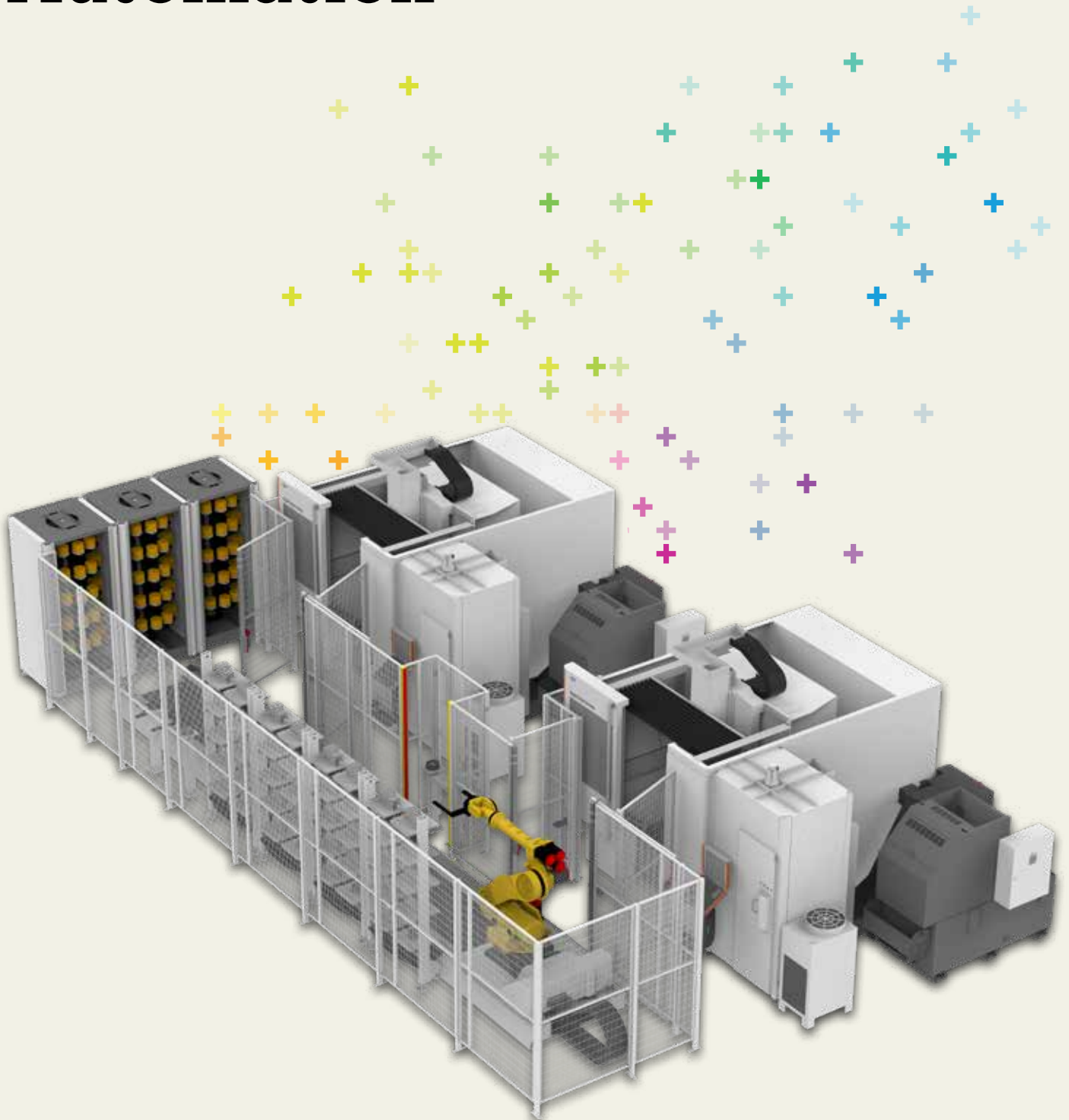


System 3R

Automation



Swedish design and quality

GF Machining Solutions: all about you

When all you need is everything, it's good to know that there is one company that you can count on to deliver complete solutions and services. From world-class electrical discharge machines (EDM), Laser texturing and Additive Manufacturing through to first-class Milling and Spindles, Tooling, Automation and software systems — all backed by unrivalled customer service and support — we, through our AgieCharmilles, Microlution, Mikron Mill, Liechti, Step-Tec and System 3R technologies, help you raise your game and increase your competitive edge.

+ We are System 3R.
We are GF Machining Solutions.

Contents

4	Introduction – Calculation examples
6	Scalable Automation
8	WorkPal 1
10	WorkPartner 1+
12	Scalable automation with Fanuc
14	Standardised modules
15	Software highlights
16	Hybrid automation with Fanuc
17	Software options
18	Tooling highlights
20	ROI – Return on investment
22	About us
23	Worldwide for you

Calculation examples

One manned shift – eight hours (5 days per week)

348,381



Machine with
3Reference system
and automation



142,002



Machine with
3Reference system

110,434



Machine without
3Reference system

Machine cost per hour	90	90	90
Number of machines	1	1	1
Unmanned machine capacity per working day	-	-	10
Working hours per day	8	8	8
Set-up time per day	2	1	1
Rejection	3	2	1
Unproductive downtime per day	0.5	0.5	0.5
Working days per week	5	5	5
Working weeks per year	46	46	46
Machine investment	400,000	400,000	400,000
3Reference system investment	-	35,000	50,000
CMM investment	-	-	-
Installation cost	-	-	10,000
Automation investment	-	-	120,000
Education and training	-	-	3,000
Results			
Annual capacity (hours)	1,265	1,610	3,910
Annual net income	110,434	142,002	348,381

