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PEMENOL 13501

PEMENOL Programmable Timer Delay Relay Module (Model 13501) Instruction Manual

DC 5V-36V Adjustable On/Off Cycle Timer Switch with Dual MOS Output

1. Introduction

This manual provides detailed instructions for the PEMENOL Programmable Timer Delay Relay Module (Model 13501). This versatile module is designed for various electronic control applications, offering precise timing and switching capabilities. Please read this manual thoroughly before operation to ensure correct usage and optimal performance.

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Video: Overview of the PEMENOL Timer Delay Relay Module.

2. Product Overview and Features

The PEMENOL Programmable Timer Delay Relay Module is a compact and robust device featuring a digital display and multiple operating modes. It is suitable for smart home automation, DIY electronics, and industrial control systems.

Key Features:

- **Dual MOS Output:** Provides lower internal resistance, improved current delivery, and reliable operation, capable of 15A/400W under typical conditions.
- **Customizable Timing Parameters:** Individually set OP (on time), CL (off time), and LOP (cycle count: 1–999 times or continuous). Settings are saved automatically after power-off.
- **Wide Voltage Range:** Operates with DC 5V–36V input.
- **High Current Support:** Supports up to 30A with a heat sink (15A/400W under typical temperature).

- **High-Level Trigger:** Accepts trigger signals from 3.0V–24V.
- **Integrated Stop Control:** Features a STOP button for quick deactivation.
- **Reverse Connection Protection:** Built-in protection against incorrect power polarity.
- **Energy-Saving Mode:** Display automatically turns off after 5 minutes of inactivity (configurable).
- **Stable Switching:** Supports frequent on/off control without mechanical contact, reducing wear and electromagnetic interference.
- **Optocoupler Isolation:** Enhances anti-interference ability.

Component Identification:

Image: Detailed view of the module with key components labeled, including input terminals, output terminals, trigger signal pins, display screen, STOP, SET, UP, and DOWN buttons, and an output indicator LED.

3. Specifications

Specification	Value

Specification	Value
Input Voltage	DC 5V-36V
Output Current (Typical)	15A
Output Current (with Heat Sink)	30A
Output Power (Typical)	400W
Trigger Signal Voltage	3.0V-24V
Timing Range	0.1 seconds to 999 minutes
Number of Terminals	3
Product Dimensions	2.36 x 0.55 x 1.54 inches (60 x 14 x 39 mm)
Item Weight	2.08 ounces
Model Number	13501

Image: Module dimensions.

4. Setup and Wiring

Proper wiring is essential for the safe and correct operation of the module. Refer to the diagram below for connection points.

Wiring Connections:

- **Input DC 5V-36V:** Connect your power supply to the input terminals. Ensure correct polarity (VIN+ and GND).
- **Load:** Connect your device (load) to the output terminals. The module acts as a switch for the load.
- **Input Signal (Trigger):** Connect your trigger signal source to the SIGNAL and GND_T terminals. A high-level signal (3.0V-24V) is used for triggering.
- **Common Ground:** The user can connect the GND of the trigger signal to the GND of the module by shorting the pads GND-T and GND. However, this is not recommended as it may reduce the anti-interference ability of the module.

Important Note: GND and GND- cannot be connected together, otherwise the module will not work normally.

Image: Wiring diagram for the timer module.

Assembly (Optional Protective Case):

The module may come with a protective case for assembly. Follow these general steps:

1. Carefully remove any protective film from the acrylic case parts.
2. Align the module with the bottom plate of the case.
3. Secure the module using the provided standoffs and screws.
4. Attach the top plate, ensuring buttons align with the module's switches.

Image: Components of the protective case for the module.

5. Operating Instructions

The module features a digital display and four buttons: STOP, SET, UP, and DOWN. These buttons are used for navigation, parameter setting, and mode selection.

Parameter Description:

- **OP:** Delay time for output ON.
- **CL:** Delay time for output OFF.
- **LOP:** Number of cycles. Range is 1-999 times. '----' indicates an unlimited loop.

Setting Parameters:

1. In the normal operating interface, press the **SET** button for approximately 2 seconds to enter the parameter setting interface.
2. The display will show the current operating mode (e.g., P1.1). Use the **UP** and **DOWN** buttons to select the desired operating mode.
3. Press **SET** briefly to enter the parameter settings for the selected mode. The first parameter (e.g., OP) will flash.
4. Use the **UP** and **DOWN** buttons to adjust the value of the flashing parameter. A short press changes the value by 1 unit; a long press changes it rapidly.
5. Press **SET** briefly to move to the next parameter (e.g., CL, LOP). Repeat step 4 to adjust its value.
6. After setting all parameters for the chosen mode, long press **SET** (approx. 2 seconds) to save the settings and exit the parameter setting interface. The module will return to the normal operating interface.

Operating Modes:

- **P1.1: Trigger Delay Mode (Single Shot)**
  Input trigger signal, then output turns ON and stays ON for time OP. After time OP, output turns OFF. The input signal is ignored if received again during the OP delay time. (OP cannot be set to 0)
- **P1.2: Trigger Delay Mode (Retriggerable)**
  Input trigger signal, then output turns ON and stays ON for time OP. After time OP, output turns OFF. If a trigger signal is received again during the OP delay time, the output will restart the delay. (OP cannot be set to 0)
- **P1.3: Trigger Delay Mode (Reset on Retrigger)**
  Input trigger signal, then output turns ON and stays ON for time OP. After time OP, output turns OFF. If a trigger signal is received again during the OP delay time, the output will reset, stop timing, and turn OFF. (OP cannot be set to 0)
- **P2: Trigger Delay Mode (OFF then ON)**
  Input trigger signal, then output stays OFF for time CL. After time CL, output turns ON and stays ON for time OP. After time OP, output turns OFF. (Both OP and CL cannot be set to 0)
- **P3.1: Trigger Delay Mode (Cycle with Trigger)**
  Input trigger signal, then output turns ON for time OP, then OFF for time CL. This cycle repeats LOP times. If a trigger signal is received again during the loops, the output will reset, stop timing, and turn OFF. (Both OP and CL cannot be set to 0)
- **P3.2: Power-ON Delay Mode (Cycle without Trigger)**
  Upon power-on, output turns ON for time OP, then OFF for time CL. This cycle repeats LOP times. This mode does not require an input trigger signal. (Both OP and CL cannot be set to 0)
- **P4: Signal Keep Mode**
  While the input signal is present, the output remains ON. The output turns OFF after delay time OP when the signal disappears. If a trigger signal is received again during the timing, the delay

time will reset. (OP cannot be set to 0)

Special Functions:

- **Auto Sleep Function:** Long press the **STOP** button in the normal running interface to toggle the auto sleep function.
  - **C-P:** Auto sleep function ON. The screen will automatically turn off if there is no operation within five minutes. It can be woken up by any button.
  - **O-d:** Auto sleep function OFF.
- **Enabled/Disabled Output:** Short press the **STOP** button to enable or disable the output during the delay time OP.
  - **ON:** Output is enabled during delay time OP.
  - **OFF:** Output is disabled during delay time OP. The module cannot output any signal in this mode.

Image: Module in operation, demonstrating its functionality.

6. Applications

This programmable timer delay relay module can be used in a wide range of applications due to its flexible timing modes and robust output capabilities.

- Automatic watering systems
- Curtain control
- Pet automatic feeding equipment
- Lighting control
- Automatic water change control for aquariums
- Car headlight control
- Motor automatic control operations

Image: Examples of product applications.

7. Safety Precautions

- Ensure the input voltage is within the specified range (DC 5V-36V).
- Observe correct polarity for all connections to prevent damage to the module and connected devices.
- Do not exceed the maximum current or power ratings. Use a heat sink if operating at higher currents (above 15A).
- Avoid short circuits.
- Keep the module away from moisture, dust, and extreme temperatures.
- If using the optional protective case, ensure all components are assembled correctly.
- Always disconnect power before making or changing any connections.

8. Troubleshooting

- **Module not powering on:** Check input voltage and polarity. Ensure connections are secure.
- **Output not activating:** Verify the selected operating mode and parameter settings (OP, CL, LOP). Check trigger signal input. Ensure the output is not disabled via the STOP button.
- **Incorrect timing:** Re-check OP, CL, and LOP values. Ensure the time unit (seconds, minutes) is correctly understood for the display.
- **Intermittent operation:** Check for loose connections. Ensure the power supply is stable and provides sufficient current. Avoid connecting GND and GND- together.
- **Display off:** The module might be in auto sleep mode. Press any button to wake it up.

9. Warranty and Support

This product comes with a standard manufacturer's warranty. For technical support, warranty claims, or further assistance, please refer to the contact information provided with your purchase or visit the PEMENOL official website.

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