

# POWER TRANSMISSION LINE TRAINER (Model : XPO-PET-TL)



## SALIENT FEATURES

- ◆ Simulates 400 KV, 50 / 60Hz, 3 Phase 1MVA. Transmission Line by scaling it down by 1000:1. Optionally second TL may be supplied for 3 bus experiments.
- ◆ XPO-PET/TL Trainer need a few set of associated panels which are mounted in a light weight sturdy aluminum profile flat demo modular panel system.
- ◆ 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.
- ◆ Useful for Under Graduate Practicals & Post Graduate projects.
- ◆ Set of Instructor Guide & Student Workbook.

## Technical Specifications

- ◆ **Input 3 phase DOL Starter panel (EMT1)**
  - 4 pole MCB of 415 V/4A.
  - DOL 9A Contactor with 230V / 50 Hz / 11VA COIL
  - Bimetallic thermal O/L relay with range 2.5A-6A
- ◆ **FWD-OFF-REV, Switch Panel (EMT 4A)**
  - FWD/REV, 3 pole 3 way switch with center OFF, 6A/440V.
- ◆ **Integrated AC 3 phase measurement panel (EMT 34) X 2**
  - Consist of (96 X 96 mm) Digital meters for 3 phase.
  - Measures V, I, PF (0.2 lag – unity 0.2 lead), Hz. Hence separate analog wattmeters (3 ph., 1ph.) are not needed.
- ◆ **VAR Compensation panel (dual panel) (EMT43)**
  - Consisting of VAR compensating capacitors of 2, 4, 6, 8, 10 & 15 $\mu$ F each of 3 nos with 3 pole 7 way switch for selection.
- ◆ **Transmission line Panel (EMT38) Table Top Panel consisting of :**
  - Can Simulate model for transmission line constructed using R(10 ohm/600W), L(0.15H/5A) and C (2.2 $\mu$ F/630V) 6 No. each component.
  - Can Simulate model for medium/long (125 km/250 km) length transmission line for  $\pi$  model.
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  - Fan cooled top setup for long life.
- ◆ **RLC load panel EMT42A/B/C**

**Table Top Panel consisting of :**

  - 3 nos of 600W resistors with switch selectable 1(oft) + 6 tap nos. of taps at 100, 112, 150, 175, 200 & 225 ohm & SIL tap of 262 ohm.
  - 3 nos. of inductor 1.5H/1A with switch selectable 1(oft) + 6 tap nos of taps at 0.3, 0.6, 0.75, 0.9, 1.2 & 1.5H.

- Capacitors 440VAC rating (3 nos, one per phase) with switch selectable 7 nos of value of 2, 5, 10, 15, 20, 30 & 50 $\mu$ F.
- Fan cooled top setup for long life.
- ◆ **3 phase dimmer panel EMT20D**

**Table Top Panel consisting of :**

  - 3 phase dimmer I/P : 415VAC, 50Hz, O/P : 0 - 470 V AC, 6A, 3 phase.

## List of Experiments :

1. Working with bi-directional 3 AC measurement panel, observing flow of real & reactive power & optionally modbus communication with PC.
2. No load test & Ferranti effect.
3. Determination of transmission line constants (ABCD) by experimental measurement using 2-port method as well as by knowing components values and its verification.
4. Load Test & Calculation of Regulation, efficiency of Transmission Line.
5. Working with power circle diagram & to find steady state power limit of transmission line.
6. Capacitive VAR compensation
7. Per unit representation
8. Symmetrical & unsymmetrical faults in transmission line.
9. Predicting Power Flow in Transmission Line (2 bus) by Numerical method [Newton Raphson / Gauss-Seidel Method]

## ◆ Mechanical Dimension (mm) & Weight of Trainer:

1170(L) x 300(W) x 990 (H)

- ◆ **Net Wt.:** 45 kg. **Gross Wt.:** 55 kg.
- ◆ **EMT20D :** 53 kg. **EMT 42 :** 60 kg. **EMT 38 :** 103 kg.
- ◆ **DC motor Net Wt.:** 40 kg. **Gross Wt.:** 52 kg.