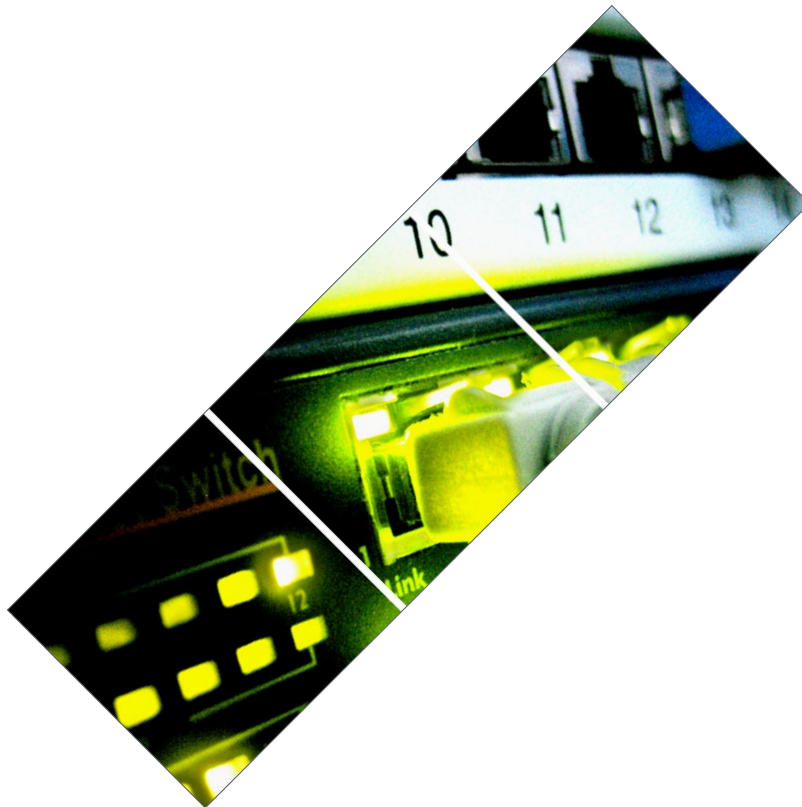


# MachineConnector

Taking Over Plant Data in Real Time from Controls and Sensors



## Basic Information

Short Definition | Areas of Application | Ready-to-use with OPC | Advantages

1

## Machine Integration

Import-Interface | Machine Data Acquisition

2

## Machine Integration (Multi-Level)

Cosmino Listener | Interfaces and Configuration

3

## Operator Integration

4 Steps to Integrating Machines | Online Data Acquisition Dialog | Real-time View

4

## Integration into the Cosmino<sup>®</sup> MES<sup>plus</sup>

The Complete Solution for the Improvement Process

5

## 1

## BASIC INFORMATION

### Short Definition of Machine Data Acquisition

Online integration of machines will make machine data available immediately and automatically. Information will be retrieved directly from the control system or from additional integrated sensor systems.

Machine data typically acquired includes:

- ◆ Production quantities, yield, scrap and rework
- ◆ Capacity utilization, availability and reliability statistics
- ◆ State of the machine (production, downtime, cycle slowdown, setup, maintenance, repair, mini stop etc.)
- ◆ Process parameters (pressure, temperature, speed, energy consumption etc.)

In comparison with manual entry, whether acquired via paper forms or online dialogs, automated data acquisition results in data that is more objective, less error prone and available nearly in real-time. Time previously spent for manual acquisition, management and correction of data becomes available as additional work capacity to the production process itself.

Another important factor is that disruptions and deviations in the processes become more transparent, because the reported disruptions include the relevant process parameters. Reaction time will be reduced due to timely and complete availability of information.

