

WHITEPAPER

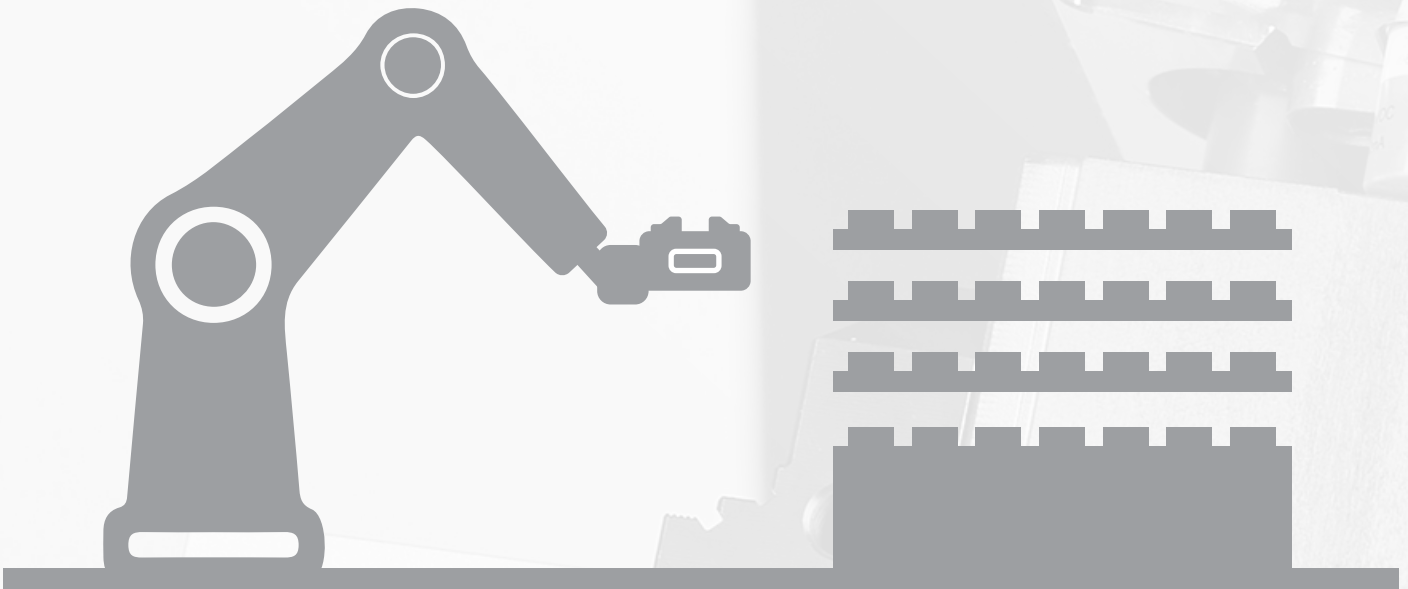
I want to automate how do I proceed?

We are your
clamping technology partner
for all types of
automation!

GRESSEL 

Get the most out of your production.
Increase your productivity with GRESSEL products!

INTRODUCTION



In today's competitive manufacturing industry, efficiency is the key to success. Companies continuously strive to optimize their production processes, reduce costs and improve the quality of their products. One of the most effective ways to achieve these goals is through milling machine automation.

Milling machine automation enables a significant increase in production capacity and speed, reduces human errors and increases the consistency of product quality. By implementing automated systems, companies can not only minimize their operating costs, but also respond more flexibly to market demands and handle complex manufacturing tasks more efficiently.

But introducing automation is a multi-faceted process that requires careful planning and execution. It is crucial to analyze the current state of manufacturing processes precisely, select suitable automation solutions and make the integration smooth. This whitepaper provides a comprehensive guide that shows you step by step how to successfully implement the automation of your milling machines. From the initial analysis to the necessary adjustments and the selection of the best technologies, all essential aspects are covered to help you maximize the efficiency and competitiveness of your company.

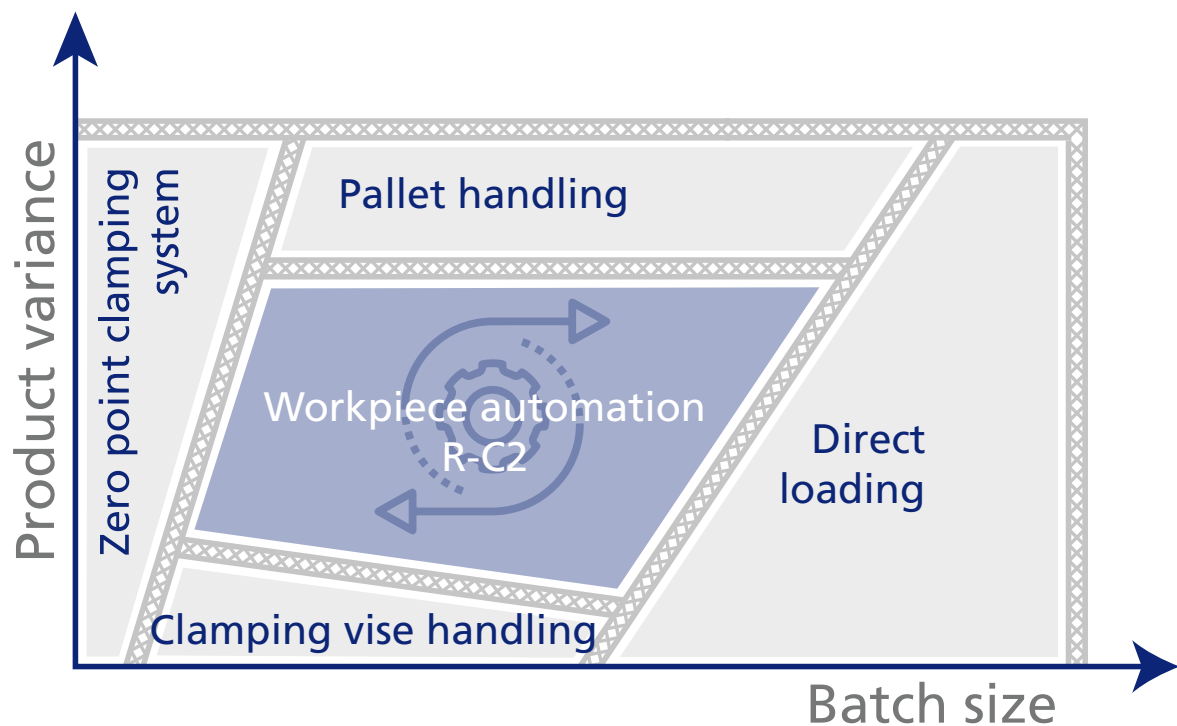
But what is the best way to go about implementing automation?

PRODUCT VARIANCE VS. BATCH SIZE

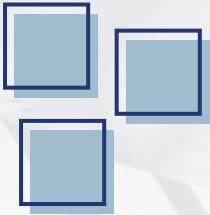
The illustration below with an overview of the most suitable types of automation, depending on the product variance and batch size, serves as an orientation aid for selecting the right automation solution for different production requirements.

- **Product variance** refers to the variety and differences in the products manufactured. A low variance means that similar or identical products are produced, while a high variance indicates a greater diversity of products.
- **Batch size** describes the number of units produced in a production run. Large batch sizes stand for mass production, while small batch sizes through to production indicate individualized production.

Depending on the combination of these two factors, the figure recommends different automation solutions:



PRODUCT VARIANCE VS. BATCH SIZE



Large batch sizes, low product variance

A fully automated solution is most effective here. As the products are similar and are produced in large quantities, workpiece handling by means of a gripper on the robot, which inserts the products into the clamping device, is recommended here.



Small batch sizes, high product variance

In such cases, flexible automation is best suited. This type of automation can quickly adapt to different product requirements and enables efficient production despite the high variance. It is usually sufficient to equip the machine with a zero-point clamping system. This considerably reduces set-up times and can significantly increase spindle times.



Medium combinations

Flexible automation solutions are ideal for scenarios with moderate variance and medium batch sizes. These offer a balance between flexibility and efficiency. This is where R-C2 Automation can play to its strengths. In particular, the 6-sided machining and the variable clamping range are crucial here, as they enable precise and versatile machining of different workpieces.

