



Engineering and Technical Teaching Equipment

Computer Controlled Advanced Industrial Servosystems Trainer - 1 kW (for AC Motors)

AEL-SERIN/CA-1 KW



www.edibon.com
↳ PRODUCTS
↳ 40.- ELECTRICITY

INTRODUCTION

A servomotor is a rotary actuator that allows for precise control of angular, velocity and acceleration. It consists of a suitable motor coupled to a sensor to get a control position, speed and torque. Besides the servomotor requires a sophisticated controller which allows control the speed and the torque of the servomotor.



ISO 9001: 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

GENERAL DESCRIPTION

The Computer Controlled Advanced Industrial Servosystems Trainer - 1 kW (for AC Motors) "AEL-SERIN/CA-1KW" has been designed by Edibon for testing the rotating electrical machines and controllers. This trainer is designed to work with different selectable operation modes according to different types of electrical machines.

Operation modes: as flywheel, lifting, rolling device, fan, compressor, with torque and speed control.

On the other hand this trainer consists of a Control Interface module connected to a three-phase motor. The motor is controlled by mean the Control Interface module and the last one is configured from a PC and the manufacture software. The control interface has a 20-bits incremental encoder that controls the speed, position and torque of the motor.

In addition, the AEL-SERIN/CA-1KW has an optional Data Acquisition and Data Control Software, EM-SCADA, for the dynamic analysis of the rotating electrical machines. This software allows observing characteristic curves, data reports and graphs, etc.

The AEL- SERIN/CA-1KW includes the following module:

- N-SERV1K. 1 kW Servomotor Module.

Optional testing software:

- EM-SCADA. Control and Data Acquisition System Software for Electrical Machines, with SCADA.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-SERIN/CA-1KW/ICA) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-SERIN/CA-1KW can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks.

- N-RACK-B.

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.

SPECIFICATIONS

The trainer includes the following modules:

- **N-SERV1K. 1 kW Servomotor Module.**

Power supply: 230 VAC.

3 Digital outputs.

Encoder outputs:

Two pairs of outputs (CH A Out, CH B Out and their respective denied outputs) that are TTL signals of incremental position generated by the encoder feedback. These signals indicate the direction of rotation of the motor.

One pair of outputs (CH Z Out and their denied) that TTL works as marker of pulses. This signal indicates the motor speed.

Relay output.

3 Analog outputs.

6 Digital inputs.

6 push-buttons.

6 Switches.

1 Analog input.

1 Potentiometer.

1 Digital encoder.

Reset push-button:

Servomotor:

Nominal voltage: 3PH, 400 VAC.

Nominal power: 2 kW.

Nominal current: 5 A.

Speed range: 0 – 4200 r.p.m.

Torque: 0 – 19,1 Nm.

IP65.

Sensor resolver (20 bits, 1048576 resolution).

Incremental encoder.

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

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.- Wiring and put into operation of an AC servomotor.
 - 2.- Starting/stopping operations of the servomotor.
 - 3.- Speed/torque control operations.
 - 4.- Variable speed control operation.
 - 5.- Variable torque control operation.
 - 6.- Warning by alarm.
 - 7.- Introduce resistant torque.
 - 8.- Variable speed control with different configurations.
 - 9.- Variable torque control with different configurations.
 - 10.- Acceleration ramp configuration.
 - 11.- Deceleration ramp configuration.
- The included software allows carry out the following practical possibilities:
- 12.- Static and dynamic determination of the operating point.
 - 13.- Measure and graphic representation of the main electrical and mechanical parameters (current, voltage, active power, reactive power, apparent power, power factor, efficiency, turning speed, torque and mechanical power).
 - 14.- Operation with automatic torque and turning speed control.
 - 15.- Operation in the four quadrants.
- Some possible practices with EM-SCADA:
- DC/AC Motor experiments:
- 16.- Braking test and real time monitoring results.
 - 17.- Study of starting currents and voltages of rotating machines.
 - 18.- Starting of motors with different methods such as star-delta starting, direct starting, starting resistors, etc.
 - 19.- Comparison of the performance characteristics between different motors.
 - 20.- Real time torque measurement waveform of rotating machines.
 - 21.- Real time speed measurement waveform of rotating machines.
 - 22.- Real time current and voltage measurement waveforms of rotating machines.
 - 23.- Electrodynamic study of different rotating machines.
 - 24.- Obtainment of characteristics curves of different rotating machines.
 - 25.- Obtainment of stored results of the tests.
- Single/Three-Phase Transformer experiments:
- 26.- Three-Phase transformer short circuit tests.
 - 27.- No-Load Three-Phase transformer tests.
 - 28.- Single-Phase transformer short circuit tests.
 - 29.- No-Load Single-Phase transformer tests.

REQUIRED SERVICES

- Electrical supply: three-phase, 380 V/50 Hz or 208 V/60 Hz, 20 kW.

DIMENSIONS AND WEIGHTS

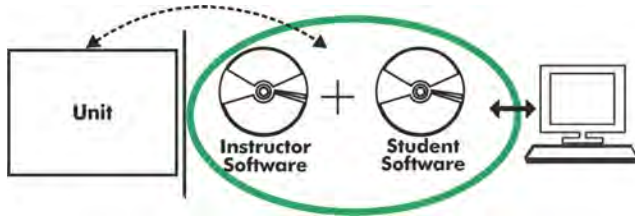
- AEL-SERIN/CA-1kW:
- Dimensions: 640 x 320 x 320 mm approx.
(19.29 x 12.99 x 12.99 inches approx.)
 - Weight: 20 Kg approx.
(44 pounds approx.).

OPTIONAL SOFTWARE

- EM-SCADA. Control and Data Acquisition System Software for Electrical Machines, with SCADA. (For more information see catalogue. Click on the following link: <http://www.edibon.com/en/files/equipment/EM-SCADA/catalog>)

Optional

AEL-SERIN/CA-1KW/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.

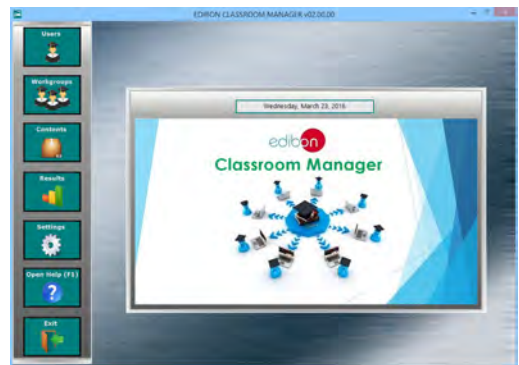
Instructor Software

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

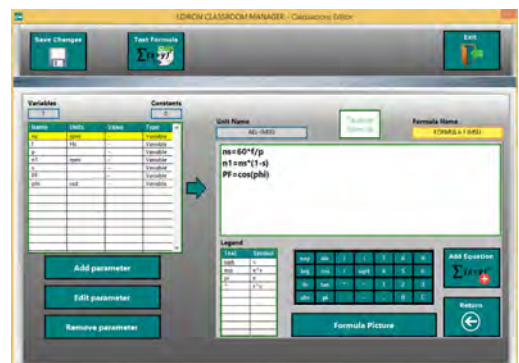
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

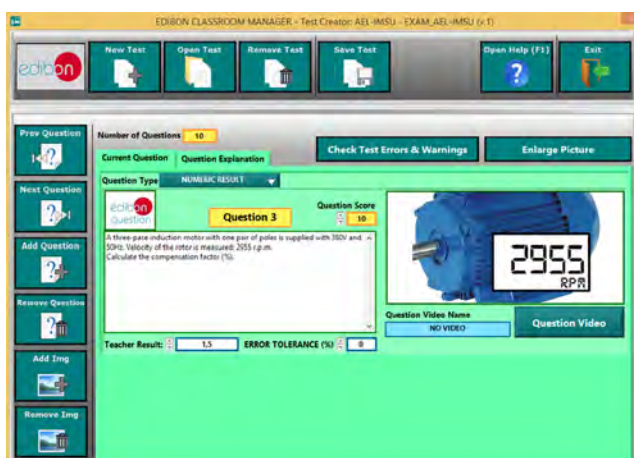
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



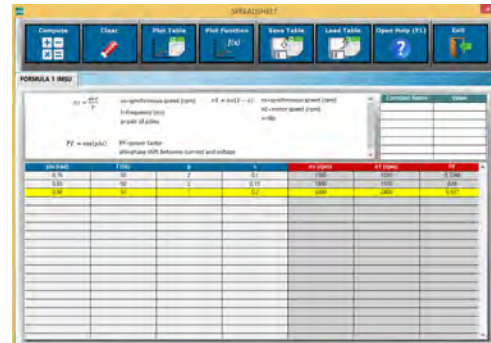
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



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:

