



## 1. Overview

The Automotive Electrical/Electronics System Training Panel is a fully functional demonstration platform based on the electrical architecture of the **Volkswagen Passat B5**. It is designed to illustrate the structure, operation, and diagnostics of key automotive electrical systems. The panel presents a real, operable vehicle electrical system, enabling comprehensive training in system identification, functional testing, fault simulation, and circuit diagnostics.

## 2. System Demonstration Capabilities

The trainer includes integrated switches, indicators, and test points to demonstrate the operation of the following systems:

### 2.1 Control & Diagnostic Interfaces

- Detection control panel with multi-point test terminals
- Engine Control Unit (ECU)
- Standard automotive diagnostic socket (OBD interface)
- Ignition switch assembly
- Dashboard / Instrument cluster
- Combination switch (lighting/wiper control)

### 2.2 Exterior Lighting System

- Left & right headlamp assemblies
- Left & right front fog lamps
- Left & right turn indicators
- Left & right side turn signal lamps
- Left & right combination tail lamps

*Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.*



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- License plate lamp
- High-mount stop lamp
- Light switch & brake light switch
- Hazard switch
- Reversing light switch

### 2.3 Wiper, Horn & Auxiliary Systems

- Wiper controller
- Horn & horn relay
- X-contact relay
- Washer motor & washer system

### 2.4 Engine Electrical & Ignition System

- Distributor-less ignition system
- Simulated injector indicator
- Fuel pump relay & indicator
- Main wiring harness of vehicle electrical system

### 2.5 Power Window & Door Lock System

- Main power window control switch
- Front left & right door control units
- Rear left & right power window motors
- Rear left & right power window switches
- Comfort system control unit
- Front right & rear left/right door lock motors

### 2.6 Audio System

- Car audio head unit
- Speakers
- Fuse elements and protection modules

## 3. Components Mounted on Shelf

The training platform additionally includes the following automotive components mounted visibly on the shelf section:

- Wiper assembly
- Washer motor

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- Washer bottle
- Starter motor
- Generator (alternator)
- Three-phase asynchronous motor
- 12V vehicle battery
- Main power switch

## 4. Technical Features

### 4.1 Structural & Safety Characteristics

- High-strength construction with **corrosion-resistant, impact-resistant, fireproof, pollution-resistant, and moisture-proof** panel material
- Clearly labelled wiring schematics and component layout
- Protected electrical circuits with fuses and overload protection

### 4.2 Diagnostic & Measurement Capabilities

- Dedicated detection terminals for measuring:
  - Resistance
  - Voltage
  - Current
  - Frequency
- Full accessibility to test points for circuit tracing and troubleshooting
- Integrated diagnostic socket for connecting automotive scan tools to:
  - Read/clear fault codes
  - Read ECU data stream
  - Perform real-time system diagnostics

### 4.3 Intelligent Fault Simulation System

- Programmable electronic fault setting panel
- Multiple user-selectable faults for:
  - Lighting system
  - Ignition system
  - Starting/charging system
  - Door/window system
  - Wiper/horn system
- Enables hands-on troubleshooting and repair exercises

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## 5. Electrical Specifications

- **Input Power Supply:** Three-phase AC mains
- **Operating DC Voltage:** 12V automotive standard
- **Integrated protection:** Overload, short circuit, and reverse polarity safeguards

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