

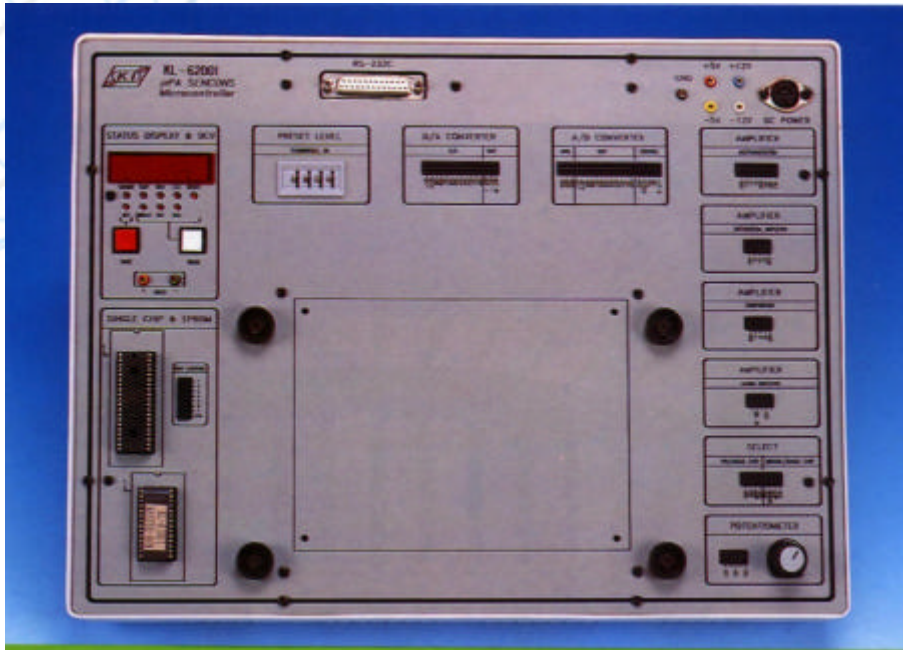


- ***Industrial-standard sensors and transducers***
- ***With RS-232 interface***
- ***Open-ended design, ideal for expansion***

The KL-620 Microcomputer Sensing Control Equipment is a comprehensive sensor/transducer control training system that incorporates industrial-grade components with various control circuits. 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 RS-232 for computer interface control experiments. Control programs can be written and down-loaded to the Single-Chip microprocessor on KL-62001 main unit from computer through RS-232 interface.

KL-62001 Main Unit



SPECIFICATION

Main Unit (KL-62001)

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 Ports

- (1) RS-232C Interface: 1x25pin D-sub connector

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 Ω
 - D. Display : 4-1/2 digit's
- (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: 8031
- (2) 8 Control Line Outputs
- (3) DRAM: adjustable sensor reference value
ZIP sockets for both single chip processor & EPROM
- (4) EPROM: 2764 or equal IC

6. D/A Converter: 1 x 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: 1x12-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:
 $\pm V_i$ 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) PIO/Single-Chip Selector
- (2) Manual/Single-Chip Selector

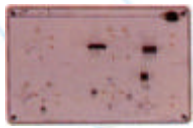
10. Potentiometer: 100K Ω , B-type

11. Accessories

- (1) Demo Diskettes
- (2) Connect Leads: A. 0.65mm-0.65mm, 150mmL, 10pcs
B. 0.65mm-0.65mm, 300mmL, 15pcs
C. 2mm-0.65mm, 300mmL, 10pcs
- (3) Cable: A. 5P-5P, (F-F), 60cmL, 1pc
B. 25P-25P (F-M), 100cmL, 1pc
- (4) User's manual
- (5) Fuse
- (6) AC cord
- (7) Anti-Dust cover

Experiment Modules

Standard Modules: KL-64001 ~ KL-64008



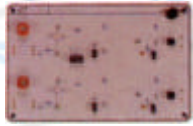
KL-64001



KL-64002



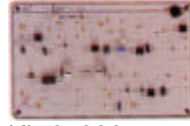
KL-64003



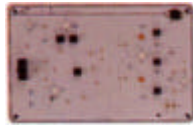
KL-64004



KL-64005



KL-64006



KL-64007



KL-64008

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 KL-62001 main unit

List of Experiments

Standard Modules: KL-64001~KL-64008

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.

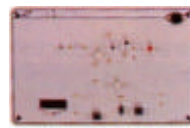
KL-64004: Gas/Smoke & Ethanol Sensor

- (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 Construction and Characteristics of Humidity Sensors.
- (7) The Applications of Humidity Sensors.

