

## KL-620

### Microcomputer Sensing Control Equipment



\* Notebook is excluded

The KL-620 Microcomputer Sensing Control equipment is a comprehensive sensor/transducer control training system. Its modular and closed-loop control circuits allow implementation of open-ended, individual control loops used in industrial applications.

The KL-620 uses only industrial-standard sensors/transducers (0~10V, 4~20mA) and is equipped with USB for computer interface control experiments. Control programs can be written and downloaded to the Single-Chip microprocessor on KL-61001A main unit from computer through USB interface.

#### ► Features

- Industrial-standard sensors and transducers
- With USB interface
- Open-ended design, ideal for expansion
- Offer a sensing data acquisition software

#### ► Specification

##### ► Main Unit (KL-61001A)

#### 1. Power Supply Unit

Fixed DC power supply

- (1) Output voltage : +5V, -5V, +12V, -12V
- (2) Max. output current : +5V/3A, -5V/0.3A, +12V/1.5A, -12V/0.3A
- (3) With output overload protection

#### 2. Interface Port

USB interface : Type B

#### 3. Status Display & DCV

- (1) Input voltage measurement
  - a. Range : 2000mV, 20V
  - b. Accuracy :  $\pm 0.05\%$  of reading + 4 counts
  - c. Input impedance : 10M $\Omega$
  - d. Display : 4-1/2 digits
- (2) Sensor input measurement
  - a. Sensor types : TEMP, %RH, LUX, WEIGHT, AUX
  - b. Accuracy :  $\pm 0.05\%$  of reading + 4 counts
  - c. Display : 4-1/2 digits

**4. Preset Level** : 4-digit thumbwheel switch, Max, value : 4095

#### 5. Single-Chip & EPROM

- (1) Single-chip processor : 89C51
- (2) 8 Control line outputs

**6. D/A Converter** : 1x12-bit DAC

- (1) Resolution : 1.22mV/bit
- (2) Analog output & control
  - OUT+ : +DC OFFSET 0V ~ +4.096V unipolar
  - OUT- : -DC OFFSET 0V ~ -4.096V unipolar
  - OUT BP : DC OFFSET -2.048V ~ +2.048V bipolar

**7. A/D Converter** : 1x12-bit ADC

- (1) Resolution : 1.22mV/bit
- (2) Input voltage range : 0 ~ +5V
- (3) Time pulse frequency : 3.58 MHz
- (4) Control signals : State, pole, over voltage Indication

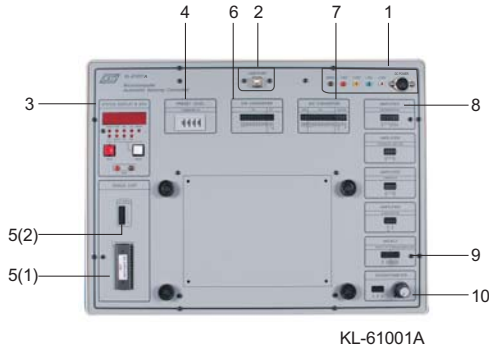
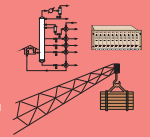
#### 8. Amplifiers

- (1) Instrumentation Amplifier:  $\pm V_i$  input,  $V_o$  output, adjustable gain
- (2) Differential amplifier :  $\pm V_i$  input,  $V_o$  output
- (3) Comparator :  $\pm V_i$  input,  $V_o$  output
- (4) Alarm amplifier : Buzzer with driver circuit

#### 9. Selectors

- (1) Single-chip selector
- (2) Manual/single-chip selector

**10. Potentiometer** : 100K $\Omega$  B-type

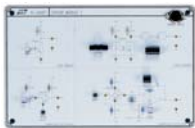


## ● Accessories

- (1) Connector leads : a. 0.5mm-0.5mm, 150mmL, 10pcs  
b. 0.5mm-0.5mm, 300mmL, 15pcs  
c. 2mm-0.5mm, 300mmL, 10pcs
- (2) Cable : USB (A-B), 1pce
- (3) User's manual
- (4) AC cord
- (5) Anti-dust cover
- (6) Software CD : Software for data acquisition

## ▶ Experiment Modules

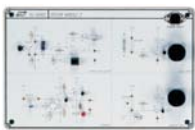
1. Using 2mm plugs and sockets
2. Comprehensive experiment manual
3. Modules secured in plastic housings
4. Connected by 2mm-0.5mm test leads
5. Dimension : 255 x 165 x 30mm
6. Circuit symbols, blocks and components printed on the Surface of each module
7. Power supplied from KL-61001A main unit



