

Unit: AE-PLC-MR1. Rotary Table Workstation 1

Key features:

- **PLC and HMI device programming software**
- **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**
- **Suitable for applied research, real industrial simulation, training courses, etc.**
- **Totally safe, using three safety systems (mechanical, electrical and electronic).**
- **Designed and manufactured under several quality standards.**
- **Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc., apart from supervising the knowledge and progress achieved by the user.**

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 ↳ PRODUCTS  
 ↳ 60.- MECHATRONICS & COMPUMECHATRONICS

For more information about Key Features, click here



ISO 9001:2015 Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



Certificate and Worlddidac Member

## INTRODUCTION

Since the 1950s, the computer integration in the manufacturing systems has been a complete revolution, increasing productivity and quality of all type of products. These computer integration systems included a lot of components from very different technologies as hydraulic, pneumatic, electrical, robotics, chemical, etc. For this reason these type of systems requires workers with specific skills to ensure that they are working properly.

The Rotary Table Workstation 1, "AE-PLC-MR1", has been designed by EDIBON to study the mounting, quality control and feeding system integrated in a rotary table. The rotary tables are common components used in the computer integrated manufacturing systems.

The "AE-PLC-MR1" workstation includes a set of practical exercises through which the students will understand how control an automatic rotary table system with a mounting, quality control and feeding system, integrated into it.

## GENERAL DESCRIPTION

The "AE-PLC-MR1" is an automatic rotary table with a feeder, quality control and mounting system integrated into it. The "AE-PLC-MR1" has a vertical storage, the system provides pieces one by one to the rotary table, then, a quality control system checks that the piece has the correct dimensions. Finally, if the piece is appropriated, is mounted inside another piece. If the piece has not the correct dimensions is discarded by the rotary table.

The "AE-PLC-MR1" workstation is designed as a modular system to facilitate the understanding of the unit. The main components are:

- The PLC: is composed by the CPU limit and all extra modules needed to perform a corrent working of the workstation and all the extra modules needed to perform a correct working of the workstation.
- The control panel: with start/stop button, emergency pushbutton, reset button, light indicators to show current state of the process, etc.
- The pneumatic circuit: contains the required solenoid valves, the pressure components, the filters and regulators to assure the appropriate working of the unit.
- The workstation: it is composed by real industrial components used by the rotary table systems such as reed sensors, presence sensors, DC motor, inductive sensors, rotary table with 8 positions, etc.

The "AE-PLC-MR1" is an independent workstation that can work alone and/or in conjunction with other workstation to make up a complete Flexible Manufacturing system\*.

\*The Flexible manufacturing systems product list is available at "Flexible Manufacturing Systems (FMS)" area of the general catalogue.

## SPECIFICATIONS

Mounted with aluminum profiles.

20 pieces:

- 2 different materials:
  - Aluminum.
  - PVC.

Vertical storage for pieces.

Electrical panel:

- Differential magneto-thermal switch.
- Power supply of 24 VDC.

Rotating table:

- Round table with 8 positions.
- DC motor.

Control panel:

- Mushroom head emergency stop push button switch.
- Start and Stop pushbuttons.
- Switch for manual or automatic operation.
- Light indicator.
- Led stack light.
- Terminal block to connect the individually identified inputs and outputs of the unit.

Pneumatic circuit:

- Air treatment unit:
  - Filter-regulator with water trap.
  - Manometer with double scale indicator.
  - Shut-off valve.

2 Simple acting pneumatic actuators.

Double acting pneumatic actuator.

Rodless pneumatic actuator with band.

Double acting pneumatic external grip clamp.

Rotary pneumatic actuator.

Rotary pneumatic actuator with 50 mm rod.

7 Pneumatic monoestable 3/2 solenoid valves.

Pneumatic bistable 5/2 solenoid valve.

2 Spring centered 5/3 pneumatic solenoid valves.

Individually identified tubes and push in fittings.

Vacuum circuit:

- 2 Telescopic flat suction pads made of NBR rubber.
- 2 Venturi effect vacuum ejector.
- 2 Pneumatic monostable 2/2 solenoid valves.
- 2 Pressure relief valve.

## Specifications

### Sensors:

Inductive effect sensor to determine the type of material of the piece (metal or plastic).

Capacitive effect sensor to determine the presence of the piece.

Linear potentiometer of 50 mm stroke to check the height of the piece.

12 Reed effect limit switches.

Encoder to detect the position of the rotating table.

### Fault generation module:

Box with lock (with key).

It Allows to generate 20 different faults.

Each fault is generated through toggle switches.

### Recommended accessories: (Not included)

#### • AE-PLCB. **Basic PLC Trainer (optional).**

The AE-PLCB is available with different PLC manufacturer models.

N-ALI02: is the Main power supply.

N-CPU: is the PLC CPU that contain the digital In/Out terminals. All CPUs types allow to connect with the PC (for programming and monitoring) and the other modules of the trainer through an Ethernet network.

N-ESA: is the analog In/Out module used to acquire and generate analog signals.

N-HMIB: is the Human Machine Interface module with a touch screen.

N-MT: is the test module with switches, push buttons and potentiometers to generate digital and analog signals.

Software to program the PLC and the HMI device.

#### • AE-CP. **Air compressor module (optional).**

Low noise level: 40 dB maximum.

Capacity of the boiler: 9 l.

Power: 340 W.

Air intake: 50 l/min.

Maximum pressure: 8 bar or 0.8 MPa.

It Includes hoses to easy connect with the EDIBON units.

### **Cables and Accessories**, for normal operation.

**Manuals:** This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Introduction to flexible manufacturing system (FMS).
- 2.- Introduction to pneumatics and electro-pneumatics.
- 3.- Introduction to vacuum technology.
- 4.- Study of the sensor detection.
- 5.- Configuration of a pneumatic application.
- 6.- Manual control of the rotary table system.
- 7.- Manual control of the feeding system on a rotary table.
- 8.- Manual control of the quality control and mounting system on a rotary table.
- 9.- Automatic control of the rotary table system.
- 10.-Automatic control of the feeding system on a rotary table.
- 11.-Automatic control of the quality control and mounting system on a rotary table.
- 12.-Change the parameters of the rotary table process.
- 13.-Optimization of the process time.
- 14.-Study and analysis of the faults inserted in the process with the fault generation module.

### REQUIRED SERVICES

- Electrical supply: single-phase, 220V/50 Hz or 110V/60 Hz.
- Computer.
- PLC unit.
- Compressed air with a 50 l/min of air flow and 8 bar of pressure.

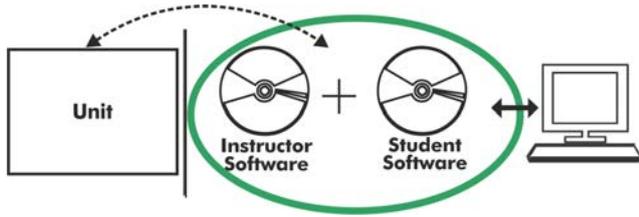
### DIMENSIONS AND WEIGHTS

- AE-PLC-MR1:
- Dimensions: 600 x 800 x 1200 mm approx.  
(23.62 x 31.49 x 47.24 inches approx.)
  - Weight: 55 Kg approx.  
(121 pounds approx.)

### RECOMMENDED ACCESSORIES (Not included)

- AE-PLCB. Standard PLC Trainer (optional).
- AE-CP. Air compressor module (optional).

**AE-PLC-MR1/ICAI. Interactive Computer Aided Instruction Software System:**



With no physical connection between unit and computer (PC), this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

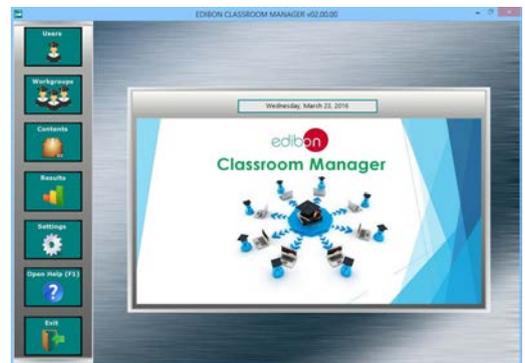
Instructor Software

**- ECM-SOF. EDIBON Classroom Manager (Instructor Software).**

ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

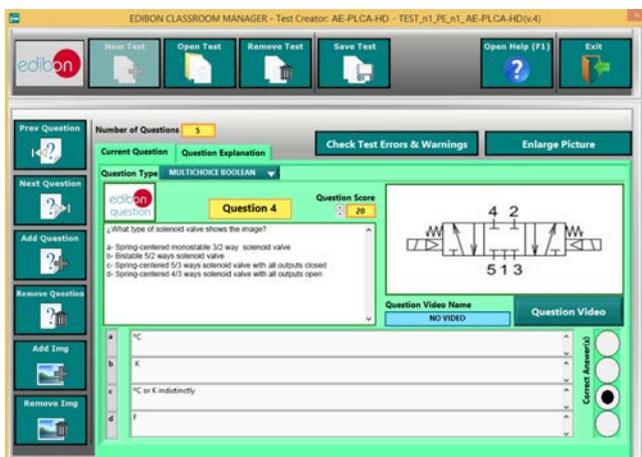
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Optional  
Student Software

- **ESL-SOF. EDIBON Student Labsoft (Student Software).**

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge and progression.**
- **Test self-correction.**
- **Calculations computing and plotting.**
- **Equation System Solver Engine.**
- **User Monitoring Learning & Printable Reports.**
- **Multimedia-Supported auxiliary resources.**

For more information see ICAI catalogue. Click on the following link:

[www.edibon.com/en/files/expansion/ICAI/catalog](http://www.edibon.com/en/files/expansion/ICAI/catalog)



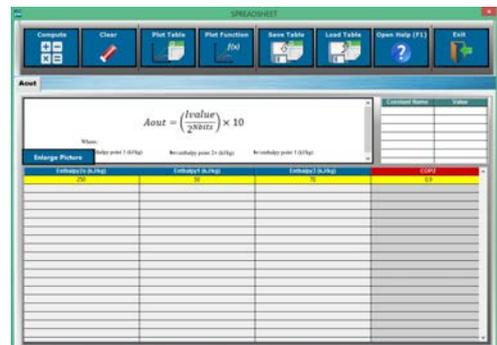
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

\* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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REPRESENTATIVE:

