



SMART FACTORY - PalaMax

SmartFactory – PalaMax Intro

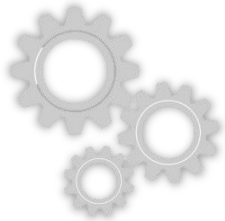
**WHERE DO WE
COME FROM?**



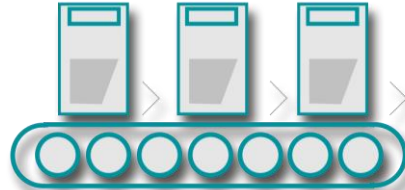
**WHERE DO
WE GO?**

Industrial Revolutions

1800 till now



Mechanization



Electricity & Assembly Lines



Microelectronics & Computers



Digitalization & Connectivity

1800

INDUSTRY 1.0

**Machines powered
by Water & Steam**

Railway, Textile Mills

1900

INDUSTRY 2.0

**Acceleration of
Working Processes**

Telecommunication

1970

INDUSTRY 3.0

**Automated
Production**

*Personal Computers, Mobile
Communication, Internet*

2000

INDUSTRY 4.0

**Internet of
Things**

Everything becomes „Smart“

Smart Card Production Factory

How it works

CARD BODY

SMART CARD

PRE-PERSONALIZATION

PERSONALIZATION



SMART FACTORY

NETWORK
Equipments,
Materials &
Humans

+

REAL-TIME
BIG DATA
Management

Identify Errors &
Potentials
IMMEDIATELY

+

MAXIMUM
Transparency

Improved Reaction Speed for:

- Utilization Problems
- Calibration & Setup
- Quality Problems
- Wear & Tear

Smart Factory

Here we go...



SMART PRODUCTION MANAGEMENT



SMART MATERIAL MANAGEMENT



TRANSPARENCY OF YOUR PRODUCTION

- Real time monitoring during production
- Track & trace each individual product
- Minimize maintenance



PRODUCTIVITY

+50 %



EFFICIENCY & SPEED

+30 %



COST REDUCTION

+20 %

- SECURING FUTURE COMPETITIVENESS
- NEW BUSINESS MODELS
- NEW SERVICES

Mühlbauer's Smart Factories for Semiconductors, RFID, Smart Card & ID Documents



*If you can't **measure** something, you can't
understand it.*

*If you can't **understand** it, you can't
control it.*

*If you can't **control** it, you can't
improve it.*

TRANSPARENCY OF YOUR PRODUCTION

Instant Visibility:

- Real time KPIs at a glance: Overall Equipment Effectiveness (OEE), Yield, Performance, Availability
- Visualization of all valuable machine data in real-time with interactive charts, graphs and more from any web-enabled device or PC and generate informative reports
- Gives managers the insight they need in order to improve operations while allowing the management to make better fact-based decisions

Return On Investment:

- Spot trends and identify opportunities for improvement when they happen due to real-time monitoring.
- Immediate intervention before major defects occur.
- Run your production with improved security and optimally employed staff

Security and Compliance:

- You are in **full control** of your data
- All data is **stored locally** on your own servers – forever
- Your **data is safe** on your IT infrastructure
- **Compliance** with ISO and PCI standards

Accessibility:

- Utilizes **responsive web design**
- Avoids expensive installation of Application Software on the individual device
- Accessible from any web enabled device

Securing your Future Competitiveness:

- New Business Models
- New Services

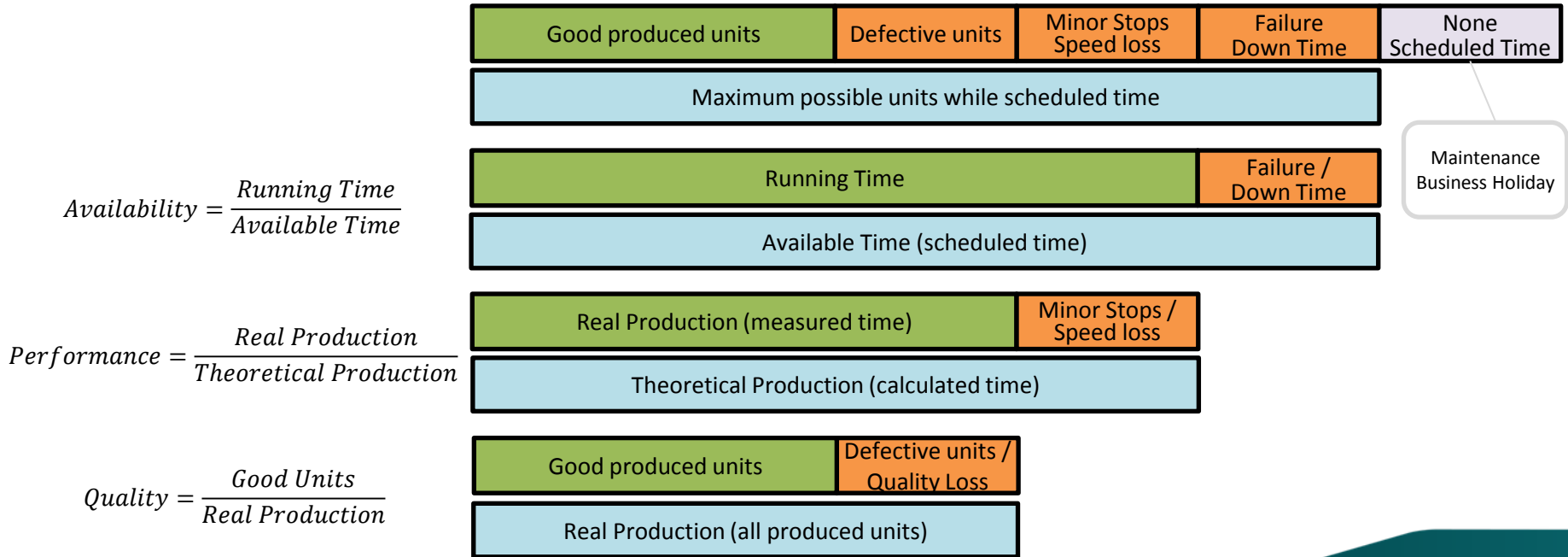


“

Mühlbauer has done a great job! We have been dreaming about such a system for more than 10 years. It's definitely changing our way of seeing our production processes.

OEE

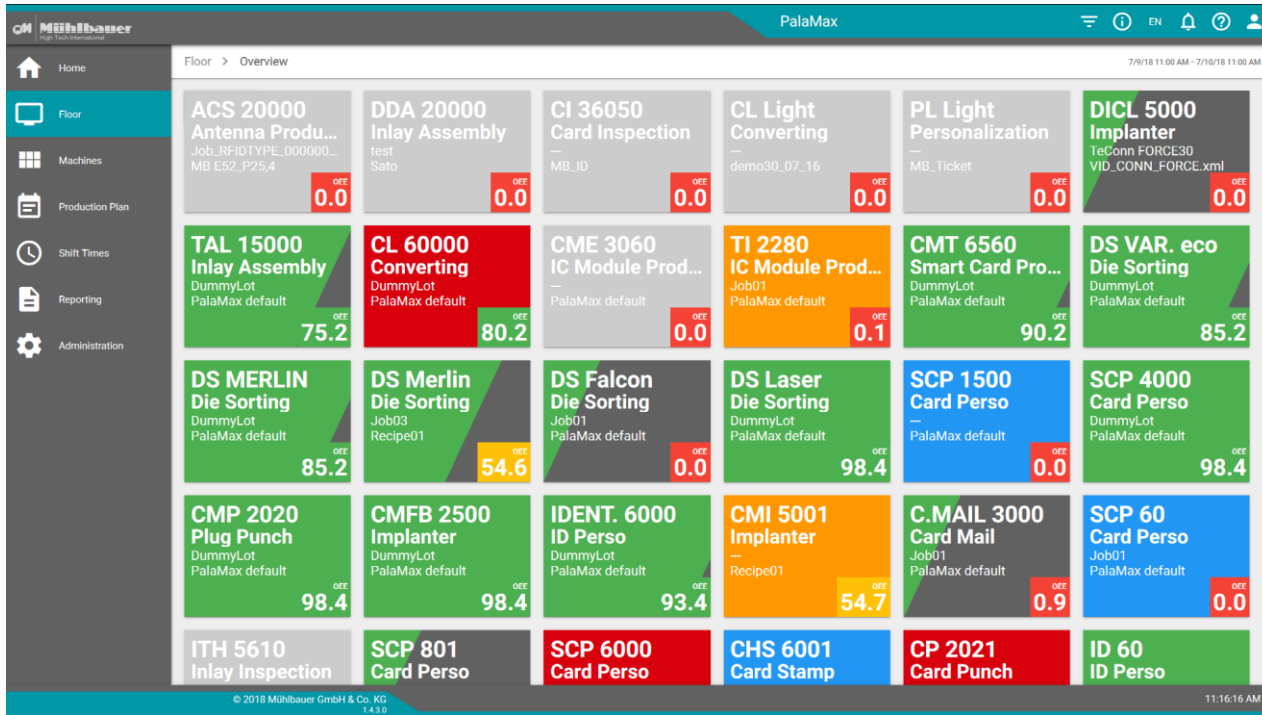
OEE (Overall Equipment Effectiveness) = Availability × Performance × Quality