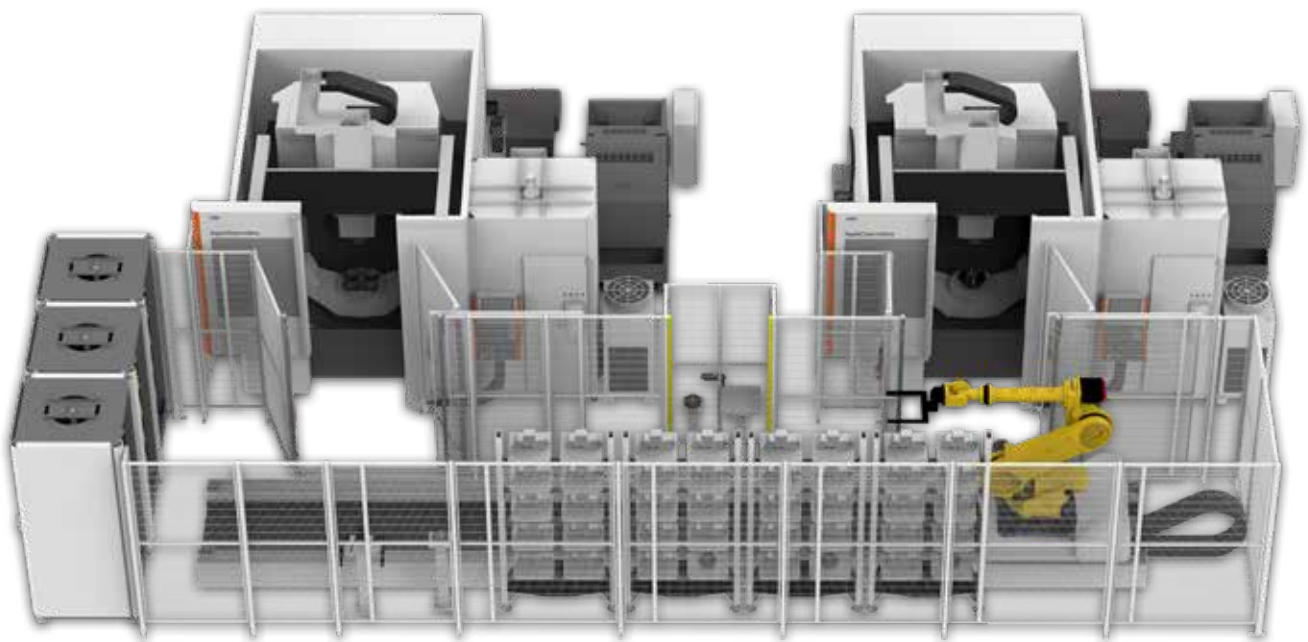
Increased profitability is within your reach

Higher productivity and faster payback

Experience has consistently shown that reducing a machine's downtime is significantly more worthwhile than chasing seconds in the actual machining process.

A rigid and exact reference system is the way to achieve this. It lets you preset away from the machine and then get it running with minimum down time. Quickly and precisely!

Fitting all your machines with the same reference system means that electrodes and workpieces can be moved between them without subsequent re-alignment and checking – **One Minute Set-up.**



A reference system minimises set-up times

Every minute converted from internal to external set-up time increases a machine's spindle time and business productivity.

Increased profitability is within your reach

A machine generates revenue when its spindle is turning. Your profitability depends on this.

Work smarter, not harder.

Scalable automation

Grows with your needs

Rotary magazine (x 3)

Large capacity in a small footprint. In this case, equipped with Macro and MacroMagnum pallets.

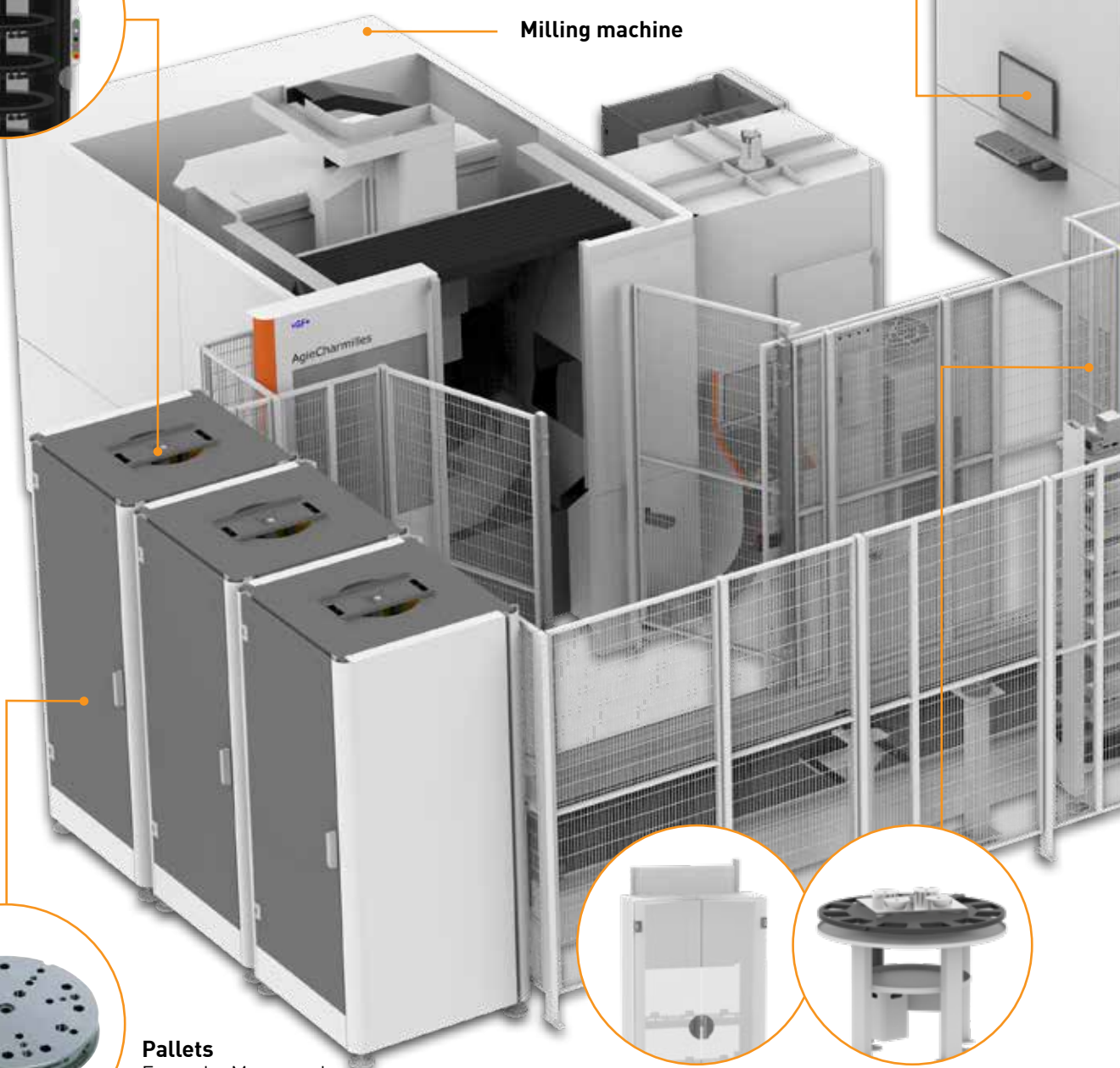


WSM – WorkShopManager

Supports 1 - 12 machines in a cell. Wire EDM, EDM, mill, laser and CMM.



Milling machine

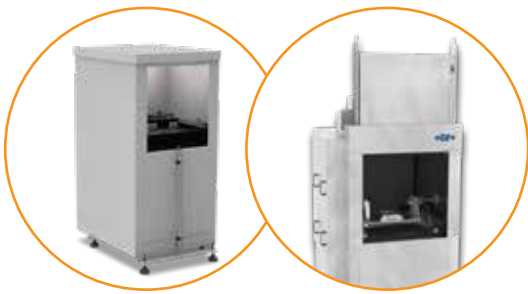


Pallets
Example: Macro and MacroMagnum.



Loading station or ULD station

Load and unload parts without stopping the automation cell. In this case, prepared MacroMagnum and Dynafix pallets.



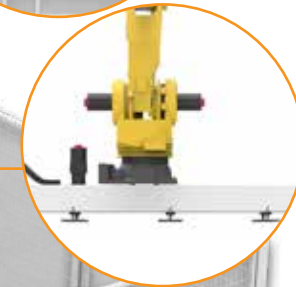
Options
Draining station and washing machine.



Milling machine



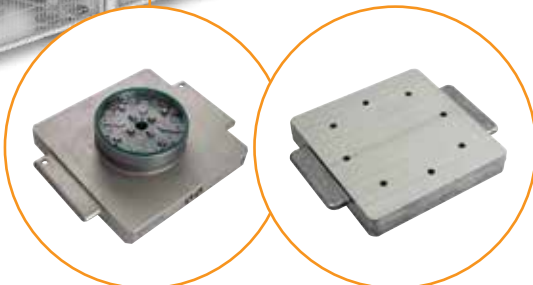
Fanuc on rail
70 - 700 kg transfer weights.



Rail
Aluminium:
Up to 20 m long.
Steel:
Up to 30 m long.



Full rack magazine (4 pcs.)
Example: Equipped with
Dynafix pallets.



Adapter plates and pallets
Example: MacroMagnum and Dynafix.

Work smarter, not harder

Smallest footprint

WorkPal 1 is a pallet changer that requires minimal floor space. It is designed for automatic changing of pallets in chucks on machine tables in:

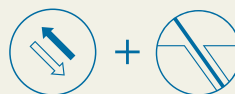
- + milling machines
- + wire EDM machines
- + laser machines
- + grinding machines
- + CMM.

With glass doors across one full side, the WorkPal 1 gives maximum access to the magazine. This greatly facilitates the loading and unloading of pallets.

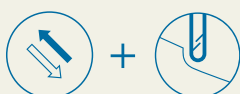


The changing arm lifts the pallets over the tank in wire EDM machines.

Wire-cutting EDM (wire EDM) WorkPal 1



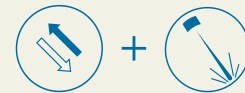
Milling WorkPal 1



Optional: WorkPal 1 equipped with Cell PC and WSM.



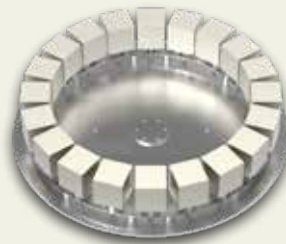
Laser
WorkPal 1



Flexible magazine configuration



12 positions ...



20 positions ...



or 60 positions

Specifications, WorkPal 1

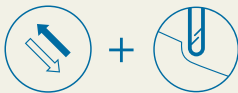
Maximum weight handled (incl. gripper, pallet, etc.)	50 kg
Maximum number of machines served	1
Maximum number of tooling types	1
Chuck adapter support	-
Technology	Milling, wire EDMing, grinding, laser and CMM
Linear rail	Manual movement
Loading station support	-
Tilting and draining station support	-
Drying station support (wire EDM)	Manual movement
BatchBuilder	Manual movement
CellManager	Manual movement
EasyCellManager (milling)	Manual movement
Hybrid station support (milling)	-
Pallet station support (milling)	-

WorkPartner 1+

Modularly adapted to your needs

- + Can serve one or two machines in a production cell.
- + One, two or three magazine capability gives exceptionally flexible capacity.
- + Large doors facilitate loading of workpieces and tools into the magazines.
- + Integrated pneumatic control of gripping devices and table chucks.
- + Minimal floor space requirements.

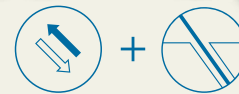
Achieve greater return on your investment!



Milling

WorkPartner 1+ (HH version).
Large magazine capacity.

Two types of tooling.
Heavy loading station.

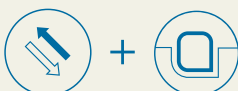


Wire-cutting EDM (wire EDM)

WorkPartner 1+ (HH version).
Heavy loading station.

EDM

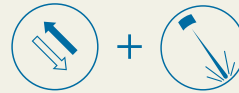
WorkPartner 1+ (LH version).
Heavy loading station.
Draining station.





Laser

WorkPartner 1+ (LL version).



Mixed technologies EDM & Milling

WorkPartner 1+ (LH version).

Large magazine capacity.

Two types of tooling.

Heavy loading station.

Draining station



Specifications, WorkPartner 1+

Maximum weight handled (incl. gripper, pallet, etc.)	80 kg
Maximum number of machines served	2
Maximum number of Tooling types	1 - 2
Chuck adapter support	■
Technology	Milling, EDMing, wire EDM, grinding, laser and CMM
Linear rail	■ Manual movement
Loading station support	■
Tilting and draining station support	■
Drying station support (wire EDM)	■
BatchBuilder	■
CellManager	■
EasyCellManager (milling)	■
Hybrid station support (milling)	-
Pallet station support (milling)	-

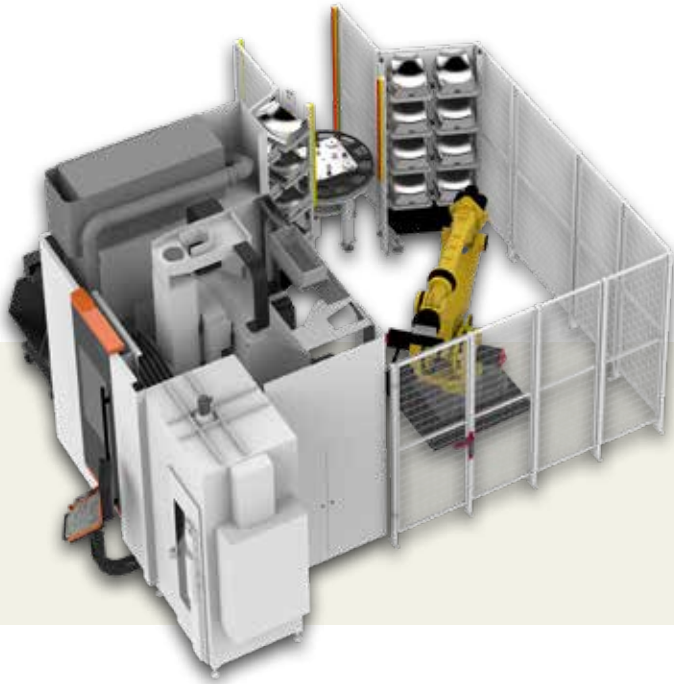
Scalable automation with Fanuc

Grows with your needs

System 3R's offerings include automation solutions with industrial robots (stationary and linear) in many sectors (e.g. die and mold as well as precision production). Our Fanuc solution covers applications that involve transfer weights of 70 - 700 kg, radial reaches of up to 3,400 mm, complex transfer movements and/or parts handling.

- + Whatever the automation requirement, our Fanuc can be specifically customised to your needs.
- + Modern technology and smart technical solutions using standardised modules ensure cost-effective yet flexible automation
- + User-friendly cell management software – complex automation made easy!

Achieve greater return on your investment !

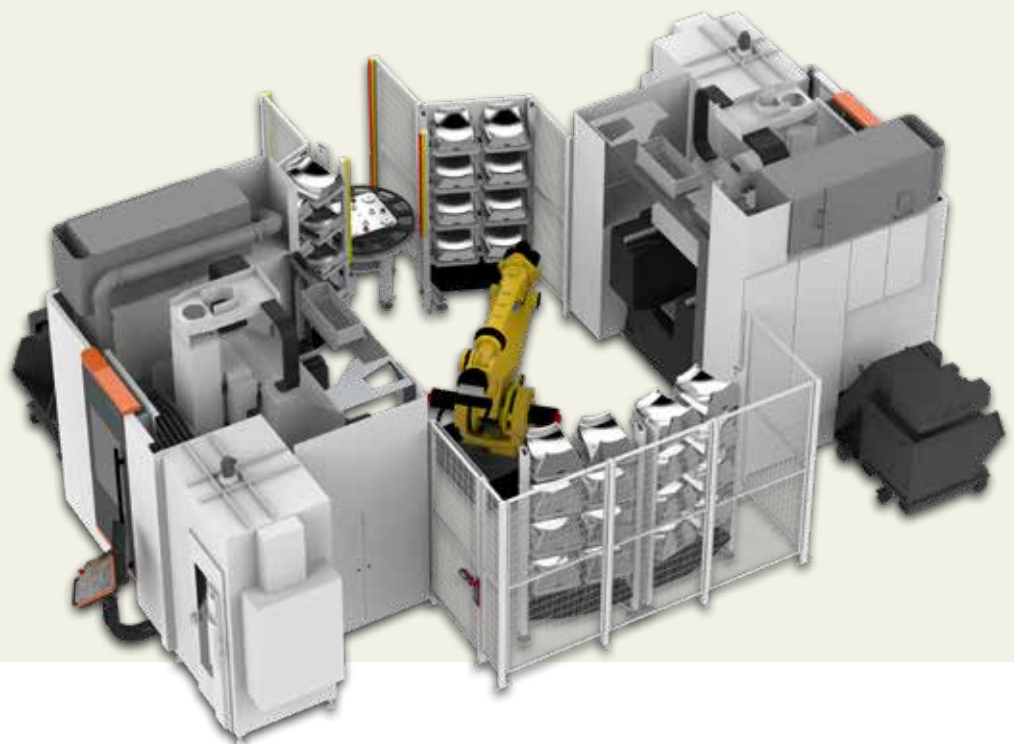


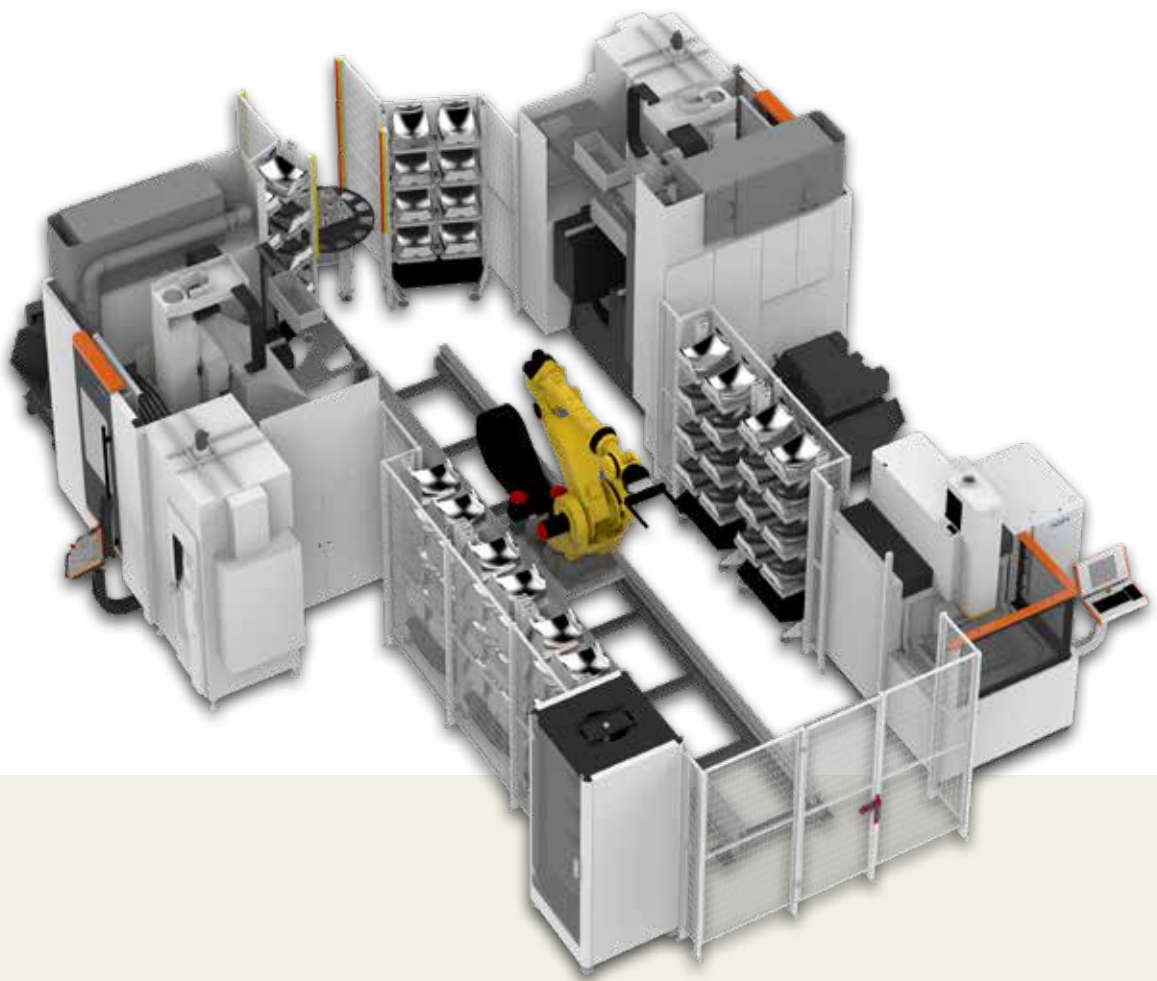
Begin

Begin with a single machine and small magazine capacity.

Add

Add a second machine for more capacity.





EXTEND

Place the Fanuc on rails and add magazine capacity to serve additional machines. Alternatively, start with a similar solution from the beginning.

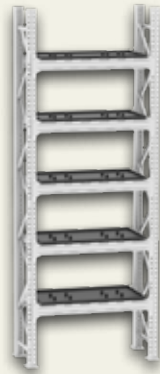
Robot type/model	Fanuc T6-70	Fanuc T6-165	Fanuc T6-210	Fanuc T6-360	Fanuc T6-700
Maximum weight handled (including gripper, pallet, etc.)	70 kg	165 kg	210 kg	360 kg	700 kg
Maximum number of machines served	1 - 12	1 - 12	1 - 12	1 - 12	1 - 12
Maximum number of tooling types	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5
Chuck adapter support	■	■	■	■	■
Technology	Milling, EDMing, wire EDMing, Grinding, laser, CMM and washing machine				
Aluminium linear rail, maximum length	20 m	20 m	20 m	-	-
Steel linear rail, maximum length	30 m	30 m	30 m	30 m	30 m
Loading station support	■	■	■	■	■
Tilting and draining station support	■	■	■	■	■
Drying station support (wire EDM)	■	■	■	■	■
BatchBuilder	-	-	-	-	-
CellManager	■	■	■	■	■
EasyCellManager (milling)	■	■	■	■	■
Hybrid station support (milling)	-	■	■	-	-
Pallet station support (milling)	■	■	■	■	■

Standardised modules

For cost-efficient solutions



Rotary magazine



LFT half-rack magazine



LFT full-rack magazine



Half-rack magazine



Full-rack magazine



Drying station



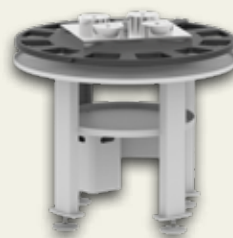
Draining station



ULD Small



ULD Big

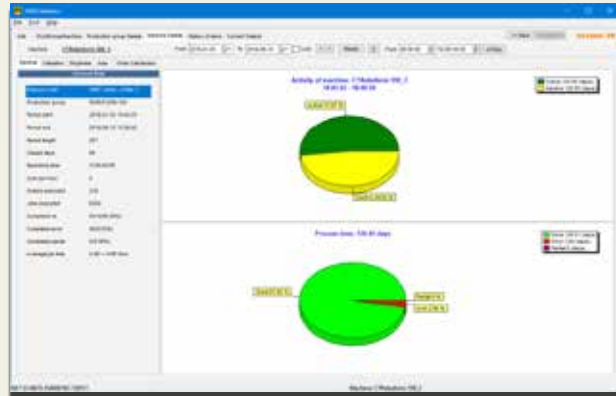
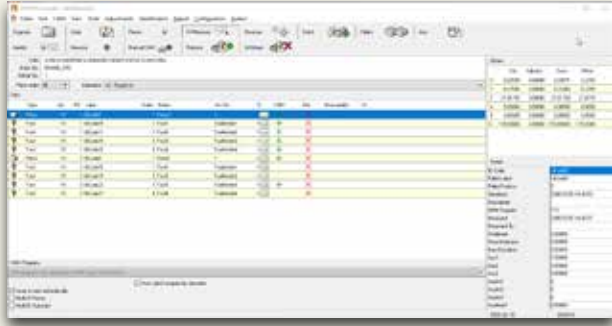


Loading/index station



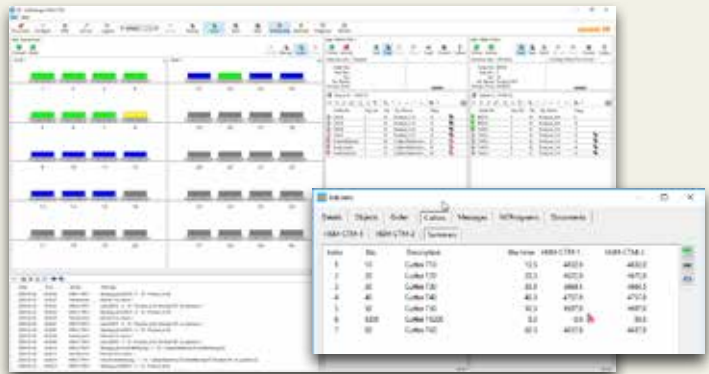
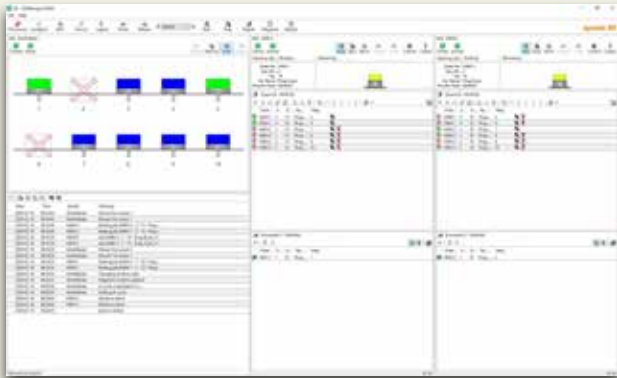
Washing machine station

