Flexible Manufacturing System 5

AE-PLC-FMS5

edibon

Engineering and Technical
Teaching Equipment

Available with PLC, as:
- **PANASONIC**
- **SIEMENS**
- **MITSUBISHI**
- **ALLEN BRADLEY**
- **OMRON**
- **Etc...**

EDIBON PATENT

Teaching Technique used

Computer Control System

① Unit: AE-PLC-FMS5. Flexible Manufacturing System 5

①.1 AE-PLC-PAN.
PANASONIC PLC
Application

② PLC, HMI and web server programming software

Computer
(not included in the supply)

④ SAC. Silent Air Compressor Unit

⑤ Cables and Accessories

⑥ Manuals
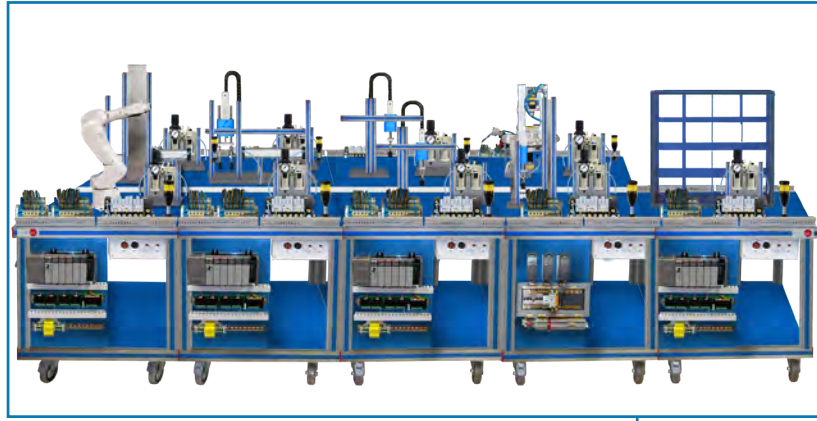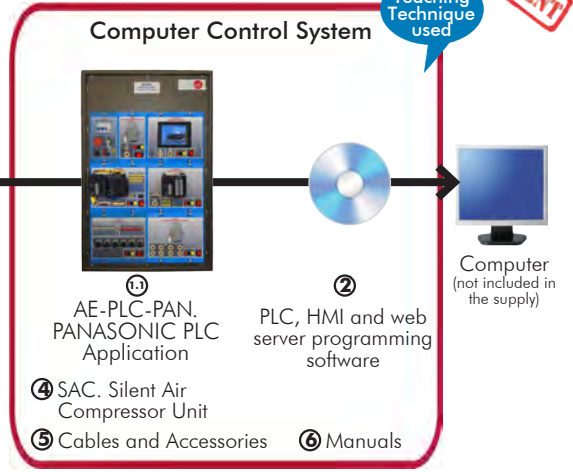
* Minimum supply always includes: 1 + 2 + 3 + 4 + 5 + 6 (Computer not included in the supply)

③ Component Workstations:

③.1 AE-PLC-DS.
Pieces Distributor
Workstation

③.3 AE-PLC-CF.
Sorting
Workstation

③.5 AE-PLC-MR3.
Rotary Table
Workstation 3

③.7 AE-PLC-MA.
Multiple
Pieces Feeder
Workstation

③.9 AE-PLC-T.
Linear Transport
Workstation

③.2 AE-PLC-SIP.
Pieces
Identification
Workstation

③.4 AE-PLC-MAN.
(2 units)
Pneumatic Handling
Workstation

③.6 AE-PLC-ALV.
Vertical
Storage
Workstation

③.8 AE-BR.
Robotic Arm
Workstation

OPEN CONTROL + MULTICONTROL + REAL TIME CONTROL

Key features:

➤ **Open Control + Multicontrol + Real-Time Control.**

➤ **PLC, HMI and web server programming software.**

➤ **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**

➤ **Capable of doing applied research, real industrial simulation, training courses, etc.**

➤ **Remote operation and control by the user and remote control for EDIBON technical support, are always included.**

➤ **Totally safe, utilizing 3 safety systems (Mechanical, Electrical & Electronic).**

➤ **Designed and manufactured under several quality standards.**

➤ **Optional software to perform 2D and 3D simulations of the processes studied and supervise and control the real system (SCADA).**

➤ **Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc. Apart from monitoring user's knowledge and progress reached.**

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➪PRODUCTS
➪60.- MECHATRONICS & COMPUMECHATRONICS

For more information about Key Features, click here

INTRODUCTION

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

The Flexible Manufacturing System 5, "AE-PLC-FMS5", has been designed by EDIBON to study how work a complete manufacturing system.

The "AE-PLC-FMS5" system includes a set of practical exercises through which the student will understand how work an automatic pieces distributor, piece identification machine, sorting system, manipulators conformed by pneumatic actuators, mounting system on a rotary table, a robotic arm with a piece feeder and automatic storage system.

GENERAL DESCRIPTION

The Flexible Manufacturing System 5, "AE-PLC-FMS5" is a modular system composed of ten workstations: the "AE-PLC-DS" Pieces Distributor Workstation, the "AE-PLC-SIP" Pieces Identification Workstation, the "AE-PLC-CF" Sorting Workstation, two "AE-PLC-MAN" Pneumatic Handling Workstations, the "AE-PLC-MR3" Rotary Table Workstation 3, the "AE-PLC-ALV" Vertical Storage Workstation, the "AE-PLC-MA" Multiple Pieces Feeder Workstation, "AE-BR" Robotic Arm Workstation and the "AE-PLC-T" Linear Transport Workstation.

The objective of the "AE-PLC-FMS5" system is to provide pieces with different colors, height and materials to the linear transport system. The different workstation take the pieces from the transport system and perform the different manufacturing stages and give back the pieces to the linear transport system. The manufacturing stages included are: sorting, mounting, storing, handling, etc. the linear transport system carry the pieces from one workstation to another till the manufacture process is complete.

The process of the "AE-PLC-FMS5" is explained in the following lines:

- First, the feeding system provides the pieces with different colors, materials and heights to the identification workstation, where the non-valid pieces are discarded and the valid pieces are placed on the linear transporter system.

- Then, one of the pneumatic manipulators take the pieces from the linear transport system and place on the rotary table to mount an auxiliary piece inside the base piece, and give back the two mounted pieces to the linear transport.

- The next process is the robotic arm system. The robotic arm take different pieces from the multiple pieces feeding workstation and mount them inside the base piece, located at the linear transport system.

- Then, the pieces are stored in the automatic storing system. The storing system works as a buffer, keeping the finished products till are required by the operator. This system is composed by a vertical storage and a three dimensional XYZ manipulator that take the pieces from the linear transport system and place them at the desired position of the storage. Once the piece are required by the system, the three dimensional manipulator take the piece from the storage and give back to the linear transport system.