PalaMax Walkthrough

Demo – Walkthrough

Factory Overview



Factory Overview:

- Displays all connected machines in particular card features.
- Makes factory production data available in real-time.
- **Instant Visibility:** Compact state overview with Key Performance Indicators (KPI) such as:
 - OEE (Overall Equipment Effectiveness)
 - Yield
 - Performance
 - Availability

Demo – Walkthrough

Factory Overview



Factory Overview:

Displays all connected machines in particular card features.

Each card shows:

- Machine name
- Machine type
- Loaded Lot
- Loaded Recipe

Demo – Walkthrough

Factory Overview



Factory Overview:

The background color of a particular card indicates the machine state:



Demo – Walkthrough

Factory Overview



Factory Overview:

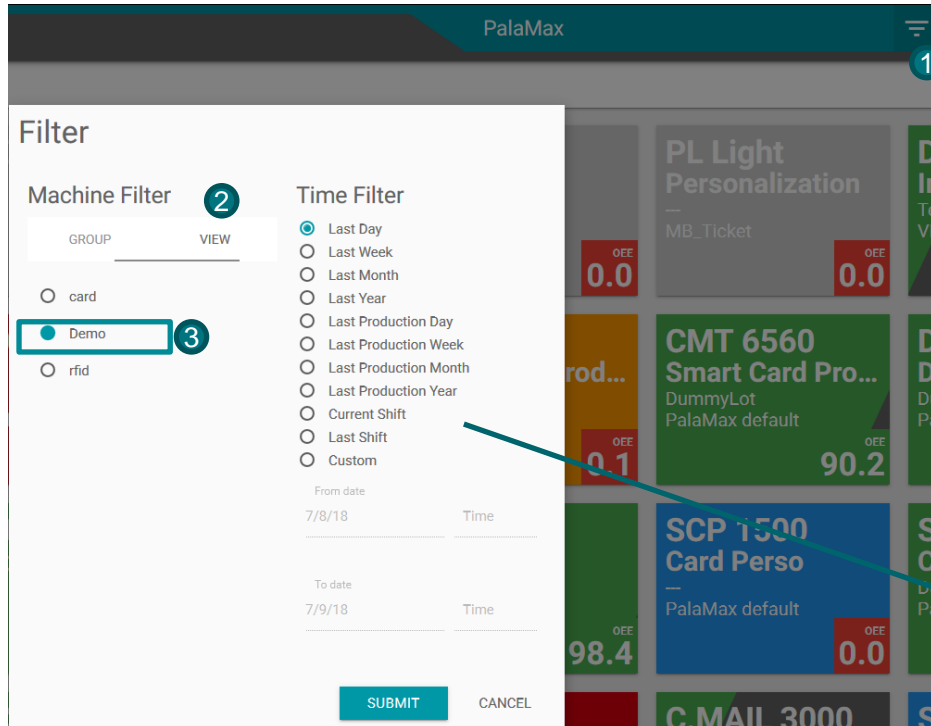
A card's right lower corner visualizes a Key Performance Indicator (KPI) such as the Overall Equipment Effectiveness (OEE).

The KPI is optically highlighted depending on its value. E.g.:



Demo – Walkthrough

Filter machine list – Select View „Demo“



The screenshot shows the PalaMax interface with a 'Filter' dialog box open. The dialog has two tabs: 'GROUP' and 'VIEW'. The 'VIEW' tab is selected, and the 'Demo' option is highlighted. The background shows a grid of machine cards with OEE values.

Filter

Machine Filter 2

GROUP VIEW

card

Demo 3

rfid

Time Filter

Last Day

Last Week

Last Month

Last Year

Last Production Day

Last Production Week

Last Production Month

Last Production Year

Current Shift

Last Shift

Custom

From date: 7/8/18 Time

To date: 7/9/18 Time

SUBMIT CANCEL

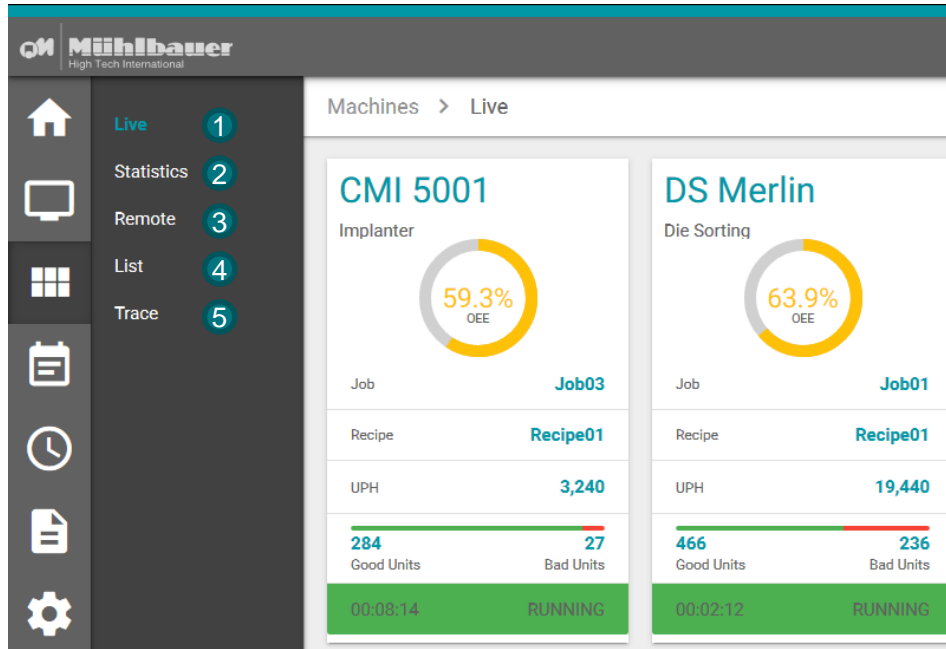
For demo purposes: Select machine view “Demo”:

1. Select From Header the “Filter” dialog
2. In the dialog select the “View” tab
3. Select machine view “Demo”

View by machine group, machine view, last day, week, month, production day, production week, production month, shift or free custom filter.

Demo – Walkthrough

Machines Overview



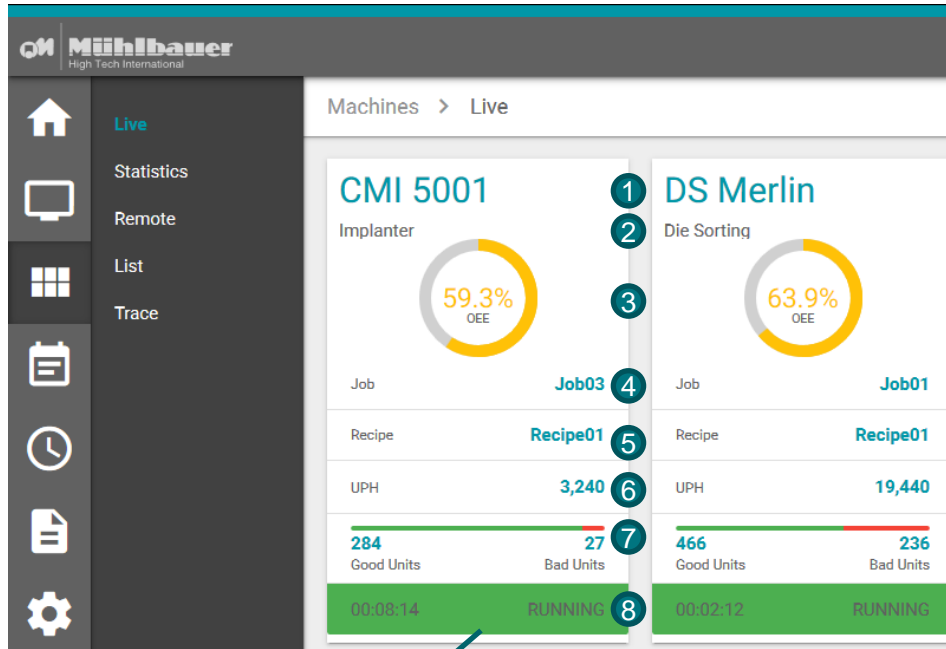
Menu – Machines:

(Filter for machines and time does apply)

1. Live: Displays real time information
2. Statistics: Displays historical data
3. Remote: Remote connection
4. List: Machine List
5. Trace: Visualization of reject reasons

Demo – Walkthrough

Machines Live



Real time factory monitoring.

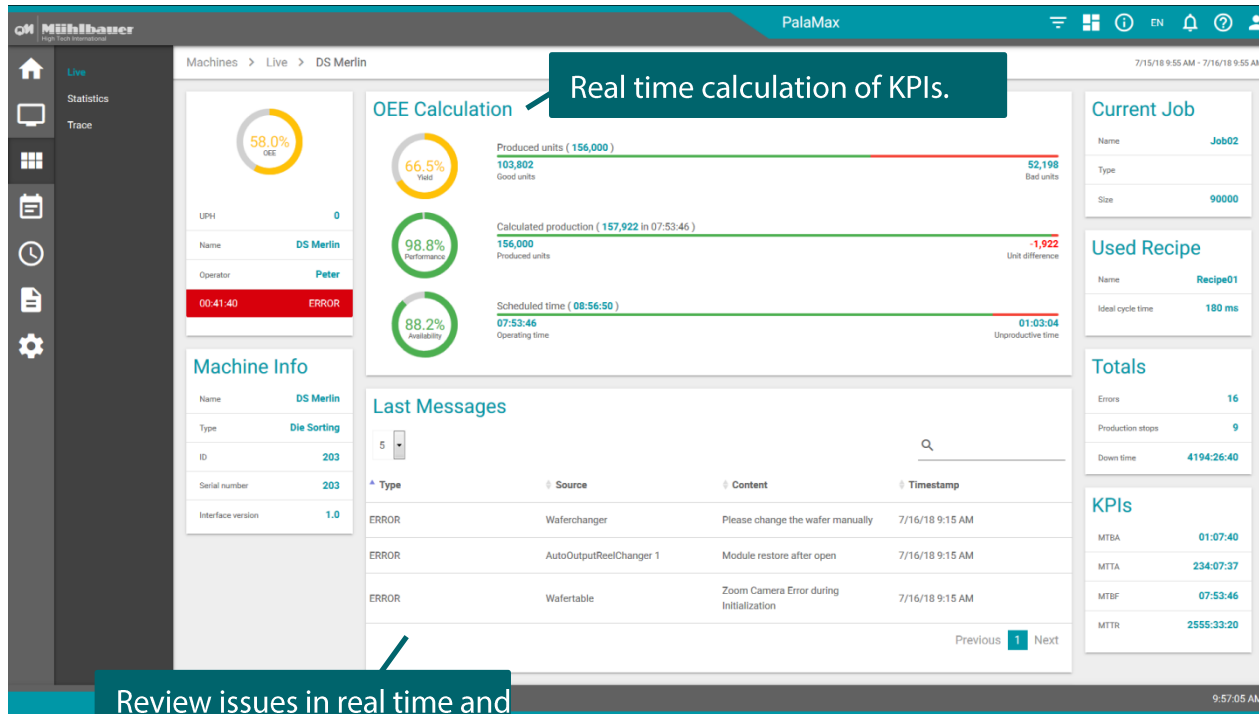
Menu – Machines Live:

(Filter for machines and time does apply)

1. Machine name
2. Machine type
3. Visualization of selected KPI
4. Loaded Job
5. Loaded Recipe
6. Current Throughput / Units per Hour (UPH)
7. Ratio Good Units to Bad Units for last job
8. Machine state and state duration

Demo – Walkthrough

Machine Live

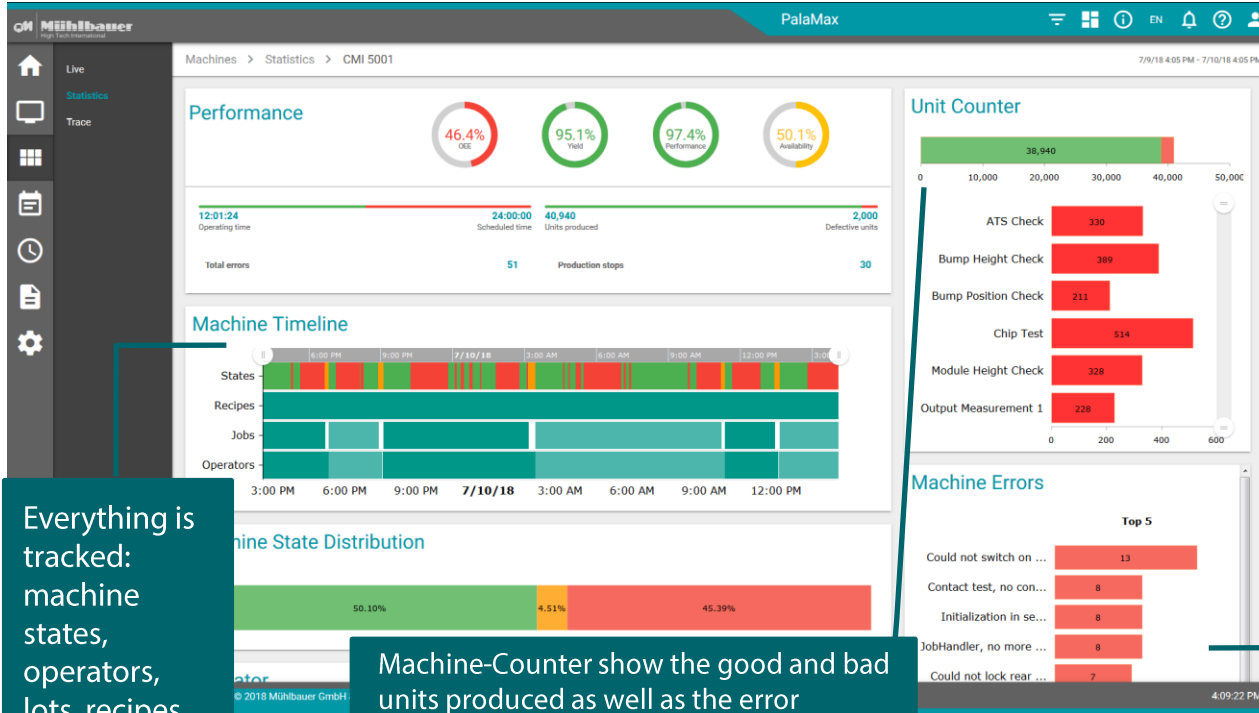


Machine Live: Get real time KPIs at a glance!

- OEE
- Yield: number of units coming out of a process/number of units going into the process
- Performance: compares actual time needed and what time was needed in the past, for the same product with the same machine
- Availability: equipment's functioning time vs. unproductive time

Demo – Walkthrough

Machine Statistics



Everything is tracked: machine states, operators, lots, recipes

Machine-Counter show the good and bad units produced as well as the error distribution across the different stations.

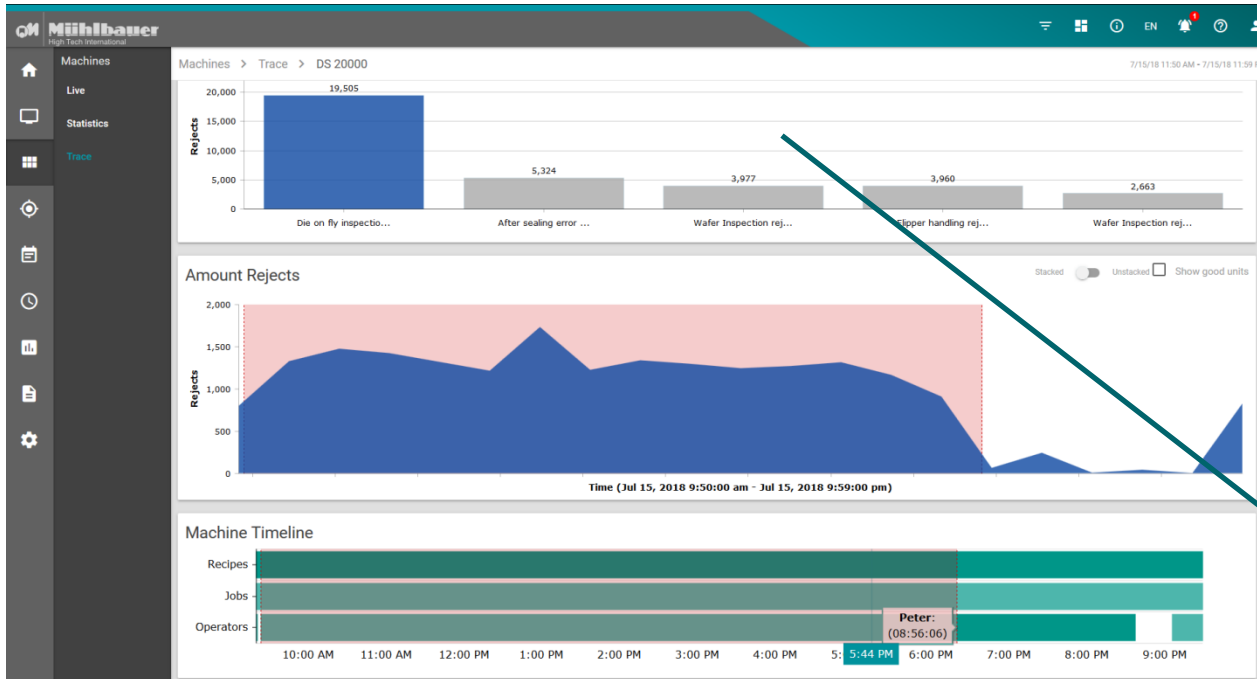
Machine Statistics:

Visualizes historical machine data:

- Performance Indicators (OEE, Yield, Performance, Availability)
- Timeline views of the machine states, loaded recipes respectively jobs and operators
- Unit counters for the whole machine as well as for each machine module
- Machine errors

View the error report and see the TOP 5 errors immediately.

Demo – Walkthrough Machine Trace



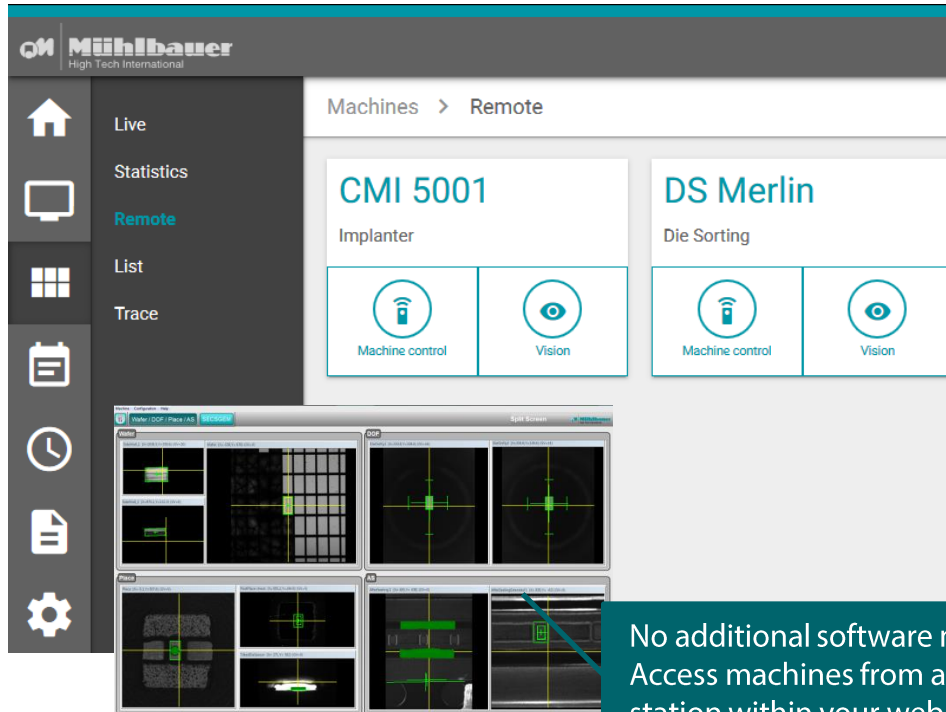
Machine Trace:

- Detailed reporting tools
- Drill-down analysis
- Identify reject reasons and their root causes
- Improve production flow

View Top reject reasons and their distribution over time + machine time line including recipes, jobs and operators.

