INTRODUCTION

Three phase AC induction motors are very popular in industrial drives. The application may change in direction of rotation. The AC motor theory explains that change in phase sequence of applied AC voltage as connected to motor windings, reverses the direction of rotation. This is achieved in this panel using F /R Three pole - two ways with centre off sweeten. As shoving in FWD' position the phase sequence is - R - Y – B In 'REV' position the same is - Y - R – B 3 Phase motors take very high starting currents at the time of starting. One of the solutions to control this current is to apply reduced voltage at the time of starting. The six Shrouded Sockets of three stator windings can be brought out. Externally the Shrouded Sockets may be connected in STAY'. At the time 2 starting to ensure reduced applied voltage. As the motor ricks up the speed, the windings may he connected in DELTA. This ensures full voltage to he applied. The STAR / DELTA switch mounted on this panel provides this arrangement. STAR - connects U1, V1.W1 to form star point, and input supply is given to U2, V2, .W2. DELTA connects U2-V1, V2 - WI, W2 – U1. to form a delta and input supply is given to delta junction points. This is achieved using 3 poles 2 ways with centre off switch.

SALIENT FEATURES

1. Facilitates easy and safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords and shrouded socket arrangements for high voltage circuits
2. Each panel is made of non-breakable tough plate and screw-less overlays showing circuits diagrams & its connection tag numbers for easy understanding and connection
3. Numerous possibilities of testing of electrical circuits.
4. Separate motor re-winding of motor rotors: assembly & re-assembly of a motor

Note: Specifications are subject to change.

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22-04-2026

Name of the Experiments

experiment – 01 To study the working of dol starter and measure the line & phase voltageon multifunction meter
experiment – 02 To study speed torque curve of dc shunt motor
experiment – 03 To study speed torque curve of dc series motor
experiment – 04 To study speed torque curve of dc separately excited motor
experiment – 05 To study speed torque curve of dc compound motor
experiment – 06 To study v-i, efficiency curves for dc shunt generator
experiment – 07 To study v-i, efficiency curves for dc series generator
experiment – 08 To study v-i, efficiency curves for dc separately excited generator
experiment – 09 To study v-i, efficiency curves for dc compound generator
experiment – 10 To study the working of 3 phase slip ring induction motor with star/ delta starter with rotor shorted and with different rotor resistance
experiment – 11 To study speed torque curve of 3 phase slip ring induction motor with rotor shorted and with different rotor resistance
experiment – 12 To study v-i curves & efficiency of synchronous generator
experiment – 13 To study speed torque curve of 3 phase synchronous ac motor
experiment – 14 To study starting of universal motor with ac supply
experiment – 15 To study speed torque curve of universal motor with 150v dc supply
experiment – 16 To study speed torque curve of capacitor start induction motor with direction control
experiment – 17 To study speed torque curve of 3 phase ac squirrel cage induction motor
experiment – 18 To study synchronization of 3 phase synchronous motor with main supply using three dark lamp method
experiment – 19 To study synchronization of 3 phase synchronous motor with main supply using two bright and 1 dark lamp method
experiment – 20 To study the working of single phase transformer and calculate its turn's ratio
experiment – 21 To study the polarity test of single phase transformer
experiment – 22 To study the open circuit test of single phase transformer
experiment – 23 To study the short circuit test of single phase transformer
experiment – 24 To study the parallel operation of single phase transformer
experiment – 25 To study single phase transformer regulation
experiment – 26 To study speed voltage curve of dc tacho generator

Panels Provided

01 ALUMINUM FRAME - MODULAR PANELS 69700 Qty.1
02 INPUT THREE PHASE DOL STARTER PANEL 69701 Qty.1
03 MULTIFUNCTION METER (SINGLE PHASE / THREE PHASE AC 50Hz).....69702 Qty.2
04 FWD/REV AND STAR-DELTA STARTER PANEL.....69703 Qty.1
05 ROTOR RESISTOR CUM 3 PHASE SYNCHRONOUS MOTOR CONTROL 69704 Qty.1
06 1Ph. MOTOR, ALTERNATOR & SYNC. MOTOR 69705 Qty.1
07 DC VOLTMETER & AMMETER AND TORQUE / RPM PANEL 69706 Qty.1
08 INPUT SINGLE PHASE DOL STARTER PANEL AC DC FIX / VARIABLE SUPPLY.....69708 Qty.1
09 AC LOAD RESISTOR 69709 Qty.1
10 DC LOAD RESISTOR.....69710 Qty.1
11 AC Load Inductor.....69711 Qty.1
12 Capacitive Load.....69712 Qty.1
13 Lamp Load.....69713 Qty.1
14 Synchroscope / 3 Phase Alternator Synchronizer.....69714 Qty.1
15 Extension Board.....69715 Qty.1
16 DC MOTOR DRIVE PANEL.....69722 Qty.2
17 DC MEASUREMENT PANEL / PHASE SEQUENCE PANEL 69723 Qty.1
18 SINGLE PHASE TRANSFORMER PANEL.....69725 Qty.1

Motors Provided

01 3 Phase AC Integrated Motor.....69302 Qty.1
02 3 Phase Salient Pole Alternator.....69303 Qty.1
03 1 Phase AC Integrated Motor.....69305 Qty.1
04 Universal Motor.....69306 Qty.1
05 DC Integrated (Foot mounted) Motor.....69309 Qty.1
06 DC Tacho Generator 69321 Qty.1

Accessories Provided

01. 4mm Shrouded Banana Patch cord 1 Meter Red.....25
02. 4mm Shrouded Banana Patch cord 1 Meter Black.....25

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TESCA™

Order Code - 46800A
Electrical Machine Trainer

ALUMINUM FRAME - MODULAR PANELS ORDER CODE - 69700

1. Electrical motor trainer rack made up aluminum profile size: 40×40mm, foldable and light in weight 10 panel setup can be interchange confidently to perform experiments.
2. Dimension Length: 1100×Hight 1000×Depth 350mm.

INPUT 3 PHASE DOL STARTER PANEL
Order Code - 69701

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)
Order Code - 69702 (2 NOS)

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.

FWD/REV AND STAR-DELTA STARTER PANEL
Order Code - 69703

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.

ROTOR RESISTOR CUM 3PHASE SYNCHRONOUS MOTOR CONTROL
Order Code - 69704

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 7Nos.

1 PH. MOTOR, ALTERNATOR & SYNC. MOTOR
Order Code - 69705

1 1 ph. MCBs of 4A/1.6A 1 each.
2 2 no. 2P2W selector switches to run as 1ph. Alternator then as synchronous motor.
3 2A push button switch to simulate as centrifugal switch.
4 1 Lamp load holder with lamp
5 Shrouded socket 14Nos.

DC VOLTMETER & AMMETER WITH TORQUE MEASUREMENT METER
Order Code - 69706

1 TWO DPM DC voltmeter (0-1000V)
2 TWO DPM DC Ammeter (020A)
3 Torque Measurement Meter
4 Shrouded socket 16Nos.

INPUT SINGLE PHASE DOL STARTER PANEL AC DC FIX / VARIABLE SUPPLY
Order Code - 69708

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.

Fix/Variable DC Supply (0-200V)
1 Shrouded socket 4Nos.

AC LOAD RESISTOR
Order Code - 69709

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

DC LOAD RESISTOR
Order Code - 69710

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

Note: Specifications are subject to change.

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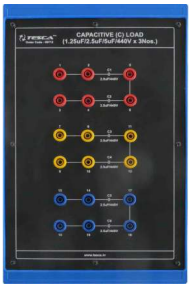
AC LOAD INDUCTOR
Order Code - 69711
1 Inductive load =0.15H/0.3H/ 0.45H/0.6H/0.75H/1.5H/3H/ 400mA X 3Nos.
2 Load inductor switch 3 Pole 7 Way/10Amp.
3 Shrouded socket 12Nos.

EXTENSION BOARD
Order Code - 69715.
1 Operating Voltage 230VAC ± 10% at 50Hz
2 ON OFF Switch with indicator
3 Eight Nos. five pin 5 Amp Electrical Sockets



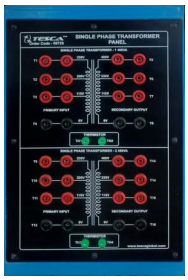
CAPACITIVE (C) LOAD
Order Code - 69712
1 Capacitive load =1.25mF /2.5mF/5mF/440VX 3Nos
2 Shrouded socket 18Nos.

DC MOTOR DRIVE PANEL
Order Code - 69722 (2 NOS)
1 2 Analog Meter
- Voltage Meter 300V DC
- Ammeter 5 Amp. DC
2 SCR Firing Controller
3 3 LED Indication
4 Shrouded safety socket 4mm for Input/Output - 6nos.

LAMP LOAD
Order Code - 69713
1 3 Nos. Lamp 100W with Holder & switch
2 Shrouded socket 12Nos.

DC MEASUREMENT PANEL / PHASE SEQUENCE PANEL
Order Code - 69723
1 DC Multifunction Meter
2. Phase Sequence Indicator
3. Power Socket
4 Shrouded safety socket 4mm for Input/Output - 12nos.

SYNCHROSCOPE /3 PH. ALTERNATORS SYNCHRONIZING
Order Code - 69714
01 Synchronoscope:- 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 qualitative indication of the phase relationship between mains and



SINGLE PHASE TRANSFORMER PANEL
Order Code - 69725
1. 2X Single Phase Tapping Transformer - 400V AC
2. Input Voltage - 230, 220, 115 & 0V
3. Output Voltage - 400, 230, 115 & 0V
4. 2 Thermistor
2. Shrouded safety socket 2 & 4mm for Input/Output

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Technical Specification of Motors

3 PHASE AC INTEGRATED MOTOR - Order Code - 69302
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.

3 PHASE SALIENT POLE ALTERNATOR - Order Code - 69303
Voltage : 415VAC, 50Hz
Capacity - 300W/4 Pole m/c, **RPM -** 1500, **Shrouded Socket -** 12
Rotor Construction : Star connected, four terminals including star point brought out on 4 slip rings mounted on shaft.
Stator construction : Separately excited field winding with laminated solid yoke, 4 pole brought out on 2 terminals

1 PHASE AC INTEGRATED MOTOR - Order Code - 69305
Voltage : 230 VAC, 50Hz
Capacity -300W/4 Pole m/c, **RPM -** 1500 **Shrouded Socket -** 18
Rotor Construction : Diecast Squirrel cage motor
Stator construction : Two windings brought out on 4 terminals for main and auxilliary. These will be used to configure different motors Split phase, CSCR, CSIR.

UNIVERSAL MOTOR - Order Code - 69306
Voltage : 230 VAC, 50Hz / 150VDC
Capacity - 300W/4 Pole m/c, **RPM -** 1500, **Shrouded Socket -** 8
Rotor Construction : Standard commutator brush arrangement brought out on 4 terminals
Stator construction : Stator brought out on 4 terminals to facilitate AC/DC operation and direction change. Built in compensating winding to minimize AR

DC INTEGRATED (FOOT MOUNTED) MACHINE - Order Code - 69309
Voltage : Varm= 180V Vfield = 180V
Capacity - 300W/4 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 2 terminals.

DC TACHOGENERATOR - ORDER CODE – 69321

Voltage	:	60V DC @1000rpm
Current	:	180mA max
Speed	:	5000 RPM max
Mounting	:	Flange

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