

# ELECTRICAL MACHINE & TRANSFORMER TRAINER

## EM-30800Q



**SCIENSCOPE**  
**EDU-LABS**



The EDU-LABS EM-30800Q Electrical Machine & Transformer Trainers has been designed for experimental and testing in electrical machines in education.

The machines are basically industrial models, self-protect kind, with coupling half-joint, especially equipped to be suitable for student training in laboratory. For this purpose, the winding ends are connected to 4 mm safety socket in a metal housing on top of which a clear synoptic diagrams as educational terminal board.

The student can easily understand operation and winding connection. Also, most of accessories and instruments designed in Panel System A4 high in standard. The machine's powers are 370W/750W, as the supply requirement for the system operation requires 240/415V, 50Hz.

- Modularized design provides the most flexible requirement of this experimental equipment.
- Each Module panel height compatible with DIN A4 standard.
- Using 4 mm safety sockets and plugs.
- Each AC/DC power supply equipped with overload protection.
- Adopting digitized and microprocessor-based measuring instruments to provide high-accuracy measurement.
- AC & DC Generator Brake with constant speed/constant torque function, easy to operate.

**DC SHUNT WOUND MACHINE  
EM-30-01-01**



- Nominal Power: 370W (1/2HP)
- Nominal Voltage: 220VDC
- Nominal Current: 1.50
- Nominal Speed: 1500 rpm
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**DC SERIES WOUND MACHINE  
EM-30-01-02**



- Nominal Power: 370W (1/2HP)
- Nominal Voltage: 220VDC
- Nominal Current: 1.50
- Nominal Speed: 1500 rpm
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**DC COMPOUND WOUND MACHINE  
EM-30-01-03**



- Nominal Power: 370W (1/2HP)
- Nominal Voltage: 220VDC
- Nominal Current: 1.50
- Nominal Speed: 1500 rpm
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**THREE PHASE INDUCTION MOTOR  
EM-30-02-01-SD**



- Nominal Power: 370W (1/2HP)
- Nominal Voltage: 450 / 690V (Delta/Star)
- Nominal Current: 2.50 / 1.50A (Delta/Star)
- Nominal Speed: 3000 rpm
- Cooling Method: Self Cooling Fan
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**THREE PHASE INDUCTION MOTOR  
EM-30-02-01 (750W)**



- Nominal Power: 750W (1HP)
- Nominal Voltage: 240 / 415V (Delta/Star)
- Nominal Current: 2.85 / 1.850A (Delta/Star)
- Nominal Speed: 1500 rpm
- Cooling Method: Self Cooling Fan
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**THREE PHASE SLIP RING MOTOR  
EM-30-02-02**



- Nominal Power: 370W (1/2HP)
- Nominal Voltage: 240 / 415V (Delta/Star)
- Nominal Current: 4.5 / 4.0A (Delta/Star)
- Nominal Speed: 1500 rpm.
- Frequency: 50Hz
- Cooling Method: Self Cooling
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**THREE PHASE SYNCHRONOUS MACHINE  
EM-30-03-02**



- Nominal Power: 370W (1/2HP)
- Nominal Voltage: 240 / 415 V (Delta/Star)
- Nominal Current: 1.85 / 2.85 A (Delta/Star)
- Nominal Speed: 3000 rpm
- Frequency: 50 Hz
- Excitation Voltage: 0 ~ 50 VDC
- Excitation Current: 0.25 A
- Winding Poles: 2
- Cooling Method: Self Cooling
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**ROTOR RESISTANCE STARTER UNIT  
EM-30-08-05**



Switching adjustable in 2 steps and able to start Three Phase Slip Ring Machine (Wound Rotor Motor) up to 750W, 415V, 50Hz.

- Horse Power : 2
- F.L.S.T. : 150
- Rotor Voltage : 120
- Rotor Current : 5
- Step : 2
- STAR Point : 1

**SINGLE PHASE CAPACITOR START MOTOR  
EM-30-04-01**



- Nominal Power: 370W
- Nominal Voltage: 240VAC
- Nominal Current: 2.5A
- Nominal Speed: 1500rpm
- Frequency: 50Hz
- Power Factor: 0.78
- Winding Poles: 4
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**SINGLE PHASE CAPACITOR START & RUN  
MOTOR EM-30-04-02**



- Nominal Power: 370W
- Nominal Voltage: 240VAC
- Nominal Current: 2.5A
- Nominal Speed: 1500rpm
- Frequency: 50Hz
- Power Factor: 0.78
- Winding Poles: 4
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**SINGLE PHASE INDUCTION MOTOR  
EM-30-04-03**



