



Salient Features

- Facilitates generator protection using numerical generator protection relay.
- VFD drive used to control brushless prime mover's speed in manual mode.
- Multi function meters read the input voltage & frequency of generator output along with power analyser data. (optional)
- The Generator/ alternator coupled with prime mover have brought out six terminals from three phase 3 windings (RYBs). The every alternate terminal of RYB is shorted and connected together to form Star connection (Neutral) at the output of generator.
- The relay panel carries shrouded sockets to connect Generator Protection relay mounted below. The CT panel and PT panel provide necessary interface between real world & relay.
- Emergency stop mushroom switch is provided with security key lock on the profile rack.
- 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
- Each panel has ABS molded plastic sturdy enclosure, and colorful screwless overlays showing circuits diagrams & its connection tag numbers for easy understanding and connection
- Set of Instructor Guide & Student Workbook.

Technical Specifications

XPO-PRT-GEN trainer can work in standalone mode with simulated grid sources consists of following panels.:

- ◆ **Input 3 phase DOL Starter panel (EMT1x 1 No.)**
 - 4 pole MCB of 415 V/20A.
 - DOL 16A Contactor with 230V/50Hz/11VA COIL
 - Bimetallic thermal O/L relay with range 9A - 15A
 - RYB inputs indicators.
 - 9 pin D (M) connector
 - Manual start / stop with local trip contact
 - Power ON LED indicator
 - Green SBS5 socket is provided for extend earth.
- ◆ **DC Volt meter & DC ammeter Panel (EMT6Bx 1 No.)**
 - DC voltmeter 0-300VDC
 - DC ammeter 0-5A
 - 4A circuit breaker.
- ◆ **Instrumentation power supply cum multichannel DPM panel (EMT8x 1 No.)**
 - DC Multi Output power supply.
 - Supplies DC power to neighbouring signal conditioning circuit.
 - panels like EMT9, CIP1, CIP2, MIT12, CE7 etc. through 20 pin FRC cable.
- Provides 1 Ph. AC supply through 3 MCB's, 4A each to power up other panels in the rack.
- Optionally Multichannel 4 position DPM for Speed, Torque etc.
- Green SBS5 socket is provided for extend earth.
- ◆ **Variable AC and DC supply panel (EMT23 x 1 No.)**
 - Input 0-230VAC, 50Hz
 - Variable O/P: AC 0-270V/3A
 - Variable O/P: DC 0-250V/3A.
- ◆ **IGBT Controlled VVVF Drive panel (EMT33A x 1 No.)**
 - Input voltage: 3 phase, 415VAC. 50Hz
 - Output voltage: 3 phase 415VAC
 - Range (Frequency Control) : 0.1 Hz to 100 (400)Hz
 - Control Mode :Sine Wave PWM
 - Capacity : 10 HP
 - With Reverse And Forward Direction
 - 3 phase EMI Inductor.
 - Mod bus RS485 interface. (optional)
- ◆ **3 Phase Bidirectional Power cum Energy meter panel (EMT34 x 4 Nos.)**
 - Bidirectional Multifunction
 - 3 phase 3/4 wire, 415VAC, CT Input 5A
 - LCD/LED display, Aux. supply 230V, 45-65Hz,5W

Note: Specifications are subject to change.

- Measure V. I., Hz, Pf, KVA, KW, KWH
- Green SBS5 socket is provided for extend earth.
- ♦ **SCR Actuator (variable DC) cum sensor signal conditioning panel (EMT9) X 1 No.**
- Full bridge SCR based 0V-195V / 3 Amp cosine firing with linear characteristics.
- Supports signal conditioning circuit for speed, torque in kg to give output 0-2.5Vdc (FS).
- External control signal (0 - 2.5VDC) to set O/P volt (0-100VDC) to control excitation.
- ♦ **Generator Protection Relay panel (EMT47B) x 1No.**
Protections: Differential, Over current, Under/Over voltage, Under/Over frequency, Reverse power, Earth fault.
- ♦ **CT panel (EMT48) x 1 No.**
- Consist of 5/5 Amp. CT 6 Nos.
- Primary side of CTs are brought on 3 x 2 x 2 SBS-5 sockets.
- Secondary side of CTs are Star connected in group of 3 & brought out on 4 x 2 SBS-5 sockets
- ♦ **415/110VAC, 50VA PT panel (EMT54) X 1 No.**
- Consisting of potential transformer,
- Input 415VAC, star connected, Output 110VAC, star connected, 50VA.

Table top panels:

- ♦ **Generator transformer Panel (EMT54B) X 1 No.**
- 3 phase power transformer with connection group Yy11,
- Input 415VAC, Output 415VAC, 5KVA,
- Secondary winding with tapping at +/-2.5% and +/-5%.
- ♦ **3 phase Squirrel cage Induction Motor Panel (EMT65) X 1 No.**
- Voltage: 3 phase Delta connected, 415 VAC, 50Hz,
- Capacity/RPM /Terminals: 3HP/4 Pole m/c / 1500RPM/

- 6 terminals.
- Rotor Construction: Diecast Squirrel cage rotor.
- Stator construction: 3x2 terminals,
- Frame/ Mounting Shaft dia : 112 Frame, Chasis mounted 38mm dia. with easily swappable gear coupling.
- ♦ **3 phase Salient Pole Alternator Panel (EMT66) x 1 No.**
- Voltage : 3 phase, star connected, 415VAC, 50Hz
- Capacity/RPM /Terminals : 3KVA/4 Pole m/c / 1500RPM
- Rotor Construction: Rotor excited 180Vdc/2.65A, two terminals brought out on 2 slip rings mounted on shaft.
- Stator construction: Six terminals brought out for star connection.
- Frame/ Mounting Shaft dia : 132 Frame, Chasis mounted 28mm dia. With easily swappable gear coupling

List of Experiments:

- Study of V curve & inverted V curve.
- Study of Generator performance chart.
- Study of generator protection for differential, over current, over/under voltage, over/under frequency, reverse power and earth faults using generator protection relay.

Mechanical Dimensions (mm)& Weight of Trainer:

1165(L)x300(W)x990(H)

Net. Wt.: 65 Kg.

Gross Wt.: 73 Kg.

3 Ph. Sq. Cg. motor Net Wt.: 40 kg.

Gross Wt.: 52 kg.

3 Ph. Salient alternator Net Wt.: 35 kg. Gross Wt.: 47 Kg.

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