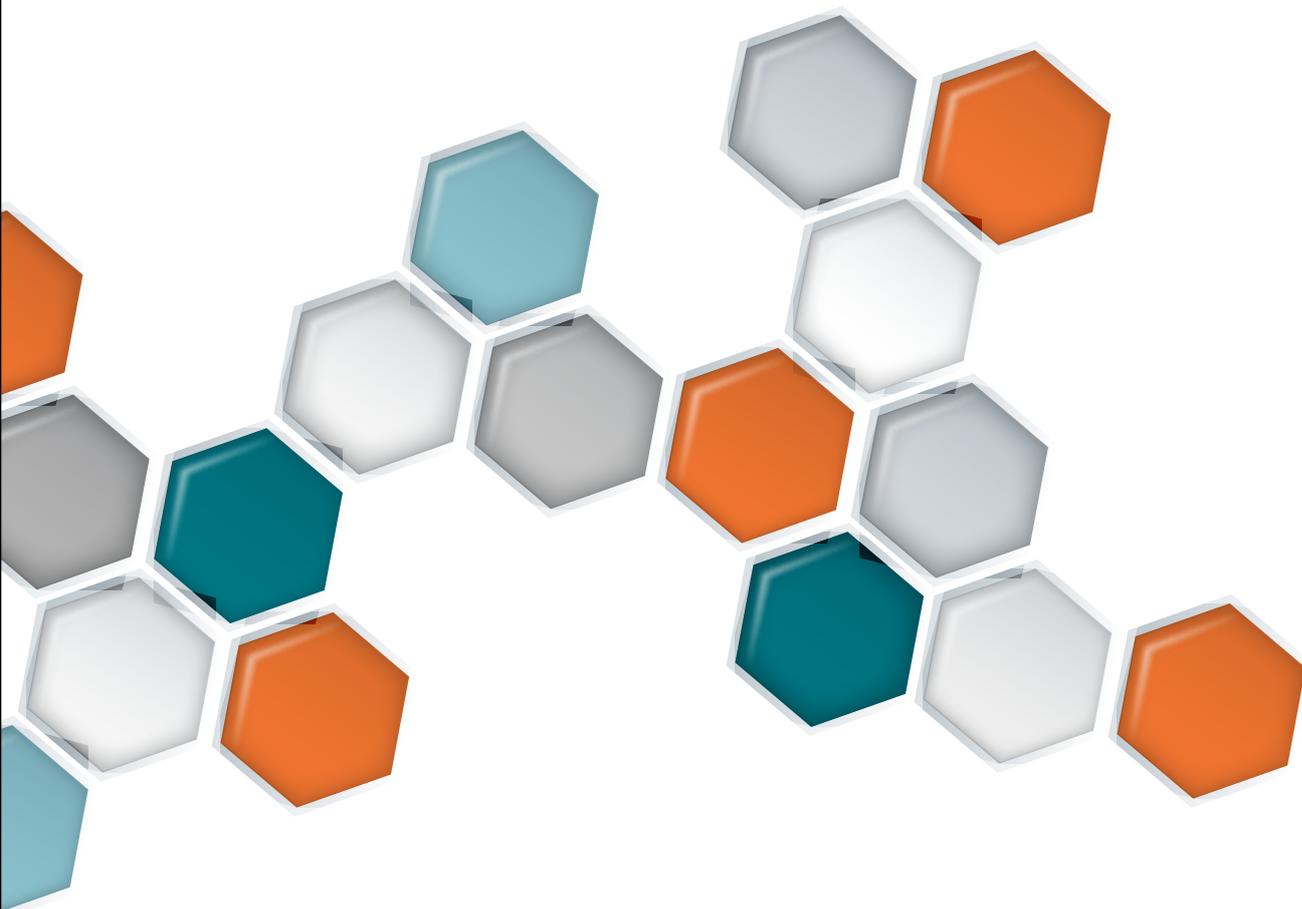


# MB PALAMAX®

TOTAL PRODUCTION TRANSPARENCY SOLUTION



# CONTENTS

MÜHLBAUER GROUP AT A GLANCE.....	4
MANUFACTURING EXECUTION SYSTEMS .....	6
MB PALAMAX® .....	8
MÜHLBAUER'S SMART FACTORIES .....	9
MB PALAMAX® FEATURES.....	10
PALAMAX.MONITOR .....	11
PALAMAX.FACTORY OVERVIEW.....	12
PALAMAX.STATS .....	13
PALAMAX.REPORT .....	14
OPTIONS & OUTLOOK.....	15



# MÜHLBAUER GROUP AT A GLANCE

## MÜHLBAUER'S BUSINESS UNITS AND SITES

Founded in 1981 in the heart of Bavaria, the Mühlbauer Group has ever since grown to a leading global player in the fields of Parts & Systems, Semiconductor Related Products, Document Solution Related Products and TECURITY® Solutions. With around 3,500 employees, technology centers in Germany, Malaysia, Slovakia, the U.S.A. and Serbia and 35 sales and service locations worldwide, Mühlbauer created a strong competence network around the globe.

We continuously invest in the latest technologies and innovative processes to enhance our competences and provide you with optimized solutions. Our in-house precision part production MPS – Mühlbauer Parts & Systems – guarantees unlimited flexibility and highest customer satisfaction.

Our business unit AUTOMATION does not only develop and assemble individually customized production systems, but also provides matching software solutions for the production process of Document and Solution Related Products. Vision inspection technologies as well as semiconductor and RFID applications complete our comprehensive portfolio.

Our business unit TECURITY® is established as a competent partner for the implementation of security systems for identifying and verifying both documents and individuals. Our clients benefit from more than three decades experiential value which we have gained during the realization of over 300 ID projects worldwide.



Mühlbauer  
Bosnia & Herzegovina



Mühlbauer  
China



Mühlbauer  
Germany



Mühlbauer  
Malaysia



Mühlbauer  
Serbia



Mühlbauer  
Slovakia



Mühlbauer  
