



1-Channel AC Detector Module (50~250VAC)

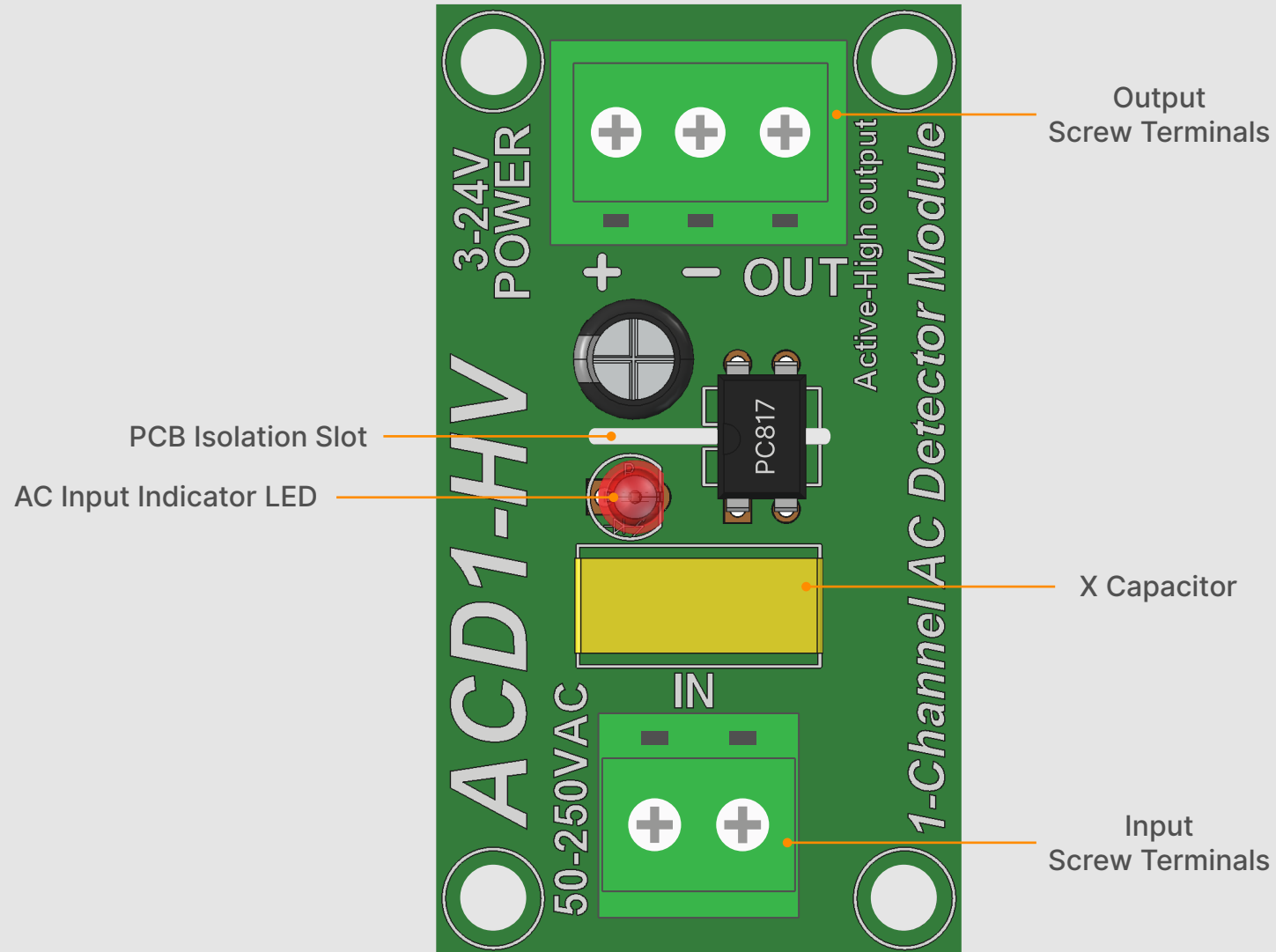
General Description

The **ACD1-HV** is an isolated AC voltage detection module designed to detect the presence of **50–250 VAC** and provide an isolated **3–24 V active-high output** for interfacing with microcontrollers, PLCs, and other low-voltage control systems. Optical isolation using a PC817 optocoupler, together with PCB isolation slots, provides electrical separation between the high-voltage input and low-voltage output. An onboard LED indicates the presence of AC voltage.

