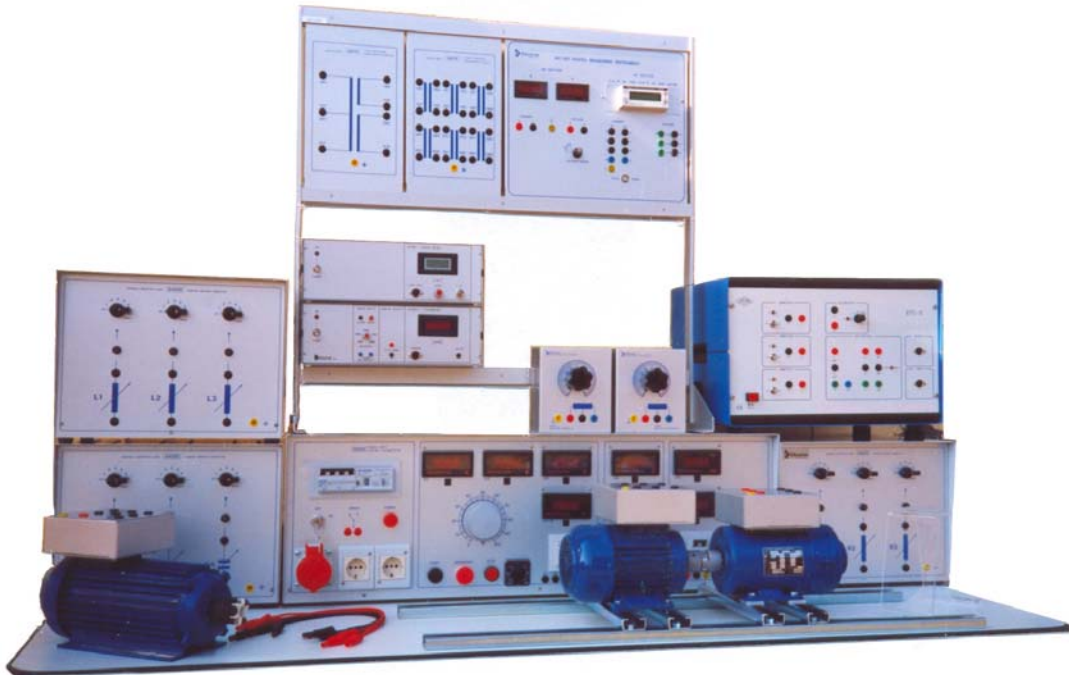


Electron S.R.L.

Design
Production &
Trading of
Educational
Equipment

A4 - MODULAR TRAINING SYSTEMS FOR THE STUDY OF ELECTRICAL MACHINES



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The system provides a complete range of integrated electrical machines, standard instruments, safety protections and accessories for an effective training on both the AC and DC machines characteristics.

They can be easily and quickly assembled on a test board that ensures safe coupling and noiseless, vibration free running. Educational boards with 4 mm safety terminals and printed electrical diagrams are mounted on each machine.

The power of the electrical machines is ranging from 3 KW (**System A4L**), 1KW (**A4M**) and fraction of HP (**A4S**)

The accessories are modular and are implemented in rugged enclosures that can be optionally mounted on an aluminum frame when being exercised or when stored. They can be used both for individual and for group demonstration purposes.

This system with the proposed composition minimizes the number of equipment required to perform the various experiments.

Including the following sections:

POWER SUPPLIES

This section contains various power supplies ranging from the universal type that is designed to be suitable to most kinds of electrical applications, to specialized units that cover more specific needs in the area of residential and industrial electrical installations.

TRANSFORMERS

Various types of transformers are offered in this section, spanning from single phase to three phase, fixed and variable. A phase shifter is also included.

TYPICAL ROTATING MACHINES

The section includes single and three phase, asynchronous and synchronous AC machines, single and poli-excitation DC machines and special units such as the Schrage motor, shaded poles, repulsion and reluctance motors. The units are also available in cut-away versions for demonstrating the internal construction details.

Included is an unit for controlling automatically the voltage of synchronous generators.

MULTIFUNCTION ELECTRICAL MACHINE

A compact and integrated system to perform most experiments and tests on standard electrical machines. Compared to that of a set of discrete machines the advantages are lower cost, modularity and, owing to the complete visibility of the components, the possibility for the student to learn their electrical and construction details.

The windings are connected to terminal boards on top of which they are clearly identified by drawings that show the internal logic and make their understanding and connections easy in the different possible combinations.

The synchronous machine is in all respect a real implementation and not a simulated function of the asynchronous unit.

MAGNETIC BRAKES

This is a series of brakes specially designed for braking and measuring torque of all rotating machines in a school laboratory environment. It includes a braking DC generator, a magnetic powder brake and an Eddy current brake. The torque can be measured by means of a load cell applied to the machine and an electronic instrument (see section A47), or with an arm and weight system.

LOADS

This section includes three series of loads: resistive, inductive and capacitive, designed to be used with all our AC and DC Generators in a training environment. In the standard versions the loads are controlled in seven steps per phase. Ten step and continuous variation versions are available on request.

RHEOSTATS

This section offers rheostats for starting AC and DC motors and for providing excitation to synchronous and DC machines: Also included is an electronic automatic starter for synchronous motors.

INSTRUMENTS FOR ELECTRICAL MACHINES

It includes the instruments required to collect the necessary information for testing electrical machines: manual and electronic RPM counters, electronic torque meter, stroboscope, analogue meters and digital power analyzer.

DATA ACQUISITION SYSTEM

This system consists of a data acquisition box, connected on one side to electrical machines under test and on the other side to a PC, and relevant control Windows based software that runs on the PC to manage tests on electrical machines. Simulations are also possible without having to physically connect the machines.

Test conditions and progress are displayed on the PC monitor where actual reproductions of the instruments are shown together with tabled data and control commands.

ACCESSORIES FOR ELECTRICAL MACHINES

Several accessories are offered in this section to complete the laboratory testing equipment. Included are: paralleling board, for paralleling synchronous generators, various starting switches for single and two speed motors, flywheel, tacho-generator, a basis for coupling electrical machines mechanically, cables and their support, a trolley and a rotor locker for keeping motor rotors locked under tests that require it.

We list here the units of this training system

Click on LEAFLETS to open the Catalogue

A4 – A02 POWER SUPPLIES

A4-A0240	UNIVERSAL POWER SUPPLY	LEAFLETS
A4-A0240M1	THREE PHASE POWER SUPPLY	
A4-A0240M2	VARIABLE THREE PHASE AND DC POWER SUPPLY	
A4-A0240M3	VARIABLE SINGLE PHASE AND DC POWER SUPPLY	
A4-A0241M	AC/DC POWER SUPPLY	
A4-A0245	UNIVERSAL POWER SUPPLY	
A4-A0250	THREE PHASE POWER DISTRIBUTION BOARD	
A4-A4121	THREE PHASE VARIABLE POWER SUPPLY	

A41 - TRANSFORMERS

A4110	SINGLE PHASE TRANSFORMERS	LEAFLETS
A4110DS	SINGLE PHASE DEMOUNTABLE TRANSFORMER	
A4111	SINGLE PHASE VARIABLE AUTOTRANSFORMERS	
A4115	THREE PHASE TRANSFORMERS	
A4121	THREE PHASE VARIABLE AUTOTRANSFORMERS	
A4130M	A4130M - THREE PHASES PHASE SHIFTER	
A4150	MAGNETIC CIRCUITS TRAINING SET	

A42 - ROTATING MACHINES

A4220	SQUIRREL CAGE THREE PHASE MOTORS	LEAFLETS
A4222	SLIP RING THREE PHASE MOTORS	
A4223	SYNCHRONOUS THREE PHASE MACHINES	
A4223-REG	ALTERNATOR VOLTAGE CONTROLLER	
A4224	SQUIRREL CAGE 2 SPEED THREE PHASE MOTORS	
A4226	THREE PHASE SCHRAGE MOTORS	
A4228	RELUCTANCE MOTOR	
A4230	SINGLE PHASE CAPACITOR RUN MOTORS	
A4230-ST	STARTER FOR SINGLE PHASE - SPLIT PHASE MOTORS	
A4232	SINGLE PHASE CAPACITOR START MOTORS	
A4234	SINGLE PHASE UNIVERSAL MOTORS	
A4236	REPULSION MOTOR	
A4238	SHADED POLES MOTOR	
A4240	DC COMPOUND EXCITATION MACHINES	
A4242	DC SERIES EXCITATION MACHINES	
A4244	DC SHUNT EXCITATION MACHINES	
A4246	DC POLY EXCITATION MACHINES	
A4248	DC PERMANENT MAGNETS MOTOR	
A42C	CUTAWAY ROTATING MACHINES SET	
A42FS	THREE PHASE MOTOR WITH FAULT SIMULATOR	

A43 – MULTI MOTOR ASSEMBLY

A4300	MULTIFUNCTION ELECTRICAL MACHINE SYSTEM	LEAFLETS
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A44 – MAGNETIC BRAKES

A4410	MAGNETIC POWDER BRAKE	LEAFLETS
A4420	EDDY CURRENT BRAKES	
A4430	BRAKING DC GENERATORS	
A4430R	VARIABLE LOAD FOR BRAKE GENERATOR	

A45 – LOADS

A4510	RESISTIVE LOADS	LEAFLETS
A4511	RESISTIVE LOADS WITH CONTINUOUS VARIATION	
A4520	CAPACITIVE LOADS	
A4521	CAPACITIVE LOADS WITH CONTINUOUS VARIATION	
A4530	INDUCTIVE LOADS	
A4531	INDUCTIVE LOADS WITH CONTINUOUS VARIATION	

A46 – RHEOSTATS

A4610	STARTER FOR DC MOTOR	LEAFLETS
A4610P	DC SHUNT/COMPOUND MOTOR START RHEOSTAT	
A4620	STARTER FOR AC MOTOR	
A4630	FIELD REGULATOR FOR DC MOTOR	
A4630R	STEPPED RESISTOR STARTER FOR AC SLIP RING MOTORS	
A4650	AUTOMATIC STARTER FOR SYNCHRONOUS MOTORS	

A47 - INSTRUMENTS FOR ELECTRICAL MACHINES

A4720	DIGITAL RPM METER	LEAFLETS
A4722	OPTICAL TRANSDUCER ASSEMBLY	
A4725	PHOTO/CONTACT DIGITAL TACHOMETER	
A4726	DIGITAL STROBOSCOPE	
A4730-4731	MOTOR TORQUE MEASURING MODULE WITH LOAD CELL	
A4750A	ANALOG ELECTRICAL POWER MEASURING SET	
A4750D	ELECTRICAL POWER MEASURING SET	

A4782 – SOFTWARE FOR ELECTRICAL MACHINES

A4782	COMPUTER BASED MEASUREMENT TRAINER	LEAFLETS
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A48 – ACCESSORIES

A4810	PARALLELING BOARD	LEAFLETS
A4840	MACHINE COUPLING BASE	
A4840RL	ROTOR LOCKER	
A4840TR	TROLLEY	
A4880	TACHOGENERATOR	
A4885	FLYWHEEL	
A4890	CABLES SET	