### Cosmino® MachineConnector Areas of Application

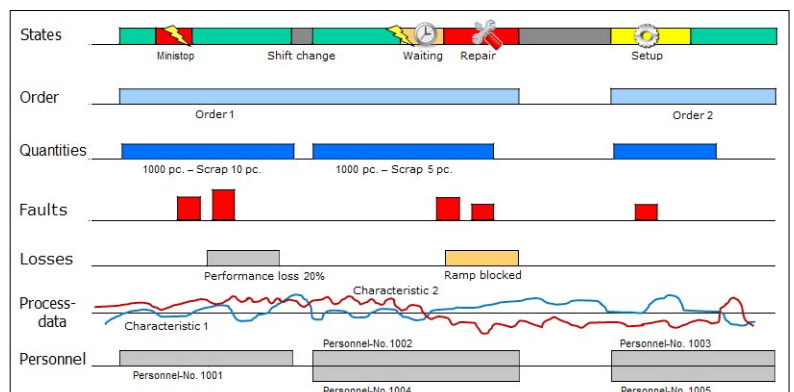
The Cosmino® MachineConnector is a module in Cosmino® MES<sup>plus</sup> and is the basis for a machine data acquisition.

It automatically records signals to the machines and makes this data available to other Cosmino modules.

Based on the automatically transferred machine data, assessments of availability, performance and quality are just as possible as tracking and logging process parameters and product characteristics, and it can be depicted in real time.

Actual cycle times will also be monitored. An absent signal indicates a disruption to be reported immediately to maintenance personnel. Disruptions and downtimes can also be supplemented with causes by the machine operator. All collected information will become directly useable for the continuous improvement process, such as the determination of the ideal machine speed through the acquisition of actual cycle signals.

Cosmino is the only solution with the ability to acquire data both electronically and manually using machine-readable forms. Third-party operational & machine data acquisition systems can also be integrated. All of the data, independent of its source, will be verified for completeness and validated against a set of relevant business rules.



## 1

## BASIC INFORMATION

### Ready-to-use with OPC, among others

The Object Linking and Embedding for Process Control (OPC) system is a standardized software interface for exchanging data between the control systems and applications from various manufacturers. Using this system, sensors and control system can communicate through a shared, flexible network. Processing the data acquired can start quickly and simply with the connection of the machine.

Another advantage of OPC integration is the simplicity of extending the system. After the initial connection between the first machine and Cosmino has been created, your electricians can quickly establish additional connections to other machines and characteristics. An external service provider will no longer be necessary and the initial installation costs will be reduced correspondingly.

In addition to OPC, Cosmino can also work with other interfaces and bus systems or directly access data from hardware or software SPS systems (such as Phoenix Contact).

### Your Cosmino® MachineConnector Advantages

- ◆ Use reliable data faster through automated, very quick data acquisition
- ◆ Reduced implementation time thanks to the ability to combine manual/online acquisition using the same data structures
- ◆ Transparency through real-time monitoring of the machine states (displayed in the actual layout of the plant)
- ◆ Reduction of average downtime, because repair technicians can respond immediately (early detection system)
- ◆ Flexibility provided by open and modular integration interface for machine or sensor data (such as OPC, S7 or proprietary interfaces)
- ◆ Minimal, transparent follow-up costs, because in-house technicians can integrate additional machines and assembly workstations
- ◆ Simultaneous acquisition of data for traceability purposes and machine parameters for the condition monitoring system without additional effort (if data can be accessed from the OPC server)
- ◆ OPC server signals can also be used by other systems (energy management)
- ◆ Reduction of costs thanks to improved calculation of prices and the discovery of incorrect plan cycle times (machine speed optimization)
- ◆ A preparatory step towards Smart Factory and Industry 4.0

```
<machineno> KEP1P </machineno>
<class> standard </class>
- <report_time> 10
  <!-- in Sekunden -->
</report_time>
- <machinemoduleconnectors>
  <!-- Mengenermittlung an einem Zaehler -->
- <mmc>
  <type>MMCTYPE02</type>
  <class>perfcounter</class>
  <polling_time>1000</polling_time>
  <delta>true</delta>
  <data_code="prod_quant_pc"> PROD</data>
- <mcl name="length">
  <class>opc</class>
  - <address>
    <prog_id> INAT TcpIpH1 OPC Server</prog_id>
    <connection>[B_Control]</connection>
    <attribute>DB_Daten_Presse2._nach_Presse</attribute>
```

*An extract from the code for OPC-Configuration of a quantity counter*

## 2

## MACHINE INTEGRATION

There are a variety of options for integrating machines, getting their data and processing it with Cosmino.