- The last stage is composed by the second pneumatic manipulator, which take the pieces from the linear transport system and place at the sorting workstation. This workstation classifies the pieces depends on the specification configured by the operator.

Each workstation is locally commanded by a PLC device and, in turn, a central PLC coordinates all workstations. The communication network between workstations and PC is based on the Ethernet protocol.

The "AE-PLC-FMS5" system design by EDIBON allows the users to learn the basic concepts of automation as the operation of an Ethernet network or how to program a PLC and about other areas as pneumatic, electro-pneumatic, etc.

The Robotic Arm included in the "AE-PLC-FMS5" system, contains the control console controller and the programming software in order to program and operate with it.

The optional "AE-AS" software is design to teach the students how works real automation software. This software allows making 2D and 3D processes simulations, supervising and controlling SCADA systems, programming and communicating PLCs, simulating hydraulic, pneumatic and electronic devices operation, etc.

With this unit there are several options and possibilities:
  - Main items: 1, 2, 3, 4 ,5 and 6.
  - Optional items: 7, 8 and 9.

Let us describe first the main items (1 to 6):

① **AE-PLC-FMS5. Unit:**
  ✱ **Available PLC models of different manufacturers: PANASONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.**
  ⊕ AE-PLC-PAN-UB. **PANASONIC PLC Base Unit,** includes:
    • N-ALI02. **Domestic Power Supply.**
      Supply voltage (Single-Phase): 230 VAC, PH+N+G.
      ON-OFF removable key.
      Output Voltage Connections:
        Two Single-Phase: 230 VAC.
        Single-Phase supply wire connecting plug.
      Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

    • N-CPU-PAN. **Panasonic CPU Module.**
      Supply voltage (Single-Phase): 100-240Vac PH+N+G.
      Overcurrent protection with fuse.
      PLC device, Panasonic FP7:
        High processing speed: 11ns per basic instruction (step).
        Programming capacity: 120k basic instructions (step).
        Data logging capacity: 256k words.
        Independent memory for comments: 3MB.
        Supports SDHC type generic memory cards up to 32GB.
      Expansion module for digital inputs:
        16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.
      Expansion module for digital outputs:
        16 relay type digital outputs with voltage level of 24Vdc.
      Web server function:
        HTML web server included in the PLC.
        Up to 16 sessions at the same time.
        Compatible with most common search engines.
      Connector for the digital input and output signals.
      Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

There are available the following optionals Kits to work with the AE-PLC-PAN-UB:
  The PLC-PAN-K1, **PANASONIC PLC Kit 1 (Optional)** includes:
    • N-MT. **Test module.**
      Supply voltage (Single-Phase): 100-240Vac PH+N+G.
      20 Digital Signal Generators:
        10 Switches.
        10 Push buttons.
        Every output has attached a green LED.
        Output voltage levels of 0Vdc and 24Vdc.
      6 Analog Signal Generators:
        6 Potentiometers.
        Output voltage range from -10V to +10V.
      Single-Phase supply hose connecting plug.
      Differential magneto-thermal, 2 poles, 25A, 30mA AC 6KA.

N-MT

  The PLC-PAN-K2, **PANASONIC PLC Kit 2 (Optional)** includes:
    • N-ESA-PAN. **Panasonic Analog I/O Module**.
      Supply voltage (Single-Phase): 100-240Vac PH+N+G.
      Expansion unit for analog inputs:
        Input voltage range from -10V to +10V.
        4 analog inputs.
        Resolution of 12 bits.
      Expansion unit for analog outputs:
        Output voltage range from -10V to +10V.
        4 analog outputs.
        Resolution of 12 bits.
      Connector for the analog input and output signals.
      Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-ESA-PAN

    • N-SWT-4. 4 **Ports Ethernet Switch Module.**
      Supply voltage (Single-Phase): 100-240Vac PH+N+G.
      Compact switch module:
        4 Ethernet ports.
        Work as Ethernet interconnection point.

N-SWT-4

The PLC-PAN-K4, **PANASONIC PLC Kit 4 (Optional)** includes:

• N-HMIA-PAN. **Panasonic Large HMI Module.**

  Supply voltage (Single-Phase): 100-240Vac PH+N+G.

  HMI device:

  Touchscreen.

  TFT display of 64K colors and 16:9 format.

  Size of the display: 187 x 147mm (7 inches).

  Resolution: 800 x 480 WVGA.

  Backlight with high brightness of 300cd/m^2.

  SD card slot.

  Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-HMIA-PAN

• N-SWT-4. **4 Ports Ethernet Switch Module.**

  Supply voltage (Single-Phase): 100-240Vac PH+N+G.

  Compact switch module:

  4 Ethernet ports.

  Work as Ethernet interconnection point.

N-SWT-4

The PLC-PAN-K5, **PANASONIC PLC Kit 5 (Optional)** includes:

• N-MOD. **Modem Communication Module.**

  Supply voltage (Single-Phase): 100-240Vac PH+N+G.

  Internet router with RJ-11 socket to connect the phone line.

N-MOD

• N-SWT-8. **8 Ports Ethernet Switch Module.**

  Supply voltage (Single-Phase): 100-240Vac PH+N+G.

  Compact switch module:

  8 Ethernet ports.

  Work as Ethernet interconnection point.

• AE-AS. **Automation Systems Simulation Software. (Optional).**

  2D and 3D systems simulations.

  Configurable simulation speed with the modes "normal simulation", "slow motion simulation", "step-by-step simulation" and "pause".

  3D editor to import pieces made with formats compatible with most 3D design programs (.STEP, .STL and .IGES). Capacity to generate 2D and 3D animations associated to the results of the simulation the user is working with.

  Capacity for simulating the following systems:

  • Hydraulic and electrohydraulic: according to ISO 1219-1 and 1219-2 standards, with an extensive library of hydraulic and electrohydraulic components with its standardized symbol.

  • Pneumatics and electro-pneumatics: with an extensive library of pneumatic, electro-pneumatic and pneumatic logic components.

  Capacity to modify the most important parameters of each hydraulic and pneumatic component, such as: efficiency curves, external loads, leaks, viscosity, thermal characteristics, etc.

  • Digital electronics: with an extensive library of standard electronic components (logic gates, amplifiers, transistors, displays, multiplexers, etc.).

  • Electrical Single-Line Diagram: with a library that enables to create diagrams for all levels of voltage usually employed in power generation, transport and distribution networks.

  • Electrical engineering: with a library that contains a great amount of components to create simple and complex electrical circuits. The models of the components included are generic and real and belong to several manufacturers.

  All the libraries include the components and its standardized symbol.