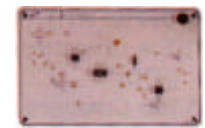
Option Modules: KL-64009 ~ KL-64016



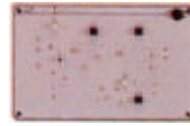
KL-64009



KL-64010



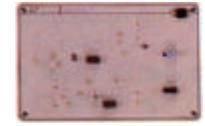
KL-64011



KL-64012



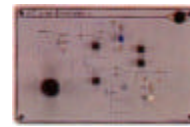
KL-64013



KL-64014



KL-64015



KL-64016

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 the Current Detect.
- (3) The Construction of the Proximity Switches.
- (4) The Application of a Capacitive Proximity Switches to Detect the Metal Object.

Option Modules: KL-64009~KL-64016

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 Conditioner for a LVDT.
- (4) The Applications of a LVDT.

KL-64016: Rotation Angle Sensor

- (1) Principles and Application of Rotation Angle Sensor.

List of Modules

STANDARD MODULES: KL-64001 ~ KL-64008

KL-64001

- (1) Photo Transistor
 - (2) Photo Interrupter
 - (3) Magnetic (Hall-Effect) ~ Digital
 - (4) Magnetic (Hall-Effect) ~ Analog
 - (5) Accessories: Magnet, 1PC
- (For KL-64001 and KL-64002 uses)

KL-64002

- | | |
|---------------------------|--------------------|
| (1) Pyroelectric Detector | (3) Thermistor |
| (2) Reed Switch | (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
 - a. Humidity transducer rated voltage: 1 Vp-p AC
 - b. Frequency range: 100Hz ~ 10KHz
 - c. Temperature range: 0°C ~ 60°C
 - d. Humidity range: 20%RH ~ 90%RH
 - e. Impedance: 13KΩ (70%RH at 25°C)

KL-64006

- (1) Infrared TX/RX Sensor
 - a. Infrared Transmitter: emission intensity: 12mW/sr
($I_F = 50mA$)
emission wavelength: 940nm
($I_F = 50mA$)
 - b. Infrared receiver: sensitivity wavelength: 1000nm
- (2) Ultrasonic TX/RX Sensor
 - a. Nominal frequency: 40KHz

KL-64007

- (1) Pressure Sensor
 - a. 0-7 psi to 0-30 psi pressure ranges
- (2) Strain Gauge
 - a. Maximum payload: <5kg
 - b. Terminal resistance: $350 \pm 50 \text{ ohm}$
- (3) Accessories:
 - a. Suction pump, 1PC
 - b. Plastic tube: 25cm, 1PC

KL-64008

- (1) Hall Current Sensor
 - a. Normal input current: $\pm 3A$ DC (if)
 - b. Linear range: 0 ~ +6A DC
 - c. Output voltage: $4.5V \pm 0.005V$ at+ if, $0.5V + 0.005V$ at -if, $R_L = 10K\Omega$
- (2) Proximity Sensor
 - a. Operation voltages: 10 ~ 30V DC
 - b. Short circuit protection
- (3) Accessories: Proximity switch 1PC

Accessories (KL-68013)

- (1) Experimental Manual
- (2) Connect Leads: A. 2mm-0.65mm, 5pcs
B. 2mm-2mm, 10pcs

OPTION MODULES: KL-64009 ~ KL-64016

KL-64009

- (1) CDS Sensor
- (2) Photovoltaic Sensor
 - a. Photovoltaic transducer open voltage ; 2V
 - b. Photovoltaic transducer close voltage ; $0.06 \mu A/lux$

KL-64010

- (1) V/F Converter
 - a. Input voltage: +10mV ~ +10V
 - b. Output frequency: 5Hz ~ 5KHz, 10Hz ~ 10KHz

KL-64011

- (1) F/V Coverter
 - a. Input frequency: 0 ~ 4.3KHz ($\pm 0.2Vp \sim \pm 5Vp$)
 - b. Output voltage: 0 ~ 4.3V DC

KL-64012

- (1) RTD (PT-100)
 - a. 0°C: 100Ω , 100°C: 139.16Ω
 - b. Rating: 250°C
 - c. Accessories: PT-100 Sensor Probe

KL-64013

- (1) Level (Water)
 - a. Simulation of the reservoirs control status (motor included)
 - b. Accessories: plastic case

KL-64014

- (1) Fiber Optics Communication
 - a. Power launched versus fiber length:
 - (1) 0~28M ($I_F : 100mA$)
 - (2) Type: P: $1\mu W$; L: 13M; $I_F : 100mA$
 - b. Accessories: Optical fiber cable

KL-64015

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

KL-64016

- (1) Rotation Angle Sensor
 - a. 10 turns (3600°) precision potentiometer
 - b. Linearity: $\pm 0.25\%$