WHAT DO I WANT TO ACHIEVE?

What do I want to achieve with my automation?



Unmanned production during off-peak times

You want your production to continue in the evenings and at night, as well as at weekends, without having to have staff on site all the time.



Relief for employees

Automation should free employees from monotonous and repetitive tasks. This allows them to concentrate on more valuable, more complex tasks that require more creativity and expertise.



Production increase

You want to increase production volume without purchasing new machines or hiring more staff. This means that existing resources should be used more efficiently through automation.



Faster order fulfillment

Through more efficient processes and the ability to produce around the clock, orders should be completed more quickly.



Dealing with the shortage of skilled workers

Since skilled workers are in short supply, you want to compensate for this shortage through automation. Machines should take over certain tasks that would otherwise have to be done by skilled workers.



Increase in machine running times

Ultimately, you want to maximize the running times of your machines so that they are as consistently productive as possible, which in turn increases efficiency and production capacity.



Reduce manufacturing costs

In order to remain competitive and win new customers, it is extremely important to reduce the manufacturing costs of your products and services to a minimum. To illustrate this, two tables with HK invoices are attached below.

WITH / WITHOUT AUTOMATION

Without automation	Workpiece A	Workpiece B	Workpiece C
Batch size	10	150	30
Processing time / parts in minutes	10	15	25
Machine hourly rate	€ 85,00	€ 85,00	€ 85,00
Set-up time including re-clamping OP10 + OP20 in minutes	80	360	120
Total costs	€ 255,00	€ 3697,50	€ 1232,50
Cost per piece	€ 25,50	€ 24,65	€ 41,08

Mit Automation	Workpiece A	Workpiece B	Workpiece C
Batch size	10	150	30
Processing time / parts in minutes	10	15	25
Machine hourly rate	€ 85,00	€ 85,00	€ 85,00
Set-up time including re-clamping OP10 + OP20 in minutes	10	14	11
Total costs	€ 155,83	€ 3207,33	€ 1078,08
Cost per piece	€ 15,58	€ 21,38	€ 35,94

Overall, the automation strategy aims to increase the efficiency, flexibility and productivity of your operation in order to succeed in a highly competitive environment.



1 Operator at a CNC machine

Billable hours: 40 hours/week
Hourly rate: 60 EUR



108.000 EUR

Potential annual turnover



2 Operators at a CNC machine

Billable hours: 80 hours/week
Hourly rate: 60 EUR



216.000 EUR

Potential annual turnover



1 operator and
1 robot cell R-C2 on a
CNC machine

Billable hours: 160 hours/week
Hourly rate: 60 EUR



480.000 EUR

Potential annual turnover

EVALUATION OF THE CLAMPING POSSIBILITIES

Choosing the right clamping solution is crucial for the efficiency of your automated processes.

Pyramid or tombstone clamping solutions

These systems offer a high level of flexibility and can significantly increase the efficiency of your production. They enable the machining of several workpieces in one setup and help to maximize spindle running time.



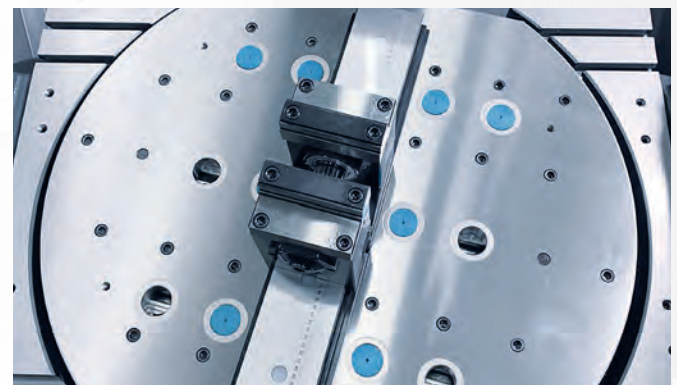
Pallet automation

Automated pallet systems facilitate the quick changing and handling of multiple workpieces at once, thereby improving overall production efficiency.



