

## KL-500

### Industrial Electronic Trainer



The KL-500 Industrial Electronic Trainer is a self-contained training equipment allowing students to learn more than 70 experiments through a power supply unit and 16 replaceable modules.

Various types of industrial electronic devices, such as UJT, PUT, SCR, SCS, DIAC, TRIAC, JFET, MOSFET, IGBT are introduced in this system. For each device, students are able to learn its characteristic, trigger circuit, and practical application circuit those providing students a comprehensive understanding of related knowledge in this technology field.

\* Option : Oscilloscope (20MHz)

#### ► Features

- Comprehensive study including the theoretical study and practical exercises
- Use of industrial-type components, devices and circuits

#### ► Specification

##### 1. Power Supply Unit (KL-51001)

- (1) ACV output voltage : 18V-0V-18V, 0.5A
- (2) ACV output voltage : 12V-0V-12V, 0.5A
- (3) DCV output voltage : +12V, 0.5A
- (4) DCV output voltage : +5V, 0.5A

##### 2. Meter/Motor Unit (KL-58001)

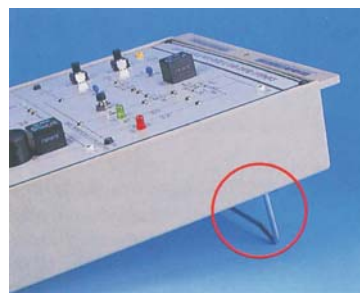
- (1) Dual-scale ACV : 150V-300V, class 2.5
- (2) Dual-scale ACA : 0-100mA-1A, class 2.5
- (3) Dual-scale DCV : 0-10V-20V, class 2.5
- (4) Dual-scale DCA : 0-100mA-1A, class 2.5
- (5) AC110V/220V motor

##### 3. Isolation Transformer (KL-58002)

- (1) AC 110V/220V

#### ► Experiment Modules

1. Generally use 2mm plugs and sockets connected by 2mm or 4mm test leads
2. Circuits, blocks and components symbols printed on the surface of each module
3. Modules secured in plastic housing, modules to standard DIN A4 equivalent height
4. Cabinet provides easy-to-store facilities for all modules
5. Comprehensive experiment manuals



Stand feet for easy operation on the workbench



KL-51001



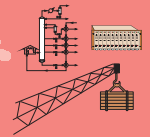
KL-58001



KL-58002



Cabinet enhances storage facilities of all modules



## ► List of Modules

- KL-53001 UJT Experiments
- KL-53002 PUT Experiments
- KL-53003 PUT & SCR Experiments
- KL-53004 SCS Experiments
- KL-53005 UJT & PUT Trigger SCR Experiments
- KL-53006 SCR Control DC Motor & DIAC, TRIAC Characteristic Experiments
- KL-53007 Automatic Control Lamp and TRIAC Control Speed Experiments
- KL-53008 Temperature Ratio, Photo-Couple and Touch Control Experiments
- KL-53009 Over/Under-Voltage Breaker and Flasher Control Experiments
- KL-53010 TRIAC Liquid Level & IC Timer Switch Experiments
- KL-53011 Digital Signal Driver & Zero-Voltage Switch Experiments
- KL-53012 Zero-Voltage Switch Experiments
- KL-53013 SCR Converter Experiments
- KL-53014 SCR Rectifier Circuit Experiments
- KL-53015 JFET/MOSFET Characteristic & MOSFET Speed Control Experiments
- KL-53016 IGBT Characteristic & IGBT Speed Control Experiments

## ► List of Experiments

### 1. Power Supply Unit Experiments

- (1) AC voltage measurement
- (2) DC voltage measurement

### 2. UJT Experiments (KL-53001)

#### *UJT Characteristic & Equivalent Circuit*

- (1) UJT introduction
- (2) UJT characteristic
- (3) UJT equivalent circuit
- (4) CDS trigger, RTH trigger

#### *UJT Oscillator Circuit & Timer Switch*

- (1) UJT relaxation oscillator
- (2) UJT timer switch

### 3. PUT Experiments (KL-53002)

#### *PUT Characteristic & Equivalent Circuit*

- (1) PUT introduction
- (2) PUT characteristic
- (3) PUT equivalent circuit
- (4) CDS trigger
- (5) RTH trigger

#### *PUT Oscillator Circuit & Timer Switch*

- (1) PUT circuit oscillator
- (2) PUT timer switch

### 4. PUT & SCR Experiments (KL-53003)

#### *PUT Staircase Generator & Voltage Control Ramp Circuit*

- (1) PUT staircase generator circuit
- (2) PUT voltage control ramp circuit

#### *SCR Characteristic & RC Shift Control Circuit*

- (1) SCR principle
- (2) SCR characteristic curve
- (3) SCR construction
- (4) SCR trigger mode
- (5) SCR RC phase control circuit

