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.
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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

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<th>Process support</th>
<th>Robot type</th>
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<td>WP1, WPT1+ and 6-axis Transformer</td>
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<td>Robot support not needed</td>
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<tr>
<td>BatchBuilder</td>
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<td>Pallet/electrode changer, WP1 and WPT1+</td>
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<tr>
<td>1 to 12</td>
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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.
+ 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.
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

WorkCenter Client

SQL database

ID option

Cell management

Batch management

Batch builder machine license

Manual magazine scan software

Robot scan software

CellManager Light

Machine processor robot cells

Robot cell

Robot cell

CellStatistics

CellMonitor

MPS2WSM

WSM Options

CutterToolMonitoring

AlarmServer

AES

Hybrid station

Pallet station

Pallet/electrode changer

Robot cell

Robot cell

Robot cell

WPC pallet changer

Machine processor manual cells

Machine processor robot cells

Machine processor robot cells

Machine processor robot cells

Manual cell

Software

Hardware (machine/robot)
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.

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### CellManager – Options

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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.
**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

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.

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.
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.
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

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</table>
For milling cells equipped with Mikron WPC

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

- JobToolManager
- Batch management
- AlarmServer
- BatchBuilder
- Hybrid station
- Robot cell
- WPC pallet changer
- Machine processor robot cells
- Manual cell
- Robot cell
- Robot scan software
- CellManager
- CellManager
- CellMonitor
- CellStatistics
- Cutter/Tool Monitoring
- AES
- MWPSWIM
- MPS2WSM
- CellGenerator
- Hybrid station
- Mikron cell system
- MPS2WSM
- WorkCenter Client
- SQL database
- WorkCenter Client
- JobToolManager

= Software
= Hardware (machine/robot)
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

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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.

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**CellManager Light – Options**

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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

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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/fixtures.

**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

<table>
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<th>WPC*</th>
<th>WorkPal 1**</th>
<th>WorkPartner 1+</th>
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<tr>
<td>Maximum weight handled (incl. gripper, pallet, etc.)</td>
<td>90, 200 or 500 kg</td>
<td>50 kg</td>
<td>80 kg</td>
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<td>Maximum number of machines served</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Maximum number of tooling types</td>
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<tr>
<td>Technology/application</td>
<td>Mill</td>
<td>Milling, EDMing, WEDMing, grinding, laser, and CMM</td>
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<tr>
<td>Linear rail for manual movement</td>
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<tr>
<td>Aluminium linear rail, maximum length</td>
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<tr>
<td>Steel linear rail, maximum length</td>
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<tr>
<td>Loading station support</td>
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<tr>
<td>Tilting and draining station support</td>
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<tr>
<td>Drying station support (wire EDMing)</td>
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## Software

<table>
<thead>
<tr>
<th>Software</th>
<th>WPC*</th>
<th>WorkPal 1**</th>
<th>WorkPartner 1+</th>
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<tbody>
<tr>
<td>CellManager</td>
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<tr>
<td>EasyCellManager (milling only)</td>
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<td>–</td>
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<tr>
<td>JobToolManager (milling only)</td>
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</tr>
<tr>
<td>CellManager Light (robotless systems)</td>
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<tr>
<td>BatchBuilder</td>
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<tr>
<td>BatchBuilder with ID</td>
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## Software options

<table>
<thead>
<tr>
<th>Software options</th>
<th>WPC*</th>
<th>WorkPal 1**</th>
<th>WorkPartner 1+</th>
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</thead>
<tbody>
<tr>
<td>Hybrid station support (milling only)</td>
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<td>–</td>
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<tr>
<td>Pallet station support (milling only)</td>
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</tbody>
</table>

* WPC (Work Piece Changer), built into Mikron MILL.
** WorkPal 1 cannot connect with EDM.
<table>
<thead>
<tr>
<th>Model</th>
<th>T6-70</th>
<th>T6-165</th>
<th>T6-210</th>
<th>T6-360</th>
<th>T6-700</th>
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<tbody>
<tr>
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<td>Mill</td>
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<td>30 m</td>
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<td>Loading Station</td>
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<tr>
<td>Tilting Station</td>
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<tr>
<td>Drying Station</td>
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<tr>
<td>Software</td>
<td>CellManager</td>
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<tr>
<td></td>
<td>EasyCellManager (milling only)</td>
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<td>BatchBuilder with ID</td>
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<tr>
<td>Software Options</td>
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<tr>
<td></td>
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</table>

Milling, EDMing, WEDMing, grinding, laser, CMM and washing.

![Image of WorkPartner 1+ with GFMS EDM](image1)

![Image of 6-axis Transformer double cell](image2)
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.

**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.

**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.

**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.

**Tooling and Automation**
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.

**Software**
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.

**Customer Services**
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.

**Digitalization solutions**
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.

**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.
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.
+ Extend 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.