Welcome and see how **CONNECTIVITY** between your machinery and your software works – easily, securely and seamlessly.

connecting the world of machinery

**umatı**
universal machine technology interface

**OPC UA**
The umati promise: Make connectivity between machinery and software easy, secure and seamless – to help customers exploit added value from data.

**Connectivity is key** for all machinery in the 21st century. It means getting data in and out of devices and software systems – preferably via open, standardized interfaces.

umati is a **global initiative** for the promotion of open communication interface standards for machinery and production equipment.

umati brings together machine builders, software producers and users in a strong community. **umati partners** share their experience to benefit from the identical implementation of OPC UA standards.

Our **mission** is to provide true "plug and play" functionality in the field of machinery, so it becomes easier for users to participate in a data-driven economy.

umati **supports** users and machine builders by creating a strong international community; raising market awareness through joint marketing; ensuring identical implementation of the endorsed OPC UA specifications; and proving the power of open, standardized data exchange ecosystems through live demonstrations.

umati relies on **OPC UA as the global interoperability standard**. Standardization work takes place in multiple "Joint Working Groups" involving various sectors of the machine building industries and the OPC Foundation. This guarantees that the individual needs of different technologies are taken into consideration and ensures maximum transparency and the support of a strong global community.

**OPC UA and the OPC Foundation:**
- provide a **framework for standardized communication** (HOW to communicate)
- support **standardization** of specific needs for various technologies (WHAT is to be communicated)
- make the standards **available worldwide with no license fee**.

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Hi, I'm Fred, your umati guide!

*The number of umati partners is growing continuously. To see who has already endorsed umati, visit [www.umati.org/partners](http://www.umati.org/partners)*
You want to connect the machines on your shop floor to your IT system, such as MES or ERP? You want to exploit your data to make your production more efficient, reduce waste and costs, and save money? umati is here to help!

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Your job needs to get done? Find out on the next few pages how umati can help...

... or you have a certain **USE CASE** in mind? From page 8 you can see how umati can help you get exactly the data you need.
I am a **SALESMAN**. I present offers to our customers and guide them through the sourcing process to find the solution that best fits their needs.

I want to be sure that...

* connectivity and compatibility can be achieved without extra engineering.

* I can propose a suitable solution straight from the price list.

* the solutions we offer are easy to understand, long-lasting and fit the customer's individual needs.

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I am a **PURCHASING MANAGER**. I ensure that our production facilities are equipped with the best equipment at a reasonable price.

I need to make sure that...

* new machines and assets fit into our existing "eco-system" of software and machinery.

* connectivity can be realized without too much extra cost.

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**SALESMEN and PURCHASING MANAGERS** don't want to get too involved in the technical details, but they want to understand why and how standardized solutions can meet their needs and help them to find the best value.
Hi! I am a **Production Manager**.
I want to know...
* if all my machines are working properly – so I can be sure of delivering my parts in time.
* Are there any downtimes? Do I lose money? What's happening...??

I am the **Owner** of a **Small Machine Shop**.
I want to connect new machinery to my existing software environment without spending a lot of money on programming individual interfaces.

This also makes the job of an **IT Administrator** easier.
As a **SHIFT PLANNER**, I am responsible for delivering on time. I want to know...
* the utilization of my machine.
* are there idle times, breakdowns or limited availability?
I need to know immediately so I can re-organize!

As a **PROCESS PLANNER**, my task is to plan ahead for maximum utilization of our assets. I want to...
* have an overview of all current jobs.
* know how the machines are performing.
* know which tools are in use in which machine.
* upload programs and recipes to prepare for future jobs.
As a **MAINTENANCE ENGINEER**, I make sure that the machines are ready for use. I need to know...
- the current condition of all machines and assets.
- upcoming services and maintenance tasks.
- immediately if any disruptions occur so we can fix them as soon as possible.

As a **MACHINE OPERATOR**, I am usually responsible for more than one machine. I need to make sure that they are loaded with tools and raw parts. I need to know...
- which machine to attend next
- what to do next
- are there any errors, warnings or malfunctions?
Asset Management

... is the process of strategically planning, monitoring, and managing assets (i.e., production facilities, machinery, equipment and other resources) to ensure efficient utilization, maximum output and high-performance production capacity.

your goals

- Maximize the life cycle and performance of the assets, ensuring their availability and reliability while optimizing the costs
- Ensure the continuous operational readiness of plant and machinery

how umati helps

- Identical implementation of identification data of individual assets
- Contains all data needed to identify production assets
- Topological relationship between assets is (implicitly) mapped
- Identification is basis for many other applications

your benefits

- Minimize unplanned downtime
- Improve production efficiency
- Adherence to delivery dates
- Minimize unnecessary expenditure on spare parts, repairs and downtimes
- Asset inventory identification
- Easier asset management
- Condition monitoring
- Maintenance and repair scheduling
- Spare parts procurement
- Performance optimization
- Compliance with regulations and standards
- Faster commissioning of new assets or the replacement of old assets in an existing production structure

See how umati can help you get exactly the data you need.
Key Performance Indicators (KPI)

... are metrics to evaluate the success of a company, a department, or a specific project. KPIs can be used to measure and improve the performance of a production process.

