

System 3R

Software portfolio



Swedish design and quality

GF Machining Solutions: all about you

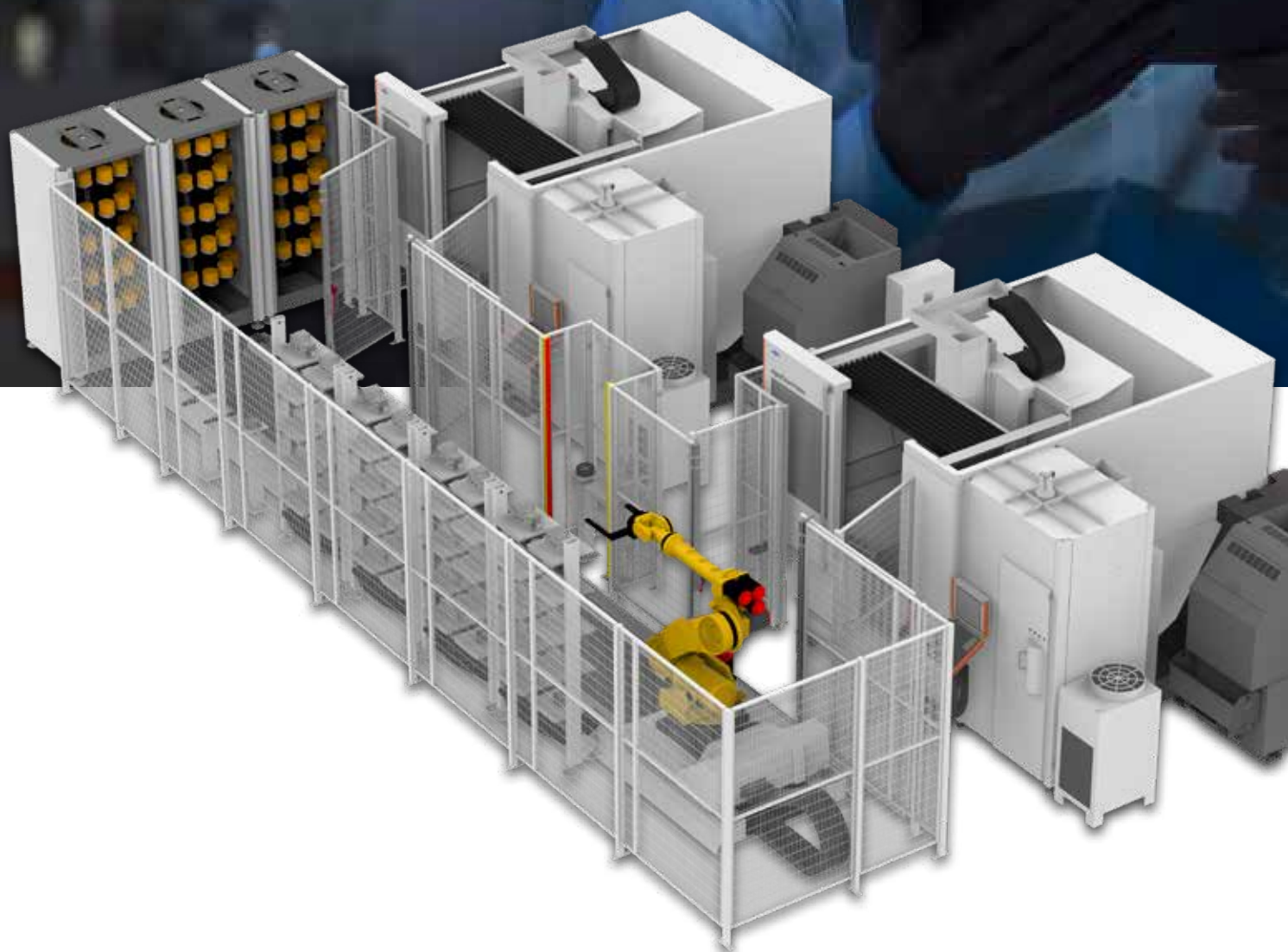
When all you need is everything, it's good to know that there is one company that you can count on to deliver complete solutions and services. From world-class electrical discharge machines (EDM), Laser texturing and Additive Manufacturing through to first-class Milling and Spindles, Tooling, Automation 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
6	Software range
8	WorkShopManager
10	CellManager
12	Hybrid automation
13	CellManager – Options
18	EasyCellManager
20	JobToolManager
22	CellManager Light
24	BatchBuilder
27	Glossary
28	Summary
30	About GF Machining Solutions
31	Worldwide for you

Machining processes





Global presence

Sales companies in over 20 countries.


Thousands of installations worldwide.

We have the solution

For all your single or multiple process production set-ups.

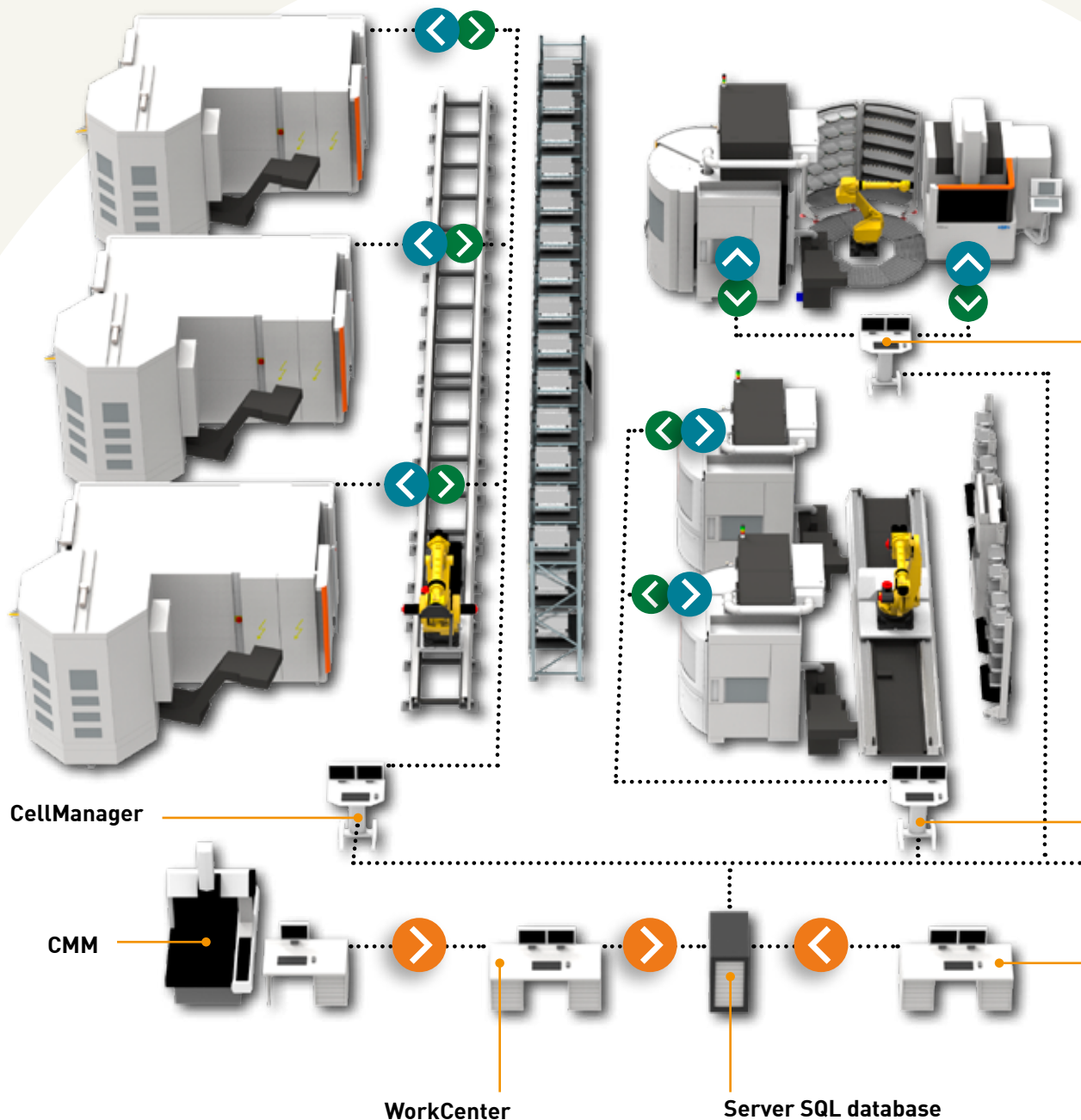
Full automation

System 3R's software portfolio embodies over 25 years of machining experience.

