DC 6-30V LED Display Automation Cycle Delay Timer Control

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Overview

The **DC 6-30V LED Display Automation Cycle Delay Timer Control Module** is an industrial-grade, multi-functional programmable timing relay designed for precision automation, load cycling, and delayed trigger operations. Equipped with an onboard 3-digit LED display, optocoupler signal isolation, and reverse-polarity power protection, this module provides wide-range delay settings (0.1 seconds up to 999 minutes). It features an onboard 5A mechanical relay capable of directly switching both AC Mains and DC loads.

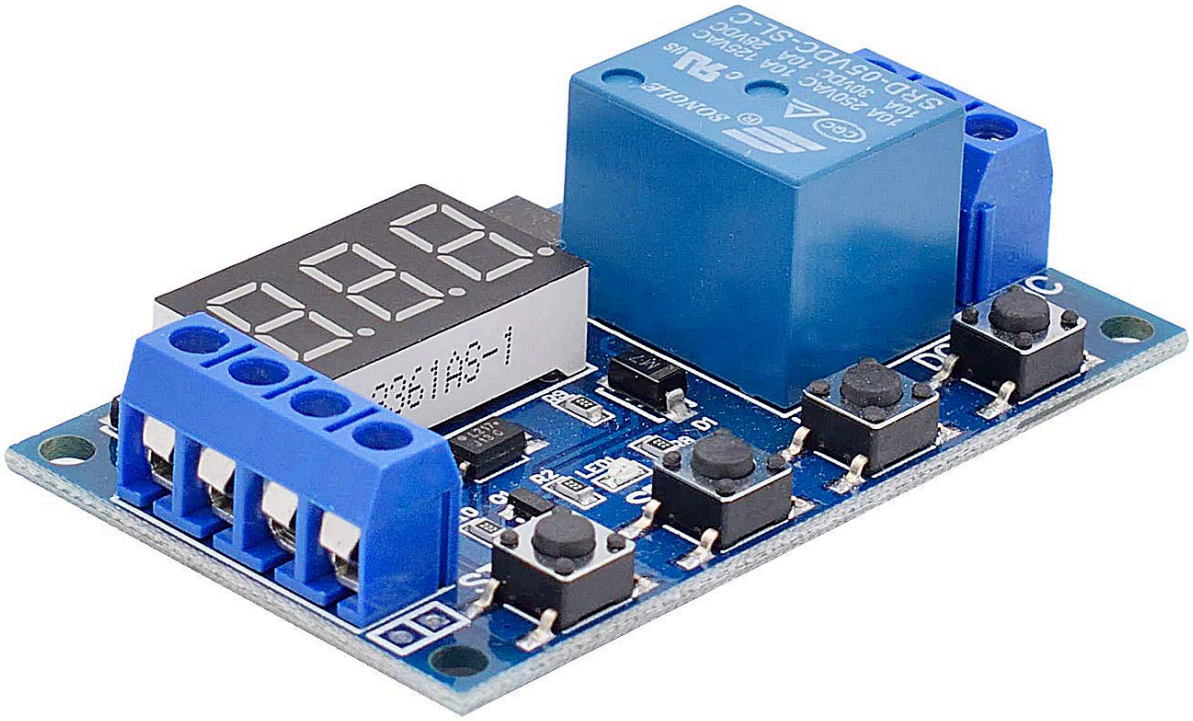


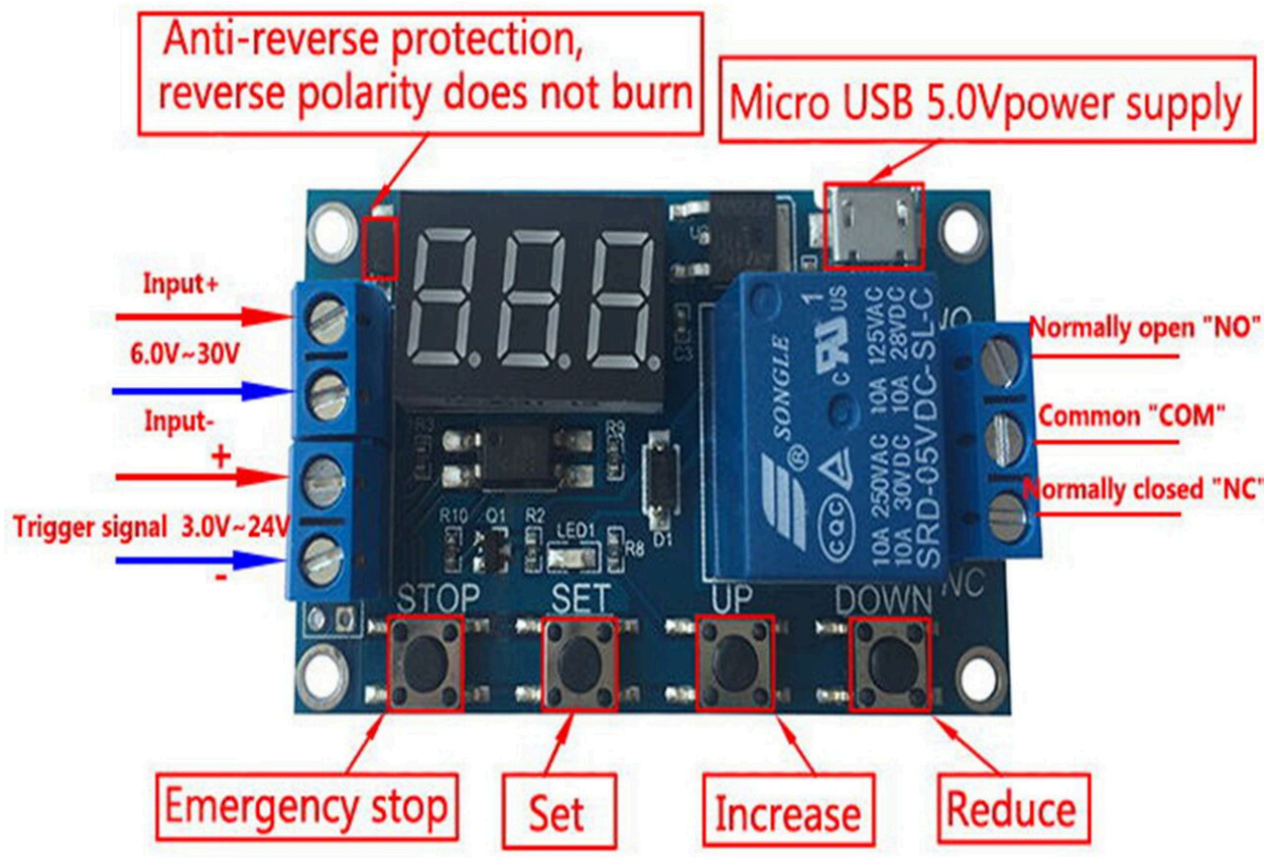
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Technical Specifications

Parameter	Value / Details
Operating Voltage	6.0V to 30.0V DC (Supports Micro-USB 5.0V power input)
Quiescent Current	20 mA
Operating Current	50 mA
Trigger Source	High-level trigger (3.0V – 24V DC) with Optocoupler Isolation
Output Capacity	DC Load: Up to 30V 5A / AC Load: Up to 220V 5A
Timing Range	0.1 seconds to 999 minutes (Continuously adjustable)
Operating Temperature	-40°C to +85°C
Dimensions	6.3 cm × 3.8 cm × 1.7 cm
Special Protection	Parameter memory retention upon power failure

Wiring & Terminal Interface:



Onboard Control Keys

- **STOP:** Toggles relay output ON/OFF, selects timing decimal positions, and toggles Sleep Mode.
- **SET:** Short-press to cycle through parameters (OP, CL, LOP); Hold for 2 seconds to enter/exit menu.
- **UP:** Increases numerical parameter values.
- **DOWN:** Decreases numerical parameter values.