  Capacity to program with the following languages:

  • GRAFCET: allows encapsulated stages for a better organization of the programmed control structures.

  • Block Diagram: blocks included are preset but they can be completely configured by the user.

  • Ladder: includes three libraries to program automata from Siemens, Allen Bradley and those fulfilling the IEC61131-3 standard, allowing the PLC to program directly. It also allows for creating and simulating the PLC program in the automated system simulated by the software.

 • Digital logic: with an extensive library of logic gates and components configured by the user.

  • Function blocks with configurable structured text.

  Direct programming in the PLCs from the manufacturers Siemens, Allen Bradley and those fulfilling the IEC61131-3 standard of the programs simulated in the software.

  Supervision, control and simulation of the manufacturing process of each station and the complete assembly by a SCADA system.

  Communication with the PLCs of the unit is performed via OPC protocol.

  Includes the 3D simulation of the automation system with the control panel and the visualization of the alarms generated by the system.

N-SWT-8

AE-AS
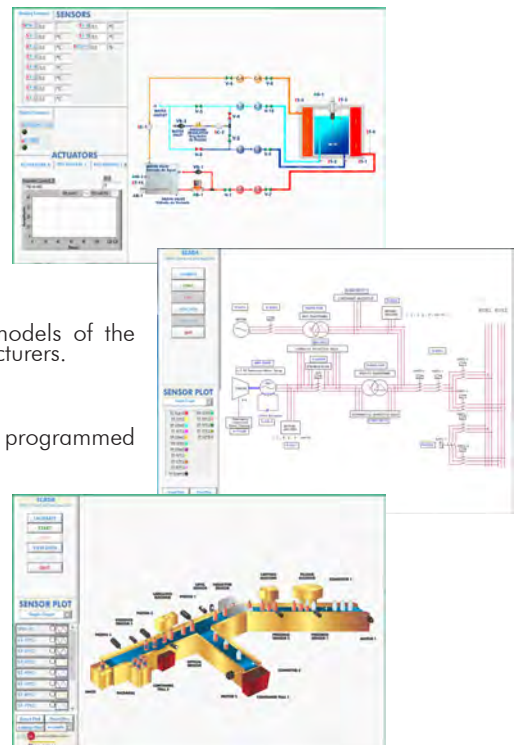
Complete Technical Specifications (for main items)

② **PLC, HMI and web server programming software.**

PLC programming software:

Programming software developed according to the norm IEC 61131-3.

Compatible with Windows operating systems.

Five programming languages:

Ladder diagrams (LD). Structured text (ST). Instruction list (IL). Sequential function chart (SFC). Function block diagram (FBD).

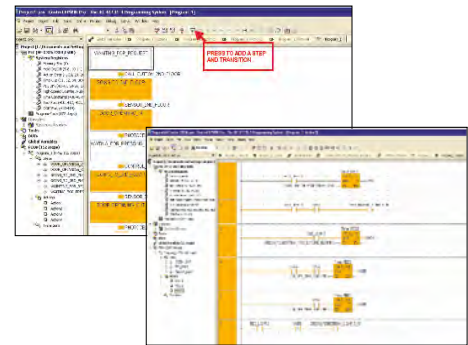Remote programming, service and diagnosis.

Minimum size of program.

Powerful debugging and monitoring tools.

Supports functions created by the user and function blocks.

Saves project files in the PLC.

Examples and quick tutorial included.

PLC Programming software

Programming software of the HMI touchscreen:

Tool to create screens:

This software is a tool created to program the touchscreen. Thanks to this tool, appropriate screens and images can be designed and created. Enables the transfer of the program to the touchscreen, uploading objects created from the terminal and print screens created.

Lots of functions. Creation of screens:

Includes many programming tools.

Text, diagram or data display devices, buttons for drawings, charts and pilot lights. Creation of functional screens adaptable to each application.

Drawing functions: creation of different programming elements through icons and bitmaps.

Easy operation (drag and drop):

A library of elements allows for programming with the mouse by just selecting and moving elements to the desired locations (drag and drop).

Easy user libraries creation:

Libraries can be registered and stored to be used in later projects.

Printing. The project screens can be printed:

Screens can be printed after previewing, selecting and configuring them.

Bitmaps editor:

This tool allows the creation, reading and modification of bitmaps to use them as programming elements in the screen. Icons (buttons) can be created from images.
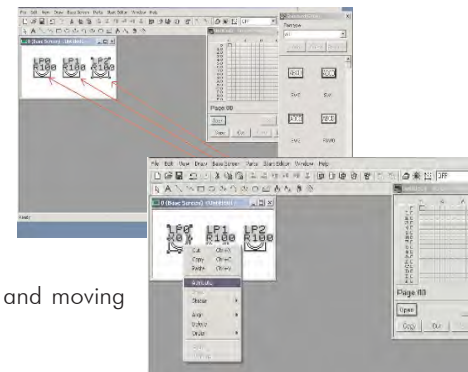
Programming software of the HMI Touchscreen

Web applications programming software:

Easy programming of complete web applications to display and control all the variables of the PLC. No previous experience in web programming is required.

Library of buttons, pushbuttons, needle indicators, bar charts, etc. for a quick programming of the applications.

The web applications can take up to 14 MB and allow up to 16 users to access at the same time.

Applications can be programmed to control all the digital and analog variables of the PLC.

Search engines compatible with the web server:

Windows: Google Chrome, Mozilla Firefox, Opera and Internet Explorer.

OS X: Safari, Google Chrome and Mozilla Firefox.

IOS: Safari and Google Chrome.

Android: Google Chrome.

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③Component Workstations:

③.1 AE-PLC-DS. **Pieces Distributor Workstation**

The "AE-PLC-DS" is a feeder workstation commanded by a PLC, which provides pieces made in different color, heights and materials to the system. The "AE-PLC-DS" keeps the pieces in a vertical storage, the workstation take the pieces one by one and place them at an exit platform through a rotary actuator with a suction cup.

The "AE-PLC-DS" is composed by the following components:

    Mounted with aluminum profiles.

    15 pieces made of aluminum and plastic.

    Vertical storage for pieces.

    Electrical panel:

        Differential magneto-thermal switch.

        Power supply of 24 Vdc.

    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 and water trap.

            Manometer with double scale indicator.

            Shut-off valve.

      Double acting pneumatic actuator.

      Rotary pneumatic actuator.

      Pneumatic monostable 5/2 solenoid valve.

      2 Pneumatic monostable 3/2 solenoid valves.

    Vacuum circuit:

      Venturi effect vacuum ejector.

      2 Pneumatic monostable 2/2 solenoid valves.

      Pressure relief valve.

  Sensors:

    2 inductive effect sensor.

    8 reed effect limit switches.

