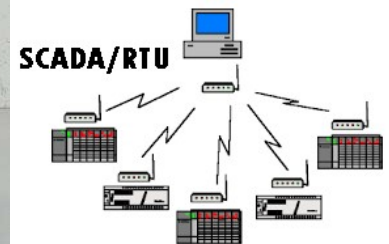


# HIGH POWER MOTOR CONTROL TRAINERS C/W SCADA RTU

## EM-33202Q

# EDU-LABS



The EDU-LABS EM-33202Q High Power Motor Control system consists of a series of modular slot-in panels modules housed in a compact epoxy coated casing. Each modules represents one or more electrical / electronic components or on block diagram of a complex circuits. All functional parts of the components are mounted inside the modules with circuit symbols/mimic diagrams screen printed on the front PCB panel and terminated at 4mm safety sockets for student experimental practice.

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.

All modular slot-in panels modules are inter connecting together by using 19mm short circuit shunt and / or 4mm stackable safety test leads sets to form the desired control circuits.

### LATEST UPGRADED FEATURES WITH SCADA/RTU MODULE EM-SCADA-RTU-01:

- Support TCP/IP MODBUS RTU protocol
- Provide management software for remote management
- Able to link real time to all EDU-LABS Training System With SCADA/RTU feature.

### THREE PHASE POWER SUPPLY EM-30-09-01



The system designed to provide all fixed AC 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.

#### Specification

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

#### Output Section

- Fixed Three Phase AC Power supply: 3 x 415V AC; 13A AC (Line To Line)
- Fixed Single Phase AC Power supply: 3 x 240V AC; 13A AC (Line To Neutral)

### AC/DC VARIABLE POWER SUPPLY EM-30-09-04-01



The system designed to provide all fixed 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.

#### Specification

- Power Input Requirement: Single Phase 240VAC, 50Hz
- Connection: 3 Pin Power Cord (UK Type) On/Off Switch With Indicator
- Fuse Protection.

#### Output Section

- Fixed Single Phase AC Power Supply: 240VAC, 50Hz (Channel 1)
- Adjustable Single Phase AC/DC Power Supply (Simultaneously) :
  - 0 ~ 250VAC, 0 ~ 5A AC (Channel 2) Complete With AC Voltmeter & AC Ammeter
  - 0 ~ 250VDC, 0 ~ 5A DC (Channel 3) Complete With DC Voltmeter & DC Ammeter

**THREE PHASE INDUCTION MOTOR  
EM-30-02-01 (2 Units)**



- Rated Power: 1KW
- Rated Voltage: 240 / 415V (Delta/Star)
- Rated Current: 3.50 / 2.5 A (Delta/Star)
- Rated Speed: 1500 rpm
- Frequency: 50 Hz
- Power Factor: 0.78
- Winding Poles: 4
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Break Load Unit / Generator Unit

**THREE PHASE SYNCHRONOUS MACHINE  
EM-30-03-02 (2 Units)**



- Nominal Power: 1KW
- Nominal Voltage: 240 / 415 V (Delta/Star)
- Nominal Current: 2.85 / 3.85A (Delta/Star)
- Nominal Speed: 1500 rpm
- Frequency: 50 Hz
- Excitation Voltage: 0 ~ 110 VDC
- Excitation Current: 3.5A
- Winding Poles: 4
- Terminals: 4mm Safety Socket
- Base Plate: Attachable To Prime Mover

**AC/DC GENERATOR BRAKE CONTROLLER  
EM-30-06-06 (2 Units)**



- Modular design
- Suitable for all type of AC and DC Generator Brake up to 3HP
- Measurement Range: 0% to 100%
- Protection: Fuse
- Unit Type : Panel H2

**AC FREQUENCY INVERTER  
EM-30-14-02 (2 Units)**



- Type: 2.2KW (3HP)
- Power Supply: 1 phase 240V, 50Hz
- Output: 6.5A
- Overload : 150% min
- Machine Control Module
- AC Machine Control Terminals : 1 color coded 4mm safety socket (U1, V1 & W1)
- AC Line Voltage Terminals (230VAC, 50Hz)
- System Ground Terminal

## PARALLEL SYNCHRONIZATION BOARD EM-30-12-01



- Modular design
- The synchronization board complete with six indicating lamps, three line fuse protection and synchronizing switch terminated by color coded 4mm safety socket.
- Suitable for investigate the synchronism between AC Generators when are parallel connected or generator with main network.
- With six indicator lamps for qualitative indication of the phase relationship between mains and generator voltage (Bright-dark circuit)
- Unit Type : Panel H2
- Terminals: 4mm Safety Socket

## DOUBLE VOLTMETER EM-30-12-02



- Modular design
- Double voltmeter 500VAC for Voltage comparison of the paralleling circuits
- Terminals: 4mm Safety Socket
- Unit Type : Panel H1

## DOUBLE FREQUENCY METER EM-30-12-03



- Modular design
- Double frequency meter 45 – 55Hz, 500VAC for frequency comparison of the paralleling circuits
- Terminals: 4mm Safety Socket
- Unit Type : Panel H1

**SYNCHRONOSCOPE  
EM-30-12-04**



- Modular design
- With rotational indicator for phase comparison in synchronizing circuits with three phase or single phase AC line.
- Instrument: Air-core, electro-dynamic quotient movement.
- Unit Type : Panel H1

**PHASE SEQUENCE METER  
EM-30-13-08**



- Modular design
- The display of these meters indicates the order of phase sequence to which their terminals are designed.
- Instrument: Air-core, electro-dynamic quotient movement.
- Unit Type : Panel H1