Your goals

- Assess productivity, efficiency and quality of production processes through objective variables

How umati helps

- KPIs are applied uniformly to the entire range of production equipment using different OPC UA Companion Specifications
- Current status and operating mode of machines and systems immediately available
- Good comparability of data

Your benefits

- Transparency through continuous performance monitoring and evaluation
- Early detection of bottlenecks, inefficient processes, or quality problems
- Initiate actions for improvement

Your general benefits:

**Save time and cost** through seamless flow of data based on standardized data interfaces – independent of a specific use case.
Preventive Maintenance

... prevents potential failures and damage to equipment or facilities by scheduling regular inspections, maintenance and repairs.

Your goals

- Avoid unforeseen downtime and repairs by adhering to maintenance schedules
- Increase the efficiency, availability and lifetime of machines and other assets

How Umati helps

- Simple "Operation Counter" and "Lifetime Counter" provide information on how long a machine has been in operation

Your benefits

- More efficient planning of maintenance times
- Combine information from operating hours counter, maintenance records, operating conditions, and the expected life of the asset
- Identify when to replace a specific component
Predictive Maintenance

... uses continuous monitoring and data analysis to predict potential failures or malfunctions and implement targeted maintenance actions before damage or production downtime occurs.

**your goals**

- Avoid unforeseen downtime and repairs by analyzing lifetime-relevant data
- Increase the efficiency, availability, and lifetime of machines and other assets

**how umati helps**

- Standardized information models for implementation
- OPC UA for Machinery Basic Building Block “Process Values” provides mechanisms for describing actual and target values and related information
- Transmit and display sensor information and other values uniformly

**your benefits**

- Collect sensor data, such as vibration, temperature, pressure, power consumption etc.
- Analyze data using a variety of methods (model-based, statistical methods, machine learning/AI) to identify patterns, anomalies and correlations that may indicate possible failures or deviations
- Drive forecasts to enable early planning and implementation of maintenance activities
- Optimization of maintenance schedules through continuous monitoring
Production Control

... is at the core of every manufacturing company. A part of production planning and control (PPC), it essentially consists of enabling and monitoring of production jobs and aims at creating an effective and efficient production process.

your goals

- Increase flexibility
- Strengthen reliability
- Improve efficiency
- Maximize asset utilization
- Maximize productivity
- Minimize unpredictable delays
- Avoid over- or underproduction
- Prevent waste of resources

how umati helps

- Collect operating data via production data acquisition systems (PDA) or Manufacturing Execution Systems (MES) without additional interfaces
- Exchange job-related information based on ISA 95 Job Control and OPC UA for Machinery
- Scalable application from simple to very complex order management systems, covering a variety of assets and standards

your benefits

- Central control for the effective and efficient execution of production processes
- Monitor asset availability
- Monitor the current status of asset utilization
- Schedule the job sequence, including assets, human resources and materials
- Prioritize jobs based on deadlines, inventory, degree of utilization, or bottlenecks
Production Monitoring

... is the continuous monitoring of the operation and performance of production processes. This ensures that they run efficiently, without errors and in accordance with the defined standards and quality specifications.

<table>
<thead>
<tr>
<th>your goals</th>
<th>how umati helps</th>
<th>your benefits</th>
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<tbody>
<tr>
<td>✶ Continuous monitoring of the entire sequence and performance of the production</td>
<td>✶ Production plants and machines are typically controlled and monitored by a higher level system (e.g. MES). These systems should rely on open, standardized interfaces.</td>
<td>✶ Comprehensive transparency of the production processes</td>
</tr>
<tr>
<td>✶ Provide an overview of the production status at all times</td>
<td>✶ Data flow together seamlessly via a variety of standards, i.e. ISA 95 Job Control and OPC UA for Machinery companion specification.</td>
<td>✶ Informed decision making and better planning</td>
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<td>✶ Building blocks, for example, are the harmnized implementation of stacklights or key performance indicators</td>
<td>✶ React quickly to any problems or bottlenecks that arise</td>
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<td></td>
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<td>✶ Minimize downtime and ensure efficient production</td>
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<td>✶ Optimize production performance</td>
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<td>✶ Increase productivity</td>
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<td>✶ Make better use of production capacity</td>
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<td>✶ Shorten lead times</td>
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<td>✶ Increase profitability</td>
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</table>
Traceability

