



#### SALIENT FEATURES :

- 01 Facilitates easy and safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords & shrouded socket arrangements.
- 02 All machines are mounted on finely painted sturdy base frame with easy machine interchangeability. Use of gear coupling facilitates screwless coupling. interchangeability. Use of gear coupling facilitates screwless coupling.
- 03 With due emphasis on student safety machines operate upto 300W power levels and upto 1500 RPM, without compromising on didactic use. Able to draw all graphs.
- 04 Trunnion mounted DC Integrated machine is used as Dynamometer for loading other machines (Motors / generators both); unlike magnetic powder brake or eddy current brake which can load only coupled Motors and not generators, with facility to measure shaft power using electronic torque / speed Measurement

#### SYNCHRONIZATION / PARALLELING OF TWO THREE PHASE ALTERNATOR TRAINER

##### Name of Experiments

- |                |   |
|----------------|---|
| Experiment -1  | speed torque curve of DC shunt motor with 3 phase AC integrated motor                                     |
| Experiment -2  | speed torque curve of DC series motor with 3 phase AC integrated motor                                    |
| Experiment -3  | Speed torque curve of separately excited DC motor with 3 phase AC integrated motor                        |
| Experiment -4  | Speed torque of DC compound motor with 3 phase AC integrated motor  |
| Experiment -5  | v-i efficiency curve for DC shunt generator with 3 phase AC integrated motor                              |
| Experiment -6  | v-i efficiency curve for DC series generator with 3 phase AC integrated motor                             |
| Experiment -7  | v-i efficiency curve for DC separately excited generator with 3 phase AC integrated motor                 |
| Experiment -8  | v-i efficiency curve for DC compound generator with 3 phase AC integrated motor                           |
| Experiment -9  | v-i efficiency curve for occ of shunt generator with 3 phase AC integrated motor                          |
| Experiment -10 | Speed torque curve of wound rotor induction motor with rotor shorted and with different Rotor resistance. |
| Experiment -11 | DOL/Star-delta starter, rotor resistance starter.   |
| Experiment -12 | Application of sync. Motor as pf improvement device-V curve.  |
| Experiment -13 | Synchronous generator V-I curves.   |
| Experiment -14 | Dark lamp method[all lamps are dark]  |
| Experiment -15 | Bright lamp method[all lamps are bright]  |
| Experiment -16 | 1 Dark 2 Bright lamp method.  |

Note: Specifications are subject to change.

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### PANELS PROVIDED

- 01 Aluminum Machine trainer Rack
- 02 Input 3 phase DOL Starter panel
- 03 Multifunction Meter (Single Phase/Three Phase AC 50Hz) - Qty.2
- 04 FWD/REV, Star-Delta starter panel
- 05 Rotor Resistor Cum 3Phase Synchronous Motor Control
- 06 DC voltmeter & Ammeter and Torque Measurement Meter - Qty.2
- 07 Variable DC Power Supply - Qty.2
- 08 Input Single Phase DOL Starter Panel AC DC Fix / Variable Supply - Qty.2
- 09 AC Load Resistor
- 10 DC Load Resistor
- 11 Synchroscope / 3 Phase Alternator Synchronizer
- 12 Extension Board


### MOTORS PROVIDED

- 01 DC Integrated (Trunion Mounted) Motor - Qty.2
- 02 3 Phase AC Integrated Motor - Qty.2


### ACCESSORIES PROVIDED

- 01 Hand held digital Tachometer
- 02 Shrouded connecting leads 4mm 50 / 100cm assorted Red & Black

### Technical Specification of Motors




**DC INTEGRATED (TRUNION MOUNTED) MOTOR - (2Nos.)**  
**Voltage :**  $V_{arm} = 180V$   $V_{field} = 180V$   
**Capacity -** 300W/2 Pole m/c, **RPM - 1500, Shrouded Socket - 12**  
**Rotor Construction:** Standard commutator / brush arrangement with laminated stack, brought out on 2 terminals  
**Stator construction :** Separately excited field winding with laminated solid yoke 2 pole and series winding brought out on 4 terminals.  
**Toque characteristic:** Provision of load cells 6Kg. 2No. assembly to measure the




**3 PHASE AC INTEGRATED MOTOR - (2Nos.)**  
**Voltage :** 415VAC, 50Hz  
**Capacity -** 300W/4 Pole m/c, **RPM - 1500, Shrouded Socket - 18**  
**Rotor Construction :** Star connected, four terminals including star point brought out on 4 slip rings mounted on shaft.  
**Stator construction :** Six terminals to be brought out to start the motor using STAR-DELTA starter.

### Technical Specification of Panels



**INPUT 3 PHASE DOL STARTER PANEL**

- 1 MCB 4 pole 4Amp.
- 2 DOL 9A Contactor with 415V / 50 Hz / 11VA COIL .
- 3 RYB Indicator
- 4 Emergency Switch
- 5 Shrouded socket 8Nos.
- 6 Push button switch for Stop/Start



**MULTIFUNCTION METER (Single Phase/ Three Phase AC 50Hz)**


- 1 Bidirectional Multifunction Meter
- 2 3 Phase 4 wire, 440V, Current 5A
- 3 LED display,
- 4 Aux supply 230V, 45-65Hz, 5W
- 5 To measure parameters ie Voltage Current., KVA, Frequency, Power factor, Active Power (W), Reactive Power (vary) etc.
- 6 Shrouded socket 08Nos. etc.

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## Technical Specification of Panels




**FWD/REV AND STAR-DELTA STARTER PANEL**

- 1 FWD/REV, 3 pole 3 way Switch with centre OFF, 10A/440V.
- 2 Star/Delta switch 3 pole, 3 way with centre OFF, 10A/440V.
- 3 Shrouded socket 12Nos.




**AC LOAD RESISTOR**

- 1 AC Resistors 10K/5K/3.5K/2.5K/2K/1.5K/OFF 200W x 3 phases/ 6 taps
- 2 Load Resistance switch 3 POL 7 Way/10Amp.
- 3 Cooling Fan size 4" 230V Operated
- 4 Shrouded socket 12Nos.




**ROTOR RESISTOR CUM 3PHASE SYNCHRONOUS MOTOR CONTROL**

- 1 Rotor resistors of 30E/5A with 3 taps of 15E, 21E, 30E each - 3 Nos.
- 2 Rotor resistor selector switch, 3 pole. 6 Way 10A/440V.
- 3 DC Rotor excitation with circuit breaker (3Amp)
- 4 Shrouded socket 8Nos.




**DC LOAD RESISTOR**

- 1 750E/600E/300E/212E/162E/125E/112E/100E/400W /8 taps + OFF + separate 60E tap For DC series Gen.
- 2 Load Resistance switch 3 POL 7 Way/10Amp.
- 3 Cooling Fan size 4" 230V Operated
- 4 Shrouded socket 6Nos.




**DC VOLTMETER & AMMETER WITH TORQUE MEASUREMENT METER**

- 1 TWO DPM DC voltmeter (0-1000V)
- 2 TWO DPM DC Ammeter (0-20A)
- 3 Torque Measurement Meter
- 4 Shrouded socket 16Nos.



**SYNCHROSCOPE /3 PH. ALTERNATORS SYNCHRONIZING**

- 01 Synchroscope:- Rotating light meter with 28 LED on a circular scale and a zero voltage differential indication with 2 LED
- 02 3 Phase Alternator Synchronizing
- 03 Synchronization indication for




**VARIABLE DC POWER SUPPLY**

- 1 Half bridge SCR based 0V-200V / 3Amp. cosine firing with linear characteristics, 3 Nos. Switch SPDT to On/Off with indication
- 2 Three Nos. of these supplies required for DC Armature, DC motor field and AC generator field.
- 3 Shrouded socket 8Nos.

**EXTENSION BOARD**

- 1 Operating Voltage 230VAC  $\pm$  10% at 50Hz
- 2 ON OFF Switch with indicator
- 3 Eight Nos. five pin 5 Amp Electrical Sockets




**INPUT SINGLE PHASE DOL STARTER PANEL AC DC FIX / VARIABLE SUPPLY**

- 1 MCB 2 pole 10A with indicator
- 2 Emergency Switch
- 3 Push button switch for Stop/Start
- 4 DOL 9A Contractor with 230V / 50 Hz / 11VA Coil .
- 5 Shrouded socket 4Nos.

**Variable AC Supply (0-200V)**

- 1 Shrouded socket 6Nos.



**ALUMINUM FRAME - MODULAR**

Electrical motor trainer rack made up aluminium profile size 40x40mm, foldable and light in weight 10 panel setup can be interchange conveniently to perform experiments. Dimension Length 1100xHeight 1000xDepth 350mm.

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