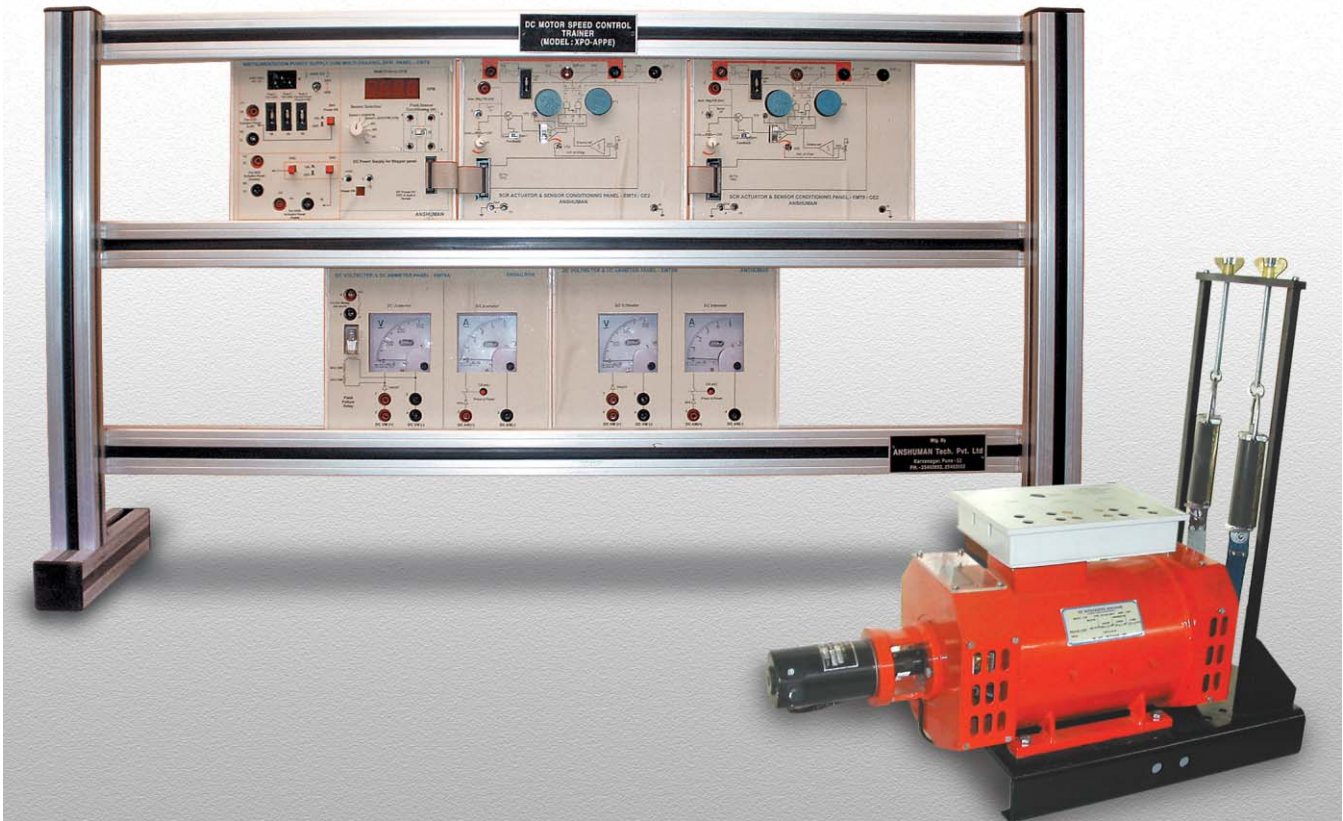


# APPLIED POWER ELECTRONICS TRAINER (Model : XPO-APPE)



## SALIENT FEATURES

- ◆ Each of following independent Applied PE trainer may need a few set of associated panels (4 nos. typically) which are mounted in a light weight sturdy aluminum flat demo panel system.
- ◆ Facilitates easy and safe wiring by students due to 4mm sturdy shrouded banana patch cords and shrouded socket arrangement for high voltage circuits.
- ◆ Each panel has ABS molded plastic sturdy enclosure, and colorful screwless overlays showing circuit diagram & its connection tag numbers for easy understanding and connections.
- ◆ Set of Instructor Guide & Student Workbook.

## 1] 3 Phase HV Thyristor control Trainer (HVDC) Electrical Specifications

- Sturdy stud type 6 SCRs (anode to body type) with PIV rating 1000V/25Amp and 6 diodes with PIV ratings of 1000V/16A, however actual use is limited to 300W for equipment safety.
- 6 Nos. of Snubbers for protection of thyristors consisting of capacitor 0.1 F/1000V and 0.1E/5W ceramic resistors.
- The Power Module with 36 shrouded bananas to construct 3 HV circuit configurations.
- Cosine firing scheme to facilitate linear control between firing angle & DC load voltage, also gives better harmonic ripple control.

### Panels needed

- Input 3 DOL/MCB Starter panel (EMT1)
- Integrated 3ph AC measurement panel (EMT20)

- 3 SCR firing/Synchronizing Panel(PE4A) + 6 SCR/Diode Power Module(PE4B)
- Inductive load panel - EMT 15A
- EMT-6B : Voltmeter (600V), Ammeter (5A)
- Lamp load panel (EMT7) 100W x 3Nos.
- Optionally 3 step down (430/110Vac) Isolation Transformer or 3 dimmer of 500VA may be ordered from safety point of view.
- Optional 3 phase induction motor (F.H.P.).

### Experiments covered

- Study of 3phase SCR cosine firing circuits
- 3phase half bridge uncontrolled
- Full bridge uncontrolled
- Half bridge controlled
- Full bridge controlled
- Single phase cycloconverter (25Hz/ 12.5Hz).
- 3phase AC power control for resistive lamp load

## 2] Single phase dual converter trainer [SPDC]

### Electrical specifications

- 2 No. CTs (1A / 30mA) to detect current zero condition in each converter bridge
- 2 No. current limiting chokes with rating 750mH/1A
- 15W/60W lamp loads / DC motor 200Vdc/200W with 1500rpm
- 4 SCR based full bridge output 0V-195V / 3 Amp, cosine firing with linear characteristics

## 3] Motor speed control trainer

<b>Motor</b>	PMDC 200V/200W motor (optional) i) 160W/180V shunt motor <b>OR</b> ii) 300W/180V DC motor with series shunt & compound winding.	Fractional HP Universal AC/DC motor 230VAC / 1/12HP
<b>Method</b>	DC Full wave controlled converter	AC Controller (Antiparallel SCR)
<b>Mechanical</b>	Chassis mounted table top with brake pulley and spring balance (5kg).	
<b>Speed feed back</b>	Electronic Tacho : 0.5V/1000RPM, Optionally 10V/1000RPM electrical tacho	Electronic tacho 0.5V/1000RPM
<b>Panels</b>	<ul style="list-style-type: none"> <li>● EMT8 : Instrumentation power supply.</li> <li>● EMT9 / PE6 : Variable thyristor/ IGBT / MOSFET based PWM controlled power for Armature supply, One more EMT9 needed for field supply only if DC shunt motor ordered..</li> <li>● EMT6B : Voltmeter (300V), Ammeter (6A), optional additional DC voltmeter with FF relay if DC shunt motor ordered.</li> </ul>	<ul style="list-style-type: none"> <li>● EMT8 : Instrumentation power supply.</li> <li>● EMT9 : Variable thyristor controlled power for Armature supply.</li> <li>● EMT6 : Voltmeter (300V), Ammeter (1A).</li> </ul>
<b>Experiments</b>	<ul style="list-style-type: none"> <li>● Open loop torque speed characteristics.</li> <li>● Closed loop speed control using Armature voltage / speed feed back using P/PI mode</li> </ul>	<ul style="list-style-type: none"> <li>● Open loop torque speed characteristics.</li> <li>● Closed loop speed control using speed feed back with <b>AC controller</b> using P/PI mode.</li> </ul>

### Panels Needed

- Instrumentation power supply panel (EMT8)
- 2 Nos. of SCR actuator panels as Forward & Reverse controlled converter (EMT9 X 2 Nos.)  
OR 2 Nos. of MOSFET -IGBT Panels (PE 6 X 2 Nos.) used (optional)
- Single phase dual converter controller panel (PE5)
- 1 Phase MCB isolator panel EMT-16

### Experiments covered

- Study of Dual converter topology & control strategy.
- Study of Dual converter operation: Resistive load / motor load.

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