  Fault generation module:

    Box with lock with key.

    Allows to generate 20 different faults.

    Each fault is generated through toggle switches.

  ∗ Available PLC models of different manufacturers: PANASONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

    Supply voltage (Single-Phase): 230 VAC, PH+N+G.

    ON-OFF removable key.

    Output Voltage Connections:

      Two Single-Phase: 230 VAC.

      Single-Phase supply wire connecting plug.

    Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**

    Supply voltage (Single-Phase): 100-240Vac PH+N+G.

    Overcurrent protection with fuse.

    PLC device, Panasonic FP7:

      High processing speed: 11ns per basic instruction (step).

      Programming capacity: 120k basic instructions (step).

      Data logging capacity: 256k words.

      Independent memory for comments: 3MB.

      Supports SDHC type generic memory cards up to 32GB.

    Expansion module for digital inputs:

      16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

    Expansion module for digital outputs:

      16 relay type digital outputs with voltage level of 24Vdc.

    Web server function:

      HTML web server included in the PLC.

      Up to 16 sessions at the same time.

      Compatible with most common search engines.

    Connector for the digital input and output signals.

    Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③Component Workstations:

③.2 AE-PLC-SIP. **Pieces Identification Workstation**

The "AE-PLC-SIP" is a quality control workstation commanded by a PLC, which check three characteristics of the input pieces. The workstation checks the color, the type of material and the height of input. The pieces identification workstation discard pieces with the incorrect height and the correct it places them at the output zone.

The "AE-PLC-SIP" is composed by the following components:

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 and water trap.
        Manometer with double scale indicator.
        Shut-off valve.
    Rodless pneumatic actuator with bands.
    Double acting pneumatic actuator.
    Pneumatic monostable 5/2 solenoid valve.
    2 Pneumatic monostable 3/2 solenoid valves.
    Individually identified tubes and push in fittings.

Sensors:
    8 Reed effect limit switches.
    Linear potentiometer.
    IR beam detector.
    Capacitive sensor.

Fault generation module:
    Box with lock with key.
    Allows to generate 20 different faults.
    Each fault is generated through toggle switches.

* **Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.**

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

- N-ALI02. **Domestic Power Supply.**
    Supply voltage (Single-Phase): 230 VAC, PH+N+G.
    ON-OFF removable key.
    Output Voltage Connections:
        Two Single-Phase: 230 VAC.
        Single-Phase supply wire connecting plug.
    Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

- N-CPU-PAN. **Panasonic CPU Module.**
    Supply voltage (Single-Phase): 100-240Vac PH+N+G.
    Overcurrent protection with fuse.
    PLC device, Panasonic FP7:
        High processing speed: 11ns per basic instruction (step).
        Programming capacity: 120k basic instructions (step).
        Data logging capacity: 256k words.
        Independent memory for comments: 3MB.
        Supports SDHC type generic memory cards up to 32GB.
    Expansion module for digital inputs:
        16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.
    Expansion module for digital outputs:
        16 relay type digital outputs with voltage level of 24Vdc.
    Web server function:
        HTML web server included in the PLC.
        Up to 16 sessions at the same time.
        Compatible with most common search engines.
    Connector for the digital input and output signals.
    Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③ Component Workstations:

③.3 AE-PLC-CF. **Sorting Workstation**

The "AE-PLC-CF" is a sorting workstation commanded by a PLC, which identifies the color and the type of the material of the input pieces and classifies them into three different places.

The "AE-PLC-CF" is composed by the following components:

Mounted with aluminum profiles.

Electrical panel:

Differential magneto-thermal switch.

Power supply of 24 Vdc.

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.

Single acting spring return pneumatic actuator.

2 Double acting pneumatic actuators.

3 Pneumatic monostable 5/2 solenoid valves.

Sensors:

4 IR beam detectors.

Reflective optical sensor.

Inductive effect sensor.

8 reed effect limit switches.

Fault generation module:

Box with lock with key.

Allows to generate 20 different faults.

Each fault is generated through toggle switches.

* Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

Supply voltage (Single-Phase): 230 VAC, PH+N+G.

ON-OFF removable key.

Output Voltage Connections:

Two Single-Phase: 230 VAC.

Single-Phase supply wire connecting plug.

Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**

Supply voltage (Single-Phase): 100-240Vac PH+N+G.

Overcurrent protection with fuse.

PLC device, Panasonic FP7:

High processing speed: 11ns per basic instruction (step).

Programming capacity: 120k basic instructions (step).

Data logging capacity: 256k words.

Independent memory for comments: 3MB.

Supports SDHC type generic memory cards up to 32GB.

Expansion module for digital inputs:

16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

Expansion module for digital outputs:

16 relay type digital outputs with voltage level of 24Vdc.

Web server function:

HTML web server included in the PLC.

Up to 16 sessions at the same time.

Compatible with most common search engines.

Connector for the digital input and output signals.

Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③ Component Workstations:

③.4 AE-PLC-MAN. **Pneumatic Handling Workstations (2 units)**

The "AE-PLC-MAN" is a pneumatic handling workstation commanded by a PLC, which performs handling and sorting functions. The workstation identify the color of the input pieces at the input pieces area, once the color is identified, the station take the piece from the input pieces area and place them at two different positions. The "AE-PLC-MAN" workstation uses a two axis pneumatic manipulator with a pneumatic gripper to handling the pieces.

The "AE-PLC-MAN" is composed by the following components:

Mounted with aluminum profiles.

Electrical panel:

Differential magneto-thermal switch.

Power supply of 24 Vdc.

Control panel:

Emergency pushbutton.

Start/Stop pushbuttons.

Manual/automatic switch.

Light indicators.

Terminal block to connect the individually identified inputs and outputs of the unit.

Pneumatic circuit:

Air treatment unit:

Filter-regulator and water trap.

Manometer with double scale indicator.

Shut-off valve.

Rodless pneumatic actuator with bands.

Double acting pneumatic actuator.

Double acting pneumatic gripper.

2 Pneumatic monostable 5/2 solenoid valves.

2 Pneumatic monostable 3/2 solenoid valves.

Sensors:

5 reed effect limit switches.

Reflective optical sensor

Fault generation module:

Box with lock with key.

Allows to generate 20 different faults.

Each fault is generated through toggle switches.

✱ Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

Supply voltage (Single-Phase): 230 VAC, PH+N+G.

ON-OFF removable key.

Output Voltage Connections:

Two Single-Phase: 230 VAC.

Single-Phase supply wire connecting plug.

Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**

Supply voltage (Single-Phase): 100-240Vac PH+N+G.

Overcurrent protection with fuse.

PLC device, Panasonic FP7:

High processing speed: 11ns per basic instruction (step).

Programming capacity: 120k basic instructions (step).

Data logging capacity: 256k words.

Independent memory for comments: 3MB.

Supports SDHC type generic memory cards up to 32GB.

Expansion module for digital inputs:

16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

Expansion module for digital outputs:

16 relay type digital outputs with voltage level of 24Vdc.

Web server function:

HTML web server included in the PLC.

Up to 16 sessions at the same time.

Compatible with most common search engines.

Connector for the digital input and output signals.

Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③ Component Workstations:

㉟AE-PLC-MR3. **Rotary Table Workstation 3**

The "AE-PLC-MR3" is a processing workstation with a rotary table commanded by a PLC. This unit take a piece from the input area, check if the position of piece is correct, and it simulates drilling the piece with a movable drilling machine. Finally the workstation place the piece to the exit piece area. The "AE-PLC-MR3" also include a polish tool to change the process and simulates the polishing of the piece.

The "AE-PLC-MR3" is composed by the following components:

Mounted with aluminum profiles.
5 pieces made in plastic.
5 pieces made in aluminum.
Vertical storage for pieces.
Electrical panel:
  Differential magneto-thermal switch.
  Power supply of 24 VDC.
Rotating table:
  Round table with diferent 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.
Electrical components:
  Drilling machine.
  DC motor.
  Electric linear actuator.
Sensors:
  2 limit switches.
  IR beam detector.
  3 capacitive sensor.
  2 inductive sensor.
Fault generation module:
  Box with lock with key.
  Allows to generate 20 different faults.
  Each fault is generated through toggle switches.

✱ Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**
  Supply voltage (Single-Phase): 230 VAC, PH+N+G.
  ON-OFF removable key.
  Output Voltage Connections:
    Two Single-Phase: 230 VAC.
    Single-Phase supply wire connecting plug.
  Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**
  Supply voltage (Single-Phase): 100-240Vac PH+N+G.
  Overcurrent protection with fuse.
  PLC device, Panasonic FP7:
    High processing speed: 11ns per basic instruction (step).
    Programming capacity: 120k basic instructions (step).
    Data logging capacity: 256k words.
    Independent memory for comments: 3MB.
    Supports SDHC type generic memory cards up to 32GB.
  Expansion module for digital inputs:
    16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.
  Expansion module for digital outputs:
    16 relay type digital outputs with voltage level of 24Vdc.
  Web server function:
    HTML web server included in the PLC.
    Up to 16 sessions at the same time.
    Compatible with most common search engines.
  Connector for the digital input and output signals.
  Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③ Component Workstations:

③.6 AE-PLC-ALV. **Vertical Storage Workstation**

The "AE-PLC-ALV" is an automatic storage workstation commanded by a PLC, which moves the pieces from the input area to the desired slot at a vertical storage.

The "AE-PLC-ALV" uses two electric and one pneumatic linear actuators to configure an automatic three axis vertical storage system. The workstation uses a double acting pneumatic gripper to handling the pieces from and to the vertical storage.

The "AE-PLC-ALV" is composed by the following components:

Mounted with aluminum profiles.

Vertical structure with 20 slots for pieces.

Electrical panel:

Differential magneto-thermal switch.

Power supply of 24 VDC.

Terminal block to connect the individually identified inputs and outputs of the unit.

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.

Electrical components:

2 linear electrical actuators with DC motor. Length: 500 mm.

Position controller.

Pneumatic circuit:

Air treatment unit:

Filter-regulator with water trap.

Manometer with double scale indicator.

Shut-off valve.

Double acting pneumatic gripper.

Double acting pneumatic actuator.

2 Pneumatic monostable 5/2 solenoid valves.

Sensors:

IR beam detector.

6 reed effect limit switches.

Fault generation module:

Box with lock with key.

Allows to generate 20 different faults.

Each fault is generated through toggle switches.

* Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

Supply voltage (Single-Phase): 230 VAC, PH+N+G.

ON-OFF removable key.

Output Voltage Connections:

Two Single-Phase: 230 VAC.

Single-Phase supply wire connecting plug.

Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**

Supply voltage (Single-Phase): 100-240Vac PH+N+G.

Overcurrent protection with fuse.

PLC device, Panasonic FP7:

High processing speed: 11ns per basic instruction (step).

Programming capacity: 120k basic instructions (step).

Data logging capacity: 256k words.

Independent memory for comments: 3MB.

Supports SDHC type generic memory cards up to 32GB.

Expansion module for digital inputs:

16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

Expansion module for digital outputs:

16 relay type digital outputs with voltage level of 24Vdc.

Web server function:

HTML web server included in the PLC.

Up to 16 sessions at the same time.

Compatible with most common search engines.

Connector for the digital input and output signals.

Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③Component Workstations:

㉟ AE-PLC-MA. **Multiple Pieces Feeder Workstation**

The "AE-PLC-MA" is a Multiple Pieces Feeder Workstation commanded by a PLC, which provides three different types of pieces to be assembled in one piece by the industrial robot of the "AE-BR" unit.

The "AE-PLC-MA" contains an input pieces area, an output pieces area and an assembling zone where the three pieces can be mounted in one.

The "AE-PLC-MA" is composed by the following components:

   Mounted with aluminum profiles.

   15 pieces made of aluminum and plastic of different colors.

   Vertical storage for pieces.

   Control panel:

      Emergency pushbutton.

      Start/Stop pushbuttons.

      Manual/automatic switch.

      Light indicators.

      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.

      3 Double acting pneumatic actuators.

      3 Pneumatic monostable 5/2 solenoid valves.

   Sensors:

      3 IR beam detectors

      6 reed effect limit switches.

   Fault generation module:

      Box with lock with key.

      Allows to generate 20 different faults.

      Each fault is generated through toggle switches.

✲ Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

   Supply voltage (Single-Phase): 230 VAC, PH+N+G.

   ON-OFF removable key.

   Output Voltage Connections:

      Two Single-Phase: 230 VAC.

      Single-Phase supply wire connecting plug.

   Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**

   Supply voltage (Single-Phase): 100-240Vac PH+N+G.

   Overcurrent protection with fuse.

   PLC device, Panasonic FP7:

      High processing speed: 11ns per basic instruction (step).

      Programming capacity: 120k basic instructions (step).

      Data logging capacity: 256k words.

      Independent memory for comments: 3MB.

      Supports SDHC type generic memory cards up to 32GB.

   Expansion module for digital inputs:

      16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

   Expansion module for digital outputs:

      16 relay type digital outputs with voltage level of 24Vdc.

   Web server function:

      HTML web server included in the PLC.

      Up to 16 sessions at the same time.

      Compatible with most common search engines.

   Connector for the digital input and output signals.

   Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③ Component Workstations:

3.8 AE-BR. Robotic Arm Station

The "AE-BR" is a robotic arm system with the control console to program its movements. The robotic arm take different pieces from the multiple pieces feeding workstation and mount them inside the base piece, located at the linear transport system.

The "AE-BR" is composed by the following components:

Mounted with aluminum profiles.

Ten aluminium pieces.

Control panel:

    Emergency pushbutton.

    Start/Stop pushbuttons.

    Manual/automatic switch.

    Light indicators for signaling.

    Signaling led tower.

    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.

    Pneumatic bistable 5/2 solenoid valve.

Robotic arm:

    6 degrees of freedom.

    Maximum load capacity: 2 Kg.

    Weight: 19 Kg.

    Position repeatability: ±0.02 mm.

    Detection method: absolute encoder.

    Arm length: 500 mm max.

    Console to program the robotic arm.

    Electric drill to install in the robotic arm.

    Pneumatic double effect external grip clamp to install in the robotic arm.

    Protection screen made of polycarbonate.

* Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

    Supply voltage (Single-Phase): 230 VAC, PH+N+G.

    ON-OFF removable key.

    Output Voltage Connections:

        Two Single-Phase: 230 VAC.

        Single-Phase supply wire connecting plug.

    Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CPU-PAN. **Panasonic CPU Module.**

    Supply voltage (Single-Phase): 100-240Vac PH+N+G.

    Overcurrent protection with fuse.

    PLC device, Panasonic FP7:

        High processing speed: 11ns per basic instruction (step).

        Programming capacity: 120k basic instructions (step).

        Data logging capacity: 256k words.

        Independent memory for comments: 3MB.

        Supports SDHC type generic memory cards up to 32GB.

    Expansion module for digital inputs:

        16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

    Expansion module for digital outputs:

        16 relay type digital outputs with voltage level of 24Vdc.

    Web server function:

        HTML web server included in the PLC.

        Up to 16 sessions at the same time.

        Compatible with most common search engines.

    Connector for the digital input and output signals.

    Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

③ **Component Workstations**:

3.9 AE-PLC-T. Linear Transport Workstation

Its function is to transport pieces between the different working stations that will perform the different assembly operations. The "AE-PLC-T" has different stops where the working stations will be installed.

The "AE-PLC-T" is composed by the following components:

Mounted with aluminum profiles.

Four pallets to transport the pieces.

Stops zones for the pallets:

Different stop zones with presence sensors and a restraint system for pallets

Electrical panel:

Differential magneto-thermal switch.

Power supply of 24 VDC.

Terminal block to connect the individually identified inputs and outputs of the unit.

Control panel:

Emergency pushbutton.

Start/Stop pushbuttons.

Manual/automatic switch.

Light indicators.

Terminal block to connect the individually identified inputs and outputs of the unit.

Electrical components:

Electric motor.

Motor controller.

Pneumatic circuit:

Air treatment unit:

Filter-regulator with water trap.

Manometer with double scale indicator.

Shut-off valve.

13 simple effect pneumatic actuators:

14 pneumatic monostable 3/2 solenoid valves.

Individually identified tubes and push in fittings.

Sensors:

24 inductive effect sensors.

Four reed effect limit switches.

Fault generation module:

Box with lock with key.

Allows to generate 20 different faults.

Each fault is generated through toggle switches.

✳ **Available PLC models of different manufacturers: PANSONIC, SIEMENS, OMRON, MITSUBISHI, ALLEN BRADLEY, etc.**

The AE-PLC-PAN-UB, **PANASONIC PLC Base Unit** includes:

• N-ALI02. **Domestic Power Supply.**

Supply voltage (Single-Phase): 230 VAC, PH+N+G.

ON-OFF removable key.

Output Voltage Connections:

Two Single-Phase: 230 VAC.

Single-Phase supply wire connecting plug.

Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

③ Component Workstations:

- N-CPU-PAN. **Panasonic CPU Module.**

    Supply voltage (Single-Phase): 100-240Vac PH+N+G.

    Overcurrent protection with fuse.

    PLC device, Panasonic FP7:

    High processing speed: 11ns per basic instruction (step).

    Programming capacity: 120k basic instructions (step).

    Data logging capacity: 256k words.

    Independent memory for comments: 3MB.

    Supports SDHC type generic memory cards up to 32GB.

    Expansion module for digital inputs:

    16 digital inputs with allowable input range from 0V to 12V or 0V to 24V.

    Expansion module for digital outputs:

    16 relay type digital outputs with voltage level of 24Vdc.

    Web server function:

    HTML web server included in the PLC.

    Up to 16 sessions at the same time.

    Compatible with most common search engines.

    Connector for the digital input and output signals.

    Connector to the Ethernet switch module (N-SWT-4 or N-SWT-8).

N-CPU-PAN

The complete unit includes as well:

   Open Control + Multicontrol + Real-Time Control.

   PLC, HMI and web server programming software.

   Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.

   Capable of doing applied research, real industrial simulation, training courses, etc.

   Remote operation and control by the user and remote control for EDIBON technical support, are always included.

   Totally safe, utilizing 3 safety systems (Mechanical, Electrical & Electronic).

   Designed and manufactured under several quality standards.

   Optional software to perform 2D and 3D simulations of the processes studied and supervise and control the real system (SCADA).

   Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc. Apart from monitoring user's knowledge and progress reached.

④ SAC. Silent Air Compressor Unit

   Designed to work with the EDIBON units.

   Single-phase motor with 340 W.

   Low noise level with 40 dB of maximum.

   Boiler capacity: 9 l.

   Maximum pressure: 8 bar or 0.8 MPa.

   Maximum air flow: 50 l/min.

   Safety relief valve.

   Start/stop switch.

   Double scale manometer psi and bar with a range from 0 to 12 bar to measure the air pressure before the air filter regulator.

   Air Filter Regulator (FR):

   Double scale manometer psi and bar with a range from 0 to 12 bar to measure the air pressure after the air filter regulator.

   Air filter with drain.

   Air pressure regulator from 0 to 8 bar.

   6 mm quick release connector of 6mm for pneumatic flexible tubes.

   Oil level indicator.

   The oil necessary to work is included with the unit.

   Include the connector types to work with pneumatic trainers of EDIBON.

SAC

⑤ **Cables and Accessories**, for normal operation.

⑥ **Manuals:**

   This unit is **supplied with 7 manuals:** Required Services, Assembly and Installation, Control Software, Starting-up, Safety, Maintenance & Practices Manuals.

∗References 1 to 6 are the main items: AE-PLC-FMS5+ PLC, HMI and web server programming software + Component Workstations +SAC + Cables and Accessories + Manuals are included in the minimum supply for enabling normal and full operation.

Practical possibilities to be done with the Flexible Manufacturing System 5 (AE-PLC-FMS5):

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.- Testing the digital inputs and outputs of the automatic system through a PLC.

