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EMC.EnergyManagement

Smart energy management on the shopfloor

Production is without question the **most energy-intensive area** of a company. Especially in times of **rising energy prices** and with a view to the **consciously responsible and sustainable use of available energy,** the EMC.EnergyManagement module offers a **holistic and order-related recording of energy values** on the shopfloor. This allows valuable conclusions to be drawn in order to counteract and **prevent unnecessary energy wastage.**

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Status Quo

How much energy is consumed on your shopfloor at any given time?

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EMC.EnergyManagement

Reliably record, visualize and analyze energy values

With the **EMC.EnergyManagement module** and efficient IoT hardware, you can **quickly identify energy-intensive processes** on the shopfloor. Solutions for optimization are easy to derive, enabling you to **increase energy efficiency** in production.

The **MES Software EMC** records the energy consumption of the machine and the quantity produced. The energy consumption of the quantity can be determined from this. By **reliably recording and documenting the energy output per product and work step,** the product-specific CO2 footprint (product carbon footprint) can be reliably determined.

The **EMC.EnergyManagement module** meets the requirements of **DIN ISO 50001** for energy management systems and **supports the targeted implementation of energy-saving measures.** Future production processes can be planned in such a way that they are **as energy-efficient and cost-saving as possible.**

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EMC.EnergyManagement

Making energy consumption on the shopfloor transparent

All recorded energy values, directly from the machines or via special IIoT hardware, come together in the **EMC.EnergyManagement** module and can therefore be integrated and accessed in the EMC MES software system - in the portal, on the dashboard or on the MES terminal.

The correlations between energy data and data from machines, production, articles and orders allow **valuable insights and potential for improvement to be derived across many areas.**

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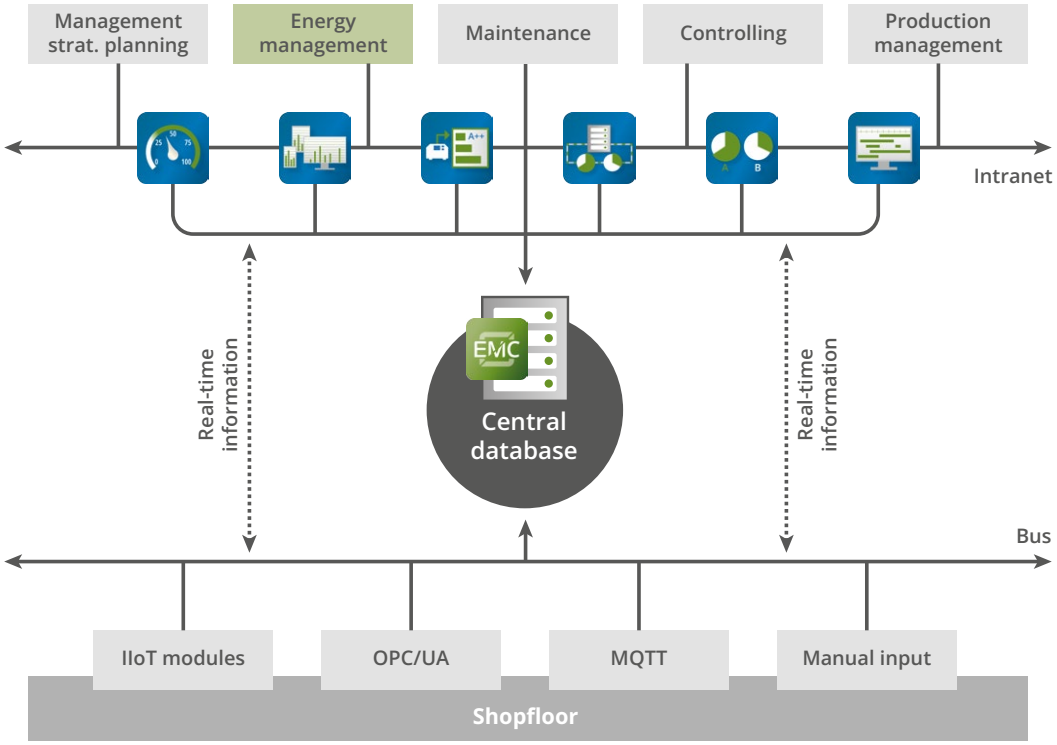
Acquisition based on the existing infrastructure

With the existing MES, the basic **infrastructure is already in place.** This means that it is already possible to determine how long the respective work step is at the machine and how many parts were produced **during this time and with what energy consumption** based on the order log-on and log-off.

