Application of Asynchronous Single-Phase Motor with Split Phase

AEL-ACSPA

INTRODUCTION

The electric motors are devices capable of transforming electrical energy into mechanical energy. The split phase induction motors are very used in industrial installations due to its great robustness, reliability and low cost. The purpose of these machines is work in a single phase network by using a resistor in its winding.

The Application of Asynchronous Single-Phase Motor with Split Phase, "AEL-ACSPA", has been designed by EDIBON in order to study of the main operations performed in the industrial field with split phase electrical motors.

The student will learn the most important operations of this type of electrical machines faithfully by using commutators, timers and contactors.

The "AEL-ACSPA" application includes the following elements:

- N-ALI01. Industrial Main Power Supply Module.
- N-PUL48. Module with Three Dual Camera Push Buttons.
- N-LAM02. Auxiliary Lamps Module.
- N-CON01. Three-Pole Contactor Module (24 VAC). (2 units)
- N-REL30. Synchronization Relay Module. (2 units)
- N-ALI03. AC Auxiliary Power Supply (24 Vac) Module.
- EMT20. Asynchronous Single-Phase Motor with Split Phase.
- FLYW. Flywheel.

Additional recommended elements (Not included):

- N-EALD. Electrical Network Analyzer Module with Oscilloscope and Data Acquisition.

If the Option A (modules mounted on rack) is chosen, the rack/s required will depend on the optional modules requested by the customer.

The application "AEL-ACSPA" can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

- N-RACK-A.

Optionally the AEL-WBR, Electrical workbench (rack) can be supplied to place the rack/s.

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC, Electrical workbench (rail) can be supplied to mount the modules.

The application "AEL-ACSPA" includes the following elements:

- **N-ALI01. Industrial Main Power Supply Module.**
    Supply voltage: 400 VAC, 3PH + N.
    ON / OFF removable key.
    Output voltage connections:
        Three-phase + Neutral: 400 VAC.
        Single-phase: 230 VAC.
    Three-phase supply hose with IP44 3PN+E 32 A 400 V connecting plug.
    Differential magnetothermal 4 poles, 25 A, 30 mA AC 6 KA.
    Emergency stop push-button.

N-ALI01

- **N-PUL48. Module with Three Dual Camera Push Buttons.**
    Two independent chambers.
    Nominal voltage: 24 VAC.
    Three double chamber push-buttons (green and red).
    Contacts:
        Three normally open contacts (NO) for green switch.
        Three normally close contacts (NC) for red switch.

N-PUL48

- **N-LAM02. Auxiliary Lamps Module.**
    Nominal voltage: 24 VAC.
    Three lamps (red, yellow and green).

N-LAM02

- **N-CON01. Three-Pole Contactor Module (24 VAC). (2 units)**
    Nominal voltage for power contacts: 400 VAC.
    Nominal voltage for control contacts: 24 VAC.
    Nominal voltage for the control coil: 24 VAC.
    Contacts:
        Three-phase normally open contact (NO) for power circuit.
        Three normally open contacts (NO) for control circuit.
        Two normally close contacts (NC) for control circuit.

N-CON01

- **N-REL30. Synchronization Relay Module. (2 units)**
    Nominal voltage for power contacts: 400 VAC.
    Nominal voltage for control contacts: 24 VAC.
    Nominal voltage for the control coil: 24 VAC.
    Contacts:
        One three-phase normally open contact (NO) for power circuit.
        Three auxiliary contacts:
            One instantaneous normally open contact (NO).
            One time normally open contact (NO).
            One time normally close contact (NC).

N-REL30

- **N-ALI03. AC Auxiliary Power Supply (24 Vac) Module.**
    Voltage supply (single-phase): 230 VAC, 1PH + N.
    Output voltage:
        Single–Phase 24 VAC / 12 VAC.
        24 VDC.
        0 – 24 VDC through potentiometer.

N-ALI03

- **EMT20. Asynchronous Single-Phase Motor with Split Phase.**
    Nominal voltage: 220 VAC.
    Nominal power: 370 W.
    RPM: 2780 rpm.
    Frequency: 50 Hz.
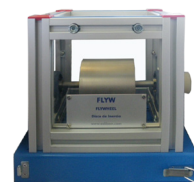   Shaft height: 71 mm.
    Starting resistor.

EMT20

- FLYW. **Flywheel.**
  Weight: 2 kg.
  Recommended maximum speed: 4000 rpm.
  Moment of inertia: 0.0025 kgm².