6.- Modify manufacturing parameters through the PLC.

7.- Configuration of a pneumatic application.

8.- Introduction to the Human-machine interface systems (HMI).

9.- Study of an automatic control of an industrial system.

10.- Control of the flexible manufacturing system through a central PLC in an Ethernet network with local PLC in each workstation.

11.- Manage the flexible manufacturing system through the HMI device.

Practical possibilities to be done with the optional software Automation Systems Simulation Software (AE-AS):

12.- Introduction to the SCADA control system.

13.- OPC server system with Ethernet.

14.- SCADA control of an automatic industrial system through PC.

Practical possibilities to be done with the Workstation alone:

- Pieces Distributor Workstation (AE-PLC-DS).

15.-Manual control of a Feeding system.

16.-Automatic control of a Feeding system.

17.-Change the parameters of the Feeding process.

18.-Optimize the process time.

19.-Study and analysis of the faults inserted in the process with the fault generation module.

- Pieces Identification Workstation (AE-PLC-SIP).

20.-Manual control of a quality control system.

21.-Automatic control of a quality control system.

22.-Change the parameters of the quality control system.

23.-Optimize the process time.

24.-Study and analysis of the faults inserted in the process with the fault generation module.

- Sorting Workstation (AE-PLC-CF).

25.-Manual control of a sorting system.

26.-Automatic control of a sorting system.

27.-Change the parameters of the sorting process.

28.-Optimize the process time.

29.-Study and analysis of the faults inserted in the process with the fault generation module.

- Pneumatic Handling Workstation (AE-PLC-MAN).

30.-Manual control of a handling system.

31.-Automatic control of a handling system.

32.-Automatic control of a handling and sorting system.

33.-Change the parameters of the process.

34.-Optimize the process time.

35.-Study and analysis of the faults inserted in the process with the fault generation module.

- Rotary Table Workstation 3 (AE-PLC-MR3).

36.-Manual control of the rotary table system.

37.-Manual control of the quality control and drilling process on a rotary table.

38.-Automatic control of the rotary table system.

39.-Automatic control of the quality control and drilling process on a rotary table.

40.-Change the parameters of the rotary table process.

41.-Optimize the process time.

42.-Study and analysis of the faults inserted in the process with the fault generation module.

- Vertical Storage Workstation (AE-PLC-ALV).

43.-Manual control of a vertical storing system.

44.-Automatic control of a vertical storing system.

45.-Change the parameters of the storing process.

46.-Optimize the process time.

47.-Study and analysis of the faults inserted in the process with the fault generation module.

- Robotic Arm Workstation (AE-BR).

48.-Introduction to robotic systems.

49.-Robotic arm configuration.

50.-Set a simple movement of the robotic arm.

51.-Introduction to pneumatics and electro-pneumatics.

52.-Configuration of a pneumatic application.

53.-Set a simple pick and place function with the robotic arm.

- Multiple Pieces Feeder Workstation (AE-PLC-MA).

54.-Configuration of the robotic arm as a pick and place system.

55.-Change the parameters of the pick and place process.

56.-Optimize the pick and place process.

57.-Configuration of the robotic arm as a mounting system.

58.-Change the parameters of the mounting process.

59.-Optimize the mounting process.

- Linear Transport Workstation (AE-PLC-T).

60.-Manual control of a transporting system.

61.-Automatic control of a transporting system.

62.-Change the parameters of a transporting process.

63.-Optimize the process time.

64.-Study and analysis of the faults inserted in the process with the fault generation module.

Other possibilities to be done with this Unit:

65.-Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

66.-Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

67.-This unit is totally safe as uses mechanical, electrical and electronic, and software safety devices.

68.-This unit can be used for doing applied research.

69.-This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

70.-Visualization of all the sensors values used in the AE-PLC-FMS5 unit process.

- Several other exercises can be done and designed by the user.

REQUIRED SERVICES

- Electrical supply: single-phase, 220V./50 Hz or 110V./60Hz.
- Computer.

DIMENSIONS AND WEIGHTS

AE-PLC-FMS5:
- Dimensions: 6000 x 3500 x 1500 mm. approx.
                  (236.22 x 137.79 x 59.05 inches approx.)
- Weight: 1200 Kg. approx.
                  (2645 pounds approx.).

RECOMMENDED ACCESSORIES (Not included)

- AE-AS. Automation System Simulation Software (Optional).

AVAILABLE VERSIONS

Offered in this catalogue:

- AE-PLC-FMS5. Flexible Manufacturing System 5.

Offered in other catalogue:

- AE-PLC-FMS1. Flexible Manufacturing System 1.
- AE-PLC-FMS2. Flexible Manufacturing System 2.
- AE-PLC-FMS3. Flexible Manufacturing System 3.
- AE-PLC-FMS4. Flexible Manufacturing System 4.
- AE-PLC-FMS6. Flexible Manufacturing System 6.
- AE-PLC-FMS7. Flexible Manufacturing System 7.
- AE-PLC-FMS8. Flexible Manufacturing System 8.
- AE-PLC-FMS9. Flexible Manufacturing System 9.
- AE-PLC-FMS10. Flexible Manufacturing System 10.
- AE-PLC-FMS11. Flexible Manufacturing System 11.
- AE-PLC-FMS12. Flexible Manufacturing System 12.
- AE-PLC-FMS13. Flexible Manufacturing System 13.
- AE-PLC-FMS14. Flexible Manufacturing System 14.

Additionally to the main items (1 to 6) described, we can offer, as optional, other items from 7 to 9.

All these items try to give more possibilities for:

    a) Technical and Vocational Education configuration. (ICAI)

    b) Multipost Expansions options. (Mini ESN and ESN)

a) Technical and Vocational Education configuration

⑦ **AE-PLC-FMS5/ICAI. Interactive Computer Aided Instruction Software System.**

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.

This software is optional and can be used additionally to items (1 to 6).

- 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.