- 
- + Secure and standardise your processes for better quality
 - + 24/7 production support
 - + Import and export to ERP systems
 - + Multiple technology support (milling, EDMing, wireEDMing, laser, grinding, CMM, drying and cleaning).

Software range

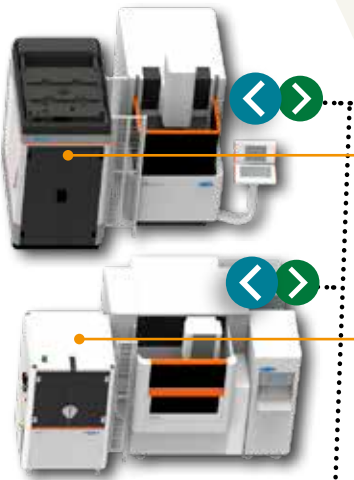
Software	Process support	Robot type
CellManager	Mill, EDM, WEDM, laser, CMM and clean	WP1, WPT1+ and 6-axis Transformer
EasyCellManager	Mill, Laser	WP1, WPT1+ and 6-axis Transformer
JobToolManager	Mill	Mikron WPC
CellManager Light	Mill, EDM, WEDM, laser and CMM	Robot support not needed
BatchBuilder	Mill, EDM, WEDM and CMM	Pallet/electrode changer, WP1 and WPT1+
BatchBuilder with ID	Mill, EDM, WEDM and CMM	Pallet/electrode changer, WP1 and WPT1+



Machines	Rail	Supported options
1 to 12	■	CTM, AES, AlarmServer, Pallet/hybrid station, statistics, monitor and MPS2WSM
1 to 4	■	CTM, AlarmServer, statistics and monitor
1	-	CTM, AlarmServer, statistics and monitor
1	-	CTM, AES, AlarmServer, statistics, monitor and MPS2WSM
1	-	
1	-	AlarmServer, statistics and monitor