USA



**MPS**  
Precision Parts & Surface Engineering



**AUTOMATION**  
Production Equipment & Systems



**WORLD OF TECURITY®**  
Government & Technology Solutions



# MANUFACTURING EXECUTION SYSTEMS

## **MB MCES** PERSONALIZATION MANAGEMENT

MB MCES is a personalization management software, which integrates incoming data with product definitions and controls the associated physical and electrical personalization processes. MB MCES handles personalization data from a variety of different input methods and formats.

## **MB INCAPE** INTEGRATED PRODUCTION MANAGEMENT SOFTWARE

MB INCAPE is Mühlbauer's Production Management Software for the production and personalization of electronic cards and documents (e.g. ID cards, ePassports, Driver's Licenses, EMV or GSM cards). Combining data management, production control and material management, the system allows for highly automated processes. It processes customer- and application-specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.

## **MB PalaMax®** TOTAL PROCESS TRANSPARENCY

MB PalaMax®, Mühlbauer's Smart Factory solution, is developed for card, tag or booklet productions, personalization factories and semiconductor backend shop floors to set and collect process data to monitor and improve the efficiency of production and personalization for later processing, visualization and statistical analysis.

## **MB tool.Leader** CONNECTOR BETWEEN SYSTEMS

MB tool.Leader is a software package which consists of several applications and serves as a reliable link between the individual systems involved in the production process. By means of MB tool.Leader, the entire process chain – from the incoming order to the final precision part – can easily be monitored and controlled. This real-time machine monitoring guarantees an automated production process. Production errors can be detected and solved at an early stage. Thus, MB tool.Leader reduces the machine downtimes, which in turn leads to an increase of the machine's productivity by up to 20 percent.

## FEATURES & ADVANTAGES

-  Configurable workflow steps regarding personalization, quality assurance & issuance
-  Fully-automated processing & production management
-  Scalability regarding different documents, machines & personalization locations
-  Flawless integration of Mühlbauer's material management system (MB WAREHOUSE)
-  Connection to card / document management systems via web service, database, file-based interface
-  Standard interface to personalization machines with integration of third-party machines possible
-  Integration of MB User Management
-  Full coverage of production control requirements (security industry & EMV standards)
-  Seamless connection to MB PalaMax® & MB Data Preparation
-  Simplified administration due to web-based operator clients
-  Monitoring of real-time performance of the production
-  Seamless tracking of documents from point of production to issuance
-  Statistical tool analyze collected data & deliver customized statistics on OEE
-  Tool which enables the remote operation of machines on the shop floor from a control centre
-  Tool which increases effectiveness & efficiency so that production becomes more profitable
-  Enables production engineering to prepare & test a repeatable factory set-up. Factories can switch between products within minutes.



MB PalaMax® is Mühlbauer's reliable software solution for measuring and improving the performance of production facilities such as card, tag, label or security document productions, personalization bureaus or semiconductor backend shop floors. MB PalaMax® automatically and continuously collects machine and process data and stores them for further processing, visualization and analysis.

## MÜHLBAUER'S SMART FACTORIES FOR SEMICONDUCTORS RFID, SMART CARD & ID DOCUMENTS

Mühlbauer's PalaMax® Smart Factory software provides a highly-efficient interface for managers, supervisors, process engineers, maintenance technicians and operators who are tasked with process monitoring and the statistical analysis of the production process. Furthermore, MB PalaMax® reliably supports the optimization of production planning and the improvement of controlling.



### MAIN BENEFITS AT A GLANCE

- Automatic, accurate & unbiased data collection
- Monitoring of live performance
- Real-time analysis of OEE data
- Continuous visualization which allows for faster reaction
- Historical data analysis
- Seamless configuration, usage & leverage
- Active system support by means of notifications & reports
- More effective & cost-saving production
- Integration of MB and third-party equipment



To communicate with users, MB PalaMax® utilizes a responsive web design user interface. In this way, no expensive application software has to be installed on the individual device. Furthermore, all kinds of common web-enabled devices – from standard PC browsers, to tablets and even smart phones – can be used to communicate with the server system via a secure browser.



## MB PALAMAX® FEATURES



### INSTANT VISIBILITY

- All relevant real-time KPIs at a glance:
  - » Overall Equipment Effectiveness (OEE)
  - » Yield
  - » Performance
  - » Availability
- Real-time visualization of all relevant machine data from any web-enabled device or PC
- Generation of informative reports
- Provision of insights to improve operations (on the line manager side) and make better fact-based decisions (on the management side)

### RETURN ON INVESTMENT

- Real-time monitoring to identify trends and opportunities for improvement
- Immediate intervention to avoid major defects
- Improved security standards & optimally employed production staff

### SECURITY & COMPLIANCE

- Total control of production data
- Local & safe storage of all data on customer's private servers
- Compliance with ISO & PCI standards

### ACCESSIBILITY

- Responsive web design
- No expensive installation of application software on the individual devices
- Accessibility from any web-enabled device



## PALAMAX.MONITOR

The PalaMax.Monitor module allows for a real-time monitoring of the production status, a number of key metrics, as well as further production-relevant messages. All information are collected from the entire shop floor and bundled in one or optionally several central points.