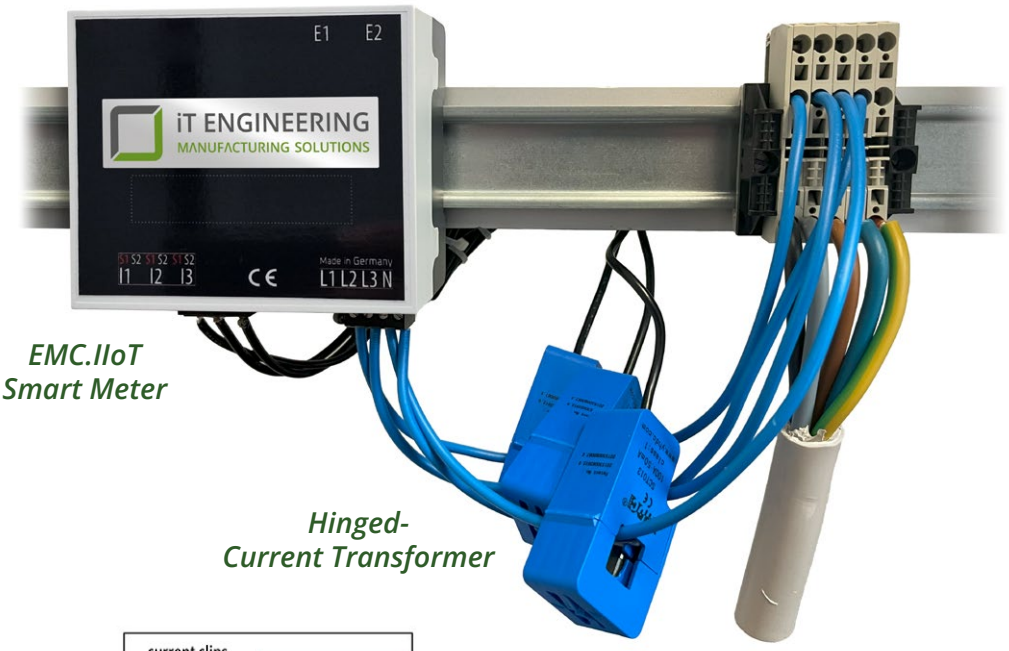
For machines with an **OPC/UA interface,** it is possible to record energy consumption **without additional recording hardware.** The power consumption is **read directly from the control system.** For existing machines without OPC/UA, we use **EMC.IIoT Smart Meter hardware** that reliably measures energy consumption and **reports it back to the MES Software EMC.**

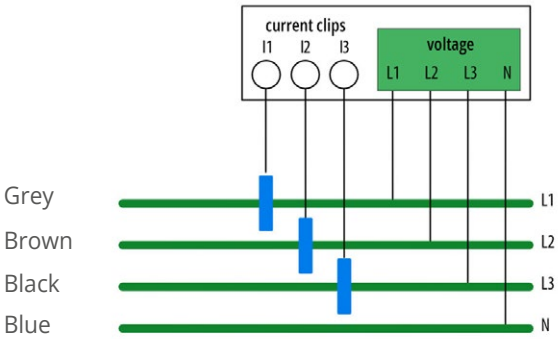


All important data can be measured:

Currents	Voltages	Powers
Work reference	Power reference	Active power
Work Feed-in	Power Feed-in	Reactive power
Frequency	Cos Phi	Apparent power

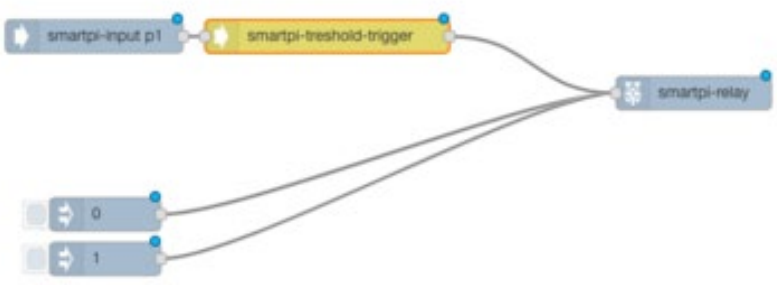
We use **modern IIoT (Industrial Internet of Things) hardware for data collection. Data is exchanged** via networks, Wi-Fi or a web server.





The **three-phase current** and the 3 phases L1, L2, L3 are **measured contactlessly via current terminals,** which can measure all important data such as currents and voltages via several inputs. In addition to current measurement, other processes such as temperature, system pressure, etc. can also be recorded.

Integration into other energy management systems is possible via MQTT and REST interfaces. **CSV files of the energy measurement data** can also be saved on other servers via FTP. **Own NodeRed modules** allow the current measured **values to be read out and integrated into flows.** This makes it possible, for example, to send an e-mail if power levels exceed or fall below the set values. There is also a separate Node-Red module for the relay (switching actuators (switch off motor, etc.)).



