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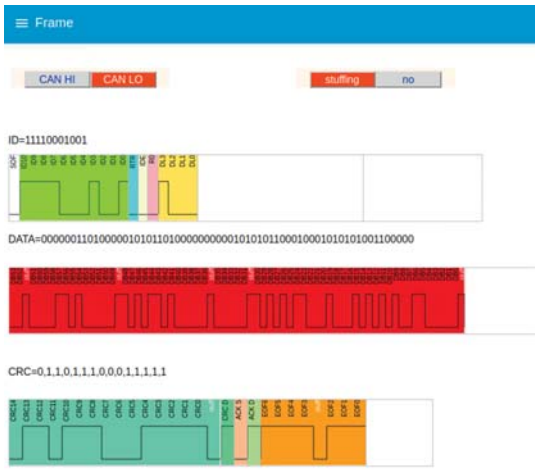
KL-810

Smart CAN BUS Training System

The Smart CAN BUS Training System has one CAN BUS network human-machine interface (HMI) platform and 10 experimental modules. In addition to providing CAN BUS signal input /output, the presentation of CAN BUS data formats and the display of various measured waveforms can be performed on the platform, following OBD-II standard in vehicles , it is able to simulate the operation of air flow, temperature, fuel system, ignition system, idle air control valve, and other sensor characteristics…etc. The system has integrated the following CAN BUS related trainings:

1. The experimental module provides physical characteristics and experiments on resistance measurements. It is the basic training for the general Electronic Control Unit (ECU) or overhauling of sensors.
2. The experimental module provides digital or analog electronic signals to perform sensor extraction, driver operations, which are essential diagnosis training for circuits and components.
3. The HMI platform provides the transmitting standard or extended address in CAN BUS format and payload data (DATA) to local or remote devices, which are basic operational training in CAN BUS communication.
4. Through different network topology, CAN BUS data can connect to the HMI platform. The web page will display the physical voltage change and corresponding CAN BUS signals, which are CAN BUS content referencing and processing training.
5. Combine two or more related experimental modules, which are connected through the CAN BUS to perform system integration operations, which serve as CAN BUS network training.
6. The HMI and experimental module are connected by CAN BUS. Present CAN BUS definition via web GUI and animation.
7. Allow other computer or mobile devices to connect CAN BUS network through wired or wireless method. Achieve CAN BUS network extension and conversion operation training.
8. Allow multiple devices to connect through the network server on the HMI platform, which is intended for synchronized learning and teleoperation training.
9. The HMI platform provides a CAN BUS circuit testing environment to develop CAN BUS advanced training.
10. The HMI platform supports Linux commands, node-red, python, and C language develop environment for CAN BUS training.



KL-82001 HMI Platform for CAN BUS

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Features

1. Provide teaching and training frameworks for automotive sensor measurements and actuator operation control.
2. The smart integrated training system transmits and receives CAN BUS signals and provides a learning environment for verifying the system theory.
3. Constructing combination experiments via CAN BUS cable.
4. Equipped with DB9, OBD-II connectors, a simulated vehicle battery with 12V power supply etc., which are provided for related CAN BUS network designs and development environments.
5. Each experimental module is equipped with a fault troubleshooting switch.
6. The HMI platform provides CAN BUS signal input/output and interaction with the experimental module. It integrates electronic signals and digital data referencing environments, which facilitate interpretation and related research.
7. The HMI platform is an open source system that supports the CAN BUS development environment.
8. Present the integrated application of IoT (Internet of Things) and CAN BUS through the web GUI of HMI platform.