### 1. The Import Interface

This interface will acquire the machine data from a third-party system and store it in a database (such as WinCC). Cosmino will use this data for further processing (through SQL, among others) and supplement it for the discovery of causes.

### 2. Integration of the machine

Cosmino receives data automatically and directly from the machine. Using sensor systems, data can be acquired automatically even from older machines and assembly lines. The Cosmino® WorkerPoint module can supplement online acquisition.

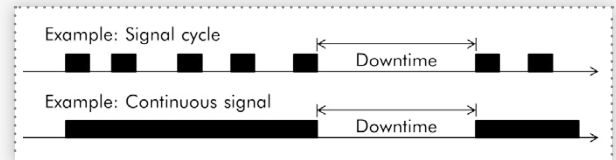
Cosmino will use the following data for assessments and calculating threshold statistics:

- ◆ Production quantities, scrap and rework
- ◆ Order data
- ◆ Cycle time
- ◆ Process parameters & energy values
- ◆ Machine states such as downtime and cycle slowdowns with time stamps.

Piece counters or sensors at the piece ejection point can monitor production quantities.

Order data and cycles periods will be taken from the control system.

Process parameters and energy values will be acquired (for example) with the help of sensors and can be used for traceability.



**Downtime and cycle time detection through signal monitoring**

A machine can be monitored for downtime periods by detecting the absence of signals (see the illustration above). These signals can be either:

- ◆ Cyclical signals (press opens)
- ◆ Continuous machine signals (conveyor speed) or
- ◆ Continuous signals (increment signal) from a piece counter.

### Your Cosmino® MachineConnector

#### Advantages:

- ◆ Current inventory statistics through automated counting of quantities produced and timely reports to the ERP system, even from assembly workstations (sensors needed)
- ◆ Objective data acquisition makes unmanned machines, larger production lines or multiple machine operations possible
- ◆ Enables real-time control of the factory
- ◆ Savings in terms of acquisition and archive costs for documents relevant to product liability

## 3

## MACHINE INTEGRATION (MULTI-LEVEL)

Peripheral equipment can hold both digital and analog signals and data.

If digital data and an Ethernet-enabled control system are available, the data will be prepared there and sent to the OPC server. If analog data (such as S5 or sensors) is available, an interface and a converter will be required for the preparation of the data and to send the standard data components to the OPC system.

The Cosmino Listener (MDES) will then query and collect the defined records. The data gathered will be stored in the Cosmino database and displayed in the Online Data Acquisition Dialog.

In general, all workstation sensors or mechanical pulse generators, which have an analog-digital converter and supply cycle or quantity data, will be supported.

This will make partial, or even full, automation of data acquisition possible.

### Cosmino Listener (MDES)

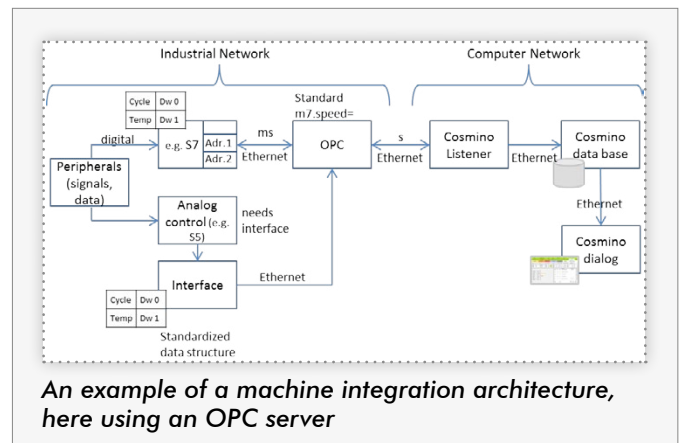
This service may be installed centrally or locally on the servers for each machine. The advantage of a local service is in the buffer option. In the event of network disruptions no data will be lost. In contrast, a central server reduces the corresponding installation and maintenance costs.

### Interfaces

The following standardized interfaces are available for data acquisition (in addition to OPC):

- ◆ Ethernet
- ◆ Phoenix Box
- ◆ Analog/TCP/IP converters (such as RS232/TCP/IP)
- ◆ CAN Bus or similar.

Customer-specific adjustments are also possible.



**An example of a machine integration architecture, here using an OPC server**

### Configuration

Only a few settings need to be made to configure an interface:

- ◆ What information should be acquired (which parameters, which signals)?
- ◆ Which system (IP address) should be notified?
- ◆ Which transmission technology and interface has been chosen?
- ◆ When should a downtime or disruption be reported (number of missing cycles or quantities)?

### Your Cosmino® MachineConnector

#### Advantages:

- ◆ Easy maintenance and many configuration options
- ◆ No more unreported periods (data over 24 hours per day, all 365 days of the year)
- ◆ Complete data all the time, even micro stops will be logged correctly

## 4

## OPERATOR INTEGRATION

**Quick start using OPC: 4 steps to integrating machines with the Cosmino system**

### 1. Assign data components to the signals of the control system

Prepare the control system signals for communication by assigning them to data components (e.g. setting the conveyor speed to xy77).

### 2. Assign OPC names to the data components

Apply your data component standard to the OPC server and assign it an OPC name (e.g. "xy77" means m7.speed).

### 3. Enter the OPC names in Cosmino

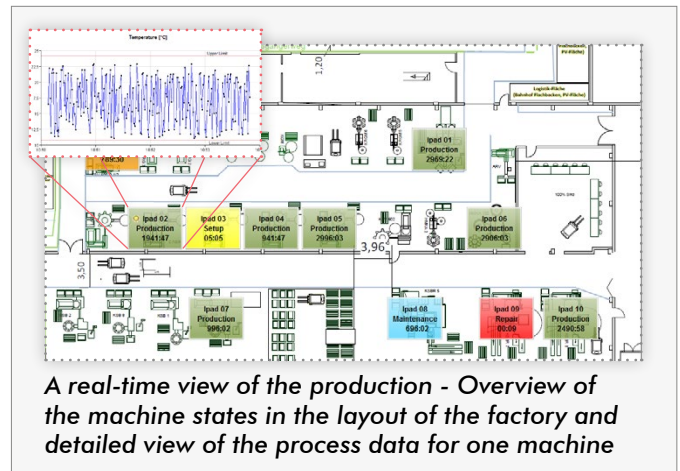
So that Cosmino Listener will request the right parameters and transfer them to the data base, the OPC names must now be configured (e.g m7.speed = the speed of Machine 7, see page 3).

### 4. Monitor the parameters

Create inspection plans for the parameters to be monitored and their inspection and measurement data in the Cosmino database.

### Your Cosmino® Advantages

- ◆ Flexibility because various signals can be integrated
- ◆ Independence because all control systems can be 'understood' by using standardized OPC names
- ◆ Customization because custom inspection plans can be created



### The Online Data Acquisition Dialog

By integrating Cosmino® WorkerPoint's Online Data Acquisition Dialog, all disruptions will also be supplemented with causes by the operators.

Often, a machine control system will detect a symptom or its effect, but not the cause of a disruption. Logistical problems like waiting periods cannot be detected at all. With the help of the WorkerPoint system, waiting and setup times, scheduled maintenance and cycle slowdowns can be recorded for future analysis. Terminals, touch panels or PCs can be utilized for this.

### Real-time View

Machine Integration will make it possible for you to **view your production system in real time**. With the help of Cosmino, you can keep an eye on all of your integrated machines and their current status. Doing so will support your maintenance team with quicker detection of problems and faster response times.

*Further information can be found in our Cosmino® WorkerPoint brochure*

## 5

## INTEGRATION INTO THE COSMINO® MES<sup>plus</sup>

COSMINO AG supports you in getting the full potential of your manufacturing and achieving the best results:

- ◆ More output
- ◆ Better quality
- ◆ Increased reliability
- ◆ Reduced costs
- ◆ Full transparency

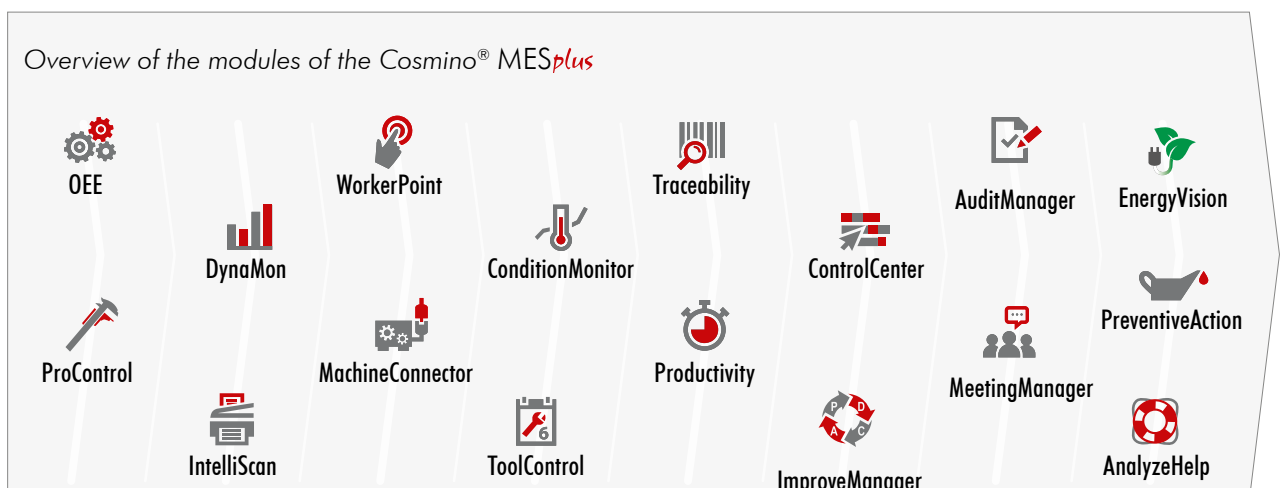
Our software belongs to the field of Manufacturing Execution Systems (MES) and can therefore be your navigator on the path to Industry 4.0 (Integrated Industry).

Thanks to more than 26 years of project experience, we can count global companies like BMW AG, Daimler AG and Continental AG among our clients today.

Thanks to its modular, standardized architecture, Cosmino® MES<sup>plus</sup> offers particularly medium-sized companies from various industries important support in the optimization of their processes and products.

### Your Cosmino® MES<sup>plus</sup> Advantages

- ◆ Focus on people  
(their knowledge will be developed and used)
- ◆ Causes instead of symptoms for downtimes  
(by integrating the employee's knowledge)
- ◆ Reporting system oriented on measures  
(award-winning, fully automated and easily understood)
- ◆ Integrated improvement management system  
(measures are linked to metrics)
- ◆ Quick start (*express*) is possible  
(automate data from paper forms; get digital data by scanning)
- ◆ Award-winning Online Data Acquisition Dialog  
(acquires data and displays information)



COSMINO AG has specialized  
in consulting, software development and service  
in the fields of Manufacturing Execution Systems (MES) and  
continuous improvement processes since 1988.



COSMINO AG supports industrial companies of any size achieve full potential of their manufacturing systems and shows how the best possible result can be achieved using the existing resources. From data acquisition to improvement management, the potential of all employees will be brought to bear.

Have we awakened your interest?  
Our sales team is looking forward  
to making contact with you!

**COSMINO AG**

Breitengraserstraße 8  
90482 Nuremberg  
Germany

Fon: +49 (0) 911 46 26 76-0

Fax: +49 (0) 911 46 26 76-76

[www.cosmino.com](http://www.cosmino.com)  
[info@cosmino.de](mailto:info@cosmino.de)