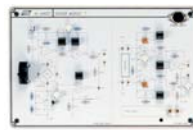
KL-64001



KL-64006



KL-64002



KL-64007



KL-64003



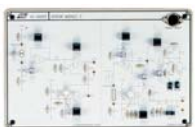
KL-64008



KL-64004



KL-64009



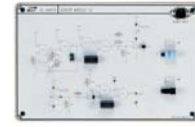
KL-64005



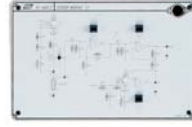
KL-64010



KL-64011



KL-64014



KL-64012



KL-64015



KL-64013



KL-64016

## ▶ List of Modules

### KL-64001

1. Phototransistor
2. Photointerrupter
3. Magnetic (hall-effect) ~ digital
4. Magnetic (hall-effect) ~ analog
5. Accessories : Magnet, 1pce  
(For KL-64001 and KL-64002 uses)

### KL-64002

1. Pyroelectric detector
2. Reed switch
3. Thermistor
4. Mercury switch

### KL-64003

1. Limit switch
2. Vibration switch
3. Condenser microphone
4. Dynamic microphone

### KL-64004

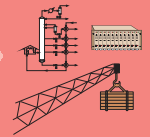
1. Gas / smoke sensor
2. Ethanol sensor

### KL-64005

1. IC (AD590) temperature sensor
2. Humidity sensor
  - (1) Humidity transducer rated voltage : 1 Vp-p AC
  - (2) Frequency range : 100Hz ~ 10KHz
  - (3) Temperature range : 0°C ~ 60°C
  - (4) Humidity range : 20%RH ~ 90%RH
  - (5) Impedance : 13KΩ (70%RH at 25°C)

### KL-64006

1. Infrared TX/RX sensor
  - (1) Infrared transmitter : Emission intensity : 12mW/sr  
(If = 50mA)  
Emission wavelength : 940nm  
(If = 50mA)
  - (2) Infrared receiver : Sensitivity wavelength : 1000nm
2. Ultrasonic TX/RX sensor
  - (1) Normal frequency : 40KHz



## KL-64007

1. Pressure sensor
  - (1) 0-7 psi to 0-30 psi pressure ranges
2. Strain gauge
  - (1) Maximum payload : <5kg
  - (2) Terminal resistance :  $350 \pm 50 \Omega$
3. Accessories:
  - (1) Suction pump, 1pce
  - (2) Plastic tube : 25cm, 1pce

## KL-64008

1. Hall current sensor
  - (1) Nominal current :  $\pm 3A$
  - (2) Current range :  $\pm 9A$
  - (3) Output voltage :  $\pm 4V$ ,  $R_L = 10 \text{ k Ohms}$
2. Proximity sensor
  - (1) Operation voltages : 10 ~ 30V DC
  - (2) Short circuit protection
3. Accessories : Proximity switch 1pce

## KL-64009

1. CDS sensor
2. Photovoltaic sensor
  - (1) Photovoltaic transducer open voltage  $\approx 2V$
  - (2) Photovoltaic transducer close voltage  $\approx 0.06 \mu A/lux$

## KL-64010

1. V/F converter
  - (1) Input voltage :  $+10mV \sim +10V$
  - (2) Output frequency : 5Hz ~ 5KHz, 10Hz ~ 10KHz

## KL-64011

1. F/V converter
  - (1) Input frequency : 0 ~ 4.3KHz (  $\pm 0.2V_p \sim \pm 5V_p$  )
  - (2) Output voltage : 0 ~ 4.3V DC

## KL-64012

1. RTD (PT-100)
  - (1)  $0^\circ C : 100\Omega$  ,  $100^\circ C : 139.16\Omega$
  - (2) Rating :  $250^\circ C$
  - (3) Accessories : PT-100 sensor probe

## KL-64013

1. Level (Water)
  - (1) Simulation of the reservoir control status (motor included)
  - (2) Accessories : plastic case

## KL-64014

1. Fiber optic emitter
  - (1) Forward current, DC (If) : 50mA
  - (2) Peak wave length : 950nm
  - (3) Output power :  $50\mu w$
2. Fiber optic phototransistor
  - (1)  $\lambda$  peak : 850nm
  - (2) Collect current (Ic) : 50mA
  - (3) Power dissipation : 100mw
3. Accessories

## KL-64015

1. LVDT
  - (1) Range :  $\pm 5mm$
  - (2) Scale : 0.01mm
  - (3) Optimum frequency : 50Hz ~ 1.1KHz  
(Nominal : 350Hz)

## KL-64016

1. Rotation angle sensor
  - (1) 10 turns ( $3600^\circ$ ) precision potentiometer
  - (2) Linearity :  $\pm 0.25\%$

## ► List of Experiments

### KL-64001

Photo Transistor/Interrupter & Hall Effect Sensor

1. Characteristics and applications of photoconductive detectors
2. Characteristics and applications of magnetic sensors
3. Principles and applications of magnetic hall sensors

### KL-64002

Pyroelectric Detector & Reed Switch & Thermistor & Mercury Switch Sensor

1. Characteristics and applications of pyroelectric detector
2. Characteristics and applications of reed switch
3. Characteristics and applications of thermal sensors
4. Characteristics and applications of mercury switch

### KL-64003

Limit Switch & Vibration Switch & Condenser/Dynamic Microphone Sensor

1. Characteristics and applications of limit switch
2. Characteristics and constructions of vibration switches
3. Characteristics and applications of microphones

### KL-64004

Gas/Smoke & Ethanol Sensor

1. Principles and applications of gas/smoke sensors
2. Principles and applications of ethanol sensors

### KL-64005

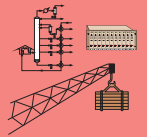
AD590 Temperature & Humidity Sensor

1. The construction of the AD590 temperature transducer
2. The characteristics of the AD590
3. The transduction principles of the AD590
4. The applications of the AD590
5. The classification of humidity sensors
6. The frame and characteristics of humidity sensors
7. The applications of humidity sensors

### KL-64006

Infrared TX/RX & Ultrasonic TX/RX Sensor

1. The characteristics of infrared (IR) transducers
2. The driver circuits of IR transducers
3. The receiver circuits of IR transducers



4. The applications of IR transducers
5. The characteristics of ultrasonic waves
6. The generations of ultrasonic waves and the design of the vibrators
7. The transmission and reception of ultrasonic waves
8. The applications of ultrasonic transducers in the field of incremental control and instrumentation

## **KL-64007**

Pressure & Strain Gauge Sensor

1. The construction of pneumatic pressure sensor
2. The operating principles of a pressure transducer
3. The applications of a pressure transducer
4. The principle of a strain gauge
5. The construction of a strain gauge
6. The characteristic of a strain gauge
7. The transduction circuit of a strain gauge
8. The application of a strain gauge

## **KL-64008**

Hall Current & Proximity Sensor

1. The operating principle of a magnetic device
2. The application of a hall-effect device to detect current
3. The construction of the proximity switches
4. The application of a inductive proximity switches to detect the metal object

## **KL-64009**

CDS & Photovoltaic Sensor

1. The CDS photoconductive cells characteristics
2. The application of a light control circuit
3. The characteristics of a photovoltaic cell
4. The principles of photoelectric conversion
5. The applications of photovoltaic cells

## **KL-64010**

V/F Converter

## **KL-64011**

F/V Converter

1. The principles of voltage-to-frequency conversion
2. The principles of frequency-to-voltage conversion
3. The operation of a photo encoder

## **KL-64012**

RTD (PT-100) Sensor

1. The characteristics of Resistance Temperature Detector (RTD)
2. The construction of a PT-100
3. The characteristics of a PT-100
4. The transduction circuit of a PT-100
5. The application of a PT-100

## **KL-64013**

Level (Water) Sensor

1. The digital circuit
2. The principle of the level control

## **KL-64014**

Fiber Optics Communication

1. The construction of the optical fiber and the characteristics
2. Fiber optical transmitter and receiver

## **KL-64015**

LVDT Sensor

1. The construction of a LVDT
2. The characteristics of a LVDT
3. The signal conditioning for a LVDT
4. The applications of a LVDT

## **KL-64016**

Rotation Angle Sensor

1. Principles and application of rotation angle sensor

## **► Accessories (KL-68013)**

1. Experimental manual
2. Connector leads :
  - (1) 2mm-0.5mm, 5pcs
  - (2) 2mm-2mm, 10pcs