edibon

Engineering and Technical
Teaching Equipment

INTRODUCTION

The students who begin their professional career as electricians, assemblers or electrical maintenance technicians require a hands-on learning with equipment that reflect faithfully the electrical installations in which they will work in the future. An important electrical branch are electrical motors and control devices that need for their operation.

The motor drives are intended to control motors via the efficient management of their parameters such us voltage, frequency, turning speed, acceleration and deceleration ramps, soft starting, etc.

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)

"Worlddidac Quality Charter"
and Platinum Member of
Worlddidac

GENERAL DESCRIPTION

The Wiring Installation Training, Start-up of DC and AC Motor Drives, "WIT-SDCAC", has been designed by Edibon for the formation at professional-practical level in the field of electrical motors controllers.

This application provides the future professionals with knowledge and essential skills on the assembly, installation, wiring and commissioning of industrial electrical motors drives. For this purpose, the application includes a specific manual in which is explained, at theoretical-practical level, the aspects concerning to the installation procedures of these devices

The WIT-SDCAC includes the following elements:

- FP-STR. Assembly Frame with Safe Electrical Power Supply.

- FP-KIT-4. Wiring Installation Kit.

- FP-KIT-10. Tubes and Fittings for Channelling Wiring Kit.

- CHER. Tool Box.

- MED65. Digital Multimeter.

- FP-KIT-5. Measuring Kit.

- FP-KIT-6. Signalling and Control Kit.

- Electrical Machines:

     - EMT5-E. D.C. Shunt-series Compound Excitation Motor.

          FP-KIT-2. DC Motor Controller Installation Kit.

     - EMT7-E. Asychronous Three-phase Motor of Squirrel Cage.

          FP-KIT-3. AC Motor Controller Installation Kit.

          FP-KIT-7. Manual Starters for Three-Phase Induction Motor of Squirrel Cage Kit.

          TRANS03. Three-phase Autotransformer 400/230 VAC, 1 kVA, Module.

Recommended elements:

- HFRB. High Flow-Rate Blower.

- FLYW. Flywheel.

- FP-MEG. Megohmmeter.

- FP-KIT-8. PLC Installation and Programming Kit.

- FP-KIT-9. 400 VAC Circuit Breakers Kit.

• FP-STR. **Assembly Frame with Safe Electrical Power Supply.**

    Aluminum structure:

        Three alminum struts.

        Easy assembly of components via hammer head screws.

        Possibility of simultaneous work of several students.

        Four swivelling casters to facilitate the movement.

        Dimensions:

            Structure height: 1800 mm.

            Workineight: 1000 mm.

            Width: 1500 mm.

        Three-Phase connection plug.

        Safe electric box:

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

            Emergency stop mushroom (230/400 VAC):

            5-wire hose for connection to frame.

            Signal lamp of voltage presence.

• FP-KIT-4. **Wiring Installation Kit.**

    100 meters of grey wire of 1.5 mm^2.

    100 meters of brown wire of 1.5 mm^2.

    100 meters of black wire of 1.5 mm^2.

    100 meters of green/yellow wire of de 1.5 mm^2.

    25 meters of screened wire.

• FP-KIT-10. **Tubes and Fittings for Channeling Wiring Kit.**

    PVC electrical conduit for wiring installation, 5 m.

    3 electrical boxes.

    Cable guide.

• CHER. **Tool Box.**

    Crimper.

    Tin.

    Meter.

    Insulation tape.

    Heat shrink.

    Pole finder.

    Voltage tester screwdriver.

    Cross-head screwdriver and flat-head screwdriver.

    Allen keys.

    Soldering iron and soldering iron support.

    Rubber hammer.

    Wire terminals and Connection terminals.

    Flanges.

    Wire cutter.

    Screw Clamp Terminals.

• MED65. **Digital Multimeter.**

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

    With this digital multimeter we will be able to measure:

        Voltage.

        Current.

        Resistance.

        Capacitors capacity.

        Temperature.

- FP-KIT-5. **Measuring Kit.**
  - Clamp Meter:
    - Clamp for alternating current measurements contactless.
    - The clamp can measure:
      - Current.
      - Voltage.
      - Resistance.
  - A voltage and continuity tester:
    - Voltage range: 12-690 VAC.
    - Phases rotating detection in three-phase systems.
    - Polarity tester.

- FP-KIT-6. **Signaling and Control Kit.**
  - Three commutators:
    - Two positions commutator.
  - Three signalling lamps:
    - Nominal voltage: 230 VAC.
    - Three lamps (red, yellow and green).
  - Emergency stop mushroom (230/400 VAC):
    - Supply voltage: 230/400 VAC.

- EMT5-E. **D.C. Shunt-series Compound Excitation Motor.**
  - Nominal power: 300 W.
  - Armature Voltage: 200 VDC.
  - Excitation Voltage: 230 VDC.
  - Armature Current: 1.5 A.
  - Excitation Current: 0.4 A.
  - RPM: 3400/7500 rpm.
  - Shaft height: 71 mm.

- FP-KIT-2. **DC Motor Controller Installation Kit.**
  - DC Motor Controller:
    - Supply voltage: 230 VAC (PH+N+G).
    - Three ON-OFF switches:
      - ON-OFF power switch.
      - Star-Stop control activation switch.
      - Internal tacho dynamo feedback switch.
    - Two potentiometers:
      - Speed control.
      - Torque control.
    - Terminals:
      - Rotor terminals.
      - Excitation terminals.
      - Tacho dynamo terminals.
    - Three driver status leds: (red, yellow and green).
    - Variable output voltage: 0 - 300 VCC.
  - A control cabinet with door:
    - Dimensions:
      - Height: 500 mm.
      - Width: 400 mm.
      - Depth: 200 mm.
  - Cut rail, 2 m.
  - Grey cable duct for wiring, 2 m.
  - 200 W, DC Motor with Wound Rotor.

- EMT7-E. **Asychronous Three-phase Motor of Squirrel Cage.**

    Nominal power: 370 W.

    Nominal voltage: 3x 230/400 VAC Δ/Y

    Frequency: 50/60 Hz.

    Poles number: 2.

    RPM: 2730 rpm.

    Shaft height: 71 mm.

- FP-KIT-3. **AC Motor Controller Installation Kit.**

    Frequency controller:

        Supply voltage: 230 VAC.

        Nominal power: 0,4 kW.

        PWM output voltage connections:

            Three-Phases: 230 VAC.

        Potentiometer for the induction motor control speed.

        Setting and visualization display of the machine parameters.

        EMC/EMI filter to limit electromagnetic interference.

    Speed control potentiometer.

    Control cabinet with door:

        Dimensions:

            Height: 500 mm.

            Width: 400 mm.

            Depth: 200 mm.

- FP-KIT-7. **Manual starters kit for Three-Phase Induction Motor of Squirrel Cage.**

    Manual Star-Delta starter:

        Nominal Voltage: 400 VAC.

    Maximum current contacts: 10 A.

    Star-Delta three position commutator:

        0: Open circuit.

        Y: star connection.

        Δ: delta connection.

    Direct manual starter:

        Nominal Voltage: 400 VAC.

        Maximum current contacts: 10 A.

        Two positions commutator (ON-OFF):

            0: Open.

            1: Close.

    Manual direct starter with inversión:

        Nominal Voltage: 400 VAC.

        Maximum current contacts: 10 A.

        Three positions commutator:

            0: Open.

            1: Direct connection.

            2: Inverse connection.

- TRANS03. **Three-phase Autotransformer 400/230 VAC, 1 kVA, Module.**

    Three-Phase Autotransformer.

    Supply Voltage: 400 VAC (3PH).

    Nominal Output Voltage: 3 x 230 VAC (3PH + N).

    Nominal power: 1 kVA.

    Transformer connection: YY0.

    Start / stop switch for instantaneous connection / disconnection of the network transformer.

    Fuses: 3 x 5 A.

    GND terminal.

- HFRB. **High Flow-Rate blower.**

    High Flow-Rate blower.

    Airflow: 600 m³/h.

    Nominal speed: 2780 r.p.m.

- FLYW. **Flywheel.**

    Weight: 2 kg.

    Maximum recommended speed: 4000 r.p.m.

    Moment of inertia: 0,0025 Km².

- FP-MEG. **Megohmmeter.**

    Measurement of insulation resistance.

    Maximun resistance: 400 MΩ.

    Continuity tester.

- FP-KIT-8. **PLC Installation and Programming Kit.**

    PLC Siemens:

        Supply voltage: 24 V.

        Contacts:

            Eight digital inputs.

            Four relay outputs.

        Software of PLC programming is included.

    PLC power supply:

        Supply voltage: 230 VAC.

        Output voltage: 24 V.

    8 x control switches.

    4 x relays (230 VAC, 2NC, 2NO).

- FP-KIT-9. **400 VAC Circuit Breakers Kit.**

    Five three pole circuit breakers:

        Nominal voltaje of power terminals: 400 VAC.

        Nominal voltaje of control terminals: 230 VAC.

        Nominal voltaje coil: 230 VAC.

        Auxiliary contacts: 3 NO / 2 NC.

- **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.- Components and electrical devices installation in the electrical cabinet.

2.- Feeder wiring in the electrical cabinet.

3.- Wiring of AC frequency controller, electrical protections and power and control circuits.

4.- Programming and commissioning of frequency controller.

5.- Programming of acceleration time with the frequency controller.

6.- Programming of deceleration time with the frequency controller.

7.- Frequency/speed control with the AC frequency controller

Some practical exercises with the recommended accesories:

8.- Wiring of the PLC to the frequency controller for maneuvers automation.

9.- Programming of the PLC according to the requirements of the installation.

10.- Wiring of electronic soft starter for motors.

11.- Configuration and commissioning of electronic soft starter for AC motors.

12.- Wiring of DC motor controller.

13.- Wiring of DC motor to the DC motor controller.

14.- Torque/speed control of the DC motor with the DC controller.

15.- Wiring of AC motor manual starters.

16.- Wiring of the blower and analysis of the energy consumption.

17.- Coupling of the flywheel and anlysis of the energy consumption.

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

REQUIRED SERVICES

- Electrical supply: three-phase, 380 VAC – 400 VAC/50 Hz or 190 VAC – 240 VAC/60 Hz, 2 kW.

DIMENSIONS AND WEIGHTS

WIT-SDCAC:

- Dimensions: 2000 x 400 x 2000 mm approx.

  (78.74 x 15.75 x 78.74 inches approx.)

- Weight: 80 Kg approx.

  (176.36 pounds approx.)

WIT-SDCAC/ICAI. Interactive Computer Aided Instruction Software System:
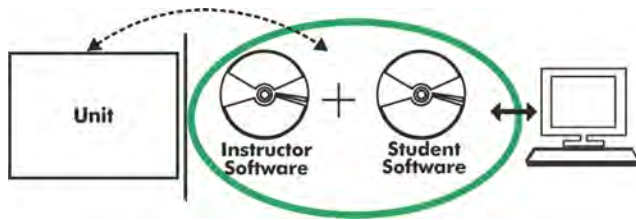
With no physical connection between unit and computer, **this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF).** Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.
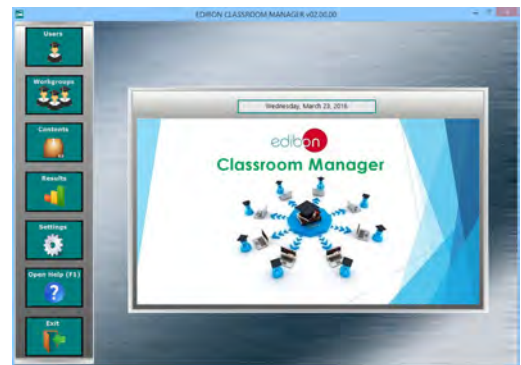
Instructor Software

- 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.**
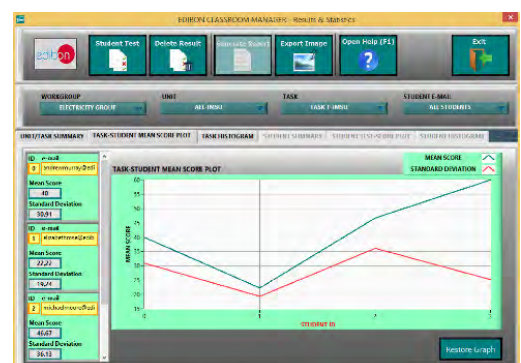

ECM-SOF. EDIBON Classroom Manager (Instructor Software)
Application Main Screen
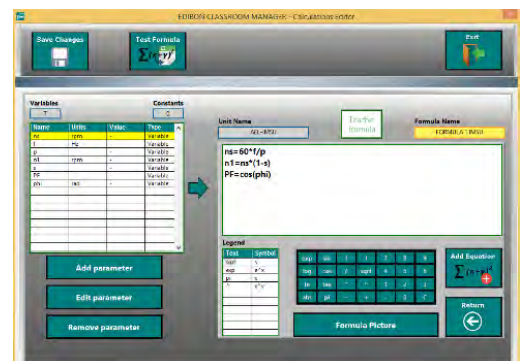
ECAL. EDIBON Calculations Program Package - Formula
Editor Screen
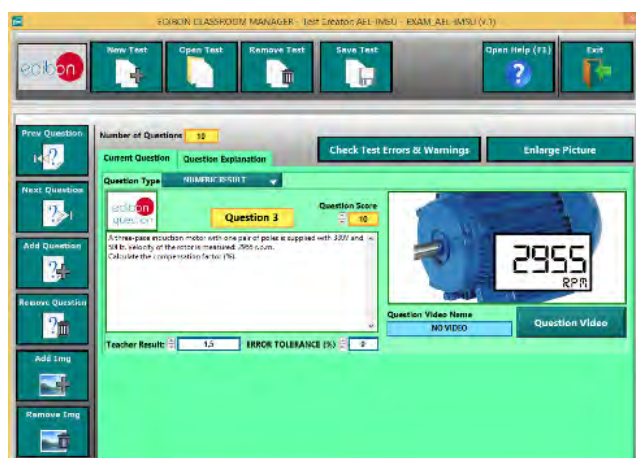
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with
Numeric Result Question

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

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.
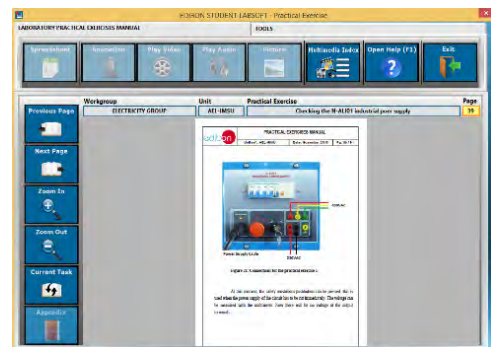
Innovative features:

• 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

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

www.edibon.com/en/files/expansion/ICAI/catalog

ERS. EDIBON Results & Statistics Program Package - Question Explanation
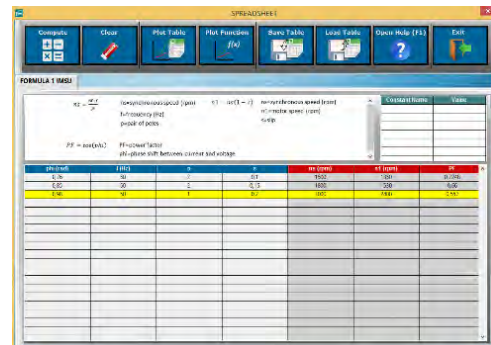
ECAL. EDIBON Calculations Program Package Main Screen

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

INTERNATIONAL

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