Software highlights



Preparation – WorkCenter

Statistics



Execution – CellManager

CTM – CutterToolManager

Software summary

WSM module	Process support	Robot type	Machines	Rail	Supported options
CellManager	EDM, wire EDM, mill, laser, CMM & clean	WP1, WP1+ & Fanuc	1 - 12	■	CTM, AES, Alarm Server, pallet/hybrid station, statistics, monitor and MPS2WSM
CellManager Light	EDM, wire EDM, mill, laser & CMM	No robot	1	-	CTM, AES, Alarm Server, statistics, monitor and MPS2WSM
BatchBuilder (without ID)	EDM, wire EDM, mill, CMM	Pallet/electrode changer, WP1 & WP1+	1	-	-
BatchBuilder (with ID)	EDM, wire EDM, mill, CMM	Pallet/electrode changer, WP1 & WP1+	1	-	Alarmserver, statistics and monitor
EasyCellManager	mill	WP1, WP1+ & Fanuc	1 - 4	■	CTM, Alarm Server, statistics and monitor
JobToolManager	mill	Mikron WPC	1	-	CTM, Alarm Server, statistics and monitor

WSM options	Technology	CellManager	CellManager Light	BatchBuilder	EasyCell Manager	JobTool Manager
CTM – cutter tool monitoring	Mill	■	■	-	■	■
Alarm Server	All	■	■	-	■	■
AES – automatic electrode selection	EDM	■	■	-	-	-
Hybrid station (pallets & raw mtrl)	Mill	■	-	-	-	-
Pallet station (re-fixturing)	Mill	■	-	-	-	-
Cell statistics	All	■	■	-	■	■
Cell monitor	All	■	■	-	■	■
MPS2WSM	All	■	■	-	-	-

Easy, Step-by-step

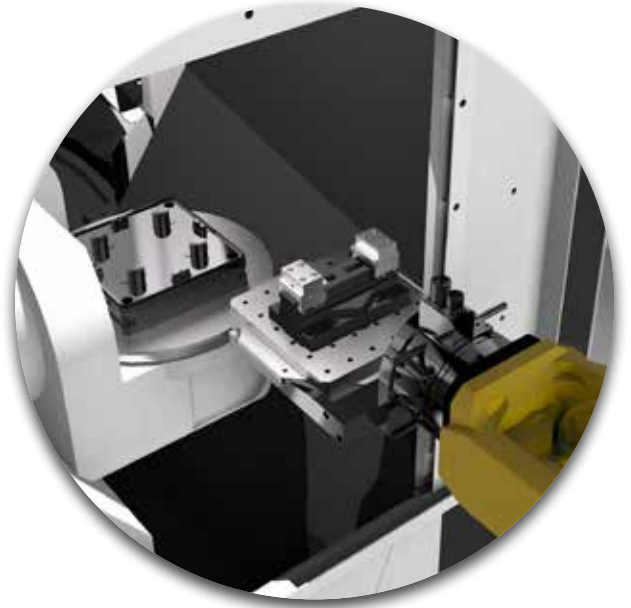


Prepare

Prepare cassettes and jobs.
Load cassettes into magazine.
Execute the jobs via CellManager.

Choose

Choose specific chuck adapter/
vice needed for the material.

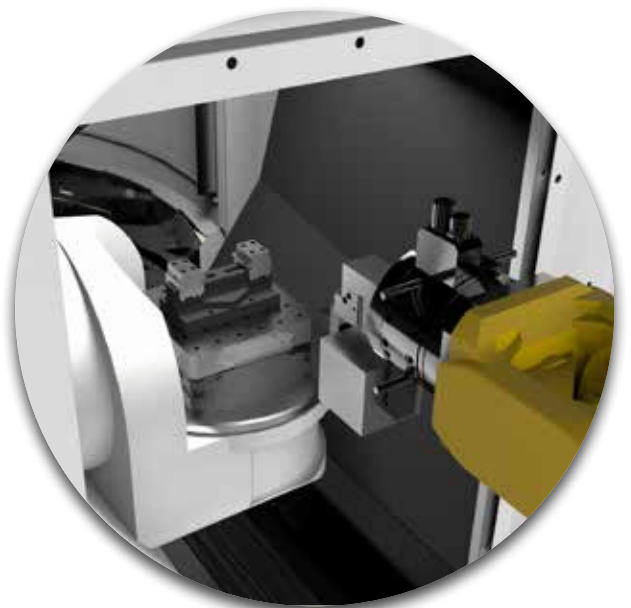


Bring

Bring the cassette with materials to the
intermediate station.

Load

Using predefined raw material
gripper, load each material into
the chuck adapter/vice and start
first job in the queue.



Hybrid automation

- + For mixed pallet automation combined with workpiece handling.
- + Fully automatic change from workpiece A to workpiece B in the machine.
- + The system keeps track of NC program, cassette, gripper, chuck adapters, quantity, etc.
- + The workpiece handling concept is ideal for workpiece families. Thus, grippers and fixtures can possibly be used for more than a single, unique workpiece.



ECM – easy cell manager

- + For milling and laser machines.
- + With System 3R robots, support 1 to 4 machines.
- + Supports loading station.

Options:

- + CTM – cutter tool monitoring.
- + Alarm server.



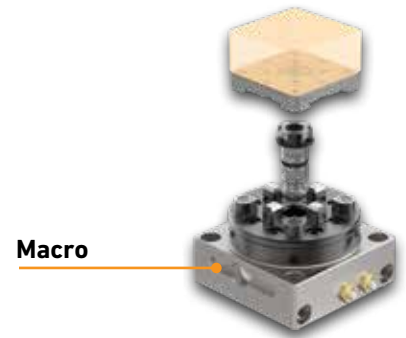
JTM – job tool manager

- + For milling machines.
- + Supports One Mikron Mill with WPC.
- + CTM – cutter tool monitoring.

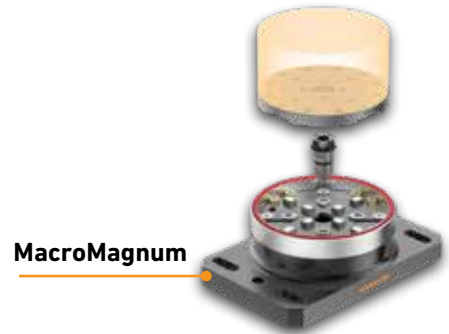
Options:

- + Alarm server.