### 5. SCS Experiments (KL-53004)

#### *SCS Characteristic Experiment*

- (1) SCS construction and operation mode
- (2) Use VOM meter measuring SCS
- (3) SCS schmitt circuit
- (4) SCS simulate PUT circuit

#### *SCS Trigger Circuit Experiment*

- (1) CDS trigger
- (2) RTH trigger

### 6. UJT & PUT Trigger SCR Experiments (KL-53005)

#### *UJT Trigger SCR Phase Control Circuit*

- (1) Phase control basic circuit
- (2) Phase control analysis
- (3) AC phase control circuit analysis
- (4) UJT trigger SCR phase control circuit

#### *PUT Trigger SCR Phase Control Circuit*



KL-53001

KL-53002

KL-53003

KL-53004

KL-53005

KL-53006

KL-53007

KL-53008



KL-53009

KL-53010

KL-53011

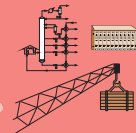
KL-53012

KL-53013

KL-53014

KL-53015

KL-53016



- 7. SCR Control DC Motor & DIAC, TRIAC (KL-53006)**  
*SCR Characteristic Experiments*  
*SCR Control DC Motor Forward/Reverse Experiment*  
(1) SCR cut-off principle  
(2) SCR control DC motor forward / reverse control experiment  
*DIAC, TRIAC Characteristic Experiment*  
(1) DIAC construction and characteristic  
(2) DIAC operation mode and measurement  
(3) TRIAC construction and characteristic  
(4) TRIAC trigger mode  
(5) TRIAC static measurement
- 8. Automatic Control Lamp, TRIAC Control Speed Experiments (KL-53007)**  
*Automatic Control Lamp Experiment*  
(1) TRIAC shift control  
(2) TRIAC automatic control lamp experiment  
*TRIAC Control Motor Speed Experiment*  
(1) Different motor introduction  
(2) TRIAC control motor speed experiment
- 9. Temperature Ratio, Photo-Couple and Touch Control Experiments (KL-53008)**  
*Bridge Temperature Ratio Control Experiment*  
(1) Electronic component of thermal resistor  
(2) SCR bridge temperature ratio control experiment  
*Photo-Couple and Touch Control Experiment*  
(1) Photo-couple control circuit  
(2) FET construction and characteristic  
(3) Touch alarm circuit
- 10. Over /Under Voltage Breaker and Flasher Control Experiments (KL-53009)**  
*Over/Under Voltage Breaker Experiment*  
(1) OPA characteristic with reverse & non-reverse circuit  
(2) Voltage comparison circuit  
*Flasher Control Experiment*  
(1) Application of TRIAC power control  
(2) AC circuit control  
(3) Multivibrator
- 11. TRIAC Liquid Level & IC Timer Switch Experiments (KL-53010)**  
*TRIAC Liquid Level Control Experiment*  
(1) Digital circuit introduction  
(2) TRIAC liquid level control experiment  
*IC Timer Switch Experiment*  
(1) NE 555 IC circuit introduction  
(2) IC timer switch experiment
- 12. Digital Signal Driver & Zero-Voltage Switch Experiments (KL-53011)**  
*Digital Signal Driver Control Experiment*  
Digital signal driver control experiment  
*Zero-Voltage Switch Experiments(I)*  
Ideal half-wave zero-voltage switch experiments
- 13. Zero-Voltage Switch Experiments (KL-53012)**  
*Zero-Voltage Switch Experiments (II)*  
(1) TRIAC zero-voltage switch experiments  
(2) IC mode zero-voltage switch experiments
- 14. SCR Converter Experiments (KL-53013)**  
(1) Parallel converter introduction  
(2) Series converter introduction  
(3) Converter trigger source  
(4) Converter voltage adjustment  
(5) Converter output-waveform improvement
- 15. SCR Rectifier Circuit Experiments (KL-53014)**  
(1) Single-phase half-wave rectifier  
(2) Single-phase full-wave rectifier  
(3) Single-phase bridge rectifier  
(4) Three-phase half-wave rectifier  
(5) Three-phase full-wave rectifier
- 16. JFET/MOSFET Characteristic & MOSFET Speed Control Experiments (KL-53015)**  
(1) JFET characteristic experiment  
(2) MOSFET characteristic experiment  
(3) MOSFET speed control experiment
- 17. IGBT Characteristic & IGBT Speed Control Experiments (KL-53016)**  
(1) IGBT characteristic experiment  
(2) IGBT speed control experiment
- **Accessories (KL-59001)**
1. Experiment manual
  2. Tank : 2 pcs
  3. Connection leads and plugs : 1 set
  4. Storage cabinet : 2 sets (KL-99001)
- **Option**  
**Rack Frame (KL-97001)**