- Nominal Power: 375W
- Nominal Voltage: 240VAC
- Nominal Current: 2.5A
- Nominal Speed: 1500rpm
- Frequency: 50Hz
- Power Factor: 0.78
- Winding Poles: 4
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**SINGLE PHASE SPLIT PHASE MOTOR  
EM-30-04-04**



- Nominal Power: 375W
- Nominal Voltage: 240VAC
- Nominal Current: 2.5A
- Nominal Speed: 1500rpm
- Frequency: 50Hz
- Power Factor: 0.78
- Winding Poles: 4
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**UNIVERSAL AC/DC MOTOR  
EM-30-04-05**



- Nominal Power: 350W (AC/DC)
- Nominal Voltage: 240 V (AC/DC)
- Nominal Current: 3.0 A
- Nominal Speed: 3000 rpm.
- Frequency: 50 Hz
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit
- Coupling: EM-21-CS (Option)

**TACHOGENERATOR  
EM-30-11-10**



- Power Rating: 350W
- Output Voltage: 0 ~ 80V
- Current: 250mA
- Speed: 3000rpm
- Motor Coupling Set (Must Compatible For Motor or Prime Mover)
- Base Plate (Musts Compatible With Motor or Prime Mover)
- Coupling: EM-21-CS (Option)

**DC GENERATOR BRAKE  
EM-30-06-05**



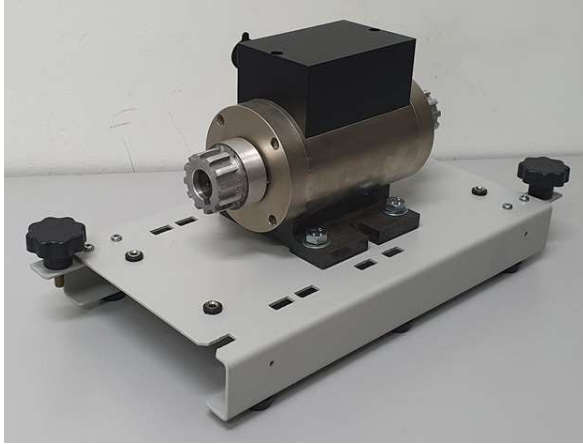
- Nominal Power: 750W (1HP)
- Nominal Voltage: 220VDC
- Nominal Current: 2.0A
- Nominal Speed: 1500 rpm
- Terminals: 4mm Safety Socket
- Cooling Method: Self Cooling
- Base Plate: Attachable To Break Load Unit

**THREE PHASE AC GENERATOR BRAKE  
EM-30-06-07**



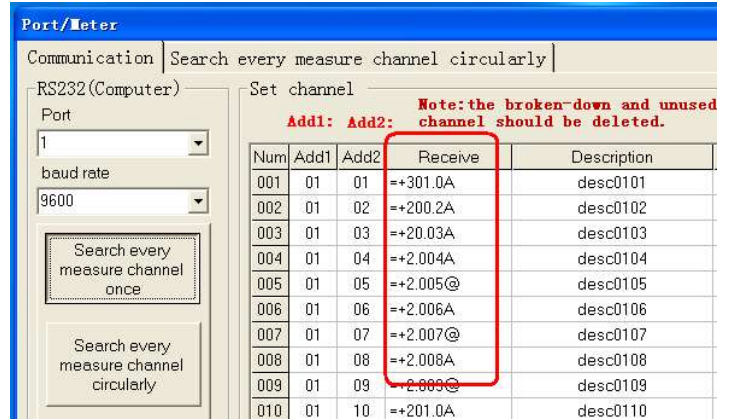
- Nominal Power: 750W (1HP)
- Nominal Voltage: 240/415AC
- Nominal Current: 2.5A
- Nominal Speed: 3000 rpm.
- Frequency: 50 Hz
- Excitation: Permanent Magnet
- Cooling Method: Self Cooling
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Motor Unit

**TORQUE SENSOR MODULE  
EM-30-06-18**



- Motor direct coupling design
- Sensor Type: Noncontact rotation torque transducer
- Max. torque:  $\pm 10\text{Nm}$
- Max Rotation speed: 12000rpm
- Torque Output: Frequency
- Speed Output: Frequency
- Connection: Shaft and Coupling

**TORQUE MANAGEMENT SOFTWARE  
EM-30-06-20**



- PC management software
- Data collection the measured data by computer serial port
- Display and save the real-time data
- Transform the saved data to TXT, EXCEL file
- By curve analyses, curve print, trend browse, report generation, report edition and report print, etc.

**TORQUE SPEED MEASURING MODULE  
EM-30-06-19**



- Modular design
- Power Supply: 240 V, 50/60 Hz
- Unit Type: Panel H2
- Torque range: -99999-99999 N.m.
- Torque display: 0-99999N.m
- Speed display: 0-99999
- Power consumption: 0-99999
- Measurement resolution: support resolution 1/1000000

- Measuring speed: 25 times per second
  - Pulse input signal: all kinds of output sensor signal, like NPN, PNP, OC, switches and rotary encoder
  - Measurement Frequency: Speed pulse input 0.3Hz~20KHz Torque pulse input, 5KHz~15KHz, can extend to 1HZ~60KHZ
  - Standard transmitter output
    - Optoelectronic isolation
    - Two 4mA~20mA DC current output, Output resolution ratio: 1/4000; error less than  $\pm 0.2\%$ , F.S, loading capacity: less than 600 $\Omega$
  - External Power Supply:  $\pm 15\text{VDC}$  or 24VDC optional, loading capacity more than 300mA
  - Serial communication port as standard configuration
    - Optoelectronic isolation
- RS232 default setting or RS485 optional

**AC/DC GENERATOR BRAKE CONTROLLER  
EM-30-06-06**



- Modular design
- Suitable for all type of AC and DC Generator Brake up to 2HP
- Measurement Range: 0% to 100%
- Protection: Fuse
- Unit Type : Panel H2
- Terminals: 4mm Safety Sockets

**SHUNT FIELD RHEOSTAT  
EM-30-08-02**



- Modular design
- Resistance: 0 ~ 2200Ω Adjustable
- Current: 1.5A
- Rated Power: 300W
- Protection: Fuse
- Terminals : 4 mm safety sockets

**SINGLE PHASE TRANSFORMER  
EM-30-05-01**



- Rated Transformer
- Primary Voltage: 2x240V
- Secondary Voltage: 2x120V
- Power: 300VA
- Frequency: 50Hz
- Terminals: 4mm Safety Socket
- Unit Type : Panel H1

**THREE PHASE TRANSFORMER  
EM-30-05-02**



Each primary and secondary windings are divided in two sections to allow many possibilities of connection including star, delta and zig-zag.

- Primary Voltage: Three Phase 415V (3x2x207.50V)
- Secondary Voltage: Three Phase 240V (3x2x120V)
- Power: 1000VA
- Frequency 50Hz
- Terminals: 4mm Safety Socket
- Unit Type : Panel H1

**RESISTIVE LOAD UNIT  
EM-30-07-01**



Single & Three phase Resistive Load 7 steps variable per phase

- Max Power : 3x100 watt
- Voltage : 240/415 Volt
- Frequency : 50Hz
- Protection : Fuse

**INDUCTIVE LOAD UNIT  
EM-30-07-02**



Single-Three phase Inductive Load 7 steps variable per phase

- Max Power : 3x100 VAR
- Voltage : 240/415 Volt
- Frequency : 50Hz
- Protection : Fuse

**CAPACITIVE LOAD UNIT  
EM-30-07-03**



Single & Three phase Capacitive Load 7 steps variable per phase

- Max Power : 3x100 VAR
- Voltage : 240/415 Volt
- Frequency : 50Hz
- Protection : Fuse

**REACTIVE COMPENSATOR  
EM-30-08-09**



- Modular design
- Capacitors: 2µF / 450V x 3  
3µF / 450V x 3
- Terminals : 4 mm safety sockets



**DIGITAL DC VOLTMETER  
EM-30-13-01**



- Modular design
- Measurement range : DC 0 ~ 600V
- Display : 3 ½ digits 14.2 mm LED
- Accuracy :  $\pm 0.2\% \pm 1$  digit
- Resolution : 1V
- Input impedance :  $1M\Omega$
- Power source : 220Vac, 50/60 Hz
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

**DIGITAL DC AMMETER  
EM-30-13-02**



- Modular design
- Measurement range : DC 0 ~ 5A
- Display : 3 ½ digits 14.2 mm LED
- Accuracy :  $\pm 0.3\% \pm 1$  digit
- Resolution : 0.01 A
- Input impedance :  $< 0.1\Omega$
- Power source : 220Vac, 50/60 Hz
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

**DIGITAL AC VOLTMETER  
EM-30-13-03**



- Modular design
- Measurement range : AC 0 ~ 600V
- Display : 3 ½ digits 14.2 mm LED
- Accuracy :  $\pm 0.2\% \pm 1$  digit
- Resolution : 1V
- Input impedance :  $1M\Omega$
- Power source : 220Vac, 50/60 Hz
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

**DIGITAL AC AMMETER  
EM-30-13-04**



- Modular design
- Measurement range : AC 0 ~ 5A
- Display : 3 ½ digits 14.2 mm LED
- Accuracy :  $\pm 0.3\% \pm 1$  digit
- Resolution : 0.01 A
- Input impedance :  $< 0.1\Omega$
- Power source : 220Vac, 50/60 Hz
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

## THREE PHASE POWER QUALITY METER EM-30-13-16



- Display Type: HD LCD Display
- Real-Time Measurement
  - Phase voltage: V1, V2, V3, Vlnavg Line voltage: V12, V23, V31, Vllavg Current: I1, I2, I3, Iavg, In Active power: per phase and total active power Reactive power: per phase and total reactive power Apparent power: per phase and total
- Energy And Demand
  - Four quadrant active energy: Import, Export, Total, Net Four quadrant reactive energy

- Power Quality Analysis
  - Voltage unbalance Current unbalance Voltage THD (Total harmonic distortion), Odd-even harmonic distortion Voltage individual harmonics, Crest factor Current THD, Odd-even harmonic distortion Current individual harmonics, K factor
- Communication
  - Ethernet 10/100M network port
  - RS485 communication port
  - MODBUS RTU communication protocol
- Settable Logging Interval
  - Logging from 1min to 60min, interval settable
- Software Accessibility
  - 4 Tariffs (DataLog) Sharp, peak, flat, valley in different season and schedule (TOU)
- PowerMeter Management Software Interface
- Accuracy:  $\pm 0.5\%$
- Protection: Fuse
- Power Supply: AC240VAC, 50Hz
- Terminals: 4mm Safety Socket
- Unit Type : Panel H2

## POWER MANAGEMENT SOFTWARE EM-30-13-16-PMS



- PC management software; web browse data
- True-RMS measuring parameters
- ANSI and IEC 0.2 accuracy class
- Power quality analysis
- 4 quadrant energy
- Data logging
- Measure individual harmonics from 2<sup>nd</sup> to 49<sup>th</sup>
- TOU, 4 Tariffs, 6 Seasons, 6 Schedules

## MOTOR COUPLING SLEEVE & SAFETY GUARD EM-30-15-06



- Motor Coupling EM-21-CS for each Motors and Generator (17 units)
- Coupling sleeve (2 units) for mechanical connection of two Electrical Machines.
- Coupling guard (2 Units)
- Material : Epoxy Coated Plate
- Attachable guard for protection against contact with electrical machines rotating parts

**TACHOMETER  
EM-30-11-07**



- Range: 5 to 99,999 RPM
- Resolution:
  - 0.1RPM <1000RPM
  - 1RPM >1000RPM
- Display: 5 Digits, 10mm (0.4")LCD
- Accuracy:  $\pm 0.05\% + 1$  Digits
- Photo Detection Distance: 50 to 150mm
- Battery: 1.5V AA x 4 pcs
- Memory: Last Value, Max. Value, Min. Value
- Size: 190 x 72 x 37 mm
- Weight: 250g

**CONNECTING SAFETY TEST LEAD SET WITH  
BRIDGING PLUG SET EM-30-15-01**



- The set consists of 2 type lead set and 2 type bridging plug set in 5 different coded colors and lengths chosen to allow the realization of all experiment manual.
- Leads are capable of 15A current safety plugs.
- Safety Terminal Socket (4mm): 25cm x 15 units; 50cm x 20 units; 100cm x 15 units
- 19mm Bridging Plug Set x 10 units
- 19mm Bridging Plug Set (Stackable) x 10 units

**STAR DELTA STARTING SWITCH MODULE  
EM-30-10-01**



- Modular design
- Switch load: 400VAC/15A
- Switch positions: 0-1-2 (0-Y- $\Delta$ )
- Unit Type : Panel H1
- Terminals : 4 mm safety sockets

**ROTATION REVERSING SWITCH MODULE  
EM-30-10-02**



- Modular Design
- Switch Load: 400VAC/15A
- Switch positions: FORWARD-OFF-REVERSE
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets (Color Coded)

**POWER DRIVE - SOFT STARTERS MODULE  
EM-30-10-10**



- Modular Design
- Connection: TP+N
- Soft Starter: 2 Phase-Controlled 3  $\phi$ , 415V
- Power Rating: 3HP, 4.8 A ,  $U_c=110-230V$  AC/DC
- Unit Type : Panel H1
- Terminals: 4mm Safety Socket

**AC VARIABLE FREQUENCY DRIVE  
EM-30-14-02**



- Type: 1.5KW (2 HP)
- Power Supply: Single phase 240V, 50Hz
- Power Terminals: R, S, T terminals
- Inverter Output: U, V, W
- Braking Resistor Terminals: P & B
- Panel Control Start/Stop, FWD and REV
- Terminal Control Start/Stop, FWD and REV
- Signal Input: 0-10V
- Digital Input: S1 to S5
- Analog Output: 4-20mA & AO
- Relay Output: RA, RB, RC
- Terminals : 4mm Safety Sockets
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**UNIVERSAL AC & DC POWER SUPPLY  
EM-30-09-02-01**



The system designed to provide all fixed and variable AC and DC supplies which necessary in an electrical machines laboratory to perform the experiment required and work project.

- Connection: 3P+N+PE Output terminations by using 4mm terminals socket.
- Input fed with AC 5 pin plug 32A AC Plug and Socket.
- Pilot lamps are provided to indicate all live supplies.
- With On/Off Selector Switch
- Fuse Protection
- Power Rating: 3KVA

**Output Supply Section**

- Fixed Single Phase AC Power Supply:
  - 3 x 240V AC; 5A AC (Phase To Neutral; R-N, B-N, Y-N)
- Fixed Three Phase AC Power Supply:
  - 3 x 450V AC; 5A AC (Phase To Phase; R-Y, Y-B, B-R)
- Adjustable Single Phase & Three Phase AC / DC Power Supply (Simultaneously):

The unit is contained in a metal housing with clear front panel label and 4mm safety sockets that make its easy and safety for student experiments.

### Specification

- Power Input Requirement: Three Phase 240V/415V, 50Hz

- 3 x 0 ~ 450VAC; 5A AC (Phase To Phase)
- 3 x 0 ~ 240VAC; 5A AC (Phase To Neutral)
- 1 x 0 ~ 430VDC; 5A DC (DC Output)

## UNIVERSAL AC/DC POWER SUPPLY EM-30-09-06-03



The system designed to provide all fixed and variable AC and DC supplies which necessary in an electrical machines laboratory to perform the experiment required and work project.

The unit is contained in a metal housing with clear front panel identification and 4mm safety sockets that make its easy and safe.

### Three Phase Power Supply EM-30-09-01-SS

- Power Input: 3 Phase 240V/415V, 50Hz via input 5 core cable with 5 pin AC Plug, 32A
- 5 Pin AC Socket Output 16A
- Indicator: 3 pilot lamp for power line in three color coded. (Red, Yellow & Blue)
- Fuse Protection: Three Phase Output
- Connection: 3P+N+PE.
- Emergency Push Button Switch
- Keylock Switch
- START Push Button Switch
- STOP Push Button Switch
- Protection: Earth leakage circuit breaker and miniature circuit breaker and AC Contactor

- Fixed Three Phase AC Power supply: 3 x 415V AC; 32A AC (Line To Line)
- Fixed Single Phase AC Power supply: 3 x 240V AC; 32A AC (Line To Neutral)

### AC/DC Variable Power Supply EM-30-09-04-03

- Fixed Single Phase AC Power Supply: 240VAC, 50Hz
- Adjustable Single Phase AC/DC Power Supply (Simultaneously) :
  - 0 ~ 250VAC, 0 ~ 12A AC
  - 0 ~ 230VDC, 0 ~ 12A DC
- AC/DC Voltmeter & AC/DC Ammeters provided to indicate output volts and amps.

### AC Socket Outlet EM-30-09-05

2 nos. 13A / 250V AC switched socket outlets.

**EXPERIMENTAL TABLE  
EM-30-16-01-02**



- 5' Standard Desktop
- Dimension:
- Length : 1500mm
- Width : 800mm
- Height : 850mm
- 3 Layer Drawer (Optional)

**EXPERIMENT PANEL FRAME  
EM-30-16-02-02**



- Din Standard A4 With Two Shelves
- Side Frame: T Shape
- Dimension:
- Length : 1450mm
- Width : 20mm
- Height : 300mm

**ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.**