



## Industry 4.0: Machinery Interconnection for Cembre

### Cembre

#### Goals

- Machinery Interconnection
- Automation of data collection
- Automation of the sending of recipes to the machines at the start of the job order
- Downtime tracking
- Determination of costs for each production order
- Traceability of production
- Compliance with legal requirements for the Italian National Industry 4.0 Plan

#### Solution

Based on a system consisting of highly modular software solutions for Industry 4.0 that allow interconnection with the company's MES. Thanks to Part Program Manager it is possible to manage all the processing configurations differentiated by machine and by article.

The solution permits to prepare the machine configuration according to the order to be executed.

#### Resources

- iDaq
- Digital Factory 4.0
- Liliium
- Part Program Manager

### The Challenge

Cembre is the leading Italian manufacturer and one of the leading European manufacturers of **electrical compression connectors** and **tools** for their installation.

Cembre needs to **automate data collection** in the press, die-cutting, wire-drawing and plastic molding departments for **fourteen machines**. It is necessary to interconnect them with the **MES** already used in order to **know the costs of each job order** in a **precise way** and to have the **traceability** of the processes.

The machinery must then undergo **technical expertise** in order to benefit from the tax incentives offered by the **Italian National Industry 4.0 Plan**.

To further **improve productivity**, Cembre required the **automatic management of recipes**. Production parameters are in fact set manually at the start of each job order on each machine, involving a certain amount of time for configurations. The solution must, therefore, be able to **automatically send specific processing parameters directly to the machine** according to the job order started by the MES.



CEMBRE is a leading European company in designing and manufacturing electrical connectors and accessories for cables, tools for their installation, cable glands, industrial marking systems and supplies important markets in the railway, industrial quadrastic and utilities sectors.

The company, founded in 1969, is based in Brescia. Its offices, factories, warehouses, laboratories and services are spread over an area of 60 thousand square meters, set in an area of about 120 thousand square meters.

The rational organization of the spaces has made it possible to create comfortable working environments in

safe and efficient conditions. CEMBRE has over 750 employees distributed in the Italian headquarters and in its five branches in France, Germany, Spain, UK and USA.

Attention to quality, technological innovation and customer orientation are the main objectives that the company focuses on with commitment and passion, through a team of highly trained and qualified people.

The company offers a catalog of over 12 thousand articles and there are over 200 patents and patent applications filed.

[www.cembre.com](http://www.cembre.com)

**Cembre S.p.A.**

Via Serenissima, 9 - 25135 Brescia  
- ITALY

## Solution

Cembre's need was resolved with a **complete and scalable solution**, achieving all set objectives. The software for Industry 4.0 already developed and extensively tested in T4SM was used: iDaq, Digital Factory 4.0 Kernel, Liliun and the new product Part Program Manager of the Digital Factory 4.0 Suite.

There are **fourteen interconnected machines** of **different types**: three presses, three die cutters, one plastic extrusion machine, four cable gland assembly machines and other types.

The used software interfaces directly to the **Siemens PLCs** of the machinery. Both standard industrial protocols (ModBus) and customized protocols on Ethernet have been used.

The proposed solution allows the machines to be connected to the company's MES. At the start of each job order from the MES, the machines automatically receive the configuration parameters for processing according to the article to be produced.

**The main data acquired are:**

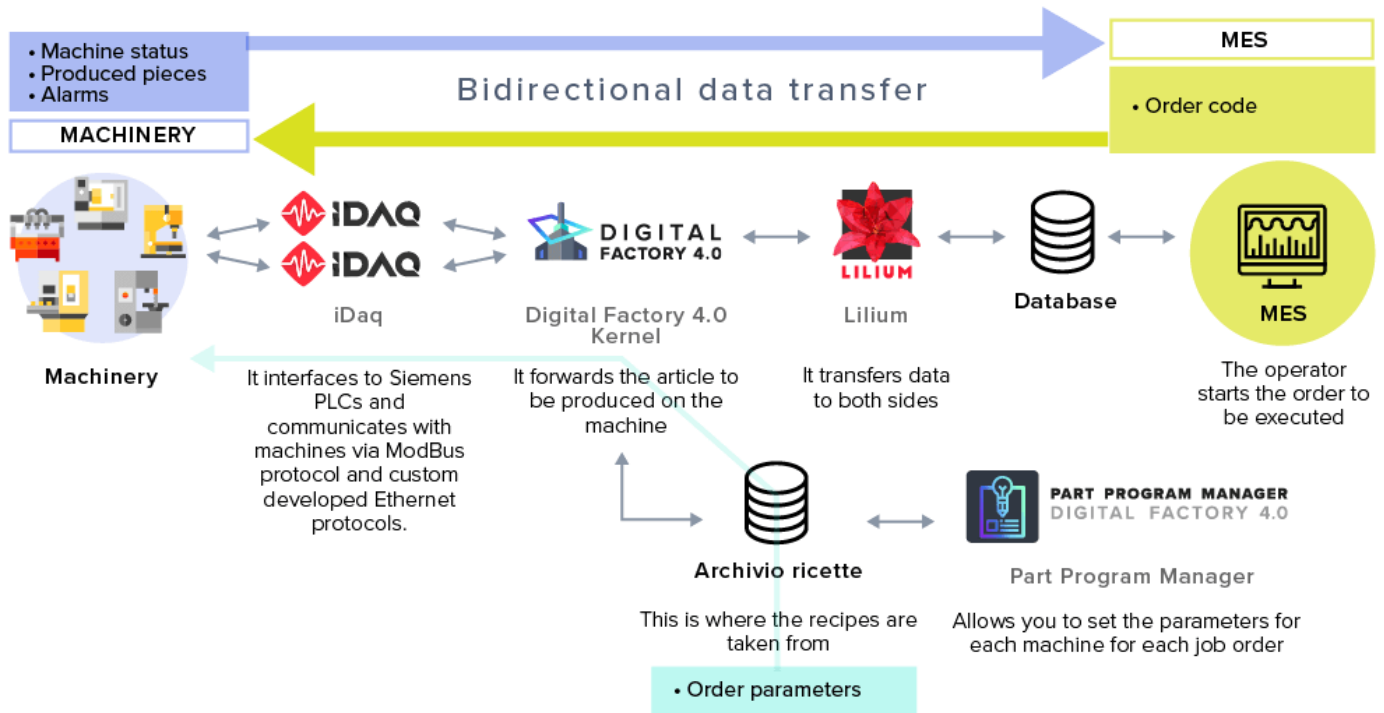
- **Machine status**
- **Number of pieces production** (pieces counter)
- **Alarms**
- **Recipe parameters**
- **Other process quantities**



*Cembre products*

## CASE STUDY | INTERCONNECTION FOR INDUSTRY 4.0

DEVELOPED BY  
T4SM TOOLS for SMART MINDS



Industry 4.0: diagram of machinery interconnection for Cembre

**iDAQ** is involved in data collection from machinery.

**Digital Factory 4.0 Kernel** collects all data acquired by **iDAQ**. It forwards job code and article to be produced to the machines according to the operator's choice from the MES and takes the recipes configured in **Part Program Manager** based on the job started sending them directly to each machine.

**Lilium** takes care of the data transfer to the company database, from which the MES extracts the information for display and archive, and the data transfer from the database to **Digital Factory 4.0** and **iDAQ**.

**Part Program Manager** permits to enter the operating data of each machine and save them as a recipe associated with the item to be produced, which will then be automatically sent to the machines.

**Part Program Manager** simplifies and speeds up considerably the work of the operators and the machine set-up, reducing time and costs thanks to the immediate sending of the operating parameters.



### TOOLS for SMART MINDS

(T4SM) is a system integrator that develops software solutions for manufacturing companies.

T4SM is Alliance Partner of National Instruments and the development team consists of Certified LabVIEW Architects (CLA) who have long experience in LV Real-Time Programming and LV-FPGA.

T4SM designs from scratch to high-quality solutions easily integrable with third-party products, which help customers to shorten time-to-market of their systems.

T4SM uses the AGILE methodology for the development of software projects and the co-design of applications with immediate benefits for customers, helping them to gain a competitive advantage over competitors.

For technical support and product information:

[www.toolsforsmartminds.com](http://www.toolsforsmartminds.com)

TOOLS for SMART MINDS  
Corporate headquarter  
Via Padania, 16  
25030 Castel Mella  
Brescia (Italy)

## Benefits and Results

All the objectives set were achieved, thus allowing Cembre to obtain considerable benefits:

- **Total integration with MES:** this allows all the new functions to be carried out directly from the MES used.
- **Time-saving and efficient recipe management:** when the job is started by the personnel in the MES, the operating data are automatically sent to each machine specific for that job.
- **Production traceability:** all production cycle data is tracked and there is a production history job by job.
- **Cost determination:** With automatically-collected production data you can have an accurate cost statement per job.
- **Reduction of paper documentation:** This enables faster retrieval of information, increased accuracy, and reduced errors.
- **Reduction of human errors:** data acquisition is automatic, reducing errors due to manual operations.
- **State Incentives of Italian National Industry 4.0 Plan:** all the requirements of legal requirements to access tax benefits have been met.
- **Modular and scalable solution:** allows future modifications and implementations in an agile way.
- **Further business digitization:** The solution has increased business digitization, which improves the performance of people, business processes and products.



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## Potentiality

The solution is fully scalable. From the field point of view, it allows both to acquire new sizes and to connect new machines quickly, ensuring a minimum impact on the existing system.

Moreover, thanks to the modularity of the solution, it is possible to interconnect machines with technologies and functionalities even different from those already connected.

## Client Comment

*"We found in T4SM the ideal partner to solve machines interfacing problems with the company MES; a partner with high technical skills, active listening capabilities and the right effectiveness in problem solving.*

*With their solution it was easy / possible to solve also the problems related to the automated sending and management of Part Program.*

*We are very satisfied with the results obtained and we are sure to have started with T4SM a collaboration relationship that will be consolidated over time".*

*Ing. Stefano Bergamaschi  
Production Planning Manager  
Cembre S.p.A.*