KL-600

KL-600 μPA SENCONS
Microcomputer sensing Control System

- *Industrial-standard sensors and transducers*
- *With RS-232 and PIO interface ports*
- *Open-ended design, ideal for expansion*

The KL-600 μPA SENCONS 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) and is equipped with RS-232 and PIO interfaces for computer interface control experiments. Control programs can be written and down-loaded to the Single-Chip microprocessor on KL-61001 main unit from computers through RS-232 interface.

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KL-61001 Main Unit

SPECIFICATION

Main Unit (KL-61001)

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/0.3A, −12V/0.3A
   (3) With output overload protection

2. Interface Ports
   (1) PIO Interface:
   1 × 25pin D-sub connector
   (2) RS-232C Interface:
   1 × 25pin D-sub connector
   (3) Bus & PIO Interface:
   1 × 60pin connector

3. Status Display & DCV
   (1) Input Voltage Measurement
   A. Range: 2000mV, 20V
   B. Accuracy: ±0.05% of reading + 4 counts
   C. Input Impedence: 10MΩ
   D. Display: 4-1/2 digits
   (2) Sensor Input Measurement
   A. Sensor Types: TEMP, %RH, LUX, WEIGHT, AUX
   B. Accuracy: ±0.05% of reading + 4 counts
   C. Display: 4-1/2 digits

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

5. Single-Chip & EPROM
   (1) Single-Chip Processor: 8031
   (2) 8 Control Line Outputs
   (3) DRAM: adjustable sensor reference value
   ZIP sockets for both single chip processor & EPROM
   (4) EPROM: 2764

6. D/A Converter: 1 × 12-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: 1 × 12-bit ADC
   (1) Resolution: 1.22mV/bit
   (2) Input Voltage Range: 0 ~ +5V
   (3) Time Pulse Frequency: 3.579545 MHz
   (4) Control Signals:
   state, pole, over voltage indication

8. Amplifiers
   (1) Instrumentation Amplifier:
   ±Vi input, Vo output, adjustable gain
   (2) Differential Amplifier: ±Vi input, Vo output
   (3) Comparator: ±Vi input, Vo output
   (4) Alarm Amplifier: buzzer with driver circuit

9. Selectors
   (1) PIO/Single-Chip Selector
   (2) Manual/Single-Chip Selector

10. Potentiometer: 100KΩ, B-type

11. Accessories
   (1) PIO interface card
   (2) Demo disk
   (3) Connect Leads: A. 0.65mm-0.65mm, 150mmL, 10pcs
   B. 0.65mm-0.65mm, 300mmL, 15pcs
   (4) Cable: A. 25P-25P (F-F) 100cmL, 1pc
   B. 25P-25P (F-M), 100cmL, 1pc
   (5) User's manual
   (6) Fuse
   (7) AC cord
   (8) Anti-Dust cover

Experiment Modules

KL-600

FEATURES:

1. *2mm plugs and sockets used throughout*
2. *Comprehensive experiment manuals*
3. *Modules secured in plastic housings*
4. *Connection by 2mm-0.65mm test leads*
5. *Dimension: 255 × 165 × 30mm*
6. *Circuit symbols, blocks and components printed on the surface of each module*
7. *Power supplied from either power module or through KL-61001 main unit*

1. 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-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

2. List of Experiments

(1) Characteristics of Various Sensors

A. Photodiode
B. Photo-Interruptor
C. Magnetic Sensor
D. Pyroelectric Detector
E. Thermistor
F. Reed Switch
G. Inclination Sensor
H. Limit Switch
I. Mercury Switch
J. Vibration Switch
K. Condenser Microphone
L. Dynamic Microphone

(2) General Sensor Characteristics Experiments

A. Gas/Smoke Detector
B. Ethanol Sensor
C. Hall-Effect (Analog)
D. Hall-Effect (Digital)

(3) AD590 Temperature Transducer Experiments

A. AD590 Characteristics & Converter Circuit
B. Boiler Temperature Control
C. Digital Thermometer
D. Computer I/O Interface Control
E. Single-Chip Microprocessor Control

(4) Thermocouple Temperature Transducer Experiments

A. Thermocouple Characteristics Curve & Converter Circuit
B. Fire Alarm
C. Digital Thermometer
D. Computer I/O Interface Control
E. Single Chip Microprocessor Control

(5) PT-100 Temperature Transducer Experiments

A. PT-100 Resistor-Temperature Characteristics Measurement
B. Fire Alarm
C. Digital Thermometer
D. Computer I/O Interface Control
E. Single-Chip Microprocessor Control

(6) Humidity Transducer Experiments

A. Humidity Tranducer Characteristics & Converter Circuit
B. Greenhouse Humidity Control
C. Digital Thermometer
D. Computer I/O Interface Control
E. Single-Chip Microprocessor Control

(7) Load-Cell Weight Measurement Experiments

A. Load Cell Characteristics & Converter Circuit
B. Weight Measurement
C. Digital Scale
D. Computer I/O Interface Control
E. Single-Chip Microprocessor Control

(8) LVDT Transducer Experiments

A. LVDT Characteristics & Converter Circuit
B. Position Measurement
C. Distance Measurement
D. Computer I/O Interface Control
E. Single-Chip Microprocessor Control

(9) Photovoltaic Transducer Experiments

A. Photovoltaic Transducer Characteristics & Converter Circuit
B. Characteristics of Various Light Sources
C. Automatic Lighting
D. Digital Luxmeter
E. Computer I/O Interface Control
F. Single-Chip Microprocessor Control

(10) Linear Scale Experiments

A. Characteristics of Linear Scale
B. Measurement of Movements
C. Computer I/O Interface Control

(11) Infrared Transducer Experiments

A. AC/DC Characteristics
B. Counter
C. Infrared Remote Control

(12) Ultrasonic Transducer Experiments

A. Ultrasound Characteristics Measurement
B. Motion Detector

(13) Pressure Sensor Experiments

A. Zero-Pressure Input Characteristics
B. Full-Scale Pressure Measurement
C. Over-Pressure Alarm

(14) V/F, F/V Converter Experiments

A. VFC/FVC Characteristics
B. Computer I/O Interface Control
C. Programmable Time Pulse Generation

(15) Accessories (KL-68011)

A. Connet Leads: (1) 2mm-0.65mm, 300mmL, 15pcs
(2) 2mm-2mm, 300mmL, 10pcs
B. Connect Plugs, ϕ2mm, 10mmL, 10pcs
C. Magnet, 1pc

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. Impedence: 1MΩ (75 ± 5% RH at 25°C)
D. Humidity range: 50% ~ 99% RH
E. Output Conversion rate: 100mV/1% RH

③ Accessories:

A. Connect Leads: 2mm-0.65mm, 600mmL, 2pcs
B. AC cord × 1
C. AD 590 sensor probe × 1
D. PT100 sensor probe × 1
E. Thermocople sensor probe × 1
F. Humidity meter × 1
G. Humidity sensor × 1

(2) KL-68002 Pressure Gauge

A. Pressure gauge: full scale 5000mm Ag
B. Flow rate control valve
C. Power source: 110V AC or 220V AC
D. Accessory: plug cable × 1, 5P-6P, > 600mmL

(3) KL-68003 Load-Cell

A. Constructed with strain gauge and bridge circuit
B. Maximum payload: < 5Kg
C. Electronic scale
D. Accessory: plug cable × 1, 5P-6P, > 600mmL

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

A. Range: ± 5mm
B. Scale: 0.01mm
C. Linear accuracy: 0.1%
D. Excitation frequency: 350Hz
E. Accessory: plug cable × 1, 5P-6P, > 600mmL

(5) KL-68005 LUX Load

A. Selectable light sources
B. Light bulb luminous intensity adjustable
C. Photovoltaic tranducer open voltage: ≒ 2V
D. Photovoltaic transducer close voltage: ≒ 0.08μA/lx
E. Accessories: (1) AC cord × 1
(2) Connect leads: 2mm-2mm, 600mmL, 2pcs

(6) KL-68006 Angle/Distance Load

Platform moving range: 300mm

Adjustable transmitting/receiving angle:
30°/step, 0 ~ 360°

A. Infrared emitter: emission intensity = 100mW/Sr
emission wavelength = 840nm
B. Infrared receiver: Max. input wavelength = 940nm
C. Ultrasound transmitter/receiver:
nominal frequency = 40 KHz
D. Accessory: Connect Leads: 2mm-2mm, 600mmL, 4pcs

(7) KL-68007 Linear Scale

A. Resolution: 0.005mm
B. Max. range: 200mm
C. Stepping motor with speed adjustment
D. Voltage requirement: + 5V DC
E. Left/Right directional switch
F. Left/Right limit switch
G. Accessories: (1) Plug cable: 5P-6P, > 600mmL, 1pc
(2) Connect leads: 2mm-2mm, 600mmL, 2pcs

(8) KL-68008 Standard Weight Set

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

(9) KL-68009 Encoder

A. DC Power supply: +5VDC
B. Output signal: A, B, M
C. Response frequency: 30KHz (100~600P/R)
D. Impedance: 2KΩ
E. Current consumption: 60mA
F. Rise/Fall time: 1μs or less

Experiments/Equipments Required

1. Sensor & General Transducer Characteristics Experiments Kit

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

2. Temperature Transducer Experiments Kit

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

3. Humidity Transducer Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63006
LOAD UNIT : KL-68001 Humidity & Temperature Load

4. Load-Cell Transducer Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63007
LOAD UNIT : KL-68003 Load-Cell;
KL-68008 Standard Weight Set

5. LVDT Transducer Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63008
LOAD UNIT : KL-68004 LVDT Load

6. Photovoltaic Transducer Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63009
LOAD UNIT : KL-68005 LUX Load

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7. Linear Scale Experiments Kit

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

8. Infrared Transducer Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63012; KL-63013
LOAD UNIT : KL-68006 Angle/Distance Load

9. Ultrasonic Transducer Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63010; KL-63014
LOAD UNIT : KL-68006 Angle/Distance Load

10. Pressure Sensor Experiments Kit

MAIN UNIT : KL-61001
MODULE : KL-63015
LOAD UNIT : KL-68002 Pressure Guage

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

MAIN UNIT : KL-61001
MODULE : KL-63016; KL-63017