Parameter Definitions & Timing Ranges

- **Key Parameters**
  - **OP (On-Time):** Duration the relay remains energized (Closed state).
  - **CL (Off-Time):** Duration the relay remains de-energized (Open state).
  - **LOP (Loop / Cycle Count):** Number of repetitions (001 to 999). Setting to --- configures an infinite loop.
- **Time Multiplier Settings (Decimal Positions)**

Toggle the decimal point position by short-pressing the STOP button while editing OP or CL:

Display	Decimal Position	Time Unit Range	Example Setting
180.	Rightmost (Ones place)	1 to 999 seconds	180 seconds
03.2	Middle (Tenths place)	0.1 to 99.9 seconds	3.2 seconds
0.0.3.	All three points illuminated	1 to 999 minutes	3 minutes

Operating Modes Summary

- **P1.1:** Trigger received → Relay turns ON for **OP** time, then turns OFF. Subsequent triggers during the countdown are ignored.
- **P1.2:** Trigger received → Relay turns ON for **OP** time, then turns OFF. Subsequent triggers during the countdown reset the timer.
- **P1.3:** Trigger received → Relay turns ON for **OP** time, then turns OFF. Subsequent triggers instantly stop the countdown and turn the relay OFF.
- **P-2:** Trigger received → Relay delays OFF for **CL** time, turns ON for **OP** time, then turns OFF.
- **P3.1:** Trigger received → Relay turns ON for **OP** time, OFF for **CL** time, and repeats for **LOP** cycles.
- **P3.2 (Auto Loop):** Power connected → Relay immediately turns ON for **OP** time, OFF for **CL** time, and repeats **LOP** cycles continuously without requiring a trigger signal.
- **P-4 (Signal Hold):** Trigger held HIGH → Relay remains ON and the timer pauses. Once the trigger signal is removed, countdown for **OP** time begins, after which the relay turns OFF.

Step-by-Step Setup & Programming Guide

Example Requirement

Turn ON the relay for 3 minutes when a signal is received, stay OFF until the next signal is received, and keep the availability loop infinite.

Configuration Procedure

1. **Enter Menu:** Press and hold **SET** for 2 seconds until the current mode flashes on the screen.
2. **Select Mode:** Use **UP** / **DOWN** to select mode **P1.1**.
3. **Edit OP Parameter:** Short-press **SET**. The display shows OP.
4. **Set Time Unit (Minutes):** Press **STOP** repeatedly until **all three decimal points illuminate** (0.0.0.).
5. **Set Duration:** Press **UP** / **DOWN** until the screen reads **0.0.3.** (3 minutes).
6. **Save Settings:** Press and hold **SET** for 2 seconds. The screen flashes and returns to standby (000).

Note: Mode P1.1 naturally acts as an infinite standby loop—it energizes for 3 minutes on every incoming signal and endlessly waits for subsequent triggers.

Troubleshooting & Emergency Stop Lockout

Issue: Display shows 0.0.0 when triggered, and relay stays OFF

- **Cause:** The module's emergency output safety switch is locked in the **OFF** state.
- **Resolution:**
  - **Ensure the board is on the main standby screen (000).**
  - **Short-press the STOP button once.**
  - **The display will briefly flash ON (enabling relay output switches).**
  - **Apply the trigger signal again; the relay will click ON and begin counting down from 3 minutes.**

Power-Saving Display Sleep Mode

Press and hold **STOP** for 2–3 seconds on the standby screen to toggle display power saving:

- **C-P (Sleep Mode):** Display turns off automatically after 5 minutes of inactivity; timer functions normally in the background. Press any key to wake up the screen.
- **O-d (Normal Mode):** Display remains lit continuously.

Applications

- **Industrial & Machinery Control:** Delayed start/stop sequences for conveyor belts, pumps, and exhaust fans.
- **Home Automation & Access Control:** Automated pulse timing for magnetic door locks, gates, and lighting systems.
- **Agricultural Automation:** Cyclic interval timing for irrigation solenoids and greenhouse misting systems.
- **Test Bench & R&D:** Endurance cycling and automated power-up testing of electronic prototypes..

Important Notes

1. ***Trigger Signal Isolation: The high-level trigger input is optocoupler-isolated. Ensure the trigger voltage stays within 3.0V to 24V DC.***
2. ***Contact Ratings: Do not exceed the maximum output contact capacity (5A at 30V DC or 220V AC). For heavy inductive loads (large motors, high-wattage heaters), connect an external contactor.***
3. ***Polarity Protection: Input power features reverse polarity protection. However, verify all wiring prior to applying power to avoid external circuit faults***

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