- 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

Instructor Software

ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen
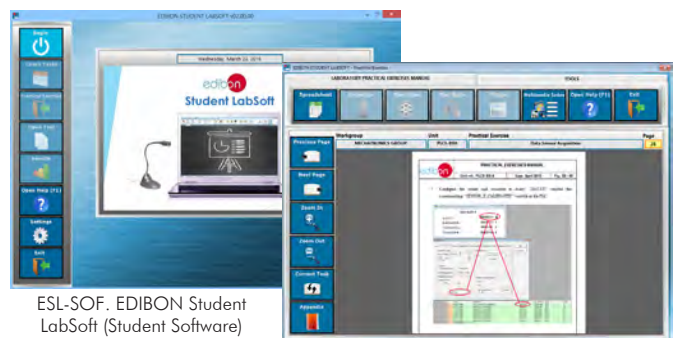
ECAL. EDIBON Calculations Program Package - Formula Editor Screen

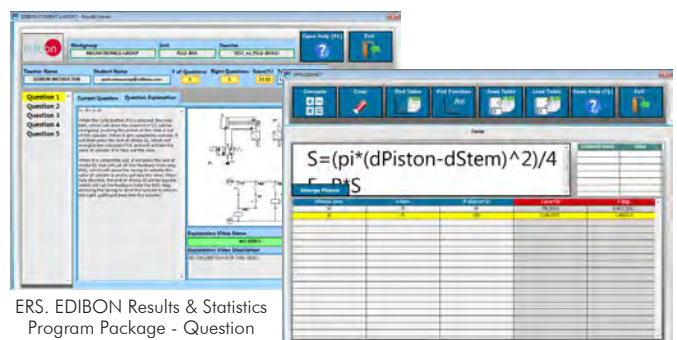ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

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

Student Software

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

$$S = (pi*(dPiston-dStem)^2)/4$$

ECAL. EDIBON Calculations Program Package Main Screen

⑧ **MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.**

Mini ESN. EDIBON Mini Scada-Net System allows up to 30 students to work with a Teaching Unit in any laboratory, simultaneously. It is useful for both, Higher Education and/or Technical and Vocational Education.

The Mini ESN system consists of the adaptation of any EDIBON Computer Controlled Unit with SCADA integrated in a local network.

This system allows to view/control the unit remotely, from any computer integrated in the local net (in the classroom), through the main computer connected to the unit. Then, the number of possible users who can work with the same unit is higher than in an usual way of working (usually only one).

<u>Main characteristics:</u>

- It allows up to 30 students to work simultaneously with the EDIBON Computer Controlled Unit with SCADA, connected in a local net.
- Open Control + Multicontrol + Real Time Control + Multi Student Post.
- Instructor controls and explains to all students at the same time.
- Any user/student can work doing "real time" control/multicontrol and visualisation.
- Instructor can see in the computer what any user/student is doing in the unit.
- Continuous communication between the instructor and all the users/students connected.

<u>Main advantages:</u>

- It allows an easier and quicker understanding.
- This system allows you can save time and cost.
- Future expansions with more EDIBON Units.

For more information see **Mini ESN** catalogue. Click on the following link:

www.edibon.com/products/catalogues/en/Mini-ESN.pdf

Mini ESN.
EDIBON Mini Scada-Net System

1 UNIT= up to 30 STUDENTS can work simultaneously

Flexible Manufacturing System 5 (AE-PLC-FMS5)

Software for:
- Computer Control
- Data Acquisition
- Data Management

Instructors' Central Computer

Mini Scada-Net Software

LOCAL NET FOR 30 STUDENTS

OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL
+
MULTI STUDENT POST

Note: The Mini ESN system can be used with any EDIBON computer controlled unit

⑨ **ESN. EDIBON Scada-Net System.**

This unit can be integrated, in the future, into a Complete Laboratory with many Units and many Students.

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

www.edibon.com/en/files/expansion/ESN/catalog
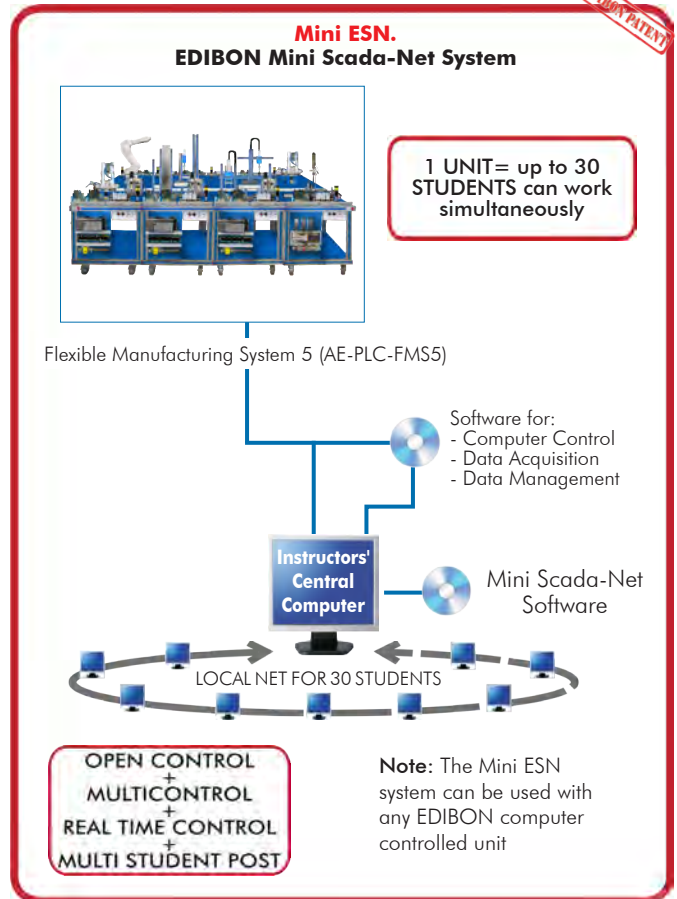
Main items (always included in the supply)

Minimum supply always includes:

① **Unit: AE-PLC-FMS5. Flexible Manufacturing System 5.**

② **PLC, HMI and web server programming software.**

③ **Component Workstations.**

  ③.1 AE-PLC-DS. **Pieces Distributor Workstation.**

  ③.2 AE-PLC-SIP. **Pieces Identification Workstation.**

  ③.3 AE-PLC-CF. **Sorting Workstation.**

  ③.4 AE-PLC-MAN. **Pneumatic Handling Workstation.**

  ③.5 AE-PLC-MR3. **Rotary Table Workstation 3.**

  ③.6 AE-PLC-ALV. **Vertical Storage Workstation.**

  ③.7 AE-PLC-MA. **Multiple Pieces Feeder Workstation.**

  ③.8 AE-BR. **Robotic Arm Workstation.**

  ③.9 AE-PLC-T. **Linear Transport Workstation.**

④ **SAC. Silent Air Compressor Unit.**

⑤ **Cables and Accessories**, for normal operation.

⑥ **Manuals.**

*IMPORTANT: Under AE-PLC-FMS5 we always supply all the elements for immediate running as 1, 2, 3, 4, 5 and 6.

Optional items (supplied under specific order)

a) Technical and Vocational Education configuration

⑦ AE-PLC-FMS5/ICAI. Interactive Computer Aided Instruction Software System.

b) Multipost Expansions options

⑧ Mini ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

⑨ ESN. EDIBON Scada-Net System.

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

REPRESENTATIVE: