



TOOLS FOR SMART MINDS

## Case Study



# Interconnection of Lathes in National Industry 4.0 Plan Perspective

## Thermo Engineering

### Challenge

- Interconnection of machinery
- Automation of data collection and historical data storage.
- Single batch cost monitoring
- Compliance with the requirements of the Italian National Industry 4.0 Plan

### Solution

Based on a system consisting of iDaq, Digital Factory 4.0 and Lilium communicating with the company machinery and MES

### Resources

- iDaq
- Digital Factory 4.0
- Lilium

## The Challenge

Thermo Engineering is highly specialized in the design and production of probes, sensors, and thermowells for temperature control.

The need is to have the **production time of each batch** in the turning department to know the precise cost per order, automate data collection, have a history and access data from the offices in real time.

For this purpose it is necessary to **interconnect FANUC CNC lathes** with the project management software and company MES, also taking advantage of the incentives offered by the **Italian National Industry 4.0 Plan**. It is, therefore, necessary to meet all relevant legal requirements.

TOOLS for SMART MINDS is tasked with making data from machinery available to management and offices.

*Above, Thermo Engineering thermowells, used in the energy, pharmaceutical and petrochemical industries.*

## **THERMO ENGINEERING**

THERMO ENGINEERING is a company founded by skilled technicians with thirty years experience in the design and production of probes, sensors, assemblies and thermowells for temperature control.

Their vast technical experience has allowed them to reach a high qualitative level which, combined with research and design of the increasingly innovative and customised solutions, has made THERMO ENGINEERING a leading company in the national and international field.

The high qualitative and technological standard achieved by THERMO ENGINEERING in the manufacturing of temperature probes has ensured that THERMO ENGINEERING regularly collaborates with ENEA in the design, manufacturing and engineering of intelligent and innovative sensors for a wide range of industrial applications.

[www.thermoengineering.it](http://www.thermoengineering.it)

### **Thermo Engineering**

Registered office:

Via Giuseppina n. 19  
26030 Malagnino (CR) ITALY

## **Solution**

All the objectives have been achieved by means of a **complete and scalable solution**. The needs of Thermo Engineering have been met by implementing T4SM's widely tested Industry 4.0 software: iDaq, Liliium, and Digital Factory 4.0. They are used respectively to communicate with machinery, transfer information and view and analyze data in real time.

The machines, **4 FANUC CNC lathes**, were connected to the company MES.

**iDaq** takes care of **data collection** directly from the field. It is in fact used to communicate with machinery through native FOCAS library. For each machine, the main operating parameters are taken.

**The main data acquired are:**

- **Machine status**
- **Number produced pieces**
- **Working time**
- **Operating parameters**



*Thermo Engineering Production*

**Digital Factory 4.0** collects all the data acquired by iDaq. It provides a global view of the data acquired from the plant machinery.

The data can be viewed in real time from different locations, each customizable according to criteria of subdivision of machinery or type of data.

**Lilium** deals with the transfer of data to the company database, from which the MES extrapolates the information for the visualization and the archive.

### CASE STUDY - THERMO ENGINEERING Interconnected - Data reading part

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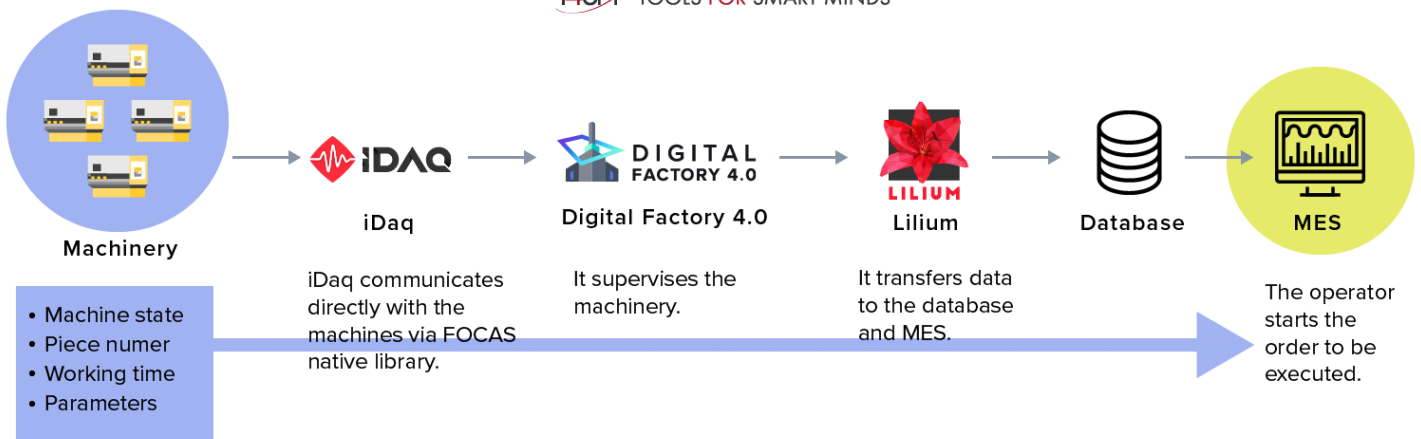


Diagram of the company interconnection with FANUC CNC lathes - Data reading part



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 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  
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25030 Castel Mella  
Brescia (Italy)

## Benefits and Results

All the set objectives have been achieved, allowing Thermo Engineering to obtain significant benefits:

- **Cost determination:** with the production data automatically collected, a precise report on costs can be obtained.
- **Reduction of human errors:** data acquisition is automatic, reducing errors due to manual operations.
- **Time-saving, production control:** The staff sends the item codes to be produced by order initiated by the MES directly to the specific machine involved.
- **Italian State Incentives of the National Industry 4.0 Plan:** all relevant legal requirements have been met in order to benefit from incentives.
- **Production traceability:** all the data of the production cycle are tracked and there is a production log batch per batch.

## Potentiality

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

Thanks to the **modularity of the solution** it is possible to interconnect machines with technologies and functions that are also different from those already connected. The intention is to interconnect other old generation machinery, which even if not designed for Industry 4.0, can become 4.0.

It will thus be possible to see from a single access point the data of all the machines involved in the process of the turning department in a global way: from the most recent to the least updated.



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From a management point of view, **the solution is open to interfacing with third-party software** for visualization, data analysis and business intelligence.

Finally, the solution allows the application of artificial intelligence algorithms, such as Machine Learning, predictive analysis and process drift control for each machine and plant. This makes it possible to **predict stops and breaks** with the **aim of promptly intervening** and thus reducing downtime and production costs.

## Client Comment

*"With the T4SM team we have finally found the professionalism, experience and technology that will allow us to take a big step forward in terms of quantity and quality of the collected process data.*

*All this offers us the potential to gain access to highly specialized and competitive international markets."*

**Daniele Vacchelli**  
**Administrator**  
**THERMO ENGINEERING SRL**