Features

- Detects **50–250 VAC** input voltage.
- **3–24 VDC** active-high output.
- Compatible with 3.3 V, 5 V, 12 V and 24 V control systems.
- **Capacitive AC input** for low power dissipation and reduced heat generation.
- **Optical isolation.**
- LED indication of AC presence.
- Screw terminal connections for AC input and DC output.
- Mounting holes compatible with DIN rail adapters.
- Dimensions: 50 X 27.7mm.

ACD1 Overview



Applications

- AC mains voltage detection and monitoring.
- PLC AC and digital input interfacing.
- Industrial automation and machine control systems.
- Electrical control panels and control cabinets.
- Building automation and facility management systems.
- Embedded monitoring and control applications.
- Smart energy monitoring and management systems.
- Power outage and mains failure detection.
- Generator, inverter, and UPS status monitoring.

Functional Description

The **ACD1-HV** continuously monitors the AC input terminals for voltages between **50 VAC and 250 VAC**. The AC input stage utilizes a **capacitive dropper circuit** instead of a conventional resistive voltage-dropping network. By using the capacitor's reactance to limit the input current, the module significantly reduces power dissipation and heat generation, improving energy efficiency during continuous operation.

When a valid AC voltage is present, the input circuitry drives the LED inside the **PC817** optocoupler, causing its internal NPN phototransistor to conduct. The optocoupler transistor then transfers the module supply voltage (**VCC**) to the output terminal, producing an **active-high** logic signal referenced to the output supply while maintaining electrical isolation between the AC input and the low-voltage output.

An onboard status LED illuminates whenever AC voltage is detected, providing immediate visual indication of the input status.

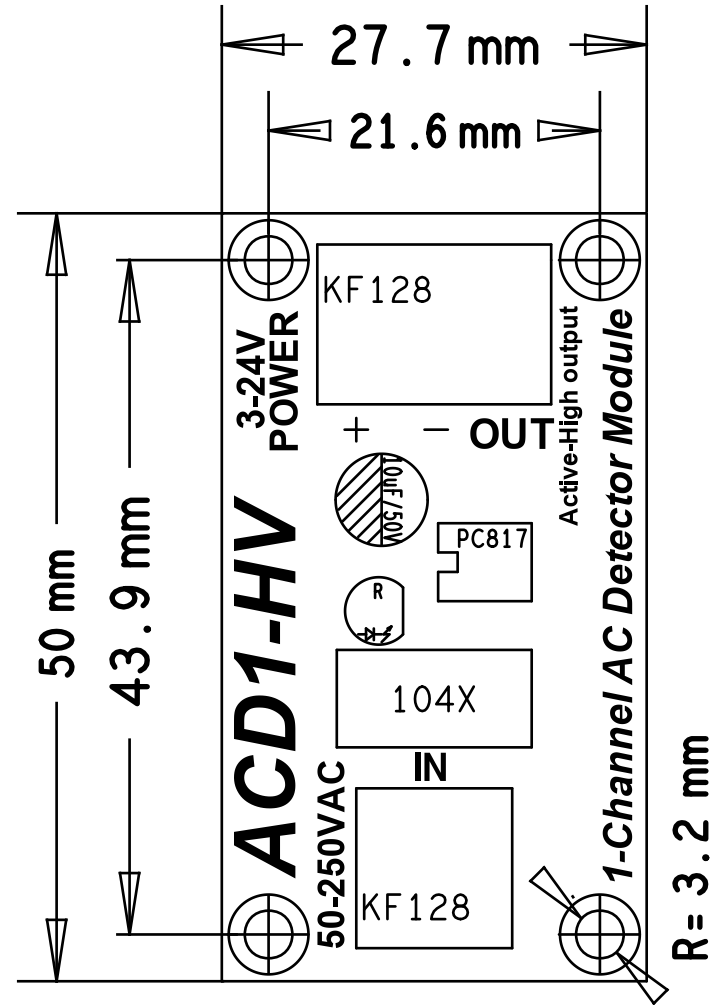
Isolation

The **ACD1-HV** provides electrical isolation through two independent mechanisms:

- **Optical Isolation:** The PC817 optocoupler eliminates any direct electrical connection between the AC input and the low-voltage output.
- **Galvanic Isolation:** dedicated PCB isolation slots, increasing creepage distance between high-voltage and low-voltage sections. Thus, reducing the risk of surface leakage currents and improving electrical safety.

Together, these features improve system safety and immunity to electrical noise commonly encountered in industrial environments.

Mechanical Dimensions Diagram



For the latest product updates and documentation, visit: www.fares-pcb.com
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