



DE LORENZO
GROUP

educational equipment manufacturers

CIM

Computer Integrated Manufacturing

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CIM

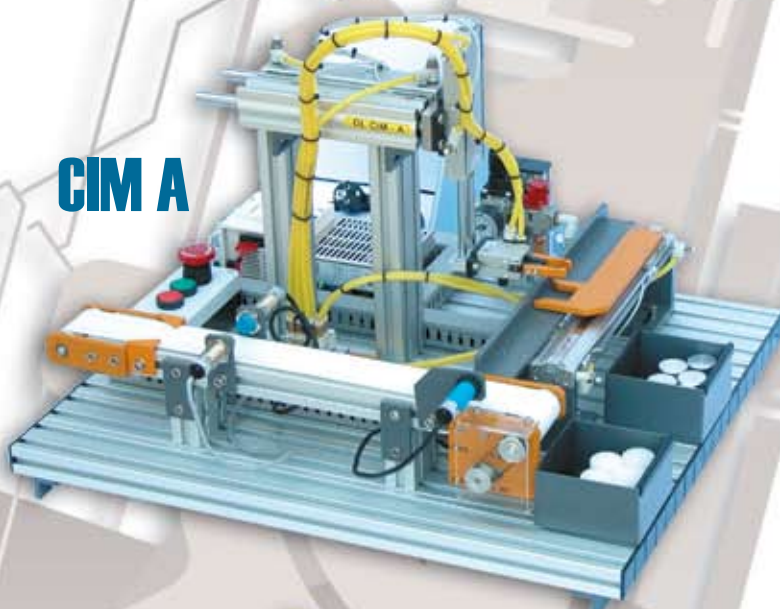
Manufatura Integrada por Computadora

COMPUTER-INTEGRATED MANUFACTURING (**CIM**) is a method of manufacturing in which the entire production process is controlled by computer. Typically, it relies on closed-loop control processes, based on real-time input from sensors.

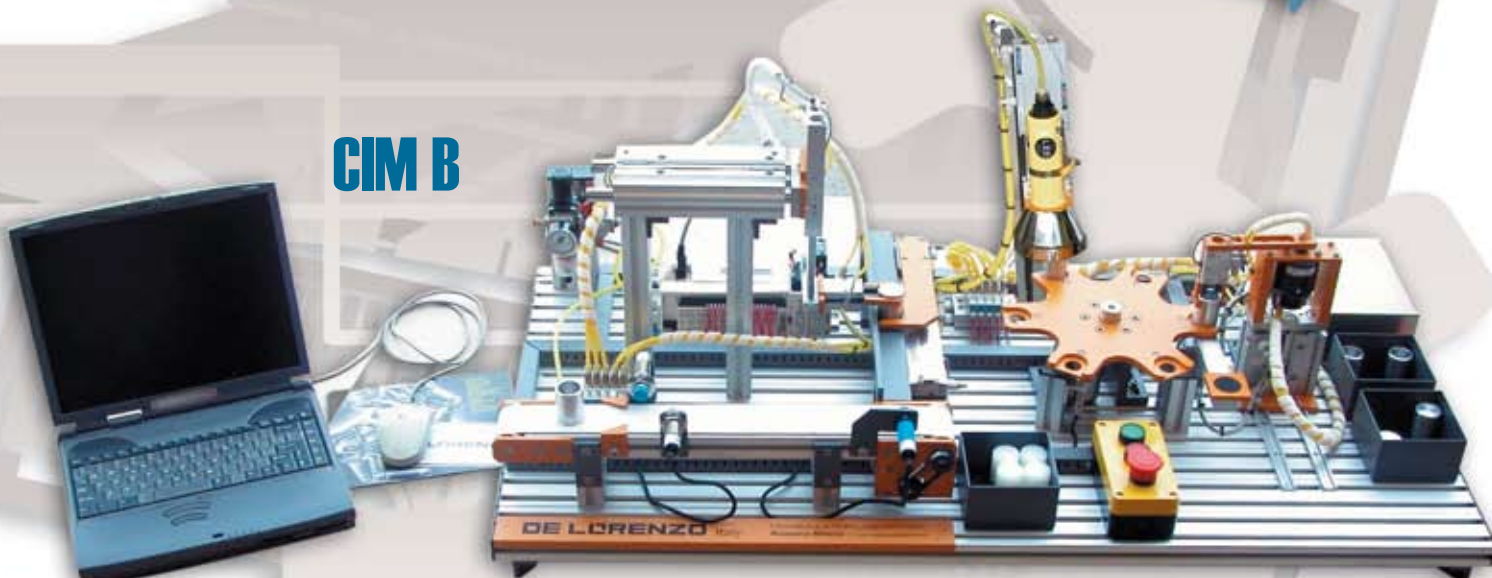
DE LORENZO's proposal for **CIM** automation products is especially designed for engineering graduates. Students can study the theory and work with the system to get a sound knowledge of the **CIM**, which allows for transversal applications in the following didactic areas: Automation, Pneumatics, Mechatronics, Electronics, Process Control, etc.



CIM A



CIM B



CONFIGURATION

Our **CIM** system is composed of different modules, each one reproducing a single basic application that is commonly used in the industry.

Each module is implemented with real electronics, mechanics and pneumatics components and has a specific function. As an integrated computer system, the output of one activity serves as the input to the next activity, through the chain of events. The whole system is controlled by one Programmable Logic Controller (PLC) and it can be configured to perform a complete process.

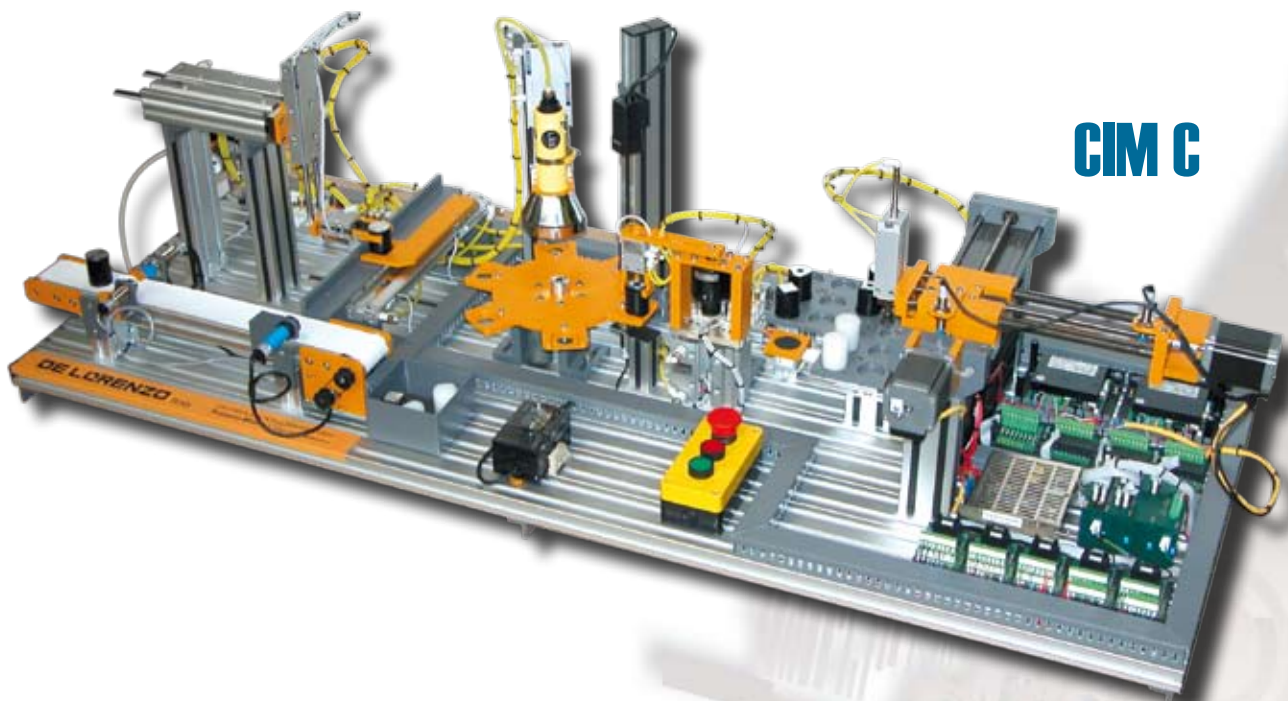
The basic modules are the following:

- Conveyor Unit
- Linear Transfer Unit
- Pick and Place Unit
- Six Station Rotary Table
- Vision Inspection System
- Drilling Module
- Unloading Arm
- Weighing Module
- Palletizer Unit

Any combination of the above modules allows creating different systems.

