

KMG-04

## DC INTEGRATED M/C COUPLE TO 3 PHASE ALTERNATOR/SYNCHRONOUS GENERATOR

MAKE : KITEK

**DC Integrated M/C Couple to 3 Phase AC Alternator/Synchronous Generator Trainer** is an aesthetically designed stout training system mounted on Aluminium Profile rack with sturdy table top Panel. Each Panel has ABS molded plastic sturdy enclosure with 4mm shrouded connectors showing connection mimic diagram with tag numbers for easy understanding. Trainer helps in analyzing DC Motor Speed/Direction Control & Synchronization of alternator using Dark Lamp, 1 Dark & 2 Bright Lamp & V-I Efficiency of Alternator/Synchronous Generator.

### SPECIFICATION

- Machine trainer having control panel provided in 30X30mm Aluminum profile rack with 3 railing sturdy table top flat panel / MS ENCLOSURE
- Electrical Control panels are provided in Slidable ABS plastic panel mounted on the aluminum rack with mimic diagram.
- Motors/Generators flexibly coupled to each other serving as a single unit for rotating electrical machines with swappable gear coupling.
- Modular type flat panel carrying various high voltage components housed in ABS plastic enclosure to minimize shock possibility.
- Modular & Slidable panel for easy site servicing not close control
- Motor/Machine Provided with Earth socket for protection.
- All input & output are terminated in 4mm BS-10 shrouded connector, provided with 4mm shrouded cable for experiments.

### STANDARD SUPPLY

- **3 Phase AC Measurement Panel - MP3**
  - ~ Bidirectional Multifunction
  - ~ 3 Phase  $\frac{3}{4}$  wire, 415V, CT Input 5A, Accuracy Class 1
  - ~ Alphanumeric LED/LCD display, Aux supply 230V AC/DC, 45-65 Hz, 5W
  - ~ V, I, Hz, Pf, KVA, KW, KWH, THD
  - ~ RS485 Communication Modbus RTU (Optional)
- **1 Phase AC Power Supply Panel - MP2**
  - ~ 1Pole 230V/4A MCB C Curve (2 No's)
  - ~ Input Supply Indicators (2No's).
  - ~ Lamp Load E27 Socket with ON/OFF 6A toggle Switch.
- **DC Meter Panel - MP4**
  - ~ DC Voltmeter 0-300V
  - ~ DC Ammeter 0-5A
  - ~ 6A Toggle Switch
- **DC Motor Drive Panel - MP6**
  - ~ Variable 0V-200V/8A DC Full Bridge, SCR based, Cosine firing
  - ~ Fixed Field Supply 200V/2A DC
  - ~ 0-300V DC Voltmeter & 0-5A DC Ammeter with polarity protection diode
  - ~ Led Indication for Power, Trip & Field
- **Torque / RPM Panel - MP10**
  - ~ Dual Core Cortex Microcontroller operating @ 133MHz, 2MB Flash Memory
  - ~ 16x2 LCD Display
  - ~ 1 Key Push Function Keypad
  - ~ RPM & Torque Sensor Socket
  - ~ RS-485 Port Modbus Device Communication
  - ~ USB Port PC Communication
- **Variable AC/DC Voltage Injector Panel - MP7**
  - ~ Variable 0-200V/3A AC output
  - ~ Variable 0-200V/3A DC output.
- **Lamp Load Panel - MP11**
  - ~ 3 Lamp Load E27 socket with 100W Bulb.
  - ~ ON/OFF 6A toggle Switch for each bulb socket.



ALUMINIUM PROFILE



MS ENCLOSURE



**MOTORS (300W Motor & 300W Generator included in Standard Supply)****• DC Series/Shunt/Compound Trunnion Machine - M1**

- ~ Shunt / Series/Separately Excited /Compound Winding
- ~ Can work as Shunt / Series/Separately Excited / Compound Motor/Generator
- ~ Capacity 300W, 200V/1.5A Armature, 200V- V field Excitation
- ~ 1500 RPM/8 Terminal
- ~ Chasis Mounted 19mm dia, 90mm frame
- ~ Thermistor to monitor Motor winding Temperature
- ~ Electrical Loading arrangements
- ~ Inductive Proximity Sensor for speed measurement
- ~ Load Cell for Torque measurement.

**• 3 Phase Salient Pole Alternator - M9**

- ~ 415V, 50Hz 300W 4 pole/ 6 Terminal, 1500 RPM
- ~ Star Connected Rotor Slip on 4 Terminal
- ~ Separately excited field winding with laminated pole, solid yoke Stator
- ~ Foot mounted 19mm dia, 90mm frame
- ~ Thermistor to monitor Motor winding Temperature

**• ACCESSORIES**

- ~ Set of 4mm Shrouded Cables required for experiments
- ~ Set of Manuals with Experiments.
- ~ Handheld Touchless Tacho Meter for Speed Measurement **(Optional)**
- ~ Demo CD showing Experiments **(Optional)**

**• EXPERIMENT LIST**

- ~ Speed Torque characteristics of DC Shunt Motor/ DC Series Motor/ DC Separately Excited DC Shunt Motor/ DC Compound Motor
- ~ Voltage regulation of an alternator by synchronous impedance method and zero power factor (zpf) method
- ~ Parameters of an alternator
  - ✓ Positive sequence reactance, Negative sequence reactance, Zero sequence reactance
- ~ Measurement of direct and quadrature axis reactance of a salient pole synchronous machine by Slip test.
- ~ Synchronization of alternator with grid using Dark Lamp, 1 Dark & 2 Bright Lamp



### OPTIONAL SUPPLY

- **DAQ**
  - ~ Windows based data Logging software to measure, monitor and datalog AC Multifunction Meter, DC Multifunction Meter, RPM, Torque simultaneously.
- **DC Motor Drive Panel - MP6**
  - ~ Variable 0V-200V/8A DC Full Bridge, SCR based, Cosine firing
  - ~ Fixed Field Supply 200V/2A DC
  - ~ 0-300V DC Voltmeter & 0-2A DC Ammeter with polarity protection diode
  - ~ Led Indication for Power, Trip & Field
- **DC Multifunction Meter Panel - MP4**
  - ~ 1 Channel Digital Multifunction
  - ~ 6 Digit LED/LCD Display to Measure V, A, W, Wh
  - ~ Range 0-300VDC V, 0-20A
  - ~ RS485 Communication Modbus RTU
- **Synchronization Panel - MP12**
  - ~ RYB Phase Sequence Indicator
  - ~ 6 bulbs with sync switch to check synchronization for generation.
  - ~ Facility to connect AC Mains & AC Generator output for synchronization with Synchronization switch
  - ~ Facility to connect 2 AC Generator's output for synchronization with Synchronization switch
- **Synchroscope Panel - MP13**
  - ~ Synchroscope to indicate degree of synchronization of two system
  - ~ Facility to connect AC Mains and/or generator output for synchronization
- **Capacitive Load Panel - MP22**
  - ~ 2  $\mu$ F / 5  $\mu$ F / 10  $\mu$ F / 15  $\mu$ F / 20  $\mu$ F / 30 $\mu$ F & 50  $\mu$ F / 440V AC 7 steps (3No's )
- **Inductive Load Panel - MP21**
  - ~ 0.15H, 0.3H, 0.45H, 0.60H, 0.75H, 1.5H, 3H/400mA (3No's)
- **AC/DC Resistive Load Panel - MP20**
  - ~ 9 way Switch selectable 400W Resistive load of OFF/750E/600E/300E/212E/162E/125E/112E/100E + 60E Tap for DC series Generator
  - ~ 7 way Switch selectable 3 no's of 400W Resistive load of OFF/10K $\Omega$ , 5K $\Omega$ , 3.5K $\Omega$ , 2.5K $\Omega$ , 2K $\Omega$ , 1.5K $\Omega$
- **Working Table - KWT-01**
  - ~ MS Work Table Size 1200x750x850 (L x W x H), with four castor wheels including two lockable wheels with Drawer size of L450mm x W500mm x H200mm.

### ORDERING INFO

Part No	1	2	3	4	5	6	7	8	9
KMG-04	A,B,C,M	1,2,3,4,5	A/M	0,1	0,1	0,1	1,2,3	0,1	0,1

SLOT	DESCRIPTION	OPTIONS				
1	DC Motor	A-DC Shunt Motor	B-DC Series Motor	C-DC Compound Motor	M-Multiple Winding Motor (Only in 300W Capacity)	
2	Capacity	1-300W Motor, 300W Alternator	2-1HP Motor, 300W Alternator	3-2HP Motor, 1HP Alternator	4-3HP Motor, 2HP Alternator	5-5HP Motor, 3HP Alternator
3	Panel Structure	A-Aluminum	M-MS Enclosure			
4	DC Drive	0-No	1-Yes			
5	DC Multifunction Meter	0-No	1-Yes			
6	DAQ	0-No	1-Yes			
7	Load Bank	1-Resistive Load	2-Inductive Load	3-Capacitive Load		
8	Synchronization	0-No	1-Yes			
9	Synchroscope	0-No	1-Yes			
10	Working Table	0-No	1-Yes			

