

ELECTRICAL CONTROL TRAINER (XPO-ECT)



Salient Features

- Learn how NAVY control systems work.
- Facility to monitor behavior of the output & process variable either on PC screen or on CRO.
- Can learn about different optional building blocks and real life processes using replaceable experiment panel & table top units : e.g. Magnetic amplifier, AC servo motor, Synchros, servo pot etc.
- Graph printing facility for laboratory journal entries.
- Aesthetically designed injection moulded electronic desk (master unit) carrying useful experiment resources like Power supplies, meters, Computer Interface, with central slot to hold various replaceable experiment panels.
- Connection through sturdy 4mm Banana sockets & Patch cords, security sockets for high voltage.
- Students workbook & Instructor's Guide provided with each unit.



Specifications of Master Unit

Basic Resources on Top board

- **Built in power supply**
DC supply
+/- 12V, 500mA.
Variable DC power supply 7 to 14Vdc/3Amp
- **Display**
A) Analog Meter – 2nos.
a) Centre zero for display of process error ($\pm 9V$)
b) For MV/SP (0-2.5V)
- **Mechanical Dimensions**
a) Master Unit : 400mm(W), 125mm (H), 270mm(D)
Net weight : 8Kg. Gross weight : 10Kg.
b) Panel : 215mm(W), 165mm(H), 40mm(D)
Net weight : 700gm approx.
- **Operating voltage**
Switch selectable 220-240Vac $\pm 10\%$ 50Hz
- **Computer Interface Adapter / CIA**
Optoisolated Adaptor to prevent damage to PC parallel port (25 pin LPT) due to wrong connections. Interfaces through 25 pin M to F cable 1mtr Length.
4 ADC channels : 0 to 2.5V full scale.
1 DAC channel : o/p 2.5 V FS.
V to I Function block : Input : 0-2.5Vdc
Output : 0-20 or 4-20mA,
(max. 100 Ω load).
- **Software**
P4 / XP / Parallel port based, data acquisition cum monitoring interface adaptor to study closed loop dynamics. PC not in scope of supply.

Modular Expt. Panels offered - (Must select atleast one of following panels to work)

Potentiometric error detection cum Magnetic Amplifier Interface panel (PMP)/CE4

- Onboard Transformer --- 2nos.
I) P: 0-230Vac S1 : 0 – 24Vac / 50mA,
S2 : 0 – 6Vac / 500mA
II) P: 0-230Vac S1 : 24 – 0 – 24 / 50mA
- Potentiometric error detector (Can be Supplied as standalone panel).
- 360 $^{\circ}$ servo pots / 10K -----2Nos.
- Facility to study error under AC supply (24-0-24) as well as DC supply (± 12) application.
- Diode Demodulator to convert AC error signal from process VI into DC error to control magnetic amplifier.
- 15 pin D (F) connector to interface with AC servo motor (process VI) & 9 pin D (F) connector to interface with synchro command station (Process VII).
- Variable control voltage 0 – 12VDC / 500mA for plotting Magnetic amplifier characteristics.
- Optionally Mag. Amplifiers 2Nos table top units with bias & error winding (12V/500mA) and load winding (6Vac/500mA). Loading resistor 10 Ω /5W. Can draw characteristics curve, series parallel mode of connection.

Optional Process Set up

Process	VI AC servo position control	VII Synchro Transmitter Receiver process	
Electrical	<ul style="list-style-type: none"> AC geared (50:1) servo motor. Main winding : 230VAC, Control winding : 6VAC/1A, O/P shaft RPM 25 (D), RPM 2500(ND). Loading: Using PMDC generator. 12V/1.5A max., Servo amplifier with builtin Power Supply. 15 pin D (M) connector to interface with PMP 	<ul style="list-style-type: none"> Operated from 230Vac \pm10% 50Hz. Synchro transmitter / Receiver pair <ul style="list-style-type: none"> - Rotor 1phase 115Vac/ 120mA - Stator 3 phase 90Vac - 9 pin D (M)connector (optional) to interface with PMP panel 	
Panel	PMP	PMP (Optional)	
Sensor	<ul style="list-style-type: none"> 1Nos. of Servo pot as position feedback of synchro control transformer coupled to motor shaft for PC/CRO interface. (0-2.5Vdc) Synchro control transformer to generate position feed back for mag amplifier based Electrical control system(Naval application) 	<ul style="list-style-type: none"> 1 No. servo pot (optional) for position feedback (0-2.5V) of command synchro for PC interface. 	
Mechanical	365(L)x220(W)x95(H)	Wt. 1.5kg 220(L) x 150 (W) x 95(H)	
Additional		<ul style="list-style-type: none"> Acts as electrical command station (SP)for process VI if interfaced with PMP. 	

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