Specifications

1. KL-85001 Crankshaft Position Sensor
   (1) Simulated automotive engine rotation : Motor DC 12V 4000 RPM
   (2) Accelerator pedal: control rotational speed (12V electronic throttle)
   (3) Simulated throttle and switch: control rotational speed
   (4) Engine Speed Sensors : Pick-up coil sensor, sensor photo interrupter, sensor hall-effect IC
   (5) With CAN BUS control interface
   (6) Accessories : Accelerator pedal
2. KL-85002 Air-Flow Sensor (Vane Type)
   (1) VAF output : 0 ~ 5V (±5%)
   (2) MAT output : 0.3V ~ 4.2V (110°C ~ -5°C)
   (3) Fan control: F/C relay switch (flowrate and RPM control)
   (4) With CAN BUS control interface
3. KL-85003 Air-Flow Sensor Hot Wire & Manifold Absolute Pressure Sensor
   (1) Air flow sensor (hot wire type)
   MAF output voltage : 0 ~ 5V (±5%)
   (2) Manifold absolute pressure sensor
   MAP output voltage : 0.11V ~ 3.6V (-80kpa ~ 0)
   (3) With CAN BUS control interface
   (4) Accessories : Manual Vacuum Pump
4. KL-85004 TPS & CTS & O2 Sensor
   (1) Throttle position sensor (TPS)
   TPS output voltage : 0 ~ 5V (±5%)
   (2) Coolant temperature sensor (CTS)
   CTS voltage/temperature : 4.3V/-5°C, 3.7V/10°C, 3V/25°C, 2.2V/40°C, 1.2V/65°C, 0.3V/110°C
   (3) Oxygen sensor
   a. O2 output voltage
   Normal : 0.31V ~ 0.6V
   Rich : 0.61V ~ 1.0V
   Lean : 0.1V ~ 0.3V
   b. Selector switch for selecting normal, rich and lean
   (4) With CAN BUS control interface
5. KL-85005 P/N, A/C, PSPS, 3GR Switch & Vehicle Speed Sensor
   (1) Park / Neutral switch
   P/N switch : 4V/0V
   (2) Air conditioning switch : 12V/0V
   (3) Power steering pressure switch : 0V/2.5V/4.8V
   (4) Simulated wheel rotate: Motor DC12V 4000 RPM (adjustable speed)
   (5) Vehicle speed sensor : Pick-up coil sensor
   (6) 3GR switch : 4.8V/0V
   (7) With CAN BUS control interface
6. KL-85006 Fuel Injectors / Spark Plugs
   (1) Fuel injector control
   a. Coil resistance of injector : 18Ω
   b. Max. engine speed : 3600rpm
   c. Selectable injection modes : synchronous, non-synchronous, sequential
   d. Injection sequence displayed by LEDs
   (2) With CAN BUS control interface
7. KL-85007 Ignition system
   (1) Single-output of ignition coil
   a. Coil resistance : 2Ω
   b. Computer-controlled ignition displayed by LEDs
   (2) Double-output of ignition coil
   a. Coil resistance : 1Ω
   b. Computer-controlled ignition displayed by LEDs
   (3) With CAN BUS control interface
8. KL-85008 Cooling Fan & Fuel Pump & A/C Compressor Relays
   (1) Cooling fan
   a. Control signal : FANC
   b. 12V DC motor driven
   c. Actuating conditions : A/C switch ON or coolant temperature sensor (CTS) signal higher than 108°C
   (2) Fuel pump
   a. Control signal : F/C
   b. 12V DC motor driven
   c. Actuating conditions : F/C switch of vane air flow sensor ON and engine running (rpm signal)
   (3) A/C compressor
   a. Control signal : ACC
   b. 12V DC motor driven
   c. Actuating condition : A/C switch ON
   (4) With CAN BUS control interface
9. KL-85009 Idle Air Control Valve
   (1) Step motor driven
   (2) Idle air control valve: Dismantle for observation.
   (3) Actuating condition: Rotation Speed Change, P/N, A/C, action with activation of PSPS switch.
   (4) With CAN BUS control interface

