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 ↳ PRODUCTS
 ↳ 40.- ELECTRICITY

INTRODUCTION

The electric motors are devices capable of transforming electrical energy into mechanical energy. The three-phase induction motors with wound rotor are very used in industrial installations. The advantage of these machine is that starting can be reduced by using rotor resistances. In the starting moment several resistances are connected to the rotor. Once the motor is turning, the rotor is short circuited.



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 Application of AC Three-Phase Induction Motor of Wound Rotor, "AEL-ACWRA", is designed for the study of the main operations performed in the industrial field with this three-phase induction motors with wound rotor.

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

The AEL-ACWRA includes the following modules:

- N-ALI01. Industrial Main Power Supply.
- N-ARR12. Direct Starter.
- N-PUL48. 3 Double Chamber Push-Buttons.
- N-LAM02. Auxiliary Lamps.
- N-CON01. 3-pole Contactor (24 VAC). (4 units)
- N-REL30. Synchronization Relay. (3 units)
- N-ALI03. AC Auxiliary Power Supply.
- EMT8. Asynchronous three-phase motor with wound rotor.
- FLYW. Flywheel.
- N-TRANS03. Three-phase Autotransformer 400/230 VAC, 1KVA.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-ACWRA/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).

Additional and recommended measurement instrumentation modules:

- Digital Instrumentation:
 - N-EALD. Network Analyzer Unit with Computer Data Acquisition.
- Analog Instrumentation:
 - N-MED10. AC Ammeter (0-5 A).
 - N-MED22. AC Voltmeter (0-400 VAC).
 - N-MED33. 3-Phase Balanced Wattmeter 440 V.
 - N-MED31. 3-Phase Phasemeter 400V.
 - N-MED39. 3-Phase Balanced Varmeter 440 V.

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-ACWRA can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

- N-RACK-A (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.

SPECIFICATIONS

The application includes the following modules:

- **N-ALI01. Industrial Power Supply.**

Supply voltage: 400 VAC, 3 PH+N+G.

ON-OFF removable key.

Output voltage connections:

Three-Phase + Neutral: 400 VAC.

Single-Phase: 230 VAC.

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

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



N-ALI01

- **N-ARR12. Direct Starter Module.**

Nominal voltage: 400 VAC.

Maximum contacts current: 10 A.

Two positions commutator (ON-OFF):

0: Open circuit.

1: Closed circuit.



N-ARR12

- **N-PUL48. 3 Double Chamber 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.

Ground terminal.



N-PUL48

- **N-LAM02. Auxiliary Lamps.**

Nominal voltage: 24 VAC.

Three lamps (red, yellow and green).

Ground terminal.



N-LAM02

- **N-CON01. 3-poles Contactor (24 VAC). (4 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 Normally Open Contacts (NO) for control circuit.

Two Normally Close Contacts (NC) for control circuit.

Ground terminal.



N-CON01

- **N-REL30. Synchronization Relay Module. (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:

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).

Ground terminal.



N-REL30

Specifications

- **N-ALI03. AC Auxiliary Power Supply.**

Supply voltage (Single-Phase): 230 VAC PH+N+G.

Output voltage:

Single-Phase 24 VAC/12 VAC.

24 VDC.

0-24 VDC through potentiometer.



N-ALI03

- **EMT8. Asynchronous Three-Phase Motor with Wound Rotor.**

Nominal power: 300 W.

Nominal voltage: 3x 230/400 VAC Δ /Y.

Frequency: 50/60 Hz.

Number of poles: 2.

RPM: 2870 r.p.m.

Nominal current: 1/ 0,5 A.



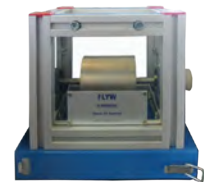
EMT8

- **FLYW. Flywheel.**

Weight: 2 kg.

Maximum recommended speed: 4000 r.p.m.

Moment of inertia: 0,0025 kgm².



FLYW

- **N-TRANS03. Three-Phase Autotransformer Module 400/230 VAC, 1KVA.**

Three-phase autotransformer.

Nominal supply voltage: 400 VAC (3PH).

Nominal output voltage: 3 x 230 VAC (3PH+N).

Nominal power: 1 kVA.

Transformer connection: YY0.

Start/stop commutator for instantaneous connection/disconnection of the grid transformer.

Fuses: 3 x 5 A.



N-TRANS03

Additional and recommended measurement instrumentation modules:

- **N-EALD. Network Analyzer Unit with Computer Data Acquisition.**

ON-OFF switch.

Supply voltage: 400 VAC.

Input terminals: Input connection with the measurement point.

Output terminals: Output connection with the measurement point.

Digital outputs: Three digital outputs are used for pulses or alarms, or for combining both.

RS-485 Communication port.

Fuses: 3 x 10 A.

Network Analyzer Display. It shows:

Active, reactive and apparent power.

Active, reactive and apparent energies.

Lines and phase currents.

Line and phase voltages.

Frequencies.

Power Factor.



N-EALD

Specifications

- N-MED10. **AC Ammeter (0-5 A).**

Measurement range: 0-5 A.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED10

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

Measurement range: 0-400 VAC.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED22

- N-MED33. **3-Phase Wattmeter 440 V.**

Nominal voltage 440 VAC.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED33

- N-MED31. **3-Phase Phasemeter 400 V.**

3 phasemeter.

400 Vac.

CAP 0.5-1-0.5 IND.

Accuracy 1.5 % of 90°.

50 or 60 Hz.



N-MED31

- N-MED39. **3-Phase Balanced Varmeter 440 V.**

3 phase balanced varmeter.

440 VAC.

Range: 0 - 300 Var.

Scale 90°.

Accuracy 1.5%.

50 or 60 Hz.



N-MED39

- **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.- Manual star-delta circuit of Asynchronous three-phase motor with wound rotor.
- 2.- Manual reversing operations of Asynchronous three-phase motor with wound rotor.
- 3.- Timer Sequential Control operations of Asynchronous three-phase motor with wound rotor.
- 4.- Automatic star/delta starter of Asynchronous three-phase motor with wound rotor.
- 5.- Automatic star-delta reversing circuit of Asynchronous three-phase motor with wound rotor.
- 6.- Countercurrent braking.
- 7.- Automatic soft starter of Asynchronous three-phase motor with wound rotor.

REQUIRED SERVICES

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

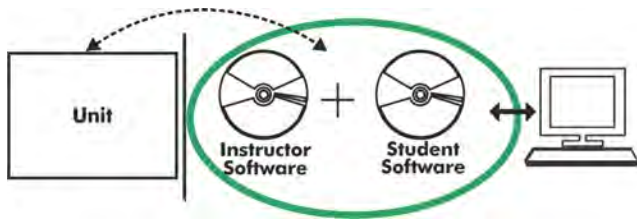
DIMENSIONS AND WEIGHTS

AEL-ACWRA:

- Dimensions: 640 x 320 x 920 mm approx.
(25.19 x 12.59 x 36.26 inches approx.)
- Weight: 70 Kg approx.
(154 pounds approx.)

Optional

AEL-ACWRA/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.

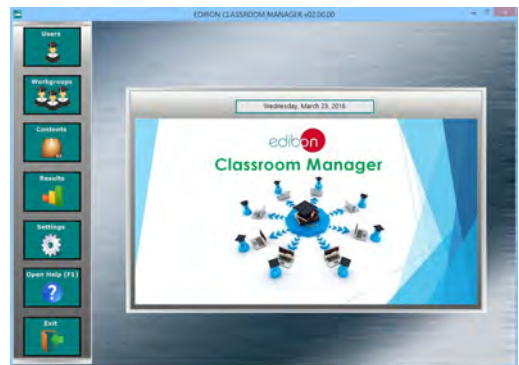
Instructor Software

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

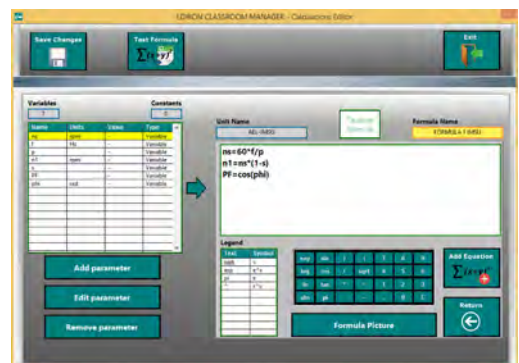
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

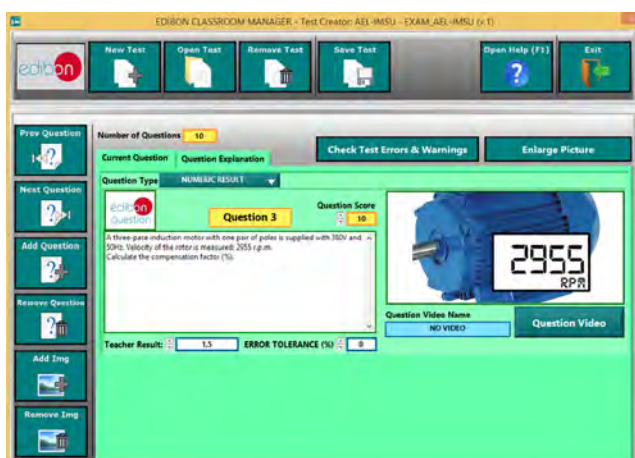
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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