CellManager

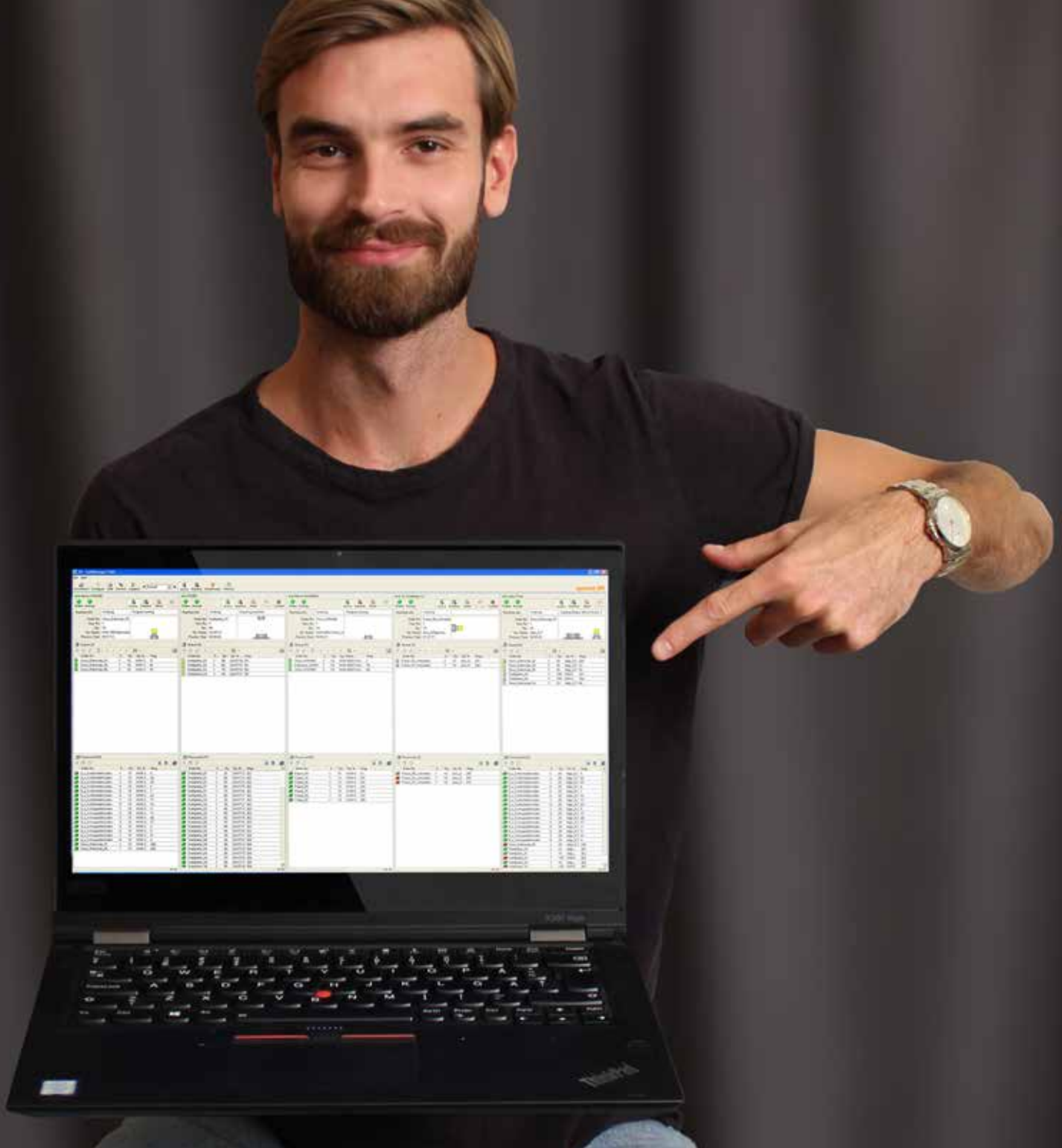


Batch management

CellManager



CAM



WorkShopManager

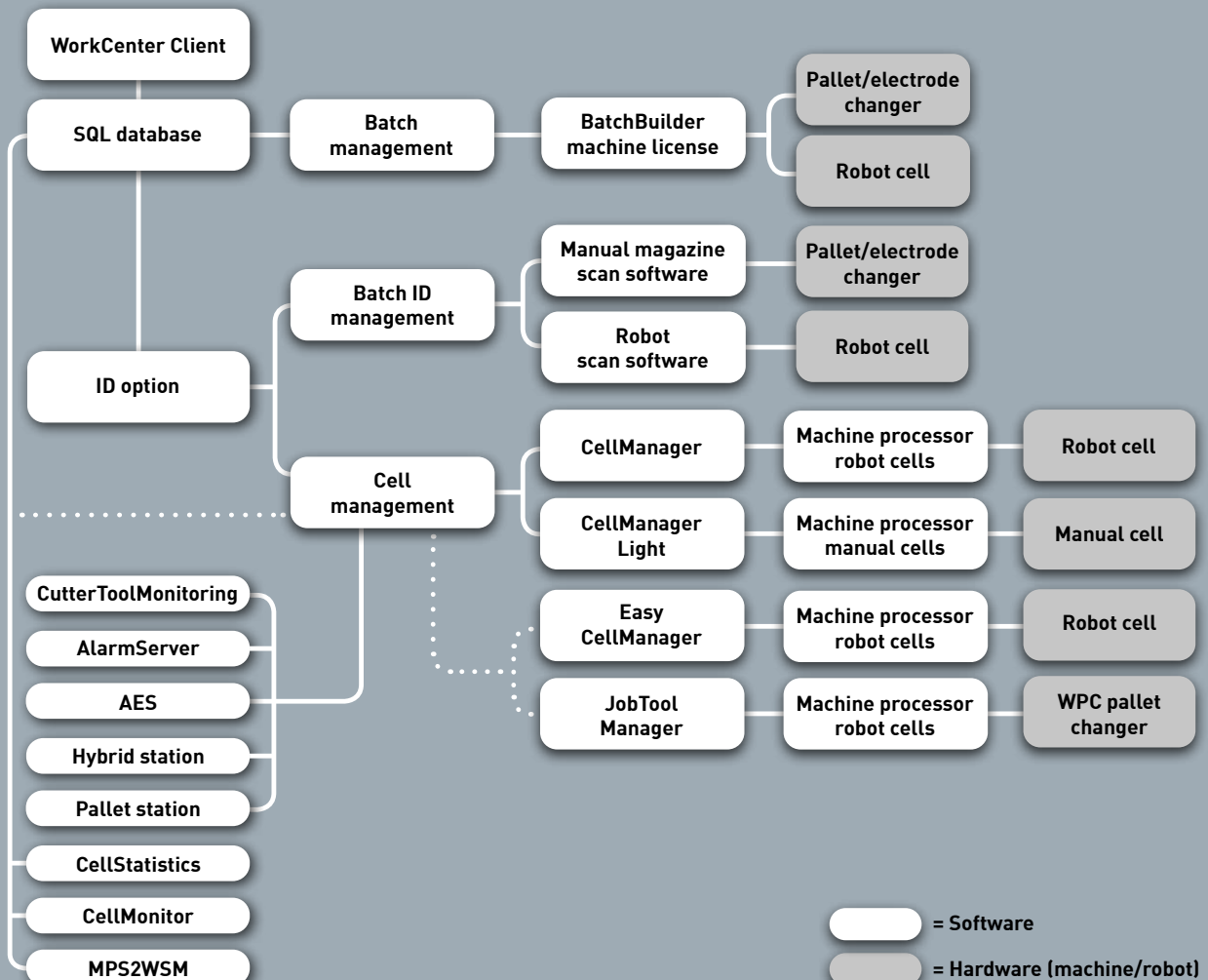
Seamless integration of all your processes

- Quick and accurate overview of the entire process chain
- Management of the entire automation process
- Human errors drastically reduced
- Process safety and reliability.

WorkShopManager

Grows with your needs

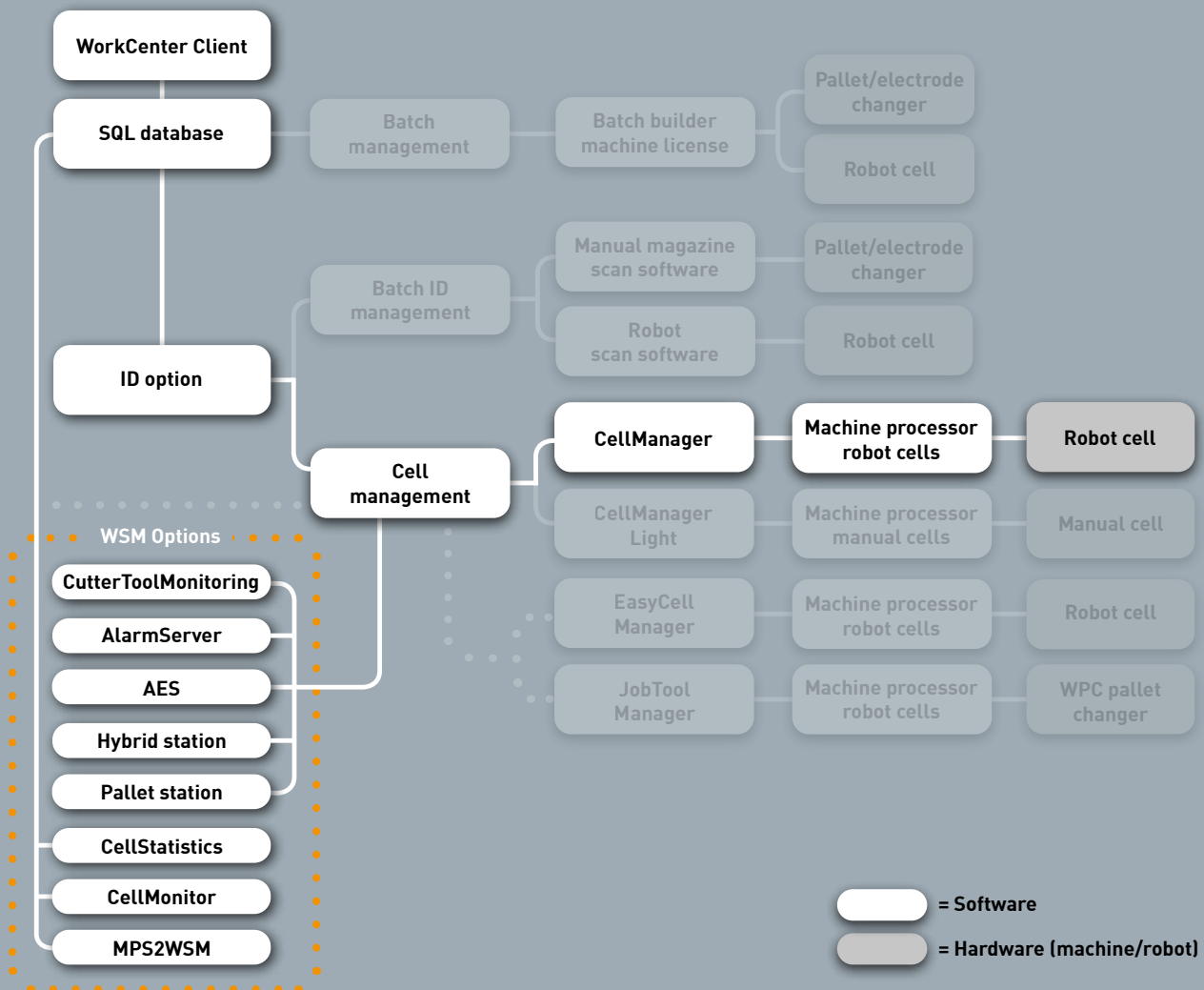
- + Easy-to-learn and user friendly
- + Brings all your production technologies together in one process chain
- + Keeps your production running with standardised procedures
- + Manages your automated processes
- + Designed for your future (new machines, magazines and options can be added later on)
- + Central database for the entire factory.



CellManager

Intuitive and user-friendly

- + 1 or up to 12 machines in a cell
- + Supports different types of machines (e.g. milling, EDMing, WireEDMing, laser, CMM and cleaning)
- + System 3R Automation – WorkPal 1, WorkPartner 1+ or 6-axis Transformer 70 – 700 kg
- + Makes processes safer and has ID system for identification
- + Clear, graphical display of magazine content
- + Easy to prioritise jobs (move up/down or stop)
- + Loading station support.



CellManager – Workflow



Three-step user friendliness

WorkCenter – Preparation

- + Generate jobs/work orders
- + Assign operations and NC programs
- + Request and transfer offset values
- + Approve and release jobs/work orders for production.

CellManager – Execution

- + Manage pallet IDs and magazine positions
- + Generate priority lists
- + Automatically start released jobs/work orders based on the priority list.

CellStatistics

- + Check utilisation in period, time of day
- + View via various graphical representations
- + Export statistics into Excel.

CellManager – Options

	Application	CellManager	ECM – Easy CellManager	JTM – Job Tool Manager	CellManager Light	BatchBuilder
CTM – CutterTool Monitoring	Milling	■	■	■	■	–
AlarmServer	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
AES – Automatic ElectrodeSelection	EDM	■	–	–	■	–
Hybrid station (pallets and raw material)	Milling	■	–	–	–	–
Pallet station (re-fixturing)	Milling	■	–	–	–	–
CellStatistics	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
CellMonitor	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
MPS2WSM	Mill, EDM, WEDM, laser, CMM, clean	■	–	–	■	–

Hybrid automation

- + For mixed pallet automation combined with workpiece handling
- + Fully automatic changing from workpiece A to workpiece B in the machine
- + The system keeps track of NC program, cassette, gripper, chuck adapters, quantities, 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.



Easy, step-by-step



Prepare

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

Choose

Choose specific chuck adapter/vice for the material.



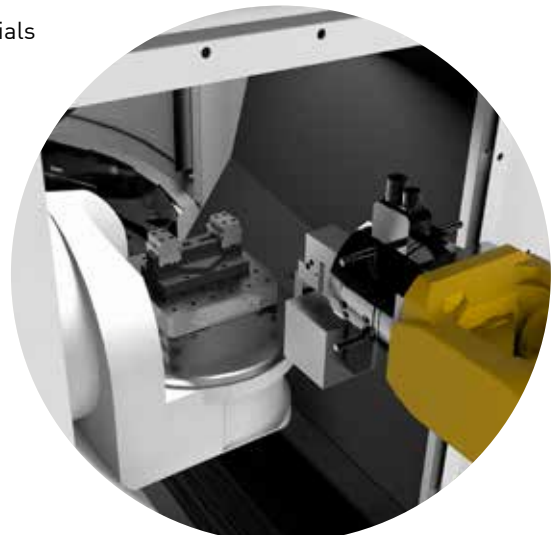
Bring

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.



CellManager – Options



CTM – CutterToolMonitoring

- + Cutters used for an operation are stored in the database
- + Cutters needed for each job are compared with the machine's tool magazine
- + Jobs where the cutters are not available are blocked
- + Cutters can be assigned estimated lifetimes (if lifetime monitoring is activated on the machine)
- + Jobs that take cutters past their estimated lifetime are blocked.



AlarmServer (example)

- + Robot cell 1 stops due to air pressure failure
- + AlarmServer receives the alarm
- + Operator 1 receives an SMS message "Air pressure failure in Robot cell 1" and/or machine 2 then stops due to "high coolant temperature"
- + AlarmServer receives the alarm
- + Operator 2 receives SMS message "Too high coolant temperature in Machine 2".



AES – AutomaticElectrodeSelection

Selection is based on the electrode part number, the actual wear status of the present electrodes and how fresh the electrodes need to be for the erosion job.

Using this system, a large set of identical electrodes can be manufactured for any erosion process while maintaining full control of CMM offsets for the individual electrodes.

AES is a WSM CellManager function. From a pool of electrodes in the production cell magazine, it automatically selects the proper electrodes for an erosion job.

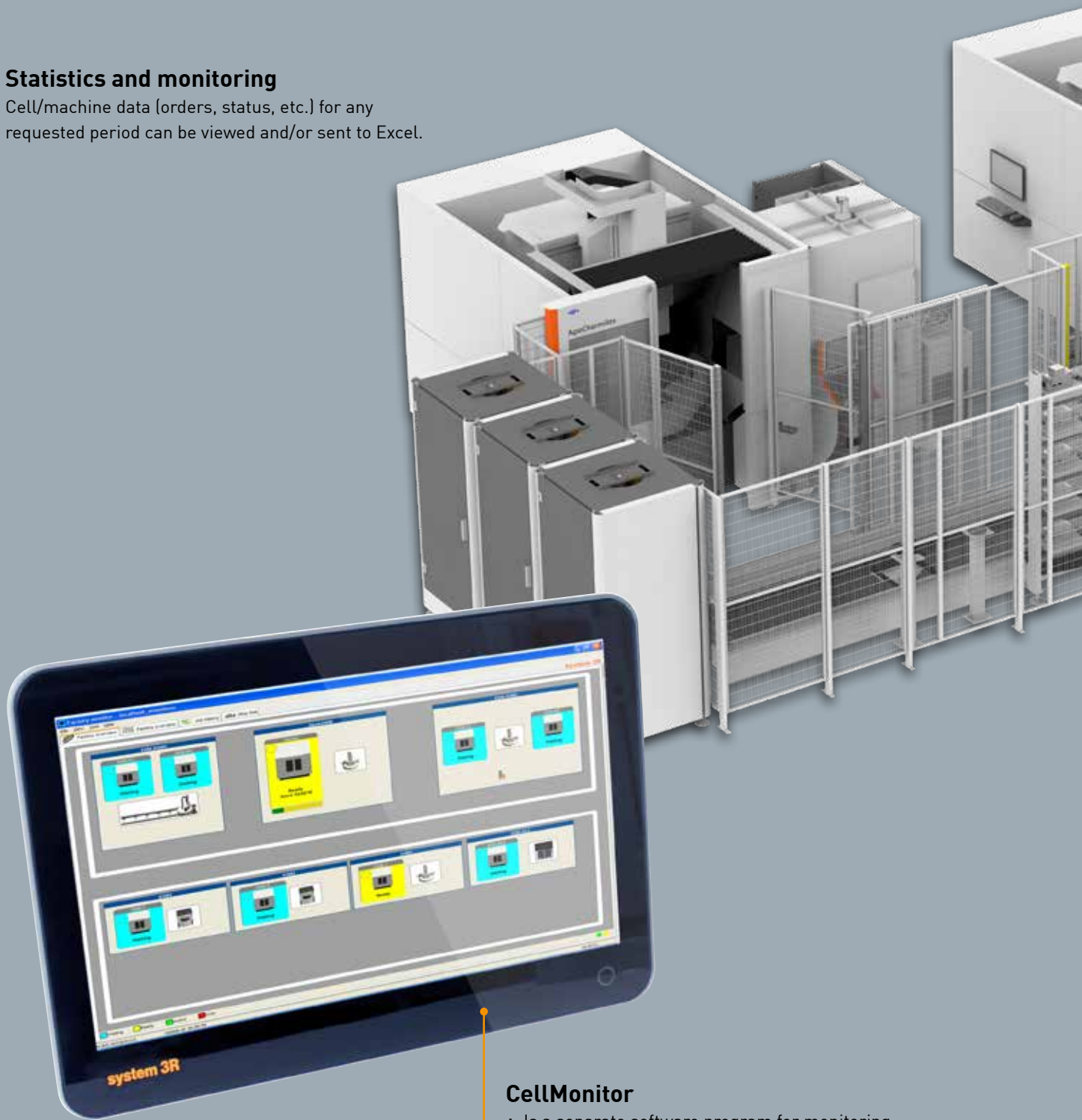


Code carrier with unique ID.

CellManager – Options

Statistics and monitoring

Cell/machine data (orders, status, etc.) for any requested period can be viewed and/or sent to Excel.



CellMonitor

+ Is a separate software program for monitoring several cells.

CellMonitor's displays

- + Cell status
- + Machine activity
- + Job status.



system 3R

CellStatistics

- + Utilization (period, time of day)
- + View as different graphics
- + Export statistics into Excel.

Production group

- + Utilization (period, time of day)
- + Job count (period, length distribution)
- + Order distribution
- + NC programs.

Machine details

- + Utilization (period, time of day)
- + Job count (period, length distribution)
- + Order distribution.

Order history

- + Details.

Current orders

- + Order list
- + Order details
- + Order distribution.

CellManager – Options

MPS2WSM import and export – Workflow



MPS2WSM import and export

An interface for MPS/ERP* systems.

- + Imports complete production orders from the MPS system into WorkShopManager
- + Exports job status and process times to the MPS system.

Existing manufacturing data is exported from ProductionPlanningSystem (PPS)

- + Order number
- + Machining operations
- + NC programs.

* MPS = Material and planning systems.
ERP = Enterprise resource planning.

A manufacturing order is automatically generated Identify

The next step is to link the physical objects with their manufacturing orders. Each object is mounted on a pallet with a code carrier that is recorded in the database.

CMM integration

To determine offset values (X-Y-Z-C) for a workpiece on its pallet (if required), a measuring machine can be used before machining.



CellManager executes the jobs as per the priority list

- + Full graphical overview of magazine content
- + Machine and job status
- + Easy to prioritise jobs (move up/down or stop).



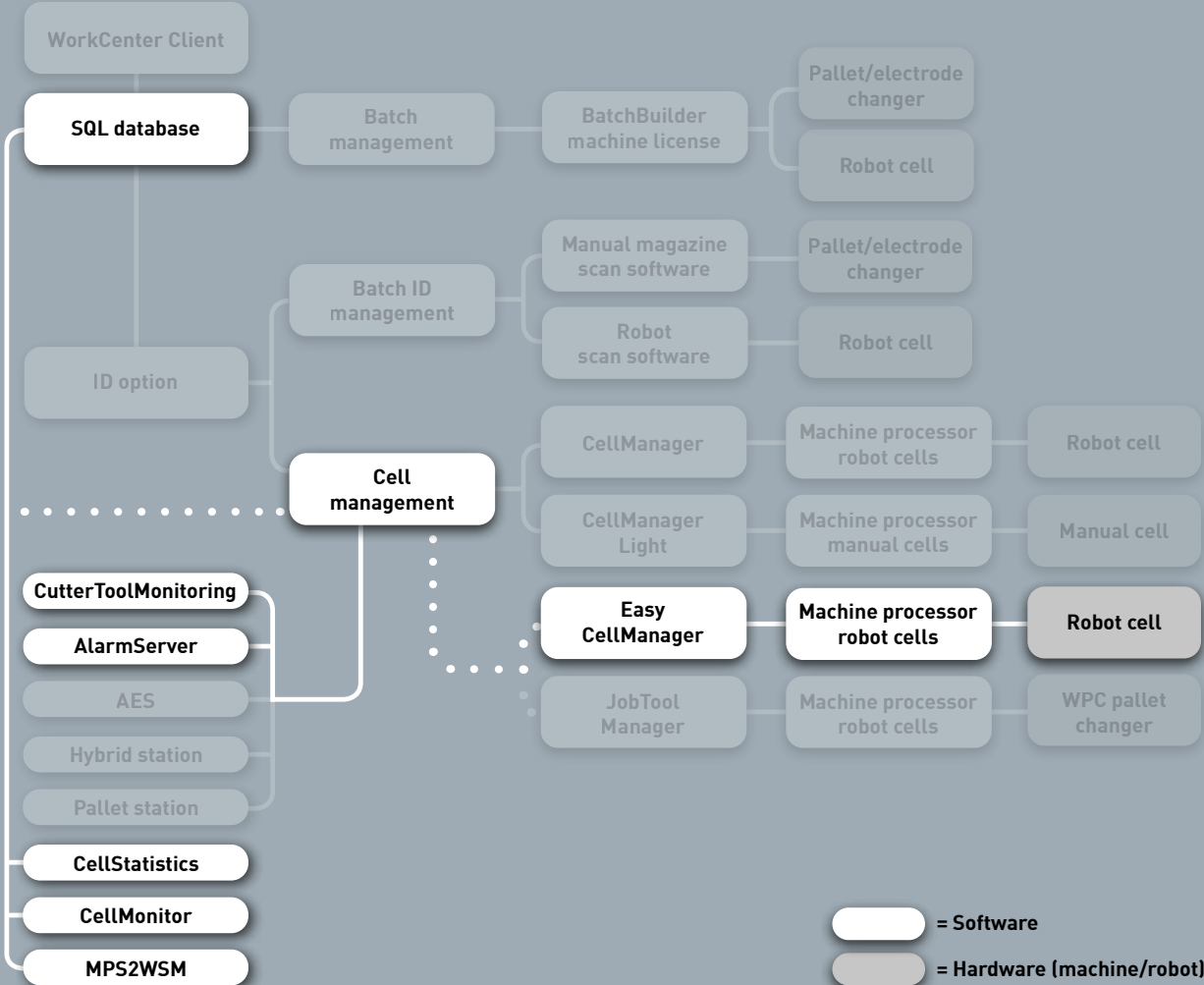
Finished orders are reported back to the production planning system

- + Article number, order number, machine ID, machine time, etc. are examples of production data that can be reported back
- + Depending on ERP system and customer, we can tailor the report.

EasyCellManager

For milling and laser cells with System 3R robots

- + Easy-to-learn and has touchscreen support
- + 1 – 4 machine support (milling and laser only)
- + System 3R automation – WorkPal 1, WorkPartner 1+ and 6-axis Transformer
- + Clear, graphical display of magazine content
- + Easy to prioritise jobs (move up/down or stop)
- + Loading station support.



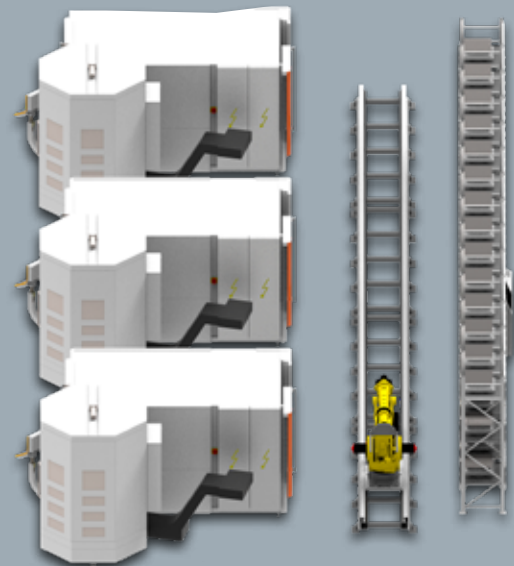


1, 2, 3 or 4 machine support



EasyCellManager

- + Easy-to-Use and install
- + New user interface and colour scheme
- + Now features loading station support
- + ID system not needed
- + 1,2,3 or 4 machine support
- + Dedicated magazine positions per machine (up to 100 magazine positions per machine).



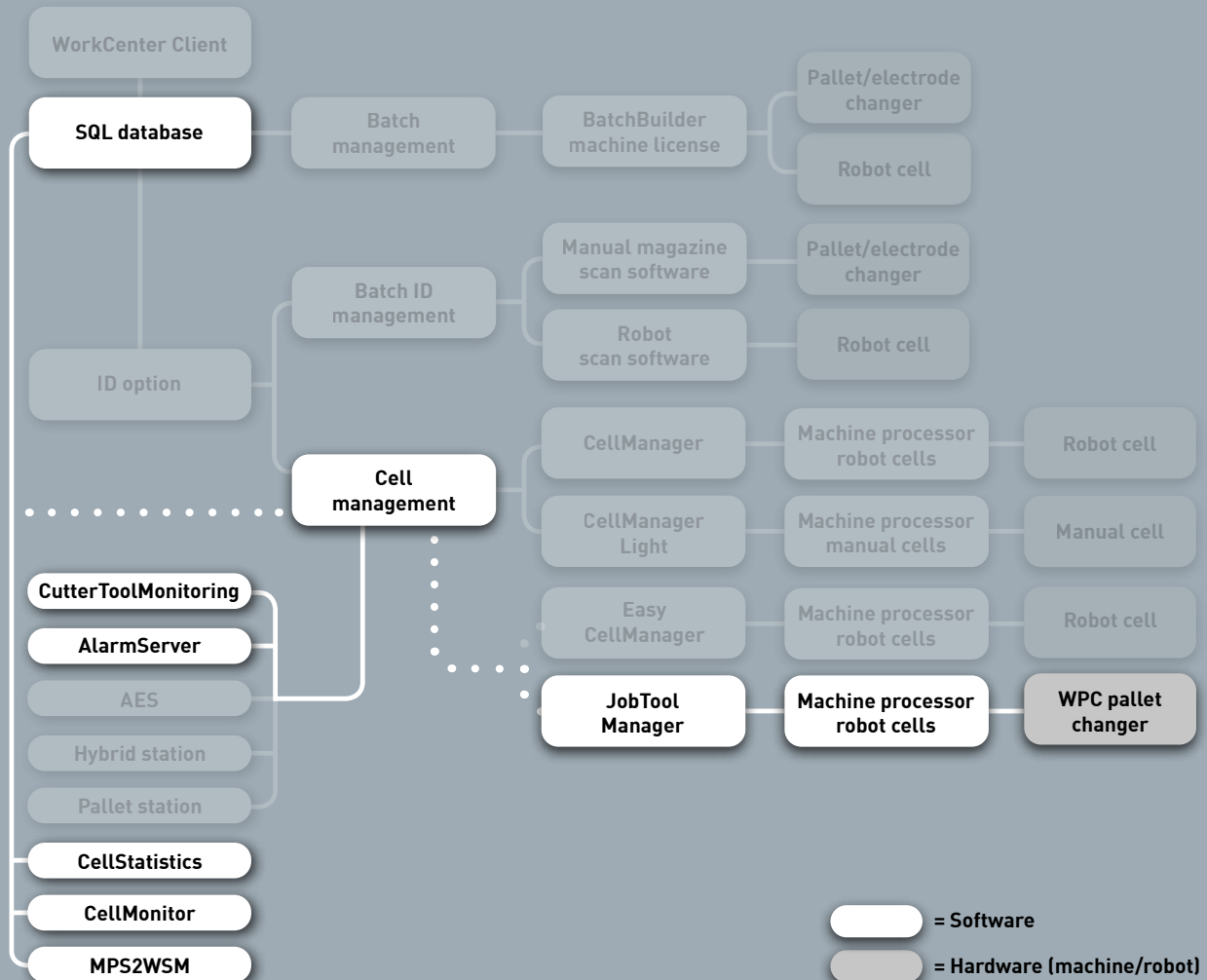
Easy CellManager – Options

	Application	CellManager	ECM – Easy CellManager	JTM – Job Tool Manager	CellManager Light	BatchBuilder
CTM – CutterTool Monitoring	Milling	■	■	■	■	–
AlarmServer	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
AES – Automatic ElectrodeSelection	EDM	■	–	–	■	–
Hybrid station (pallets and raw material)	Milling	■	–	–	–	–
Pallet station (re-fixturing)	Milling	■	–	–	–	–
CellStatistics	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
CellMonitor	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
MPS2WSM	Mill, EDM, WEDM, laser, CMM, clean	■	–	–	■	–

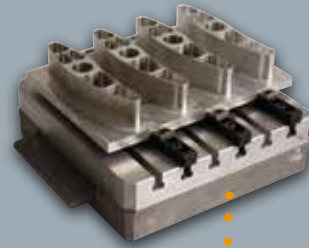
JobToolManager

For milling cells equipped with Mikron WPC

- + Easy-to-learn and has touchscreen support
- + 1 machine support (milling only)
- + Only Mikron milling machines with WPC (WorkPieceChanger)
- + Clear, graphical display for magazine content
- + Easy to prioritise jobs (move up/down or stop)



Micron WPC equipped with Dynafix pallets.



JobToolManager

- + 1 x CellPC (touch)
- + CutterToolMonitoring (CTM) included
- + AlarmServer available as optional extra
- + Shorter operator learning curve
- + ID system not needed
- + Easy-to-Use and install
- + New user interface and colour scheme.

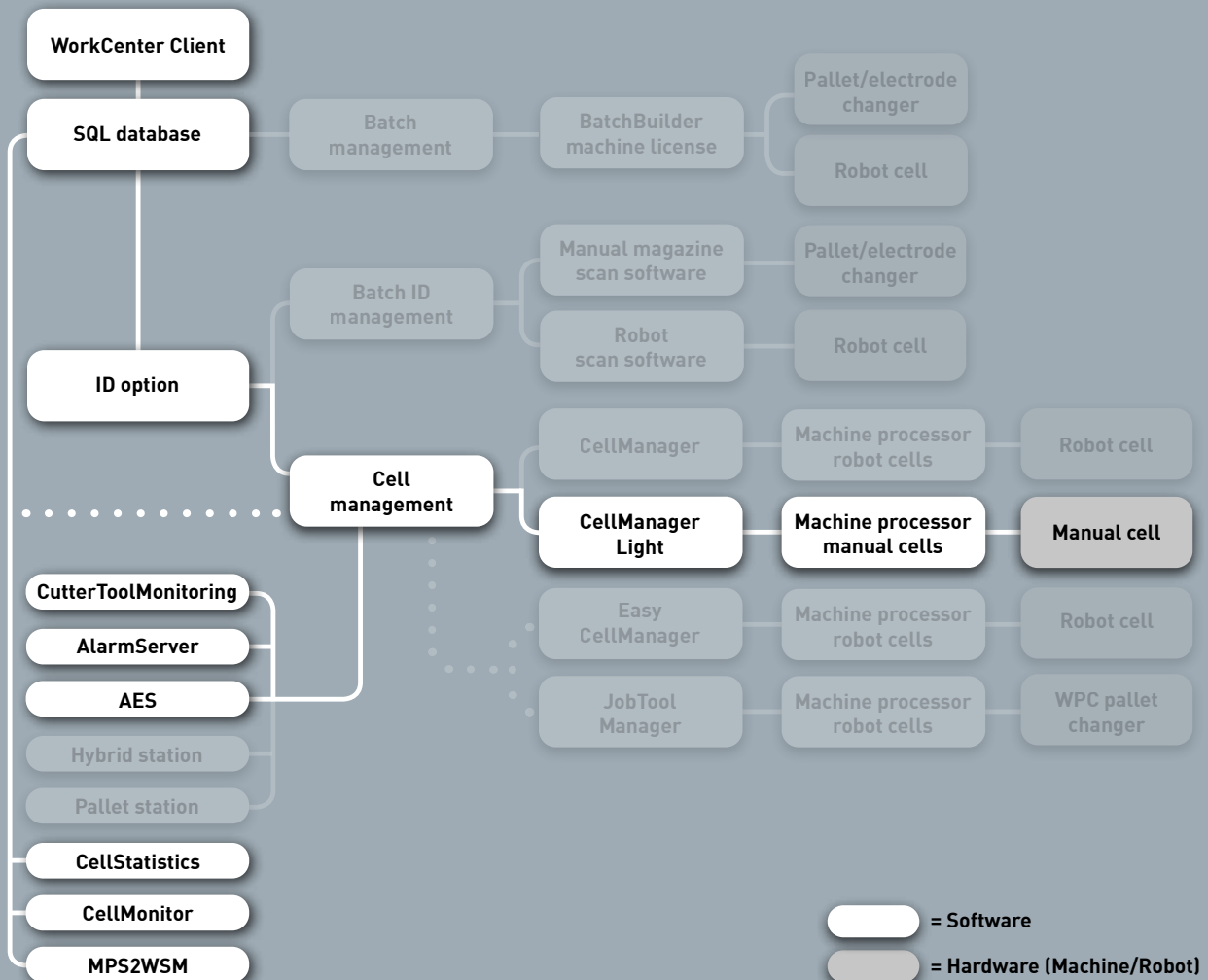
JobToolManager – Options

	Application	CellManager	ECM – Easy CellManager	JTM – Job ToolManager	CellManager Light	BatchBuilder
CTM – CutterTool Monitoring	Milling	■	■	■	■	–
AlarmServer	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
AES – Automatic ElectrodeSelection	EDM	■	–	–	■	–
Hybrid station (pallets and raw material)	Milling	■	–	–	–	–
Pallet station (re-fixturing)	Milling	■	–	–	–	–
CellStatistics	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
CellMonitor	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
MPS2WSM	Mill, EDM, WEDM, laser, CMM, clean	■	–	–	■	–

CellManager Light

Full process control in robotless systems

- + One or several machines
- + Robots not needed
- + Supports different types of machines (e.g. milling, EDMing, WireEDMing, laser and CMM)
- + Makes processes safer and has ID system for identification.



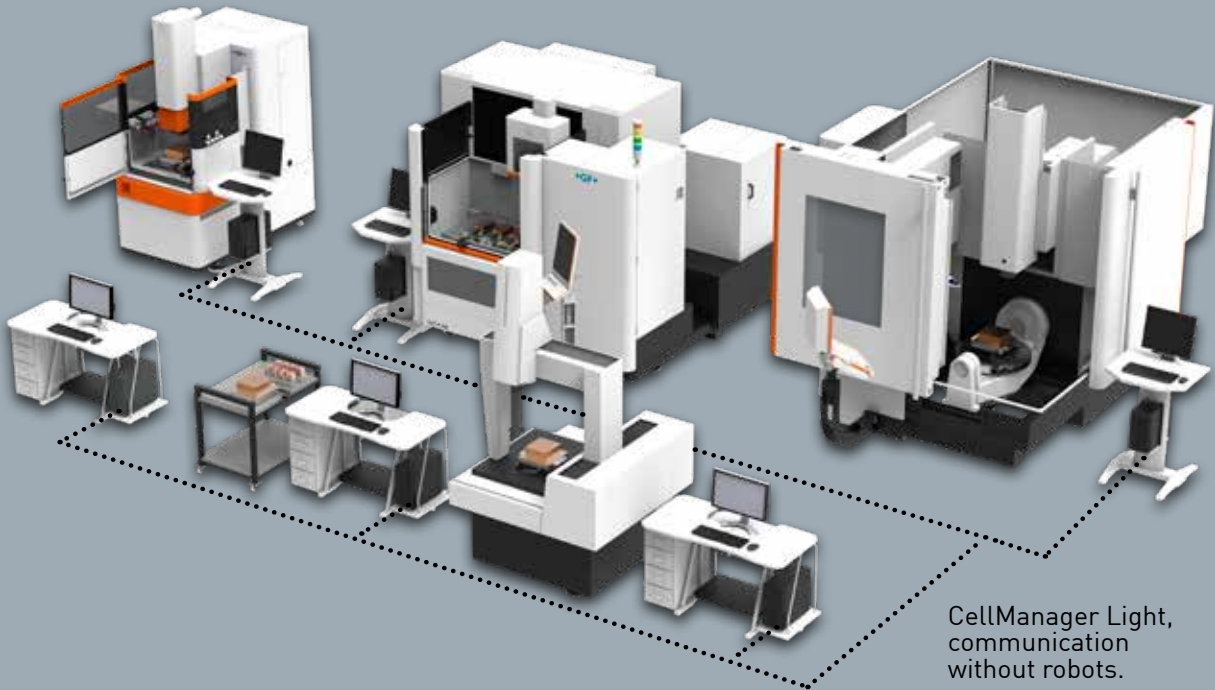


CellManager Light (robotless systems)

A real-time cell management system for organising and executing work in manually loaded machines.

An excellent way to organise your workshop before you step into automation.

1. Create a machining order
2. Identify workpieces and electrodes
3. Measure workpiece and electrode offsets
4. Load workpiece and electrodes
5. Identify workpiece and electrodes in the machine
6. CellManager light feeds offset values and magazine positions into the NC program
7. The NC program is automatically transferred to the machine and machining starts.



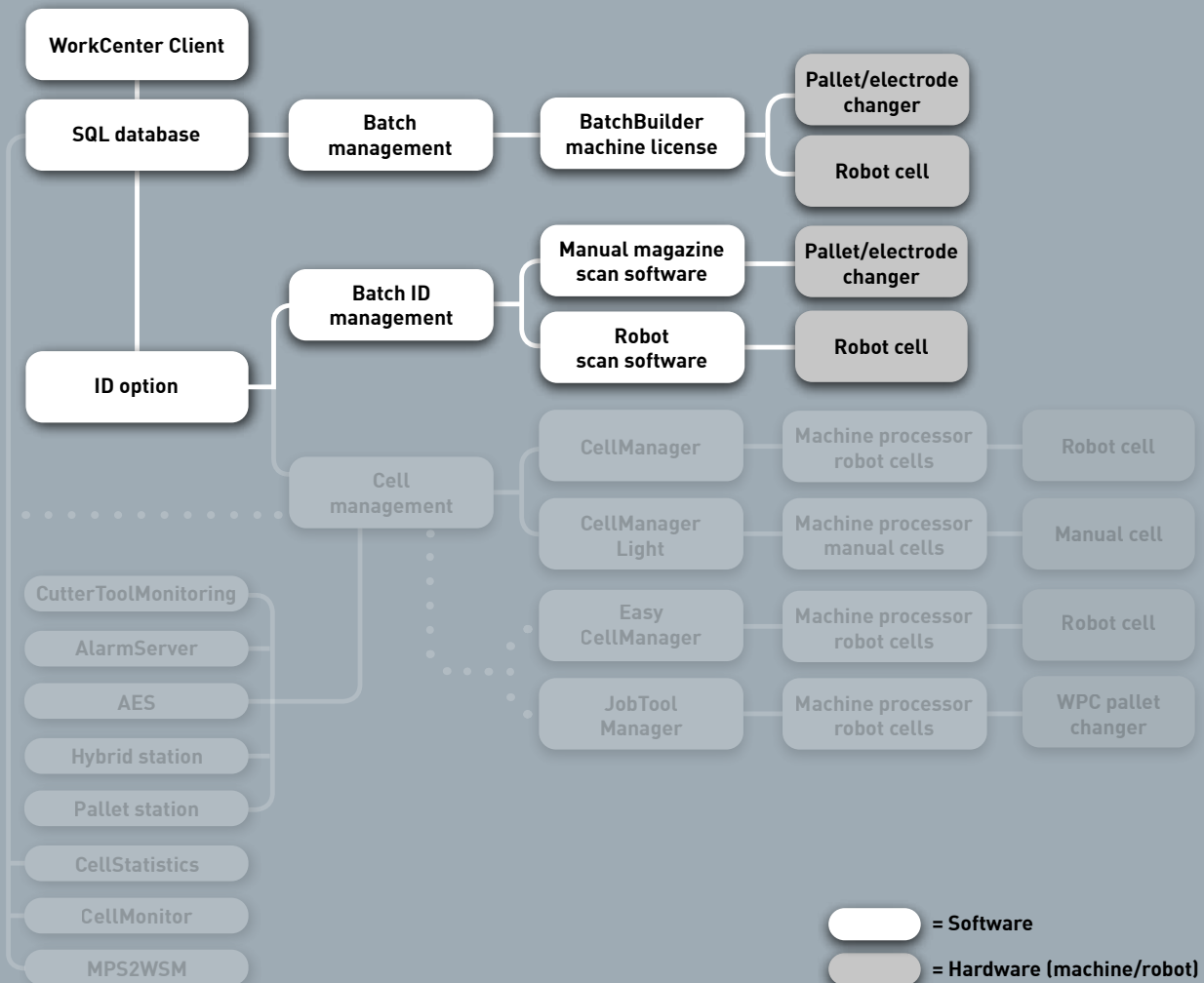
CellManager Light – Options

	Application	CellManager	ECM – Easy CellManager	JTM – Job Tool Manager	CellManager Light	BatchBuilder
CTM – Cutter Tool Monitoring	Milling	■	■	■	■	–
AlarmServer	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
AES – Automatic Electrode Selection	EDM	■	–	–	■	–
Hybrid station (pallets and raw material)	Milling	■	–	–	–	–
Pallet station (re-fixturing)	Milling	■	–	–	–	–
CellStatistics	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
CellMonitor	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
MPS2WSM	Mill, EDM, WEDM, laser, CMM, clean	■	–	–	■	–

BatchBuilder

Entry level – Create job batches to run in your robot cell

- + Supports System 3R robots (WorkPal 1, WorkPartner 1+ and 6-axis Transformer)
- + Supports different types of machines (e.g. Milling, EDMing, WireEDMing and CMM)
- + Works with or without ID system.





BatchBuilder

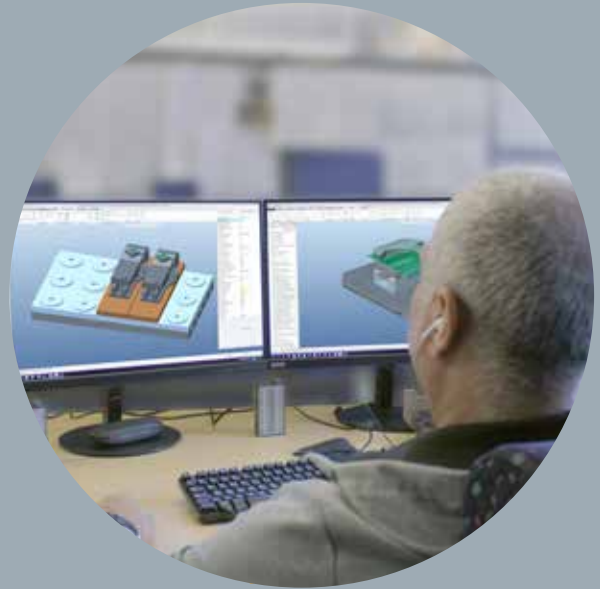
Execution of jobs created as a queue (batch).
One-way of communication (fewer functions than CellManager). Jobs cannot be re-arranged, priorities cannot be set, etc.

BatchBuilder – Options

	Application	CellManager	ECM – Easy CellManager	JTM – Job ToolManager	CellManager Light	BatchBuilder
CTM – CutterTool Monitoring	Milling	■	■	■	■	–
AlarmServer	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
AES – Automatic ElectrodeSelection	EDM	■	–	–	■	–
Hybrid station (pallets and raw material)	Milling	■	–	–	–	–
Pallet station (re-fixturing)	Milling	■	–	–	–	–
CellStatistics	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
CellMonitor	Mill, EDM, WEDM, laser, CMM, clean	■	■	■	■	–
MPS2WSM	Mill, EDM, WEDM, laser, CMM, clean	■	–	–	■	–

BatchBuilder – Workflow

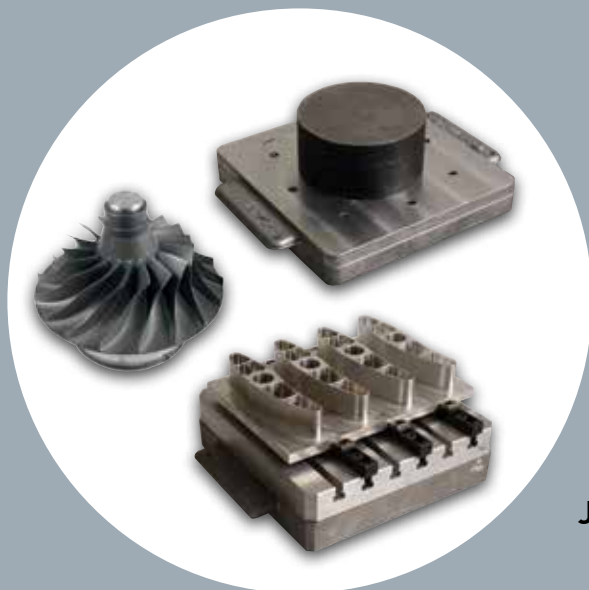
**Organisation and
NC preparation (CAM)**



Preset



**Order numbers
and operations**
(NC program, offset
values and magazine
positions)



Jobs batch

Glossary

AlarmServer – Option for WSM. Sends out an alarm if a robot cell detects an error.

AES – Automatic electrode selection. Selects the proper electrode from a pool of electrodes in the magazine.

BatchBuilder – Creates and executes jobs as a job queue (batch). For one machine only. Works with or without ID system. One-way of communication (fewer functions than CellManager)

CellManager – Manages pallet ID codes and magazine positions; creates priority lists; starts jobs; and, updates the database with current info, etc.

CellManager Light – For organizing and executing work in manually loaded machines. Very useful before you step into automation.

CellMonitor – Displays status of cells and machine activity.

CellStatistics – Retrieves and analyses cell and order data.

CAM – Computer aided manufacturing. Converts CAD models into NC programs.

CMM – Coordinate measuring machine

CTM – CutterToolMonitoring. Keeps track of which cutter tool are needed/used/missing, their lifetimes, etc.

ECM – EasyCellManager. For milling machines only. Support 1 – 4 machines. Easy planning of job sequences and priorities with full control. ID system not required.

Hybrid station – For handling pallets holding a mix of fixtures/workpieces and raw material.

ID Chip (code carrier) – Device with a preprogrammed, unique ID. Keeps track of each pallet/fixture.

ID Option – Keep track of pallets and fixtures all with unique ID identity.

Industry 4.0 – Smart factory solutions. Is helping manufacturers to become more flexible and to react to market changes more easily. By increasing the speed of innovation and the focus

on the customer being in the centre, is also leading to faster design processes.

JTM – JobToolManager. For Mikron milling machines only. ID system not needed. For one machine only. CTM included. Micron WPC (work piece changer) is needed.

MPS2WSM – Material and planning system integration with WSM. Imports and exports complete production orders from MPS into WSM (and vice versa).

NC-program – Numerical control (also called CNC – computer numerical control). Used to control, automate and monitor the movements.

Pallet station – Serves as “parking place” where pallets can be re-fixtured outside the robot cell. ID chip needed.

Planning system – Any system such as MPS (material planning system), ERP (enterprise resource planning), MES (manufacturing execution system), etc.

Production group – A group of WSM cells of the same type and all able to do the same sort of work.

6-axis Transformer – System 3R’s most flexible robot solution. Handles weights of 70 – 700 kg. Works with or without rail. Can also be used in hybrid automation.

Statistics – Utilisation (period, time of day), current orders, machine details, history, etc.

SQL Server – A Microsoft database solution. Handles all data in a relational database management system.

WorkCenter – Creates orders, assigns operations and NC programs, retrieves offset values and releases orders for production.

WP1 – WorkPal 1. System 3R’s smallest robot solution.

WPT1+ – WorkPartner 1+. System 3R’s medium-sized robot solution.

WSM – WorkShopManager. System 3R’s largest software package. Seamless integration of all your processes.

Summary

Robot type/model	WPC*	WorkPal 1**	WorkPartner 1+
Maximum weight handled (incl. gripper, pallet, etc.)	90, 200 or 500 kg	50 kg	80 kg
Maximum number of machines served	1	1	2
Maximum number of tooling types	1	1	1 – 2
Chuck adapter support	–	–	■
Technology/application	Mill	Milling, EDMing, WEDMing, grinding, laser, and CMM	
Linear rail for manual movement	–	■	■
Aluminium linear rail, maximum length	–	–	–
Steel linear rail, maximum length	–	–	–
Loading station support	–	–	■
Tilting and draining station support	–	–	■
Drying station support (wire EDMing)	–	■	■
Software			
CellManager	–	■	■
EasyCellManager (milling only)	–	■	■
JobToolManager (milling only)	■	–	–
CellManager Light (robotless systems)	–	–	–
BatchBuilder	–	■	■
BatchBuilder with ID	–	■	■
Software options			
Hybrid station support (milling only)	–	–	–
Pallet station support (milling only)	–	–	–

* WPC (Work Piece Changer), built into Mikron MILL.

** WorkPal 1 cannot connect with EDM.



WPC with GFMS Mikron MILL

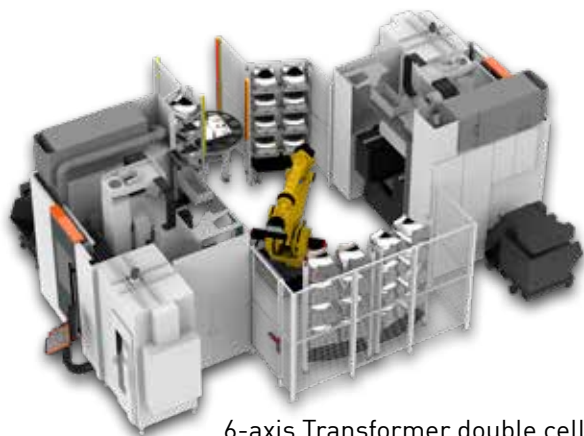


WorkPal 1 with GFMS WEDM

	Model T6-70	Model T6-165	Model T6-210	Model T6-360	Model T6-700
	70 kg	165 kg	210 kg	360 kg	700 kg
	1 – 12	1 – 12	1 – 12	1 – 12	1 – 12
	1 – 5	1 – 5	1 – 5	1 – 5	1 – 5
	■	■	■	■	■
	Milling, EDMing, WEDMing, grinding, laser, CMM and washing.				
	-	-	-	-	-
	20 m	20 m	20 m	-	-
	30 m	30 m	30 m	30 m	30 m
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	■	■	-	-
	■	■	■	■	■



WorkPartner 1+ with GFMS EDM



6-axis Transformer double cell

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 ability 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
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