Suggested configurations are shown in the following table:

UNIT	CIM A	CIM B	CIM C
1. Conveyor Unit	X	X	X
2. Linear Transfer Unit	X	X	X
3. Pick and Place Unit	X	X	X
4. Six Station Rotary Table		X	X
5. Vision Inspection System			X
6. Drilling Module		X	X
7. Unloading Arm		X	X
8. Weighing Module		X	X
9. Palletizer Unit			X



GIM

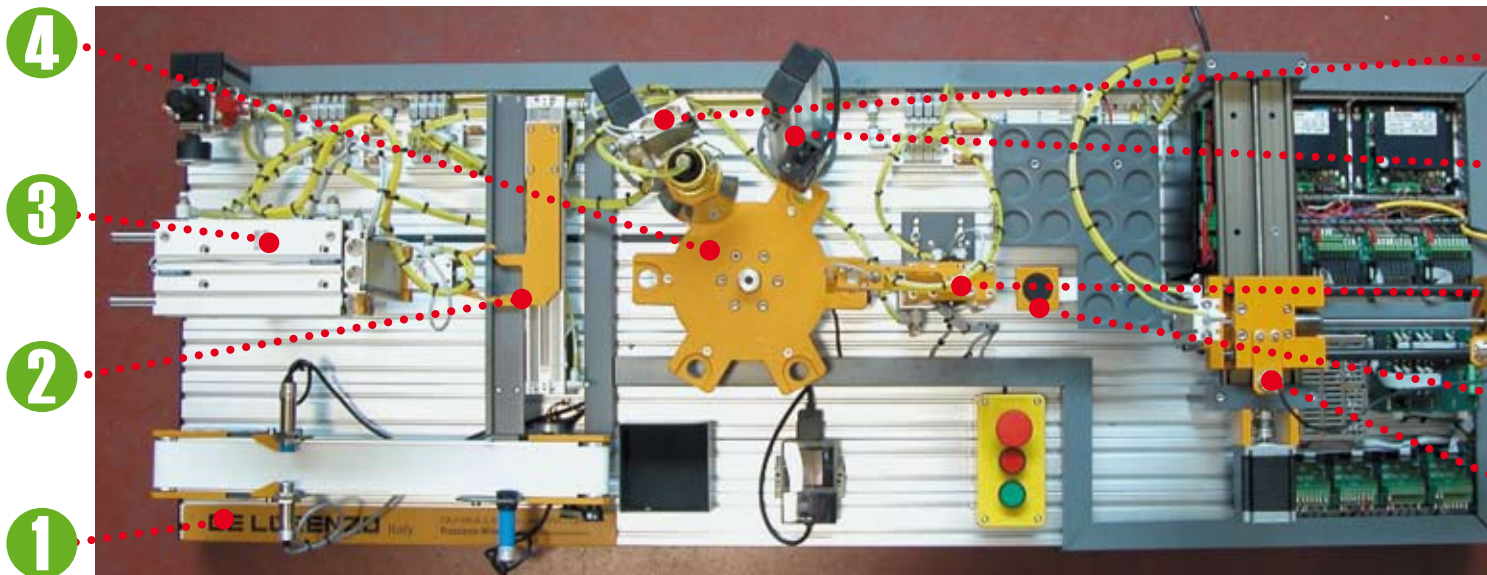
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1 Conveyor Unit

The materials are transferred in a linear motion by means of the belt CONVEYOR driven by geared DC motors. This unit moves materials/objects from one end to the other. Sensors are used to sense the parts material and presence. This is a miniature model of a real industrial CONVEYOR SYSTEM.

The **LINEAR TRANSFER UNIT** is an electro-pneumatic controlled linear actuator. Magnetic switches are fixed to sense the retracted and extended position of the transfer unit. The **LINEAR TRANSFER UNIT** transfers materials from the conveyor to the linear Pick and Place Unit with the help of a pneumatically operated rodless double acting cylinder.

2 Linear Transfer Unit



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Pick and Place Unit

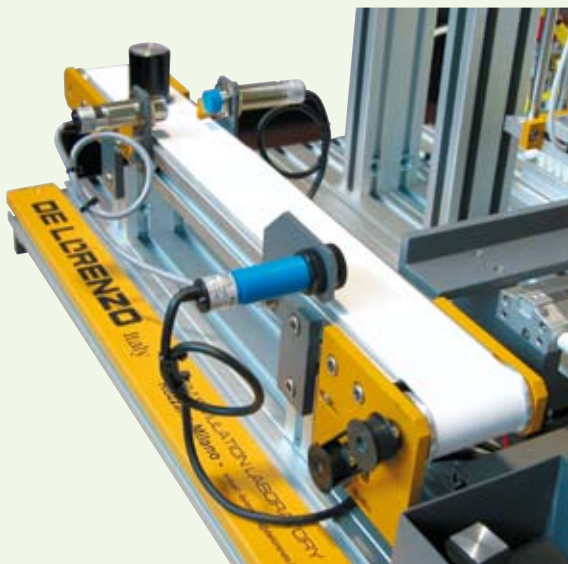
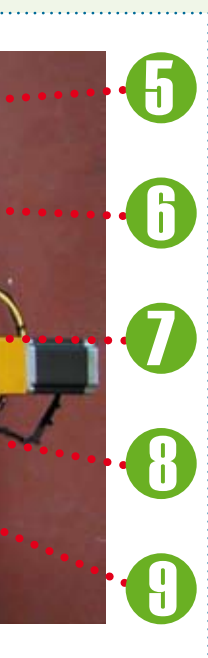
The **PICK AND PLACE UNIT** is a totally electro-pneumatic control system. There are three main parts in this unit: 1. Vertical arm (vertical double acting cylinder) 2. Horizontal arm (horizontal double acting cylinder) and 3. Angular gripper (double acting angular gripper for holding work pieces). Magnetic switches are fixed to sense the retracted and extended position of the actuator.

The **PICK AND PLACE UNIT** transfers the material from the Linear Transfer Unit end to the next Unit with the help of vertical arm, horizontal arm and angular gripper.

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A **SIX STATION ROTARY TABLE** consists of a horizontal circular worktable, on which the work piece is placed to be processed. The worktable is indexed to present each workpiece to each workhead to accomplish the sequence of machining operations.

Six Station Rotary Table



1. CONVEYOR UNIT



2. LINEAR TRANSFER UNIT



3. PICK AND PLACE UNIT

5 Drilling Module

The **DRILLING MODULE** simulates the function of drilling the work piece. The PLC tells the vertically double acting flat cylinder to position the drilling device near the work piece and to start the drilling device.

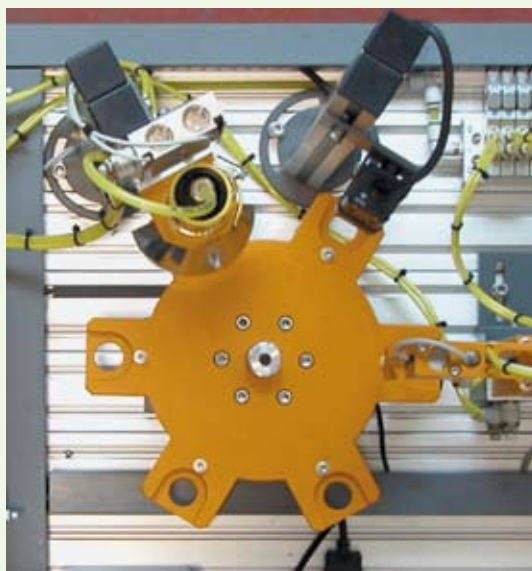
The **VISION SYSTEM** is a compact visual sensing equipment, which is used for quality control inspections in automated production lines. The **VISION SYSTEM** serves under the class of visual sensing methods. The **VISION SYSTEM** basically analyzes an image obtained by a video camera, displays it and reports its characteristics to the system controller.

6 Vision Inspection System

The **UNLOADING ARM** or horizontal Pick and Place Unit is an Electro-pneumatic system in which the movement is controlled by a linear and rotary actuator. This system works as a miniature pick and place robot with a limited path application.

The **UNLOADING ARM** is used to transfer the components or work pieces from one workstation to the other.

7 Unloading Arm



4. PICK AND PLACE UNIT

4. SIX STATION ROTARY TABLE

5. DRILLING MODULE
6. VISION INSPECTION SYSTEM

7. UNLOADING ARM

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Weighing Module

The **WEIGHING MODULE** consists of two elements: the load cell and the interface circuit. The load cell generates a variable resistance value related to the weight of the object that is placed over it. The interface circuit receives, processes and sends this value to the analog input of the PLC, which determines the correspondent weight of the work piece placed over the load cell.

Palletizer Unit

The **PALLETIZER** is used for palletizing (placing) the work piece in a particular order. Our **XY PALLETIZER** is a stepper motor controlled unit. The motor controls the movement and the position of the axis of the **PALLETIZER**.

For Workpiece handling, a suction cup is provided which is controlled using a flat cylinder - double acting. The cylinder will extend & retract to pick up or dispense the Workpiece.

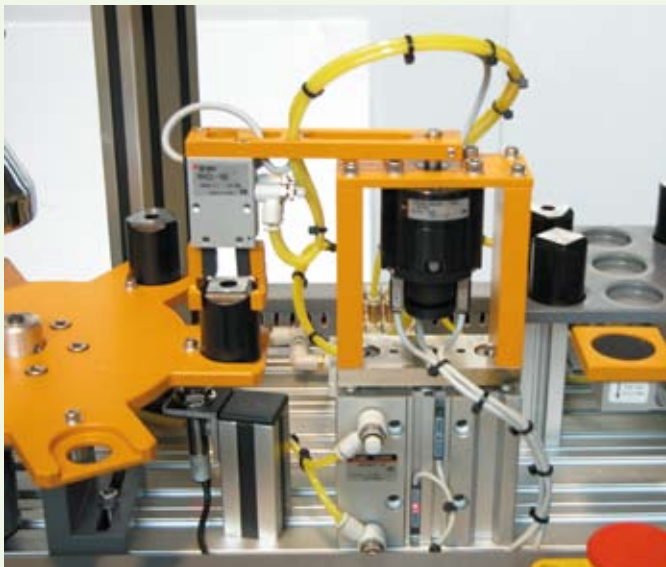
The system includes the software for programming the PLC.

On request, it can also be supplied with a powerful industrial Supervisory Control And Data Acquisition (SCADA) software for system simulation and control. This software includes all the building blocks needed to develop Human Machine Interfaces (HMIs). The software interfaces with the **CIM**'s PLC and uses real-time graphical interface to develop and publish the system, instrumentations, sensors and components; dynamic and animated graphic screens; trends, alarms, reports and data bank.

In both cases, the PC is not included.

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Software

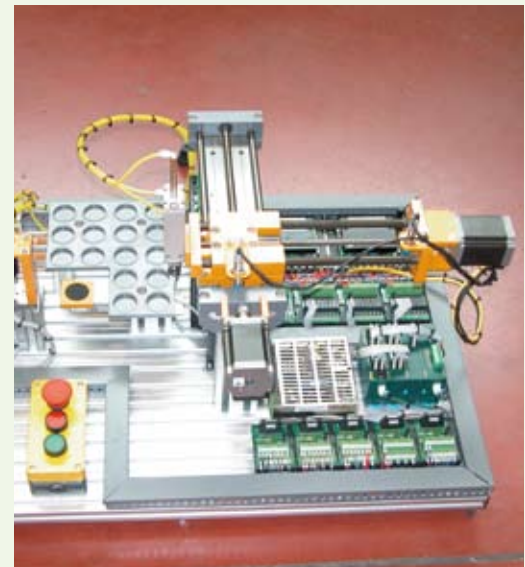
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7.
UNLOADING ARM



8.
WEIGHING MODULE



9.
PALLETIZER UNIT

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viale Romagna 20
20089 Rozzano - Milan/Italy
Ph. ++39 02 82 54 551
Fax ++39 02 82 55 181
www.delorenzogroup.com
delorenzo@delorenzo.it