Engineering and Technical Teaching Equipment

DC Series Excitation Motors Application

AEL-DCSE

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PRODUCTS
4.- ELECTRICITY

INTRODUCTION

The electric motors are devices capable of transforming electrical energy into mechanical energy. The DC series excitation motors are very used in industrial installations due to its great robustness, reliability and low cost. The starting current consumed by these motors is very high, being harmful to the machine and the protections. The soft starters aim at reducing these currents close to the nominal values. For this purpose it is very important to know several operations carried out with these electrical machines.

Certificate of Approval of the Quality Management System

European Union Certificate
(total safety)

UL and CSA Regulations
(All our products are manufactured according to current UL and CSA regulations)

Certificate of Approval of the Environmental Management System

Worlddidac Association Certificate of Membership

GENERAL DESCRIPTION

The Application of DC Series Excitation Motor, "AEL-DCSE", has been designed by EDIBON for the study of the main operations performed in the industrial field with DC Series Excitation Motors.

The student will learn the most important operations of these electrical machines faithfully by using commutators and contactors.

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

- N-ALI02. Domestic Main Power Supply Module.
- N-PUL48. Three Double Chamber Push-Buttons Module.
- N-LAM02. Auxiliary Lamps Module.
- N-CON01. Three-Pole Contactor Module (24 VAC). (3 units).
- N-ALI03. AC Auxiliary Power Supply (24 Vac) Module.
- FLYW. Flywheel.
- N-VVCC/M. DC Motor Speed Controller (Intermediate option) Module.
- N-REV. Single Phase Variable Resistor Module.
- EMT2. DC Series Excitation Motor-Generator.
- TECNEL/TM. Hand Tachometer.

Additional recommended elements (Not included):

- N-MED17. DC Voltmeter Module (0-200 V).
- N-MED16. DC Voltmeter Module (0-50 V).
- N-MED05. DC Ammeter Module (0-1.5 A).

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-DCSE" 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.

SPECIFICATIONS

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

- N-ALI02. **Domestic Main Power Supply Module.**
  - Supply voltage (single–phase): 230 VAC, 1PH + N.
  - ON / OFF removable key.
  - Output voltage connections:
    - Two single-phase: 230 VAC.
  - Single-phase supply hose with connecting plug.
  - Differential magnetothermal 2 poles, 25 A, 30 mA AC 6 KA.
  - Emergency stop push-button.


N-ALI02

- N-PUL48. **Three Double Chamber Push-Buttons Module.**
  - 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

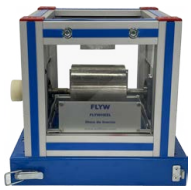
- N-CON01. **Three-Pole Contactor Module (24 VAC). (3 units).**
  - Nominal voltage for power contacts: 400 VAC.
  - Nominal voltage for control contacts: 24 VAC.
  - Nominal voltage for the control coil: 24 VAC.
  - Contacts:
    - Three-phase normally open contact (NO) for power circuit.
    - Three normally open contacts (NO) for control circuit.
    - Two normally close contacts (NC) for control circuit.


N-CON01

- N-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

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


FLYW

- N-WCC/M. **DC Motor Speed Controller (Intermediate option) Module.**
  - Supply voltage: 230 VAC.
  - Variable output voltage: 0 – 300 VDC.
  - Fuse: 2 A.


N-WCC/M

Specifications

- N-REV. **Single Phase Variable Resistor Module.**
  - Variable resistor: 150 Ohm.
  - Maximum power: 500 W.
  - Potentiometer.
  - Terminals:
    - Three terminals to choose all resistance or variable resistance.
  - Fuse: 2 A.

N-REV

- EMT2. **DC Series Excitation Motor-Generator.**
  - Nominal power: 300 W.
  - Armature voltage: 200 VDC.
  - Armature current: 1.5 A.
  - Speed: 7500 rpm.
  - Shaft height: 71 mm.

EMT2

- TECNEL/TM. **Hand Tachometer.**
  - Two AA batteries.
  - Three positions switch to choice the measurement method.
  - Speed recording push button.
  - Speed measurement push button.
  - Disassemble pieces for different shafts.
  - Speed digital display.

TECNEL/TM

<u>Additional recommended elements</u> (Not included):

- N-MED17. **DC Voltimeter Module (0-200 V).**
  - Measurement range: 0 – 200 VDC.
  - Terminals:
    - Measurement terminals.

N-MED17

- N-MED16. **DC Voltmeter Module (0-50 V).**
  - Analogue voltmeter.
  - Connection terminals.
  - Voltage range: 0 – 50 V.

N-MED16

- N-MED05. **DC Amperimeter Module (0-1.5 A).**
  - Measurement range: 0 – 200 VDC.
  - Terminals:
    - Measurement terminals.

N-MED05

- **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.

EXERCISES AND PRACTICAL POSSIBILITIES

1.- DC motor speed control.

2.- DC machine turning direction control.

3.- DC machine speed reading.

4.- Excitation current control.

Some possible practices with the recommended additional elements:

5.- Rotor current measurement and torque estimation.

6.- Measurement of armature voltage.

REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz 1 kW.

DIMENSIONS AND WEIGHTS

AEL-DCSE:

- Dimensions: 640 x 320 x 920 mm approx.
  (25.19 x 12.59 x 36.26 inches approx.)
- Weight: 50 Kg approx.
  (119 pounds approx.)

ADDITIONAL RECOMMENDED ELEMENTS (Not included)

- N-MED17. DC Voltmeter Module (0-200 V).
- N-MED16. DC Voltmeter Module (0-50 V).
- N-MED05. DC Ammeter Module (0-1.5 A).

SIMILAR UNITS AVAILABLE

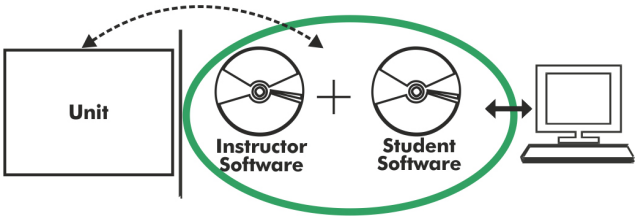
Offered in this catalog:

- AEL-DCSE. Application of DC Series Excitation Motors.

Offered in others catalogs:

- AEL-DCEMA. DC Electrical Motors Application.
- AEL-DCEMT. DC Electrical Motors Applications.

AEL-DCSE/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.

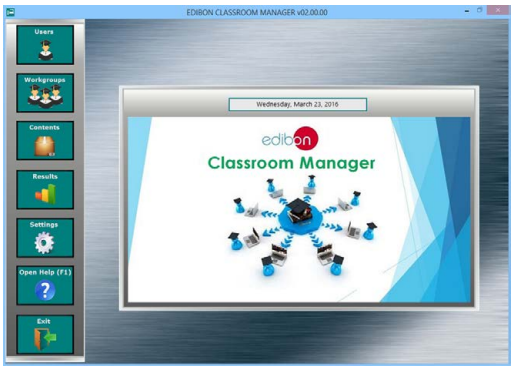
Instructor Software

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

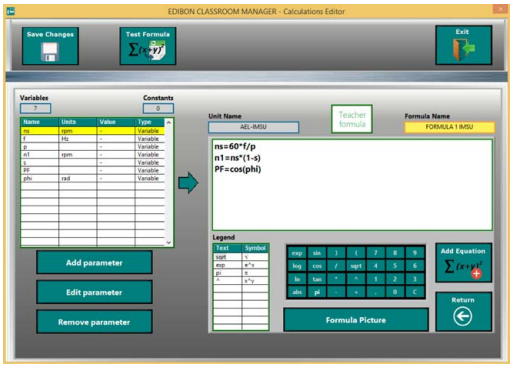
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

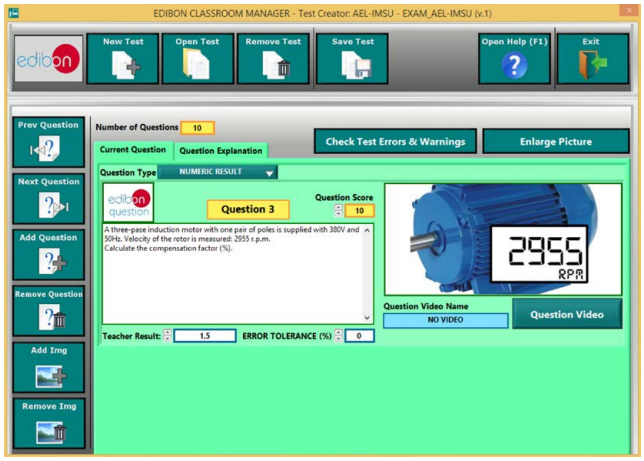
- **User Data Base Management.**
- **Administration and assignment of Workgroup, Task and Training sessions.**
- **Creation and Integration of Practical Exercises and Multimedia Resources.**
- **Custom Design of Evaluation Methods.**
- **Creation and assignment of Formulas & Equations.**
- **Equation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



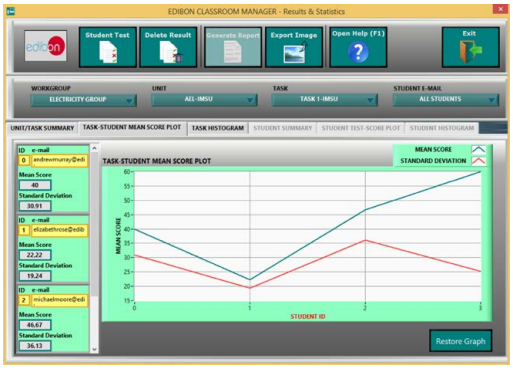
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

Optional

Student Software

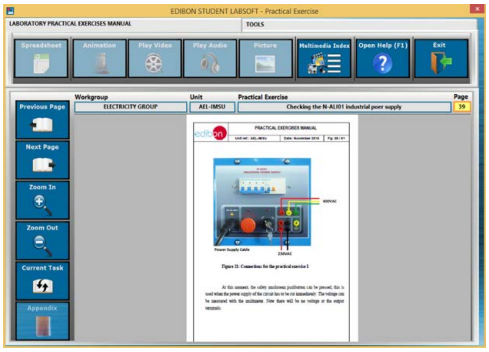
- ESL-SOF. EDIBON Student Labsoft (Student Software).

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:

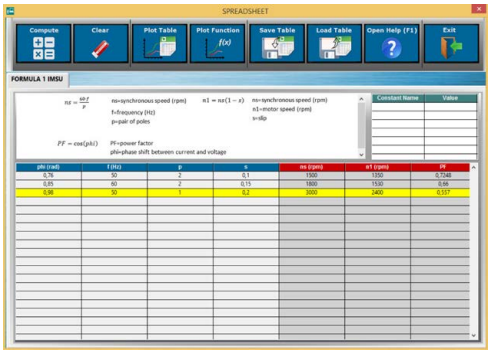
- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge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

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

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

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

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

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REPRESENTATIVE: