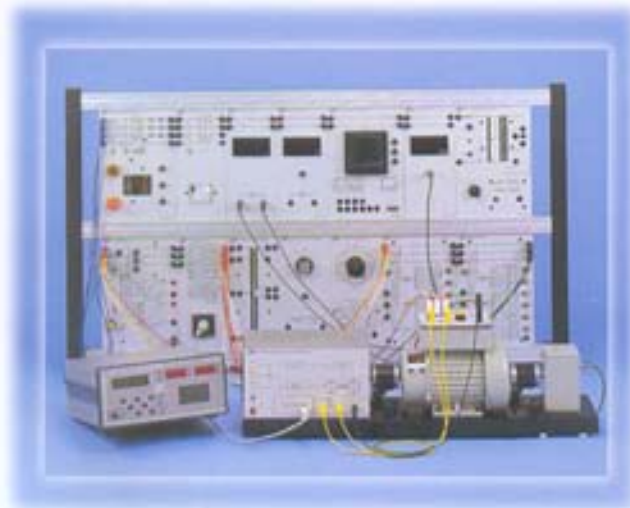




Electrical Machines System



System Features

- Modularized design providing 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 DC/AC power supply equipped with overload protection.
- Rotary machine and brake with over-heating protection.
- Adopting digitized and microprocessor-based measuring instrument to provide high-accuracy measurement.
- Brake with constant speed/constant torque function, easy to operate.
- Drawing complete T/N curve.
- Connecting to PC, measuring and drawing characteristic curve available.
- 300W-grade designed equipment suitable for learning the theory and characteristics of electrical machines.
- Standalone machine design equipped with two shaft ends and aluminum alloy base for coupling to other machines.
- Training panel uses 5 mm isolation bakelite, printed component symbol, value, and function, easy to connect.
- Fully protected system safe to connect various kind of machines.
- Providing powerful computer measuring software for saving graphic file, drawing and printing characteristic curves.
- For the sake of safety, the system normally operates at three-phase 220V. Different line voltages can be adjusted by system transformer.

EM-3330-1A

DC Permanent-magnet Machine

This machine can be used for motor and generator operation.

Ratings for motor operation
Rated Voltage: 180 Vdc
Rated Current: 2.7 A
Rated Speed: 2500 rpm
Rated Power: 0.4 KW



EM-3330-1B

DC Multifunction Machine

This machine can be as shunt, series, compound wound machine.

As a shunt wound motor

Rated Voltage / Current: 220 Vdc / 1.65 A
Rated Speed: 1770 rpm
Rated Power: 0.25 KW

As a separately excited generator

Rating Voltage / Current: 170 Vdc / 1.2 A
Excitation Voltage / Current: 200 Vdc / 0.1 A
Rated Speed: 2000 rpm
Rated Power: 0.2 KW



EM-3330-1C

Single-phase Induction Motor

With starting and operating capacitors

Rated Voltage: 220 Vac, 50/60 Hz

Ratings for 60 Hz power

Rated Current: 2.37 A
Rated Speed: 1680 rpm(60Hz); 1430 rpm(50Hz)
Rated Power: 0.3 KW
Power Factor: 0.89
Starting Capacitor: 100 μ F
Operating Capacitor: 16 μ F





EM-3000 SERIES

EM-3330-1D

DC Shunt Wound Machine

This machine can be used for motor and generator operation.

Ratings for motor operation

Rated Voltage/Current: 220 Vdc/1.65 A
Rated Speed: 1800 rpm
Rated Power: 0.25 KW



EM-3330-1E

DC Series Wound Machine

This machine can be used for motor and generator operation.

Ratings for motor operation

Rated Voltage / Current: 220 Vdc / 1.65 A
Rated Speed: 1800 rpm
Rated Power: 0.25 KW



EM-3330-1F

DC Compound Wound Machine

This machine can be used for motor and generator operation

Ratings for motor operation

Rated Voltage / Current: 220 Vdc / 1.65 A
Rated Speed: 1800 rpm
Rated Power: 0.25 KW



EM-3330-3A

Three-phase Salient Pole Synchronous Machine

This machine can be used for motor and generator operation.