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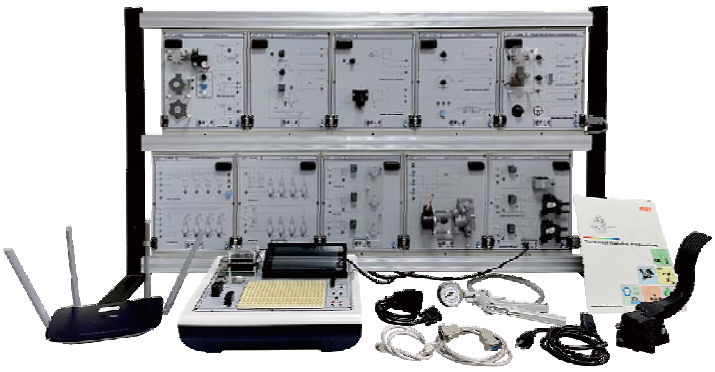
10. KL-85010 TCC & CCP & EGRV
    (1) Torque converter clutch
        a. Control signal : TCC
        b. 12VDC solenoid valve
        c. Actuating condition: TPS above 95%, speed above 40Km/h, action with 3GR signals ON.
    (2) Carbon canister purge valve
        a. Control signal : CCP
        b. 12VDC carbon canister purge valve
        c. Actuating conditions
           RPM signal : engine speed faster than 1200 rpm
           CTS signal : coolant temperature greater than 65°C
           TPS : 20~50%
    (3) Exhaust gas recirculation valve
        a. Control signal : EGRV
        b. 12VDC exhaust gas recirculation valve
        c. Actuating conditions :
           RPM signal : engine speed faster than 1200 rpm
           CTS signal : coolant temperature greater than 65°C
           MAP : -50kpa~-40kpa
    (4) With CAN BUS control interface
11. KL-82001 HMI platform for CAN BUS
    (1) Power Supply:
        Input: 100~240VAC/3A, 50Hz/60Hz
        Output: a. Simulated vehicle battery: 12VDC/6A
                b. Experimental power supply: 5V DC/10A
    (2) Controller
        a. Card computer: Raspberry PI 4 Model B
        b. Memory card: 32G micro SD card
        c. CAN BUS control panel: MCP2515
    (3) Display
        a. 7-inch touch screen DSI interface
        b. Resolution 800x480, 60fps, 24-bit color
        c. Metal protection frame
    (4) CAN BUS control interface
        a. OBD-II male and female connectors
        b. DB9 male and female connectors
    (5) Brick base plate 22x17
    (6) Provides CAN BUS signals, display of data formats (SOF, ACK, EOF, CRC, STUFF bit, etc.) in CAN communication, simulated vehicle operation, airflow, temperature, fuel system, ignition system, idle air control valve system with various sensor characteristics and actuator operations.
    (7) Accessories : OBD-II to DB9 cable
                      KL-85081 Wireless AP




KL-85001


KL-85002


KL-85003


KL-85004


KL-85005


KL-85006


KL-85007


KL-85008


KL-85009


KL-85010

List of Experiments

1. Engine Speed Sensors
   (1) Pick-up Coil Type Engine Speed Sensor (NE Signal)
   (2) Photo-Type Engine Speed Sensor (PHO Signal)
   (3) HALL IC Engine Speed Sensor (HALL Signal)
2. Air-Flow Sensors
   (1) Vane Air-Flow Sensor (VAF)
   (2) Hot Wire Mass Air-Flow Sensor (MAF)
   (3) Manifold Absolute Pressure Sensor (MAP)
3. Throttle Position Sensor
4. Coolant Temperature Sensor
5. Oxygen Sensor
6. Vehicle Speed Sensor
7. Third Gear Switch
8. Park/Neutral Switch
9. Air Conditioning Switch
10. Power Steering Pressure Switch
11. Injector Circuit
12. Computer-Controlled Ignition System
13. Cooling Fan Relay Circuit
14. Fuel Pump Relay Circuit
15. A/C Compressor Relay Circuit
16. Idle Air Control Valve
17. Torque Converter Clutch
18. Carbon Canister Purge Valve
19. Exhaust Gas Recirculation Valve

Accessories (KL-89004)

1. 9-pin D-sub RS-232 Cables :
   (1) 180cm male-to-female cable x 1 pce
   (2) 40cm female-to-female cable x 1 pce
2. Connector Leads : 2mm-2mm
3. Experiment Manual
4. Rack Frame (KL-97002)
5. Storage Cabinet (KL-99001) x 2 sets