Zero-point clamping systems

These precise systems offer a fast and reliable clamping solution, especially for frequently changing batch sizes. They significantly reduce set-up times and improve repeatability.



Direct workpiece loading

This method can significantly increase production speed by loading cubic and cylindrical workpieces directly and quickly into the machine using a robot and a gripper.



GRESSEL R-C2 Automation

An example of specialized automation solutions, which are characterized by high flexibility, large component variation, user-friendliness and 6-sided complete processing.



EVALUATION OF THE EXISTING MACHINE

Before purchasing new machines, check how well your existing machines are suited to automation.

What adjustments are necessary?

Machines may need to be retrofitted or modified to support automated processes. This may include integrating interfaces from machine manufacturers that enable seamless communication between the machines and the automation software. Additionally, automatic loading doors could be installed to optimize material flow and facilitate automatic loading and unloading of the machines.

Which automation components can be integrated?

Check which existing machines can be supplemented or improved with new automation technologies.

These considerations will help you find the best approach to integrating automation solutions into your existing production environment.

Our 3D configurator is an innovative online tool that allows you to configure clamping systems and workpiece holders individually according to your needs. With this configurator you can visualize, adjust and view various products in real time directly in 3D and select various options such as size, material and accessories. Once your configuration is complete, you can download the finished models as CAD files and integrate them directly into your own design processes. This simplifies your planning and ensures seamless integration of GRESSEL products into your manufacturing process.

ARTANDISSEIT 3X120° / WINKEL

3D-KONFIGURATOR

Jetzt Spannlösung direkt online konfigurieren

Einfache Benutzung

Download als 3D Modell

24/7 Wunschprodukt in 3D & Echtzeit verfügbar

Kundenbeispiele als Inspiration



Unsere Spannsysteme passen immer. **GARANTIERT!**



Jetzt konfigurieren

GRESSEL 

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The GRESSEL promise



We guarantee you lower workpiece manufacturing costs

With our 100 years of experience and our knowledge of the daily challenges in manufacturing, we offer you more than just products - we deliver a promise.



On-site service

If necessary, our distribution technicians will come directly to your production facility to ensure you receive personal and effective service.



Individual advice

Our experts are ready to advise you personally and develop tailor-made solutions for your specific needs.



Optimization check

Our specialists analyze and evaluate your processes to identify optimization potential and provide recommendations for more efficient production.



Training offer

We offer personal training to ensure that your employees are always up to date with the latest technology.



Digital service

3D data for your products is available 24/7 in our configurator. You can find our entire range in our flip catalog.



100 years of GRESSEL AG

Experienced distribution technicians on site and experienced engineers in Aadorf with the latest CAD workstations.

We let our customers speak

At GRESSEL AG, we understand that optimizing machine running times and especially spindle running times is not just a question of technology, but also of the right strategy and support. Our customers rely on our expertise to significantly increase their productivity through shorter setup times, longer spindle running times and thus lower workpiece manufacturing costs.



EXPERTEN DER SPANNTÉCHNIK

Seit über 100 Jahren.

ANALYSIS OF THE CURRENT SITUATION

The first and most important step to automation is a thorough analysis of your products. We start by determining which parts or components are suitable for automation and what specific requirements you have for the automation process. A precise analysis will help you select the most suitable automation solution and ensure that it meets your specific production requirements and covers the product variety you have defined.

Material

Different materials have different requirements for processing and clamping systems. Weight in particular plays a significant role here.

Shape and size

The geometry of the parts influences the type of clamping systems and automation solutions. The product geometries and shapes are other aspects that influence automation. Lifting force, clamping, tooling and storage capacity are also important points to consider.

Complexity

Complex parts can pose special challenges and require specialized clamping solutions.

Running time

The running time of the components is crucial for the efficiency of the production process. In order to reduce machine downtimes to a minimum, the running time of a component should be such that another component can be prepared and set up during this time. This ensures a continuous production flow and the utilization of the machines remains optimal.

Number of clampings

If re-clamping is required to machine the sixth side of a component, this requires a special automation solution. To avoid the use of personnel for re-clamping, the use of an R-C2 automation with a 6-side station is advantageous. This automation enables the robot to take over the re-clamping and manufacture the components after the last processing stage and place them without further clamping operations. This supports a completely unmanned process and maximizes production efficiency.

INSPECTION OF INFRASTRUCTURE

Your company's existing infrastructure is a key factor in the successful implementation of automation solutions. Make sure your infrastructure meets the requirements of the new systems:

- Energy supply
- Placement, layout and safety zones
- Network
- Communication
- Automation culture
- Programming
- Tool supply
- Logistics
- Integration of multiple machines

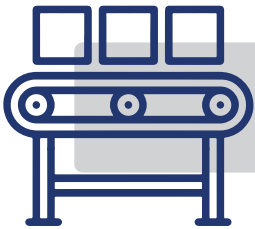
CONTINUOUS IMPROVEMENT

Continuous improvement is an essential part of any successful automation solution. After you have implemented your workpiece automation, you should regularly monitor the performance of the systems and make targeted adjustments to continuously increase efficiency and productivity.

With these steps, you are well equipped to successfully embark on the path to automation. If you have any further questions or need support, we at GRESSEL AG are always happy to help. Let's take your production processes to the next level together!

PALLET AUTOMATION

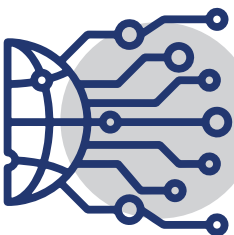
TOP 3 Advantages



Chaotic production is
very much possible



Very high reliability



Low
complexity

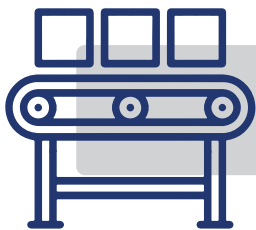


WORKPIECE AUTOMATION R-C2

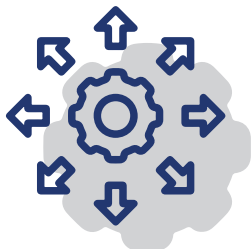
TOP 3 Advantages



Minimum working time
on automation



Chaotic production is
very much possible



Very high
output



WORKPIECE ROBOT DIRECT LOADING

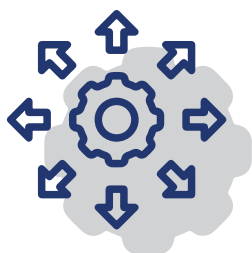
TOP 3 Advantages



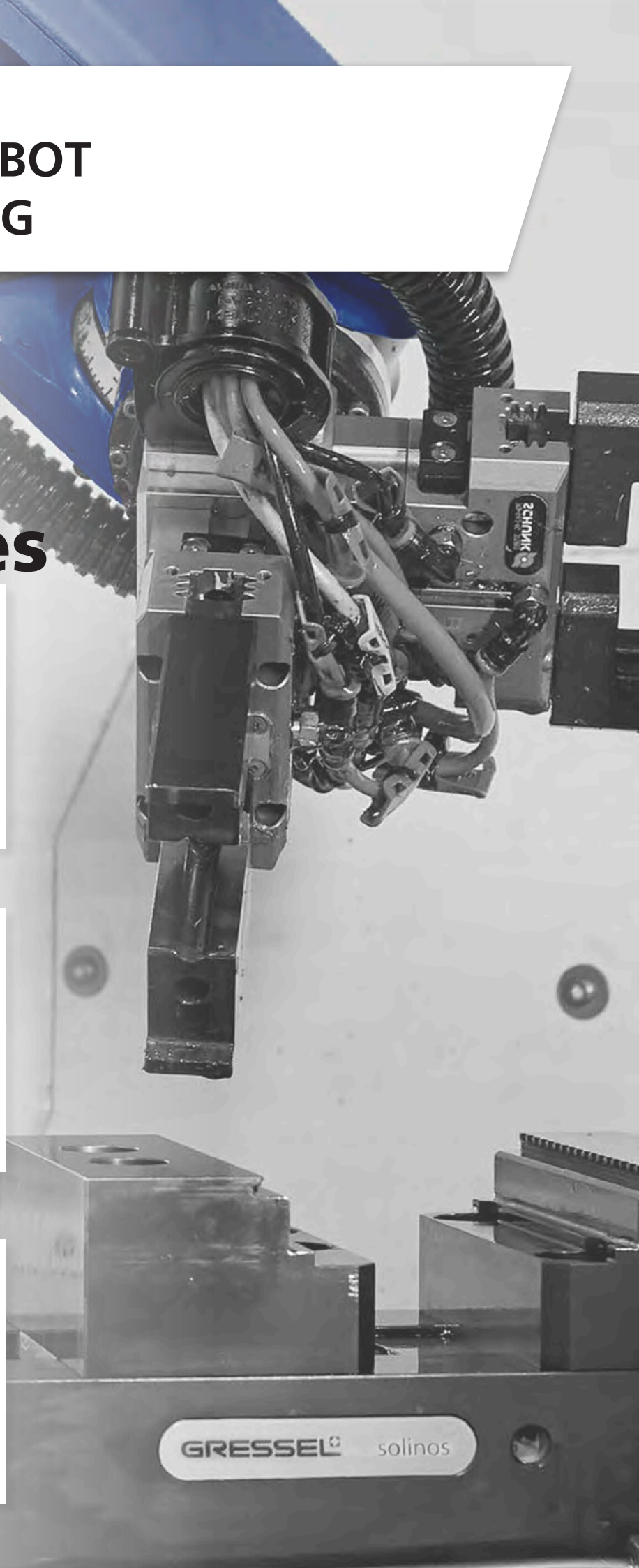
Average investment costs



Low requirement for
floor space



Very high
output



generation-automation.ch



R-C2.com



Do we have
awakened
your interest?

Use the checklist below to record your specific requirements. Please send this to your responsible GRESSEL distribution engineer.

We will check your information and provide you with targeted support in planning and implementing your automation solutions. Together we can take the next step towards more efficient and competitive production.

MATRIX GENERATION AUTOMATION

MATRIX „GENERATION AUTOMATION“

+++ Excellent

+ Good

++ Very good

