



INTRODUCTION

A transformer is an electrical machine that transfers electrical energy between two or more circuits through electromagnetic induction.

Electromagnetic induction produces an electromotive force within a conductor which is exposed to time varying magnetic fields.

Transformers are used to increase or decrease the alternating voltages in electric power applications. To prove that the transformer meets customer's specifications and design expectations, the transformer has to go through different testing procedures in manufacturer premises.



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 AEL-SPTT Single-Phase Transformer Trainer has been designed by Edibon to allow the students to learn how realize different single-phase transformer test and how they work.

With this trainer, the user can realize the open circuit and short circuit test. Thus, the student will be able to determinate the equivalent circuit and obtain the losses of the machine. This trainer includes a series of resistive, inductive and capacitive loads to study different behavior of the transformer such as internal drop voltages, energy losses, etc. On this way the user will analyze the differences among resistive, inductive and capacitive loads. One important parameter to analyze is the efficiency of the transformer, which can be studied with this trainer.

The AEL-SPTT includes all necessary modules in order to realize all practical exercises described before, such as transformer, network analyzers, power supply and resistive, inductive and capacitive loads.

Optionally, this trainer can be acquired with the Control and Data Acquisition System of Electrical Machines, EM-SCADA. This system is designed to analyze and monitoring all voltajes, currents and performace curves of dinamyc and static electrical machines. After testing procedures, the user can obtaint result reports.

The AEL-SPTT has the following modules:

- N-VPS01. AC 3PH Variable Power Supply.
- N-MED09. AC Ammeter (0-2.5 A). (2 units)
- N-MED22. AC Voltmeter (0-400 VAC).
- N-MED32. 1-Phase Wattmeter 230 V.
- N-MED65. Digital Multimeter.
- TRA31. 1kVA Single-Phase Transformer.
- N-REV. Variable Resistor.
- N-CON. Capacitor Module.
- N-IND. Inductance module.

Optional testing software:

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

Optional learning software:

In addition, Edibon provides optional software (AEL-SPTT/ICAI) 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-SPTT can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks.

- N-RACK-M. (2 units).

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 trainer includes the following modules:

• N-VPS01. **AC 3PH Variable Power Supply.**

ON-OFF removable key.

Input Voltage: 400 VAC, 3PH+N.

Output Voltage:

0...450 VAC.

0...24 VDC.

Maximum current: 2A.

Frequency: 50/60 Hz.

Wheel to regulate the voltage.

Three lamps.

Measurement commutators:

One commutator to measure the voltage:

6 positions: L1-N ; L2-N ; L3-N ; L1-L2 ; L1-L3 ; L2-L3.

One commutator to measure the current:

3 positions: L1, L2, L3.

Three-Phase supply hose with IP44 3PN+E 32A 400V connecting plug.

Differential magnetothermal, 4 poles, 25A, 300mA AC 6KA.



N-VPS01

• N-MED09. **AC Ammeter (0-2.5 A). (2 units).**

Measurement range: 0-2.5 A.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED09

• N-MED22. **AC Voltmeter (0-400 VAC).**

Measurement range: 0-400 VAC.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED22

• N-MED32. **1-Phase Wattmeter 230 V.**

Nominal voltage 230 VAC.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED32

Specifications

- **N-MED65. Digital Multimeter.**

This module has a digital multimeter of 3 ½ digits, with double-jack ending cables of 4 mm to facilitate interconnections.

With this digital multimeter we will be able to measure:

Voltage.

Current.

Resistance.

Capacitors capacity.

Temperature.



N-MED65

- **TRA31. 1kVA Single-Phase Transformer.**

Nominal supply voltage: 230 VAC.

Nominal output voltage: 230 VAC

Nominal power: 1kVA.



TRA31

- **N-REV. Single phase variable resistor.**

Variable resistor of 150 Ohm.

Maximum power: 500 W.

Potentiometer.

Terminals:

Three terminals to choose all resistance or variable resistance.

Fuse: 2 A.



N-REV

- **N-IND. Inductance module.**

Value: 1.4H.

Current fuse: 2A

Selector:

Position 0: circuit opened.

Position 1: circuit closed.



N-IND

- **N-CON. Capacitor Module.**

Capacitor value: 7 uF.

Nominal Voltage: 230 VAC.

Selector:

Position 0: circuit opened.

Position 1: circuit closed.



N-CON

- **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.- Calculation of transformer ratio. | 6.- Drop voltage with inductive load. |
| 2.- Open circuit test. | 7.- Drop voltage with capacitive load. |
| 3.- Short circuit test. | 8.- Study the efficiency of the transformer. |
| 4.- Determination of equivalent circuit. | 9.- Determination of load which allows the maximum efficiency of the transformer. |
| 5.- Drop voltage with resistive load. | |

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

AEL-SPTT:

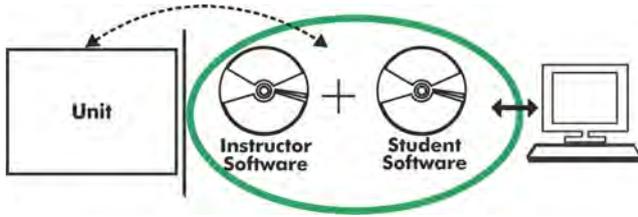
- Dimensions: 1380 x 840 x 2010 mm. approx.
(54.33 x 33.07 x 79.13 inches approx.).
- Weight: 50 Kg. approx.
(110 pounds approx.).

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/products/catalogues/en/units/electricity/advanced/AEL-EM-SCADA.pdf>)

Optional

AEL-SPTT/ICAI. Interactive Computer Aided Instruction Software System.



Without 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.

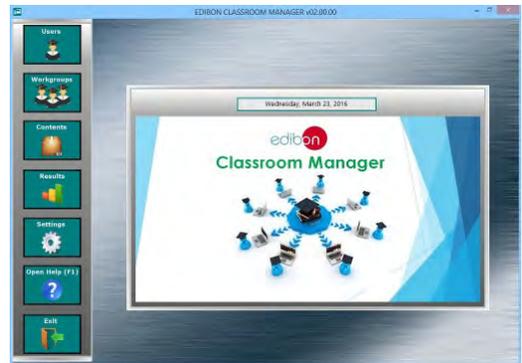
Instructor Software

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

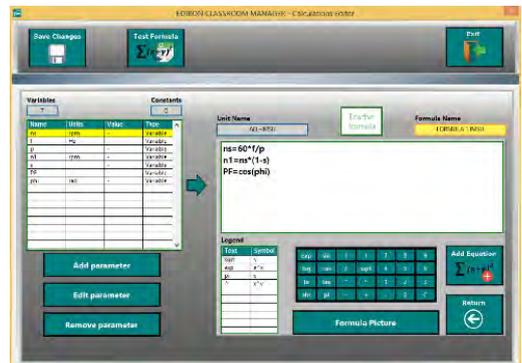
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual 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:

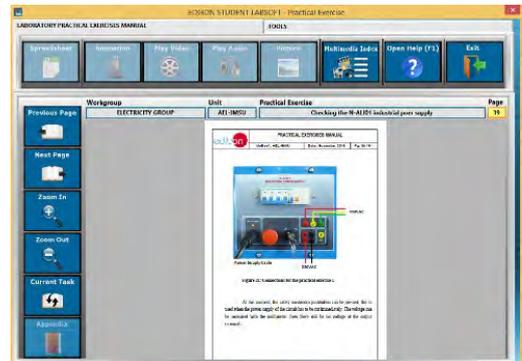
- Student Log-In & Self-Registration.**
- Existing Tasks checking & Monitoring.**
- Default contents & scheduled tasks available to be used from the first session.**
- Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- Evaluation Methods to prove your knowledge and progression.**
- 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/products/catalogues/en/units/electricity/ICAI-Electricity/ICAI-Electricity.pdf



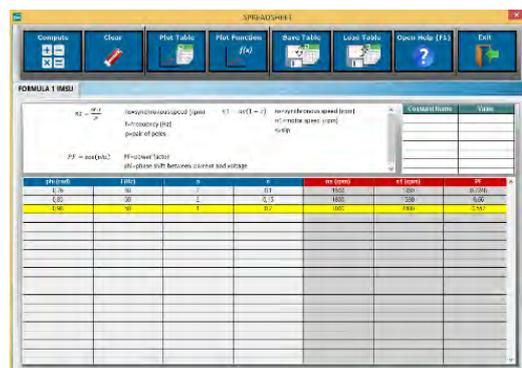
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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.



C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANÉS. (Madrid). SPAIN.
Phone: 34-91-6199363 FAX: 34-91-6198647
E-mail: edibon@edibon.com WEB site: www.edibon.com

Edition: ED01/16
Date: October/2016

REPRESENTATIVE:

