

# MEASURING TRAINER (Analog & Digital)

Measuring Trainer is a major part of Measuring Lab. To become familiar with this part here is a complete system in which Measuring Trainer is a comprehensive and self-contained system suitable for anyone engaged in Electronic Measurements experiments. All necessary equipments for Measuring (Analog & Digital) experiments such as power supply signal generator, switches and displays are installed on the main unit.

## MAIN ASPECTS OF THIS TRAINER

- Suitable for combinational logic, sequential logic, and microprocessor circuit experimentation and Design.
- Ideal tool for learning the basics of Electronic Measurements.
- Integrated training system, with complete curriculum.
- Comprehensive power supply, signal supply, and testing devices for convenient experimentation.
- Expandability and flexibility of experiments greatly increased by large breadboard.
- All supplies equipped with overload protection.
- 13 experiment modules form basis for over 60 fully documented experiments.
- Main units and experiment modules also available separately for economical construction of class sets.

## Features:

1. Power Switch with Inner Light Indicator
2. Input Power Supply Power Supply 110/220V AC  $\pm 10\%$  50/60Hz & Fuse Protected
3. Fixed DC Power Supply Voltage range: +5V, -5V, +12V and -12V
4. Maximum current output: 1.A for +5V rail, 300mA for others
5. Output overload Protection (Fuses)
6. Removable Solder less Breadboard 1680 interconnected tie points, accepting all DIP devices, components with leads and solid wires of AWG #22-30 (0.3mm to 0.8mm)
7. 4x16 LCD for Digital Volt Meter, Current Meter & Resistance Meter Display

## EXPERIMENTS:

1. Linear Measurement and Error Analysis using
  - a. Vernier caliper
  - b. Digital Caliper
  - c. Micrometer Screw Gauge
2. Construction & Design of Analog meters
  - a. Galvanometer
  - b. Ammeter
  - c. Voltmeter
3. Measurement of Power and Power factor by
  - a. Ammeter method
  - b. Voltmeter method
4. **4. Study of the bridge rectifier using oscilloscope to find**
  - a. **input frequency**
  - b.  **$V_{rms}$ ,  $V_{avg}$ ,  $I_{rms}$  and  $I_{avg}$**
5. Measurement of electrical energy by electronic wattmeter and energy meter (KWH meter).
6. Measurement of Displacement using Linear Variable Differential Transformers (LVDT)

7. Temperature Measurements using
8. IC Temperature Sensor LM 335
9. Resistance Temperature Detector (RTD)
10. N.T.C. Thermistor
11. K or J type Thermocouple
12. Spring-damper Systems to study
13. Static Extension
14. Undamped oscillations (unforced spring-mass system)
15. Damped oscillations (unforced mass-spring damper system)
16. Speed Measurements using
  - a. Stroboscope
  - b. Tachometer
17. Strain Gauge and its Applications
18. Optical Transducers
  - a. Filament Lamp
  - b. Photovoltaic Cell
  - c. Photoconductive Cell
19. Design and construction of a 4-bit R 2R ladder DAC (digital to analog converter) circuit.
20. Study of Microcontroller's ADC, DAC circuits and their usage
21. Using Microcontroller, design
  - a. Voltmeter
  - b. Ammeter
  - c. Frequency generator
22. PC Based instrumentation like
  - a. Oscilloscope
  - b. Function generator
  - c. Digital Logic Analyzer
  - d. Spectrum Analyzer
23. And interfaces like
  - a. USB
  - b. Serial
  - c. GPIB etc.

### **For Projects**

1. Using Microcontroller, design
  - a. Voltmeter
  - b. Ammeter
  - c. Frequency generator
2. PC Based instrumentation like
  - a. Oscilloscope
  - b. Function generator
  - c. Digital Logic Analyzer
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3. And interfaces like
  - a. USB
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  - c. GPIB etc.