Additional recommended elements (Not included):

- N-EALD. **Electrical Network Analyzer Module with Oscilloscope and Data Acquisition.**
  The network analyzer module allows fulfilling measurements, displaying and analyzing all the parameters of the AC electrical networks. It has an LCD screen and push-buttons for the navigation through the different menus. It includes specific software for monitoring current and voltage curves, harmonics display, tariffs programming, alarms programming and electrical parameters storage.
  Features:
  Multifunctional three-phase power meter:
      Three-phase and single-phase voltage. Up to 690 VAC L-L.
      Line and neutral nominal current: 10 A.
      Active, reactive and apparent power.
      Suitable frequencies: 25 Hz, 50 Hz, 60 Hz and 400 Hz.
      Display of the V-I vector diagram.
      Supply voltage: 85 – 265 VAC.
  Energy quality control:
      Current and voltage individual harmonics measurement. Up to the 40th harmonic.
      Voltage and current THD, TDD and K-Factor.
      Maximums and minimums display.
      Waveforms display, 128 samples/sec.
  Events and data storage:
  Harmonics analyzer:
      Voltage and current THD, current TDD and K-Factor, up to the 40th harmonic.
      Current and voltage harmonic spectrum and angles.
  Tariff programming:
      Class 0.5S IEC 62053 – 22, active and reactive power in four quadrants.
      Measurement of the total and per phase three-phase active, reactive and apparent powers.
      Usage time, four energy/demand records of total tariffs.
      Eight tariffs, four seasons and four types of days.
      Automatic daily report of energy consumption maximums and minimums.
  Communications:
      RS – 485 communication port.

- **All necessary cables to realize the practical exercises are included.**

Cables and accessories, for normal operation.

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

FLYW

N-EALD

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Manual starter of asynchronous single-phase motor with split phase.

2.- Automatic starter of asynchronous single-phase motor with split phase.

3.- Timer Sequential Control operations of asynchronous single-phase motor with split phase.

4.- Starter of asynchronous single-phase motor with split phase with Flywheel.

REQUIRED SERVICES

- Electrical supply: three-phase, 380 VAC – 400 VAC/50 Hz or 190 VAC – 240 VAC/60 Hz, 1 kW.

DIMENSIONS AND WEIGHTS

AEL-ACSPA:
- Dimensions: 640 x 320 x 920 mm approx.
   (25.19 x 12.59 x 36.22 inches approx.)
- Weight: 55 kg approx.
   (121 pounds approx.)

ADDITIONAL RECOMMENDED ELEMENTS (Not included)

- N-EALD. Electrical Network Analyzer Module with Oscilloscope and Data Acquisition.

SIMILAR UNITS AVAILABLE

Offered in this catalog:

- AEL-ACSPA. Application of Asynchronous Single-Phase Motor with Split Phase.

Offered in other catalog:

- AEL-ACEMT. Advanced AC Electrical Motors Application.

AEL-ACSPA/ICAI. Interactive Computer Aided Instruction Software:
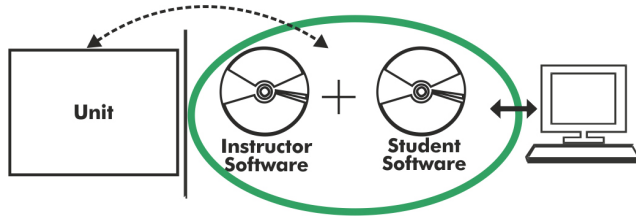

With no physical connection between unit and computer, **this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF).** Both are interconnected so that the teacher knows at any moment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