= Neutral

Pallet handling

Workpiece dimensions

+++

Workpiece weight

+++

Workpiece forms

cubic, round, bu

Workpiece changing speed

+

Batch sizes

1-50

6. side automatically

=

6. side different workpieces automatically

=

5-axis accessibility

++

Combination workpiece handling & pallet handling

=

Employees free running time of machines

++

Workpiece-specific clamping force automatically adjustable

=

Few employees set-up time on automation for workpiece

+

Few employees set-up time on automation for new workpiece

+

Automate an existing machine

=

Accessibility of the machine

++

Space requirement for automation

+

Low investment costs

+

Amortisation of automation

++

	Workpiece automation R-C2	Workpiece direct loading
	220 x 220 x 220 mm (R-C2 standard)	+
	max. 25 kg (R-C2 standard)	+
lky	cubic, round, bulky	cubic, round, bulky
	+	+++
	3-500	>500
	+++	++
	+++	=
	+++	++
	+++	=
	+++	++
	+++	=
	+++	+++
	+++	+
	++	+
	++	+
	++	++
	++	++
	+++	+++

Checklist

1. Goals of automation

Unmanned production during off-peak times
Completely unmanned process
Reducing the workload on employees
Increasing production
Faster order processing
Overcoming the shortage of skilled workers
Increasing machine running times
Reducing manufacturing costs
Reducing set-up times

2. Production analysis

Machine type:
Clamping technology:
Integrators:
Interface:
Space requirement:
Safety zone:

3. Process analysis

Brief description of the process:

4. Product analysis

Brief description of your products:

Product variations

NO

YES, please describe:

Material:

Geometry:

Dimensions:

Series volume:

Recurring:

5. CNC machine

Automatic door

Automatic clamping system

Media transfer in the machine table

Cabling (interface)

6. Employee analysis

No automation knowledge

Little previous knowledge:

Training required

7. Automation solution

Pallet automation

Robot direct loading

GRESSEL R-C2

8. Budget

What budget is set:

Financing models (purchase, leasing...):

9. Schedule

When is the system planned to be implemented:

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