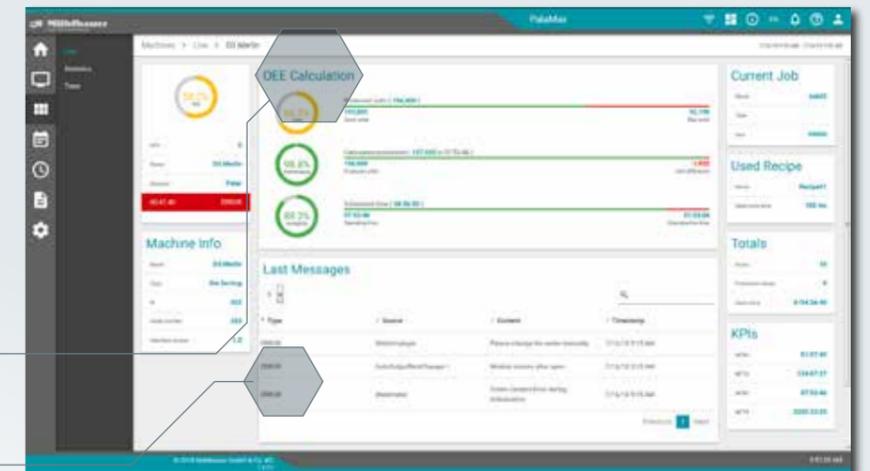
Snapshot of the current system status, which is displayed on the monitoring module.



The main goal of "Real Time Monitoring" (RTM) is it to make all real-time production data visible to users, so that they can react fast and efficiently whenever production optimization is required.

Real-time calculation of KPIs

Errors can be detected in real time and fixed immediately.



### VISUALIZATION OF REAL-TIME PRODUCTION DATA INCLUDING:

- Real-time monitoring of KPIs
  - » OEE (Overall Equipment Effectiveness)
  - » Yield
  - » Performance
  - » Availability
- UPH (Units Per Hour)
- MTBF (Mean Time Between Failures)
- MTBA (Mean Time Between Assists)
- MTTA (Mean Time To Assists)
- MTTR (Mean Time To Repair)
- Compact overview of all machine states:
  - » Running/Stop/Idle/Error/Service/Off
- Time in current state
- Operator
- Material (active product, recipe)
- Lot, lot size & percentage of completeness
- Counters, total parts (output) & good parts
- Failures, alarms & idle reasons



## PALAMAX.FACTORY OVERVIEW

This module provides a complete production overview for a monitoring device. The display of this page follows a simple tile design: a tile's background color represents the general status of a machine. The text fields within the tile contain the machine's most important metrics and meta-data. Thus, everyone involved in the production process can retrieve the system's current status.

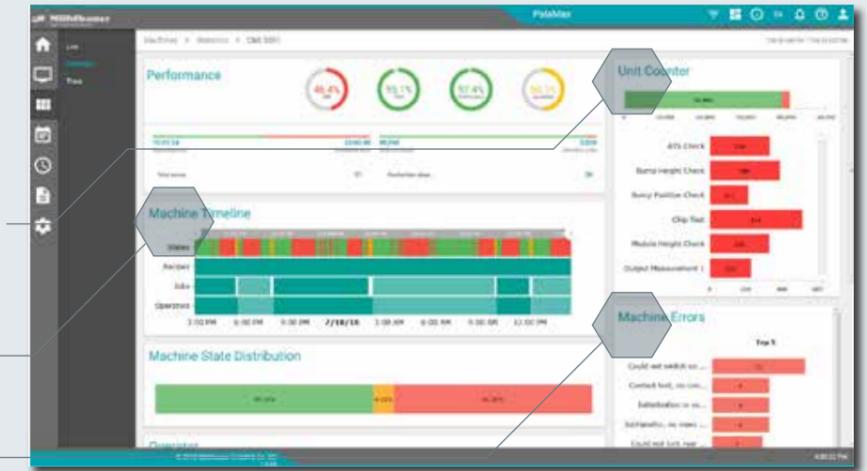


- Key Performance Indicators (KPI) such as:
  - » OEE (Overall Equipment Effectiveness)
  - » Yield
  - » Performance
  - » Availability
- Status display on large TV screens & monitors in production or office area
- Immediate positive effect on productivity
- Improvement of communication between departments



## PALAMAX.STATS

This module provides a reliable interface to management and to system operators to monitor and visualize the production process more efficiently. PalaMax.Stats displays different statistics of the available process data which are collected and stored in the database. The time intervals are freely selectable.



The Unit Counter displays the good and bad units produced, as well as the error distribution across the different stations.

The Machine Timeline completely tracks machine states, operators, lots & recipes.

The error report immediately displays the TOP 5 errors.

### DISPLAYING TRENDS FOR KEY STATISTICS FOR SINGLE MACHINES & GROUPS OF MACHINES:

- Selection of different time scales day, weeks, shift, lot times
- Capturing of historical data:
  - » State, Product & Recipe
  - » UPH & Utilization
  - » Yield, total parts (output)
  - » Good parts, rejects
  - » Uptime & downtime
- Detailed analysis of processes such as
  - » Yield loss by root cause
  - » Bottle-neck identification



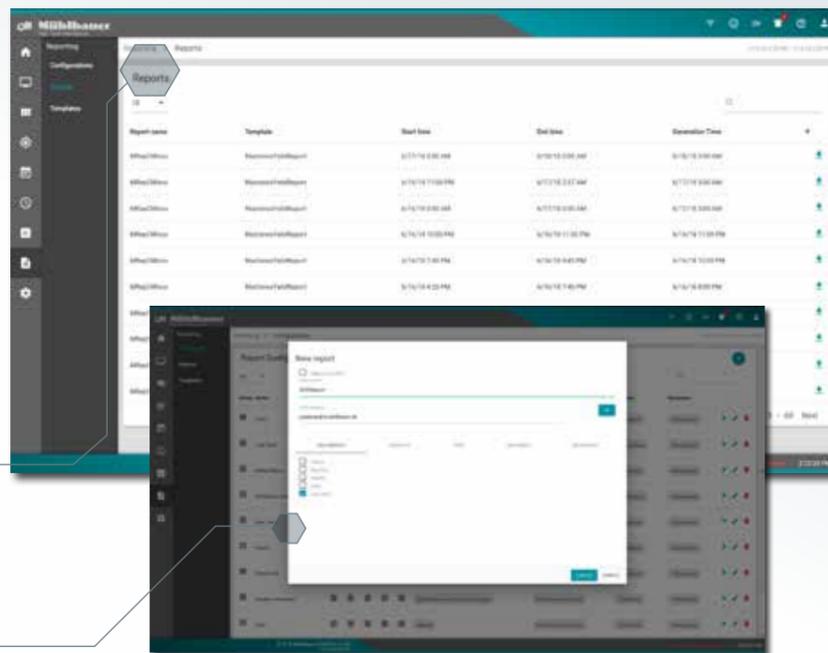


## PALAMAX.REPORT

This MB PalaMax® reporting module tracks and documents the productivity. The automated data collection delivers unbiased and accurate reports. Manual data entries are not necessary, anymore. The reporting module generates Microsoft Excel files containing all data. It is fully customizable and provides the possibility to use one of Mühlbauer's various standard report templates or create an individual report template which can be uploaded to the system.

### DISPLAYING OF UPDATES BY MEANS OF AUTOMATIC GENERATED REPORTS & NOTIFICATIONS:

- Tailor-made reporting to display individual requirements
- Creation of custom reports
- Creation & upload of customized Microsoft Excel templates
- Configuration of MB PalaMax® with individual schedules, notifications, alerts & recipients lists



Reports are automatically distributed and forwarded by mail. They also stay available for later downloading.

Creation of reports based on requirements: individual templates, machine selection, defined time of creation.

### PALAMAX.REPORT PROVIDES THE FOLLOWING FUNCTIONS:

- Flawless & accurate reporting
- Report generation based on: time (day, week or month) respectively production time, production week, production month, lot, carrier
- Machine list (single machine or machine group)
- Machine state analysis
- KPI Analysis
  - » OEE
  - » Yield
  - » Performance
  - » Availability

### GENERATION OF LOT REPORTS CONTAINING

- Production Meta Data as
  - » Operators
  - » Lot & recipe information
  - » Times: start time, end time & duration
  - » Machine serial number & machine name
- Process station results: performance data, number of good and rejected units, yield calculation for each process module
- Used Material: input material, output material & total numbers

## OPTIONS & OUTLOOK

MB PalaMax® is delivered with the core modules Monitor, FactoryOverview, Statistics and Report. The feature module Remote is available on request. The other feature modules listed below will be available soon.



### PALAMAX.REMOTE

Machines on the shop floor can be operated remotely from a control center. This first step of shop floor automation and significantly reduces staff requirements.

- Direct access to all machines from one central place
- Significant time savings
- Improvement of staff effectiveness & security



### PALAMAX.MAINTAIN

This module manages the maintenance tasks on the shop floor. It keeps track of run-time and power-on-time and sends automatic notifications whenever a machine is due for maintenance. This allows the switch from random stoppages to scheduled and preventive maintenance.

- Planning of scheduled production down times
- More efficient maintenance planning & execution
- Saving of maintenance costs due to precise determination of actual need



### PALAMAX.RECIPE

This module manages recipes and their versions and enables production engineering to prepare and test a repeatable factory setup. Factories can switch between products within minutes. PalaMax.Recipe can set up production and verification systems in a repeatable manner, providing comparable quality performance indicators.

- Reduction of products' setup times
- Repeatability of produced & qualified qualities is ensured
- Production becomes more comprehensible & specific



### PALAMAX.TRACE

This module traces a product throughout the entire production process.

- Comparison of single manufacturing runs among each other
- Detection and definition of reasons for production faults
- Improvement of information on the production process



### PALAMAX.COST

This module collects process timings and allocates machine costs to generate unit costs.

- Comparison between different production routes for the same product
- Increase of profit resulting from a tighter cost control
- More profitable production





### MÜHLBAUER GERMANY

Mühlbauer Group Headquarters  
Josef-Mühlbauer-Platz 1, 93426 Roding, Germany  
Phone: +49 9461 952 0, Fax: +49 9461 952 1101  
info@muehlbauer.de, www.muehlbauer.de

### MÜHLBAUER USA

Muehlbauer Inc.  
226 Pickett's Line  
Newport News, VA 23603-1366, USA  
Phone: +1 757 947 2820, Fax: +1 757 947 2930  
info@muehlbauer.com, www.muehlbauer.com

### MÜHLBAUER MALAYSIA

Muehlbauer Technologies Sdn. Bhd.  
No. 3 Jalan TU 62, Taman Tasik Utama,  
75450 Melaka, Malaysia  
Phone: +60 6 2517 100, Fax: +60 6 2517 101  
info@muehlbauer.com.my, www.muehlbauer.com.my

### MÜHLBAUER SERBIA

Mühlbauer Technologies d.o.o.  
Evropska 17, 22300 Stara Pazova, Serbia  
Phone: +381 22 215 5100, Fax: +381 22 215 5130  
serbia@muehlbauer.de, www.muehlbauer.de

### MÜHLBAUER CHINA

Muehlbauer Technologies (Wuxi) Co., Ltd.  
No 23. Huayi Road, Wuxi New District  
214135 Wuxi, Jiangsu, China  
Phone: +86 510 8190 0100, Fax: +86 510 8190 0101  
info@muehlbauer.cn, www.muehlbauer.cn

### MÜHLBAUER SLOVAKIA

Muehlbauer Technologies s.r.o.  
Novozámocká 233, 94905 Nitra, Slovakia  
Phone: +421 37 6946 000, Fax: +421 37 6946 501  
info@muehlbauer.sk, www.muehlbauer.com



### MÜHLBAUER ID SERVICES GMBH

Josef-Mühlbauer-Platz 1 | 93426 Roding | Germany  
Tel.: +49 9461 952 0 | Fax: +49 9461 952 1101  
Mail: info@muehlbauer.de | Web: www.muehlbauer.de