

3 PHASE INVERTER TRAINER (Model : XPO-INV)



SALIENT FEATURES

- ◆ XPO-INV includes reconfigurable hardware modules and individually replaceable power modules, which may be interconnected to construct 3 phase/ 1 phase inverter topologies. Moreover, the FPGA controller board is accessible to user, thereby facilitating quick verification and testing of new ideas.
- ◆ optionally use of hall sensors for voltage/current measurements.
- ◆ Light weight yet sturdy, table top Aluminum profile modular flat demo panel setup, carrying various high voltage components housed in plastic modular panels with colorful overlays to minimize shock possibility & easy servicing.
- ◆ Facilitates easy and safe wiring by students due to use of 4mm Shrouded banana patch cords 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 connections, experiments also set of Instructor Guide & Student Workbook.

Technical Specifications

Aluminum profile modular flat demo panel rack (5X2) system, carrying various high voltage components housed in plastic enclosures (panel) to minimise shock possibility.

◆ Instrumentation Power supply cum Multichannel DPM panel (EMT 8) (6 Shrouded sockets):

- $\pm 12V/500$ mA, $+5V/300$ mA, Unregulated $17V$ dc/ 750 mA, line synchronizing signal, $13V/3$ Amp.
- Multi channel DPM for digital display of parameters.
- 20 pin FRC power bus to supply power to neighboring panel.

◆ 8 IGBT Power & sensing panel - PE7A/L & R (74 Shrouded banana sockets)

Consisting of

- $1200V/40A$ IGBT with opto isolated (LV) TTL compatible driver circuit & individual heat sink with built in isolated DC power supply for gate drive - 8 nos.
- Optionally Current measurement AC (12 nos) & DC (1no) using Hall sensors (Max I/P up to $20A$, $50/60$ Hz), Isolation up to $2KV$, O/P = $0-3V$ for controller feedback.
- Optionally Voltage measurement AC (3 nos) & DC (1no) using hall sensors (Max I/P $10-500V$, $50/60$ Hz), Isolation up to $2KV$, O/P = $0-3V$ for controller feedback.
- 2 nos of relays for ON/OFF control of I/P & O/P under /uc control.
- DC link supply for inverter $300V/5A$.
- May be used in manual mode using SG3525 PWM controller (1 phase application) as well as from DSP/FPGA controller (Optionally User selectable choice of controller).

◆ FPGA based controller panel (XPO-EST) SPARTAN III (XC3S50AN)

- $16MHz$ crystal operated multi-output clock source to operate various resources on Mother Board like CPU, Baud rate, Timer/Counter etc.
- 6 LV TTL gate drive outputs to and 6 status feedback inputs

from 6 nos IGBT power modules through 26 pin FRC cable.

- Optionally 2 digital outputs for ON/OFF Relay control & one for controller ON led.
- Optionally opto isolated 3 inputs for encoder/ hall sensors from PMSR/BLDC and 1 input for DC bus fault interrupt.
- ◆ **AC voltmeter panel (EMT2)**
 - Voltmeter range: $500V$
 - 1 pole 4 way switch to select line voltage for three phase
- ◆ **Dual range AC ammeter panel (EMT3)**
 - Current range: $2A/6A$ selectable
 - 1 pole 7 way switch to select phase current to three phases
- ◆ **Lamp load panel (EMT7)**
 - $230V/15/40/60/100W$ X 3 bulbs with individual ON/OFF using $6A$ toggle switch.
- ◆ **Variable AC & DC supply panel (EMT23)**
 - Variable O/P: AC $0-270V/3A$ for V/F manual setting
- ◆ **Resistive load panel (EMT14A/B)**
 - DC resistors: $750E/600E/300E/212E/162E/125E/112E/100E/400W/8$ taps + OFF + separate $60E$ tap for DC series Gen.
- ◆ **3 phase Induction motor specs :**
 - 3 phase induction motor, $\frac{1}{2}$ HP, $1500RPM$, 3 terminal (star $440Vac/0.5A$) motor with Hand held Tachometer for speed measurement
- ◆ **Accessories:**
 - Power scope, BNC to BNC cables x 2 nos., Tachometer
- ◆ **List of Experiments :**
 - 1) Speed control of 3 Ph. Induction motor by varying frequency (0 to 70 Hz) and Voltage
- ◆ **Mechanical Dimension (mm) of Trainer :**
 - 1170 (L) x 300 (W) x 545 (H)mm
 - Net Weight : 20 kg. Gross Weight : 31 kg.**
 - 3 Ph. I.M. Net Weight : 17 kg. Gross Weight : 21 kg.**