



SALIENT FEATURES

- Each of following independent PET trainer may need a few set of associated panels (7-8 nos. typically) which are mounted in a light weight sturdy aluminum profile flat demo 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 4. Set of Instructor Guide & Student Workbook

Technical Specifications

◆ Input 3 phase DOL Starter panel (EMT1)

- 4 pole MCB of 415 V/2A.
- DOL 9A Contactor with 230V / 50 Hz / 11VA COIL.
- Bimetallic thermal O/L relay with range 1.4A - 2.3A.

◆ Resistor Load (EMT14A/14B)

- (1) AC Resistors = 10K/5K/3.5K/2.5K/2K/1.5K/
200WX3 phases/ 6 taps
- (2) DC Resistors = 750E/600E/300E/212E/162E/ 125E/
112E/100E/400W / 6 taps

◆ LC Load (EMT 15A/15B) panel

- (A) Inductive load = 0.75H/3H/300mAX3Nos.
- (B) Capacitive load = 1.25 F/2.5 F/5 F/415VX 3Nos.

◆ 1phase Motor, Alternator & Sync. Motor Panel (EMT 16)

- 1ph. MCBs of 4A/1.6A - 2nos.
- 2no. 2P2W selector switches to run as 1ph. alternator then as synchronous motor.
- 8A pushbutton switch to simulate as centrifugal switch.

◆ Integrated AC 1 phase measurement panel (EMT20F)

- Consist of 96 x 96mm, Digital meter for 1ph. Measures V, I, PF (0.2 lag unity 0.2 lead), Hz. Hence separate analog wattmeter (1ph.) is not needed.
- Current specs for 1ph. meter = 1A/5A.

◆ Variable voltage & current injector panel (EMT23)

- Consist of 1 ph. dimmer 230VAC/1A
- Short circuit transformer with primary 230VAC/1A, secondary 1V/ 20A.

◆ Integrated AC 3 phase measurement panel (EMT34)

- Consist of 96 x 96mm Digital meters for 3ph. Measures V, I, PF (0.2 lag unity 0.2 lead), Hz. Hence separate analog wattmeters (3ph., 1ph.) are not needed.

◆ Transmission line panel (EMT 38)

- Simulated model for short transmission line using R (10 ohm) & L (45 mH) components.
- Simulated model for medium length transmission line for II model.
- Simulated model for medium length transmission line for T model.

◆ Over current and elapsed time measurement Panel (EMT39)

- Consists of AC ammeter of 20A.
- Elapsed time counter range 999.001 msec, resolution 1msec.

◆ Phase sequence indicator and study Expt. Panel (P30)

- Study 3 phase 440V Electric utility supply.
- Determination of over voltage, under voltage, single phasing & reverse phasing / Displays OV, UV, SP, RP on digital display.
- 9 V Battery / +12V Supply operated.

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Choice of Power Engineering Trainer [PET] : Select one or more trainer.

S. N.	Model Name Specifications	XPO-PSS/Gen Generation & X'tmer	XPO-PET/TL Transmission line	XPO-PET/SSD Substation Switching & Distribution	XPO-PET/SCADA Smart PET	XPO-PET/PR-I Protection Relays - I	XPO-PET/PR-II Protection Relays - II
1.	Rack . config / No. of panels	4 X 2 (7)	5 x 2 (7)	5 x 2 (9)	4 x 2 (8)	4 x 2	4 x 2
2.	Resource Panels needed.	EMT4, EMT8, EMT9 (3nos), EMT5A/5B, EMT6A/6B, EMT26A/26B, EMT34.	EMT1, EMT34 (2 nos), Table Top- EMT38 (2 nos), EMT14 A/B (dual panel), EMT15 A/B (dual panel), P30 phase sequence indicator.	EMT41 (9 Nos.)	Converter cum distribution panel (CDF), Simulation cum extension panel (SEP), Power supply panel-Auxiliary substation power supply 24VDC, Relay Panel.	EMT16, EMT23, EMT39, EMT20F	EMT16, EMT23, EMT39, EMT20F
3.	Table Top M/C's / accessories	<ul style="list-style-type: none"> Trunnion mounted DC 1HP shunt machine coupled to 3ph. salient pole alternator 1KVA, 415VAC, 50Hz. Transformer 1KVA, 3ph, 415:415VAC, 50Hz. 	3 phase dimmer: I/P: 415V, 3 50Hz, O/P: 0-470V, 3A, 3 .			Select one or more of the following <ul style="list-style-type: none"> IDMT Over Current Relay Over / under voltage Relay Earth Fault Relay Differential Relay Buchholz Relay 	Select one or more of the following <ul style="list-style-type: none"> Reverse power relay Under/over frequency relay Phase balance /sequence relay Power factor relay Distance Relay
4.	List of Experiments	<ol style="list-style-type: none"> Regulation of 3 ph. alternator by : <ol style="list-style-type: none"> Synchronous impedance method ZPF or POTIER method Actual load test Determination of : <ol style="list-style-type: none"> Direct axis and quadrate axis sub transient reactance X_d' & X_q'. Zero sequence reactance X_0. Negative sequence reactance X_2 	<ol style="list-style-type: none"> Understanding phase sequence of a 3ph. phase source. Working with bi-directional 3ph. AC measurement panel, observing flow of real & reactive power & optionally modbus communication with PC. No load test & Ferranti effect. Determination of transmission line constants (ABCD) by experimental measurement using 2-port method as well as by knowing components values. Load test & calculation of regulation, efficiency of transmission line. Receiving end circle diagram. Sending end circle diagram. Combined power circle diagram. Per unit representation 	<p>To study following configuration.</p> <ol style="list-style-type: none"> Single Bus Configuration Double Bus Double Breaker Configuration Main & Transfer Bus Configuration Double Bus Single Breaker Configuration Ring Bus Configuration Breaker and a Half Configuration 	<p>Study of :</p> <ul style="list-style-type: none"> DCS consisting of PLC networked over RS485 with MultiDrop SCADA S/W [Supplied on Installable CD] with MODBUS capability, USB H/W lock. Protection Relay [optionally MODBUS RS485 configurable] PLC receives trip contact from protection relays, circuit breakers & provides trip outputs to circuit breaker between various power substations like generation, transformer, transmission line, substation switching network etc. 	<p>To plot characteristics curve / behavior.</p>	
5.	Mechanical dimension (mm) / Kg. Wt.		1170(L) x 300(W) x 990 (H) 40 Kg.	1170(L) x 300(W) x 990 (H) 40 Kg.	960(L) x 300(W) x 545 (H) 17 Kg.	960(L) x 300(W) x 545 (H) 17 Kg.	960(L) x 300(W) x 545 (H) 17 Kg.