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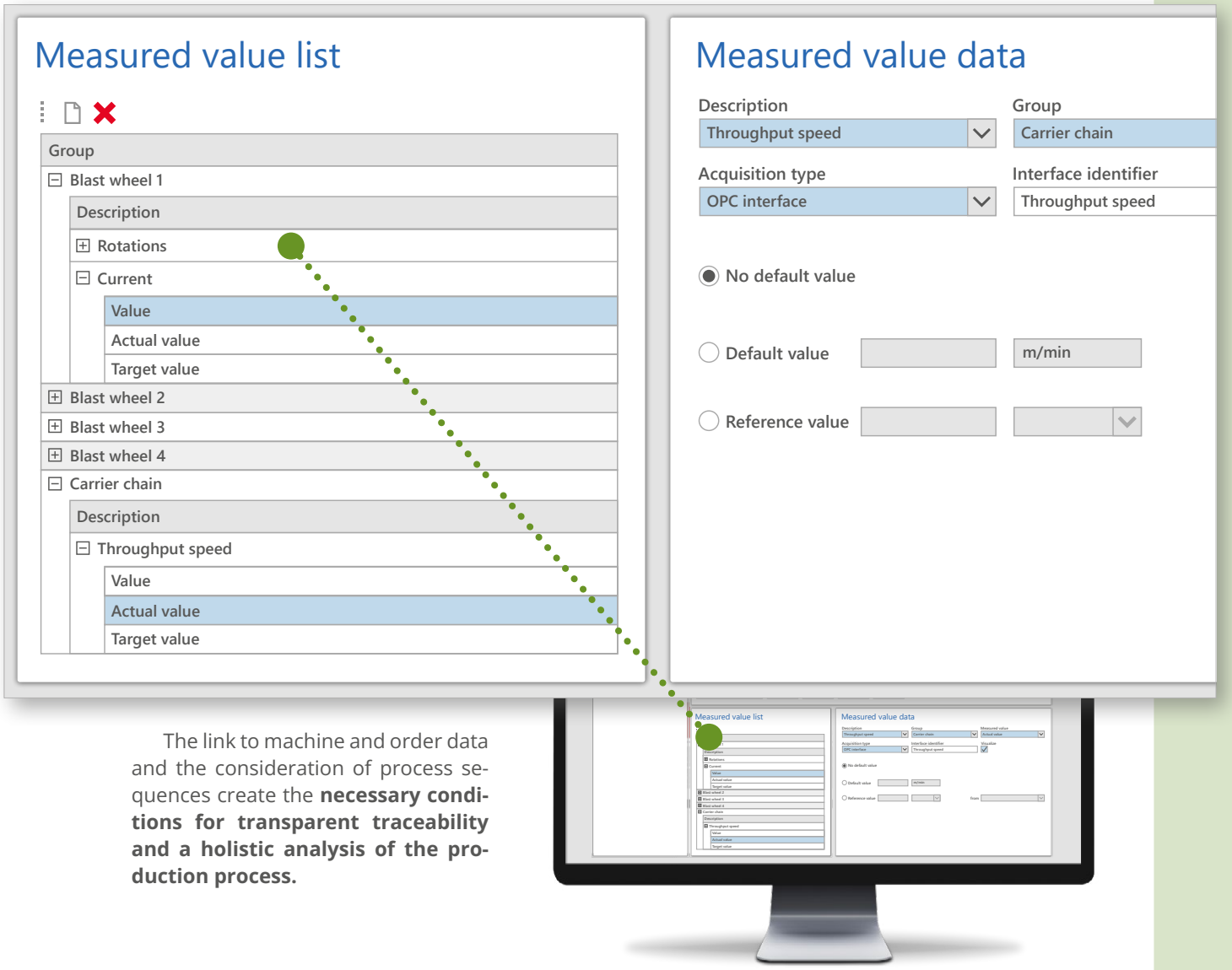
Individual configuration of the energy data to be recorded

The recording hardware (e.g. EMC.IIoT Smart Meter) is configured with the **properties of the measured value** in EMC.data **for each installation or consumption point:**

- Measured value and limit values
- Communication to the recording hardware (e.g. Modibus, OPC/UA)
- Acquisition type (cyclical or event-controlled)
- Alarm type (e.g. mail, lamp, app)



The link to machine and order data and the consideration of process sequences create the **necessary conditions for transparent traceability and a holistic analysis of the production process.**

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Automatic alarm in the event of overruns

The MES Software EMC has an **early warning mechanism.** Threshold values can be individually defined via the **configuration in the EMC.portal.** If the **threshold value is exceeded** during operation, an **alarm is triggered automatically.** The responsible production employee then receives a **message by e-mail and/ or SMS.**

- (●) No default value
- ( ) Default value [ ] [m/min]
- ( ) Reference value [ ] [▾] from [▾]

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Easy evaluation of energy consumption

The **processing and documentation of current and voltage** enables **holistic use of the recorded energy values,** from recording directly on the existing machines to evaluating consumption and visualizing online.

The **flexible configuration** of the **EMC.EnergyManagement module** enables the output of any mathematical values such as **totals, mean values, extreme values, ratios, etc..** Individual requirements and calculations can be easily integrated.