**DIGITAL AC VOLTMETER  
EM-30-13-03 (2 Units)**



- 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 (Color Coded)

**DIGITAL AC AMMETER  
EM-30-13-04 (2 Units)**



- 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 (Color Coded)

**THREE PHASE POWER QUALITY METER  
EM-30-13-16 (2 Units)**



- 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 apparent power Power factor: per phase and total power factor Total frequency
- Energy And Demand
  - Four quadrant active energy: Import, Export, Total, Net Four quadrant

- reactive energy: Import, Export, Total, Net Active, Reactive, Apparent demand
- 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
- Trend Logging
  - Phase voltage Line voltage Current Active power Reactive power Apparent power Power factor Frequency Three-phase unbalance Active energy Reactive energy Apparent energy Phase
- Software Accessibility
  - 4 Tariffs (DataLog) Sharp, peak, flat, valley in different season and schedule (TOU)
- PowerMeter Management Software Interface
- Protection: Fuse
- Terminals: 4mm Safety Socket
- Unit Type : Panel H2

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



- PC software for power quality meter
- 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

**COMPUTER DESKTOP SYSTEM  
EM-30-13-16-PC (OPTIONAL)**



- Operating system: Windows 10 Home 64
- Processor: Intel® Celeron® J1800 with Intel HD Graphics (2.41 GHz, 1 MB cache)
- Hard drive description: 500 GB 7200 rpm SATA
- Keyboard: USB wired Windows 8 keyboard
- Pointing device: USB wired optical mouse
- Network interface: Integrated Ethernet 10/100 BASE-T

**THREE PHASE POWER SUPPLY MODULE  
EM-10-09-01 (2 Units)**



- Modular Design
- Power Input: 3 Phase 240V/415V, 50Hz via input 5 core cable with 5 pin AC Plug, 32A.
- Connection: 3P+N+PE.
- Protection: Earth leakage circuit breaker and miniature circuit breaker
- Complete with START and STOP Push Button
- Three Pole ON/OFF Selector Switch.
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

**SELECTOR SWITCH MODULE  
EM-10-05-02 (2 Units)**



- Switch 1: 4 Pole Selector Switch
  - L1, L2, L3 and N
  - Switch Load: 415Vac, 10A
- Switch 2: 2 Way Selector Switch
  - Way 1: Normally Close (NC)
  - Way 2: Normally Open (NO)
  - Switch Load: 240Vac, 5A
- Switch 2: Key Switch
  - Way 1: Normally Close (NC)
  - Way 2: Normally Open (NO)
  - Switch Load: 240Vac, 5A
- Unit Type : Panel H1

**PUSH BUTTON SWITCH MODULE (I)  
EM-10-08-01 (2 Units)**



- Push Button Switch 1 (NCx1, NOx1)
- Push Button Switch 2 (NCx1, NOx1)
- Push Button Switch 3 (NCx2)
- Push Button Switch 4 (NOx2)
- Unit Type : Panel H1
- Terminals: 4mm Safety Socket

**MAGNETIC CONTACTOR MODULE  
EM-10-03-01 (3 UNITS)**



- Modular Design
- 3 Pole Magnetic Contactor
- Auxiliary Switch (NCx2, NOx2)
- Unit Type : Panel H1
- Terminals: 4mm Safety Socket

**CIRCUIT BREAKER (3 POLES) MODULE  
EM-10-01-01 (2 Units)**



- Modular Design
- Connection: 3P+N+PE
- Three Pole Circuit Breaker
- Switch Load: 10A
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

**CURRENT LIMIT PROTECTION MODULE  
EM-10-04-01 (2 UNITS)**



- Modular Design
- Connection: 3P+N+PE.
- Switch Load: 415Vac,10A
- Current Setting Range: 4 ~ 6.3A (Adjustable Current Limiting)
- Complete with START and STOP Push Button
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets

**PILOT LAMP MODULE  
EM-10-10-01 (2 Units)**



- Modular Design
- 4 Units Pilot Lamp (Color: Red, Yellow, Blue & Green)
- Unit Type : Panel H1
- Terminals: 4mm Safety Socket

**TIMER MODULE  
EM-10-07-01 (2 Units)**



- Supply Voltage : 240VAC, 50Hz
- Time Range : 30 Sec
- Contact Rating : 240VAC, 5A
- Timer : 2 Units
- Timer 1 : Contact 1 (NCx1, NOx1);
  - Contact 2 (NCx1, NOx1)
- Timer 2 : Contact 1 (NCx1, NOx1);
  - Contact 2 (NCx1, NOx1)
- Unit Type : Panel H1
- Terminals: 4mm Safety Sockets



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



- Modular design
- Switch load: 400VAC/15A
- Switch positions: 0-1-2 (0-Y-Δ)
- 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

**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

**CONNECTING SAFETY TEST LEAD SET  
EM-30-15-03**



- 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 (4mm): 25cm x 10 units; 50cm x 10 units; 100cm x 5 units
- 19mm Bridging Plug Set x 10 units
- 19mm Bridging Plug Set (Stackable) x 10 units

**COUPLING HUB, NYLON SLEEVE &  
SAFETY GUARD EM-30-15-03**



- Application: Motor & Generator
- Coupling Sleeve For Mechanical Connection Of Two Electrical Machines

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



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

**Note: Due to products continuous development process, layout and specification may change without prior notices.**