Demo – Walkthrough

Machines Remote



Mühlbauer High Tech International

Machines > Remote

CMI 5001 Implanter

DS Merlin Die Sorting

Machine control Vision

Machine control Vision

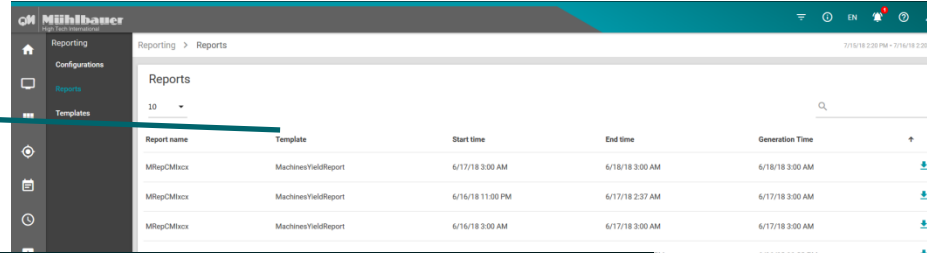
No additional software necessary:
Access machines from a central
station within your web browser.

Remote control of machines:

- Establish a remote connection within the browser to a particular machine
- Direct access to all machines from one central place
- Serve more machines with one operator only → Improve staff effectiveness
- Remote key switch on machine to permit remote operation is SEMI and CE conform
- Operate machines on the shop floor remotely from a control center. This first step shop floor automation reduces staff requirements on the shop floor.

Demo – Walkthrough Reporting

Reports are automatically distributed and sent by mail or available for later download.

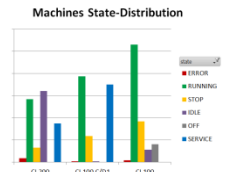
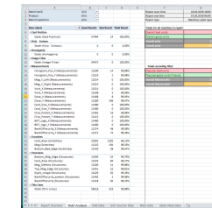


Report name	Template	Start time	End time	Generation Time
MRepCMtccx	MachinesYieldReport	6/17/18 3:00 AM	6/18/18 3:00 AM	6/18/18 3:00 AM
MRepCMtccx	MachinesYieldReport	6/16/18 11:00 PM	6/17/18 2:37 AM	6/17/18 3:00 AM
MRepCMtccx	MachinesYieldReport	6/16/18 3:00 AM	6/17/18 3:00 AM	6/17/18 3:00 AM
				6/16/18 11:00 PM
				6/16/18 10:00 PM
				6/16/18 8:00 PM
				6/16/18 3:00 AM
				6/16/18 3:00 AM
				6/15/18 11:00 PM
				6/15/18 10:00 PM

Stay informed with automatic generated reports and notifications:

- Tailor reports to display what you want and need
- Create custom reports
- Create and upload your custom templates with Microsoft Excel
- Configure PalaMax with your schedules, notifications, alerts and recipients lists

Create reports based on your requirements: your template, your machine selection, your defined time of creation.





PalaMax.Trace

Trace your product through the entire production process.

- Allows the comparison of manufacturing runs between each other
- Detect and define reasons for production faults



PalaMax.Maintain

Manages the maintenance tasks on the shop floor. The aim is to switch a process from random stoppages to scheduled and preventive maintenance.

- Enables planning of production down times in a deterministic manner
- Supports the maintenance planning and execution to be more efficient



PalaMax.Cost

Collects process timings and allocates machine cost to generate unit cost.

- Enables profit from a tighter cost control
- Makes your production more profitable.



PalaMax.Recipe

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

- Ensures the repeatability of produced and qualified qualities
- Makes production more comprehensible & specific

TRANSPARENCY OF YOUR PRODUCTION

- Better data: automatically, accurate and unbiased data collection
- Monitor real-time performance and generate real time production statistics
- Analyze OEE and KPI data in Real Time
- Continuous visualization allows fast reaction
- Historical data analysis
- Active system supports you with notifications and reports
- Runs everywhere: The responsive user interface design allows the usage on any chose device
- Run more units but save rejects and money
- Easy to configure, easy to use, easy to leverage
- Data collection from the shop floor of Mühlbauer and 3rd party equipment

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