Ratings for motor operation

Rated Voltage / Current: Δ 220 Vac / 1.17 A
Excitation Voltage/Current: 60 Vdc / 0.3 A(60 Hz);
66 Vdc / 0.35A(50 Hz)

Rated Speed: 1800 rpm(60 Hz);1500 rpm(50 Hz)

Rated Power: 0.3 KW

Power Factor: 1.0

Ratings for generator operation

Rated Voltage/Current: Δ 220 Vac / 0.8 A

Excitation voltage: 66 Vdc

Rated Speed: 1800 rpm(60 Hz);1500 rpm(50 Hz)

Rated Power: 0.3 KW

Power Factor: 1.0



EM-3330-3B

Three-phase Rotor Winding Motor

Rated Voltage: Δ 220 Vac, 50 / 60 Hz

Rated Current: 2.0 A

Rated Speed: 1630 rpm(60 Hz);1410 rpm(50 Hz)

Rated Power: 0.35 KW

Power Factor: 0.7



EM-3330-3C

Three-phase Squirrel Cage Motor

Rated Voltage: Δ 220 Vac, 50 / 60 Hz

Rated Current: 1.4 A

Rated Speed: 1670 rpm(60 Hz);1420 rpm(50 Hz)

Rated Power: 0.3 KW

Power Factor: 0.82





Electrical Machines System

EM-3320-1A

Magnetic Powder Brake Unit

1. Power Supply: 110/220 Vac
2. Type: forced air-cooling magnetic powder brake
3. Braking Torque: 0.999 kg-m (9.999 N-m) max.
4. Speed Sensing: photoelectric type, 60 pulses/rev.
5. Torque Sensing: strain-gage torque transducer, torsion bar
6. Temperature Sensing: thermal switch
7. Base Unit: integral, aluminum alloy
8. Connecting to controller via the dedicated cable
9. Cooling Fan: 12 Vdc, 0.29 A
10. Analog DC Outputs:
 - torque output (1 V/1 kg-m),
 - speed output (1 V/1000 rpm),
 - power output (1 V/1 KW)



EM-3320-1N

Brake Controller

1. Power Supply: 110/220 Vac
2. Connecting to magnetic powder brake unit via dedicated cable
3. 4-digit 7-segment LED Display: 2 sets
 - Display speed (S), torque (T) and power (P) of the motor under test
 - Display control voltage (V) and current (I) applied to Magnetic Powder Brake Unit
4. LCD Character Display (20x2) & Buttons for control command entry and display
5. LCD Graphic Display (128x64)
 - Graphically display characteristics of brake and motor
 - Display, record, and save various values presenting on LED display
6. Display Range:
 - Torque: 0 ~ 0.999 kg-m or 0 ~ 9.999 N-m
 - Speed: 0 ~ 9999 rpm
 - Power: 0 ~ 9.999 KW
 - Voltage: 0 ~ 24 V
 - Current: 0 ~ 0.999 A
7. Control Mode:
 - Open-loop control mode
 - Manual loading and unloading power to brake
 - Automatic loading and unloading power to brake
 - Selectable initial power W_i and max power W_m :
0 ~ 0.99 kg-m
 - Selectable loading time: 1 ~ 15 sec
 - Closed-loop control mode
 - Constant-torque mode
 - Constant-speed mode
8. Fault detection and indication
 - MAIN indicator for controller fault
 - BRAKE indicator for brake fault
 - MOTOR indicator for motor fault
9. Communicating with PC through RS-232 (Standard) or RS-485 (Option) port
10. Dedicated hardware and software allow processing and displaying data on PC, such as full-screen displaying, tracing, recording, printing motor speed, motor torque, motor power, brake voltage and brake current.



EM-3310-1A

DC Power Supply Module

- Module design
Working Voltage: 3 ϕ 220 Vac, 50 / 60 Hz
Fixed Output Voltage: 200 Vdc/6 A max.
Adjustable Output Voltage: 0 ~ 240 Vdc / 10 A max.
With current limiting and start functions
Fuse Protection
Terminals: 4mm safety sockets



EM-3310-1B

Three-phase Power Supply Module

- Module design
Overcurrent/Leakage protection switch
Start and emergency off buttons
Working Voltage: 3 ϕ 220 Vac, 50 / 60 Hz
Rated Output: 3 ϕ 220 Vac / 10 A
Fuse Protection
Terminals: 4mm safety sockets



EM-3310-1C

Synchronous Machine Exciter Module

- Module design
Working Voltage: 220 Vac, 50 / 60 Hz
Output Voltage: AC 0 ~ 220 V / 0.8 A
0 ~ 120 V / 1.6 A
0 ~ 40 V / 2.5 A
DC 0 ~ 220 V / 0.8 A
0 ~ 120 V / 1.6 A
0 ~ 40 V / 2.5 A
Terminals: 4 mm safety sockets





EM-3000 SERIES

EM-3310-1D

AC/DC Power Supply
Bench-top design
Working Voltage: 3 ϕ 220 Vac, 50 / 60 Hz
Output Voltage: 3 ϕ 0 - 260 V/5 A
DC 0 - 230 V/5 A
Fuse protection
Terminals: 4 mm sockets



EM-3310-2D

Y/ Δ Starting Switch Module
Module design
Switch Load: 400 Vac/15 A
Switch Positions: 0 - 1 - 2 (0 - Y- Δ)
Terminals: 4 mm safety sockets



EM-3310-2A

3-P Current Limit Protection Switch Module
Module design
Switch Load: 400 Vac/10 A
Current Setting Range: 2.5 - 4.0 A
(adjustable current limiting)
Terminals: 4 mm safety sockets



EM-3310-4A

DC Machine Starter
Module design
Resistance: 47 Ω circular rheostat, adjustable
Current: 1.4 A
Rated Power: 100 W
Fuse Protection
Terminals: 4 mm safety sockets



EM-3310-2B

Four-pole Switch Module
Module design
Switch Load: 400 Vac / 15 A
Terminals: 4 mm safety sockets



EM-3310-4B

DC Motor Field Regulator
Module design
Resistance: 2.2 K Ω circular rheostat, adjustable
Current: 150 mA
Rated Power: 50 W
Fuse Protection
Terminals: 4 mm safety sockets



EM-3310-2C

Reversing Switch Module
Module design
Switch Load: 400 Vac / 10 A
Switch Positions: FOR - STOP - REV
Terminals: 4 mm safety sockets



EM-3310-4D

DC Generator Field Regulator
Module design
Resistance: 2.2 K Ω circular rheostat, adjustable
Current: 150 mA
Rated Power: 50 W
Fuse Protection
Terminals: 4 mm safety sockets





Electrical Machines System

EM-3310-4E

Winding Machine Starter

Module design

Control three-phase motor starting

Starting Impedance: 5 steps, 3 resistors, 0 - 1,65 Ω each

Rated Current: 3A

Terminals: 4 mm safety sockets



EM-3310-4C

Capacitive Load

Module design

Load Capacitors: 3 capacitor (Y connection), 6 steps,
2.5 μ F/250 V each step

Rated Load: 220 V/1A

Fuse Protection

Terminals: 4 mm safety sockets



EM-3310-4F

Reactive Compensator

Module design

Capacitors: 2 μ F/450 V x 3

3 μ F/450 V x 3

Terminals: 4 mm safety sockets



EM-3310-4L

Inductive Load

Module design

Load inductors: 3 inductors (Y connection), 6 steps,
1.7 H/160 mA each step

Rated Load: 220 V/1A

Fuse Protection

Terminals: 4 mm safety sockets



EM-3310-4H

DC Generator Load Resistor

Module design

Resistor: 1 K Ω circular rheostat, adjustable

Rated Power: 300 W

Fuse Protection

Terminals: 4 mm safety sockets



EM-3310-5B

Fuse Set

Module design

4 D-Type Fuses, 4A/500V

Terminals: 4 mm safety sockets



EM-3310-4R

Resistive Load

Module design

Load Resistors: 3 resistors (Y connection), 6 steps,
920 Ω / 20 W each step

Rated Load: 220 V/1.0 A

Fuse Protection

Terminals: 4 mm safety sockets



EM-3310-3A

Digital DCA Meter

Module design

Measurement Range: DC 0 - 10 A

Display: 3 1/2 digits 14.2 mm LED

Accuracy: $\pm 0.2\%$ ± 1 digit

Resolution: 0.01 A

Input Impedance: $\leq 0.1 \Omega$

Power Source: 220 Vac, 50/60 Hz

Terminals: 4 mm safety sockets





EM-3000 SERIES

EM-3310-3B

Digital DCV Meter

Module design

Measurement Range: 0 ~ 600 Vdc

Display: 3 1/2 digits 14.2 mm LED

Accuracy: $\pm 0.2\% \pm 1$ digit

Resolution: 1 V

Input Impedance: ≥ 1 M Ω

Power Source: 220 Vac, 50 / 60 Hz

Terminals: 4 mm safety sockets



EM-3310-3E

Digital Three-phase Watt Meter

Module design

Power: single-/three-phase, 0 ~ 2 KW (240 V / 5 A)

Display: 4 1/2 digits 14.2 mm LED

Accuracy: $\pm 0.3\% \pm 3$ digit

Resolution: 0.1 W

Power Source: 220 Vac, 50 / 60 Hz

Terminals: 4 mm safety sockets



EM-3310-3C

Digital ACA Meter

Module design

Measurement Range: AC 0 ~ 10 A

Display: 3 1/2 digits 14.2 mm LED

Accuracy: $\pm 0.3\% \pm 1$ digit

Resolution: 0.01 A

Input Impedance: $\leq 0.1 \Omega$

Power Source: 220 Vac, 50 / 60 Hz

Terminals: 4 mm safety sockets



EM-3310-3F

Digital Power Factor Meter

Module design

Measurement Range: -0.50 ~ 1.00 ~ +0.50 (240 V / 5 A)

Display: 3 1/2 digits 14.2 mm LED

Accuracy: $\pm 1\% \pm 1$ digit

Resolution: 0.01 V

Power Source: 220 Vac, 50/60 Hz

Terminals: 4 mm safety sockets



EM-3310-3D

Digital ACV Meter

Module design

Measurement Range: 0 ~ 600 Vac

Display: 3 1/2 digits 14.2 mm LED

Accuracy: $\pm 0.2\% \pm 1$ digit

Resolution: 1 V

Input Impedance: ≥ 1 M Ω

Power Source: 220 Vac, 50 / 60 Hz

Terminals: 4 mm safety sockets



EM-3310-3G

Digital RPM Meter

Module design

Display: 5 digits

Measurement Range: 0 ~ 99999 rpm

Accuracy: $\pm 0.1\% \pm 1$ digit

Power Source: 220 Vac, 50 / 60 Hz





Electrical Machines System

EM-3310-3H

Digital Power Analysis Meter

Display :

4 digits (9999), 0.4" LED indicators (V, A, W, PF, Hz, Var)

5 digits (99999), 0.4" LED indicators (WH, VarH)

Input range:

Voltage: 12 ~ 600 V (L - L)

Current: 0.05 ~ 5 A

Frequency: 45 Hz ~ 65 Hz

Accuracy: (at 23 ± 5°C sin wave)

Voltage: ± 0.1% of reading ± 0.15% of range

Current: ± 0.1% of reading ± 0.15% of range

Watt: ± 0.2% of reading ± 0.3% of range

Var: ± 0.2% of reading ± 0.3% of range

Power factor: ± 0.5% of range

PF polarity: "++" lagging, "--" leading

Watt hour: ± 0.25% of reading ± 0.05% of range

Var hour: ± 0.25% of reading ± 0.05% of range

Hz: ± 0.2% of reading

CT, PT scaling: 1 ~ 9999

Factors: Setting for REF: 0.800 ~ 1.200

Power supply: 220 Vac

Communication Port: RS-232(Standard), RS-485(Option)

Terminals: 4 mm safety sockets



EM-3340-1A

Single-phase Transformer Unit

Input Voltage: 0 ~ 110 ~ 190 ~ 220 Vac

Output Voltage: 0 ~ 12 ~ 24 V/5 A,

0 ~ 110 ~ 190 ~ 220 V/1 A



EM-3340-3A

Three-phase Transformer Unit

Rated Power: 250 VA

Input Voltage: 3 φ Vac

Output Voltage: 63.5 Vac *6



EM-3340-3B

System Transformer

Rated Power: 1.5 KVA

Primary: depend on the local line voltage

Secondary: 3 φ 220 V

Frequency: 50 / 60 Hz



Cutaway Model of Electrical Machine



Options:

DC Permanent-magnet Motor (EM-3350-1A)

Single-phase Induction Motor (EM-3350-1C)

DC Shunt Wound Motor (EM-3350-1D)

DC Compound Wound Motor (EM-3350-1F)

Three-phase Salient Pole Synchronous Motor (EM-3350-3A)

Three-phase Rotor Winding Motor (EM-3350-3B)

Three-phase Squirrel Cage Motor (EM-3350-3C)

Cutaway models are made from normal electrical machines.

The stator is cut away by 1/4 over the entire length to enable an optimum view of the internal construction of the machine. The cutaway surfaces are protected against corrosion.



EM-3000 SERIES

EM-3380-1A

Laboratory Table

Dimensions: 1800(W) x 900(D) x 780(H)mm \pm 5%



EM-3380-2A

Experimental Frame

The experimental frames described below are suitable for setting up of test circuits and for demonstration purposes with 297 mm high experimental panels.

