KL-600

Microcomputer Sensing Control System

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) and is equipped with USB for computer 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 : ±0.05% of reading + 4 counts

c. Input impedance : 10MΩ

d. Display : 4½ digits

(2) Sensor input measurement

a. Sensor types : TEMP, %RH, LUX, WEIGHT, AUX

b. Accuracy : ±0.05% of reading + 4 counts

c. Display : 4½ digits

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

5. Single-Chip & EPROM

(1) Single-chip processor

(2) 8 Control line outputs

6. D/A Converter : 1x12-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

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

(1) Input voltage range : 0 ~ +5V

(2) Time pulse frequency : 3.58 MHz

(3) 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

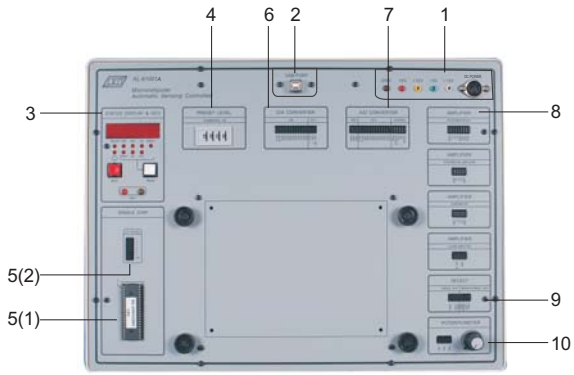
(4) Alarm amplifier : buzzer with driver circuit

9. Selectors

(1) Single-chip selector

(2) Manual/single-chip selector

10. Potentiometer : 100KΩ B-type



KL-61001A

Experiment Modules

1. 2mm plugs and sockets used throughout
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 either power module or through KL-61001A main unit

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


KL-63001


KL-63003

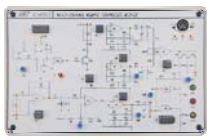

KL-63002

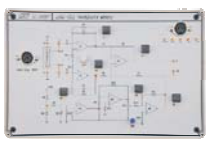

KL-63004


KL-63005


KL-63012


KL-63006


KL-63013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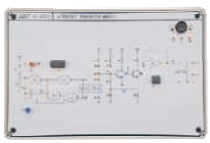
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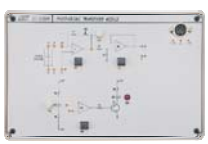
KL-63008


KL-63015


KL-63009


KL-63016


KL-63010


KL-63017


KL-63011

List of Experiments

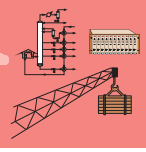
1. D/A and A/D Converters

2. Characteristics of Various Sensors

(1) Photodiode
(2) Photo-interrupter
(3) Magnetic sensor
(4) Pyroelectric detector
(5) Thermistor
(6) Reed switch
(7) Inclination sensor
(8) Limit switch
(9) Mercury switch
(10) Vibration switch
(11) Condenser microphone
(12) Dynamic microphone

3. General Sensor Characteristics Experiments

(1) Gas / smoke detector
(2) Ethanol sensor
(3) Hall-effect (analog)
(4) Hall-effect (digital)



4. AD590 Temperature Transducer Experiments
(1) AD590 characteristics & converter circuit
(2) Boiler with temperature control
(3) Digital thermometer
(4) Computer I/O interface control
(5) Single-chip microprocessor control

5. Thermocouple Temperature Transducer Experiments
(1) Thermocouple characteristics curve & converter circuit
(2) Fire alarm
(3) Digital thermometer
(4) Computer I/O interface control
(5) Single chip microprocessor control

6. PT-100 Temperature Transducer Experiments
(1) PT-100 resistor-temperature characteristics measurement
(2) Fire alarm
(3) Digital thermometer
(4) Computer I/O interface control
(5) Single-chip microprocessor control

7. Humidity Transducer Experiments
(1) Humidity transducer characteristics & converter circuit
(2) Greenhouse humidity control
(3) Digital humidity-meter
(4) Computer I/O interface control
(5) Single-chip microprocessor control

8. Load-Cell Weight Measurement Experiments
(1) Load cell characteristics & converter circuit
(2) Weight measurement
(3) Digital scale
(4) Computer I/O interface control
(5) Single-chip microprocessor control

9. LVDT Transducer Experiments
(1) LVDT characteristics & converter circuit
(2) Position measurement
(3) Distance measurement
(4) Computer I/O interface control
(5) Single-chip microprocessor control

10. Photovoltaic Transducer Experiments
(1) Photovoltaic transducer characteristics & converter circuit
(2) Characteristics of various light sources
(3) Automatic lighting
(4) Digital luxmeter
(5) Computer I/O interface control
(6) Single-chip microprocessor control

11. Linear Scale Experiments
(1) Characteristics of linear scale
(2) Measurement of movements
(3) Computer I/O interface control

12. Infrared Transducer Experiments
(1) AC/DC characteristics
(2) Counter
(3) Infrared remote control

13. Ultrasonic Transducer Experiments
(1) Ultrasonic characteristics measurement
(2) Motion detector

14. Pressure Sensor Experiments
(1) Zero-pressure input characteristics
(2) Full-scale pressure measurement
(3) Over-pressure alarm

15. V/F, F/V Converter Experiments
(1) VFC/FVC characteristics
(2) Computer I/O interface control
(3) Programmable time pulse generation

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 : 2KΩ
(5) Current consumption : 60mA
(6) Rise/fall time : 1μs or less

▸ *Experiments / Equipment Required*

1. Sensor & General Transducer Characteristics Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63001; KL-63002

2. Temperature Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63003; KL-63004; KL-63005
LOAD UNIT : KL-68001 Humidity & Temperature load

3. Humidity Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63006
LOAD UNIT : KL-68001 Humidity & temperature load

4. Load-Cell Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63007
LOAD UNIT : KL-68003 Load-cell; KL-68008 Standard weight set

5. LVDT Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63008
LOAD UNIT : KL-68004 LVDT load

6. Photovoltaic Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63009
LOAD UNIT : KL-68005 LUX load

7. Linear Scale Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63010; KL-63011
LOAD UNIT : KL-68007 Linear scale

8. Infrared Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63012; KL-63013
LOAD UNIT : KL-68006 Angle/displacement load

9. Ultrasonic Transducer Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63010; KL-63014
LOAD UNIT : KL-68006 Angle/displacement load

10. Pressure Sensor Experiments Kit
MAIN UNIT : KL-61001A
MODULE : KL-63015
LOAD UNIT : KL-68002 Pressure gauge

11. V/F, F/V Converter Experiments Kit
MAIN UNIT : KL-61001A
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