Tooling highlights

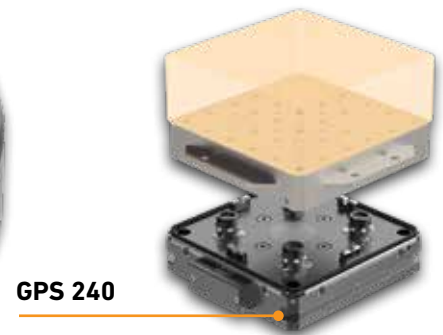


Macro

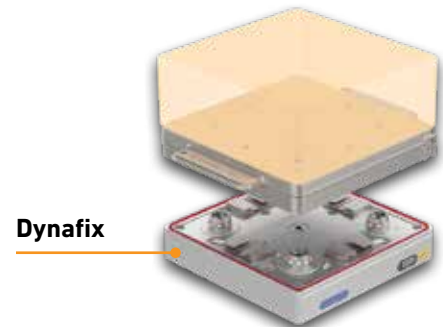


MacroMagnum

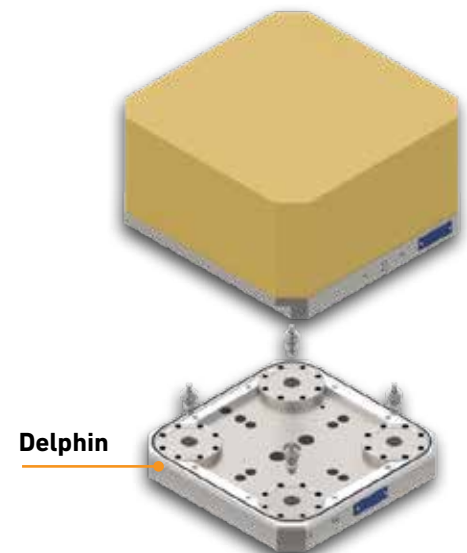
Matrix



GPS 240



Dynafix



Delphin

System 3R can provide an exceptionally wide range of tooling from very small (25 mm pallets) to very large (Delphin BIG, up to several meters). No matter what customers require, the materials they work with and the machines they have, our solutions deliver the best possible accuracy. We can help each customer find the right chuck system and pallets for the application in question. Our tooling systems can work in all environments encountered in modern production. We can equip wire EDM, EDM, milling, laser, grinding, additive manufacturing and CMM machines of all brands. We have also developed tooling for extreme use in environments e.g. ECM, AM, water, oils, etc. This has been achieved by using materials such as cemented carbide, Inconel, ceramic, diabase, etc.

Submicron accuracy – Already here!

Submicron is achievable with Nano.
Our Macro and the Matrix systems are outstanding for submicron accuracy.
System 3R was the market's first supplier of Nano tooling.
+ Consistent accuracy $< 1 \mu\text{m}$.



Vibration dampening pallet (VDP)

Our VDP system offers increased removal rate, better surface finish and reduced tool wear.
One obvious advantage of our VDP products is that they allow machining with more complex cutting data – in other words, better exploitation of machine capacity.
A further plus is better surface quality than when machining with conventional mountings. VDP also reduces tool wear and consequently, tool costs. Similarly, reduced vibration extends the life of the machine spindle.
Last but not least, the lower noise level may, in some case, improve the workshop environment.

Matrix

System 3R is constantly working to develop its product ranges – not least with a view to entering new fields of application.
Mainly for powder pressing in the production of indexable inserts, we have, for several years, been supplying pallet systems to the cemented carbide industry.
This is an industry in which flexibility and quick deliveries are an essential for competitiveness and where demands for accuracy are strict.
Consequently, System 3R has adapted its powder-pressing pallet system so that it can be used in a significantly wider field of application, i.e. metal-cutting machining. Here, it is being launched under the product name Matrix.



ROI – Return on investment

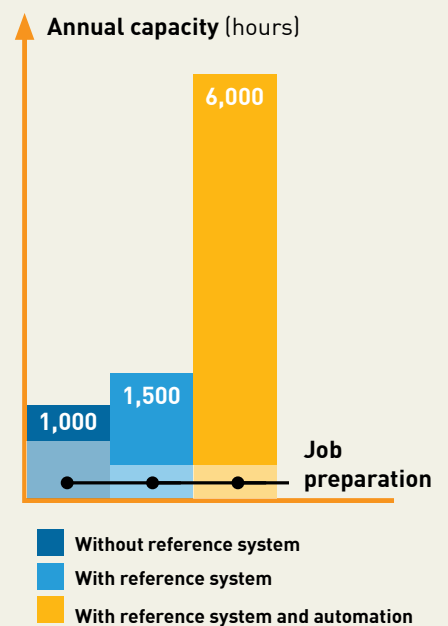
Automation is a way of creating long-term security for survival. Currently, many expensive machines are not being used to more than a limited part of their real capacity. By helping you to increase this use, System 3R also improves your ROI. We help you organize and structure your production from a holistic, process perspective.



Capacity



Productivity



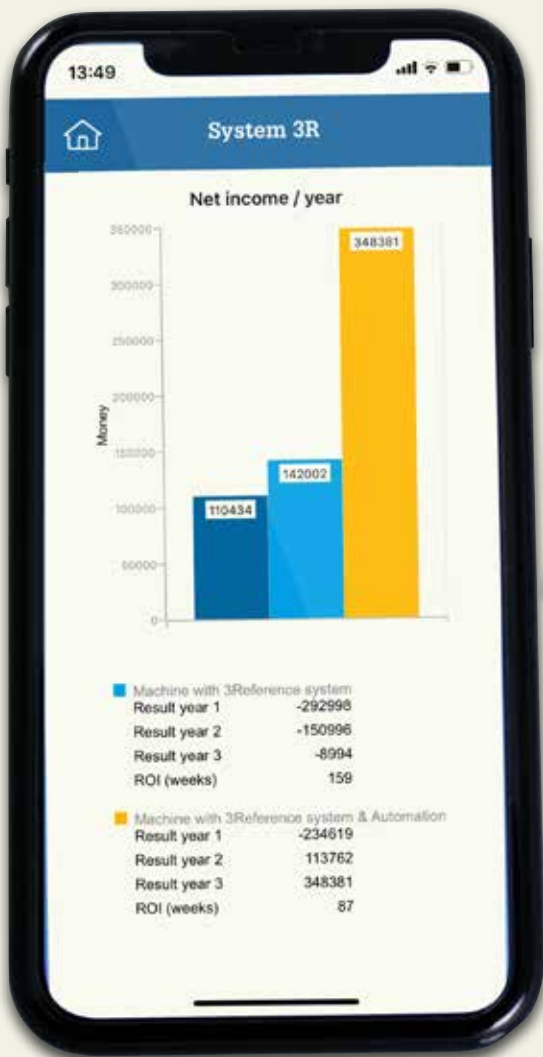
Reduce set-up times

- + Reduce set-up time by more than 85% per operation.
- + Add automation (e.g. workpiece transfer) and work 24/7.



System 3R offers you great potential

By using System 3R equipment and software, you can almost immediately start reaping greater benefit from your investments. We are convinced that once you have started with automation you will continue on that path. We help you reach the future faster and better equipped. Furthermore, with our newly developed ROI App we can help you with the figures.



Testing Catalogue

- Feeding - for aluminum manufacturing and EDMing
- Feeding - for wire EDMing
- Feeding - for Parts production
- Feeding, Delphi modular Clamping System

Automation Catalogue

- WorkPal 1
- WorkPartner 1x
- Fanuc, six-axis robot
- WDM - WorkDrugManager

Easy calculation of costs and returns:

- + Machine investment.
- + Machine + tooling investment.
- + Machine + tooling + automation investment.

About GF Machining Solutions

Multi-technology solutions provider

Our commitment to you and your specific applications is proven by the value-adding intelligence, productivity and quality delivered by our multi-technology solutions. Your success is our chief motivator. That's why we are continuously advancing our legendary technical expertise. Wherever you are, whatever your market segment and whatever the size of your operation, we have the complete solutions and the customer-centric commitment to accelerate your success—today.



EDM (electrical discharge machining)

Wire-cutting EDM

GF Machining Solutions' wire-cutting EDM is fast, precise and increasingly energy efficient. From ultraprecise machining of miniaturized components down to 0.02 mm to powerful solutions for demanding high-speed machining with respect to surface accuracy, our wire EDM solutions position you for success.

Die-sinking EDM

GF Machining Solutions is revolutionizing die-sinking EDM with features like iGAP technology to dramatically boost machining speed and reduce electrode wear. All of our die-sinking systems offer fast removal and deliver mirror finishes of Ra 0.1 µm [4 µin].

Hole-drilling EDM

GF Machining Solutions' robust hole-drilling EDM solutions enable you to drill holes in electrically conductive materials at a very high speed—and, with a five-axis configuration, at any angle on a workpiece with an inclined surface.

Tooling and Automation



Tooling

Our customers experience complete autonomy while maintaining extreme accuracy, thanks to our highly accurate System 3R reference systems for holding and positioning electrodes and work pieces. All types of machines can easily be linked, which reduces set-up times and enables a seamless transfer of workpieces between different operations.

Automation

Together with System 3R, we also provide scalable and cost-effective Automation solutions for simple, single machine cells or complex, multi-process cells, tailored to your needs.



Milling

Milling

Precision tool and mold manufacturers enjoy a competitive edge with our Mikron MILL S solutions' fast and precise machining. The Mikron MILL P machines achieve above-average productivity thanks to their high performance and Automation. Customers seeking fastest return on investment benefit from the affordable efficiency of our MILL E solutions.

High Performance Airfoil Machining

Our Liechti turnkey solutions enable the highly dynamic manufacturing of precision airfoils. Thanks to their unique performance and our expertise in airfoil machining, you increase productivity by producing at the lowest cost per part.

Spindles

As part of GF Machining Solutions, Step-Tec is engaged in the very first stage of each machining center development project. Compact design combined with excellent thermal and geometric repeatability ensure the perfect integration of this core component into the machine tool.

Software



Digitalization solutions

To drive its digital transformation, GF Machining Solutions acquired Symmedia GmbH, a company specialized in software for machine connectivity. Together, we offer a complete range of Industry 4.0 solutions across all industries. The future requires the agility to adapt quickly to continual digital processes. Our intelligent manufacturing offers embedded expertise, optimized production processes, and workshop Automation: solutions for smart and connected machines.



Advanced manufacturing

Laser texturing

Aesthetic and functional texturing is easy and infinitely repeatable with our digitized Laser technology. Even complex 3D geometries, including precision parts, are textured, engraved, microstructured, marked and labeled.

Laser micromachining

GF Machining Solutions offers the industry's most complete line of Laser micromachining platforms optimized for small, high-precision features to meet the increasing need for smaller, smarter parts to support today's leading-edge products.

Laser Additive Manufacturing (AM)

GF Machining Solutions and 3D Systems, a leading global provider of additive manufacturing solutions and the pioneer of 3D printing, have partnered to introduce new metal 3D printing solutions that enable manufacturers to produce complex metal parts more efficiently.

Customer Services



Worldwide for you

Ensuring the best performance throughout the lifetime of our customers' equipment is the goal of our three levels of support. Operations Support offers the complete range of original wear parts and certified consumables. Machine Support includes spare parts, technical support, and a range of preventive services to maximize machine uptime. Business Support offers customer-specific business solutions.



Switzerland

Biel/Bienne
Losone
Geneva
Flawil
Langnau

www.gfms.com
www.gfms.com/ch

Europe

Germany, Schorndorf
www.gfms.com/de

United Kingdom, Coventry
www.gfms.com/uk

Italy, Agrate Brianza - MI
www.gfms.com/it

Spain, Sant Boi de Llobregat
Barcelona
www.gfms.com/es

France, Palaiseau
www.gfms.com/fr

Poland, Raszyn / Warsaw
www.gfms.com/pl

Czech Republic, Brno
www.gfms.com/cz

Sweden, Vällingby
www.gfms.com/system3r

Turkey, Istanbul
www.gfms.com/tr

Americas

USA
Lincolnshire, IL
Chicago, IL
Holliston, MA
Huntersville, NC
Irvine, CA
Woodridge, IL
www.gfms.com/us

Canada, Mississauga ON
www.gfms.com/us

Mexico, Monterrey NL
www.gfms.com/us

Brazil, São Paulo
www.gfms.com/br

Asia

China
Beijing, Shanghai, Chengdu, Dongguan,
Hongkong, Changzhou
www.gfms.com/cn

India, Bangalore
www.gfms.com/sg

Japan
Tokyo, Yokohama
www.gfms.com/jp

Korea, Seoul
www.gfms.com/kr

Malaysia, Petaling Jaya
www.gfms.com/sg

Singapore, Singapore
www.gfms.com/sg

Taiwan
Taipei, Taichung
www.gfms.com/tw

Vietnam, Hanoi
www.gfms.com/sg

Use our customer services to optimise your equipment uptime

Our services:

- + Ensure productivity.
- + Reduce running costs and waste/scrap
- + Maximise the return on your System 3R investments.
- + Extending the lifetime of your System 3R equipment while maintaining optimum precision.
- + Ensure robot cell safety satisfies present machine directives.

System 3R's customer services are uniquely positioned to help you maximise the availability, value, precision and productivity of your System 3R equipment. Our services are cost-effective, customer-centric and cutting edge. They put your success at the centre, ramp up your productivity and ensure predictable, uninterrupted uptime. System 3R's service engineers are your expert partners for a wide range of success-triggering services.

For more information, please get in touch with your local System 3R dealer.

For contact details, please refer to www.system3r.com.

