



System Overview

- This trainer is a dual-panel industrial simulation system designed to bridge theoretical power systems knowledge with practical installation and troubleshooting skills.
- It simulates a complete power cycle: Grid/Generator Input -> Automatic Transfer -> Multi-stage Distribution -> Industrial/Domestic Load Control.

Panel A: Main Distribution Board (MDB)

- The MDB serves as the primary protection, metering, and distribution hub.
- Core Specifications:
- Incomer: 63A 3P MCCB equipped with a Motorized Actuator and Under Voltage Trip (UVT) coil for automated safety logic.
- Leakage Protection: Earth Leakage Relay (ELR) integrated with a Core Balance Current Transformer (CBCT) for high-sensitivity fault detection.
- Distribution: RCCBs: 40A 30mA 2P (×3) for residual current protection. MCBs: 6A, 10A, and 16A (×3 each) for branch circuit overcurrent protection.
- Metering & Analysis: Digital Power Analyzer supported by three 60:5A CTs and a Power Factor Relay (PFR) with an 11-pin base.
- Bus Bar System: 100A copper bus bars with insulators and a transparent acrylic safety cover for visual inspection of live components.

Panel B: Automatic Transfer Switch (ATS)

- This panel demonstrates the logic and hardware required for power continuity and surge mitigation.
- Core Specifications:
- Transfer Unit: 4-Pole (4P) 63A ATS unit for seamless switching between Main and Backup sources.
- Surge Protection: 40kA Class 2 4P SPD to demonstrate transient voltage suppression.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.



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- Logic & Backup: 650VA UPS integration to show how critical loads remain powered during the ATS transition interval.
- Protection: High Breaking Capacity (HRC) 32A fuses and 2A control fuses for logic circuit safety.
- Indication: LED matrix (RYB + 2 Green) for Source Available and Load Active status.

Integrated Practical Modules (Student Tasks)

- This trainer is specifically designed to facilitate the following ten (10) core practical exercises:
- Single-Line Diagram (SLD) Mapping – Students trace power flow from incoming supply through MCCB, Bus Bars, and final MCBs.
- 3-Phase Load Balancing – Wiring single-phase and three-phase circuits to ensure equal current distribution across R-Y-B phases.
- MCCB Control Logic – Wiring the UVT Coil and Actuator to demonstrate remote tripping and under-voltage protection.
- Earth Leakage Protection – Connecting RCCBs and the ELR/CBCT system to simulate and detect ground faults.
- Power Quality & PF Control – Wiring CTs to the PFR and Digital Analyzer to observe reactive power and power factor correction.
- ATS Logic & Operation – Wiring the ATS unit to detect power failure, switch to backup (UPS), and revert automatically.
- Surge Protection Wiring – Proper installation of the SPD between phases, neutral, and earth to protect sensitive equipment.
- Industrial Motor Control – Integrating a DOL Starter and a Single-phase Induction Motor (1–5 HP) into the Main DB.
- Domestic Circuit Integration – Control and protection of a ceiling fan (with regulator), 13A sockets, and lighting (100W bulb).
- Fault Simulation & Troubleshooting – Using the door buzzer and indicators to signal faults within the short-circuit simulation circuit.

Physical Construction & Accessories

- Enclosures: Two surface-mount industrial metal cabinets.
- Connectivity: Industrial 5-pin sockets (male/female) for safe panel-to-panel and panel-to-load connections.
- Mounting: Standard DIN rail bars for modular component installation.
- Hardware: Comprehensive set of nuts, bolts, and self-tapping screws for professional assembly.

Expected Educational Outcomes

- Upon completion of the curriculum using this trainer, students will be able to:
- Read and execute complex industrial wiring diagrams.
- Select and coordinate protective devices (MCB vs. MCCB vs. Fuse).
- Configure automated transfer logic for emergency power systems.
- Perform live power analysis and interpret data from digital analyzers.

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- Apply earthing and neutral interconnection standards for safety compliance.



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