

KL-600

Microcomputer Sensing Control System



* Notebook is excluded.

The KL-600 Microcomputer Sensing Control System is a comprehensive sensor / transducer control training system that incorporates industrial-grade components with various control circuits and load units. Its modular and closed-loop control circuits allow implementation of open-ended, individual control loops used in industrial applications.

The KL-600 uses only industrial-standard sensors / transducers (0~10V, 4~20mA) with 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-61001B)

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. A/D Converter : 1x12-bit ADC

- (1) Input voltage range : 0 ~ +5V
- (2) Time pulse frequency : 3.58 MHz
- (3) Control signals : Status, pole, over range indication

3. Interface Port

USB interface : Type B

4. D/A Converter : 1 x 12-bit DAC

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

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

6. Status Display & DCV

Input voltage measurement

- a. Range : 2000mV, 20V
- b. Accuracy : $\pm 0.05\%$ of reading + 4 counts
- c. Input impedance : 10M Ω
- d. Display : 4 1/2 digits

7. Mode Selector

Manual/single-chip

8. Buzzer

Maximum input signal voltage : +12V

9. Microcontroller Signals

5 Control line outputs

10. Model Holder : X4

11. Potentiometer : 100K Ω B-type

12. Comparator

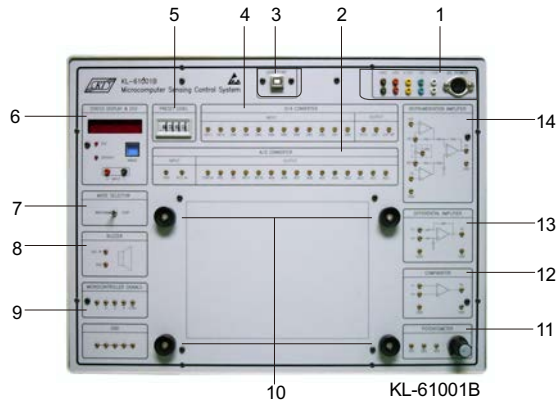
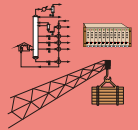
V-, V+ input, Vo output

13. Differential amplifier

V-, V+ input, Vo output

14. Instrumentation amplifier

V-, V+ input, Vo output, adjustable gain



- KL-63011 Linear Scale Module
- KL-63012 Infrared Transducer Module
- KL-63013 Multi-Channel Remote Controlled Module
- KL-63014 Ultrasonic Transducer Module
- KL-63015 Pressure Sensor Module
- KL-63016 VFC Module
- KL-63017 FVC Module

Experiment Modules

1. 2mm plugs and sockets used throughout
2. Comprehensive experiment manual
3. Modules secured in plastic housings
4. Connected by 2mm-2mm 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 either power module or through KL-61001B main unit

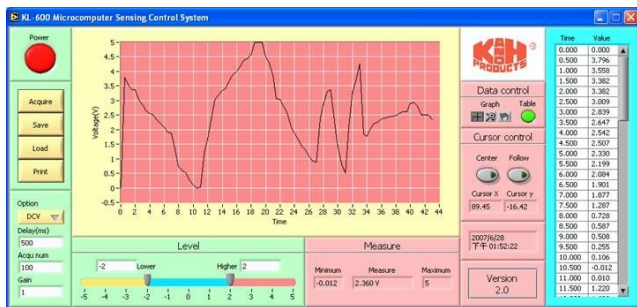
Graphic User Interface Software

System Requirements

1. Operating System : XP, Vista, or Windows 7
2. Computer Processor : Intel Pentium 4 or later
3. Computer Interface : USB
4. Computer Memory : 1 GB or more
5. HDD Space : 200MB of free space

Specification & Feature

1. Real time acquire signal
2. Adjustable acquire frequency
3. Current, Min and Max value displayed
4. Data save, load and print function
5. X-axis : TIME/DIV
Y-axis : VOLT/DIV
6. Storage format : Excel format

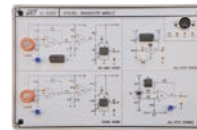


List of Modules

- KL-63001 Sensor Module
- KL-63002 General Transducer Module
- KL-63003 AD590 Transducer Module
- KL-63004 Thermocouple Transducer Module
- KL-63005 PT-100 Temperature Transducer Module
- KL-63006 Humidity Transducer Module
- KL-63007 Load-Cell Transducer Module
- KL-63008 LVDT Transducer Module
- KL-63009 Photovoltaic Transducer Module
- KL-63010 Counter Module



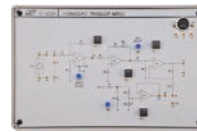
KL-63001



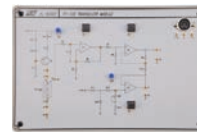
KL-63002



KL-63003



KL-63004



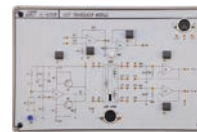
KL-63005



KL-63006



KL-63007



KL-63008



KL-63009



KL-63010



KL-63011



KL-63012



KL-63013



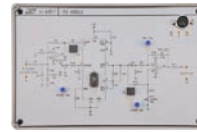
KL-63014



KL-63015



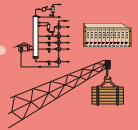
KL-63016



KL-63017

List of Experiments

1. D/A and A/D Converters
2. Characteristics of Various Sensors
 - (1) Phototransistor
 - (2) Photocoupler
 - (3) Magnetic sensor
 - (4) Pyroelectric detector
 - (5) Thermistor
 - (6) Reed switch
 - (7) Inclination sensor
 - (8) Limit switch
 - (9) Mercury switch
 - (10) Vibration switch
 - (11) Microphone



3. General Sensor Characteristics Experiments

- (1) Gas/smoke detector
- (2) Ethanol sensor
- (3) Digital hall sensor
- (4) Analog hall sensor

4. AD590 Temperature Transducer Experiments

- (1) Characteristics and transduction circuit of the AD590
- (2) Temperature controller

5. Thermocouple Temperature Transducer Experiments

- (1) Thermocouple characteristics
- (2) Transduction circuit

6. PT-100 Temperature Transducer Experiments

- (1) R vs. T characteristic of PT-100
- (2) Transduction circuit
- (3) Fire alarm

7. Humidity Transducer Experiments

- (1) Basic measurement
- (2) Impedance measurement
- (3) Conversion voltage measurement
- (4) Hygrometer

8. Load-Cell Weight Measurement Experiments

- (1) Characteristics and transduction circuit of load cell
- (2) Overweight alarm

9. LVDT Transducer Experiments

- (1) Characteristics of LVDT
- (2) Position detector

10. Photovoltaic Transducer Experiments

- (1) Photovoltaic characteristics
- (2) Photovoltaic transducer circuit
- (3) Automatic streetlamp controller

11. Linear Scale Experiments

- (1) Basic characteristics
- (2) Direction measurement
- (3) Distance measurement

12. Infrared Transducer Experiments

- (1) DC characteristics
- (2) AC characteristics
- (3) Event counter
- (4) IR remote controller

13. Ultrasonic Transducer Experiments

- (1) Effective distance test
- (2) Angle test
- (3) Space disturbance detector

14. Pressure Sensor Experiments

- (1) Zero-pressure input characteristics

15. V/F, F/V Converter Experiments

- (1) VFC converter
- (2) FVC converter
- (3) FSK modulation
- (4) Encoder

► Load Units

1. KL-68001 Humidity & Temperature Load

- (1) Temperature load
 - a. Provides heat source for AD590, PT-100 and thermocouples
 - b. Temperature range : Ambient~200°C
 - c. Manual/automatic adjustment
 - d. Insulated for safety reasons
 - e. Digital temperature control : SSR driven voltage output
 - f. ON/OFF LED indicator
- (2) Humidity load
 - a. Humidity transducer rated voltage : Maximum 1V AC
 - b. Frequency range : 500Hz~1KHz
 - c. Impedance : 1MΩ (75±5% RH at 25°C)
 - d. Humidity range : 50%~99% RH
 - e. Output conversion rate : 100mV / 1% RH

2. KL-68002 Pressure Gauge

- (1) Pressure gauge : full scale 5000mm Ag
- (2) Flow rate control valve
- (3) Power source : 110V AC or 220V AC

3. KL-68003 Load Cell

- (1) Construct strain gauge and bridge circuit
- (2) Maximum load : <5Kg
- (3) Electronic scale

4. KL-68004 Linear Variable-Differential Transformer (LVDT)

- (1) Range : ±5mm
- (2) Scale : 0.01mm
- (3) Linear accuracy : 0.1%
- (4) Excitation frequency : 350Hz

5. KL-68005 LUX Load

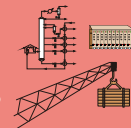
- (1) Selectable light sources
- (2) Light bulb luminous intensity adjustable
- (3) Photovoltaic transducer open voltage : ≈ 2V
- (4) Photovoltaic transducer close current : ≈ 0.08 μA/lx

6. KL-68006 Angle/Distance Load

- (1) Platform moving range : 300mm
- (2) Adjustable transmitting/receiving angle : 30°/step, 0~360°
- (3) Infrared receiver : Max. input wavelength = 940nm
- (4) Ultrasonic transmitter/receiver : nominal frequency=40KHz

7. KL-68007 Linear Scale

- (1) Resolution : 0.005mm
- (2) Max. range : 200mm
- (3) Stepping motor with speed adjustment
- (4) Voltage requirement : +5V DC
- (5) Left/right directional switch
- (6) Left/right limit switch



8. KL-68008 Standard Weight Set

2 x 50g; 2 x 100g; 1 x 200g; 1 x 500g; 2 x 1Kg; 1 x 2Kg

9. KL-68009 Encoder

- (1) DC power supply : +5V DC
- (2) Output signal : A, B, M
- (3) Response frequency : 30KHz (100~600P/R)
- (4) Impedance : 2K Ω
- (5) Current consumption : 60mA
- (6) Rise/fall time : 1 μ s or less

► Experiments / Equipment Required

1. Sensor & General Transducer Characteristics Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63001; KL-63002

2. Temperature Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63003; KL-63004; KL-63005
LOAD UNIT : KL-68001 Humidity & Temperature load

3. Humidity Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63006
LOAD UNIT : KL-68001 Humidity & temperature load

4. Load-Cell Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63007
LOAD UNIT : KL-68003 Load-cell; KL-68008 Standard weight set

5. LVDT Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63008
LOAD UNIT : KL-68004 LVDT load

6. Photovoltaic Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63009
LOAD UNIT : KL-68005 LUX load

7. Linear Scale Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63010; KL-63011
LOAD UNIT : KL-68007 Linear scale

8. Infrared Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63012; KL-63013
LOAD UNIT : KL-68006 Angle/displacement load

9. Ultrasonic Transducer Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63010; KL-63014
LOAD UNIT : KL-68006 Angle/displacement load

10. Pressure Sensor Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63015
LOAD UNIT : KL-68002 Pressure gauge

11. V/F, F/V Converter Experiments Kit

MAIN UNIT : KL-61001B
MODULE : KL-63016; KL-63017
LOAD UNIT : KL-68009



1. Sensor & General Transducer Characteristics Experiments Kit



2. Temperature Transducer Experiments Kit



3. Humidity Transducer Experiments Kit



4. Load-Cell Transducer Experiments Kit



5. LVDT Transducer Experiments Kit



6. Photovoltaic Transducer Experiments Kit



7. Linear Scale Experiments Kit



8. Infrared Transducer Experiments Kit



9. Ultrasonic Transducer Experiments Kit



10. Pressure Sensor Experiments Kit



11. V/F, F/V Converter Experiments Kit

► Accessories (KL-68011)

- 1. Experimental manual
- 2. Connection leads and plugs : 1 set
- 3. Magnet : 1 pce