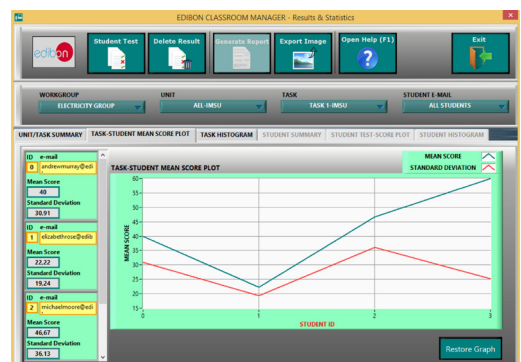• Report generation, User Progression Monitoring and Statistics.
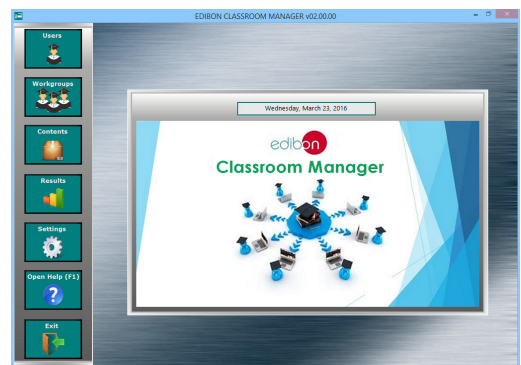
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen
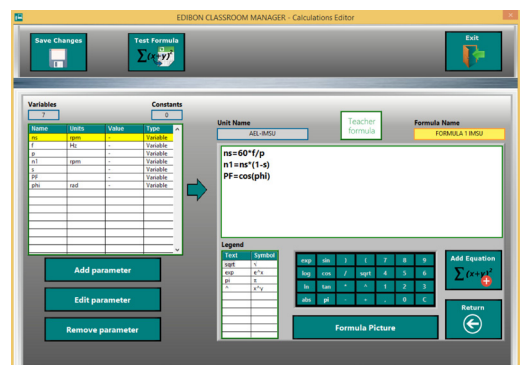
ECAL. EDIBON Calculations Program Package - Formula Editor Screen
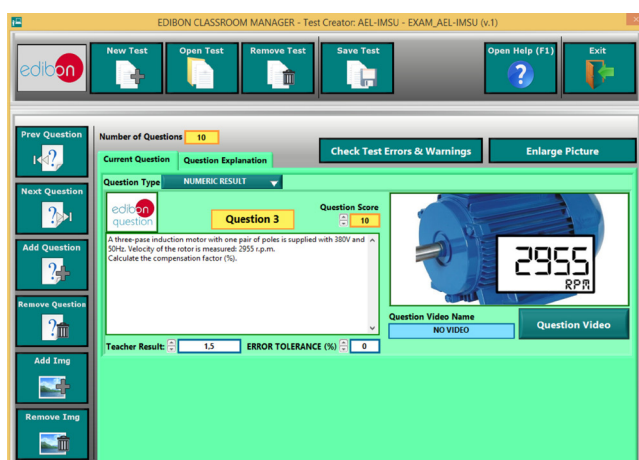
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

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

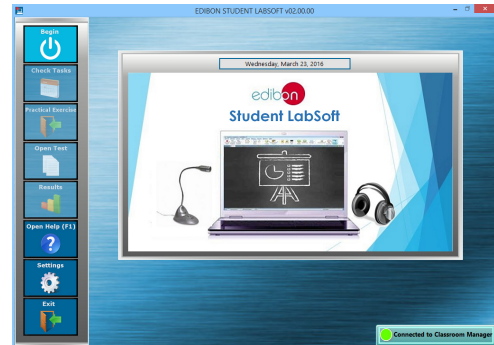## - ESL-SOF. EDIBON Student Labsoft (Student Software).

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:

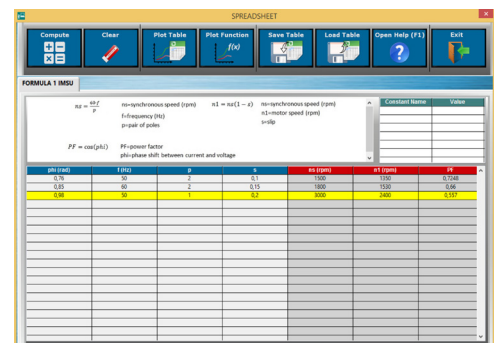**www.edibon.com/en/interactive-computer-aided-instruction-software**

ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen
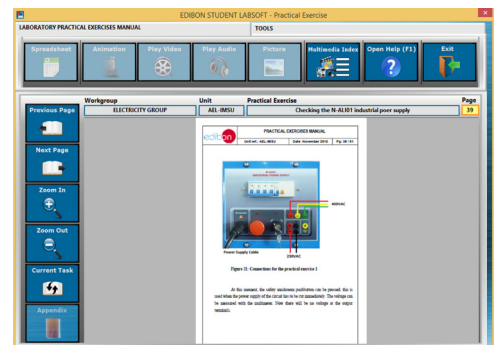
EPE. EDIBON Practical Exercise Program Package Main Screen

ERS. EDIBON Results & Statistics Program Package - Question Explanation

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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