range of applications, falling prices and growing user-friendliness, Theilinger is increasingly focusing on the further development and integration of such systems, which have already proven themselves in practice many times over.

CHALLENGE: COOPERATION WITH KAWASAKI ROBOTIS

Relationships with suppliers and partners are maintained on a very long-term basis. Richard Meyer-Theilinger and his team always stay close to the market and are open to new and better solutions. This is how the collaboration with Kawasaki Robotics began over 12 years ago: A mutual customer opted for Kawasaki robots and Meyer-Theilinger was quickly convinced:

“The technology and cost-effectiveness was noticeably better than anything else on the market and immediately appealed to us. Since then, we have successfully completed numerous projects together with Kawasaki Robotics and now use Kawasaki robots as standard in our projects.”

In the last two years alone, Theilinger has integrated 22 Kawasaki robots – including for demanding sorting tasks such as universal joints in propeller shaft production for commercial vehicles. A further 11 robots from the Japanese manufacturer have been ordered for the massive conversion and expansion of an automation system in 2025. The complex task involves the precise removal, testing, sorting, milling and lasering of numerous different parts. Philipp Theilinger welcomes this challenge:

“It’s demanding, but we’ve mastered it. We have respect for the task, but we know how to master it – and we rely on the proven quality of Kawasaki robots”.

SOLUTION

Among other things, Theilinger buys used milling machines at low prices and subjects them to a comprehensive retrofit. Spare parts are also reconditioned and reused sustainably. For Theilinger, it goes without saying that the cost savings are passed on directly to the customer:

“We have the expertise and the means to stay well below the usual price. This is a huge cost advantage for our customers and more important than ever in times when every investment is under scrutiny.”

The company building in the north-east of Nuremberg also continues the company philosophy: the entire roof has been equipped with photovoltaic systems for years and easily covers the energy requirements of the building and production on clear days – and usually even feeds green electricity into the grid.

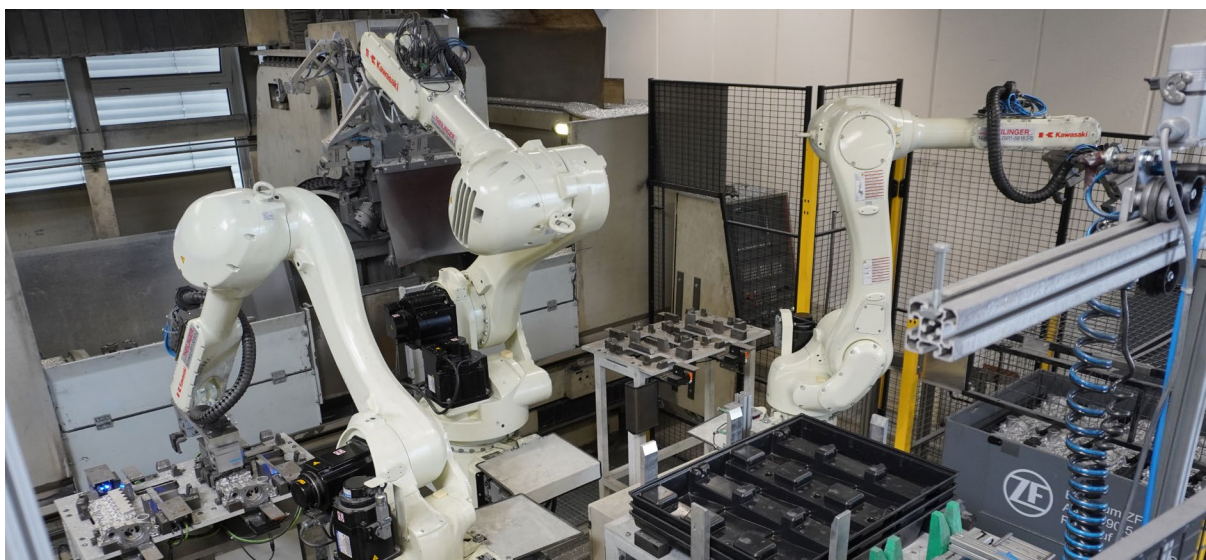
KAWASAKI ROBOTS PRODUCE NEW GENERATION OF TRANSMISSION CONTROL PARTS

Two newly commissioned processing lines, each with three Kawasaki robots from the RS series, are working at full speed at Theilinger for long-standing customers in the automotive industry.

The RS020N models perform automated removal using bin picking, supported by a camera system that enables precise sorting and provision of the parts. In addition, the processing quality is finally checked using AI-supported image processing. An RS030N is also used for loading the CNC milling machine. The high-speed robots in the RS series are true all-rounders: with their compact design, flexible working range, long reach and maximum precision, they are suitable for a wide range of industrial applications.

The systems are extremely efficient and well thought out down to the last detail: the cycle times of all robots and process steps are optimally coordinated. Both RS020N robots alternate when using the large gripper for several parts – automatic and fast tool change included. In addition to maximum efficiency, maximum precision and quality are crucial in this project: each system produces thousands of components every day with a minimum error rate, reliably meeting the high requirements of the automotive industry.

Another important plus in times of strongly fluctuating capacities: Production is easily scalable. An output of 10,000 units per day could be implemented immediately if required. The capacity could even be increased to up to 20,000 per day.



OUTLOOK: SECURING THE FUTURE OF PRODUCTION THROUGH AUTOMATION

Theilinger will continue to focus on automation solutions in the coming years. In addition to the automotive supply industry, other sectors are increasingly being added – including the construction industry, fastening elements in joining

processes, heating construction, screw elements in machine tools and lathes and many more. Regular maintenance is essential – this is how downtimes can be reliably avoided and minimized.

In addition, the Collision Detect option for the Kawasaki Robotics Controller is used as standard to reliably prevent damage during operation.

Richard Meyer-Theilinger is convinced that monotonous and physically demanding tasks such as handling components are neither economical nor practical for the use of human labor in the long term. Such tasks not only impair production reliability, but also make it more difficult to plan and increase the efficiency of the entire operation.

“Kawasaki robots offer an extremely economical and reliable solution here. (..) By combining them with modern camera systems, sophisticated automation concepts and our comprehensive expertise, they secure the future of almost any production environment.” explains Meyer-Theilinger.

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Learn more about the RS020N [here](#).

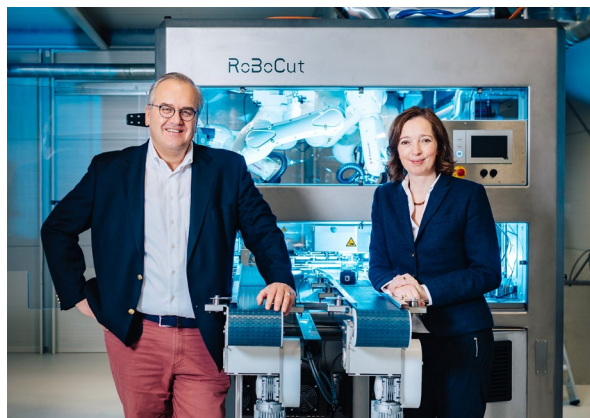


Are you thinking about automating a part of your production?

We can walk through your setup, identify where automation adds value and demonstrate how our technology handles real production requirements.

[Book a meeting](#)

How robots, AI and lasers are revolutionizing plant propagation



For more than 100 years and already in its third generation, the family-owned company Bock Bio Science has been a leading global expert in in-vitro and horticultural plant propagation.

The idea for RoBoCut, the automated, laser-based propagation of plants - reliable, cost-effective and sustainable - was born 10 years ago. Today, the owners Friederike and Stephan von Rundstedt lead a team of 14 experts and RoBoCut is the beginning of a new generation of plant propagation from 2022.

RoBoCut is the result of an elaborate, ten-year development phase. The idea behind the pro-

■ **Industries**

Laboratory automation
Horticulture
Biotechnology

■ **Applications**

Laser cutting
AI-driven image recognition

■ **Robot Series**

RS-series

ject: to automatically propagate sterile plants in the in-vitro laboratory. The process is quickly explained on paper: Detect and grasp, lay cutting lines, cut, pick up and place in fresh beakers. The RoBoCut system relies on a laser on a high-performance robotic arm instead of the usual scalpel. This allows a clean and highly precise cut for optimal propagation.

The cell with four Kawasaki robots primarily serves large in vitro laboratories worldwide. These employ thousands of people at specially equipped workbenches. The automation potential there is accordingly extremely large. But the solution is also aimed at growers and seedling producers.

CHALLENGE: HOW DID THE TOPIC GET STARTED?

Bio Science is a classic plant and tissue culture laboratory - with the goal of automating propagation in the laboratory.

Until now, this was primarily possible via work in low-wage countries. But Friederike and Stephan von Rundstedt were quickly certain: propagation should stay in Bremen, including the expertise and know-how. The journey began with the propagation of rare orchids. Initial discussions with automation partners around ten years ago initially resulted in mixed feedback:

“Too complex, more than 40 decisions per minute at the workbench, no machine can do that (...) With the advent of artificial intelligence, machine learning and image recognition, that changed slowly but surely.”

adds the horticultural science graduate, Friederike von Rundstedt.



In the beginning, RoBoCut was only developed for Bock Bio Science itself, but after the first presentations, interest from outside grew rapidly. It quickly became clear that the solution should also be offered to competitors. In the future, the machines will be supplied to the former competition.

During a visit of Stephan von Rundstedt with an employee of the Hannover Messe, the first conversation took place at the booth of Kawasaki Robotics. There, they quickly got into conversation with the long-standing Kawasaki integrator DMP. The chemistry was there right away: Managing Director Franz-Josef Diekstall was enthusiastic about the idea from the start and was on board immediately.

“You have to find someone who ticks like you and thinks ‘out of the box’ - and Mr. Diekstall was just as crazy as we were.” laughs Stephan von Rundstedt.

And the support from Kawasaki Robotics was also remarkable for him:

“Kawasaki’s willingness to provide us with a loaner robot for tests and initial prototypes in an uncomplicated manner was a great help, especially at the beginning of the project - this allowed us to quickly gain momentum and confidence.”

SOLUTION: HOW IS THE CELL STRUCTURED?

The RoBoCut system is a fully sterile cell equipped with one RS007L and three RS007N high performance robots from Kawasaki Robotics.

Cups containing plants to be propagated are fed in via an infeed. These are opened and a single plant at a time is removed by a robot with a mechanical gripper and presented to an image recognition system - where the plant is precisely detected within 0.3 seconds and the cutting lines defined.

The plant is then transferred to the so-called laser chamber, where it is divided according to the laid cutting line. This is where the actual automatic propagation takes place: The laser divides the plant into individual shoots, which are placed on a sterile conveyor belt. From there, they are grabbed by another robot and placed in a new cup with fresh agar-agar culture medium. The cup is closed and leaves the machine via the outfeed. Automation with RoBoCut allows contactless handling of the plants in the sterile room - without human contact.



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The advantage of the laser over conventional scalpels: A laser beam has only a quarter of the thickness of a scalpel in comparison. The cut is absolutely precise, fast and causes no damage to the plant. Combined with the system's image recognition, the laser can also cut precisely along the natural growth line. The result: significantly better growth in the new plants, as they can immediately absorb nutrients more intensively.

Although RoBoCut was initially developed for the difficult-to-reproduce Phalaenopsis orchids, the system is also suitable for the propagation of numerous other plants - including ornamental plants, woody plants, perennials or nutritionally relevant plants such as potatoes.

However, RoBoCut will also be used outside plant and tissue culture - in vegetative propagation - in the future. This is particularly relevant for cuttings producers, such as eucalyptus, street trees, bedding and balcony plants and much more. Several other crops will follow in the next few years. For example, there have already been some inquiries about the propagation of medicinal cannabis - a market with enormous growth prospects.



ARTIFICIAL INTELLIGENCE DEFINES PERFECT CUTTING LINES

Artificial intelligence plays a key role at RoBoCut: In addition to the four controllers for the robots, three industrial PCs and an AI server are installed. 16 cameras provide the necessary input for the vision recognition software.

The AI is used in almost every step of the process, such as post-removal recognition.

Based on these images, a 3D model is generated, on which the cutting lines are defined using AI. Before the laser cut is made in the next step, the plant is recorded again and the 3D model is aligned - so any displacements during transport can be easily compensated for.

The final challenge in the process: removing the correct plant parts from the assembly line in



the appropriate position and placing them in the agar-agar medium. By using AI, the robot receives the exact information to sort out unwanted plant parts and precisely remove and place the correct offshoots.

RESULTS: FOCUS ON SUSTAINABILITY AND ENVIRONMENTAL PROTECTION

For Friederike von Rundstedt, the factors of environmental protection and sustainability were in the foreground right from the start:

“With one unit, we can replace up to ten sterile workbenches and save energy. This also makes on-site production worthwhile, and emissions from thousands of air miles to favorable production countries are avoided.”

The rapid and healthy growth of the precisely cut plant cuttings also significantly reduces the use of pesticides in the downstream production process.

With more than five billion plants produced in vitro and an annual growth rate of twelve percent, the global demand is enormous. “RoBoCut is a solution that is urgently awaited on the market.” adds Stephan von Rundstedt. In the future, plants that are not yet produced in vitro can be produced using the same method - locally, sustainably and always with consistent quality. RoBoCut is thus making an active contribution and

looking to the future: the RoBoCut team is already looking into the question of which processes in plant processing can be additionally automated.

Subsidies, prizes, and a look into the future

The road to RoBoCut was not always easy due to the high level of complexity - especially in terms of AI and software, a complete reboot was even necessary in the meantime.

“But despite all the challenges, we are now at a point where we can say: It’s going. It is no longer a question of ‘if’, but when we go public.” Stephan von Rundstedt proudly reports.

The German Federal Ministries of Research, Agriculture and Economics recognized the potential of the solution early on and supported the project with funding.

Numerous leading international plant breeders contacted Bock Bio Science and viewed the prototype on site in Bremen. In 2019, the Bremen Environmental Prize was also awarded to the RoBoCut project - further encouragement for the entrepreneurial couple.

An initial preview video on LinkedIn in 2019 exceeded the von Rundstedts' expectations even further - more than 12,000 views and more than 1,000 very specific inquiries showed the entrepreneurs the level of interest in the market.

In the future, RoBoCut can also play a decisive role in cushioning the economic effects of an exceptional situation such as the COVID-19 pandemic: for example, the supply of young plants from producing countries was massively restricted during the pandemic - resulting in significantly higher prices and poor availability.

“We hope to be able to initiate a turnaround with the system: It has to be worthwhile again to produce locally.” explains Friederike von Rundstedt.



The project has already made waves: In 2018, RoBoCut won the TASPO Award, an important innovation prize in the green industry.

ASSOCIATED PRODUCTS:

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Learn more about the RS007N [here](#).

Learn more about the RS007L [here](#).



PART 2:

CP & MC SERIES

Pharmaceutical Automation for Safe and Reliable Production of Anticancer Drugs



Industries

Medical

Applications

Material Handling

Robot Series

MC series

Yuyama Manufacturing was founded in November 1964 and continues to provide solutions to the medical field, where labor shortages are an issue. The company delivers systems and equipment to support various pharmaceutical operations, including dispensing equipment such as powdered medicine dispensers, as well as electronic medical records and sterilizers to the medical field.

This time, we will focus on ChemoRo the Spike, an anticancer drug mixing and preparation robot developed by Yuyama Manufacturing to realize the automation of drug preparation, and the Kawasaki Robotics pharmaceutical robot MC004N, which was the driving force behind its development.

CHALLENGES

- Manual drug preparation exposes medical workers to hazardous substances
- Varying drug types and preparation styles complicate automation
- A clean environment places strict constraints on equipment

Anticancer drugs are usually prepared manually at drug preparation sites. However, anticancer drugs made to fight cancer cells are harmful to humans, and pharmacists prepare them every day while facing that risk. Accidental exposure to radiation is a problem in itself, and there is a constant stream of women leaving their jobs due to the risk to pregnancy and childbirth.

Furthermore, various issues have arisen in the medical field, such as the increased costs of using a closed drug transport system called CSTD, which is used to prevent exposure. In light of this

situation, Yuyama Manufacturing was consulted about automation, and we started up the goal of automating the drug preparation of anticancer drugs to avoid risks in the medical field. This was the beginning of the development of ChemoRo.



THE CHALLENGE OF AUTOMATION AND THE NEED FOR 6-AXIS ROBOTS

If the same movement is required for stable varieties, it is not that difficult to automate it as a dedicated device.

However, the drug preparation work that was automated this time had to meet three requirements:

- Handling various varieties of drugs
- The amount changes depending on the preparation content
- Adapting to the different styles and techniques of each university and medical institution

To meet these requirements, ChemoRo's drug preparation work needs to achieve flexible movements as close as possible to human hands, and for that reason, we decided to use a 6-axis robot with a wide range of variable techniques as the arm.

In addition, the drug preparation system had to be kept in a clean environment (ISO class 5). The robots used there had to be suitable for clean environments, a specification that most manufacturers did not offer at the time.

Although Yuyama Manufacturing had consulted with Kawasaki Heavy Industries, there were no

plans to implement Kawasaki's robots in ChemoRo, as Kawasaki did not have a lineup of 6-axis robots at the time.

However, as Yuyama Manufacturing proceeded with the development, the technical team at Yuyama Manufacturing, impressed by Kawasaki's polite response and sincere attitude, began to say:

"We want to work together to make the project a success, taking advantage of each other's strengths."

Kawasaki Heavy Industries was then put in charge of developing the MC004N robot, which is suitable for clean environments, and the two companies decided to work together on the ChemoRo anticancer drug preparation automation project.

"It felt like Kawasaki's sales and engineering teams could work together as one team," says Koike, development manager at Yuyama Manufacturing, looking back on that time.

REASONS FOR CHOOSING THE MC SERIES

The deciding factor for adopting the MC series in ChemoRo was that the cable is built into the arm.

Conventional robots generally had their wiring coming out along with the arm, but for robots in clean environments, it was essential that the cable be built into the robot arm, considering not only appearance but also safety.



"Anticancer drugs are powerful drugs, and we need to reduce the risk of accidents when handling them.

If the cable is exposed, it could collide with the medicine and tip over, causing the bottle to break and spilling the medicine on the floor, so the built-in cable specification was a must," says Kawachi (hereinafter Kawachi), development manager at Yuyama Manufacturing.

THREE CHALLENGES AND SOLUTIONS AT THE TIME OF INTRODUCTION

Yuyama Manufacturing had no experience in commercializing equipment using 6-axis robots, so adopting them was a challenge in itself.

“From the beginning, Kawasaki Heavy Industries supported us kindly and taught us how to use them from 1 to 10. As a result, I was able to acquire the know-how of robots myself, and the development was successful.” says Kawachi.

Development progressed as the Kawasaki Heavy Industries staff eliminated the initial hurdles, such as knowledge and anxiety about automation using robots.

Pharmacists at hospitals prepare medicines in a safety cabinet, and Yuyama Manufacturing wanted to commercialize the product while maintaining the design image of the safety cabinet. With this design, it is possible to realize a layout that allows workers to wipe it clean afterwards, making it a product design that is closer to the user.

Since it was difficult to imagine the robot working on a safety cabinet when placed on the floor, we adopted a so-called “ceiling-hanging” type robot that hangs from the ceiling, so that it can automatically perform the same tasks as a pharmacist.

One of the features of the MC004N is its highly accurate coordinated motion. The two robot arms, each holding a different part, work together like two human hands, enabling fine movements. However, we faced unexpected difficulties at the beginning of development. The first thing that bothered us was the stopping error of the robot’s repetitive motion. All robot manufactur-

ers claim that the expected error is about 0.03 to 0.05 mm, but when we actually used it, we could not achieve that accuracy.

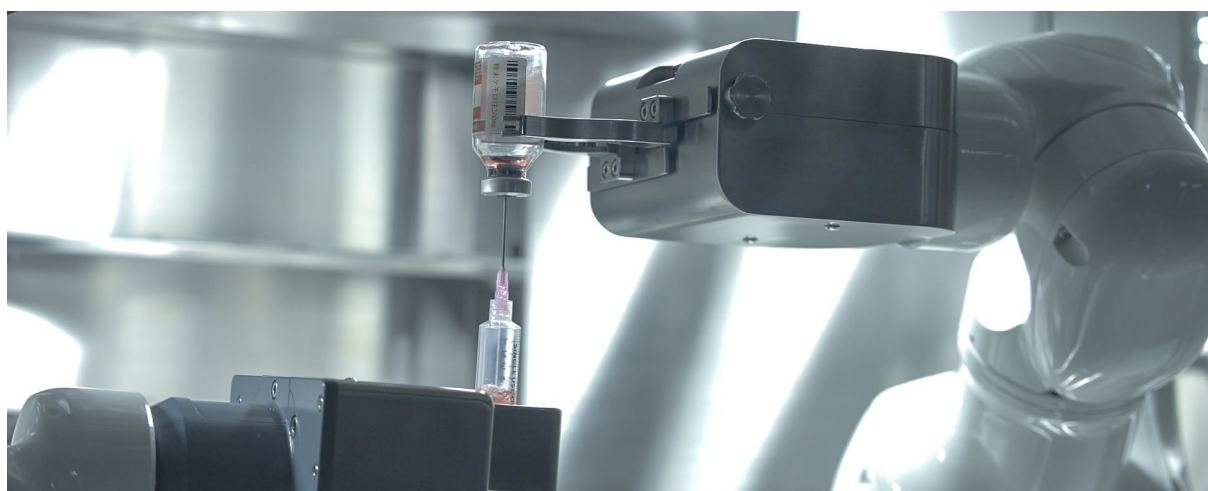
This sometimes caused the needle to deviate from the intended insertion point or the machine to break down. The cause of this was on the side of the materials that the robot was holding, such as the syringes and vials.

For example, when a robot grasps a syringe, it is able to grasp the center of the syringe with its hand with precision, but the bending precision of the “injection needle” attached to the tip of the syringe is unstable, so there was a problem that the grip and the needle tip were not always accurate.

“We improved the precision by repeatedly correcting the error based on the positional relationship between the robot and the needle detected by the sensor and operating it.

There was also an issue with the rubber stopper that is punctured into the infusion bag, as the puncture position differs depending on the manufacturer, but by using Kawasaki Heavy Industries’ vision, the robot learned the positional relationship and was able to correctly insert the needle into the target puncture position.” says Koike.

In this way, many development challenges were overcome based on Kawasaki Heavy Industries’ solutions using collaborative operation and sensing.



RESULTS

- Automatic preparation reduces exposure risks
- More pharmacist time redirected toward patient care
- Stable and accurate preparation of anticancer drugs
- Strengthened trust in Yuyama's technical capabilities

Yuyama's long-term goal is to automate all anticancer drug preparation.

ChemoRo already contributes to this by reducing the health risks pharmacists face. It also improves patient safety. Traditionally, infusion bags were placed inside the safety cabinet, which could expose them to radiation.

ChemoRo places the infusion bag outside the cabinet, protecting both staff and patients.

By automating preparation for hospitalized patients, pharmacists gain more time for one to one tasks such as medication guidance. Hospitals adopting ChemoRo often choose Yuyama for additional equipment, demonstrating increased confidence in the company's technology.

Looking ahead, Yuyama hopes for continued collaboration with Kawasaki and expresses interest in a smaller MC004N to make integration even easier across more facilities.

They also aim to raise awareness of ChemoRo at academic conferences to expand its impact.

ASSOCIATED PRODUCTS:

Medical & pharmaceutical robot

The MC004N clean robot helps prevent human errors, contamination risks, and exposure to High Potency Pharmaceutical Ingredients, such as anticancer drugs.

The robot meets the healthcare industry's processing equipment specifications for accuracy, consistency and cleanliness, making it ideal for assembly, dispensing, inspection and material handling applications.

Learn more about the MC004N [here](#).



Modular Automation in Confined Spaces for Food Manufacturer Greinwald



- **Industries**
Food & Beverage
- **Applications**
Palletizing
- **Robot Series**
CP series

The project group has specialized in the development of sophisticated automation solutions for packaging processes for many years.

International customers from numerous industries such as food, beverages, hygiene, wood, steel and construction trust in the system integrator based in Kranenburg (Nordrhein-Westfalen) who delivers tailored solutions adapted to each client's specific requirements – even when

dealing with variable batch sizes or tight spatial constraints at production sites.

This was also the case with a solution for Greinwald: the food manufacturer from the Allgäu region, known for its seasoning mixes, soups, sauces, and dressings. The collaboration originated through a recommendation from can manufacturer J.M. Schmitt – a long-standing customer of the project group and supplier to Greinwald.

CHALLENGES: KAWASAKI ROBOTICS CP180L AT THE HEART OF THE AUTOMATION SYSTEM

Project manager Ella Liversage, who supports numerous customer projects across the board, is convinced by Kawasaki Robotics:

“We know that Kawasaki is a pioneer in robotics. For us, the priority is working with a dependable partner that helps us minimize downtime and ensures reliable performance.”

The solution implemented at Greinwald includes two identical robotic systems, each equipped with a high-speed Kawasaki CP180L palletizing robot—and each system integrates two pick-up and two feed stations.

With a maximum reach of 3,255 mm and a pay-

load capacity of up to 180 kg, the CP180L serves as the powerful centerpiece of this compact and efficient automation setup. The cans, which are produced in variable sizes, are stacked in up to 15 layers with a maximum total height of 1,765 mm on an Euro pallet.



Efficiency was crucial to the project right from the start: the target was up to 160 cans and 3 layers per robot per minute. During the palletizing process, empty pallets are drawn from a magazine via a conveyor system and placed onto one of four palletizing stations. Depending on the recipe selected, either a layer of product or an intermediate layer is added. The PROPAL gripper head, designed in-house by the project group, can approach all 4 pallet positions and all 4 layer tables.



Filled cans are conveyed from a staging table to the system using a row pusher and storage system, then organized into layers—either aligned or staggered as needed. Once a pallet is fully stacked, it's moved out of the system via a trans-

fer carriage to the wrapping station. After wrapping, the pallet is ready for removal. If labeling is required, the optional PROLABEL pallet labeling system, also developed by project group, applies the necessary identifiers.

SOLUTION: MODULAR DESIGN CREATES FLEXIBILITY

The brewery market has changed massively in recent years, and being able to provide one product type is not enough to meet market demand. The new robot-assisted production provides the flexibility Westheimer needed to meet customer requests.

“It used to be one type of beer in small and large bottles. Today, we have several private labels, lemonade and other beverages, and produce for other companies.

In short, there is an incredible variety. Our team and production facilities are being challenged much more than before.”

says Tolzmann.

PANDEMIC PIVOT

By automating their line, Westheimer met the high demand for more bottled beer and greater product variety - including non-alcoholic beverages - that arose during the COVID-19 pandemic.

Now that bottle production has been fully and successfully automated, the brewery can shift their focus to expanding their keg and cask production line.



Prior to being packaged for distribution, filled bottles of Westheimer beer travel on a production line

SOLUTION

- Kawasaki CP500L first installed to replace outdated palletizing machinery
- Two BX200L robots added in second phase of automation to load and unload bottles into crates

Back in 2017, when Westheimer first deployed the CP500L, it has significantly helped them combat a wide labor shortage in the industry while at the same time allowing them to redeploy their existing employees to more human-friendly roles better suited for their skills.

The Kawasaki CP500L robot has a payload of 500 kg and a maximum speed of 900 cycles per hour. With a reach of 3,255 mm, a palletizing height of 2,200 mm and a net weight of only 1,650 kg, it is the most powerful robot in its class.

In addition to the speed, precision, a compact design of the robot, the independent loading abilities of the machine and Kawasaki's Cubic-S safety system were also key selling points.

A new chain gripper for the same purpose would have required more programming and would have been more susceptible to faults.

Moreover, Westheimer's production takes place on two linked levels - handling empty bottles and end products below and filling above.

The crates with empty bottles are fed from the first floor to the bottle line via a conveyor system. There, a BX200L robot removes the bottles from the crates with a gripper and places them on a conveyor. A waiting crate washer cleans the crates and feeds them to the packer.

The empty bottles are transferred to the bottle washer via a feeder. There, the bottles are first checked for damage, incorrect shapes, and similar factors, and then intensively cleaned. After cleaning, the bottles are additionally checked by an inspector. Only the bottles in perfect condition move on. They are then filled, checked again, labelled, and packed into the crates provided by the packer - another BX200L. By switching to double crates, the speed of the packer has increased.

The filled and ready-to-sell crates are then fed via the conveyor system to the palletizer to process for distribution. Integrating the new robots was a straightforward task. Because all relevant machines basically remained in the same place and the new robots have such a small footprint, only safety fences and new belt settings were necessary.

RESULTS

Above all, the significantly reduced running costs – especially compared to older machines – have provided a tangible advantage for the Westheimer brewery after only a short time.

Now that they completely automated their bottle production line, they're looking to further automate their keg and cask production line in the

future. Westheimer employees approved of the new robots, seeing them as a great relief, according to Tolzmann.

“In the past, you had to get bottles out manually, check them, move pallets here, etc. The robots are a tremendous relief... physically above all.”

ASSOCIATED PRODUCTS:



BX200L

Optimized spot welding robot

The BX200L high-speed spot welding robot features a hollow wrist for housing cables and hoses. It is suitable for large weld guns and can easily replace an inefficient existing robot.

Learn more about the BX200L [here](#).



CP500L

High speed Palletizing robot

The CP series palletizing robots feature industry leading cycle time, a broad motion range, a space and energy saving controller, and easy-to-use palletizing software to program the robot's operation.

The CP500L palletizing robot has a maximum payload capacity of 500kg, and it drives the flexible automation of end-of-line and distribution processes in a wide range of industries, as well as supports the highest production line efficiencies.

Learn more about the CP500L [here](#).

WHY NOT DEPLOY A ROBOT FROM **KAWASAKI ROBOTICS?**

Thinking about automating a part of your production?

Many companies reach that point when output needs to increase or when manual processes are no longer stable enough.

With over 50 years of experience in industrial robotics, Kawasaki has developed and provided numerous applications for various industries. Our robots are built to handle these situations reliably, whether the task is palletizing, welding, or material handling.

If you want to see how the systems work in practice, you can visit our headquarters in Germany or meet with our partners in France and Poland. Demonstrations give a clear impression of the robots in real operation and how they fit into existing production setups.

Experience our robots

**If you would like to arrange a visit
or discuss an upcoming project,
please contact:**

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