Creation of energy performance indicators (EnPIs)

In order to **optimize and plan energy consumption,** it is crucial to make it measurable. Only those who know where their resources are being "burned" can develop solutions for optimization. The recorded energy values can be used to determine and display a **large number of relevant energy performance indicators** (EnPIs). In addition to **absolute energy consumption in production** or **electricity consumption per reference value,** specific energy consumption such as the **product carbon footprint (PCF)** can also be determined easily and reliably. Others are

- **Energy OEE:** OEE x energy effectiveness
- **Energy effectiveness** (VDMA key figure):
  (planned energy requirement for the reporting quantity / actual energy consumption) * 100
- **Energy consumption per unit** (VDMA key figure): Actual consumption / reporting quantity
- **Optimum performance:** Energy consumption of the last completed confirmation in comparison to the previous minimum energy consumption of this material at the workplace
- **Planning effectiveness** (planning accuracy): 1 – {actual energy - planned energy)/planned energy}

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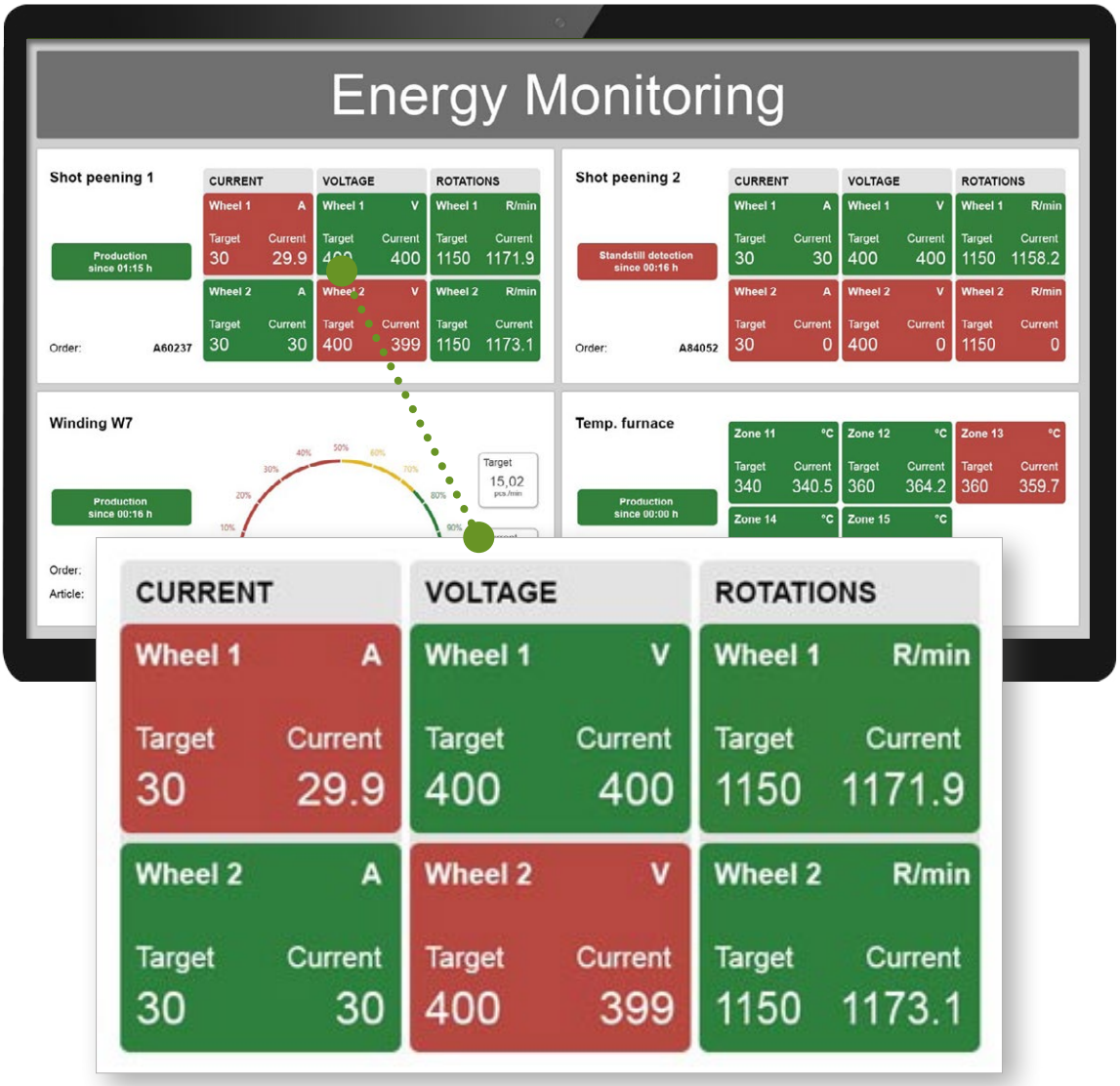
Energy monitoring in real time

The recorded energy values can be visualized easily and clearly **via freely configurable dashboards - in real time through direct access to the machine or the IoT.** It is also possible to include other energy-relevant data from other modules of the MES Software EMC in the energy monitoring for visualization. This enables **extensive monitoring of the current energy consumption** and supports **rapid optimization.**



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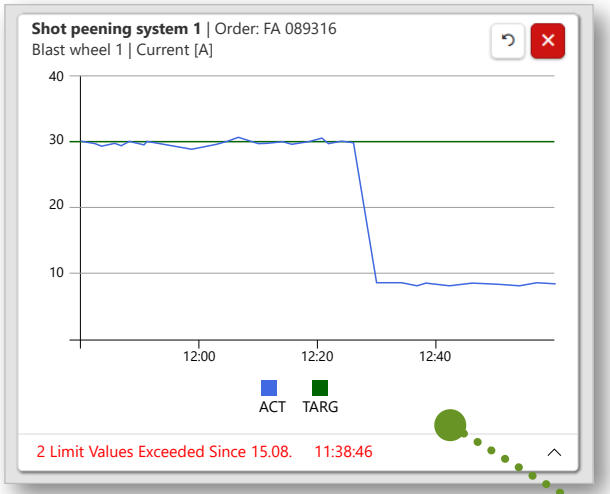

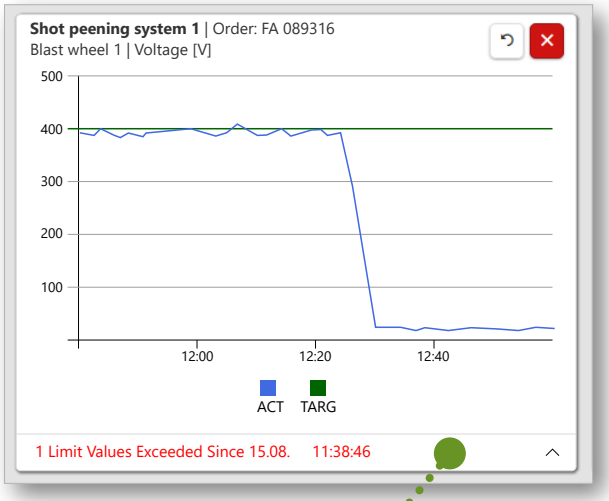

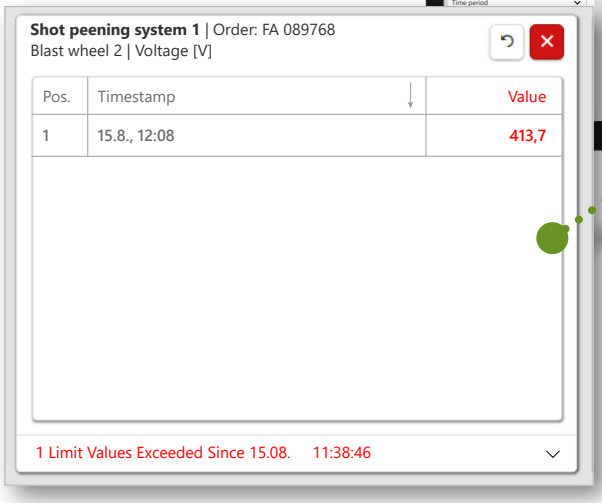

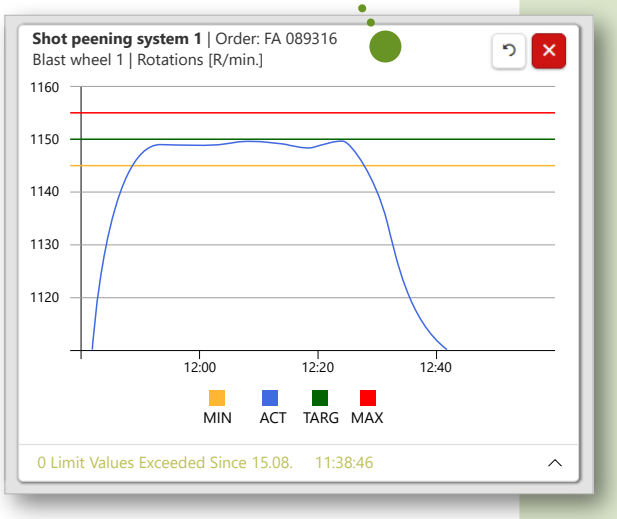

Energy process data

Clear display and visualization of energy process data in real time. This data serves as the **basis for evaluating and analyzing** the energy values. **Limit violations or unnecessary energy consumption** due to downtimes **can be clearly and precisely identified.**

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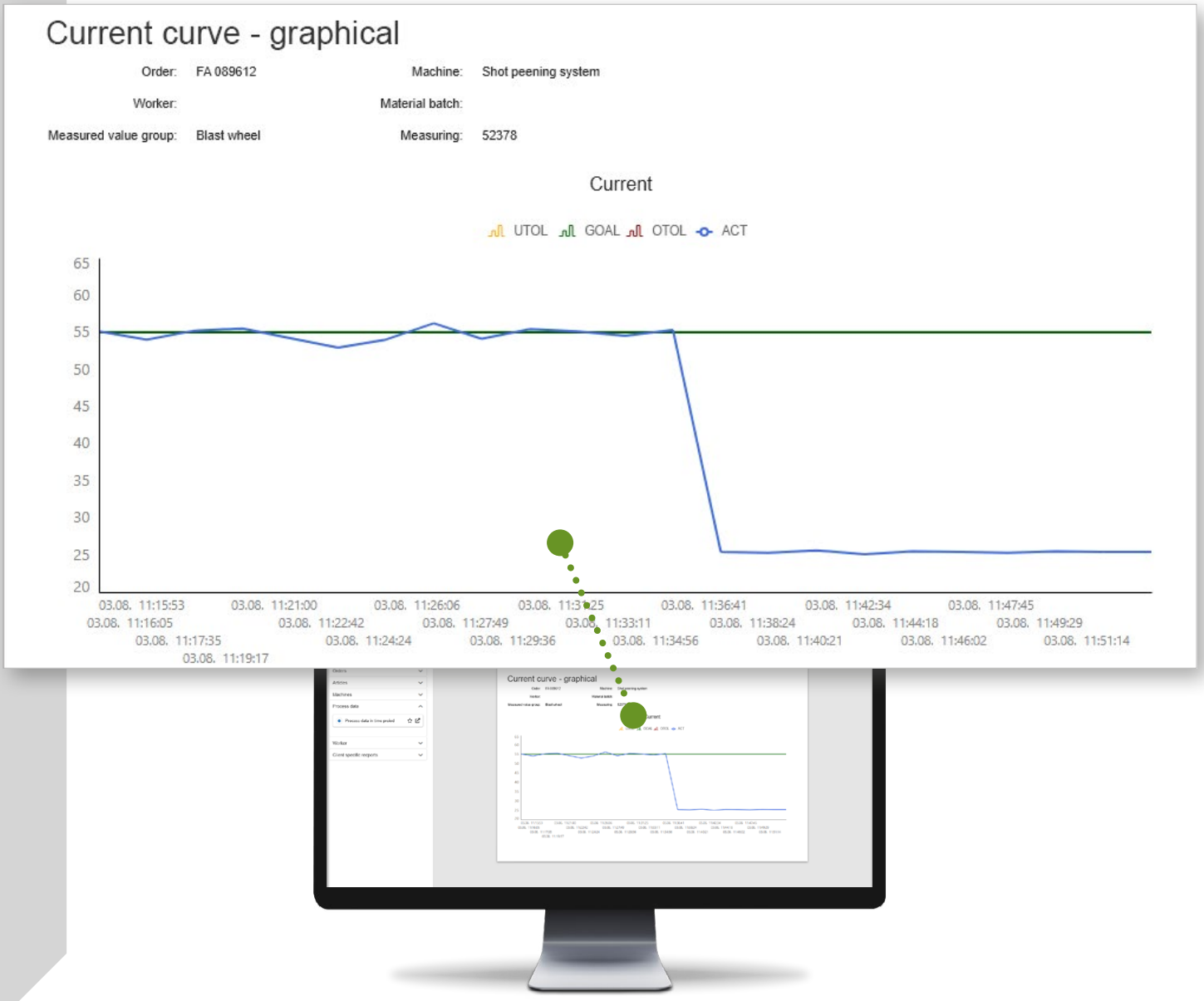
Create and send energy reports easily

With just a few clicks, you can generate a **monthly report** or a **report showing long-term and short-term consumption trends,** for example. All energy reports and reports created can be **saved and sent directly in the portal in the usual formats** (PDF, Word, ...). All created reports are saved in the system and can be displayed via the portal - **on the desktop or mobile.**



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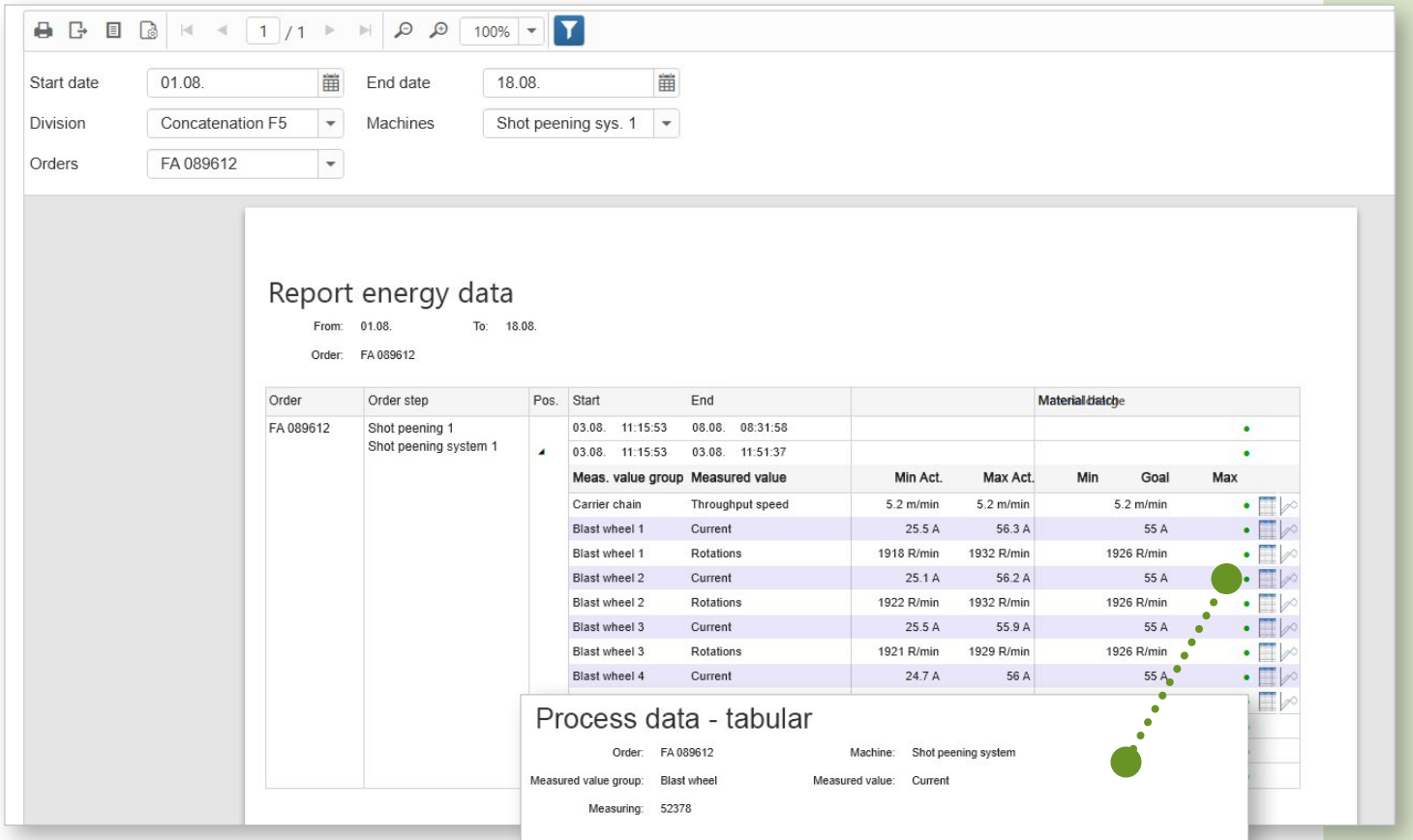
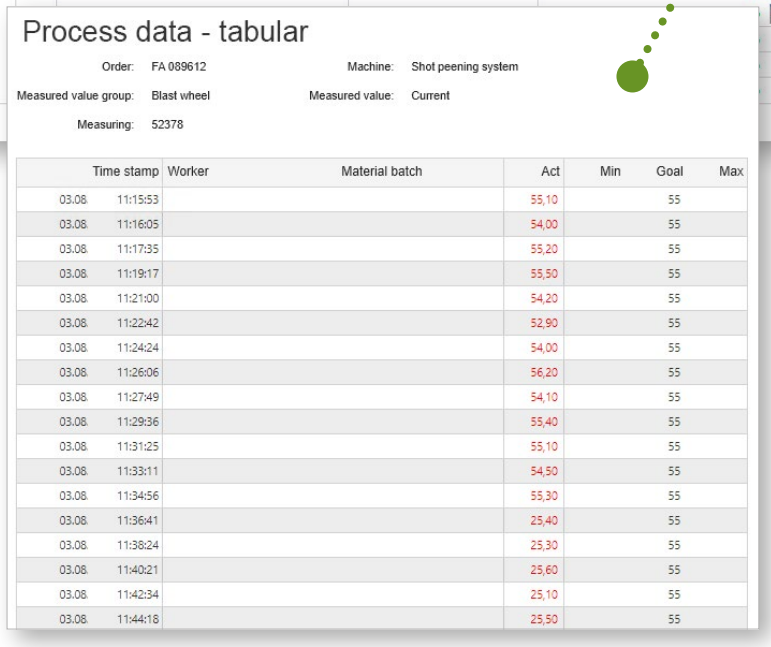
Process data in the time period

With the **MES Software EMC reports, all parameters** such as the time with start and end time, the department or the orders can be **individually selected.** This means that the report server can be used to reliably create and evaluate a **large number of reports, each with different parameters, energy values and correlations.**





Additional **linked reports** can also be displayed.

For example, a **tabular list** provides an **even more detailed evaluation of the recorded energy values.**

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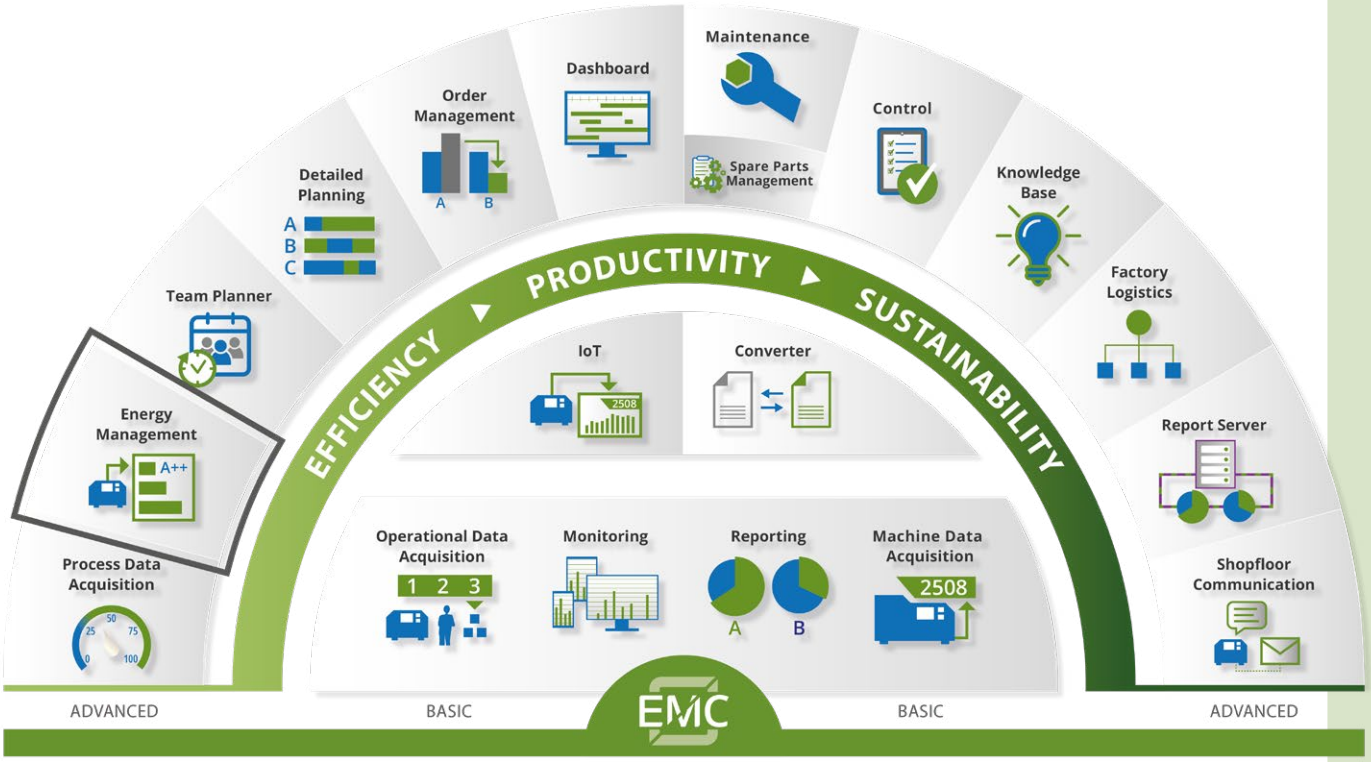
MES Software EMC

The solution for your smart networked manufacturing

Our user-friendly MES Software EMC controls all digital processes on the shopfloor **from planning, implementation, maintenance to traceability, shipping, production orders and a sustainable evaluation.**

It adapts completely to your needs, integrates into your existing IT landscape and brings together the data streams from ERP and the shopfloor.



The **modular architecture** of the MES Software EMC offers you the important **freedom and flexibility** in the implementation of your future-oriented production. Together with the **central MES database,** it is the basis for a **customer-oriented implementation - step-by-step or holistically - individual modules or as a complete system.**

No matter which solution you choose, with EMC you are always one step ahead and have the **best possible transparency** in production. All with the aim of **increasing your efficiency.**

iT Engineering Manufacturing Solutions GmbH is your provider of a well-developed Manufacturing Execution System in production management.

As an IT and MES expert in the metal forming industry and thanks to our large network of partners and memberships in associations (including VDFI and netzwerkdraht e.V.), as well as the best contacts with machine manufacturers, we know exactly how to obtain the important data and how to use it to digitalize processes and thus increase efficiency and productivity in manufacturing.

Our MES Software EMC acts as a central information hub and, by integrating the production data, ensures integration of production data for transparent production processes, flexibility and cost efficiency.

With a high level of technical and industry competence as well as many years of experience and expertise, we accompany you personally and step by step in transforming your production into a digital factory.

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