The experimental frames can be secured to benches or back uprights and removed to any time.

The side pieces consist of rectangular tube steel, 60x30x2mm, protected against corrosion, horizontal sections consists of anodized-aluminum H profiles.

Frames dimension:

1800(W) x 730(H) x 250(D)mm \pm 5% (EM-3380-2A)

1800(W) x 1060(H) x 250(D)mm \pm 5% (EM-3380-2B)



EM-3390-1A

Connecting Lead Holder

Mobile type, with 5-foot tubular steel base, with five casters.

Height: 1400mm, chipboard suitable with 20 connecting leads slots.



EM-3390-2A

Coupling

Material: Rubber

Coupling sleeve for mechanical connection of two electrical machines.



EM-3390-2B

Coupling Guard

Material: Plate coating

Attachable guard for protection against contact with electrical machines rotating parts



EM-3390-2C

Shaft End Guard

Material: Plate coating

Attachable guard for protection against contact with electrical machines rotating parts



EM-3390-3A

Connecting Leads Set

4mm safety plugs with leads

max. Rating Current: 19A

Consisting of:

Connecting leads (25cm), Red/Black/Yellow/Blue/White.

Connecting leads (50cm), Red/Black/Yellow/Blue/White/Green.

Connecting leads (100cm), Red/Yellow/Blue/White.

Connecting leads (150cm), Red/Yellow/Blue/White.

Connecting leads (100cm), Green.

Connecting leads (150cm), Black.



EM-3390-4A

Safety Bridging Plugs Set

4mm safety bridging plugs 19 mm spacing

max. Rating Current: 19 A

Consisting of:

KCN-419A safety bridging plug.

KCN-419B safety bridging plug.



KCN-419A



KCN-419B



Electrical Machines System

Laboratory Experiments of Electrical Machines

I. Single-Phase Transformer

- Polarity test
- Turns ratio test
- Open circuit test
- Short circuit test
- Load characteristic tests
 - Resistive load
 - Inductive load
 - Capacitive load

II. Three-Phase Transformer

- Three-phase connections
 - Y-Y connection
 - Y- Δ connection
 - Y-Z connection
 - Δ -Y connection
 - Δ - Δ connection
 - Δ -Z connection

III. DC Machines

- DC permanent-magnet motor
 - Connection and motor direction control
 - Torque-speed characteristic
- DC shunt wound motor
 - Connection and motor direction control
 - Torque-speed characteristic
 - Speed control
- DC separately-excited generator
 - No-load saturation characteristic
 - Load characteristic
- DC shunt wound generator
 - No-load characteristic
 - Load characteristic
- DC series wound motor
 - Connection and motor direction control
 - Torque-speed characteristic
 - Speed control
- DC series wound generator
 - Load characteristic
- DC compound wound motor
 - Connection and direction control of DC cumulative-compound wound motor
 - Torque-speed characteristic of DC cumulative-compound wound motor
 - Speed control of DC cumulative-compound wound motor
 - Connection and direction control of DC differential-compound wound motor
 - Torque-speed characteristic of DC differential-compound wound motor

- Speed control of DC differential-compound wound motor
- DC compound wound generator
 - Load characteristic of DC cumulative-compound wound generator
 - Load characteristic of DC differential-compound wound generator

IV. Induction Machines

- Single-phase split phase induction motor
 - Torque-speed characteristic with split-phase winding starting
 - Torque-speed characteristic with capacitor starting and running
- Three-phase squirrel cage induction motor
 - Connection and motor direction control
 - Y- Δ starting
 - PF correction
 - No-load characteristic
 - Blocked-rotor test
 - Torque-speed characteristic
- Three-phase rotor winding induction motor
 - Connection and motor direction control
 - Blocked-rotor test
 - Torque-speed characteristic
- Three-phase salient pole synchronous motor
 - Connection and motor direction control
 - Excitation characteristic
 - Load characteristic
- Three-phase salient pole synchronous generator
 - Armature resistance measurement
 - No-load saturation and short circuit characteristic
 - Load characteristic
 - Excitation characteristic

Remark: Additionally purchasing the System Transformer is recommended that the user is in the area where 3-phase 220 V power is not available.



EM-3000 SERIES

Overview of Equipment Required

- ▲ : DC Multifunction Machine can be used as shunt, series, compound wound machine for motor and generator operation.
- * : Additionally recommended
- ** : Alternative to Digital RPM Meter(EM-3310-3G)
- () : Alternative to Digital Power Analysis Meter(EM-3310-3H)

	Transformer Tests	DC Permanent-Magnet Motor Tests	DC Shunt wound Motor Tests	DC Separately-excited Generator Tests	DC Shunt wound Generator Tests	DC Series wound Motor Tests	DC Series wound Generator Tests	DC Compound wound Motor Tests	DC Compound wound Generator Tests	Single-Phase Induction Motor Tests	Three-Phase Squirrel-Cage Induction Motor Tests	Three-Phase Rotor Winding Motor Tests	Three-Phase Synchronous Motor (Salient-Pole) Tests	Three-Phase Synchronous Generator (Salient-Pole) Tests	Total
EM-3330-1A DC Permanent-magnet Machine		1		1	1	1	1							1	1
EM-3330-1B DC Multifunction Machine			▲1	▲1	▲1	▲1	▲1	▲1	▲1						▲1
EM-3330-1C Single-phase Induction Motor										1					1
EM-3330-1D DC Shunt Wound Machine			1	1	1										1
EM-3330-1E DC Series Wound Machine						1	1								1
EM-3330-1F DC Compound Wound Machine								1	1						1
EM-3330-3A Three-phase Salient Pole Synchronous Machine													1	1	1
EM-3330-3B Three-phase Rotor Winding Motor												1			1
EM-3330-3C Three-phase Squirrel Cage Motor											1				1
EM-3320-1A Magnetic Powder Brake Unit		1	1	**	**	1	**	1	**	1	1	1	1	**	1
EM-3320-1N Brake Controller		1	1	**	**	1	**	1	**	1	1	1	1	**	1
EM-3310-1A DC Power Supply Module		1	1	1	1	1	1	1	1						1
EM-3310-1B Three-phase Power Supply Module	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EM-3310-1C Synchronous Machine Exciter Module													1	1	1
EM-3310-1D AC/DC Power Supply	1			1						1	1				1
EM-3310-2A 3-P Current Limit Protection Switch Module	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EM-3310-2B Four-pole Switch Module											1	1	1	1	1
EM-3310-2C Reversing Switch Module											1	1	1	1	1
EM-3310-2D Y/Δ Starting Switch Module											1				1
EM-3310-4A DC Machine Starter						1									1
EM-3310-4B DC Motor Field Regulator			1					1							1
EM-3310-4D DC Generator Field Regulator					1				1						1
EM-3310-4E Winding Machine Starter												1			1
EM-3310-4H DC Generator Load Resistor				1	1		1	1							1
EM-3310-4R Resistive Load	1														1
EM-3310-4C Capacitive Load	1														1
EM-3310-4L Inductive Load	1														1
EM-3310-3A Digital DCA Meter			1	2	3	3	2	2	2	3			1	2	3
EM-3310-3B Digital DCV Meter			1	1	3	2	1	3	1	2			1	2	3
EM-3310-3C Digital ACA Meter	2									(1)	(1)	(1)	(1)	(1)	2
EM-3310-3D Digital ACV Meter	3									(1)	(1)	(1)	(1)	(1)	3
EM-3310-3E Digital Three-phase Watt Meter										(1)	(1)	(1)	(1)	(1)	(1)
EM-3310-3F Digital Power Factor Meter										(1)	(1)	(1)	(1)	(1)	(1)
EM-3310-3G Digital RPM Meter				1	1		1	1							1
EM-3310-3H Digital Power Analysis Meter										1	1	1	1	1	1
EM-3310-4F Reactive Compensator											1				1
EM-3310-5B Fuse Set	1										1	1			1
EM-3340-1A Single-Phase Transformer	1														1
EM-3340-3A Three-Phase Transformer	1														1
EM-3380-1A Laboratory Table	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
EM-3380-2A Experimental Frame (two-layers)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EM-3380-2B Experimental Frame (three-layers)															
EM-3390-1A Connecting Lead Holder	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
EM-3390-2A Coupling		1	1	2	2	1	2	1	2	1	1	1	1	2	2
EM-3390-2B Coupling Guard		1	1	2	2	1	2	1	2	1	1	1	1	2	2
EM-3390-2C Shaft End Guard		1	1	1	1	1	1	1	1	1	1	1	1	1	1
EM-3390-3A Connecting Leads Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EM-3390-4A Safety Bridging Plugs Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Experiment Manual	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EM-3340-3B System Transformer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1