... is the ability to track the entire life cycle of a product or component along the supply chain. It enables companies to collect and track information about the origin, manufacture, delivery and use of a product.

your goals

- Track and trace the entire life cycle of a product
- Failure Mode Analysis
- Improve recall management
- Improve product quality

how umati helps

- Collect operating data and order results via production data acquisition systems (PDA) or Manufacturing Execution Systems (MES) without additional interfaces
- ISA 95 Job Control and OPC UA for Machinery companion specification
- AutoID specification

your benefits

- Quick identification and return of defective products or components
- Analyze quality problems to determine the causes and initiate appropriate actions
- Trace the origin and location of components and raw materials along the supply chain
- Identify responsible parties in case of product defects or safety problems
- Traceability in the event of a recall
- Monitoring/assessment of environmental impacts along the supply chain
- Identification of opportunities to improve sustainability
Quality Management

... ensures the quality of manufactured parts or products in order to minimize defects, meet customer requirements and improve the overall quality of production.

your goals
- Error detection
- Scrap reduction
- Improved product quality
- Reliability

how umati helps
- Collect operating data, evaluation and result parameters via production data acquisition systems (PDA) or Manufacturing Execution Systems (MES) without additional interfaces
- ISA 95 Job Control and OPC UA for Machinery companion specification
- Transfer complex test reports with OPC UA for Machinery - result transfer specification

your benefits
- Acquire and analyze machine performance data from sensors
- Continuous monitoring and analysis of parameters (e.g. temperature, pressure, speed, vibration, ...)
- Identification of problems or deviations
- Integration of testing and measuring systems in the production line
- Quality feature testing during production and thus automated monitoring and evaluation of product features
- Use algorithms and machine learning for automatic detection of deviations / errors
- Identify patterns / trends / systematic errors and causes of quality problems
**Energy Monitoring**

... comprises the recording, monitoring and analysis of the energy consumption of machines or plants to improve energy efficiency.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>✨ Identify energy saving potential</td>
<td>✨ Consideration of different variables, including electricity, steam, hot water, coal, petrol or compressed air</td>
<td>✨ Continuous monitoring, recording, analysis and optimization of energy consumption</td>
</tr>
<tr>
<td>✨ Transparent consumption statistics</td>
<td>✨ Harmonized implementation of the use case across multiple Standardization Working Groups</td>
<td>✨ Use sensors, measuring devices and software solutions to record energy consumption</td>
</tr>
<tr>
<td>✨ Minimize energy consumption</td>
<td>✨ Information model to describe measuring points of consumption or generation of energy flows (measuring points contain one or more different values)</td>
<td>✨ Identify inefficient operating conditions</td>
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<td></td>
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<td>✨ Uncover energy saving potential</td>
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Load Management

... involves managing and distributing the energy load in order to maximize energy efficiency, reduce costs and ensure the reliability of the energy supply system.

<table>
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<tr>
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<tbody>
<tr>
<td>✴ Optimize Energy consumption</td>
<td>✴ Consideration of energy availability, tariff structure, energy efficiency of machinery and equipment, production planning and the energy consumption mix</td>
<td>✴ Adjust energy demand to energy availability and costs</td>
</tr>
<tr>
<td>✴ Take advantage of cheap electricity prices</td>
<td>✴ Harmonized implementation of the use case across multiple Standardization Working Groups</td>
<td>✴ Peak load avoidance and power consumption smoothing</td>
</tr>
<tr>
<td>✴ Increase energy efficiency</td>
<td>✴ Information model to describe the mapping of energy measurement variables at various measurement points</td>
<td>✴ Benefit from cheaper tariffs in times of low demand</td>
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<tr>
<td>✴ Energy supply security</td>
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<td>✴ Avoid overloads of the energy system</td>
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Product Carbon Footprint (PCF)

... is the total amount of greenhouse gas emissions generated during the life cycle of a product, including emissions from the production, transport, use and disposal of the product.
You need more information about umati? Have a look at UMATI.ORG
umati is operated by

VDMA – Machinery and Equipment Manufacturers Association
www.vdma.org

VDW – German Machine Tool Builders' Association
www.vdw.de

Experience live connectivity with umati.app

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